Frontage Road Traffic Impact Study

Sycamore Township, Ohio

August 30, 2012

Brandstetter Carroll Inc.

We Enhance Community and Quality of Life

Acknowledgements

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Sycamore Township, Ohio

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Frontage Road Traffic Impact Study Update
Sycamore Township, Ohio

Executive Summary

Traffic volumes in the Kenwood Towne Center area of Sycamore Township have shown consistent growth over the past 20 years. Major capital improvements have been made to increase capacity, yet volumes continue to grow and the popularity of the retail and business areas show no sign of abating. Therefore, alternative solutions must be reviewed IF Sycamore Township is to retain its status as a retail and corporate leader in the region.

There is no single solution to continue to provide acceptable traffic flow within this region. Rather, many different solutions will need to be implemented so that the incremental effect of each solution builds upon and compliments each subsequent one. Within the past 18 months, ODOT implemented a strategy of improved timing within the Montgomery Road corridor to decrease travel times from west of Kenwood Road to Galbreath Road AT. Time savings were achieved through this effort with minimal capital costs.

These low cost opportunities for increasing capacity and reducing delay will be reduced over time. It is for that reason the Frontage Road project will assist the area. This would be considered a major capital improvement project, but the following study shows that the new roadway will reduce delays by up to 20% at deficient approaches at the Montgomery Road intersections of Kenwood Road and St. Vincent Drive (Frontage Road).

The new roadway will provide an alternative connection between Kenwood Road and Montgomery Road. The location of the roadway will also provide an opportunity to implement Access Management principles along the north side of Montgomery Road. The reduction of access points on the north side of the roadway will allow for increased turn lane lengths for the west bound traffic on Montgomery Road without limiting access to existing properties on the south side of the street.

In summary, the proposed Frontage Road will provide the traveling public with additional choices to travel within a densely populated and popular destination environment. Ancillary benefits will also be realized and should be kept in consideration, but these considerations should not drive the decision making process for the construction of this project.

The recommendations section of this report provides the following three revisions, which should take place to improve overall traffic in the area of study.

1. Construct a new roadway from Montgomery road to Styrax Lane
2. Modify the existing signal at Montgomery road and St. Vincent to accommodate the proposed roadway.
3. Extend the existing eastbound left turn lane at Kenwood Road 100 feet to provide additional storage capacity.

Table of Contents

List of Tables

List of Exhibits

Section I
Existing Conditions

I. Existing Conditions

A. Existing Marketplace

Over the course of the past 20 years significant growth has occurred in Sycamore Township, Ohio and this submarket of Greater Cincinnati has emerged as a retail and business leader in the region. Recent market studies have shown that Sycamore Township office buildings are able to capture the highest rent per square foot than other regional submarkets and the retail strength continues with growth at Kenwood Towne Center. Most of this economic activity is focused around the I-71/Montgomery Road interchange and the I-71/Kenwood Road interchange. Numerous capital improvement projects have taken place along the corridors of both Montgomery Road and Kenwood Road in an effort to increase capacity as a result of consistent long term growth in this area. Although these improvements have provided reduced delays, there are still localized areas of concern which could be improved.

B. Existing Roadway and Traffic Conditions

One of these areas that can be improved is along the Montgomery Road corridor starting just west of Kenwood Road and extending through the interchange at I-71. The scope of this study examines the existing and future traffic signal conditions at the following intersections:

- Kenwood Road and Orchard Lane
- Montgomery Road and Kenwood Road
- Montgomery Road and St. Vincent

The intersection at Orchard Lane provides a key route for residential traffic to the north and the west while also providing access to Nordstrom to the east. The proximity of this signal to Montgomery Road has been a cause of concern for many years and pre-dates the recent addition of the Nordstrom access. Southbound traffic on Kenwood Road has historically been queued to a point where it affects the opportunity for any movements to take place, causing yet further delays.

The intersection at Kenwood Road with Montgomery Road is currently experiencing delays in the PM hour in excess of 56 seconds (for a resulting LOS E). And the 20 year projection shows similar results. This long term projection is based upon regional growth rates and does not include the impact of additional volume due to another major development in the area which is likely to take place over the course of the next 20 years.

The intersection of Montgomery Road and St. Vincent is currently providing a LOS of B in the PM peak as it handles mainly those vehicles who exit the office park. A LOS B is good and it far outperforms the intersection of Montgomery Road and Kenwood Road.

In February 2011 TEC Engineering completed a study for ODOT which provided improved timing of the existing signals on Montgomery Road (US-22) from Kenwood Road to Galbraith Road. The purpose of this study was to increase efficiency through the corridor via improved timing at the AM, Noon, and PM peak times. The optimization of the signals did create a net decrease in delay within the overall corridor. However, the reduction in delay specifically at Montgomery Road and Kenwood Road was only 3% (approximately 1 sec).

C. Purpose of Study

The purpose of this study is to analyze the effect that a proposed access road would have on the surrounding traffic and intersections discussed above. These intersections will be directly affected by the addition of a Frontage Road located between Orchard Lane and Montgomery Road, west of Kenwood Road. The purpose of the Frontage Road is to relieve congestion from the adjacent intersections and improve traffic flow within the area. All of the above intersections will remain signalized in any proposed condition.

D. Existing Traffic Data

BCI coordinated with the Ohio Department of Transportation (ODOT) to obtain certified traffic counts from the District Office. The traffic plates utilized in this study are dated February 29, 2012 and includes a "No-Build" and "Build" Condition for the AM and PM peak hours. The Noon peak was not analyzed in this study. The "Build" Condition took into account the traffic diversion of vehicles after the construction of the new Frontage Road.

Existing signal timing data was obtained from both the Hamilton County Engineers Office (HCEO) and ODOT for the signals within the study area. The existing timing was then utilized for the traffic models created. In addition, the above referenced TEC Engineering study was reviewed to compare the results with their recently completed study.

The peak hours for each intersection are listed below:

Kenwood Road and Montgomery Road	7:30 AM to 8:30 AM
	4:45 PM to 5:45 PM
Montgomery Road and St. Vincent	7:45 AM to 8:45 AM
	5:00 PM to 6:00 PM
Styrax Lane and Orchard Lane	7:45 AM to 8:45 AM
	5:00 PM to 6:00 PM
Kenwood Road and Orchard Lane	11:00 AM to 12:00 AM
	5:00 PM to 6:00 PM

Section II
Proposed Impact of Frontage Road

II. Proposed Impact of Frontage Road

For the purpose of this study, the "No-Build" and "Build" scenarios are defined as follows:

No-Build: The scenario includes the Level of Service and delay summary for the existing intersections based upon no improvements to any of the intersections.

Build: This scenario includes the addition of Frontage Road to the roadway network and analyzes the Level of Service and associated delay of this new road.

A. Capacity Analysis

Level of Service (LOS) is a measure of intersection delay as defined in the Highway Capacity Manual (HCM). It is utilized as a means of quantifying the amount of lost travel time that a driver will experience at a given intersection. The delay (seconds) is then provided a corresponding letter grade based on the range in the chart below. The higher the letter grade corresponds to less delay that a driver will experience at a given intersection.

Table 1: LOS Delay summary

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

Synchro software(Version 7) was utilized to determine the amount of delay that will be present at each intersection within the study area. The cycle length at each intersection was optimized to determine an efficient means of distributing delay. Since the signals along Montgomery Road are located within a coordinated signal system, the cycle length was fixed to match the existing condition. This study only revised the distribution of the splits within the predetermined cycle length established in the TEC Study.

B. Traffic Impact Study Scenarios

The following is a summary of the scenarios that were analyzed for the proposed new roadway. The scenarios represent a development alternative, or existing condition, in order to determine the effect that the scenario will have on the surrounding infrastructure.

The scenarios are as follows:

2012 No-Build

2012 Build

2032 No-Build

2032 Build

Each of these scenarios was analyzed in the AM and PM peak to determine the effect that the scenario will have on the study intersections.

1. No-Build Scenario

   This scenario provides a baseline for understanding the existing conditions at the study intersections. The intersection timing was based upon the most current (June 2012) timing of the intersections based upon information provided from ODOT, HCEO, and the TEC January, 2011 Study. The 2032 timing was modeled based upon the 2012 existing conditions.

2. Build Scenario

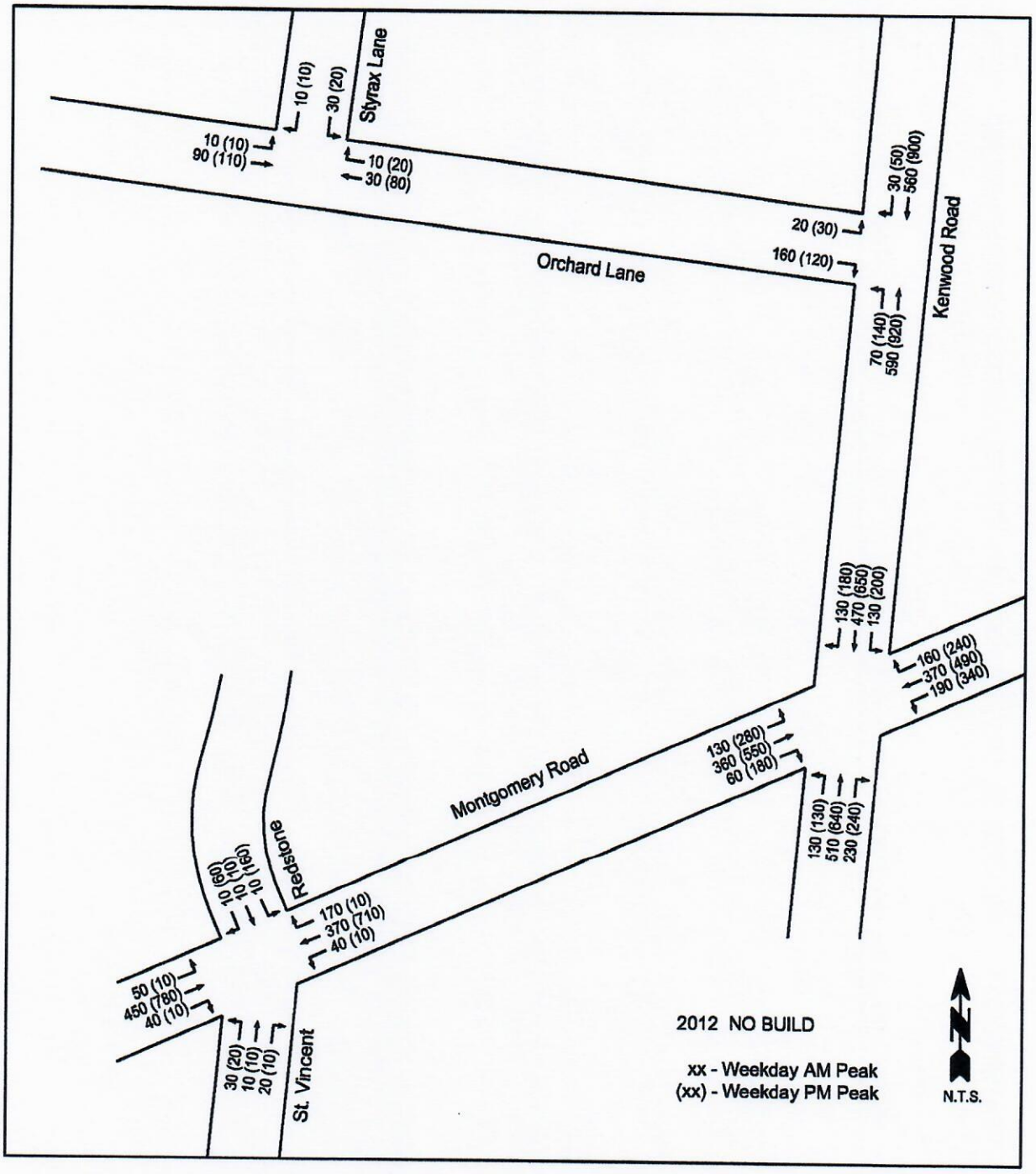
   This scenario shows the effect that the proposed improvements will have on the study area. Vehicle trips were allocated by ODOT Central Office in their preparation of Certified Traffic.

The revised trip distribution and Level of Service analysis shows that delay will be reduced in the aggregate when the overall network is reviewed. Some approaches do show increased delay, but the overall benefit to the network far exceeds the limited delay of particular approaches.

C. Traffic Volume Exhibits

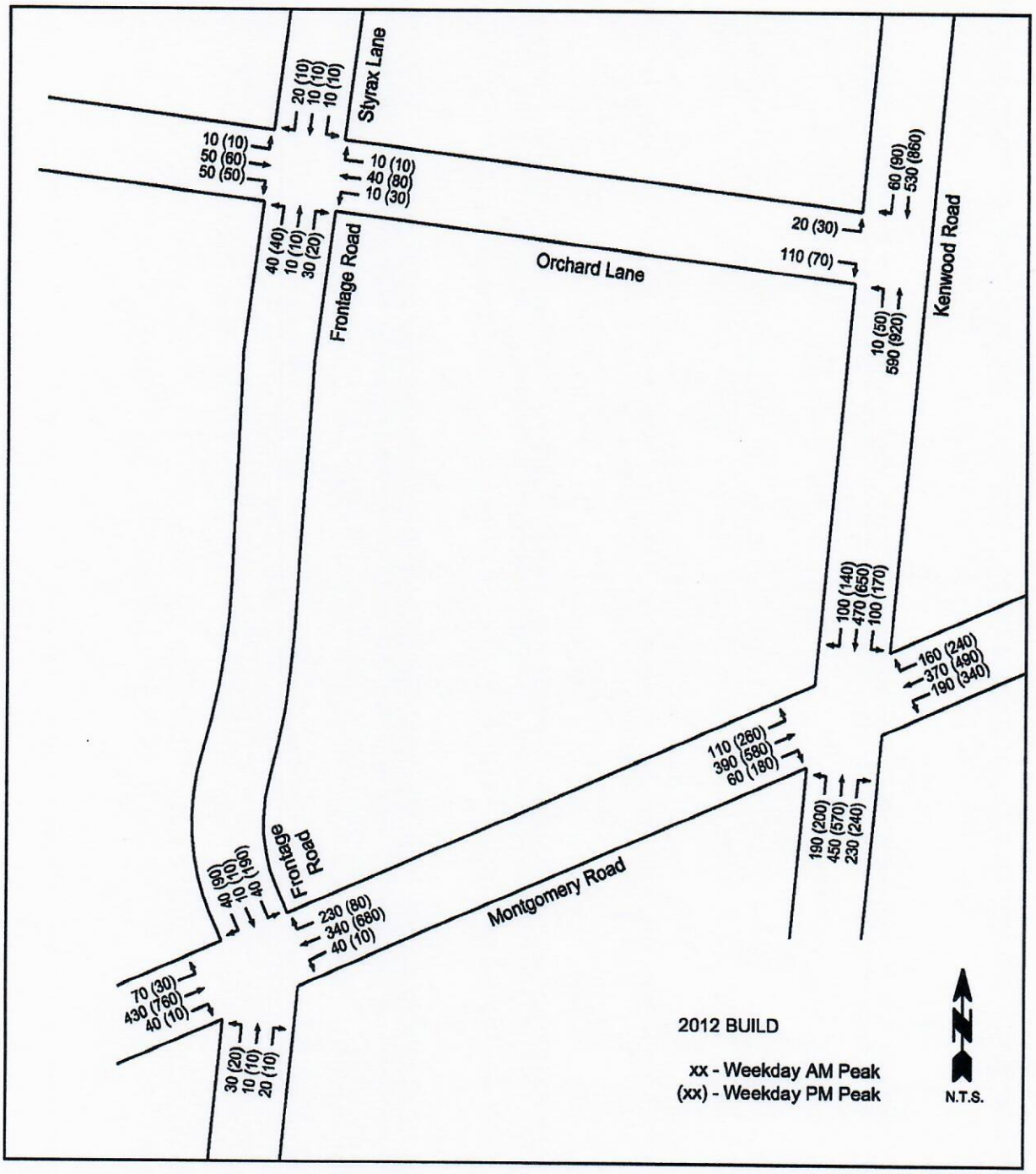
The following exhibits represent the traffic volume scenarios that are discussed in previous section of this report. They show the volumes for the 2012 and 2032 No-Build and Build scenarios.

Exhibit 1: 2012 No-Build



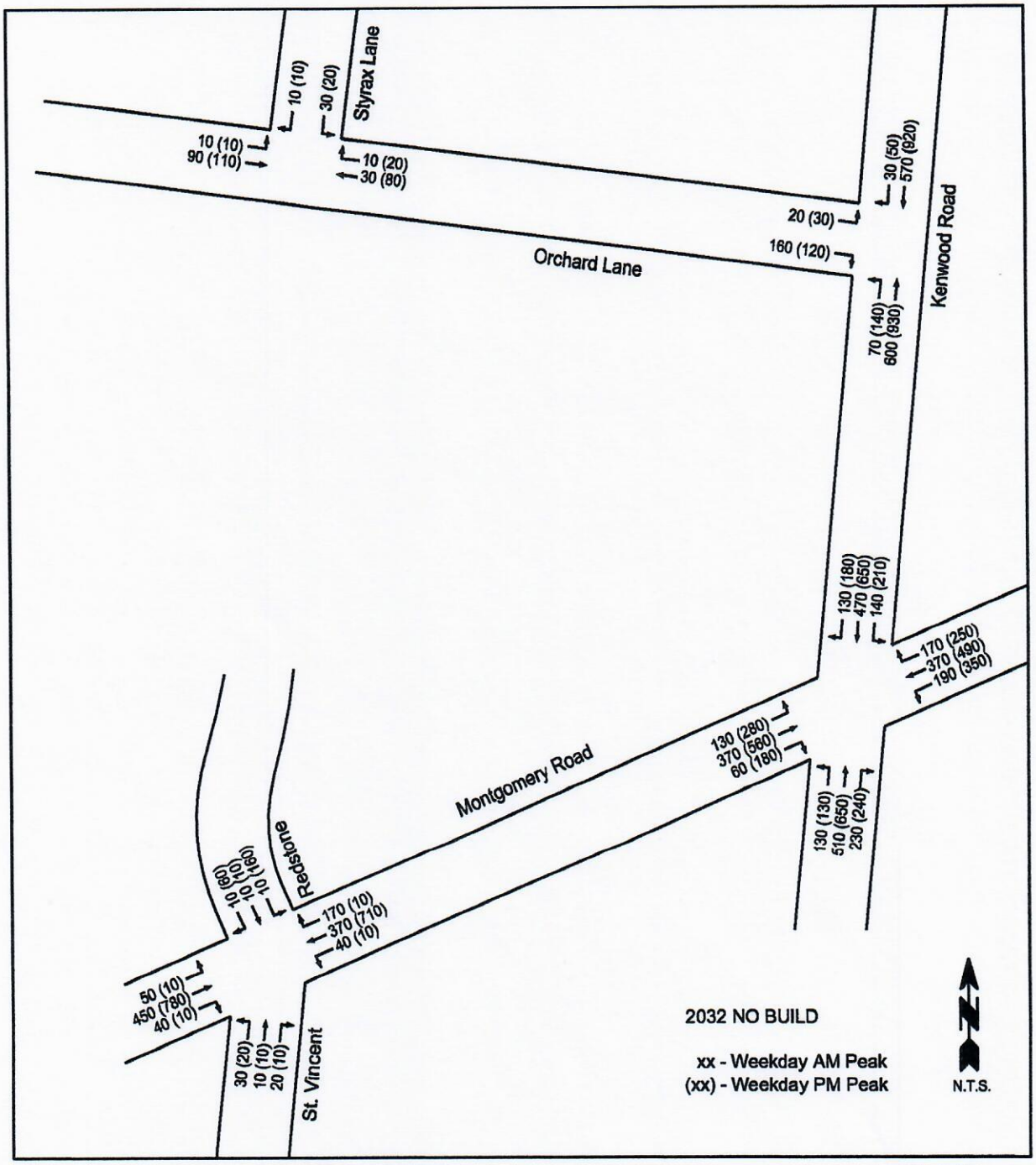
June 25, 2012

Exhibit 2: 2012 Build



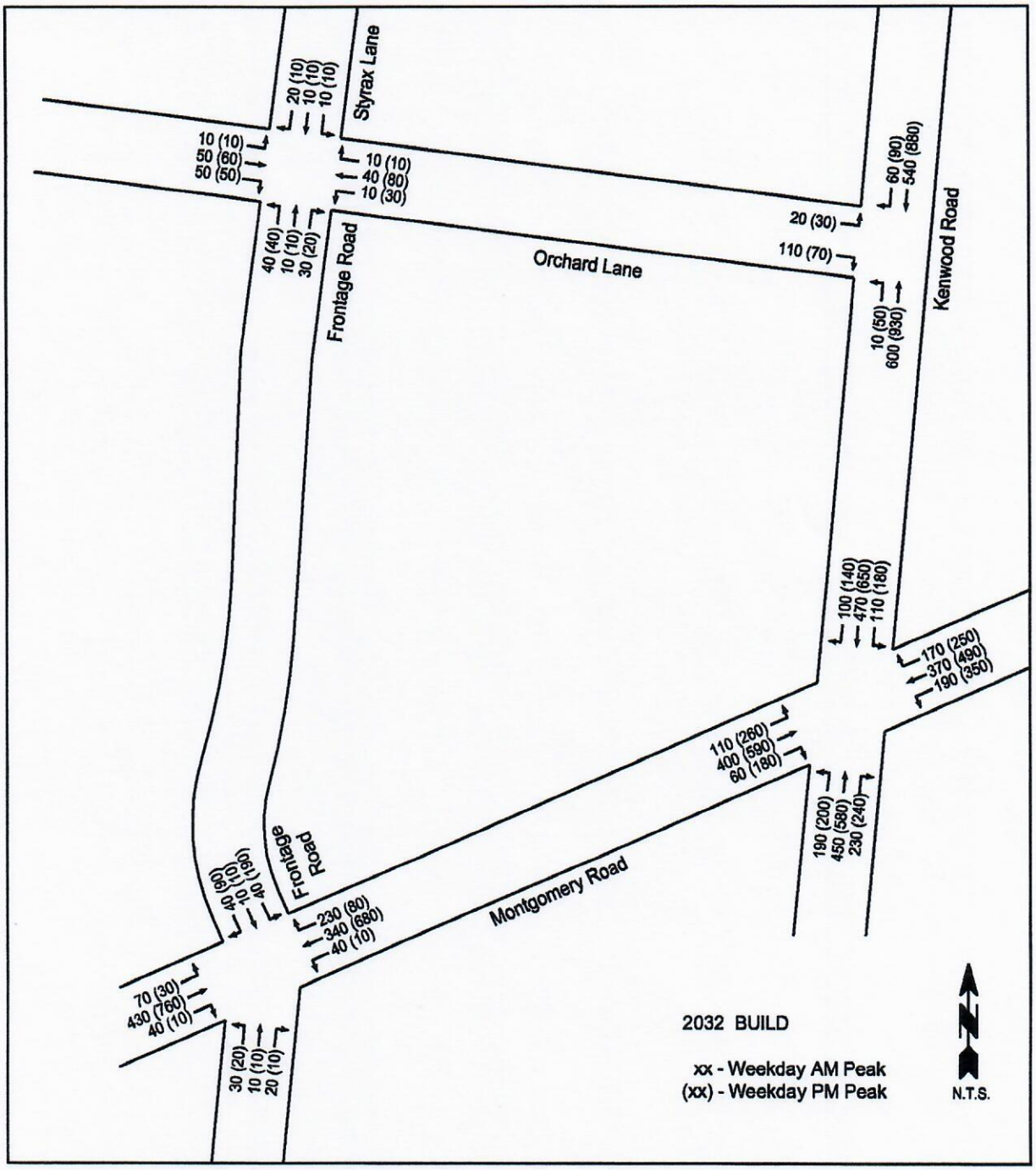
June 25, 2012

Exhibit 3: 2032 No-Build



June 25, 2012

Exhibit 4: 2032 Build



June 25, 2012

Section III
Scenario Volume Summaries

III. Scenario Volume Summaries

The LOS shown below are associated with the scenarios previously discussed in this report.

