Traffic Study

Southern Hills Development

prepared for:

Southern Hills Real Estate, LLC

Southwest Drive (Highway 49)
and
Kellers Chapel Road

Jonesboro, Arkansas

PETERS & ASSOCIATES
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Project No.: P-2032

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EXECUTIVE SUMMARY

Peters & Associates Engineers, Inc., has conducted a traffic engineering study relating to a proposed mixed-use development (Southern Hills) to be constructed on the east side of Southwest Drive (Highway 49) and on the north side of Kellers Chapel Road in Jonesboro, Arkansas. The intersection of Southwest Drive and Kellers Chapel Road is signalized. There is an additional signalized intersection on Kellers Chapel Road approximately 70 feet east of Southwest Drive at Mt. Carmel Road which is controlled with the same controller as the intersection of Southwest Drive and Kellers Chapel Road. Access to the site is proposed to be provided by three new Collector Streets intersecting Southwest Drive (Collector B, Collector E and Collector G) and five access drives to serve commercial tracts along Southwest Drive (Drive A, Drive C, Drive D, Drive F and Drive H). Additionally, there are points of access planned along Kellers Chapel Road. The primary focus of this report is to assess traffic operational characteristics of the nearby intersections of Southwest Drive and Kellers Chapel Road, Kellers Chapel Road and Mt. Carmel Road and the proposed Collector Streets and access drives intersections along Southwest Drive.

Directional splits and proposed street assignments for site-generated traffic volumes at the study intersections were made based on existing traffic patterns, transportation network and regional use and the Southern Hills site plan layout.

Projected traffic volumes were calculated for full build-out of the proposed Southern Hills development. The site is expected to be completed within ten years. These projected site-generated trips were added to the existing traffic volumes plus background traffic volume growth (with a rate of 2.5 percent per year for the first ten years, and a 1 percent per year rate for the following ten years), which resulted in projected traffic volumes at full build-out of the site as proposed.

As a part of this study, capacity and level of service traffic operational analysis has been conducted for the study intersections for AM and PM peak hours for existing traffic conditions (updated to 2020) and for projected traffic conditions.

Findings of this study are summarized as follows:

- Approximately 18,862 vehicle trips (combined in and out) per average weekday are projected to be generated by full build-out of the proposed Southern Hills mixed-use land uses on this site. Of this total for full build-out conditions, approximately 787 vehicle trips are estimated during the traffic conditions of the AM peak hour and approximately 1,378 vehicle trips are estimated during the traffic conditions of the PM peak hour.

- There is approximately 3,300 linear feet of site frontage along Southwest Drive. With three new collector streets and five new access drives, the spacing between the proposed access points would average over 400 feet between intersections. This spacing conforms to the recently adopted City of Jonesboro Access Management Policy for access spacing on a major arterial roadway.

- Capacity and level of service analysis was performed for existing traffic volumes, lane geometry and traffic control for the AM and PM peak hours for the existing study intersections. All vehicle movements currently operate at what calculates as an acceptable LOS "C" or better for existing traffic conditions at the study intersections for the AM and PM peak hours.

- Capacity and LOS analysis was performed for projected traffic conditions for full build-out of the Southern Hills development plus 20-year background traffic volume growth for the AM and PM peak hours for the study intersections. There are several vehicle movements at the study intersections that are expected to operate at what calculates as worse then LOS "D" during the AM and PM peak hours without any mitigation. However, capacity and LOS analysis was performed for projected traffic conditions for full build-out of the Southern Hills development plus 20-year background traffic volume growth for the AM and PM peak hours for the study intersections with the following mitigation assumed:
    - Widen Kellers Chapel Road eastbound and westbound approaches to Southwest Drive to three lanes with each consisting of a left-turn lane, a left/thru/right turn lane and one receiving lane.

- Traffic signal control at Southwest Drive and Collector E intersection and with Collector E consisting of dual left-turn lanes, a right-turn lane and a receiving lane.

- There are several vehicle movements at the study intersections that are expected to operate at improved LOS during the projected AM and PM peak hours with proposed mitigation. Additionally, as shown in the detailed LOS results in the Appendix, there is expected to be reduced vehicle delay. Furthermore the minor vehicle delay is expected to occur on the side streets with vehicles on Southwest Drive experiencing minimal delay in the study area. Additionally, with three new Collector Streets intersecting Southwest Drive and five access drives to serve commercial tracts along Southwest Drive, this is expected to accommodate left-turns at multiple, well spread locations entering the site. If fewer intersections were to be provided, the southbound left-turns on Southwest Drive could experience longer delay and vehicle queuing during the AM and PM peak hours.

- Projected intersection capacity utilization values and average control delay are expected to be acceptable for all of the study intersections for projected 20-year traffic conditions with the site-generated traffic included with the proposed mitigative improvements assumed.

- Based on peak hour volume criteria set out in the MUTCD, it was found that traffic signal warrants are projected to be met at the intersection of Southwest Drive and Collector E for projected 20-year traffic conditions.

- It was found that criteria is not expected to be met for a northbound right-turn deceleration lane on Southwest Drive at the proposed site intersections during the weekday AM and PM peak hour projected traffic conditions except for the approach to Collector E during the PM peak hour. However, capacity and LOS results for projected traffic conditions indicate that a right-turn deceleration lane is not needed.

Recommendations of this study are summarized as follows:

- At full build-out of the site, it is recommended to widen Kellers Chapel Road eastbound and westbound approaches to Southwest Drive from two lanes to three lanes with each accommodating a left-turn lane, a left/thru/right turn lane and one receiving lane. This recommendation will also necessitate modifications to the traffic signal which controls Southwest Drive and Kellers Chapel Road and Kellers Chapel Road and Mt. Carmel Road. The traffic signal modifications at Southwest Drive and Kellers Chapel Road could also include the addition of provisions for pedestrians at this intersection.

- At full build-out of the site, it is recommended that a fully-actuated traffic signal be installed at the intersection of Southwest Drive and Collector E. Additionally, Collector E should be constructed to consist of dual left-turn lanes, a right-turn lane and a receiving lane.

- It is recommended that Drives D and F at Southwest Drive each be constructed to allow left and right-turns in and only right-turns out (prohibit left-turns out).

- Intersection improvements for Southwest Drive and Kellers Chapel Road and new intersections along Southwest Drive must conform to design standards of ARDOT and the City of Jonesboro and will require approval by ARDOT and the City.

- Traffic signal design for the intersection of Southwest Drive and Collector E and traffic signal modifications for the intersection of Southwest Drive and Kellers Chapel Road must conform to design standards of ARDOT and the City of Jonesboro and will require approval by ARDOT and the City.

INTRODUCTION

Peters & Associates Engineers, Inc., has conducted a traffic engineering study relating to a proposed mixed-use development (Southern Hills) to be constructed on the east side of Southwest Drive (Highway 49) and on the north side of Kellers Chapel Road in Jonesboro, Arkansas. The intersection of Southwest Drive and Kellers Chapel Road is signalized. There is an additional signalized intersection on Kellers Chapel Road approximately 70 feet east of Southwest Drive at Mt. Carmel Road which is controlled with the same controller as the intersection of Southwest Drive and Kellers Chapel Road. Access to the site is proposed to be provided by three new Collector Streets intersecting Southwest Drive (Collector B, Collector E and Collector G) and five access drives to serve commercial tracts along Southwest Drive (Drive A, Drive C, Drive D, Drive F and Drive H). Additionally, there are points of access planned along Kellers Chapel Road. The primary focus of this report is to assess traffic operational characteristics of the nearby intersections of Southwest Drive and Kellers Chapel Road, Kellers Chapel Road and Mt. Carmel Road and the proposed Collector Streets and access drives intersections along Southwest Drive. A reduced copy of the site plan is included in the Appendix for reference.

There are proposed to be a variety of land uses on the Southern Hills site, including residential apartments, town homes, condominiums, office, mini-warehouse, assisted living, retail uses and common areas (parks). Directional splits and proposed street assignments for site-generated traffic volumes at the study intersections were made based on existing traffic patterns, transportation network and regional use and the Southern Hills site plan layout of development.

This is a report of methodology and findings relating to a traffic engineering study undertaken to:

- Evaluate existing traffic conditions in the vicinity of the site.

- Determine projected traffic volumes entering and exiting the proposed development at the nearby study intersections and the new street and access drive intersections along the site frontage proposed to serve the site.

- Identify the effects on traffic operations for existing traffic in combination with site-generated traffic associated with full build-out of the planned Southern Hills development with twenty years background traffic volume growth in the vicinity.

- Evaluate existing and projected traffic operations for the study intersections and make recommendations for improvements which may be necessary and appropriate for acceptable traffic operations for the projected traffic conditions.

In the following sections of this traffic study report are traffic data, study methods, findings and recommendations. The study is technical in nature. Analysis techniques employed are those most commonly used in the traffic engineering profession for traffic impact analysis. Certain data and calculations relative to traffic operational analysis are referenced in the report. Complete calculations and data are included in the Appendix of the report.

THE SITE

The location of the development is in the City of Jonesboro, in Craighead County, Arkansas. The development is proposed to be constructed on the east side of Southwest Drive (Highway 49) and on the north side of Kellers Chapel Road. The intersection of Southwest Drive and Kellers Chapel Road is signalized. The site is currently undeveloped. There are proposed to be a variety of land uses on the Southern Hills site, including residential apartments, town homes, condominiums, office, mini-warehouse, assisted living, retail uses and common areas (parks). The proposed development site location and vicinity are shown on Figures 1 and 2, which follow.

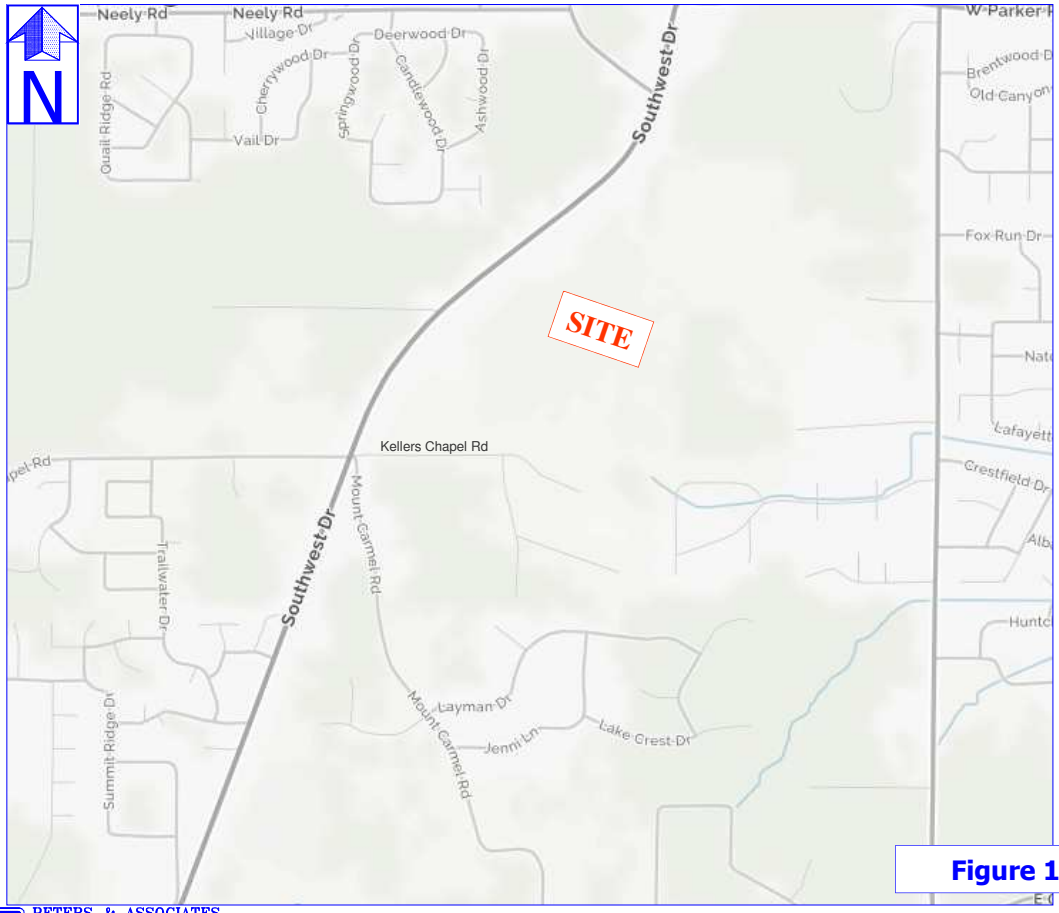


Figure 1 – Vicinity Map

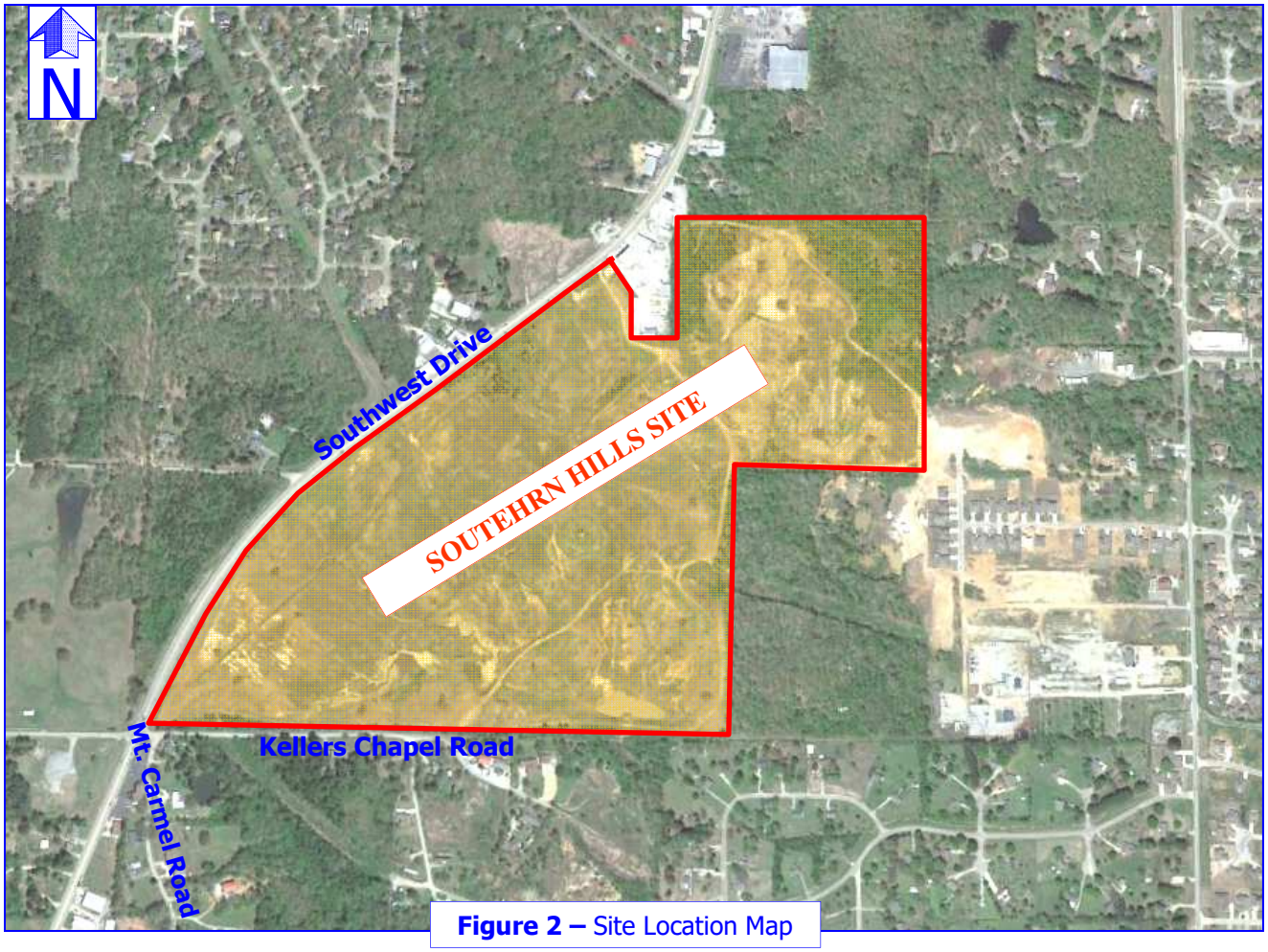


Figure 2 – Site Location Map

Access to the site is proposed to be provided by three new Collector Streets intersecting Southwest Drive (Collector B, Collector E and Collector G) and five access drives to serve commercial tracts along Southwest Drive (Drive A, Drive C, Drive D, Drive F and Drive H). Additionally, there are points of access planned along Kellers Chapel Road. Collector E may be extended in the future to the east by others to connect to Culberhouse Road.

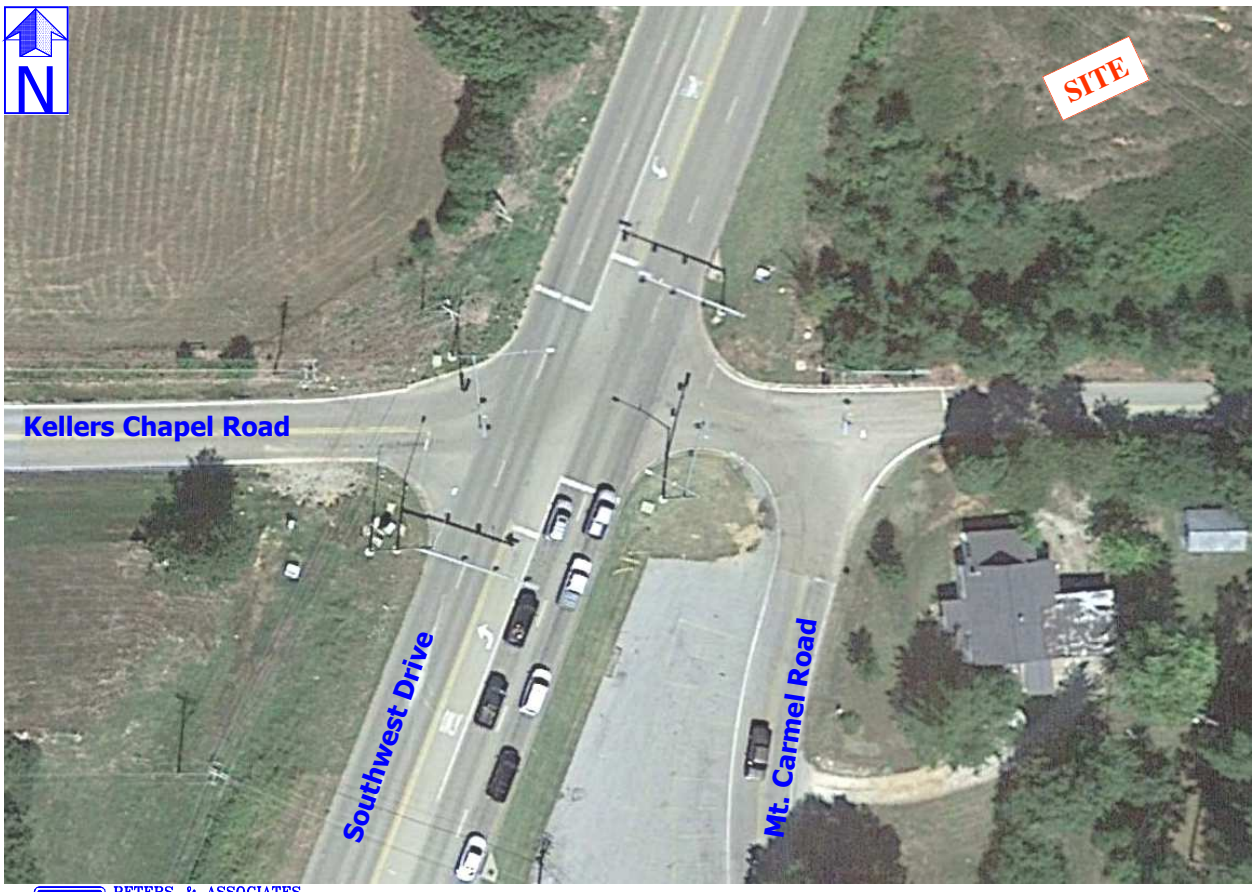
There is approximately 3,300 linear feet of site frontage along Southwest Drive. With three new collector streets and five new access drives, the spacing between the proposed access points would average over 400 feet between intersections. This spacing conforms to the recently adopted City of Jonesboro Access Management Policy for access spacing on a major arterial roadway as shown on this page.

Type of Corridor	Spacing
Major Arterial	300' to 500'
Minor Arterial	200' to 300'
Collector	100' to 200'

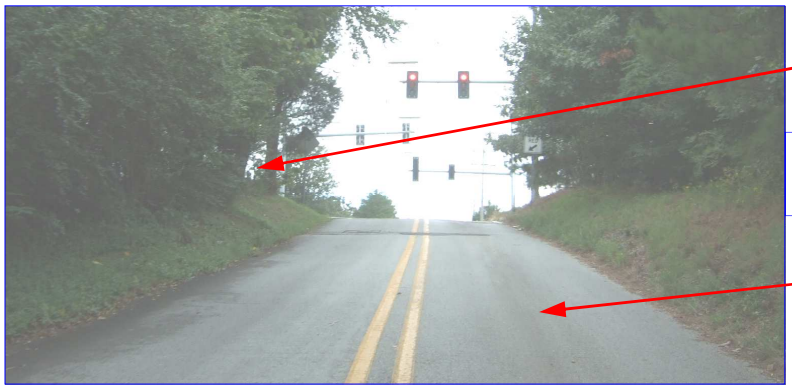
City of Jonesboro
Access Management Policy
Curb Cut Spacing

Southwest Drive, Highway 49, is a five-lane roadway with a speed limit of 50 miles per hour in the vicinity of the site. Southwest Drive is classified as a Principal Arterial on the City of Jonesboro Master Street Plan (MSP). The following photos show the general layout of the intersections of Southwest Drive and Kellers Chapel Road and Kellers Chapel Road and Mt. Carmel Road in the vicinity of the site. Photos were taken at locations as indicated on the captions.

Southwest Drive and Kellers Chapel Road and Mt. Carmel Road




Kellers Chapel Road
Looking south on Southwest Drive toward Kellers Chapel Road
Southwest Drive


Mt. Carmel Road
Looking west on Kellers Chapel Road toward Mt. Carmel Road
Kellers Chapel Road


Kellers Chapel Road
Looking north on Mt. Carmel Road toward Kellers Chapel Road
Mt. Carmel Road


Southwest Drive
Looking east on Kellers Chapel Road toward Southwest Drive.
Kellers Chapel Road

EXISTING TRAFFIC CONDITIONS

Traffic count data collected as a part of this study include AM and PM peak hours vehicle turning movement counts at the following intersections:

- Southwest Drive and Kellers Chapel Road.
- Kellers Chapel Road and Mt. Carmel Road.

Since schools are out and some local businesses are currently closed due to Covid-19 virus, existing traffic counts would not be representative of actual daily and peak hour conditions. Therefore, the method to update existing traffic volumes for the study intersections was discussed and agreed upon with the City of Jonesboro.

Traffic counts from 2017 were conducted while schools were is session. This count data was adjusted to account for 2.5 percent annual background growth for three years to provide updated count data.

The adjusted AM and PM peak hours vehicle turning movement counts are shown on Figure 3A, "Existing Traffic Volumes - AM Peak Hour," and Figure 3B, "Existing Traffic Volumes - PM Peak Hour." The 2017 peak hours vehicle turning movement count data (without adjustments to account for three years background growth) for these intersections are presented in more detail in the Appendix of this report.

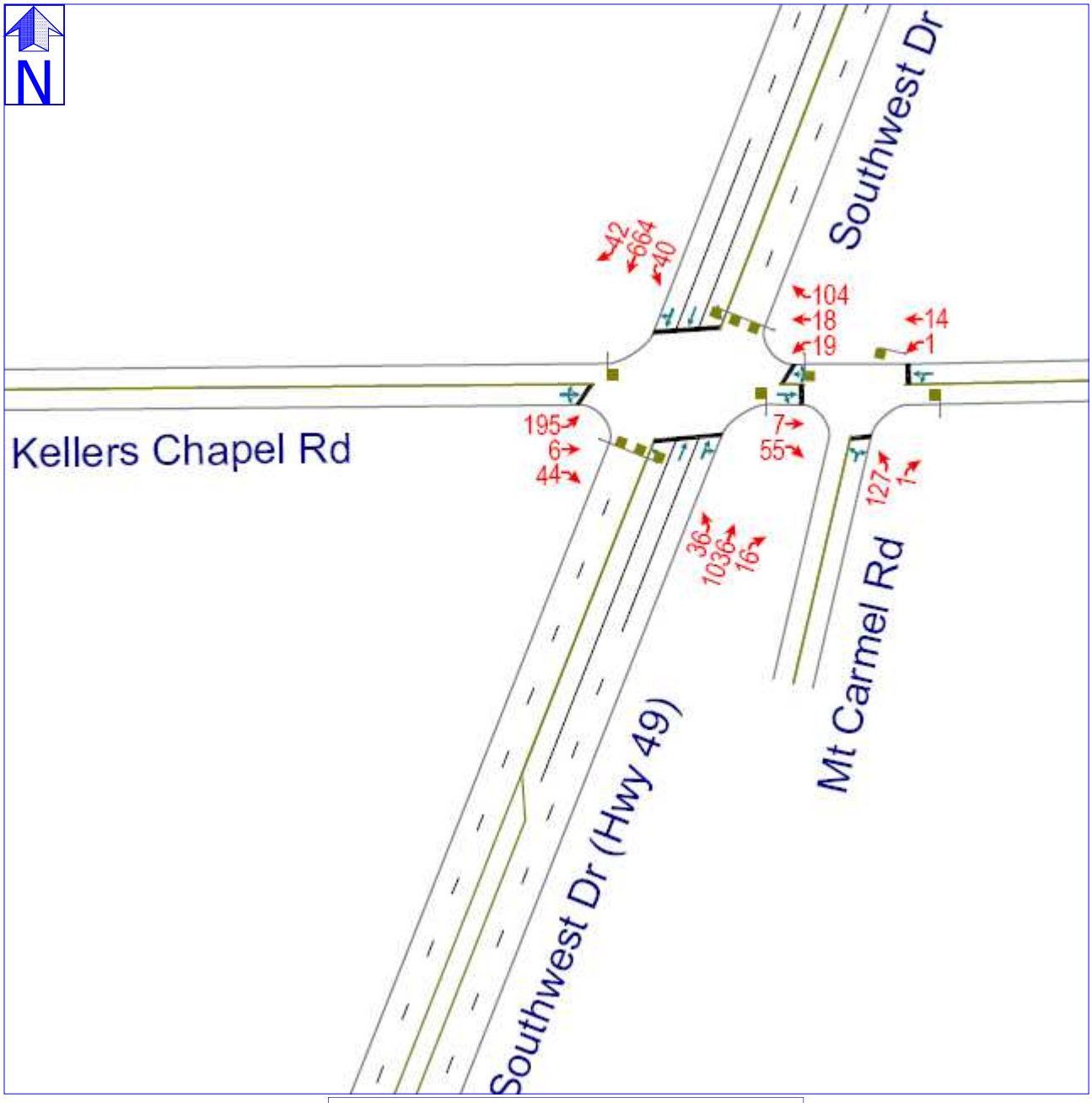


Figure 3A
Existing Traffic Volumes - AM Peak Hour
(Adjusted for 2020)

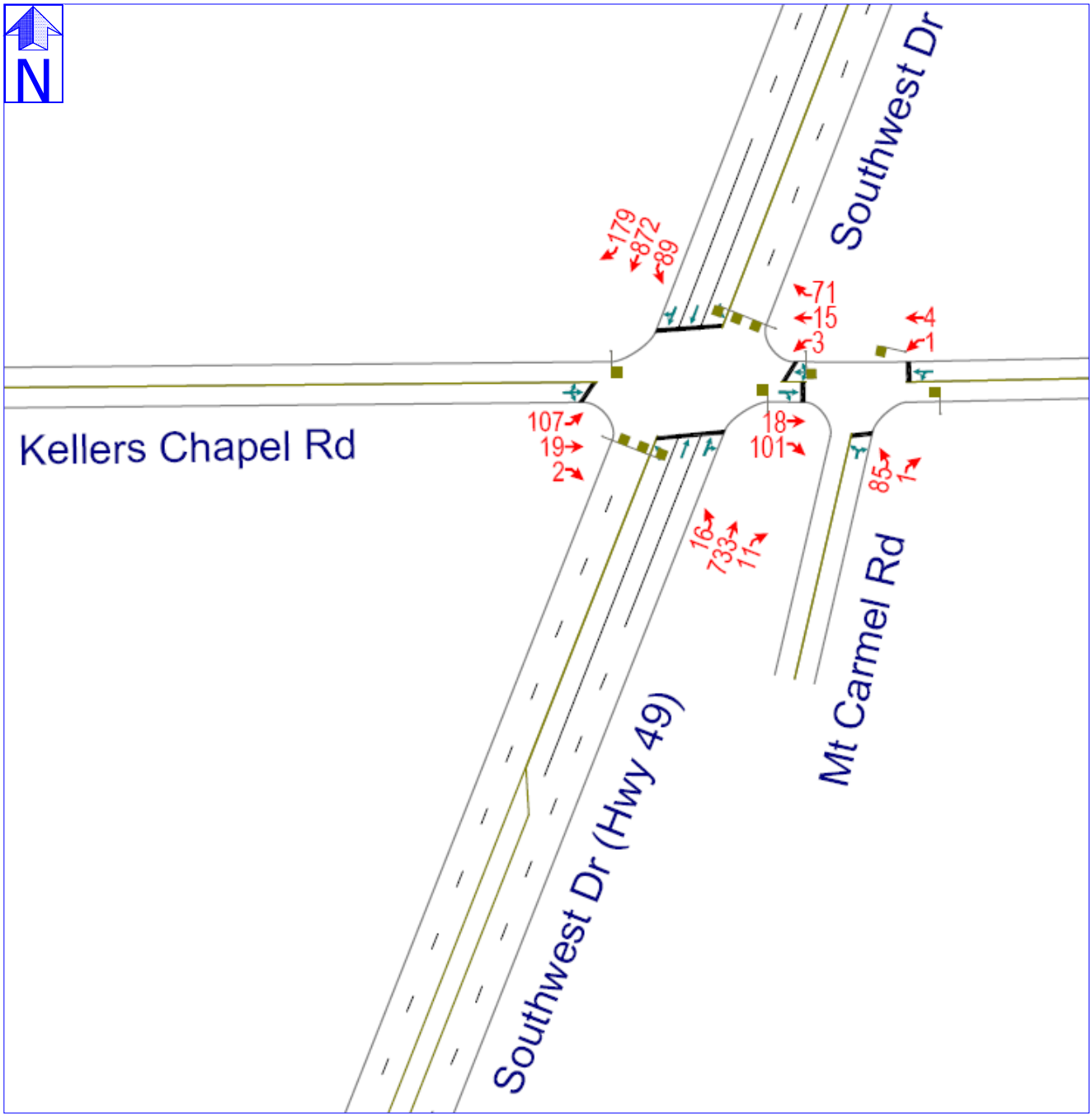


Figure 3B
Existing Traffic Volumes - PM Peak Hour
(Adjusted for 2020)

TRIP GENERATION and SITE TRAFFIC PROJECTIONS

The Trip Generation, an Informational Report, published by the Institute of Transportation Engineers (ITE) and The Trip Generation Manual 10th Edition, 2017, were utilized in calculating the magnitude of traffic volumes expected to be generated by the proposed land uses of the site. These are reliable sources for this information and are commonly used in the traffic engineering profession. This software is the most up-to-date software for estimating vehicle trip generation at this time.

Using the selected trip generation rates, calculations were made as a part of this study to provide a reliable estimate of traffic volumes that can be expected to be associated with full build-out development of Southern Hills as proposed. These calculations entail applying the appropriate trip-generation rates to the land uses planned or assumed for the development. Results of these calculations are summarized on Table 1, "Summary of Trip-Generation."

These calculations indicate that approximately 18,862 vehicle trips (combined in and out) per average weekday are projected to be generated by full build-out of the proposed Southern Hills mixed-use land uses on this site. Of this total for full build-out conditions, approximately 787 vehicle trips are estimated during the traffic conditions of the AM peak hour and approximately 1,378 vehicle trips are estimated during the traffic conditions of the PM peak hour.

These data have been adjusted for internal trip capture (i.e. multi-purpose trips within the site as opposed to new trips for each site land use).

FULL BUILD				24-HOUR TWO-WAY WEEKDAY VOLUME	AM PEAK HOUR VOLUME		PM PEAK HOUR VOLUME	
AREA	PROPOSED LAND USE	APPROXIMATE SIZE	ITE CODE		ENTER	EXIT	ENTER	EXIT
A	Gas Station w/ C-Store	16 Fuel Positions	945	3,286	102	98	114	110
	Retail Commercial	20,000 Sq. Ft.	820	755	12	7	36	40
B	Office	11,600 Sq. Ft.	710	113	11	2	2	11
	Assisted Living	50 Beds	254	130	6	4	5	8
C	Retail Commercial	40,000 Sq. Ft.	820	1,510	23	15	73	79
D	Retail Commercial	100,000 Sq. Ft.	820	3,775	58	36	183	198
E	Residential Apartments	106 Units	220	776	11	38	37	22
	Townhomes	106 Units	220	776	11	38	37	22
	Condominiums	106 Units	220	776	11	38	37	22
F	Warehouse Sef-Storage	50,000 Sq. Ft.	151	76	3	2	4	5
G	Common Place (Park)	10.34 Acres	411	8	0	0	0	1
H	Retail Commercial	30,000 Sq. Ft.	820	1,133	17	11	55	59
J	Retail Commercial	55,000 Sq. Ft.	820	2,076	32	20	101	109
K	Residential Apartments	80 Units	220	586	8	29	28	17
	Townhomes	48 Units	220	351	5	17	17	10
	Condominiums	48 Units	220	351	5	17	17	10
L	Retail Commercial	42,000 Sq. Ft.	820	1,586	24	15	77	83
M	Office	81,000 Sq. Ft.	710	789	81	13	15	78
N	Common Place (Park)	10.12 Acres	411	8	0	0	0	1
O	Common Place (Park)	1.06 Acres	411	1	0	0	0	0
	UNADJUSTED TOTAL DRIVEWAY VOLUMES			**18,862**	**420**	**400**	**838**	**885**
	INTERNAL TRIP CAPTURE				**-17**	**-16**	**-168**	**-177**
	ADJUSTED DRIVEWAY VOLUMES				**403**	**384**	**670**	**708**
	TOTAL ENTERING + EXITING				**787**		**1,378**	

Table 1 – Summary of Trip-Generation

These data have also been adjusted for "pass-by" trips (i.e. that portion of the site-destined traffic that could come from the existing adjacent street traffic stream). Calculations for pass-by trips was made consistent with values from Institute of Transportation Engineers (ITE) Trip Generation Manual 9th Edition, 2012, and Trip Generation Software 2013 by Trafficware, LLC and details of these volumes are included in the Appendix of this report.

Retail commercial, residential and office traffic, as will be associated with site, ordinarily contributes to the adjacent street traffic conditions during the on-street AM and PM peak traffic hours. Accordingly, the AM and PM peak traffic periods of the adjacent roads are the traffic operating conditions which have warranted primary traffic analysis as a part of this study.

In early comments from City staff there was a question about the density of the multi-family portion of the development. For the multi-family areas proposed, if only 12 units per acre (instead of 16) is constructed for these tracts it would generate approximate only 1,000 fewer trips per day. This would only be a 5 percent reduction in traffic volumes at full build of the site.

TRAFFIC VOLUME ASSIGNMENTS

Once projected traffic was estimated for the site, directional distributions were made to reflect the percent of anticipated vehicle turning movements at the study intersections. Vehicle trip distribution was developed based on current traffic counts and expected travel patterns to and from the proposed development. Directional distribution percentages used in this study are shown on Figure 4, "Directional Distribution - Site Traffic."

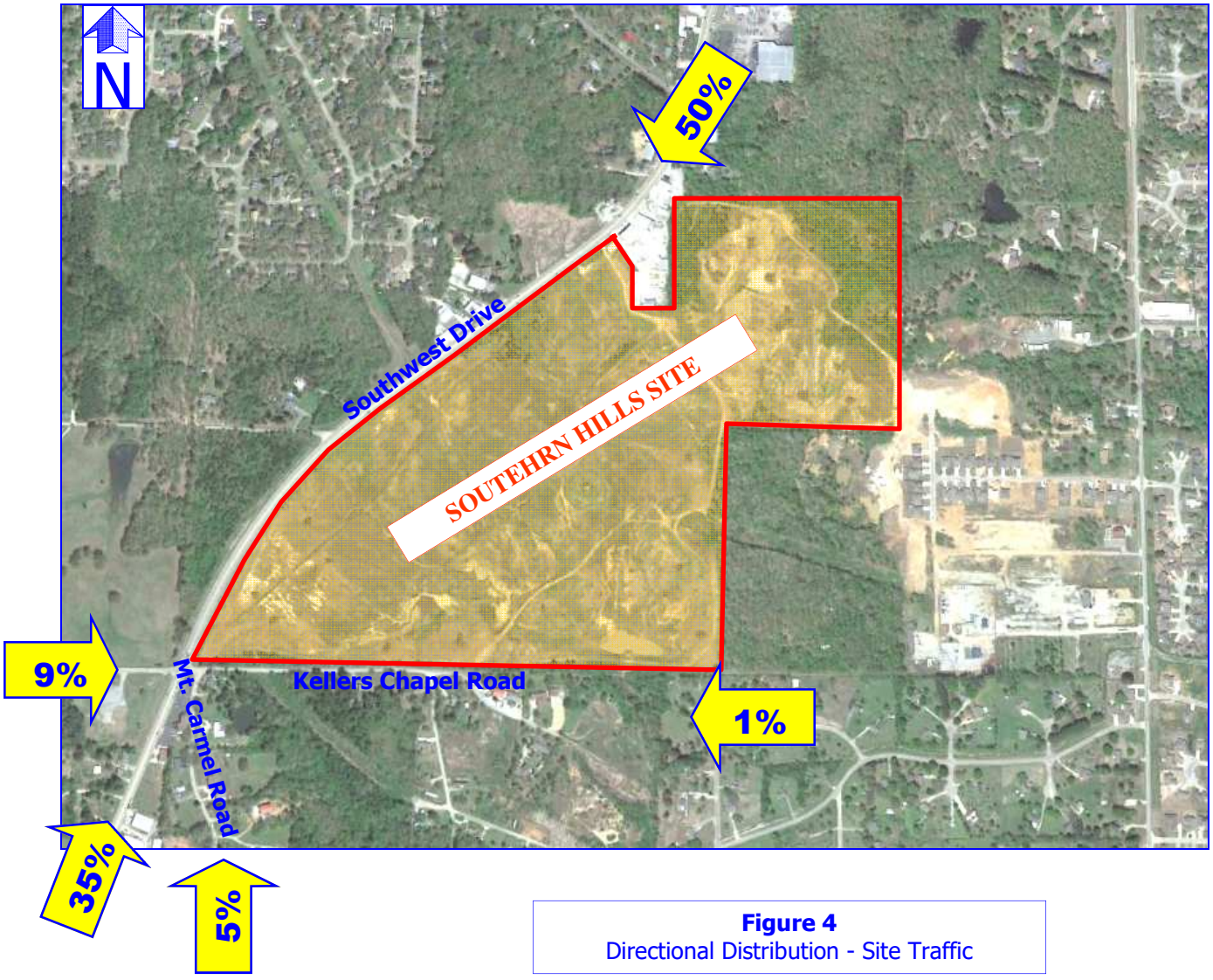


Figure 4
Directional Distribution - Site Traffic

The directional distribution percentages for site traffic have been equated to percentage turns for each movement at the study intersections. The site-generated traffic volumes result from applying the directional distribution percentages to the corresponding projected site-generated traffic volumes summarized on Table 1, "Summary of Trip-Generation."

