

# MASTER TRAFFIC IMPACT STUDY

For

**Flying Horse North  
El Paso County, Colorado  
PCD File No. SKP223**

July 2022

Revised:  
September 2022

Prepared for:

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

Prepared by:



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Fred Lantz, PE



21-101521

**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.



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Fred Lantz, P.E. #23410

9/22/22

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Date**Developer's Statement**

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



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

SEP 22 2022

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Date

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## I. Introduction

### Project Overview

This traffic impact study is provided as a planning document and addresses the capacity, geometric, and control requirements associated with the development entitled Flying Horse North.

This proposed mixed-use development consists of a variety of residential, commercial, recreational, and lodging land uses. The development is located along Old Stagecoach Road between State Highway 83 and Black Forest Road in El Paso County, Colorado.

### Study Area Boundaries

The study area to be examined in this analysis encompasses the Hodgen Road intersections with State Highway 83 and Black Forest Road, the Old Stagecoach Road intersections with State Highway 83, Shortwall Drive, Allen Ranch Road, and Black Forest Road, the North Gate Boulevard intersection with State Highway 83, and the Shoup Road intersections with State Highway 83 and Black Forest Road.

Figure 1 illustrates location of the site and study intersections.

### Site Description

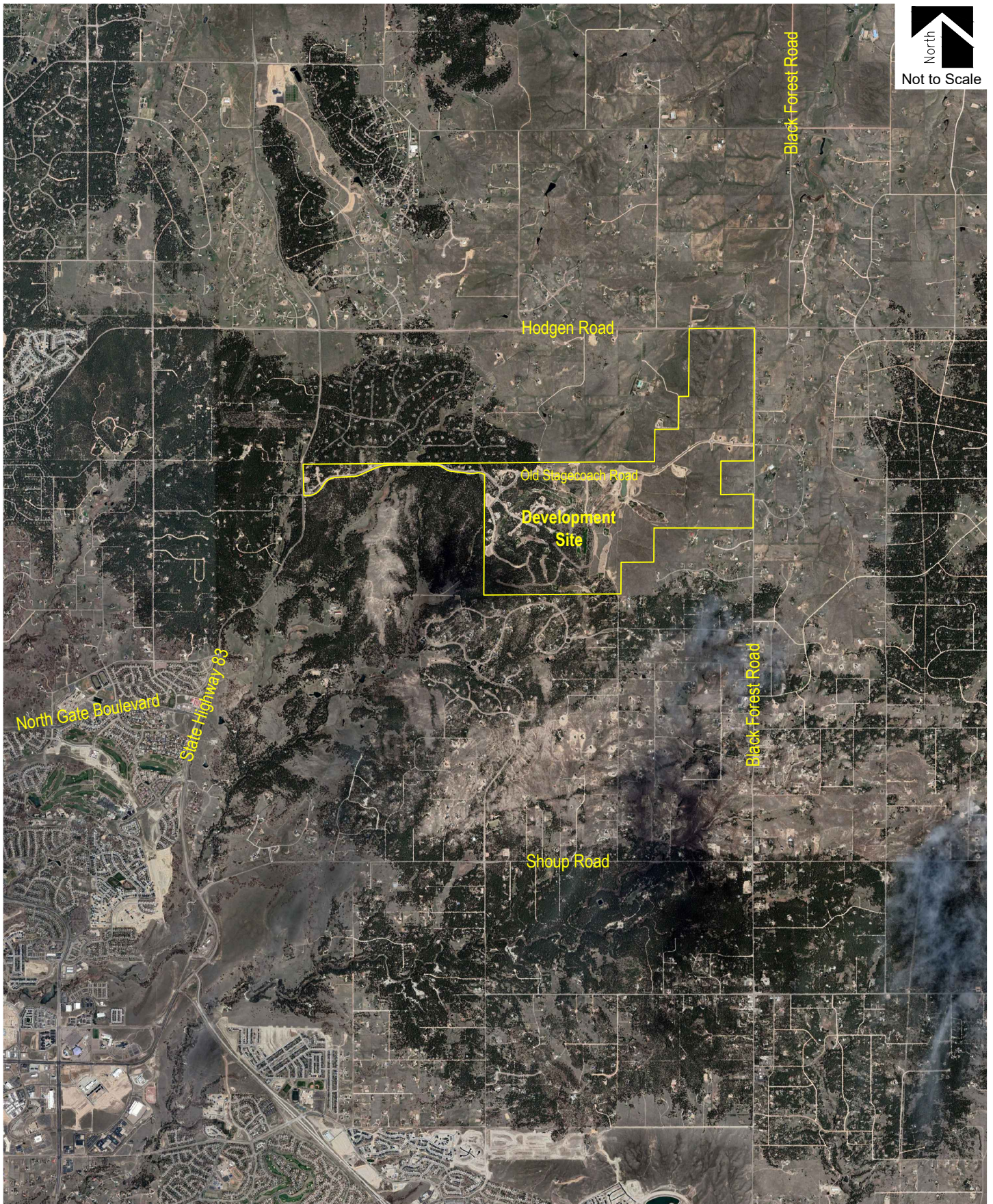
Land for the development is partially vacant and surrounded by a mix of open space, recreational, and residential land uses. The occupied portion of land development is currently the Flying Horse North Golf Course, which is expected to become an ancillary use for the proposed resort hotel.

The proposed development's sketch plan is conceptual and not all land uses have been determined. However, for purposes of this analysis, there is assumed to be construction for 846 single-family housing dwelling units, a resort hotel supporting 275 rooms, an approximate 44,600 square foot fitness center, and approximately 99,100 square feet of commercial land use.

Considering the conceptual nature of the proposed development, future access will generally include multiple access drives along all exterior roadways bordering the proposed development and along Old Stagecoach Road. For purposes of this analysis, primary points of entry to the overall development area are provided at the following locations: one full-movement access serving as the east leg of the State Highway 83 and Stagecoach Road intersection, and one full-movement access serving as the west leg of the Black Forest Road and Old Stagecoach Road intersection.

For purposes of this study, it is anticipated that development construction would be completed by end of Year 2027. A sketch plan, as prepared by HR Green, Inc., is shown on Figure 2. This plan is provided for illustrative purposes only.





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**Figure 1**  
**SITE LOCATION**

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Not to Scale

LEGEND

ESTATE LOTS (5 AC)

ESTATE LOTS (2.5 AC)

LOW DENSITY

MEDIUM DENSITY

COMMERCIAL

GOLF CLUB, FITNESS CENTER, RESTAURANT/BAR (HOTEL)

HOTEL COMPLEX

CLUBHOUSE

ROADWAY

DETENTION

SITE BOUNDARY

HOTEL PARCELS

SCHOOL DISTRICT LINE

FHN TRAIL

PUBLIC COUNTY TRAIL

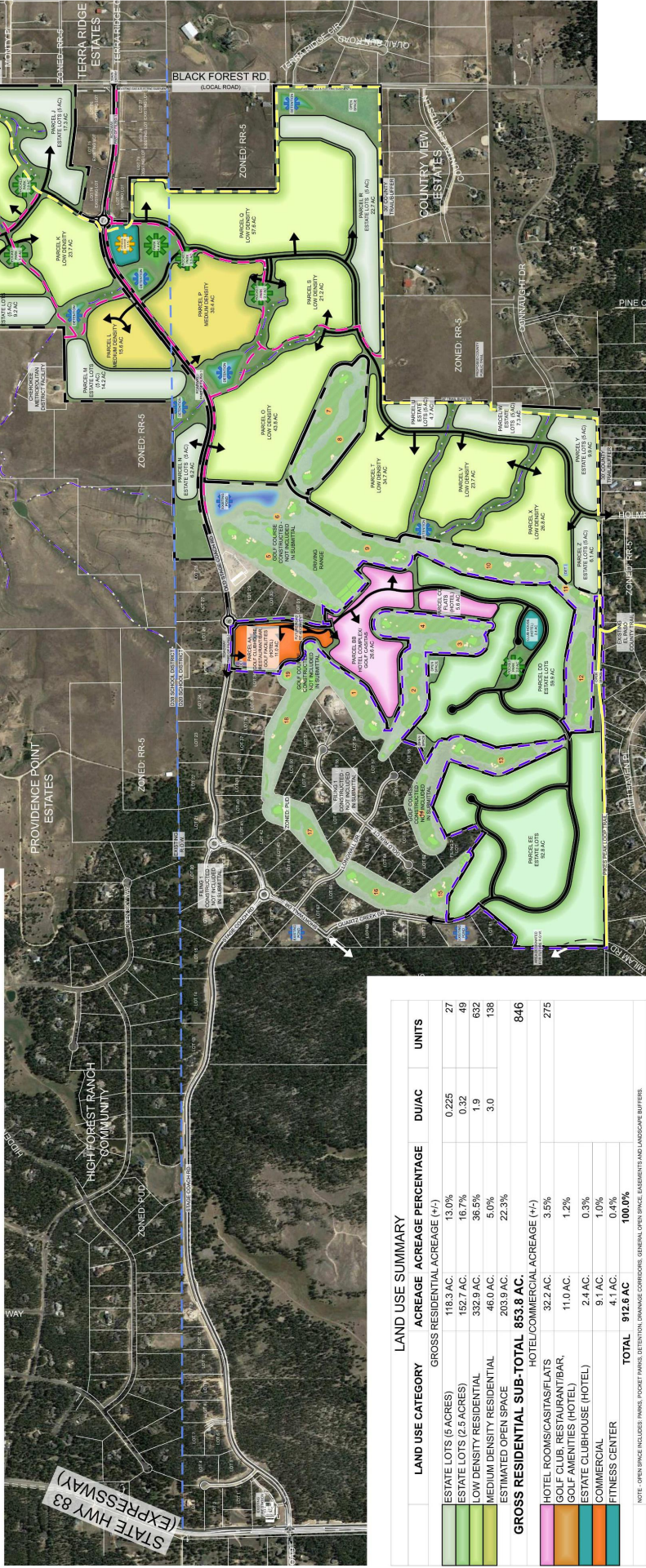
EXISTING DRAINAGE WAY

PARK/POCKET PARK

FITNESS CENTER

POTENTIAL FIRE STATION

DETENTION



LAND USE SUMMARY				
LAND USE CATEGORY	ACREAGE	PERCENTAGE	DUIAC	UNITS
GROSS RESIDENTIAL ACREAGE (+/-)				
ESTATE LOTS (6 ACRES)	118.3 AC.	13.0%	0.225	27
ESTATE LOTS (2.5 ACRES)	152.7 AC.	16.7%	0.32	49
LOW DENSITY RESIDENTIAL	332.9 AC.	36.5%	1.9	632
MEDIUM DENSITY RESIDENTIAL	48.0 AC.	5.0%	3.0	138
ESTIMATED OPEN SPACE	203.9 AC.	22.3%		
GROSS RESIDENTIAL SUB-TOTAL 853.8 AC.				
HOTEL/COMMERCIAL ACREAGE (+/-)				
HOTEL ROOMS/CASITAS/FLATS	32.2 AC.	3.5%		275
GOLF CLUB RESTAURANT/BAR	11.0 AC.	1.2%		
GOLF AMENITIES (HOTEL)	2.4 AC.	0.3%		
ESTATE CLUBHOUSE (HOTEL)	9.1 AC.	1.0%		
COMMERCIAL	4.1 AC.	0.4%		
FITNESS CENTER	4.1 AC.	0.4%		
TOTAL	912.6 AC	100.0%		

NOTE: OPEN SPACE INCLUDES PARKS, POCKET PARKS, UTILITY, DRAINAGE CORRIDORS, GENERAL OPEN SPACE, EASEMENTS AND LANDSCAPE BUFFERS.



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Figure 2  
SKETCH 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, and Allen Ranch Road. A brief description of each roadway, based on the County's 2016 Major Transportation Corridors Plan (MTCP)<sup>1</sup> and Engineering Criteria Manual (ECM)<sup>2</sup>, as well as the City's Major Thoroughfare Plan<sup>3</sup>, 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 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. East and west of State Highway 83, the County's 2016 MTCP categorizes Hodgen Road as a minor arterial and major arterial roadway, respectively. Hodgen Road provides a posted speed limit of 55 MPH.

Black Forest Road is a north-south, El Paso County-owned, minor arterial roadway having two through lanes (one lane in each direction) with shared turn lanes at the intersections within the study area. Black Forest Road provides posted speed limits of 40 to 45 MPH. Black Forest Road extends north of Hodgen Road as an unpaved, private roadway. Black Forest Road continues as a public roadway north of Hodgen Road, offset approximately one-quarter mile east, and classified as a collector roadway.

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 2016 MTCP categorizes Shoup Road as a minor arterial roadway while the City's Major Thoroughfare Plan categorizes Shoup Road as a principal arterial roadway. Shoup Road provides posted speed limits of 30 to 45 MPH. Shoup Road ends at State Highway 83 creating a signalized, T-intersection.

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<sup>1</sup> El Paso County 2016 Major Transportation Corridors Plan Update, Felsburg Holt & Ullevig, December 2016.

<sup>2</sup> El Paso County Engineering Criteria Manual, El Paso County, October 2020.

<sup>3</sup> Major Thoroughfare Plan, City of Colorado Springs, August 2011.



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 Major Thoroughfare Plan 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 over 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. Old Stagecoach Road is unclassified in both the County's 2016 MTCP and the City's Major Thoroughfare Plan. However, per Sections 2.2.4 and 2.3.2 of the County's ECM, the roadway's estimated right-of-way (ROW) width, its connection from State Highway 83 to Black Forest Road, its posted speed limit of 35 MPH, and per review of the Flying Horse North Preliminary Plan<sup>4</sup>, Old Stagecoach Road is classified 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 major 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 2016 MTCP and the City's Major Thoroughfare Plan. However, per Section 2.3.2, Table 2-5 of the County's ECM and the roadway's posted speed limit, Shortwall Drive is assumed to be classified 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 2016 MTCP and the City's Major Thoroughfare Plan. However, per Section 2.2.4 of the County's ECM and the roadway's estimated ROW width, Allen Ranch Road is assumed to be classified as a rural local roadway with a design speed limit of 30 MPH.

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 Road intersections with Shortwall Drive and Allen Ranch Road operate under roundabout 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 the County's 2016 MTCP, 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. However, the County's 2016 MTCP does not mention when these improvements will occur. As such, these improvements are assumed to occur by Year 2042, providing for a conservative analysis.

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<sup>4</sup> Flying Horse North: Preliminary Plan, N.E.S. Inc., July 18, 2018.

## II. Existing Traffic Conditions

Morning (AM) and afternoon (PM) peak hour traffic counts were collected at the following intersections:

- State Highway 83 / Hodgen Road
- State Highway 83 / Stagecoach Road
- State Highway 83 / North Gate Boulevard
- State Highway 83 / Shoup Road
- Ridge Run Drive / Hodgen Road
- Black Forest Road / Hodgen Road
- Black Forest Road / Old Stagecoach Road
- Black Forest Road / Shoup Road
- Stagecoach Road / Shortwall Drive
- Old Stagecoach Road / Allen Ranch Road

Average daily (24-hour) traffic volumes were collected along the following roadways:

- Black Forest Road
- Hodgen Road
- Stagecoach Road
- Old Stagecoach Road
- Shoup Road

Counts were collected on Tuesday, November 30, 2021, with AM peak hour counts being collected during the period of 7:00 AM to 9:00 AM, and PM peak hour counts being collected during the period of 4:00 PM to 6:00 PM.

Considering how traffic counts were collected one week after the Thanksgiving holiday, and due to the possible effects of the COVID-19 pandemic, collected traffic counts may not accurately represent daily and peak hour traffic volumes under normal 24-hour and peak traffic conditions. Therefore, a method was used in order to validate collected traffic data, or to more accurately represent existing traffic volumes under normal conditions. The methodology used included referencing historical traffic count data along Hodgen Road, Shoup Road, and Black Forest Road provided by CDOT's Traffic Count Database System (TCDS)<sup>5</sup>. These referenced average daily traffic (ADT) volumes were then grown to Year 2022 at a compounded annual growth rate of three percent.

The three percent compounded annual growth rate was determined using population growth estimates provided by the Pikes Peak Area Council of Governments' (PPACG) 2045 Long Range Transportation Plan<sup>6</sup>, as well as traffic data provided by CDOT's Online Transportation Information System (OTIS) for the adjacent segment of State Highway 83.

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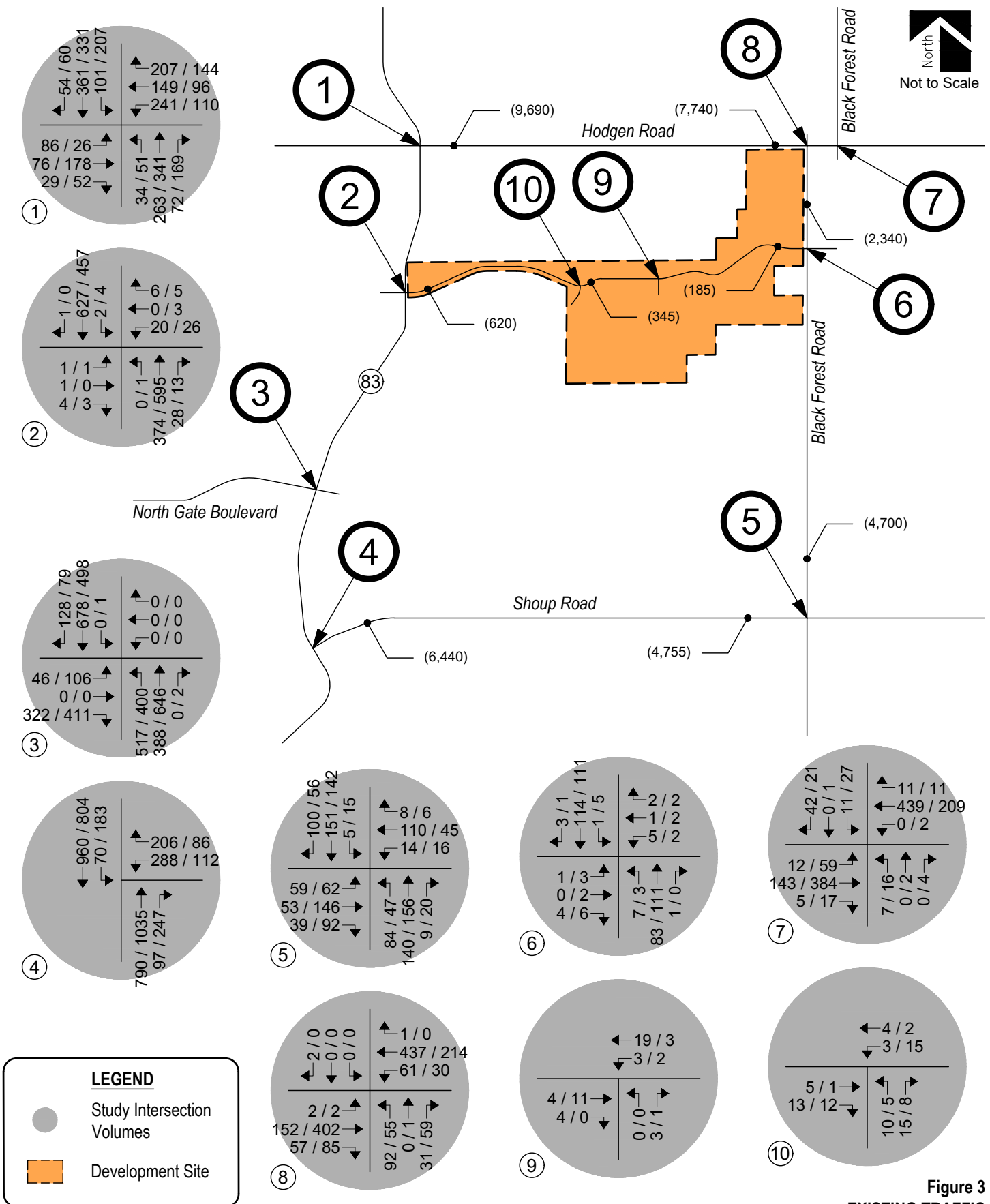
<sup>5</sup> Transportation Data Management System, MS2, 2021.

<sup>6</sup> Moving Forward 2045: Pikes Peak Area Regional Transportation Plan, Pikes Peak Area Council of Governments, January 2020.

Newly collected traffic counts were then compared to CDOT's calculated Year 2022 ADT volumes. It was determined that newly collected traffic counts represent higher traffic volumes. As such, no holiday nor COVID-19 adjustments were considered in this analysis.

Newly collected counts are shown on Figure 3. Existing intersection geometry is shown on Figure 4.

Existing signal timing parameters for the State Highway 83 intersections with Hodgen Road, North Gate Boulevard, and Shoup Road, as well as the intersection of Black Forest Road with Shoup Road, were obtained from County, City, and CDOT Staff. Existing signal timing parameters were used throughout this study to the best extent possible in order to remain consistent with existing signal coordination plans. County, City, and CDOT signal timing information received is included for reference in Appendix A.



**Figure 3**  
**EXISTING TRAFFIC**

Volumes

AM / PM Peak Hour

(ADT) : Average Daily Traffic



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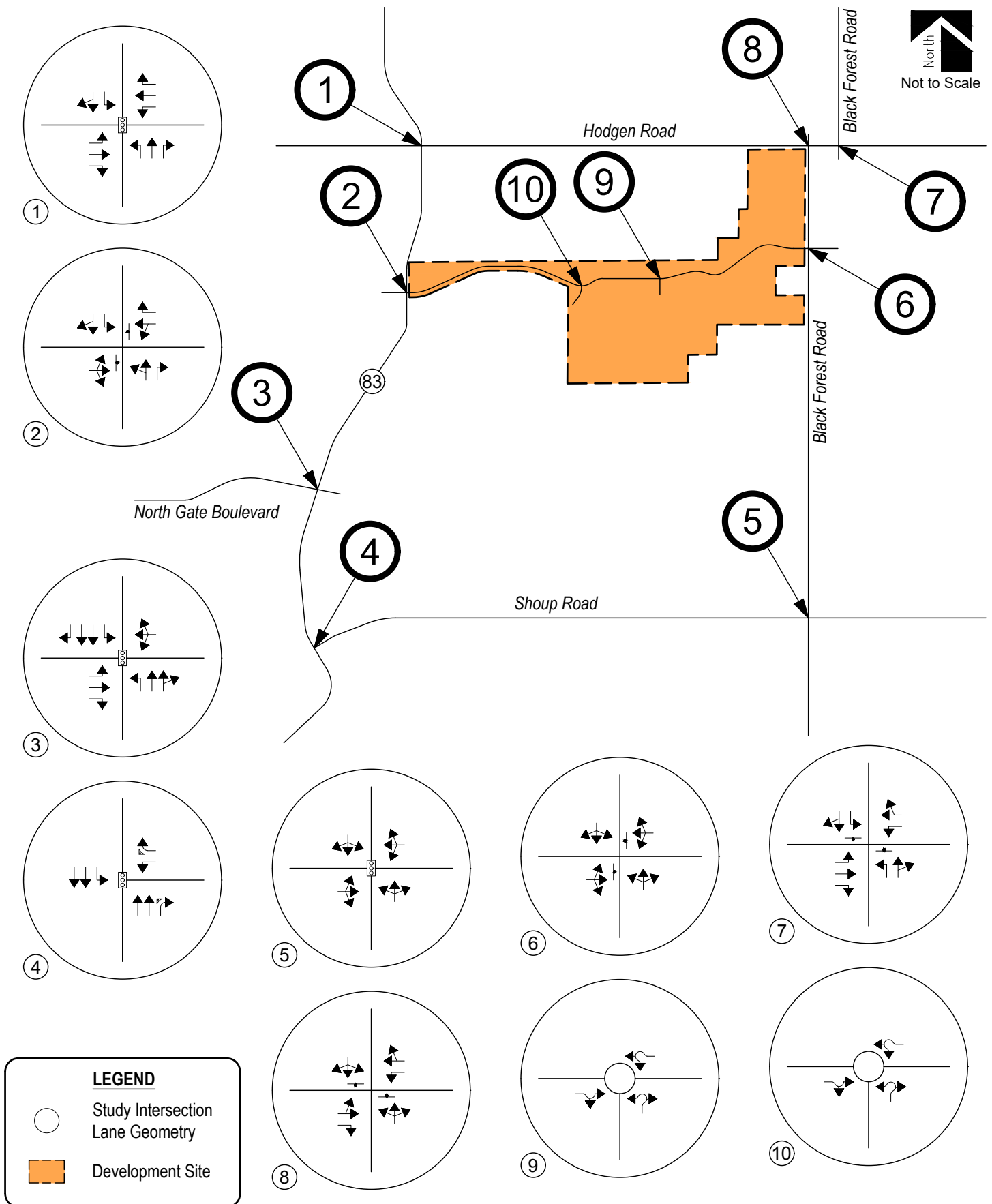
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**Figure 4**  
**EXISTING TRAFFIC**  
Intersection Geometry

**Peak Hour Intersection Levels of Service – Existing 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 existing 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 of 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 C and have been used throughout this study.

The level of service analyses results for existing conditions are summarized in Table 1.

Intersection capacity worksheets developed for this study are provided in Appendix D.

**Table 1 – Intersection Capacity Analysis Summary – Existing Traffic**

INTERSECTION LANE GROUPS	LEVEL OF SERVICE	
	AM PEAK HOUR	PM PEAK HOUR
State Highway 83 / Hodgen Road (Signalized)	C (22.4)	B (16.7)
State Highway 83 / North Gate Boulevard (Signalized)	B (17.8)	B (11.3)
State Highway 83 / Shoup Road (Signalized)	B (16.0)	B (11.2)
Black Forest Road / Shoup Road (Signalized)	B (15.6)	C (21.6)
State Highway 83 / Stagecoach Road (Stop-Controlled)		
Eastbound Left, Through and Right	C	C
Westbound Left and Through	D	E
Westbound Right	B	B
Northbound Left and Through	A	A
Southbound Left	A	A
Black Forest Road / Old Stagecoach Road (Stop-Controlled)		
Eastbound Left, Through and Right	A	A
Westbound Left, Through and Right	B	B
Northbound Left, Through and Right	A	A
Southbound Left, Through and Right	A	A
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	B
Southbound Left	C	C
Southbound Through and Right	B	B
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
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
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

## **Existing Traffic Analysis Results**

Under existing conditions, operational analysis shows that the signalized intersection of State Highway 83 with Hodgen Road has overall operations at LOS C during the morning peak traffic hour and LOS B during the afternoon peak traffic hour.