		2012 No-Build LOS				2012 Build LOS				2032 No-Build LOS				2032 Build LOS			
		AM Delay (sec.)	AM LOS	PM Delay (sec.)	PM LOS	AM Delay (sec.)	AM LOS	PM Delay (sec.)	PM LOS	AM Delay (sec.)	AM LOS	PM Delay (sec.)	PM LOS	AM Delay (sec.)	AM LOS	PM Delay (sec.)	PM LOS
Montgomery Road and Kenwood Road																	
EB	L	18.9	B	29.3	C	16.7	B	26.6	C	19.1	B	27.3	C	16.9	B	26.6	C
	T	29.0	C	46.0	D	29.7	C	48.8	D	29.3	C	46.8	D	30.2	C	49.9	D
	Approach	26.6	C	41.4	D	27.2	C	43.2	D	27.0	C	41.7	D	27.6	C	44.0	D
WB	L	17.8	B	108.9	F	18.8	B	96.9	F	18.5	B	119.7	F	19.1	B	106.1	F
	T	16.4	B	38.8	D	26.6	C	37.6	D	16.7	B	38.3	D	26.9	C	37.6	D
	R	19.3	B	12.9	B	13.9	B	13.2	B	19.0	B	12.9	B	13.6	B	13.1	B
	Approach	17.4	B	55.3	E	21.7	C	51.0	D	17.7	B	58.6	E	21.8	C	54.0	D
NB	L	26.9	C	37.0	D	50.3	D	80.2	F	26.5	C	37.0	D	49.0	D	80.7	F
	TR	44.4	D	57.3	E	43.8	D	49.2	D	44.7	D	57.3	E	43.9	D	49.6	D
	Approach	41.8	D	54.7	D	45.2	D	55.4	E	42.0	D	54.7	D	45.0	D	55.8	E
SB	L	28.1	C	54.4	D	27.1	C	40.4	D	29.0	C	65.4	E	29.1	C	45.2	D
	TR	39.2	D	76.8	E	42.0	D	65.2	E	39.0	D	77.3	E	42.9	D	72.8	E
	Approach	37.3	D	72.4	E	39.8	D	60.8	E	37.1	D	74.9	E	40.6	D	67.7	E
Overall Intersection		31.6	C	56.0	E	34.2	C	52.4	D	31.7	C	57.7	E	34.4	C	55.1	E
Montgomery Road and Frontage Road																	
EB	L	4.1	A	5.5	A	4.2	A	5.5	A	4.1	A	5.5	A	4.2	A	5.5	A
	T	7.4	A	8.1	A	7.7	A	8.0	A	7.4	A	8.1	A	7.7	A	8.0	A
	Approach	7.1	A	8.0	A	7.3	A	7.9	A	7.1	A	8.0	A	7.3	A	7.9	A
WB	T	4.2	A	5.6	A	4.2	A	5.6	A	4.2	A	5.6	A	4.2	A	5.6	A
	R	6.7	A	8.7	A	6.0	A	10.2	B	6.7	A	8.7	A	6.0	A	10.2	B
	Approach	6.5	A	8.7	A	5.8	A	10.2	B	6.5	A	8.7	A	5.8	A	10.2	B
NB	L	42.6	D	38.9	D	43.1	D	38.9	D	42.6	D	38.9	D	43.1	D	38.9	D
	T	25.1	C	36.5	D	30.0	C	36.5	D	25.1	C	36.5	D	30.0	C	36.5	D
	Approach	33.9	C	37.7	D	36.5	D	37.7	D	33.9	C	37.7	D	36.5	D	37.7	D
SB	L	39.9	D	58.5	E	45.0	D	70.5	E	39.9	D	58.5	E	45.0	D	70.5	E
	T	36.6	D	18.0	B	25.0	C	16.1	B	36.6	D	18.0	B	25.0	C	16.1	B
	Approach	37.7	D	46.2	D	33.9	C	51.8	D	37.7	D	46.2	D	33.9	C	51.8	D
Overall Intersection		8.8	A	13.9	B	9.7	A	16.3	B	8.8	A	13.9	B	9.7	A	16.3	B
Kenwood Road and Orchard Lane																	
EB	L	10.5	B	31.9	C	23.0	C	28.5	C	10.5	B	34.3	C	23.0	C	28.5	C
	Approach	10.5	B	31.9	C	23.0	C	28.5	C	10.5	B	34.3	C	23.0	C	28.5	C
NB	L	N/A		N/A		0.8	A	2.0	A	12.4	B	3.5	A	0.8	A	2.1	A
	T	13.0	B	2.4	A	1.0	A	1.9	A	12.7	B	2.0	A	1.0	A	2.0	A
	Approach	13.0	B	2.4	A	1.0	A	1.9	A	12.6	B	2.2	A	1.0	A	2.0	A
SB	T	6.2	A	3.5	A	2.0	A	2.7	A	6.2	A	3.5	A	2.0	A	2.7	A
	Approach	6.2	A	3.5	A	2.0	A	2.7	A	6.2	A	3.5	A	2.0	A	2.7	A
Overall Intersection		10.0	B	5.5	A	3.8	A	3.8	A	9.8	A	5.2	A	3.8	A	3.8	A

Section IV
Recommendations and Conclusions

IV. Recommendations and Conclusions

The following items below are improvements which would help facilitate improved traffic flow through the study area.

1. Construct a new roadway from Montgomery Road to Styrax Lane. A proposed alignment of this new roadway is shown in this report. This roadway will provide drivers with additional options and reduce overall delay at the existing intersections. The final alignment of the roadway still requires additional analysis in order to minimize construction costs and reduce the impact that the road will have on surrounding properties.

2. Modify the existing traffic signal at Montgomery Road and St. Vincent (Frontage Road on the north leg) to accommodate the proposed roadway.

3. The existing businesses located on the north side of Montgomery Road will most likely need to be relocated in order to construct the proposed Frontage Road. All of these properties currently have access points on Montgomery Road. Once these businesses are relocated, then the access points can be removed from Montgomery Road. This will allow the extension of the westbound left turn lane to Kenwood Road northbound to be extended by approximately 100 feet. There is currently a dual left turn lane which can be restriped to accommodate the turn lane extension. The design length for this turn lane will not be met. However, the additional 100 feet of storage will help facilitate left turns movements at the intersection.

V. Synchro Analysis

A. 2012 AM No-Build

Lanes, Volumes, Timings
11: Montgomery Road & Frontage Road 8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	450	40	40	370	170	30	10	20	10	10	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	233		0	302		0	83		0	125		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.988			0.953			0.898			0.925	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3497	0	1770	3373	0	1770	1673	0	1770	1723	0
Flt Permitted	0.425			0.407			0.522			0.737		
Satd. Flow (perm)	792	3497	0	758	3373	0	972	1673	0	1373	1723	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			66			21			11	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		593			821			804			165	
Travel Time (s)		10.1			14.0			18.3			3.8	
Peak Hour Factor	0.83	0.83	0.83	0.97	0.97	0.97	0.97	0.97	0.97	0.90	0.90	0.90
Adj. Flow (vph)	60	542	48	41	381	175	31	10	21	11	11	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	590	0	41	556	0	31	31	0	11	22	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	50	50		50	50		50	50		50	50	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	18.0		5.0	18.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	13.0	39.3		13.0	28.0		13.0	22.0		13.0	40.8	
Total Split (s)	16.0	43.0	0.0	16.0	43.0	0.0	16.0	39.0	0.0	22.0	45.0	0.0
Total Split (%)	13.3%	35.8%	0.0%	13.3%	35.8%	0.0%	13.3%	32.5%	0.0%	18.3%	37.5%	0.0%

8/22/2012 2012 No-Build AM Peak Synchro 7 - Light: Report Page 1

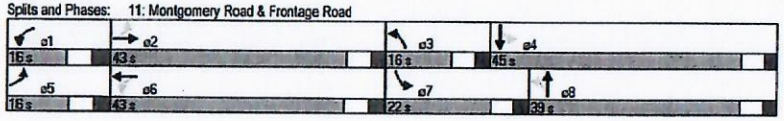
Lanes, Volumes, Timings
11: Montgomery Road & Frontage Road 8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	9.7	36.7		9.3	36.3		10.1	33.1		16.2	39.2	
Yellow Time (s)	3.9	3.9		3.9	3.9		3.6	3.6		3.6	3.6	
All-Red Time (s)	2.4	2.4		2.8	2.8		2.3	2.3		2.2	2.2	
Lost Time Adjust (s)	-2.3	-2.3	0.0	-2.7	-2.7	-1.8	-1.9	-1.9	0.0	-1.8	-1.8	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	2.2	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		6.0									6.0	
Flash Dont Walk (s)		22.0									25.0	
Pedestrian Calls (#/hr)		0									0	
Act Effct Green (s)	96.4	90.0		95.5	90.0		16.7	14.3		13.4	8.4	
Actuated g/C Ratio	0.80	0.75		0.80	0.75		0.14	0.12		0.11	0.07	
v/c Ratio	0.08	0.22		0.06	0.22		0.16	0.14		0.06	0.17	
Control Delay	4.1	7.4		4.2	6.7		42.6	25.1		39.9	36.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	4.1	7.4		4.2	6.7		42.6	25.1		39.9	36.6	
LOS	A	A		A	A		D	C		D	D	
Approach Delay		7.1			6.5			33.9			37.7	
Approach LOS		A			A			C			D	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 64.7 (54%), Referenced to phase 2:EBTL and 6:WBTL, Start of FDW or yellow
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.22
Intersection Signal Delay: 8.8 Intersection LOS: A
Intersection Capacity Utilization 38.2% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 11: Montgomery Road & Frontage Road



8/22/2012 2012 No-Build AM Peak Synchro 7 - Light: Report Page 2

Section V
Synchro Analysis

Lanes, Volumes, Timings
9: Montgomery Road & Nordstrom Drive

8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	59	617	9	33	596	39	1	1	8	6	1	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	147		0	145		0	193		0	68		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998			0.991			0.870			0.855	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	5075	0	1770	5040	0	1770	1621	0	1770	1593	0
Flt Permitted	0.368			0.393			0.720			0.748		
Satd. Flow (perm)	685	5075	0	732	5040	0	1341	1621	0	1393	1593	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			9			13			55	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		624			660			742			341	
Travel Time (s)		10.6			11.3			16.9			7.8	
Peak Hour Factor	0.96	0.96	0.96	0.91	0.91	0.91	0.63	0.63	0.63	0.51	0.51	0.51
Adj. Flow (vph)	61	643	9	36	655	43	2	2	13	12	2	55
Shared Lane Traffic (%)												
Lane Group Flow (vph)	61	652	0	36	698	0	2	15	0	12	57	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	50	50		50	50		50	50		50	50	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	20.0		5.0	20.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	10.9	33.5		13.0	26.0		40.1	40.1		28.0	28.0	
Total Split (s)	21.9	44.9	0.0	24.0	47.0	0.0	51.1	51.1	0.0	51.1	51.1	0.0
Total Split (%)	18.3%	37.4%	0.0%	20.0%	39.2%	0.0%	42.6%	42.6%	0.0%	42.6%	42.6%	0.0%

Lanes, Volumes, Timings
9: Montgomery Road & Nordstrom Drive

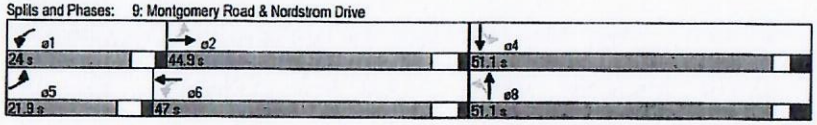
8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	16.4	39.4		18.5	41.5		45.0	45.0		45.1	45.1	
Yellow Time (s)	3.9	3.9		3.9	3.9		2.8	2.8		2.8	2.8	
All-Red Time (s)	1.6	1.6		1.6	1.6		3.3	3.3		3.2	3.2	
Lost Time Adjust (s)	-1.5	-1.5	0.0	-1.5	-1.5	0.0	-2.1	-2.1	0.0	-2.0	-2.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		6.0					6.0	6.0				
Flash Dont Walk (s)		17.0					22.0	22.0				
Pedestrian Calls (#/hr)		0					0	0				
Act Effct Green (s)	103.2	99.2		102.0	96.8		8.9	8.9		8.9	8.9	
Actuated g/C Ratio	0.86	0.83		0.85	0.81		0.07	0.07		0.07	0.07	
v/c Ratio	0.09	0.16		0.05	0.17		0.02	0.11		0.12	0.34	
Control Delay	2.0	3.3		1.5	4.0		50.0	27.2		53.3	19.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	2.0	3.3		1.5	4.0		50.0	27.2		53.3	19.8	
LOS	A	A		A	A		D	C		D	B	
Approach Delay		3.2			3.9			29.9			25.7	
Approach LOS		A			A			C			C	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 115.5 (96%), Referenced to phase 2:EBTL and 6:WBTL, Start of FDW or yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.34
Intersection Signal Delay: 4.9 — Intersection LOS: A
Intersection Capacity Utilization 35.8% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 9: Montgomery Road & Nordstrom Drive



Lanes, Volumes, Timings
10: E. Galbraith Road & Montgomery Road

8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	37	97	119	240	198	57	103	269	96	53	451	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	185		0	125		0	125		0	40		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.917			0.966			0.961			0.981	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1708	0	1770	1799	0	1770	3401	0	1770	3472	0
Flt Permitted	0.516			0.255			0.317			0.504		
Satd. Flow (perm)	961	1708	0	475	1799	0	590	3401	0	939	3472	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		54			14			43			14	
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		1732			476			1053			881	
Travel Time (s)		39.4			10.8			17.9			15.0	
Peak Hour Factor	0.81	0.81	0.81	0.92	0.92	0.92	0.94	0.94	0.94	0.86	0.86	0.86
Adj. Flow (vph)	46	120	147	261	215	62	110	286	102	62	524	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	267	0	261	277	0	110	388	0	62	600	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	50	50		50	50		50	50		50	50	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	20.0		5.0	20.0	
Minimum Split (s)	13.0	40.8		13.0	22.0		13.0	39.8		10.9	26.0	
Total Split (s)	15.0	42.8	0.0	22.0	49.8	0.0	15.0	40.2	0.0	15.0	40.2	0.0
Total Split (%)	12.5%	35.7%	0.0%	18.3%	41.5%	0.0%	12.5%	33.5%	0.0%	12.5%	33.5%	0.0%

Lanes, Volumes, Timings
10: E. Galbraith Road & Montgomery Road

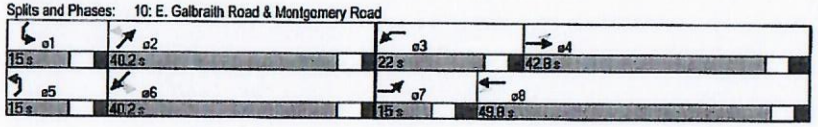
8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Maximum Green (s)	8.2	36.0		16.1	43.9		9.2	34.4		9.2	34.4	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.9	3.9		3.9	3.9	
All-Red Time (s)	3.2	3.2		2.3	2.3		1.9	1.9		1.9	1.9	
Lost Time Adjust (s)	-2.8	-2.8	0.0	-1.9	-1.9	0.0	-1.8	-1.8	0.0	-1.8	-1.8	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)		6.0						6.0				
Flash Dont Walk (s)		28.0						24.0				
Pedestrian Calls (#/hr)		0						0				
Act Effct Green (s)	33.6	23.6		45.1	33.6		65.2	55.8		61.2	51.8	
Actuated g/C Ratio	0.28	0.20		0.38	0.28		0.54	0.46		0.51	0.43	
v/c Ratio	0.14	0.70		0.71	0.54		0.26	0.24		0.11	0.40	
Control Delay	22.9	45.0		37.5	38.8		16.2	16.7		15.0	25.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.9	45.0		37.5	38.8		16.2	16.7		15.0	25.5	
LOS	C	D		D	D		B	B		B	C	
Approach Delay		41.7			38.1			16.6			24.5	
Approach LOS		D			D			B			C	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 17.2 (14%), Referenced to phase 2:NETL and 6:SWTL, Start of FDW or yellow
Natural Cycle: 105
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 28.9 — Intersection LOS: C
Intersection Capacity Utilization 61.4% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 10: E. Galbraith Road & Montgomery Road



Lanes, Volumes, Timings
11: Montgomery Road & Kenwood Road

8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	130	360	60	190	370	160	130	510	230	130	470	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	233		0	302		0	83		0	125		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.979				0.850		0.953			0.968	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3465	0	1770	3539	1583	1770	3373	0	1770	3426	0
Flt Permitted	0.476			0.364			0.221			0.116		
Satd. Flow (perm)	887	3465	0	678	3539	1583	412	3373	0	216	3426	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16				165		61			32	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		593			624			804			331	
Travel Time (s)		10.1			10.6			18.3			7.5	
Peak Hour Factor	0.83	0.83	0.83	0.97	0.97	0.97	0.97	0.97	0.97	0.90	0.90	0.90
Adj. Flow (vph)	157	434	72	196	381	165	134	526	237	144	522	144
Shared Lane Traffic (%)												
Lane Group Flow (vph)	157	506	0	196	381	165	134	763	0	144	666	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1	1	1	1		1	1	
Detector Template												
Leading Detector (ft)	50	50		50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	50	50		50	50	50	50	50		50	50	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Turn Type	pm+pt			pm+pt		Over	pm+pt			pm+pt		
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6	7	3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	18.0		5.0	18.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	13.0	39.3		13.0	28.0	13.0	13.0	22.0		13.0	40.8	
Total Split (s)	16.0	43.0	0.0	16.0	43.0	22.0	16.0	39.0	0.0	22.0	45.0	0.0
Total Split (%)	13.3%	35.8%	0.0%	13.3%	35.8%	18.3%	13.3%	32.5%	0.0%	18.3%	37.5%	0.0%

Lanes, Volumes, Timings
11: Montgomery Road & Kenwood Road

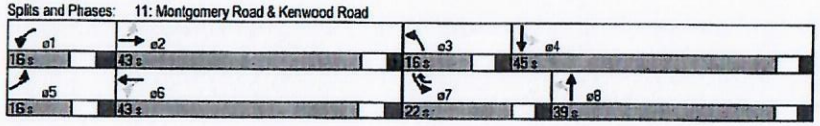
8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	9.7	36.7		9.3	36.3	16.2	10.1	33.1		16.2	39.2	
Yellow Time (s)	3.9	3.9		3.9	3.9	3.6	3.6	3.6		3.6	3.6	
All-Red Time (s)	2.4	2.4		2.8	2.8	2.2	2.3	2.3		2.2	2.2	
Lost Time Adjust (s)	-2.3	-2.3	0.0	-2.7	-2.7	-1.8	-1.9	-1.9	0.0	-1.8	-1.8	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max	None	None	None		None	None	
Walk Time (s)		6.0									6.0	
Flash Dont Walk (s)		22.0									25.0	
Pedestrian Calls (#/hr)		0									0	
Act Effct Green (s)	56.9	44.9		58.9	45.9	13.9	43.8	32.2		48.1	34.5	
Actuated g/C Ratio	0.47	0.37		0.49	0.38	0.12	0.36	0.27		0.40	0.29	
v/c Ratio	0.31	0.39		0.43	0.28	0.50	0.48	0.80		0.54	0.66	
Control Delay	18.9	29.0		17.8	16.4	19.3	26.9	44.4		28.1	37.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	1.6	
Total Delay	18.9	29.0		17.8	16.4	19.3	26.9	44.4		28.1	39.2	
LOS	B	C		B	B	B	C	D		C	D	
Approach Delay		26.6			17.4			41.8			37.3	
Approach LOS		C			B			D			D	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 64.7 (54%), Referenced to phase 2:EBTL and 6:WBTL, Start of FDW or yellow
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.80
Intersection Signal Delay: 31.6 — Intersection LOS: C
Intersection Capacity Utilization 67.5% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 11: Montgomery Road & Kenwood Road



Lanes, Volumes, Timings
15: Orchard Lane & Kenwood Road

8/22/2012

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	27	72	46	644	453	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	30			0
Storage Lanes	0	0	1			0
Taper Length (ft)	25	25	25			25
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt	0.901				0.991	
Flt Protected	0.987		0.950			
Satd. Flow (prot)	1657	0	1770	3539	3507	0
Flt Permitted	0.987		0.454			
Satd. Flow (perm)	1657	0	846	3539	3507	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	84				9	
Link Speed (mph)	30			30	30	
Link Distance (ft)	805			331	556	
Travel Time (s)	18.3			7.5	12.6	
Peak Hour Factor	0.86	0.86	0.92	0.92	0.95	0.95
Adj. Flow (vph)	31	84	50	700	477	32
Shared Lane Traffic (%)						
Lane Group Flow (vph)	115	0	50	700	509	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Number of Detectors	1		1	1	1	
Detector Template						
Leading Detector (ft)	50		50	50	50	
Trailing Detector (ft)	0		0	0	0	
Detector 1 Position(ft)	0		0	0	0	
Detector 1 Size(ft)	50		50	50	50	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	
Turn Type			Perm			
Protected Phases	4			2	6	
Permitted Phases			2			
Detector Phase	4		2	2	6	
Switch Phase						
Minimum Initial (s)	25.0		50.0	50.0	50.0	
Minimum Split (s)	31.0		56.0	56.0	56.0	
Total Split (s)	48.0	0.0	72.0	72.0	72.0	0.0
Total Split (%)	40.0%	0.0%	60.0%	60.0%	60.0%	0.0%

Lanes, Volumes, Timings
15: Orchard Lane & Kenwood Road

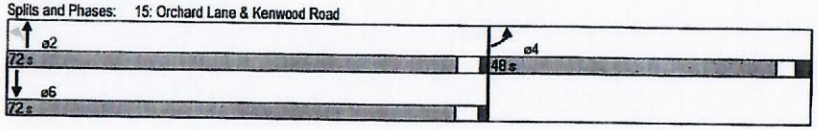
8/22/2012

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Maximum Green (s)	42.7		67.2	67.2	66.9	
Yellow Time (s)	2.8		3.6	3.6	3.6	
All-Red Time (s)	2.5		1.2	1.2	1.5	
Lost Time Adjust (s)	-1.3	0.0	-0.8	-0.8	-1.1	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	None		C-Min	C-Min	C-Min	
Walk Time (s)	6.0				6.0	
Flash Dont Walk (s)	15.0				8.0	
Pedestrian Calls (#/hr)	0				0	
Act Effct Green (s)	26.3		85.7	85.7	85.7	
Actuated g/C Ratio	0.22		0.71	0.71	0.71	
v/c Ratio	0.27		0.08	0.28	0.20	
Control Delay	14.9		11.3	11.9	5.8	
Queue Delay	0.0		0.0	0.7	0.0	
Total Delay	14.9		11.3	12.6	5.9	
LOS	B		B	B	A	
Approach Delay	14.9			12.6	5.9	
Approach LOS	B			B	A	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 26.9 (22%), Referenced to phase 2:NBTL and 6:SBT, Start of FDW or yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.28
Intersection Signal Delay: 10.3 — Intersection LOS: B
Intersection Capacity Utilization 69.2% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 15: Orchard Lane & Kenwood Road



