SM ROCHA, LLC
TRAFFIC & TRANSPORTATION ENGINEERING

SMR Response
09/23/2026

August 18, 2026

Drew Balsick
Flying Horse Development
2138 Flying Horse Club Drive
Colorado Springs, Colorado 80921

RE: Flying Horse North Filing 8 / Transportation Memorandum
El Paso County, Colorado
SF2531

Dear Drew,

SM ROCHA, LLC is pleased to provide traffic generation information for the development entitled Flying Horse North Filing 8. This development is located near the southwest corner of Old Stagecoach Road and Black Forest Road in El Paso County, Colorado.

This information has been revised to address County Staff review comments made to the December 2025 version of this study regarding the addition of missing evaluation elements from Section B.2.4.D of the County's ECM, as well as in discussion of recommended improvements warranted by this development.

The intent of this analysis is to present traffic volumes likely generated by the proposed development, provide a traffic volume comparison to previous land use assumptions approved for the development site, and consider potential impacts to the adjacent roadway network. This letter also serves as an update to the Flying Horse North Major PUD Amendment Master Traffic Impact Study[1], and was prepared in accordance with Appendix B of El Paso County's Engineering Criteria Manual (ECM)[2].

please include the PCD File No.

PCD File No. added.

The following is a summary of analysis results.

Site Description and Access

Land for the development is currently vacant and surrounded by a mix of residential and recreational land uses. The proposed development is understood to entail the new construction of 50 single-family detached homes.

[1] Flying Horse North Major PUD Amendment: Master Traffic Impact Study, SM ROCHA, LLC, January 2026.
[2] El Paso County Engineering Criteria Manual, El Paso County, January 2025.

Proposed access to the development is general and provided via one full-movement access onto Old Stagecoach Road via Sandbagger Drive, and via the extension of Holmes Road north to Sandbagger Drive. Additional full-movement site access is proposed onto the Holmes Road extension via Par Court and Wedge Trail, each serving approximately seven to nine lots.

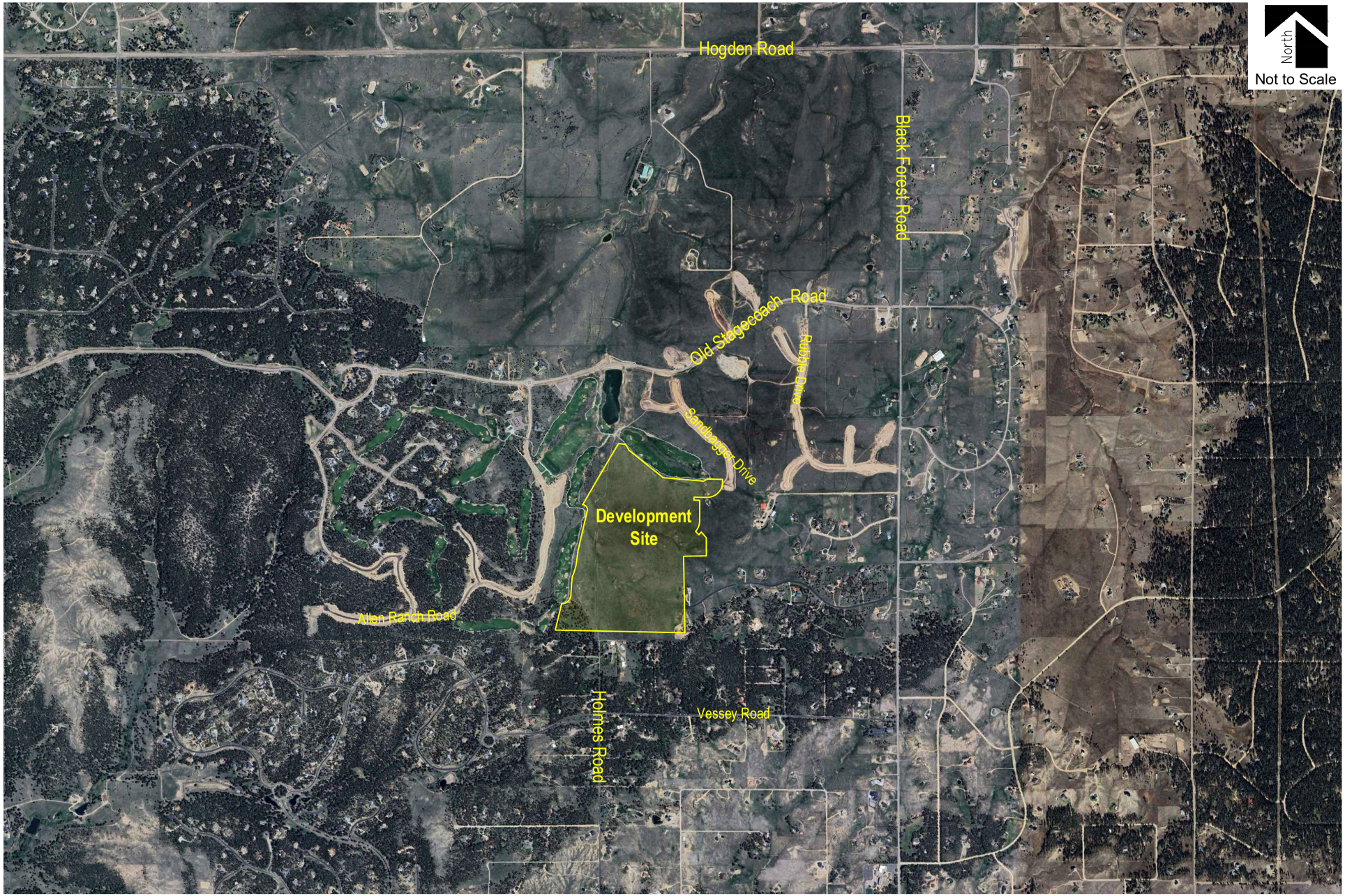
A conceptual sight distance exhibit illustrating approximate entering sight distance triangles is included for reference in Appendix C. This two-dimensional exhibit does not consider the potential for landscaping, utility, nor vertical curve obstructions, and were prepared in accordance to Table 2-35 of the County's ECM and Section 9.5.3.2 of the American Association of State Highway and Transportation Officials' (AASHTO) A Policy on Geometric Design of Highway and Streets (Green Book)[3], and is provided for illustrative purposes only.

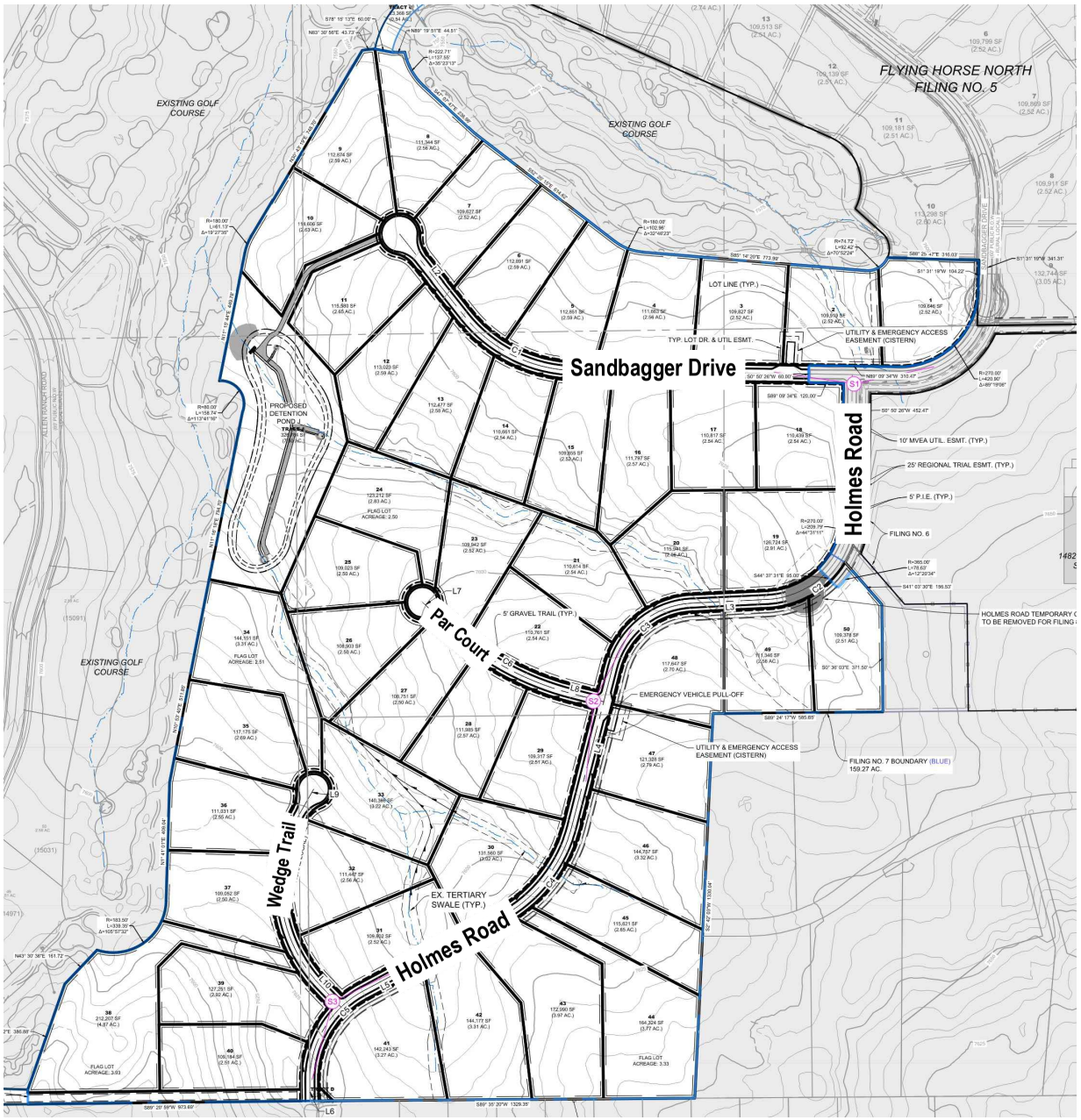
Please refer to the overall site plan for intersection sight distance requirements.

General site and access locations are shown on Figure 1.

An overall site plan, as prepared by HR Green, Inc., is shown on Figure 2. This plan is provided for illustrative purposes only.

[3] A Policy on Geometric Design of Highways and Streets (7th Edition), American Association of State Highway and Transportation Officials, 2018.


Hogden Road
Black Forest Road
Old Stagecoach Road
Ridge Blue
Sandhaven Drive
Development Site
Allen Ranch Road
Holmes Road
Vessey Road
North
Not to Scale



North
Not to Scale

FLYING HORSE NORTH FILING 8
Transportation Memorandum

SM ROCHA, LLC
Traffic & Transportation Engineering

Figure 2
OVERALL SITE PLAN

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Existing and Committed Surface Transportation Network

Within the study area, State Highway 83 is the primary roadway that will accommodate traffic to and from the proposed development. Secondary roadways include Hodgen Road, Black Forest Road, Shoup Road, Old Stagecoach Road, North Gate Boulevard, Ridge Run Drive, Shortwall Drive, Allen Ranch Road, Vessey Road, and Holmes Road. A brief description of each roadway, based on the County's Major Transportation Corridors Plan (MTCP)[4] and ECM, as well as the City's Major Thoroughfare Plan (MTP)[5] and the Hodgen Road Corridor Plan (Access Management Plan)[6], is provided below:

> State Highway 83 is a north-south, state-owned, principal arterial roadway having two to four through lanes (one to two lanes in each direction) with a combination of shared and exclusive turn lanes at the intersections within the study area. The Colorado Department of Transportation (CDOT) categorizes the adjacent segment of State Highway 83 as a Regional Highway (R-A) north of Old North Gate Road, and an Expressway, Major Bypass (E-X) south of Old North Gate Road. State Highway 83 provides posted speed limits of 55 to 60 MPH.
>
> Hodgen Road is an east-west, El Paso County-owned, rural minor arterial roadway having two through lanes (one lane in each direction) with a combination of shared and exclusive turn lanes at the intersections within the study area. Hodgen Road provides a posted speed limit of 55 MPH.
>
> It is noted that the Hodgen Road Corridor Plan did not consider future access along the south side of the roadway along this development frontage. However, considering that the proposed access onto Hodgen Road meets the one-quarter-mile access spacing for a minor arterial roadway per Section 2.3.2, Table 2-4 of the County's ECM and that the proposed development is residential, the proposed access location is believed to be appropriate.
>
> Black Forest Road is a north-south, El Paso County-owned, minor arterial roadway providing posted speed limits ranging from 40 to 45 MPH. Visual inspection of the roadway's existing conditions shows how Black Forest Road accommodates two through lanes (one lane in each direction) with shared turn lanes at the intersections within the study area.
>
> The County's MTCP declares how the study segment of Black Forest Road currently functions as an unimproved rural roadway with planned upgrades by 2045 to function as a two-lane minor arterial roadway. Comparison of the existing roadway conditions to Section 2.2.4 of the County's ECM concludes that Black Forest Road has a deficient cross-section per the County's typical rural minor arterial (two lane) design standards.

[4] El Paso County Major Transportation Corridors Plan (MTCP), Felsburg Holt & Ullevig, July 2024.
[5] City of Colorado Springs Major Thoroughfare Plan, City of Colorado Springs, Department of Public Works, June 2, 2022.
[6] Hodgen Road Corridor Plan, Access Management Plan, El Paso County, August 10, 2007.

Black Forest Road extends north of Hodgen Road as an unpaved private roadway, and continues its minor arterial classification as a public roadway north of Hodgen Road, offset approximately one-quarter mile to the east.

Ridge Run Drive is a north-south, El Paso County-owned, local roadway having two through lanes (one lane in each direction) with a combination of shared and exclusive turn lanes at the intersection within the study area. Ridge Run Drive does not provide a posted speed limit. However, per Section 2.3.2, Table 2-5 of the County's ECM, Ridge Run Drive is assumed to have a design speed limit of 30 MPH. Ridge Run Drive ends at Hodgen Road and continues north as Black Forest Road.

Shoup Road is an east-west, El Paso County-owned roadway having two through lanes (one lane in each direction) with a combination of shared and exclusive turn lanes at the intersections within the study area. The County's MTCP categorizes Shoup Road as a rural minor arterial roadway while the City's MTP categorizes Shoup Road as a principal arterial roadway. Shoup Road provides posted speed limits of 30 to 45 MPH, and ends at State Highway 83 creating a signalized T-intersection.

The County's MTCP further considers Shoup Road functioning as a rural, unimproved roadway nearing its deficiency. Existing daily traffic volumes suggest that Shoup Road is already deficient in its cross-section as the 6,000 vehicles-per-day threshold is exceeded. As a result, the County's MTCP indicates planned upgrades for Shoup Road to occur by 2045 to accommodate the County ECM's rural minor arterial (two lane) cross-section.

North Gate Boulevard is an east-west, City of Colorado Springs-owned roadway having four through lanes (two lanes in each direction) with exclusive turn lanes at the intersection within the study area. The City's MTP categorizes the adjacent segment of North Gate Boulevard as a principal arterial roadway and provides a posted speed limit of 40 MPH. The City's jurisdiction of North Gate Boulevard ends at State Highway 83 and continues east as a private roadway.

Old Stagecoach Road is an east-west, El Paso County-owned roadway having two through lanes (one lane in each direction) with a combination of shared and exclusive turn lanes at the intersections within the study area. The County's MTCP categorizes Old Stagecoach Road as a rural minor collector roadway. Old Stagecoach Road ends at Black Forest Road, continuing east as Terra Ridge Circle, and ends at Shortwall Drive, continuing west as Stagecoach Road with a minor collector roadway classification.

Shortwall Drive is a north-south roadway having two through lanes (one lane in each direction) with shared turn lanes at the intersection within the study area. Shortwall Drive provides a posted speed limit of 35 MPH and is unclassified in both the County's MTCP and the City's MTP. However, per Section 2.3.2, Table 2-5 of the County's ECM and the roadway's posted speed limit, Shortwall Drive has an existing classification as a rural minor collector roadway.

Allen Ranch Road is a north-south roadway having two through lanes (one lane in each direction) with shared turn lanes at the intersection within the study area. Allen Ranch Road is unclassified in both the County's MTCP and the City's MTP. However, per Section 2.2.4 of the County's ECM and the roadway's estimated ROW width, Allen Ranch Road has an existing classification as a rural local roadway with a design speed limit of 30 MPH.

Vessey Road is an east-west roadway having two through lanes (one lane in each direction) with no dedicated turn lanes at the intersections within the study area. Vessey Road provides a posted speed limit of 30 MPH and is unclassified in both the County's MTCP and the City's MTP. However, per Section 2.3.2, Table 2-5 of the County's ECM and the roadway's estimated ROW width, Vessey Road is classified as a local roadway east of Holmes Road.

rural Added

Holmes Road is a north-south roadway having two through lanes (one lane in each direction) with no dedicated turn lanes at the intersection within the study area. Holmes Road provides a posted speed limit of 15 MPH and is unclassified in both the County's MTCP and the City's MTP. However, per Section 2.3.2, Table 2-5 of the County's ECM and the roadway's estimated ROW width, Holmes Road is classified as a rural local roadway.

The study intersections of State Highway 83 with Shoup Road, North Gate Boulevard, and Hodgen Road, as well as the intersection of Black Forest Road with Shoup Road, are signalized. The Old Stagecoach Roach intersections with Shortwall Drive and Allen Ranch Road operate under roundabout-control conditions. All other study intersections operate under a stop-controlled condition. A stop-controlled intersection is defined as a roadway intersection where vehicle rights-of-way are controlled by one or more "STOP" signs.

Pursuant to discussions provided within the CO 83 Access Control Plan[7], State Highway 83 is envisioned to be widened from four to six through lanes from Shoup Road to Old North Gate Road and widened from two to four through lanes from Old North Gate Road to Hodgen Road. Additionally, the jogged alignment of Black Forest Road across Hodgen Road will be eliminated, allowing consistent alignment across the roadway. The County's MTCP describes these improvements as anticipated by Year 2045. As such, these improvements are assumed to occur by Year 2045 and therefore are not included within this analysis.

[7] CO 83 Access Control Plan, Atkins, October 2021.

Background Traffic – Year 2030

Background traffic is the traffic projected to be on area roadways without consideration of the proposed development. Background traffic includes traffic generated by development of vacant parcels in the area.

To account for projected increases in background traffic for Year 2030, traffic volumes from the approved Flying Horse North Major PUD Amendment Master Traffic Impact Study were referenced. The Master TIS had applied a conservative growth rate of three percent to existing traffic volumes pursuant to 20-year growth projections provided by the Colorado Department of Transportation's (CDOT) Online Transportation Information System (OTIS) as well as the Pike's Peak Area Council of Governments' (PPACG) 2045 Long Range Transportation Plan[8].

Referenced background traffic volumes from the Flying Horse North Major PUD Amendment Master TIS had also accounted for projected traffic from adjacent future developments not yet built, including those found within the Flying Horse Traffic Impact Study[9], the Flying Horse North Filing 4 Traffic Generation Analysis[10], and the Flying Horse North Filing 5 Traffic Generation Analysis[11].

As part of this development application, projected traffic volumes generated by Flying Horse North Filing 7[12] were also added to background traffic volumes.

The study area intersections and projected short-term background ADT volumes are shown on Figure 3. Projected background intersection traffic volumes and intersection geometry for Year 2030 are shown in Figure 4 and Figure 5, respectively.

[8] Moving Forward 2045: Pikes Peak Area Regional Transportation Plan, Pikes Peak Area Council of Governments, January 2020.
[9] Flying Horse: Traffic Impact Study, Galloway & Company, Inc., June 1, 2022.
[10] Flying Horse North Filing 4: Traffic Generation Analysis, SM ROCHA, LLC, February 2025.
[11] Flying Horse North Filing 5: Traffic Generation Analysis, SM ROCHA, LLC, November 2024.
[12] Flying Horse North Filing 7: Transportation Memorandum, SM ROCHA LLC, August 2026.

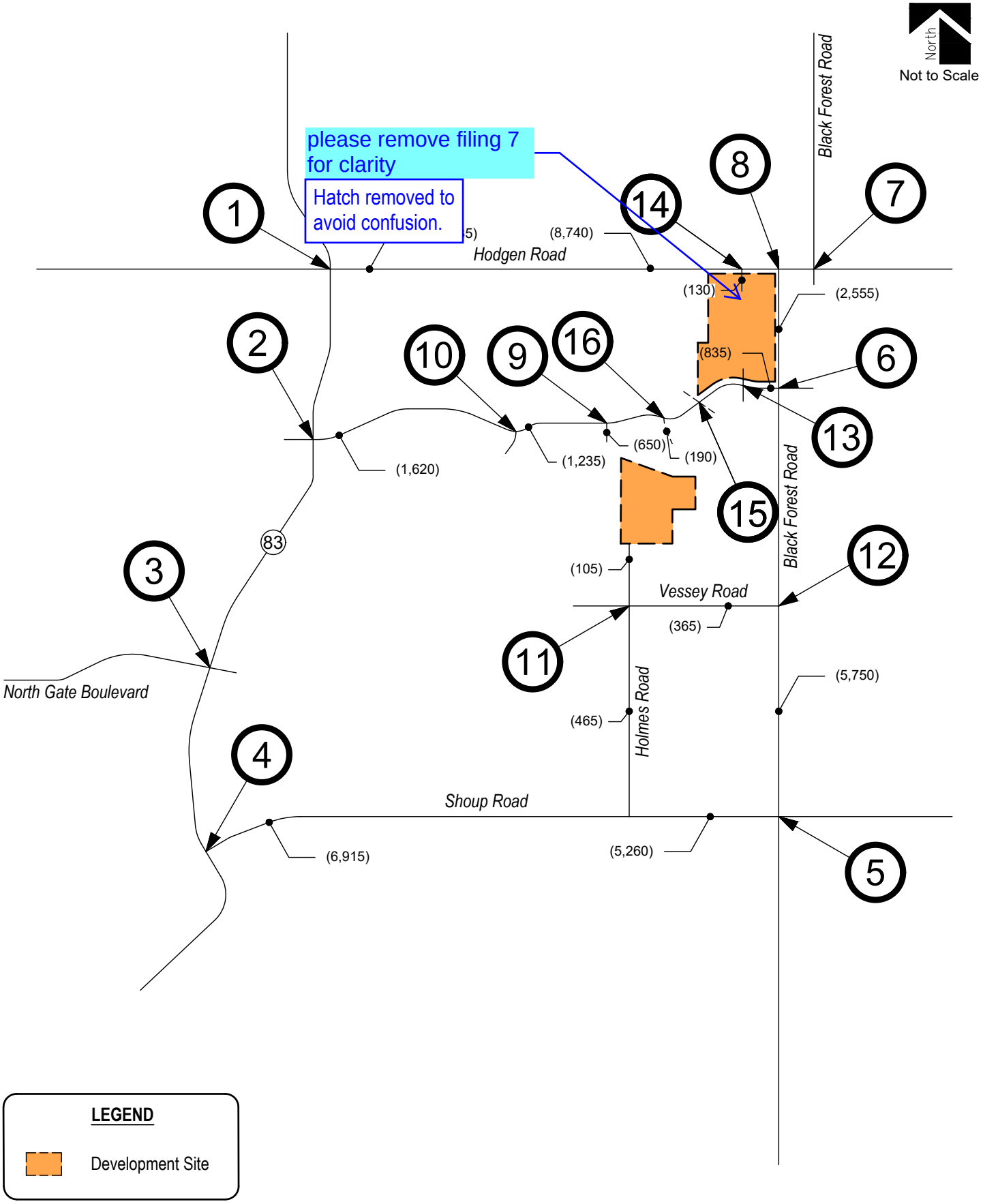


Figure 3
BACKGROUND TRAFFIC - YEAR 2030
(ADT) : Average Daily Traffic

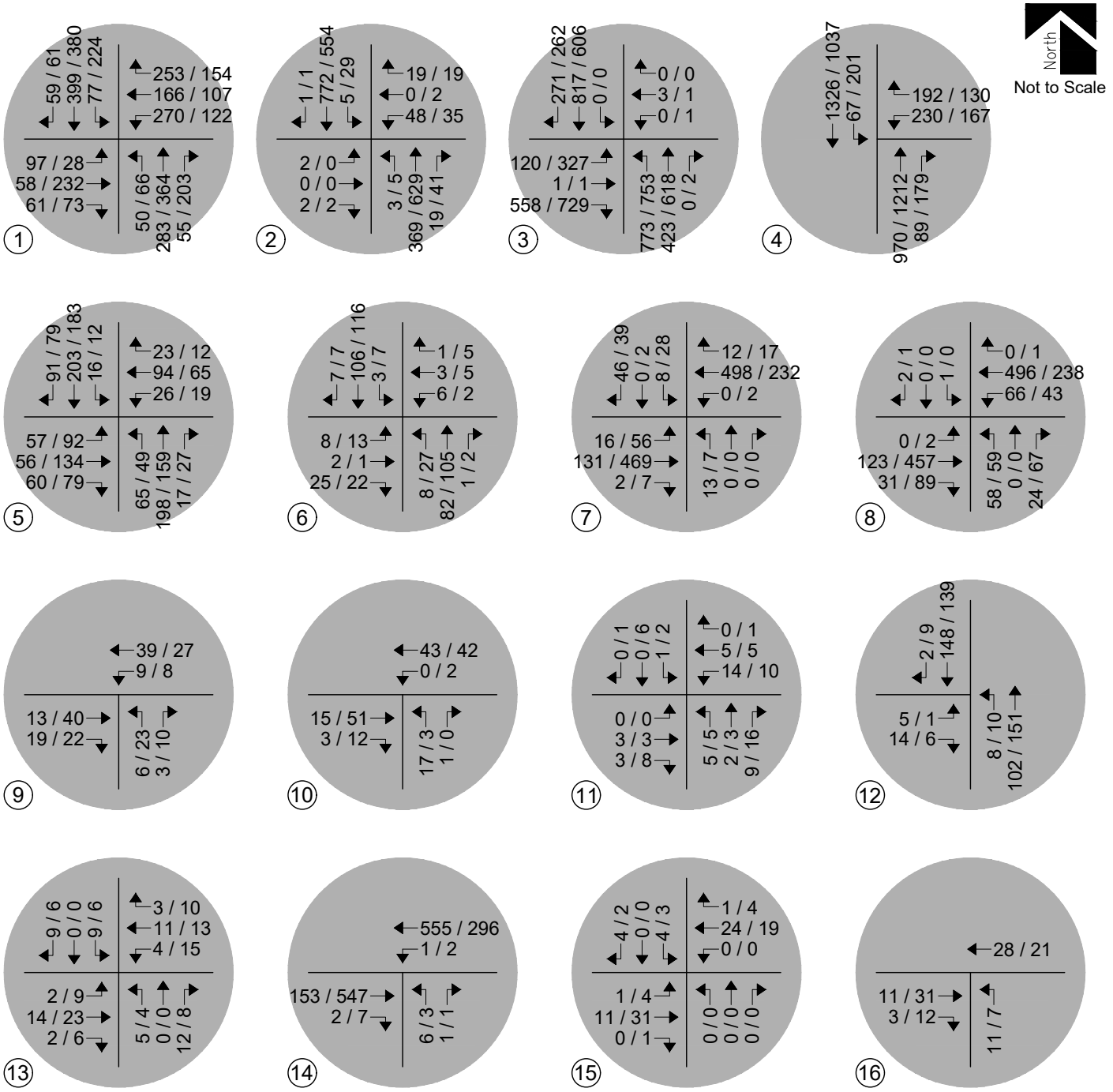
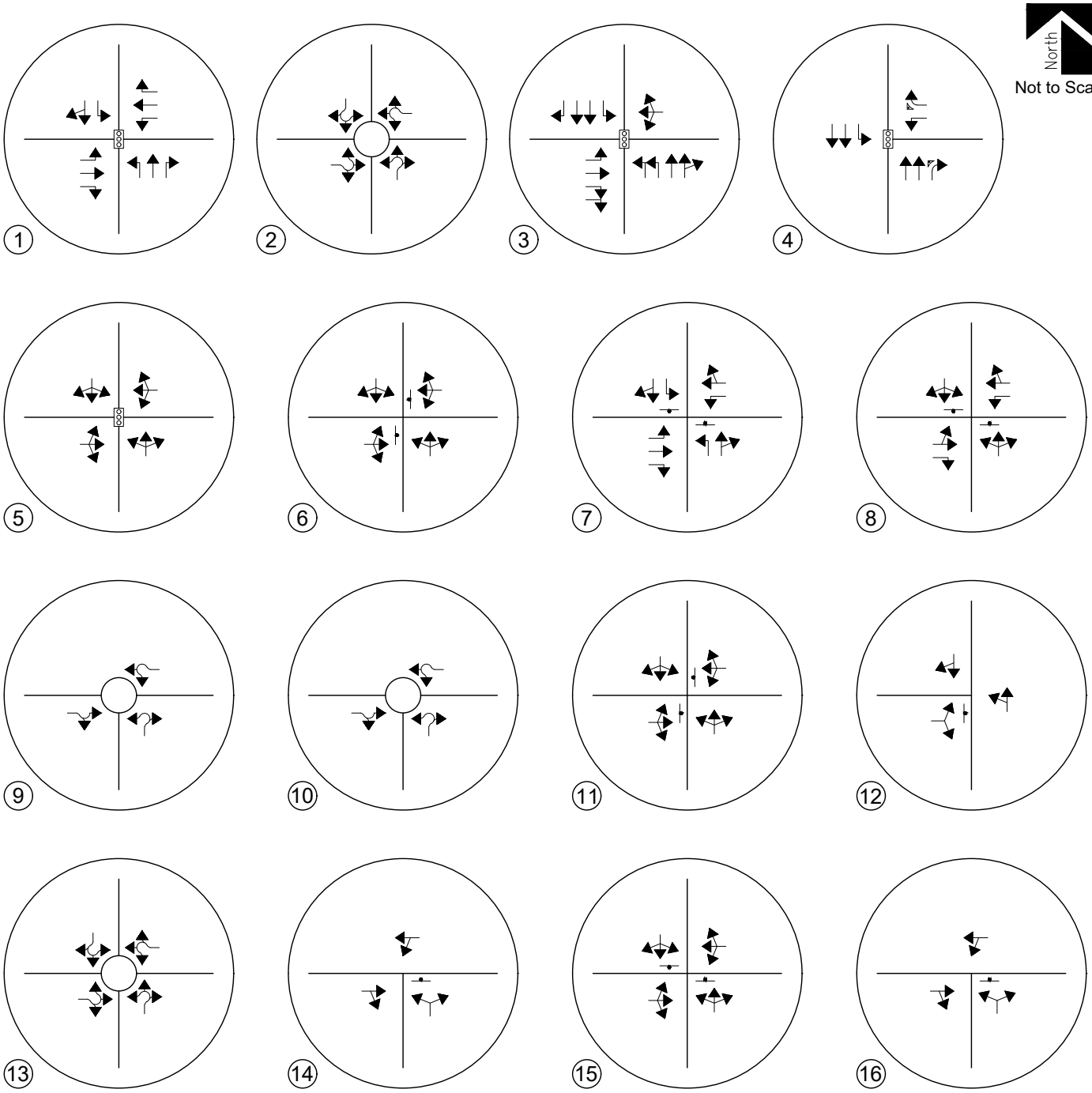


Figure 4
BACKGROUND TRAFFIC - YEAR 2030
Volumes
AM / PM Peak Hour



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Study Intersection Lane Geometry

Figure 5
BACKGROUND TRAFFIC - YEAR 2030
Intersection Geometry

Peak Hour Intersection Levels of Service – Background Traffic

The Signalized, Unsignalized, and Roundabout Intersection Analysis techniques, as published in the Highway Capacity Manual (HCM) by the Transportation Research Board and as incorporated into the SYNCHRO computer program, were used to analyze the study intersections for future traffic conditions. These nationally accepted techniques allow for the determination of intersection level of service (LOS) based on the congestion and delay of each traffic movement and based on the volume to capacity ratio and control delay for each approach.