The signalized intersection of State Highway 83 with North Gate Boulevard has overall operations at LOS B during both the morning and afternoon peak traffic hours.

The signalized intersection of State Highway 83 with Shoup Road has overall operations at LOS B during both the morning and afternoon peak traffic hours.

The signalized intersection of Black Forest Road with Shoup Road has overall operations at LOS B during the morning peak traffic hour and LOS C during the afternoon peak traffic hour.

The stop-controlled intersection of State Highway 83 with Stagecoach Road has turning movement operations at or better than LOS D during the morning peak traffic hour and LOS E or better during the afternoon peak traffic hour. The LOS E operation shown for the westbound left and through turn movement is attributed to the through volumes along State Highway 83 and the stop-controlled nature of the intersection.

The stop-controlled intersection of Black Forest Road with Old Stagecoach Road has turning movement operations at or better than LOS B during both the morning and afternoon peak traffic hours.

The stop-controlled intersection of Hodgen Road with Ridge Run Drive has turning movement operations at or better than LOS C during both the morning and afternoon peak traffic hours.

The stop-controlled intersection of Hodgen Road with Black Forrest Road has turning movement operations at or better than LOS C during both the morning and afternoon peak traffic hours.

The roundabout intersection of Old Stagecoach Road with Allen Ranch Road has turning movement operations at LOS A during both the morning and afternoon peak traffic hours.

The roundabout intersection of Old Stagecoach Road with Shortwall Drive has turning movement operations at LOS A during both the morning and afternoon peak traffic hours.

### **III. Future Traffic Conditions Without Proposed Development**

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 Years 2027 and 2042, a compounded annual growth rate was determined using population growth estimates provided by the PPACG's 2045 Long Range Transportation Plan, as well as traffic data provided by CDOT's OTIS for the adjacent segment of State Highway 83. PPACG's 2045 Long Range Transportation Plan anticipate a 20-year growth rate between one and two percent, while CDOT's OTIS anticipates a 20-year growth rate between two and three percent. Therefore, in order to provide for a conservative analysis, a growth rate of three percent was applied to existing traffic volumes. This annual growth rate is also considered to be consistent with long-term regional growth projections and the level of in-fill development expected within the area.

The County's Electronic Development Application Review Program (EDARP) provides traffic studies for future adjacent developments, providing additional trips that could impact the study area. However, these future development areas have traffic studies that are over three years old and no longer comply to the County's 2016 MTCP. These developments include but are not limited to: Mountain Dance, Shamrock Ranch, Paint Brush Hills, Setters View Subdivision, and Providence Point. As such, the conservative three percent annual growth mentioned above is expected to account for any future development within the overall study area.

Pursuant to the non-committed area roadway improvements discussed in Section I, Year 2027 background traffic conditions assume no roadway improvements to accommodate regional transportation demands. Year 2042 background traffic conditions assume the widening of State Highway 83 and the alignment of Black Forest Road across Hodgen Road. Year 2042 also assumes existing signal timing parameters for the signalized intersections within the study area with optimized intersection splits in effort to better long-term intersection performance. These assumptions provide for a conservative analysis.

Projected background traffic volumes and intersection geometry for Year 2027 are shown on Figure 5 and Figure 6, respectively.

Projected background traffic volumes and intersection geometry for Year 2042 are shown on Figure 7 and Figure 8, respectively.

### **Background Traffic Signal Warrants**

A preliminary signal warrant analysis, using Year 2027 and 2042 background traffic volumes, was conducted for the State Highway 83 with Stagecoach Road intersection, as well as the Black Forest Road with Hodgen Road intersection, in order to review potential for traffic signal control. Warrant study worksheets are provided for reference in Appendix E.

From a traffic volume perspective, the State Highway 83 with Stagecoach Road intersection remained below the vehicle volume thresholds required to meet Warrant 1 (Eight-Hour Vehicular Volume), Warrant 2 (Four-Hour Vehicular Volume), and Warrant 3 (Peak Hour), from the MUTCD, for the installation of a traffic signal. As such, the intersection remained under stop-controlled conditions for Year 2027 and Year 2042 background traffic conditions.

Upon realignment of the Black Forest Road with Hodgen Road intersection assumed to occur by Year 2042, the study intersection was determined to be above the minimum vehicle volumes required to meet Warrants 1, 2, and 3 for the installation of a traffic signal. As such, the realigned intersection was analyzed under assumed traffic signal control by Year 2042.

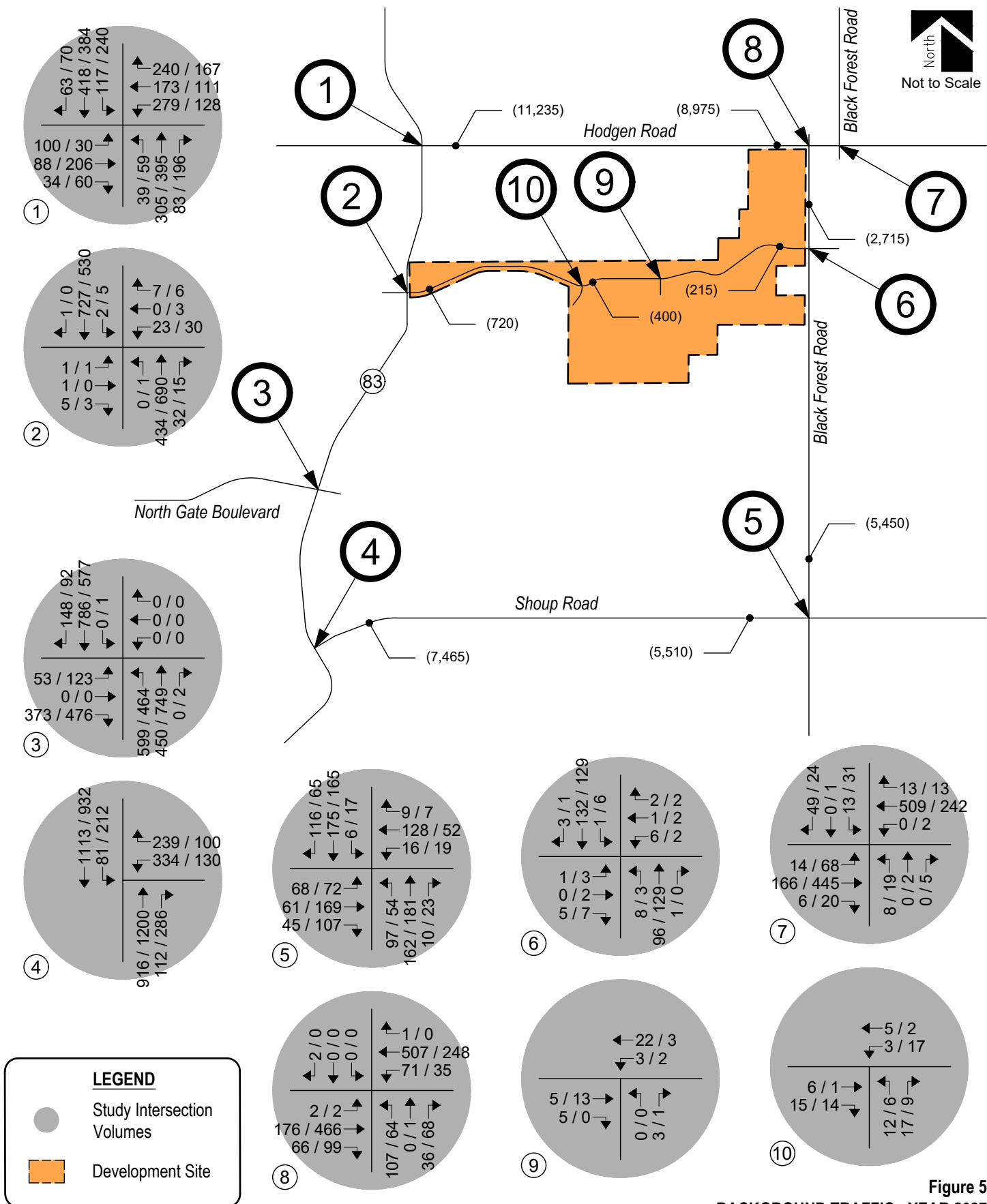
Said intersections should be monitored further by CDOT or County Staff as area development occurs to determine when or if traffic signal installation is appropriate.

### **Peak Hour Intersection Levels of Service – Background Traffic**

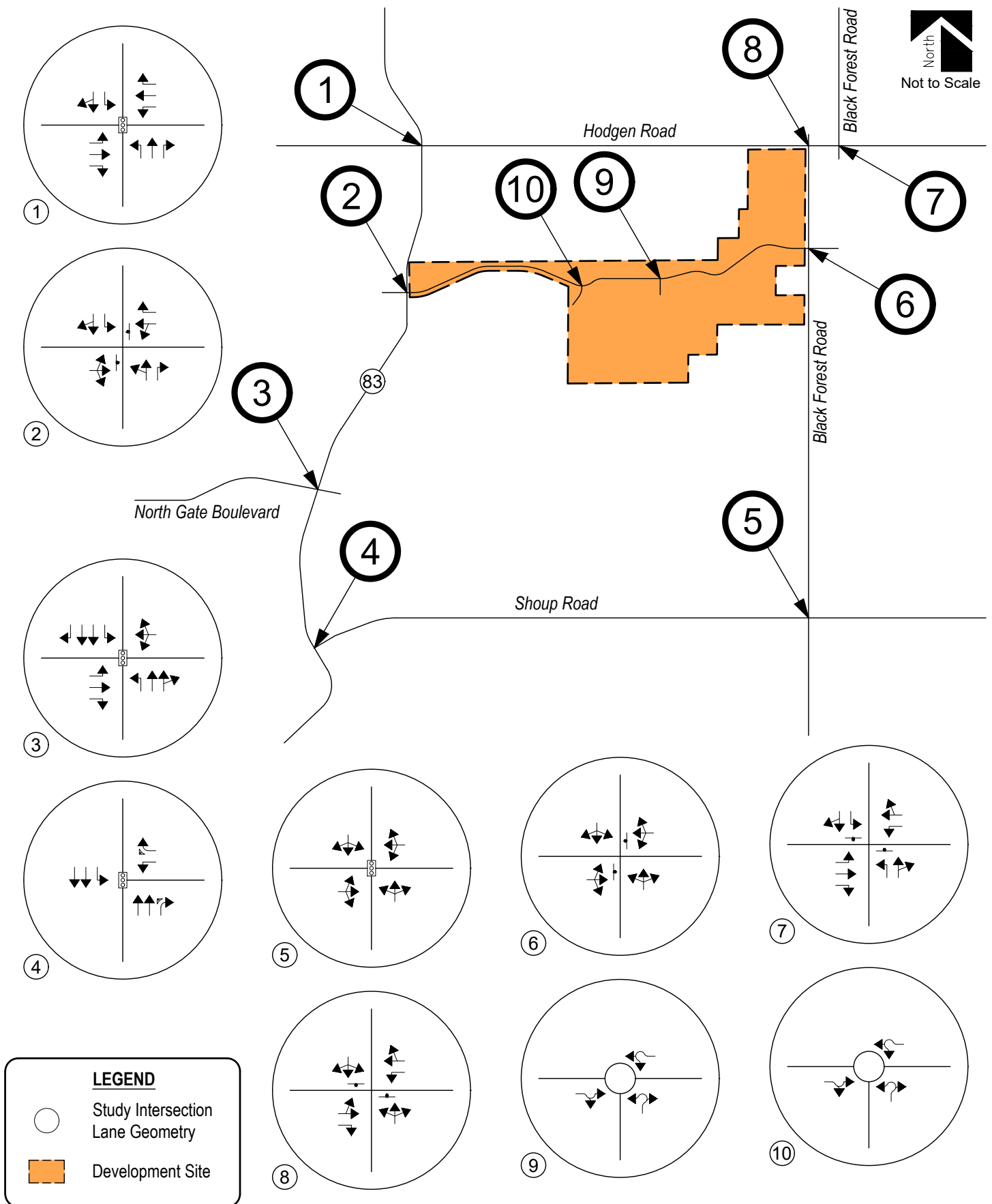
As with existing traffic conditions, the operations of study intersections were analyzed under background conditions, without the proposed development, using the SYNCHRO computer program.

Background traffic level of service analysis results for Year 2027 are listed in Table 2. Year 2042 operational results are summarized in Table 3.

Definitions of levels of service are given in Appendix C. Intersection capacity worksheets are provided in Appendix D.



**Figure 5**  
**BACKGROUND TRAFFIC - YEAR 2027**  
 Volumes  
 AM / PM Peak Hour  
 (ADT) : Average Daily Traffic



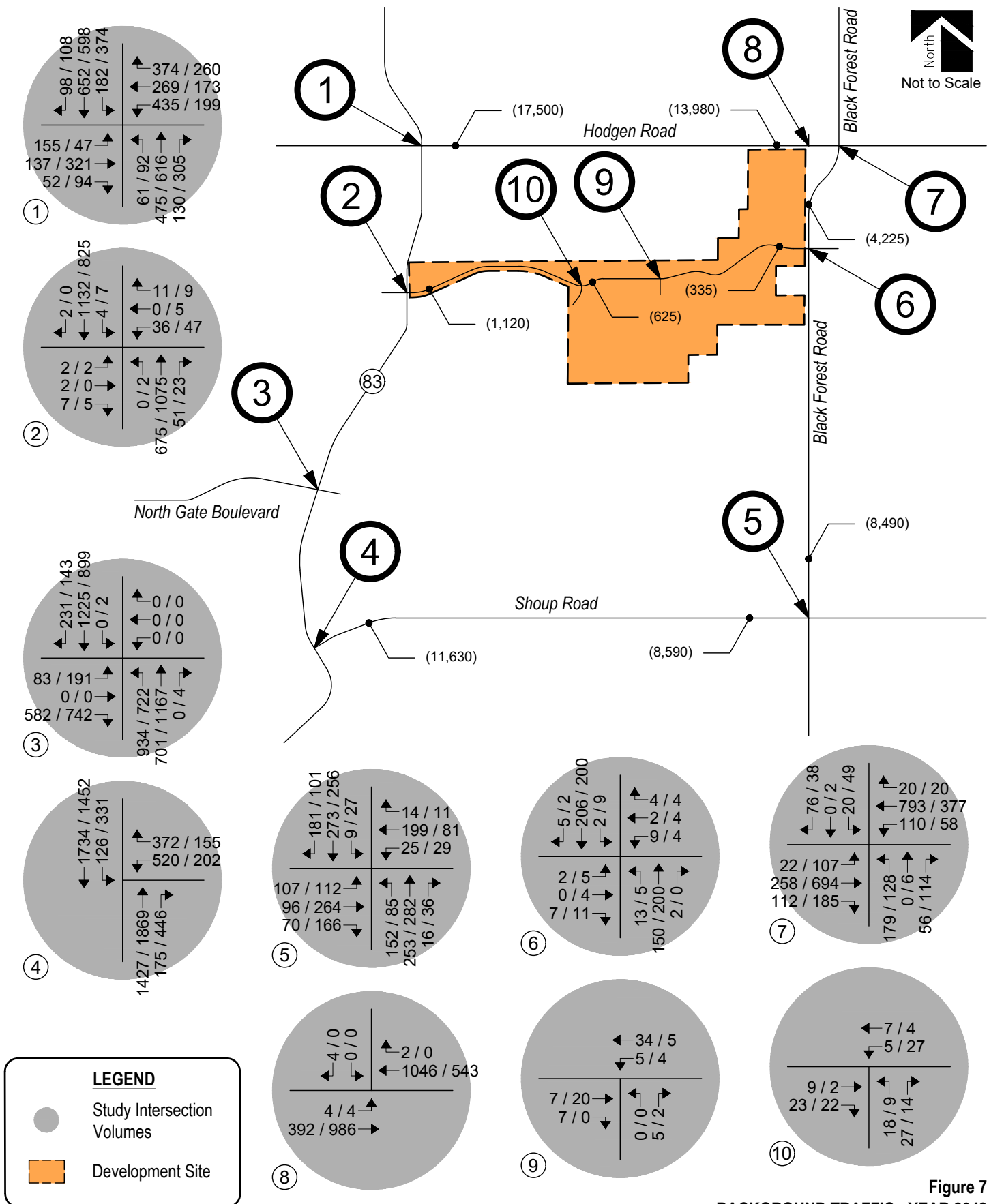
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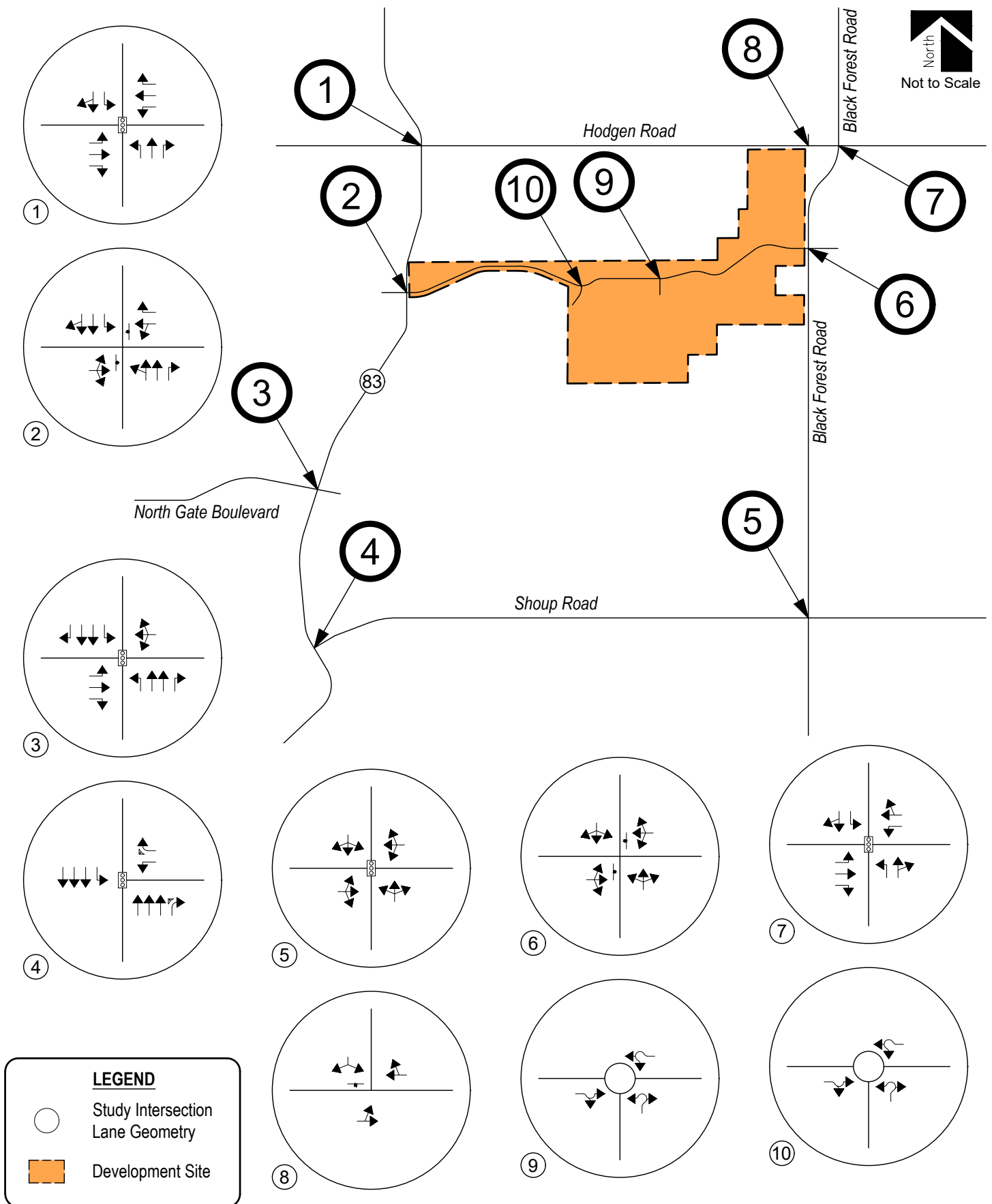
**Figure 6**  
**BACKGROUND TRAFFIC - YEAR 2027**  
Intersection Geometry

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**Figure 7**  
**BACKGROUND TRAFFIC - YEAR 2042**  
 Volumes  
 AM / PM Peak Hour  
 (ADT) : Average Daily Traffic



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**Figure 8**  
**BACKGROUND TRAFFIC - YEAR 2042**  
Intersection Geometry

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**Table 2 – Intersection Capacity Analysis Summary – Background Traffic – Year 2027**

INTERSECTION LANE GROUPS	LEVEL OF SERVICE	
	AM PEAK HOUR	PM PEAK HOUR
State Highway 83 / Hodgen Road (Signalized)	C (27.8)	B (18.5)
State Highway 83 / North Gate Boulevard (Signalized)	D (38.2)	B (14.1)
State Highway 83 / Shoup Road (Signalized)	B (18.1)	B (13.7)
Black Forest Road / Shoup Road (Signalized)	B (17.3)	C (23.7)
State Highway 83 / Stagecoach Road (Stop-Controlled)		
Eastbound Left, Through and Right	C	C
Westbound Left and Through	E	F
Westbound Right	B	C
Northbound Left and Through	A	A
Southbound Left	A	A
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
Hodgen Road / Black Forest Road / Ridge Run Drive (Stop-Controlled)		
Eastbound Left	A	A
Westbound Left	A	A
Northbound Left	C	D
Northbound Through and Right	A	B
Southbound Left	C	D
Southbound Through and Right	B	B
Hodgen Road / Black Forest Road / Black Forrest Road (Stop-Controlled)		
Eastbound Left and Through	B	A
Westbound Left	A	A
Northbound Left, Through and Right	D	C
Southbound Left, Through and Right	B	A
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
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

## **Background Traffic Analysis Results – Year 2027**

Year 2027 background traffic analysis indicates that all signalized intersections within the study area experience overall operations at or better than LOS D during the morning peak traffic hour and LOS C or better during the afternoon peak traffic hour.

All stop-controlled intersections within the study area have turning movement operations at or better than LOS D during the morning and afternoon peak traffic hours. Exceptions would include the westbound left and through turning movement at State Highway 83 and Stagecoach Road, which operates at LOS E and F during the morning and afternoon peak traffic hours, respectively. The LOS E and F operations are attributed to the through traffic volume along State Highway 83 and the stop-controlled nature of the intersection.

The roundabout intersections along Old Stagecoach Road are shown to have turning movement operations at LOS A during both the morning and afternoon peak traffic hours.

It is to be noted that it is not uncommon for unsignalized movements to or from an arterial roadway, in urban areas, to operate with noticeable delays during peak traffic hours. It is, however, likely that turn movements will operate better than the results obtained with this HCM Two Way Stop Control (TWSC) level of service analysis would indicate, as the HCM analysis may not accurately account for the effect of vehicle platooning and gaps caused by upstream signals. Upstream signal controls along State Highway 83 may create additional gaps in the traffic stream for turning movements at Stagecoach Road which could provide mitigation to the LOS E and F operations projected during their respective peak traffic hours. In coordination with County Staff, signal progression may need to be reevaluated with future development applications to mitigate the potential for poor levels of service.

**Table 3 – Intersection Capacity Analysis Summary – Background Traffic – Year 2042**

INTERSECTION LANE GROUPS	LEVEL OF SERVICE	
	AM PEAK HOUR	PM PEAK HOUR
State Highway 83 / Hodgen Road (Signalized)	D (45.9)	D (53.5)
State Highway 83 / North Gate Boulevard (Signalized)	F (82.9)	D (50.3)
State Highway 83 / Shoup Road (Signalized)	C (25.7)	C (20.3)
Black Forest Road / Shoup Road (Signalized)	C (24.3)	C (27.8)
Hodgen Road / Black Forest Road (Signalized)	C (20.6)	B (16.1)
State Highway 83 / Stagecoach Road (Stop-Controlled)		
Eastbound Left, Through and Right	D	C
Westbound Left and Through	F	F
Westbound Right	B	B
Northbound Left and Through	A	A
Southbound Left	A	B
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
Hodgen Road / Black Forrest Road (Stop-Controlled)		
Eastbound Left and Through	A	A
Southbound Left and Right	C	A
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
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

**Background Traffic Analysis Results – Year 2042**

By Year 2042 and without the proposed development, all signalized intersections within the study area are expected to have overall operations at or better than LOS D during both the morning and afternoon peak traffic hours. The exception includes the State Highway 83 and North Gate Boulevard intersection which shows overall LOS F operations during the morning peak traffic hour. The LOS F operation is attributed to the northbound left turning volumes and conflicting southbound through volumes. A possible mitigation to the anticipated LOS F operation could be the implementation of dual northbound left turn lanes that could allow for an overall LOS D operation.

All stop-controlled intersections within the study area project turning movement operations at or better than LOS D during both peak traffic hours. Exceptions still include the westbound left and through turning movement at State Highway 83 and Stagecoach Road, which operates at LOS F during either peak traffic hour. The LOS F operations are attributed to the through traffic volume along State Highway 83 and the stop-controlled nature of the intersection.

Although the study intersection of State Highway 83 and Stagecoach Road is not projected to meet MUTCD's vehicle volumes requirements for consideration of traffic signal control, signalization at the intersection could provide relief to the levels or service indicated under stop-control conditions.

It is emphasized that it is not uncommon for unsignalized movements to or from an arterial roadway, in urbanized areas, to operate with noticeable delays during peak traffic hours. It is, however, likely that turn movements will operate better than the results obtained with this HCM Two Way Stop Control (TWSC) level of service analysis would indicate, as HCM analysis limitations may not accurately account for the effect of vehicle platooning and gaps caused by upstream signals. Upstream signal controls along State Highway 83 may create additional gaps in the traffic stream for turning movements at Stagecoach Road which could provide mitigation to the LOS F operations projected during both peak traffic hours. In coordination with County Staff, signal progression may need to be reevaluated with future development applications to mitigate the potential for poor levels of service.

Both roundabout intersections along Old Stagecoach Road are shown to have projected turning movement operations at LOS A during both the morning and afternoon peak traffic hours.