These projected site-generated trips for the development were added to the existing traffic volumes plus background traffic volume growth (with a rate of 2.5 percent per year for the first 10 years and an additional 1 percent per year for the following 10 years), have been combined and the results are depicted on the following figures:

- Figure 5A, "Projected Future 20-Year Traffic Volumes - AM Peak Hour."
- Figure 5B, "Projected Future 20-Year Traffic Volumes - PM Peak Hour."

Traffic volumes shown on Figures 3A, 3B, 5A and 5B are the values used in capacity and level of service calculations conducted as a part of this study. The effect of existing background traffic (i.e. the adjacent street non-site traffic which exists) and projected traffic associated with the site development as well as background traffic volume growth has thus been accounted for in this analysis.

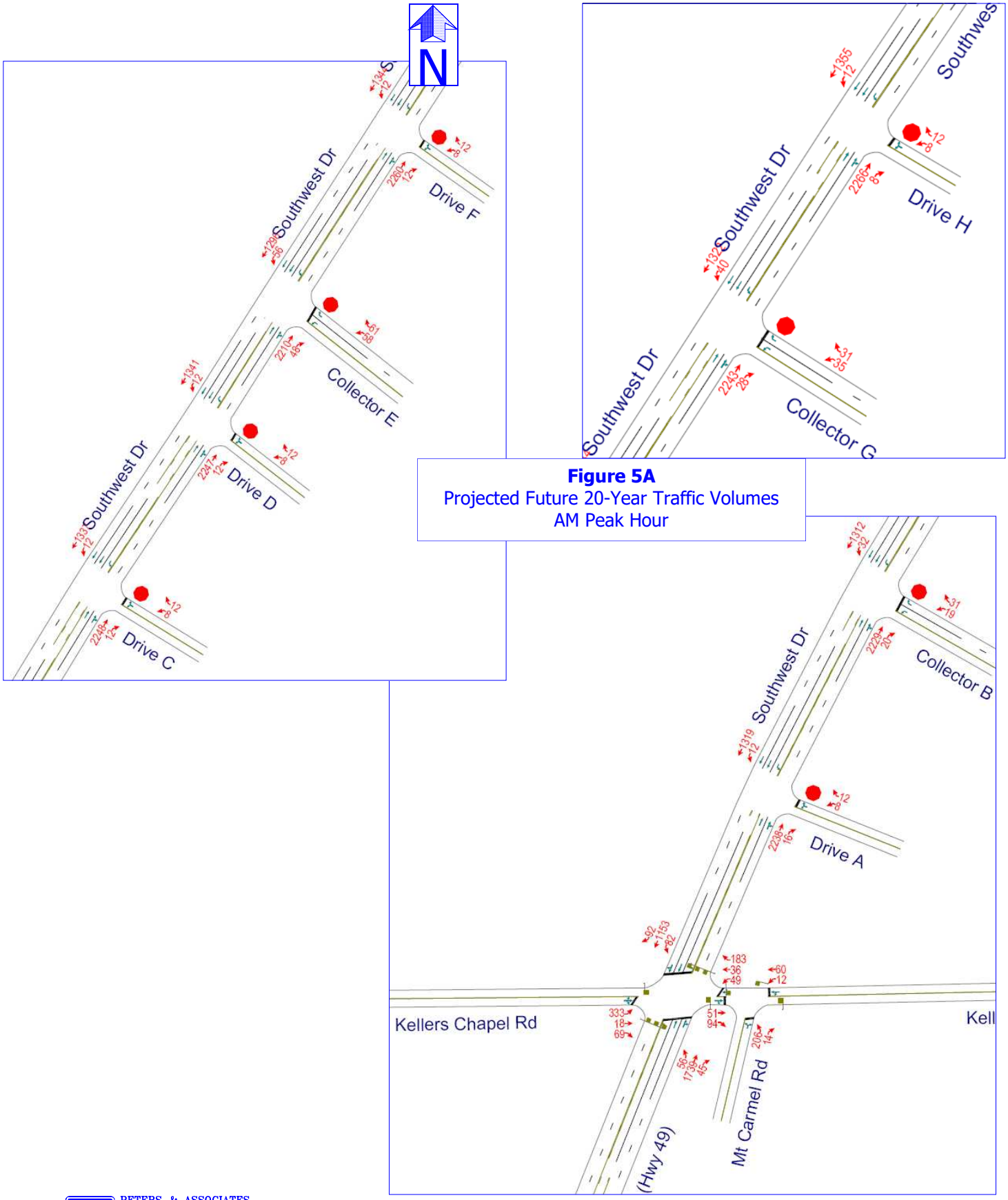


Figure 5A
Projected Future 20-Year Traffic Volumes
AM Peak Hour

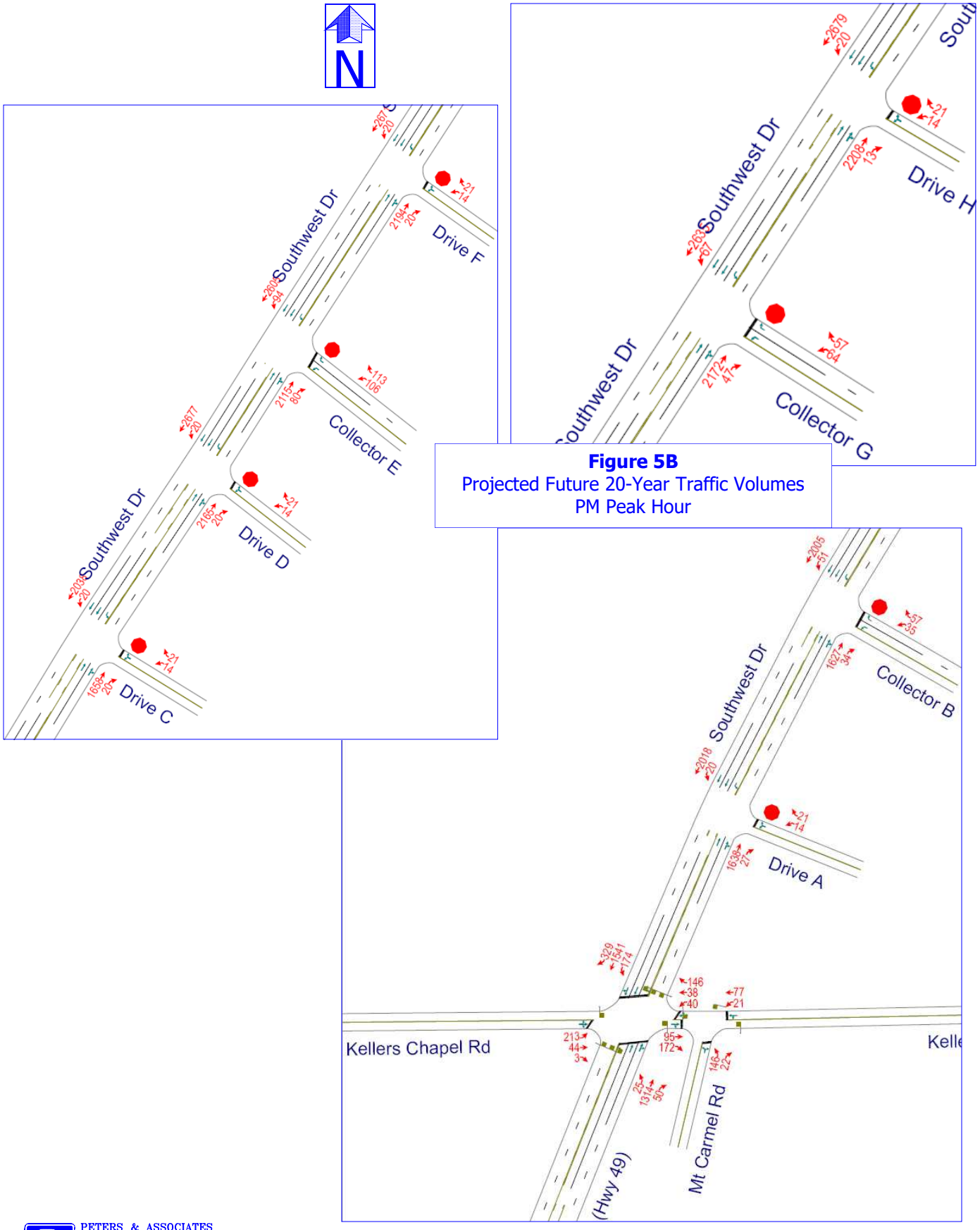


Figure 5B
Projected Future 20-Year Traffic Volumes
PM Peak Hour

CAPACITY and LEVEL OF SERVICE

Generally, the "capacity" of a street is a measure of its ability to accommodate a certain magnitude of moving vehicles. It is a rate as opposed to a quantity, measured in terms of vehicles per hour. More specifically, street capacity refers to the maximum number of vehicles that a street element (e.g. an intersection) can be expected to accommodate in a given time period under the prevailing roadway and traffic conditions.

Traffic operational analysis for the study intersections were evaluated based on the methodologies outlined in the Highway Capacity Manual, 2010 Edition, published by the Transportation Research Board. The operating conditions at an intersection are graded by the "level of service" experienced by drivers. Level of service (LOS) describes the quality of traffic operating conditions and is rated from "A" to "F". LOS "A" represents the most desirable condition with free-flow movement of traffic with minimal delays. LOS "F" generally indicates severely congested conditions with excessive delays to motorists. Intermediate grades of B, C, D, and E reflect incremental increases in the average delay per stopped vehicle. Delay is measured in seconds per vehicle. The table below shows the upper limit of delay associated with each level of service for signalized and un-signalized intersections.

Intersection Level of Service Delay Thresholds

Level of Service (LOS)	Signalized	Un-Signalized
A	< 10 Seconds	< 10 Seconds
B	< 20 Seconds	< 15 Seconds
C	< 35 Seconds	< 25 Seconds
D	< 55 Seconds	< 35 Seconds
E	< 80 Seconds	< 50 Seconds
F	≥ 80 Seconds	≥ 50 Seconds

The LOS rating deemed acceptable varies by community, facility type and traffic control device. LOS "D" is the desirable goal for movements at un-signalized intersections that must yield to other movements; however, a LOS "E" or "F" is often accepted for low to moderate traffic volumes where the installation of a traffic signal is not warranted by the conditions at the intersection or the location is deemed undesirable for signalization for other reasons. Other reasons may include the close proximity of an existing traffic signal or the presence of a convenient alternative route. For signalized intersections, level of service and average delay relate to all vehicles using the intersection. LOS "D" is the typical desirable standard for signalized intersections. The study intersection was evaluated using the Synchro analysis software package based on Highway Capacity Manual methods. This computer program has been proven to be reliable when used to analyze capacity and levels of traffic service under various operating conditions. Detailed results for all capacity calculations are included in the Appendix. The adjacent street weekday AM and PM peak traffic periods were used for these calculations. Factors included in the analysis are as follows:

- Existing traffic volumes and patterns.
- Directional distribution of projected traffic volumes.
- Existing and proposed intersection geometry (including elements such as turn lanes, curb radii, etc.).
- Existing background traffic volumes and projected site-generated volumes for projected traffic conditions.
- 20-Year background traffic growth.
- Existing or proposed traffic control.

CAPACITY ANALYSIS

Level of Service Analysis Results

Existing Traffic Conditions

Capacity and level of service analysis was performed for existing traffic volumes, lane geometry and traffic control for the AM and PM peak hours for the following study intersections:

- Southwest Drive and Kellers Chapel Road.
- Kellers Chapel Road and Mt. Carmel Road.

As indicated in Table 2, "Level of Service Summary – Existing Traffic Conditions," all vehicle movements currently operate at what calculates as an acceptable LOS "C" or better for existing traffic conditions at the study intersections for the AM and PM peak hours.

Traffic volumes used for this analysis are shown on Figure 3A, "Existing Traffic Volumes - AM Peak Hour," and Figure 3B, "Existing Traffic Volumes - PM Peak Hour."

EXISTING TRAFFIC CONDITIONS		Traffic Control	Eastbound Left-Turn	Eastbound Thru	Eastbound Right-Turn	Westbound Left-Turn	Westbound Thru	Westbound Right-Turn	Northbound Left-Turn	Northbound Thru	Northbound Right-Turn	Southbound Left-Turn	Southbound Thru	Southbound Right-Turn	Overall Intersection	Avg. Control Delay Seconds / Vehicle	Intersection Capacity Utilization (%)
INTERSECTION	PEAK HR		PEAK HOUR - LEVEL OF SERVICE														
Southwest Drive and Kellers Chapel Road	AM	SIGNAL	C			A			A	B		A	B		**B**	15.6	70.2%
	PM		B			A			A	B		B	B		**B**	14.3	60.0%
Kellers Chapel Road and Mt. Carmel Road	AM	SIGNAL		A		A			C		C				**B**	18.4	18.5%
	PM			A		A			C		C				**B**	12.4	18.6%

Table 2 - Level of Service Summary - Existing Traffic Conditions

Projected 20-Year Traffic Conditions

Capacity and LOS analysis was performed for projected traffic conditions for full build-out of the Southern Hills development plus 20-year background traffic volume growth for the AM and PM peak hours for the following intersections:

- Southwest Drive and Kellers Chapel Road.
- Kellers Chapel Road and Mt. Carmel Road.
- Southwest Drive and Drive A.
- Southwest Drive and Collector B.
- Southwest Drive and Drive C.
- Southwest Drive and Drive D.
- Southwest Drive and Collector E.
- Southwest Drive and Drive F.
- Southwest Drive and Collector G.
- Southwest Drive and Drive H.

Traffic volumes used for these projected traffic conditions are shown on Figure 5A, "Projected Future 20-Year Traffic Volumes - AM Peak Hour," and Figure 5B, "Projected Future 20-Year Traffic Volumes - PM Peak Hour."

The operating conditions projected to exist at the study intersections without mitigation are summarized in Table 3, "Level of Service Summary - Projected 20-Year Traffic Condition Without Mitigation." As indicated in Table 3, there are several vehicle movements at the study intersections that are expected to operate at what calculates as worse then LOS "D" during the AM and PM peak hours without any mitigation.

However, capacity and LOS analysis was performed for projected traffic conditions for full build-out of the Southern Hills development plus 20-year background traffic volume growth for the AM and PM peak hours for the study intersections with the following mitigation assumed:

- Widen Kellers Chapel Road eastbound and westbound approaches to Southwest Drive to three lanes with each consisting of a left-turn lane, a left/thru/right turn lane and one receiving lane.
- Traffic signal control at Southwest Drive and Collector E intersection and with Collector E consisting of dual left-turn lanes, a right-turn lane and a receiving lane.

The operating conditions projected to exist at the study intersections with mitigation as proposed are summarized in Table 4, "Level of Service Summary - Projected 20-Year Traffic Condition With Mitigation."

As indicated in Table 4, there are several vehicle movements at the study intersections that are expected to operate at improved LOS during the projected AM and PM peak hours with proposed mitigation. Additionally, as shown in the detailed LOS results in the Appendix, there is expected to be reduced vehicle delay. Furthermore the minor vehicle delay is expected to occur on the side streets with vehicles on Southwest Drive experiencing minimal delay in the study area. Additionally, with three new Collector Streets intersecting Southwest Drive and five access drives to serve commercial tracts along Southwest Drive, this is expected to accommodate left-turns at multiple, well spread locations entering the site. If fewer intersections were to be provided, the southbound left-turns on Southwest Drive could experience longer delay and vehicle queuing during the AM and PM peak hours.

Projected intersection capacity utilization values and average control delay are expected to be acceptable for all of the study intersections for projected 20-year traffic conditions with the site-generated traffic included with the proposed mitigative improvements assumed.

PROJECTED TRAFFIC CONDITIONS SITE FULL BUILD-OUT PLUS 20-YEARS BACKGROUND GROWTH		Traffic Control	Eastbound Left-Turn	Eastbound Thru	Eastbound Right-Turn	Westbound Left-Turn	Westbound Thru	Westbound Right-Turn	Northbound Left-Turn	Northbound Thru	Northbound Right-Turn	Southbound Left-Turn	Southbound Thru	Southbound Right-Turn	Overall Intersection	Avg. Control Delay Seconds / Vehicle	Intersection Capacity Utilization (%)
INTERSECTION	PEAK HR		PEAK HOUR - LEVEL OF SERVICE														
Southwest Drive and Kellers Chapel Road	AM	SIGNAL	F			B			B	D		F	C		**D**	43.3	114.9%
	PM		E			B			B	C		D	C		**C**	30.4	104.1%
Kellers Chapel Road and Mt. Carmel Road	AM	SIGNAL		A		A			E		E				**C**	32.4	34.6%
	PM			A		A			F		F				**C**	32.9	41.1%
Southwest Drive and Drive A	AM	"STOP" SIGN				E		E		A		D	A		**n/a**	0.3	77.7%
	PM					C		C		A		B	A		**n/a**	0.4	70.6%
Southwest Drive and Collector B	AM	"STOP" SIGN				F		B		A		D	A		**n/a**	0.5	77.6%
	PM					E		B		A		C	A		**n/a**	8.0	70.2%
Southwest Drive and Drive C	AM	"STOP" SIGN				E		E		A		D	A		**n/a**	0.3	77.9%
	PM					C		C		A		C	A		**n/a**	0.3	71.2%
Southwest Drive and Drive D	AM	"STOP" SIGN				E		E		A		D	A		**n/a**	0.3	77.9%
	PM					F		F		A		D	A		**n/a**	0.5	90.3%
Southwest Drive and Collector E	AM	"STOP" SIGN				F		E		A		D	A		**n/a**	6.4	78.8%
	PM					F		F		A		E	A		**n/a**	22.0	91.2%
Southwest Drive and Drive F	AM	"STOP" SIGN				F		F		A		D	A		**n/a**	0.4	78.2%
	PM					F		F		A		D	A		**n/a**	0.6	90.2%
Southwest Drive and Collector G	AM	"STOP" SIGN				F		F		A		D	A		**n/a**	2.4	78.3%
	PM					F		F		A		D	A		**n/a**	6.7	89.6%
Southwest Drive and Drive H	AM	"STOP" SIGN				F		F		A		D	A		**n/a**	0.4	78.3%
	PM					F		F		A		D	A		**n/a**	0.6	90.4%

Table 3 - Level of Service Summary - Projected 20-Year Traffic Condition Without Mitigation

PROJECTED TRAFFIC CONDITIONS SITE FULL BUILD-OUT PLUS 20-YEARS BACKGROUND GROWTH WITH MITIGATION		Traffic Control	Eastbound Left-Turn	Eastbound Thru	Eastbound Right-Turn	Westbound Left-Turn	Westbound Thru	Westbound Right-Turn	Northbound Left-Turn	Northbound Thru	Northbound Right-Turn	Southbound Left-Turn	Southbound Thru	Southbound Right-Turn	Overall Intersection	Avg. Control Delay Seconds / Vehicle	Intersection Capacity Utilization (%)
INTERSECTION	PEAK HR		PEAK HOUR - LEVEL OF SERVICE														
*Southwest Drive and Kellers Chapel Road	AM	SIGNAL	D		D	A	A		B	C		E	B		**C**	27.1	93.4%
	PM		D		D	C	B		B	C		D	C		**C**	26.0	89.2%
Kellers Chapel Road and Mt. Carmel Road	AM	SIGNAL		A		A			F		F				**E**	72.4	34.6%
	PM			A		A			F		F				**C**	32.5	41.1%
Southwest Drive and Drive A	AM	"STOP" SIGN				E		E		A		D	A		**n/a**	0.3	77.7%
	PM					B		B		A		B	A		**n/a**	0.2	70.6%
Southwest Drive and Collector B	AM	"STOP" SIGN				F		B		A		D	A		**n/a**	0.9	77.6%
	PM					C		B		A		C	A		**n/a**	0.5	70.2%
Southwest Drive and Drive C	AM	"STOP" SIGN				E		E		A		D	A		**n/a**	0.3	77.9%
	PM					C		C		A		B	A		**n/a**	0.2	71.2%
Southwest Drive and Drive D	AM	"STOP" SIGN				E		E		A		D	A		**n/a**	0.3	77.9%
	PM					E		E		A		D	A		**n/a**	0.5	90.3%
**Southwest Drive and Collector E	AM	SIGNAL				E		C		A		D	A		**A**	7.1	78.8%
	PM					E		D		C		D	C		**C**	28.8	88.2%
Southwest Drive and Drive F	AM	"STOP" SIGN				D		D		A		C	A		**n/a**	0.2	78.2%
	PM					E		E		A		C	A		**n/a**	0.3	90.2%
Southwest Drive and Collector G	AM	"STOP" SIGN				E		E		A		C	A		**n/a**	0.9	78.3%
	PM					F		F		A		C	A		**n/a**	2.6	89.6%
Southwest Drive and Drive H	AM	"STOP" SIGN				D		D		A		C	A		**n/a**	0.2	78.3%
	PM					E		E		A		E	A		**n/a**	0.3	90.4%

Mitigation Includes:

*Widen Kellers Chapel Road eastbound and westbound approaches to Southwest Drive to three lanes with each consisting of a left-turn lane, a left/thru/right turn lane and one receiving lane.

**Traffic signal control at Southwest Drive and Collector E intersection and with Collector E consisting of dual left-turn lanes, a right-turn lane and a receiving lane.

Table 4 - Level of Service Summary - Projected 20-Year Traffic Condition With Mitigation

TRAFFIC SIGNAL WARRANTS ANALYSIS

In evaluating the need for a traffic signal, certain established warrants are examined by investigating traffic conditions and physical characteristics of the location. The decision to install a traffic signal at a particular location is evaluated quantitatively relative to these warrants. Satisfaction of conditions for only one of the warrants, as specified, is required for signalization. These warrants, as specified in the Manual on Uniform Traffic Control Devices (MUTCD), are described in detail in the appendix of this report. They are summarized as follows:

- **Warrant One: Eight-Hour Vehicular Volume**
- **Warrant Two: Four-Hour Vehicular Volume**
- **Warrant Three: Peak Hour**
- **Warrant Four: Pedestrian Volume**
- **Warrant Five: School Crossing**
- **Warrant Six: Coordinated Signal System**
- **Warrant Seven: Crash Experience**
- **Warrant Eight: Roadway Network**

SIGNAL WARRANTS RESULTS

Traffic signal warrants analysis was made for 20-year projected traffic volumes for full build-out conditions for the intersection of Southwest Drive and Collector E.

As stated in *MUTCD Section 4C.01, Studies Factors for Justifying Traffic Control Signals, the study should consider the effects of the right-turn vehicles from the minor-street approaches. Engineering judgment should be used to determine what, if any, portion of the right-turn traffic is subtracted from the minor-street traffic count when evaluating the count against the signal warrants*. As a part of the traffic signal warrants analysis for this intersection included in this study, all of the westbound right-turns on Collector E approach to Southwest Drive have been factored out for analysis of projected traffic conditions.

Based on peak hour volume criteria set out in the MUTCD, it was found that traffic signal warrants are projected to be met at the intersection of Southwest Drive and Collector E for projected 20-year traffic conditions. Peak hour traffic signal warrants analysis results are depicted on the following tables:

- Table 5, "Projected 20-Year Traffic Conditions - Southwest Drive and Collector E - AM Peak Hour."
- Table 6, "Projected 20-Year Traffic Conditions - Southwest Drive and Collector E - PM Peak Hour."

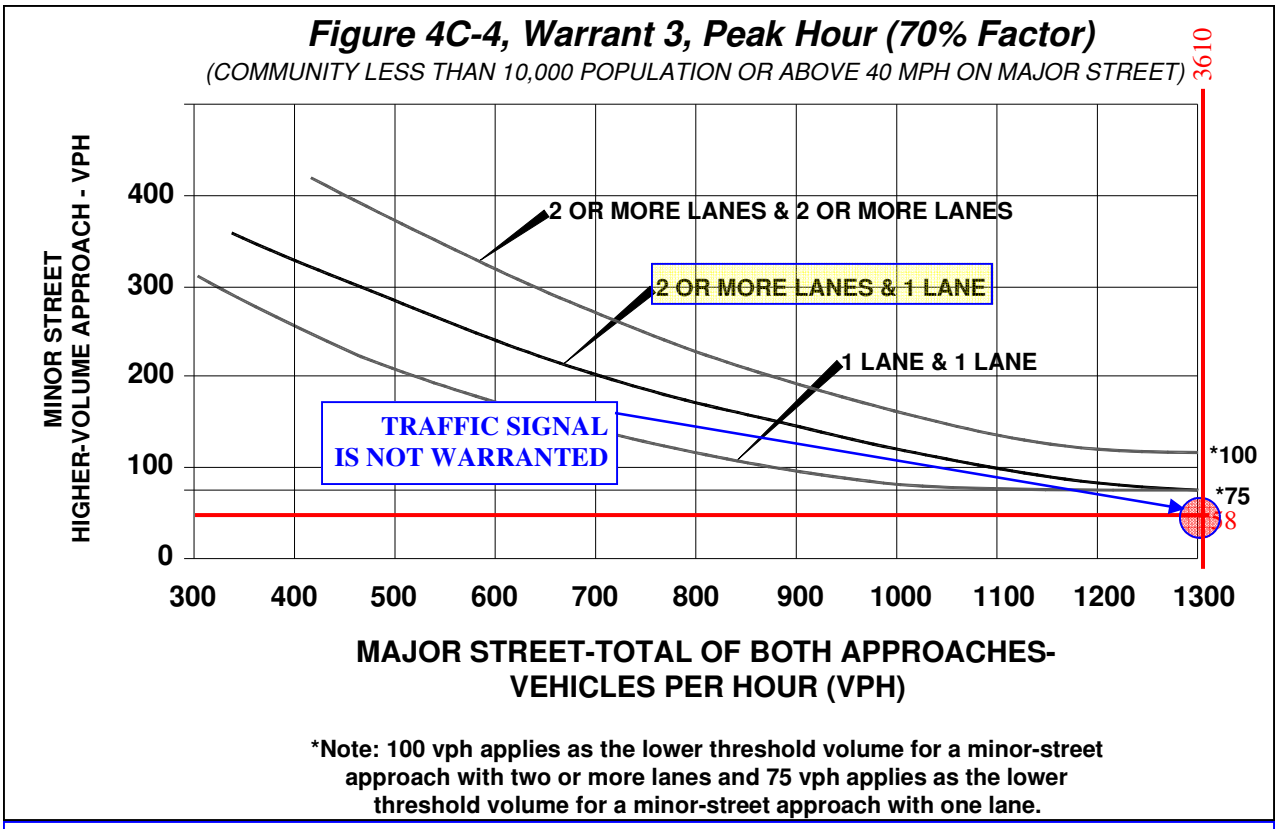


Table 5 - Projected 20-Year Traffic Conditions - Southwest Drive and Collector E - AM Peak Hour

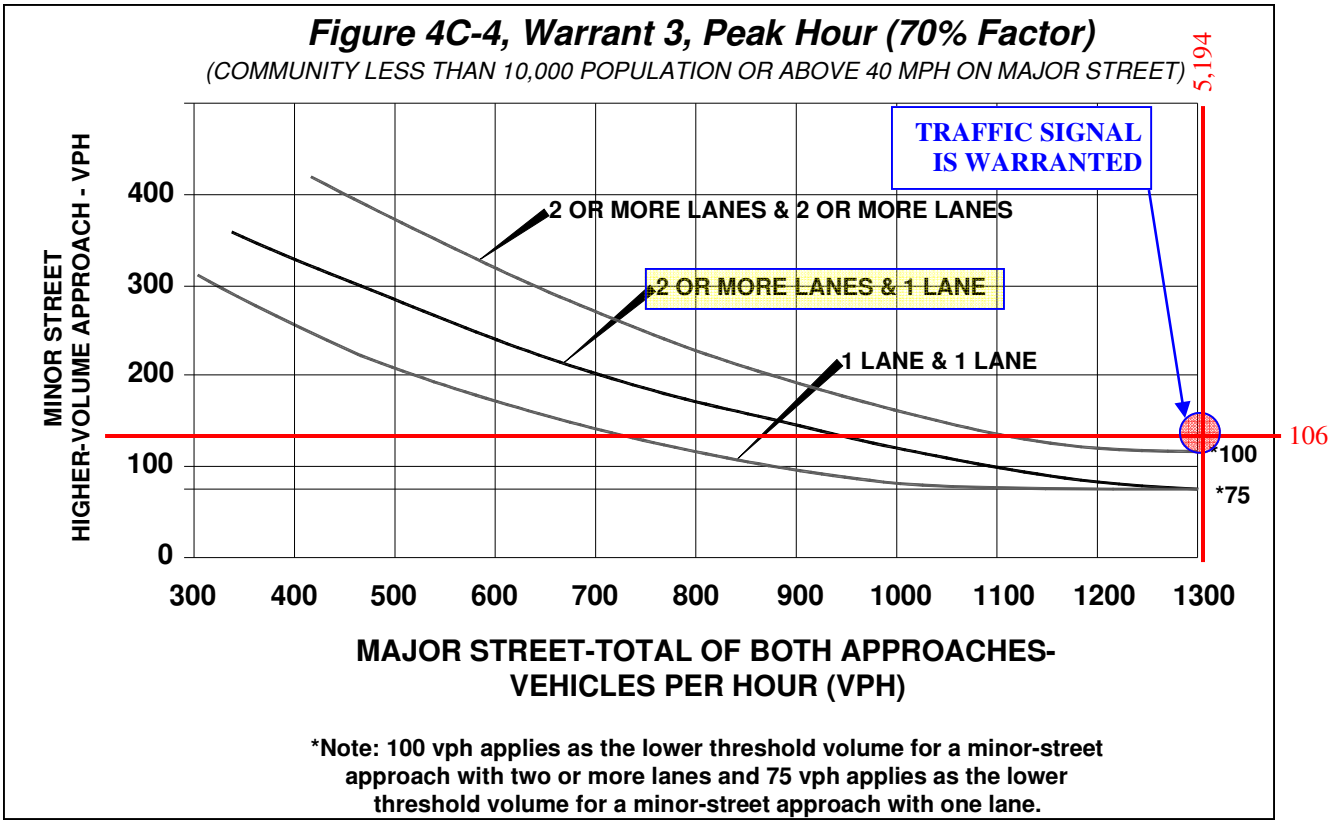


Table 6 - Projected 20-Year Traffic Conditions - Southwest Drive and Collector E - PM Peak Hour

AUXILIARY RIGHT-TURN LANE ANALYSIS

The volumes used and results for right-turn lane warrants on Southwest Drive at the proposed Collector Street locations (Collector B, Collector E and Collector G) for the worst-case weekday AM and PM peak hours have been conducted using guidelines for right-turn lanes warrants consistent with criteria described in AASHTO's A Policy on Geometric Design of Highways and Street, 2011, 6th Edition. The following are guidelines for right turn lane recommendations at un-signalized intersections:

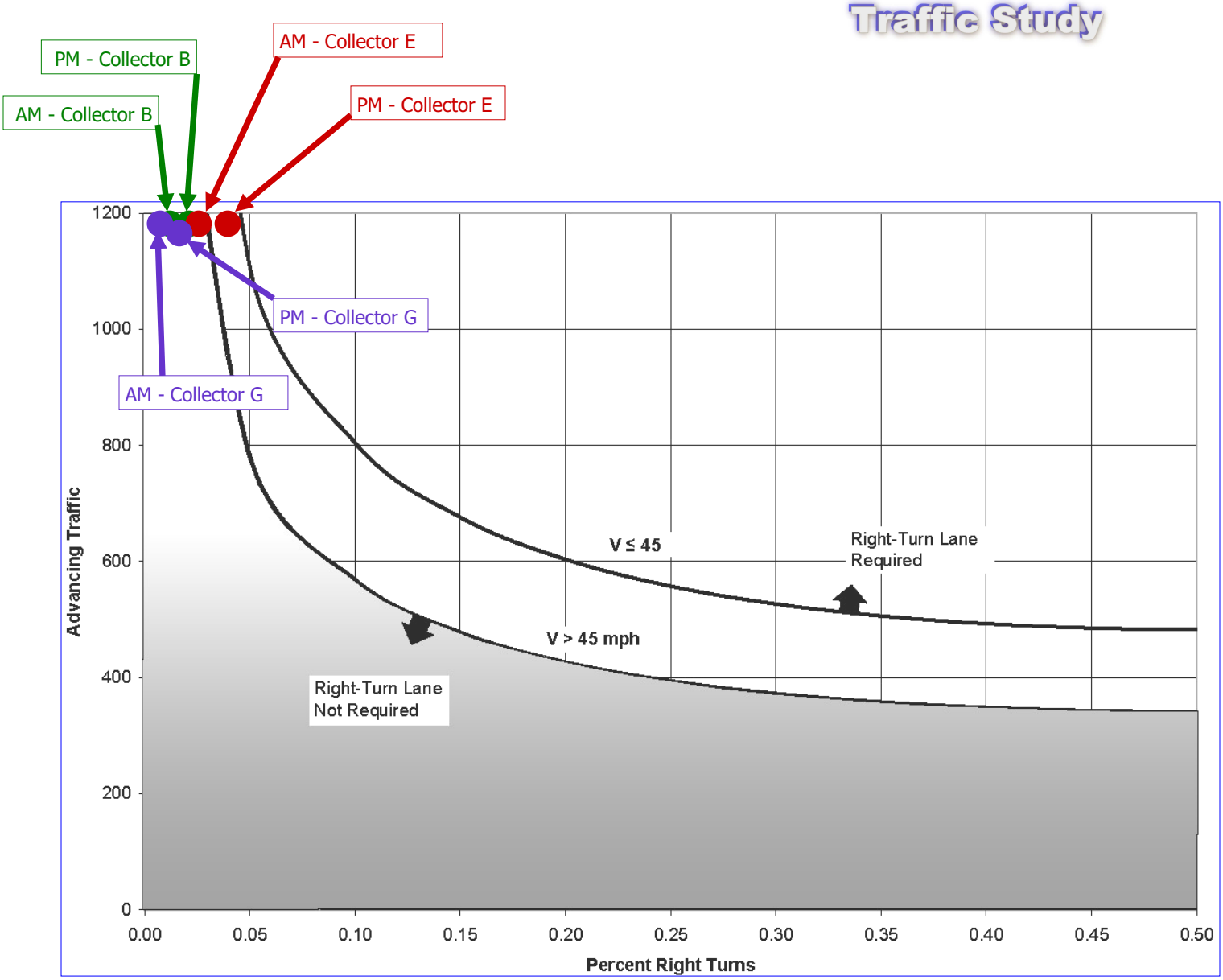
- Right-turn lanes shall be considered if traffic volumes at an intersection meet the thresholds as shown on the following page on Graph 1, "Right-Turn Lane Warrants," for non-stopping approaches at a non-signalized intersection.

- The following data is required for the Right-Turn Lane Warrants criteria:
    - Speed limit (equal or less than 45 MPH or greater than 45 MPH).
    - Percent of right-turns.
    - Advancing volume (includes through + right + left turn traffic).

- Capacity analysis should also be used to evaluate the need for right-turn lanes at stop controlled approaches. It was found that the northbound right-turn vehicle movements on Southwest Drive at the Collector B, Collector E and Collector G are expected to operate at what calculates as an acceptable LOS "C" or better for projected traffic conditions for the AM and PM peak hours.

Southwest Drive is currently a five-lane undivided roadway with a posted 50 mile per hour speed limit. Guidelines for a northbound deceleration right-turn lane on Southwest Drive at Collector B, Collector E and Collector G has been analyzed for the AM and PM peak hours for projected conditions. The results are depicted on Graph 1 and are summarized as follows:

- Northbound Southwest Drive and Collector B
  - AM Peak Hour
    - Advancing Volume = 2,249 vehicles.
    - Right-Turns = 20 vehicles (1% RT).
    - Right-Turn Warrant Not Met.
  - PM Peak Hour
    - Advancing Volume = 1,661 vehicles.
    - Right-Turns = 34 vehicles (2% RT).
    - Right-Turn Warrant Not Met.
- Northbound Southwest Drive and Collector E
  - AM Peak Hour
    - Advancing Volume = 2,258 vehicles.
    - Right-Turns = 48 vehicles (2% RT).
    - Right-Turn Warrant Not Met.
  - PM Peak Hour
    - Advancing Volume = 2,195 vehicles.
    - Right-Turns = 80 vehicles (4% RT).
    - Right-Turn Warrant Met.
- Northbound Southwest Drive and Collector G
  - AM Peak Hour
    - Advancing Volume = 2,271 vehicles.
    - Right-Turns = 28 vehicles (1% RT).
    - Right-Turn Warrant Not Met.
  - PM Peak Hour
    - Advancing Volume = 2,219 vehicles.
    - Right-Turns = 47 vehicles (2% RT).
    - Right-Turn Warrant Not Met.



Graph 1 - Right-Turn Lane Warrants

FINDINGS and RECOMMENDATIONS

Findings of this study are summarized as follows:

- Approximately 18,862 vehicle trips (combined in and out) per average weekday are projected to be generated by full build-out of the proposed Southern Hills mixed-use land uses on this site. Of this total for full build-out conditions, approximately 787 vehicle trips are estimated during the traffic conditions of the AM peak hour and approximately 1,378 vehicle trips are estimated during the traffic conditions of the PM peak hour.

- There is approximately 3,300 linear feet of site frontage along Southwest Drive. With three new collector streets and five new access drives, the spacing between the proposed access points would average over 400 feet between intersections. This spacing conforms to the recently adopted City of Jonesboro Access Management Policy for access spacing on a major arterial roadway.

- Capacity and level of service analysis was performed for existing traffic volumes, lane geometry and traffic control for the AM and PM peak hours for the existing study intersections. All vehicle movements currently operate at what calculates as an acceptable LOS "C" or better for existing traffic conditions at the study intersections for the AM and PM peak hours.

- Capacity and LOS analysis was performed for projected traffic conditions for full build-out of the Southern Hills development plus 20-year background traffic volume growth for the AM and PM peak hours for the study intersections. There are several vehicle movements at the study intersections that are expected to operate at what calculates as worse then LOS "D" during the AM and PM peak hours without any mitigation. However, capacity and LOS analysis was performed for projected traffic conditions for full build-out of the Southern Hills development plus 20-year background traffic volume growth for the AM and PM peak hours for the study intersections with the following mitigation assumed:
    - Widen Kellers Chapel Road eastbound and westbound

approaches to Southwest Drive to three lanes with each consisting of a left-turn lane, a left/thru/right turn lane and one receiving lane.

- Traffic signal control at Southwest Drive and Collector E intersection and with Collector E consisting of dual left-turn lanes, a right-turn lane and a receiving lane.