Lanes, Volumes, Timings
17: Montgomery Road & McDonalds Drive

8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	600	90	102	656	62	51	9	126	16	3	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	222		0	86		0	50		0	39		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.980			0.987			0.860			0.900	
Flt Protected	0.950			0.950			0.950			0.950		
Sald. Flow (prot)	1770	4984	0	1770	5019	0	1770	1602	0	1770	1676	0
Flt Permitted	0.341			0.361			0.752			0.305		
Sald. Flow (perm)	635	4984	0	672	5019	0	1401	1602	0	568	1676	0
Right Turn on Red			Yes			Yes			Yes			Yes
Sald. Flow (RTOR)		33			18			159			6	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		660			358			416			204	
Travel Time (s)		11.3			6.1			9.5			4.6	
Peak Hour Factor	0.94	0.94	0.94	0.91	0.91	0.91	0.79	0.79	0.79	0.86	0.86	0.86
Adj. Flow (vph)	11	638	96	112	721	68	65	11	159	19	3	6
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	734	0	112	789	0	65	170	0	19	9	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	50	50		50	50		50	50		50	50	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	26.0	26.0		26.0	26.0		11.1	11.1		38.1	38.1	
Total Split (s)	63.9	63.9	0.0	63.9	63.9	0.0	56.1	56.1	0.0	56.1	56.1	0.0
Total Split (%)	53.3%	53.3%	0.0%	53.3%	53.3%	0.0%	46.8%	46.8%	0.0%	46.8%	46.8%	0.0%

Lanes, Volumes, Timings
17: Montgomery Road & McDonalds Drive

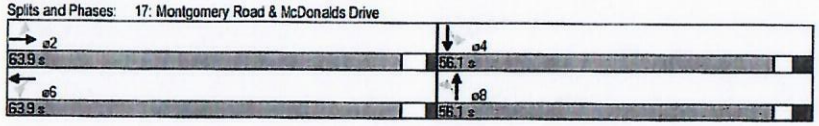
8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	58.5	58.5		58.5	58.5		50.0	50.0		50.0	50.0	
Yellow Time (s)	3.9	3.9		3.9	3.9		2.8	2.8		2.8	2.8	
All-Red Time (s)	1.5	1.5		1.5	1.5		3.3	3.3		3.3	3.3	
Lost Time Adjust (s)	-1.4	-1.4	0.0	-1.4	-1.4	0.0	-2.1	-2.1	0.0	-2.1	-2.1	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)										6.0	6.0	
Flash Dont Walk (s)										24.0	24.0	
Pedestrian Calls (#/hr)										0	0	
Act Effct Green (s)	98.9	98.9		98.9	98.9		13.1	13.1		13.1	13.1	
Actuated g/C Ratio	0.82	0.82		0.82	0.82		0.11	0.11		0.11	0.11	
v/c Ratio	0.02	0.18		0.20	0.19		0.42	0.54		0.31	0.05	
Control Delay	1.8	1.5		3.3	2.1		57.3	15.3		60.4	31.1	
Queue Delay	0.0	0.0		0.0	0.2		0.0	0.0		0.0	0.0	
Total Delay	1.8	1.5		3.3	2.2		57.3	15.3		60.4	31.1	
LOS	A	A		A	A		E	B		E	C	
Approach Delay		1.5			2.4			26.9			51.0	
Approach LOS		A			A			C			D	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of FDW or yellow, Master Intersection
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.54
Intersection Signal Delay: 5.8 — Intersection LOS: A
Intersection Capacity Utilization 56.6% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 17: Montgomery Road & McDonalds Drive



Lanes, Volumes, Timings
21: Montgomery Road & I-71 SB Off Ramp

8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	645	97	386	385	0	0	0	0	339	0	407
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	171		0
Storage Lanes	0		0	1		0	0		0	2		2
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	1.00	1.00	1.00	0.97	1.00	0.88
Frt		0.980										0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	6280	0	1770	5085	0	0	0	0	3433	0	2787
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	6280	0	1770	5085	0	0	0	0	3433	0	2787
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		31										424
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		358			624			446			657	
Travel Time (s)		6.1			10.6			10.1			14.9	
Peak Hour Factor	0.95	0.95	0.95	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.96	0.96
Adj. Flow (vph)	0	679	102	420	418	0	0	0	0	353	0	424
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	781	0	420	418	0	0	0	0	353	0	424
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		1		1	1					1		1
Detector Template												
Leading Detector (ft)		50		50	50					50		50
Trailing Detector (ft)		0		0	0					0		0
Detector 1 Position(ft)		0		0	0					0		0
Detector 1 Size(ft)		50		50	50					50		50
Detector 1 Type		Cl+Ex		Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0		0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0		0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0		0.0	0.0					0.0		0.0
Turn Type				Prot						custom		custom
Protected Phases		2		1	6							
Permitted Phases										4		4
Detector Phase		2		1	6					4		4
Switch Phase												
Minimum Initial (s)		20.0		5.0	20.0					5.0		5.0
Minimum Split (s)		26.0		11.2	26.2					12.3		12.3
Total Split (s)	0.0	35.0	0.0	50.8	85.8	0.0	0.0	0.0	0.0	34.2	0.0	34.2
Total Split (%)	0.0%	29.2%	0.0%	42.3%	71.5%	0.0%	0.0%	0.0%	0.0%	28.5%	0.0%	28.5%

Lanes, Volumes, Timings
21: Montgomery Road & I-71 SB Off Ramp

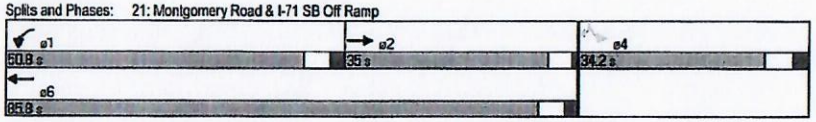
8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)		30.2		44.6	79.6					27.4		27.4
Yellow Time (s)		3.9		3.9	3.9					4.3		4.3
All-Red Time (s)		0.9		2.3	2.3					2.5		2.5
Lost Time Adjust (s)	0.0	-0.8	0.0	-2.2	-2.2	0.0	0.0	0.0	0.0	-2.8	0.0	-2.8
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag		Lag		Lead								
Lead-Lag Optimize?		Yes		Yes								
Vehicle Extension (s)		3.0		3.0	3.0					3.0		3.0
Recall Mode		C-Max		None	C-Max					None		None
Walk Time (s)		6.0										
Flash Dont Walk (s)		8.0										
Pedestrian Calls (#/hr)		0										
Act Effct Green (s)		50.1		36.2	90.4					21.6		21.6
Actuated g/C Ratio		0.42		0.30	0.75					0.18		0.18
v/c Ratio		0.30		0.79	0.11					0.57		0.50
Control Delay		20.4		21.7	2.4					48.2		5.8
Queue Delay		0.0		0.0	0.0					0.0		0.0
Total Delay		20.4		21.7	2.4					48.2		5.8
LOS		C		C	A					D		A
Approach Delay		20.4			12.1							
Approach LOS		C			B							

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 102.2 (85%), Referenced to phase 2:EBT and 6:WBT, Start of FDW or yellow
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.79
Intersection Signal Delay: 19.0 — Intersection LOS: B
Intersection Capacity Utilization 57.7% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 21: Montgomery Road & I-71 SB Off Ramp



Lanes, Volumes, Timings
24: Montgomery Road & I-71 NB On Ramp

8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	348	724	0	0	669	248	98	0	418	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	188		0	0		0
Storage Lanes	1		0	0		0	1		1	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.91	1.00	1.00	0.86	0.86	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.959				0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1770	5085	0	0	6145	0	1770	0	1583	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	1770	5085	0	0	6145	0	1770	0	1583	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					73				191			
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		624			328			592			409	
Travel Time (s)		10.6			5.6			13.5			9.3	
Peak Hour Factor	0.86	0.86	0.86	0.83	0.83	0.83	0.84	0.84	0.84	0.92	0.92	0.92
Adj. Flow (vph)	405	842	0	0	806	299	117	0	498	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	405	842	0	0	1105	0	117	0	498	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1			1		1		1			
Detector Template												
Leading Detector (ft)	50	50			50		50		50			
Trailing Detector (ft)	0	0			0		0		0			
Detector 1 Position(ft)	0	0			0		0		0			
Detector 1 Size(ft)	50	50			50		50		50			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex		Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0		0.0		0.0			
Detector 1 Queue (s)	0.0	0.0			0.0		0.0		0.0			
Detector 1 Delay (s)	0.0	0.0			0.0		0.0		0.0			
Turn Type	Prot						custom		custom			
Protected Phases	5	2			6							
Permitted Phases							8		8			
Detector Phase	5	2			6		8		8			
Switch Phase												
Minimum Initial (s)	5.0	18.0			18.0		5.0		5.0			
Minimum Split (s)	22.1	26.0			26.0		22.0		22.0			
Total Split (s)	47.0	80.0	0.0	0.0	33.0	0.0	40.0	0.0	40.0	0.0	0.0	0.0
Total Split (%)	39.2%	66.7%	0.0%	0.0%	27.5%	0.0%	33.3%	0.0%	33.3%	0.0%	0.0%	0.0%

Lanes, Volumes, Timings
24: Montgomery Road & I-71 NB On Ramp

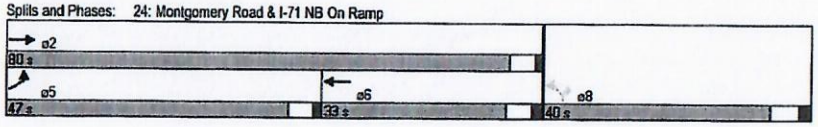
8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	41.9	74.9			27.3		33.8		33.8			
Yellow Time (s)	3.9	3.9			3.9		4.3		4.3			
All-Red Time (s)	1.2	1.2			1.8		1.9		1.9			
Lost Time Adjust (s)	-1.1	-1.1	0.0	0.0	-1.7	0.0	-2.2	0.0	-2.2	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Recall Mode	None	C-Max			C-Max		None		None			
Walk Time (s)	6.0											
Flash Dont Walk (s)	8.0											
Pedestrian Calls (#/hr)	0											
Act Effct Green (s)	33.9	80.4			42.4		31.6		31.6			
Actuated g/C Ratio	0.28	0.67			0.35		0.26		0.26			
v/c Ratio	0.81	0.25			0.50		0.25		0.89			
Control Delay	33.8	3.8			26.6		34.8		44.8			
Queue Delay	0.0	0.0			0.0		0.0		0.0			
Total Delay	33.8	3.8			26.6		34.8		44.8			
LOS	C	A			C		C		D			
Approach Delay		13.5			26.6							
Approach LOS		B			C							

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 41.3 (34%), Referenced to phase 2:EBT and 6:WBT, Start of FDW or yellow
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 24.5 — Intersection LOS: C
Intersection Capacity Utilization 57.7% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 24: Montgomery Road & I-71 NB On Ramp



Lanes, Volumes, Timings
27: Hosbrook Rd & Montgomery Road

8/22/2012

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	303	30	79	11	7	25	103	507	120	118	687	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	80		0	145		0	100		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.891			0.883				0.850		0.990	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1660	0	1770	1645	0	1770	3539	1583	1770	3504	0
Flt Permitted	0.512			0.679			0.270			0.415		
Satd. Flow (perm)	954	1660	0	1265	1645	0	503	3539	1583	773	3504	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		88			46				125		7	
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		580			420			717			1053	
Travel Time (s)		13.2			9.5			12.2			17.9	
Peak Hour Factor	0.90	0.90	0.90	0.54	0.54	0.54	0.96	0.96	0.96	0.87	0.87	0.87
Adj. Flow (vph)	337	33	88	20	13	46	107	528	125	136	790	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	337	121	0	20	59	0	107	528	125	136	847	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1	1	1	1	
Detector Template												
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	50	50		50	50		50	50	50	50	50	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2		2	6		
Detector Phase	3	8		7	4		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	13.0	38.1		22.0	22.0		13.0	36.5	36.5	13.0	34.0	
Total Split (s)	21.0	39.1	0.0	23.0	41.1	0.0	15.0	42.9	42.9	15.0	42.9	0.0
Total Split (%)	17.5%	32.6%	0.0%	19.2%	34.3%	0.0%	12.5%	35.8%	35.8%	12.5%	35.8%	0.0%

Lanes, Volumes, Timings
27: Hosbrook Rd & Montgomery Road

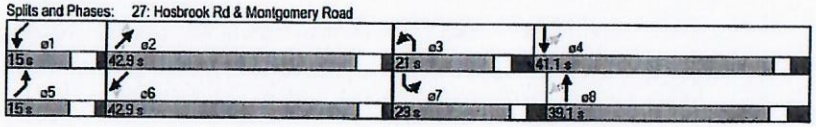
8/22/2012

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Maximum Green (s)	14.9	33.0		17.4	35.5		9.5	37.4	37.4	9.7	37.6	
Yellow Time (s)	2.8	2.8		2.8	2.8		3.9	3.9	3.9	3.9	3.9	
All-Red Time (s)	3.3	3.3		2.8	2.8		1.6	1.6	1.6	1.4	1.4	
Lost Time Adjust (s)	-2.1	-2.1	0.0	-1.6	-1.6	0.0	-1.5	-1.5	-1.5	-1.3	-1.3	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	
Walk Time (s)		6.0						6.0	6.0		6.0	
Flash Dont Walk (s)		24.0						22.0	22.0		14.0	
Pedestrian Calls (#/hr)		0						0	0		0	
Act Effct Green (s)	27.5	22.3		15.5	8.8		79.9	70.5	70.5	81.0	71.0	
Actuated g/C Ratio	0.23	0.19		0.13	0.07		0.67	0.59	0.59	0.68	0.59	
v/c Ratio	1.01	0.32		0.10	0.36		0.25	0.25	0.13	0.23	0.41	
Control Delay	95.1	17.3		35.2	26.1		6.2	10.8	2.1	7.0	13.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	95.1	17.3		35.2	26.1		6.2	10.8	2.1	7.0	13.9	
LOS	F	B		D	C		A	B	A	A	B	
Approach Delay		74.5			28.4			8.7			13.0	
Approach LOS		E			C			A			B	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 30.4 (25%), Referenced to phase 2:NETL and 6:SWTL, Start of FDW or yellow
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.01
Intersection Signal Delay: 24.5 — Intersection LOS: C
Intersection Capacity Utilization 59.7% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 27: Hosbrook Rd & Montgomery Road



B. 2012 PM No-Build

Lanes, Volumes, Timings
11: Montgomery Road & Frontage Road 8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	780	10	10	710	10	20	10	10	160	10	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	233		0	302		0	83		0	125		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998			0.998			0.925			0.872	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3532	0	1770	3532	0	1770	1723	0	1770	1624	0
Flt Permitted	0.312			0.259			0.703			0.454		
Satd. Flow (perm)	581	3532	0	482	3532	0	1310	1723	0	846	1624	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			1			11			71	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		593			312			804			165	
Travel Time (s)		10.1			5.3			18.3			3.8	
Peak Hour Factor	0.83	0.83	0.83	0.91	0.91	0.91	0.93	0.93	0.93	0.84	0.84	0.84
Adj. Flow (vph)	12	940	12	11	780	11	22	11	11	190	12	71
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	952	0	11	791	0	22	22	0	190	83	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	50	50		50	50		50	50		50	50	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	18.0		5.0	18.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	11.3	38.3		11.7	24.7		10.9	11.0		10.8	39.8	
Total Split (s)	26.9	40.0	0.0	23.0	36.1	0.0	15.0	38.5	0.0	18.5	42.0	0.0
Total Split (%)	22.4%	33.3%	0.0%	19.2%	30.1%	0.0%	12.5%	32.1%	0.0%	15.4%	35.0%	0.0%

8/22/2012 2012 No-Build PM Peak Synchro 7 - Light: Report Page 1

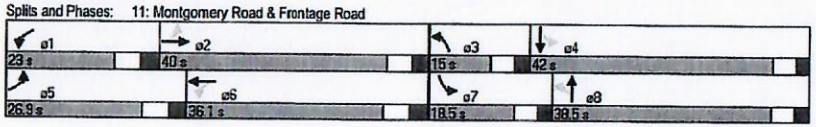
Lanes, Volumes, Timings
11: Montgomery Road & Frontage Road 8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	20.6	33.7		16.3	29.4		9.1	32.6		12.7	36.2	
Yellow Time (s)	3.9	3.9		3.9	3.9		3.6	3.6		3.6	3.6	
All-Red Time (s)	2.4	2.4		2.8	2.8		2.3	2.3		2.2	2.2	
Lost Time Adjust (s)	-2.3	-2.3	0.0	-2.7	-2.7	-1.8	-1.9	-1.9	0.0	-1.8	-1.8	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	2.2	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		6.0									6.0	
Flash Dont Walk (s)		22.0									25.0	
Pedestrian Calls (#/hr)		0									0	
Act Effct Green (s)	88.9	87.2		88.4	84.9		14.2	8.5		22.2	14.1	
Actuated g/C Ratio	0.74	0.73		0.74	0.71		0.12	0.07		0.18	0.12	
v/c Ratio	0.02	0.37		0.02	0.32		0.12	0.17		0.71	0.33	
Control Delay	5.5	8.1		5.6	8.7		38.9	36.4		58.5	18.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	5.5	8.1		5.6	8.7		38.9	36.4		58.5	18.0	
LOS	A	A		A	A		D	D		E	B	
Approach Delay		8.0			8.7			37.7			46.2	
Approach LOS		A			A			D			D	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 63.7 (53%), Referenced to phase 2:EBTL and 6:WBTL, Start of FDW or yellow
Natural Cycle: 105
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 13.9 Intersection LOS: B
Intersection Capacity Utilization 44.1% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 11: Montgomery Road & Frontage Road



8/22/2012 2012 No-Build PM Peak Synchro 7 - Light: Report Page 2

Lanes, Volumes, Timings
11: Montgomery Road & Kenwood Road

8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	280	550	180	340	490	240	130	640	240	200	650	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	233		0	302		0	83		0	125		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.963				0.850		0.959			0.968	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3408	0	1770	3539	1583	1770	3394	0	1770	3426	0
Flt Permitted	0.283			0.116			0.116			0.105		
Satd. Flow (perm)	527	3408	0	216	3539	1583	216	3394	0	196	3426	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		38				264		45			31	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		593			312			804			331	
Travel Time (s)		10.1			5.3			18.3			7.5	
Peak Hour Factor	0.83	0.83	0.83	0.91	0.91	0.91	0.93	0.93	0.93	0.84	0.84	0.84
Adj. Flow (vph)	337	663	217	374	538	264	140	688	258	238	774	214
Shared Lane Traffic (%)												
Lane Group Flow (vph)	337	880	0	374	538	264	140	946	0	238	988	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1	1	1	1		1	1	
Detector Template												
Leading Detector (ft)	50	50		50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	50	50		50	50	50	50	50		50	50	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Turn Type	pm+pt			pm+pt		Over	pm+pt			pm+pt		
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6	7	3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	18.0		5.0	18.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	11.3	38.3		11.7	24.7	10.8	10.9	11.0		10.8	39.8	
Total Split (s)	26.9	40.0	0.0	23.0	36.1	18.5	15.0	38.5	0.0	18.5	42.0	0.0
Total Split (%)	22.4%	33.3%	0.0%	19.2%	30.1%	15.4%	12.5%	32.1%	0.0%	15.4%	35.0%	0.0%

Lanes, Volumes, Timings
11: Montgomery Road & Kenwood Road

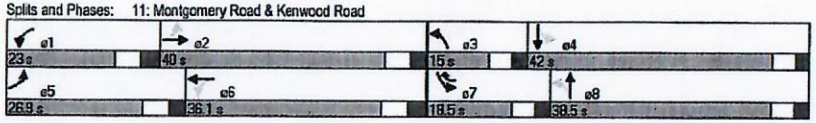
8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	20.6	33.7		16.3	29.4	12.7	9.1	32.6		12.7	36.2	
Yellow Time (s)	3.9	3.9		3.9	3.9	3.6	3.6	3.6		3.6	3.6	
All-Red Time (s)	2.4	2.4		2.8	2.8	2.2	2.3	2.3		2.2	2.2	
Lost Time Adjust (s)	-2.3	-2.3	0.0	-2.7	-2.7	-1.8	-1.9	-1.9	0.0	-1.8	-1.8	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max	None	None	None		None	None	
Walk Time (s)		6.0									6.0	
Flash Dont Walk (s)		22.0									25.0	
Pedestrian Calls (#/hr)		0									0	
Act Effct Green (s)	56.6	36.0		53.5	34.4	14.5	45.2	34.4		52.5	38.2	
Actuated g/C Ratio	0.47	0.30		0.45	0.29	0.12	0.38	0.29		0.44	0.32	
v/c Ratio	0.73	0.84		1.09	0.53	0.62	0.64	0.94		0.86	0.89	
Control Delay	29.3	46.0		108.9	38.8	12.9	37.0	57.3		53.9	46.9	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	32.2	
Total Delay	29.3	46.0		108.9	38.8	12.9	37.0	57.3		53.9	79.1	
LOS	C	D		F	D	B	D	E		D	E	
Approach Delay		41.4			55.3			54.7			74.2	
Approach LOS		D			E			D			E	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 63.7 (53%), Referenced to phase 2:EBTL and 6:WBTL, Start of FDW or yellow
Natural Cycle: 115
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.09
Intersection Signal Delay: 56.5 — Intersection LOS: E
Intersection Capacity Utilization 89.6% — ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 11: Montgomery Road & Kenwood Road



Lanes, Volumes, Timings
15: Orchard Lane & Kenwood Road

8/22/2012

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	30	120	0	820	900	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	30			0
Storage Lanes	0	0	1			0
Taper Length (ft)	25	25	25			25
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt	0.892				0.992	
Flt Protected	0.990					
Satd. Flow (prot)	1645	0	1863	3539	3511	0
Flt Permitted	0.990					
Satd. Flow (perm)	1645	0	1863	3539	3511	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	118				8	
Link Speed (mph)	30			30	30	
Link Distance (ft)	805			331	556	
Travel Time (s)	18.3			7.5	12.6	
Peak Hour Factor	0.80	0.80	0.89	0.89	0.89	0.89
Adj. Flow (vph)	38	150	0	921	1011	56
Shared Lane Traffic (%)						
Lane Group Flow (vph)	188	0	0	921	1067	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Number of Detectors	1		1	1	1	
Detector Template						
Leading Detector (ft)	50		50	50	50	
Trailing Detector (ft)	0		0	0	0	
Detector 1 Position(ft)	0		0	0	0	
Detector 1 Size(ft)	50		50	50	50	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	
Turn Type			Perm			
Protected Phases	4			2	6	
Permitted Phases			2			
Detector Phase	4		2	2	6	
Switch Phase						
Minimum Initial (s)	5.0		50.0	50.0	50.0	
Minimum Split (s)	31.0		56.0	56.0	56.0	
Total Split (s)	44.0	0.0	76.0	76.0	76.0	0.0
Total Split (%)	36.7%	0.0%	63.3%	63.3%	63.3%	0.0%