## IV. Proposed Project Traffic

### Trip Generation

Standard traffic generation characteristics compiled by the Institute of Transportation Engineers (ITE) in their report entitled Trip Generation Manual, 11<sup>th</sup> Edition, were applied to the proposed land use in order to estimate average daily traffic (ADT), AM Peak Hour, and PM Peak Hour vehicle trips. A vehicle trip is defined as a one-way vehicle movement from a point of origin to a point of destination.

The ITE land use codes 210 (Single-Family Detached Housing) applied to estate lots and low density residential acreages, 215 (Single-Family Attached Housing) applied to medium density acreage, 330 (Resort Hotel) applied to hotel rooms / golf casitas and branded flats acreages, 492 (Health/Fitness Club) applied to fitness center acreage, and 821 (Shopping Plaza (40-150k)) applied to commercial acreage were used for estimating trip generation because of their best fit to the proposed land use descriptions.

It is important to note that ITE land use codes 330 (Resort Hotel) and 492 (Health/Fitness Club) do not provide a 24-hour trip generation rate. Therefore, in order to estimate 24-hour trip generation volumes from said land uses, Resort Hotel used 24-hour trip generation rates from ITE land use code 310 (Hotel), and Health/Fitness Club derived 24-hour trip generation volumes using standard relationships of ADT volumes versus peak hour volumes.

Additionally, as described by ITE's Trip Generation Manual, resort hotels cater to the tourist and vacation industry, often providing recreational facilities such as golf courses. Therefore, site-generated trips resulting from the golf course land use are already included within ITE land use code 330 (Resort Hotel). As such, considering how the golf course is already existing, the addition of site-generated trips shown below in Table 5 is understood to provide for a conservative analysis.

Due to the conceptual nature of the proposed development, no specific commercial land uses have been determined. As such, a floor-area-ratio (FAR) of 0.25, referenced from Section 5.3.2, Table 5-4 of the County's Land Development Code<sup>7</sup>, was applied to the commercial areas of the Flying Horse North sketch plan.

As actual land uses, densities or site plans within the Flying Horse North sketch plan become defined over time and through additional County land use approval procedures, it is expected that traffic generation characteristics considered within this study will need to be updated by more specific traffic analyses or studies to help assess if transportation improvements are needed to mitigate potential traffic impacts.

Trip generation rates used in this study are presented in Table 4.

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<sup>7</sup> Land Development Code of El Paso County, Colorado, El Paso County Development, December 2021.

**Table 4 – Trip Generation Rates**

ITE CODE	LAND USE	UNIT	TRIP GENERATION RATES						
			24 HOUR	AM PEAK HOUR			PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
210	Single-Family Detached Housing	DU	9.43	0.18	0.52	0.70	0.59	0.35	0.94
215	Single-Family Attached Housing	DU	7.20	0.15	0.33	0.48	0.32	0.25	0.57
330	Resort Hotel	RMS	7.99 <sup>†</sup>	0.23	0.09	0.32	0.18	0.23	0.41
492	Health/Fitness Club	KSF	*	0.67	0.64	1.31	1.97	1.48	3.45
821	Shopping Plaza (40-150k)	KSF	67.52	1.07	0.66	1.73	2.54	2.65	5.19

Key: DU = Dwelling Units. KSF = Thousand Square Feet Gross Floor Area. RMS = Rooms.

<sup>†</sup> = 24-hour trip generation rate from ITE land use code 310 (Hotel).

Note: All data and calculations above are subject to being rounded to nearest value.

Table 5 illustrates projected ADT, AM Peak Hour, and PM Peak Hour traffic volumes likely generated by the proposed development upon build-out.

**Table 5 – Trip Generation Summary**

ITE CODE	LAND USE	SIZE	TOTAL TRIPS GENERATED						
			24 HOUR	AM PEAK HOUR			PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
210	Single-Family Detached Housing	708 DU	6,676	129	367	496	419	246	666
215	Single-Family Attached Housing	138 DU	994	21	46	66	45	34	79
330	Resort Hotel	275 RMS	2,197	63	25	88	48	64	113
492	Health/Fitness Club	44.6 KSF	1,540	30	29	58	88	66	154
821	Shopping Plaza (40-150k)	99.1 KSF	6,691	106	65	171	252	262	514
<i>Total:</i>			<i>18,099</i>	<i>349</i>	<i>531</i>	<i>880</i>	<i>852</i>	<i>673</i>	<i>1,525</i>

Note: All data and calculations above are subject to being rounded to nearest value.

Upon build-out and without consideration of applicable vehicle trip reductions, Table 5 illustrates that the proposed development has the potential to generate approximately 18,099 daily trips with 880 of those occurring during the morning peak hour and 1,525 during the afternoon peak hour.



## Adjustments to Trip Generation Rates

It is considered likely that a mixed-use development of this type will attract trips from within area land uses. Utilizing research obtained by the National Cooperative Highway Research Program (NCHRP), ITE created an estimation tool<sup>8</sup> for determining internal capture for mixed-use developments. Using NCHRP Report 684 methodology, it is determined that the proposed land uses have various internal capture percentages ranging from 0 to 30 percent. Applying vehicle occupancy estimates from ITE's Trip Generation Handbook, 3<sup>rd</sup> Edition, it is determined that overall averages of approximately 2% of total AM peak hour trips and approximately 15% of total PM peak hour trips will be captured internally.

It is important to note that ITE's recreational land uses, such as Health/Fitness Club, are not subject to internal capture computations within the estimation tool. This is due to the nature of such businesses which generally operate as destinations for a specific demographic serving a wide area.

ITE's internal capture spreadsheets are provided for reference in Appendix B.

Table 6 illustrates projected ADT, AM Peak Hour, and PM Peak Hour traffic volumes likely generated by the proposed development upon build-out with reductions applied due to internal capture.

**Table 6 – Trip Generation Summary with Reductions**

ITE CODELAND USESIZE				TOTAL TRIPS GENERATED						
				24 HOUR	AM PEAK HOUR			PM PEAK HOUR		
					ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
Internal Capture Trip Reduction:				8%	2%	1%	2%	15%	12%	14%
210	Single-Family Detached Housing	708	DU	6,176	126	363	488	356	217	576
Internal Capture Trip Reduction:				8%	2%	1%	2%	15%	12%	14%
215	Single-Family Attached Housing	138	DU	919	20	45	65	38	30	68
Internal Capture Trip Reduction:				13%	0%	13%	7%	30%	7%	19%
330	Resort Hotel	275	RMS	1,923	63	21	82	34	60	92
Internal Capture Trip Reduction:				0%	0%	0%	0%	0%	0%	0%
492	Health/Fitness Club	44.6	KSF	1,540	30	29	58	88	66	154
Internal Capture Trip Reduction:				13%	7%	4%	6%	12%	29%	21%
821	Shopping Plaza (40-150k)	99.1	KSF	5,821	99	63	162	222	186	409
Reduced Total:				16,379	338	521	856	738	559	1,299

Note: All data and calculations above are subject to being rounded to nearest value.

Upon build-out and with consideration for internal capture trip reductions, Table 6 illustrates that the proposed development has the potential to generate approximately 16,379 daily trips with 856 of those occurring during the morning peak hour and 1,299 during the afternoon peak hour.

<sup>8</sup> NCHRP Report 684: Enhancing Internal Trip Capture Estimation for Mixed-Use Developments, National Cooperative Highway Research Program, October 2010.

**Trip Distribution**

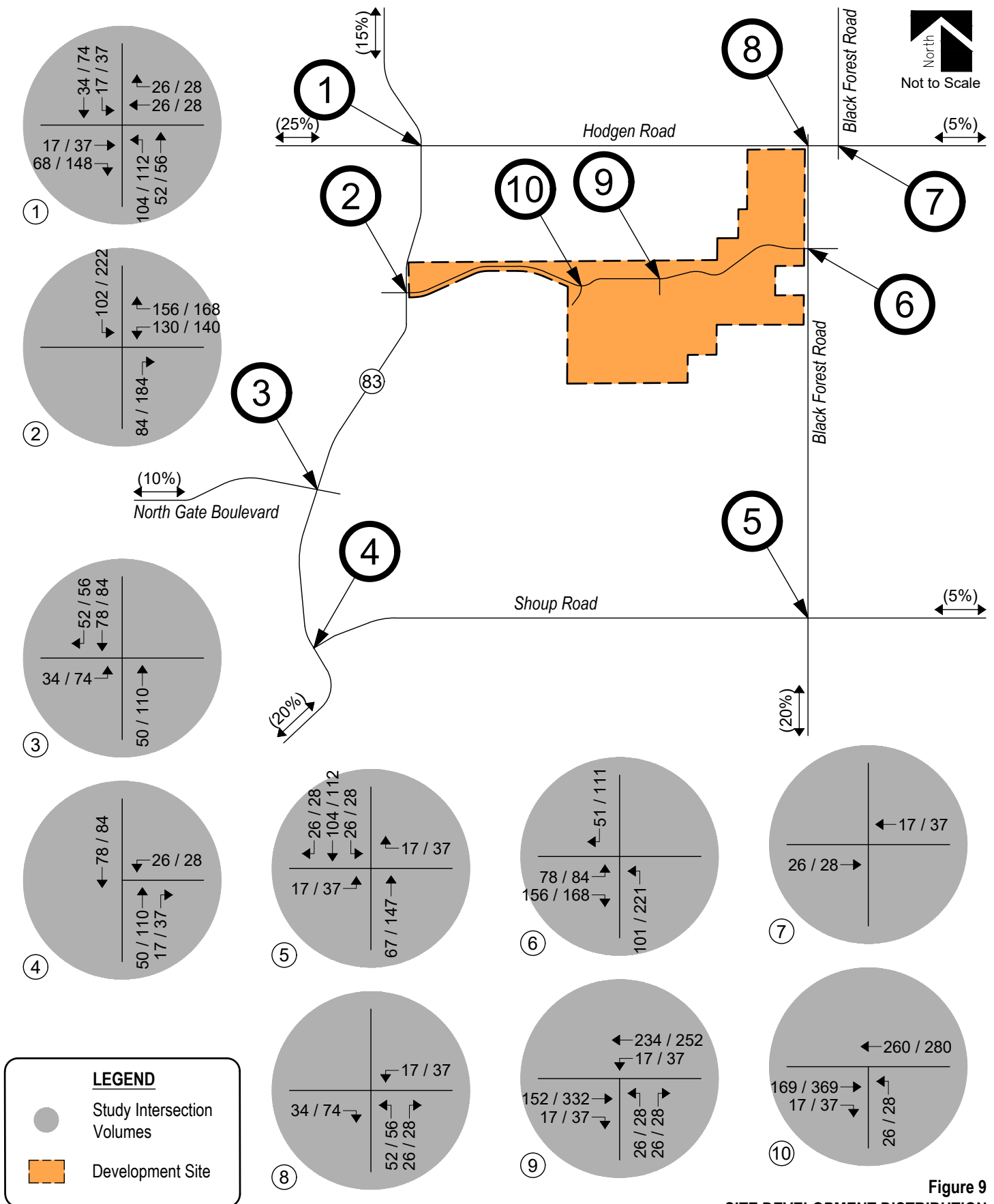
The overall directional distribution of site-generated traffic was determined based on the location of development site within the County, proposed and existing area land uses, allowed turning movements, available roadway network, and in reference to historical traffic count data provided by CDOT's TCDS.

Overall trip distribution patterns for the development are shown on Figure 9.

**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 9.



## **V. Future Traffic Conditions With Proposed Developments**

Total traffic is the traffic projected to be on area roadways with consideration of the proposed development. Total traffic includes background traffic projections for Years 2027 and 2042 with consideration of site-generated traffic. For analysis purposes, it was assumed that overall development construction would be completed by end of Year 2027.

Pursuant to area roadway improvement discussions provided in Section III, Year 2027 and Year 2042 total traffic conditions assume no additional roadway improvements to accommodate regional transportation demands than that described for each background analysis year. Roadway improvements associated with site development are expected to be limited to site access and frontage as required by the governing agency.

Projected Year 2027 total traffic volumes and intersection geometry are shown in Figure 10 and Figure 11, respectively.

Figure 12 and Figure 13 shows projected total traffic volumes and intersection geometry for Year 2042, respectively.

### **Total Traffic Signal Warrants**

A preliminary signal warrant analysis, using total traffic volumes, was conducted for the State Highway 83 with Stagecoach Road intersection, as well as the Black Forest Road with Old Stagecoach Road intersection, to review the potential for traffic signal control. Year 2027 analysis results conclude that both intersections exceed minimum vehicle volume thresholds to meet MUTCD's Warrant 1 – Eight-Hour Vehicular Volume, Warrant 2 – Four-Hour Vehicular Volume, and Warrant 3 – Peak Hour for the installation of a traffic signal.

As such, the Black Forest Road with Old Stagecoach Road intersection was analyzed under traffic signal control, while the State Highway 83 with Stagecoach Road intersection may require traffic signal or roundabout control upon development build-out. CDOT has indicated that a roundabout is the preferred intersection control option at State Highway 83 and Stagecoach Road.

The study intersections should be monitored further by CDOT or County Staff as actual area development occurs to determine when or if intersection control improvements are appropriate.

Warrant study worksheets are provided for reference in Appendix E.

### **Total Traffic Auxiliary Lane Analysis**

Auxiliary lanes for site development accesses were based on the County's ECM and CDOT's State Highway Access Code (SHAC)<sup>9</sup>.

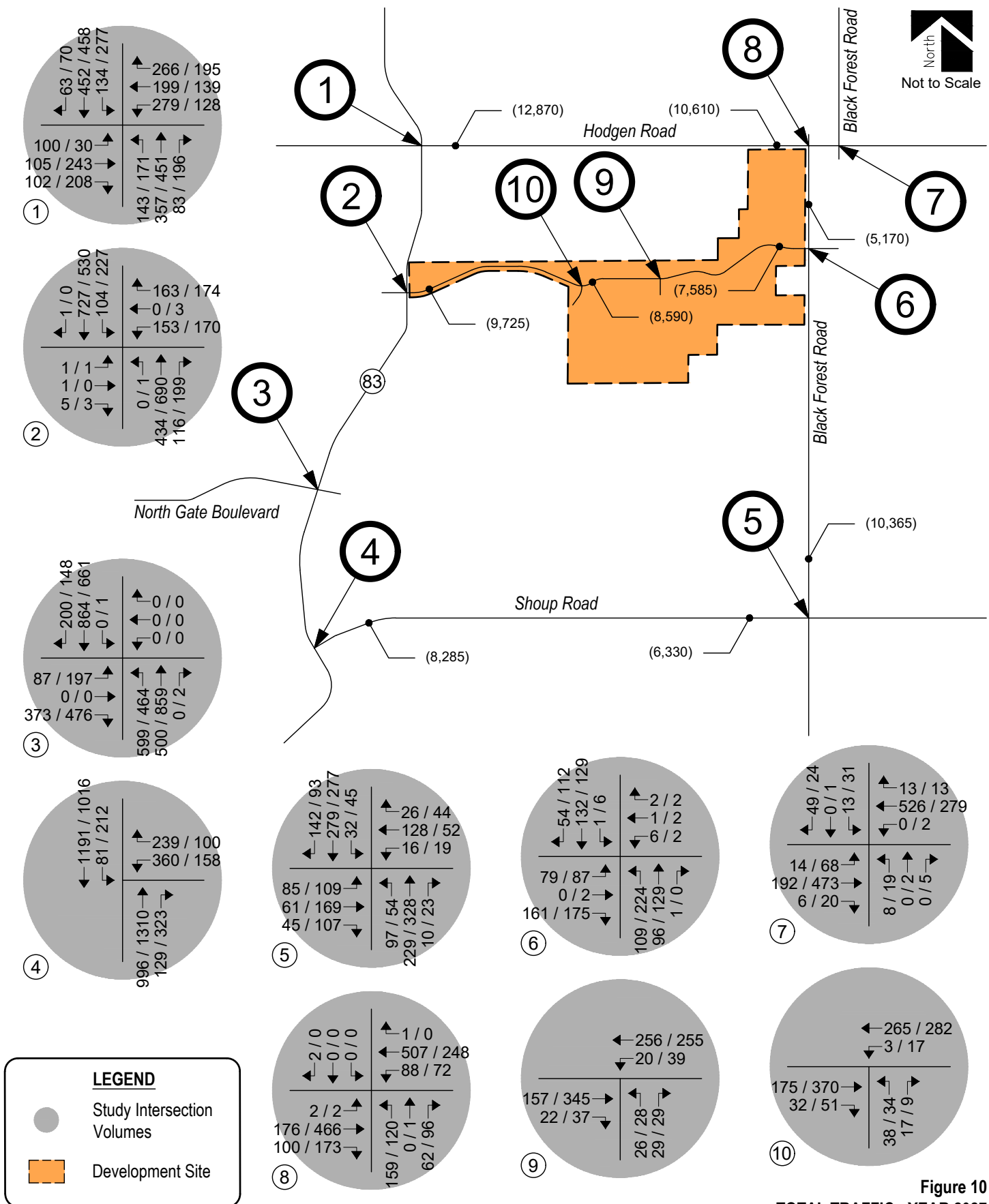
Considering development build-out, an evaluation of auxiliary lane requirements, pursuant to Section 2.3.7 of the County's ECM, reveals that a southbound right turn deceleration lane along Black Forest Road at Old Stagecoach Road may be required since the southbound right turn ingress volume exceeds the 25 vehicles per hour threshold. Section 2.3.7 of the County's ECM also reveals that an exclusive northbound left turn deceleration lane may be required along Black Forest Road at Old Stagecoach Road since the northbound left turn ingress volume exceeds the County's threshold of 10 vehicles per hour.

An evaluation of auxiliary lane requirements, pursuant to Sections 3.8(5) and 4.8(2) of CDOT's SHAC, reveals that the existing northbound right and southbound left turn lanes along State Highway 83 may need to be lengthened to accommodate projected vehicle volumes in the long-term future.

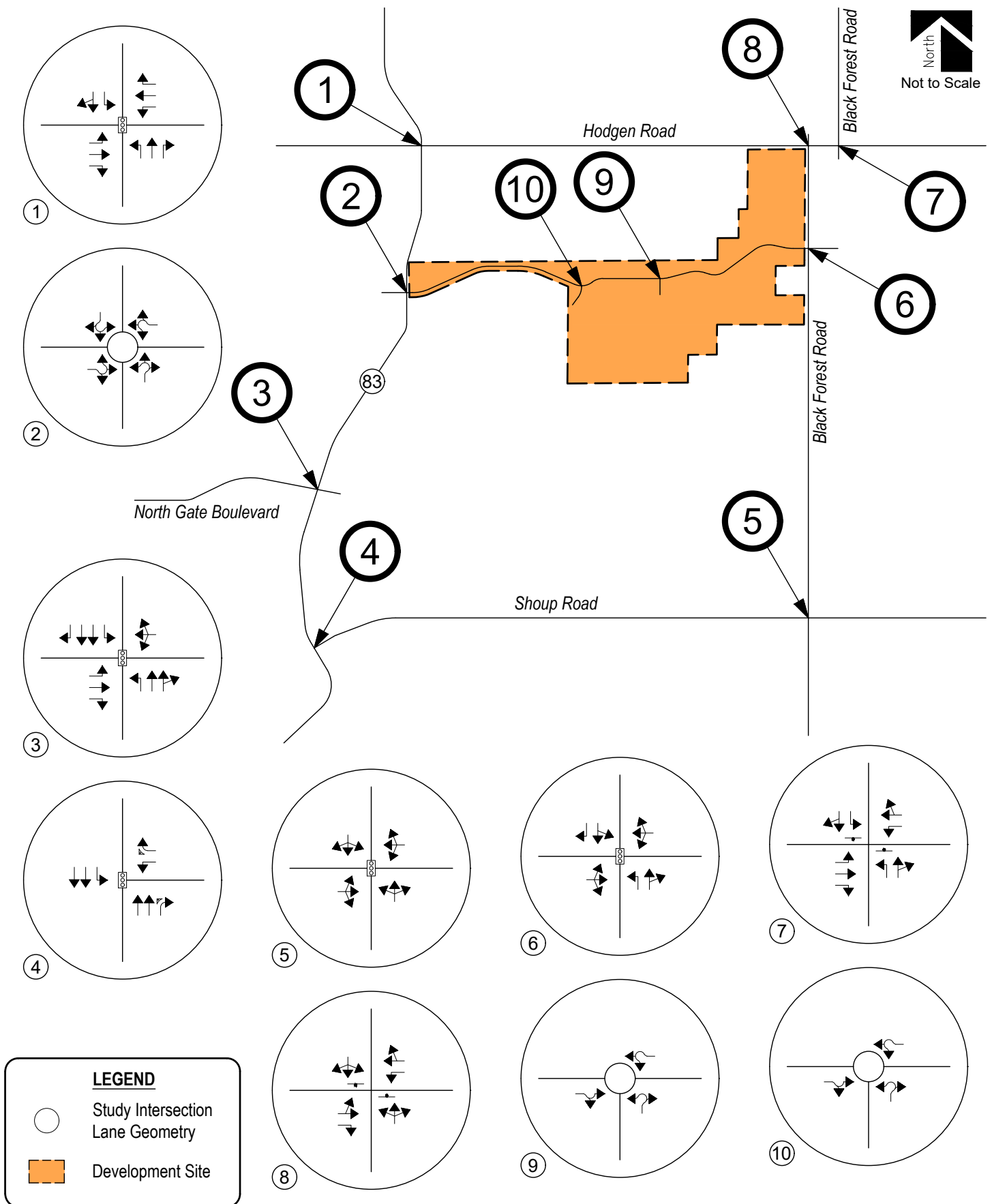
Due to the conservative analysis performed throughout this study and the conceptual nature of the Flying Horse North sketch plan, it is expected that auxiliary lane requirements evaluated within this study will need to be updated by more specific traffic analyses or studies as actual area development occurs, to help assess if transportation improvements are needed to meet the County's and CDOT's vehicle volume thresholds.

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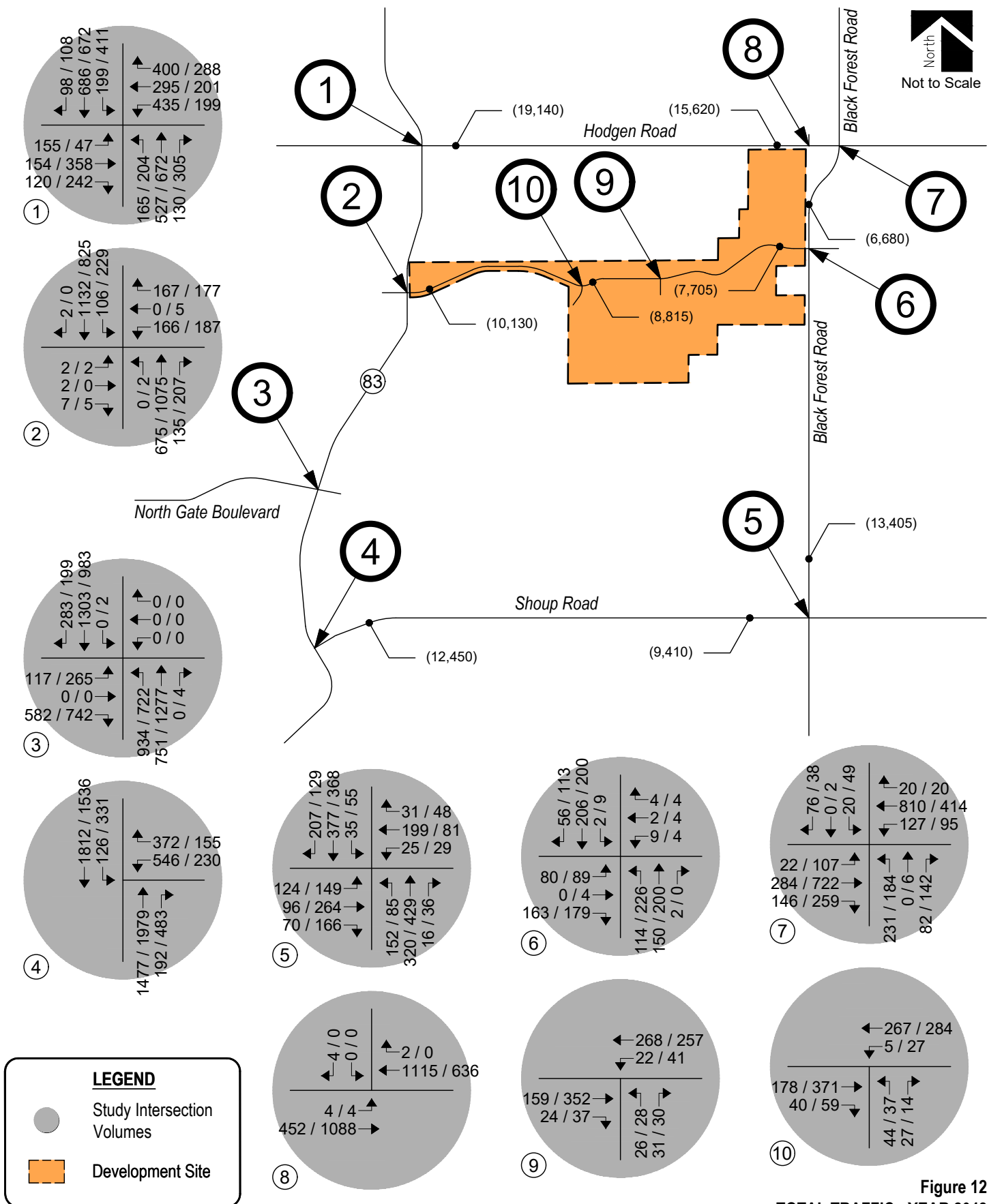
<sup>9</sup> State Highway Access Code, The Transportation Commission of Colorado, March 2002.