Pursuant to Section B.4.1.A of the County's ECM, the design objective for each scenario of this study shall be level of service "D". Level of service is a method of measurement used by transportation professionals to quantify a driver's perception of travel conditions that include travel time, number of stops, and total amount of stopped delay experienced on a roadway network. The HCM categorizes level of service into a range from "A" which indicates little, if any, vehicle delay, to "F" which indicates a level of operation considered unacceptable to most drivers. These levels of service grades with brief descriptions of the operating condition, for unsignalized and signalized intersections, are included for reference in Appendix D and have been used throughout this study.

Background traffic level of service analysis results for Year 2030 are listed in Table 1.

Intersection capacity worksheets are provided in Appendix E.

Table 1 – Intersection Capacity Analysis Summary – Background Traffic – Year 2030

	INTERSECTION LANE GROUPS	LEVEL OF SERVICE AM PEAK HOUR	 PM PEAK HOUR
1	State Highway 83 / Hodgen Road (Signalized)	C (25.0)	B (18.8)
3	State Highway 83 / North Gate Boulevard (Signalized)	B (18.3)	C (22.6)
4	State Highway 83 / Shoup Road (Signalized)	B (15.2)	B (15.5)
5	Black Forest Road / Shoup Road (Signalized)	B (16.2)	C (21.9)
2	State Highway 83 / Stagecoach Road (Roundabout)		
	Eastbound Left, Through and Right	A	A
	Westbound Left, Through and Right	A	A
	Northbound Left, Through and Right	A	B
	Southbound Left, Through and Right	B	A
6	Black Forest Road / Old Stagecoach Road (Stop-Controlled)		
	Eastbound Left, Through and Right	B	B
	Westbound Left, Through and Right	B	B
	Northbound Left, Through and Right	A	A
	Southbound Left, Through and Right	A	A
7	Hodgen Road / Black Forest Road / Ridge Run Drive (Stop-Controlled)		
	Eastbound Left	A	A
	Westbound Left	A	A
	Northbound Left	C	C
	Nortbhound Through and Right	A	A
	Southbound Left	C	C
	Southbound Through and Right	B	B
8	Hodgen Road / Black Forest Road / Black Forrest Road (Stop-Controlled)		
	Eastbound Left and Through	A	A
	Westbound Left	A	A
	Northbound Left, Through and Right	C	C
	Southbound Left, Through and Right	B	A
9	Old Stagecoach Road / Allen Ranch Road (Roundabout)		
	Eastbound Through and Right	A	A
	Westbound Left and Through	A	A
	Northbound Left and Right	A	A
10	Old Stagecoach Road / Shortwall Drive (Roundabout)		
	Eastbound Through and Right	A	A
	Westbound Left and Through	A	A
	Northbound Left and Right	A	A

Key: Signalized Intersection: Level of Service (Control Delay in sec/veh)
Stop-Controlled Intersection: Level of Service
Roundabout Intersection: Level of Service

Table 1 (Cont'd)– Intersection Capacity Analysis Summary – Background Traffic – Year 2030

	INTERSECTION LANE GROUPS	LEVEL OF SERVICE AM PEAK HOUR	 PM PEAK HOUR
11	Vessey Road / Holmes Road (Stop-Controlled)		
	Eastbound Left,Through and Right	A	A
	Westbound Left, Through and Right	A	A
	Northbound Left, Through and Right	A	A
	Southbound Left, Through and Right	A	A
12	Black Forest Road / Vessey Road (Stop-Controlled)		
	Eastbound Left and Right	A	A
	Northbound Left and Through	A	A
13	Old Stagecoach Road / Rubble Drive (Roundabout)		
	Eastbound Left, Through and Right	A	A
	Westbound Left, Through and Right	A	A
	Northbound Left, Through and Right	A	A
	Southbound Left, Through and Right	A	A
14	Rubble Drive / Hodgen Road (Stop-Controlled)		
	Westbound Left and Through	A	A
	Northbound Left and Right	B	C
15	Old Stagecoach Road / Fringe Place / Park Access (Stop-Controlled)		
	Eastbound Left, Through and Right	A	A
	Westbound Left, Through and Right	A	A
	Northbound Left, Through and Right	A	A
	Southbound Left, Through and Right	A	A
16	Old Stagecoach Road / Sandbagger Drive (Stop-Controlled)		
	Westbound Left and Through	A	A
	Northbound Left and Right	A	A

Key: Stop-Controlled Intersection: Level of Service
Roundabout Intersection: Level of Service

Background Traffic Analysis Results – Year 2030

Year 2030 background traffic analysis indicates that all intersections within the study area are anticipated to operate at LOS C or better during the morning and afternoon peak traffic hours.

These intersection operations are similar to those found within the previously approved traffic study.

Vehicle Trip Generation

Standard traffic generation characteristics compiled by the Institute of Transportation Engineers (ITE) in their report entitled Trip Generation Manual, 12th Edition, were applied to the proposed land use in order to estimate the average daily traffic (ADT) and peak hour vehicle trips. A vehicle trip is defined as a one-way vehicle movement from point of origin to point of destination.

Table 2 presents average trip generation rates for the development area proposed. Use of average trip generation rates presents a conservative analysis. ITE land use code 210 (Single-Family Detached Housing) was used for analysis because of its best fit to the proposed land use.

Table 2 – Trip Generation Rates

			TRIP GENERATION RATES						
ITE			24	AM PEAK HOUR			PM PEAK HOUR		
CODE	LAND USE	UNIT	HOUR	ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
210	Single-Family Detached Housing	DU	9.09	0.19	0.51	0.70	0.58	0.35	0.93

Key: DU = Dwelling Units.
Note: All data and calculations above are subject to being rounded to nearest value.

Table 3 summarizes the projected ADT and peak hour traffic volumes likely generated by the land use area proposed and provides comparison to traffic volume estimates for the previously proposed land use.

Table 3 – Trip Generation Summary

			TOTAL TRIPS GENERATED						
ITE			24	AM PEAK HOUR			PM PEAK HOUR		
CODE	LAND USE	SIZE	HOUR	ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
Site Development - Previously Proposed *									
210	Single-Family Detached Housing	50 DU	472	9	26	35	30	17	47
	Previously Proposed Total:		*472*	*9*	*26*	*35*	*30*	*17*	*47*
Site Development - Proposed									
210	Single-Family Detached Housing	50 DU	455	9	26	35	29	18	47
	Proposed Total:		*455*	*9*	*26*	*35*	*29*	*18*	*47*
	Difference Total:		***-18***	***0***	***0***	***0***	***-1***	***1***	***-1***

Key: DU = Dwelling Units.
* = Flying Horse North Major PUD Amendment: Master Traffic Impact Study, SM ROCHA, LLC, January 2026.
Note: All data and calculations above are subject to being rounded to nearest value.

As Table 3 shows, the proposed development area has the potential to generate approximately 455 daily trips with 35 of those occurring during the morning peak hour and 47 during the afternoon peak hour. Table 2 further shows how proposed development traffic volumes generally do not exceed that approved within the Flying Horse North Major PUD Amendment Master Traffic Impact Study.

Adjustments to Trip Generation Rates

A development of this type is not likely to attract trips from within area land uses nor pass-by or diverted link trips from the adjacent roadway system, therefore no trip reduction was taken in this analysis.

Trip Distribution

The overall directional distribution of site-generated traffic was determined based on that approved within the Flying Horse North Major PUD Amendment Master Traffic Impact Study. The overall directional distribution of site-generated traffic from the Master TIS was determined based on the location of development site within the County, proposed and existing area land uses, allowed turning movements, available roadway network, and in reference to historical traffic count data provided by CDOT's Traffic Count Database System (TCDS)[12].

Overall trip distribution patterns for the development are shown in Figure 6.

Trip Assignment

Traffic assignment is how generated and distributed vehicle trips are expected to be loaded onto the available roadway network.

Applying trip distribution patterns to site-generated traffic provides the overall site-generated trip assignments shown on Figure 7.

[12] Transportation Data Management System, MS2, 2025.

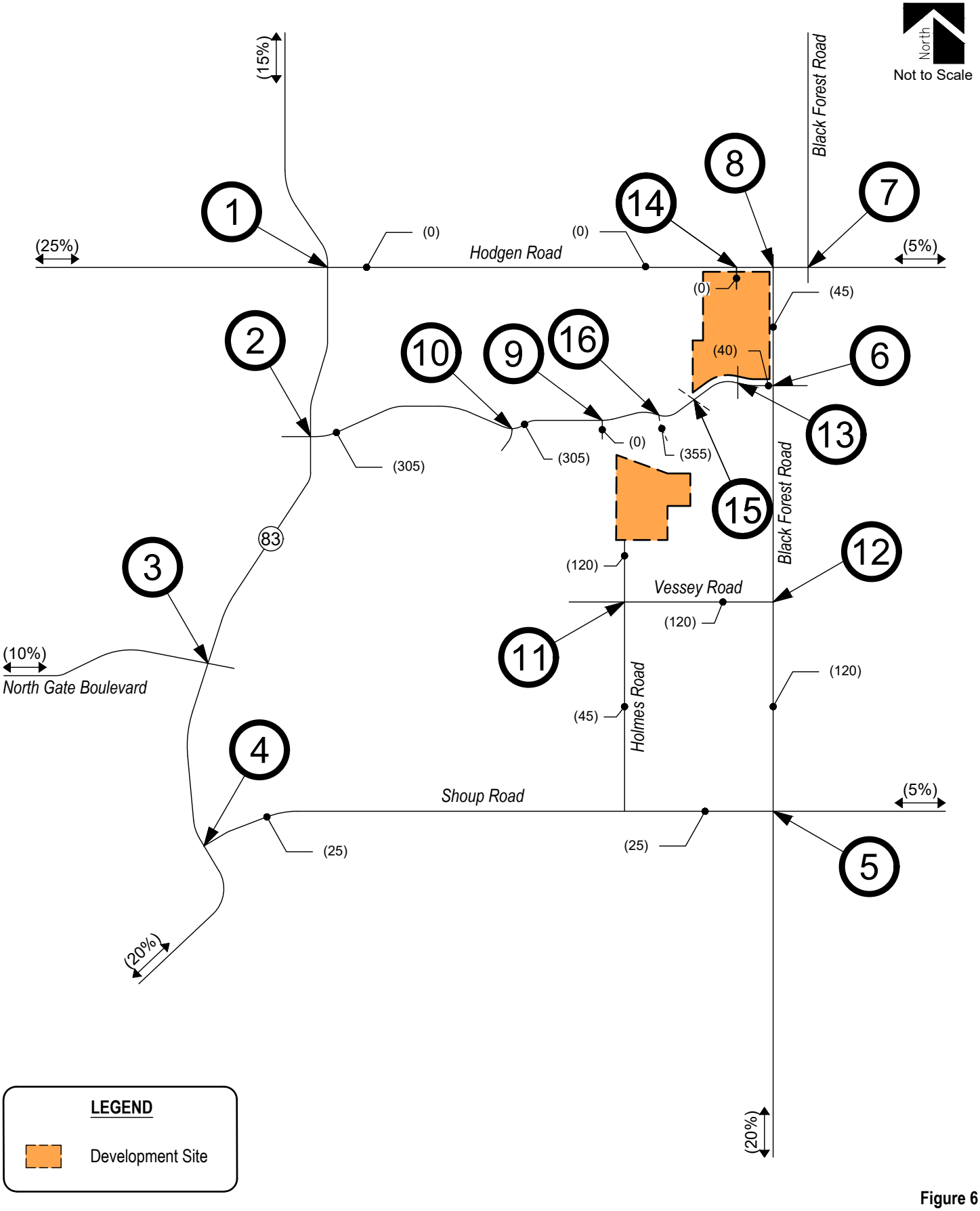
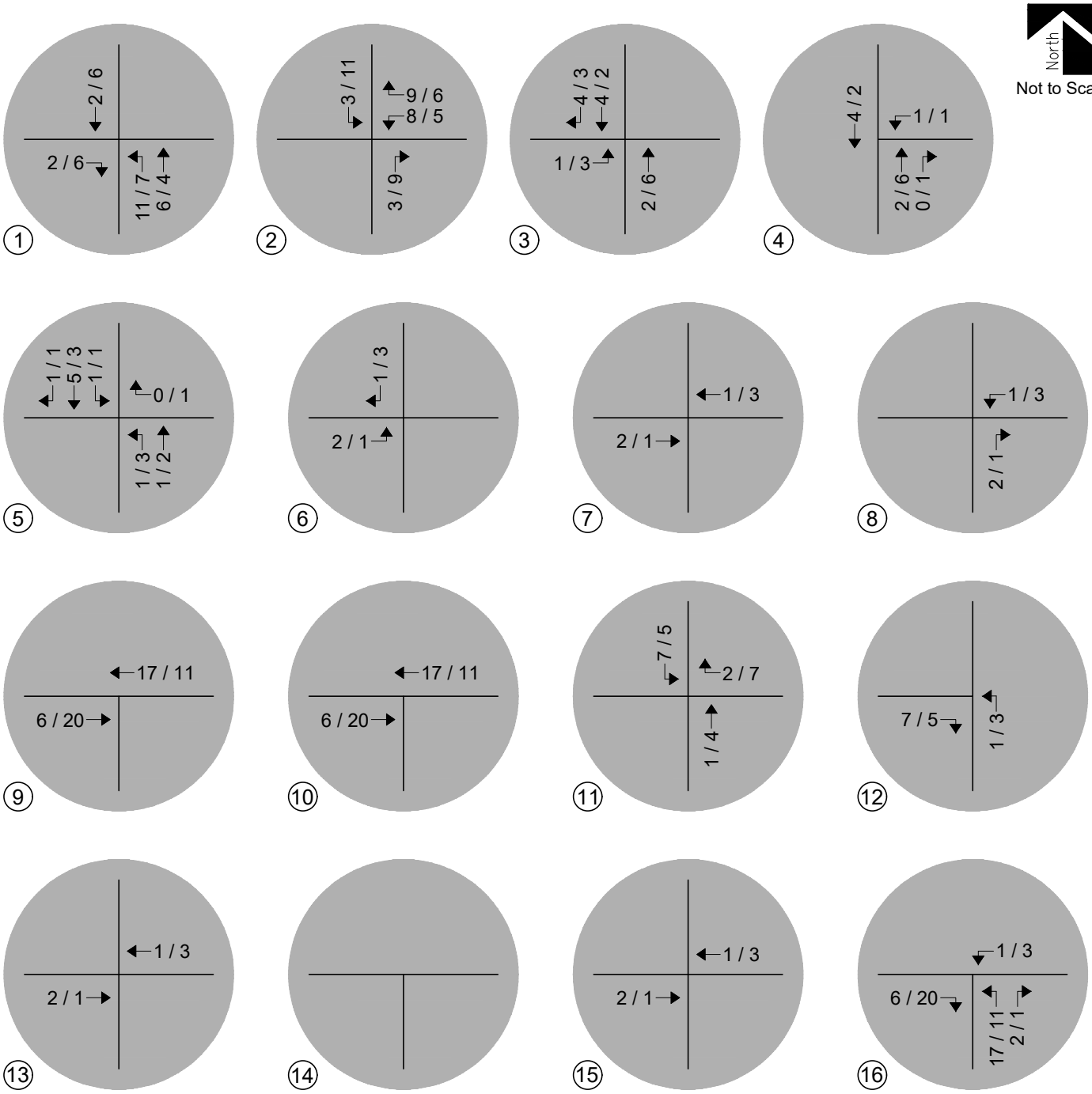


Figure 6
SITE DEVELOPMENT DISTRIBUTION
(%) : Overall
(ADT) : Average Daily Traffic



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Study Intersection Volumes

FLYING HORSE NORTH FILING 8
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Figure 7
SITE-GENERATED TRIPS
AM / PM Peak Hour

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Total Traffic – Year 2030

Total traffic is the traffic projected to be on area roadways with consideration of the proposed development. Total traffic includes background traffic projections for Year 2030 with consideration of site-generated traffic.

The study area intersections and projected short-term total ADT volumes are shown in Figure 8. Projected Year 2030 total intersection traffic volumes and intersection geometry are shown in Figure 9 and Figure 10, respectively.

Total Traffic Auxiliary Lane Analysis

Auxiliary lanes for the study area intersections were based on the County's ECM and CDOT's State Highway Access Code (SHAC)[13].

An evaluation of auxiliary lane requirements, pursuant to Section 2.3.7 of the County's ECM, reveals how exclusive left turn lanes are required along minor arterial roadways and lower classifications if projected peak hour turning volumes meet or exceed 25 vehicles per hour (VPH). Additionally, right turn lanes are required along minor arterial roadways and lower classifications if projected peak hour turning volumes meet or exceed 50 VPH.

Sections 3.8(5) and 4.8(2) of CDOT's SHAC reveals how exclusive left turn lanes along State Highway 83 are required if projected peak hour left turning volumes exceed 10 VPH, and exclusive right turn lanes are required if projected peak hour right turning volumes exceed 25 VPH.

Auxiliary lane requirements and appropriate turn lane lengths are illustrated within the 95th percentile queue length results in Table 5.

[13] State Highway Access Code, The Transportation Commission of Colorado, March 2002.

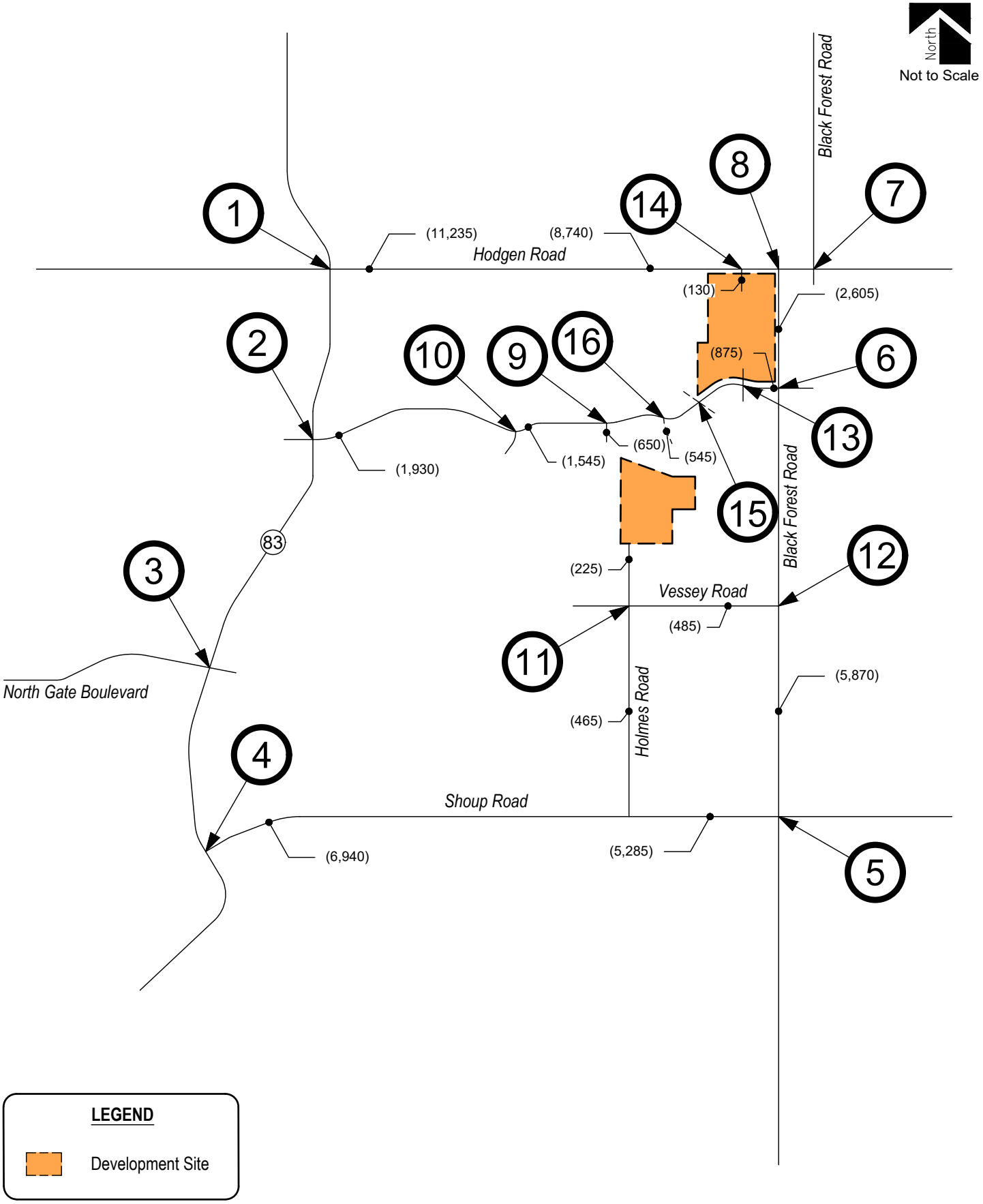
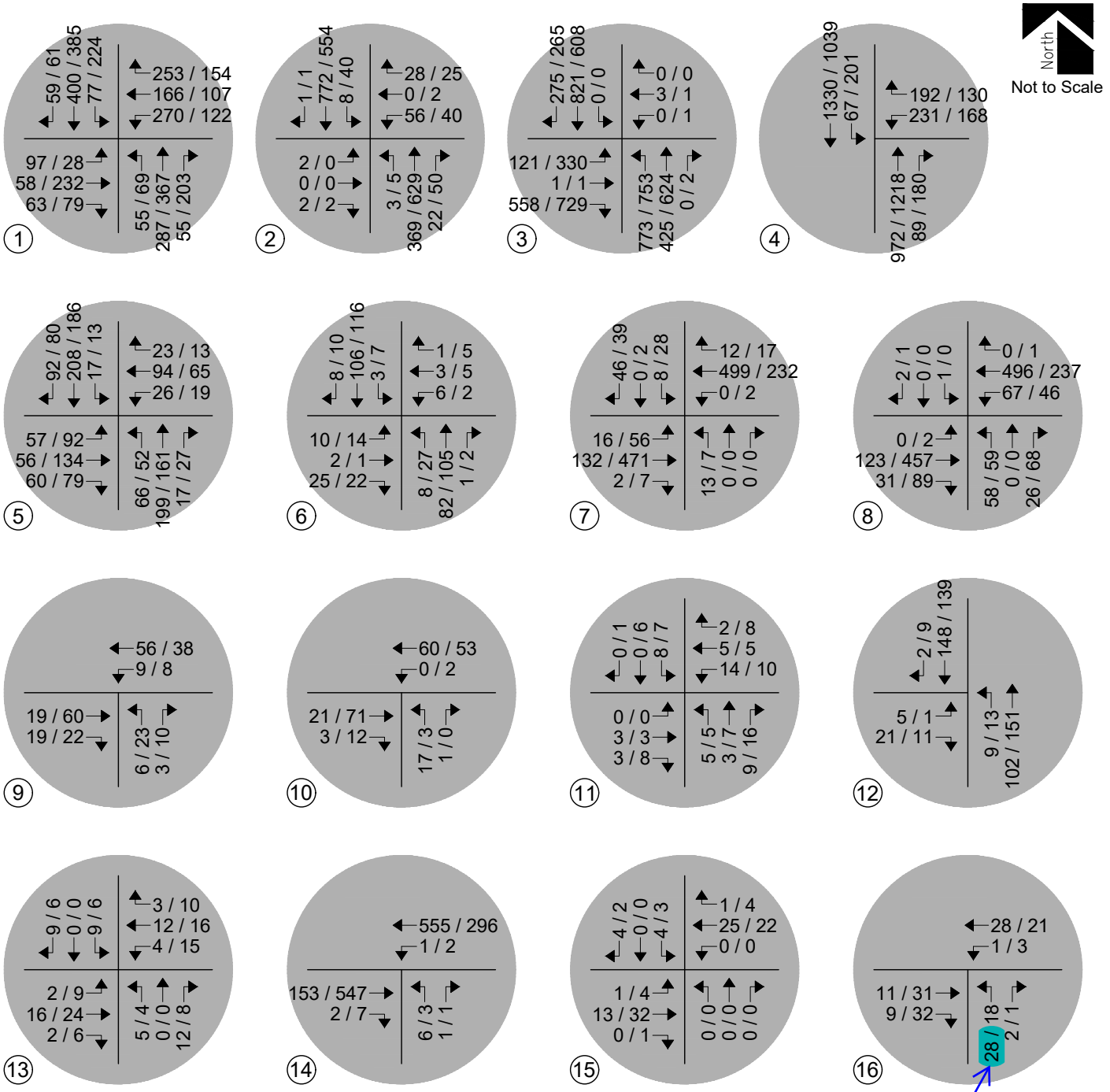


Figure 8
TOTAL TRAFFIC - YEAR 2030
(ADT) : Average Daily Traffic



turning movement triggers left turn lane requirement

Comment acknowledged, discussion added.

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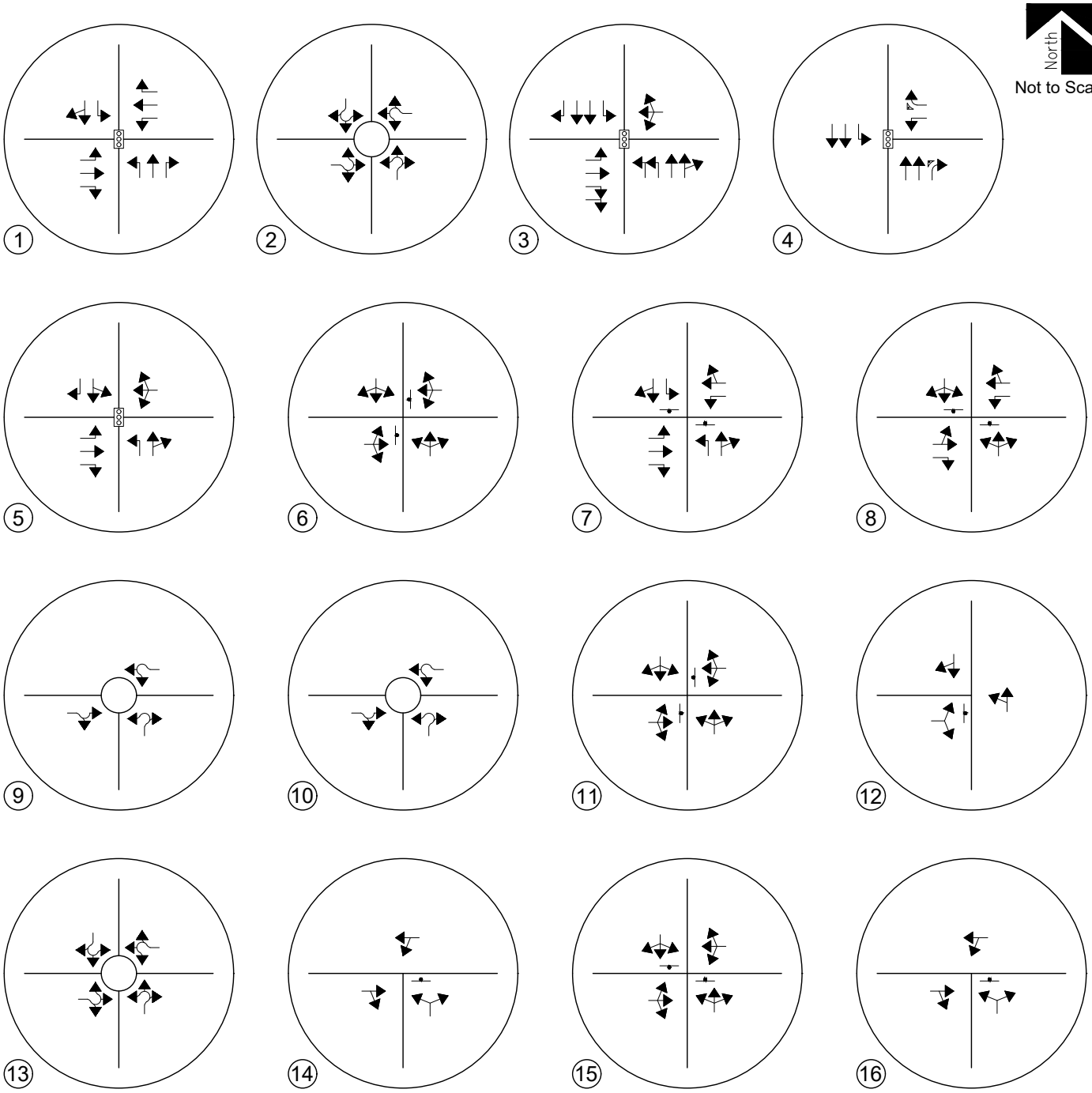
Study Intersection Volumes

Figure 9
TOTAL TRAFFIC - YEAR 2030
Volumes
AM / PM Peak Hour



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Study Intersection Lane Geometry

Figure 10
TOTAL TRAFFIC - YEAR 2030
Intersection Geometry

Peak Hour Intersection Levels of Service – Total Traffic

As with background traffic, the operations of the study intersections were analyzed under projected total traffic conditions using the SYNCHRO computer program. The analyses and procedures were performed in accordance with the latest HCM and are based upon the worst-case conditions that occur during a typical weekday upon build-out of site development and analyzed land uses. Therefore, study intersections are likely to operate with traffic conditions better than those described within this study, which represent the peak hours of weekday operations only.