Lanes, Volumes, Timings
15: Orchard Lane & Kenwood Road

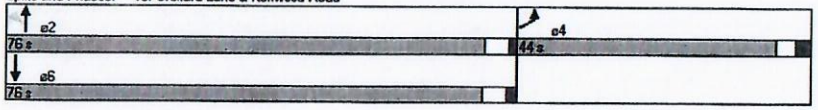
8/22/2012

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Maximum Green (s)	38.7		71.2	71.2	70.9	
Yellow Time (s)	2.8		3.6	3.6	3.6	
All-Red Time (s)	2.5		1.2	1.2	1.5	
Lost Time Adjust (s)	-1.3	0.0	-0.8	-0.8	-1.1	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	None		C-Min	C-Min	C-Min	
Walk Time (s)	6.0				6.0	
Flash Dont Walk (s)	15.0				8.0	
Pedestrian Calls (#/hr)	0				0	
Act Effct Green (s)	12.6			99.4	99.4	
Actuated g/C Ratio	0.10			0.83	0.83	
v/c Ratio	0.67			0.31	0.37	
Control Delay	31.8			1.9	3.3	
Queue Delay	0.1			0.4	0.2	
Total Delay	31.9			2.4	3.5	
LOS	C			A	A	
Approach Delay	31.9			2.4	3.5	
Approach LOS	C			A	A	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 68.3 (57%), Referenced to phase 2:NBTL and 6:SBT, Start of FDW or yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.67
Intersection Signal Delay: 5.5 — Intersection LOS: A
Intersection Capacity Utilization 57.4% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 15: Orchard Lane & Kenwood Road



C. 2032 AM No-Build

Lanes, Volumes, Timings
11: Montgomery Road & Frontage Road 8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	450	40	40	370	170	30	10	20	10	10	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	233		0	302		0	83		0	125		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.988			0.953			0.898			0.925	
Flt Protected	0.950			0.950			0.950			0.950		
Sald. Flow (prot)	1770	3497	0	1770	3373	0	1770	1673	0	1770	1723	0
Flt Permitted	0.425			0.407			0.522			0.737		
Sald. Flow (perm)	792	3497	0	758	3373	0	972	1673	0	1373	1723	0
Right Turn on Red			Yes			Yes			Yes			Yes
Sald. Flow (RTOR)		8			66			21			11	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		593			821			804			165	
Travel Time (s)		10.1			14.0			18.3			3.8	
Peak Hour Factor	0.83	0.83	0.83	0.97	0.97	0.97	0.97	0.97	0.97	0.90	0.90	0.90
Adj. Flow (vph)	60	542	48	41	381	175	31	10	21	11	11	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	590	0	41	556	0	31	31	0	11	22	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	50	50		50	50		50	50		50	50	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	18.0		5.0	18.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	13.0	39.3		13.0	28.0		13.0	22.0		13.0	40.8	
Total Split (s)	16.0	43.0	0.0	16.0	43.0	0.0	16.0	39.0	0.0	22.0	45.0	0.0
Total Split (%)	13.3%	35.8%	0.0%	13.3%	35.8%	0.0%	13.3%	32.5%	0.0%	18.3%	37.5%	0.0%

8/22/2012 2032 No-Build AM Peak Synchro 7 - Light: Report Page 1

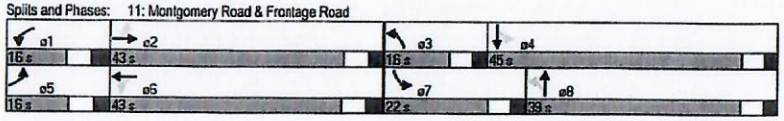
Lanes, Volumes, Timings
11: Montgomery Road & Frontage Road 8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	9.7	36.7		9.3	36.3		10.1	33.1		16.2	39.2	
Yellow Time (s)	3.9	3.9		3.9	3.9		3.6	3.6		3.6	3.6	
All-Red Time (s)	2.4	2.4		2.8	2.8		2.3	2.3		2.2	2.2	
Lost Time Adjust (s)	-2.3	-2.3	0.0	-2.7	-2.7	-1.8	-1.9	-1.9	0.0	-1.8	-1.8	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	2.2	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		6.0									6.0	
Flash Dont Walk (s)		22.0									25.0	
Pedestrian Calls (#/hr)		0									0	
Act Effct Green (s)	96.4	90.0		96.5	90.0		16.7	14.3		13.4	8.4	
Actuated g/C Ratio	0.80	0.75		0.80	0.75		0.14	0.12		0.11	0.07	
v/c Ratio	0.08	0.22		0.06	0.22		0.16	0.14		0.06	0.17	
Control Delay	4.1	7.4		4.2	6.7		42.6	25.1		39.9	36.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	4.1	7.4		4.2	6.7		42.6	25.1		39.9	36.6	
LOS	A	A		A	A		D	C		D	D	
Approach Delay		7.1			6.5			33.9			37.7	
Approach LOS		A			A			C			D	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 64.7 (54%), Referenced to phase 2:EBTL and 6:WBTL, Start of FDW or yellow
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.22
Intersection Signal Delay: 8.8 Intersection LOS: A
Intersection Capacity Utilization 38.2% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 11: Montgomery Road & Frontage Road



8/22/2012 2032 No-Build AM Peak Synchro 7 - Light: Report Page 2

Lanes, Volumes, Timings
9: Montgomery Road & Nordstrom Drive

8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	59	617	9	33	596	39	1	1	8	6	1	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	147		0	145		0	193		0	68		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998			0.991			0.870			0.855	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	5075	0	1770	5040	0	1770	1621	0	1770	1593	0
Flt Permitted	0.368			0.393			0.720			0.748		
Satd. Flow (perm)	685	5075	0	732	5040	0	1341	1621	0	1393	1593	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			9			13			55	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		624			660			742			341	
Travel Time (s)		10.6			11.3			16.9			7.8	
Peak Hour Factor	0.96	0.96	0.96	0.91	0.91	0.91	0.63	0.63	0.63	0.51	0.51	0.51
Adj. Flow (vph)	61	643	9	36	655	43	2	2	13	12	2	55
Shared Lane Traffic (%)												
Lane Group Flow (vph)	61	652	0	36	698	0	2	15	0	12	57	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	50	50		50	50		50	50		50	50	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	20.0		5.0	20.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	10.9	33.5		13.0	26.0		40.1	40.1		28.0	28.0	
Total Split (s)	21.9	44.9	0.0	24.0	47.0	0.0	51.1	51.1	0.0	51.1	51.1	0.0
Total Split (%)	18.3%	37.4%	0.0%	20.0%	39.2%	0.0%	42.6%	42.6%	0.0%	42.6%	42.6%	0.0%

Lanes, Volumes, Timings
9: Montgomery Road & Nordstrom Drive

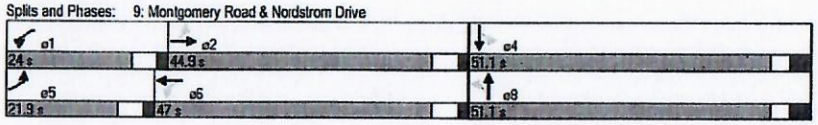
8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	16.4	39.4		18.5	41.5		45.0	45.0		45.1	45.1	
Yellow Time (s)	3.9	3.9		3.9	3.9		2.8	2.8		2.8	2.8	
All-Red Time (s)	1.6	1.6		1.6	1.6		3.3	3.3		3.2	3.2	
Lost Time Adjust (s)	-1.5	-1.5	0.0	-1.5	-1.5	0.0	-2.1	-2.1	0.0	-2.0	-2.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		6.0					6.0	6.0				
Flash Dont Walk (s)		17.0					22.0	22.0				
Pedestrian Calls (#/hr)		0					0	0				
Act Effct Green (s)	103.2	99.2		102.0	96.8		8.9	8.9		8.9	8.9	
Actuated g/C Ratio	0.86	0.83		0.85	0.81		0.07	0.07		0.07	0.07	
v/c Ratio	0.09	0.16		0.05	0.17		0.02	0.11		0.12	0.34	
Control Delay	2.0	3.3		1.5	4.0		50.0	27.2		53.3	19.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	2.0	3.3		1.5	4.0		50.0	27.2		53.3	19.8	
LOS	A	A		A	A		D	C		D	B	
Approach Delay		3.2			3.9			29.9			25.7	
Approach LOS		A			A			C			C	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 115.5 (96%), Referenced to phase 2:EBTL and 6:WBTL, Start of FDW or yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.34
Intersection Signal Delay: 4.8 — Intersection LOS: A
Intersection Capacity Utilization 35.8% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 9: Montgomery Road & Nordstrom Drive



Lanes, Volumes, Timings
10: E. Galbraith Road & Montgomery Road

8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	37	97	119	240	198	57	103	269	96	53	451	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	185		0	125		0	125		0	40		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.917			0.966			0.961			0.981	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1708	0	1770	1799	0	1770	3401	0	1770	3472	0
Flt Permitted	0.516			0.255			0.317			0.504		
Satd. Flow (perm)	961	1708	0	475	1799	0	590	3401	0	939	3472	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		54			14			43			14	
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		1732			476			1053			881	
Travel Time (s)		39.4			10.8			17.9			15.0	
Peak Hour Factor	0.81	0.81	0.81	0.92	0.92	0.92	0.94	0.94	0.94	0.86	0.86	0.86
Adj. Flow (vph)	46	120	147	261	215	62	110	286	102	62	524	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	267	0	261	277	0	110	388	0	62	600	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	50	50		50	50		50	50		50	50	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	20.0		5.0	20.0	
Minimum Split (s)	13.0	40.8		13.0	22.0		13.0	39.8		10.9	26.0	
Total Split (s)	15.0	42.8	0.0	22.0	49.8	0.0	15.0	40.2	0.0	15.0	40.2	0.0
Total Split (%)	12.5%	35.7%	0.0%	18.3%	41.5%	0.0%	12.5%	33.5%	0.0%	12.5%	33.5%	0.0%

Lanes, Volumes, Timings
10: E. Galbraith Road & Montgomery Road

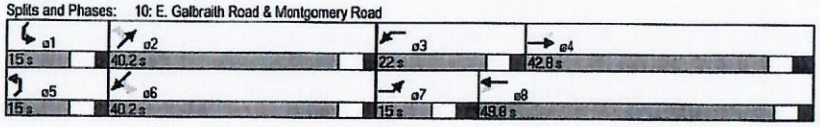
8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Maximum Green (s)	8.2	36.0		16.1	43.9		9.2	34.4		9.2	34.4	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.9	3.9		3.9	3.9	
All-Red Time (s)	3.2	3.2		2.3	2.3		1.9	1.9		1.9	1.9	
Lost Time Adjust (s)	-2.8	-2.8	0.0	-1.9	-1.9	0.0	-1.8	-1.8	0.0	-1.8	-1.8	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)		6.0						6.0				
Flash Dont Walk (s)		28.0						24.0				
Pedestrian Calls (#/hr)		0						0				
Act Effct Green (s)	33.6	23.6		45.1	33.6		65.2	55.8		61.2	51.8	
Actuated g/C Ratio	0.28	0.20		0.38	0.28		0.54	0.46		0.51	0.43	
v/c Ratio	0.14	0.70		0.71	0.54		0.26	0.24		0.11	0.40	
Control Delay	22.9	45.0		37.5	38.8		16.2	16.7		15.0	25.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.9	45.0		37.5	38.8		16.2	16.7		15.0	25.5	
LOS	C	D		D	D		B	B		B	C	
Approach Delay		41.7			38.1			16.6			24.5	
Approach LOS		D			D			B			C	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 17.2 (14%), Referenced to phase 2:NETL and 6:SWTL, Start of FDW or yellow
Natural Cycle: 105
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 28.9 — Intersection LOS: C
Intersection Capacity Utilization 61.4% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 10: E. Galbraith Road & Montgomery Road



Lanes, Volumes, Timings
11: Montgomery Road & Kenwood Road

8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	130	370	60	190	370	170	130	510	230	140	470	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	233		0	302		0	83		0	125		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.979				0.850		0.953			0.968	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3465	0	1770	3539	1583	1770	3373	0	1770	3426	0
Flt Permitted	0.475			0.354			0.228			0.114		
Satd. Flow (perm)	885	3465	0	659	3539	1583	425	3373	0	212	3426	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16				175		61			32	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		593			624			804			331	
Travel Time (s)		10.1			10.6			18.3			7.5	
Peak Hour Factor	0.83	0.83	0.83	0.97	0.97	0.97	0.97	0.97	0.97	0.90	0.90	0.90
Adj. Flow (vph)	157	446	72	196	381	175	134	526	237	156	522	144
Shared Lane Traffic (%)												
Lane Group Flow (vph)	157	518	0	196	381	175	134	763	0	156	666	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1	1	1	1		1	1	
Detector Template												
Leading Detector (ft)	50	50		50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	50	50		50	50	50	50	50		50	50	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Turn Type	pm+pt			pm+pt		Over	pm+pt			pm+pt		
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6	7	3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	18.0		5.0	18.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	13.0	39.3		13.0	28.0	13.0	13.0	22.0		13.0	40.8	
Total Split (s)	16.0	43.0	0.0	16.0	43.0	22.0	16.0	39.0	0.0	22.0	45.0	0.0
Total Split (%)	13.3%	35.8%	0.0%	13.3%	35.8%	18.3%	13.3%	32.5%	0.0%	18.3%	37.5%	0.0%

Lanes, Volumes, Timings
11: Montgomery Road & Kenwood Road

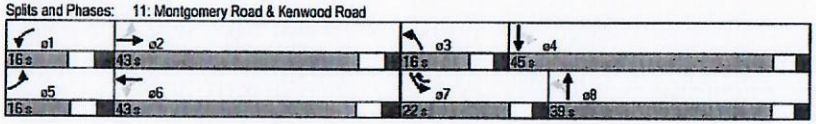
8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	9.7	36.7		9.3	36.3	16.2	10.1	33.1		16.2	39.2	
Yellow Time (s)	3.9	3.9		3.9	3.9	3.6	3.6	3.6		3.6	3.6	
All-Red Time (s)	2.4	2.4		2.8	2.8	2.2	2.3	2.3		2.2	2.2	
Lost Time Adjust (s)	-2.3	-2.3	0.0	-2.7	-2.7	-1.8	-1.9	-1.9	0.0	-1.8	-1.8	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max	None	None	None		None	None	
Walk Time (s)		6.0									6.0	
Flash Dont Walk (s)		22.0									25.0	
Pedestrian Calls (#/hr)		0									0	
Act Effct Green (s)	56.5	44.6		58.5	45.6	14.4	43.7	32.1		49.0	35.0	
Actuated g/C Ratio	0.47	0.37		0.49	0.38	0.12	0.36	0.27		0.41	0.29	
v/c Ratio	0.31	0.40		0.45	0.28	0.51	0.47	0.81		0.57	0.65	
Control Delay	19.1	29.3		18.5	16.7	19.0	26.5	44.7		28.7	37.1	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	1.5	
Total Delay	19.1	29.3		18.5	16.7	19.0	26.5	44.7		28.7	38.5	
LOS	B	C		B	B	B	C	D		C	D	
Approach Delay		27.0			17.7			42.0			36.6	
Approach LOS		C			B			D			D	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 64.7 (54%), Referenced to phase 2:EBTL and 6:WBTL, Start of FDW or yellow
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.81
Intersection Signal Delay: 31.6 — Intersection LOS: C
Intersection Capacity Utilization 68.1% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 11: Montgomery Road & Kenwood Road



Lanes, Volumes, Timings
15: Orchard Lane & Kenwood Road

8/22/2012

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	20	160	70	600	570	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	30			0
Storage Lanes	0	0	1			0
Taper Length (ft)	25	25	25			25
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt	0.880				0.992	
Flt Protected	0.995		0.950			
Satd. Flow (prot)	1631	0	1770	3539	3511	0
Flt Permitted	0.995		0.394			
Satd. Flow (perm)	1631	0	734	3539	3511	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	186				7	
Link Speed (mph)	30			30	30	
Link Distance (ft)	805			331	556	
Travel Time (s)	18.3			7.5	12.6	
Peak Hour Factor	0.86	0.86	0.92	0.92	0.95	0.95
Adj. Flow (vph)	23	186	76	652	600	32
Shared Lane Traffic (%)						
Lane Group Flow (vph)	209	0	76	652	632	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Number of Detectors	1		1	1	1	
Detector Template						
Leading Detector (ft)	50		50	50	50	
Trailing Detector (ft)	0		0	0	0	
Detector 1 Position(ft)	0		0	0	0	
Detector 1 Size(ft)	50		50	50	50	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	
Turn Type			Perm			
Protected Phases	4			2	6	
Permitted Phases			2			
Detector Phase	4		2	2	6	
Switch Phase						
Minimum Initial (s)	25.0		50.0	50.0	50.0	
Minimum Split (s)	31.0		56.0	56.0	56.0	
Total Split (s)	48.0	0.0	72.0	72.0	72.0	0.0
Total Split (%)	40.0%	0.0%	60.0%	60.0%	60.0%	0.0%

Lanes, Volumes, Timings
15: Orchard Lane & Kenwood Road

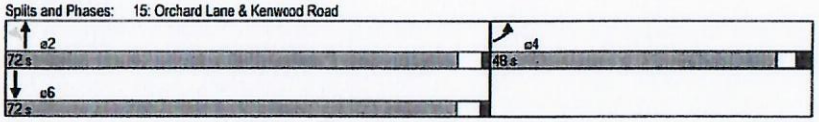
8/22/2012

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Maximum Green (s)	42.7		67.2	67.2	66.9	
Yellow Time (s)	2.8		3.6	3.6	3.6	
All-Red Time (s)	2.5		1.2	1.2	1.5	
Lost Time Adjust (s)	-1.3	0.0	-0.8	-0.8	-1.1	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	None		C-Min	C-Min	C-Min	
Walk Time (s)	6.0				6.0	
Flash Dont Walk (s)	15.0				8.0	
Pedestrian Calls (#/hr)	0				0	
Act Effct Green (s)	26.3		85.7	85.7	85.7	
Actuated g/C Ratio	0.22		0.71	0.71	0.71	
v/c Ratio	0.42		0.15	0.26	0.25	
Control Delay	10.5		12.4	12.0	6.2	
Queue Delay	0.0		0.0	0.7	0.0	
Total Delay	10.5		12.4	12.7	6.2	
LOS	B		B	B	A	
Approach Delay	10.5			12.6	6.2	
Approach LOS	B			B	A	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 26.9 (22%), Referenced to phase 2:NBTL and 6:SBT, Start of FDW or yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.42
Intersection Signal Delay: 9.8 — Intersection LOS: A
Intersection Capacity Utilization 85.7% — ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 15: Orchard Lane & Kenwood Road



Lanes, Volumes, Timings
17: Montgomery Road & McDonalds Drive

8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	600	90	102	656	62	51	9	126	16	3	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	222		0	86		0	50		0	39		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.980			0.987			0.860			0.900	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	4984	0	1770	5019	0	1770	1602	0	1770	1676	0
Flt Permitted	0.341			0.361			0.752			0.305		
Satd. Flow (perm)	635	4984	0	672	5019	0	1401	1602	0	568	1676	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		33			18			159			6	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		660			358			416			204	
Travel Time (s)		11.3			6.1			9.5			4.6	
Peak Hour Factor	0.94	0.94	0.94	0.91	0.91	0.91	0.79	0.79	0.79	0.86	0.86	0.86
Adj. Flow (vph)	11	638	96	112	721	68	65	11	159	19	3	6
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	734	0	112	789	0	65	170	0	19	9	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	50	50		50	50		50	50		50	50	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	26.0	26.0		26.0	26.0		11.1	11.1		38.1	38.1	
Total Split (s)	63.9	63.9	0.0	63.9	63.9	0.0	56.1	56.1	0.0	56.1	56.1	0.0
Total Split (%)	53.3%	53.3%	0.0%	53.3%	53.3%	0.0%	46.8%	46.8%	0.0%	46.8%	46.8%	0.0%

Lanes, Volumes, Timings
17: Montgomery Road & McDonalds Drive

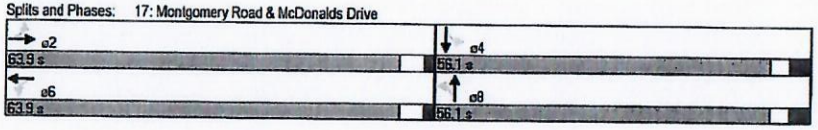
8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	58.5	58.5		58.5	58.5		50.0	50.0		50.0	50.0	
Yellow Time (s)	3.9	3.9		3.9	3.9		2.8	2.8		2.8	2.8	
All-Red Time (s)	1.5	1.5		1.5	1.5		3.3	3.3		3.3	3.3	
Lost Time Adjust (s)	-1.4	-1.4	0.0	-1.4	-1.4	0.0	-2.1	-2.1	0.0	-2.1	-2.1	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)										6.0	6.0	
Flash Dont Walk (s)										24.0	24.0	
Pedestrian Calls (#/hr)										0	0	
Act Effct Green (s)	98.9	98.9		98.9	98.9		13.1	13.1		13.1	13.1	
Actuated g/C Ratio	0.82	0.82		0.82	0.82		0.11	0.11		0.11	0.11	
v/c Ratio	0.02	0.18		0.20	0.19		0.42	0.54		0.31	0.05	
Control Delay	1.8	1.5		3.3	2.1		57.3	15.3		60.4	31.1	
Queue Delay	0.0	0.0		0.0	0.2		0.0	0.0		0.0	0.0	
Total Delay	1.8	1.5		3.3	2.2		57.3	15.3		60.4	31.1	
LOS	A	A		A	A		E	B		E	C	
Approach Delay		1.5			2.4			26.9			51.0	
Approach LOS		A			A			C			D	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of FDW or yellow, Master Intersection
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.54
Intersection Signal Delay: 5.8 — Intersection LOS: A
Intersection Capacity Utilization 56.6% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 17: Montgomery Road & McDonalds Drive



Lanes, Volumes, Timings
21: Montgomery Road & I-71 SB Off Ramp

8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	645	97	386	385	0	0	0	0	339	0	407
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	171		0
Storage Lanes	0		0	1		0	0		0	2		2
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	1.00	1.00	1.00	0.97	1.00	0.88
Frt		0.960										0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	6280	0	1770	5085	0	0	0	0	3433	0	2787
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	6280	0	1770	5085	0	0	0	0	3433	0	2787
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		31										424
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		358			624			446			657	
Travel Time (s)		6.1			10.6			10.1			14.9	
Peak Hour Factor	0.95	0.95	0.95	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.96	0.96
Adj. Flow (vph)	0	679	102	420	418	0	0	0	0	353	0	424
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	781	0	420	418	0	0	0	0	353	0	424
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		1		1	1					1		1
Detector Template												
Leading Detector (ft)		50		50	50					50		50
Trailing Detector (ft)		0		0	0					0		0
Detector 1 Position(ft)		0		0	0					0		0
Detector 1 Size(ft)		50		50	50					50		50
Detector 1 Type		Cl+Ex		Cl+Ex	Cl+Ex					Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0		0.0	0.0					0.0		0.0
Detector 1 Queue (s)		0.0		0.0	0.0					0.0		0.0
Detector 1 Delay (s)		0.0		0.0	0.0					0.0		0.0
Turn Type				Prot						custom		custom
Protected Phases		2		1	6							
Permitted Phases										4		4
Detector Phase		2		1	6					4		4
Switch Phase												
Minimum Initial (s)		20.0		5.0	20.0					5.0		5.0
Minimum Split (s)		26.0		11.2	26.2					12.3		12.3
Total Split (s)	0.0	35.0	0.0	50.8	85.8	0.0	0.0	0.0	0.0	34.2	0.0	34.2
Total Split (%)	0.0%	29.2%	0.0%	42.3%	71.5%	0.0%	0.0%	0.0%	0.0%	28.5%	0.0%	28.5%