**Figure 10**  
**TOTAL TRAFFIC - YEAR 2027**  
 Volumes  
 AM / PM Peak Hour  
 (ADT) : Average Daily Traffic

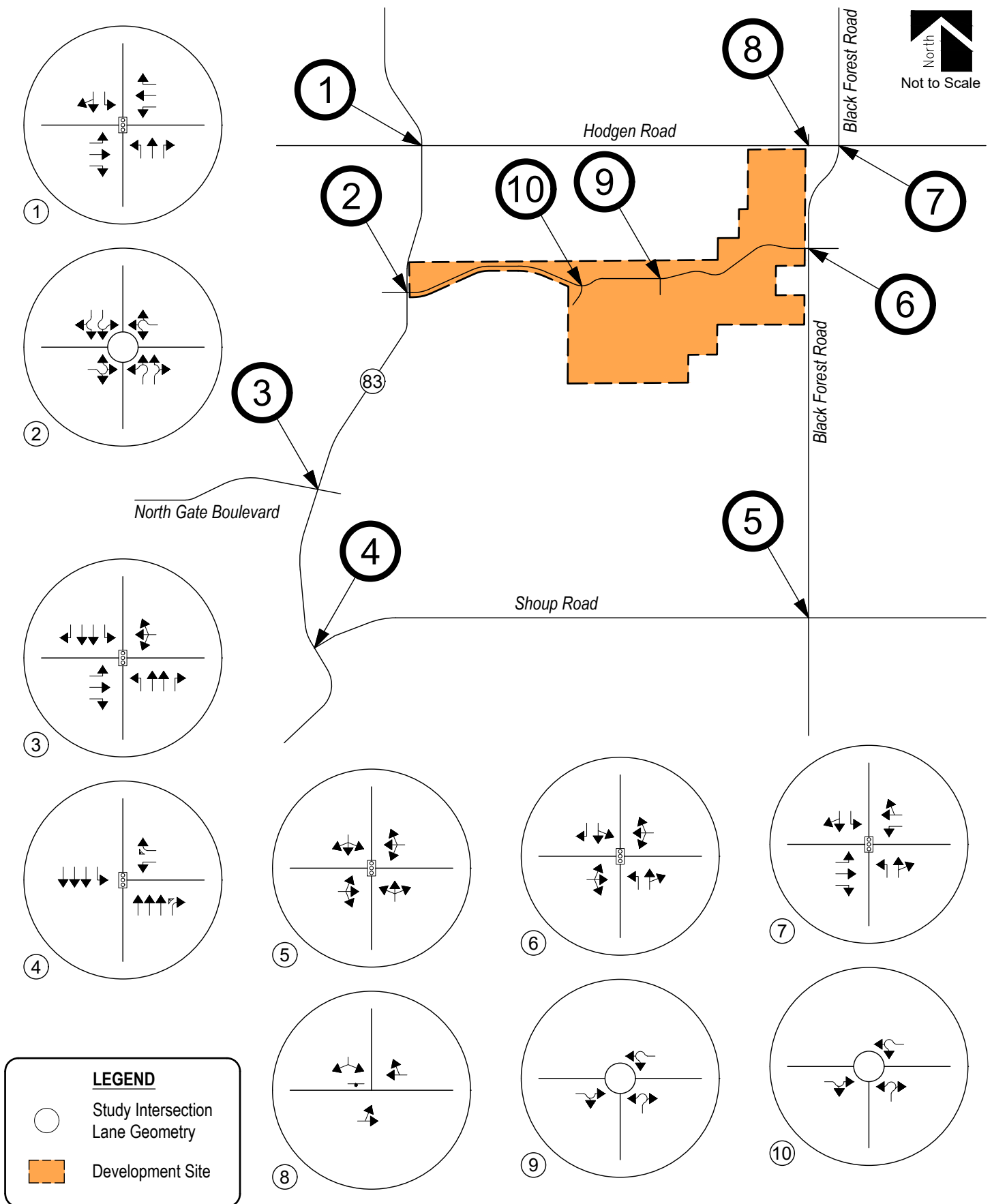


**Figure 11**  
**TOTAL TRAFFIC - YEAR 2027**  
 Intersection Geometry



**Figure 12**  
**TOTAL TRAFFIC - YEAR 2042**  
 Volumes  
 AM / PM Peak Hour  
 (ADT) : Average Daily Traffic





**Figure 13**  
**TOTAL TRAFFIC - YEAR 2042**  
 Intersection Geometry

## **VI. Project Impacts**

The analyses and procedures described in this study were performed in accordance with the Highway Capacity Manual (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.

### **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. Total traffic level of service analysis results for Years 2027 and 2042 are summarized in Table 7 and Table 8, respectively.

Definitions of levels of service are given in Appendix C. Intersection capacity worksheets are provided in Appendix D.

**Table 7 – Intersection Capacity Analysis Summary – Total Traffic – Year 2027**

INTERSECTION LANE GROUPS	LEVEL OF SERVICE	
	AM PEAK HOUR	PM PEAK HOUR
State Highway 83 / Hodgen Road (Signalized)	C (28.1)	B (19.6)
State Highway 83 / North Gate Boulevard (Signalized)	C (32.4)	B (17.8)
State Highway 83 / Shoup Road (Signalized)	B (19.1)	B (17.2)
Black Forest Road / Shoup Road (Signalized)	B (17.6)	C (24.0)
State Highway 83 / Stagecoach Road (Roundabout)		
Eastbound Left, Through and Right	A	A
Westbound Left, Through and Right	A	C
Northbound Left, Through and Right	A	D
Southbound Left, Through and Right	B	C
State Highway 83 / Stagecoach Road (Signalized)	B (16.1)	C (23.2)
Black Forest Road / Old Stagecoach Road (Stop-Controlled)		
Eastbound Left, Through and Right	B	C
Westbound Left, Through and Right	B	C
Northbound Left	A	A
Southbound Left and Through	A	A
Black Forest Road / Old Stagecoach Road (Signalized)	B (11.1)	B (11.4)
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	B
Southbound Left	C	D
Southbound Through and Right	B	B
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	F	E
Southbound Left, Through and Right	B	A
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
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 8 – Intersection Capacity Analysis Summary – Total Traffic – Year 2042**

INTERSECTION LANE GROUPS	LEVEL OF SERVICE	
	AM PEAK HOUR	PM PEAK HOUR
State Highway 83 / Hodgen Road (Signalized)	E (61.4)	F (80.6)
State Highway 83 / North Gate Boulevard (Signalized)	F (92.9)	E (60.3)
State Highway 83 / Shoup Road (Signalized)	C (27.1)	C (22.3)
Black Forest Road / Shoup Road (Signalized)	C (29.6)	D (42.6)
Hodgen Road / Black Forest Road (Signalized)	C (23.6)	B (19.2)
State Highway 83 / Stagecoach Road (Roundabout)		
Eastbound Left, Through and Right	B	A
Westbound Left, Through and Right	B	D
Northbound Left and Through	A	B
Northbound Through and Right	A	B
Southbound Left and Through	B	A
Southbound Through and Right	B	A
State Highway 83 / Stagecoach Road (Signalized)	B (14.0)	C (22.2)
Black Forest Road / Old Stagecoach Road (Stop-Controlled)		
Eastbound Left, Through and Right	C	E
Westbound Left, Through and Right	C	C
Northbound Left	A	A
Southbound Left and Through	A	A
Black Forest Road / Old Stagecoach Road (Signalized)	B (11.1)	B (12.1)
Hodgen Road / Black Forrest Road (Stop-Controlled)		
Eastbound Left and Through	B	A
Southbound Left and Right	C	A
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
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

### Total Traffic Analysis Results Upon Development Build-Out

Table 8 illustrates how, by Year 2042 and upon assumed development build-out, the signalized intersection of State Highway 83 with Hodgen Road experiences overall operations at LOS E during the morning peak traffic hour and LOS F during the afternoon peak traffic hour. The poor levels of service are attributed to westbound, northbound, and southbound turn movements. Possible mitigation for the anticipated LOS E and LOS F operations could be the consideration of alternate signal timing, additional turn lanes, and an additional southbound through lane which could further reduce overall intersection delay and better accommodate vehicle queue lengths.

The signalized intersection of State Highway 83 with North Gate Boulevard anticipates overall operations at LOS F during the morning peak traffic hour and LOS E during the afternoon peak traffic hour. The LOS E and F operations are attributed to the northbound left turning volumes and conflicting southbound through volumes. To mitigate the poor level of service operations, implementing dual northbound left turn lanes and optimized signal timing could provide for overall LOS D operations.

The signalized intersection of State Highway 83 with Shoup Road projects overall operations at LOS C during both the morning and afternoon peak traffic hours.

The signalized intersection of Black Forest Road with Shoup Road has projected overall operations at LOS C during the morning peak traffic hour and LOS D during the afternoon peak traffic hour.

The signalized intersection of Hodgen Road with Black Forest Road anticipates overall operations at LOS C during the morning peak traffic hour and LOS B during the afternoon peak traffic hour.

The roundabout-controlled intersection of State Highway 83 with Stagecoach Road is projected to have turning movement operations at or better than LOS B during the morning peak traffic hour and LOS D or better during the afternoon peak traffic hour. As a signal-controlled intersection, overall LOS B and C operations are expected during the morning and afternoon peak traffic hours, respectively. CDOT has indicated that a roundabout is the preferred intersection control type.

The stop-controlled intersection of Black Forest Road with Old Stagecoach Road is projected to have turning movement operations at or better than LOS C during both the morning and afternoon peak traffic hours. Exceptions include the eastbound turning movement which expects LOS E operations during the afternoon peak traffic hour. The LOS E operation is attributed to the northbound and southbound through volumes along Black Forest Road and the stop-controlled nature of the intersection. Traffic signal control of the intersection, as analyzed in Section V and shown in Table 8, has the potential to provide acceptable overall intersection operations.

The stop-controlled intersection of Hodgen Road with Black Forrest Road shows turning movement operations at or better than LOS C during both the morning and afternoon peak traffic hours.

It is again emphasized that it is not uncommon for unsignalized movements to or from an arterial roadway, in urbanized areas, to operate with noticeable delays during peak traffic hours. It is, however, likely that turn movements will operate better than the results obtained with this HCM TWSC level of service analysis would indicate, as the HCM analysis limitations may not accurately account for the effect of vehicle platooning and gaps caused by upstream signals. Upstream signal controls along Black Forest Road may create additional gaps in the traffic stream for turning movements at Old Stagecoach Road which could provide mitigation to the LOS E operation projected during the afternoon peak traffic hour. In coordination with County Staff, signal progression may need to be reevaluated with future development applications to mitigate the potential for poor levels of service.

The roundabout intersections of Old Stagecoach Road with Allen Ranch Road and Shortwall Drive anticipate turning movement operations at LOS A during both peak traffic hours.

## Queue Length Analysis

Queue lengths for the study intersections were analyzed using Year 2042 total traffic conditions. The analysis yields estimate of 95<sup>th</sup> percentile queue lengths, which have only a five percent probability of being exceeded during the analysis time period. An average vehicle length of 25 feet was assumed. Queue lengths were modeled and are included with the Synchro worksheets in Appendix D.

Table 9 summarizes the 95<sup>th</sup> percentile queue results in comparison to the projected storage requirements for turn movements within study area for Year 2042.

As Table 9 shows, all turn lane lengths at study intersections have sufficient storage to accommodate future traffic volumes. However, at the State Highway 83 intersections with Hodgen Road and North Gate Boulevard, as well as the Black Forest Road intersection with Hodgen Road, various turning movements are projected to have 95<sup>th</sup> percentile queuing that exceed existing turn lane lengths.

It is emphasized that this analysis reflects the sketch plan proposed for the overall development. As such, queuing results reflect conceptual land uses and densities. As actual land uses, densities, or site plans within the Flying Horse North Sketch Plan become defined over time, it is expected that evaluation of vehicle queuing will need to be updated by more specific traffic analyses or studies to help assess if transportation improvements are needed to mitigate or accommodate potential 95<sup>th</sup> percentile vehicle queues.

**Table 9 – Turn Lane Queues and Storage Requirements – Total Traffic – Year 2042**

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						
State Highway 83 / Hodgen Road	EB	L	420'	180'	61'	420'
		T	-	142'	371'	-
		R	420'	40'	72'	420'
	WB	L	350'	617'	362'	310' x2
		T	-	271'	201'	-
		R	350'	203'	64'	350'
	NB	L	120'	264'	345'	345'
		T	-	534'	886'	-
		R	650'	40'	179'	650'
	SB	L	525'	170'	576'	580'
T,R		-	1005'	906'	-	
State Highway 83 / North Gate Boulevard	EB	L	225'	183'	313'	315'
		T	-	0'	0'	-
		R	285'	216'	373'	375'
	WB	L,T,R	-	0'	0'	-
		L	900'	889'	658'	900'
		T	-	72'	259'	-
	NB	R	-	0'	0'	-
		L	750'	0'	6'	750'
		T	-	614'	476'	-
	SB	R	730'	89'	51'	730'
State Highway 83 / Shoup Road		WB	L	-	510'	281'
	R		500'	222'	55'	500'
	NB	T	-	382'	522'	-
		R	710'	44'	55'	710'
	SB	L	980'	126'	314'	980'
		T	-	421'	169'	-
Black Forest Road / Shoup Road	EB	L,T,R	-	300'	519'	-
	WB	L,T,R	-	198'	88'	-
	NB	L,T,R	-	457'	566'	-
	SB	L,T,R	-	389'	517'	-
Black Forest Road / Hodgen Road	EB	L	400'	12'	35'	400'
		T	-	145'	462'	-
		R	335'	27'	32'	335'
	WB	L	280'	47'	32'	280'
		T,R	-	717'	216'	-
	NB	L	125'	282'	229'	285'
		T,R	-	0'	56'	-
	SB	L	65'	30'	61'	65'
		T,R	-	0'	29'	-

Note: Turn Lane Length does not include taper length.

Key: x2 = Dual Turn Lanes.

Table 9 (Continued) – Turn Lane Queues and Storage Requirements – Total Traffic – Year 2042

Intersection	Turn Movement		Existing Turn Lane Length (feet)	AM Peak Hour	PM Peak Hour	Recommended Turn Lane Length (feet)
				95th Percentile Queue Length (feet)	95th Percentile Queue Length (feet)	
Potential Signalized Intersections						
State Highway 83 / Stagecoach Road	EB	L,T,R	-	16'	0'	-
	WB	L,T	-	206'	246'	-
		R	135'	54'	56'	135'
	NB	L,T	-	180'	337'	-
		R	320'	31'	37'	320'
	SB	L	415'	30'	128'	415'
T,R		-	163'	105'	-	
Black Forest Road / Old Stagecoach Road	EB	L,T,R	-	82'	100'	-
	WB	L,T,R	-	15'	12'	-
	NB	L	-	42'	84'	195'
		T,R	-	53'	73'	-
	SB	L,T	-	111'	123'	-
		R	-	0'	23'	195'
Stop-Controlled Intersections						
Black Forest Road / Old Stagecoach Road	EB	L,T,R	-	60'	150'	-
	WB	L,T,R	-	5'	5'	-
	NB	L	-	8'	20'	195'
		T,R	-	0'	0'	-
	SB	L,T	-	0'	0'	-
		R	-	0'	0'	195'
Black Forrest Road / Hodgen Road	EB	L,T	-	0'	0'	-
	WB	T,R	-	0'	0'	-
	SB	L,R	-	3'	0'	-
Roundabout Intersections						
State Highway 83 / Stagecoach Road	EB	L,T,R	-	0'	0'	-
	WB	L,T,R	-	75'	175'	-
	NB	L,T	-	50'	125'	-
		T,R	-	50'	125'	-
	SB	L,T	-	100'	75'	-
		T,R	-	100'	75'	-
Old Stagecoach Road / Allen Ranch Road	EB	T,R	-	25'	25'	-
	WB	L,T	-	25'	25'	-
	NB	L,R	-	0'	0'	-
Old Stagecoach Road / Shortwall Drive	EB	T,R	-	25'	50'	-
	WB	L,T	-	25'	25'	-
	NB	L,R	-	0'	0'	-

Note: Turn Lane Length does not include taper length.



## **Pedestrian Circulation & Safety Analysis**

In accordance with Section B.2.4.B of the County's ECM, an assessment to pedestrian connectivity and safety was considered. However, it is emphasized that the sketch plan analyzed throughout this study is conceptual and details of pedestrian circulation and connectivity have not been determined. As actual site plans within the overall development become defined over time, it is assumed that an evaluation of pedestrian circulation and connectivity may need to be evaluated.

With the assumption that future site plans are designed per the County's ECM, and pursuant to the Federal Highway Administration's (FHWA) Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations<sup>10</sup>, pedestrian safety is not expected to be of concern. Moreover, traffic calming and pedestrian crossing treatments are not applicable, and traffic calming is not recommended for the proposed conditions.

## **Transportation Demand Management Plan**

Pursuant to Section B.2.4.B of the County's ECM, a Transportation Demand Management (TDM) Plan for the proposed development was prepared in order to identify features, measures, and strategies designed to reduce single-occupant vehicle (SOV) trips and maximize the use of alternate modes of transportation. As it relates to this development site and the overall area, these alternate modes of transportation include, but may not be limited to, public bus routes, shuttles, car-pooling, bicycling, scooters, and walking. This is consistent with transportation facilities and services described within the County's MTCP and the Pikes Peak Area Council of Governments (PPACG) 2045 Regional Transportation Plan – Transit<sup>11</sup>.

One method includes the availability of public bus routes. The City of Colorado Springs provides the Mountain Metropolitan Transit (MMT). While MMT currently does not provide service in unincorporated areas of El Paso County, transit services are expected to be available upon buildout of the overall development area in the long-term future. Additional transit services include CDOT's Bustang, a regional commuter bus service between the City of Colorado Springs and Denver. Other transit services for unincorporated areas of El Paso County, as described within the MTCP, include Community Intersections, ComCor, Amblicab, El Paso Fountain Valley Senior Citizens Program, Goodwill Industries, Metro Mobility, Mountain Community Senior Services, Rocky Mountain Health Care Services, and Silver Key Senior Services. These public modes of transportation are expected to be affordable and easy to access.

Residents, tenants, visitors, or employees of the overall development area may also encouraged to travel by bicycle or by walking. Within the immediate area, public sidewalks and pedestrian trails will be available to allow for connectivity within the greater area. Urban and regional trails exist within the overall area, as shown in the MTCP, and are planned to be improved in the future. Other forms of transportation may also be available that encourage the use of these pedestrian routes, including electric scooters and electric bicycles.

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<sup>10</sup> Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations, Federal Highway Administration, July 2018.

<sup>11</sup> 2045 Regional Transportation Plan – Transit, Mountain Metropolitan Transit, January 8, 2020.

As site plans within Flying Horse North develop, they may consider promoting alternate modes of pedestrian travel and accommodations as needed. In reference to the City and County of Denver's TDM Guide, general strategies and tools for implementing a successful TDM Plan may include subsidized transit passes, investments in future transit stops, transit connection services, and passenger pick-up / drop-off areas used in conjunction with transit connection services. Bicycle and pedestrian strategies may include shared bicycle amenities, bike, e-bike, or scooter share/loan programs, subsidized shared mobility programs, or pedestrian wayfindings. Parking and car-share strategies may include parking fees, parking cash-out programs, or incentivized carpooling programs. Supportive strategies may include membership in a Transportation Management Association (TMA), transportation incentive fundings, transit screens and information kiosks, new resident kits, or teleworking policies. Event-related TDM strategies may include one-time transit passes, valet bicycle parking, or special event transit services.

### Recommended Improvements

Table 10 illustrates the recommended roadway and intersection control improvements associated with the proposed Flying Horse North development and adjacent area.

**Table 10 – Recommended Improvements Summary**

IMPROVEMENT	TYPE	TIMING	RESPONSIBILITY
Signalization of State Highway 83 / Stagecoach Road	Traffic Signal	When Warranted	Applicant / Developer
Signalization of Black Forest Road / Old Stagecoach Road	Traffic Signal	When Warranted	Applicant / Developer
Construct southbound right turn lane along Black Forest Road at Old Stagecoach Road	Auxiliary Lane	With Final Plat Application(s) / Site Development	Applicant / Developer
Construct northbound left turn lane along Black Forest Road at Old Stagecoach Road	Auxiliary Lane	With Final Plat Application(s) / Site Development	Applicant / Developer
Construct dual westbound left turn lane along Hodgen Road at State Highway 83	Auxiliary Lane	With Final Plat Application(s) / Site Development	Applicant / Developer
Lengthen northbound and southbound left turn lanes along SH 83 at Hodgen Road	Auxiliary Lane	When 95th Percentile Queuing Exceeds Existing Lane Length	Developments and other trip generators within the overall area
Lengthen eastbound left and right turn lanes along North Gate Boulevard at SH 83	Auxiliary Lane and Median Modification	When 95th Percentile Queuing Exceeds Existing Lane Length	Developments and other trip generators along North Gate Boulevard west of SH 83
Lengthen eastbound right turn lane along Hodgen Road at Black Forest Road	Auxiliary Lane	When 95th Percentile Queuing Exceeds Existing Lane Length	Developments and other trip generators within the overall area
Lengthen northbound left turn lane along Black Forest Road at Hodgen Road	Auxiliary Lane and Roadway Realignment	When 95th Percentile Queuing Exceeds Existing Lane Length	Developments and other trip generators within the overall area
Widen State Highway 83 to four-lane cross-section from Old North Gate Road to Hodgen Road	Roadway Segment	Shown on MTCP by 2040	Master planned
Widen State Highway 83 to six-lane cross-section from Shoup Road to Old North Gate Road	Roadway Segment	Shown on MTCP by 2040	Master planned
Eliminate jog in alignment of Black Forest Road across Hodgen Road	Realignment	Shown on MTCP by 2040	Master planned

Recommended improvements, as shown in Table 10 above, which may be reimbursable under the County's MTCP include roadway widening and realignment improvements.

## VII. Conclusion

This traffic impact study is provided as a planning document and addressed the capacity, geometric, and control requirements associated with the development entitled Flying Horse North. This proposed mixed-use development consists of a variety of residential, commercial, recreational, and lodging land uses. The development is located along Old Stagecoach Road between State Highway 83 and Black Forest Road in El Paso County, Colorado.

The study area examined in this analysis encompassed the Hodgen Road intersections with State Highway 83 and Black Forest Road, the Old Stagecoach Road intersections with State Highway 83, Shortwall Drive, Allen Ranch Road, and Black Forest Road, the North Gate Boulevard intersection with State Highway 83, and the Shoup Road intersections with State Highway 83 and Black Forest Road.

Analysis was conducted for critical AM Peak Hour and PM Peak Hour traffic operations for existing traffic conditions, Year 2027 and Year 2042 background traffic conditions, and Year 2027 and Year 2042 total traffic conditions.

Analysis of existing traffic conditions indicates that all signalized intersections within the study area have operations at LOS C or better during morning and afternoon peak traffic hours. The stop-controlled intersections within the study area have turning movement operations at or better than LOS D during either peak traffic hour. The exception includes the westbound left and through movement at State Highway 83 and Stagecoach Road, which is shown to have a LOS E turn movement operation during the afternoon peak traffic hour. The roundabout intersections along Old Stagecoach Road experience LOS A turning movement operations during both peak traffic hours.

Without the proposed development, Year 2027 background operational analysis shows that all signalized intersections within the study area experience overall operations at or better than LOS D during either peak traffic hour. All stop-controlled intersections within the study area have turning movement operations at or better than LOS D during both peak traffic hours. Exceptions would include the westbound left and through turning movement at State Highway 83 and Stagecoach Road, which operates at LOS E and F during either peak traffic hour, respectively. The poor operations are attributed to the through traffic volume along State Highway 83 and the stop-controlled nature of the intersection. The roundabout intersections along Old Stagecoach Road are shown to have turning movement operations at LOS A during both the morning and afternoon peak traffic hours.

By Year 2042 and without the proposed development, all signalized intersections within the study area are expected to have overall operations at or better than LOS D during both the morning and afternoon peak traffic hours. The exception includes the State Highway 83 and North Gate Boulevard intersection which shows overall LOS F operation during the morning peak traffic hour. The LOS F operation is attributed to the northbound left turning volumes and conflicting southbound through volumes. A possible mitigation to the anticipated LOS F operation could be the implementation of dual northbound left turn lanes, which would allow for an overall LOS D operation. All stop-controlled intersections within the study area project turning movement operations at or better than LOS D during both peak traffic hours. Exceptions still include the westbound left and through turning movement at State Highway 83

and Stagecoach Road, which operates at LOS F during either peak traffic hour. The LOS F operations are attributed to the through traffic volume along State Highway 83 and the stop-controlled nature of the intersection. Although the study intersection of State Highway 83 and Stagecoach Road does not meet MUTCD's vehicle volume thresholds for consideration of traffic signal control, signalization at the intersection could provide relief to the poor levels of service indicated under stop-control conditions. Both roundabout intersections along Old Stagecoach Road are shown to have turning movement operations at LOS A during both the morning and afternoon peak traffic hours.

It has been emphasized throughout this study that it is not uncommon for unsignalized movements to or from an arterial roadway, in urban areas, to operate with noticeable delays during peak traffic hours. It is, however, likely that turn movements will operate better than the results obtained with this HCM Two Way Stop Control (TWSC) level of service analysis would indicate, as the HCM analysis limitations may not accurately account for the effect of vehicle platooning and gaps caused by upstream signals. Upstream signal controls along State Highway 83 may create additional gaps in the traffic stream for turning movements at Stagecoach Road which could provide mitigation to the LOS F operations projected during both peak traffic hours. In coordination with County Staff, signal progression may need to be reevaluated with future development applications to mitigate the potential for poor levels of service.

Analysis of future traffic conditions indicates that the addition of site-generated traffic is expected to create minimal negative impact to traffic operations for the existing and surrounding roadway system upon roadway and intersection control improvements assumed within this analysis. With all conservative assumptions defined in this analysis, the study intersections are projected to operate at future levels of service comparable to Year 2042 background traffic conditions. Proposed site accesses have long-term operations at LOS D or better during peak traffic periods and upon assumed development build-out.

In order to mitigate anticipated poor intersection operations at the intersection of State Highway 83 with Hodgen Road, consideration of alternate signal timing, additional turn lanes, and an additional southbound through lane could reduce overall intersection delay and better accommodate vehicle queue lengths. At the State Highway 83 and North Gate Boulevard intersection, operational mitigation solutions may include implementing dual northbound left turn lanes and optimized signal timing in order to achieve overall LOS D intersection operations. At stop-controlled intersections reporting poor turning movement operations, signalization is a possible solution that is projected to allow for acceptable overall intersection operations.

It is reemphasized that analyses provided throughout this study reflect conceptual land uses and densities per the sketch plan shown in Figure 2. As such, it is expected that analyses and assumptions used throughout this study may need to be reevaluated once actual land uses, densities, and site plans become defined over time.

This site is subject to the El Paso County Road Impact Fee Program (Resolution 19-471), as amended. An option for payment will be selected at the final land use approval stage.