Total traffic level of service analysis results for Year 2030 are summarized in Table 4.

Definitions of levels of service are given in Appendix D.

Intersection capacity worksheets are provided in Appendix E.

Table 4 – Intersection Capacity Analysis Summary – Total Traffic – Year 2030

	INTERSECTION	LEVEL OF SERVICE	
	LANE GROUPS	AM PEAK HOUR	PM PEAK HOUR
1	State Highway 83 / Hodgen Road (Signalized)	C (26.2)	B (18.2)
3	State Highway 83 / North Gate Boulevard (Signalized)	B (15.4)	C (24.3)
4	State Highway 83 / Shoup Road (Signalized)	B (14.9)	B (16.4)
5	Black Forest Road / Shoup Road (Signalized)	B (12.7)	B (14.9)
2	State Highway 83 / Stagecoach Road (Roundabout)		
	Eastbound Left, Through and Right	A	A
	Westbound Left, Through and Right	A	A
	Northbound Left, Through and Right	A	A
	Southbound Left, Through and Right	B	A
6	Black Forest Road / Old Stagecoach Road (Stop-Controlled)		
	Eastbound Left, Through and Right	A	B
	Westbound Left, Through and Right	B	B
	Northbound Left, Through and Right	A	A
	Southbound Left, Through and Right	A	A

Key: Signalized Intersection: Level of Service (Control Delay in sec/veh)
Stop-Controlled Intersection: Level of Service
Roundabout Intersection: Level of Service

Table 4 (Cont'd) – Intersection Capacity Analysis Summary – Total Traffic – Year 2030

	INTERSECTION	LEVEL OF SERVICE	
	LANE GROUPS	AM PEAK HOUR	PM PEAK HOUR
7	Hodgen Road / Black Forest Road / Ridge Run Drive (Stop-Controlled)		
	Eastbound Left	A	A
	Westbound Left	A	A
	Northbound Left	C	C
	Northbound Through and Right	A	A
	Southbound Left	C	C
	Southbound Through and Right	B	B
8	Hodgen Road / Black Forest Road / Black Forrest Road (Stop-Controlled)		
	Eastbound Left and Through	A	A
	Westbound Left	A	A
	Northbound Left, Through and Right	C	C
	Southbound Left, Through and Right	B	A
9	Old Stagecoach Road / Allen Ranch Road (Roundabout)		
	Eastbound Through and Right	A	A
	Westbound Left and Through	A	A
	Northbound Left and Right	A	A
10	Old Stagecoach Road / Shortwall Drive (Roundabout)		
	Eastbound Through and Right	A	A
	Westbound Left and Through	A	A
	Northbound Left and Right	A	A
11	Vessey Road / Holmes Road (Stop-Controlled)		
	Eastbound Left,Through and Right	A	A
	Westbound Left, Through and Right	A	A
	Northbound Left, Through and Right	A	A
	Southbound Left, Through and Right	A	A
12	Black Forest Road / Vessey Road (Stop-Controlled)		
	Eastbound Left and Right	A	A
	Northbound Left and Through	A	A
13	Old Stagecoach Road / Rubble Drive (Roundabout)		
	Eastbound Left, Through and Right	A	A
	Westbound Left, Through and Right	A	A
	Northbound Left, Through and Right	A	A
	Southbound Left, Through and Right	A	A
14	Rubble Drive / Hodgen Road (Stop-Controlled)		
	Westbound Left and Through	A	A
	Northbound Left and Right	B	C
15	Old Stagecoach Road / Fringe Place / Park Access (Stop-Controlled)		
	Eastbound Left, Through and Right	A	A
	Westbound Left, Through and Right	A	A
	Northbound Left, Through and Right	A	A
	Southbound Left, Through and Right	A	A
16	Old Stagecoach Road / Sandbagger Drive (Stop-Controlled)		
	Westbound Left and Through	A	A
	Northbound Left and Right	A	A

Key: Signalized Intersection: Level of Service (Control Delay in sec/veh)
Stop-Controlled Intersection: Level of Service
Roundabout Intersection: Level of Service

Total Traffic Analysis Results Upon Development Build-Out

Table 4 illustrates how, by Year 2030 and upon development build-out, all intersections within the study area are projected to operate at or better than LOS C during the AM and PM peak traffic hours. Compared to the background traffic analysis, the traffic generated by the proposed development is not expected to significantly change the operations of the study intersections.

These intersection operations are similar to background conditions.

Queue Length Analysis

Queue lengths were analyzed using Year 2030 total traffic conditions. The analysis yields estimate of 95th percentile queue lengths, which have only a five percent probability of being exceeded during the analysis time period. Queue lengths were modeled and are included with the Synchro worksheets in Appendix E.

In general, auxiliary lane lengths are recommended to accommodate the County's minimum turn lane lengths or accommodate long-term 95th percentile vehicle queues, whichever is greater.

Table 5 summarizes the 95th percentile queue results in comparison to the projected storage requirements for turn movements within study area for Year 2030.

Table 5 – Turn Lane Queues and Storage Requirements – Total Traffic – Year 2030

Intersection		Turn Movement		Existing Turn Lane Length (feet)	AM Peak Hour 95th Percentile Queue Length (feet)	PM Peak Hour 95th Percentile Queue Length (feet)	Recommended Turn Lane Length (feet)
Signalized Intersections							
1	State Highway 83 / Hodgen Road	EB	L	420' + 180'(T)	95'	35'	420' + 180'(T)
			T	-	59'	194'	-
			R	420' + 180'(T)	3'	14'	420' + 180'(T)
		WB	L	350' + 115'(T)	310'	150'	350' + 115'(T)
			T	-	141'	96'	-
			R	350' + 155'(T)	60'	48'	350' + 155'(T)
		NB	L	120' + 85'(T)	24'	28'	120' + 85'(T)
			T	-	157'	207'	-
			R	650' + 260'(T)	3'	35'	650' + 260'(T)
		SB	L	525' + 140'(T)	31'	80'	525' + 140'(T)
			T,R	-	271'	259'	-
3	State Highway 83 / North Gate Bouldvard	EB	L	225' + 180'(T)	116'	402'	445' + 180'(T)
			T	-	5'	5'	-
			R	285'	46'	50'	285'
		WB	L,T,R	-	9'	6'	-
		NB	L	900' + 230'(T)	208'	138'	900' + 230'(T)
			T,R	-	70'	106'	-
		SB	L	750' + 110'(T)	0'	0'	750' + 110'(T)
			T	-	287'	201'	-
			R	730' + 125'(T)	52'	52'	730' + 125'(T)
4	State Highway 83 / Shoup Road	WB	L	500' + 100'(T)	212'	159'	500' + 100'(T)
			R	-	55'	48'	-
		NB	T	-	322'	508'	-
			R	710' + 185'(T)	27'	40'	710' + 185'(T)
		SB	L	980' + 150'(T)	32'	128'	980' + 150'(T)
			T	-	360'	210'	-
5	Black Forest Road / Shoup Road	EB	L	-	60'	87'	235' + 140'(T)
			T	-	56'	115'	-
			R	-	31'	35'	235' + 140'(T)
		WB	L,T,R	-	117'	84'	-
		NB	L	-	27'	20'	295' + 180'(T)
			T,R	-	70'	58'	-
		SB	L,T	-	74'	64'	-
			R	-	15'	14'	295' + 180'(T)

Key: x2 = Dual Turn Lanes.
T = Approach Taper.

Table 5 (Cont'd) – Turn Lane Queues and Storage Requirements – Total Traffic – Year 2030

Intersection		Turn Movement		Existing Turn Lane Length (feet)	AM Peak Hour 95th Percentile Queue Length (feet)	PM Peak Hour 95th Percentile Queue Length (feet)	Recommended Turn Lane Length (feet)
Stop-Controlled Intersections							
6	Black Forest Road / Old Stagecoach Road	EB	L,T,R	-	5'	5'	-
		WB	L,T,R	-	0'	3'	-
		NB	L	-	0'	3'	235' + 200'(T)
			T,R	-	0'	0'	-
		SB	L,T,R	-	0'	0'	-
7	Black Forest Road / Hodgen Road	EB	L	400' + 275'(T)	3'	3'	400' + 275'(T)
			T	-	0'	0'	-
			R	335' + 275'(T)	0'	0'	335' + 275'(T)
		WB	L	280' + 225'(T)	0'	0'	280' + 225'(T)
			T,R	-	0'	0'	-
		NB	L	125'	3'	3'	125'
			T,R	-	0'	0'	-
		SB	L	65' + 25'(T)	3'	10'	65' + 25'(T)
			T,R	-	8'	5'	-
8	Black Forrest Road / Hodgen Road	EB	L,T	-	0'	0'	-
			R	260' + 240'(T)	0'	0'	260' + 240'(T)
		WB	L	290' + 200'(T)	5'	5'	290' + 200'(T)
			T,R	-	0'	0'	-
		NB	L,T,R	-	25'	43'	-
		SB	L,T,R	-	0'	0'	-
11	Vessey Road / Holmes Road	EB	L,T,R	-	0'	0'	-
		WB	L,T,R	-	0'	3'	-
		NB	L,T,R	-	0'	0'	-
		SB	L,T,R	-	0'	0'	-
12	Black Forest Road / Vessey Road	EB	L,R	-	3'	0'	-
		NB	L,T	-	0'	0'	-
		SB	T,R	-	0'	0'	-
14	Rubble Drive / Hodgen Road	EB	T,R	-	0'	0'	-
		WB	L,T	-	0'	0'	-
		NB	L,R	-	3'	0'	-
15	Old Stagecoach Road / Fringe Place / Park Access	EB	L,T,R	-	0'	0'	-
		WB	L,T,R	-	0'	0'	-
		NB	L,T,R	-	0'	0'	-
		SB	L,T,R	-	0'	0'	-
16	Old Stagecoach Road / Sandbagger Drive	EB	T,R	-	0'	0'	-
		WB	L,T	-	0'	0'	-
		NB	L	-	3'	3'	115' + 120'(T)
			R	-	0'	0'	-

Key: x2 = Dual Turn Lanes.
T = Approach Taper.

Table 5 (Cont'd) – Turn Lane Queues and Storage Requirements – Total Traffic – Year 2030

Intersection		Turn Movement		Existing Turn Lane Length (feet)	AM Peak Hour 95th Percentile Queue Length (feet)	PM Peak Hour 95th Percentile Queue Length (feet)	Recommended Turn Lane Length (feet)
Roundabout Intersections							
2	State Highway 83 / Stagecoach Road	EB	L,T,R	-	0'	0'	-
		WB	L,T,R	-	0'	0'	-
		NB	L,T,R	-	25'	100'	-
		SB	L,T,R	-	150'	75'	-
9	Old Stagecoach Road / Allen Ranch Road	EB	T,R	-	0'	0'	-
		WB	L,T	-	0'	0'	-
		NB	L,R	-	0'	0'	-
10	Old Stagecoach Road / Shortwall Drive	EB	T,R	-	0'	0'	-
		WB	L,T	-	0'	0'	-
		NB	L,R	-	0'	0'	-
13	Old Stagecoach Road / Rubble Drive	EB	L,T,R	-	0'	0'	-
		WB	L,T,R	-	0'	0'	-
		NB	L,T,R	-	0'	0'	-
		SB	L,T,R	-	0'	0'	-

Key: x2 = Dual Turn Lanes.
T = Approach Taper.

As Table 5 shows, the majority of turn lane lengths at the study intersections have sufficient storage to accommodate future traffic volumes. Synchro analysis results indicate that the greatest queue length occurred along North Gate Boulevard at State Highway 83 during the afternoon peak traffic hour. Synchro's analysis results indicate that the queue length is approximately 16-17 vehicles for the eastbound left turn movement.

Please reference Appendix A for queue analysis results analyzed within the previously approved traffic study.

Pedestrian Circulation & Safety Analysis

In accordance with Section B.2.4.D of the County's ECM, an assessment to adequacy of pedestrian and bicycle facilities within the study area was considered.

Due to the rural nature of the development area and the rural local roadway classification of Sandbagger Drive, Holmes Road, Par Court, and Wedge Trail, as illustrated on the site plan, no pedestrian or bicycle facilities are being proposed.

Recommended Improvements

Roadway and intersection improvement recommendations for Flying Horse North Filing 8 were assessed pursuant to existing and future roadway characteristics, projected peak hour traffic volumes, anticipated level of service results, forecasted 95th percentile queue lengths, and pursuant to recommended improvements stated within the Flying Horse North Major PUD Amendment – Intersection & Roadway Improvement Updates Memorandum[14].

In accordance with the recommended improvements tables provided within the Flying Horse North Major PUD Amendment – Intersection & Roadway Improvement Updates Memorandum, no auxiliary lane requirements are being warranted with the development of Flying Horse North Filing 8. As a result, construction of a northbound left turn deceleration lane along Black Forest Road at Vessey Road is not recommended. Moreover, no additional geometric nor intersection control improvements for the study area intersections are being recommended with the development of Flying Horse North Filing 8.

Moreover, no roadway improvements are being warranted with the development of Flying Horse North Filing 8. Therefore, no roadway improvements are being recommended with this development

Recommended improvement information from the Flying Horse North Major PUD Amendment – Intersection & Roadway Improvement Updates Memorandum is provided for reference in Appendix B.

Intersection 16, Old Stagecoach Rd and Sandbagger Dr, left turns exceed the ECM min threshold for turn lane requirements. Please include a discussion of this in the recommendations. Table 5 contains a recommended turn lane length at this intersection. Discussion may include justification of why the turn lane was not recommended in this report.

Comment acknowledged, discussion added.

[14] Flying Horse North Major PUD Amendment – Intersection & Roadway Improvement Updates Memorandum, SM ROCHA, LLC, July 9, 2026.

Conclusion

This analysis assessed traffic generation for the Flying Horse North Filing 8 development, provided a traffic volume comparison to previous land use assumptions proposed for the development site, and considered potential impacts to the adjacent roadway network.

It is our professional opinion that the proposed site-generated traffic is expected to create no negative impact to traffic operations for the surrounding roadway network and proposed site access drives and is in compliance with the Flying Horse North Major PUD Amendment Master Traffic Impact Study.

We trust that our findings will assist in the planning and approval of the Flying Horse North Filing 8 development. Please contact us should further assistance be needed.

Sincerely,

SM ROCHA, LLC
Traffic & Transportation Engineering

Leo Ornelas, EIT
Traffic Engineer

COLORADO REGISTERED
FREDERICK C. LANTZ
23410
08/18/2026
PROFESSIONAL ENGINEER

Fred Lantz, PE
Traffic Engineer

Traffic Engineer's Statement

The attached traffic report and supporting information were prepared under my responsible charge and they comport with the standard of care. So far as is consistent with the standard of care, said report was prepared in general conformance with the criteria established by the County for traffic reports.

_____ 08/18/2026

Fred Lantz, P.E. #23410 Date

Developer's Statement

I, the Developer, have read and will comply with all commitments made on my behalf within this report.

_____ 09/01/2026

Drew Balsick Date
Flying Horse Development
2138 Flying Horse Club Drive
Colorado Springs, CO 80921

APPENDIX A

Flying Horse North Major PUD Amendment TIS
Referenced Traffic Volumes & Queues

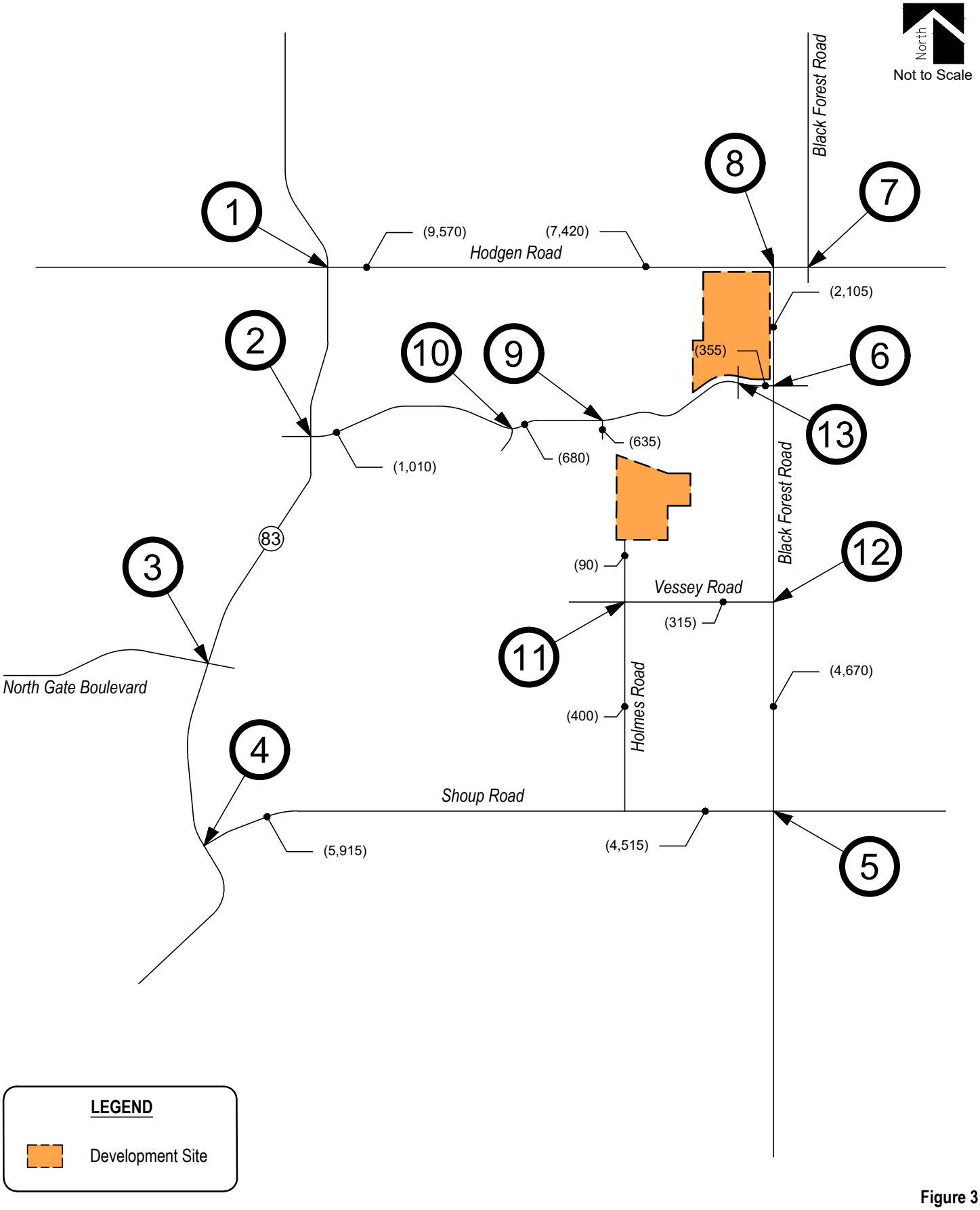
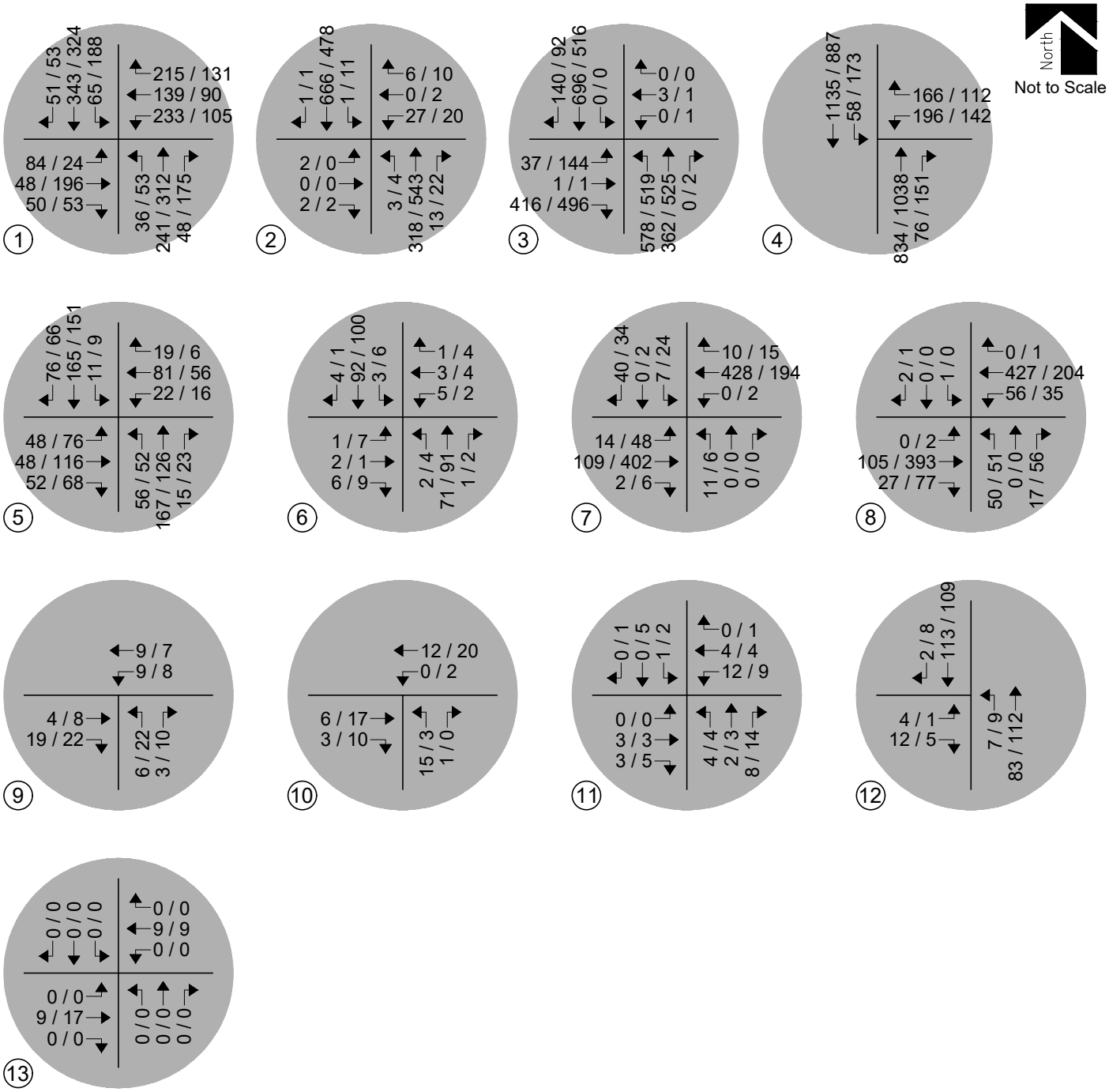


Figure 3
EXISTING TRAFFIC
Volumes
(ADT) : Average Daily Traffic



LEGEND

Study Intersection Volumes

Figure 4
EXISTING TRAFFIC
Volumes
AM / PM Peak Hour

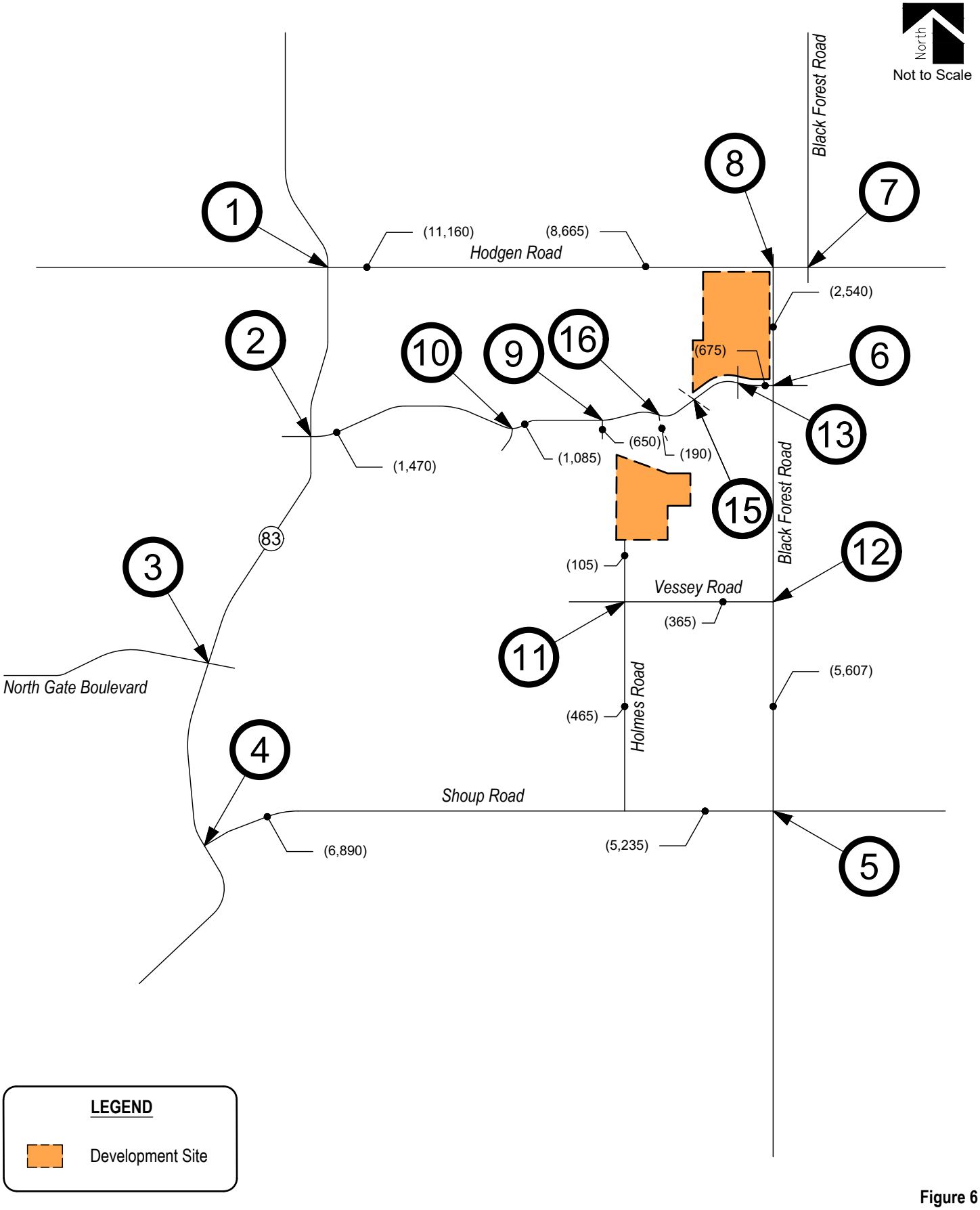
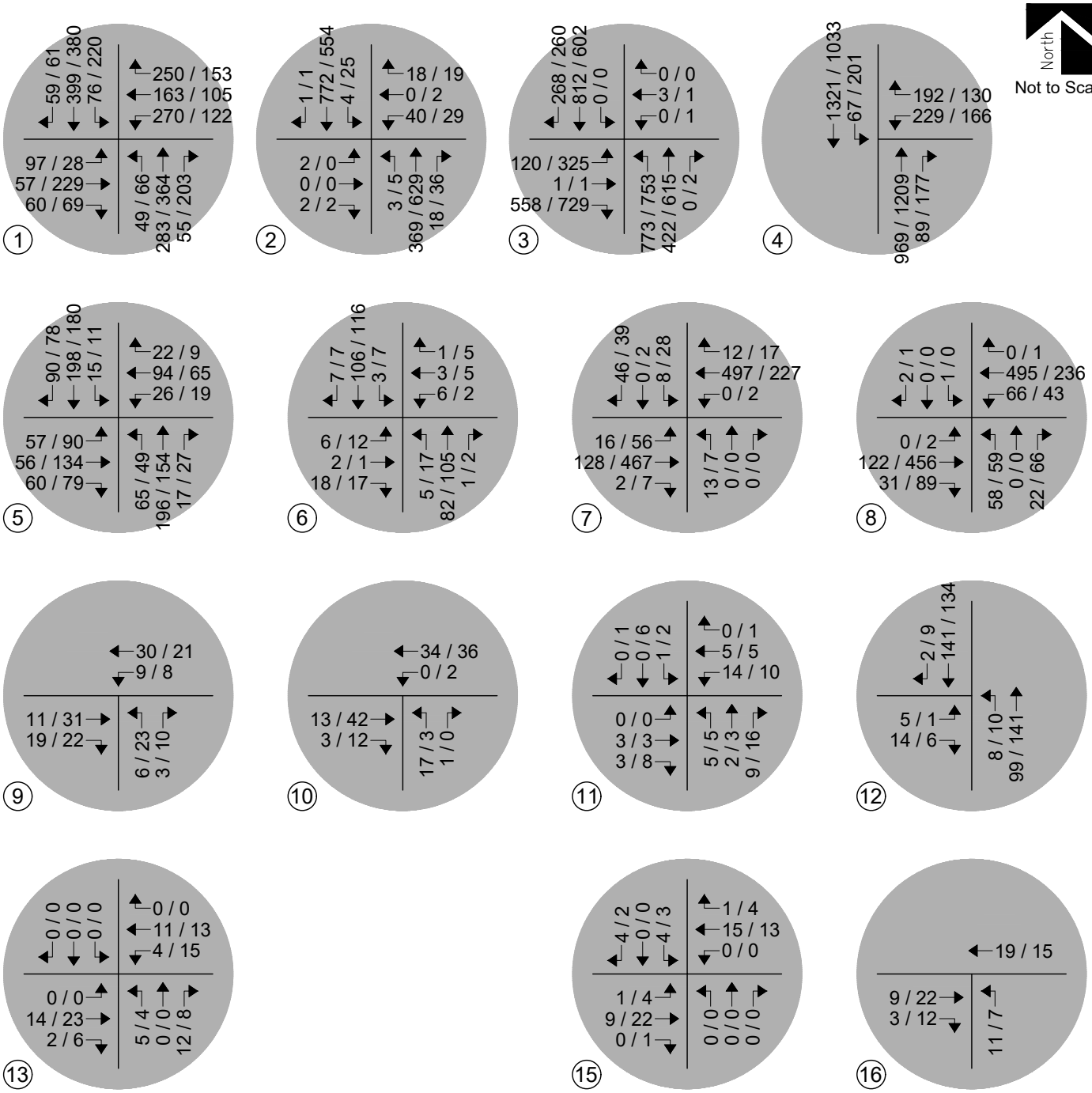