- There are several vehicle movements at the study intersections that are expected to operate at improved LOS during the projected AM and PM peak hours with proposed mitigation. Additionally, as shown in the detailed LOS results in the Appendix, there is expected to be reduced vehicle delay. Furthermore the minor vehicle delay is expected to occur on the side streets with vehicles on Southwest Drive experiencing minimal delay in the study area. Additionally, with three new Collector Streets intersecting Southwest Drive and five access drives to serve commercial tracts along Southwest Drive, this is expected to accommodate left-turns at multiple, well spread locations entering the site. If fewer intersections were to be provided, the southbound left-turns on Southwest Drive could experience longer delay and vehicle queuing during the AM and PM peak hours.

- Projected intersection capacity utilization values and average control delay are expected to be acceptable for all of the study intersections for projected 20-year traffic conditions with the site-generated traffic included with the proposed mitigative improvements assumed.

- Based on peak hour volume criteria set out in the MUTCD, it was found that traffic signal warrants are projected to be met at the intersection of Southwest Drive and Collector E for projected 20-year traffic conditions.

- It was found that criteria is not expected to be met for a northbound right-turn deceleration lane on Southwest Drive at the proposed site intersections during the weekday AM and PM peak hour projected traffic conditions except for the approach to Collector E during the PM peak hour. However, capacity and LOS results for projected traffic conditions indicate that a right-turn deceleration lane is not needed.

Recommendations of this study are summarized as follows:

- At full build-out of the site, it is recommended to widen Kellers Chapel Road eastbound and westbound approaches to Southwest Drive from two lanes to three lanes with each accommodating a left-turn lane, a left/thru/right turn lane and one receiving lane. This recommendation will also necessitate modifications to the traffic signal which controls Southwest Drive and Kellers Chapel Road and Kellers Chapel Road and Mt. Carmel Road. The traffic signal modifications at Southwest Drive and Kellers Chapel Road could also include the addition of provisions for pedestrians at this intersection.

- At full build-out of the site, it is recommended that a fully-actuated traffic signal be installed at the intersection of Southwest Drive and Collector E. Additionally, Collector E should be constructed to consist of dual left-turn lanes, a right-turn lane and a receiving lane.

- It is recommended that Drives D and F at Southwest Drive each be constructed to allow left and right-turns in and only right-turns out (prohibit left-turns out).

- Intersection improvements for Southwest Drive and Kellers Chapel Road and new intersections along Southwest Drive must conform to design standards of ARDOT and the City of Jonesboro and will require approval by ARDOT and the City.

- Traffic signal design for the intersection of Southwest Drive and Collector E and traffic signal modifications for the intersection of Southwest Drive and Kellers Chapel Road must conform to design standards of ARDOT and the City of Jonesboro and will require approval by ARDOT and the City.

PETERS & ASSOCIATES
ENGINEERS, INC.

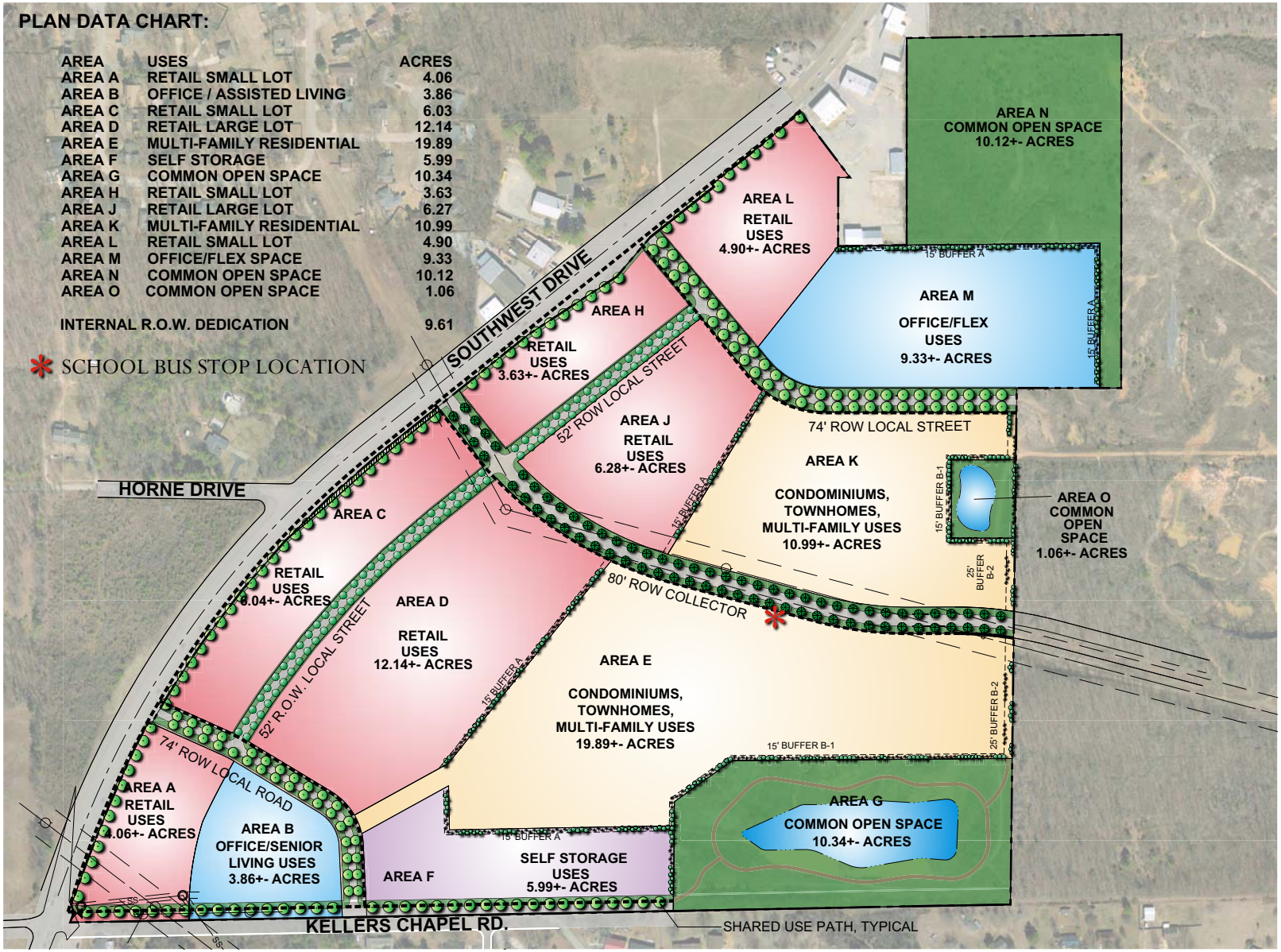
APPENDIX

Site Plan

PLAN DATA CHART:

AREA	USES	ACRES
AREA A	RETAIL SMALL LOT	4.06
AREA B	OFFICE / ASSISTED LIVING	3.86
AREA C	RETAIL SMALL LOT	6.03
AREA D	RETAIL LARGE LOT	12.14
AREA E	MULTI-FAMILY RESIDENTIAL	19.89
AREA F	SELF STORAGE	5.99
AREA G	COMMON OPEN SPACE	10.34
AREA H	RETAIL SMALL LOT	3.63
AREA J	RETAIL LARGE LOT	6.27
AREA K	MULTI-FAMILY RESIDENTIAL	10.99
AREA L	RETAIL SMALL LOT	4.90
AREA M	OFFICE/FLEX SPACE	9.33
AREA N	COMMON OPEN SPACE	10.12
AREA O	COMMON OPEN SPACE	1.06
INTERNAL R.O.W. DEDICATION		9.61

* SCHOOL BUS STOP LOCATION



N
W E
S

GRAPHIC SCALE

300 0 150 300 600

(IN FEET)
1 inch = 300 ft.

SOUTHERN HILLS
PLANNED DEVELOPMENT
JONESBORO, ARKANSAS

FISHER ARNOLD
ENGINEERS | ARCHITECTS | CONSULTANTS | PLANNERS

PETERS & ASSOCIATES
ENGINEERS, INC.

Trip-Generation Data

ITE TRIP-GENERATION 10TH EDITION
Southern Hills
Gas Station with 16 Fueling Positions with C-Store Land-Use (ITE 945)
4/23/2020
P2032

Weekday Daily Volume

DATA STATISTICS

Land Use:
Gasoline/Service Station With Convenience Market (945) Click for more details

Independent Variable:
Vehicle Fueling Positions

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
5

Avg. Num. of Vehicle Fueling Positions:
18

Average Rate:
205.36

Range of Rates:
129.50 - 316.45

Standard Deviation:
73.80

Fitted Curve Equation:
T = 268.46(X) - 1161.00

R^2:
0.61

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 3286 (Total), 1643 (Entry), 1643 (Exit)
Fitted Curve: 3134 (Total), 1567 (Entry), 1567 (Exit)

Weekday AM Peak Hour of Adjacent Street

Directional Distribution:
51% entering, 49% exiting

Calculated Trip Ends:
Average Rate: 200 (Total), 102 (Entry), 98 (Exit)
Fitted Curve: 207 (Total), 105 (Entry), 102 (Exit)

Weekday PM Peak Hour of Adjacent Street

Directional Distribution:
51% entering, 49% exiting

Calculated Trip Ends:
Average Rate: 224 (Total), 114 (Entry), 110 (Exit)

ITE TRIP-GENERATION 10TH EDITION
Southern Hills
Approximate 20,000 Sq. Ft. Commercial Retail Land-Use (ITE 820)
4/23/2020
P2032

Weekday Daily Volume

DATA STATISTICS

Land Use:
Shopping Center (820) Click for more details

Independent Variable:
1000 Sq. Ft. GLA

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
147

Avg. 1000 Sq. Ft. GLA:
453

Average Rate:
37.75

Range of Rates:
7.42 - 207.98

Standard Deviation:
16.41

Fitted Curve Equation:
Ln(T) = 0.68 Ln(X) + 5.57

R^2:
0.76

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 755 (Total), 377 (Entry), 378 (Exit)
Fitted Curve: 2012 (Total), 1006 (Entry), 1006 (Exit)

Weekday AM Peak Hour of Adjacent Street

Directional Distribution:
62% entering, 38% exiting

Calculated Trip Ends:
Average Rate: 19 (Total), 12 (Entry), 7 (Exit)
Fitted Curve: 162 (Total), 100 (Entry), 62 (Exit)

Weekday PM Peak Hour of Adjacent Street

Directional Distribution:
48% entering, 52% exiting

Calculated Trip Ends:
Average Rate: 76 (Total), 36 (Entry), 40 (Exit)
Fitted Curve: 165 (Total), 79 (Entry), 86 (Exit)

ITE TRIP-GENERATION 10TH EDITION
Southern Hills
Approximate 11,600 Sq. Ft. Office Land-Use (ITE 710)
4/23/2020
P2032

Weekday Daily Volume

DATA STATISTICS

Land Use:
General Office Building (710) Click for more details

Independent Variable:
1000 Sq. Ft. GFA

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
66

Avg. 1000 Sq. Ft. GFA:
171

Average Rate:
9.74

Range of Rates:
2.71 - 27.56

Standard Deviation:
5.15

Fitted Curve Equation:
Ln(T) = 0.97 Ln(X) + 2.50

R^2:
0.83

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 113 (Total), 56 (Entry), 57 (Exit)
Fitted Curve: 131 (Total), 65 (Entry), 66 (Exit)

Weekday AM Peak Hour of Adjacent Street

Directional Distribution:
86% entering, 14% exiting

Calculated Trip Ends:
Average Rate: 13 (Total), 11 (Entry), 2 (Exit)
Fitted Curve: 37 (Total), 32 (Entry), 5 (Exit)

Weekday PM Peak Hour of Adjacent Street

Directional Distribution:
16% entering, 84% exiting

Calculated Trip Ends:
Average Rate: 13 (Total), 2 (Entry), 11 (Exit)
Fitted Curve: 15 (Total), 2 (Entry), 13 (Exit)

ITE TRIP-GENERATION 10TH EDITION
Southern Hills
Approximate 50 Bed Assisted Living Land-Use (ITE 254)
4/23/2020
P2032

Weekday Daily Volume

DATA STATISTICS

Land Use:
Assisted Living (254) Click for more details

Independent Variable:
Beds

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
2

Avg. Num. of Beds:
135

Average Rate:
2.60

Range of Rates:
1.86 - 4.14

Standard Deviation:
****

Fitted Curve Equation:
Not Given

R^2:
****

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 130 (Total), 65 (Entry), 65 (Exit)

Weekday AM Peak Hour of Adjacent Street

Directional Distribution:
63% entering, 37% exiting

Calculated Trip Ends:
Average Rate: 10 (Total), 6 (Entry), 4 (Exit)

Weekday PM Peak Hour of Adjacent Street

Directional Distribution:
38% entering, 62% exiting

Calculated Trip Ends:
Average Rate: 13 (Total), 5 (Entry), 8 (Exit)

ITE TRIP-GENERATION 10TH EDITION
Southern Hills
Approximate 40,000 Sq. Ft. Commercial Retail Land-Use (ITE 820)
4/23/2020
P2032

Weekday Daily Volume

DATA STATISTICS

Land Use:
Shopping Center (820) Click for more details

Independent Variable:
1000 Sq. Ft. GLA

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
147

Avg. 1000 Sq. Ft. GLA:
453

Average Rate:
37.75

Range of Rates:
7.42 - 207.98

Standard Deviation:
16.41

Fitted Curve Equation:
Ln(T) = 0.68 Ln(X) + 5.57

R^2:
0.76

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 1510 (Total), 755 (Entry), 755 (Exit)
Fitted Curve: 3224 (Total), 1612 (Entry), 1612 (Exit)

Weekday AM Peak Hour of Adjacent Street

Directional Distribution:
62% entering, 38% exiting

Calculated Trip Ends:
Average Rate: 38 (Total), 23 (Entry), 15 (Exit)
Fitted Curve: 172 (Total), 107 (Entry), 65 (Exit)

Weekday PM Peak Hour of Adjacent Street

Directional Distribution:
48% entering, 52% exiting

Calculated Trip Ends:
Average Rate: 152 (Total), 73 (Entry), 79 (Exit)
Fitted Curve: 276 (Total), 132 (Entry), 144 (Exit)

ITE TRIP-GENERATION 10TH EDITION
Southern Hills
Approximate 100,000 Sq. Ft. Commercial Retail Land-Use (ITE 820)
4/23/2020
P2032

Weekday Daily Volume

DATA STATISTICS

Land Use:
Shopping Center (820) Click for more details

Independent Variable:
1000 Sq. Ft. GLA

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
147

Avg. 1000 Sq. Ft. GLA:
453

Average Rate:
37.75

Range of Rates:
7.42 - 207.98

Standard Deviation:
16.41

Fitted Curve Equation:
Ln(T) = 0.68 Ln(X) + 5.57

R^2:
0.76

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 3775 (Total), 1887 (Entry), 1888 (Exit)
Fitted Curve: 6012 (Total), 3006 (Entry), 3006 (Exit)

Weekday AM Peak Hour of Adjacent Street

Directional Distribution:
62% entering, 38% exiting

Calculated Trip Ends:
Average Rate: 94 (Total), 58 (Entry), 36 (Exit)
Fitted Curve: 202 (Total), 125 (Entry), 77 (Exit)

Weekday PM Peak Hour of Adjacent Street

Directional Distribution:
48% entering, 52% exiting

Calculated Trip Ends:
Average Rate: 381 (Total), 183 (Entry), 198 (Exit)
Fitted Curve: 543 (Total), 260 (Entry), 283 (Exit)

ITE TRIP-GENERATION 10TH EDITION
Southern Hills
Approximate 106 Residential Multi-Family Land-Use (ITE 220)
4/23/2020
P2032

Weekday Daily Volume

DATA STATISTICS

Land Use:
Multifamily Housing (Low-Rise) (220) Click for more details

Independent Variable:
Dwelling Units

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
29

Avg. Num. of Dwelling Units:
168

Average Rate:
7.32

Range of Rates:
4.45 - 10.97

Standard Deviation:
1.31

Fitted Curve Equation:
T = 7.56(X) - 40.86

R^2:
0.96

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 776 (Total), 388 (Entry), 388 (Exit)
Fitted Curve: 761 (Total), 380 (Entry), 381 (Exit)

Weekday AM Peak Hour of Adjacent Street

Directional Distribution:
23% entering, 77% exiting

Calculated Trip Ends:
Average Rate: 49 (Total), 11 (Entry), 38 (Exit)
Fitted Curve: 50 (Total), 11 (Entry), 39 (Exit)

Weekday PM Peak Hour of Adjacent Street

Directional Distribution:
63% entering, 37% exiting

Calculated Trip Ends:
Average Rate: 59 (Total), 37 (Entry), 22 (Exit)
Fitted Curve: 62 (Total), 39 (Entry), 23 (Exit)

ITE TRIP-GENERATION 10TH EDITION
Southern Hills
Approximate 106 Residential Townhomes Land-Use (ITE 220)
4/23/2020
P2032

Weekday Daily Volume

DATA STATISTICS

Land Use:
Multifamily Housing (Low-Rise) (220) Click for more details

Independent Variable:
Dwelling Units

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
29

Avg. Num. of Dwelling Units:
168

Average Rate:
7.32

Range of Rates:
4.45 - 10.97

Standard Deviation:
1.31

Fitted Curve Equation:
T = 7.56(X) - 40.86

R^2:
0.96

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 776 (Total), 388 (Entry), 388 (Exit)
Fitted Curve: 761 (Total), 380 (Entry), 381 (Exit)

Weekday AM Peak Hour of Adjacent Street

Directional Distribution:
23% entering, 77% exiting

Calculated Trip Ends:
Average Rate: 49 (Total), 11 (Entry), 38 (Exit)
Fitted Curve: 50 (Total), 11 (Entry), 39 (Exit)

Weekday PM Peak Hour of Adjacent Street

Directional Distribution:
63% entering, 37% exiting

Calculated Trip Ends:
Average Rate: 59 (Total), 37 (Entry), 22 (Exit)
Fitted Curve: 62 (Total), 39 (Entry), 23 (Exit)

ITE TRIP-GENERATION 10TH EDITION
Southern Hills
Approximate 106 Residential Condos Land-Use (ITE 220)
4/23/2020
P2032

Weekday Daily Volume

DATA STATISTICS

Land Use:
Multifamily Housing (Low-Rise) (220) Click for more details

Independent Variable:
Dwelling Units

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
29

Avg. Num. of Dwelling Units:
168

Average Rate:
7.32

Range of Rates:
4.45 - 10.97

Standard Deviation:
1.31

Fitted Curve Equation:
T = 7.56(X) - 40.86

R^2:
0.96

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 776 (Total), 388 (Entry), 388 (Exit)
Fitted Curve: 761 (Total), 380 (Entry), 381 (Exit)

Weekday AM Peak Hour of Adjacent Street

Directional Distribution:
23% entering, 77% exiting

Calculated Trip Ends:
Average Rate: 49 (Total), 11 (Entry), 38 (Exit)
Fitted Curve: 50 (Total), 11 (Entry), 39 (Exit)

Weekday PM Peak Hour of Adjacent Street

Directional Distribution:
63% entering, 37% exiting

Calculated Trip Ends:
Average Rate: 59 (Total), 37 (Entry), 22 (Exit)
Fitted Curve: 62 (Total), 39 (Entry), 23 (Exit)

ITE TRIP-GENERATION 10TH EDITION
Southern Hills
Approximate 50,000 Sq. Ft. Mini-Storage Land-Use (ITE 151)
4/23/2020
P2032

Weekday Daily Volume

DATA STATISTICS

Land Use:
Mini-Warehouse (151) Click for more details

Independent Variable:
1000 Sq. Ft. GFA

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
15

Avg. 1000 Sq. Ft. GFA:
52

Average Rate:
1.51

Range of Rates:
0.38 - 3.25

Standard Deviation:
0.95

Fitted Curve Equation:
Not Given

R^2:
****

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 76 (Total), 38 (Entry), 38 (Exit)

Weekday AM Peak Hour of Adjacent Street

Directional Distribution:
60% entering, 40% exiting

Calculated Trip Ends:
Average Rate: 5 (Total), 3 (Entry), 2 (Exit)

Weekday PM Peak Hour of Adjacent Street

Directional Distribution:
47% entering, 53% exiting

Calculated Trip Ends:
Average Rate: 9 (Total), 4 (Entry), 5 (Exit)

ITE TRIP-GENERATION 10TH EDITION
Southern Hills
Approximate 10.34 Acres Common Place (Park) Land-Use (ITE 411)
4/23/2020
P2032

Weekday Daily Volume

DATA STATISTICS

Land Use:
Public Park (411) Click for more details

Independent Variable:
Acres

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
5

Avg. Num. of Acres:
612

Average Rate:
0.78

Range of Rates:
0.55 - 34.00

Standard Deviation:
1.36

Fitted Curve Equation:
T = 0.64(X) + 88.46

R^2:
0.82

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 8 (Total), 4 (Entry), 4 (Exit)
Fitted Curve: 95 (Total), 47 (Entry), 48 (Exit)

Weekday AM Peak Hour of Adjacent Street

Directional Distribution:
59% entering, 41% exiting

Calculated Trip Ends:
Average Rate: 0 (Total), 0 (Entry), 0 (Exit)

Weekday PM Peak Hour of Adjacent Street

Directional Distribution:
55% entering, 45% exiting

Calculated Trip Ends:
Average Rate: 1 (Total), 0 (Entry), 1 (Exit)
Fitted Curve: 23 (Total), 13 (Entry), 10 (Exit)

ITE TRIP-GENERATION 10TH EDITION
Southern Hills
Approximate 30,000 Sq. Ft. Commercial Retail Land-Use (ITE 820)
4/23/2020
P2032

Weekday Daily Volume

DATA STATISTICS

Land Use:
Shopping Center (820) Click for more details

Independent Variable:
1000 Sq. Ft. GLA

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
147

Avg. 1000 Sq. Ft. GLA:
453

Average Rate:
37.75

Range of Rates:
7.42 - 207.98

Standard Deviation:
16.41

Fitted Curve Equation:
Ln(T) = 0.68 Ln(X) + 5.57

R^2:
0.76

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 1133 (Total), 566 (Entry), 567 (Exit)
Fitted Curve: 2651 (Total), 1325 (Entry), 1326 (Exit)

Weekday AM Peak Hour of Adjacent Street

Directional Distribution:
62% entering, 38% exiting

Calculated Trip Ends:
Average Rate: 28 (Total), 17 (Entry), 11 (Exit)
Fitted Curve: 167 (Total), 103 (Entry), 64 (Exit)

Weekday PM Peak Hour of Adjacent Street

Directional Distribution:
48% entering, 52% exiting

Calculated Trip Ends:
Average Rate: 114 (Total), 55 (Entry), 59 (Exit)
Fitted Curve: 223 (Total), 107 (Entry), 116 (Exit)

ITE TRIP-GENERATION 10TH EDITION
Southern Hills
Approximate 55,000 Sq. Ft. Commercial Retail Land-Use (ITE 820)
4/23/2020
P2032

Weekday Daily Volume

DATA STATISTICS

Land Use:
Shopping Center (820) Click for more details

Independent Variable:
1000 Sq. Ft. GLA

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
147

Avg. 1000 Sq. Ft. GLA:
453

Average Rate:
37.75

Range of Rates:
7.42 - 207.98

Standard Deviation:
16.41

Fitted Curve Equation:
Ln(T) = 0.68 Ln(X) + 5.57

R^2:
0.76

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 2076 (Total), 1038 (Entry), 1038 (Exit)
Fitted Curve: 4004 (Total), 2002 (Entry), 2002 (Exit)

Weekday AM Peak Hour of Adjacent Street

Directional Distribution:
62% entering, 38% exiting

Calculated Trip Ends:
Average Rate: 52 (Total), 32 (Entry), 20 (Exit)
Fitted Curve: 179 (Total), 111 (Entry), 68 (Exit)

Weekday PM Peak Hour of Adjacent Street

Directional Distribution:
48% entering, 52% exiting

Calculated Trip Ends:
Average Rate: 210 (Total), 101 (Entry), 109 (Exit)
Fitted Curve: 349 (Total), 167 (Entry), 182 (Exit)

ITE TRIP-GENERATION 10TH EDITION
Southern Hills
Approximate 80 Residential Multi-Family Land-Use (ITE 220)
4/23/2020
P2032

Weekday Daily Volume

DATA STATISTICS

Land Use:
Multifamily Housing (Low-Rise) (220) Click for more details

Independent Variable:
Dwelling Units

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
29

Avg. Num. of Dwelling Units:
168

Average Rate:
7.32

Range of Rates:
4.45 - 10.97

Standard Deviation:
1.31

Fitted Curve Equation:
T = 7.56(X) - 40.86

R^2:
0.96

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 586 (Total), 293 (Entry), 293 (Exit)
Fitted Curve: 564 (Total), 282 (Entry), 282 (Exit)

Weekday AM Peak Hour of Adjacent Street

Directional Distribution:
23% entering, 77% exiting

Calculated Trip Ends:
Average Rate: 37 (Total), 8 (Entry), 29 (Exit)
Fitted Curve: 39 (Total), 9 (Entry), 30 (Exit)

Weekday PM Peak Hour of Adjacent Street

Directional Distribution:
63% entering, 37% exiting

Calculated Trip Ends:
Average Rate: 45 (Total), 28 (Entry), 17 (Exit)
Fitted Curve: 48 (Total), 30 (Entry), 18 (Exit)

ITE TRIP-GENERATION 10TH EDITION
Southern Hills
Approximate 48 Residential Townhomes Land-Use (ITE 220)
4/23/2020
P2032

Weekday Daily Volume

DATA STATISTICS

Land Use:
Multifamily Housing (Low-Rise) (220) Click for more details

Independent Variable:
Dwelling Units

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
29

Avg. Num. of Dwelling Units:
168

Average Rate:
7.32

Range of Rates:
4.45 - 10.97

Standard Deviation:
1.31

Fitted Curve Equation:
T = 7.56(X) - 40.86

R^2:
0.96

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 351 (Total), 175 (Entry), 176 (Exit)
Fitted Curve: 322 (Total), 161 (Entry), 161 (Exit)

Weekday AM Peak Hour of Adjacent Street

Directional Distribution:
23% entering, 77% exiting

Calculated Trip Ends:
Average Rate: 22 (Total), 5 (Entry), 17 (Exit)
Fitted Curve: 24 (Total), 5 (Entry), 19 (Exit)

Weekday PM Peak Hour of Adjacent Street

Directional Distribution:
63% entering, 37% exiting

Calculated Trip Ends:
Average Rate: 27 (Total), 17 (Entry), 10 (Exit)
Fitted Curve: 31 (Total), 19 (Entry), 12 (Exit)

ITE TRIP-GENERATION 10TH EDITION
Southern Hills
Approximate 48 Residential Condos Land-Use (ITE 220)
4/23/2020
P2032

Weekday Daily Volume

DATA STATISTICS

Land Use:
Multifamily Housing (Low-Rise) (220) Click for more details

Independent Variable:
Dwelling Units

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
29

Avg. Num. of Dwelling Units:
168

Average Rate:
7.32

Range of Rates:
4.45 - 10.97

Standard Deviation:
1.31

Fitted Curve Equation:
T = 7.56(X) - 40.86

R^2:
0.96

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 351 (Total), 175 (Entry), 176 (Exit)
Fitted Curve: 322 (Total), 161 (Entry), 161 (Exit)

Weekday AM Peak Hour of Adjacent Street

Directional Distribution:
23% entering, 77% exiting

Calculated Trip Ends:
Average Rate: 22 (Total), 5 (Entry), 17 (Exit)
Fitted Curve: 24 (Total), 5 (Entry), 19 (Exit)

Weekday PM Peak Hour of Adjacent Street

Directional Distribution:
63% entering, 37% exiting

Calculated Trip Ends:
Average Rate: 27 (Total), 17 (Entry), 10 (Exit)
Fitted Curve: 31 (Total), 19 (Entry), 12 (Exit)

ITE TRIP-GENERATION 10TH EDITION
Southern Hills
Approximate 42,000 Sq. Ft. Commercial Retail Land-Use (ITE 820)
4/23/2020
P2032

Weekday Daily Volume

DATA STATISTICS

Land Use:
Shopping Center (820) Click for more details

Independent Variable:
1000 Sq. Ft. GLA

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
147

Avg. 1000 Sq. Ft. GLA:
453

Average Rate:
37.75

Range of Rates:
7.42 - 207.98

Standard Deviation:
16.41

Fitted Curve Equation:
Ln(T) = 0.68 Ln(X) + 5.57

R^2:
0.76

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 1586 (Total), 793 (Entry), 793 (Exit)
Fitted Curve: 3333 (Total), 1666 (Entry), 1667 (Exit)

Weekday AM Peak Hour of Adjacent Street

Directional Distribution:
62% entering, 38% exiting

Calculated Trip Ends:
Average Rate: 39 (Total), 24 (Entry), 15 (Exit)
Fitted Curve: 173 (Total), 107 (Entry), 66 (Exit)

Weekday PM Peak Hour of Adjacent Street

Directional Distribution:
48% entering, 52% exiting

Calculated Trip Ends:
Average Rate: 160 (Total), 77 (Entry), 83 (Exit)
Fitted Curve: 286 (Total), 137 (Entry), 149 (Exit)

ITE TRIP-GENERATION 10TH EDITION
Southern Hills
Approximate 81,000 Sq. Ft. Office Land-Use (ITE 710)
4/23/2020
P2032

Weekday Daily Volume

DATA STATISTICS

Land Use:
General Office Building (710) Click for more details

Independent Variable:
1000 Sq. Ft. GFA

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
66

Avg. 1000 Sq. Ft. GFA:
171

Average Rate:
9.74

Range of Rates:
2.71 - 27.56

Standard Deviation:
5.15

Fitted Curve Equation:
Ln(T) = 0.97 Ln(X) + 2.50

R^2:
0.83

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 789 (Total), 394 (Entry), 395 (Exit)
Fitted Curve: 865 (Total), 432 (Entry), 433 (Exit)

Weekday AM Peak Hour of Adjacent Street

Directional Distribution:
86% entering, 14% exiting

Calculated Trip Ends:
Average Rate: 94 (Total), 81 (Entry), 13 (Exit)
Fitted Curve: 103 (Total), 88 (Entry), 15 (Exit)

Weekday PM Peak Hour of Adjacent Street

Directional Distribution:
16% entering, 84% exiting

Calculated Trip Ends:
Average Rate: 93 (Total), 15 (Entry), 78 (Exit)
Fitted Curve: 93 (Total), 15 (Entry), 78 (Exit)

ITE TRIP-GENERATION 10TH EDITION
Southern Hills
Approximate 10.12 Acres Common Place (Park) Land-Use (ITE 411)
4/23/2020
P2032

Weekday Daily Volume

DATA STATISTICS

Land Use:
Public Park (411) Click for more details

Independent Variable:
Acres

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
5

Avg. Num. of Acres:
612

Average Rate:
0.78

Range of Rates:
0.55 - 34.00

Standard Deviation:
1.36

Fitted Curve Equation:
T = 0.64(X) + 88.46

R^2:
0.82

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 8 (Total), 4 (Entry), 4 (Exit)
Fitted Curve: 95 (Total), 47 (Entry), 48 (Exit)

Weekday AM Peak Hour of Adjacent Street

Directional Distribution:
59% entering, 41% exiting

Calculated Trip Ends:
Average Rate: 0 (Total), 0 (Entry), 0 (Exit)

Weekday PM Peak Hour of Adjacent Street

Directional Distribution:
55% entering, 45% exiting

Calculated Trip Ends:
Average Rate: 1 (Total), 0 (Entry), 1 (Exit)
Fitted Curve: 23 (Total), 13 (Entry), 10 (Exit)

ITE TRIP-GENERATION 10TH EDITION
Southern Hills
Approximate 1.06 Acres Common Place (Park) Land-Use (ITE 411)
4/23/2020
P2032

Weekday Daily Volume

DATA STATISTICS

Land Use:
Public Park (411) Click for more details

Independent Variable:
Acres

Time Period:
Weekday

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
5

Avg. Num. of Acres:
612

Average Rate:
0.78

Range of Rates:
0.55 - 34.00

Standard Deviation:
1.36

Fitted Curve Equation:
T = 0.64(X) + 88.46

R^2:
0.82

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 1 (Total), 0 (Entry), 1 (Exit)
Fitted Curve: 89 (Total), 44 (Entry), 45 (Exit)

Weekday AM Peak Hour of Adjacent Street

Directional Distribution:
59% entering, 41% exiting

Calculated Trip Ends:
Average Rate: 0 (Total), 0 (Entry), 0 (Exit)

Weekday PM Peak Hour of Adjacent Street

Directional Distribution:
55% entering, 45% exiting

Calculated Trip Ends:
Average Rate: 0 (Total), 0 (Entry), 0 (Exit)
Fitted Curve: 23 (Total), 12 (Entry), 11 (Exit)

Trip Generation Summary - Southern Hills

Project: P2032 Southern Hills
Alternative: Southern Hills

Open Date: 4/23/2020
Analysis Date: 4/23/2020

ITE	Land Use	Average Daily Trips			AM Peak Hour of Adjacent Street Traffic			PM Peak Hour of Adjacent Street Traffic		
		Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
945	GASMARKET 1	1302	1302	2604	82	81	163	108	108	216
	16 Vehicle Fueling Positions									
820	CENTERSHOPPING 1	427	427	854	12	7	19	36	38	74
	20 Gross Leasable Area 1000 SF									
710	OFFICEGENERAL 1	64	64	128	16	2	18	3	14	17
	11.6 Gross Floor Area 1000 SF									
254	ASSISTLIVE 1	67	66	133	5	2	7	5	6	11
	50 Beds									
820	CENTERSHOPPING 2	854	854	1708	24	14	38	71	77	148
	40 Gross Leasable Area 1000 SF									
820	CENTERSHOPPING 3	2135	2135	4270	60	36	96	178	193	371
	100 Gross Leasable Area 1000 SF									
220	APT 1	353	352	705	11	43	54	43	23	66
	106 Dwelling Units									
220	APT 2	353	352	705	11	43	54	43	23	66
	106 Dwelling Units									
220	APT 3	353	352	705	11	43	54	43	23	66
	106 Dwelling Units									
151	MWAREHOUSE 1	63	62	125	4	3	7	7	6	13
	50 Gross Floor Area 1000 SF									
411	PARK 1	10	10	20	26	21	47	21	15	36
	10.34 Acres									
820	CENTERSHOPPING 4	641	640	1281	18	11	29	53	58	111
	30 Gross Leasable Area 1000 SF									
820	CENTERSHOPPING 5	1175	1174	2349	33	20	53	98	106	204
	55 Gross Leasable Area 1000 SF									
220	APT 4	266	266	532	8	33	41	33	17	50
	80 Dwelling Units									
220	APT 5	160	159	319	5	19	24	20	10	30
	48 Dwelling Units									
220	APT 6	160	159	319	5	19	24	20	10	30
	48 Dwelling Units									

Source: Institute of Transportation Engineers, Trip Generation Manual 9th Edition, 2012

ITE	Land Use	Average Daily Trips Enter	Average Daily Trips Exit	Average Daily Trips Total	AM Peak Hour of Adjacent Street Traffic Enter	AM Peak Hour of Adjacent Street Traffic Exit	AM Peak Hour of Adjacent Street Traffic Total	PM Peak Hour of Adjacent Street Traffic Enter	PM Peak Hour of Adjacent Street Traffic Exit	PM Peak Hour of Adjacent Street Traffic Total
820	CENTERSHOPPING 6	897	896	1793	25	15	40	75	81	156
	42 Gross Leasable Area 1000 SF									
710	OFFICEGENERAL 2	447	446	893	111	15	126	21	100	121
	81 Gross Floor Area 1000 SF									
411	PARK 2	10	9	19	26	20	46	20	15	35
	10.12 Acres									
411	PARK 3	1	1	2	3	2	5	2	2	4
	1.06 Acres									
Unadjusted Volume		9738	9726	19464	496	449	945	900	925	1825
Internal Capture Trips		0	0	0	17	17	34	178	178	356
Pass-By Trips		0	0	0	0	0	0	151	153	304
Volume Added to Adjacent Streets		9738	9726	19464	479	432	911	571	594	1165

Total AM Peak Hour Internal Capture = 4 Percent

Total PM Peak Hour Internal Capture = 20 Percent

Source: Institute of Transportation Engineers, Trip Generation Manual 9th Edition, 2012

PETERS & ASSOCIATES
ENGINEERS, INC.