The submittal of new CDOT access permits are anticipated with the development of this site and will be coordinated through CDOT staff.

## **APPENDIX A**

**Traffic Count Data  
Signal Timing Information**



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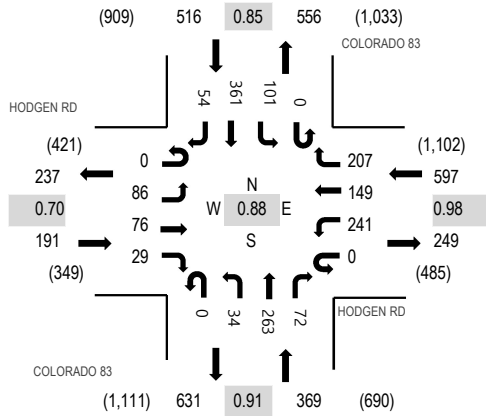
**Location:** 5 COLORADO 83 & HODGEN RD AM

**Date:** Tuesday, November 30, 2021

**Peak Hour:** 07:15 AM - 08:15 AM

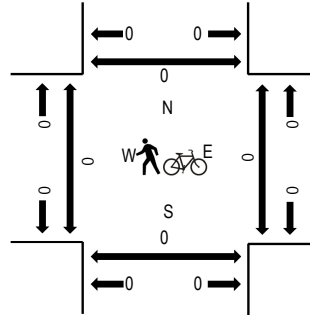
**Peak 15-Minutes:** 07:30 AM - 07:45 AM

### Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

### Peak Hour - Pedestrians/Bicycles on Crosswalk



### Traffic Counts

Interval Start Time	HODGEN RD Eastbound				HODGEN RD Westbound				COLORADO 83 Northbound				COLORADO 83 Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	9	11	10	0	64	26	65	0	5	41	10	0	21	56	2	320	1,626	0	0	0	0
7:15 AM	0	27	17	4	0	70	45	46	0	8	67	14	0	19	79	6	402	1,673	0	0	0	0
7:30 AM	0	39	19	10	0	74	33	55	0	5	73	15	0	36	98	17	474	1,590	0	0	0	0
7:45 AM	0	12	27	6	0	57	47	55	0	10	56	20	0	22	89	29	430	1,494	0	0	0	0
8:00 AM	0	8	13	9	0	40	24	51	0	11	67	23	0	24	95	2	367	1,424	0	0	0	0
8:15 AM	0	12	19	4	0	33	27	36	0	13	52	19	0	25	75	4	319		0	0	0	0
8:30 AM	0	20	21	7	0	44	37	53	0	9	66	19	0	32	67	3	378		0	0	0	0
8:45 AM	0	14	20	11	0	42	31	47	0	10	62	15	0	24	67	17	360		0	0	0	0
Count Total	0	141	147	61	0	424	270	408	0	71	484	135	0	203	626	80	3,050		0	0	0	0
Peak Hour	0	86	76	29	0	241	149	207	0	34	263	72	0	101	361	54	1,673		0	0	0	0



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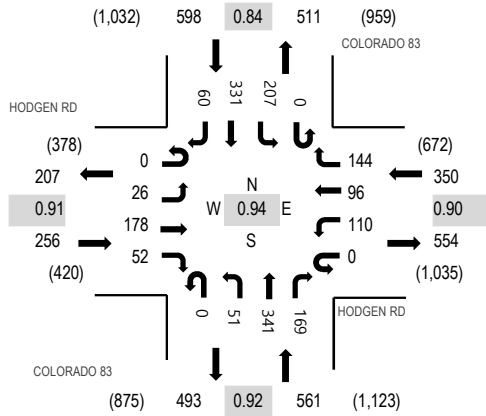
**Location:** 5 COLORADO 83 & HODGEN RD PM

**Date:** Tuesday, November 30, 2021

**Peak Hour:** 04:00 PM - 05:00 PM

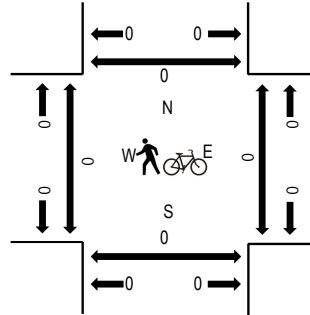
**Peak 15-Minutes:** 04:15 PM - 04:30 PM

### Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

### Peak Hour - Pedestrians/Bicycles on Crosswalk



### Traffic Counts

Interval Start Time	HODGEN RD Eastbound				HODGEN RD Westbound				COLORADO 83 Northbound				COLORADO 83 Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	9	32	21	0	23	22	28	0	18	73	35	0	59	89	31	440	1,765	0	0	0	0
4:15 PM	0	3	52	15	0	33	20	46	0	10	101	51	0	53	75	9	468	1,741	0	0	0	0
4:30 PM	0	7	46	7	0	33	23	29	0	6	73	48	0	52	78	13	415	1,660	0	0	0	0
4:45 PM	0	7	48	9	0	21	31	41	0	17	94	35	0	43	89	7	442	1,613	0	0	0	0
5:00 PM	0	2	42	12	0	33	22	32	0	12	100	48	0	55	51	7	416	1,482	0	0	0	0
5:15 PM	0	3	28	3	0	38	35	29	0	15	70	35	0	55	71	5	387		0	0	0	0
5:30 PM	0	6	33	6	0	30	17	30	0	13	84	47	0	27	69	6	368		0	0	0	0
5:45 PM	0	3	21	5	0	18	22	16	0	12	73	53	0	37	46	5	311		0	0	0	0
Count Total	0	40	302	78	0	229	192	251	0	103	668	352	0	381	568	83	3,247		0	0	0	0
Peak Hour	0	26	178	52	0	110	96	144	0	51	341	169	0	207	331	60	1,765		0	0	0	0



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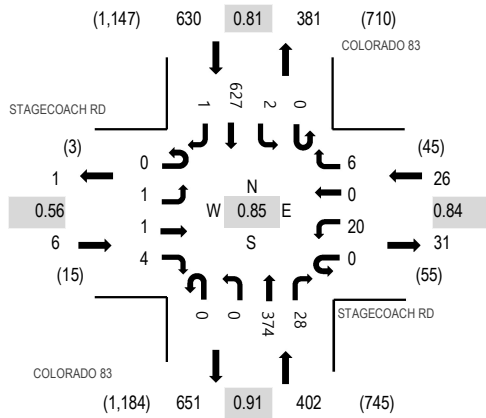
**Location:** 8 COLORADO 83 & STAGECOACH RD AM

**Date:** Tuesday, November 30, 2021

**Peak Hour:** 07:15 AM - 08:15 AM

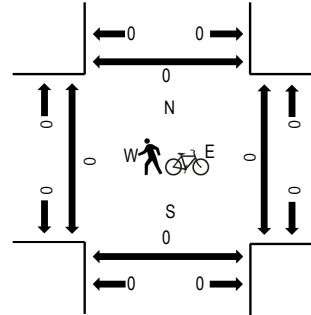
**Peak 15-Minutes:** 07:30 AM - 07:45 AM

### Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

### Peak Hour - Pedestrians/Bicycles on Crosswalk



### Traffic Counts

Interval Start Time	STAGECOACH RD Eastbound				STAGECOACH RD Westbound				COLORADO 83 Northbound				COLORADO 83 Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	1	0	3	0	5	0	3	0	0	49	6	0	1	132	0	200	1,040	0	0	0	0
7:15 AM	0	1	1	1	0	3	0	1	0	0	92	2	0	0	155	0	256	1,064	0	0	0	0
7:30 AM	0	0	0	0	0	6	0	2	0	0	93	9	0	1	202	1	314	1,033	0	0	0	0
7:45 AM	0	0	0	2	0	5	0	2	0	0	85	8	0	1	167	0	270	944	0	0	0	0
8:00 AM	0	0	0	1	0	6	0	1	0	0	104	9	0	0	103	0	224	912	0	0	0	0
8:15 AM	0	0	0	2	0	2	0	2	0	0	98	7	0	0	114	0	225		0	0	0	0
8:30 AM	0	0	0	3	0	2	1	0	0	0	85	2	0	2	130	0	225		0	0	0	0
8:45 AM	0	0	0	0	0	3	0	1	0	1	90	5	0	1	137	0	238		0	0	0	0
Count Total	0	2	1	12	0	32	1	12	0	1	696	48	0	6	1,140	1	1,952		0	0	0	0
Peak Hour	0	1	1	4	0	20	0	6	0	0	374	28	0	2	627	1	1,064		0	0	0	0





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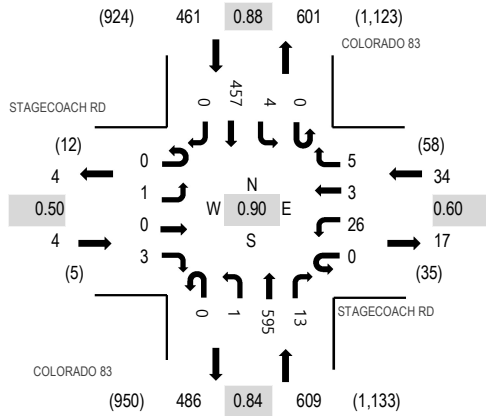
**Location:** 8 COLORADO 83 & STAGECOACH RD PM

**Date:** Tuesday, November 30, 2021

**Peak Hour:** 04:30 PM - 05:30 PM

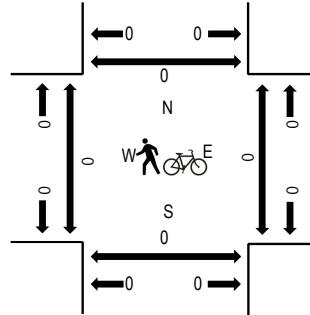
**Peak 15-Minutes:** 05:15 PM - 05:30 PM

### Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

### Peak Hour - Pedestrians/Bicycles on Crosswalk



### Traffic Counts

Interval Start Time	STAGECOACH RD Eastbound				STAGECOACH RD Westbound				COLORADO 83 Northbound				COLORADO 83 Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	0	0	0	0	3	0	6	0	1	112	3	0	3	123	0	251	1,066	0	0	0	0
4:15 PM	0	1	0	0	0	3	1	3	0	1	143	3	0	2	133	0	290	1,089	0	0	0	0
4:30 PM	0	1	0	1	0	8	0	0	0	0	140	3	0	0	98	0	251	1,108	0	0	0	0
4:45 PM	0	0	0	1	0	2	1	3	0	0	153	2	0	1	111	0	274	1,096	0	0	0	0
5:00 PM	0	0	0	0	0	11	2	2	0	1	126	2	0	0	130	0	274	1,054	0	0	0	0
5:15 PM	0	0	0	1	0	5	0	0	0	0	176	6	0	3	118	0	309		0	0	0	0
5:30 PM	0	0	0	0	0	2	1	1	0	2	127	3	0	0	102	1	239		0	0	0	0
5:45 PM	0	0	0	0	0	1	0	3	0	1	126	2	0	2	97	0	232		0	0	0	0
Count Total	0	2	0	3	0	35	5	18	0	6	1,103	24	0	11	912	1	2,120		0	0	0	0
Peak Hour	0	1	0	3	0	26	3	5	0	1	595	13	0	4	457	0	1,108		0	0	0	0



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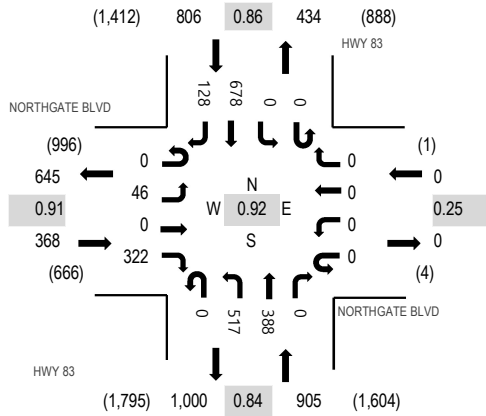
**Location:** 9 HWY 83 & NORTHGATE BLVD AM

**Date:** Tuesday, November 30, 2021

**Peak Hour:** 07:00 AM - 08:00 AM

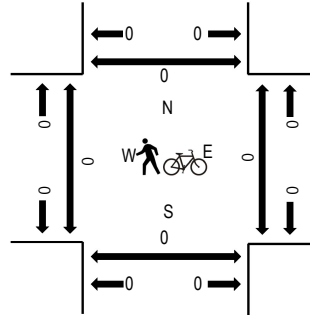
**Peak 15-Minutes:** 07:30 AM - 07:45 AM

### Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

### Peak Hour - Pedestrians/Bicycles on Crosswalk



### Traffic Counts

Interval Start Time	NORTHGATE BLVD Eastbound				NORTHGATE BLVD Westbound				HWY 83 Northbound				HWY 83 Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	6	0	74	0	0	0	0	0	111	76	0	0	0	147	23	437	2,079	0	0	0	0
7:15 AM	0	9	0	78	0	0	0	0	0	160	112	0	0	0	159	41	559	2,056	0	0	0	0
7:30 AM	0	15	0	89	0	0	0	0	0	132	92	0	0	0	203	32	563	1,910	0	0	0	0
7:45 AM	0	16	0	81	0	0	0	0	0	114	108	0	0	0	169	32	520	1,743	0	0	0	0
8:00 AM	0	12	0	79	0	0	0	0	0	85	106	1	0	1	115	15	414	1,604	0	0	0	0
8:15 AM	0	16	0	67	0	0	0	0	0	68	108	0	0	0	138	16	413		0	0	0	0
8:30 AM	0	12	0	54	0	0	0	0	0	68	97	0	0	0	151	14	396		0	0	0	0
8:45 AM	0	10	1	47	0	0	0	1	0	73	92	1	0	0	144	12	381		0	0	0	0
Count Total	0	96	1	569	0	0	0	1	0	811	791	2	0	1	1,226	185	3,683		0	0	0	0
Peak Hour	0	46	0	322	0	0	0	0	0	517	388	0	0	0	678	128	2,079		0	0	0	0



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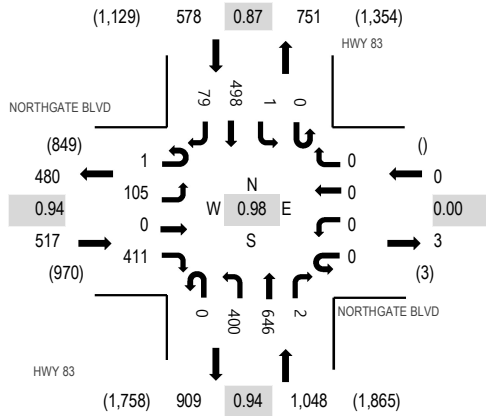
**Location:** 9 HWY 83 & NORTHGATE BLVD PM

**Date:** Tuesday, November 30, 2021

**Peak Hour:** 04:30 PM - 05:30 PM

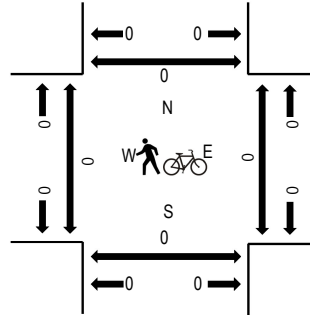
**Peak 15-Minutes:** 05:00 PM - 05:15 PM

### Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

### Peak Hour - Pedestrians/Bicycles on Crosswalk



### Traffic Counts

Interval Start Time	NORTHGATE BLVD Eastbound				NORTHGATE BLVD Westbound				HWY 83 Northbound				HWY 83 Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	26	0	118	0	0	0	0	0	78	130	0	0	0	129	18	499	2,041	0	0	0	0
4:15 PM	0	23	0	105	0	0	0	0	0	80	135	0	0	0	121	23	487	2,087	0	0	0	0
4:30 PM	0	25	0	112	0	0	0	0	0	100	162	0	0	0	117	18	534	2,143	0	0	0	0
4:45 PM	0	29	0	102	0	0	0	0	0	101	160	2	0	1	107	19	521	2,045	0	0	0	0
5:00 PM	1	21	0	110	0	0	0	0	0	103	142	0	0	0	147	21	545	1,923	0	0	0	0
5:15 PM	0	30	0	87	0	0	0	0	0	96	182	0	0	0	127	21	543		0	0	0	0
5:30 PM	0	19	0	65	0	0	0	0	0	83	129	0	0	0	133	7	436		0	0	0	0
5:45 PM	0	24	0	73	0	0	0	0	0	65	117	0	0	0	105	15	399		0	0	0	0
Count Total	1	197	0	772	0	0	0	0	0	706	1,157	2	0	1	986	142	3,964		0	0	0	0
Peak Hour	1	105	0	411	0	0	0	0	0	400	646	2	0	1	498	79	2,143		0	0	0	0



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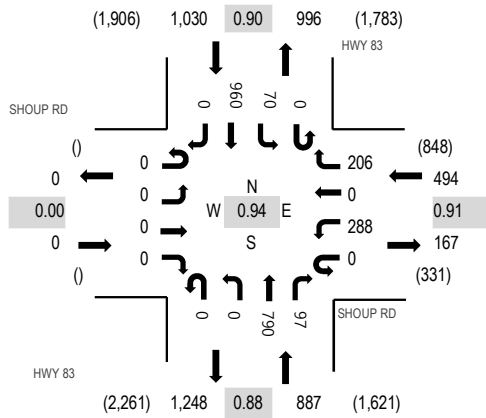
**Location:** 10 HWY 83 & SHOUP RD AM

**Date:** Tuesday, November 30, 2021

**Peak Hour:** 07:15 AM - 08:15 AM

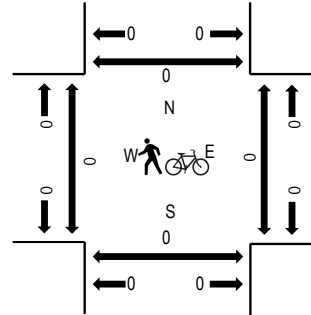
**Peak 15-Minutes:** 07:15 AM - 07:30 AM

### Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

### Peak Hour - Pedestrians/Bicycles on Crosswalk



### Traffic Counts

Interval Start Time	SHOUP RD Eastbound				SHOUP RD Westbound				HWY 83 Northbound				HWY 83 Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	0	0	0	0	55	0	51	0	0	156	8	0	6	224	0	500	2,399	0	0	0	0
7:15 AM	0	0	0	0	0	66	0	67	0	0	232	20	0	11	245	0	641	2,411	0	0	0	0
7:30 AM	0	0	0	0	0	85	0	53	0	0	176	20	0	22	270	0	626	2,260	0	0	0	0
7:45 AM	0	0	0	0	0	79	0	49	0	0	203	28	0	20	253	0	632	2,127	0	0	0	0
8:00 AM	0	0	0	0	0	58	0	37	0	0	179	29	0	17	192	0	512	1,976	0	0	0	0
8:15 AM	0	0	0	0	0	51	0	23	0	0	171	22	0	28	195	0	490		0	0	0	0
8:30 AM	0	0	0	0	0	54	0	23	0	0	171	23	0	20	202	0	493		0	0	0	0
8:45 AM	0	0	0	0	0	57	0	40	0	0	152	31	0	26	175	0	481		0	0	0	0
Count Total	0	0	0	0	0	505	0	343	0	0	1,440	181	0	150	1,756	0	4,375		0	0	0	0
Peak Hour	0	0	0	0	0	288	0	206	0	0	790	97	0	70	960	0	2,411		0	0	0	0



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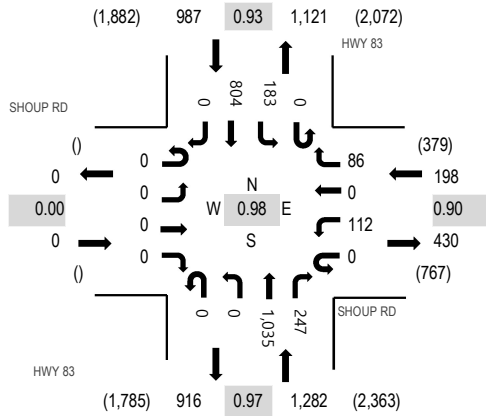
**Location:** 10 HWY 83 & SHOUP RD PM

**Date:** Tuesday, November 30, 2021

**Peak Hour:** 04:30 PM - 05:30 PM

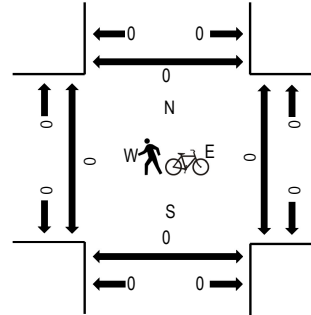
**Peak 15-Minutes:** 04:30 PM - 04:45 PM

### Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

### Peak Hour - Pedestrians/Bicycles on Crosswalk



### Traffic Counts

Interval Start Time	SHOUP RD Eastbound				SHOUP RD Westbound				HWY 83 Northbound				HWY 83 Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	0	0	0	0	26	0	26	0	0	237	55	0	33	198	0	575	2,408	0	0	0	0
4:15 PM	0	0	0	0	0	36	0	18	0	0	223	54	0	43	233	0	607	2,462	0	0	0	0
4:30 PM	0	0	0	0	0	33	0	24	0	0	271	61	0	38	203	0	630	2,467	0	0	0	0
4:45 PM	0	0	0	0	0	24	0	19	0	0	245	65	0	52	191	0	596	2,336	0	0	0	0
5:00 PM	0	0	0	0	0	22	0	24	0	0	242	73	0	52	216	0	629	2,216	0	0	0	0
5:15 PM	0	0	0	0	0	33	0	19	0	0	277	48	0	41	194	0	612		0	0	0	0
5:30 PM	0	0	0	0	0	21	0	20	0	0	220	46	0	26	166	0	499		0	0	0	0
5:45 PM	0	0	0	0	0	22	0	12	0	0	195	51	0	29	167	0	476		0	0	0	0
Count Total	0	0	0	0	0	217	0	162	0	0	1,910	453	0	314	1,568	0	4,624		0	0	0	0
Peak Hour	0	0	0	0	0	112	0	86	0	0	1,035	247	0	183	804	0	2,467		0	0	0	0





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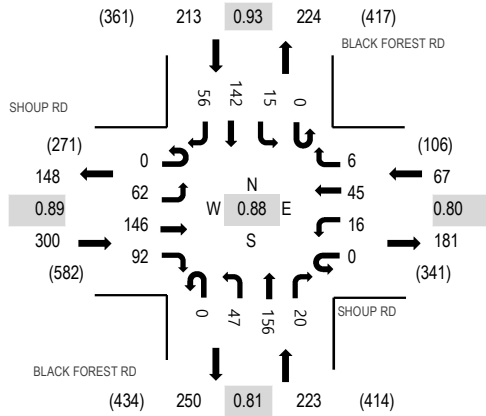
**Location:** 4 BLACK FOREST RD & SHOUP RD PM

**Date:** Tuesday, November 30, 2021

**Peak Hour:** 04:00 PM - 05:00 PM

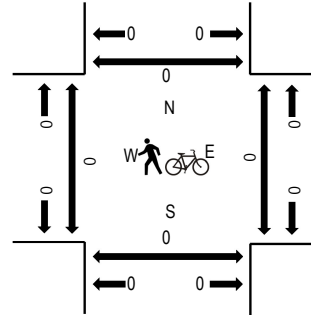
**Peak 15-Minutes:** 04:00 PM - 04:15 PM

### Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

### Peak Hour - Pedestrians/Bicycles on Crosswalk



### Traffic Counts

Interval Start Time	SHOUP RD Eastbound				SHOUP RD Westbound				BLACK FOREST RD Northbound				BLACK FOREST RD Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	19	41	24	0	4	10	4	0	9	49	11	0	3	38	16	228	803	0	0	0	0
4:15 PM	0	17	37	24	0	7	13	1	0	16	44	4	0	6	34	8	211	744	0	0	0	0
4:30 PM	0	10	30	21	0	3	14	1	0	9	32	2	0	5	35	15	177	712	0	0	0	0
4:45 PM	0	16	38	23	0	2	8	0	0	13	31	3	0	1	35	17	187	703	0	0	0	0
5:00 PM	0	16	40	16	0	2	5	1	0	15	32	5	0	3	21	13	169	660	0	0	0	0
5:15 PM	0	15	35	18	0	1	8	0	0	22	32	3	0	1	34	10	179		0	0	0	0
5:30 PM	0	19	33	21	0	2	6	1	0	7	34	5	0	1	25	14	168		0	0	0	0
5:45 PM	0	22	25	22	0	2	11	0	0	8	21	7	0	2	20	4	144		0	0	0	0
Count Total	0	134	279	169	0	23	75	8	0	99	275	40	0	22	242	97	1,463		0	0	0	0
Peak Hour	0	62	146	92	0	16	45	6	0	47	156	20	0	15	142	56	803		0	0	0	0





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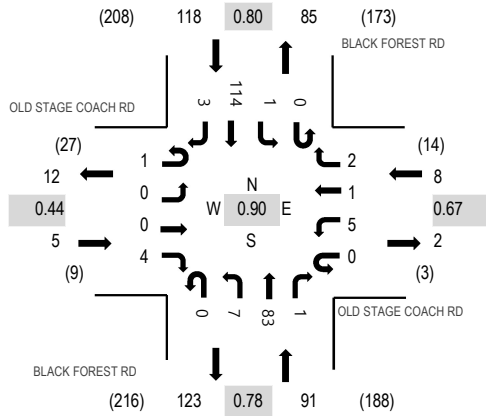
**Location:** 3 BLACK FOREST RD & OLD STAGE COACH RD AM

**Date:** Tuesday, November 30, 2021

**Peak Hour:** 08:00 AM - 09:00 AM

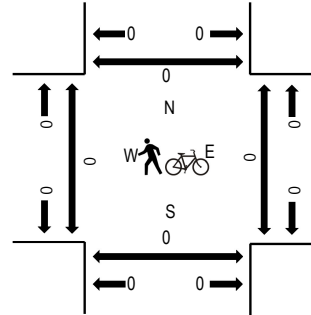
**Peak 15-Minutes:** 08:30 AM - 08:45 AM

### Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

### Peak Hour - Pedestrians/Bicycles on Crosswalk



### Traffic Counts

Interval Start Time	OLD STAGE COACH RD Eastbound				OLD STAGE COACH RD Westbound				BLACK FOREST RD Northbound				BLACK FOREST RD Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	0	0	1	0	0	0	0	0	2	15	0	0	0	18	0	36	197	0	0	0	0
7:15 AM	0	0	0	1	0	0	3	1	0	3	28	0	0	0	20	0	56	199	0	0	0	0
7:30 AM	0	0	0	0	0	1	0	1	0	2	26	0	0	0	29	0	59	203	0	0	0	0
7:45 AM	0	0	1	1	0	0	0	0	0	4	17	0	0	0	22	1	46	206	0	0	0	0
8:00 AM	0	0	0	1	0	1	0	0	0	1	16	0	0	1	18	0	38	222	0	0	0	0
8:15 AM	0	0	0	0	0	2	1	0	0	5	20	1	0	0	30	1	60		0	0	0	0
8:30 AM	1	0	0	3	0	2	0	1	0	1	23	0	0	0	31	0	62		0	0	0	0
8:45 AM	0	0	0	0	0	0	0	1	0	0	24	0	0	0	35	2	62		0	0	0	0
Count Total	1	0	1	7	0	6	4	4	0	18	169	1	0	1	203	4	419		0	0	0	0
Peak Hour	1	0	0	4	0	5	1	2	0	7	83	1	0	1	114	3	222		0	0	0	0



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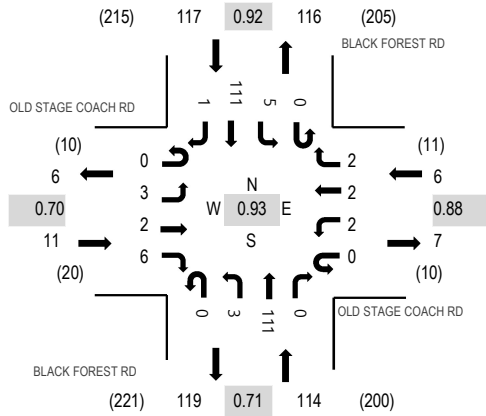
**Location:** 3 BLACK FOREST RD & OLD STAGE COACH RD PM

**Date:** Tuesday, November 30, 2021

**Peak Hour:** 04:00 PM - 05:00 PM

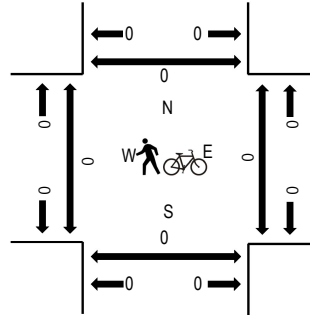
**Peak 15-Minutes:** 04:00 PM - 04:15 PM

### Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

### Peak Hour - Pedestrians/Bicycles on Crosswalk



### Traffic Counts

Interval Start Time	OLD STAGE COACH RD Eastbound				OLD STAGE COACH RD Westbound				BLACK FOREST RD Northbound				BLACK FOREST RD Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	1	1	1	0	0	0	1	0	0	40	0	0	2	21	0	67	248	0	0	0	0
4:15 PM	0	1	0	2	0	1	1	0	0	0	23	0	0	0	26	1	55	242	0	0	0	0
4:30 PM	0	0	0	0	0	1	1	0	0	1	29	0	0	1	33	0	66	242	0	0	0	0
4:45 PM	0	1	1	3	0	0	0	1	0	2	19	0	0	2	31	0	60	217	0	0	0	0
5:00 PM	0	2	0	0	0	1	0	1	0	0	26	0	0	1	29	1	61	198	0	0	0	0
5:15 PM	0	1	0	3	0	1	0	1	0	1	20	1	0	0	26	1	55		0	0	0	0
5:30 PM	0	1	0	2	0	0	1	0	0	0	16	1	0	0	20	0	41		0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	21	0	0	0	20	0	41		0	0	0	0
Count Total	0	7	2	11	0	4	3	4	0	4	194	2	0	6	206	3	446		0	0	0	0
Peak Hour	0	3	2	6	0	2	2	2	0	3	111	0	0	5	111	1	248		0	0	0	0



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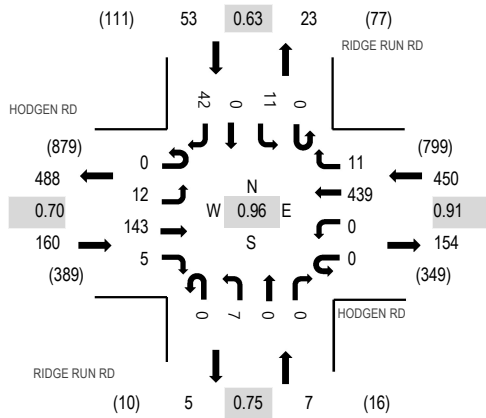
**Location:** 1 RIDGE RUN RD & HODGEN RD AM

**Date:** Tuesday, November 30, 2021

**Peak Hour:** 07:00 AM - 08:00 AM

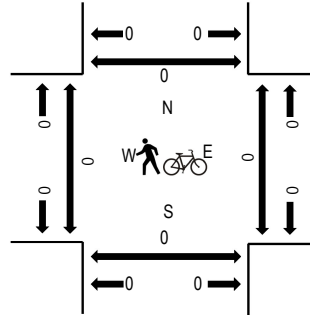
**Peak 15-Minutes:** 07:15 AM - 07:30 AM

### Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

### Peak Hour - Pedestrians/Bicycles on Crosswalk



### Traffic Counts

Interval Start Time	HODGEN RD Eastbound				HODGEN RD Westbound				RIDGE RUN RD Northbound				RIDGE RUN RD Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	2	34	1	0	0	103	1	0	1	0	0	0	3	0	8	153	670	0	0	0	0
7:15 AM	0	3	24	2	0	0	122	2	0	4	0	0	0	2	0	15	174	666	0	0	0	0
7:30 AM	0	5	41	1	0	0	113	2	0	1	0	0	0	1	0	10	174	621	0	0	0	0
7:45 AM	0	2	44	1	0	0	101	6	0	1	0	0	0	5	0	9	169	639	0	0	0	0
8:00 AM	0	6	32	2	0	0	94	3	0	2	0	0	0	1	0	9	149	645	0	0	0	0
8:15 AM	0	4	30	2	0	0	74	7	0	1	0	1	0	0	0	10	129		0	0	0	0
8:30 AM	0	8	62	1	0	0	95	8	0	3	0	0	0	0	0	15	192		0	0	0	0
8:45 AM	0	16	66	0	0	0	66	2	0	2	0	0	0	3	0	20	175		0	0	0	0
Count Total	0	46	333	10	0	0	768	31	0	15	0	1	0	15	0	96	1,315		0	0	0	0
Peak Hour	0	12	143	5	0	0	439	11	0	7	0	0	0	11	0	42	670		0	0	0	0



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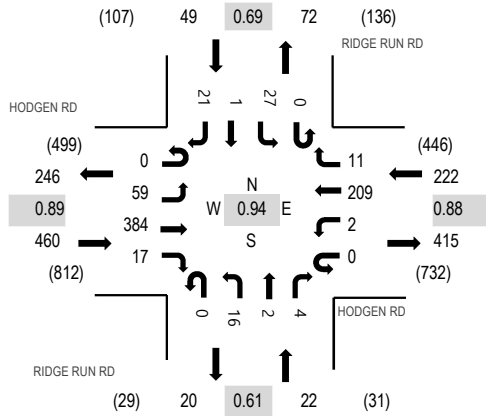
**Location:** 1 RIDGE RUN RD & HODGEN RD PM

**Date:** Tuesday, November 30, 2021

**Peak Hour:** 04:00 PM - 05:00 PM

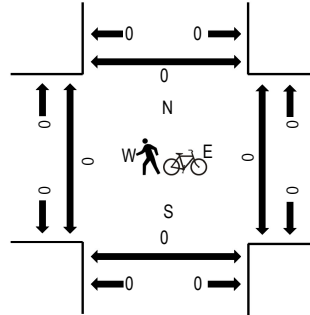
**Peak 15-Minutes:** 04:30 PM - 04:45 PM

### Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

### Peak Hour - Pedestrians/Bicycles on Crosswalk



### Traffic Counts

Interval Start Time	HODGEN RD Eastbound				HODGEN RD Westbound				RIDGE RUN RD Northbound				RIDGE RUN RD Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	18	87	10	0	1	45	6	0	4	0	0	0	13	0	5	189	753	0	0	0	0
4:15 PM	0	16	92	2	0	1	56	1	0	2	1	2	0	6	0	7	186	746	0	0	0	0
4:30 PM	0	14	111	4	0	0	56	2	0	2	0	2	0	5	0	5	201	745	0	0	0	0
4:45 PM	0	11	94	1	0	0	52	2	0	8	1	0	0	3	1	4	177	692	0	0	0	0
5:00 PM	0	11	81	4	0	0	62	7	0	0	0	1	0	2	0	14	182	643	0	0	0	0
5:15 PM	0	12	84	2	0	0	57	3	0	6	0	0	0	10	0	11	185		0	0	0	0
5:30 PM	0	10	67	0	0	0	52	7	0	1	0	0	0	2	0	9	148		0	0	0	0
5:45 PM	0	11	68	2	0	0	33	3	0	1	0	0	0	2	1	7	128		0	0	0	0
Count Total	0	103	684	25	0	2	413	31	0	24	2	5	0	43	2	62	1,396		0	0	0	0
Peak Hour	0	59	384	17	0	2	209	11	0	16	2	4	0	27	1	21	753		0	0	0	0



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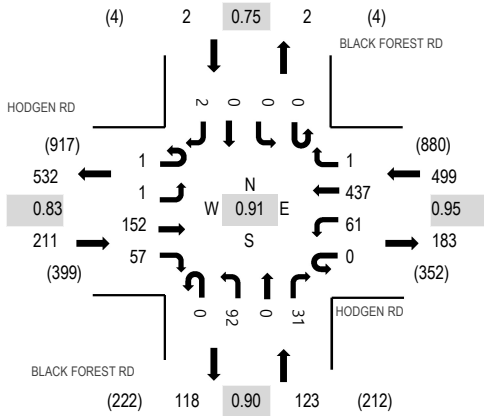
**Location:** 2 BLACK FOREST RD & HODGEN RD AM

**Date:** Tuesday, November 30, 2021

**Peak Hour:** 07:15 AM - 08:15 AM

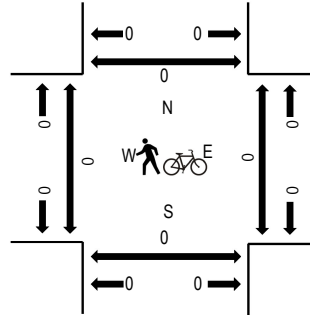
**Peak 15-Minutes:** 07:45 AM - 08:00 AM

### Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

### Peak Hour - Pedestrians/Bicycles on Crosswalk



### Traffic Counts

Interval Start Time	HODGEN RD Eastbound				HODGEN RD Westbound				BLACK FOREST RD Northbound				BLACK FOREST RD Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	0	18	8	0	11	111	0	0	11	0	6	0	0	0	0	165	799	0	0	0	0
7:15 AM	0	1	35	12	0	20	102	0	0	22	0	12	0	0	0	0	204	835	0	0	0	0
7:30 AM	0	0	37	14	0	14	104	0	0	25	0	5	0	0	0	1	200	814	0	0	0	0
7:45 AM	1	0	49	17	0	14	118	0	0	26	0	5	0	0	0	0	230	763	0	0	0	0
8:00 AM	0	0	31	14	0	13	113	1	0	19	0	9	0	0	0	1	201	696	0	0	0	0
8:15 AM	0	0	45	14	0	16	85	0	0	17	0	5	0	1	0	0	183		0	0	0	0
8:30 AM	0	0	36	10	0	15	63	0	0	19	0	6	0	0	0	0	149		0	0	0	0
8:45 AM	0	0	43	14	0	16	63	1	0	16	0	9	1	0	0	0	163		0	0	0	3
Count Total	1	1	294	103	0	119	759	2	0	155	0	57	1	1	0	2	1,495		0	0	0	3
Peak Hour	1	1	152	57	0	61	437	1	0	92	0	31	0	0	0	2	835		0	0	0	0



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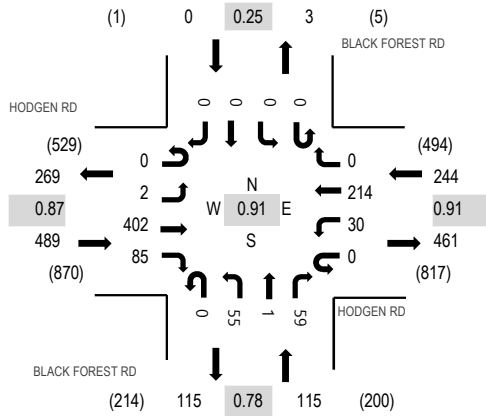
**Location:** 2 BLACK FOREST RD & HODGEN RD PM

**Date:** Tuesday, November 30, 2021

**Peak Hour:** 04:00 PM - 05:00 PM

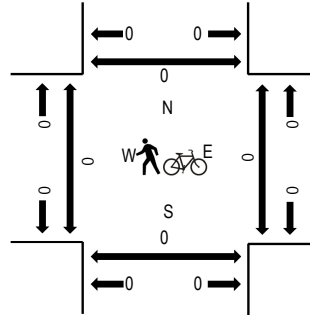
**Peak 15-Minutes:** 04:30 PM - 04:45 PM

### Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

### Peak Hour - Pedestrians/Bicycles on Crosswalk



### Traffic Counts

Interval Start Time	HODGEN RD Eastbound				HODGEN RD Westbound				BLACK FOREST RD Northbound				BLACK FOREST RD Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	0	100	19	0	5	48	0	0	14	1	22	0	0	0	0	209	848	0	0	0	0
4:15 PM	0	0	95	19	0	7	56	0	0	17	0	10	0	0	0	0	204	843	0	0	0	0
4:30 PM	0	1	117	23	0	9	55	0	0	13	0	16	0	0	0	0	234	843	0	0	0	0
4:45 PM	0	1	90	24	0	9	55	0	0	11	0	11	0	0	0	0	201	774	0	0	0	0
5:00 PM	0	0	84	23	0	11	63	0	0	11	0	12	0	0	0	0	204	717	0	0	0	0
5:15 PM	0	0	87	15	0	8	67	1	0	14	0	11	0	1	0	0	204		0	0	0	0
5:30 PM	0	1	71	14	0	9	52	0	0	13	0	5	0	0	0	0	165		0	0	0	0
5:45 PM	0	0	71	15	0	4	35	0	0	5	0	14	0	0	0	0	144		0	0	0	0
Count Total	0	3	715	152	0	62	431	1	0	98	1	101	0	1	0	0	1,565		0	0	0	0
Peak Hour	0	2	402	85	0	30	214	0	0	55	1	59	0	0	0	0	848		0	0	0	0



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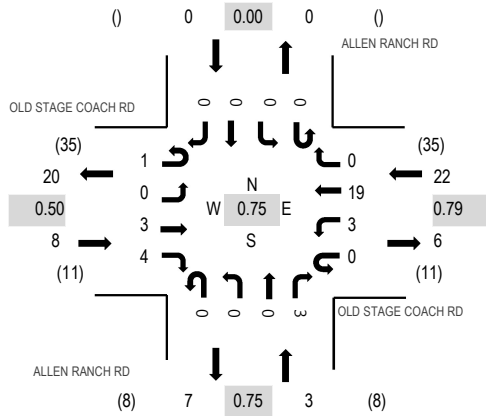
**Location:** 6 ALLEN RANCH RD & OLD STAGE COACH RD AM

**Date:** Tuesday, November 30, 2021

**Peak Hour:** 07:15 AM - 08:15 AM

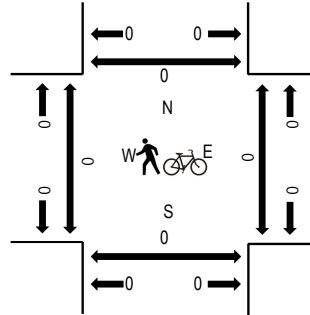
**Peak 15-Minutes:** 07:45 AM - 08:00 AM

### Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

### Peak Hour - Pedestrians/Bicycles on Crosswalk



### Traffic Counts

Interval Start Time	OLD STAGE COACH RD Eastbound				OLD STAGE COACH RD Westbound				ALLEN RANCH RD Northbound				ALLEN RANCH RD Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3	30	0	0	0	0
7:15 AM	0	0	2	0	0	0	7	0	0	0	0	0	0	0	0	0	9	33	0	0	0	0
7:30 AM	0	0	0	1	0	2	3	0	0	0	0	1	0	0	0	0	7	31	0	0	0	0
7:45 AM	1	0	1	2	0	1	5	0	0	0	0	1	0	0	0	0	11	31	0	0	0	0
8:00 AM	0	0	0	1	0	0	4	0	0	0	0	1	0	0	0	0	6	24	0	0	0	0
8:15 AM	0	0	1	0	0	0	5	0	0	1	0	0	0	0	0	0	7		0	0	0	0
8:30 AM	0	0	1	1	0	0	3	0	0	1	0	1	0	0	0	0	7		0	0	0	0
8:45 AM	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	4		0	0	0	0
Count Total	1	0	5	5	0	3	32	0	0	2	0	6	0	0	0	0	54		0	0	0	0
Peak Hour	1	0	3	4	0	3	19	0	0	0	0	3	0	0	0	0	33		0	0	0	0





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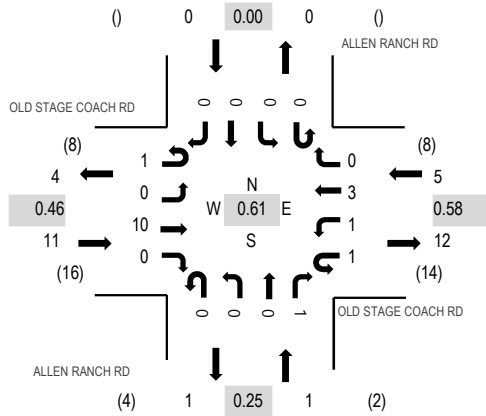
**Location:** 6 ALLEN RANCH RD & OLD STAGE COACH RD PM

**Date:** Tuesday, November 30, 2021

**Peak Hour:** 04:00 PM - 05:00 PM

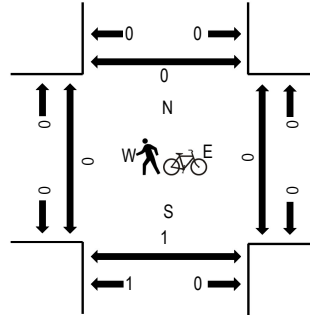
**Peak 15-Minutes:** 04:00 PM - 04:15 PM

### Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

### Peak Hour - Pedestrians/Bicycles on Crosswalk



### Traffic Counts

Interval Start Time	OLD STAGE COACH RD Eastbound				OLD STAGE COACH RD Westbound				ALLEN RANCH RD Northbound				ALLEN RANCH RD Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	0	6	0	0	1	0	0	0	0	0	0	0	0	0	0	7	17	0	0	1	0
4:15 PM	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	2	15	0	0	0	0
4:30 PM	0	0	3	0	1	0	2	0	0	0	0	0	0	0	0	0	6	15	0	0	0	0
4:45 PM	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	11	0	0	0	0
5:00 PM	0	0	2	0	0	1	2	0	0	0	0	0	0	0	0	0	5	9	0	0	0	0
5:15 PM	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2		0	0	0	0
5:30 PM	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	2		0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0
Count Total	2	0	12	2	1	2	5	0	0	1	0	1	0	0	0	0	26		0	0	1	0
Peak Hour	1	0	10	0	1	1	3	0	0	0	0	1	0	0	0	0	17		0	0	1	0



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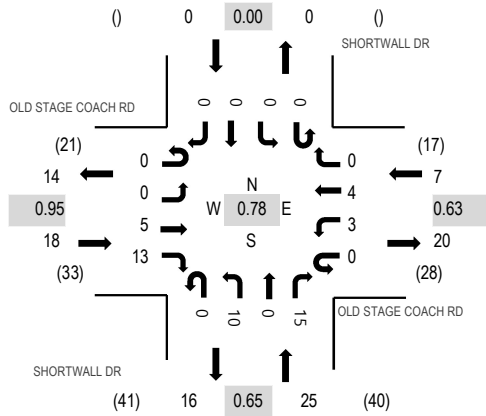
**Location:** 7 SHORTWALL DR & OLD STAGE COACH RD AM

**Date:** Tuesday, November 30, 2021

**Peak Hour:** 07:30 AM - 08:30 AM

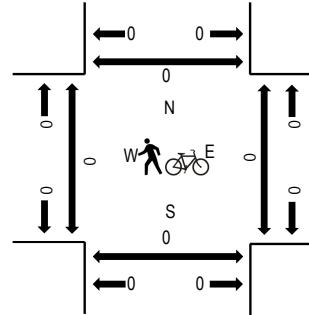
**Peak 15-Minutes:** 07:45 AM - 08:00 AM

### Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

### Peak Hour - Pedestrians/Bicycles on Crosswalk



### Traffic Counts

Interval Start Time	OLD STAGE COACH RD Eastbound				OLD STAGE COACH RD Westbound				SHORTWALL DR Northbound				SHORTWALL DR Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	0	1	4	0	4	0	0	0	3	0	1	0	0	0	0	13	49	0	0	0	0
7:15 AM	0	0	0	5	0	3	0	0	0	1	0	1	0	0	0	0	10	47	0	0	0	0
7:30 AM	0	0	0	5	0	1	0	0	0	3	0	1	0	0	0	0	10	50	0	0	0	0
7:45 AM	0	0	2	2	0	0	2	0	0	5	0	5	0	0	0	0	16	50	0	0	0	0
8:00 AM	0	0	2	3	0	0	1	0	0	0	0	5	0	0	0	0	11	41	0	0	0	0
8:15 AM	0	0	1	3	0	2	1	0	0	2	0	4	0	0	0	0	13		0	0	0	0
8:30 AM	0	0	0	3	0	2	0	0	0	2	0	3	0	0	0	0	10		0	0	0	0
8:45 AM	0	0	0	2	0	1	0	0	1	1	0	2	0	0	0	0	7		0	0	0	0
Count Total	0	0	6	27	0	13	4	0	1	17	0	22	0	0	0	0	90		0	0	0	0
Peak Hour	0	0	5	13	0	3	4	0	0	10	0	15	0	0	0	0	50		0	0	0	0



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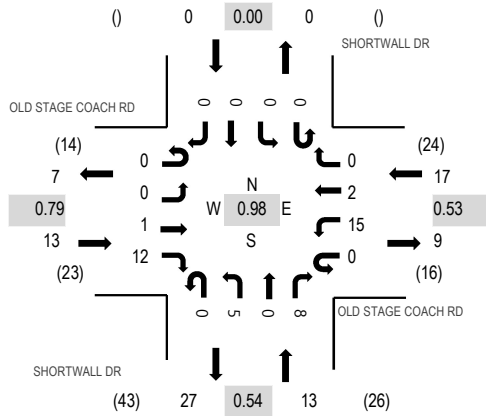
**Location:** 7 SHORTWALL DR & OLD STAGE COACH RD PM

**Date:** Tuesday, November 30, 2021

**Peak Hour:** 04:00 PM - 05:00 PM

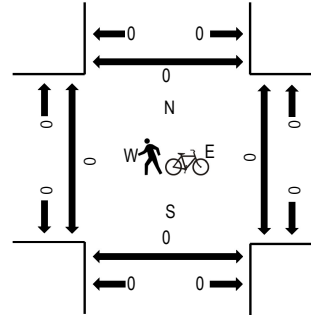
**Peak 15-Minutes:** 04:00 PM - 04:15 PM

### Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

### Peak Hour - Pedestrians/Bicycles on Crosswalk



### Traffic Counts

Interval Start Time	OLD STAGE COACH RD				OLD STAGE COACH RD				SHORTWALL DR				SHORTWALL DR				Total	Rolling Hour	Pedestrian Crossings			
	Eastbound				Westbound				Northbound				Southbound						West	East	South	North
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right						
4:00 PM	0	0	0	0	0	8	0	0	0	2	0	1	0	0	0	0	11	43	0	0	0	0
4:15 PM	0	0	0	4	0	1	0	0	0	1	0	4	0	0	0	0	10	41	0	0	0	0
4:30 PM	0	0	0	3	0	3	1	0	0	2	0	2	0	0	0	0	11	39	0	0	0	0
4:45 PM	0	0	1	5	0	3	1	0	0	0	0	1	0	0	0	0	11	36	0	0	0	0
5:00 PM	0	0	0	6	0	2	0	0	0	0	0	1	0	0	0	0	9	30	0	0	0	0
5:15 PM	0	0	0	0	0	2	0	0	0	2	0	4	0	0	0	0	8		0	0	0	0
5:30 PM	0	0	0	2	0	2	0	0	0	2	0	2	0	0	0	0	8		0	0	0	0
5:45 PM	0	0	0	2	0	0	1	0	0	2	0	0	0	0	0	0	5		0	0	0	0
Count Total	0	0	1	22	0	21	3	0	0	11	0	15	0	0	0	0	73		0	0	0	0
Peak Hour	0	0	1	12	0	15	2	0	0	5	0	8	0	0	0	0	43		0	0	0	0

Site Code: 11  
Station ID: 11  
BLACK FOREST RD S.O. HODGEN RD

Latitude: 0' 0.0000 Undefined

Start Time	30-Nov-21 Tue	NB	SB	Total
12:00 AM		0	2	2
01:00		0	1	1
02:00		0	2	2
03:00		2	0	2
04:00		9	1	10
05:00		25	13	38
06:00		55	53	108
07:00		92	87	179
08:00		83	125	208
09:00		71	86	157
10:00		77	79	156
11:00		58	64	122
12:00 PM		68	61	129
01:00		78	75	153
02:00		84	89	173
03:00		138	126	264
04:00		111	116	227
05:00		83	94	177
06:00		42	44	86
07:00		24	34	58
08:00		20	16	36
09:00		10	16	26
10:00		8	5	13
11:00		5	8	13
Total		1143	1197	2340
Percent		48.8%	51.2%	
AM Peak	-	07:00	08:00	-
Vol.	-	92	125	-
PM Peak	-	15:00	15:00	-
Vol.	-	138	126	-
Grand Total		1143	1197	2340
Percent		48.8%	51.2%	
ADT		ADT 2,340		AADT 2,340