Figure 6
BACKGROUND TRAFFIC - YEAR 2030
Volumes
(ADT) : Average Daily Traffic



LEGEND

Study Intersection Volumes

Figure 7
BACKGROUND TRAFFIC - YEAR 2030
Volumes
AM / PM Peak Hour

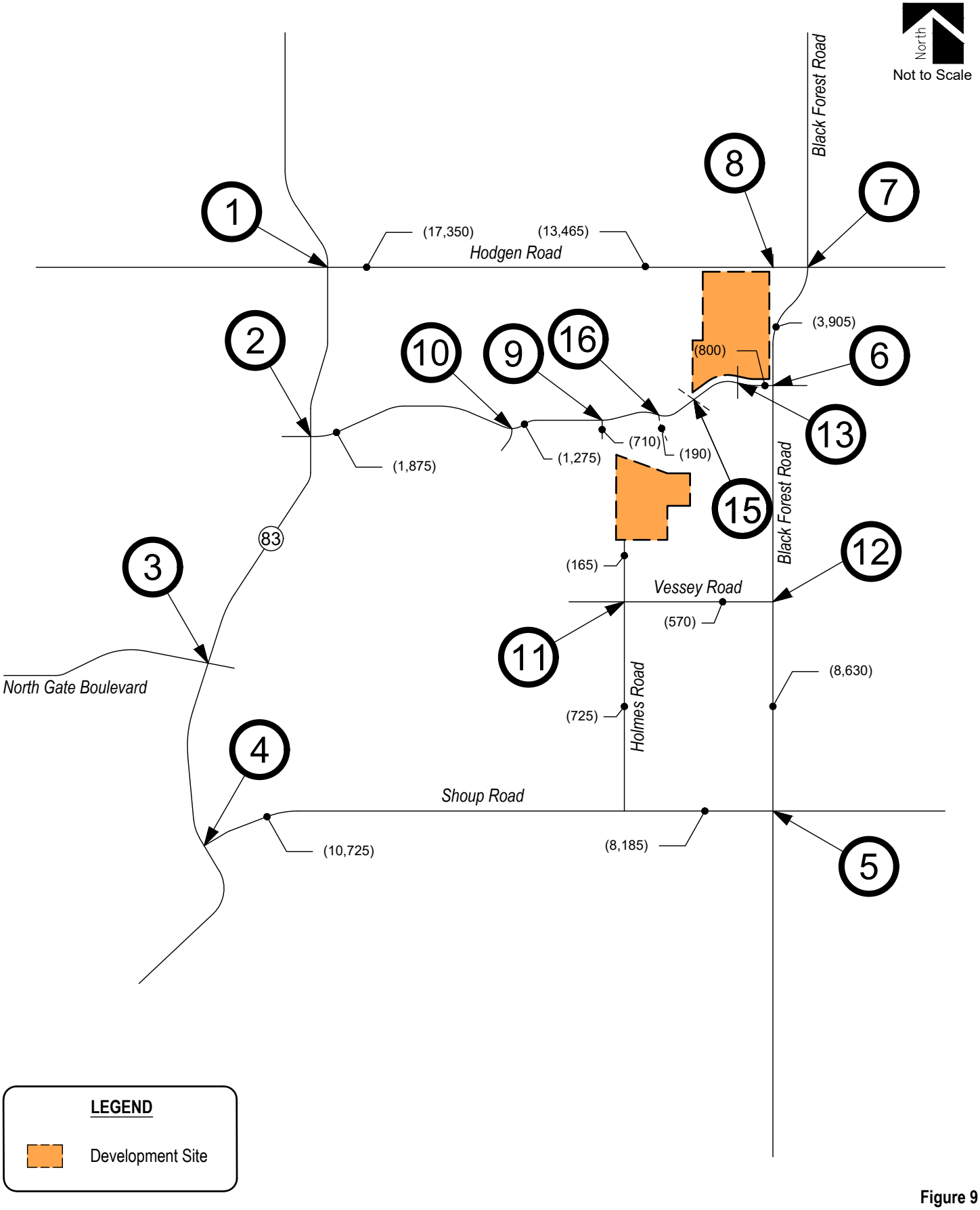
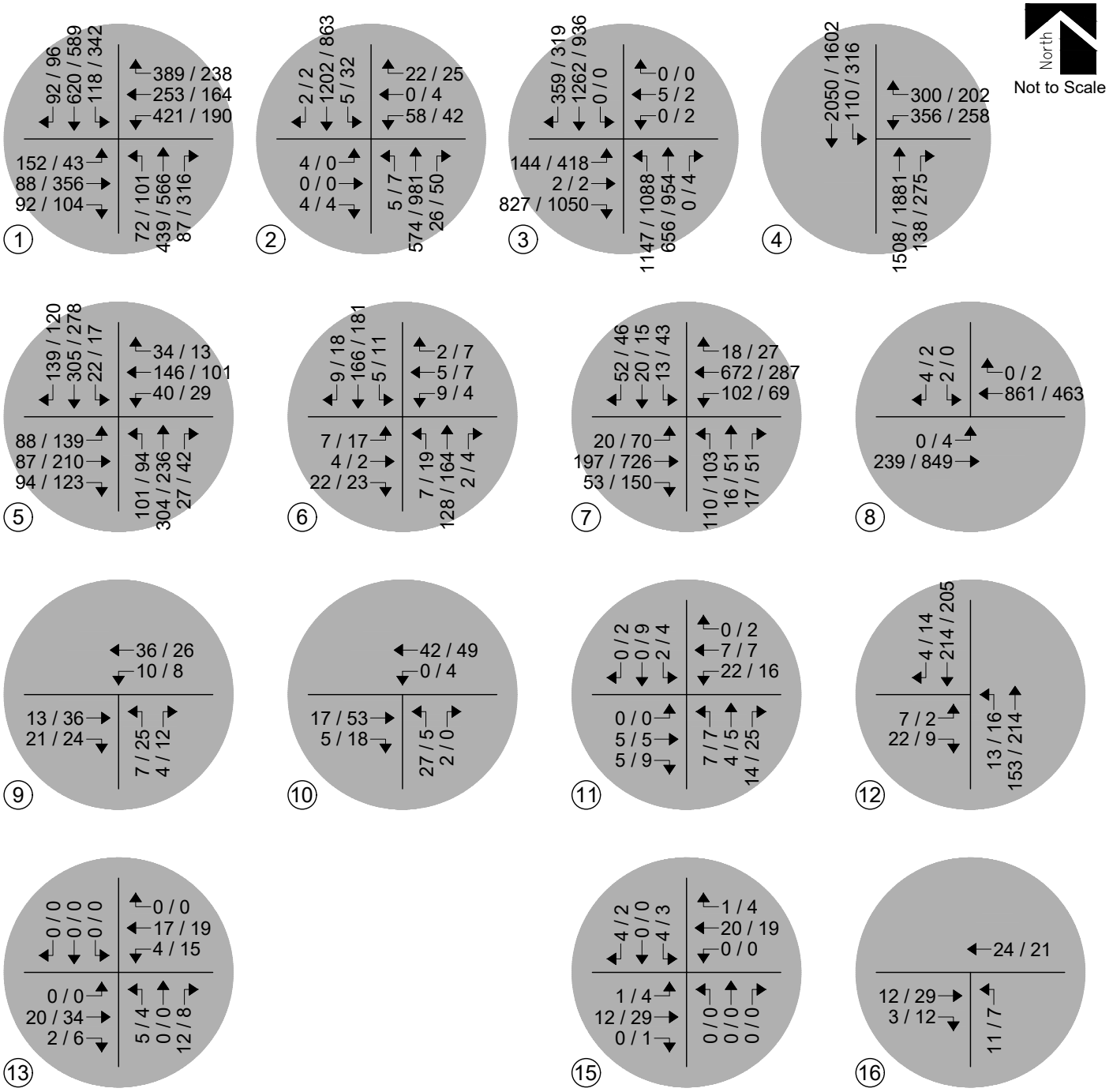


Figure 9
BACKGROUND TRAFFIC - YEAR 2045
Volumes
(ADT) : Average Daily Traffic



LEGEND

Study Intersection Volumes

Figure 10
BACKGROUND TRAFFIC - YEAR 2045
Volumes
AM / PM Peak Hour

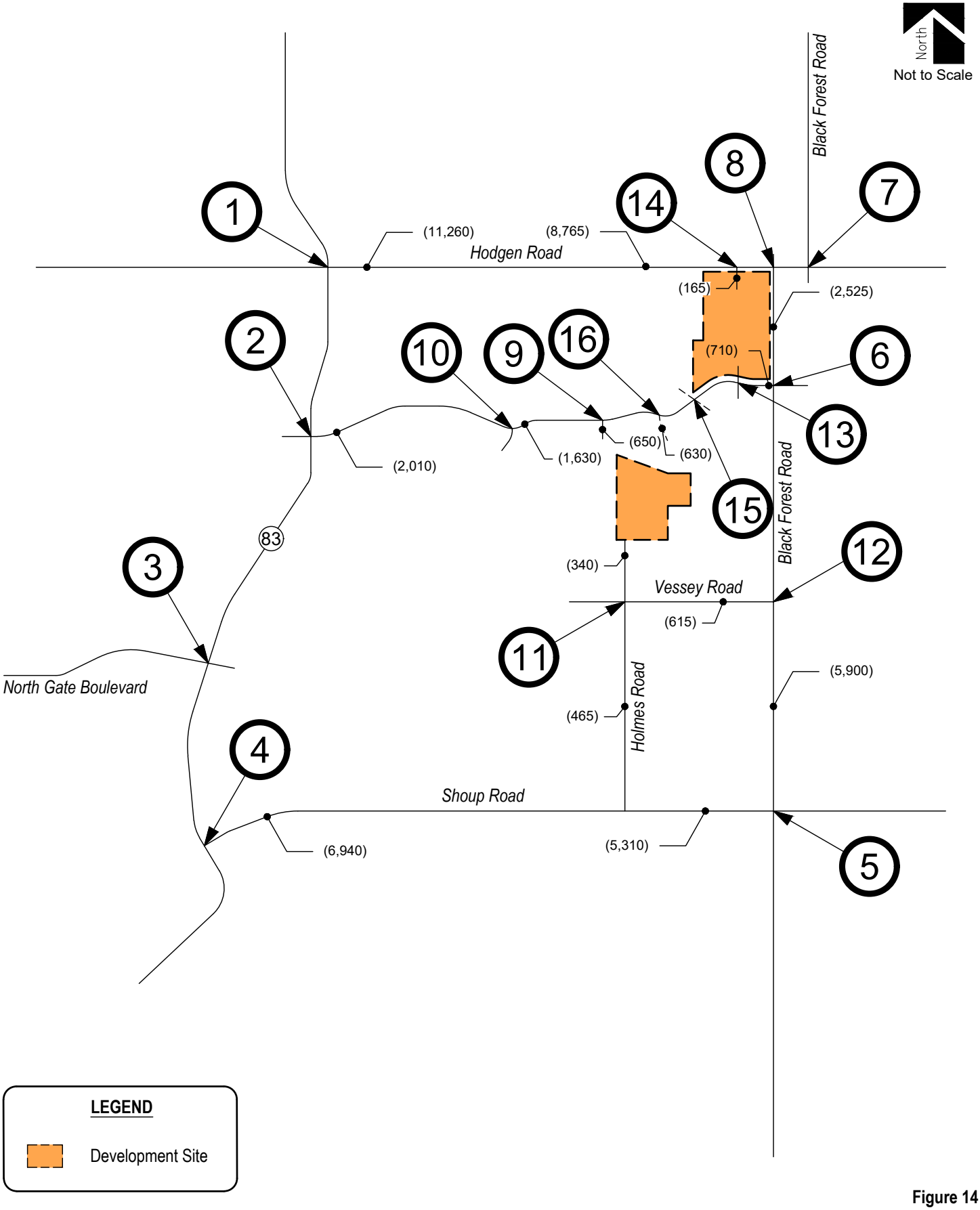
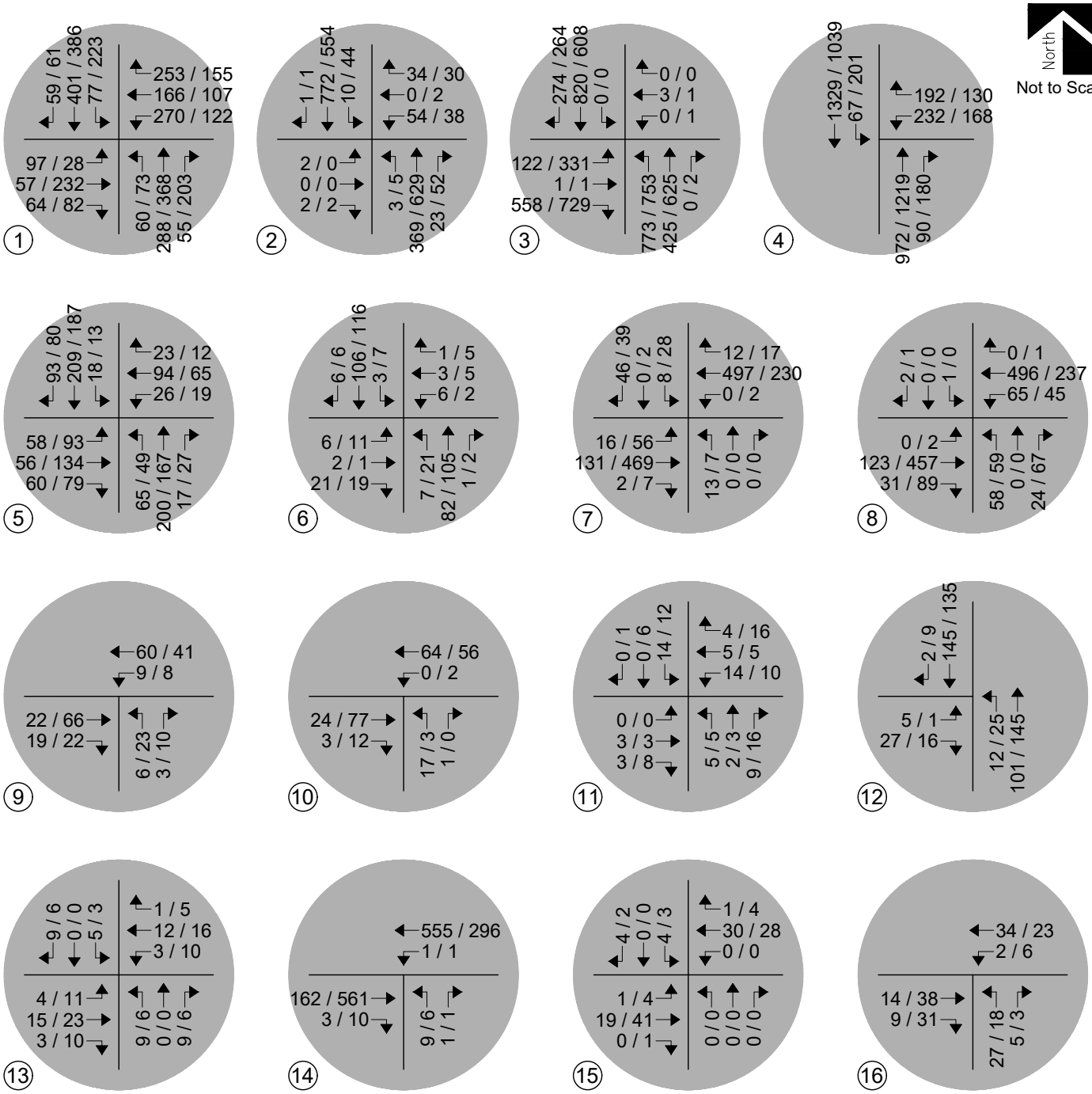


Figure 14
TOTAL TRAFFIC - YEAR 2030
Volumes
(ADT) : Average Daily Traffic



LEGEND

Study Intersection Volumes

Figure 15
TOTAL TRAFFIC - YEAR 2030
Volumes
AM / PM Peak Hour

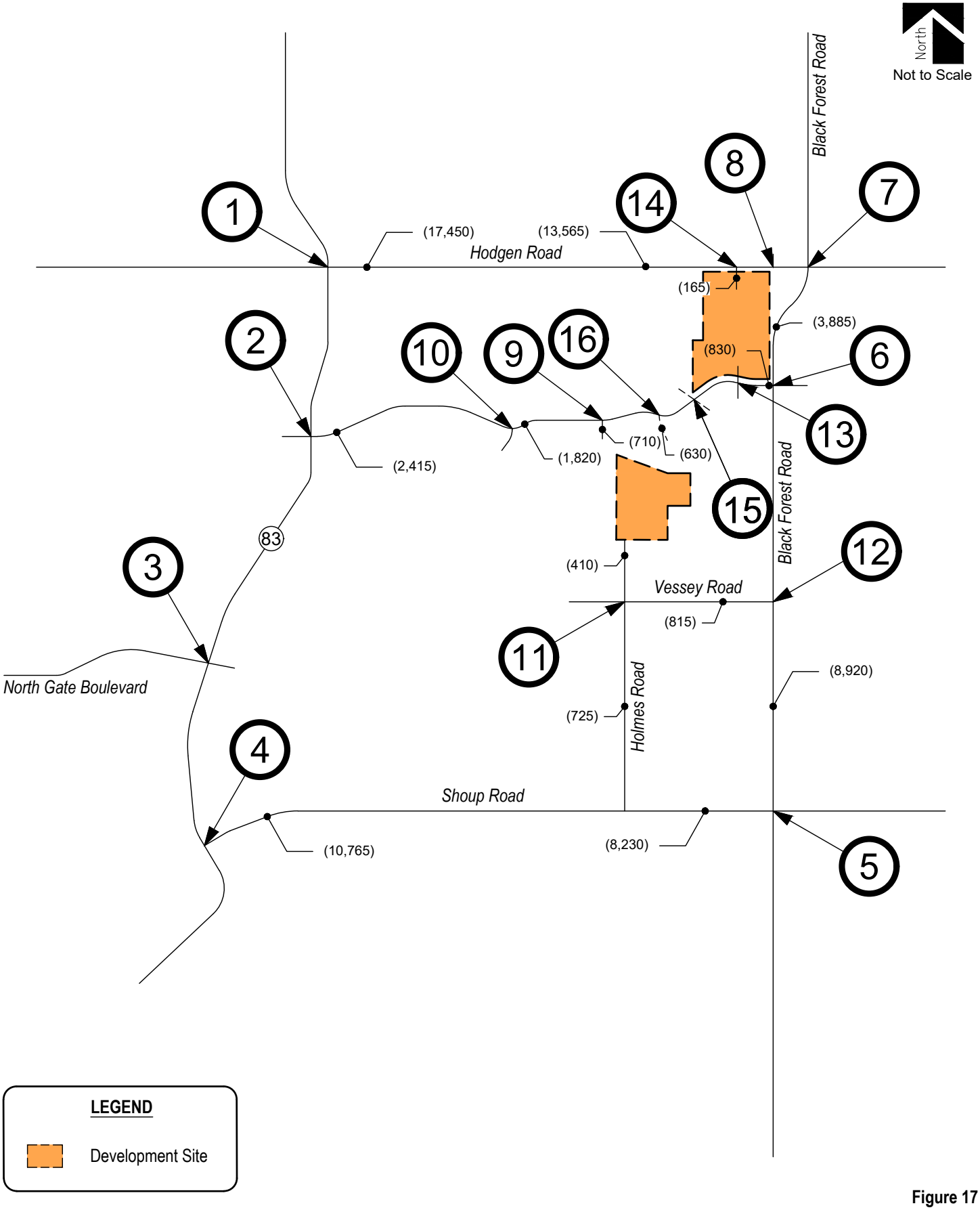
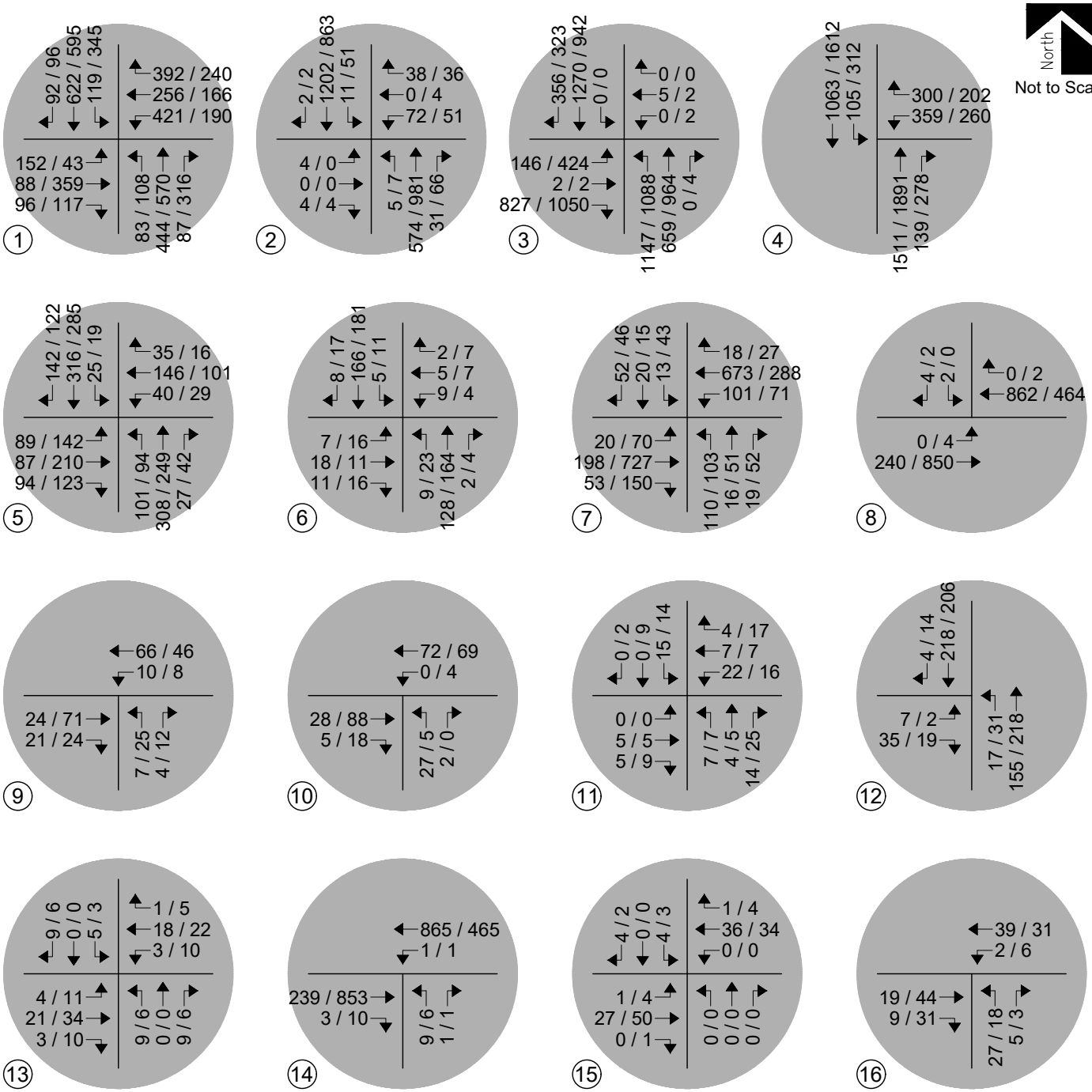


Figure 17
TOTAL TRAFFIC - YEAR 2045
Volumes
(ADT) : Average Daily Traffic



LEGEND

Study Intersection Volumes

Figure 18
TOTAL TRAFFIC - YEAR 2045
Volumes
AM / PM Peak Hour

Year 2030 Total Traffic Queues

Intersection		Turn Movement		Existing Turn Lane Length (feet)	AM Peak Hour 95th Percentile Queue Length (feet)	PM Peak Hour 95th Percentile Queue Length (feet)	Recommended Turn Lane Length (feet)
Signalized Intersections							
1	State Highway 83 / Hodgen Road	EB	L	420' + 180'(T)	93'	34'	420' + 180'(T)
			T	-	57'	191'	-
			R	420' + 180'(T)	4'	15'	420' + 180'(T)
		WB	L	350' + 115'(T)	305'	148'	350' + 115'(T)
			T	-	138'	94'	-
			R	350' + 155'(T)	59'	47'	350' + 155'(T)
		NB	L	120' + 85'(T)	25'	29'	120' + 85'(T)
			T	-	155'	204'	-
			R	650' + 260'(T)	3'	35'	650' + 260'(T)
		SB	L	525' + 140'(T)	31'	79'	525' + 140'(T)
			T,R	-	267'	257'	-
3	State Highway 83 / North Gate Bouldvard	EB	L	225' + 180'(T)	115'	397'	445' + 180'(T)
			T	-	5'	5'	-
			R	285'	44'	49'	285'
		WB	L,T,R	-	8'	6'	-
		NB	L	900' + 230'(T)	205'	136'	900' + 230'(T)
			T,R	-	69'	104'	-
		SB	L	750' + 110'(T)	0'	0'	750' + 110'(T)
			T	-	282'	198'	-
			R	730' + 125'(T)	52'	50'	730' + 125'(T)
4	State Highway 83 / Shoup Road	WB	L	500' + 100'(T)	210'	156'	500' + 100'(T)
			R	-	54'	47'	-
		NB	T	-	316'	501'	-
			R	710' + 185'(T)	26'	39'	710' + 185'(T)
		SB	L	980' + 150'(T)	32'	126'	980' + 150'(T)
			T	-	355'	206'	-
5	Black Forest Road / Shoup Road	EB	L	-	59'	86'	235' + 140'(T)
			T	-	55'	113'	-
			R	-	30'	35'	235' + 140'(T)
		WB	L,T,R	-	115'	83'	-
		NB	L	-	26'	20'	295' + 180'(T)
			T,R	-	68'	58'	-
		SB	L,T	-	74'	63'	-
			R	-	15'	13'	295' + 180'(T)
Potential Signalized Intersections							
2	*State Highway 83 / Stagecoach Road*	*EB*	*L,T,R*	-	*0'*	*0'*	-
		WB	*L,T,R*	-	*30'*	*44'*	-
		NB	*L,T,R*	-	*78'*	*210'*	-
		SB	*L,T,R*	-	*229'*	*180'*	-

Key: x2 = Dual Turn Lanes.
T = Approach Taper.

Year 2030 Total Traffic Queues

Intersection		Turn Movement		Existing Turn Lane Length (feet)	AM Peak Hour 95th Percentile Queue Length (feet)	PM Peak Hour 95th Percentile Queue Length (feet)	Recommended Turn Lane Length (feet)
Stop-Controlled Intersections							
6	Black Forest Road / Old Stagecoach Road	EB	L,T,R	-	3'	3'	-
		WB	L,T,R	-	0'	3'	-
		NB	L	-	0'	0'	235' + 200'(T)
			T,R	-	0'	0'	-
		SB	L,T,R	-	0'	0'	-
7	Black Forest Road / Hodgen Road	EB	L	400' + 275'(T)	3'	3'	400' + 275'(T)
			T	-	0'	0'	-
			R	335' + 275'(T)	0'	0'	335' + 275'(T)
		WB	L	280' + 225'(T)	0'	0'	280' + 225'(T)
			T,R	-	0'	0'	-
		NB	L	125'	3'	3'	125'
			T,R	-	0'	0'	-
		SB	L	65' + 25'(T)	3'	10'	65' + 25'(T)
			T,R	-	8'	5'	-
8	Black Forrest Road / Hodgen Road	EB	L,T	-	0'	0'	-
			R	260' + 240'(T)	0'	0'	260' + 240'(T)
		WB	L	290' + 200'(T)	5'	5'	290' + 200'(T)
			T,R	-	0'	0'	-
		NB	L,T,R	-	25'	43'	-
		SB	L,T,R	-	0'	0'	-
11	Vessey Road / Holmes Road	EB	L,T,R	-	0'	0'	-
		WB	L,T,R	-	3'	3'	-
		NB	L,T,R	-	0'	0'	-
		SB	L,T,R	-	0'	0'	-
12	Black Forest Road / Vessey Road	EB	L,R	-	3'	3'	-
		NB	L,T	-	0'	3'	-
		SB	T,R	-	0'	0'	-
14	Rubble Drive / Hodgen Road	EB	T,R	-	0'	0'	-
		WB	L,T	-	0'	0'	-
		NB	L,R	-	3'	3'	-
15	Old Stagecoach Road / Fringe Place / Park Access	EB	L,T,R	-	0'	0'	-
		WB	L,T,R	-	0'	0'	-
		NB	L,T,R	-	0'	0'	-
		SB	L,T,R	-	0'	0'	-
16	Old Stagecoach Road / Sandbagger Drive	EB	T,R	-	0'	0'	-
		WB	L,T	-	0'	0'	-
		NB	L	-	3'	3'	115' + 120'(T)
			R	-	3'	3'	-

Key: x2 = Dual Turn Lanes.
T = Approach Taper.

Year 2030 Total Traffic Queues

Intersection		Turn Movement		Existing Turn Lane Length (feet)	AM Peak Hour 95th Percentile Queue Length (feet)	PM Peak Hour 95th Percentile Queue Length (feet)	Recommended Turn Lane Length (feet)
Roundabout Intersections							
2	State Highway 83 / Stagecoach Road	EB	L,T,R	-	0'	0'	-
		WB	L,T,R	-	0'	0'	-
		NB	L,T,R	-	25'	100'	-
		SB	L,T,R	-	150'	75'	-
9	Old Stagecoach Road / Allen Ranch Road	EB	T,R	-	0'	0'	-
		WB	L,T	-	0'	0'	-
		NB	L,R	-	0'	0'	-
10	Old Stagecoach Road / Shortwall Drive	EB	T,R	-	0'	0'	-
		WB	L,T	-	0'	0'	-
		NB	L,R	-	0'	0'	-
13	Old Stagecoach Road / Rubble Drive	EB	L,T,R	-	0'	0'	-
		WB	L,T,R	-	0'	0'	-
		NB	L,T,R	-	0'	0'	-
		SB	L,T,R	-	0'	0'	-

Key: x2 = Dual Turn Lanes.
T = Approach Taper.