Vehicle Turning Movement Count Data

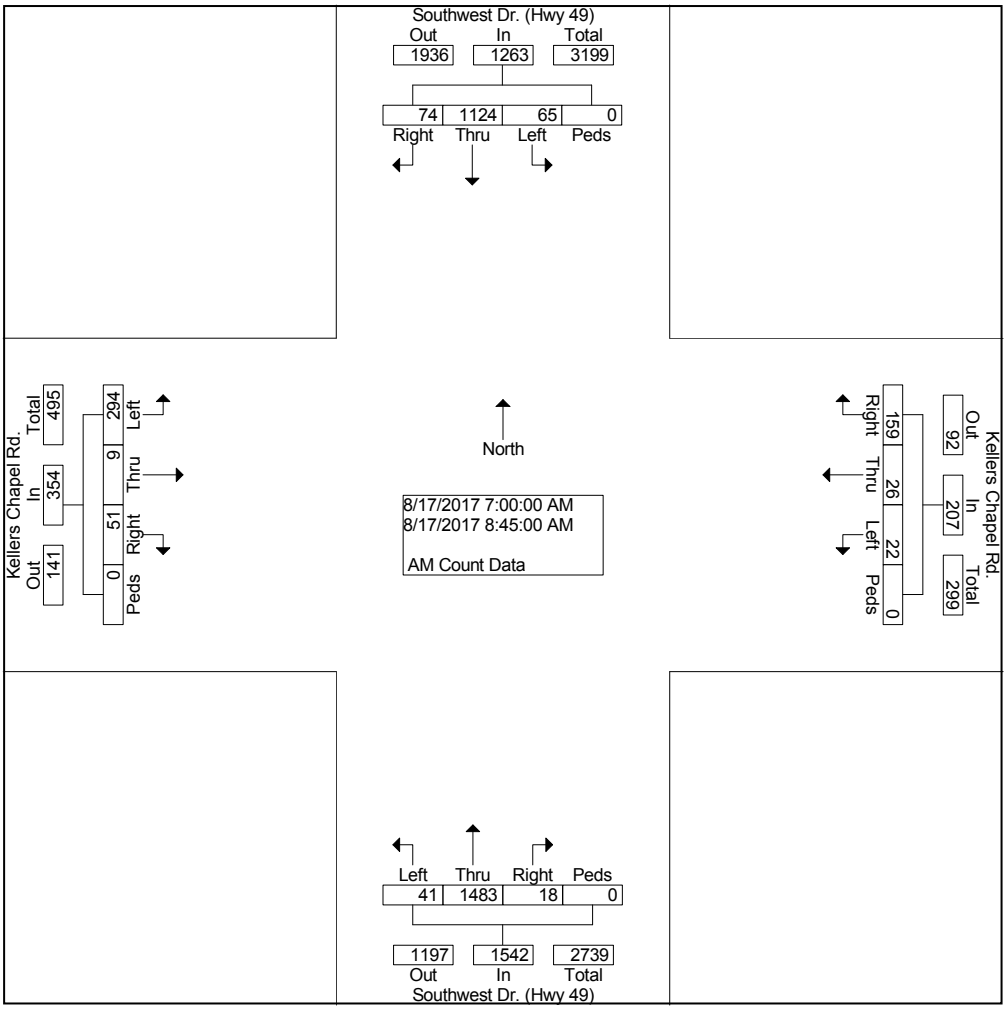
Peters & Associates Engineers, Inc.
Peak Hour Turning Movement Count Data

AM Hour Turning Movement Count Data
Southwest Dr. and Kellers Chapel Rd.
Jonesboro, AR
P1885

File Name : AM-49-KC
Site Code : 00000000
Start Date : 08/17/2017
Page No : 1

Groups Printed- AM Count Data

	Southwest Dr. (Hwy 49) From North					Kellers Chapel Rd. From East					Southwest Dr. (Hwy 49) From South					Kellers Chapel Rd. From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
07:00 AM	8	187	7	0	202	20	2	3	0	25	0	149	0	0	149	6	1	41	0	48	424
07:15 AM	10	209	9	0	228	25	3	4	0	32	0	206	2	0	208	22	0	46	0	68	536
07:30 AM	6	168	8	0	182	27	8	7	0	42	5	240	12	0	257	14	2	65	0	81	562
07:45 AM	13	134	9	0	156	26	3	5	0	34	6	280	11	0	297	4	3	41	0	48	535
Total	37	698	33	0	768	98	16	19	0	133	11	875	25	0	911	46	6	193	0	245	2057
08:00 AM	10	106	11	0	127	19	3	2	0	24	4	236	8	0	248	1	1	29	0	31	430
08:15 AM	8	102	9	0	119	16	4	0	0	20	1	123	2	0	126	0	1	23	0	24	289
08:30 AM	7	103	5	0	115	16	2	1	0	19	1	116	2	0	119	4	0	15	0	19	272
08:45 AM	12	115	7	0	134	10	1	0	0	11	1	133	4	0	138	0	1	34	0	35	318
Total	37	426	32	0	495	61	10	3	0	74	7	608	16	0	631	5	3	101	0	109	1309
Grand Total	74	1124	65	0	1263	159	26	22	0	207	18	1483	41	0	1542	51	9	294	0	354	3366
Apprch %	5.9	89.0	5.1	0.0		76.8	12.6	10.6	0.0		1.2	96.2	2.7	0.0		14.4	2.5	83.1	0.0		
Total %	2.2	33.4	1.9	0.0	37.5	4.7	0.8	0.7	0.0	6.1	0.5	44.1	1.2	0.0	45.8	1.5	0.3	8.7	0.0	10.5	

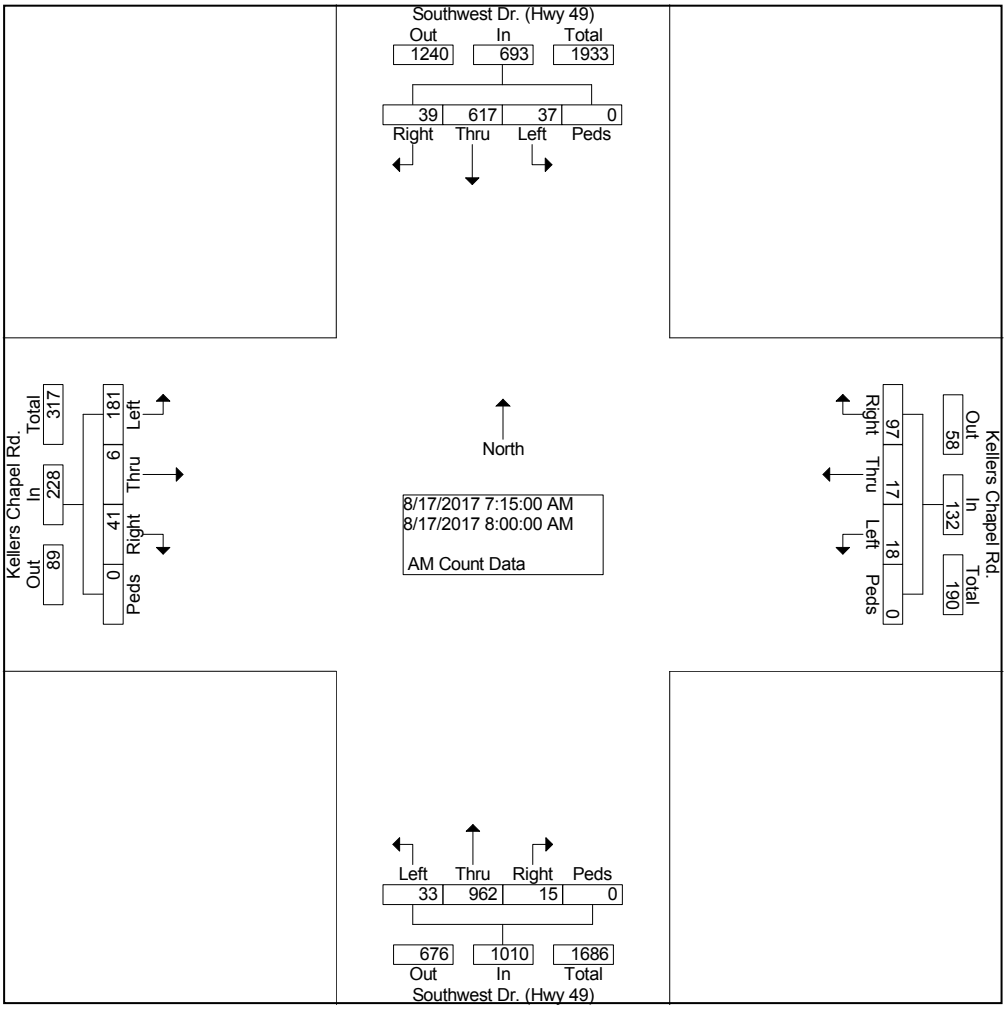


Peters & Associates Engineers, Inc.
Peak Hour Turning Movement Count Data

AM Hour Turning Movement Count Data
Southwest Dr. and Kellers Chapel Rd.
Jonesboro, AR
P1885

File Name : AM-49-KC
Site Code : 00000000
Start Date : 08/17/2017
Page No : 2

	Southwest Dr. (Hwy 49) From North					Kellers Chapel Rd. From East					Southwest Dr. (Hwy 49) From South					Kellers Chapel Rd. From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Intersection	07:15 AM																				
Volume	39	617	37	0	693	97	17	18	0	132	15	962	33	0	1010	41	6	181	0	228	2063
Percent	5.6	89.0	5.3	0.0		73.5	12.9	13.6	0.0		1.5	95.2	3.3	0.0		18.0	2.6	79.4	0.0		
07:30 Volume	6	168	8	0	182	27	8	7	0	42	5	240	12	0	257	14	2	65	0	81	562
Peak Factor																					0.918
High Int.	07:15 AM					07:30 AM					07:45 AM					07:30 AM					
Volume	10	209	9	0	228	27	8	7	0	42	6	280	11	0	297	14	2	65	0	81	
Peak Factor					0.760					0.786					0.850					0.704	



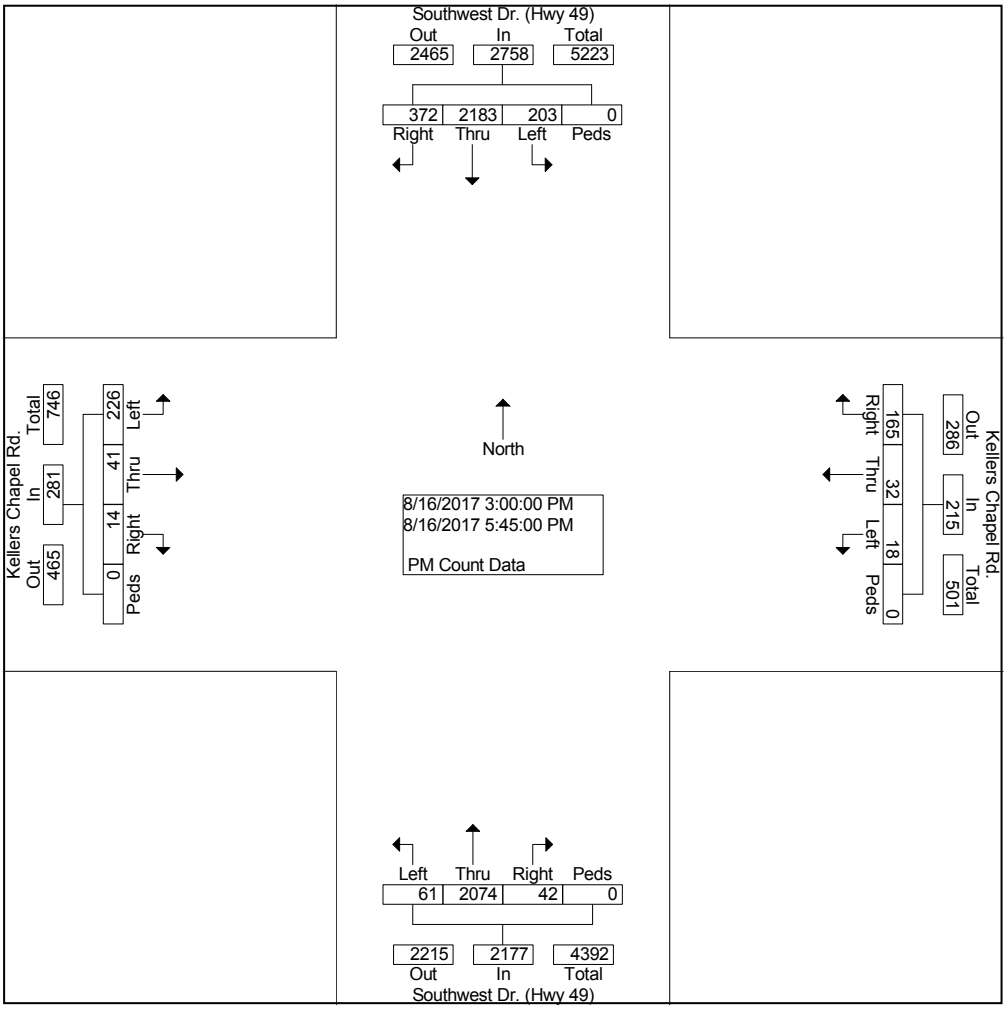
Peters & Associates Engineers, Inc.
Peak Hour Turning Movement Count Data

PM Hour Turning Movement Count Data
Southwest Dr. and Kellers Chapel Rd.
Jonesboro, AR
P1885

File Name : PM-49-KC
Site Code : 00000000
Start Date : 08/16/2017
Page No : 1

Groups Printed- PM Count Data

	Southwest Dr. (Hwy 49) From North					Kellers Chapel Rd. From East					Southwest Dr. (Hwy 49) From South					Kellers Chapel Rd. From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
03:00 PM	21	201	9	0	231	10	2	3	0	15	6	154	1	0	161	2	4	18	0	24	431
03:15 PM	30	144	12	0	186	18	2	1	0	21	6	203	15	0	224	0	1	9	0	10	441
03:30 PM	22	136	14	0	172	14	0	3	0	17	3	246	12	0	261	4	5	11	0	20	470
03:45 PM	16	145	11	0	172	10	2	1	0	13	3	173	4	0	180	0	2	25	0	27	392
Total	89	626	46	0	761	52	6	8	0	66	18	776	32	0	826	6	12	63	0	81	1734
04:00 PM	27	163	15	0	205	12	2	2	0	16	2	162	2	0	166	3	1	24	0	28	415
04:15 PM	26	170	20	0	216	5	4	1	0	10	4	166	6	0	176	1	3	5	0	9	411
04:30 PM	29	193	20	0	242	15	4	3	0	22	5	149	3	0	157	0	3	14	0	17	438
04:45 PM	35	221	19	0	275	15	2	1	0	18	3	140	3	0	146	2	4	21	0	27	466
Total	117	747	74	0	938	47	12	7	0	66	14	617	14	0	645	6	11	64	0	81	1730
05:00 PM	41	209	19	0	269	14	2	0	0	16	3	183	5	0	191	1	2	19	0	22	498
05:15 PM	57	211	26	0	294	17	2	1	0	20	4	173	2	0	179	1	6	14	0	21	514
05:30 PM	46	194	21	0	261	23	7	1	0	31	2	165	7	0	174	0	3	17	0	20	486
05:45 PM	22	196	17	0	235	12	3	1	0	16	1	160	1	0	162	0	7	49	0	56	469
Total	166	810	83	0	1059	66	14	3	0	83	10	681	15	0	706	2	18	99	0	119	1967
Grand Total	372	2183	203	0	2758	165	32	18	0	215	42	2074	61	0	2177	14	41	226	0	281	5431
Apprch %	13.5	79.2	7.4	0.0		76.7	14.9	8.4	0.0		1.9	95.3	2.8	0.0		5.0	14.6	80.4	0.0		
Total %	6.8	40.2	3.7	0.0	50.8	3.0	0.6	0.3	0.0	4.0	0.8	38.2	1.1	0.0	40.1	0.3	0.8	4.2	0.0	5.2	

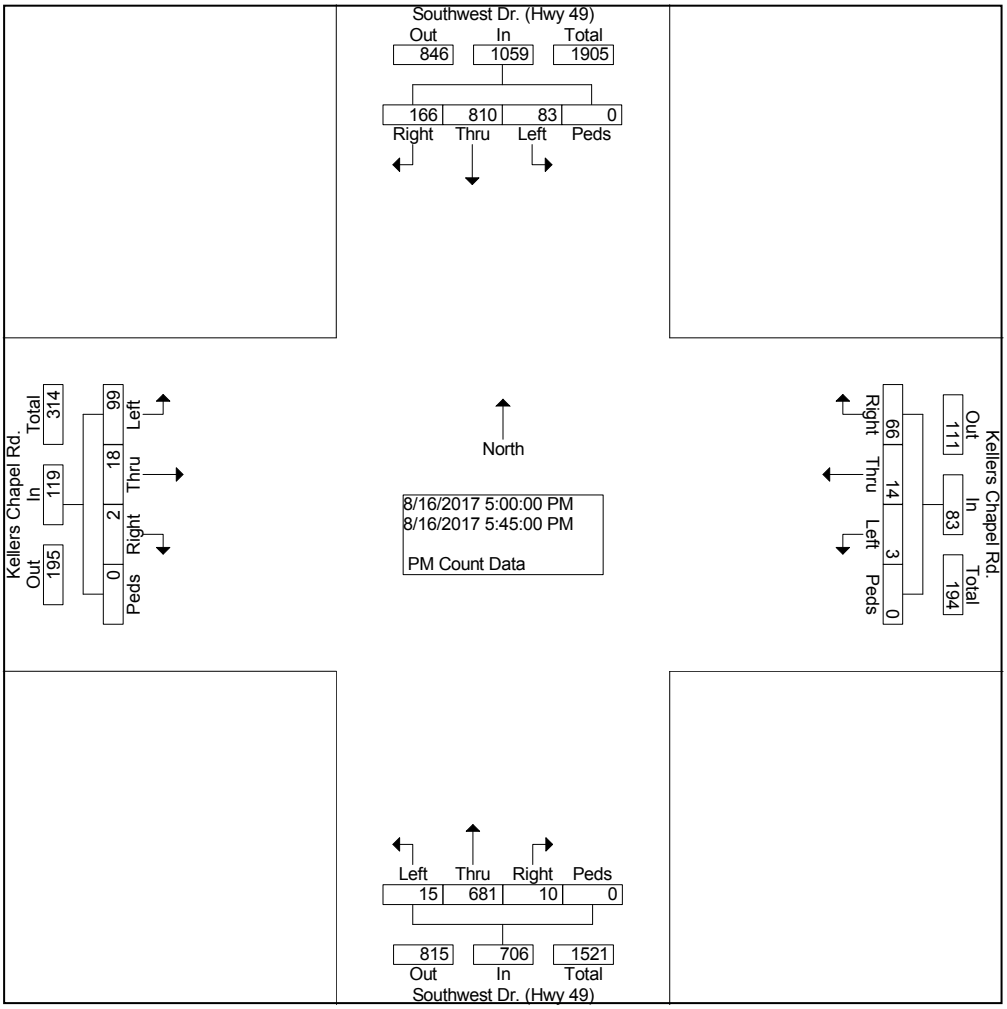


Peters & Associates Engineers, Inc.
Peak Hour Turning Movement Count Data

PM Hour Turning Movement Count Data
Southwest Dr. and Kellers Chapel Rd.
Jonesboro, AR
P1885

File Name : PM-49-KC
Site Code : 00000000
Start Date : 08/16/2017
Page No : 2

	Southwest Dr. (Hwy 49) From North					Kellers Chapel Rd. From East					Southwest Dr. (Hwy 49) From South					Kellers Chapel Rd. From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Intersection	05:00 PM																				
Volume	166	810	83	0	1059	66	14	3	0	83	10	681	15	0	706	2	18	99	0	119	1967
Percent	15.7	76.5	7.8	0.0		79.5	16.9	3.6	0.0		1.4	96.5	2.1	0.0		1.7	15.1	83.2	0.0		
05:15 Volume	57	211	26	0	294	17	2	1	0	20	4	173	2	0	179	1	6	14	0	21	514
Peak Factor																					0.957
High Int.	05:15 PM					05:30 PM					05:00 PM					05:45 PM					
Volume	57	211	26	0	294	23	7	1	0	31	3	183	5	0	191	0	7	49	0	56	
Peak Factor					0.901					0.669					0.924					0.531	



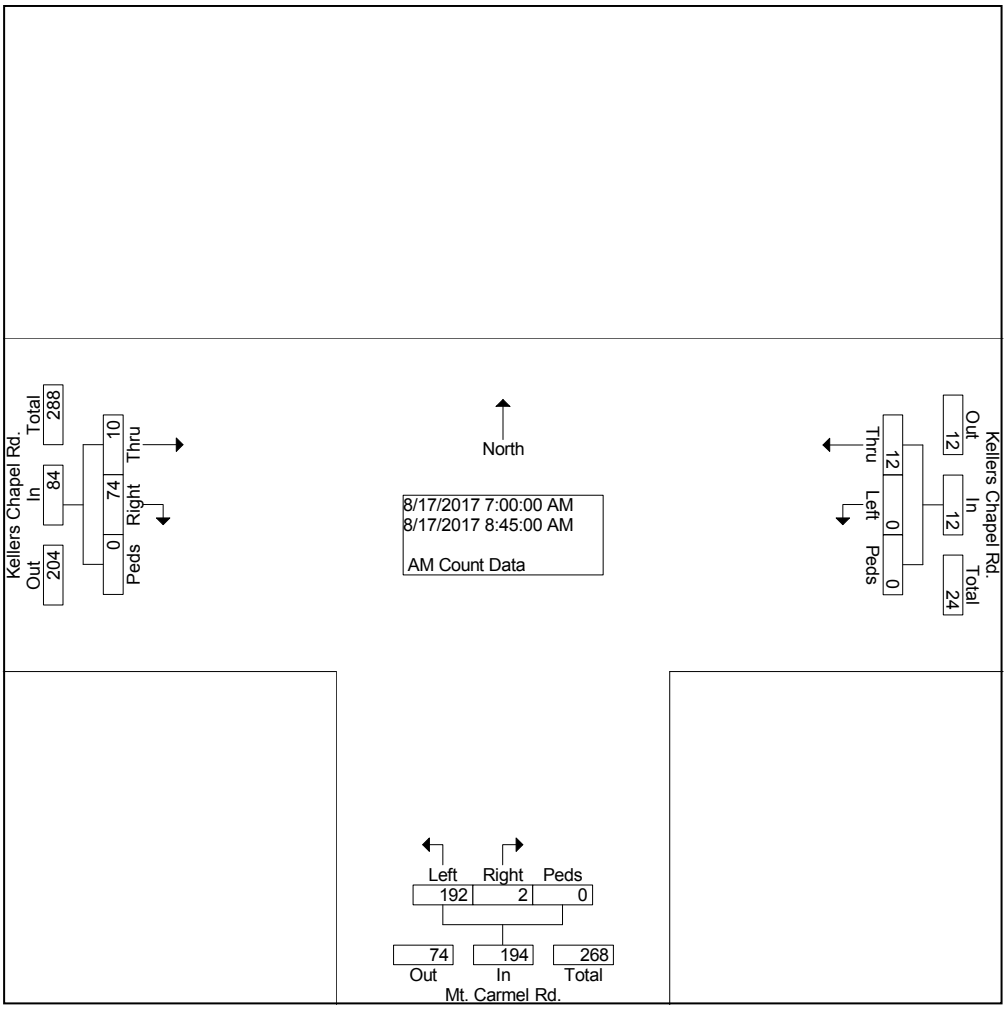
Peters & Associates Engineers, Inc.
Peak Hour Turning Movement Count Data

AM Hour Turning Movement Count Data
Kellers Chapel Rd. and Mt. Carmel Rd.
Jonesboro, AR
P1885

File Name : AM-MtCar
Site Code : 00000000
Start Date : 08/17/2017
Page No : 1

Groups Printed- AM Count Data

	Kellers Chapel Rd. From East				Mt. Carmel Rd. From South				Kellers Chapel Rd. From West				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
07:00 AM	2	0	0	2	0	24	0	24	7	1	0	8	34
07:15 AM	2	0	0	2	0	30	0	30	6	0	0	6	38
07:30 AM	2	0	0	2	0	39	0	39	15	1	0	16	57
07:45 AM	2	0	0	2	0	28	0	28	17	1	0	18	48
Total	8	0	0	8	0	121	0	121	45	3	0	48	177
08:00 AM	0	0	0	0	1	21	0	22	13	2	0	15	37
08:15 AM	1	0	0	1	1	20	0	21	9	1	0	10	32
08:30 AM	0	0	0	0	0	19	0	19	3	1	0	4	23
08:45 AM	3	0	0	3	0	11	0	11	4	3	0	7	21
Total	4	0	0	4	2	71	0	73	29	7	0	36	113
Grand Total	12	0	0	12	2	192	0	194	74	10	0	84	290
Apprch %	100.0	0.0	0.0		1.0	99.0	0.0		88.1	11.9	0.0		
Total %	4.1	0.0	0.0	4.1	0.7	66.2	0.0	66.9	25.5	3.4	0.0	29.0	

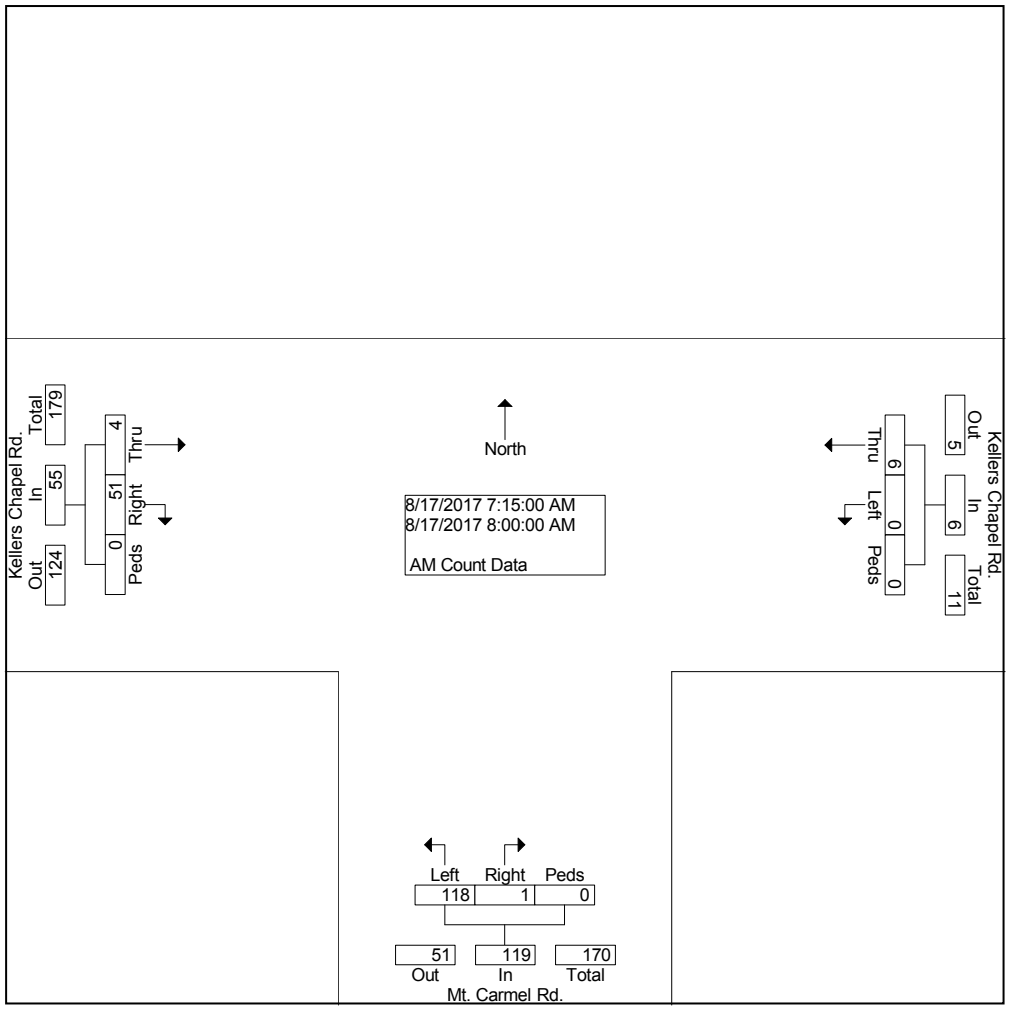


Peters & Associates Engineers, Inc.
Peak Hour Turning Movement Count Data

AM Hour Turning Movement Count Data
Kellers Chapel Rd. and Mt. Carmel Rd.
Jonesboro, AR
P1885

File Name : AM-MtCar
Site Code : 00000000
Start Date : 08/17/2017
Page No : 2

	Kellers Chapel Rd. From East				Mt. Carmel Rd. From South				Kellers Chapel Rd. From West				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1													
Intersection	07:15 AM												
Volume	6	0	0	6	1	118	0	119	51	4	0	55	180
Percent	100.0	0.0	0.0		0.8	99.2	0.0		92.7	7.3	0.0		
07:30 Volume	2	0	0	2	0	39	0	39	15	1	0	16	57
Peak Factor													0.789
High Int.	07:15 AM				07:30 AM				07:45 AM				
Volume	2	0	0	2	0	39	0	39	17	1	0	18	
Peak Factor				0.750				0.763				0.764	



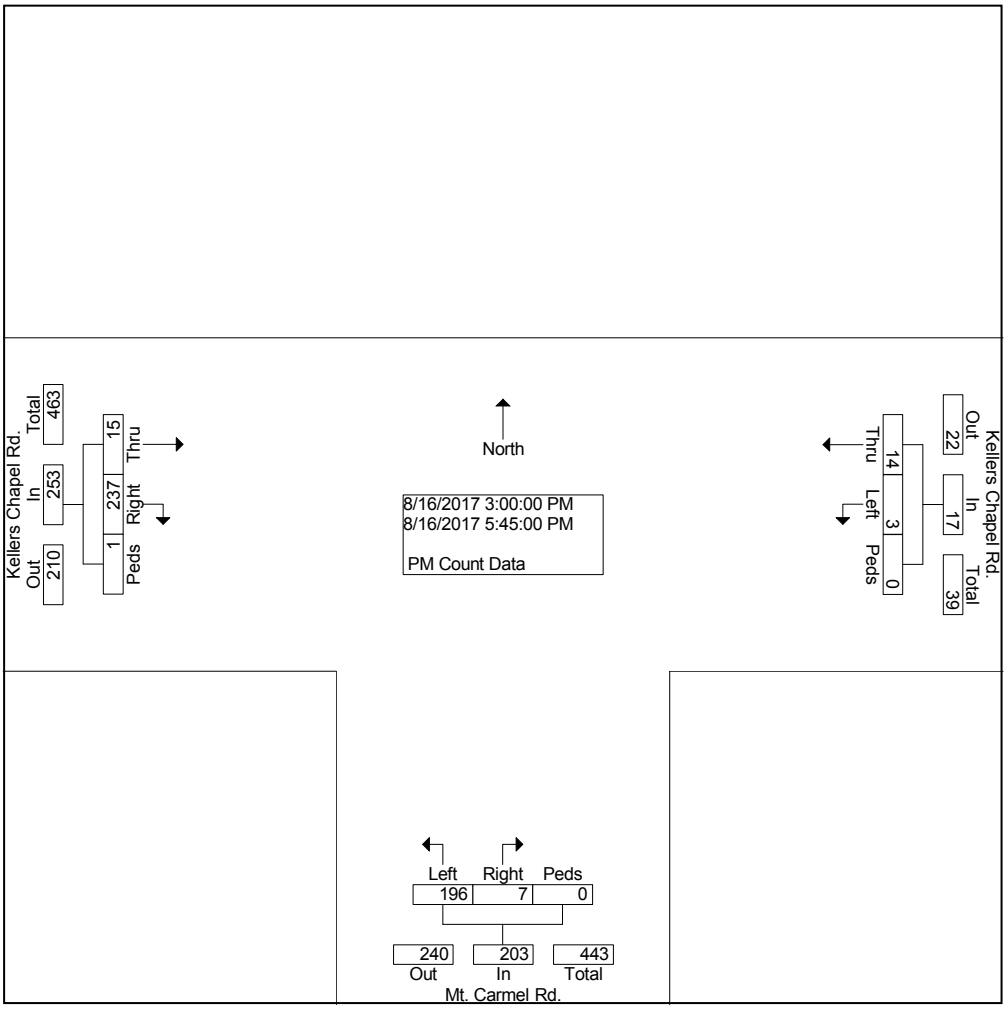
Peters & Associates Engineers, Inc.
Peak Hour Turning Movement Count Data

PM Hour Turning Movement Count Data
Kellers Chapel Rd. and Mt Carmel Rd.
Jonesboro, AR
P1885

File Name : PM-MtCar
Site Code : 00000000
Start Date : 08/16/2017
Page No : 1

Groups Printed- PM Count Data

	Kellers Chapel Rd. From East				Mt. Carmel Rd. From South				Kellers Chapel Rd. From West				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
03:00 PM	2	0	0	2	0	15	0	15	15	1	0	16	33
03:15 PM	3	0	0	3	2	18	0	20	18	0	0	18	41
03:30 PM	0	1	0	1	1	18	0	19	20	1	0	21	41
03:45 PM	0	0	0	0	1	13	0	14	14	0	1	15	29
Total	5	1	0	6	4	64	0	68	67	2	1	70	144
04:00 PM	2	1	0	3	1	14	0	15	11	3	0	14	32
04:15 PM	0	1	0	1	1	6	0	7	19	0	0	19	27
04:30 PM	2	0	0	2	0	18	0	18	23	3	0	26	46
04:45 PM	2	0	0	2	0	16	0	16	25	2	0	27	45
Total	6	2	0	8	2	54	0	56	78	8	0	86	150
05:00 PM	0	0	0	0	1	16	0	17	17	2	0	19	36
05:15 PM	1	0	0	1	0	18	0	18	28	2	0	30	49
05:30 PM	1	0	0	1	0	29	0	29	24	1	0	25	55
05:45 PM	1	0	0	1	0	15	0	15	23	0	0	23	39
Total	3	0	0	3	1	78	0	79	92	5	0	97	179
Grand Total	14	3	0	17	7	196	0	203	237	15	1	253	473
Apprch %	82.4	17.6	0.0		3.4	96.6	0.0		93.7	5.9	0.4		
Total %	3.0	0.6	0.0	3.6	1.5	41.4	0.0	42.9	50.1	3.2	0.2	53.5	

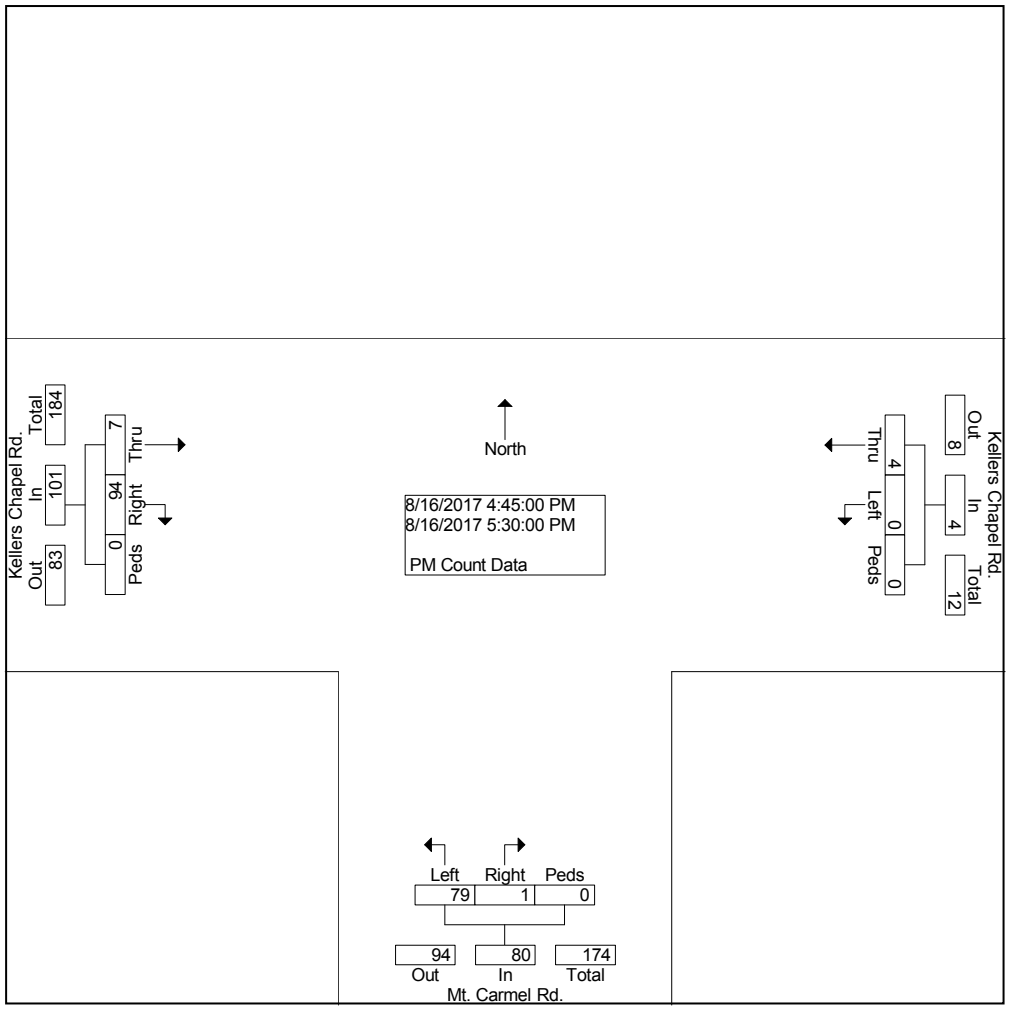


Peters & Associates Engineers, Inc.
Peak Hour Turning Movement Count Data

PM Hour Turning Movement Count Data
Kellers Chapel Rd. and Mt Carmel Rd.
Jonesboro, AR
P1885

File Name : PM-MtCar
Site Code : 00000000
Start Date : 08/16/2017
Page No : 2

	Kellers Chapel Rd. From East				Mt. Carmel Rd. From South				Kellers Chapel Rd. From West				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Peak Hour From 03:00 PM to 05:45 PM - Peak 1 of 1													
Intersection	04:45 PM												
Volume	4	0	0	4	1	79	0	80	94	7	0	101	185
Percent	100.0	0.0	0.0		1.3	98.8	0.0		93.1	6.9	0.0		
05:30 Volume	1	0	0	1	0	29	0	29	24	1	0	25	55
Peak Factor													0.841
High Int.	04:45 PM				05:30 PM				05:15 PM				
Volume	2	0	0	2	0	29	0	29	28	2	0	30	
Peak Factor				0.500				0.690				0.842	

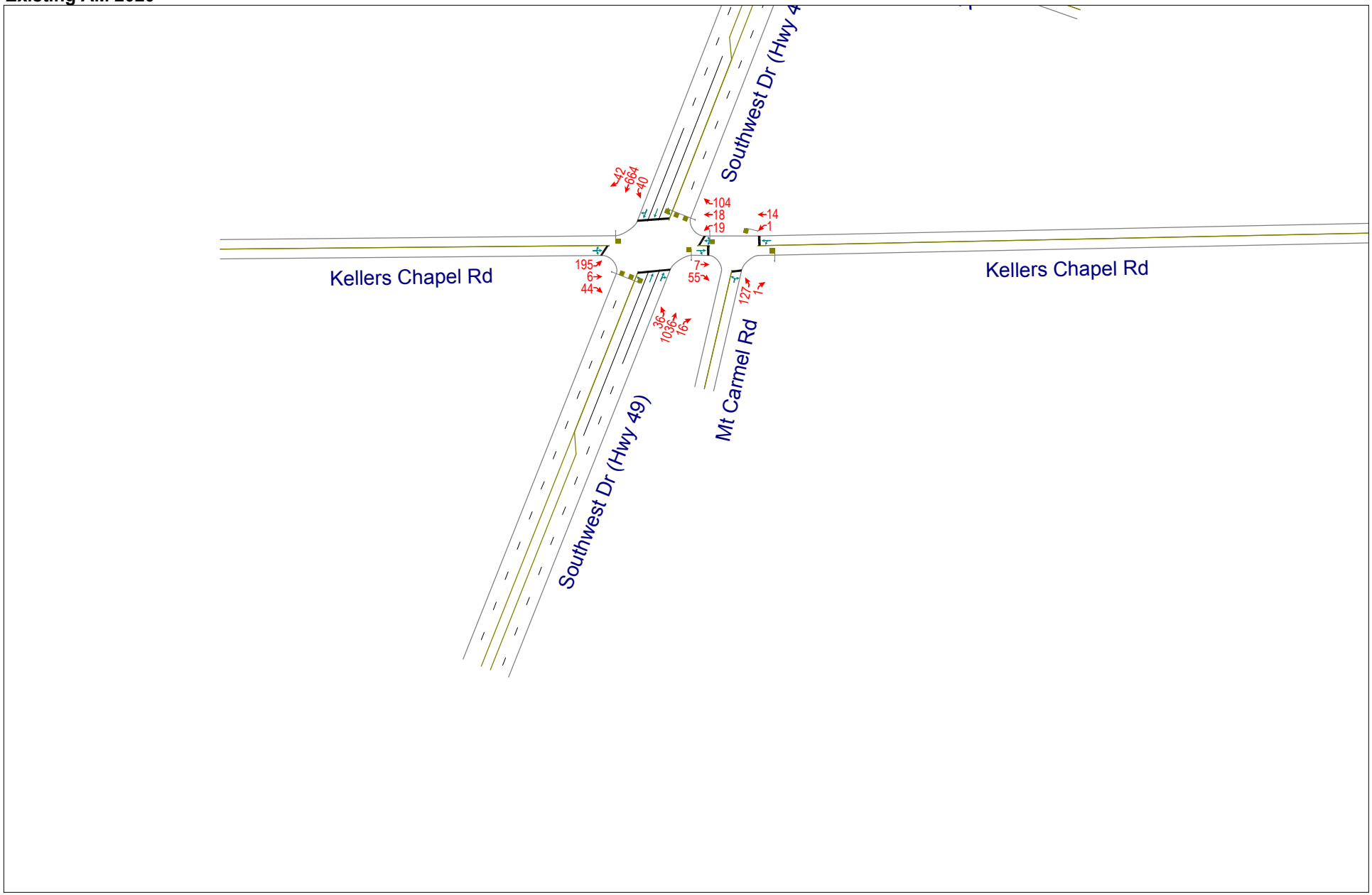


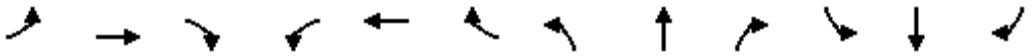
PETERS & ASSOCIATES
ENGINEERS, INC.