Site Code: 12  
Station ID: 12  
HODGEN RD W.O. BLACK FOREST RD

Latitude: 0' 0.0000 Undefined

Start Time	30-Nov-21 Tue	EB	WB	Total
12:00 AM		12	4	16
01:00		7	3	10
02:00		4	9	13
03:00		7	22	29
04:00		7	56	63
05:00		16	155	171
06:00		102	340	442
07:00		187	522	709
08:00		208	377	585
09:00		164	252	416
10:00		185	243	428
11:00		185	223	408
12:00 PM		214	197	411
01:00		223	225	448
02:00		276	237	513
03:00		425	267	692
04:00		495	276	771
05:00		383	266	649
06:00		262	112	374
07:00		171	56	227
08:00		115	37	152
09:00		99	28	127
10:00		44	10	54
11:00		27	7	34
Total		3818	3924	7742
Percent		49.3%	50.7%	
AM Peak	-	08:00	07:00	-
Vol.	-	208	522	-
PM Peak	-	16:00	16:00	-
Vol.	-	495	276	-
Grand Total		3818	3924	7742
Percent		49.3%	50.7%	
ADT		ADT 7,742	AADT 7,742	

Site Code: 14  
Station ID: 14  
BLACK FOREST RD N.O. SHOUP RD

Latitude: 0' 0.0000 Undefined

Start Time	30-Nov-21 Tue	NB	SB	Total
12:00 AM		4	5	9
01:00		3	1	4
02:00		1	2	3
03:00		1	5	6
04:00		7	14	21
05:00		15	37	52
06:00		58	135	193
07:00		146	231	377
08:00		211	271	482
09:00		111	188	299
10:00		123	158	281
11:00		119	121	240
12:00 PM		158	133	291
01:00		156	117	273
02:00		153	156	309
03:00		304	244	548
04:00		213	208	421
05:00		195	146	341
06:00		136	83	219
07:00		74	35	109
08:00		62	42	104
09:00		44	18	62
10:00		23	11	34
11:00		17	5	22
Total		2334	2366	4700
Percent		49.7%	50.3%	
AM Peak	-	08:00	08:00	-
Vol.	-	211	271	-
PM Peak	-	15:00	15:00	-
Vol.	-	304	244	-
Grand Total		2334	2366	4700
Percent		49.7%	50.3%	
ADT		ADT 4,700		AADT 4,700

Site Code: 15  
Station ID: 15  
SHOUP RD W.O. BLACK FOREST RD

Latitude: 0' 0.0000 Undefined

Start Time	30-Nov-21 Tue	EB	WB	Total
12:00 AM		4	4	8
01:00		3	1	4
02:00		1	4	5
03:00		2	4	6
04:00		1	8	9
05:00		6	44	50
06:00		27	181	208
07:00		92	390	482
08:00		151	261	412
09:00		85	161	246
10:00		105	132	237
11:00		100	110	210
12:00 PM		121	122	243
01:00		149	114	263
02:00		146	137	283
03:00		341	221	562
04:00		305	158	463
05:00		271	122	393
06:00		157	96	253
07:00		110	27	137
08:00		85	57	142
09:00		54	18	72
10:00		32	13	45
11:00		15	5	20
Total		2363	2390	4753
Percent		49.7%	50.3%	
AM Peak	-	08:00	07:00	-
Vol.	-	151	390	-
PM Peak	-	15:00	15:00	-
Vol.	-	341	221	-
Grand Total		2363	2390	4753
Percent		49.7%	50.3%	
ADT		ADT 4,753	AADT 4,753	

Site Code: 17  
Station ID: 17  
HODGEN RD E.O. HWY 83  
Latitude: 0' 0.0000 Undefined

Start Time	30-Nov-21 Tue	EB	WB	Total
12:00 AM		17	5	22
01:00		8	3	11
02:00		5	10	15
03:00		7	24	31
04:00		9	60	69
05:00		20	178	198
06:00		117	403	520
07:00		230	635	865
08:00		245	463	708
09:00		225	332	557
10:00		231	313	544
11:00		255	303	558
12:00 PM		274	288	562
01:00		303	290	593
02:00		339	301	640
03:00		526	297	823
04:00		582	351	933
05:00		479	327	806
06:00		343	151	494
07:00		215	71	286
08:00		146	48	194
09:00		127	30	157
10:00		50	12	62
11:00		34	8	42
Total		4787	4903	9690
Percent		49.4%	50.6%	
AM Peak	-	11:00	07:00	-
Vol.	-	255	635	-
PM Peak	-	16:00	16:00	-
Vol.	-	582	351	-
Grand Total		4787	4903	9690
Percent		49.4%	50.6%	
ADT		ADT 9,690	AADT 9,690	



Site Code: 19  
Station ID: 19  
SHOUP RD E.O. HWY 83

Latitude: 0' 0.0000 Undefined

Start Time	30-Nov-21 Tue	EB	WB	Total
12:00 AM		7	5	12
01:00		4	0	4
02:00		2	4	6
03:00		1	6	7
04:00		3	20	23
05:00		11	59	70
06:00		38	210	248
07:00		139	508	647
08:00		196	332	528
09:00		130	232	362
10:00		153	195	348
11:00		169	183	352
12:00 PM		170	190	360
01:00		197	156	353
02:00		232	190	422
03:00		386	277	663
04:00		380	210	590
05:00		382	192	574
06:00		211	116	327
07:00		150	51	201
08:00		105	49	154
09:00		79	25	104
10:00		42	17	59
11:00		21	7	28
Total		3208	3234	6442
Percent		49.8%	50.2%	
AM Peak	-	08:00	07:00	-
Vol.	-	196	508	-
PM Peak	-	15:00	15:00	-
Vol.	-	386	277	-
Grand Total		3208	3234	6442
Percent		49.8%	50.2%	
ADT		ADT 6,442	AADT 6,442	

Site Code: 13  
Station ID: 13  
OLD STAGE COACH RD W.O. BLACK FOREST RD

Latitude: 0' 0.0000 Undefined

Start Time	30-Nov-21 Tue	EB	WB	Total
12:00 AM		1	0	1
01:00		0	0	0
02:00		0	0	0
03:00		0	0	0
04:00		0	0	0
05:00		0	0	0
06:00		1	4	5
07:00		4	14	18
08:00		5	15	20
09:00		7	8	15
10:00		7	4	11
11:00		5	3	8
12:00 PM		5	7	12
01:00		5	9	14
02:00		7	6	13
03:00		18	5	23
04:00		12	7	19
05:00		8	4	12
06:00		3	1	4
07:00		4	0	4
08:00		1	1	2
09:00		1	0	1
10:00		0	0	0
11:00		1	0	1
Total		95	88	183
Percent		51.9%	48.1%	
AM Peak	-	09:00	08:00	-
Vol.	-	7	15	-
PM Peak	-	15:00	13:00	-
Vol.	-	18	9	-
Grand Total		95	88	183
Percent		51.9%	48.1%	
ADT		ADT 183		AADT 183

Site Code: 16  
Station ID: 16  
OLD STAGE COACH RD E.O. SHORT WALL DR

Latitude: 0' 0.0000 Undefined

Start Time	30-Nov-21 Tue	EB	WB	Total
12:00 AM		0	0	0
01:00		0	0	0
02:00		0	0	0
03:00		0	0	0
04:00		1	1	2
05:00		2	0	2
06:00		8	5	13
07:00		12	23	35
08:00		9	19	28
09:00		16	14	30
10:00		13	9	22
11:00		7	11	18
12:00 PM		14	19	33
01:00		12	22	34
02:00		6	10	16
03:00		22	14	36
04:00		15	11	26
05:00		9	13	22
06:00		5	5	10
07:00		5	1	6
08:00		1	2	3
09:00		4	2	6
10:00		2	0	2
11:00		1	1	2
Total		164	182	346
Percent		47.4%	52.6%	
AM Peak	-	09:00	07:00	-
Vol.	-	16	23	-
PM Peak	-	15:00	13:00	-
Vol.	-	22	22	-
Grand Total		164	182	346
Percent		47.4%	52.6%	
ADT		ADT 346	AADT 346	

Site Code: 18  
Station ID: 18  
STAGECOACH RD E.O. HWY 83

Latitude: 0' 0.0000 Undefined

Start Time	30-Nov-21 Tue	EB	WB	Total
12:00 AM		0	0	0
01:00		0	0	0
02:00		1	1	2
03:00		0	0	0
04:00		0	3	3
05:00		3	4	7
06:00		12	10	22
07:00		25	30	55
08:00		31	22	53
09:00		27	31	58
10:00		17	22	39
11:00		18	23	41
12:00 PM		26	25	51
01:00		24	25	49
02:00		11	18	29
03:00		38	30	68
04:00		25	27	52
05:00		15	20	35
06:00		12	13	25
07:00		10	4	14
08:00		3	2	5
09:00		3	1	4
10:00		3	1	4
11:00		1	1	2
Total		305	313	618
Percent		49.4%	50.6%	
AM Peak	-	08:00	09:00	-
Vol.	-	31	31	-
PM Peak	-	15:00	15:00	-
Vol.	-	38	30	-
Grand Total		305	313	618
Percent		49.4%	50.6%	
ADT		ADT 618		AADT 618

0 + Key			Phase + Key			NB		EB		SB		WB
FUNCTION	KEY	1 2 3 4 5 6 7 8	FUNCTION	KEY	Ph 1	Ph 2	Ph 3	Ph 4	Ph 5	Ph 6	Ph 7	Ph 8
Vehicle Recall	0	2 6	Max I	0	0	55	0	35	0	55	0	35
Ped Recall	1		Max II/HFDW	1	0	55	0	35	0	55	0	35
Red Lock	2		Walk	2	0	0	0	0	0	0	0	0
Yellow Lock	3		Flashing DW	3	0	0	0	0	0	0	0	0
Permits	4	2 4 6 8	Max Initial	4	0	0	0	0	0	0	0	0
Ped Phases	5		Min Green	5	0	12	0	8	0	12	0	8
Lead Phases	6	1 3 5 7	TBR	6	0	0	0	0	0	0	0	0
Double Entry	7	4 8	TTR	7	0	0	0	0	0	0	0	0
Sequential Timing	8		Observe Gap	8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Startup Green	9		Passage	9	0.0	0.2	0.0	0.2	0.0	0.2	0.0	0.2
Overlap A	A		Min Gap	A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Overlap B	B		Added Actuation	B	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Overlap C	C		Yellow	C	0.0	4.0	0.0	4.0	0.0	4.0	0.0	4.0
Overlap D	D		Red Clear	D	0.0	2.0	0.0	2.0	0.0	2.0	0.0	2.0
Exclusive	E		Red Revert	E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Simultaneous Gap	F	2 4 6 8	Walk II	F	0	0	0	0	0	0	0	0

9 + Key			C + F + Key		
FUNCTION	KEY	VALUE	FUNCTION	KEY	VALUE
Short Power Down	0	4	Page ID	0	0
Long Power Down	1	14	Reserved	1	0
EVA Delay Type	2	0	Reserved	2	0
EVb Delay Type	3	0	Reserved	3	0
EVC Delay Type	4	0	OLA Red	4	0.0
EVD Delay Type	5	0	OLB Red	5	0.0
RR Delay Type	6	0	OLC Red	6	0.0
Ped Inhibit	7	0	OLD Red	7	0.0
OLA Green	8	0.0			12345678
OLA Yellow	9	0.0	Overlap E	8	
OLB Green	A	0.0	Overlap F	9	
OLB Yellow	B	0.0	Red Rest	A	
OLC Green	C	0.0	Max Recall	B	
OLC Yellow	D	0.0	Flash Green	C	
OLD Green	E	0.0	Flash Walk	D	
OLD Yellow	F	0.0	Advance Walk	E	
			Restrictive Phase	F	

D + C + 9 + Key			D + C + B + Key		
FUNCTION	KEY	VALUE	FUNCTION	KEY	VALUE
Short Power Down	0	0	Page ID	0	1
Long Power Down	1	0	Reserved	1	0
EVA Delay Type	2	0	Reserved	2	0
EVb Delay Type	3	0	Reserved	3	0
EVC Delay Type	4	0	OLA Red	4	0.0
EVD Delay Type	5	0	OLB Red	5	0.0
RR Delay Type	6	0	OLC Red	6	0.0
Ped Inhibit	7	0	OLD Red	7	0.0
OLA Green	8	0.0			12345678
OLA Yellow	9	0.0	Overlap E	8	
OLB Green	A	0.0	Overlap F	9	
OLB Yellow	B	0.0	Red Rest	A	
OLC Green	C	0.0	Max Recall	B	
OLC Yellow	D	0.0	Flash Green	C	
OLD Green	E	0.0	Flash Walk	D	
OLD Yellow	F	0.0	Advance Walk	E	
			Restrictive Phase	F	

D + D + 9 + Key			D + D + B + Key		
FUNCTION	KEY	VALUE	FUNCTION	KEY	VALUE
Short Power Down	0	0	Page ID	0	2
Long Power Down	1	0	Reserved	1	0
EVA Delay Type	2	0	Reserved	2	0
EVb Delay Type	3	0	Reserved	3	0
EVC Delay Type	4	0	OLA Red	4	0.0
EVD Delay Type	5	0	OLB Red	5	0.0
RR Delay Type	6	0	OLC Red	6	0.0
Ped Inhibit	7	0	OLD Red	7	0.0
OLA Green	8	0.0			12345678
OLA Yellow	9	0.0	Overlap E	8	
OLB Green	A	0.0	Overlap F	9	
OLB Yellow	B	0.0	Red Rest	A	
OLC Green	C	0.0	Max Recall	B	
OLC Yellow	D	0.0	Flash Green	C	
OLD Green	E	0.0	Flash Walk	D	
OLD Yellow	F	0.0	Advance Walk	E	
			Restrictive Phase	F	



C + Key			E + Key		
FUNCTION	KEY	VALUE	FUNCTION	KEY	VALUE
Year	0	17	EVA Delay	0	0
Month	1	12	EVA Minimum	1	0
Day of Month	2	26	EVb Delay	2	0
		1234567	EVb Minimum	3	0
Day of Week	3	3	EVC Delay	4	0
		VALUE	EVC Minimum	5	0
Hour	4	9	EVD Delay	6	0
Minute	5	44	EVD Minimum	7	0
Second	6	50	OL Red Revert	8	0.0
Reserved	7	0	RR Delay	9	0
Triggers On In Flash	8	0	RR Clear	A	0
		12345678			12345678
Startup Yellow	9		RR Clear Phases	B	
EVA Phases	A		RR Permit	C	
EVb Phases	B		RR OL Permit	D	
EVC Phases	C		NEMA Hold Phases	E	
EVD Phases	D		Reserved	F	12 4
Handicap Ped	E				
Reserved	F				

Note: \* = Set Type 3 Detector

B + 0 + Key			D + Key		
FUNCTION	KEY	VALUE	FUNCTION	KEY	VALUE
Present Plan	0	0	Floating Ped	2E	0
TOD/DOW Plan	1	0	ID Number	2F	104
Hardwire Plan	2	0	No Coord Ped Recall	3E	0
Modem Plan	3	0	Rest In Walk	3F	0
Mode (0-4)	4	0	Adv Warning EOG	4E	0
Master (0 = Off)	5	0	Adv Warning SOG	4F	0
Master Clock	6	0	RR Red Clear	5E	0
Local Clock	7	0	RR Clear Color	5F	0
Dwell Clock	8	0	Bus Delay	6D	0.0
Reserved	9	0	Bus Free T1	6E	0
Reserved	A	0	Bus Free T3	6F	0
Reserved	B	0	EV Min After Clear	7E	0
		12345678	EV Indicators	7F	0
Reserved	C		NEMA Inputs	66	0
NEMA CNA Phase	D		Reserved		0
Adv Warning Phase	E		Reserved		0
MRI Phase	F	4 8			

B + A + Key			B + B + Key			B + C + Key		
FUNCTION	KEY	VALUE	FUNCTION	KEY	VALUE	FUNCTION	KEY	VALUE
Bus P1 T1	0	0	Bus P4 T1	0	0	Bus P7 T1	0	0
Bus P1 T2	1	0	Bus P4 T2	1	0	Bus P7 T2	1	0
Bus P1 T3	2	0	Bus P4 T3	2	0	Bus P7 T3	2	0
Bus P2 T1	3	0	Bus P5 T1	3	0	Bus P8 T1	3	0
Bus P2 T2	4	0	Bus P5 T2	4	0	Bus P8 T2	4	0
Bus P2 T3	5	0	Bus P5 T3	5	0	Bus P8 T3	5	0
Bus P3 T1	6	0	Bus P6 T1	6	0	Bus P9 T1	6	0
Bus P3 T2	7	0	Bus P6 T2	7	0	Bus P9 T2	7	0
Bus P3 T3	8	0	Bus P6 T3	8	0	Bus P9 T3	8	0
Perm 2 P1	9	0	Perm 2 P4	9	0	Perm 2 P7	9	0
Perm 2 P2	A	0	Perm 2 P5	A	0	Perm 2 P8	A	0
Perm 2 P3	B	0	Perm 2 P6	B	0	Perm 2 P9	B	0
		12345678			12345678			12345678
Flash Yellow	C	2 6	OL Flash Yellow	C		Coordinated Max	C	
Flash Circuit	D	2 4 6 8	OL Flash Circuit	D		TOD Red Rest	D	
TOD/DOW Max	E		TOD/DOW Ped	E		OLA Switchpack	E	
OLB Switchpack	F		OLC Switchpack	F		OLD Switchpack	F	

A + 4 + Key			A + 5 + Key			A + 6 + Key		
C1 PIN (CODE)	KEY	VALUE	C1 PIN (CODE)	KEY	VALUE	C1 PIN (CODE)	KEY	VALUE
PH2 E&C #39(11)	0	21	PH5 E&C #55(31)	0	0	PH2 PPB #67(51)	0	0
PH6 E&C #40(12)	1	11	PH1 E&C #56(32)	1	0	PH6 PPB #68(52)	1	0
PH4 E&C #41(13)	2	23	PH7 E&C #57(33)	2	0	PH4 PPB #69(53)	2	0
PH8 E&C #42(14)	3	13	PH3 E&C #58(34)	3	0	PH8 PPB #70(54)	3	0
PH2 E&C #43(15)	4	22	PH5 E&C #59(35)	4	0	EVA #71(55)	4	0
PH6 E&C #44(16)	5	0	PH1 E&C #60(36)	5	0	EVB #72(56)	5	0
PH4 E&C #45(17)	6	24	PH7 E&C #61(37)	6	0	EVC #73(57)	6	0
PH8 E&C #46(18)	7	0	PH3 E&C #62(38)	7	0	EVD #74(58)	7	0
PH2 C #47(21)	8	12	N/U	8	0	(-) #75 (61)	8	0
PH6 C #48(22)	9	15	N/U	9	0	PH2 E. #76(62)	9	0
PH4 C #49(23)	A	14	N/U	A	0	PH6 E. #77(63)	A	0
PH8 C #50(24)	B	17	N/U	B	0	PH4 E. #78(64)	B	0
PED INH. #51(25)	C	0	PH2 E&C #63(45)	C	0	PH8 E. #79(65)	C	0
RR #52(26)	D	0	PH6 E&C #64(46)	D	0	ADV. #80(66)	D	0
ADV. EN #53(27)	E	0	PH4 E&C #65(47)	E	0	FL SENCE #81(67)	E	0
(-) #54(28)	F	0	PH8 E&C #66(48)	F	0	STOP TIME #82(68)	F	0

A + 0 + Key			A + 1 + Key			A + 2 + Key			A + 3 + Key		
FUNCTION(CODE)	KEY	VALUE	FUNCTION	KEY	VALUE	FUNCTION	KEY	VALUE	FUNCTION	KEY	VALUE
04 D/W (11)	0	23	08 D/W (31)	0	0	02 Ped Yellow(51)	0	34	01 D/W (71)	0	0
04 Walk (12)	1	25	08 Walk (32)	1	0	06 Ped Yellow(52)	1	0	01 Walk (72)	1	0
04 Red (13)	2	0	08 Red (33)	2	21	04 Ped Yellow(53)	2	24	OLB Red (73)	2	0
04 Yellow (14)	3	0	08 Yellow (34)	3	51	08 Ped Yellow(54)	3	0	OLB Yellow (74)	3	0
04 Green (15)	4	0	08 Green (35)	4	22	03 Ped Yellow(55)	4	0	OLB Green (75)	4	0
03 Red (16)	5	43	07 Red (36)	5	0	01 Ped Yellow(56)	5	0	OLA Red (76)	5	0
03 Yellow (17)	6	44	07 Yellow (37)	6	0	Flash (57)	6	0	OLA Yellow (77)	6	0
03 Green (18)	7	45	07 Green (38)	7	0	Watchdog (58)	7	0	OLA Green (78)	7	0
02 D/W (21)	8	33	06 D/W (41)	8	0	03 D/W (61)	8	0	Reserved	8	0
02 Walk (22)	9	35	06 Walk (42)	9	0	03 Walk (62)	9	0	S.D.	9	0
02 Red (23)	A	11	06 Red (43)	A	16	OLD Red (63)	A	0	LTT	A	0
02 Yellow (24)	B	53	06 Yellow (44)	B	17	OLD Yellow (64)	B	0	ID (MSB)	B	0
02 Green (25)	C	12	06 Green (45)	C	18	OLD Green (65)	C	0	Group 1	C	0
01 Red (26)	D	0	05 Red (46)	D	0	OLC Red (66)	D	0	Group 2	D	0
01 Yellow (27)	E	0	05 Yellow (47)	E	0	OLC Yellow (67)	E	0	Group 3	E	0
01 Green (28)	F	0	05 Green (48)	F	0	OLC Green (68)	F	0	Group 4	F	0

104 - Black Forest @ Shoup Road  
Table 13 - Additional Overlaps  
04/24/2018 4:24 PM

D + 9 + 0 + Key			D + 9 + 3 + Key			E + F + Key		
FUNCTION	KEY	12345678	FUNCTION	KEY	VALUE	FUNCTION	KEY	VALUE
Overlap H	0		OLH Green	0	0.0	RR Max II	0	0
Overlap J	1		OLH Yellow	1	0.0	Ped Perm Plan 1	1	0
Overlap K	2		OLH Red	2	0.0	Ped Perm Plan 2	2	0
Overlap L	3		OLJ Green	3	0.0	Ped Perm Plan 3	3	0
OLH Switchpack	4		OLJ Yellow	4	0.0	Ped Perm Plan 4	4	0
OLJ Switchpack	5		OLJ Red	5	0.0	Ped Perm Plan 5	5	0
OLK Switchpack	6		OLK Green	6	0.0	Ped Perm Plan 6	6	0
OLL Switchpack	7		OLK Yellow	7	0.0	Ped Perm Plan 7	7	0
Reserved	8		OLK Red	8	0.0	Ped Perm Plan 8	8	0
TimeKeeper (hc11)	9		OLL Green	9	0.0	Ped Perm Plan 9	9	0
All Red B4 EV	A		OLL Yellow	A	0.0	Long Power Outs	A	0
Reserved	B		OLL Red	B	0.0	Short Power Outs	B	0
Reserved	C		Spring DST	C	50	Failed Detectors	C	0
Reserved	D		Reserved	D		Max II On	D	0
Reserved	E		TR-3 GPS(6800)	E	0	Fall DST	E	177
Reserved	F		RTC Clock	F	0	Revision Level	F	21

CDOT

**MaxTime Timing Shee**

Initial Install

**Administration****Unit Information**

Controller ID	0
Main St.	Hwy. 83
Side St.	Hodgen Rd.