Lanes, Volumes, Timings
21: Montgomery Road & I-71 SB Off Ramp

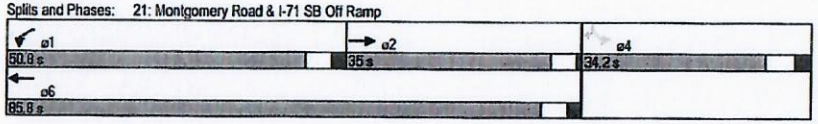
8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)		30.2		44.6	79.6					27.4		27.4
Yellow Time (s)		3.9		3.9	3.9					4.3		4.3
All-Red Time (s)		0.9		2.3	2.3					2.5		2.5
Lost Time Adjust (s)	0.0	-0.8	0.0	-2.2	-2.2	0.0	0.0	0.0	0.0	-2.8	0.0	-2.8
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag		Lag		Lead								
Lead-Lag Optimize?		Yes		Yes								
Vehicle Extension (s)		3.0		3.0	3.0					3.0		3.0
Recall Mode		C-Max		None	C-Max					None		None
Walk Time (s)		6.0										
Flash Dont Walk (s)		8.0										
Pedestrian Calls (#/hr)		0										
Act Effct Green (s)		50.1		36.2	90.4					21.6		21.6
Actuated g/C Ratio		0.42		0.30	0.75					0.18		0.18
v/c Ratio		0.30		0.79	0.11					0.57		0.50
Control Delay		20.4		21.7	2.4					48.2		5.8
Queue Delay		0.0		0.0	0.0					0.0		0.0
Total Delay		20.4		21.7	2.4					48.2		5.8
LOS		C		C	A					D		A
Approach Delay		20.4			12.1							
Approach LOS		C			B							

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 102.2 (85%), Referenced to phase 2:EBT and 6:WBT, Start of FDW or yellow
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.79
Intersection Signal Delay: 19.0 — Intersection LOS: B
Intersection Capacity Utilization 57.7% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 21: Montgomery Road & I-71 SB Off Ramp



Lanes, Volumes, Timings
24: Montgomery Road & I-71 NB On Ramp

8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	348	724	0	0	669	248	98	0	418	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	188		0	0		0
Storage Lanes	1		0	0		0	1		1	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.91	1.00	1.00	0.86	0.86	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.959				0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1770	5085	0	0	6145	0	1770	0	1583	0	0	0
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	1770	5085	0	0	6145	0	1770	0	1583	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					73				191			
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		624			328			592			409	
Travel Time (s)		10.6			5.6			13.5			9.3	
Peak Hour Factor	0.86	0.86	0.86	0.83	0.83	0.83	0.84	0.84	0.84	0.92	0.92	0.92
Adj. Flow (vph)	405	842	0	0	806	299	117	0	498	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	405	842	0	0	1105	0	117	0	498	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1			1		1		1			
Detector Template												
Leading Detector (ft)	50	50			50		50		50			
Trailing Detector (ft)	0	0			0		0		0			
Detector 1 Position(ft)	0	0			0		0		0			
Detector 1 Size(ft)	50	50			50		50		50			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex		Cl+Ex		Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0		0.0		0.0			
Detector 1 Queue (s)	0.0	0.0			0.0		0.0		0.0			
Detector 1 Delay (s)	0.0	0.0			0.0		0.0		0.0			
Turn Type	Prot						custom		custom			
Protected Phases	5	2			6							
Permitted Phases							8		8			
Detector Phase	5	2			6		8		8			
Switch Phase												
Minimum Initial (s)	5.0	18.0			18.0		5.0		5.0			
Minimum Split (s)	22.1	26.0			26.0		22.0		22.0			
Total Split (s)	47.0	80.0	0.0	0.0	33.0	0.0	40.0	0.0	40.0	0.0	0.0	0.0
Total Split (%)	39.2%	66.7%	0.0%	0.0%	27.5%	0.0%	33.3%	0.0%	33.3%	0.0%	0.0%	0.0%

Lanes, Volumes, Timings
24: Montgomery Road & I-71 NB On Ramp

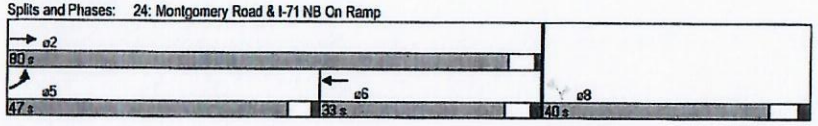
8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	41.9	74.9			27.3		33.8		33.8			
Yellow Time (s)	3.9	3.9			3.9		4.3		4.3			
All-Red Time (s)	1.2	1.2			1.8		1.9		1.9			
Lost Time Adjust (s)	-1.1	-1.1	0.0	0.0	-1.7	0.0	-2.2	0.0	-2.2	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead				Lag							
Lead-Lag Optimize?	Yes				Yes							
Vehicle Extension (s)	3.0	3.0			3.0		3.0		3.0			
Recall Mode	None	C-Max			C-Max		None		None			
Walk Time (s)	6.0											
Flash Dont Walk (s)	8.0											
Pedestrian Calls (#/hr)	0											
Act Effct Green (s)	33.9	80.4			42.4		31.6		31.6			
Actuated g/C Ratio	0.28	0.67			0.35		0.26		0.26			
v/c Ratio	0.81	0.25			0.50		0.25		0.89			
Control Delay	33.7	3.7			26.6		34.8		44.8			
Queue Delay	0.0	0.0			0.0		0.0		0.0			
Total Delay	33.7	3.7			26.6		34.8		44.8			
LOS	C	A			C		C		D			
Approach Delay		13.5			26.6							
Approach LOS		B			C							

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 41.3 (34%), Referenced to phase 2:EBT and 6:WBT, Start of FDW or yellow
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 24.4 — Intersection LOS: C
Intersection Capacity Utilization 57.7% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 24: Montgomery Road & I-71 NB On Ramp



Lanes, Volumes, Timings
27: Hosbrook Rd & Montgomery Road

8/22/2012

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	303	30	79	11	7	25	103	507	120	118	687	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	80		0	145		0	100		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.891			0.883				0.850		0.990	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1660	0	1770	1645	0	1770	3539	1583	1770	3504	0
Flt Permitted	0.512			0.679			0.270			0.415		
Satd. Flow (perm)	954	1660	0	1265	1645	0	503	3539	1583	773	3504	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		88			46				125		7	
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		580			420			717			1053	
Travel Time (s)		13.2			9.5			12.2			17.9	
Peak Hour Factor	0.90	0.90	0.90	0.54	0.54	0.54	0.96	0.96	0.96	0.87	0.87	0.87
Adj. Flow (vph)	337	33	88	20	13	46	107	528	125	136	790	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	337	121	0	20	59	0	107	528	125	136	847	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1	1	1	1	
Detector Template												
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	50	50		50	50		50	50	50	50	50	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2		2	6		
Detector Phase	3	8		7	4		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	20.0	20.0	5.0	20.0	
Minimum Split (s)	13.0	38.1		22.0	22.0		13.0	36.5	36.5	13.0	34.0	
Total Split (s)	21.0	39.1	0.0	23.0	41.1	0.0	15.0	42.9	42.9	15.0	42.9	0.0
Total Split (%)	17.5%	32.6%	0.0%	19.2%	34.3%	0.0%	12.5%	35.8%	35.8%	12.5%	35.8%	0.0%

Lanes, Volumes, Timings
27: Hosbrook Rd & Montgomery Road

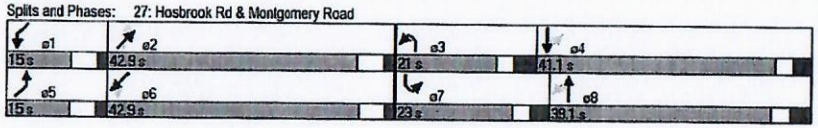
8/22/2012

Lane Group	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Maximum Green (s)	14.9	33.0		17.4	35.5		9.5	37.4	37.4	9.7	37.6	
Yellow Time (s)	2.8	2.8		2.8	2.8		3.9	3.9	3.9	3.9	3.9	
All-Red Time (s)	3.3	3.3		2.8	2.8		1.6	1.6	1.6	1.4	1.4	
Lost Time Adjust (s)	-2.1	-2.1	0.0	-1.6	-1.6	0.0	-1.5	-1.5	-1.5	-1.3	-1.3	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	
Walk Time (s)		6.0						6.0	6.0		6.0	
Flash Dont Walk (s)		24.0						22.0	22.0		14.0	
Pedestrian Calls (#/hr)		0						0	0		0	
Act Effct Green (s)	27.5	22.3		15.5	8.8		79.9	70.5	70.5	81.0	71.0	
Actuated g/C Ratio	0.23	0.19		0.13	0.07		0.67	0.59	0.59	0.68	0.59	
v/c Ratio	1.01	0.32		0.10	0.36		0.25	0.25	0.13	0.23	0.41	
Control Delay	95.1	17.3		35.2	26.1		6.2	10.8	2.1	7.0	13.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	95.1	17.3		35.2	26.1		6.2	10.8	2.1	7.0	13.9	
LOS	F	B		D	C		A	B	A	A	B	
Approach Delay		74.5			28.4			8.7			13.0	
Approach LOS		E			C			A			B	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 30.4 (25%), Referenced to phase 2:NETL and 6:SWTL, Start of FDW or yellow
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.01
Intersection Signal Delay: 24.5 — Intersection LOS: C
Intersection Capacity Utilization 59.7% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 27: Hosbrook Rd & Montgomery Road



D. 2032 PM No-Build

Lanes, Volumes, Timings
11: Montgomery Road & Frontage Road 8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	780	10	10	710	10	20	10	10	160	10	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	233		0	302		0	83		0	125		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998			0.998			0.925			0.872	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3532	0	1770	3532	0	1770	1723	0	1770	1624	0
Flt Permitted	0.312			0.259			0.703			0.454		
Satd. Flow (perm)	581	3532	0	482	3532	0	1310	1723	0	846	1624	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			1			11			71	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		593			312			804			165	
Travel Time (s)		10.1			5.3			18.3			3.8	
Peak Hour Factor	0.83	0.83	0.83	0.91	0.91	0.91	0.93	0.93	0.93	0.84	0.84	0.84
Adj. Flow (vph)	12	940	12	11	780	11	22	11	11	190	12	71
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	952	0	11	791	0	22	22	0	190	83	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	50	50		50	50		50	50		50	50	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	18.0		5.0	18.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	11.3	38.3		11.7	24.7		10.9	11.0		10.8	39.8	
Total Split (s)	26.9	40.0	0.0	23.0	36.1	0.0	15.0	38.5	0.0	18.5	42.0	0.0
Total Split (%)	22.4%	33.3%	0.0%	19.2%	30.1%	0.0%	12.5%	32.1%	0.0%	15.4%	35.0%	0.0%

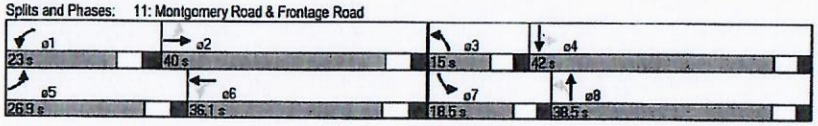
Lanes, Volumes, Timings
11: Montgomery Road & Frontage Road 8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	20.6	33.7		16.3	29.4		9.1	32.6		12.7	36.2	
Yellow Time (s)	3.9	3.9		3.9	3.9		3.6	3.6		3.6	3.6	
All-Red Time (s)	2.4	2.4		2.8	2.8		2.3	2.3		2.2	2.2	
Lost Time Adjust (s)	-2.3	-2.3	0.0	-2.7	-2.7	-1.8	-1.9	-1.9	0.0	-1.8	-1.8	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	2.2	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		6.0									6.0	
Flash Dont Walk (s)		22.0									25.0	
Pedestrian Calls (#/hr)		0									0	
Act Effct Green (s)	88.9	87.2		88.4	84.9		14.2	8.5		22.2	14.1	
Actuated g/C Ratio	0.74	0.73		0.74	0.71		0.12	0.07		0.18	0.12	
v/c Ratio	0.02	0.37		0.02	0.32		0.12	0.17		0.71	0.33	
Control Delay	5.5	8.1		5.6	8.7		38.9	36.4		58.5	18.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	5.5	8.1		5.6	8.7		38.9	36.4		58.5	18.0	
LOS	A	A		A	A		D	D		E	B	
Approach Delay		8.0			8.7			37.7			46.2	
Approach LOS		A			A			D			D	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 63.7 (53%), Referenced to phase 2:EBTL and 6:WBTL, Start of FDW or yellow
Natural Cycle: 105
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 13.9 Intersection LOS: B
Intersection Capacity Utilization 44.1% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 11: Montgomery Road & Frontage Road



Lanes, Volumes, Timings
11: Montgomery Road & Kenwood Road

8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	260	560	180	350	490	250	130	640	240	210	650	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	233		0	302		0	83		0	125		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.964				0.850		0.959			0.968	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3412	0	1770	3539	1583	1770	3394	0	1770	3426	0
Flt Permitted	0.292			0.114			0.116			0.105		
Satd. Flow (perm)	544	3412	0	212	3539	1583	216	3394	0	196	3426	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		37				275		45			31	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		593			312			804			331	
Travel Time (s)		10.1			5.3			18.3			7.5	
Peak Hour Factor	0.83	0.83	0.83	0.91	0.91	0.91	0.93	0.93	0.93	0.84	0.84	0.84
Adj. Flow (vph)	313	675	217	385	538	275	140	688	258	250	774	214
Shared Lane Traffic (%)												
Lane Group Flow (vph)	313	892	0	385	538	275	140	946	0	250	988	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1	1	1	1		1	1	
Detector Template												
Leading Detector (ft)	50	50		50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	50	50		50	50	50	50	50		50	50	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Turn Type	pm+pt			pm+pt		Over	pm+pt			pm+pt		
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6	7	3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	18.0		5.0	18.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	11.3	38.3		11.7	24.7	10.8	10.9	11.0		10.8	39.8	
Total Split (s)	26.9	40.0	0.0	23.0	36.1	18.5	15.0	38.5	0.0	18.5	42.0	0.0
Total Split (%)	22.4%	33.3%	0.0%	19.2%	30.1%	15.4%	12.5%	32.1%	0.0%	15.4%	35.0%	0.0%

Lanes, Volumes, Timings
11: Montgomery Road & Kenwood Road

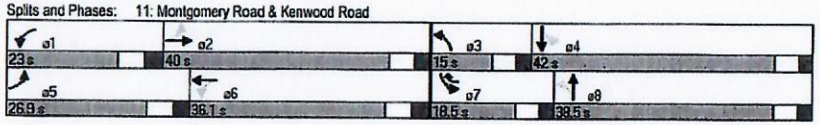
8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	20.6	33.7		16.3	29.4	12.7	9.1	32.6		12.7	36.2	
Yellow Time (s)	3.9	3.9		3.9	3.9	3.6	3.6	3.6		3.6	3.6	
All-Red Time (s)	2.4	2.4		2.8	2.8	2.2	2.3	2.3		2.2	2.2	
Lost Time Adjust (s)	-2.3	-2.3	0.0	-2.7	-2.7	-1.8	-1.9	-1.9	0.0	-1.8	-1.8	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max	None	None	None		None	None	
Walk Time (s)		6.0									6.0	
Flash Dont Walk (s)		22.0									25.0	
Pedestrian Calls (#/hr)		0									0	
Act Effct Green (s)	56.0	36.0		54.1	35.1	14.5	45.2	34.4		52.5	38.2	
Actuated g/C Ratio	0.47	0.30		0.45	0.29	0.12	0.38	0.29		0.44	0.32	
v/c Ratio	0.68	0.85		1.12	0.52	0.64	0.64	0.94		0.91	0.89	
Control Delay	27.3	46.8		119.7	38.3	12.9	37.0	57.3		65.4	46.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	30.9	
Total Delay	27.3	46.8		119.7	38.3	12.9	37.0	57.3		65.4	77.3	
LOS	C	D		F	D	B	D	E		E	E	
Approach Delay		41.7			58.6			54.7			74.9	
Approach LOS		D			E			D			E	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 63.7 (53%), Referenced to phase 2:EBTL and 6:WBTL, Start of FDW or yellow
Natural Cycle: 115
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.12
Intersection Signal Delay: 57.7 — Intersection LOS: E
Intersection Capacity Utilization 91.0% — ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 11: Montgomery Road & Kenwood Road



Lanes, Volumes, Timings
15: Orchard Lane & Kenwood Road

8/22/2012

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	30	120	140	930	920	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	30			0
Storage Lanes	0	0	1			0
Taper Length (ft)	25	25	25			25
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt	0.892				0.992	
Flt Protected	0.990		0.950			
Sald. Flow (prot)	1645	0	1770	3539	3511	0
Flt Permitted	0.990		0.247			
Sald. Flow (perm)	1645	0	460	3539	3511	0
Right Turn on Red		Yes				Yes
Sald. Flow (RTOR)	112				8	
Link Speed (mph)	30			30	30	
Link Distance (ft)	805			331	556	
Travel Time (s)	18.3			7.5	12.6	
Peak Hour Factor	0.80	0.80	0.89	0.89	0.89	0.89
Adj. Flow (vph)	38	150	157	1045	1034	56
Shared Lane Traffic (%)						
Lane Group Flow (vph)	188	0	157	1045	1090	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Number of Detectors	1		1	1	1	
Detector Template						
Leading Detector (ft)	50		50	50	50	
Trailing Detector (ft)	0		0	0	0	
Detector 1 Position(ft)	0		0	0	0	
Detector 1 Size(ft)	50		50	50	50	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	
Turn Type			Perm			
Protected Phases	4			2	6	
Permitted Phases			2			
Detector Phase	4		2	2	6	
Switch Phase						
Minimum Initial (s)	5.0		50.0	50.0	50.0	
Minimum Split (s)	31.0		56.0	56.0	56.0	
Total Split (s)	44.0	0.0	76.0	76.0	76.0	0.0
Total Split (%)	36.7%	0.0%	63.3%	63.3%	63.3%	0.0%

Lanes, Volumes, Timings
15: Orchard Lane & Kenwood Road

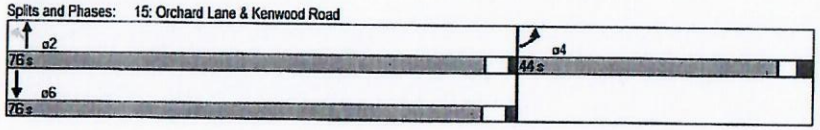
8/22/2012

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Maximum Green (s)	38.7		71.2	71.2	70.9	
Yellow Time (s)	2.8		3.6	3.6	3.6	
All-Red Time (s)	2.5		1.2	1.2	1.5	
Lost Time Adjust (s)	-1.3	0.0	-0.8	-0.8	-1.1	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	None		C-Min	C-Min	C-Min	
Walk Time (s)	6.0				6.0	
Flash Dont Walk (s)	15.0				8.0	
Pedestrian Calls (#/hr)	0				0	
Act Effct Green (s)	13.0		99.0	99.0	99.0	
Actuated g/C Ratio	0.11		0.82	0.82	0.82	
v/c Ratio	0.68		0.41	0.36	0.38	
Control Delay	33.1		3.6	1.5	3.4	
Queue Delay	0.2		0.0	0.4	0.2	
Total Delay	33.4		3.6	1.9	3.6	
LOS	C		A	A	A	
Approach Delay	33.4			2.1	3.6	
Approach LOS	C			A	A	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 68.3 (57%), Referenced to phase 2:NBTL and 6:SBT, Start of FDW or yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.68
Intersection Signal Delay: 5.1 — Intersection LOS: A
Intersection Capacity Utilization 102.4% — ICU Level of Service G
Analysis Period (min) 15

Splits and Phases: 15: Orchard Lane & Kenwood Road



E. 2012 AM Build

Lanes, Volumes, Timings
11: Montgomery Road & Frontage Road

8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	450	40	40	370	170	30	10	20	10	10	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	233		0	302		0	83		0	125		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.988			0.953			0.898			0.925	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3497	0	1770	3373	0	1770	1673	0	1770	1723	0
Flt Permitted	0.426			0.408			0.549			0.737		
Satd. Flow (perm)	794	3497	0	760	3373	0	1023	1673	0	1373	1723	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			73			21			11	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		593			821			804			165	
Travel Time (s)		10.1			14.0			18.3			3.8	
Peak Hour Factor	0.83	0.83	0.83	0.97	0.97	0.97	0.97	0.97	0.97	0.90	0.90	0.90
Adj. Flow (vph)	60	542	48	41	381	175	31	10	21	11	11	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	590	0	41	556	0	31	31	0	11	22	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	50	50		50	50		50	50		50	50	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	18.0		5.0	18.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	13.0	39.3		13.0	28.0		13.0	22.0		13.0	40.8	
Total Split (s)	15.0	51.2	0.0	15.0	51.2	0.0	13.0	40.8	0.0	13.0	40.8	0.0
Total Split (%)	12.5%	42.7%	0.0%	12.5%	42.7%	0.0%	10.8%	34.0%	0.0%	10.8%	34.0%	0.0%

Lanes, Volumes, Timings
11: Montgomery Road & Frontage Road

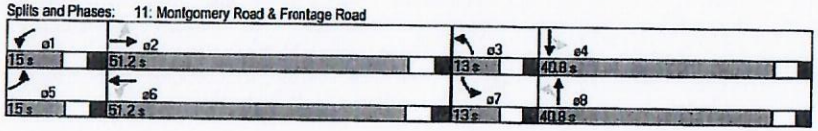
8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	8.7	44.9		8.3	44.5		7.1	34.9		7.2	35.0	
Yellow Time (s)	3.9	3.9		3.9	3.9		3.6	3.6		3.6	3.6	
All-Red Time (s)	2.4	2.4		2.8	2.8		2.3	2.3		2.2	2.2	
Lost Time Adjust (s)	-2.3	-2.3	0.0	-2.7	-2.7	-1.8	-1.9	-1.9	0.0	-1.8	-1.8	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	2.2	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		6.0									6.0	
Flash Dont Walk (s)		22.0									25.0	
Pedestrian Calls (#/hr)		0									0	
Act Effct Green (s)	97.0	90.7		97.1	90.7		15.7	13.7		13.5	8.5	
Actuated g/C Ratio	0.81	0.76		0.81	0.76		0.13	0.11		0.11	0.07	
v/c Ratio	0.08	0.22		0.06	0.22		0.17	0.15		0.06	0.17	
Control Delay	3.8	7.0		3.9	6.2		43.8	25.9		40.9	36.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	3.8	7.0		3.9	6.2		43.8	25.9		40.9	36.4	
LOS	A	A		A	A		D	C		D	D	
Approach Delay		6.7			6.1			34.8			37.9	
Approach LOS		A			A			C			D	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 64.7 (54%), Referenced to phase 2:EBTL and 6:WBTL, Start of FDW or yellow
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.22
Intersection Signal Delay: 8.5 — Intersection LOS: A
Intersection Capacity Utilization 38.2% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 11: Montgomery Road & Frontage Road