Capacity & Level of Service Calculations

P2032 **4/22/2020**

Existing AM 2020





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	195	6	44	19	18	104	36	1036	16	40	664	42
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (ft)	150		0	100		0	200		0	200		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	1611	0	0	1535	0	1630	3253	0	1630	3230	0
Flt Permitted		0.962			0.993		0.303			0.138		
Satd. Flow (perm)	0	1611	0	0	1535	0	520	3253	0	237	3230	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			50			50	
Link Distance (ft)		534			109			561			454	
Travel Time (s)		12.1			2.5			7.7			6.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	267	0	0	154	0	39	1143	0	43	768	0
Turn Type	Split	NA		Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	4!	4!		8!	8!		5	2		1	6	
Permitted Phases							2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		8.0	20.0		8.0	20.0	
Total Split (s)	40.0	40.0		40.0	40.0		8.0	32.0		8.0	32.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		10.0%	40.0%		10.0%	40.0%	
Maximum Green (s)	36.0	36.0		36.0	36.0		4.0	28.0		4.0	28.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5		0.5	0.5	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		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	None		None	None		None	Min		None	Min	
Walk Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0			11.0	
Pedestrian Calls (#/hr)	0	0		0	0			0			0	
Act Effct Green (s)		16.9			16.9		30.4	28.3		31.1	29.8	
Actuated g/C Ratio		0.29			0.29		0.53	0.49		0.54	0.52	
v/c Ratio		0.57			0.34		0.11	0.72		0.19	0.46	
Control Delay		22.7			5.7		8.2	18.0		9.4	12.3	
Queue Delay		0.0			0.1		0.0	0.0		0.1	0.0	
Total Delay		22.7			5.8		8.2	18.0		9.5	12.3	
LOS		C			A		A	B		A	B	
Approach Delay		22.7			5.8			17.7			12.1	
Approach LOS		C			A			B			B	
Queue Length 50th (ft)		85			8		6	195		7	82	
Queue Length 95th (ft)		148			15		21	#347		22	182	

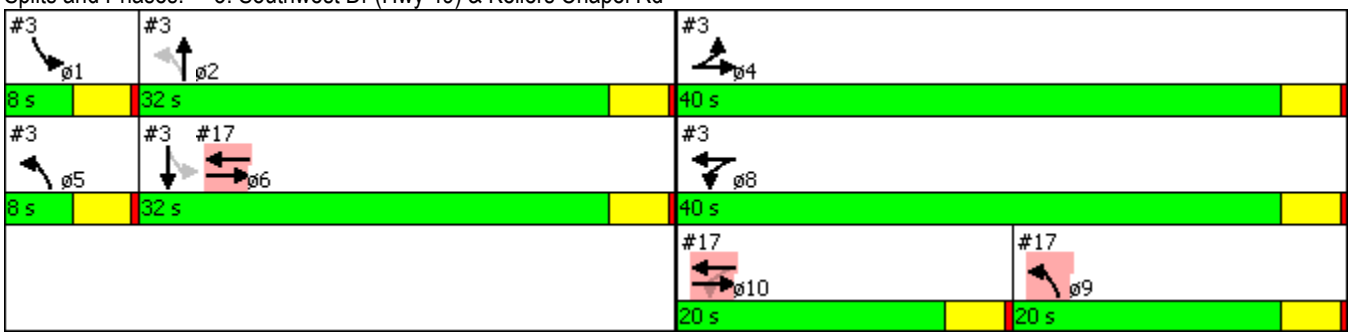
Lane Group	ø9	ø10
Lane Configurations		
Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	9	10
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	20.0	20.0
Total Split (s)	20.0	20.0
Total Split (%)	25%	25%
Maximum Green (s)	16.0	16.0
Yellow Time (s)	3.5	3.5
All-Red Time (s)	0.5	0.5
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes
Vehicle Extension (s)	3.0	3.0
Recall Mode	Min	None
Walk Time (s)	5.0	5.0
Flash Dont Walk (s)	11.0	11.0
Pedestrian Calls (#/hr)	0	0
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		454			29			481			374	
Turn Bay Length (ft)							200			200		
Base Capacity (vph)		1048			998		354	1645		228	1714	
Starvation Cap Reductn		0			245		0	0		0	0	
Spillback Cap Reductn		38			0		0	0		16	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.26			0.20		0.11	0.69		0.20	0.45	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 57.7			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 15.6		Intersection LOS: B	
Intersection Capacity Utilization 70.2%		ICU Level of Service C	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
! Phase conflict between lane groups.

Splits and Phases: 3: Southwest Dr (Hwy 49) & Kellers Chapel Rd



Lane Group	ø9	ø10
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

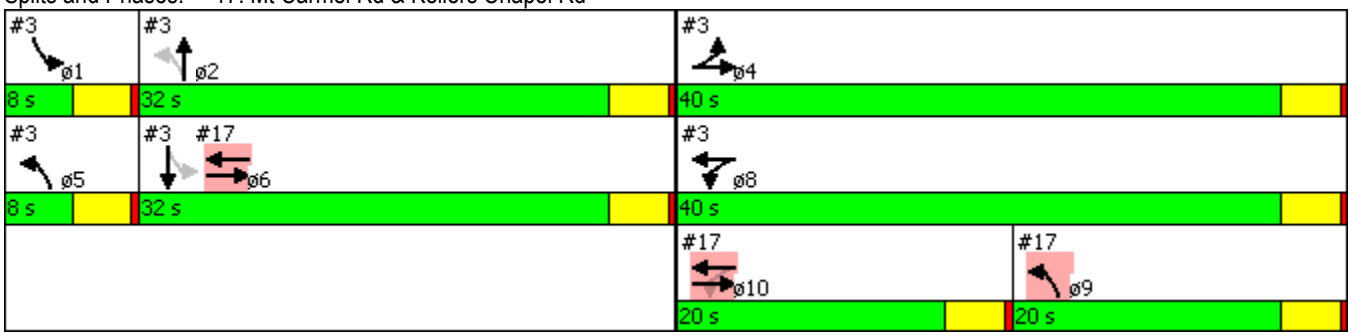
Intersection Summary

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	ø1	ø2	ø4	ø5	ø6	ø8
Lane Configurations												
Volume (vph)	7	55	1	14	127	1						
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750						
Satd. Flow (prot)	1512	0	0	1711	1633	0						
Flt Permitted				0.995	0.953							
Satd. Flow (perm)	1512	0	0	1707	1633	0						
Right Turn on Red		No				No						
Satd. Flow (RTOR)												
Link Speed (mph)	30			30	30							
Link Distance (ft)	109			779	182							
Travel Time (s)	2.5			17.7	4.1							
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92						
Shared Lane Traffic (%)												
Lane Group Flow (vph)	68	0	0	16	139	0						
Turn Type	NA		custom	NA	NA							
Protected Phases	6 10			6 10	9		1	2	4	5	6	8
Permitted Phases			10									
Detector Phase	6 10		10	6 10	9							
Switch Phase												
Minimum Initial (s)			4.0		4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)			20.0		20.0		8.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)			20.0		20.0		8.0	32.0	40.0	8.0	32.0	40.0
Total Split (%)			25.0%		25.0%		10%	40%	50%	10%	40%	50%
Maximum Green (s)			16.0		16.0		4.0	28.0	36.0	4.0	28.0	36.0
Yellow Time (s)			3.5		3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)			0.5		0.5		0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)					0.0							
Total Lost Time (s)					4.0							
Lead/Lag			Lead		Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?			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		Min		None	Min	None	None	Min	None
Walk Time (s)			5.0		5.0			5.0	5.0		5.0	5.0
Flash Dont Walk (s)			11.0		11.0			11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)			0		0			0	0		0	0
Act Effct Green (s)	39.8			39.8	11.8							
Actuated g/C Ratio	0.69			0.69	0.20							
v/c Ratio	0.07			0.01	0.42							
Control Delay	3.2			6.3	27.1							
Queue Delay	0.2			0.0	0.0							
Total Delay	3.4			6.3	27.1							
LOS	A			A	C							
Approach Delay	3.4			6.3	27.1							
Approach LOS	A			A	C							
Queue Length 50th (ft)	2			1	50							
Queue Length 95th (ft)	m14			10	99							
Internal Link Dist (ft)	29			699	102							
Turn Bay Length (ft)												
Base Capacity (vph)	1291			1457	472							

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	ø1	ø2	ø4	ø5	ø6	ø8
Starvation Cap Reductn	838			0	0							
Spillback Cap Reductn	0			0	0							
Storage Cap Reductn	0			0	0							
Reduced v/c Ratio	0.15			0.01	0.29							

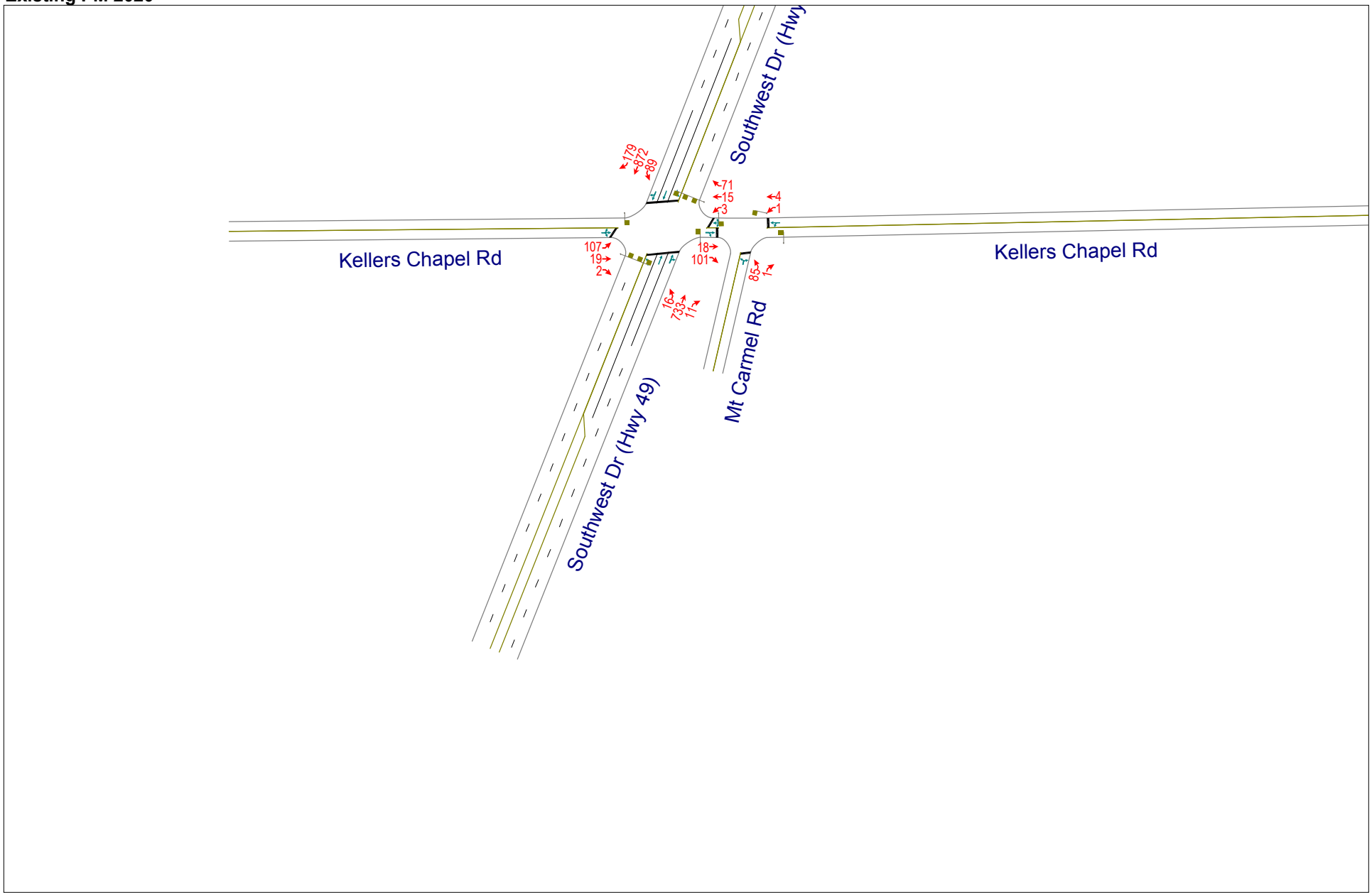
Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 57.7			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 18.4		Intersection LOS: B	
Intersection Capacity Utilization 18.5%		ICU Level of Service A	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

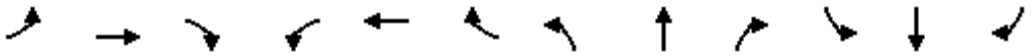
Splits and Phases: 17: Mt Carmel Rd & Kellers Chapel Rd



P2032 **4/22/2020**

Existing PM 2020





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	107	19	2	3	15	71	16	733	11	89	872	179
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (ft)	150		0	100		0	200		0	200		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	1644	0	0	1527	0	1630	3253	0	1630	3175	0
Flt Permitted		0.960			0.998		0.167			0.247		
Satd. Flow (perm)	0	1644	0	0	1527	0	287	3253	0	424	3175	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			50			50	
Link Distance (ft)		534			109			561			454	
Travel Time (s)		12.1			2.5			7.7			6.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	139	0	0	96	0	17	809	0	97	1143	0
Turn Type	Split	NA		Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	4!	4!		8!	8!		5	2		1	6	
Permitted Phases							2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		8.0	20.0		8.0	20.0	
Total Split (s)	40.0	40.0		40.0	40.0		8.0	32.0		8.0	32.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		10.0%	40.0%		10.0%	40.0%	
Maximum Green (s)	36.0	36.0		36.0	36.0		4.0	28.0		4.0	28.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5		0.5	0.5	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		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	None		None	None		None	Min		None	Min	
Walk Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0			11.0	
Pedestrian Calls (#/hr)	0	0		0	0			0			0	
Act Effct Green (s)		16.4			16.4		27.4	24.4		29.8	29.2	
Actuated g/C Ratio		0.30			0.30		0.50	0.44		0.54	0.53	
v/c Ratio		0.28			0.21		0.07	0.56		0.30	0.68	
Control Delay		16.4			3.5		7.7	15.3		9.9	14.7	
Queue Delay		0.0			0.1		0.0	0.0		0.1	0.0	
Total Delay		16.4			3.5		7.7	15.3		10.0	14.7	
LOS		B			A		A	B		B	B	
Approach Delay		16.4			3.5			15.1			14.3	
Approach LOS		B			A			B			B	
Queue Length 50th (ft)		32			3		2	112		15	134	
Queue Length 95th (ft)		79			6		11	181		38	#333	

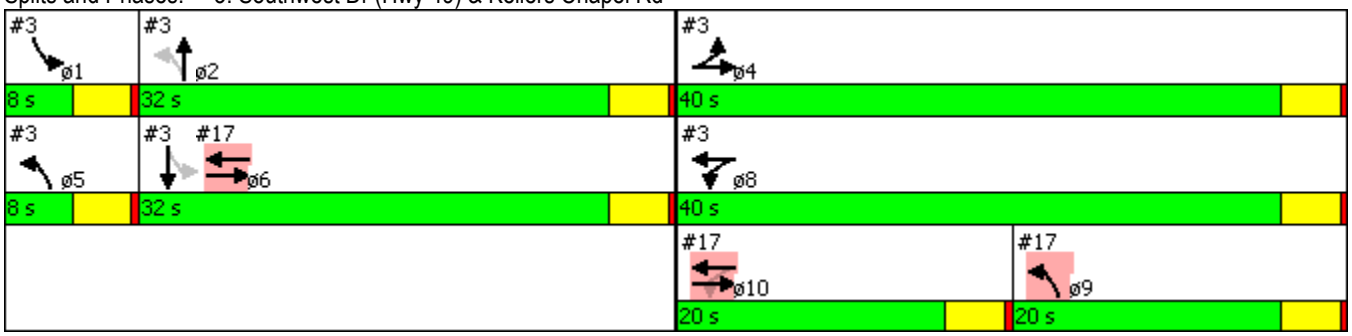
Lane Group	ø9	ø10
Lane Configurations		
Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	9	10
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	20.0	20.0
Total Split (s)	20.0	20.0
Total Split (%)	25%	25%
Maximum Green (s)	16.0	16.0
Yellow Time (s)	3.5	3.5
All-Red Time (s)	0.5	0.5
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes
Vehicle Extension (s)	3.0	3.0
Recall Mode	Min	None
Walk Time (s)	5.0	5.0
Flash Dont Walk (s)	11.0	11.0
Pedestrian Calls (#/hr)	0	0
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		454			29			481			374	
Turn Bay Length (ft)							200			200		
Base Capacity (vph)		1098			1020		242	1690		319	1679	
Starvation Cap Reductn		0			318		0	0		0	0	
Spillback Cap Reductn		53			0		0	0		22	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.13			0.14		0.07	0.48		0.33	0.68	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 55.1			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 14.3		Intersection LOS: B	
Intersection Capacity Utilization 60.0%		ICU Level of Service B	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
! Phase conflict between lane groups.

Splits and Phases: 3: Southwest Dr (Hwy 49) & Kellers Chapel Rd



Lane Group	ø9	ø10
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

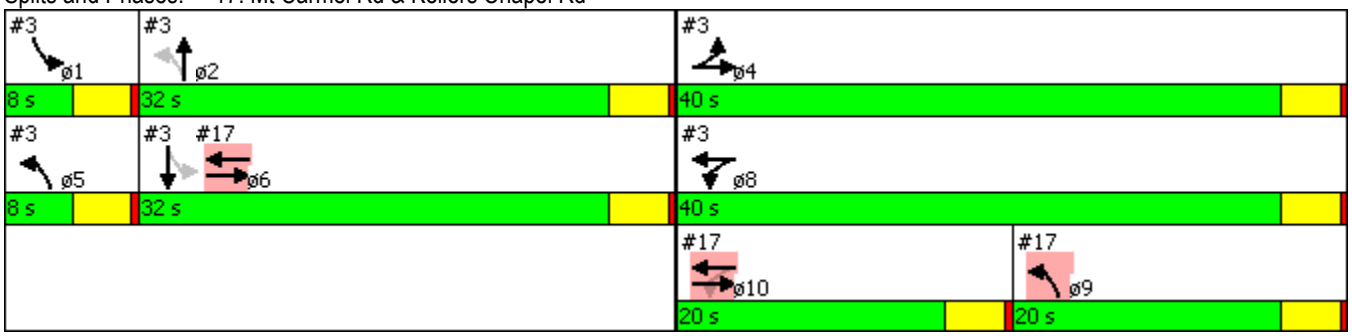
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	ø1	ø2	ø4	ø5	ø6	ø8
Lane Configurations												
Volume (vph)	18	101	1	4	85	1						
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750						
Satd. Flow (prot)	1520	0	0	1699	1633	0						
Flt Permitted				0.982	0.953							
Satd. Flow (perm)	1520	0	0	1685	1633	0						
Right Turn on Red		No				No						
Satd. Flow (RTOR)												
Link Speed (mph)	30			30	30							
Link Distance (ft)	109			779	182							
Travel Time (s)	2.5			17.7	4.1							
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92						
Shared Lane Traffic (%)												
Lane Group Flow (vph)	130	0	0	5	93	0						
Turn Type	NA		custom	NA	NA							
Protected Phases	6 10			6 10	9		1	2	4	5	6	8
Permitted Phases			10									
Detector Phase	6 10		10	6 10	9							
Switch Phase												
Minimum Initial (s)			4.0		4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)			20.0		20.0		8.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)			20.0		20.0		8.0	32.0	40.0	8.0	32.0	40.0
Total Split (%)			25.0%		25.0%		10%	40%	50%	10%	40%	50%
Maximum Green (s)			16.0		16.0		4.0	28.0	36.0	4.0	28.0	36.0
Yellow Time (s)			3.5		3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)			0.5		0.5		0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)					0.0							
Total Lost Time (s)					4.0							
Lead/Lag			Lead		Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?			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		Min		None	Min	None	None	Min	None
Walk Time (s)			5.0		5.0			5.0	5.0		5.0	5.0
Flash Dont Walk (s)			11.0		11.0			11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)			0		0			0	0		0	0
Act Effct Green (s)	39.2			39.2	8.9							
Actuated g/C Ratio	0.71			0.71	0.16							
v/c Ratio	0.12			0.00	0.35							
Control Delay	2.6			4.8	26.3							
Queue Delay	0.2			0.0	0.0							
Total Delay	2.8			4.8	26.3							
LOS	A			A	C							
Approach Delay	2.8			4.8	26.3							
Approach LOS	A			A	C							
Queue Length 50th (ft)	2			1	27							
Queue Length 95th (ft)	54			5	72							
Internal Link Dist (ft)	29			699	102							
Turn Bay Length (ft)												
Base Capacity (vph)	1328			1472	484							

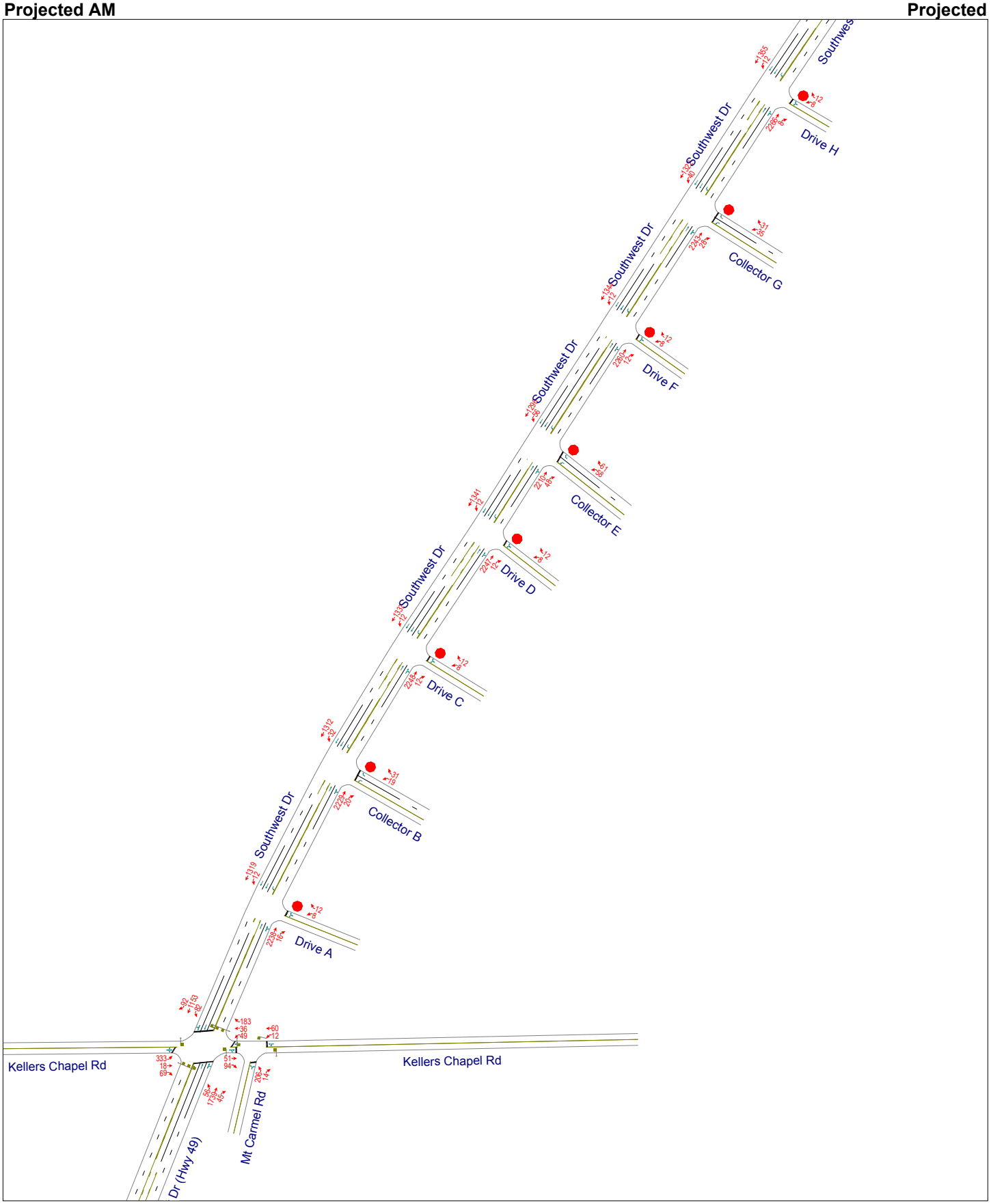
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	ø1	ø2	ø4	ø5	ø6	ø8
Starvation Cap Reductn	734			0	0							
Spillback Cap Reductn	0			0	0							
Storage Cap Reductn	0			0	0							
Reduced v/c Ratio	0.22			0.00	0.19							

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 55.1
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.68
Intersection Signal Delay: 12.4 Intersection LOS: B
Intersection Capacity Utilization 19.6% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 17: Mt Carmel Rd & Kellers Chapel Rd




Southwest Dr
Drive H
Southwest Dr
Collector G
Southwest Dr
Drive F
Southwest Dr
Collector E
Southwest Dr
Drive D
Southwest Dr
Drive C
Southwest Dr
Collector B
Southwest Dr
Drive A
Kellers Chapel Rd
Kellers Chapel Rd
Mt Carmel Rd
Dr (Hwy 49)

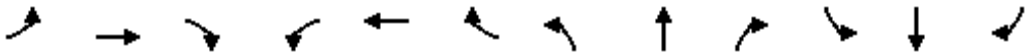
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	8	12	2248	12	12	1337
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0	0		0	120	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Satd. Flow (prot)	1562	0	3257	0	1646	3260
Flt Permitted	0.980				0.950	
Satd. Flow (perm)	1562	0	3257	0	1646	3260
Link Speed (mph)	30		50			50
Link Distance (ft)	185		287			288
Travel Time (s)	4.2		3.9			3.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	2%	1%	1%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	0	2456	0	13	1453
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 77.9%		ICU Level of Service D	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	8	12	2248	12	12	1337
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	13	2443	13	13	1453
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			921			
pX, platoon unblocked	0.43	0.43			0.43	
vC, conflicting volume	3203	1228			2457	
vC1, stage 1 conf vol	2450					
vC2, stage 2 conf vol	753					
vCu, unblocked vol	3477	0			1721	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	84	97			92	
cM capacity (veh/h)	54	462			156	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	22	1629	828	13	727	727
Volume Left	9	0	0	13	0	0
Volume Right	13	0	13	0	0	0
cSH	116	1700	1700	156	1700	1700
Volume to Capacity	0.19	0.96	0.49	0.08	0.43	0.43
Queue Length 95th (ft)	16	0	0	7	0	0
Control Delay (s)	43.2	0.0	0.0	30.1	0.0	0.0
Lane LOS	E			D		
Approach Delay (s)	43.2	0.0		0.3		
Approach LOS	E					

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	333	18	69	49	36	183	56	1739	45	82	1153	92
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0		0	0		0	200		0	200		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	1614	0	0	1544	0	1630	3247	0	1630	3224	0
Flt Permitted		0.962			0.991		0.103			0.052		
Satd. Flow (perm)	0	1614	0	0	1544	0	177	3247	0	89	3224	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			78			3			10	
Link Speed (mph)		30			30			50			50	
Link Distance (ft)		534			109			561			316	
Travel Time (s)		12.1			2.5			7.7			4.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	457	0	0	291	0	61	1939	0	89	1353	0
Turn Type	Split	NA		Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	4!	4!		8!	8!		5	2		1	6	
Permitted Phases							2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		8.0	20.0		8.0	20.0	
Total Split (s)	44.0	44.0		44.0	44.0		11.0	87.0		9.0	85.0	
Total Split (%)	31.4%	31.4%		31.4%	31.4%		7.9%	62.1%		6.4%	60.7%	
Maximum Green (s)	40.0	40.0		40.0	40.0		7.0	83.0		5.0	81.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5		0.5	0.5	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lead/Lag							Lead	Lead		Lag	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	None		None	None		None	Min		None	Min	
Walk Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0			11.0	
Pedestrian Calls (#/hr)	0	0		0	0			0			0	
Act Effct Green (s)		40.0			40.0		83.0	83.0		83.2	83.2	
Actuated g/C Ratio		0.29			0.29		0.59	0.59		0.59	0.59	
v/c Ratio		0.98			0.59		0.35	1.01		0.83	0.70	
Control Delay		85.8			10.4		17.7	50.6		94.8	22.7	
Queue Delay		0.0			2.7		0.0	0.0		0.0	0.0	
Total Delay		85.8			13.1		17.7	50.6		94.8	22.7	
LOS		F			B		B	D		F	C	
Approach Delay		85.8			13.1			49.6			27.2	
Approach LOS		F			B			D			C	
Queue Length 50th (ft)		409			0		23	~913		36	447	
Queue Length 95th (ft)		#639			41		43	#1107		#139	535	

Lane Group	ø9	ø10
Lane Configurations		
Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	9	10
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	20.0	20.0
Total Split (s)	24.0	20.0
Total Split (%)	17%	14%
Maximum Green (s)	20.0	16.0
Yellow Time (s)	3.5	3.5
All-Red Time (s)	0.5	0.5
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes
Vehicle Extension (s)	3.0	3.0
Recall Mode	Min	None
Walk Time (s)	5.0	5.0
Flash Dont Walk (s)	11.0	11.0
Pedestrian Calls (#/hr)	0	0
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		454			29			481			236	
Turn Bay Length (ft)							200			200		
Base Capacity (vph)		466			496		177	1926		107	1920	
Starvation Cap Reductn		0			112		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.98			0.76		0.34	1.01		0.83	0.70	

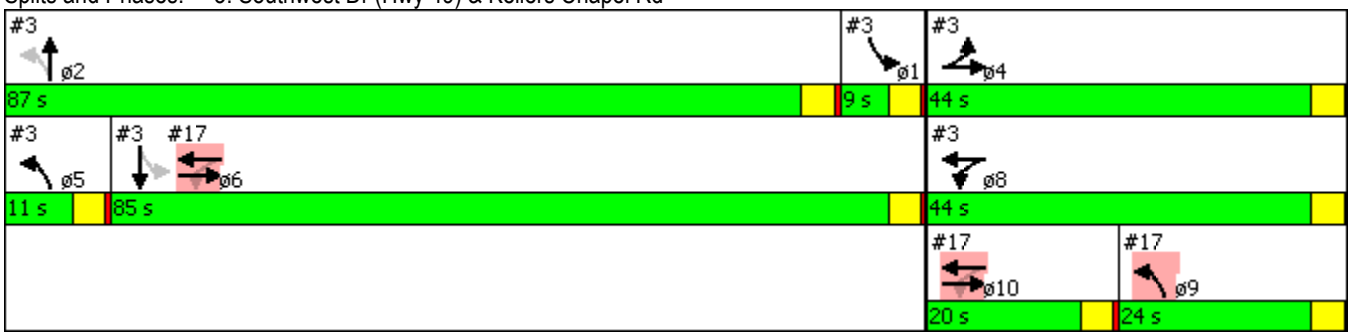
Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Natural Cycle: 130			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.01			
Intersection Signal Delay: 43.3		Intersection LOS: D	
Intersection Capacity Utilization 114.9%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

! Phase conflict between lane groups.

Splits and Phases: 3: Southwest Dr (Hwy 49) & Kellers Chapel Rd

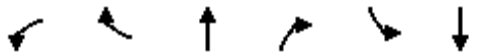


Lane Group	ø9	ø10
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	8	12	2238	16	12	1319
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0	0		0	200	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Satd. Flow (prot)	1562	0	3257	0	1646	3260
Flt Permitted	0.980				0.950	
Satd. Flow (perm)	1562	0	3257	0	1646	3260
Link Speed (mph)	30		50			50
Link Distance (ft)	208		316			318
Travel Time (s)	4.7		4.3			4.3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	2%	1%	1%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	0	2450	0	13	1434
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 77.7%		ICU Level of Service D	
Analysis Period (min) 15			



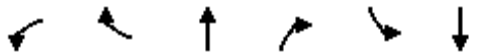
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	8	12	2238	16	12	1319
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	13	2433	17	13	1434
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			316			
pX, platoon unblocked	0.42	0.42			0.42	
vC, conflicting volume	3184	1225			2450	
vC1, stage 1 conf vol	2441					
vC2, stage 2 conf vol	743					
vCu, unblocked vol	3443	0			1678	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	85	97			92	
cM capacity (veh/h)	57	453			159	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	22	1622	828	13	717	717
Volume Left	9	0	0	13	0	0
Volume Right	13	0	17	0	0	0
cSH	119	1700	1700	159	1700	1700
Volume to Capacity	0.18	0.95	0.49	0.08	0.42	0.42
Queue Length 95th (ft)	16	0	0	7	0	0
Control Delay (s)	41.8	0.0	0.0	29.6	0.0	0.0
Lane LOS	E			D		
Approach Delay (s)	41.8	0.0		0.3		
Approach LOS	E					

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	19	31	2229	20	32	1312
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0	0		0	120	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25				25	
Satd. Flow (prot)	1646	1473	3257	0	1646	3260
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1646	1473	3257	0	1646	3260
Link Speed (mph)	30		50			50
Link Distance (ft)	211		318			287
Travel Time (s)	4.8		4.3			3.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	2%	1%	1%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	21	34	2445	0	35	1426
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 77.6%		ICU Level of Service D	
Analysis Period (min) 15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	19	31	2229	20	32	1312
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	34	2423	22	35	1426
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			634			
pX, platoon unblocked	0.42	0.42			0.42	
vC, conflicting volume	3216	1222			2445	
vC1, stage 1 conf vol	2434					
vC2, stage 2 conf vol	783					
vCu, unblocked vol	3514	0			1679	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	64	93			78	
cM capacity (veh/h)	57	457			161	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	21	34	1615	829	35	713	713
Volume Left	21	0	0	0	35	0	0
Volume Right	0	34	0	22	0	0	0
cSH	57	457	1700	1700	161	1700	1700
Volume to Capacity	0.36	0.07	0.95	0.49	0.22	0.42	0.42
Queue Length 95th (ft)	33	6	0	0	20	0	0
Control Delay (s)	100.4	13.5	0.0	0.0	33.5	0.0	0.0
Lane LOS	F	B			D		
Approach Delay (s)	46.5		0.0		0.8		
Approach LOS	E						

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		

Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Volume (vph)	2247	12	12	1341	8	12
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)		0	120		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Satd. Flow (prot)	3257	0	1646	3260	1562	0
Flt Permitted			0.950		0.980	
Satd. Flow (perm)	3257	0	1646	3260	1562	0
Link Speed (mph)	50			50	30	
Link Distance (ft)	288			204	182	
Travel Time (s)	3.9			2.8	4.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	1%	1%	2%	1%	1%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2455	0	13	1458	22	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 77.9%		ICU Level of Service D	
Analysis Period (min) 15			

Movement	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Volume (veh/h)	2247	12	12	1341	8	12
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2442	13	13	1458	9	13
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)	1209					
pX, platoon unblocked			0.43		0.43	0.43
vC, conflicting volume			2455		3204	1228
vC1, stage 1 conf vol					2449	
vC2, stage 2 conf vol					755	
vCu, unblocked vol			1732		3474	0
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			92		84	97
cM capacity (veh/h)			157		54	467

Direction, Lane #	NB 1	NB 2	SB 1	SB 2	SB 3	NW 1
Volume Total	1628	827	13	729	729	22
Volume Left	0	0	13	0	0	9
Volume Right	0	13	0	0	0	13
cSH	1700	1700	157	1700	1700	116
Volume to Capacity	0.96	0.49	0.08	0.43	0.43	0.19
Queue Length 95th (ft)	0	0	7	0	0	16
Control Delay (s)	0.0	0.0	30.1	0.0	0.0	43.2
Lane LOS			D			E
Approach Delay (s)	0.0		0.3			43.2
Approach LOS						E

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		

Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Volume (vph)	2210	48	56	1296	58	61
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)		0	200		0	0
Storage Lanes		0	1		1	1
Taper Length (ft)			25		25	
Satd. Flow (prot)	3251	0	1646	3260	1646	1473
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	3251	0	1646	3260	1646	1473
Link Speed (mph)	50			50	30	
Link Distance (ft)	204			296	224	
Travel Time (s)	2.8			4.0	5.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	1%	1%	2%	1%	1%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2454	0	61	1409	63	66
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Volume (veh/h)	2210	48	56	1296	58	61
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2402	52	61	1409	63	66
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			2454		3254	1227
vC1, stage 1 conf vol					2428	
vC2, stage 2 conf vol					826	
vCu, unblocked vol			2454		3254	1227
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			68		0	61
cM capacity (veh/h)			190		50	171

Direction, Lane #	NB 1	NB 2	SB 1	SB 2	SB 3	NW 1	NW 2
Volume Total	1601	853	61	704	704	63	66
Volume Left	0	0	61	0	0	63	0
Volume Right	0	52	0	0	0	0	66
cSH	1700	1700	190	1700	1700	50	171
Volume to Capacity	0.94	0.50	0.32	0.41	0.41	1.25	0.39
Queue Length 95th (ft)	0	0	33	0	0	143	42
Control Delay (s)	0.0	0.0	32.6	0.0	0.0	342.3	38.6
Lane LOS			D			F	E
Approach Delay (s)	0.0		1.4			186.6	
Approach LOS						F	

Intersection Summary			
Average Delay	6.4		
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		

Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Volume (vph)	2260	12	12	1344	8	12
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)		0	120		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Satd. Flow (prot)	3257	0	1646	3260	1562	0
Flt Permitted			0.950		0.980	
Satd. Flow (perm)	3257	0	1646	3260	1562	0
Link Speed (mph)	50			50	30	
Link Distance (ft)	296			283	170	
Travel Time (s)	4.0			3.9	3.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	1%	1%	2%	1%	1%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2470	0	13	1461	22	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Volume (veh/h)	2260	12	12	1344	8	12
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2457	13	13	1461	9	13
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			2470		3220	1235
vC1, stage 1 conf vol					2463	
vC2, stage 2 conf vol					757	
vCu, unblocked vol			2470		3220	1235
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			93		82	92
cM capacity (veh/h)			187		49	169