Year 2045 Total Traffic Queues

Intersection		Turn Movement		Existing Turn Lane Length (feet)	AM Peak Hour 95th Percentile Queue Length (feet)	PM Peak Hour 95th Percentile Queue Length (feet)	Recommended Turn Lane Length (feet)
Signalized Intersections							
1	State Highway 83 / Hodgen Road	EB	L	420' + 180'(T)	252'	58'	420' + 180'(T)
			T	-	103'	376'	-
			R	420' + 180'(T)	42'	44'	420' + 180'(T)
		WB	L	350' + 115'(T)	221'	155'	270'x2 + 240'(T)
			T	-	273'	170'	-
			R	350' + 155'(T)	112'	60'	350' + 155'(T)
		NB	L	120' + 85'(T)	47'	65'	120' + 85'(T)
			T	-	330'	535'	-
			R	650' + 260'(T)	26'	146'	650' + 260'(T)
		SB	L	525' + 140'(T)	30'	88'	350'x2 + 300'(T)
			T	-	529'	541'	-
			R	-	37'	30'	400' + 300'(T)
3	State Highway 83 / North Gate Bouldvard	EB	L	225' + 180'(T)	141'	451'	445' + 180'(T)
			T	-	7'	6'	-
			R	285'	179'	214'	285'x2 + 180'(T)
		WB	L,T,R	-	11'	8'	-
		NB	L	900' + 230'(T)	542'	526'	500'x2 + 300'(T)
			T,R	-	102'	236'	-
		SB	L	750' + 110'(T)	0'	0'	750' + 110'(T)
			T	-	518'	400'	-
			R	730' + 125'(T)	51'	59'	730' + 125'(T)
4	State Highway 83 / Shoup Road	WB	L	500' + 100'(T)	122'	122'	245'x2 + 200'(T)
			R	-	165'	63'	-
		NB	T	-	324'	471'	-
			R	710' + 185'(T)	33'	44'	710' + 185'(T)
		SB	L	980' + 150'(T)	72'	286'	980' + 150'(T)
			T	-	157'	182'	-
5	Black Forest Road / Shoup Road	EB	L	-	79'	120'	285' + 140'(T)
			T	-	71'	159'	-
			R	-	35'	39'	285' + 140'(T)
		WB	L	-	40'	34'	185' + 140'(T)
			T,R	-	127'	89'	-
		NB	L	-	41'	45'	295' + 180'(T)
			T,R	-	115'	115'	-
		SB	L	-	14'	13'	245' + 180'(T)
			T	-	109'	116'	-
			R	-	20'	21'	345' + 180'(T)
7	Black Forest Road / Hodgen Road	EB	L	400' + 275'(T)	12'	26'	400' + 275'(T)
			T	-	102'	476'	-
			R	335' + 275'(T)	4'	26'	335' + 275'(T)
		WB	L	280' + 225'(T)	39'	26'	280' + 225'(T)
			T,R	-	476'	148'	-
		NB	L	125'	115'	113'	125'
			T,R	-	34'	79'	-
		SB	L	65' + 25'(T)	23'	56'	65' + 25'(T)
			T,R	-	47'	44'	-

Key: x2 = Dual Turn Lanes.
T = Approach Taper.

Year 2045 Total Traffic Queues

Intersection		Turn Movement		Existing Turn Lane Length (feet)	AM Peak Hour 95th Percentile Queue Length (feet)	PM Peak Hour 95th Percentile Queue Length (feet)	Recommended Turn Lane Length (feet)
Potential Signalized Intersections							
2	*State Highway 83 / Stagecoach Road*	*EB*	*L,T,R*	-	*0'*	*0'*	-
		WB	*L,T,R*	-	*41'*	*63'*	-
		NB	*L,T*	-	*59'*	*140'*	-
			T,R	-	*0'*	*0'*	-
		SB	*L,T*	-	*153'*	*124'*	-
			T,R	-	*0'*	*0'*	-
Stop-Controlled Intersections							
6	Black Forest Road / Old Stagecoach Road	EB	L,T,R	-	5'	8'	-
		WB	L,T,R	-	3'	3'	-
		NB	L	-	0'	0'	235' + 200'(T)
			T,R	-	0'	0'	-
		SB	L,T,R	-	0'	0'	-
8	Black Forrest Road / Hodgen Road	EB	L,T	-	0'	0'	-
		WB	T,R	-	0'	0'	-
		SB	L,R	-	3'	0'	-
11	Vessey Road / Holmes Road	EB	L,T,R	-	0'	0'	-
		WB	L,T,R	-	3'	3'	-
		NB	L,T,R	-	0'	0'	-
		SB	L,T,R	-	0'	0'	-
12	Black Forest Road / Vessey Road	EB	L,R	-	5'	3'	-
		NB	L	-	0'	3'	245' + 180'(T)
			T	-	0'	0'	-
		SB	T,R	-	0'	0'	-
14	Rubble Drive / Hodgen Road	EB	T,R	-	0'	0'	-
		WB	L,T	-	0'	0'	-
		NB	L,R	-	5'	5'	-
15	Old Stagecoach Road / Fringe Place / Park Access	EB	L,T,R	-	0'	0'	-
		WB	L,T,R	-	0'	0'	-
		NB	L,T,R	-	0'	0'	-
		SB	L,T,R	-	0'	0'	-
16	Old Stagecoach Road / Sandbagger Drive	EB	T,R	-	0'	0'	-
		WB	L,T	-	0'	0'	-
		NB	L	-	3'	3'	115' + 120'(T)
			R	-	3'	3'	-

Key: x2 = Dual Turn Lanes.
T = Approach Taper.

Year 2045 Total Traffic Queues

Intersection		Turn Movement		Existing Turn Lane Length (feet)	AM Peak Hour 95th Percentile Queue Length (feet)	PM Peak Hour 95th Percentile Queue Length (feet)	Recommended Turn Lane Length (feet)
Roundabout Intersections							
2	State Highway 83 / Stagecoach Road	EB	L,T,R	-	0'	0'	-
		WB	L,T,R	-	25'	25'	-
		NB	L,T	-	25'	50'	-
			T,R	-	25'	50'	-
		SB	L,T	-	75'	50'	-
			T,R	-	75'	50'	-
9	Old Stagecoach Road / Allen Ranch Road	EB	T,R	-	0'	0'	-
		WB	L,T	-	0'	0'	-
		NB	L,R	-	0'	0'	-
10	Old Stagecoach Road / Shortwall Drive	EB	T,R	-	0'	0'	-
		WB	L,T	-	0'	0'	-
		NB	L,R	-	0'	0'	-
13	Old Stagecoach Road / Rubble Drive	EB	L,T,R	-	0'	0'	-
		WB	L,T,R	-	0'	0'	-
		NB	L,T,R	-	0'	0'	-
		SB	L,T,R	-	0'	0'	-

Key: x2 = Dual Turn Lanes.
T = Approach Taper.

APPENDIX B

Flying Horse North Major PUD Amendment
Intersection & Roadway Improvement Updates Memorandum

SM ROCHA, LLC
TRAFFIC & TRANSPORTATION ENGINEERING

MEMORANDUM

TO: Drew Balsick
Flying Horse Development

FROM: Brandon Wilson, PE
SM ROCHA, LLC

DATE: July 9, 2026

SUBJECT: Flying Horse North Major PUD Amendment – Intersection & Roadway Improvement Updates

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This memorandum and attached information are provided to summarize proposed changes needed for the recommended roadway and intersection improvements associated with the study area within the approved Flying Horse North Major PUD Amendment Master Traffic Impact Study[1].

Analysis Objective

- Provide background information to understand the history of the proposed development site, including previously approved roadway and intersection improvement recommendations.
- Referencing the approved Master TIS, jurisdictional requirements, master planned projects, and current roadway conditions, evaluate the validity of roadway and intersection improvement recommendations as presented within the approved Master TIS, and propose any changes to reflect the latest-and-greatest information.

Site Development Background

In 2016, a rezone application was approved to allow for 1,418 acres of land to be rezoned from RR-5 (Residential Rural) into a PUD zoning district to allow for the construction of 283 single-family residential lots between 2.5 and 5 acres in size in additional to an 18-hole golf course (PCD File No. PUD162). The accompanying Updated Traffic Impact Analysis[2] estimated 3,337 daily trips generated by the PUD Preliminary Plan, resulting in various necessary roadway and intersection improvements to meet governing criteria. A list of these improvements is provided for reference in Attachment A.

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[1] Flying Horse North Major PUD Amendment: Master Traffic Impact Study, SM Rocha, LLC, January 14, 2026.
[2] Flying Horse North: Updated Traffic Impact Analysis, LSC Transportation Consultants, Inc., July 21, 2016.

In September 2018, the Flying Horse North Preliminary Plan (PCD File No. SP-17-012) and Flying Horse North Filing No. 1 final plat (SF-18-001) were approved to allow for the construction of 80 single-family residential lots and the 18-hole golf course on approximately 557 acres of land. Flying Horse North Filing 1 included the construction of Old Stagecoach Road from State Highway 83 east to Black Forest Road, as well as all intersection improvements at State Highway 83 and Old Stagecoach Road shown in Attachment B.

In 2022, a Sketch Plan application was proposed to include a mix of single-family and multifamily residential land uses as well as various commercial and lodging uses on approximately 913 acres of land (PCD File No. SKP223), bringing the total developable acreage for Flying Horse North to approximately 1,459 acres. The Sketch Plan included 846 residential lots (an increase of 644 lots when compared to the 2016 PUD Preliminary Plan), a luxury resort hotel supporting 275 total rooms, a fitness center, supporting amenities for the golf course clubhouse, and various commercial uses located near Black Forest Road and Hodgen Road. Compared to the 2016 PUD Preliminary Plan, the accompanying Sketch Plan Master TIS[3] projected how the changes in land use and density would result in approximately 16,379 newly generated vehicle trips, or an approximate 400 percent increase in site-generated trips when compared to the 2016 PUD Preliminary Plan. This Sketch Plan application received formal County approval in December 2022. The resulting recommended roadway and intersection improvements associated with the Sketch Plan application are provided for reference in Attachment C.

Next, in 2024, a combined PUD/Preliminary Plan application was proposed as the first stage of implementing the approved Flying Horse North Sketch Plan (PCD File No. PUDSP234). This application considered the construction for 834 residential lots, a luxury resort hotel, a fitness center, and various supporting commercial uses. As a result, warranted infrastructure improvements were significant enough that development of the PUD/Preliminary Plan was not feasible. Additionally, the luxury resort hotel had received strong opposition from Planning Commission and neighbors, therefore had been removed from the Sketch Plan shortly thereafter. The proposal for multifamily housing uses was also removed. Nonetheless, the PUD/Preliminary Plan application was withdrawn. The withdrawn recommended roadway and intersection improvements associated with the previously proposed PUD/Preliminary Plan application are provided for reference in Attachment D.

Since then, the County has approved development for 299 additional single-family residential lots, as well as expansion of the clubhouse for the Flying Horse North golf course.

With the completed construction of that described above, all recommended improvements identified within the 2016 PUD Preliminary Plan's Updated TIA (Attachment A) have been satisfied.

A new application is now being proposed to amend the 2016 PUD Preliminary Plan to allow for a minor density increase of 16 residential lots, increasing the overall density from 283 lots to 299 lots (PCD File No. PUDSP252). As provided within the approved Flying Horse North Major PUD Amendment Master TIS, a summary of recommended roadway and intersection improvements are provided for reference in Attachment E.

[3] Flying Horse North: Master Traffic Impact Study, SM Rocha, LLC, October 27, 2022.

It is recognized that while the Major PUD Amendment in only proposing a minor increase in density by 16 lots, its accompanying Master TIS recommends a significant increase of improvements to the roadway network when compared to the 2016 PUD Preliminary Plan. This is due to the fact that traffic patterns and volumes have changed since the 2016 PUD Preliminary Plan was approved as a result of new developments and regional growth for the overall area. Therefore, an updated list of recommended improvements is being proposed that more accurately reflects appropriate improvements, timelines, impacts, and responsibilities. For example, where dedicated turn lanes have been recommended at the Black Forest Road and Shoup Road intersection, these improvements are believed to be regional considering how this intersection is off-site (three miles south of the development site), little to no site-generated trips are being added, and since this development will also be paying their fair share of road impact fees, which will be applied directly towards master planned projects.

Please note that the impact for each listed improvement created by the Flying Horse North Major PUD Amendment was calculated by comparing Year 2045 background and total traffic volumes from the accompanying Master Traffic Impact Study. For recommended intersection improvements, projected intersection turning movement volumes were compared. For recommended roadway improvements, projected 24-hour volumes were compared.

Intersection Improvements

INTERSECTION		IMPROVEMENT	TIMING	PERCENT DEVELOPMENT IMPACT	RESPONSIBILITY
1	State Highway 83 / Hodgen Road	Construct dual westbound left turn deceleration lanes	When left turn movement >300 vehicles per peak hour (projected to occur by Year 2045)	0%	Regional - El Paso County / Others
		Construct dual southbound left turn deceleration lanes		<1%	Regional - CDOT
		Construct southbound right turn deceleration lane	When right turn movement >25 vehicles per peak hour (currently met in Existing conditions)	0%	Regional - CDOT
2	State Highway 83 / Stagecoach Road	Implement Roundabout-Control	Assumed by Year 2030	2%	Regional - CDOT
3	State Highway 83 / North Gate Boulevard	Lengthen eastbound left turn deceleration lane	When 95th percentile queues exceed existing lane lengths (projected to occur by Year 2030)	<1%	City of Colorado Springs and CDOT
		Construct dual eastbound right turn deceleration lanes	Assumed by Year 2030		
		Construct dual northbound left turn deceleration lanes	When left turn movement >300 vehicles per peak hour (currently met in Existing conditions)	0%	
4	State Highway 83 / Shoup Road	Construct dual westbound left turn deceleration lanes	When left turn movement >300 vehicles per peak hour (projected to occur by Year 2045)	<1%	Regional - City of Colorado Springs
5	Black Forest Road / Shoup Road (1)	Construct eastbound left turn deceleration lane	When left turn movement ≥25 vehicles per peak hour (currently met in Existing conditions)	2%	Regional - El Paso County / Others
		Construct eastbound right turn deceleration lane	When right turn movement ≥50 vehicles per peak hour (currently met in Existing conditions)	0%	
		Construct westbound left turn deceleration lane	When left turn movement ≥25 vehicles per peak hour (projected to occur by Year 2030)	0%	
		Construct northbound left turn deceleration lane	When left turn movement ≥25 vehicles per peak hour (currently met in Existing conditions)	0%	
		Construct southbound left turn deceleration lane	When left turn movement ≥25 vehicles per peak hour (projected to occur by Year 2045)	13%	
		Construct southbound right turn deceleration lane	When right turn movement ≥50 vehicles per peak hour (currently met in Existing conditions)	2%	
7	Hodgen Road / Black Forest Road / Ridge Run Drive	Implement Traffic Signalization Control (2)	Warranted with Black Forest Road realignment (assumed by Year 2045)	<1%	Regional - El Paso County / Others
8	Hodgen Road / Black Forest Road	Construct northbound left turn deceleration lane (3)	When left turn movement ≥25 vehicles per peak hour (currently met in Existing conditions)	0%	Regional - El Paso County / Others
12	Black Forest Road / Vessey Road	Construct northbound left turn deceleration lane (4)	When left turn movement ≥25 vehicles per peak hour (projected to occur by Year 2030)	41%	Regional - El Paso County / Others
16	Old Stagecoach Road / Sandbagger Drive	Construct south leg of the intersection and implement stop-control	Recently completed	100%	Flying Horse North Developments

Key: (1) = Recommended improvements unlikely due to right-of-way contraints.
(2) = Recommended improvement unlikely due to right-of-way contraints prohibiting realignment of Black Forest Road.
(3) = Improvement not reflected within this analysis to provide conservative operational results.
(4) = Recommended improvement not feasible due to site constraints, including but not limited to: right-of-way contraints for Black Forest Road, offsite roadway, minimal vehicle trips.

Roadway Improvements

ROADWAY	IMPROVEMENT	TIMING	PERCENT DEVELOPMENT IMPACT	RESPONSIBILITY
State Highway 83	Widen to four-lane cross-section from Old North Gate Road to Hodgen Road	Shown in County's MTCP by Year 2045 and in CO 83 ACP	1%	CDOT
	* Widen to six-lane cross-section from Shoup Road to Old North Gate Road			
Hodgen Road	Improve to County's Urban Minor Arterial cross-section from State Highway 83 to Black Forest Road	When ADT >10,000 trips/day (with Final Plat Application(s) / Site Development)	<1%	Regional - El Paso County / Others
	* Improve to County's Urban 4 Lane Principal Arterial cross-section from State Highway 83 to Black Forest Road	When ADT >20,000 trips/day (with Final Plat Application(s) / Site Development)		
Black Forest Road	Eliminate jog in alignment across Hodgen Road	Shown in County's MTCP by Year 2045	0%	Regional - El Paso County / Others
	Rural County road upgrades to Minor Arterial Roadway	When ADT >6,000 trips / day (shown in County's MTCP by Year 2045)	3%	
Shoup Road	Rural County road upgrades to Minor Arterial Roadway	When ADT >6,000 trips/day (shown in County's MTCP by Year 2045)	<1%	Regional - El Paso County / Others
Stagecoach Road and Old Stagecoach Road	Improve to a modified arterial cross-section, to be determined with Developer and County	Recently completed with FHN Filing 1	30%	Flying Horse North Developments
Vessey Road	Improve to County's Urban Local cross-section	When ADT >750 trips/day (by Year 2045)	43%	Regional - El Paso County / Others

Key: * = Improvement not reflected within this analysis to provide conservative operational results.

Conclusion

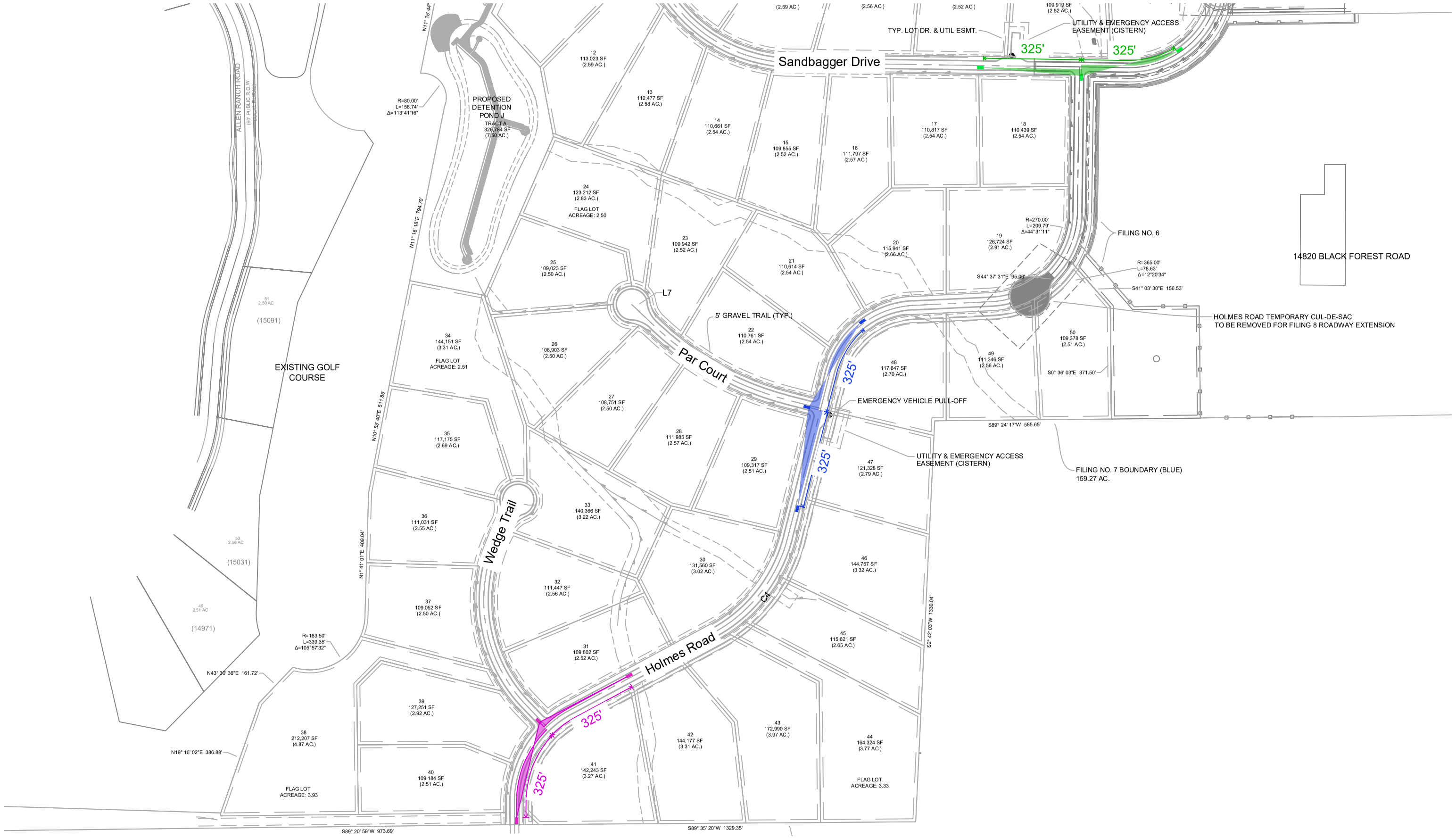
In reference to the approved Flying Horse North Major PUD Amendment Master Traffic Impact Study, jurisdictional requirements, master planned projects, and current roadway conditions, the changes being proposed within the approved Master TIS are believed to be outdated. As a result, proposed recommended improvements have been updated to reflect current conditions.

It is trusted that information provided within this memorandum will assist in the review and approval of the proposed Flying Horse North Major PUD Amendment. We remain available should additional information be needed.

It is emphasized that previously recommended roadway and intersection improvements associated with older development applications, as discussed, are provided for reference in the attachments at the end of this memorandum.

APPENDIX C

Entering Sight Distance Exhibit



FLYING HORSE NORTH FILING 8

Entering Sight Distance Exhibit

SM ROCHA, LLC

Traffic and Transportation Engineering

August 2026

0 300 North

APPENDIX D

Level of Service Definitions

The following information is referenced from the Highway Capacity Manual: A Guide for Multimodal Mobility Analysis, 7th Edition, Transportation Research Board, 2022: Chapter 19 – Signalized Intersections.

Motorized Vehicle Level of Service (LOS) for Signalized Intersections

Levels of service are defined to represent reasonable ranges in control delay.

LOS A Describes operations with a control delay of 10 s/veh or less and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is exceptionally favorable or the cycle length is very short. If it is due to favorable progression, most vehicles arrive during the green indication and travel through the intersection without stopping.

LOS B Describes operations with control delay between 10 and 20 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.

LOS C Describes operations with control delay between 20 and 35 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when progression is favorable or the cycle length is moderate. Individual *cycle failures* (i.e., one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear at this level. The number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping.

LOS D Describes operations with control delay between 35 and 55 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long. Many vehicles stop and individual cycle failures are noticeable.

LOS E Describes operations with control delay between 55 and 80 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.

LOS F Describes operations with control delay exceeding 80 s/veh or a volume-to-capacity ratio greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.

Control Delay (s/veh)	LOS by Volume-to-Capacity Ratio[a]	
	$v/c \leq 1.0$	$v/c > 1.0$
≤ 10	A	F
> 10 – 20	B	F
> 20 – 35	C	F
> 35 – 55	D	F
> 55 – 80	E	F
> 80	F	F

Note: [a] For approach-based and intersectionwide assessments, LOS is defined solely by control delay.

The following information is referenced from the Highway Capacity Manual: A Guide for Multimodal Mobility Analysis, 7th Edition, Transportation Research Board, 2022: Chapter 20 – Two-Way Stop-Controlled Intersections, Chapter 21 – All-Way Stop-Controlled Intersections, and Chapter 22 - Roundabouts.

Motorized Vehicle Level of Service (LOS) for Unsignalized & Roundabout Intersections

LOS is a quantitative stratification of performance measure(s) representing quality of service. Quality of service describes how well a transportation facility or service operates from a traveler's perspective. LOS is measured on an A – F scale, with LOS A representing the best operating conditions from a traveler's perspective.

Control Delay (s/veh)	LOS by Volume-to-Capacity Ratio[a]	
	$v/c \leq 1.0$	$v/c > 1.0$
0 – 10	A	F
> 10 – 15	B	F
> 15 – 25	C	F
> 25 – 35	D	F
> 35 – 50	E	F
> 50	F	F

Note: The LOS criteria apply to each lane on a given approach and to each approach on the minor street. LOS is not calculated for major-street approaches or for the intersection as a whole.

[a] For approaches and intersectionwide assessment, LOS is defined solely by control delay.

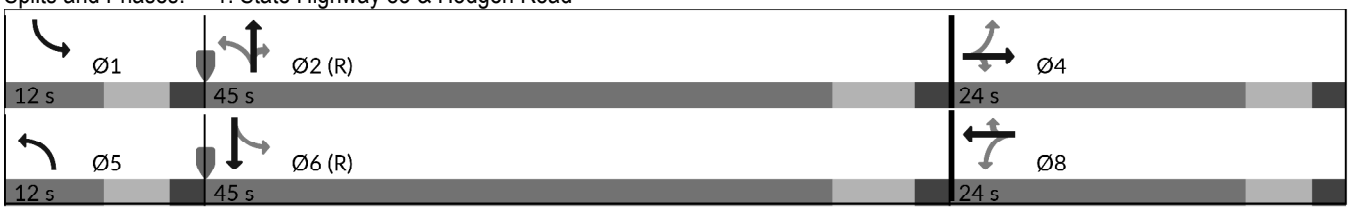
APPENDIX E

Capacity Worksheets

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	97	58	61	270	166	253	50	283	55	77	399
Future Volume (vph)	97	58	61	270	166	253	50	283	55	77	399
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA
Protected Phases		4			8		5	2		1	6
Permitted Phases	4		4	8		8	2		2	6	
Detector Phase	4	4	4	8	8	8	5	2	2	1	6
Switch Phase											
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	6.0	35.0	35.0	6.0	35.0
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	14.0	12.0	42.0	42.0	12.0	42.0
Total Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	12.0	45.0	45.0	12.0	45.0
Total Split (%)	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%	14.8%	55.6%	55.6%	14.8%	55.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	18.0	18.0	18.0	18.0	18.0	18.0	45.0	38.0	38.0	45.0	38.0
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.22	0.22	0.56	0.47	0.47	0.56	0.47
v/c Ratio	0.55	0.20	0.19	0.94	0.41	0.49	0.14	0.37	0.08	0.16	0.63
Control Delay (s/veh)	37.3	27.3	2.8	73.7	30.6	7.2	6.8	15.4	0.4	6.8	20.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	37.3	27.3	2.8	73.7	30.6	7.2	6.8	15.4	0.4	6.8	20.0
LOS	D	C	A	E	C	A	A	B	A	A	B
Approach Delay (s/veh)		24.9			38.9			12.2			18.1
Approach LOS		C			D			B			B

Intersection Summary	
Cycle Length: 81	
Actuated Cycle Length: 81	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 75	
Control Type: Pretimed	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay (s/veh): 25.0	Intersection LOS: C
Intersection Capacity Utilization 76.6%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 1: State Highway 83 & Hodgen Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	139	83	87	276	169	258	55	311	60	91	538
v/c Ratio	0.55	0.20	0.19	0.94	0.41	0.49	0.14	0.37	0.08	0.16	0.63
Control Delay (s/veh)	37.3	27.3	2.8	73.7	30.6	7.2	6.8	15.4	0.4	6.8	20.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	37.3	27.3	2.8	73.7	30.6	7.2	6.8	15.4	0.4	6.8	20.0
Queue Length 50th (ft)	65	36	0	139	75	0	10	101	0	17	199
Queue Length 95th (ft)	93	56	0	#286	134	62	23	164	3	33	279
Internal Link Dist (ft)		824			1611			1078			1286
Turn Bay Length (ft)	420		420	350		350	120		650	525	
Base Capacity (vph)	253	406	453	293	410	530	406	840	799	582	851
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.20	0.19	0.94	0.41	0.49	0.14	0.37	0.08	0.16	0.63

Intersection Summary

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

Intersection	
Intersection Delay, s/veh	11.8
Intersection LOS	B

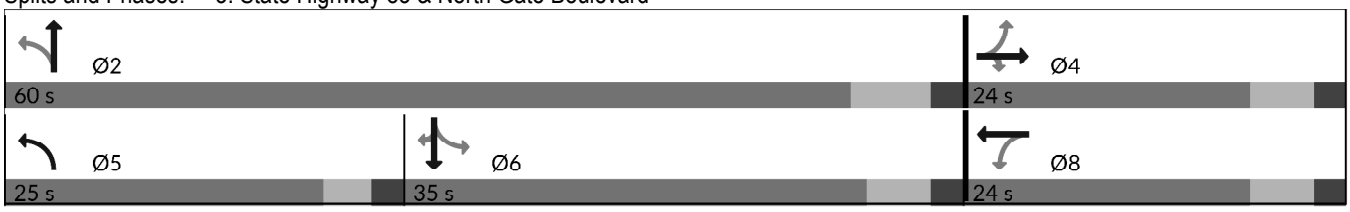
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	8	80	429	960
Demand Flow Rate, veh/h	10	88	464	983
Vehicles Circulating, veh/h	1038	444	13	60
Vehicles Exiting, veh/h	5	33	1035	472
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	9.7	5.5	6.0	14.9
Approach LOS	A	A	A	B

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	10	88	464	983
Cap Entry Lane, veh/h	479	877	1362	1298
Entry HV Adj Factor	0.800	0.909	0.924	0.977
Flow Entry, veh/h	8	80	429	960
Cap Entry, veh/h	383	798	1258	1267
V/C Ratio	0.021	0.100	0.341	0.757
Control Delay, s/veh	9.7	5.5	6.0	14.9
LOS	A	A	A	B
95th %tile Queue, veh	0	0	2	8