Lanes, Volumes, Timings
11: Montgomery Road & Kenwood Road

8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	110	390	60	190	370	160	190	450	230	100	470	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	233		0	302		0	83		0	125		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.980				0.850		0.949			0.974	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3468	0	1770	3539	1583	1770	3359	0	1770	3447	0
Flt Permitted	0.482			0.328			0.185			0.125		
Satd. Flow (perm)	898	3468	0	611	3539	1583	345	3359	0	233	3447	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14				176		75			22	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		593			480			804			331	
Travel Time (s)		10.1			8.2			18.3			7.5	
Peak Hour Factor	0.83	0.83	0.83	0.91	0.91	0.91	0.93	0.93	0.93	0.84	0.84	0.84
Adj. Flow (vph)	133	470	72	209	407	176	204	484	247	119	560	119
Shared Lane Traffic (%)												
Lane Group Flow (vph)	133	542	0	209	407	176	204	731	0	119	679	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1	1	1	1		1	1	
Detector Template												
Leading Detector (ft)	50	50		50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	50	50		50	50	50	50	50		50	50	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Turn Type	pm+pt			pm+pt		Over	pm+pt			pm+pt		
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6	7	3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	18.0		5.0	18.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	11.3	38.3		11.7	24.7	10.8	10.9	11.0		10.8	39.8	
Total Split (s)	26.9	40.0	0.0	23.0	36.1	18.5	15.0	38.5	0.0	18.5	42.0	0.0
Total Split (%)	22.4%	33.3%	0.0%	19.2%	30.1%	15.4%	12.5%	32.1%	0.0%	15.4%	35.0%	0.0%

Lanes, Volumes, Timings
11: Montgomery Road & Kenwood Road

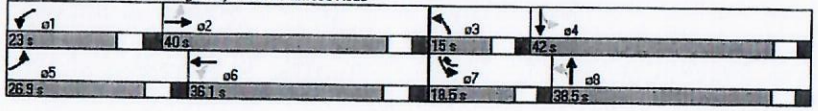
8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	20.6	33.7		16.3	29.4	12.7	9.1	32.6		12.7	36.2	
Yellow Time (s)	3.9	3.9		3.9	3.9	3.6	3.6	3.6		3.6	3.6	
All-Red Time (s)	2.4	2.4		2.8	2.8	2.2	2.3	2.3		2.2	2.2	
Lost Time Adjust (s)	-2.3	-2.3	0.0	-2.7	-2.7	-1.8	-1.9	-1.9	0.0	-1.8	-1.8	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max	None	None	None		None	None	
Walk Time (s)		6.0									6.0	
Flash Dont Walk (s)		22.0									25.0	
Pedestrian Calls (#/hr)		0									0	
Act Effct Green (s)	57.6	45.1		63.7	48.2	12.3	42.0	31.0		44.7	32.3	
Actuated g/C Ratio	0.48	0.38		0.53	0.40	0.10	0.35	0.26		0.37	0.27	
v/c Ratio	0.25	0.41		0.44	0.29	0.55	0.81	0.79		0.49	0.72	
Control Delay	16.7	29.8		18.8	26.6	13.9	50.3	43.7		28.2	41.8	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	1.5	
Total Delay	16.7	29.8		18.8	26.6	13.9	50.3	43.7		28.2	43.3	
LOS	B	C		B	C	B	D	D		C	D	
Approach Delay		27.2			21.7			45.1			41.0	
Approach LOS		C			C			D			D	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 63.7 (53%), Referenced to phase 2:EBTL and 6:WBTL, Start of FDW or yellow
Natural Cycle: 105
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.81
Intersection Signal Delay: 34.5 — Intersection LOS: C
Intersection Capacity Utilization 65.6% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 11: Montgomery Road & Kenwood Road



Lanes, Volumes, Timings
15: Orchard Lane & Kenwood Road

8/22/2012

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	20	110	10	590	530	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	30			0
Storage Lanes	0	0	1			0
Taper Length (ft)	25	25	25			25
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt	0.886				0.985	
Flt Protected	0.992		0.950			
Sald. Flow (prot)	1637	0	1770	3539	3486	0
Flt Permitted	0.992		0.398			
Sald. Flow (perm)	1637	0	741	3539	3486	0
Right Turn on Red		Yes				Yes
Sald. Flow (RTOR)	138				18	
Link Speed (mph)	30			30	30	
Link Distance (ft)	805			331	556	
Travel Time (s)	18.3			7.5	12.6	
Peak Hour Factor	0.80	0.80	0.89	0.89	0.89	0.89
Adj. Flow (vph)	25	138	11	663	596	67
Shared Lane Traffic (%)						
Lane Group Flow (vph)	163	0	11	663	663	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Number of Detectors	1		1	1	1	
Detector Template						
Leading Detector (ft)	50		50	50	50	
Trailing Detector (ft)	0		0	0	0	
Detector 1 Position(ft)	0		0	0	0	
Detector 1 Size(ft)	50		50	50	50	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	
Turn Type			Perm			
Protected Phases	4			2	6	
Permitted Phases			2			
Detector Phase	4		2	2	6	
Switch Phase						
Minimum Initial (s)	5.0		50.0	50.0	50.0	
Minimum Split (s)	31.0		56.0	56.0	56.0	
Total Split (s)	44.0	0.0	76.0	76.0	76.0	0.0
Total Split (%)	36.7%	0.0%	63.3%	63.3%	63.3%	0.0%

Lanes, Volumes, Timings
15: Orchard Lane & Kenwood Road

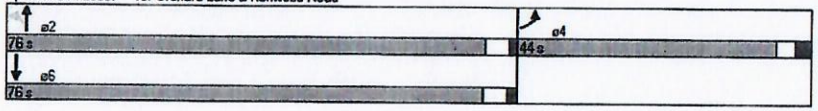
8/22/2012

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Maximum Green (s)	38.7		71.2	71.2	70.9	
Yellow Time (s)	2.8		3.6	3.6	3.6	
All-Red Time (s)	2.5		1.2	1.2	1.5	
Lost Time Adjust (s)	-1.3	0.0	-0.8	-0.8	-1.1	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	None		C-Min	C-Min	C-Min	
Walk Time (s)	6.0				6.0	
Flash Dont Walk (s)	15.0				8.0	
Pedestrian Calls (#/hr)	0				0	
Act Effct Green (s)	10.0		102.0	102.0	102.0	
Actuated g/C Ratio	0.08		0.85	0.85	0.85	
v/c Ratio	0.62		0.02	0.22	0.22	
Control Delay	23.0		0.8	0.8	2.0	
Queue Delay	0.0		0.0	0.3	0.0	
Total Delay	23.0		0.8	1.0	2.0	
LOS	C		A	A	A	
Approach Delay	23.0			1.0	2.0	
Approach LOS	C			A	A	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 68.3 (57%), Referenced to phase 2:NBTL and 6:SBT, Start of FDW or yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.62
Intersection Signal Delay: 3.8 — Intersection LOS: A
Intersection Capacity Utilization 56.2% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 15: Orchard Lane & Kenwood Road



F. 2012 PM Build

Lanes, Volumes, Timings
11: Montgomery Road & Frontage Road

8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	760	10	10	680	80	20	10	10	190	10	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	233		0	302		0	83		0	125		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998			0.984			0.925			0.865	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3532	0	1770	3483	0	1770	1723	0	1770	1611	0
Flt Permitted	0.285			0.273			0.681			0.454		
Satd. Flow (perm)	531	3532	0	509	3483	0	1269	1723	0	846	1611	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			10			11			107	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		593			480			804			165	
Travel Time (s)		10.1			8.2			18.3			3.8	
Peak Hour Factor	0.83	0.83	0.83	0.91	0.91	0.91	0.93	0.93	0.93	0.84	0.84	0.84
Adj. Flow (vph)	36	916	12	11	747	88	22	11	11	226	12	107
Shared Lane Traffic (%)												
Lane Group Flow (vph)	36	928	0	11	835	0	22	22	0	226	119	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	50	50		50	50		50	50		50	50	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	18.0		5.0	18.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	11.3	38.3		11.7	24.7		10.9	11.0		10.8	39.8	
Total Split (s)	26.9	40.0	0.0	23.0	36.1	0.0	15.0	38.5	0.0	18.5	42.0	0.0
Total Split (%)	22.4%	33.3%	0.0%	19.2%	30.1%	0.0%	12.5%	32.1%	0.0%	15.4%	35.0%	0.0%

8/22/2012 2012 Build PM Peak

Synchro 7 - Light: Report
Page 1

G. 2032 AM Build

Lanes, Volumes, Timings
11: Montgomery Road & Frontage Road 8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	430	40	40	340	230	30	10	20	40	10	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	233		0	302		0	83		0	125		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.987			0.940			0.898			0.880	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3493	0	1770	3327	0	1770	1673	0	1770	1639	0
Flt Permitted	0.408			0.422			0.721			0.619		
Satd. Flow (perm)	760	3493	0	786	3327	0	1343	1673	0	1153	1639	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			163			21			44	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		593			821			804			165	
Travel Time (s)		10.1			14.0			18.3			3.8	
Peak Hour Factor	0.83	0.83	0.83	0.97	0.97	0.97	0.97	0.97	0.97	0.90	0.90	0.90
Adj. Flow (vph)	84	518	48	41	351	237	31	10	21	44	11	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	84	566	0	41	588	0	31	31	0	44	55	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	50	50		50	50		50	50		50	50	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	18.0		5.0	18.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	13.0	39.3		13.0	28.0		13.0	22.0		13.0	40.8	
Total Split (s)	15.0	51.2	0.0	15.0	51.2	0.0	13.0	40.8	0.0	13.0	40.8	0.0
Total Split (%)	12.5%	42.7%	0.0%	12.5%	42.7%	0.0%	10.8%	34.0%	0.0%	10.8%	34.0%	0.0%

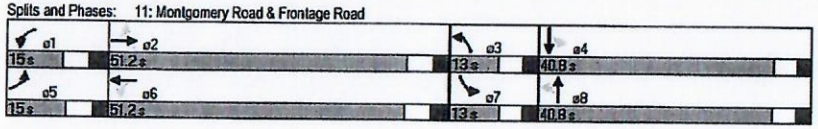
Lanes, Volumes, Timings
11: Montgomery Road & Frontage Road 8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	8.7	44.9		8.3	44.5		7.1	34.9		7.2	35.0	
Yellow Time (s)	3.9	3.9		3.9	3.9		3.6	3.6		3.6	3.6	
All-Red Time (s)	2.4	2.4		2.8	2.8		2.3	2.3		2.2	2.2	
Lost Time Adjust (s)	-2.3	-2.3	0.0	-2.7	-2.7	-1.8	-1.9	-1.9	0.0	-1.8	-1.8	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	2.2	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		6.0									6.0	
Flash Dont Walk (s)		22.0									25.0	
Pedestrian Calls (#/hr)		0									0	
Act Effct Green (s)	94.5	87.7		93.7	87.3		14.5	8.9		14.6	9.2	
Actuated g/C Ratio	0.79	0.73		0.78	0.73		0.12	0.07		0.12	0.08	
v/c Ratio	0.12	0.22		0.06	0.24		0.16	0.22		0.24	0.33	
Control Delay	4.2	7.7		4.2	6.0		43.1	30.0		45.0	25.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	4.2	7.7		4.2	6.0		43.1	30.0		45.0	25.0	
LOS	A	A		A	A		D	C		D	C	
Approach Delay		7.3			5.8			36.5			33.9	
Approach LOS		A			A			D			C	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 64.7 (54%), Referenced to phase 2:EBTL and 6:WBTL, Start of FDW or yellow
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.33
Intersection Signal Delay: 9.7 Intersection LOS: A
Intersection Capacity Utilization 39.8% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 11: Montgomery Road & Frontage Road



Lanes, Volumes, Timings
11: Montgomery Road & Kenwood Road

8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	110	400	60	190	370	170	190	450	230	110	470	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	233		0	302		0	83		0	125		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.981				0.850		0.949			0.974	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3472	0	1770	3539	1583	1770	3359	0	1770	3447	0
Flt Permitted	0.482			0.318			0.191			0.124		
Satd. Flow (perm)	898	3472	0	592	3539	1583	356	3359	0	231	3447	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14				187		75			22	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		593			480			804			331	
Travel Time (s)		10.1			8.2			18.3			7.5	
Peak Hour Factor	0.83	0.83	0.83	0.91	0.91	0.91	0.93	0.93	0.93	0.84	0.84	0.84
Adj. Flow (vph)	133	482	72	209	407	187	204	484	247	131	560	119
Shared Lane Traffic (%)												
Lane Group Flow (vph)	133	554	0	209	407	187	204	731	0	131	679	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1	1	1	1		1	1	
Detector Template												
Leading Detector (ft)	50	50		50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	50	50		50	50	50	50	50		50	50	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Turn Type	pm+pt			pm+pt		Over	pm+pt			pm+pt		
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6	7	3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	18.0		5.0	18.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	11.3	38.3		11.7	24.7	10.8	10.9	11.0		10.8	39.8	
Total Split (s)	26.9	40.0	0.0	23.0	36.1	18.5	15.0	38.5	0.0	18.5	42.0	0.0
Total Split (%)	22.4%	33.3%	0.0%	19.2%	30.1%	15.4%	12.5%	32.1%	0.0%	15.4%	35.0%	0.0%

8/22/2012 2032 Build AM Peak

Synchro 7 - Light: Report
Page 1

H. 2032 PM Build

Lanes, Volumes, Timings
11: Montgomery Road & Frontage Road 8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	760	10	10	680	80	20	10	10	190	10	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	233		0	302		0	83		0	125		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998			0.984			0.925			0.865	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3532	0	1770	3483	0	1770	1723	0	1770	1611	0
Flt Permitted	0.285			0.273			0.681			0.454		
Satd. Flow (perm)	531	3532	0	509	3483	0	1269	1723	0	846	1611	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			10			11			107	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		593			480			804			165	
Travel Time (s)		10.1			8.2			18.3			3.8	
Peak Hour Factor	0.83	0.83	0.83	0.91	0.91	0.91	0.93	0.93	0.93	0.84	0.84	0.84
Adj. Flow (vph)	36	916	12	11	747	88	22	11	11	226	12	107
Shared Lane Traffic (%)												
Lane Group Flow (vph)	36	928	0	11	835	0	22	22	0	226	119	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template												
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	50	50		50	50		50	50		50	50	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	18.0		5.0	18.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	11.3	38.3		11.7	24.7		10.9	11.0		10.8	39.8	
Total Split (s)	26.9	40.0	0.0	23.0	36.1	0.0	15.0	38.5	0.0	18.5	42.0	0.0
Total Split (%)	22.4%	33.3%	0.0%	19.2%	30.1%	0.0%	12.5%	32.1%	0.0%	15.4%	35.0%	0.0%

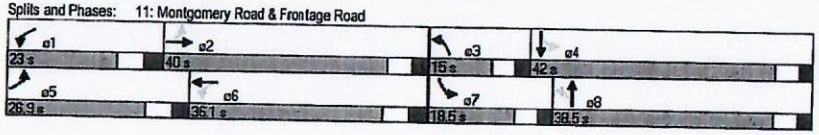
Lanes, Volumes, Timings
11: Montgomery Road & Frontage Road 8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	20.6	33.7		16.3	29.4		9.1	32.6		12.7	36.2	
Yellow Time (s)	3.9	3.9		3.9	3.9		3.6	3.6		3.6	3.6	
All-Red Time (s)	2.4	2.4		2.8	2.8		2.3	2.3		2.2	2.2	
Lost Time Adjust (s)	-2.3	-2.3	0.0	-2.7	-2.7	-1.8	-1.9	-1.9	0.0	-1.8	-1.8	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	2.2	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		6.0									6.0	
Flash Dont Walk (s)		22.0									25.0	
Pedestrian Calls (#/hr)		0									0	
Act Effct Green (s)	88.9	87.0		87.0	81.8		14.2	8.5		22.4	14.3	
Actuated g/C Ratio	0.74	0.72		0.72	0.68		0.12	0.07		0.19	0.12	
v/c Ratio	0.07	0.36		0.02	0.35		0.12	0.17		0.84	0.41	
Control Delay	5.5	8.0		5.6	10.2		38.9	36.5		70.5	16.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	5.5	8.0		5.6	10.2		38.9	36.5		70.5	16.1	
LOS	A	A		A	B		D	D		E	B	
Approach Delay		7.9			10.2			37.7			51.8	
Approach LOS		A			B			D			D	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 63.7 (53%), Referenced to phase 2:EBTL and 6:WBTL, Start of FDW or yellow
Natural Cycle: 105
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 16.3 — Intersection LOS: B
Intersection Capacity Utilization 48.8% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 11: Montgomery Road & Frontage Road



Lanes, Volumes, Timings
11: Montgomery Road & Kenwood Road

8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	260	590	180	350	490	250	200	570	240	180	650	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	233		0	302		0	83		0	125		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.965				0.850		0.956			0.973	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3415	0	1770	3539	1583	1770	3383	0	1770	3444	0
Flt Permitted	0.307			0.111			0.118			0.108		
Satd. Flow (perm)	572	3415	0	207	3539	1583	220	3383	0	201	3444	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		34				275		54			22	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		593			480			804			331	
Travel Time (s)		10.1			8.2			18.3			7.5	
Peak Hour Factor	0.83	0.83	0.83	0.91	0.91	0.91	0.93	0.93	0.93	0.84	0.84	0.84
Adj. Flow (vph)	313	711	217	385	538	275	215	613	258	214	774	167
Shared Lane Traffic (%)												
Lane Group Flow (vph)	313	928	0	385	538	275	215	871	0	214	941	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1	1	1	1		1	1	
Detector Template												
Leading Detector (ft)	50	50		50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	50	50		50	50	50	50	50		50	50	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Turn Type	pm+pt			pm+pt		Over	pm+pt			pm+pt		
Protected Phases	5	2		1	6	7	3	8		7	4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6	7	3	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	18.0		5.0	18.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	11.3	38.3		11.7	24.7	10.8	10.9	11.0		10.8	39.8	
Total Split (s)	26.9	40.0	0.0	23.0	36.1	18.5	15.0	38.5	0.0	18.5	42.0	0.0
Total Split (%)	22.4%	33.3%	0.0%	19.2%	30.1%	15.4%	12.5%	32.1%	0.0%	15.4%	35.0%	0.0%

Lanes, Volumes, Timings
11: Montgomery Road & Kenwood Road

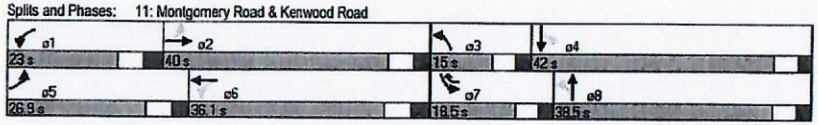
8/22/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	20.6	33.7		16.3	29.4	12.7	9.1	32.6		12.7	36.2	
Yellow Time (s)	3.9	3.9		3.9	3.9	3.6	3.6	3.6		3.6	3.6	
All-Red Time (s)	2.4	2.4		2.8	2.8	2.2	2.3	2.3		2.2	2.2	
Lost Time Adjust (s)	-2.3	-2.3	0.0	-2.7	-2.7	-1.8	-1.9	-1.9	0.0	-1.8	-1.8	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max	None	None	None		None	None	
Walk Time (s)		6.0									6.0	
Flash Dont Walk (s)		22.0									25.0	
Pedestrian Calls (#/hr)		0									0	
Act Effct Green (s)	55.9	36.0		55.0	36.1	14.2	44.8	33.8		51.1	37.0	
Actuated g/C Ratio	0.47	0.30		0.46	0.30	0.12	0.37	0.28		0.43	0.31	
v/c Ratio	0.67	0.89		1.08	0.50	0.64	0.96	0.88		0.79	0.87	
Control Delay	26.6	49.9		106.1	37.6	13.1	80.7	49.6		45.1	46.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	24.4	
Total Delay	26.6	49.9		106.1	37.6	13.1	80.7	49.6		45.1	71.1	
LOS	C	D		F	D	B	F	D		D	E	
Approach Delay		44.0			54.0			55.8			66.3	
Approach LOS		D			D			E			E	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 63.7 (53%), Referenced to phase 2:EBTL and 6:WBTL, Start of FDW or yellow
Natural Cycle: 115
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.08
Intersection Signal Delay: 54.8 — Intersection LOS: D
Intersection Capacity Utilization 88.3% — ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 11: Montgomery Road & Kenwood Road



Lanes, Volumes, Timings
15: Orchard Lane & Kenwood Road

8/22/2012

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	30	70	50	920	880	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	30			0
Storage Lanes	0	0	1			0
Taper Length (ft)	25	25	25			25
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt	0.906				0.986	
Flt Protected	0.985		0.950			
Satd. Flow (prot)	1662	0	1770	3539	3490	0
Flt Permitted	0.985		0.250			
Satd. Flow (perm)	1662	0	466	3539	3490	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	88				16	
Link Speed (mph)	30			30	30	
Link Distance (ft)	805			331	556	
Travel Time (s)	18.3			7.5	12.6	
Peak Hour Factor	0.80	0.80	0.89	0.89	0.89	0.89
Adj. Flow (vph)	38	88	56	1034	989	101
Shared Lane Traffic (%)						
Lane Group Flow (vph)	126	0	56	1034	1090	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Number of Detectors	1		1	1	1	
Detector Template						
Leading Detector (ft)	50		50	50	50	
Trailing Detector (ft)	0		0	0	0	
Detector 1 Position(ft)	0		0	0	0	
Detector 1 Size(ft)	50		50	50	50	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	
Turn Type			Perm			
Protected Phases	4			2	6	
Permitted Phases			2			
Detector Phase	4		2	2	6	
Switch Phase						
Minimum Initial (s)	5.0		50.0	50.0	50.0	
Minimum Split (s)	31.0		56.0	56.0	56.0	
Total Split (s)	44.0	0.0	76.0	76.0	76.0	0.0
Total Split (%)	36.7%	0.0%	63.3%	63.3%	63.3%	0.0%