Direction, Lane #	NB 1	NB 2	SB 1	SB 2	SB 3	NW 1
Volume Total	1638	832	13	730	730	22
Volume Left	0	0	13	0	0	9
Volume Right	0	13	0	0	0	13
cSH	1700	1700	187	1700	1700	85
Volume to Capacity	0.96	0.49	0.07	0.43	0.43	0.26
Queue Length 95th (ft)	0	0	6	0	0	23
Control Delay (s)	0.0	0.0	25.6	0.0	0.0	61.1
Lane LOS			D			F
Approach Delay (s)	0.0		0.2			61.1
Approach LOS						F

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	ø1	ø2	ø4	ø5	ø6	ø8
Lane Configurations												
Volume (vph)	51	94	12	60	206	14						
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750						
Satd. Flow (prot)	1580	0	0	1719	1641	0						
Flt Permitted				0.955	0.955							
Satd. Flow (perm)	1580	0	0	1655	1641	0						
Right Turn on Red		Yes				Yes						
Satd. Flow (RTOR)	102				2							
Link Speed (mph)	30			30	30							
Link Distance (ft)	109			779	182							
Travel Time (s)	2.5			17.7	4.1							
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92						
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%						
Shared Lane Traffic (%)												
Lane Group Flow (vph)	157	0	0	78	239	0						
Turn Type	NA		Perm	NA	NA							
Protected Phases	6 10			6 10	9		1	2	4	5	6	8
Permitted Phases			6 10									
Detector Phase	6 10		6 10	6 10	9							
Switch Phase												
Minimum Initial (s)					4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)					20.0		8.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)					24.0		9.0	87.0	44.0	11.0	85.0	44.0
Total Split (%)					17.1%		6%	62%	31%	8%	61%	31%
Maximum Green (s)					20.0		5.0	83.0	40.0	7.0	81.0	40.0
Yellow Time (s)					3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)					0.5		0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)					0.0							
Total Lost Time (s)					4.0							
Lead/Lag					Lag		Lag	Lead		Lead	Lag	
Lead-Lag Optimize?					Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)					3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode					Min		None	Min	None	None	Min	None
Walk Time (s)					5.0			5.0	5.0		5.0	5.0
Flash Dont Walk (s)					11.0			11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)					0			0	0		0	0
Act Effct Green (s)	92.9			92.9	30.3							
Actuated g/C Ratio	0.66			0.66	0.22							
v/c Ratio	0.15			0.07	0.67							
Control Delay	0.2			9.1	60.3							
Queue Delay	1.4			0.0	0.0							
Total Delay	1.6			9.1	60.3							
LOS	A			A	E							
Approach Delay	1.6			9.1	60.3							
Approach LOS	A			A	E							
Queue Length 50th (ft)	0			25	200							
Queue Length 95th (ft)	m0			45	297							
Internal Link Dist (ft)	29			699	102							
Turn Bay Length (ft)												

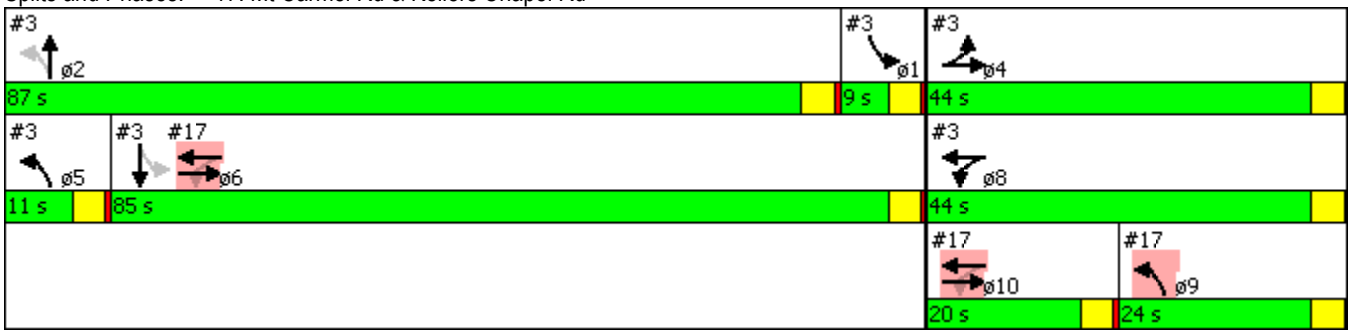
Lane Group	ø10
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	10
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	20.0
Total Split (s)	20.0
Total Split (%)	14%
Maximum Green (s)	16.0
Yellow Time (s)	3.5
All-Red Time (s)	0.5
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	ø1	ø2	ø4	ø5	ø6	ø8
Base Capacity (vph)	1191			1220	357							
Starvation Cap Reductn	859			0	0							
Spillback Cap Reductn	0			68	0							
Storage Cap Reductn	0			0	0							
Reduced v/c Ratio	0.47			0.07	0.67							

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Natural Cycle: 130			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.01			
Intersection Signal Delay: 32.4		Intersection LOS: C	
Intersection Capacity Utilization 34.6%		ICU Level of Service A	
Analysis Period (min) 15			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 17: Mt Carmel Rd & Kellers Chapel Rd



Lane Group	ø10
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	35	31	2243	28	40	1322
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0	0		0	150	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25				25	
Satd. Flow (prot)	1646	1473	3254	0	1646	3260
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1646	1473	3254	0	1646	3260
Link Speed (mph)	30		50			50
Link Distance (ft)	202		283			288
Travel Time (s)	4.6		3.9			3.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	2%	1%	1%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	38	34	2468	0	43	1437
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 78.3%		ICU Level of Service D	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	35	31	2243	28	40	1322
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	34	2438	30	43	1437
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	3259	1234			2468	
vC1, stage 1 conf vol	2453					
vC2, stage 2 conf vol	805					
vCu, unblocked vol	3259	1234			2468	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	22	80			77	
cM capacity (veh/h)	49	170			188	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	38	34	1625	843	43	718	718
Volume Left	38	0	0	0	43	0	0
Volume Right	0	34	0	30	0	0	0
cSH	49	170	1700	1700	188	1700	1700
Volume to Capacity	0.78	0.20	0.96	0.50	0.23	0.42	0.42
Queue Length 95th (ft)	79	18	0	0	22	0	0
Control Delay (s)	195.5	31.4	0.0	0.0	29.9	0.0	0.0
Lane LOS	F	D			D		
Approach Delay (s)	118.4		0.0		0.9		
Approach LOS	F						

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		

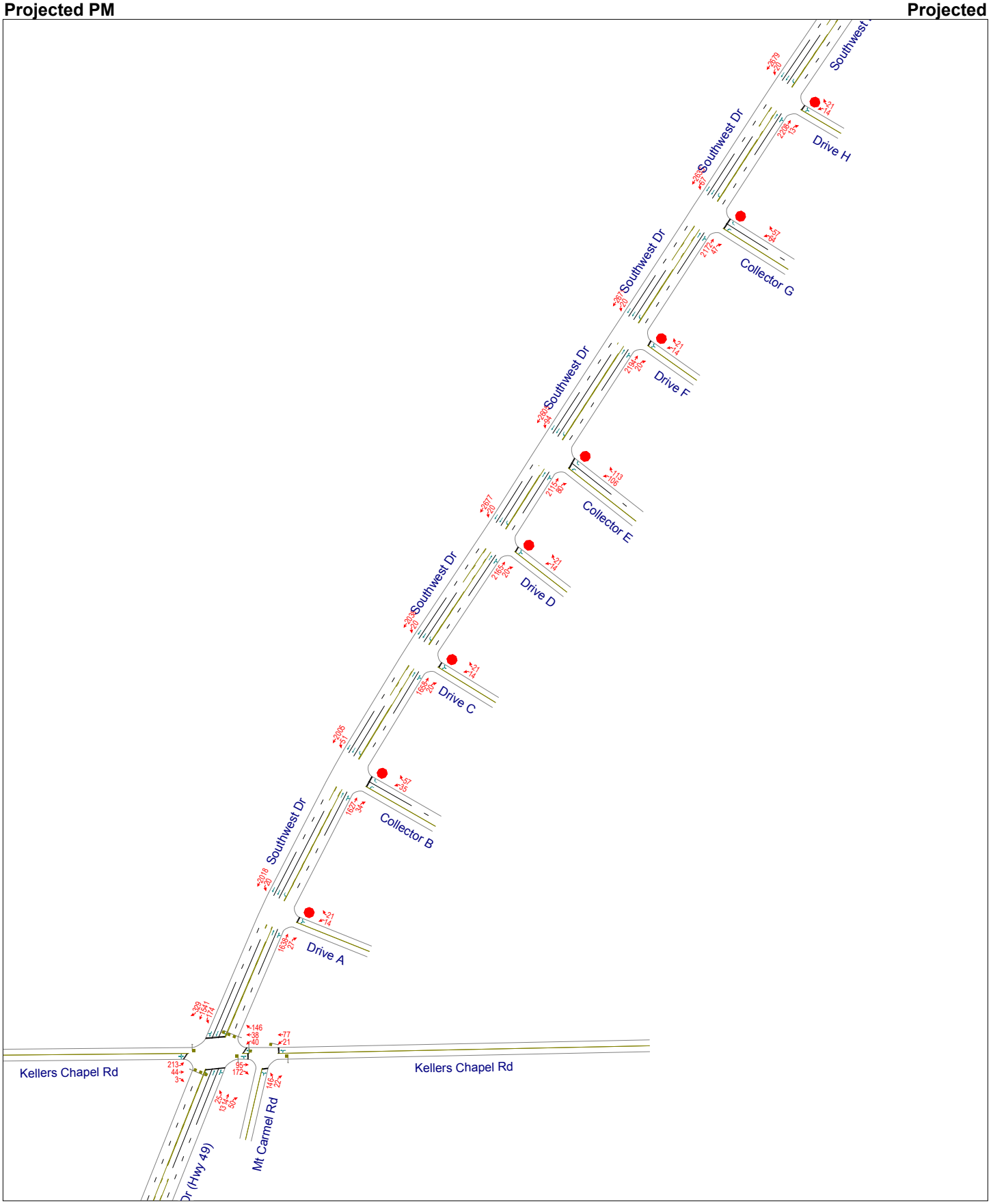
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	8	12	2266	8	12	1355
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0	0		0	120	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Satd. Flow (prot)	1578	0	3257	0	1662	3260
Flt Permitted	0.980				0.950	
Satd. Flow (perm)	1578	0	3257	0	1662	3260
Link Speed (mph)	30		50			50
Link Distance (ft)	142		288			335
Travel Time (s)	3.2		3.9			4.6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	0	2472	0	13	1473
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 78.3%		ICU Level of Service D	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	8	12	2266	8	12	1355
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	13	2463	9	13	1473
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	3230	1236			2472	
vC1, stage 1 conf vol	2467					
vC2, stage 2 conf vol	762					
vCu, unblocked vol	3230	1236			2472	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	82	92			93	
cM capacity (veh/h)	49	171			190	

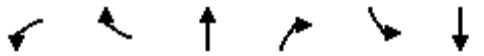
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	22	1642	830	13	736	736
Volume Left	9	0	0	13	0	0
Volume Right	13	0	9	0	0	0
cSH	86	1700	1700	190	1700	1700
Volume to Capacity	0.25	0.97	0.49	0.07	0.43	0.43
Queue Length 95th (ft)	23	0	0	5	0	0
Control Delay (s)	60.5	0.0	0.0	25.3	0.0	0.0
Lane LOS	F			D		
Approach Delay (s)	60.5	0.0		0.2		
Approach LOS	F					

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		


Southwest Dr
Drive H
Collector G
Drive F
Collector E
Drive D
Drive C
Collector B
Drive A
Kellers Chapel Rd
Kellers Chapel Rd
Mt Carmel Rd
Dr (Hwy 49)

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	14	21	1658	20	20	2038
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0	0		0	120	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Satd. Flow (prot)	1560	0	3254	0	1646	3260
Flt Permitted	0.981				0.950	
Satd. Flow (perm)	1560	0	3254	0	1646	3260
Link Speed (mph)	30		50			50
Link Distance (ft)	185		287			288
Travel Time (s)	4.2		3.9			3.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	2%	1%	1%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	38	0	1824	0	22	2215
Sign Control	Stop		Free			Free

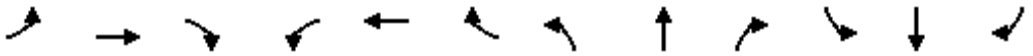
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 71.2%		ICU Level of Service C	
Analysis Period (min) 15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	14	21	1658	20	20	2038
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	23	1802	22	22	2215
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			921			
pX, platoon unblocked	0.67	0.67			0.67	
vC, conflicting volume	2964	912			1824	
vC1, stage 1 conf vol	1813					
vC2, stage 2 conf vol	1151					
vCu, unblocked vol	2947	0			1248	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	88	97			94	
cM capacity (veh/h)	128	730			375	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	38	1201	622	22	1108	1108
Volume Left	15	0	0	22	0	0
Volume Right	23	0	22	0	0	0
cSH	253	1700	1700	375	1700	1700
Volume to Capacity	0.15	0.71	0.37	0.06	0.65	0.65
Queue Length 95th (ft)	13	0	0	5	0	0
Control Delay (s)	21.7	0.0	0.0	15.2	0.0	0.0
Lane LOS	C			C		
Approach Delay (s)	21.7	0.0		0.1		
Approach LOS	C					

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	213	44	3	40	38	146	25	1314	50	174	1541	329
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0		0	0		0	200		0	200		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	1647	0	0	1551	0	1630	3244	0	1630	3175	0
Flt Permitted		0.961			0.991		0.044			0.092		
Satd. Flow (perm)	0	1647	0	0	1551	0	75	3244	0	158	3175	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					57			4			32	
Link Speed (mph)		30			30			50			50	
Link Distance (ft)		534			109			561			316	
Travel Time (s)		12.1			2.5			7.7			4.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	283	0	0	243	0	27	1482	0	189	2033	0
Turn Type	Split	NA		Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	4!	4!		8!	8!		5	2		1	6	
Permitted Phases							2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		8.0	20.0		8.0	20.0	
Total Split (s)	44.0	44.0		44.0	44.0		8.0	93.0		23.0	108.0	
Total Split (%)	27.5%	27.5%		27.5%	27.5%		5.0%	58.1%		14.4%	67.5%	
Maximum Green (s)	40.0	40.0		40.0	40.0		4.0	89.0		19.0	104.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5		0.5	0.5	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		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	None		None	None		None	Min		None	Min	
Walk Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0			11.0	
Pedestrian Calls (#/hr)	0	0		0	0			0			0	
Act Effct Green (s)		32.8			32.8		92.3	88.3		106.6	102.1	
Actuated g/C Ratio		0.22			0.22		0.63	0.60		0.72	0.69	
v/c Ratio		0.77			0.62		0.30	0.76		0.74	0.92	
Control Delay		69.9			14.0		18.4	26.4		38.0	28.5	
Queue Delay		0.1			3.3		0.0	0.0		3.1	0.0	
Total Delay		70.0			17.2		18.4	26.4		41.1	28.5	
LOS		E			B		B	C		D	C	
Approach Delay		70.1			17.2			26.3			29.6	
Approach LOS		E			B			C			C	
Queue Length 50th (ft)		271			29		7	532		74	856	
Queue Length 95th (ft)		382			m47		19	751		176	#1260	

Lane Group	ø9	ø10
Lane Configurations		
Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	9	10
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	20.0	20.0
Total Split (s)	24.0	20.0
Total Split (%)	15%	13%
Maximum Green (s)	20.0	16.0
Yellow Time (s)	3.5	3.5
All-Red Time (s)	0.5	0.5
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes
Vehicle Extension (s)	3.0	3.0
Recall Mode	Min	None
Walk Time (s)	5.0	5.0
Flash Dont Walk (s)	11.0	11.0
Pedestrian Calls (#/hr)	0	0
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		454			29			481			236	
Turn Bay Length (ft)							200			200		
Base Capacity (vph)		449			465		89	1988		305	2262	
Starvation Cap Reductn		0			137		0	0		0	0	
Spillback Cap Reductn		8			0		0	0		52	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.64			0.74		0.30	0.75		0.75	0.90	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 147.5			
Natural Cycle: 140			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.92			
Intersection Signal Delay: 30.4		Intersection LOS: C	
Intersection Capacity Utilization 104.1%		ICU Level of Service G	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.
! Phase conflict between lane groups.

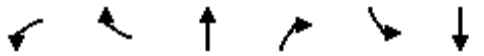
Splits and Phases: 3: Southwest Dr (Hwy 49) & Kellers Chapel Rd

Lane Group	ø9	ø10
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	14	21	1638	27	20	2018
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0	0		0	200	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Satd. Flow (prot)	1560	0	3254	0	1646	3260
Flt Permitted	0.981				0.950	
Satd. Flow (perm)	1560	0	3254	0	1646	3260
Link Speed (mph)	30		50			50
Link Distance (ft)	208		316			318
Travel Time (s)	4.7		4.3			4.3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	2%	1%	1%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	38	0	1809	0	22	2193
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 70.6%		ICU Level of Service C	
Analysis Period (min) 15			



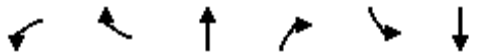
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	14	21	1638	27	20	2018
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	23	1780	29	22	2193
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			316			
pX, platoon unblocked	0.67	0.67			0.67	
vC, conflicting volume	2935	905			1810	
vC1, stage 1 conf vol	1795					
vC2, stage 2 conf vol	1140					
vCu, unblocked vol	2903	0			1214	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	88	97			94	
cM capacity (veh/h)	132	725			384	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	38	1187	623	22	1097	1097
Volume Left	15	0	0	22	0	0
Volume Right	23	0	29	0	0	0
cSH	260	1700	1700	384	1700	1700
Volume to Capacity	0.15	0.70	0.37	0.06	0.65	0.65
Queue Length 95th (ft)	13	0	0	4	0	0
Control Delay (s)	21.2	0.0	0.0	14.9	0.0	0.0
Lane LOS	C			B		
Approach Delay (s)	21.2	0.0		0.1		
Approach LOS	C					

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	70.6%	ICU Level of Service	C
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	35	57	1627	34	51	2005
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0	0		0	120	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25				25	
Satd. Flow (prot)	1646	1473	3251	0	1646	3260
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1646	1473	3251	0	1646	3260
Link Speed (mph)	30		50			50
Link Distance (ft)	211		318			287
Travel Time (s)	4.8		4.3			3.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	2%	1%	1%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	38	62	1805	0	55	2179
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 70.2%		ICU Level of Service C	
Analysis Period (min) 15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	35	57	1627	34	51	2005
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	62	1768	37	55	2179
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			634			
pX, platoon unblocked	0.67	0.67			0.67	
vC, conflicting volume	2988	903			1805	
vC1, stage 1 conf vol	1787					
vC2, stage 2 conf vol	1201					
vCu, unblocked vol	2981	0			1211	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	70	91			86	
cM capacity (veh/h)	125	726			386	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	38	62	1179	626	55	1090	1090
Volume Left	38	0	0	0	55	0	0
Volume Right	0	62	0	37	0	0	0
cSH	125	726	1700	1700	386	1700	1700
Volume to Capacity	0.30	0.09	0.69	0.37	0.14	0.64	0.64
Queue Length 95th (ft)	30	7	0	0	12	0	0
Control Delay (s)	46.0	10.4	0.0	0.0	15.9	0.0	0.0
Lane LOS	E	B			C		
Approach Delay (s)	23.9		0.0		0.4		
Approach LOS	C						

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	70.2%	ICU Level of Service	C
Analysis Period (min)	15		

Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Volume (vph)	2165	20	20	2677	14	21
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)		0	120		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Satd. Flow (prot)	3257	0	1646	3260	1560	0
Flt Permitted			0.950		0.981	
Satd. Flow (perm)	3257	0	1646	3260	1560	0
Link Speed (mph)	50			50	30	
Link Distance (ft)	288			204	182	
Travel Time (s)	3.9			2.8	4.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	1%	1%	2%	1%	1%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2375	0	22	2910	38	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 90.3%		ICU Level of Service E	
Analysis Period (min) 15			

Movement	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Volume (veh/h)	2165	20	20	2677	14	21
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2353	22	22	2910	15	23
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)	1209					
pX, platoon unblocked			0.67		0.67	0.67
vC, conflicting volume			2375		3862	1188
vC1, stage 1 conf vol					2364	
vC2, stage 2 conf vol					1498	
vCu, unblocked vol			2073		4279	312
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			88		70	95
cM capacity (veh/h)			181		51	463

Direction, Lane #	NB 1	NB 2	SB 1	SB 2	SB 3	NW 1
Volume Total	1569	806	22	1455	1455	38
Volume Left	0	0	22	0	0	15
Volume Right	0	22	0	0	0	23
cSH	1700	1700	181	1700	1700	110
Volume to Capacity	0.92	0.47	0.12	0.86	0.86	0.35
Queue Length 95th (ft)	0	0	10	0	0	35
Control Delay (s)	0.0	0.0	27.6	0.0	0.0	54.4
Lane LOS			D			F
Approach Delay (s)	0.0		0.2			54.4
Approach LOS						F

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	90.3%	ICU Level of Service	E
Analysis Period (min)	15		

Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Volume (vph)	2115	80	94	2605	106	113
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)		0	200		0	0
Storage Lanes		0	1		1	1
Taper Length (ft)			25		25	
Satd. Flow (prot)	3245	0	1646	3260	1646	1473
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	3245	0	1646	3260	1646	1473
Link Speed (mph)	50			50	30	
Link Distance (ft)	204			296	224	
Travel Time (s)	2.8			4.0	5.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	1%	1%	2%	1%	1%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2386	0	102	2832	115	123
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 91.2%		ICU Level of Service F	
Analysis Period (min) 15			

Movement	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Volume (veh/h)	2115	80	94	2605	106	113
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2299	87	102	2832	115	123
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			2386		3962	1193
vC1, stage 1 conf vol					2342	
vC2, stage 2 conf vol					1620	
vCu, unblocked vol			2386		3962	1193
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			49		0	32
cM capacity (veh/h)			202		43	181

Direction, Lane #	NB 1	NB 2	SB 1	SB 2	SB 3	NW 1	NW 2
Volume Total	1533	853	102	1416	1416	115	123
Volume Left	0	0	102	0	0	115	0
Volume Right	0	87	0	0	0	0	123
cSH	1700	1700	202	1700	1700	43	181
Volume to Capacity	0.90	0.50	0.51	0.83	0.83	2.69	0.68
Queue Length 95th (ft)	0	0	64	0	0	313	102
Control Delay (s)	0.0	0.0	39.7	0.0	0.0	965.1	59.0
Lane LOS			E			F	F
Approach Delay (s)	0.0		1.4			497.6	
Approach LOS						F	

Intersection Summary			
Average Delay	22.0		
Intersection Capacity Utilization	91.2%	ICU Level of Service	F
Analysis Period (min)	15		

Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Volume (vph)	2194	20	20	2671	14	21
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)		0	120		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Satd. Flow (prot)	3257	0	1646	3260	1560	0
Flt Permitted			0.950		0.981	
Satd. Flow (perm)	3257	0	1646	3260	1560	0
Link Speed (mph)	50			50	30	
Link Distance (ft)	296			283	170	
Travel Time (s)	4.0			3.9	3.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	1%	1%	2%	1%	1%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2407	0	22	2903	38	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 90.2%		ICU Level of Service E	
Analysis Period (min) 15			

Movement	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Volume (veh/h)	2194	20	20	2671	14	21
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2385	22	22	2903	15	23
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			2407		3891	1203
vC1, stage 1 conf vol					2396	
vC2, stage 2 conf vol					1495	
vCu, unblocked vol			2407		3891	1203
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			89		69	87
cM capacity (veh/h)			199		50	178

Direction, Lane #	NB 1	NB 2	SB 1	SB 2	SB 3	NW 1
Volume Total	1590	817	22	1452	1452	38
Volume Left	0	0	22	0	0	15
Volume Right	0	22	0	0	0	23
cSH	1700	1700	199	1700	1700	87
Volume to Capacity	0.94	0.48	0.11	0.85	0.85	0.44
Queue Length 95th (ft)	0	0	9	0	0	45
Control Delay (s)	0.0	0.0	25.4	0.0	0.0	74.7
Lane LOS			D			F
Approach Delay (s)	0.0		0.2			74.7
Approach LOS						F

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	90.2%	ICU Level of Service	E
Analysis Period (min)	15		

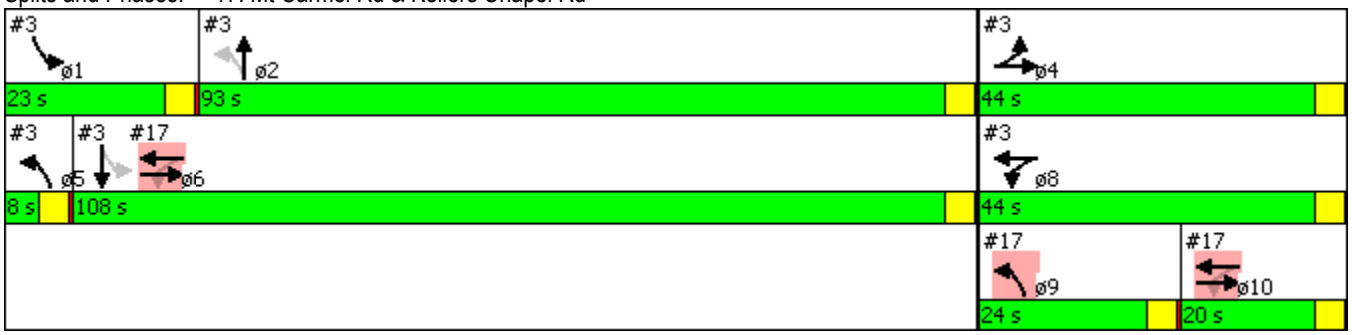
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	ø1	ø2	ø4	ø5	ø6	ø8
Lane Configurations												
Volume (vph)	95	172	21	77	146	22						
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750						
Satd. Flow (prot)	1582	0	0	1714	1630	0						
Flt Permitted				0.906	0.958							
Satd. Flow (perm)	1582	0	0	1570	1630	0						
Right Turn on Red		Yes				Yes						
Satd. Flow (RTOR)	163				4							
Link Speed (mph)	30			30	30							
Link Distance (ft)	109			779	182							
Travel Time (s)	2.5			17.7	4.1							
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92						
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%						
Shared Lane Traffic (%)												
Lane Group Flow (vph)	290	0	0	107	183	0						
Turn Type	NA		Perm	NA	NA							
Protected Phases	6 10			6 10	9		1	2	4	5	6	8
Permitted Phases			6 10									
Detector Phase	6 10		6 10	6 10	9							
Switch Phase												
Minimum Initial (s)					4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)					20.0		8.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)					24.0		23.0	93.0	44.0	8.0	108.0	44.0
Total Split (%)					15.0%		14%	58%	28%	5%	68%	28%
Maximum Green (s)					20.0		19.0	89.0	40.0	4.0	104.0	40.0
Yellow Time (s)					3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)					0.5		0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)					0.0							
Total Lost Time (s)					4.0							
Lead/Lag					Lead		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?					Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)					3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode					Min		None	Min	None	None	Min	None
Walk Time (s)					5.0			5.0	5.0		5.0	5.0
Flash Dont Walk (s)					11.0			11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)					0			0	0		0	0
Act Effct Green (s)	113.5			113.5	19.1							
Actuated g/C Ratio	0.77			0.77	0.13							
v/c Ratio	0.23			0.09	0.86							
Control Delay	2.2			3.3	95.1							
Queue Delay	2.3			0.0	0.0							
Total Delay	4.5			3.3	95.1							
LOS	A			A	F							
Approach Delay	4.5			3.3	95.1							
Approach LOS	A			A	F							
Queue Length 50th (ft)	14			18	177							
Queue Length 95th (ft)	12			29	#337							
Internal Link Dist (ft)	29			699	102							
Turn Bay Length (ft)												

Lane Group	ø10
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	10
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	20.0
Total Split (s)	20.0
Total Split (%)	13%
Maximum Green (s)	16.0
Yellow Time (s)	3.5
All-Red Time (s)	0.5
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	ø1	ø2	ø4	ø5	ø6	ø8
Base Capacity (vph)	1302			1260	225							
Starvation Cap Reductn	867			0	0							
Spillback Cap Reductn	0			171	0							
Storage Cap Reductn	0			0	0							
Reduced v/c Ratio	0.67			0.10	0.81							

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 147.5			
Natural Cycle: 140			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.92			
Intersection Signal Delay: 32.9		Intersection LOS: C	
Intersection Capacity Utilization 41.1%		ICU Level of Service A	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 17: Mt Carmel Rd & Kellers Chapel Rd



Lane Group	ø10
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	64	57	2172	47	67	2635
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0	0		0	150	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25				25	
Satd. Flow (prot)	1646	1473	3251	0	1646	3260
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1646	1473	3251	0	1646	3260
Link Speed (mph)	30		50			50
Link Distance (ft)	202		283			288
Travel Time (s)	4.6		3.9			3.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	2%	1%	1%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	70	62	2412	0	73	2864
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 89.6%		ICU Level of Service E	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	64	57	2172	47	67	2635
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	70	62	2361	51	73	2864
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	3964	1206			2412	
vC1, stage 1 conf vol	2386					
vC2, stage 2 conf vol	1578					
vCu, unblocked vol	3964	1206			2412	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	65			63	
cM capacity (veh/h)	46	177			198	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	70	62	1574	838	73	1432	1432
Volume Left	70	0	0	0	73	0	0
Volume Right	0	62	0	51	0	0	0
cSH	46	177	1700	1700	198	1700	1700
Volume to Capacity	1.52	0.35	0.93	0.49	0.37	0.84	0.84
Queue Length 95th (ft)	170	37	0	0	40	0	0
Control Delay (s)	462.4	35.9	0.0	0.0	33.5	0.0	0.0
Lane LOS	F	E			D		
Approach Delay (s)	261.5		0.0		0.8		
Approach LOS	F						

Intersection Summary			
Average Delay	6.7		
Intersection Capacity Utilization	89.6%	ICU Level of Service	E
Analysis Period (min)	15		

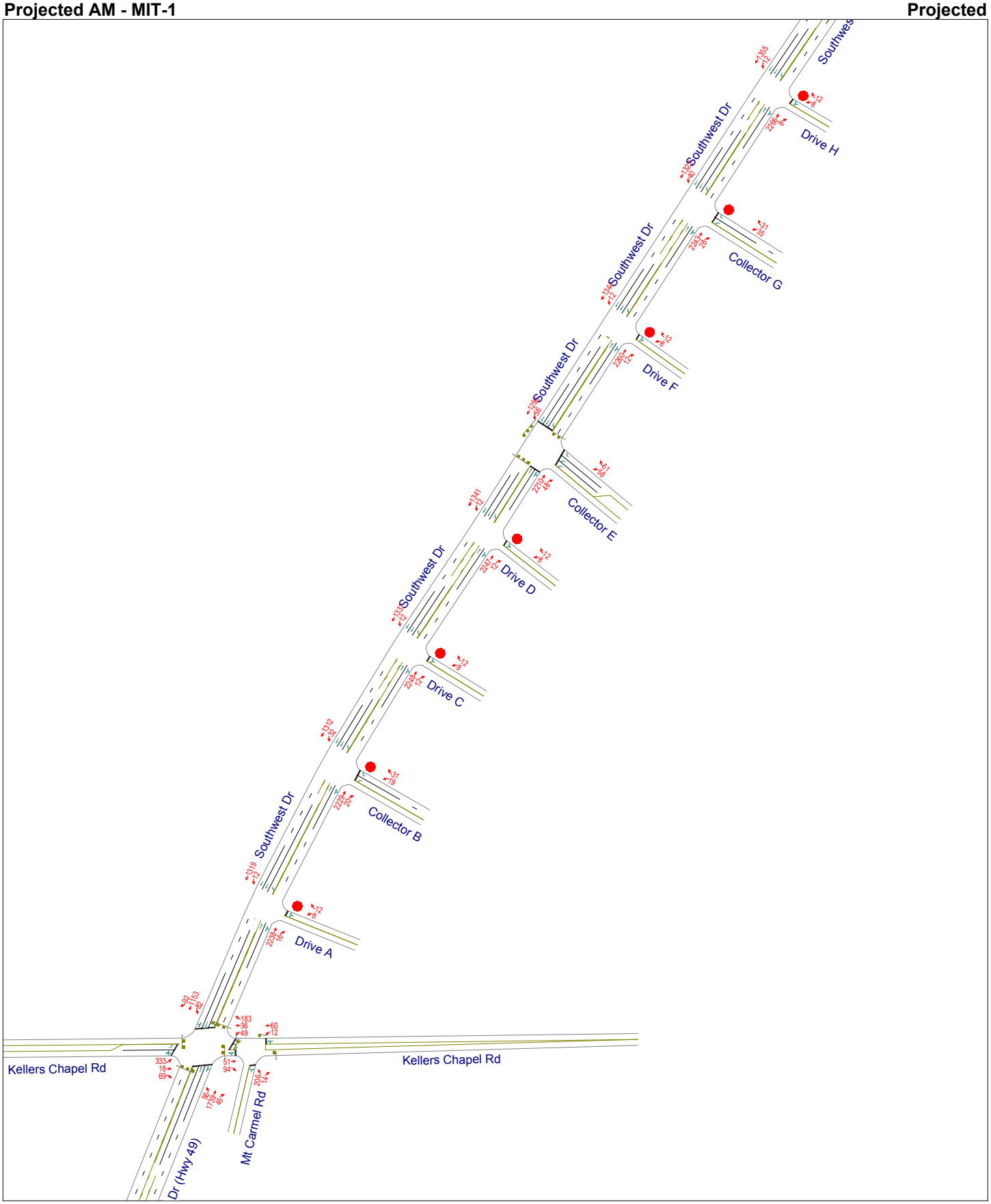
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	14	21	2208	13	20	2679
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0	0		0	120	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Satd. Flow (prot)	1576	0	3257	0	1662	3260
Flt Permitted	0.981				0.950	
Satd. Flow (perm)	1576	0	3257	0	1662	3260
Link Speed (mph)	30		50			50
Link Distance (ft)	142		288			335
Travel Time (s)	3.2		3.9			4.6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	38	0	2414	0	22	2912
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 90.4%		ICU Level of Service E	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	14	21	2208	13	20	2679
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	23	2400	14	22	2912
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	3907	1207			2414	
vC1, stage 1 conf vol	2407					
vC2, stage 2 conf vol	1499					
vCu, unblocked vol	3907	1207			2414	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	69	87			89	
cM capacity (veh/h)	50	178			200	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	38	1600	814	22	1456	1456
Volume Left	15	0	0	22	0	0
Volume Right	23	0	14	0	0	0
cSH	88	1700	1700	200	1700	1700
Volume to Capacity	0.43	0.94	0.48	0.11	0.86	0.86
Queue Length 95th (ft)	45	0	0	9	0	0
Control Delay (s)	74.6	0.0	0.0	25.2	0.0	0.0
Lane LOS	F			D		
Approach Delay (s)	74.6	0.0		0.2		
Approach LOS	F					

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	90.4%	ICU Level of Service	E
Analysis Period (min)	15		


Southwes
Southwest Dr
Drive H
Southwest Dr
Collector G
Southwest Dr
Drive F
Southwest Dr
Collector E
Southwest Dr
Drive D
Southwest Dr
Drive C
Southwest Dr
Collector B
Southwest Dr
Drive A
Kellers Chapel Rd
Kellers Chapel Rd
Dr (Hwy 49)
Mt Carmel Rd

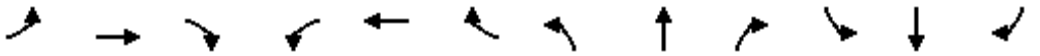
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	8	12	2248	12	12	1337
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0	0		0	120	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Satd. Flow (prot)	1562	0	3257	0	1646	3260
Flt Permitted	0.980				0.950	
Satd. Flow (perm)	1562	0	3257	0	1646	3260
Link Speed (mph)	30		50			50
Link Distance (ft)	185		287			288
Travel Time (s)	4.2		3.9			3.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	2%	1%	1%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	0	2456	0	13	1453
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 77.9%		ICU Level of Service D	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	8	12	2248	12	12	1337
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	13	2443	13	13	1453
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			921			492
pX, platoon unblocked	0.46	0.41			0.41	
vC, conflicting volume	3203	1228			2457	
vC1, stage 1 conf vol	2450					
vC2, stage 2 conf vol	753					
vCu, unblocked vol	2509	0			1689	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	84	97			92	
cM capacity (veh/h)	56	451			157	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	22	1629	828	13	727	727
Volume Left	9	0	0	13	0	0
Volume Right	13	0	13	0	0	0
cSH	118	1700	1700	157	1700	1700
Volume to Capacity	0.18	0.96	0.49	0.08	0.43	0.43
Queue Length 95th (ft)	16	0	0	7	0	0
Control Delay (s)	42.4	0.0	0.0	30.0	0.0	0.0
Lane LOS	E			D		
Approach Delay (s)	42.4	0.0		0.3		
Approach LOS	E					

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	333	18	69	49	36	183	56	1739	45	82	1153	92
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (ft)	100		0	80		0	200		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1548	1505	0	1548	1428	0	1630	3247	0	1630	3224	0
Flt Permitted	0.950	0.972		0.950	0.999		0.114			0.058		
Satd. Flow (perm)	1548	1505	0	1548	1428	0	196	3247	0	100	3224	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			75			3			11	
Link Speed (mph)		30			30			50			50	
Link Distance (ft)		534			109			561			316	
Travel Time (s)		12.1			2.5			7.7			4.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)	36%			10%								
Lane Group Flow (vph)	232	225	0	48	243	0	61	1939	0	89	1353	0
Turn Type	Split	NA		Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	4!	4!		8!	8!		5	2		1	6	
Permitted Phases							2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		8.0	20.0		8.0	20.0	
Total Split (s)	40.0	40.0		40.0	40.0		11.0	72.0		8.0	69.0	
Total Split (%)	33.3%	33.3%		33.3%	33.3%		9.2%	60.0%		6.7%	57.5%	
Maximum Green (s)	36.0	36.0		36.0	36.0		7.0	68.0		4.0	65.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5		0.5	0.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag							Lead	Lead		Lag	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	None		None	None		None	C-Min		None	C-Min	
Walk Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0			11.0	
Pedestrian Calls (#/hr)	0	0		0	0			0			0	
Act Effct Green (s)	27.7	27.7		27.7	27.7		76.3	76.3		75.0	75.0	
Actuated g/C Ratio	0.23	0.23		0.23	0.23		0.64	0.64		0.62	0.62	
v/c Ratio	0.65	0.62		0.13	0.63		0.29	0.94		0.79	0.67	
Control Delay	50.7	45.1		8.3	6.2		12.4	30.6		74.8	16.2	
Queue Delay	0.0	0.1		1.2	2.9		0.0	0.0		3.6	0.0	
Total Delay	50.7	45.3		9.5	9.1		12.4	30.6		78.4	16.2	
LOS	D	D		A	A		B	C		E	B	
Approach Delay		48.0			9.1			30.0			20.1	
Approach LOS		D			A			C			C	
Queue Length 50th (ft)	174	152		7	0		16	643		23	353	
Queue Length 95th (ft)	250	227		m7	m2		38	#968		#125	511	

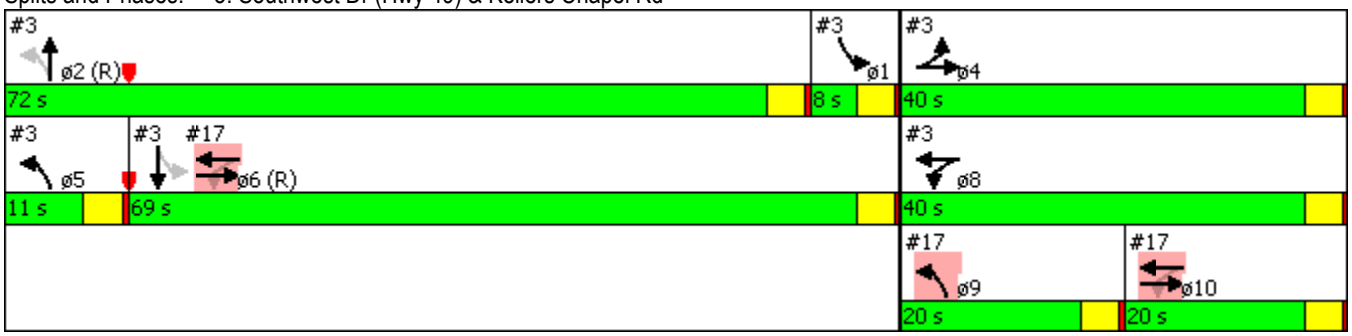
Lane Group	ø9	ø10
Lane Configurations		
Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	9	10
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	20.0	20.0
Total Split (s)	20.0	20.0
Total Split (%)	17%	17%
Maximum Green (s)	16.0	16.0
Yellow Time (s)	3.5	3.5
All-Red Time (s)	0.5	0.5
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes
Vehicle Extension (s)	3.0	3.0
Recall Mode	Min	None
Walk Time (s)	5.0	5.0
Flash Dont Walk (s)	11.0	11.0
Pedestrian Calls (#/hr)	0	0
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		454			29			481			236	
Turn Bay Length (ft)	100			80			200			200		
Base Capacity (vph)	464	466		464	480		215	2065		113	2018	
Starvation Cap Reductn	0	0		300	143		0	0		0	0	
Spillback Cap Reductn	0	18		0	0		0	0		5	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.50	0.50		0.29	0.72		0.28	0.94		0.82	0.67	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 12 (10%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 130			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.09			
Intersection Signal Delay: 27.1		Intersection LOS: C	
Intersection Capacity Utilization 93.4%		ICU Level of Service F	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.
! Phase conflict between lane groups.