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	120	1	558	3	773	422	817	271
Future Volume (vph)	120	1	558	3	773	422	817	271
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	NA	Perm
Protected Phases		4		8	5	2	6	
Permitted Phases	4		4		2			6
Detector Phase	4	4	4	8	5	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.0	11.0	11.0	11.0	10.0	12.0	11.0	11.0
Total Split (s)	24.0	24.0	24.0	24.0	25.0	60.0	35.0	35.0
Total Split (%)	28.6%	28.6%	28.6%	28.6%	29.8%	71.4%	41.7%	41.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	5.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	5.0	7.0	6.0	6.0
Lead/Lag					Lead		Lag	Lag
Lead-Lag Optimize?					Yes		Yes	Yes
Recall Mode	None	None	None	None	Max	Max	Max	Max
Act Effct Green (s)	13.2	13.2	13.2	13.2	55.1	53.1	29.1	29.1
Actuated g/C Ratio	0.17	0.17	0.17	0.17	0.69	0.67	0.37	0.37
v/c Ratio	0.61	0.00	0.63	0.04	0.85	0.22	0.73	0.40
Control Delay (s/veh)	42.6	26.0	5.8	27.0	26.2	5.9	26.5	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	42.6	26.0	5.8	27.0	26.2	5.9	26.5	4.2
LOS	D	C	A	C	C	A	C	A
Approach Delay (s/veh)		12.3		27.0		19.0	21.0	
Approach LOS		B		C		B	C	

Intersection Summary	
Cycle Length: 84	
Actuated Cycle Length: 79.4	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay (s/veh): 18.3	Intersection LOS: B
Intersection Capacity Utilization 72.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 3: State Highway 83 & North Gate Boulevard



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	132	1	613	12	920	502	950	315
v/c Ratio	0.61	0.00	0.63	0.04	0.85	0.22	0.73	0.40
Control Delay (s/veh)	42.6	26.0	5.8	27.0	26.2	5.9	26.5	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	42.6	26.0	5.8	27.0	26.2	5.9	26.5	4.2
Queue Length 50th (ft)	66	0	0	5	162	47	217	0
Queue Length 95th (ft)	125	5	46	5	#250	72	291	45
Internal Link Dist (ft)		997		136		1617	2154	
Turn Bay Length (ft)	225		285		900			730
Base Capacity (vph)	297	431	1107	431	1082	2300	1295	779
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.00	0.55	0.03	0.85	0.22	0.73	0.40

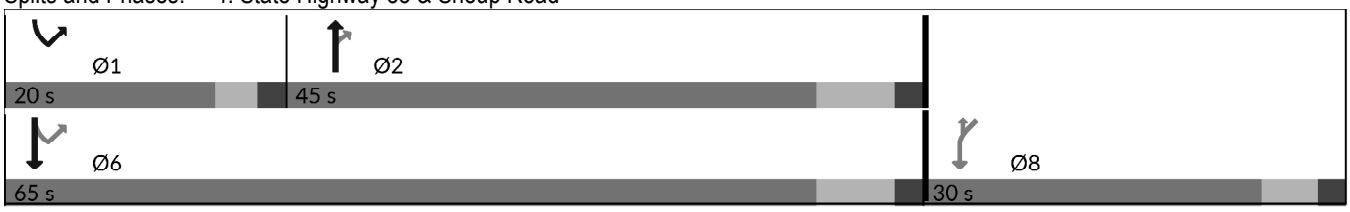
Intersection Summary

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

Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	970	89	67	1326	230	192
Future Volume (vph)	970	89	67	1326	230	192
Turn Type	NA	Perm	pm+pt	NA	Perm	Perm
Protected Phases	2		1	6		
Permitted Phases		2	6		8	8
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	20.0	20.0	4.0	20.0	4.0	4.0
Minimum Split (s)	27.5	27.5	9.0	27.5	10.0	10.0
Total Split (s)	45.0	45.0	20.0	65.0	30.0	30.0
Total Split (%)	47.4%	47.4%	21.1%	68.4%	31.6%	31.6%
Yellow Time (s)	5.5	5.5	3.0	5.5	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	5.0	7.5	6.0	6.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	Max	Max	None	Max	None	None
Act Effct Green (s)	48.0	48.0	60.1	57.6	16.9	16.9
Actuated g/C Ratio	0.54	0.54	0.68	0.65	0.19	0.19
v/c Ratio	0.59	0.11	0.23	0.64	0.70	0.45
Control Delay (s/veh)	16.9	3.3	7.4	11.3	43.9	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	16.9	3.3	7.4	11.3	43.9	7.5
LOS	B	A	A	B	D	A
Approach Delay (s/veh)	15.7			11.1	27.4	
Approach LOS	B			B	C	

Intersection Summary	
Cycle Length: 95	
Actuated Cycle Length: 88.1	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay (s/veh): 15.2	Intersection LOS: B
Intersection Capacity Utilization 60.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: State Highway 83 & Shoup Road



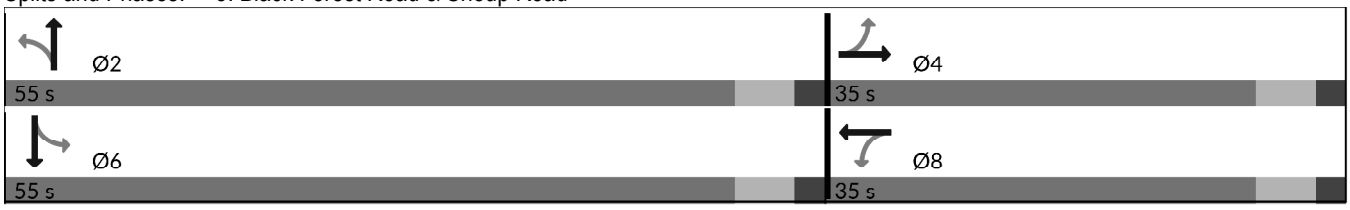
Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Group Flow (vph)	1102	101	74	1473	253	211
v/c Ratio	0.59	0.11	0.23	0.64	0.70	0.45
Control Delay (s/veh)	16.9	3.3	7.4	11.3	43.9	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	16.9	3.3	7.4	11.3	43.9	7.5
Queue Length 50th (ft)	222	0	12	228	133	0
Queue Length 95th (ft)	343	26	34	372	212	55
Internal Link Dist (ft)	1042			1734	675	
Turn Bay Length (ft)		710	980			500
Base Capacity (vph)	1874	901	451	2315	513	585
Starvation Cap Reductn	0	0	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	0.59	0.11	0.16	0.64	0.49	0.36

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	57	56	26	94	65	198	16	203
Future Volume (vph)	57	56	26	94	65	198	16	203
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	12.0	12.0	12.0	12.0
Minimum Split (s)	14.0	14.0	14.0	14.0	18.0	18.0	18.0	18.0
Total Split (s)	35.0	35.0	35.0	35.0	55.0	55.0	55.0	55.0
Total Split (%)	38.9%	38.9%	38.9%	38.9%	61.1%	61.1%	61.1%	61.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		6.0		6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Max	Max	Max	Max
Act Effct Green (s)		14.1		14.1		49.2		49.2
Actuated g/C Ratio		0.19		0.19		0.65		0.65
v/c Ratio		0.70		0.50		0.35		0.44
Control Delay (s/veh)		37.1		30.7		8.0		8.2
Queue Delay		0.0		0.0		0.0		0.0
Total Delay (s/veh)		37.1		30.7		8.0		8.2
LOS		D		C		A		A
Approach Delay (s/veh)		37.1		30.7		8.0		8.2
Approach LOS		D		C		A		A

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 75.4	
Natural Cycle: 40	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay (s/veh): 16.2	Intersection LOS: B
Intersection Capacity Utilization 63.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 5: Black Forest Road & Shoup Road



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	199	154	318	470
v/c Ratio	0.70	0.50	0.35	0.44
Control Delay (s/veh)	37.1	30.7	8.0	8.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay (s/veh)	37.1	30.7	8.0	8.2
Queue Length 50th (ft)	79	60	63	90
Queue Length 95th (ft)	143	113	139	122
Internal Link Dist (ft)	965	1070	1292	9145
Turn Bay Length (ft)				
Base Capacity (vph)	556	624	904	1078
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.36	0.25	0.35	0.44

Intersection Summary

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Vol, veh/h	8	2	25	6	3	1	8	82	1	3	106	7
Future Vol, veh/h	8	2	25	6	3	1	8	82	1	3	106	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	44	44	44	67	67	67	78	78	78	80	80	80
Heavy Vehicles, %	100	0	25	0	0	0	0	10	0	100	5	0
Mvmt Flow	18	5	57	9	4	1	10	105	1	4	133	9

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	272	271	137	269	275	106	141	0	0	106	0	0
Stage 1	144	144	-	126	126	-	-	-	-	-	-	-
Stage 2	128	127	-	142	149	-	-	-	-	-	-	-
Critical Hdwy	8.1	6.5	6.45	7.1	6.5	6.2	4.1	-	-	5.1	-	-
Critical Hdwy Stg 1	7.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	7.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	4.4	4	3.525	3.5	4	3.3	2.2	-	-	3.1	-	-
Pot Cap-1 Maneuver	521	639	854	688	636	954	1454	-	-	1045	-	-
Stage 1	671	781	-	882	795	-	-	-	-	-	-	-
Stage 2	687	795	-	865	778	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	511	631	854	631	628	954	1454	-	-	1045	-	-
Mov Cap-2 Maneuver	511	631	-	631	628	-	-	-	-	-	-	-
Stage 1	669	778	-	876	789	-	-	-	-	-	-	-
Stage 2	677	789	-	800	775	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	10.55	10.65	0.66	0.22
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	158	-	-	728	652	46	-	-
HCM Lane V/C Ratio	0.007	-	-	0.109	0.023	0.004	-	-
HCM Ctrl Dly (s/v)	7.5	0	-	10.6	10.7	8.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.4	0.1	0	-	-

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	131	2	0	498	12	13	0	0	8	0	46
Future Vol, veh/h	16	131	2	0	498	12	13	0	0	8	0	46
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	400	-	335	280	-	-	-	-	-	65	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	70	70	70	91	91	91	75	75	75	63	63	63
Heavy Vehicles, %	42	4	40	0	4	0	14	0	0	9	0	0
Mvmt Flow	23	187	3	0	547	13	17	0	0	13	0	73

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	560	0	0	190	0	0	780	793	187	787	790	554
Stage 1	-	-	-	-	-	-	233	233	-	554	554	-
Stage 2	-	-	-	-	-	-	547	560	-	233	236	-
Critical Hdwy	4.52	-	-	4.1	-	-	7.24	6.5	6.2	7.19	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.24	5.5	-	6.19	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.24	5.5	-	6.19	5.5	-
Follow-up Hdwy	2.578	-	-	2.2	-	-	3.626	4	3.3	3.581	4	3.3
Pot Cap-1 Maneuver	839	-	-	1396	-	-	299	323	860	301	325	536
Stage 1	-	-	-	-	-	-	744	716	-	505	517	-
Stage 2	-	-	-	-	-	-	500	514	-	755	714	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	839	-	-	1396	-	-	251	314	860	293	316	536
Mov Cap-2 Maneuver	-	-	-	-	-	-	251	314	-	293	316	-
Stage 1	-	-	-	-	-	-	724	696	-	505	517	-
Stage 2	-	-	-	-	-	-	432	514	-	734	694	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	1.01	0	20.41	13.52
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	251	-	839	-	-	1396	-	-	293	536
HCM Lane V/C Ratio	0.069	-	0.027	-	-	-	-	-	0.043	0.136
HCM Ctrl Dly (s/v)	20.4	0	9.4	-	-	0	-	-	17.8	12.8
HCM Lane LOS	C	A	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.2	-	0.1	-	-	0	-	-	0.1	0.5

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	124	31	66	496	0	58	0	24	1	0	2
Future Vol, veh/h	0	124	31	66	496	0	58	0	24	1	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	260	290	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	95	95	95	90	90	90	75	75	75
Heavy Vehicles, %	100	9	4	2	5	100	8	0	10	0	0	0
Mvmt Flow	0	149	37	69	522	0	64	0	27	1	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	522	0	0	187	0	0	810	810	149	810	848	522
Stage 1	-	-	-	-	-	-	149	149	-	661	661	-
Stage 2	-	-	-	-	-	-	661	661	-	149	187	-
Critical Hdwy	5.1	-	-	4.12	-	-	7.18	6.5	6.3	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.18	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.18	5.5	-	6.1	5.5	-
Follow-up Hdwy	3.1	-	-	2.218	-	-	3.572	4	3.39	3.5	4	3.3
Pot Cap-1 Maneuver	688	-	-	1388	-	-	291	316	876	301	301	559
Stage 1	-	-	-	-	-	-	839	777	-	455	463	-
Stage 2	-	-	-	-	-	-	442	463	-	858	749	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	688	-	-	1388	-	-	275	300	876	277	286	559
Mov Cap-2 Maneuver	-	-	-	-	-	-	275	300	-	277	286	-
Stage 1	-	-	-	-	-	-	839	777	-	432	440	-
Stage 2	-	-	-	-	-	-	418	440	-	832	749	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0	0.91	19.16	13.71
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	345	688	-	-	1388	-	-	417
HCM Lane V/C Ratio	0.264	-	-	-	0.05	-	-	0.01
HCM Ctrl Dly (s/v)	19.2	0	-	-	7.7	-	-	13.7
HCM Lane LOS	C	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	1	0	-	-	0.2	-	-	0

Intersection	
Intersection Delay, s/veh	3.5
Intersection LOS	A

Approach	EB	WB	NB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	64	60	12
Demand Flow Rate, veh/h	74	70	13
Vehicles Circulating, veh/h	11	8	26
Vehicles Exiting, veh/h	67	31	59
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	3.5	3.5	3.0
Approach LOS	A	A	A

Lane	Left	Left	Left
Designated Moves	TR	LT	LR
Assumed Moves	TR	LT	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
A (Intercept)	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	74	70	13
Cap Entry Lane, veh/h	1364	1369	1344
Entry HV Adj Factor	0.865	0.854	0.923
Flow Entry, veh/h	64	60	12
Cap Entry, veh/h	1180	1168	1240
V/C Ratio	0.054	0.051	0.010
Control Delay, s/veh	3.5	3.5	3.0
LOS	A	A	A
95th %tile Queue, veh	0	0	0

Intersection	
Intersection Delay, s/veh	3.2
Intersection LOS	A

Approach	WB	NB	SE
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	68	28	19
Demand Flow Rate, veh/h	72	32	20
Vehicles Circulating, veh/h	30	17	0
Vehicles Exiting, veh/h	19	3	102
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	3.3	3.2	2.9
Approach LOS	A	A	A

Lane	Left	Left	Left
Designated Moves	LR	LR	LR
Assumed Moves	LR	LR	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
A (Intercept)	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	72	32	20
Cap Entry Lane, veh/h	1338	1356	1380
Entry HV Adj Factor	0.944	0.875	0.950
Flow Entry, veh/h	68	28	19
Cap Entry, veh/h	1264	1187	1311
V/C Ratio	0.054	0.024	0.014
Control Delay, s/veh	3.3	3.2	2.9
LOS	A	A	A
95th %tile Queue, veh	0	0	0

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Vol, veh/h	0	3	3	14	5	0	5	2	9	1	0	0
Future Vol, veh/h	0	3	3	14	5	0	5	2	9	1	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	3	3	15	5	0	5	2	10	1	0	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	18	25	0	22	20	7	0	0	0	12	0	0
Stage 1	2	2	-	18	18	-	-	-	-	-	-	-
Stage 2	16	23	-	4	2	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	996	868	-	991	874	1075	-	-	-	1607	-	-
Stage 1	1021	894	-	1001	880	-	-	-	-	-	-	-
Stage 2	1004	876	-	1019	894	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	989	868	-	-	873	1075	-	-	-	1607	-	-
Mov Cap-2 Maneuver	989	868	-	-	873	-	-	-	-	-	-	-
Stage 1	1020	893	-	1001	880	-	-	-	-	-	-	-
Stage 2	998	876	-	1014	893	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v				7.24
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	-	-	-	-	-	1607	-	-
HCM Lane V/C Ratio	-	-	-	-	-	0.001	-	-
HCM Ctrl Dly (s/v)	-	-	-	-	-	7.2	0	-
HCM Lane LOS	-	-	-	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	-	-	0	-	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	14	8	102	148	2
Future Vol, veh/h	5	14	8	102	148	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	15	9	111	161	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	290	162	163	0	-	0
Stage 1	162	-	-	-	-	-
Stage 2	128	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	700	883	1416	-	-	-
Stage 1	867	-	-	-	-	-
Stage 2	898	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	696	883	1416	-	-	-
Mov Cap-2 Maneuver	696	-	-	-	-	-
Stage 1	861	-	-	-	-	-
Stage 2	898	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	9.48	0.55	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	131	-	825	-	-
HCM Lane V/C Ratio	0.006	-	0.025	-	-
HCM Ctrl Dly (s/v)	7.6	0	9.5	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Intersection Delay, s/veh	2.8
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	19	19	18	20
Demand Flow Rate, veh/h	19	19	18	20
Vehicles Circulating, veh/h	14	7	27	21
Vehicles Exiting, veh/h	27	38	6	5
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	2.8	2.8	2.8	2.8
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	19	19	18	20
Cap Entry Lane, veh/h	1360	1370	1342	1351
Entry HV Adj Factor	0.985	0.988	1.000	1.000
Flow Entry, veh/h	19	19	18	20
Cap Entry, veh/h	1339	1353	1342	1351
V/C Ratio	0.014	0.014	0.013	0.015
Control Delay, s/veh	2.8	2.8	2.8	2.8
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	153	2	1	555	6	1
Future Vol, veh/h	153	2	1	555	6	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	166	2	1	603	7	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	168	0	773	167
Stage 1	-	-	-	-	167	-
Stage 2	-	-	-	-	605	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1409	-	367	877
Stage 1	-	-	-	-	862	-
Stage 2	-	-	-	-	545	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1409	-	367	877
Mov Cap-2 Maneuver	-	-	-	-	367	-
Stage 1	-	-	-	-	862	-
Stage 2	-	-	-	-	544	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.01	14.17
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	400	-	-	3	-
HCM Lane V/C Ratio	0.019	-	-	0.001	-
HCM Ctrl Dly (s/v)	14.2	-	-	7.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	1.7

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	4	0	4	0	0	0	1	11	0	0	24	1
Future Vol, veh/h	4	0	4	0	0	0	1	11	0	0	24	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	0	4	0	0	0	1	12	0	0	26	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	41	41	27	40	41	12	27	0	0	12	0	0
Stage 1	27	27	-	14	14	-	-	-	-	-	-	-
Stage 2	14	14	-	26	27	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	963	851	1049	964	851	1069	1587	-	-	1607	-	-
Stage 1	991	873	-	1006	884	-	-	-	-	-	-	-
Stage 2	1006	884	-	991	873	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	962	851	1049	959	850	1069	1587	-	-	1607	-	-
Mov Cap-2 Maneuver	962	851	-	959	850	-	-	-	-	-	-	-
Stage 1	991	873	-	1005	883	-	-	-	-	-	-	-
Stage 2	1005	883	-	987	873	-	-	-	-	-	-	-

Approach	SE	NW	NE	SW
HCM Ctrl Dly, s/v	8.62	0	0.61	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NEL	NET	NER	NWLn1	SELn1	SWL	SWT	SWR
Capacity (veh/h)	150	-	-	-	1004	1607	-	-
HCM Lane V/C Ratio	0.001	-	-	-	0.009	-	-	-
HCM Ctrl Dly (s/v)	7.3	0	-	0	8.6	0	-	-
HCM Lane LOS	A	A	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	0	0	-	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	11	3	0	28	11	0
Future Vol, veh/h	11	3	0	28	11	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	3	0	30	12	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	15	0	44	14
Stage 1	-	-	-	-	14	-
Stage 2	-	-	-	-	30	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1603	-	967	1066
Stage 1	-	-	-	-	1009	-
Stage 2	-	-	-	-	992	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1603	-	967	1066
Mov Cap-2 Maneuver	-	-	-	-	967	-
Stage 1	-	-	-	-	1009	-
Stage 2	-	-	-	-	992	-

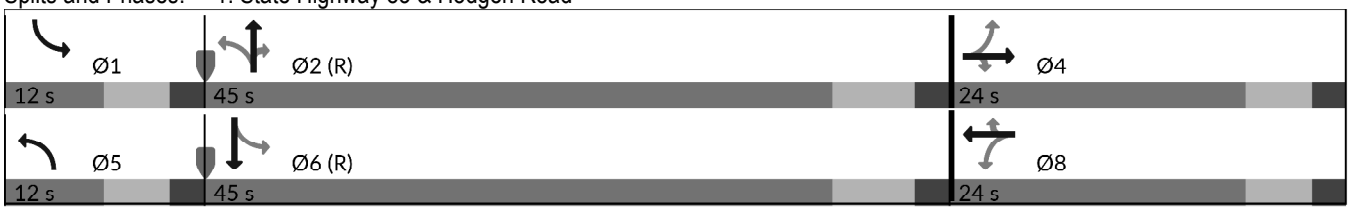
Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0	8.77
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	967	-	-	1603	-
HCM Lane V/C Ratio	0.012	-	-	-	-
HCM Ctrl Dly (s/v)	8.8	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	28	232	73	122	107	154	66	364	203	224	380
Future Volume (vph)	28	232	73	122	107	154	66	364	203	224	380
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA
Protected Phases		4			8		5	2		1	6
Permitted Phases	4		4	8		8	2		2	6	
Detector Phase	4	4	4	8	8	8	5	2	2	1	6
Switch Phase											
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	6.0	35.0	35.0	6.0	35.0
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	14.0	12.0	42.0	42.0	12.0	42.0
Total Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	12.0	45.0	45.0	12.0	45.0
Total Split (%)	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%	14.8%	55.6%	55.6%	14.8%	55.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	18.0	18.0	18.0	18.0	18.0	18.0	45.0	38.0	38.0	45.0	38.0
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.22	0.22	0.56	0.47	0.47	0.56	0.47
v/c Ratio	0.11	0.63	0.18	0.72	0.29	0.36	0.17	0.45	0.25	0.52	0.60
Control Delay (s/veh)	26.5	36.4	2.2	52.9	28.4	6.9	7.0	16.6	2.7	11.7	19.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	26.5	36.4	2.2	52.9	28.4	6.9	7.0	16.6	2.7	11.7	19.1
LOS	C	D	A	D	C	A	A	B	A	B	B
Approach Delay (s/veh)		28.1			27.6			11.1			16.6
Approach LOS		C			C			B			B

Intersection Summary	
Cycle Length: 81	
Actuated Cycle Length: 81	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 75	
Control Type: Pretimed	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay (s/veh): 18.8	Intersection LOS: B
Intersection Capacity Utilization 81.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 1: State Highway 83 & Hodgen Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	31	255	80	136	119	171	72	396	221	267	525
v/c Ratio	0.11	0.63	0.18	0.72	0.29	0.36	0.17	0.45	0.25	0.52	0.60
Control Delay (s/veh)	26.5	36.4	2.2	52.9	28.4	6.9	7.0	16.6	2.7	11.7	19.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	26.5	36.4	2.2	52.9	28.4	6.9	7.0	16.6	2.7	11.7	19.1
Queue Length 50th (ft)	13	121	0	65	51	0	13	132	0	56	184
Queue Length 95th (ft)	36	201	11	#154	98	49	28	205	35	85	255
Internal Link Dist (ft)		824			1611			1078			1286
Turn Bay Length (ft)	420		420	350		350	120		650	525	
Base Capacity (vph)	276	406	443	189	414	478	433	874	867	515	872
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.63	0.18	0.72	0.29	0.36	0.17	0.45	0.25	0.52	0.60

Intersection Summary

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

Intersection	
Intersection Delay, s/veh	9.4
Intersection LOS	A

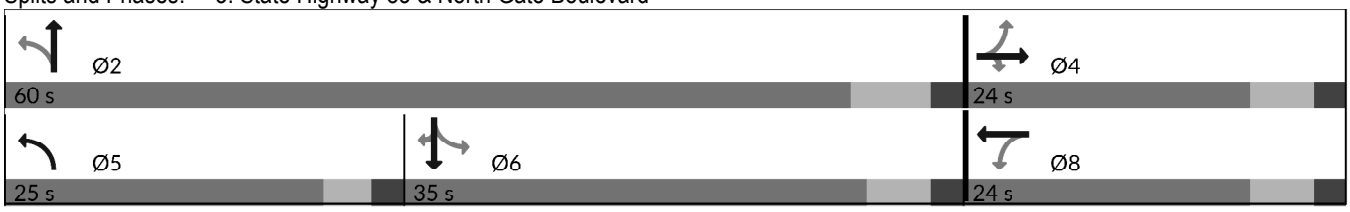
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	4	93	804	664
Demand Flow Rate, veh/h	4	99	823	677
Vehicles Circulating, veh/h	734	770	33	67
Vehicles Exiting, veh/h	10	86	705	802
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	5.6	8.0	10.2	8.6
Approach LOS	A	A	B	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	4	99	823	677
Cap Entry Lane, veh/h	653	629	1334	1289
Entry HV Adj Factor	1.000	0.939	0.977	0.981
Flow Entry, veh/h	4	93	804	664
Cap Entry, veh/h	653	591	1303	1265
V/C Ratio	0.006	0.157	0.617	0.525
Control Delay, s/veh	5.6	8.0	10.2	8.6
LOS	A	A	B	A
95th %tile Queue, veh	0	1	5	3

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	327	1	729	1	1	753	615	606	262
Future Volume (vph)	327	1	729	1	1	753	615	606	262
Turn Type	Perm	NA	Perm	Perm	NA	pm+pt	NA	NA	Perm
Protected Phases		4			8	5	2	6	
Permitted Phases	4		4	8		2			6
Detector Phase	4	4	4	8	8	5	2	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	10.0	12.0	11.0	11.0
Total Split (s)	24.0	24.0	24.0	24.0	24.0	25.0	60.0	35.0	35.0
Total Split (%)	28.6%	28.6%	28.6%	28.6%	28.6%	29.8%	71.4%	41.7%	41.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	5.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	5.0	7.0	6.0	6.0
Lead/Lag						Lead		Lag	Lag
Lead-Lag Optimize?						Yes		Yes	Yes
Recall Mode	None	None	None	None	None	Max	Max	Max	Max
Act Effct Green (s)	18.0	18.0	18.0		18.0	55.0	53.0	29.0	29.0
Actuated g/C Ratio	0.21	0.21	0.21		0.21	0.65	0.63	0.35	0.35
v/c Ratio	1.14	0.00	0.64		0.01	0.68	0.29	0.57	0.40
Control Delay (s/veh)	128.5	26.0	5.0		26.0	11.2	7.4	24.7	4.3
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	128.5	26.0	5.0		26.0	11.2	7.4	24.7	4.3
LOS	F	C	A		C	B	A	C	A
Approach Delay (s/veh)		43.2			26.0		9.5	18.5	
Approach LOS		D			C		A	B	

Intersection Summary	
Cycle Length: 84	
Actuated Cycle Length: 84	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.14	
Intersection Signal Delay (s/veh): 22.6	Intersection LOS: C
Intersection Capacity Utilization 77.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 3: State Highway 83 & North Gate Boulevard



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	348	1	776	2	801	656	697	301
v/c Ratio	1.14	0.00	0.64	0.01	0.68	0.29	0.57	0.40
Control Delay (s/veh)	128.5	26.0	5.0	26.0	11.2	7.4	24.7	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	128.5	26.0	5.0	26.0	11.2	7.4	24.7	4.3
Queue Length 50th (ft)	~219	0	0	1	86	73	157	0
Queue Length 95th (ft)	#383	5	48	6	141	99	204	46
Internal Link Dist (ft)		997		136		1617	2154	
Turn Bay Length (ft)	225		285		900			730
Base Capacity (vph)	305	407	1218	380	1179	2278	1221	754
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.14	0.00	0.64	0.01	0.68	0.29	0.57	0.40

Intersection Summary

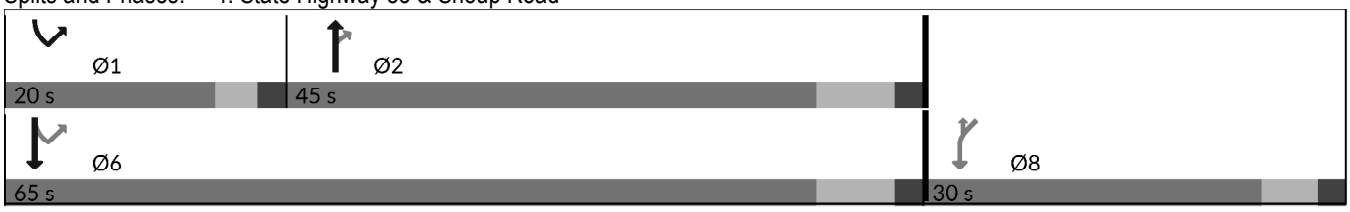
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	1212	179	201	1037	167	130
Future Volume (vph)	1212	179	201	1037	167	130
Turn Type	NA	Perm	pm+pt	NA	Perm	Perm
Protected Phases	2		1	6		
Permitted Phases		2	6		8	8
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	20.0	20.0	4.0	20.0	4.0	4.0
Minimum Split (s)	27.5	27.5	9.0	27.5	10.0	10.0
Total Split (s)	45.0	45.0	20.0	65.0	30.0	30.0
Total Split (%)	47.4%	47.4%	21.1%	68.4%	31.6%	31.6%
Yellow Time (s)	5.5	5.5	3.0	5.5	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	5.0	7.5	6.0	6.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	Max	Max	None	Max	None	None
Act Effct Green (s)	42.3	42.3	60.1	57.6	13.8	13.8
Actuated g/C Ratio	0.50	0.50	0.71	0.68	0.16	0.16
v/c Ratio	0.70	0.21	0.62	0.46	0.63	0.38
Control Delay (s/veh)	20.7	3.2	16.8	7.6	42.8	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	20.7	3.2	16.8	7.6	42.8	8.6
LOS	C	A	B	A	D	A
Approach Delay (s/veh)	18.5			9.1	27.9	
Approach LOS	B			A	C	

Intersection Summary	
Cycle Length: 95	
Actuated Cycle Length: 84.9	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay (s/veh): 15.5	Intersection LOS: B
Intersection Capacity Utilization 69.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 4: State Highway 83 & Shoup Road



Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Group Flow (vph)	1249	185	216	1115	186	144
v/c Ratio	0.70	0.21	0.62	0.46	0.63	0.38
Control Delay (s/veh)	20.7	3.2	16.8	7.6	42.8	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	20.7	3.2	16.8	7.6	42.8	8.6
Queue Length 50th (ft)	256	0	32	128	96	0
Queue Length 95th (ft)	424	38	109	210	163	48
Internal Link Dist (ft)	1042			1734	675	
Turn Bay Length (ft)		710	980			500
Base Capacity (vph)	1780	897	439	2400	517	555
Starvation Cap Reductn	0	0	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	0.70	0.21	0.49	0.46	0.36	0.26