Section VI
Appendix

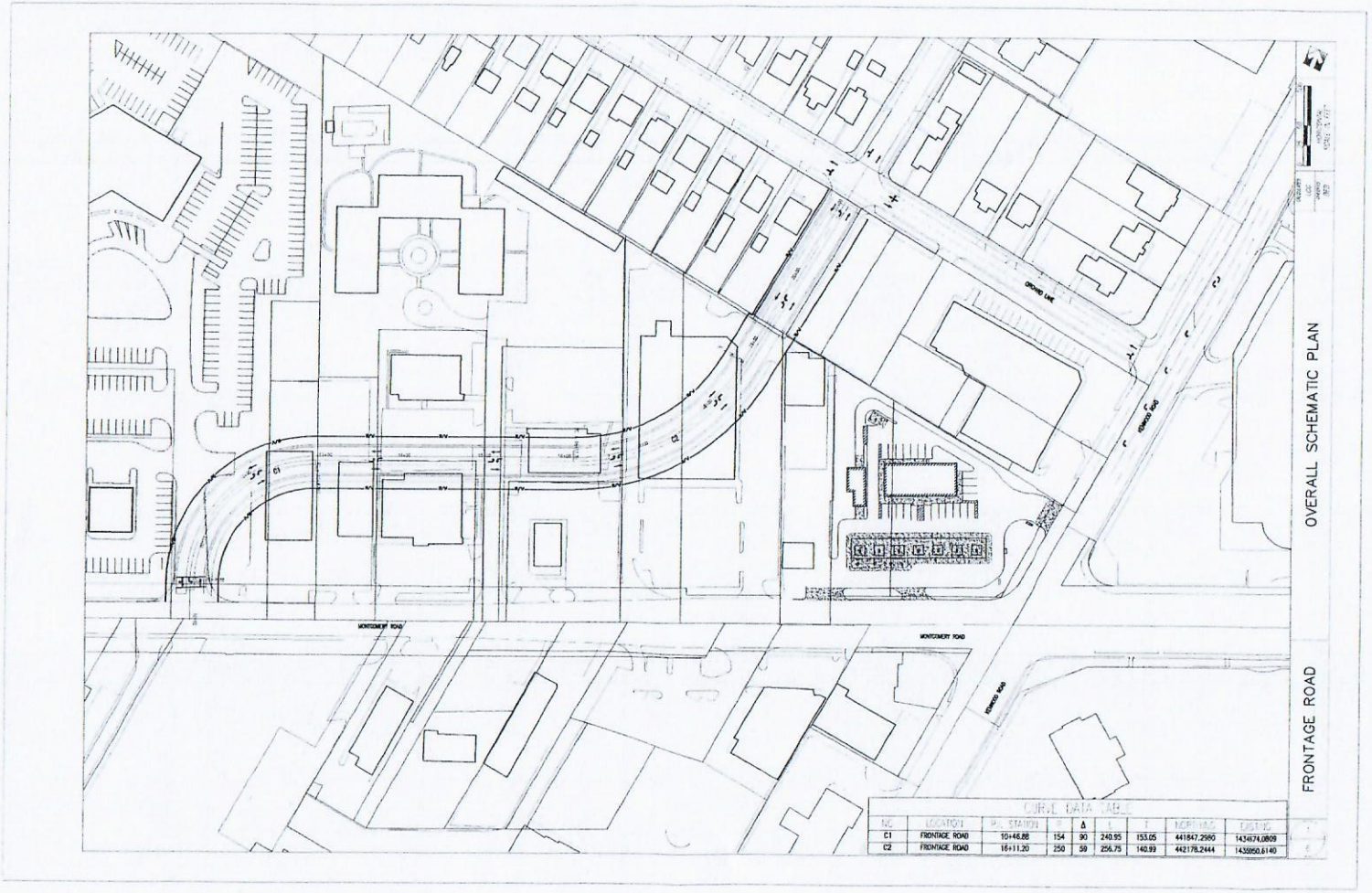
VI. Appendix

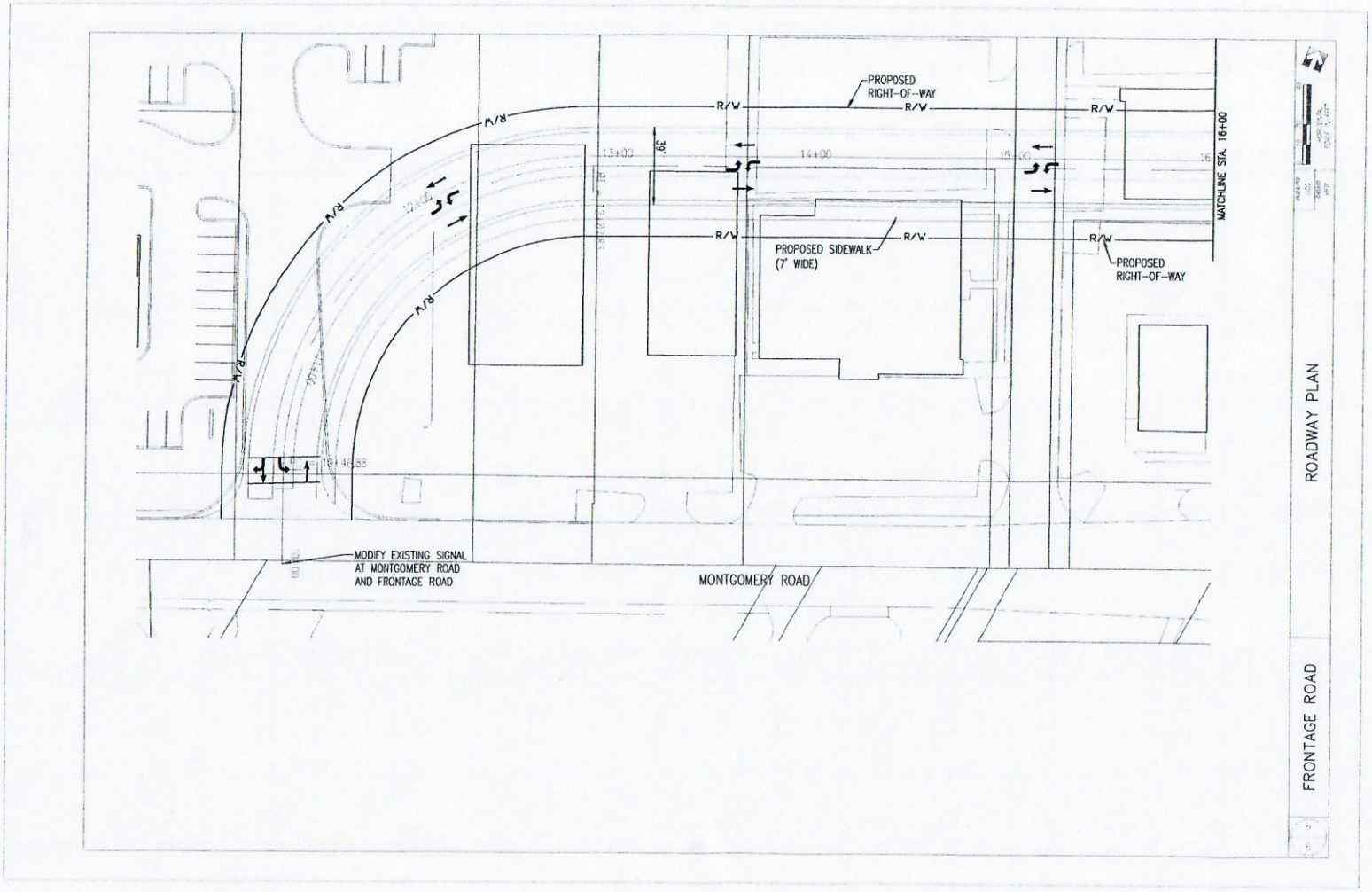
A. Schematic Documents

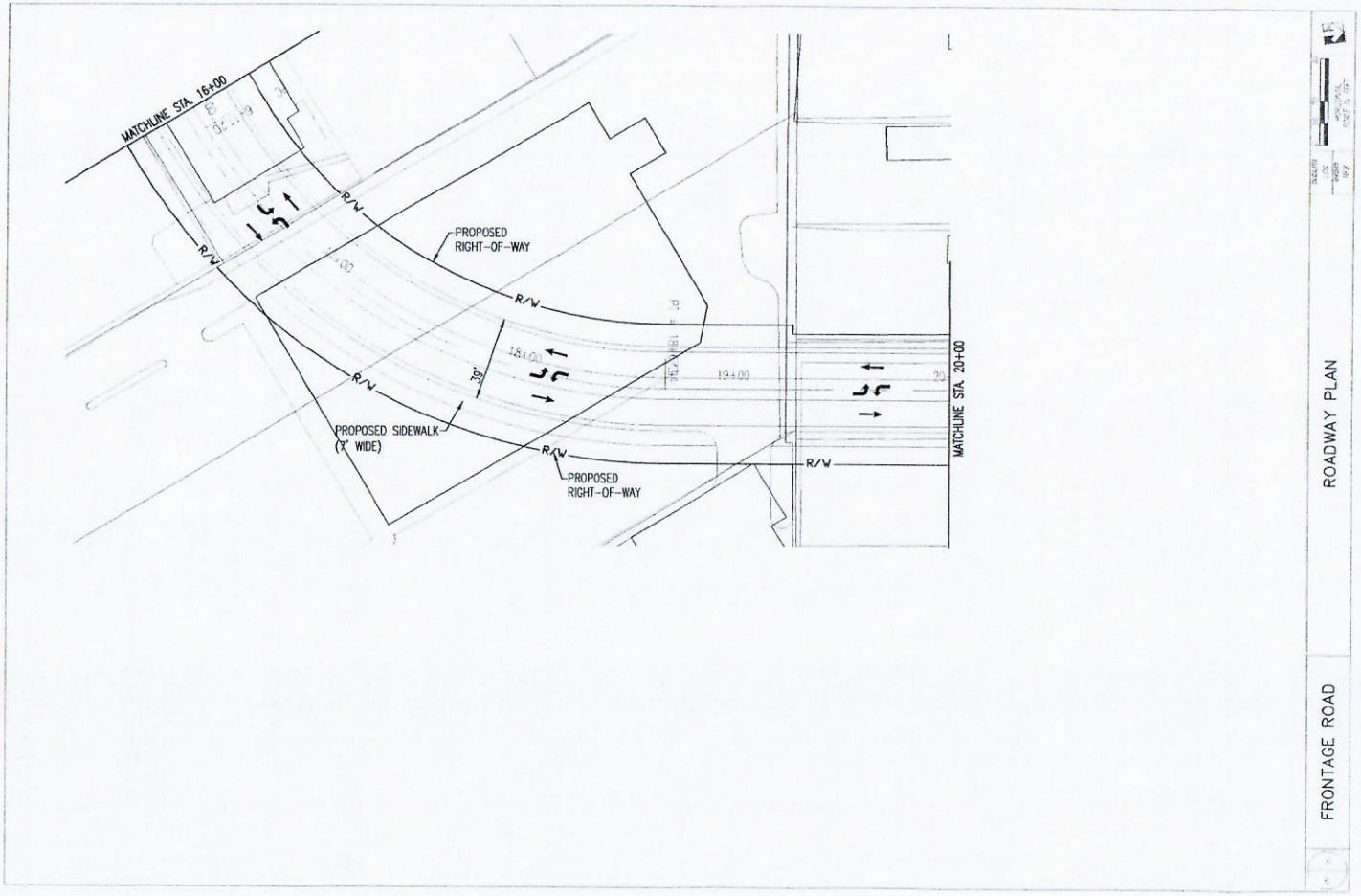
B. HAM-22-10.80, No PID

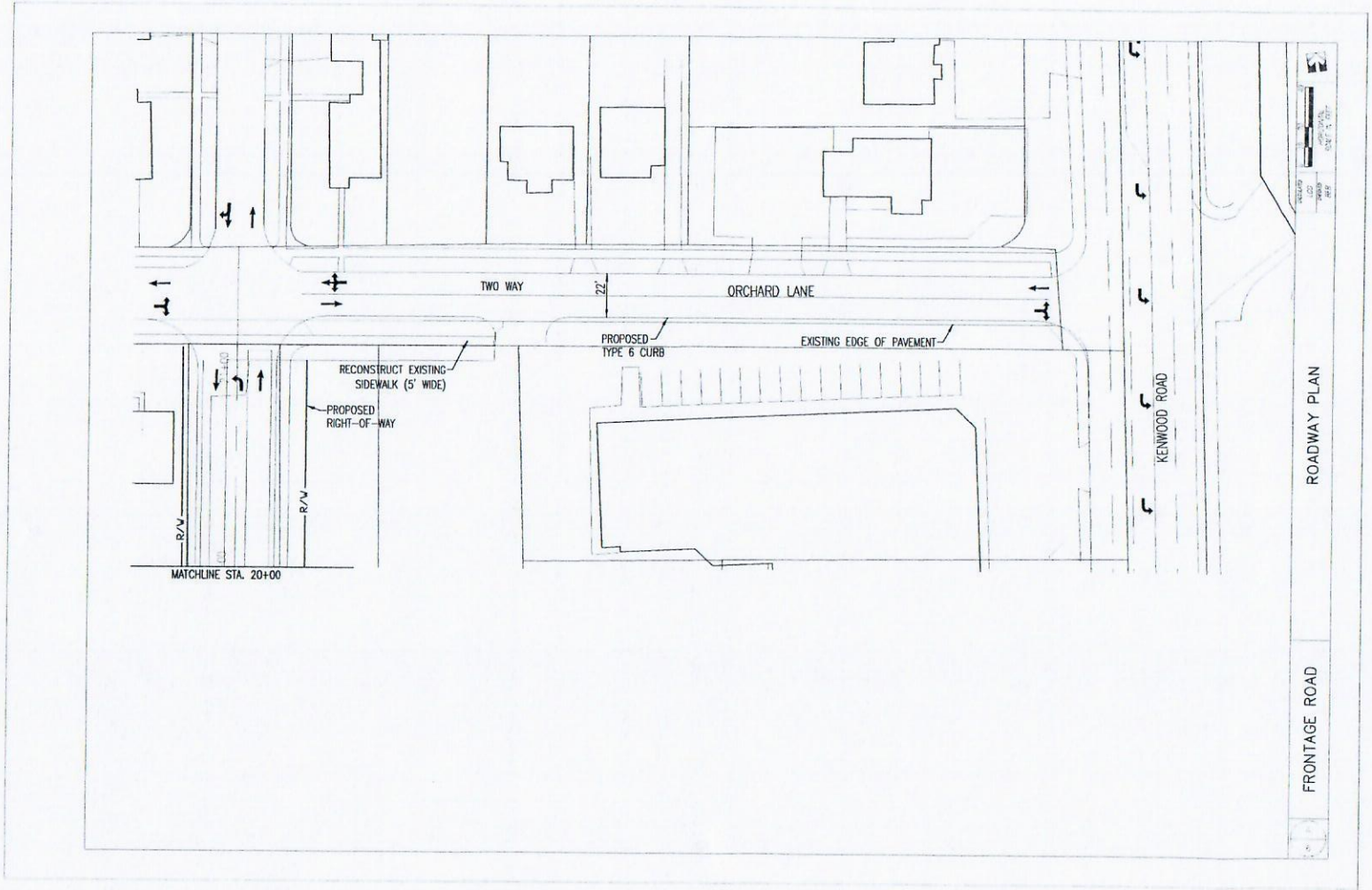
Appendix A
Schematic Documents

A. Schematic Documents




PROPOSED RIGHT-OF-WAY
R/W
13+00
14+00
15+00
39'
PROPOSED SIDEWALK (7' WIDE)
PROPOSED RIGHT-OF-WAY
MATCHLINE STA. 16+00
MODIFY EXISTING SIGNAL AT MONTGOMERY ROAD AND FRONTAGE ROAD
MONTGOMERY ROAD
FRONTAGE ROAD
ROADWAY PLAN


MATCHLINE STA. 16+00
R/W
PROPOSED
RIGHT-OF-WAY
R/W
R/W
39'
18+00
19+00
20
MATCHLINE STA. 20+00
PROPOSED SIDEWALK
(7' WIDE)
R/W
PROPOSED
RIGHT-OF-WAY
R/W
ROADWAY PLAN
FRONTAGE ROAD


FRONTAGE ROAD
ROADWAY PLAN
KENWOOD ROAD
ORCHARD LANE
TWO WAY
22'
PROPOSED TYPE 6 CURB
EXISTING EDGE OF PAVEMENT
RECONSTRUCT EXISTING SIDEWALK (5' WIDE)
PROPOSED RIGHT-OF-WAY
R/W
R/W
MATCHLINE STA. 20+00

Appendix B
Ham-22-10.80, No PID

B. Ham-22-10.80, No PID

INTER-OFFICE COMMUNICATION

TO: **Jennifer Elston, Pavement Engineer, District 8**

FROM: Becky Salak, Transportation Planner, Office of Statewide Planning and Research