Splits and Phases: 3: Southwest Dr (Hwy 49) & Kellers Chapel Rd



Lane Group	ø9	ø10
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	8	12	2238	16	12	1319
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0	0		0	200	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Satd. Flow (prot)	1562	0	3257	0	1646	3260
Flt Permitted	0.980				0.950	
Satd. Flow (perm)	1562	0	3257	0	1646	3260
Link Speed (mph)	30		50			50
Link Distance (ft)	208		316			318
Travel Time (s)	4.7		4.3			4.3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	2%	1%	1%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	0	2450	0	13	1434
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 77.7%		ICU Level of Service D	
Analysis Period (min) 15			

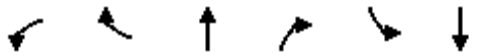
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	8	12	2238	16	12	1319
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	13	2433	17	13	1434
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			316			1097
pX, platoon unblocked	0.47	0.43			0.43	
vC, conflicting volume	3184	1225			2450	
vC1, stage 1 conf vol	2441					
vC2, stage 2 conf vol	743					
vCu, unblocked vol	2570	0			1725	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	84	97			92	
cM capacity (veh/h)	56	469			158	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	22	1622	828	13	717	717
Volume Left	9	0	0	13	0	0
Volume Right	13	0	17	0	0	0
cSH	118	1700	1700	158	1700	1700
Volume to Capacity	0.18	0.95	0.49	0.08	0.42	0.42
Queue Length 95th (ft)	16	0	0	7	0	0
Control Delay (s)	42.1	0.0	0.0	29.8	0.0	0.0
Lane LOS	E			D		
Approach Delay (s)	42.1	0.0		0.3		
Approach LOS	E					

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	19	31	2229	20	32	1312
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0	0		0	120	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25				25	
Satd. Flow (prot)	1646	1473	3257	0	1646	3260
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1646	1473	3257	0	1646	3260
Link Speed (mph)	30		50			50
Link Distance (ft)	211		318			287
Travel Time (s)	4.8		4.3			3.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	2%	1%	1%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	21	34	2445	0	35	1426
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 77.6%		ICU Level of Service D	
Analysis Period (min) 15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	19	31	2229	20	32	1312
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	34	2423	22	35	1426
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			634			779
pX, platoon unblocked	0.47	0.42			0.42	
vC, conflicting volume	3216	1222			2445	
vC1, stage 1 conf vol	2434					
vC2, stage 2 conf vol	783					
vCu, unblocked vol	2579	0			1680	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	64	93			78	
cM capacity (veh/h)	58	458			161	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	21	34	1615	829	35	713	713
Volume Left	21	0	0	0	35	0	0
Volume Right	0	34	0	22	0	0	0
cSH	58	458	1700	1700	161	1700	1700
Volume to Capacity	0.36	0.07	0.95	0.49	0.22	0.42	0.42
Queue Length 95th (ft)	33	6	0	0	20	0	0
Control Delay (s)	98.9	13.5	0.0	0.0	33.5	0.0	0.0
Lane LOS	F	B			D		
Approach Delay (s)	45.9		0.0		0.8		
Approach LOS	E						

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		

Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Volume (vph)	2247	12	12	1341	8	12
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)		0	120		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Satd. Flow (prot)	3257	0	1646	3260	1562	0
Flt Permitted			0.950		0.980	
Satd. Flow (perm)	3257	0	1646	3260	1562	0
Link Speed (mph)	50			50	30	
Link Distance (ft)	288			204	182	
Travel Time (s)	3.9			2.8	4.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	1%	1%	2%	1%	1%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2455	0	13	1458	22	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 77.9%		ICU Level of Service D	
Analysis Period (min) 15			

Movement	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Volume (veh/h)	2247	12	12	1341	8	12
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2442	13	13	1458	9	13
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)	1209			204		
pX, platoon unblocked			0.41		0.46	0.41
vC, conflicting volume			2455		3204	1228
vC1, stage 1 conf vol					2449	
vC2, stage 2 conf vol					755	
vCu, unblocked vol			1677		2510	0
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			92		85	97
cM capacity (veh/h)			158		56	448

Direction, Lane #	NB 1	NB 2	SB 1	SB 2	SB 3	NW 1
Volume Total	1628	827	13	729	729	22
Volume Left	0	0	13	0	0	9
Volume Right	0	13	0	0	0	13
cSH	1700	1700	158	1700	1700	118
Volume to Capacity	0.96	0.49	0.08	0.43	0.43	0.18
Queue Length 95th (ft)	0	0	7	0	0	16
Control Delay (s)	0.0	0.0	29.9	0.0	0.0	42.1
Lane LOS			D			E
Approach Delay (s)	0.0		0.3			42.1
Approach LOS						E

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		

Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Volume (vph)	2210	48	56	1296	58	61
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)		0	200		100	0
Storage Lanes		0	1		2	1
Taper Length (ft)			25		25	
Satd. Flow (prot)	3251	0	1646	3260	3193	1473
Flt Permitted			0.039		0.950	
Satd. Flow (perm)	3251	0	68	3260	3193	1473
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	5					59
Link Speed (mph)	50			50	30	
Link Distance (ft)	204			296	224	
Travel Time (s)	2.8			4.0	5.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	1%	1%	2%	1%	1%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2454	0	61	1409	63	66
Turn Type	NA		pm+pt	NA	NA	Perm
Protected Phases	2		1	6	8	
Permitted Phases			6			8
Detector Phase	2		1	6	8	8
Switch Phase						
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	20.0		8.0	20.0	20.0	20.0
Total Split (s)	92.0		8.0	100.0	20.0	20.0
Total Split (%)	76.7%		6.7%	83.3%	16.7%	16.7%
Maximum Green (s)	88.0		4.0	96.0	16.0	16.0
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	0.5		0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	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	C-Max		None	C-Max	None	None
Walk Time (s)	5.0			5.0	5.0	5.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	100.4		106.0	106.8	8.0	8.0
Actuated g/C Ratio	0.84		0.88	0.89	0.07	0.07
v/c Ratio	0.90		0.54	0.49	0.30	0.43
Control Delay	7.2		38.9	2.4	56.3	24.7
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	7.2		38.9	2.4	56.3	24.7
LOS	A		D	A	E	C
Approach Delay	7.2			3.9	40.2	
Approach LOS	A			A	D	
Queue Length 50th (ft)	230		4	89	24	5

Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Queue Length 95th (ft)	#1133		#56	142	46	50
Internal Link Dist (ft)	124			216	144	
Turn Bay Length (ft)			200		100	
Base Capacity (vph)	2720		112	2901	425	247
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.90		0.54	0.49	0.15	0.27

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 7.1		Intersection LOS: A	
Intersection Capacity Utilization 78.8%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 13: Southwest Dr & Collector E

Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Volume (vph)	2260	12	12	1344	8	12
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)		0	120		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Satd. Flow (prot)	3257	0	1646	3260	1562	0
Flt Permitted			0.950		0.980	
Satd. Flow (perm)	3257	0	1646	3260	1562	0
Link Speed (mph)	50			50	30	
Link Distance (ft)	296			283	170	
Travel Time (s)	4.0			3.9	3.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	1%	1%	2%	1%	1%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2470	0	13	1461	22	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 78.2%		ICU Level of Service D	
Analysis Period (min) 15			

Movement	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Volume (veh/h)	2260	12	12	1344	8	12
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2457	13	13	1461	9	13
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)	296					
pX, platoon unblocked			0.19		0.19	0.19
vC, conflicting volume			2470		3220	1235
vC1, stage 1 conf vol					2463	
vC2, stage 2 conf vol					757	
vCu, unblocked vol			256		4136	0
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			95		94	94
cM capacity (veh/h)			254		136	210

Direction, Lane #	NB 1	NB 2	SB 1	SB 2	SB 3	NW 1
Volume Total	1638	832	13	730	730	22
Volume Left	0	0	13	0	0	9
Volume Right	0	13	0	0	0	13
cSH	1700	1700	254	1700	1700	173
Volume to Capacity	0.96	0.49	0.05	0.43	0.43	0.13
Queue Length 95th (ft)	0	0	4	0	0	11
Control Delay (s)	0.0	0.0	19.9	0.0	0.0	28.8
Lane LOS			C			D
Approach Delay (s)	0.0		0.2			28.8
Approach LOS						D

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		

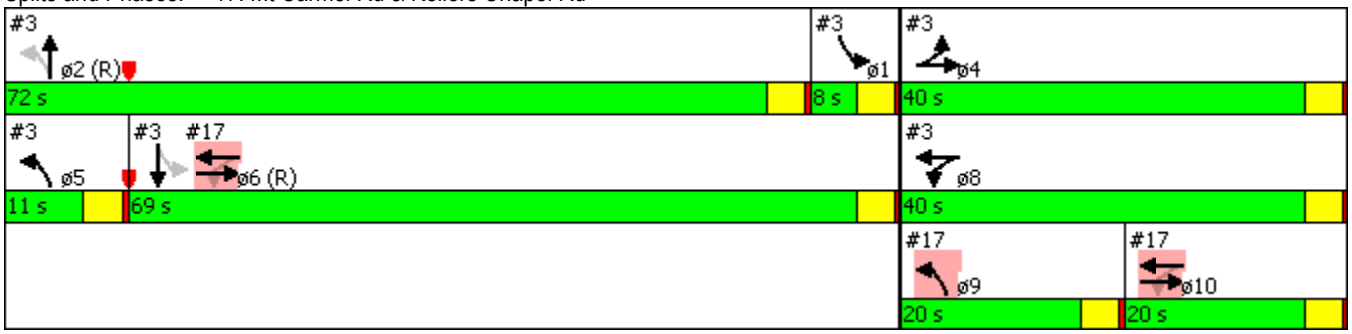
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	ø1	ø2	ø4	ø5	ø6	ø8
Lane Configurations												
Volume (vph)	51	94	12	60	206	14						
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750						
Satd. Flow (prot)	1580	0	0	1719	1641	0						
Flt Permitted				0.958	0.955							
Satd. Flow (perm)	1580	0	0	1660	1641	0						
Right Turn on Red		Yes				Yes						
Satd. Flow (RTOR)	102				2							
Link Speed (mph)	30			30	30							
Link Distance (ft)	109			779	182							
Travel Time (s)	2.5			17.7	4.1							
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92						
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%						
Shared Lane Traffic (%)												
Lane Group Flow (vph)	157	0	0	78	239	0						
Turn Type	NA		Perm	NA	NA							
Protected Phases	6 10			6 10	9		1	2	4	5	6	8
Permitted Phases			6 10									
Detector Phase	6 10		6 10	6 10	9							
Switch Phase												
Minimum Initial (s)					4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)					20.0		8.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)					20.0		8.0	72.0	40.0	11.0	69.0	40.0
Total Split (%)					16.7%		7%	60%	33%	9%	58%	33%
Maximum Green (s)					16.0		4.0	68.0	36.0	7.0	65.0	36.0
Yellow Time (s)					3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)					0.5		0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)					0.0							
Total Lost Time (s)					4.0							
Lead/Lag					Lead		Lag	Lead		Lead	Lag	
Lead-Lag Optimize?					Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)					3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode					Min		None	C-Min	None	None	C-Min	None
Walk Time (s)					5.0			5.0	5.0		5.0	5.0
Flash Dont Walk (s)					11.0			11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)					0			0	0		0	0
Act Effct Green (s)	83.5			83.5	16.0							
Actuated g/C Ratio	0.70			0.70	0.13							
v/c Ratio	0.14			0.07	1.09							
Control Delay	2.9			3.8	133.9							
Queue Delay	1.4			0.0	5.7							
Total Delay	4.3			3.8	139.6							
LOS	A			A	F							
Approach Delay	4.3			3.8	139.6							
Approach LOS	A			A	F							
Queue Length 50th (ft)	5			10	~207							
Queue Length 95th (ft)	m21			20	#372							
Internal Link Dist (ft)	29			699	102							
Turn Bay Length (ft)												

Lane Group	ø10
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	10
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	20.0
Total Split (s)	20.0
Total Split (%)	17%
Maximum Green (s)	16.0
Yellow Time (s)	3.5
All-Red Time (s)	0.5
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	ø1	ø2	ø4	ø5	ø6	ø8
Base Capacity (vph)	1206			1240	220							
Starvation Cap Reductn	872			0	0							
Spillback Cap Reductn	0			0	13							
Storage Cap Reductn	0			0	0							
Reduced v/c Ratio	0.47			0.06	1.15							

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 12 (10%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 130			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.09			
Intersection Signal Delay: 72.4		Intersection LOS: E	
Intersection Capacity Utilization 34.6%		ICU Level of Service A	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 17: Mt Carmel Rd & Kellers Chapel Rd

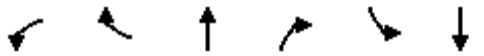


Lane Group	ø10
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	35	31	2243	28	40	1322
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0	0		0	150	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25				25	
Satd. Flow (prot)	1646	1473	3254	0	1646	3260
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1646	1473	3254	0	1646	3260
Link Speed (mph)	30		50			50
Link Distance (ft)	202		283			288
Travel Time (s)	4.6		3.9			3.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	2%	1%	1%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	38	34	2468	0	43	1437
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 78.3%		ICU Level of Service D	
Analysis Period (min) 15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	35	31	2243	28	40	1322
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	34	2438	30	43	1437
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			579			
pX, platoon unblocked	0.20	0.20			0.20	
vC, conflicting volume	3259	1234			2468	
vC1, stage 1 conf vol	2453					
vC2, stage 2 conf vol	805					
vCu, unblocked vol	4290	0			350	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	70	85			82	
cM capacity (veh/h)	129	218			243	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	38	34	1625	843	43	718	718
Volume Left	38	0	0	0	43	0	0
Volume Right	0	34	0	30	0	0	0
cSH	129	218	1700	1700	243	1700	1700
Volume to Capacity	0.30	0.15	0.96	0.50	0.18	0.42	0.42
Queue Length 95th (ft)	29	13	0	0	16	0	0
Control Delay (s)	44.3	24.5	0.0	0.0	23.0	0.0	0.0
Lane LOS	E	C			C		
Approach Delay (s)	35.0		0.0		0.7		
Approach LOS	E						

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	8	12	2266	8	12	1355
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0	0		0	120	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Satd. Flow (prot)	1578	0	3257	0	1662	3260
Flt Permitted	0.980				0.950	
Satd. Flow (perm)	1578	0	3257	0	1662	3260
Link Speed (mph)	30		50			50
Link Distance (ft)	142		288			335
Travel Time (s)	3.2		3.9			4.6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	0	2472	0	13	1473
Sign Control	Stop		Free			Free

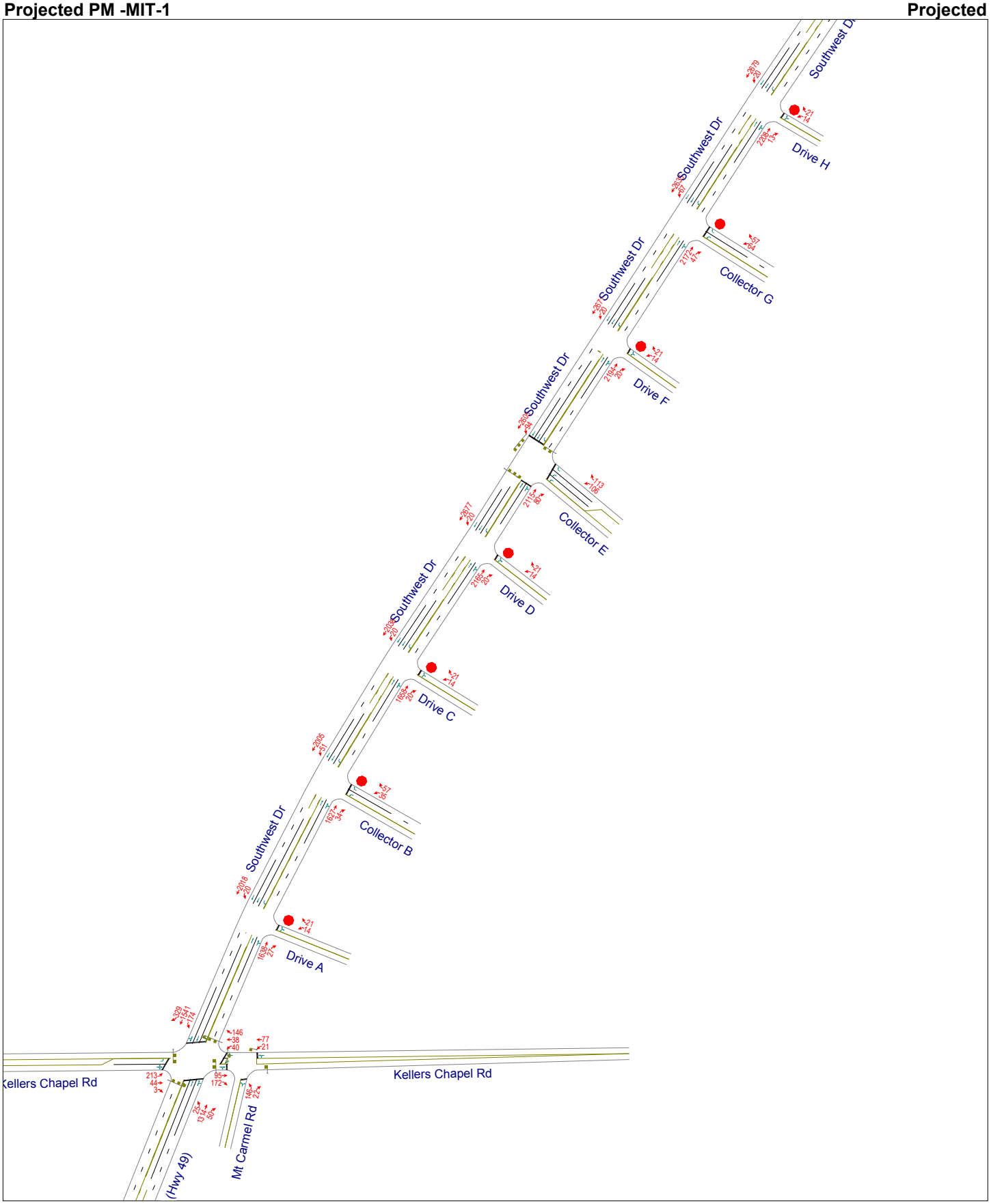
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 78.3%		ICU Level of Service D	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	8	12	2266	8	12	1355
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	13	2463	9	13	1473
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			867			
pX, platoon unblocked	0.21	0.21			0.21	
vC, conflicting volume	3230	1236			2472	
vC1, stage 1 conf vol	2467					
vC2, stage 2 conf vol	762					
vCu, unblocked vol	4102	0			467	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	94			94	
cM capacity (veh/h)	117	228			230	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	22	1642	830	13	736	736
Volume Left	9	0	0	13	0	0
Volume Right	13	0	9	0	0	0
cSH	165	1700	1700	230	1700	1700
Volume to Capacity	0.13	0.97	0.49	0.06	0.43	0.43
Queue Length 95th (ft)	11	0	0	4	0	0
Control Delay (s)	30.1	0.0	0.0	21.6	0.0	0.0
Lane LOS	D			C		
Approach Delay (s)	30.1	0.0		0.2		
Approach LOS	D					

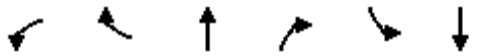
Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		

P2032 **4/23/2020**
Projected PM -MIT-1 **Projected**



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	14	21	1658	20	20	2038
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0	0		0	120	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Satd. Flow (prot)	1560	0	3254	0	1646	3260
Flt Permitted	0.981				0.950	
Satd. Flow (perm)	1560	0	3254	0	1646	3260
Link Speed (mph)	30		50			50
Link Distance (ft)	185		287			288
Travel Time (s)	4.2		3.9			3.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	2%	1%	1%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	38	0	1824	0	22	2215
Sign Control	Stop		Free			Free

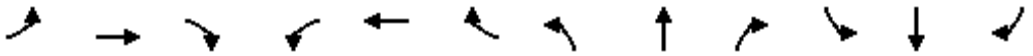
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 71.2%		ICU Level of Service C	
Analysis Period (min) 15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	14	21	1658	20	20	2038
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	23	1802	22	22	2215
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			921			492
pX, platoon unblocked	0.33	0.67			0.67	
vC, conflicting volume	2964	912			1824	
vC1, stage 1 conf vol	1813					
vC2, stage 2 conf vol	1151					
vCu, unblocked vol	0	0			1242	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	97			94	
cM capacity (veh/h)	315	728			376	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	38	1201	622	22	1108	1108
Volume Left	15	0	0	22	0	0
Volume Right	23	0	22	0	0	0
cSH	477	1700	1700	376	1700	1700
Volume to Capacity	0.08	0.71	0.37	0.06	0.65	0.65
Queue Length 95th (ft)	6	0	0	5	0	0
Control Delay (s)	13.2	0.0	0.0	15.2	0.0	0.0
Lane LOS	B			C		
Approach Delay (s)	13.2	0.0		0.1		
Approach LOS	B					

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	213	44	3	40	38	146	25	1314	50	174	1541	329
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (ft)	100		0	80		0	200		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1548	1575	0	1548	1438	0	1630	3244	0	1630	3175	0
Flt Permitted	0.950	0.969		0.950	0.999		0.052			0.091		
Satd. Flow (perm)	1548	1575	0	1548	1438	0	89	3244	0	156	3175	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			122			4			35	
Link Speed (mph)		30			30			50			50	
Link Distance (ft)		534			109			561			316	
Travel Time (s)		12.1			2.5			7.7			4.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)	39%			10%								
Lane Group Flow (vph)	142	141	0	39	204	0	27	1482	0	189	2033	0
Turn Type	Split	NA		Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	4!	4!		8!	8!		5	2		1	6	
Permitted Phases							2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		8.0	20.0		8.0	20.0	
Total Split (s)	40.0	40.0		40.0	40.0		8.0	80.0		20.0	92.0	
Total Split (%)	28.6%	28.6%		28.6%	28.6%		5.7%	57.1%		14.3%	65.7%	
Maximum Green (s)	36.0	36.0		36.0	36.0		4.0	76.0		16.0	88.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5		0.5	0.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	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	None		None	None		None	Min		None	Min	
Walk Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0			11.0	
Pedestrian Calls (#/hr)	0	0		0	0			0			0	
Act Effct Green (s)	26.2	26.2		26.2	26.2		79.6	75.6		92.7	88.1	
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.63	0.60		0.73	0.69	
v/c Ratio	0.45	0.43		0.12	0.52		0.26	0.77		0.71	0.92	
Control Delay	49.9	49.1		27.8	11.7		12.9	23.0		32.8	25.2	
Queue Delay	0.0	0.1		0.7	1.3		0.0	0.0		5.2	0.0	
Total Delay	49.9	49.2		28.4	13.0		12.9	23.0		38.0	25.2	
LOS	D	D		C	B		B	C		D	C	
Approach Delay		49.5			15.5			22.8			26.3	
Approach LOS		D			B			C			C	
Queue Length 50th (ft)	111	110		13	0		5	461		62	725	
Queue Length 95th (ft)	185	181		m23	m0		14	590		148	#1026	

Lane Group	ø9	ø10
Lane Configurations		
Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	9	10
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	4.0	4.0
Minimum Split (s)	20.0	20.0
Total Split (s)	20.0	20.0
Total Split (%)	14%	14%
Maximum Green (s)	16.0	16.0
Yellow Time (s)	3.5	3.5
All-Red Time (s)	0.5	0.5
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes
Vehicle Extension (s)	3.0	3.0
Recall Mode	Min	None
Walk Time (s)	5.0	5.0
Flash Dont Walk (s)	11.0	11.0
Pedestrian Calls (#/hr)	0	0
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		454			29			481			236	
Turn Bay Length (ft)	100			80			200			200		
Base Capacity (vph)	439	447		439	495		104	1951		299	2212	
Starvation Cap Reductn	0	0		256	142		0	0		0	0	
Spillback Cap Reductn	0	40		0	0		0	0		62	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.32	0.35		0.21	0.58		0.26	0.76		0.80	0.92	

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 127			
Natural Cycle: 140			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.92			
Intersection Signal Delay: 26.0		Intersection LOS: C	
Intersection Capacity Utilization 89.2%		ICU Level of Service E	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.
! Phase conflict between lane groups.

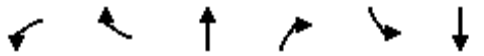
Splits and Phases: 3: Southwest Dr (Hwy 49) & Kellers Chapel Rd

Lane Group	ø9	ø10
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	14	21	1638	27	20	2018
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0	0		0	200	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Satd. Flow (prot)	1560	0	3254	0	1646	3260
Flt Permitted	0.981				0.950	
Satd. Flow (perm)	1560	0	3254	0	1646	3260
Link Speed (mph)	30		50			50
Link Distance (ft)	208		316			318
Travel Time (s)	4.7		4.3			4.3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	2%	1%	1%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	38	0	1809	0	22	2193
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 70.6%		ICU Level of Service C	
Analysis Period (min) 15			



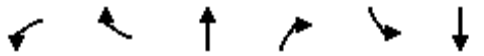
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	14	21	1638	27	20	2018
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	23	1780	29	22	2193
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			316			1097
pX, platoon unblocked	0.36	0.66			0.66	
vC, conflicting volume	2935	905			1810	
vC1, stage 1 conf vol	1795					
vC2, stage 2 conf vol	1140					
vCu, unblocked vol	0	0			1207	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	97			94	
cM capacity (veh/h)	346	722			385	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	38	1187	623	22	1097	1097
Volume Left	15	0	0	22	0	0
Volume Right	23	0	29	0	0	0
cSH	503	1700	1700	385	1700	1700
Volume to Capacity	0.08	0.70	0.37	0.06	0.65	0.65
Queue Length 95th (ft)	6	0	0	4	0	0
Control Delay (s)	12.7	0.0	0.0	14.9	0.0	0.0
Lane LOS	B			B		
Approach Delay (s)	12.7	0.0		0.1		
Approach LOS	B					

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	70.6%	ICU Level of Service	C
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	35	57	1627	34	51	2005
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0	0		0	120	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25				25	
Satd. Flow (prot)	1646	1473	3251	0	1646	3260
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1646	1473	3251	0	1646	3260
Link Speed (mph)	30		50			50
Link Distance (ft)	211		318			287
Travel Time (s)	4.8		4.3			3.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	2%	1%	1%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	38	62	1805	0	55	2179
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 70.2%		ICU Level of Service C	
Analysis Period (min) 15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	35	57	1627	34	51	2005
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	62	1768	37	55	2179
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			634			779
pX, platoon unblocked	0.34	0.67			0.67	
vC, conflicting volume	2988	903			1805	
vC1, stage 1 conf vol	1787					
vC2, stage 2 conf vol	1201					
vCu, unblocked vol	0	0			1204	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	87	91			86	
cM capacity (veh/h)	300	723			386	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	38	62	1179	626	55	1090	1090
Volume Left	38	0	0	0	55	0	0
Volume Right	0	62	0	37	0	0	0
cSH	300	723	1700	1700	386	1700	1700
Volume to Capacity	0.13	0.09	0.69	0.37	0.14	0.64	0.64
Queue Length 95th (ft)	11	7	0	0	12	0	0
Control Delay (s)	18.7	10.4	0.0	0.0	15.9	0.0	0.0
Lane LOS	C	B			C		
Approach Delay (s)	13.6		0.0		0.4		
Approach LOS	B						

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	70.2%	ICU Level of Service	C
Analysis Period (min)	15		

Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Volume (vph)	2165	20	20	2677	14	21
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)		0	120		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Satd. Flow (prot)	3257	0	1646	3260	1560	0
Flt Permitted			0.950		0.981	
Satd. Flow (perm)	3257	0	1646	3260	1560	0
Link Speed (mph)	50			50	30	
Link Distance (ft)	288			204	182	
Travel Time (s)	3.9			2.8	4.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	1%	1%	2%	1%	1%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2375	0	22	2910	38	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 90.3%		ICU Level of Service E	
Analysis Period (min) 15			

Movement	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Volume (veh/h)	2165	20	20	2677	14	21
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2353	22	22	2910	15	23
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)	1209			204		
pX, platoon unblocked			0.67		0.30	0.67
vC, conflicting volume			2375		3862	1188
vC1, stage 1 conf vol					2364	
vC2, stage 2 conf vol					1498	
vCu, unblocked vol			2071		997	306
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			88		73	95
cM capacity (veh/h)			181		56	466

Direction, Lane #	NB 1	NB 2	SB 1	SB 2	SB 3	NW 1
Volume Total	1569	806	22	1455	1455	38
Volume Left	0	0	22	0	0	15
Volume Right	0	22	0	0	0	23
cSH	1700	1700	181	1700	1700	119
Volume to Capacity	0.92	0.47	0.12	0.86	0.86	0.32
Queue Length 95th (ft)	0	0	10	0	0	31
Control Delay (s)	0.0	0.0	27.6	0.0	0.0	48.7
Lane LOS			D			E
Approach Delay (s)	0.0		0.2			48.7
Approach LOS						E

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	90.3%	ICU Level of Service	E
Analysis Period (min)	15		

Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Volume (vph)	2115	80	94	2605	106	113
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)		0	200		100	0
Storage Lanes		0	1		2	1
Taper Length (ft)			25		25	
Satd. Flow (prot)	3245	0	1646	3260	3193	1473
Flt Permitted			0.036		0.950	
Satd. Flow (perm)	3245	0	62	3260	3193	1473
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	8					75
Link Speed (mph)	50			50	30	
Link Distance (ft)	204			296	224	
Travel Time (s)	2.8			4.0	5.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	1%	1%	2%	1%	1%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2386	0	102	2832	115	123
Turn Type	NA		pm+pt	NA	NA	Perm
Protected Phases	2		1	6	8	
Permitted Phases			6			8
Detector Phase	2		1	6	8	8
Switch Phase						
Minimum Initial (s)	4.0		4.0	4.0	4.0	4.0
Minimum Split (s)	20.0		8.0	20.0	20.0	20.0
Total Split (s)	110.0		10.0	120.0	20.0	20.0
Total Split (%)	78.6%		7.1%	85.7%	14.3%	14.3%
Maximum Green (s)	106.0		6.0	116.0	16.0	16.0
Yellow Time (s)	3.5		3.5	3.5	3.5	3.5
All-Red Time (s)	0.5		0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	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)	5.0			5.0	5.0	5.0
Flash Dont Walk (s)	11.0			11.0	11.0	11.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	108.2		120.8	120.8	11.2	11.2
Actuated g/C Ratio	0.77		0.86	0.86	0.08	0.08
v/c Ratio	0.95		0.68	1.01	0.45	0.66
Control Delay	24.5		50.9	29.4	66.3	43.1
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	24.5		50.9	29.4	66.3	43.1
LOS	C		D	C	E	D
Approach Delay	24.5			30.2	54.3	
Approach LOS	C			C	D	
Queue Length 50th (ft)	913		42	~984	52	43

Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Queue Length 95th (ft)	#1277		#157	#1588	82	109
Internal Link Dist (ft)	124			216	144	
Turn Bay Length (ft)			200		100	
Base Capacity (vph)	2509		150	2812	364	234
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.95		0.68	1.01	0.32	0.53

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 140	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Natural Cycle: 150	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.01	
Intersection Signal Delay: 28.8	Intersection LOS: C
Intersection Capacity Utilization 88.2%	ICU Level of Service E
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 13: Southwest Dr & Collector E

Lane Group	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Volume (vph)	2194	20	20	2671	14	21
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)		0	120		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Satd. Flow (prot)	3257	0	1646	3260	1560	0
Flt Permitted			0.950		0.981	
Satd. Flow (perm)	3257	0	1646	3260	1560	0
Link Speed (mph)	50			50	30	
Link Distance (ft)	296			283	170	
Travel Time (s)	4.0			3.9	3.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	1%	1%	2%	1%	1%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2407	0	22	2903	38	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 90.2%		ICU Level of Service E	
Analysis Period (min) 15			

Movement	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Volume (veh/h)	2194	20	20	2671	14	21
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2385	22	22	2903	15	23
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)	296					
pX, platoon unblocked			0.24		0.24	0.24
vC, conflicting volume			2407		3891	1203
vC1, stage 1 conf vol					2396	
vC2, stage 2 conf vol					1495	
vCu, unblocked vol			492		6764	0
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			91		85	91
cM capacity (veh/h)			254		99	257

Direction, Lane #	NB 1	NB 2	SB 1	SB 2	SB 3	NW 1
Volume Total	1590	817	22	1452	1452	38
Volume Left	0	0	22	0	0	15
Volume Right	0	22	0	0	0	23
cSH	1700	1700	254	1700	1700	157
Volume to Capacity	0.94	0.48	0.09	0.85	0.85	0.24
Queue Length 95th (ft)	0	0	7	0	0	23
Control Delay (s)	0.0	0.0	20.5	0.0	0.0	35.2
Lane LOS			C			E
Approach Delay (s)	0.0		0.2			35.2
Approach LOS						E

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	90.2%	ICU Level of Service	E
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	ø1	ø2	ø4	ø5	ø6	ø8
Lane Configurations												
Volume (vph)	95	172	21	77	146	22						
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750						
Satd. Flow (prot)	1582	0	0	1714	1630	0						
Flt Permitted				0.910	0.958							
Satd. Flow (perm)	1582	0	0	1577	1630	0						
Right Turn on Red		Yes				Yes						
Satd. Flow (RTOR)	187				4							
Link Speed (mph)	30			30	30							
Link Distance (ft)	109			779	182							
Travel Time (s)	2.5			17.7	4.1							
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92						
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%						
Shared Lane Traffic (%)												
Lane Group Flow (vph)	290	0	0	107	183	0						
Turn Type	NA		Perm	NA	NA							
Protected Phases	6 10			6 10	9		1	2	4	5	6	8
Permitted Phases			6 10									
Detector Phase	6 10		6 10	6 10	9							
Switch Phase												
Minimum Initial (s)					4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)					20.0		8.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)					20.0		20.0	80.0	40.0	8.0	92.0	40.0
Total Split (%)					14.3%		14%	57%	29%	6%	66%	29%
Maximum Green (s)					16.0		16.0	76.0	36.0	4.0	88.0	36.0
Yellow Time (s)					3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)					0.5		0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)					0.0							
Total Lost Time (s)					4.0							
Lead/Lag					Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?					Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)					3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode					Min		None	Min	None	None	Min	None
Walk Time (s)					5.0			5.0	5.0		5.0	5.0
Flash Dont Walk (s)					11.0			11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)					0			0	0		0	0
Act Effct Green (s)	98.3			98.3	16.0							
Actuated g/C Ratio	0.77			0.77	0.13							
v/c Ratio	0.23			0.09	0.88							
Control Delay	2.4			4.1	91.3							
Queue Delay	1.7			0.0	2.6							
Total Delay	4.2			4.1	93.9							
LOS	A			A	F							
Approach Delay	4.2			4.1	93.9							
Approach LOS	A			A	F							
Queue Length 50th (ft)	3			21	151							
Queue Length 95th (ft)	m14			36	#297							
Internal Link Dist (ft)	29			699	102							
Turn Bay Length (ft)												

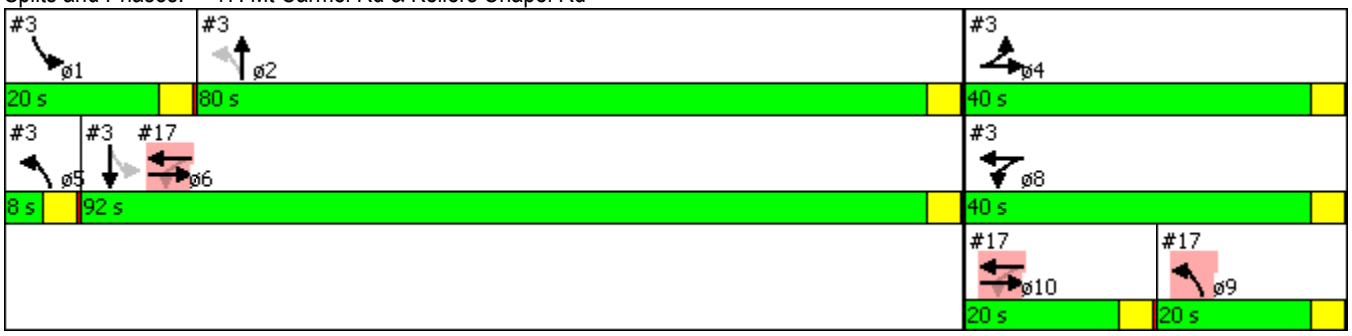
Lane Group	ø10
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	10
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	20.0
Total Split (s)	20.0
Total Split (%)	14%
Maximum Green (s)	16.0
Yellow Time (s)	3.5
All-Red Time (s)	0.5
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	ø1	ø2	ø4	ø5	ø6	ø8
Base Capacity (vph)	1374			1342	208							
Starvation Cap Reductn	903			0	0							
Spillback Cap Reductn	0			139	5							
Storage Cap Reductn	0			0	0							
Reduced v/c Ratio	0.62			0.09	0.90							

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 127			
Natural Cycle: 140			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.92			
Intersection Signal Delay: 32.5		Intersection LOS: C	
Intersection Capacity Utilization 41.1%		ICU Level of Service A	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 17: Mt Carmel Rd & Kellers Chapel Rd



Lane Group	ø10
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

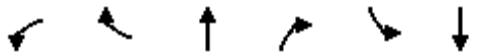
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	64	57	2172	47	67	2635
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0	0		0	150	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25				25	
Satd. Flow (prot)	1646	1473	3251	0	1646	3260
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1646	1473	3251	0	1646	3260
Link Speed (mph)	30		50			50
Link Distance (ft)	202		283			288
Travel Time (s)	4.6		3.9			3.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	2%	1%	1%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	70	62	2412	0	73	2864
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 89.6%		ICU Level of Service E	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	64	57	2172	47	67	2635
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	70	62	2361	51	73	2864
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			579			
pX, platoon unblocked	0.24	0.24			0.24	
vC, conflicting volume	3964	1206			2412	
vC1, stage 1 conf vol	2386					
vC2, stage 2 conf vol	1578					
vCu, unblocked vol	6955	0			588	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	13	77			70	
cM capacity (veh/h)	80	265			241	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	70	62	1574	838	73	1432	1432
Volume Left	70	0	0	0	73	0	0
Volume Right	0	62	0	51	0	0	0
cSH	80	265	1700	1700	241	1700	1700
Volume to Capacity	0.87	0.23	0.93	0.49	0.30	0.84	0.84
Queue Length 95th (ft)	112	22	0	0	31	0	0
Control Delay (s)	155.0	22.7	0.0	0.0	26.2	0.0	0.0
Lane LOS	F	C			D		
Approach Delay (s)	92.7		0.0		0.7		
Approach LOS	F						

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	89.6%	ICU Level of Service	E
Analysis Period (min)	15		



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	14	21	2208	13	20	2679
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (ft)	0	0		0	120	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Satd. Flow (prot)	1576	0	3257	0	1662	3260
Flt Permitted	0.981				0.950	
Satd. Flow (perm)	1576	0	3257	0	1662	3260
Link Speed (mph)	30		50			50
Link Distance (ft)	142		288			335
Travel Time (s)	3.2		3.9			4.6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	38	0	2414	0	22	2912
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 90.4%		ICU Level of Service E	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	14	21	2208	13	20	2679
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	23	2400	14	22	2912
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			867			
pX, platoon unblocked	0.25	0.25			0.25	
vC, conflicting volume	3907	1207			2414	
vC1, stage 1 conf vol	2407					
vC2, stage 2 conf vol	1499					
vCu, unblocked vol	6593	0			678	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	83	92			91	
cM capacity (veh/h)	90	275			233	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	38	1600	814	22	1456	1456
Volume Left	15	0	0	22	0	0
Volume Right	23	0	14	0	0	0
cSH	150	1700	1700	233	1700	1700
Volume to Capacity	0.25	0.94	0.48	0.09	0.86	0.86
Queue Length 95th (ft)	24	0	0	8	0	0
Control Delay (s)	36.8	0.0	0.0	22.0	0.0	0.0
Lane LOS	E			C		
Approach Delay (s)	36.8	0.0		0.2		
Approach LOS	E					

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	90.4%	ICU Level of Service	E
Analysis Period (min)	15		

PETERS & ASSOCIATES
ENGINEERS, INC.