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	92	134	19	65	49	159	12	183
Future Volume (vph)	92	134	19	65	49	159	12	183
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	12.0	12.0	12.0	12.0
Minimum Split (s)	14.0	14.0	14.0	14.0	18.0	18.0	18.0	18.0
Total Split (s)	35.0	35.0	35.0	35.0	55.0	55.0	55.0	55.0
Total Split (%)	38.9%	38.9%	38.9%	38.9%	61.1%	61.1%	61.1%	61.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		6.0		6.0		6.0		6.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Max	Max	Max	Max
Act Effct Green (s)		21.6		21.6		49.2		49.2
Actuated g/C Ratio		0.26		0.26		0.59		0.59
v/c Ratio		0.81		0.28		0.30		0.28
Control Delay (s/veh)		42.2		23.9		10.1		9.0
Queue Delay		0.0		0.0		0.0		0.0
Total Delay (s/veh)		42.2		23.9		10.1		9.0
LOS		D		C		B		A
Approach Delay (s/veh)		42.2		23.9		10.1		9.0
Approach LOS		D		C		B		A

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 82.9	
Natural Cycle: 40	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.81	
Intersection Signal Delay (s/veh): 21.9	Intersection LOS: C
Intersection Capacity Utilization 64.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 5: Black Forest Road & Shoup Road

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	343	120	289	295
v/c Ratio	0.81	0.28	0.30	0.28
Control Delay (s/veh)	42.2	23.9	10.1	9.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay (s/veh)	42.2	23.9	10.1	9.0
Queue Length 50th (ft)	159	47	67	62
Queue Length 95th (ft)	253	78	117	130
Internal Link Dist (ft)	965	1070	1292	9117
Turn Bay Length (ft)				
Base Capacity (vph)	565	568	961	1040
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.61	0.21	0.30	0.28

Intersection Summary

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	13	1	22	2	5	5	17	105	2	7	116	7
Future Vol, veh/h	13	1	22	2	5	5	17	105	2	7	116	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	70	70	70	88	88	88	71	71	71	92	92	92
Heavy Vehicles, %	33	0	0	0	0	0	0	3	0	0	6	100
Mvmt Flow	19	1	31	2	6	6	24	148	3	8	126	8

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	344	344	130	339	346	149	134	0	0	151	0	0
Stage 1	145	145	-	197	197	-	-	-	-	-	-	-
Stage 2	199	199	-	142	149	-	-	-	-	-	-	-
Critical Hdwy	7.43	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.43	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.43	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.797	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	556	582	925	619	580	903	1463	-	-	1443	-	-
Stage 1	789	781	-	809	742	-	-	-	-	-	-	-
Stage 2	737	740	-	866	778	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	534	568	925	582	567	903	1463	-	-	1443	-	-
Mov Cap-2 Maneuver	534	568	-	582	567	-	-	-	-	-	-	-
Stage 1	785	776	-	795	728	-	-	-	-	-	-	-
Stage 2	714	727	-	830	773	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	10.37	10.45	1.03	0.4
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	246	-	-	722	674	96	-	-
HCM Lane V/C Ratio	0.016	-	-	0.071	0.02	0.005	-	-
HCM Ctrl Dly (s/v)	7.5	0	-	10.4	10.4	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0	-	-

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	56	469	7	2	229	17	7	0	0	28	2	39
Future Vol, veh/h	56	469	7	2	229	17	7	0	0	28	2	39
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	400	-	335	280	-	-	-	-	-	65	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	88	88	88	61	61	61	69	69	69
Heavy Vehicles, %	0	4	18	0	3	0	6	0	25	4	0	0
Mvmt Flow	63	527	8	2	260	19	11	0	0	41	3	57

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	280	0	0	535	0	0	919	937	527	927	935	270
Stage 1	-	-	-	-	-	-	653	653	-	274	274	-
Stage 2	-	-	-	-	-	-	266	284	-	653	661	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.16	6.5	6.45	7.14	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.5	-	6.14	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.5	-	6.14	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.554	4	3.525	3.536	4	3.3
Pot Cap-1 Maneuver	1295	-	-	1043	-	-	248	267	509	247	267	774
Stage 1	-	-	-	-	-	-	450	467	-	727	687	-
Stage 2	-	-	-	-	-	-	730	680	-	453	463	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1295	-	-	1043	-	-	216	253	509	234	254	774
Mov Cap-2 Maneuver	-	-	-	-	-	-	216	253	-	234	254	-
Stage 1	-	-	-	-	-	-	428	444	-	726	685	-
Stage 2	-	-	-	-	-	-	673	678	-	431	440	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0.83	0.07	22.63	15.86
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	216	-	1295	-	-	1043	-	-	234	703
HCM Lane V/C Ratio	0.053	-	0.049	-	-	0.002	-	-	0.173	0.084
HCM Ctrl Dly (s/v)	22.6	0	7.9	-	-	8.5	-	-	23.6	10.6
HCM Lane LOS	C	A	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.2	-	0.2	-	-	0	-	-	0.6	0.3

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	458	89	43	238	1	59	0	67	0	0	1
Future Vol, veh/h	2	458	89	43	238	1	59	0	67	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	260	290	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	91	91	91	78	78	78	25	25	25
Heavy Vehicles, %	0	5	8	0	1	0	2	0	5	0	0	0
Mvmt Flow	2	526	102	47	262	1	76	0	86	0	0	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	263	0	0	629	0	0	887	888	526	888	990	262
Stage 1	-	-	-	-	-	-	531	531	-	357	357	-
Stage 2	-	-	-	-	-	-	356	357	-	531	633	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.12	6.5	6.25	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.518	4	3.345	3.5	4	3.3
Pot Cap-1 Maneuver	1313	-	-	963	-	-	265	285	546	267	248	781
Stage 1	-	-	-	-	-	-	532	529	-	665	632	-
Stage 2	-	-	-	-	-	-	661	632	-	535	476	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1313	-	-	963	-	-	250	270	546	213	236	781
Mov Cap-2 Maneuver	-	-	-	-	-	-	250	270	-	213	236	-
Stage 1	-	-	-	-	-	-	530	528	-	633	601	-
Stage 2	-	-	-	-	-	-	626	601	-	450	475	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0.03	1.36	23.71	9.63
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	351	8	-	-	963	-	-	781
HCM Lane V/C Ratio	0.46	0.002	-	-	0.049	-	-	0.005
HCM Ctrl Dly (s/v)	23.7	7.7	0	-	8.9	-	-	9.6
HCM Lane LOS	C	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	2.3	0	-	-	0.2	-	-	0

Intersection	
Intersection Delay, s/veh	3.5
Intersection LOS	A

Approach	EB	WB	NB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	135	61	132
Demand Flow Rate, veh/h	135	61	132
Vehicles Circulating, veh/h	14	92	87
Vehicles Exiting, veh/h	139	127	62
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	3.4	3.3	3.7
Approach LOS	A	A	A

Lane	Left	Left	Left
Designated Moves	TR	LT	LR
Assumed Moves	TR	LT	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
A (Intercept)	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	135	61	132
Cap Entry Lane, veh/h	1360	1256	1263
Entry HV Adj Factor	1.000	1.000	1.000
Flow Entry, veh/h	135	61	132
Cap Entry, veh/h	1360	1256	1263
V/C Ratio	0.099	0.049	0.105
Control Delay, s/veh	3.4	3.3	3.7
LOS	A	A	A
95th %tile Queue, veh	0	0	0

Intersection	
Intersection Delay, s/veh	3.1
Intersection LOS	A

Approach	WB	NB	SE
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	83	6	80
Demand Flow Rate, veh/h	83	6	80
Vehicles Circulating, veh/h	6	65	4
Vehicles Exiting, veh/h	65	19	85
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	3.1	2.8	3.1
Approach LOS	A	A	A

Lane	Left	Left	Left
Designated Moves	LR	LR	LR
Assumed Moves	LR	LR	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
A (Intercept)	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	83	6	80
Cap Entry Lane, veh/h	1371	1291	1374
Entry HV Adj Factor	1.000	1.000	1.000
Flow Entry, veh/h	83	6	80
Cap Entry, veh/h	1371	1291	1374
V/C Ratio	0.061	0.005	0.058
Control Delay, s/veh	3.1	2.8	3.1
LOS	A	A	A
95th %tile Queue, veh	0	0	0

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Vol, veh/h	0	3	8	10	5	1	5	3	16	2	6	1
Future Vol, veh/h	0	3	8	10	5	1	5	3	16	2	6	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	3	9	11	5	1	5	3	17	2	7	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	28	43	7	35	35	12	8	0	0	21	0	0
Stage 1	11	11	-	23	23	-	-	-	-	-	-	-
Stage 2	17	32	-	13	12	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	981	849	1075	971	858	1069	1613	-	-	1595	-	-
Stage 1	1009	886	-	995	876	-	-	-	-	-	-	-
Stage 2	1003	869	-	1008	886	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	969	845	1075	955	854	1069	1613	-	-	1595	-	-
Mov Cap-2 Maneuver	969	845	-	955	854	-	-	-	-	-	-	-
Stage 1	1008	885	-	992	873	-	-	-	-	-	-	-
Stage 2	992	866	-	995	884	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	8.64	8.96	1.51	1.61
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	321	-	-	1001	927	389	-	-
HCM Lane V/C Ratio	0.003	-	-	0.012	0.019	0.001	-	-
HCM Ctrl Dly (s/v)	7.2	0	-	8.6	9	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	6	10	151	139	9
Future Vol, veh/h	1	6	10	151	139	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	7	11	164	151	10

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	342	156	161	0	-	0
Stage 1	156	-	-	-	-	-
Stage 2	186	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	654	890	1418	-	-	-
Stage 1	872	-	-	-	-	-
Stage 2	846	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	649	890	1418	-	-	-
Mov Cap-2 Maneuver	649	-	-	-	-	-
Stage 1	865	-	-	-	-	-
Stage 2	846	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	9.3	0.47	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	112	-	845	-	-
HCM Lane V/C Ratio	0.008	-	0.009	-	-
HCM Ctrl Dly (s/v)	7.6	0	9.3	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Intersection Delay, s/veh	2.9
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	42	41	13	14
Demand Flow Rate, veh/h	43	41	13	14
Vehicles Circulating, veh/h	23	14	43	34
Vehicles Exiting, veh/h	25	42	23	21
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	3.0	2.9	2.8	2.8
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	43	41	13	14
Cap Entry Lane, veh/h	1348	1360	1321	1333
Entry HV Adj Factor	0.988	0.993	1.000	1.000
Flow Entry, veh/h	42	41	13	14
Cap Entry, veh/h	1332	1351	1321	1333
V/C Ratio	0.032	0.030	0.010	0.011
Control Delay, s/veh	3.0	2.9	2.8	2.8
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	545	7	2	296	3	1
Future Vol, veh/h	545	7	2	296	3	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	592	8	2	322	3	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	600	0	922	596
Stage 1	-	-	-	-	596	-
Stage 2	-	-	-	-	326	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	977	-	300	503
Stage 1	-	-	-	-	550	-
Stage 2	-	-	-	-	731	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	977	-	299	503
Mov Cap-2 Maneuver	-	-	-	-	299	-
Stage 1	-	-	-	-	550	-
Stage 2	-	-	-	-	729	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.06	15.96
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	333	-	-	12	-
HCM Lane V/C Ratio	0.013	-	-	0.002	-
HCM Ctrl Dly (s/v)	16	-	-	8.7	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	1.1

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	3	0	2	0	0	0	4	31	1	0	19	4
Future Vol, veh/h	3	0	2	0	0	0	4	31	1	0	19	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	0	2	0	0	0	4	34	1	0	21	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	65	66	23	64	68	34	25	0	0	35	0	0
Stage 1	23	23	-	43	43	-	-	-	-	-	-	-
Stage 2	42	43	-	21	25	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	928	824	1054	931	823	1039	1589	-	-	1577	-	-
Stage 1	995	876	-	971	859	-	-	-	-	-	-	-
Stage 2	972	859	-	998	874	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	926	822	1054	926	820	1039	1589	-	-	1577	-	-
Mov Cap-2 Maneuver	926	822	-	926	820	-	-	-	-	-	-	-
Stage 1	995	876	-	969	857	-	-	-	-	-	-	-
Stage 2	969	856	-	996	874	-	-	-	-	-	-	-

Approach	SE	NW	NE	SW
HCM Ctrl Dly, s/v	8.72	0	0.81	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NEL	NET	NER	NWLn1	SELn1	SWL	SWT	SWR
Capacity (veh/h)	199	-	-	-	973	1577	-	-
HCM Lane V/C Ratio	0.003	-	-	-	0.006	-	-	-
HCM Ctrl Dly (s/v)	7.3	0	-	0	8.7	0	-	-
HCM Lane LOS	A	A	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	0	0	-	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	31	12	0	21	7	0
Future Vol, veh/h	31	12	0	21	7	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	34	13	0	23	8	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	47	0	63	40
Stage 1	-	-	-	-	40	-
Stage 2	-	-	-	-	23	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1561	-	943	1031
Stage 1	-	-	-	-	982	-
Stage 2	-	-	-	-	1000	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1561	-	943	1031
Mov Cap-2 Maneuver	-	-	-	-	943	-
Stage 1	-	-	-	-	982	-
Stage 2	-	-	-	-	1000	-

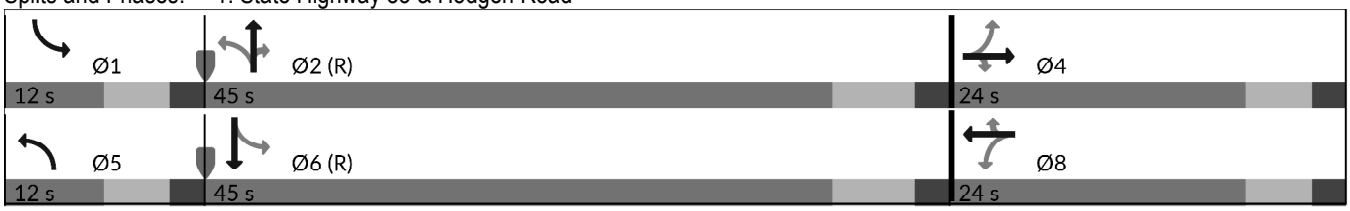
Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0	8.85
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	943	-	-	1561	-
HCM Lane V/C Ratio	0.008	-	-	-	-
HCM Ctrl Dly (s/v)	8.8	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	97	58	63	270	166	253	55	287	55	77	400
Future Volume (vph)	97	58	63	270	166	253	55	287	55	77	400
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA
Protected Phases		4			8		5	2		1	6
Permitted Phases	4		4	8		8	2		2	6	
Detector Phase	4	4	4	8	8	8	5	2	2	1	6
Switch Phase											
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	6.0	35.0	35.0	6.0	35.0
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	14.0	12.0	42.0	42.0	12.0	42.0
Total Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	12.0	45.0	45.0	12.0	45.0
Total Split (%)	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%	14.8%	55.6%	55.6%	14.8%	55.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	18.0	18.0	18.0	18.0	18.0	18.0	45.0	38.0	38.0	45.0	38.0
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.22	0.22	0.56	0.47	0.47	0.56	0.47
v/c Ratio	0.42	0.15	0.15	0.99	0.43	0.49	0.13	0.36	0.07	0.14	0.58
Control Delay (s/veh)	33.1	26.6	0.9	84.5	31.0	6.9	6.7	15.2	0.4	6.7	18.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	33.1	26.6	0.9	84.5	31.0	6.9	6.7	15.2	0.4	6.7	18.6
LOS	C	C	A	F	C	A	A	B	A	A	B
Approach Delay (s/veh)		22.1			43.1			12.0			16.9
Approach LOS		C			D			B			B

Intersection Summary	
Cycle Length: 81	
Actuated Cycle Length: 81	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 80	
Control Type: Pretimed	
Maximum v/c Ratio: 0.99	
Intersection Signal Delay (s/veh): 26.2	Intersection LOS: C
Intersection Capacity Utilization 76.6%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 1: State Highway 83 & Hodgen Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	105	63	68	293	180	275	60	312	60	84	499
v/c Ratio	0.42	0.15	0.15	0.99	0.43	0.49	0.13	0.36	0.07	0.14	0.58
Control Delay (s/veh)	33.1	26.6	0.9	84.5	31.0	6.9	6.7	15.2	0.4	6.7	18.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	33.1	26.6	0.9	84.5	31.0	6.9	6.7	15.2	0.4	6.7	18.6
Queue Length 50th (ft)	47	26	0	151	80	0	11	98	0	15	174
Queue Length 95th (ft)	95	59	3	#310	141	60	24	157	3	31	271
Internal Link Dist (ft)		824			1611			1078			1286
Turn Bay Length (ft)	420		420	350		350	600		400	600	
Base Capacity (vph)	251	414	456	296	414	565	454	874	806	615	863
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.15	0.15	0.99	0.43	0.49	0.13	0.36	0.07	0.14	0.58

Intersection Summary

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

Intersection	
Intersection Delay, s/veh	9.4
Intersection LOS	A

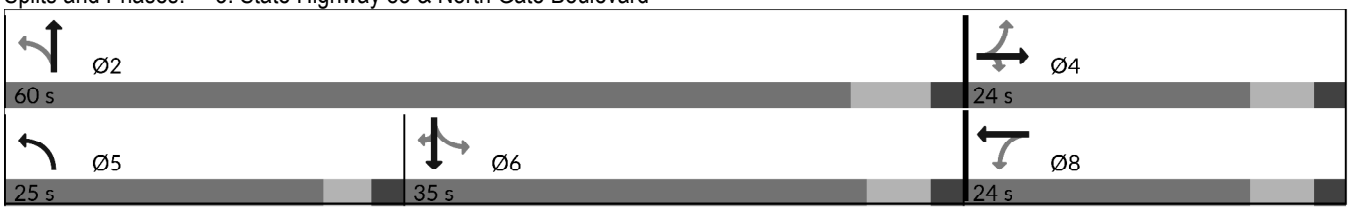
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	4	91	428	849
Demand Flow Rate, veh/h	4	93	436	866
Vehicles Circulating, veh/h	927	414	11	65
Vehicles Exiting, veh/h	4	33	920	442
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	6.8	5.0	5.5	11.8
Approach LOS	A	A	A	B

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	4	93	436	866
Cap Entry Lane, veh/h	536	905	1364	1291
Entry HV Adj Factor	1.000	0.978	0.982	0.981
Flow Entry, veh/h	4	91	428	849
Cap Entry, veh/h	536	885	1339	1266
V/C Ratio	0.007	0.103	0.320	0.671
Control Delay, s/veh	6.8	5.0	5.5	11.8
LOS	A	A	A	B
95th %tile Queue, veh	0	0	1	6

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	121	1	558	3	773	425	821	275
Future Volume (vph)	121	1	558	3	773	425	821	275
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	NA	Perm
Protected Phases		4		8	5	2	6	
Permitted Phases	4		4		2			6
Detector Phase	4	4	4	8	5	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.0	11.0	11.0	11.0	10.0	12.0	11.0	11.0
Total Split (s)	24.0	24.0	24.0	24.0	25.0	60.0	35.0	35.0
Total Split (%)	28.6%	28.6%	28.6%	28.6%	29.8%	71.4%	41.7%	41.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	5.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	5.0	7.0	6.0	6.0
Lead/Lag					Lead		Lag	Lag
Lead-Lag Optimize?					Yes		Yes	Yes
Recall Mode	None	None	None	None	Max	Max	Max	Max
Act Effct Green (s)	12.8	12.8	12.8	12.8	55.1	53.1	29.1	29.1
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.70	0.67	0.37	0.37
v/c Ratio	0.58	0.00	0.63	0.01	0.75	0.19	0.69	0.39
Control Delay (s/veh)	40.8	26.0	5.9	26.3	17.6	5.6	25.0	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	40.8	26.0	5.9	26.3	17.6	5.6	25.0	4.2
LOS	D	C	A	C	B	A	C	A
Approach Delay (s/veh)		12.2		26.3		13.3	19.8	
Approach LOS		B		C		B	B	

Intersection Summary	
Cycle Length: 84	
Actuated Cycle Length: 79	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay (s/veh): 15.4	Intersection LOS: B
Intersection Capacity Utilization 72.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 3: State Highway 83 & North Gate Boulevard



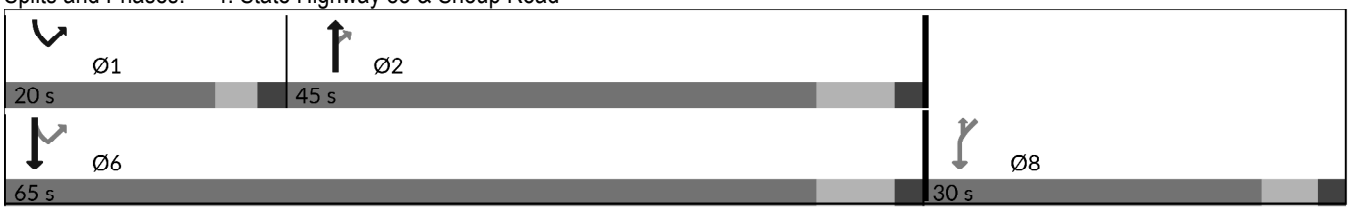
Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	132	1	607	3	840	462	892	299
v/c Ratio	0.58	0.00	0.63	0.01	0.75	0.19	0.69	0.39
Control Delay (s/veh)	40.8	26.0	5.9	26.3	17.6	5.6	25.0	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	40.8	26.0	5.9	26.3	17.6	5.6	25.0	4.2
Queue Length 50th (ft)	62	0	0	1	119	40	197	0
Queue Length 95th (ft)	116	5	46	9	208	70	287	52
Internal Link Dist (ft)		997		136		1617	2154	
Turn Bay Length (ft)	225		285		900			730
Base Capacity (vph)	321	425	1105	425	1126	2380	1302	771
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.00	0.55	0.01	0.75	0.19	0.69	0.39

Intersection Summary

Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	972	89	67	1330	231	192
Future Volume (vph)	972	89	67	1330	231	192
Turn Type	NA	Perm	pm+pt	NA	Perm	Perm
Protected Phases	2		1	6		
Permitted Phases		2	6		8	8
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	20.0	20.0	4.0	20.0	4.0	4.0
Minimum Split (s)	27.5	27.5	9.0	27.5	10.0	10.0
Total Split (s)	45.0	45.0	20.0	65.0	30.0	30.0
Total Split (%)	47.4%	47.4%	21.1%	68.4%	31.6%	31.6%
Yellow Time (s)	5.5	5.5	3.0	5.5	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	5.0	7.5	6.0	6.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	Max	Max	None	Max	None	None
Act Effct Green (s)	48.1	48.1	60.1	57.6	16.9	16.9
Actuated g/C Ratio	0.55	0.55	0.68	0.65	0.19	0.19
v/c Ratio	0.55	0.11	0.21	0.62	0.70	0.44
Control Delay (s/veh)	16.1	3.4	7.1	11.1	44.0	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	16.1	3.4	7.1	11.1	44.0	7.5
LOS	B	A	A	B	D	A
Approach Delay (s/veh)	15.0			10.9	27.4	
Approach LOS	B			B	C	

Intersection Summary	
Cycle Length: 95	
Actuated Cycle Length: 88.1	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay (s/veh): 14.9	Intersection LOS: B
Intersection Capacity Utilization 60.8%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: State Highway 83 & Shoup Road



Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Group Flow (vph)	1057	97	73	1446	251	209
v/c Ratio	0.55	0.11	0.21	0.62	0.70	0.44
Control Delay (s/veh)	16.1	3.4	7.1	11.1	44.0	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	16.1	3.4	7.1	11.1	44.0	7.5
Queue Length 50th (ft)	202	0	12	222	133	0
Queue Length 95th (ft)	322	27	32	360	212	55
Internal Link Dist (ft)	1042			1734	675	
Turn Bay Length (ft)		710	980			500
Base Capacity (vph)	1931	908	483	2314	508	584
Starvation Cap Reductn	0	0	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	0.55	0.11	0.15	0.62	0.49	0.36

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	57	56	60	26	94	65	200	17	208	92
Future Volume (vph)	57	56	60	26	94	65	200	17	208	92
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		4			8		2		6	
Permitted Phases	4		4	8		2		6		6
Detector Phase	4	4	4	8	8	2	2	6	6	6
Switch Phase										
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	12.0	12.0	12.0	12.0	12.0
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	18.0	18.0	18.0	18.0	18.0
Total Split (s)	35.0	35.0	35.0	35.0	35.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	38.9%	38.9%	38.9%	38.9%	38.9%	61.1%	61.1%	61.1%	61.1%	61.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0	6.0		6.0	6.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	Max	Max	Max	Max	Max
Act Effct Green (s)	11.5	11.5	11.5		11.5	49.1	49.1		49.1	49.1
Actuated g/C Ratio	0.16	0.16	0.16		0.16	0.68	0.68		0.68	0.68
v/c Ratio	0.33	0.21	0.21		0.56	0.09	0.19		0.20	0.09
Control Delay (s/veh)	31.9	27.8	9.3		34.3	5.1	5.1		5.3	1.5
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0
Total Delay (s/veh)	31.9	27.8	9.3		34.3	5.1	5.1		5.3	1.5
LOS	C	C	A		C	A	A		A	A
Approach Delay (s/veh)		22.8			34.3		5.1		4.2	
Approach LOS		C			C		A		A	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 72.6	
Natural Cycle: 40	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.56	
Intersection Signal Delay (s/veh): 12.7	Intersection LOS: B
Intersection Capacity Utilization 52.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 5: Black Forest Road & Shoup Road

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	62	61	65	155	71	235	244	100
v/c Ratio	0.33	0.21	0.21	0.56	0.09	0.19	0.20	0.09
Control Delay (s/veh)	31.9	27.8	9.3	34.3	5.1	5.1	5.3	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	31.9	27.8	9.3	34.3	5.1	5.1	5.3	1.5
Queue Length 50th (ft)	25	25	0	61	9	32	35	0
Queue Length 95th (ft)	60	56	31	117	27	70	74	15
Internal Link Dist (ft)		965		1070		1292	9089	
Turn Bay Length (ft)	295		295		245			295
Base Capacity (vph)	469	745	672	679	764	1247	1226	1102
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.08	0.10	0.23	0.09	0.19	0.20	0.09

Intersection Summary

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	10	2	25	6	3	1	8	82	1	3	106	8
Future Vol, veh/h	10	2	25	6	3	1	8	82	1	3	106	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	2	27	7	3	1	9	89	1	3	115	9

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	234	234	120	230	238	90	124	0	0	90	0	0
Stage 1	126	126	-	107	107	-	-	-	-	-	-	-
Stage 2	108	108	-	123	130	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	720	667	932	725	663	968	1463	-	-	1505	-	-
Stage 1	878	792	-	898	807	-	-	-	-	-	-	-
Stage 2	897	806	-	881	788	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	710	661	932	696	658	968	1463	-	-	1505	-	-
Mov Cap-2 Maneuver	710	661	-	696	658	-	-	-	-	-	-	-
Stage 1	876	790	-	893	802	-	-	-	-	-	-	-
Stage 2	887	801	-	851	786	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	9.49	10.2	0.66	0.19
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	158	-	-	842	703	46	-	-
HCM Lane V/C Ratio	0.006	-	-	0.048	0.015	0.002	-	-
HCM Ctrl Dly (s/v)	7.5	0	-	9.5	10.2	7.4	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0	0	-	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	132	2	0	499	12	13	0	0	8	0	46
Future Vol, veh/h	16	132	2	0	499	12	13	0	0	8	0	46
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	400	-	335	280	-	-	-	-	-	65	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	17	143	2	0	542	13	14	0	0	9	0	50

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	555	0	0	146	0	0	721	734	143	727	729	549
Stage 1	-	-	-	-	-	-	178	178	-	549	549	-
Stage 2	-	-	-	-	-	-	542	555	-	178	180	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1015	-	-	1436	-	-	343	347	904	339	350	536
Stage 1	-	-	-	-	-	-	824	752	-	520	516	-
Stage 2	-	-	-	-	-	-	524	513	-	824	750	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1015	-	-	1436	-	-	305	342	904	334	344	536
Mov Cap-2 Maneuver	-	-	-	-	-	-	305	342	-	334	344	-
Stage 1	-	-	-	-	-	-	809	739	-	520	516	-
Stage 2	-	-	-	-	-	-	475	513	-	809	737	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0.92	0	17.36	12.96
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	305	-	1015	-	-	1436	-	-	334	536
HCM Lane V/C Ratio	0.046	-	0.017	-	-	-	-	-	0.026	0.093
HCM Ctrl Dly (s/v)	17.4	0	8.6	-	-	0	-	-	16.1	12.4
HCM Lane LOS	C	A	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-	0	-	-	0.1	0.3

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	123	31	67	496	0	58	0	26	1	0	2
Future Vol, veh/h	0	123	31	67	496	0	58	0	26	1	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	260	290	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	134	34	73	539	0	63	0	28	1	0	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	539	0	0	167	0	0	818	818	134	818	852	539
Stage 1	-	-	-	-	-	-	134	134	-	685	685	-
Stage 2	-	-	-	-	-	-	685	685	-	134	167	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1029	-	-	1410	-	-	295	310	915	295	297	542
Stage 1	-	-	-	-	-	-	870	786	-	438	448	-
Stage 2	-	-	-	-	-	-	438	448	-	870	760	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1029	-	-	1410	-	-	278	294	915	271	281	542
Mov Cap-2 Maneuver	-	-	-	-	-	-	278	294	-	271	281	-
Stage 1	-	-	-	-	-	-	870	786	-	416	425	-
Stage 2	-	-	-	-	-	-	414	425	-	843	760	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0	0.92	18.64	13.93
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	355	1029	-	-	1410	-	-	406
HCM Lane V/C Ratio	0.257	-	-	-	0.052	-	-	0.008
HCM Ctrl Dly (s/v)	18.6	0	-	-	7.7	-	-	13.9
HCM Lane LOS	C	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	1	0	-	-	0.2	-	-	0

Intersection	
Intersection Delay, s/veh	3.0
Intersection LOS	A

Approach	EB	WB	NB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	42	71	10
Demand Flow Rate, veh/h	42	72	10
Vehicles Circulating, veh/h	10	7	21
Vehicles Exiting, veh/h	69	24	31
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	2.9	3.1	2.7
Approach LOS	A	A	A