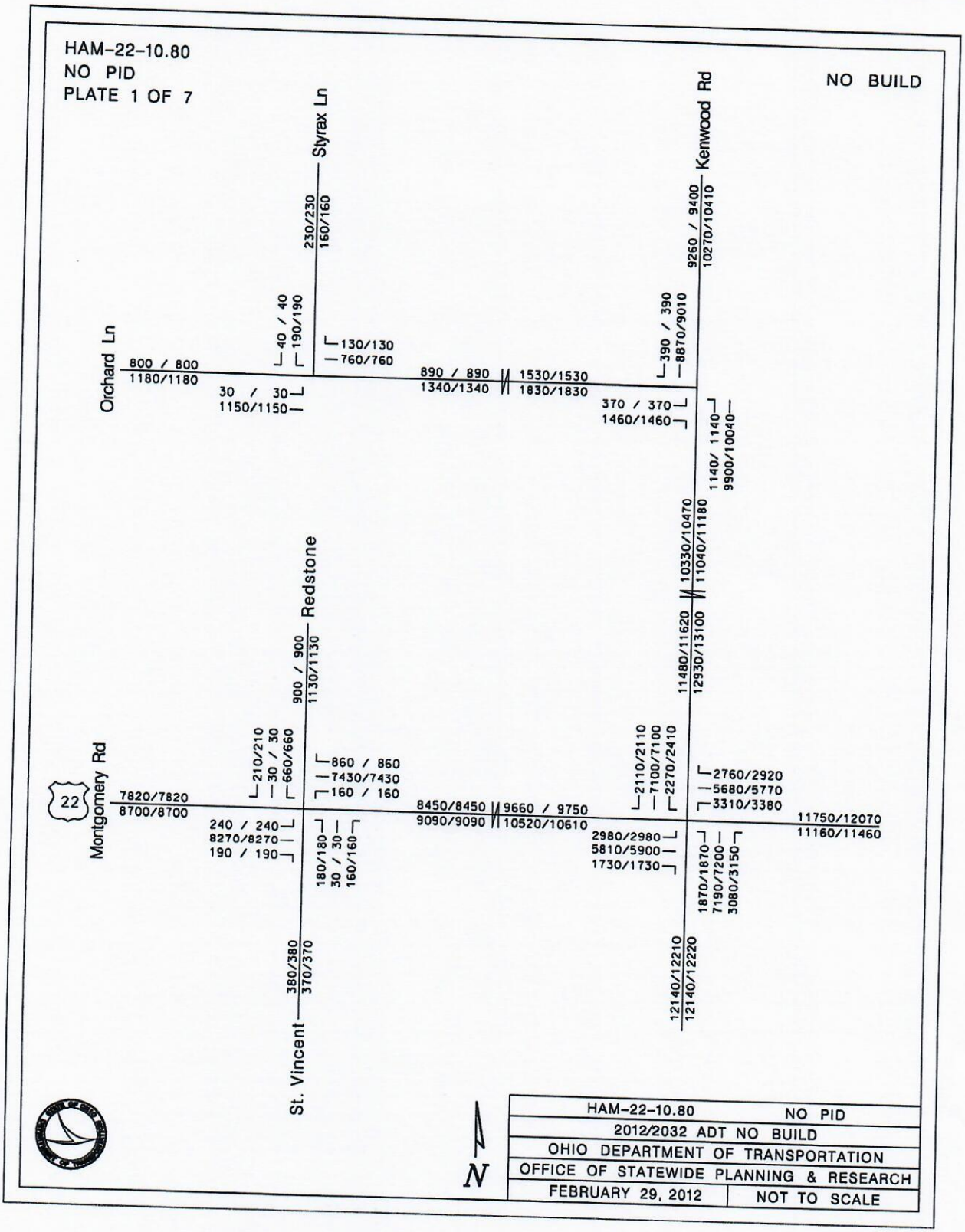
SUBJECT: **HAM-22-10.80, No PID**

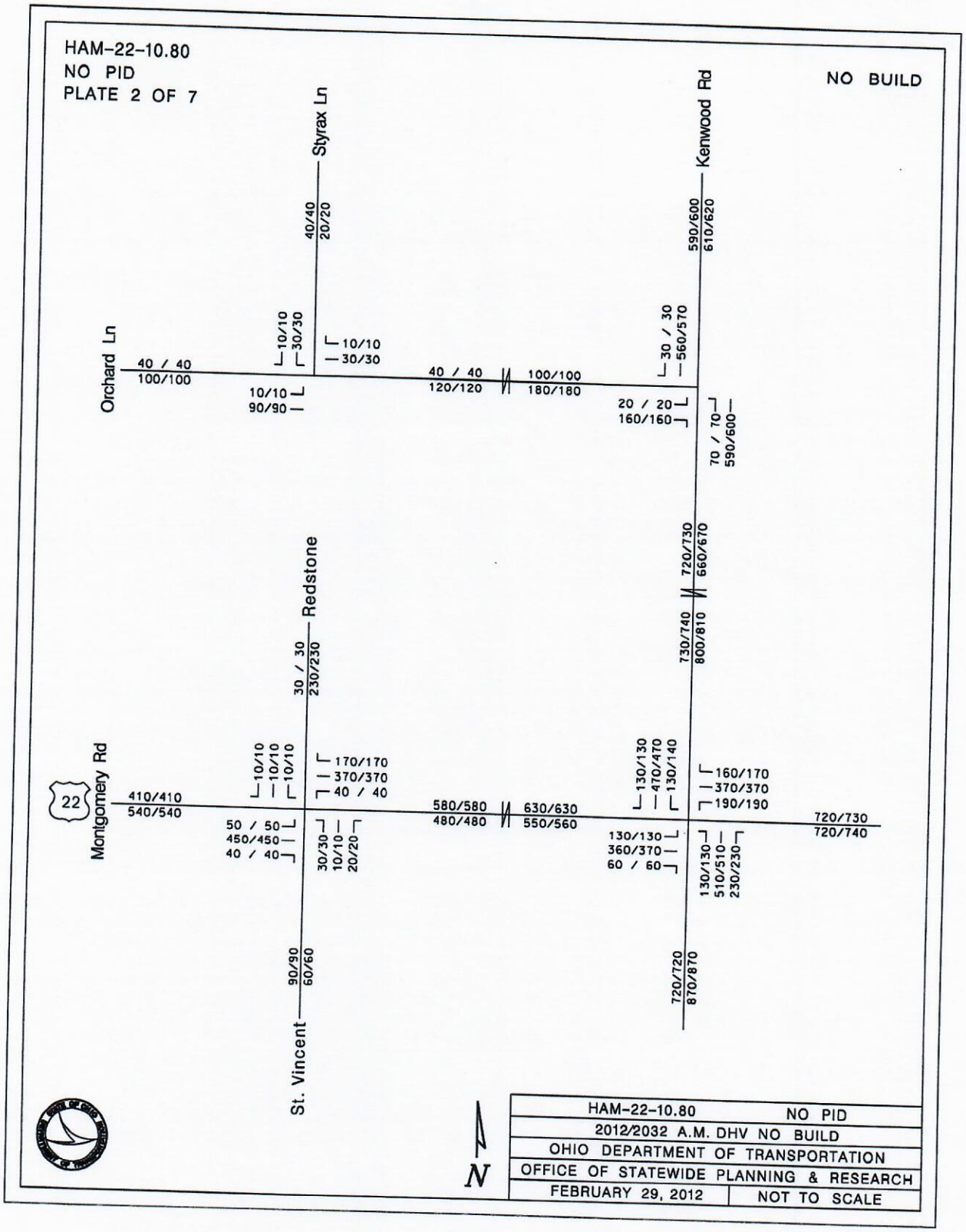
DATE: February 29, 2012

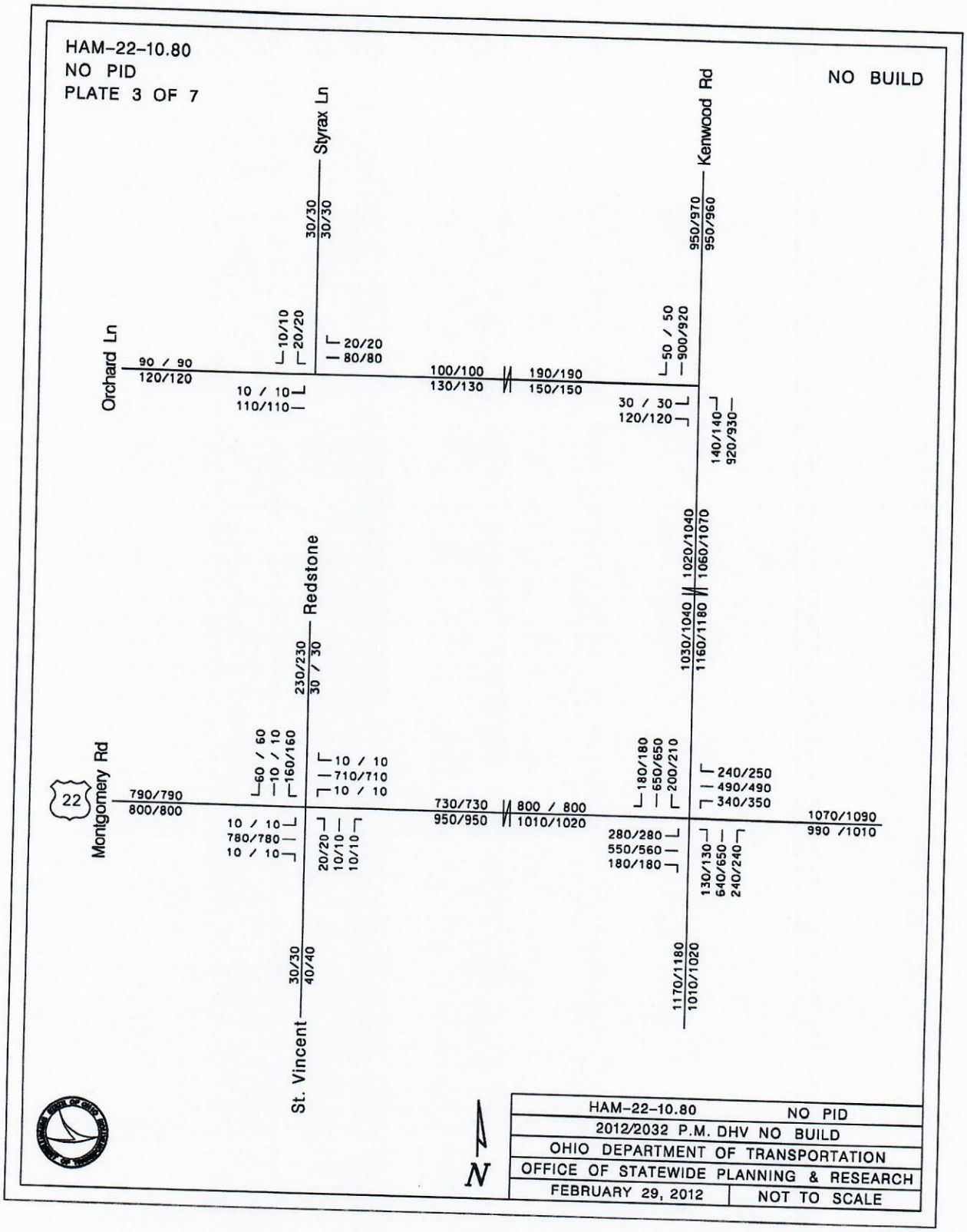
In reply to a request received January 17, 2012, plates are attached showing 2012/2032 ADT, A.M. and P.M. DHV turning movement volumes for the No Build and Build scenarios. K&D factors can be calculated from the plates. Truck factors are included on a separate plate.

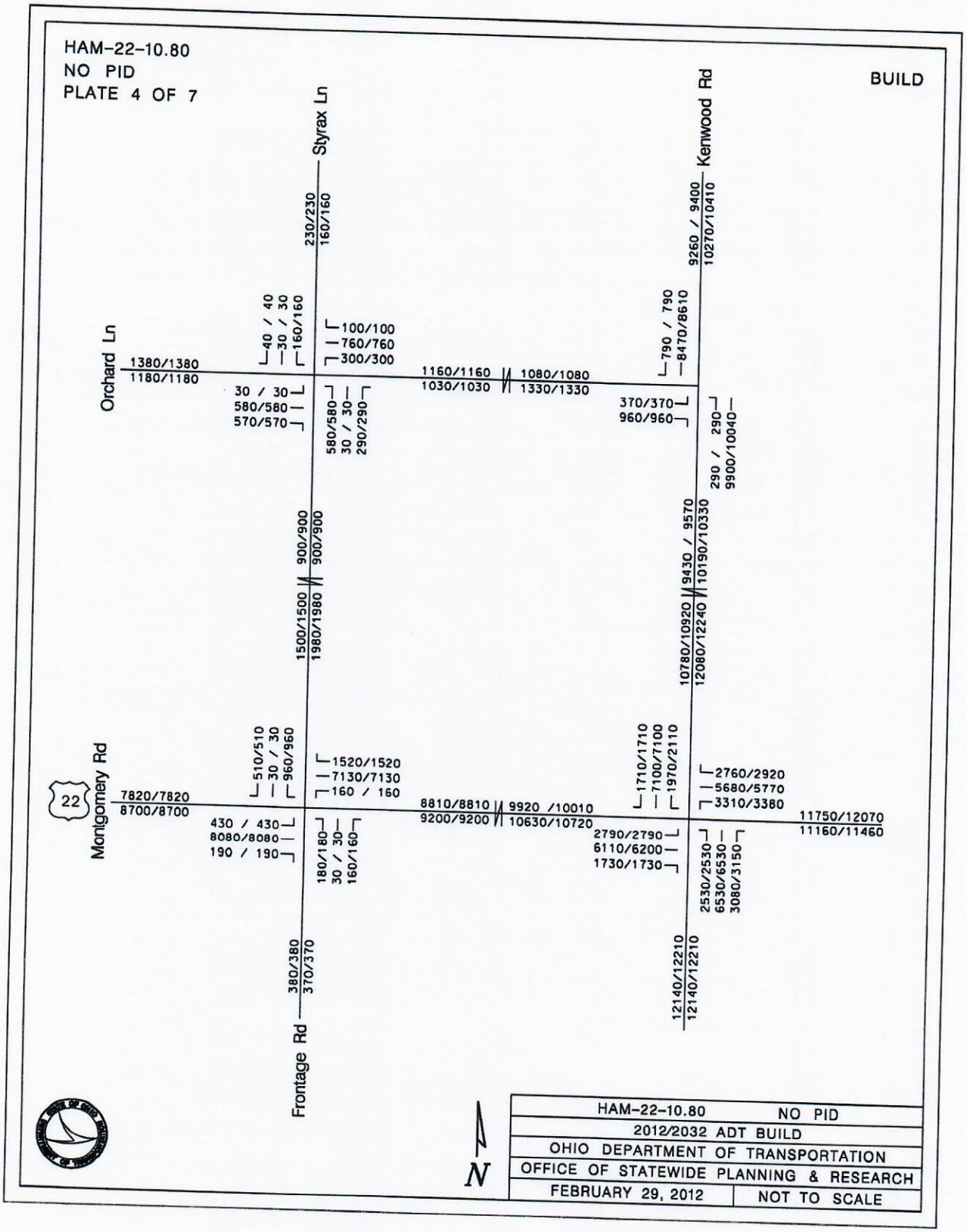
If you have any questions, please contact me at (614) 644-8195.

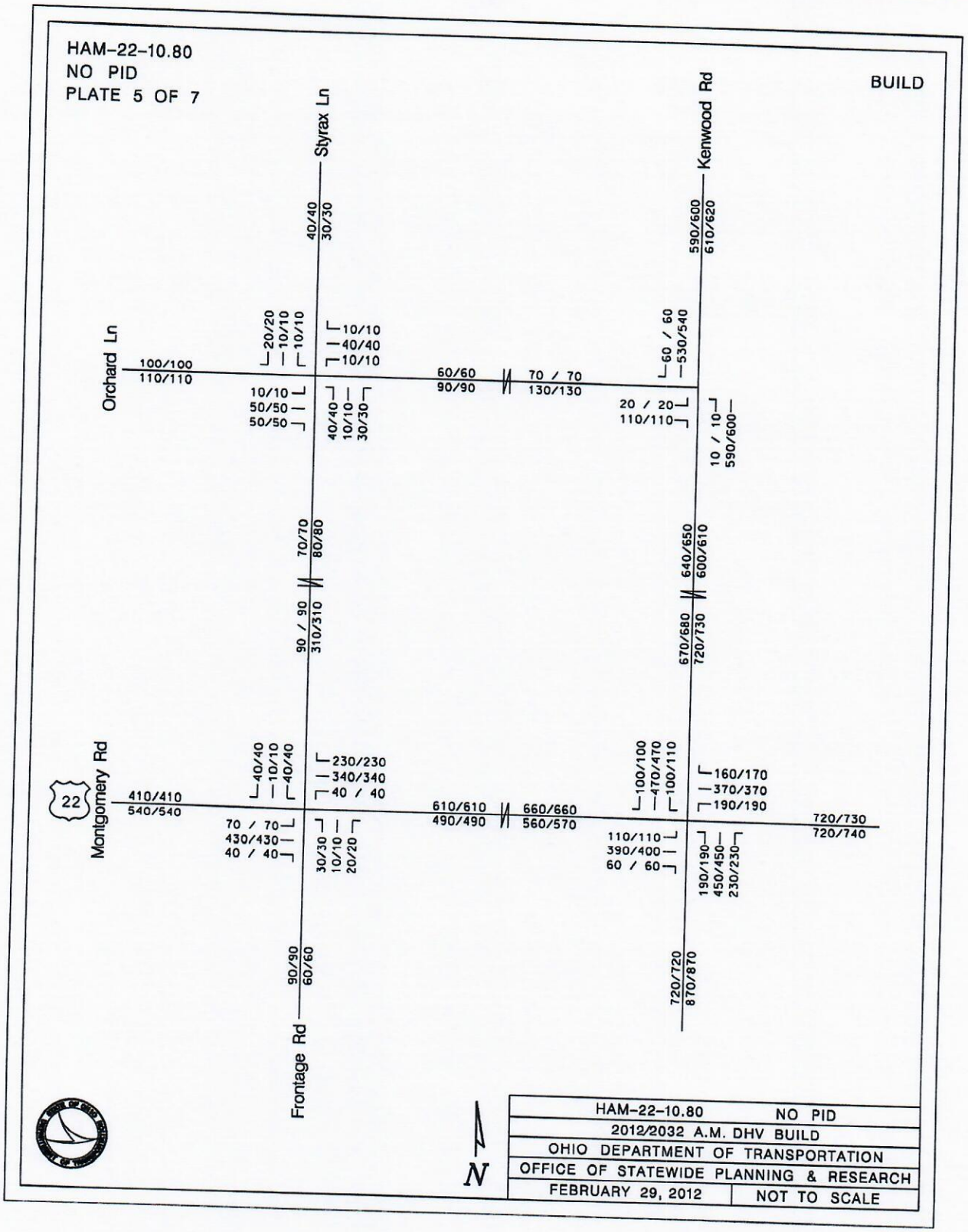
c: M. Byram, OSPR – G. Giaimo, OSPR – File

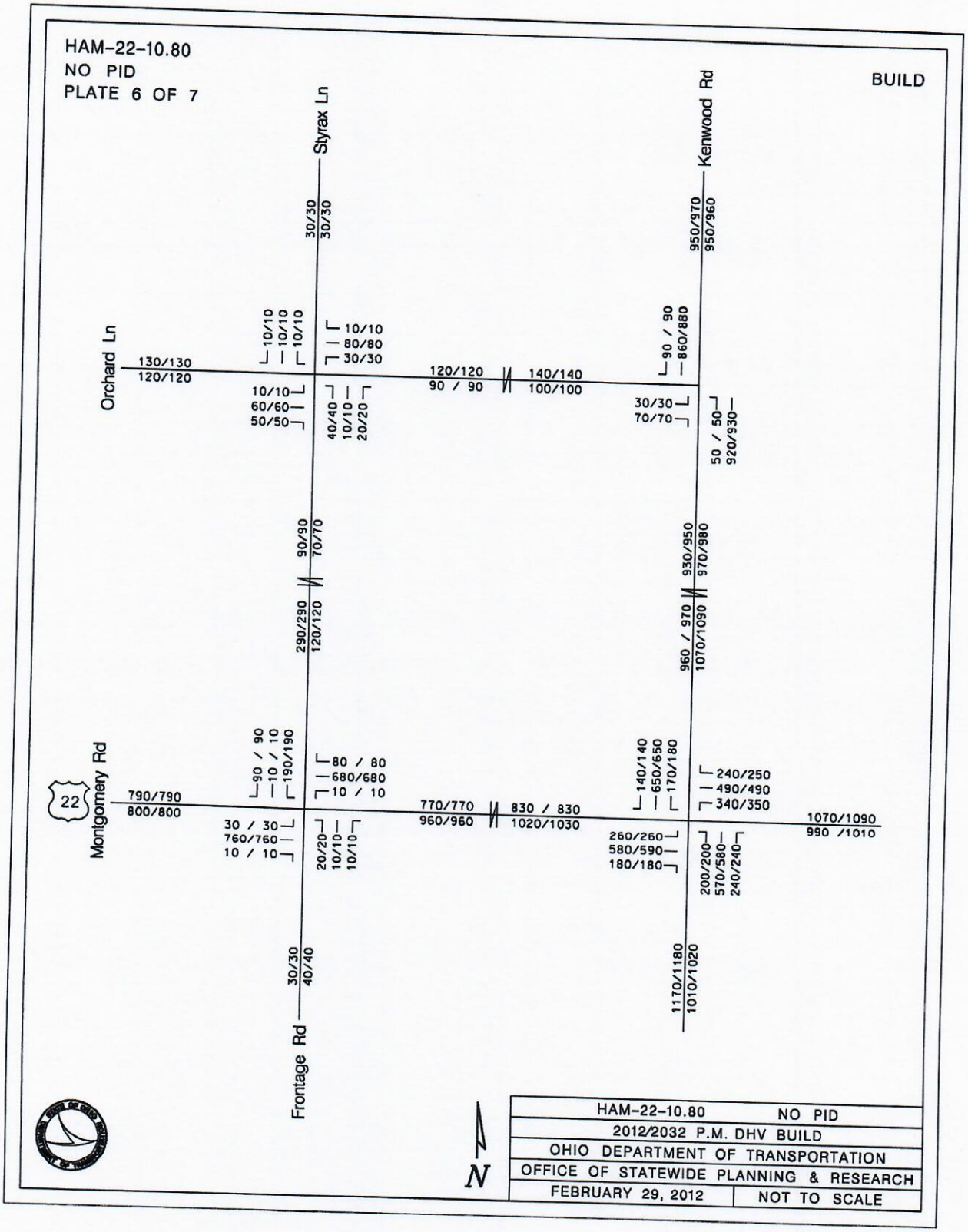

HAM-22-10.80
NO PID
PLATE 1 OF 7
NO BUILD
Orchard Ln
Styrax Ln
Kenwood Rd
Redstone
Montgomery Rd
22
St. Vincent
800 / 800
1180/1180
40 / 40
190/190
230/230
160/160
130/130
760/760
890 / 890
1340/1340
1530/1530
1830/1830
390 / 390
8870/9010
9260 / 9400
10270/10410
30 / 30
1150/1150
370 / 370
1460/1460
1140/ 1140
9900/10040
10330/10470
11040/11180
11480/11620
12930/13100
900 / 900
1130/1130
210/210
30 / 30
660/660
860 / 860
7430/7430
160 / 160
2110/2110
7100/7100
2270/2410
2760/2920
5680/5770
3310/3380
7820/7820
8700/8700
8450/8450
9090/9090
9660 / 9750
10520/10610
11750/12070
11160/11460
240 / 240
8270/8270
190 / 190
180/180
30 / 30
160/160
2980/2980
5810/5900
1730/1730
1870/1870
7190/7200
3080/3150
380/380
370/370
12140/12210
12140/12220
N
HAM-22-10.80 NO PID
2012/2032 ADT NO BUILD
OHIO DEPARTMENT OF TRANSPORTATION
OFFICE OF STATEWIDE PLANNING & RESEARCH
FEBRUARY 29, 2012
NOT TO SCALE


HAM-22-10.80
NO PID
PLATE 2 OF 7
NO BUILD
Styrax Ln
Kenwood Rd
Orchard Ln
Redstone
Montgomery Rd
22
St. Vincent
40/40
20/20
590/600
610/620
10/10
30/30
30 / 30
560/570
40 / 40
100/100
40 / 40
120/120
100/100
180/180
10/10
90/90
20 / 20
160/160
70 / 70
590/600
720/730
660/670
730/740
800/810
30 / 30
230/230
10/10
10/10
10/10
170/170
370/370
40 / 40
130/130
470/470
130/140
160/170
370/370
190/190
410/410
540/540
580/580
480/480
630/630
550/560
720/730
720/740
50 / 50
450/450
40 / 40
30/30
10/10
20/20
130/130
360/370
60 / 60
130/130
510/510
230/230
90/90
60/60
720/720
870/870
N
HAM-22-10.80 NO PID
2012/2032 A.M. DHV NO BUILD
OHIO DEPARTMENT OF TRANSPORTATION
OFFICE OF STATEWIDE PLANNING & RESEARCH
FEBRUARY 29, 2012
NOT TO SCALE


HAM-22-10.80
NO PID
PLATE 3 OF 7
NO BUILD
Orchard Ln
Styrax Ln
Kenwood Rd
Redstone
Montgomery Rd
22
St. Vincent
90 / 90
120/120
10/10
20/20
10 / 10
110/110
20/20
80/80
100/100
130/130
190/190
150/150
30/30
30/30
50 / 50
900/920
950/970
950/960
30 / 30
120/120
140/140
920/930
1020/1040
1060/1070
1030/1040
1160/1180
230/230
30 / 30
60 / 60
10 / 10
160/160
10 / 10
710/710
10 / 10
790/790
800/800
10 / 10
780/780
10 / 10
20/20
10/10
10/10
730/730
950/950
800 / 800
1010/1020
180/180
650/650
200/210
240/250
490/490
340/350
1070/1090
990 /1010
280/280
550/560
180/180
130/130
640/650
240/240
30/30
40/40
1170/1180
1010/1020
N
HAM-22-10.80 NO PID
2012/2032 P.M. DHV NO BUILD
OHIO DEPARTMENT OF TRANSPORTATION
OFFICE OF STATEWIDE PLANNING & RESEARCH
FEBRUARY 29, 2012
NOT TO SCALE


HAM-22-10.80
NO PID
PLATE 4 OF 7
BUILD
Styrax Ln
Kenwood Rd
Orchard Ln
Montgomery Rd
22
Frontage Rd
230/230
160/160
9260 / 9400
10270/10410
40 / 40
30 / 30
160/160
100/100
760/760
300/300
790 / 790
8470/8610
1380/1380
1180/1180
1160/1160
1030/1030
1080/1080
1330/1330
30 / 30
580/580
570/570
580/580
30 / 30
290/290
370/370
960/960
290 / 290
9900/10040
900/900
900/900
1500/1500
1980/1980
9430 / 9570
10190/10330
10780/10920
12080/12240
510/510
30 / 30
960/960
1520/1520
7130/7130
160 / 160
1710/1710
7100/7100
1970/2110
2760/2920
5680/5770
3310/3380
7820/7820
8700/8700
8810/8810
9200/9200
9920 /10010
10630/10720
11750/12070
11160/11460
430 / 430
8080/8080
190 / 190
180/180
30 / 30
160/160
2790/2790
6110/6200
1730/1730
2530/2530
6530/6530
3080/3150
380/380
370/370
12140/12210
12140/12210
N
HAM-22-10.80 NO PID
2012/2032 ADT BUILD
OHIO DEPARTMENT OF TRANSPORTATION
OFFICE OF STATEWIDE PLANNING & RESEARCH
FEBRUARY 29, 2012
NOT TO SCALE


HAM-22-10.80
NO PID
PLATE 5 OF 7
BUILD
Styrax Ln
Kenwood Rd
Orchard Ln
Montgomery Rd
22
Frontage Rd
100/100
110/110
20/20
10/10
10/10
10/10
40/40
10/10
40/40
30/30
60/60
90/90
70 / 70
130/130
60 / 60
530/540
590/600
610/620
10/10
50/50
50/50
40/40
10/10
30/30
20 / 20
110/110
10 / 10
590/600
70/70
80/80
90 / 90
310/310
640/650
600/610
670/680
720/730
410/410
540/540
40/40
10/10
40/40
230/230
340/340
40 / 40
610/610
490/490
660/660
560/570
100/100
470/470
100/110
160/170
370/370
190/190
720/730
720/740
70 / 70
430/430
40 / 40
30/30
10/10
20/20
110/110
390/400
60 / 60
190/190
450/450
230/230
90/90
60/60
720/720
870/870
N
HAM-22-10.80 NO PID
2012/2032 A.M. DHV BUILD
OHIO DEPARTMENT OF TRANSPORTATION
OFFICE OF STATEWIDE PLANNING & RESEARCH
FEBRUARY 29, 2012
NOT TO SCALE


HAM-22-10.80
NO PID
PLATE 6 OF 7
BUILD
Styrax Ln
Kenwood Rd
Orchard Ln
Montgomery Rd
22
Frontage Rd
30/30
30/30
950/970
950/960
10/10
10/10
10/10
10/10
80/80
30/30
90 / 90
860/880
130/130
120/120
120/120
90 / 90
140/140
100/100
10/10
60/60
50/50
40/40
10/10
20/20
30/30
70/70
50 / 50
920/930
90/90
70/70
930/950
970/980
290/290
120/120
960 / 970
1070/1090
90 / 90
10 / 10
190/190
80 / 80
680/680
10 / 10
140/140
650/650
170/180
240/250
490/490
340/350
790/790
800/800
770/770
960/960
830 / 830
1020/1030
1070/1090
990 /1010
30 / 30
760/760
10 / 10
20/20
10/10
10/10
260/260
580/590
180/180
200/200
570/580
240/240
30/30
40/40
1170/1180
1010/1020
N
HAM-22-10.80 NO PID
2012/2032 P.M. DHV BUILD
OHIO DEPARTMENT OF TRANSPORTATION
OFFICE OF STATEWIDE PLANNING & RESEARCH
FEBRUARY 29, 2012
NOT TO SCALE


HAM-22-10.80
NO PID
PLATE 7 OF 7
BUILD
Styrax Ln
Kenwood Rd
Orchard Ln
Montgomery Rd
22
Frontage Rd
0.01/0.01/0.01
0.02/0.03/0.02
0.01/0.02/0.01
0.01/0.02/.01
0.02/0.02/0.02
0.02/0.03/0.02
0.02/0.01/0.01
0.02/0.03/0.01
0.03/0.03/0.01
0.03/0.04/0.01
0.03/0.04/0.01
0.03/0.04/0.01
0.07/0.06/0.02
0.02/0.02/0.01
TRUCK FACTORS
T24/A.M. TD/P.M. TD
N
HAM-22-10.80 NO PID
TRUCK FACTORS
OHIO DEPARTMENT OF TRANSPORTATION
OFFICE OF STATEWIDE PLANNING & RESEARCH
FEBRUARY 29, 2012
NOT TO SCALE