Traffic Signal Warrants and Results

CHAPTER 4C. TRAFFIC CONTROL SIGNAL NEEDS STUDIES

Section 4C.01 Studies and Factors for Justifying Traffic Control Signals

Standard:

01 **An engineering study of traffic conditions, pedestrian characteristics, and physical characteristics of the location shall be performed to determine whether installation of a traffic control signal is justified at a particular location.**

02 **The investigation of the need for a traffic control signal shall include an analysis of factors related to the existing operation and safety at the study location and the potential to improve these conditions, and the applicable factors contained in the following traffic signal warrants:**

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

03 **The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.**

Support:

04 Sections 8C.09 and 8C.10 contain information regarding the use of traffic control signals instead of gates and/or flashing-light signals at highway-rail grade crossings and highway-light rail transit grade crossings, respectively.

Guidance:

05 *A traffic control signal should not be installed unless one or more of the factors described in this Chapter are met.*

06 *A traffic control signal should not be installed unless an engineering study indicates that installing a traffic control signal will improve the overall safety and/or operation of the intersection.*

07 *A traffic control signal should not be installed if it will seriously disrupt progressive traffic flow.*

08 *The study should consider the effects of the right-turn vehicles from the minor-street approaches. Engineering judgment should be used to determine what, if any, portion of the right-turn traffic is subtracted from the minor-street traffic count when evaluating the count against the signal warrants listed in Paragraph 2.*

09 *Engineering judgment should also be used in applying various traffic signal warrants to cases where approaches consist of one lane plus one left-turn or right-turn lane. The site-specific traffic characteristics should dictate whether an approach is considered as one lane or two lanes. For example, for an approach with one lane for through and right-turning traffic plus a left-turn lane, if engineering judgment indicates that it should be considered a one-lane approach because the traffic using the left-turn lane is minor, the total traffic volume approaching the intersection should be applied against the signal warrants as a one-lane approach. The approach should be considered two lanes if approximately half of the traffic on the approach turns left and the left-turn lane is of sufficient length to accommodate all left-turn vehicles.*

10 *Similar engineering judgment and rationale should be applied to a street approach with one through/left-turn lane plus a right-turn lane. In this case, the degree of conflict of minor-street right-turn traffic with traffic on the major street should be considered. Thus, right-turn traffic should not be included in the minor-street volume if the movement enters the major street with minimal conflict. The approach should be evaluated as a one-lane approach with only the traffic volume in the through/left-turn lane considered.*

11 *At a location that is under development or construction and where it is not possible to obtain a traffic count that would represent future traffic conditions, hourly volumes should be estimated as part of an engineering study for comparison with traffic signal warrants. Except for locations where the engineering study uses the satisfaction of Warrant 8 to justify a signal, a traffic control signal installed under projected conditions should have an engineering study done within 1 year of putting the signal into stop-and-go operation to determine if the signal is justified. If not justified, the signal should be taken out of stop-and-go operation or removed.*

12 *For signal warrant analysis, a location with a wide median, even if the median width is greater than 30 feet, should be considered as one intersection.*

Option:

13 At an intersection with a high volume of left-turn traffic from the major street, the signal warrant analysis may be performed in a manner that considers the higher of the major-street left-turn volumes as the "minor-street" volume and the corresponding single direction of opposing traffic on the major street as the "major-street" volume.

14 For signal warrants requiring conditions to be present for a certain number of hours in order to be satisfied, any four sequential 15-minute periods may be considered as 1 hour if the separate 1-hour periods used in the warrant analysis do not overlap each other and both the major-street volume and the minor-street volume are for the same specific one-hour periods.

15 For signal warrant analysis, bicyclists may be counted as either vehicles or pedestrians.

Support:

16 When performing a signal warrant analysis, bicyclists riding in the street with other vehicular traffic are usually counted as vehicles and bicyclists who are clearly using pedestrian facilities are usually counted as pedestrians.

Option:

17 Engineering study data may include the following:

A. The number of vehicles entering the intersection in each hour from each approach during 12 hours of an average day. It is desirable that the hours selected contain the greatest percentage of the 24-hour traffic volume.
B. Vehicular volumes for each traffic movement from each approach, classified by vehicle type (heavy trucks, passenger cars and light trucks, public-transit vehicles, and, in some locations, bicycles), during each 15-minute period of the 2 hours in the morning and 2 hours in the afternoon during which total traffic entering the intersection is greatest.
C. Pedestrian volume counts on each crosswalk during the same periods as the vehicular counts in Item B and during hours of highest pedestrian volume. Where young, elderly, and/or persons with physical or visual disabilities need special consideration, the pedestrians and their crossing times may be classified by general observation.
D. Information about nearby facilities and activity centers that serve the young, elderly, and/or persons with disabilities, including requests from persons with disabilities for accessible crossing improvements at the location under study. These persons might not be adequately reflected in the pedestrian volume count if the absence of a signal restrains their mobility.
E. The posted or statutory speed limit or the 85th-percentile speed on the uncontrolled approaches to the location.
F. A condition diagram showing details of the physical layout, including such features as intersection geometrics, channelization, grades, sight-distance restrictions, transit stops and routes, parking conditions, pavement markings, roadway lighting, driveways, nearby railroad crossings, distance to nearest traffic control signals, utility poles and fixtures, and adjacent land use.
G. A collision diagram showing crash experience by type, location, direction of movement, severity, weather, time of day, date, and day of week for at least 1 year.

18 The following data, which are desirable for a more precise understanding of the operation of the intersection, may be obtained during the periods described in Item B of Paragraph 17:

A. Vehicle-hours of stopped time delay determined separately for each approach.
B. The number and distribution of acceptable gaps in vehicular traffic on the major street for entrance from the minor street.
C. The posted or statutory speed limit or the 85th-percentile speed on controlled approaches at a point near to the intersection but unaffected by the control.
D. Pedestrian delay time for at least two 30-minute peak pedestrian delay periods of an average weekday or like periods of a Saturday or Sunday.
E. Queue length on stop-controlled approaches.

Section 4C.02 Warrant 1, Eight-Hour Vehicular Volume

Support:

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

02 The Interruption of Continuous Traffic, Condition B, is intended for application at locations where Condition A is not satisfied and where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street.

03 It is intended that Warrant 1 be treated as a single warrant. If Condition A is satisfied, then Warrant 1 is satisfied and analyses of Condition B and the combination of Conditions A and B are not needed. Similarly, if Condition B is satisfied, then Warrant 1 is satisfied and an analysis of the combination of Conditions A and B is not needed.

Standard:

04 **The need for a traffic control signal shall be considered if an engineering study finds that one of the following conditions exist for each of any 8 hours of an average day:**

A. The vehicles per hour given in both of the 100 percent columns of Condition A in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; or

B. The vehicles per hour given in both of the 100 percent columns of Condition B in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.

In applying each condition the major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of these 8 hours.

Option:

05 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 70 percent columns in Table 4C-1 may be used in place of the 100 percent columns.

Guidance:

06 *The combination of Conditions A and B is intended for application at locations where Condition A is not satisfied and Condition B is not satisfied and should be applied only after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems.*

Standard:

07 **The need for a traffic control signal shall be considered if an engineering study finds that both of the following conditions exist for each of any 8 hours of an average day:**

A. The vehicles per hour given in both of the 80 percent columns of Condition A in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; and

B. The vehicles per hour given in both of the 80 percent columns of Condition B in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.

These major-street and minor-street volumes shall be for the same 8 hours for each condition; however, the 8 hours satisfied in Condition A shall not be required to be the same 8 hours satisfied in Condition B. On the minor street, the higher volume shall not be required to be on the same approach during each of the 8 hours.

Table 4C-1. Warrant 1, Eight-Hour Vehicular Volume

Condition A—Minimum Vehicular Volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%[a]	80%[b]	70%[c]	56%[d]	100%[a]	80%[b]	70%[c]	56%[d]
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

Condition B—Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%[a]	80%[b]	70%[c]	56%[d]	100%[a]	80%[b]	70%[c]	56%[d]
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

[a] Basic minimum hourly volume

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

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

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

Option:

08 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 56 percent columns in Table 4C-1 may be used in place of the 80 percent columns.

Section 4C.03 Warrant 2, Four-Hour Vehicular Volume

Support:

01 The Four-Hour Vehicular Volume signal warrant conditions are intended to be applied where the volume of intersecting traffic is the principal reason to consider installing a traffic control signal.

Standard:

02 **The need for a traffic control signal shall be considered if an engineering study finds that, for each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) all fall above the applicable curve in Figure 4C-1 for the existing combination of approach lanes. On the minor street, the higher volume shall not be required to be on the same approach during each of these 4 hours.**

Option:

03 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-2 may be used in place of Figure 4C-1.

Section 4C.04 Warrant 3, Peak Hour

Support:

01 The Peak Hour signal warrant is intended for use at a location where traffic conditions are such that for a minimum of 1 hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street.

Standard:

02 **This signal warrant shall be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.**

03 **The need for a traffic control signal shall be considered if an engineering study finds that the criteria in either of the following two categories are met:**

A. If all three of the following conditions exist for the same 1 hour (any four consecutive 15-minute periods) of an average day:

1. The total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equals or exceeds: 4 vehicle-hours for a one-lane approach or 5 vehicle-hours for a two-lane approach; and

2. The volume on the same minor-street approach (one direction only) equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes; and

3. The total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.

B. The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) for 1 hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve in Figure 4C-3 for the existing combination of approach lanes.

Option:

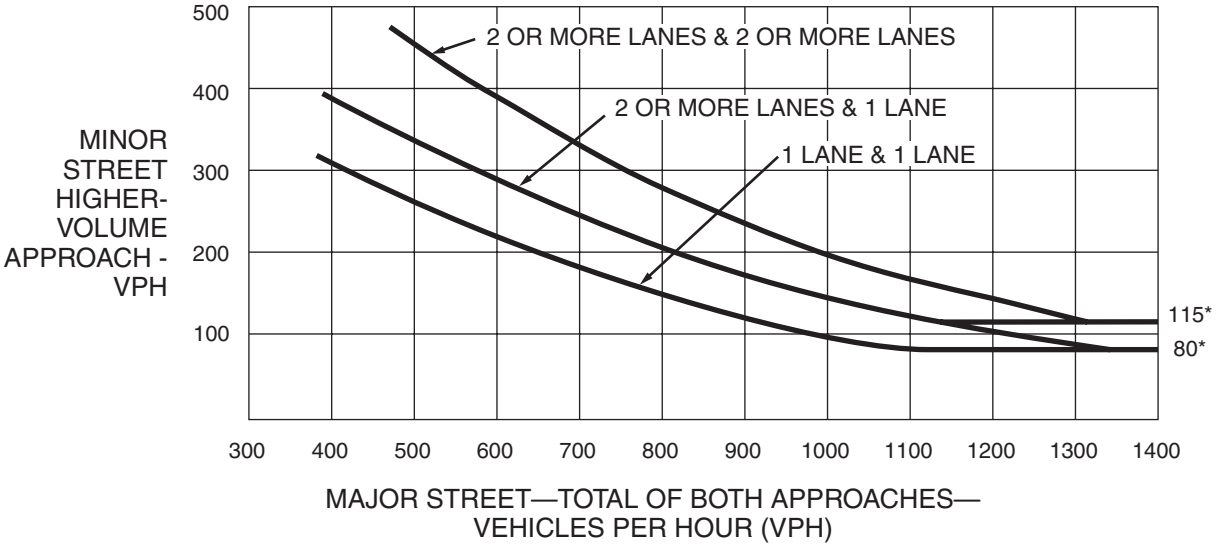
04 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-4 may be used in place of Figure 4C-3 to evaluate the criteria in the second category of the Standard.

05 If this warrant is the only warrant met and a traffic control signal is justified by an engineering study, the traffic control signal may be operated in the flashing mode during the hours that the volume criteria of this warrant are not met.

Guidance:

06 *If this warrant is the only warrant met and a traffic control signal is justified by an engineering study, the traffic control signal should be traffic-actuated.*

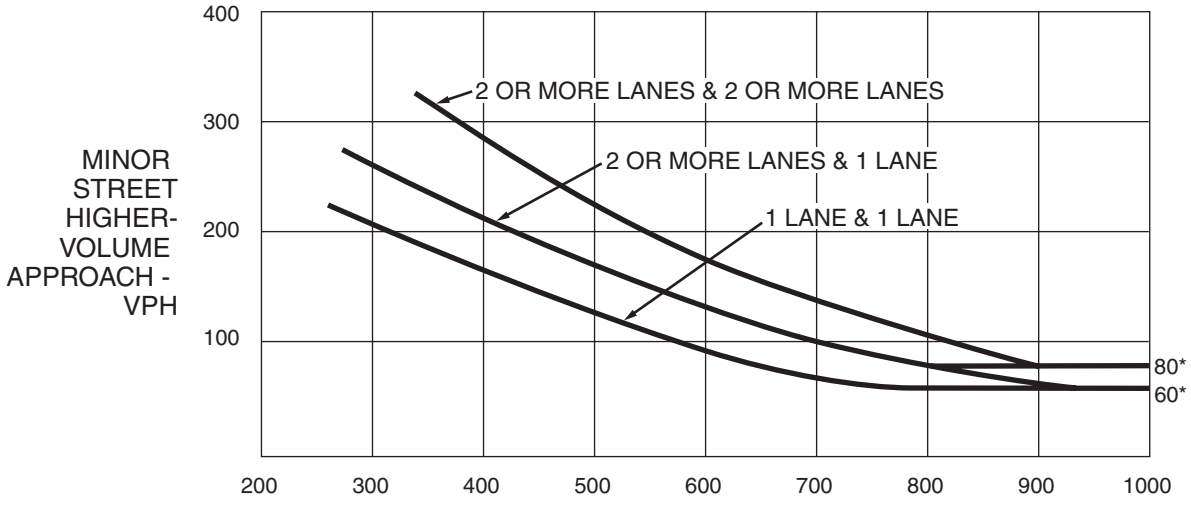
Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume



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

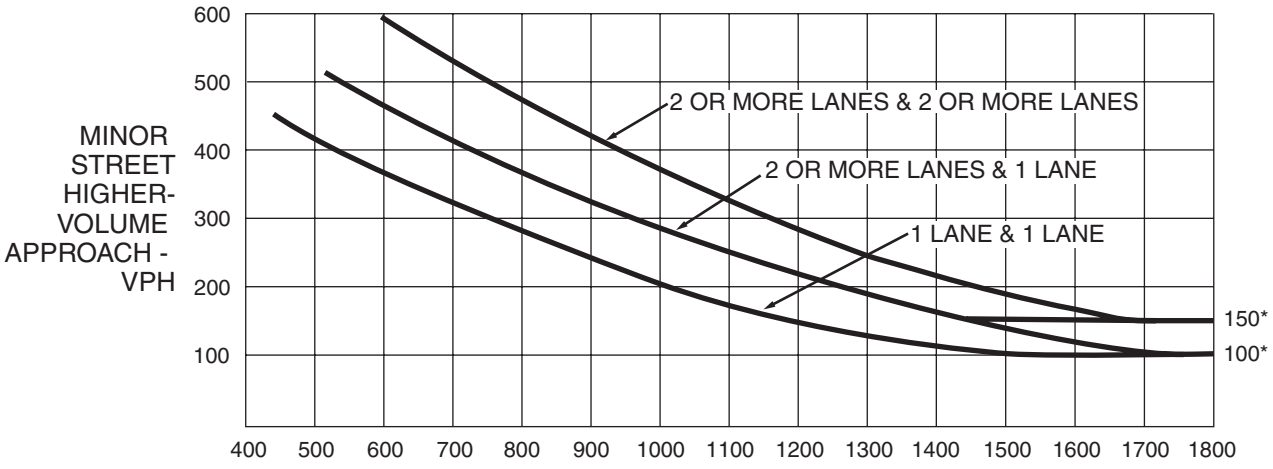
Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



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

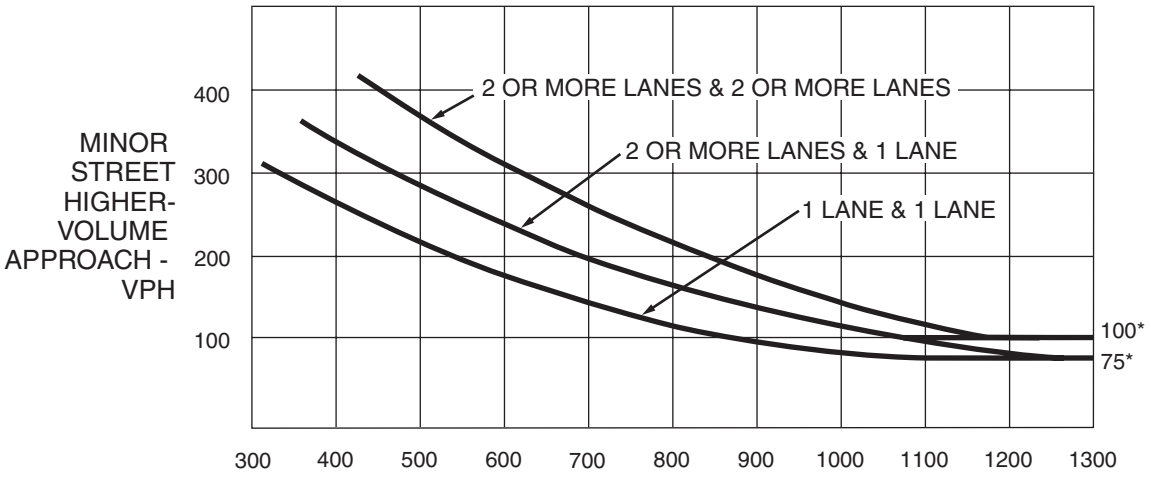
Figure 4C-3. Warrant 3, Peak Hour



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

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



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

Section 4C.05 Warrant 4, Pedestrian Volume

Support:

01 The Pedestrian Volume signal warrant is intended for application where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street.

Standard:

02 **The need for a traffic control signal at an intersection or midblock crossing shall be considered if an engineering study finds that one of the following criteria is met:**

- **A. For each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding pedestrians per hour crossing the major street (total of all crossings) all fall above the curve in Figure 4C-5; or**
- **B. For 1 hour (any four consecutive 15-minute periods) of an average day, the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding pedestrians per hour crossing the major street (total of all crossings) falls above the curve in Figure 4C-7.**

Option:

03 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 35 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-6 may be used in place of Figure 4C-5 to evaluate Criterion A in Paragraph 2, and Figure 4C-8 may be used in place of Figure 4C-7 to evaluate Criterion B in Paragraph 2.

Standard:

04 **The Pedestrian Volume signal warrant shall not be applied at locations where the distance to the nearest traffic control signal or STOP sign controlling the street that pedestrians desire to cross is less than 300 feet, unless the proposed traffic control signal will not restrict the progressive movement of traffic.**

05 **If this warrant is met and a traffic control signal is justified by an engineering study, the traffic control signal shall be equipped with pedestrian signal heads complying with the provisions set forth in Chapter 4E.**

Guidance:

06 *If this warrant is met and a traffic control signal is justified by an engineering study, then:*

- *A. If it is installed at an intersection or major driveway location, the traffic control signal should also control the minor-street or driveway traffic, should be traffic-actuated, and should include pedestrian detection.*
- *B. If it is installed at a non-intersection crossing, the traffic control signal should be installed at least 100 feet from side streets or driveways that are controlled by STOP or YIELD signs, and should be pedestrian-actuated. If the traffic control signal is installed at a non-intersection crossing, at least one of the signal faces should be over the traveled way for each approach, parking and other sight obstructions should be prohibited for at least 100 feet in advance of and at least 20 feet beyond the crosswalk or site accommodations should be made through curb extensions or other techniques to provide adequate sight distance, and the installation should include suitable standard signs and pavement markings.*
- *C. Furthermore, if it is installed within a signal system, the traffic control signal should be coordinated.*

Option:

07 The criterion for the pedestrian volume crossing the major street may be reduced as much as 50 percent if the 15th-percentile crossing speed of pedestrians is less than 3.5 feet per second.

08 A traffic control signal may not be needed at the study location if adjacent coordinated traffic control signals consistently provide gaps of adequate length for pedestrians to cross the street.

Section 4C.06 Warrant 5, School Crossing

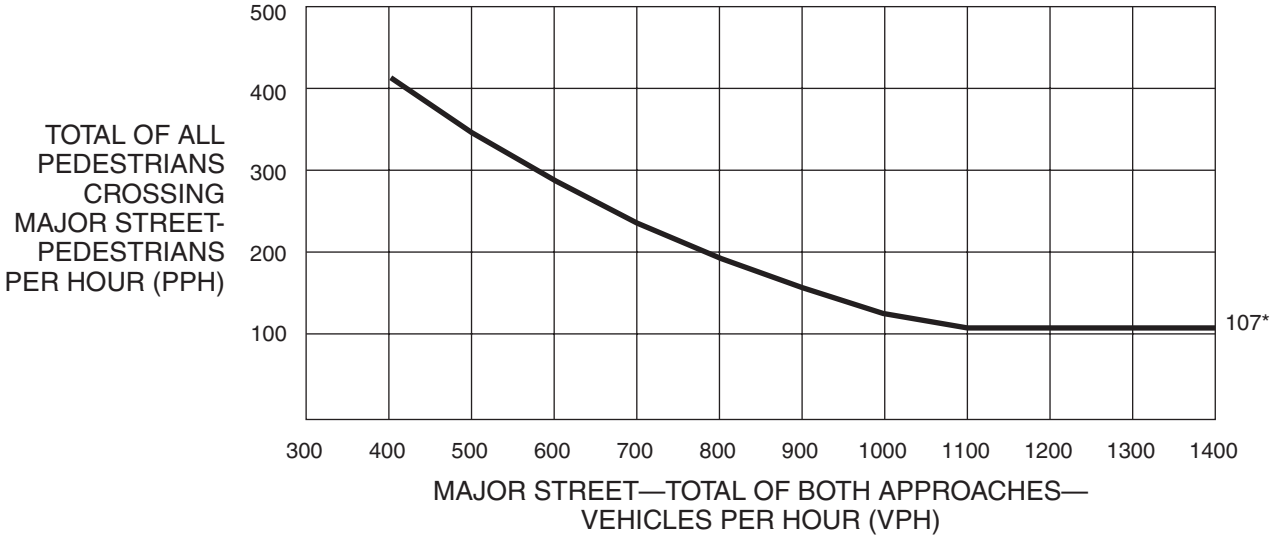
Support:

01 The School Crossing signal warrant is intended for application where the fact that schoolchildren cross the major street is the principal reason to consider installing a traffic control signal. For the purposes of this warrant, the word “schoolchildren” includes elementary through high school students.

Standard:

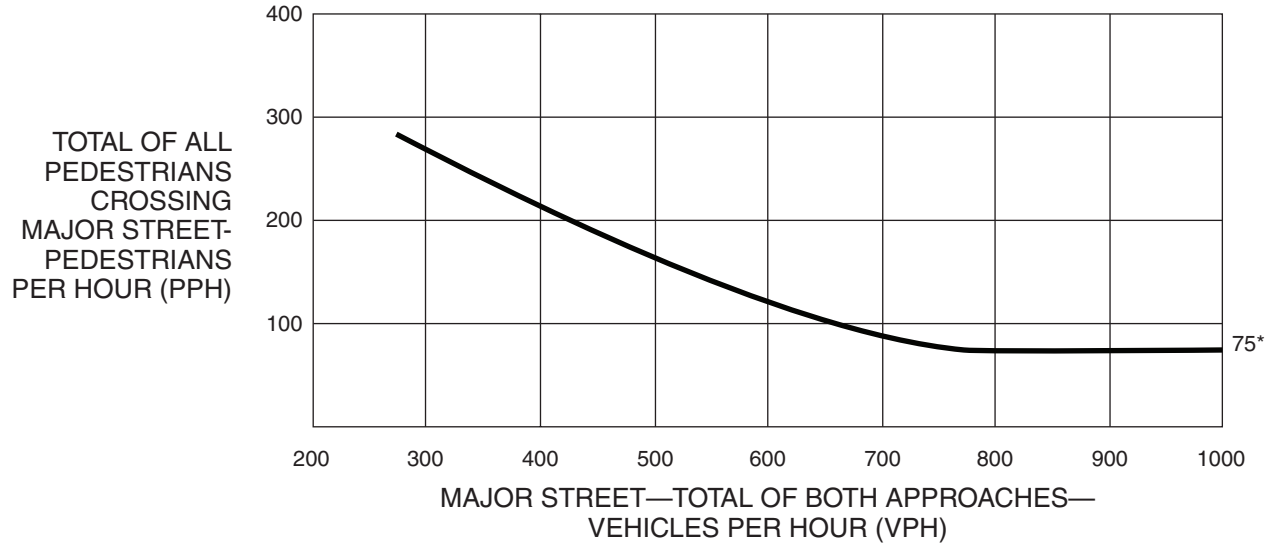
02 **The need for a traffic control signal shall be considered when an engineering study of the frequency and adequacy of gaps in the vehicular traffic stream as related to the number and size of groups of schoolchildren at an established school crossing across the major street shows that the number of adequate gaps in the traffic stream during the period when the schoolchildren are using the crossing is less than the number of minutes in the same period (see Section 7A.03) and there are a minimum of 20 schoolchildren during the highest crossing hour.**

Figure 4C-5. Warrant 4, Pedestrian Four-Hour Volume



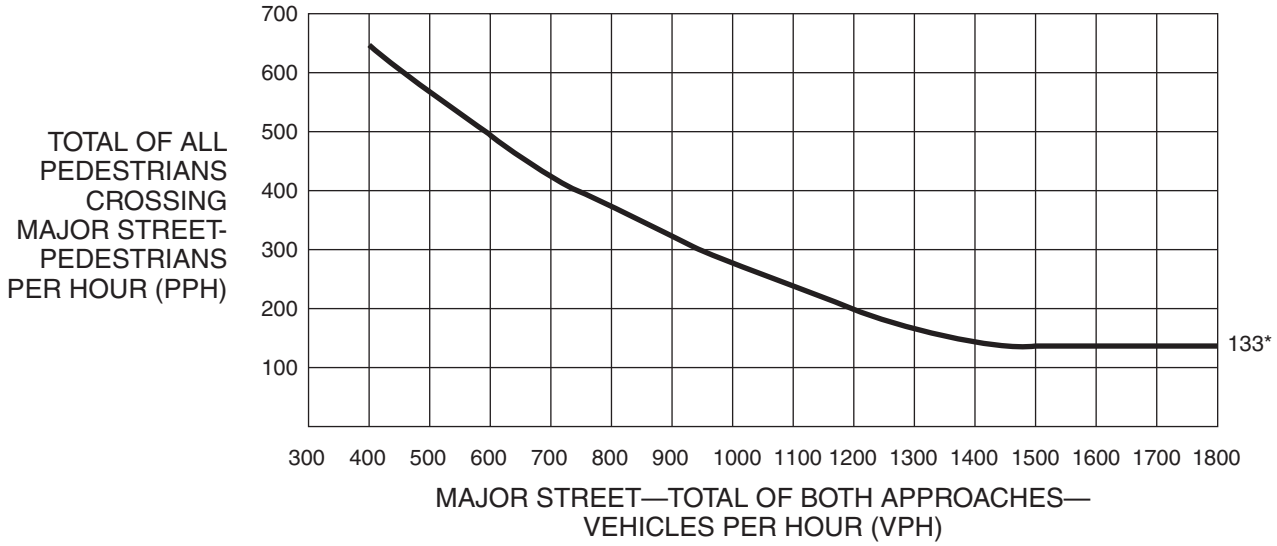
*Note: 107 pph applies as the lower threshold volume.

Figure 4C-6. Warrant 4, Pedestrian Four-Hour Volume (70% Factor)



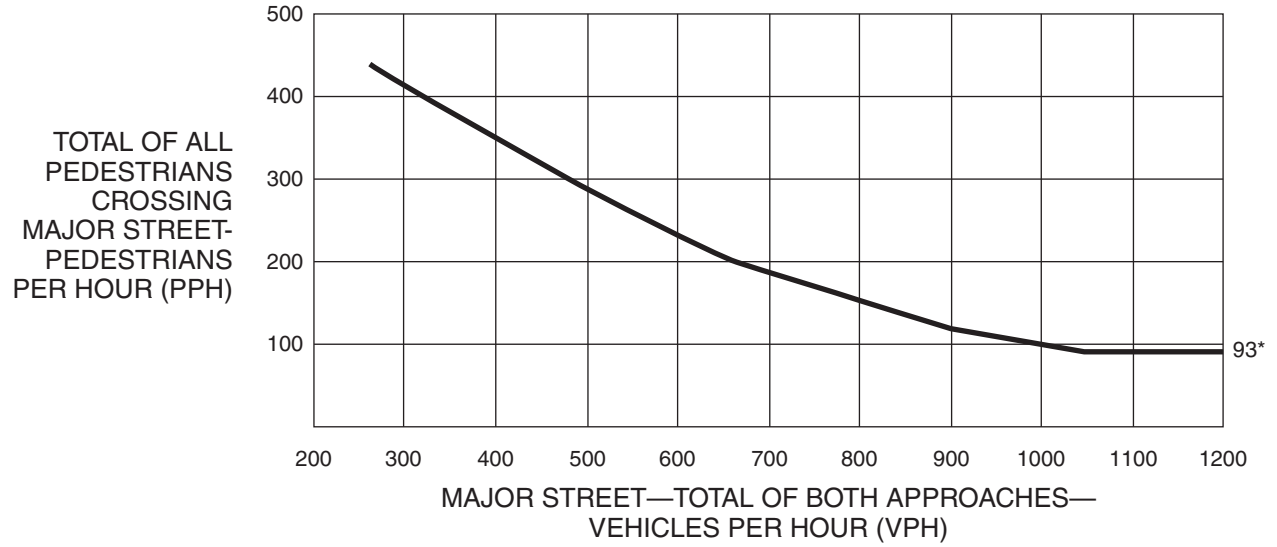
*Note: 75 pph applies as the lower threshold volume.

Figure 4C-7. Warrant 4, Pedestrian Peak Hour



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

Figure 4C-8. Warrant 4, Pedestrian Peak Hour (70% Factor)



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

03 **Before a decision is made to install a traffic control signal, consideration shall be given to the implementation of other remedial measures, such as warning signs and flashers, school speed zones, school crossing guards, or a grade-separated crossing.**

04 **The School Crossing signal warrant shall not be applied at locations where the distance to the nearest traffic control signal along the major street is less than 300 feet, unless the proposed traffic control signal will not restrict the progressive movement of traffic.**

Guidance:

05 *If this warrant is met and a traffic control signal is justified by an engineering study, then:*

A. If it is installed at an intersection or major driveway location, the traffic control signal should also control the minor-street or driveway traffic, should be traffic-actuated, and should include pedestrian detection.

B. If it is installed at a non-intersection crossing, the traffic control signal should be installed at least 100 feet from side streets or driveways that are controlled by STOP or YIELD signs, and should be pedestrian-actuated. If the traffic control signal is installed at a non-intersection crossing, at least one of the signal faces should be over the traveled way for each approach, parking and other sight obstructions should be prohibited for at least 100 feet in advance of and at least 20 feet beyond the crosswalk or site accommodations should be made through curb extensions or other techniques to provide adequate sight distance, and the installation should include suitable standard signs and pavement markings.

C. Furthermore, if it is installed within a signal system, the traffic control signal should be coordinated.

Section 4C.07 Warrant 6, Coordinated Signal System

Support:

01 Progressive movement in a coordinated signal system sometimes necessitates installing traffic control signals at intersections where they would not otherwise be needed in order to maintain proper platooning of vehicles.

Standard:

02 **The need for a traffic control signal shall be considered if an engineering study finds that one of the following criteria is met:**

A. On a one-way street or a street that has traffic predominantly in one direction, the adjacent traffic control signals are so far apart that they do not provide the necessary degree of vehicular platooning.

B. On a two-way street, adjacent traffic control signals do not provide the necessary degree of platooning and the proposed and adjacent traffic control signals will collectively provide a progressive operation.

Guidance:

03 *The Coordinated Signal System signal warrant should not be applied where the resultant spacing of traffic control signals would be less than 1,000 feet.*

Section 4C.08 Warrant 7, Crash Experience

Support:

01 The Crash Experience signal warrant conditions are intended for application where the severity and frequency of crashes are the principal reasons to consider installing a traffic control signal.

Standard:

02 **The need for a traffic control signal shall be considered if an engineering study finds that all of the following criteria are met:**

A. Adequate trial of alternatives with satisfactory observance and enforcement has failed to reduce the crash frequency; and

B. Five or more reported crashes, of types susceptible to correction by a traffic control signal, have occurred within a 12-month period, each crash involving personal injury or property damage apparently exceeding the applicable requirements for a reportable crash; and

C. For each of any 8 hours of an average day, the vehicles per hour (vph) given in both of the 80 percent columns of Condition A in Table 4C-1 (see Section 4C.02), or the vph in both of the 80 percent columns of Condition B in Table 4C-1 exists on the major-street and the higher-volume minor-street approach, respectively, to the intersection, or the volume of pedestrian traffic is not less than 80 percent of the requirements specified in the Pedestrian Volume warrant. These major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of the 8 hours.

Option:

03 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 56 percent columns in Table 4C-1 may be used in place of the 80 percent columns.

Section 4C.09 Warrant 8, Roadway Network

Support:

01 Installing a traffic control signal at some intersections might be justified to encourage concentration and organization of traffic flow on a roadway network.

Standard:

02 **The need for a traffic control signal shall be considered if an engineering study finds that the common intersection of two or more major routes meets one or both of the following criteria:**

- **A. The intersection has a total existing, or immediately projected, entering volume of at least 1,000 vehicles per hour during the peak hour of a typical weekday and has 5-year projected traffic volumes, based on an engineering study, that meet one or more of Warrants 1, 2, and 3 during an average weekday; or**
- **B. The intersection has a total existing or immediately projected entering volume of at least 1,000 vehicles per hour for each of any 5 hours of a non-normal business day (Saturday or Sunday).**

03 **A major route as used in this signal warrant shall have at least one of the following characteristics:**

- **A. It is part of the street or highway system that serves as the principal roadway network for through traffic flow.**
- **B. It includes rural or suburban highways outside, entering, or traversing a city.**
- **C. It appears as a major route on an official plan, such as a major street plan in an urban area traffic and transportation study.**

Section 4C.10 Warrant 9, Intersection Near a Grade Crossing

Support:

01 The Intersection Near a Grade Crossing signal warrant is intended for use at a location where none of the conditions described in the other eight traffic signal warrants are met, but the proximity to the intersection of a grade crossing on an intersection approach controlled by a STOP or YIELD sign is the principal reason to consider installing a traffic control signal.

Guidance:

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

- *A. Providing additional pavement that would enable vehicles to clear the track or that would provide space for an evasive maneuver, or*
- *B. Reassigning the stop controls at the intersection to make the approach across the track a non-stopping approach.*

Standard:

03 **The need for a traffic control signal shall be considered if an engineering study finds that both of the following criteria are met:**

- **A. A grade crossing exists on an approach controlled by a STOP or YIELD sign and the center of the track nearest to the intersection is within 140 feet of the stop line or yield line on the approach; and**
- **B. During the highest traffic volume hour during which rail traffic uses the crossing, the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the minor-street approach that crosses the track (one direction only, approaching the intersection) falls above the applicable curve in Figure 4C-9 or 4C-10 for the existing combination of approach lanes over the track and the distance D, which is the clear storage distance as defined in Section 1A.13.**

Guidance:

04 *The following considerations apply when plotting the traffic volume data on Figure 4C-9 or 4C-10:*

- *A. Figure 4C-9 should be used if there is only one lane approaching the intersection at the track crossing location and Figure 4C-10 should be used if there are two or more lanes approaching the intersection at the track crossing location.*

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