Lane	Left	Left	Left
Designated Moves	TR	LT	LR
Assumed Moves	TR	LT	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
A (Intercept)	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	42	72	10
Cap Entry Lane, veh/h	1366	1370	1351
Entry HV Adj Factor	0.990	0.983	1.000
Flow Entry, veh/h	42	71	10
Cap Entry, veh/h	1352	1347	1351
V/C Ratio	0.031	0.053	0.007
Control Delay, s/veh	2.9	3.1	2.7
LOS	A	A	A
95th %tile Queue, veh	0	0	0

Intersection	
Intersection Delay, s/veh	3.0
Intersection LOS	A

Approach	WB	NB	SE
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	65	19	26
Demand Flow Rate, veh/h	66	19	26
Vehicles Circulating, veh/h	18	23	0
Vehicles Exiting, veh/h	24	3	84
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	3.1	2.8	2.8
Approach LOS	A	A	A

Lane	Left	Left	Left
Designated Moves	LR	LR	LR
Assumed Moves	LR	LR	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
A (Intercept)	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	66	19	26
Cap Entry Lane, veh/h	1355	1348	1380
Entry HV Adj Factor	0.985	1.000	1.000
Flow Entry, veh/h	65	19	26
Cap Entry, veh/h	1334	1348	1380
V/C Ratio	0.049	0.014	0.019
Control Delay, s/veh	3.1	2.8	2.8
LOS	A	A	A
95th %tile Queue, veh	0	0	0

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Vol, veh/h	0	3	3	14	5	2	5	2	9	8	0	0
Future Vol, veh/h	0	3	3	14	5	2	5	2	9	8	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	3	3	15	5	2	5	2	10	9	0	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	33	40	0	37	35	7	0	0	0	12	0	0
Stage 1	17	17	-	18	18	-	-	-	-	-	-	-
Stage 2	16	23	-	19	17	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	974	852	-	968	857	1075	-	-	-	1607	-	-
Stage 1	1002	881	-	1001	880	-	-	-	-	-	-	-
Stage 2	1004	876	-	1000	881	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	961	847	-	-	852	1075	-	-	-	1607	-	-
Mov Cap-2 Maneuver	961	847	-	-	852	-	-	-	-	-	-	-
Stage 1	997	876	-	1001	880	-	-	-	-	-	-	-
Stage 2	996	876	-	991	876	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v				7.25
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	-	-	-	-	-	1607	-	-
HCM Lane V/C Ratio	-	-	-	-	-	0.005	-	-
HCM Ctrl Dly (s/v)	-	-	-	-	-	7.3	0	-
HCM Lane LOS	-	-	-	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	-	-	0	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	21	10	102	148	2
Future Vol, veh/h	5	21	10	102	148	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	23	11	111	161	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	295	162	163	0	-	0
Stage 1	162	-	-	-	-	-
Stage 2	133	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	696	883	1416	-	-	-
Stage 1	867	-	-	-	-	-
Stage 2	894	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	691	883	1416	-	-	-
Mov Cap-2 Maneuver	691	-	-	-	-	-
Stage 1	860	-	-	-	-	-
Stage 2	894	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	9.45	0.68	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	161	-	838	-	-
HCM Lane V/C Ratio	0.008	-	0.034	-	-
HCM Ctrl Dly (s/v)	7.6	0	9.4	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Intersection Delay, s/veh	2.8
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	21	20	18	20
Demand Flow Rate, veh/h	21	20	18	20
Vehicles Circulating, veh/h	14	7	29	22
Vehicles Exiting, veh/h	28	40	6	5
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	2.8	2.8	2.8	2.8
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	21	20	18	20
Cap Entry Lane, veh/h	1360	1370	1340	1349
Entry HV Adj Factor	0.984	0.987	1.000	1.000
Flow Entry, veh/h	21	20	18	20
Cap Entry, veh/h	1339	1353	1340	1349
V/C Ratio	0.015	0.015	0.013	0.015
Control Delay, s/veh	2.8	2.8	2.8	2.8
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	153	2	1	555	6	1
Future Vol, veh/h	153	2	1	555	6	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	166	2	1	603	7	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	168	0	773	167
Stage 1	-	-	-	-	167	-
Stage 2	-	-	-	-	605	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1409	-	367	877
Stage 1	-	-	-	-	862	-
Stage 2	-	-	-	-	545	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1409	-	367	877
Mov Cap-2 Maneuver	-	-	-	-	367	-
Stage 1	-	-	-	-	862	-
Stage 2	-	-	-	-	544	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.01	14.17
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	400	-	-	3	-
HCM Lane V/C Ratio	0.019	-	-	0.001	-
HCM Ctrl Dly (s/v)	14.2	-	-	7.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	1.6

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	4	0	4	0	0	0	1	13	0	0	25	1
Future Vol, veh/h	4	0	4	0	0	0	1	13	0	0	25	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	0	4	0	0	0	1	14	0	0	27	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	44	44	28	43	45	14	28	0	0	14	0	0
Stage 1	28	28	-	16	16	-	-	-	-	-	-	-
Stage 2	16	16	-	27	28	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	958	848	1048	959	847	1066	1585	-	-	1604	-	-
Stage 1	989	872	-	1003	882	-	-	-	-	-	-	-
Stage 2	1003	882	-	990	872	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	958	847	1048	954	847	1066	1585	-	-	1604	-	-
Mov Cap-2 Maneuver	958	847	-	954	847	-	-	-	-	-	-	-
Stage 1	989	872	-	1003	881	-	-	-	-	-	-	-
Stage 2	1003	881	-	986	872	-	-	-	-	-	-	-

Approach	SE	NW	NE	SW
HCM Ctrl Dly, s/v	8.63	0	0.52	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NEL	NET	NER	NWLn1	SELn1	SWL	SWT	SWR
Capacity (veh/h)	129	-	-	-	1001	1604	-	-
HCM Lane V/C Ratio	0.001	-	-	-	0.009	-	-	-
HCM Ctrl Dly (s/v)	7.3	0	-	0	8.6	0	-	-
HCM Lane LOS	A	A	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	0	0	-	-

Intersection	
Int Delay, s/veh	3.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	11	9	1	28	28	2
Future Vol, veh/h	11	9	1	28	28	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	10	1	30	30	2

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	22	0	49	17
Stage 1	-	-	-	-	17	-
Stage 2	-	-	-	-	33	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1594	-	960	1062
Stage 1	-	-	-	-	1006	-
Stage 2	-	-	-	-	990	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1594	-	959	1062
Mov Cap-2 Maneuver	-	-	-	-	959	-
Stage 1	-	-	-	-	1006	-
Stage 2	-	-	-	-	989	-

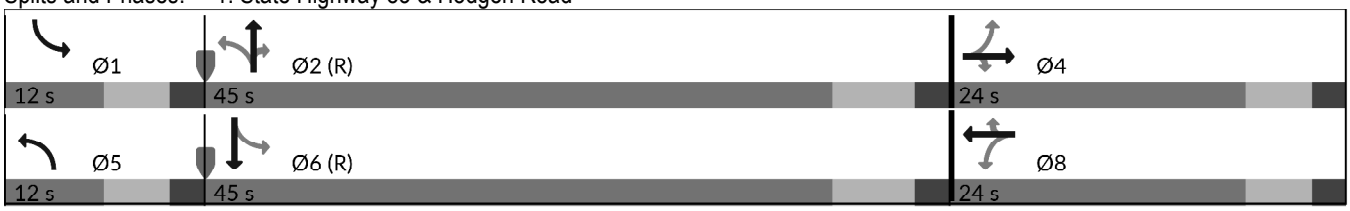
Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.25	8.86
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	965	-	-	62	-
HCM Lane V/C Ratio	0.034	-	-	0.001	-
HCM Ctrl Dly (s/v)	8.9	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	28	232	79	122	107	154	69	367	203	224	385
Future Volume (vph)	28	232	79	122	107	154	69	367	203	224	385
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA
Protected Phases		4			8		5	2		1	6
Permitted Phases	4		4	8		8	2		2	6	
Detector Phase	4	4	4	8	8	8	5	2	2	1	6
Switch Phase											
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	6.0	35.0	35.0	6.0	35.0
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	14.0	12.0	42.0	42.0	12.0	42.0
Total Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	12.0	45.0	45.0	12.0	45.0
Total Split (%)	29.6%	29.6%	29.6%	29.6%	29.6%	29.6%	14.8%	55.6%	55.6%	14.8%	55.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0	4.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	18.0	18.0	18.0	18.0	18.0	18.0	45.0	38.0	38.0	45.0	38.0
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.22	0.22	0.56	0.47	0.47	0.56	0.47
v/c Ratio	0.11	0.61	0.19	0.70	0.28	0.35	0.16	0.46	0.26	0.45	0.56
Control Delay (s/veh)	26.4	35.5	2.7	51.0	28.3	6.8	6.9	16.7	2.7	10.1	18.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	26.4	35.5	2.7	51.0	28.3	6.8	6.9	16.7	2.7	10.1	18.2
LOS	C	D	A	D	C	A	A	B	A	B	B
Approach Delay (s/veh)		27.1			27.0			11.2			15.5
Approach LOS		C			C			B			B

Intersection Summary	
Cycle Length: 81	
Actuated Cycle Length: 81	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 75	
Control Type: Pretimed	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay (s/veh): 18.2	Intersection LOS: B
Intersection Capacity Utilization 81.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 1: State Highway 83 & Hodgen Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	30	252	86	133	116	167	75	399	221	243	484
v/c Ratio	0.11	0.61	0.19	0.70	0.28	0.35	0.16	0.46	0.26	0.45	0.56
Control Delay (s/veh)	26.4	35.5	2.7	51.0	28.3	6.8	6.9	16.7	2.7	10.1	18.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	26.4	35.5	2.7	51.0	28.3	6.8	6.9	16.7	2.7	10.1	18.2
Queue Length 50th (ft)	12	117	0	63	50	0	13	133	0	48	167
Queue Length 95th (ft)	35	194	14	#150	96	48	28	207	35	80	259
Internal Link Dist (ft)		824			1611			1078			1286
Turn Bay Length (ft)	420		420	350		350	600		400	600	
Base Capacity (vph)	282	414	456	190	414	481	466	874	859	538	863
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.61	0.19	0.70	0.28	0.35	0.16	0.46	0.26	0.45	0.56

Intersection Summary

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

Intersection	
Intersection Delay, s/veh	8.7
Intersection LOS	A

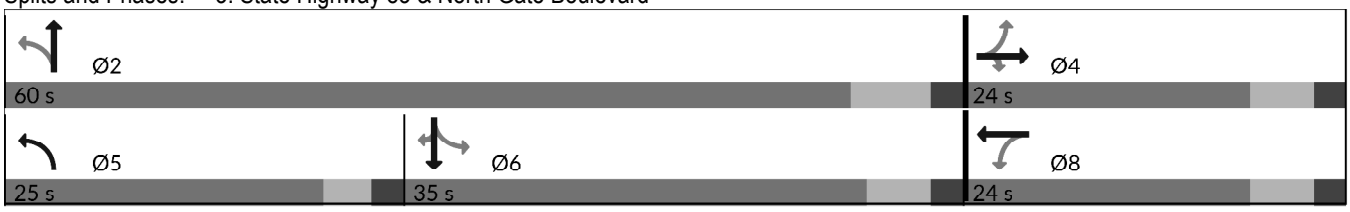
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	2	72	743	646
Demand Flow Rate, veh/h	2	74	758	659
Vehicles Circulating, veh/h	702	703	44	51
Vehicles Exiting, veh/h	8	99	660	726
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	5.4	6.7	9.3	8.1
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	2	74	758	659
Cap Entry Lane, veh/h	674	674	1319	1310
Entry HV Adj Factor	1.000	0.972	0.981	0.980
Flow Entry, veh/h	2	72	743	646
Cap Entry, veh/h	674	655	1294	1284
V/C Ratio	0.003	0.110	0.575	0.503
Control Delay, s/veh	5.4	6.7	9.3	8.1
LOS	A	A	A	A
95th %tile Queue, veh	0	0	4	3

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	330	1	729	1	1	753	624	608	265
Future Volume (vph)	330	1	729	1	1	753	624	608	265
Turn Type	Perm	NA	Perm	Perm	NA	pm+pt	NA	NA	Perm
Protected Phases		4			8	5	2	6	
Permitted Phases	4		4	8		2			6
Detector Phase	4	4	4	8	8	5	2	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	10.0	12.0	11.0	11.0
Total Split (s)	24.0	24.0	24.0	24.0	24.0	25.0	60.0	35.0	35.0
Total Split (%)	28.6%	28.6%	28.6%	28.6%	28.6%	29.8%	71.4%	41.7%	41.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	5.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	5.0	7.0	6.0	6.0
Lead/Lag						Lead		Lag	Lag
Lead-Lag Optimize?						Yes		Yes	Yes
Recall Mode	None	None	None	None	None	Max	Max	Max	Max
Act Effct Green (s)	18.0	18.0	18.0		18.0	55.0	53.0	29.0	29.0
Actuated g/C Ratio	0.21	0.21	0.21		0.21	0.65	0.63	0.35	0.35
v/c Ratio	1.19	0.00	0.65		0.01	0.68	0.30	0.54	0.39
Control Delay (s/veh)	145.6	26.0	5.1		26.0	10.7	7.5	24.2	4.3
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	145.6	26.0	5.1		26.0	10.7	7.5	24.2	4.3
LOS	F	C	A		C	B	A	C	A
Approach Delay (s/veh)		48.9			26.0		9.3	18.1	
Approach LOS		D			C		A	B	

Intersection Summary	
Cycle Length: 84	
Actuated Cycle Length: 84	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.19	
Intersection Signal Delay (s/veh): 24.3	Intersection LOS: C
Intersection Capacity Utilization 77.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 3: State Highway 83 & North Gate Boulevard



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	359	1	792	2	818	680	661	288
v/c Ratio	1.19	0.00	0.65	0.01	0.68	0.30	0.54	0.39
Control Delay (s/veh)	145.6	26.0	5.1	26.0	10.7	7.5	24.2	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	145.6	26.0	5.1	26.0	10.7	7.5	24.2	4.3
Queue Length 50th (ft)	~235	0	0	1	89	77	147	0
Queue Length 95th (ft)	#402	5	50	6	138	106	201	52
Internal Link Dist (ft)		997		136		1617	2154	
Turn Bay Length (ft)	225		285		900			730
Base Capacity (vph)	302	399	1219	373	1198	2233	1221	735
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.19	0.00	0.65	0.01	0.68	0.30	0.54	0.39

Intersection Summary

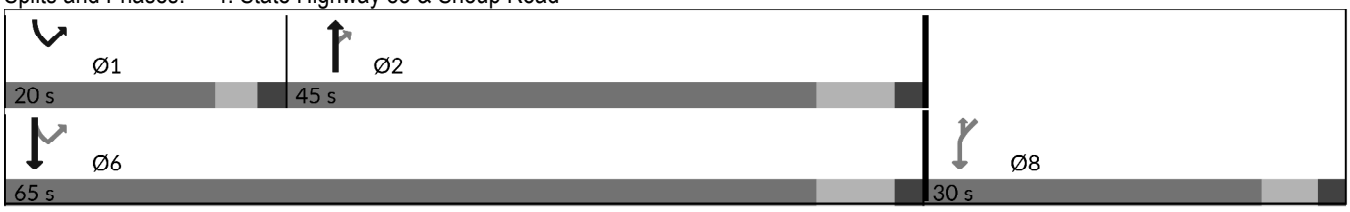
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	1218	180	201	1039	168	130
Future Volume (vph)	1218	180	201	1039	168	130
Turn Type	NA	Perm	pm+pt	NA	Perm	Perm
Protected Phases	2		1	6		
Permitted Phases		2	6		8	8
Detector Phase	2	2	1	6	8	8
Switch Phase						
Minimum Initial (s)	20.0	20.0	4.0	20.0	4.0	4.0
Minimum Split (s)	27.5	27.5	9.0	27.5	10.0	10.0
Total Split (s)	45.0	45.0	20.0	65.0	30.0	30.0
Total Split (%)	47.4%	47.4%	21.1%	68.4%	31.6%	31.6%
Yellow Time (s)	5.5	5.5	3.0	5.5	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	5.0	7.5	6.0	6.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	Max	Max	None	Max	None	None
Act Effct Green (s)	42.1	42.1	60.1	57.6	13.5	13.5
Actuated g/C Ratio	0.50	0.50	0.71	0.68	0.16	0.16
v/c Ratio	0.75	0.22	0.66	0.47	0.62	0.38
Control Delay (s/veh)	22.2	3.2	22.2	7.6	42.4	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	22.2	3.2	22.2	7.6	42.4	8.8
LOS	C	A	C	A	D	A
Approach Delay (s/veh)	19.8			9.9	27.8	
Approach LOS	B			A	C	

Intersection Summary	
Cycle Length: 95	
Actuated Cycle Length: 84.6	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay (s/veh): 16.4	Intersection LOS: B
Intersection Capacity Utilization 69.5%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 4: State Highway 83 & Shoup Road



Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Group Flow (vph)	1324	196	218	1129	183	141
v/c Ratio	0.75	0.22	0.66	0.47	0.62	0.38
Control Delay (s/veh)	22.2	3.2	22.2	7.6	42.4	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	22.2	3.2	22.2	7.6	42.4	8.8
Queue Length 50th (ft)	284	0	45	129	93	0
Queue Length 95th (ft)	#508	40	128	210	159	48
Internal Link Dist (ft)	1042			1734	675	
Turn Bay Length (ft)		710	980			500
Base Capacity (vph)	1762	886	414	2409	529	550
Starvation Cap Reductn	0	0	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	0.75	0.22	0.53	0.47	0.35	0.26

Intersection Summary

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

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	93	134	79	19	65	49	164	13	186	80
Future Volume (vph)	93	134	79	19	65	49	164	13	186	80
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		4			8		2		6	
Permitted Phases	4		4	8		2		6		6
Detector Phase	4	4	4	8	8	2	2	6	6	6
Switch Phase										
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	12.0	12.0	12.0	12.0	12.0
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	18.0	18.0	18.0	18.0	18.0
Total Split (s)	35.0	35.0	35.0	35.0	35.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	38.9%	38.9%	38.9%	38.9%	38.9%	61.1%	61.1%	61.1%	61.1%	61.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0	6.0		6.0	6.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	Max	Max	Max	Max	Max
Act Effct Green (s)	11.1	11.1	11.1		11.1	49.1	49.1		49.1	49.1
Actuated g/C Ratio	0.15	0.15	0.15		0.15	0.68	0.68		0.68	0.68
v/c Ratio	0.45	0.51	0.27		0.41	0.07	0.17		0.17	0.08
Control Delay (s/veh)	34.5	34.5	9.2		29.9	4.8	4.7		5.0	1.5
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0
Total Delay (s/veh)	34.5	34.5	9.2		29.9	4.8	4.7		5.0	1.5
LOS	C	C	A		C	A	A		A	A
Approach Delay (s/veh)		27.9			29.9		4.7		4.0	
Approach LOS		C			C		A		A	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 72.2	
Natural Cycle: 40	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.51	
Intersection Signal Delay (s/veh): 14.9	Intersection LOS: B
Intersection Capacity Utilization 54.5%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 5: Black Forest Road & Shoup Road

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	101	146	86	106	53	207	216	87
v/c Ratio	0.45	0.51	0.27	0.41	0.07	0.17	0.17	0.08
Control Delay (s/veh)	34.5	34.5	9.2	29.9	4.8	4.7	5.0	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	34.5	34.5	9.2	29.9	4.8	4.7	5.0	1.5
Queue Length 50th (ft)	42	61	0	40	7	26	29	0
Queue Length 95th (ft)	87	115	35	84	20	58	64	14
Internal Link Dist (ft)		965		1070		1292	9075	
Turn Bay Length (ft)	295		295		245			295
Base Capacity (vph)	583	749	688	667	788	1244	1240	1103
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.19	0.13	0.16	0.07	0.17	0.17	0.08

Intersection Summary

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	14	1	22	2	5	5	27	105	2	7	116	10
Future Vol, veh/h	14	1	22	2	5	5	27	105	2	7	116	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	1	24	2	5	5	29	114	2	8	126	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	322	322	132	316	326	115	137	0	0	116	0	0
Stage 1	147	147	-	174	174	-	-	-	-	-	-	-
Stage 2	176	175	-	142	152	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	631	595	918	637	592	937	1447	-	-	1472	-	-
Stage 1	856	776	-	828	755	-	-	-	-	-	-	-
Stage 2	826	754	-	861	771	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	604	579	918	602	576	937	1447	-	-	1472	-	-
Mov Cap-2 Maneuver	604	579	-	602	576	-	-	-	-	-	-	-
Stage 1	851	771	-	810	739	-	-	-	-	-	-	-
Stage 2	798	738	-	833	767	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	10.02	10.3	1.52	0.39
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	361	-	-	757	692	93	-	-
HCM Lane V/C Ratio	0.02	-	-	0.053	0.019	0.005	-	-
HCM Ctrl Dly (s/v)	7.5	0	-	10	10.3	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	0	-	-

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	56	471	7	2	232	17	7	0	0	28	2	39
Future Vol, veh/h	56	471	7	2	232	17	7	0	0	28	2	39
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	400	-	335	280	-	-	-	-	-	65	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	61	512	8	2	252	18	8	0	0	30	2	42

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	271	0	0	520	0	0	891	909	512	899	907	261
Stage 1	-	-	-	-	-	-	634	634	-	266	266	-
Stage 2	-	-	-	-	-	-	258	275	-	634	641	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1293	-	-	1047	-	-	263	275	562	260	276	777
Stage 1	-	-	-	-	-	-	467	473	-	740	689	-
Stage 2	-	-	-	-	-	-	747	683	-	467	469	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1293	-	-	1047	-	-	235	262	562	247	262	777
Mov Cap-2 Maneuver	-	-	-	-	-	-	235	262	-	247	262	-
Stage 1	-	-	-	-	-	-	445	451	-	738	687	-
Stage 2	-	-	-	-	-	-	703	681	-	445	447	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0.83	0.07	20.86	14.96
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	235	-	1293	-	-	1047	-	-	247	709
HCM Lane V/C Ratio	0.032	-	0.047	-	-	0.002	-	-	0.123	0.063
HCM Ctrl Dly (s/v)	20.9	0	7.9	-	-	8.4	-	-	21.6	10.4
HCM Lane LOS	C	A	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-	0	-	-	0.4	0.2

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	457	89	46	237	1	59	0	68	0	0	1
Future Vol, veh/h	2	457	89	46	237	1	59	0	68	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	260	290	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	497	97	50	258	1	64	0	74	0	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	259	0	0	593	0	0	859	860	497	859	956	258
Stage 1	-	-	-	-	-	-	501	501	-	358	358	-
Stage 2	-	-	-	-	-	-	358	359	-	501	598	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1306	-	-	983	-	-	277	294	573	276	258	780
Stage 1	-	-	-	-	-	-	552	543	-	660	628	-
Stage 2	-	-	-	-	-	-	660	627	-	552	491	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1306	-	-	983	-	-	262	278	573	228	244	780
Mov Cap-2 Maneuver	-	-	-	-	-	-	262	278	-	228	244	-
Stage 1	-	-	-	-	-	-	551	541	-	626	596	-
Stage 2	-	-	-	-	-	-	626	595	-	480	490	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0.03	1.44	20.47	9.62
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	369	8	-	-	983	-	-	780
HCM Lane V/C Ratio	0.374	0.002	-	-	0.051	-	-	0.001
HCM Ctrl Dly (s/v)	20.5	7.8	0	-	8.9	-	-	9.6
HCM Lane LOS	C	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	1.7	0	-	-	0.2	-	-	0

Intersection	
Intersection Delay, s/veh	3.1
Intersection LOS	A

Approach	EB	WB	NB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	89	50	36
Demand Flow Rate, veh/h	90	51	37
Vehicles Circulating, veh/h	9	26	66
Vehicles Exiting, veh/h	68	77	33
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	3.2	3.0	3.1
Approach LOS	A	A	A

Lane	Left	Left	Left
Designated Moves	TR	LT	LR
Assumed Moves	TR	LT	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
A (Intercept)	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	90	51	37
Cap Entry Lane, veh/h	1367	1344	1290
Entry HV Adj Factor	0.986	0.984	0.973
Flow Entry, veh/h	89	50	36
Cap Entry, veh/h	1348	1322	1255
V/C Ratio	0.066	0.038	0.029
Control Delay, s/veh	3.2	3.0	3.1
LOS	A	A	A
95th %tile Queue, veh	0	0	0

Intersection	
Intersection Delay, s/veh	3.1
Intersection LOS	A

Approach	WB	NB	SE
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	60	3	90
Demand Flow Rate, veh/h	61	3	92
Vehicles Circulating, veh/h	3	79	2
Vehicles Exiting, veh/h	79	15	62
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	3.0	2.8	3.2
Approach LOS	A	A	A

Lane	Left	Left	Left
Designated Moves	LR	LR	LR
Assumed Moves	LR	LR	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
A (Intercept)	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	61	3	92
Cap Entry Lane, veh/h	1376	1273	1377
Entry HV Adj Factor	0.984	1.000	0.978
Flow Entry, veh/h	60	3	90
Cap Entry, veh/h	1353	1273	1347
V/C Ratio	0.044	0.002	0.067
Control Delay, s/veh	3.0	2.8	3.2
LOS	A	A	A
95th %tile Queue, veh	0	0	0

Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Vol, veh/h	0	3	8	10	5	8	5	3	16	7	6	1
Future Vol, veh/h	0	3	8	10	5	8	5	3	16	7	6	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	3	9	11	5	9	5	3	17	8	7	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	39	54	7	46	46	12	8	0	0	21	0	0
Stage 1	22	22	-	23	23	-	-	-	-	-	-	-
Stage 2	17	32	-	23	23	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	965	837	1075	955	846	1069	1613	-	-	1595	-	-
Stage 1	996	877	-	995	876	-	-	-	-	-	-	-
Stage 2	1003	869	-	995	876	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	944	831	1075	936	839	1069	1613	-	-	1595	-	-
Mov Cap-2 Maneuver	944	831	-	936	839	-	-	-	-	-	-	-
Stage 1	991	872	-	992	873	-	-	-	-	-	-	-
Stage 2	985	866	-	978	872	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	8.66	8.88	1.51	3.63
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	321	-	-	995	953	875	-	-
HCM Lane V/C Ratio	0.003	-	-	0.012	0.026	0.005	-	-
HCM Ctrl Dly (s/v)	7.2	0	-	8.7	8.9	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	11	17	151	139	9
Future Vol, veh/h	1	11	17	151	139	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	12	18	164	151	10

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	357	156	161	0	-	0
Stage 1	156	-	-	-	-	-
Stage 2	201	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	641	890	1418	-	-	-
Stage 1	872	-	-	-	-	-
Stage 2	833	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	632	890	1418	-	-	-
Mov Cap-2 Maneuver	632	-	-	-	-	-
Stage 1	860	-	-	-	-	-
Stage 2	833	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	9.25	0.77	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	182	-	860	-	-
HCM Lane V/C Ratio	0.013	-	0.015	-	-
HCM Ctrl Dly (s/v)	7.6	0	9.2	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Intersection Delay, s/veh	2.9
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	43	44	13	14
Demand Flow Rate, veh/h	44	44	13	14
Vehicles Circulating, veh/h	23	14	44	37
Vehicles Exiting, veh/h	28	43	23	21
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	3.0	2.9	2.8	2.8
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	44	44	13	14
Cap Entry Lane, veh/h	1348	1360	1319	1329
Entry HV Adj Factor	0.988	0.992	1.000	1.000
Flow Entry, veh/h	43	44	13	14
Cap Entry, veh/h	1332	1350	1319	1329
V/C Ratio	0.033	0.032	0.010	0.011
Control Delay, s/veh	3.0	2.9	2.8	2.8
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	547	7	2	296	3	1
Future Vol, veh/h	547	7	2	296	3	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	595	8	2	322	3	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	602	0	924	598
Stage 1	-	-	-	-	598	-
Stage 2	-	-	-	-	326	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	975	-	299	502
Stage 1	-	-	-	-	549	-
Stage 2	-	-	-	-	731	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	975	-	298	502
Mov Cap-2 Maneuver	-	-	-	-	298	-
Stage 1	-	-	-	-	549	-
Stage 2	-	-	-	-	729	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.06	15.99
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	332	-	-	12	-
HCM Lane V/C Ratio	0.013	-	-	0.002	-
HCM Ctrl Dly (s/v)	16	-	-	8.7	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	1.1

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	0	0	0	3	0	2	4	32	1	0	22	4
Future Vol, veh/h	0	0	0	3	0	2	4	32	1	0	22	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	3	0	2	4	35	1	0	24	4

Major/Minor	Minor1			Minor2			Major1			Major2		
Conflicting Flow All	68	72	35	70	71	26	28	0	0	36	0	0
Stage 1	44	44	-	26	26	-	-	-	-	-	-	-
Stage 2	24	28	-	43	45	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	925	818	1037	922	820	1050	1585	-	-	1575	-	-
Stage 1	970	858	-	991	873	-	-	-	-	-	-	-
Stage 2	994	872	-	971	858	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	920	816	1037	920	818	1050	1585	-	-	1575	-	-
Mov Cap-2 Maneuver	920	816	-	920	818	-	-	-	-	-	-	-
Stage 1	967	856	-	991	873	-	-	-	-	-	-	-
Stage 2	992	872	-	968	855	-	-	-	-	-	-	-

Approach	NB	SB	NE	SW
HCM Ctrl Dly, s/v	0	8.74	0.79	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NEL	NET	NER	NBLn1	SBLn1	SWL	SWT	SWR
Capacity (veh/h)	193	-	-	-	968	1575	-	-
HCM Lane V/C Ratio	0.003	-	-	-	0.006	-	-	-
HCM Ctrl Dly (s/v)	7.3	0	-	0	8.7	0	-	-
HCM Lane LOS	A	A	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	0	0	-	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	31	32	3	21	18	1
Future Vol, veh/h	31	32	3	21	18	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	34	35	3	23	20	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	68	0	80	51
Stage 1	-	-	-	-	51	-
Stage 2	-	-	-	-	29	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1533	-	922	1017
Stage 1	-	-	-	-	971	-
Stage 2	-	-	-	-	993	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1533	-	920	1017
Mov Cap-2 Maneuver	-	-	-	-	920	-
Stage 1	-	-	-	-	971	-
Stage 2	-	-	-	-	991	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.92	8.98
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	925	-	-	225	-
HCM Lane V/C Ratio	0.022	-	-	0.002	-
HCM Ctrl Dly (s/v)	9	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-