 Cross Black\_White.jpg

Adapter	IP Address	Subnet Mask	Default Gateway	ARP	DHCP
1	192.168.13.10	255.255.255.0	192.168.13.31	Disable	
2	10.20.70.51	255.255.255.0	0.0.0.0	Disable	

**Serial Ports:**

Port	Description	Function	Address	Baud	Bits	Stop	Parity	Flow	CTS	RTS
1	Port 2/C21S	None	1	9600	8	1	None	None	0	0
2	Aux P3/C22S	None	1	9600	8	1	None	None	0	0
3	SDLC Port 1	None	1	9600	8	1	None	None	0	0
4	Com A/C50S	None	1	9600	8	1	None	None	0	0
5	FIO	None	1	9600	8	1	None	None	0	0
6	DISPLAY/C60M	None	1	9600	8	1	None	None	0	0
7	SP7	None	1	9600	8	1	None	None	0	0
8	SP8/Com B	None	1	9600	8	1	None	None	0	0

**Unit Parameters**

Startup Flash	1	Auto Ped Clr	Enable	Red Revert	4.0	Backup Time	600	Ext Mode	Disable
All Red Exit	0	Grn Flash Freq.	60	Yel Flash Freq.	60	MCE Enable	Enable	Free Seq.	1
MCE Seq.	1	Start Yellow	0.0	Start Red	0.0	Start Clear Hold	6		

**Phase Parameters**

Phases	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Walk Time	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clear Time	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Don't Walk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Min Green	6	35	5	8	6	35	5	8	1	1	1	1	1	1	1	1	1	1	1	1
Min Green 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Passage	3.0	3.0	1.0	3.0	3.0	3.0	1.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max-1	12	45	0	24	12	45	0	24	0	0	0	0	0	0	0	0	0	0	0	0
Max-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Max-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yel Change	4.0	5.0	3.0	4.0	4.0	5.0	3.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Red Clear	2.0	2.0	1.0	2.0	2.0	2.0	1.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Add Red Clear	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red Revert	5.0	5.0	0.0	5.0	5.0	5.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Added Initial	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Initial	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time B4 Reduce	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cars B4 Reduce	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Time To Reduce	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reduce By	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Min Gap	3.0	3.0	0.0	3.0	3.0	3.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dyn Max Limit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dyn Max Step	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advance Walk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Delay Ped	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alt Walk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alt Ped Clr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pre Green	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pre Clearance	0.0	7.0	0.0	0.0	0.0	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Phases	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Walk Time	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clear Time	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Don't Walk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Min Green	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1



Min Green 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Passage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Max-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Max-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yel Change	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Red Clear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Add Red Clear	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red Revert	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Added Initial	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Initial	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time B4 Reduce	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cars B4 Reduce	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Time To Reduce	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reduce By	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Min Gap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dyn Max Limit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dyn Max Step	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advance Walk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Delay Ped	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alt Walk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alt Ped Clr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pre Green	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pre Clearance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

**Phase Options**

Phases	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Enable																				
Auto Flash Ent.																				
Auto Flash Exit																				
Non Actuated I																				
Non Actuated II																				
Non Lock Mem																				
Min Veh Recall																				
Max Veh Recall																				
Ped Recall																				
Soft Veh Recall																				
Dual Entry																				
Sim Gap Dis																				
Guaranteed Pass																				
Act Rest Walk																				
Cond Service																				
Add Initial																				

Phases	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Enable																				
Auto Flash Ent.																				
Auto Flash Exit																				
Non Actuated I																				
Non Actuated II																				
Non Lock Mem																				
Min Veh Recall																				
Max Veh Recall																				
Ped Recall																				
Soft Veh Recall																				
Dual Entry																				
Sim Gap Dis																				
Guaranteed Pass																				
Act Rest Walk																				
Cond Service																				
Add Initial																				

**Additional Phase Options**

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Phases	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ped Clr During Yel																				
Ped Clr During Red																				
Cond Reservice																				
Yel Min Override																				
No Startup Call																				
Adv. Warn Flasher																				
No Ped Str Up Call																				
Ped Clr OVTG																				
Flash Exit Call																				
Flash Exit Ped Call																				
MinGreen2																				
MaxGreen2																				
MaxGreen3																				
Ped2																				
Ped Clear Pre Clear																				
Ped NA+ Mode																				
Red Rest																				
Serve Evy Oth Even																				
Serve Evy Oth Odd																				

Phases	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ped Clr During Yel																				
Ped Clr During Red																				
Cond Reservice																				
Yel Min Override																				
No Startup Call																				
Adv. Warn Flasher																				
No Ped Str Up Call																				
Ped Clr OVTG																				
Flash Exit Call																				
Flash Exit Ped Call																				
MinGreen2																				
MaxGreen2																				
MaxGreen3																				
Ped2																				
Ped Clear Pre Clear																				
Ped NA+ Mode																				
Red Rest																				
Serve Evy Oth Even																				
Serve Evy Oth Odd																				

### Phase Configuration

Ph.	Startup	Ring	Concurrent	No Served Phases	Startup Min	Description
1	Phase Not On	1	5,6		0	
2	Green No Walk	1	5,6		0	
3	Phase Not On	1	7		0	
4	Phase Not On	1	7		0	
5	Phase Not On	2	1,2		0	
6	Green No Walk	2	1,2		0	
7	Phase Not On	2	3,4,8		0	
8	Phase Not On	1	7		0	
9	None	0			0	
10	None	0			0	
11	None	0			0	
12	None	0			0	
13	None	0			0	
14	None	0			0	
15	None	0			0	
16	None	0			0	
17	None	0			0	
18	None	0			0	
19	None	0			0	
20	None	0			0	

21	None	0			0	
22	None	0			0	
23	None	0			0	
24	None	0			0	
25	None	0			0	
26	None	0			0	
27	None	0			0	
28	None	0			0	
29	None	0			0	
30	None	0			0	
31	None	0			0	
32	None	0			0	
33	None	0			0	
34	None	0			0	
35	None	0			0	
36	None	0			0	
37	None	0			0	
38	None	0			0	
39	None	0			0	
40	None	0			0	

Sequence Configuration

Sequence 1

Ring	Phases
1	1,2,a,3,4,8,b
2	5,6,a,7,b
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	

Sequence 2

Ring	Phases
1	2,1,a,3,4,b
2	5,6,a,7,8,b
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	

Sequence 3

Ring	Phases
1	1,2,a,4,3,b
2	5,6,a,7,8,b
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	

Sequence 4

Ring	Phases
1	2,1,a,4,3,b
2	5,6,a,7,8,b
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	

Sequence 5

Ring	Phases
1	1,2,a,3,4,b
2	6,5,a,7,8,b
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	

Sequence 6

Ring	Phases
1	2,1,a,3,4,b
2	6,5,a,7,8,b
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	

Sequence 7

Ring	Phases
1	1,2,a,4,3,b
2	6,5,a,7,8,b
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	

Sequence 8

Ring	Phases
1	2,1,a,4,3,b
2	6,5,a,7,8,b
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	

Sequence 9

Ring	Phases
1	1,2,a,3,4,b

Sequence 10

Ring	Phases
1	2,1,a,3,4,b

Sequence 11

Ring	Phases
1	1,2,a,4,3,b

Sequence 12

Ring	Phases
1	2,1,a,4,3,b

2	5,6,a,8,7,b	2	5,6,a,8,7,b	2	5,6,a,8,7,b	2	5,6,a,8,7,b
3		3		3		3	
4		4		4		4	
5		5		5		5	
6		6		6		6	
7		7		7		7	
8		8		8		8	
9		9		9		9	
10		10		10		10	
11		11		11		11	
12		12		12		12	
13		13		13		13	
14		14		14		14	
15		15		15		15	
16		16		16		16	

Sequence 13		Sequence 14		Sequence 15		Sequence 16	
Ring	Phases	Ring	Phases	Ring	Phases	Ring	Phases
1	1,2,a,3,4,b	1	2,1,a,3,4,b	1	1,2,a,4,3,b	1	2,1,a,4,3,b
2	6,5,a,8,7,b	2	6,5,a,8,7,b	2	6,5,a,8,7,b	2	6,5,a,8,7,b
3		3		3		3	
4		4		4		4	
5		5		5		5	
6		6		6		6	
7		7		7		7	
8		8		8		8	
9		9		9		9	
10		10		10		10	

Sequence 13		Sequence 14		Sequence 15		Sequence 16	
11		11		11		11	
12		12		12		12	
13		13		13		13	
14		14		14		14	
15		15		15		15	
16		16		16		16	

Sequence 17		Sequence 18		Sequence 19		Sequence 20	
Ring	Phases	Ring	Phases	Ring	Phases	Ring	Phases
1		1		1		1	
2		2		2		2	
3		3		3		3	
4		4		4		4	
5		5		5		5	
6		6		6		6	
7		7		7		7	
8		8		8		8	
9		9		9		9	
10		10		10		10	
11		11		11		11	
12		12		12		12	
13		13		13		13	
14		14		14		14	
15		15		15		15	
16		16		16		16	

Vehicle Detection Parameters

Det.	Call Phs	Call Ovl	Additional Call Phase	Switch Phase	Delay	Extend	Queue Limit	No Activity	Max Presence	Erratic Counts	Failed Time	Description
1	1	0		0	0.0	0.0	0	0	0	0	0	
2	2	0		0	0.0	0.0	0	0	0	0	0	
3	2	0		0	0.0	0.0	0	0	0	0	0	
4	2	0		0	0.0	0.0	0	0	0	0	0	

5	2	0		0	0.0	0.0	0	0	0	0	0	
6	2	0		0	0.0	0.0	0	0	0	0	0	
7	3	0		0	0.0	0.0	0	0	0	0	0	
8	4	0		0	0.0	0.0	0	0	0	0	0	
9	4	0		0	0.0	0.0	0	0	0	0	0	
10	4	0		0	0.0	0.0	0	0	0	0	0	
11	4	0		0	0.0	0.0	0	0	0	0	0	
12	4	0		0	0.0	0.0	0	0	0	0	0	
13	1	0		0	0.0	0.0	0	0	0	0	0	
14	3	0		0	0.0	0.0	0	0	0	0	0	
15	5	0		0	0.0	0.0	0	0	0	0	0	
16	6	0		0	0.0	0.0	0	0	0	0	0	
17	6	0		0	0.0	0.0	0	0	0	0	0	
18	6	0		0	0.0	0.0	0	0	0	0	0	
19	6	0		0	0.0	0.0	0	0	0	0	0	
20	6	0		0	0.0	0.0	0	0	0	0	0	
21	7	0		0	0.0	0.0	0	0	0	0	0	
22	8	0		0	0.0	0.0	0	0	0	0	0	
23	8	0		0	0.0	0.0	0	0	0	0	0	
24	8	0		0	0.0	0.0	0	0	0	0	0	
25	8	0		0	0.0	0.0	0	0	0	0	0	
26	8	0		0	0.0	0.0	0	0	0	0	0	
27	5	0		0	0.0	0.0	0	0	0	0	0	
28	7	0		0	0.0	0.0	0	0	0	0	0	
29	0	0		0	0.0	0.0	0	0	0	0	0	
30	0	0		0	0.0	0.0	0	0	0	0	0	
31	0	0		0	0.0	0.0	0	0	0	0	0	
32	0	0		0	0.0	0.0	0	0	0	0	0	
33	0	0		0	0.0	0.0	0	0	0	0	0	
34	0	0		0	0.0	0.0	0	0	0	0	0	
35	0	0		0	0.0	0.0	0	0	0	0	0	
36	0	0		0	0.0	0.0	0	0	0	0	0	
37	0	0		0	0.0	0.0	0	0	0	0	0	
38	0	0		0	0.0	0.0	0	0	0	0	0	
39	0	0		0	0.0	0.0	0	0	0	0	0	
40	0	0		0	0.0	0.0	0	0	0	0	0	
41	0	0		0	0.0	0.0	0	0	0	0	0	
42	0	0		0	0.0	0.0	0	0	0	0	0	
43	0	0		0	0.0	0.0	0	0	0	0	0	
44	0	0		0	0.0	0.0	0	0	0	0	0	
45	0	0		0	0.0	0.0	0	0	0	0	0	
46	0	0		0	0.0	0.0	0	0	0	0	0	
47	0	0		0	0.0	0.0	0	0	0	0	0	
48	0	0		0	0.0	0.0	0	0	0	0	0	
49	0	0		0	0.0	0.0	0	0	0	0	0	
50	0	0		0	0.0	0.0	0	0	0	0	0	
51	0	0		0	0.0	0.0	0	0	0	0	0	
52	0	0		0	0.0	0.0	0	0	0	0	0	
53	0	0		0	0.0	0.0	0	0	0	0	0	
54	0	0		0	0.0	0.0	0	0	0	0	0	
55	0	0		0	0.0	0.0	0	0	0	0	0	
56	0	0		0	0.0	0.0	0	0	0	0	0	
57	0	0		0	0.0	0.0	0	0	0	0	0	
58	0	0		0	0.0	0.0	0	0	0	0	0	
59	0	0		0	0.0	0.0	0	0	0	0	0	
60	0	0		0	0.0	0.0	0	0	0	0	0	
61	0	0		0	0.0	0.0	0	0	0	0	0	
62	0	0		0	0.0	0.0	0	0	0	0	0	
63	0	0		0	0.0	0.0	0	0	0	0	0	
64	0	0		0	0.0	0.0	0	0	0	0	0	
65	0	0		0	0.0	0.0	0	0	0	0	0	
66	0	0		0	0.0	0.0	0	0	0	0	0	
67	0	0		0	0.0	0.0	0	0	0	0	0	
68	0	0		0	0.0	0.0	0	0	0	0	0	

69	0	0		0	0.0	0.0	0	0	0	0	0	
70	0	0		0	0.0	0.0	0	0	0	0	0	
71	0	0		0	0.0	0.0	0	0	0	0	0	
72	0	0		0	0.0	0.0	0	0	0	0	0	

**Vehicle Detection Options**

Detector	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Volume Detector																				
Occupancy																				
Yellow Lock Call																				
Red Lock call																				
Passage																				
Queue																				
Call																				
Terminate																				

Detector	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Volume Detector																				
Occupancy																				
Yellow Lock Call																				
Red Lock call																				
Passage																				
Queue																				
Call																				
Terminate																				

Detector	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Volume Detector																				
Occupancy																				
Yellow Lock Call																				
Red Lock call																				
Passage																				
Queue																				
Call																				
Terminate																				

Detector	61	62	63	64	65	66	67	68	69	70	71	72
Volume Detector												
Occupancy												
Yellow Lock Call												
Red Lock call												
Passage												
Queue												
Call												
Terminate												

Data Collection Period 0

**Pedestrian Detectors**

Det	Call Phase	Call Ovp	No Act	Max Presence	Erratic Count
1	0	0	0	0	0
2	2	0	0	0	0
3	0	0	0	0	0
4	4	0	0	0	0
5	0	0	0	0	0
6	6	0	0	0	0
7	0	0	0	0	0
8	8	0	0	0	0
9	0	0	0	0	0
10	0	0	0	0	0
11	0	0	0	0	0
12	0	0	0	0	0
13	0	0	0	0	0
14	0	0	0	0	0

Det	Call Phase	Call Ovp	No Act	Max Presence	Erratic Count
21	0	0	0	0	0
22	0	0	0	0	0
23	0	0	0	0	0
24	0	0	0	0	0
25	0	0	0	0	0
26	0	0	0	0	0
27	0	0	0	0	0
28	0	0	0	0	0
29	0	0	0	0	0
30	0	0	0	0	0
31	0	0	0	0	0
32	0	0	0	0	0
33	0	0	0	0	0
34	0	0	0	0	0

15	0	0	0	0	0	35	0	0	0	0	0
16	0	0	0	0	0	36	0	0	0	0	0
17	0	0	0	0	0	37	0	0	0	0	0
18	0	0	0	0	0	38	0	0	0	0	0
19	0	0	0	0	0	39	0	0	0	0	0
20	0	0	0	0	0	40	0	0	0	0	0

Overlaps				Trail	Trail	Trail	Walk	Ped	Walk	Ped			
OLP	Type	Included Phases	Modifier Phases	GRN	YEL	RED	1	Clr 1	2	Clr 2	Delay	Flash	Descriptions
1	FYA - 4 Sec	2	1	0	0.0	0.0	0	0	0	0	0.0	On	
2	Off			0	0.0	0.0	0	0	0	0	0.0	Off	
3	Off			0	0.0	0.0	0	0	0	0	0.0	Off	
4	Off			0	0.0	0.0	0	0	0	0	0.0	Off	
5	FYA - 4 Sec	6	5	0	0.0	0.0	0	0	0	0	0.0	On	
6	Off			0	0.0	0.0	0	0	0	0	0.0	Off	
7	Off			0	0.0	0.0	0	0	0	0	0.0	Off	
8	Off			0	0.0	0.0	0	0	0	0	0.0	Off	
9	Off			0	0.0	0.0	0	0	0	0	0.0	Off	
10	Off			0	0.0	0.0	0	0	0	0	0.0	Off	
11	Off			0	0.0	0.0	0	0	0	0	0.0	Off	
12	Off			0	0.0	0.0	0	0	0	0	0.0	Off	
13	Off			0	0.0	0.0	0	0	0	0	0.0	Off	
14	Off			0	0.0	0.0	0	0	0	0	0.0	Off	
15	Off			0	0.0	0.0	0	0	0	0	0.0	Off	
16	Off			0	0.0	0.0	0	0	0	0	0.0	Off	
17	Off			0	0.0	0.0	0	0	0	0	0.0	Off	
18	Off			0	0.0	0.0	0	0	0	0	0.0	Off	
19	Off			0	0.0	0.0	0	0	0	0	0.0	Off	
20	Off			0	0.0	0.0	0	0	0	0	0.0	Off	
21	Off			0	0.0	0.0	0	0	0	0	0.0	Off	
22	Off			0	0.0	0.0	0	0	0	0	0.0	Off	
23	Off			0	0.0	0.0	0	0	0	0	0.0	Off	
24	Off			0	0.0	0.0	0	0	0	0	0.0	Off	
25	Off			0	0.0	0.0	0	0	0	0	0.0	Off	
26	Off			0	0.0	0.0	0	0	0	0	0.0	Off	
27	Off			0	0.0	0.0	0	0	0	0	0.0	Off	
28	Off			0	0.0	0.0	0	0	0	0	0.0	Off	
29	Off			0	0.0	0.0	0	0	0	0	0.0	Off	
30	Off			0	0.0	0.0	0	0	0	0	0.0	Off	
31	Off			0	0.0	0.0	0	0	0	0	0.0	Off	
32	Off			0	0.0	0.0	0	0	0	0	0.0	Off	

Coordination Parameters

Operational Mode	Correction Mode	Maximum Mode	Force Mode
Manual Free	Shortway (Auto)	Per Pattern	Per Pattern

Patterns									Phs	Det	Ped
Patt.	Cycle	Offset 1	Offset 2	Offset 2	Split	Sequence	Ref. Color	Max Mode	Pln	Pln	Pln
1	0	0	0	0	0	0	Yel	Inh	1	1	1
2	0	0	0	0	0	0	Yel	Inh	1	1	1
3	0	0	0	0	0	0	Yel	Inh	1	1	1
4	0	0	0	0	0	0	Yel	Inh	1	1	1
5	0	0	0	0	0	0	Yel	Inh	1	1	1
6	0	0	0	0	0	0	Yel	Inh	1	1	1
7	0	0	0	0	0	0	Yel	Inh	1	1	1
8	0	0	0	0	0	0	Yel	Inh	1	1	1
9	0	0	0	0	0	0	Yel	Inh	1	1	1
10	0	0	0	0	0	0	Yel	Inh	1	1	1
11	0	0	0	0	0	0	Yel	Inh	1	1	1
12	0	0	0	0	0	0	Yel	Inh	1	1	1
13	0	0	0	0	0	0	Yel	Inh	1	1	1
14	0	0	0	0	0	0	Yel	Inh	1	1	1
15	0	0	0	0	0	0	Yel	Inh	1	1	1
16	0	0	0	0	0	0	Yel	Inh	1	1	1

17	0	0	0	0	0	0	Yel	Inh	1	1	1
18	0	0	0	0	0	0	Yel	Inh	1	1	1
19	0	0	0	0	0	0	Yel	Inh	1	1	1
20	0	0	0	0	0	0	Yel	Inh	1	1	1
21	0	0	0	0	0	0	Yel	Inh	1	1	1
22	0	0	0	0	0	0	Yel	Inh	1	1	1
23	0	0	0	0	0	0	Yel	Inh	1	1	1
24	0	0	0	0	0	0	Yel	Inh	1	1	1
25	0	0	0	0	0	0	Yel	Inh	1	1	1
26	0	0	0	0	0	0	Yel	Inh	1	1	1
27	0	0	0	0	0	0	Yel	Inh	1	1	1
28	0	0	0	0	0	0	Yel	Inh	1	1	1
29	0	0	0	0	0	0	Yel	Inh	1	1	1
30	0	0	0	0	0	0	Yel	Inh	1	1	1
31	0	0	0	0	0	0	Yel	Inh	1	1	1
32	0	0	0	0	0	0	Yel	Inh	1	1	1
33	0	0	0	0	0	0	Yel	Inh	1	1	1
34	0	0	0	0	0	0	Yel	Inh	1	1	1
35	0	0	0	0	0	0	Yel	Inh	1	1	1
36	0	0	0	0	0	0	Yel	Inh	1	1	1
37	0	0	0	0	0	0	Yel	Inh	1	1	1
38	0	0	0	0	0	0	Yel	Inh	1	1	1
39	0	0	0	0	0	0	Yel	Inh	1	1	1
40	0	0	0	0	0	0	Yel	Inh	1	1	1
41	0	0	0	0	0	0	Yel	Inh	1	1	1
42	0	0	0	0	0	0	Yel	Inh	1	1	1
43	0	0	0	0	0	0	Yel	Inh	1	1	1
44	0	0	0	0	0	0	Yel	Inh	1	1	1
45	0	0	0	0	0	0	Yel	Inh	1	1	1
46	0	0	0	0	0	0	Yel	Inh	1	1	1
47	0	0	0	0	0	0	Yel	Inh	1	1	1
48	0	0	0	0	0	0	Yel	Inh	1	1	1
49	0	0	0	0	0	0	Yel	Inh	1	1	1
50	0	0	0	0	0	0	Yel	Inh	1	1	1
51	0	0	0	0	0	0	Yel	Inh	1	1	1
52	0	0	0	0	0	0	Yel	Inh	1	1	1
53	0	0	0	0	0	0	Yel	Inh	1	1	1
54	0	0	0	0	0	0	Yel	Inh	1	1	1
55	0	0	0	0	0	0	Yel	Inh	1	1	1
56	0	0	0	0	0	0	Yel	Inh	1	1	1
57	0	0	0	0	0	0	Yel	Inh	1	1	1
58	0	0	0	0	0	0	Yel	Inh	1	1	1
59	0	0	0	0	0	0	Yel	Inh	1	1	1
60	0	0	0	0	0	0	Yel	Inh	1	1	1
61	0	0	0	0	0	0	Yel	Inh	1	1	1
62	0	0	0	0	0	0	Yel	Inh	1	1	1
63	0	0	0	0	0	0	Yel	Inh	1	1	1
64	0	0	0	0	0	0	Yel	Inh	1	1	1
65	0	0	0	0	0	0	Yel	Inh	1	1	1
66	0	0	0	0	0	0	Yel	Inh	1	1	1
67	0	0	0	0	0	0	Yel	Inh	1	1	1
68	0	0	0	0	0	0	Yel	Inh	1	1	1
69	0	0	0	0	0	0	Yel	Inh	1	1	1
70	0	0	0	0	0	0	Yel	Inh	1	1	1
71	0	0	0	0	0	0	Yel	Inh	1	1	1
72	0	0	0	0	0	0	Yel	Inh	1	1	1
73	0	0	0	0	0	0	Yel	Inh	1	1	1
74	0	0	0	0	0	0	Yel	Inh	1	1	1
75	0	0	0	0	0	0	Yel	Inh	1	1	1
76	0	0	0	0	0	0	Yel	Inh	1	1	1
77	0	0	0	0	0	0	Yel	Inh	1	1	1
78	0	0	0	0	0	0	Yel	Inh	1	1	1
79	0	0	0	0	0	0	Yel	Inh	1	1	1



80	0	0	0	0	0	0	Yel	Inh	1	1	1
81	0	0	0	0	0	0	Yel	Inh	1	1	1
82	0	0	0	0	0	0	Yel	Inh	1	1	1
83	0	0	0	0	0	0	Yel	Inh	1	1	1
84	0	0	0	0	0	0	Yel	Inh	1	1	1
85	0	0	0	0	0	0	Yel	Inh	1	1	1
86	0	0	0	0	0	0	Yel	Inh	1	1	1
87	0	0	0	0	0	0	Yel	Inh	1	1	1
88	0	0	0	0	0	0	Yel	Inh	1	1	1
89	0	0	0	0	0	0	Yel	Inh	1	1	1
90	0	0	0	0	0	0	Yel	Inh	1	1	1
91	0	0	0	0	0	0	Yel	Inh	1	1	1
92	0	0	0	0	0	0	Yel	Inh	1	1	1
93	0	0	0	0	0	0	Yel	Inh	1	1	1
94	0	0	0	0	0	0	Yel	Inh	1	1	1
95	0	0	0	0	0	0	Yel	Inh	1	1	1
96	0	0	0	0	0	0	Yel	Inh	1	1	1
97	0	0	0	0	0	0	Yel	Inh	1	1	1
98	0	0	0	0	0	0	Yel	Inh	1	1	1
99	0	0	0	0	0	0	Yel	Inh	1	1	1
100	0	0	0	0	0	0	Yel	Inh	1	1	1
101	0	0	0	0	0	0	Yel	Inh	1	1	1
102	0	0	0	0	0	0	Yel	Inh	1	1	1
103	0	0	0	0	0	0	Yel	Inh	1	1	1
104	0	0	0	0	0	0	Yel	Inh	1	1	1
105	0	0	0	0	0	0	Yel	Inh	1	1	1
106	0	0	0	0	0	0	Yel	Inh	1	1	1
107	0	0	0	0	0	0	Yel	Inh	1	1	1
108	0	0	0	0	0	0	Yel	Inh	1	1	1
109	0	0	0	0	0	0	Yel	Inh	1	1	1
110	0	0	0	0	0	0	Yel	Inh	1	1	1
111	0	0	0	0	0	0	Yel	Inh	1	1	1
112	0	0	0	0	0	0	Yel	Inh	1	1	1
113	0	0	0	0	0	0	Yel	Inh	1	1	1
114	0	0	0	0	0	0	Yel	Inh	1	1	1
115	0	0	0	0	0	0	Yel	Inh	1	1	1
116	0	0	0	0	0	0	Yel	Inh	1	1	1
117	0	0	0	0	0	0	Yel	Inh	1	1	1
118	0	0	0	0	0	0	Yel	Inh	1	1	1
119	0	0	0	0	0	0	Yel	Inh	1	1	1
120	0	0	0	0	0	0	Yel	Inh	1	1	1
121	0	0	0	0	0	0	Yel	Inh	1	1	1
122	0	0	0	0	0	0	Yel	Inh	1	1	1
123	0	0	0	0	0	0	Yel	Inh	1	1	1
124	0	0	0	0	0	0	Yel	Inh	1	1	1
125	0	0	0	0	0	0	Yel	Inh	1	1	1
126	0	0	0	0	0	0	Yel	Inh	1	1	1
127	0	0	0	0	0	0	Yel	Inh	1	1	1
128	0	0	0	0	0	0	Yel	Inh	1	1	1

Split Parameters

Split 1		Coord	Ref	Mode
PH.	Time	PH	PH	
1	0			None
2	0			None
3	0			None
4	0			None
5	0			None
6	0			None
7	0			None
8	0			None
9	0			None
10	0			None
11	0			None

Split 2		Coord	Ref	Mode
PH.	Time	PH	PH	
1	0			None
2	0			None
3	0			None
4	0			None
5	0			None
6	0			None
7	0			None
8	0			None
9	0			None
10	0			None
11	0			None

12	0			None
13	0			None
14	0			None
15	0			None
16	0			None

12	0			None
13	0			None
14	0			None
15	0			None
16	0			None

Split 3		Coord	Ref	Mode
PH.	Time	PH	PH	
1	0			None
2	0			None
3	0			None
4	0			None
5	0			None
6	0			None
7	0			None
8	0			None
9	0			None
10	0			None
11	0			None
12	0			None
13	0			None
14	0			None
15	0			None
16	0			None

Split 4		Coord	Ref	Mode
PH.	Time	PH	PH	
1	0			None
2	0			None
3	0			None
4	0			None
5	0			None
6	0			None
7	0			None
8	0			None
9	0			None
10	0			None
11	0			None
12	0			None
13	0			None
14	0			None
15	0			None
16	0			None

Split 5		Coord	Ref	Mode
PH.	Time	PH	PH	
1	0			None
2	0			None
3	0			None
4	0			None
5	0			None
6	0			None
7	0			None
8	0			None
9	0			None
10	0			None
11	0			None
12	0			None
13	0			None
14	0			None
15	0			None
16	0			None

Split 6		Coord	Ref	Mode
PH.	Time	PH	PH	
1	0			None
2	0			None
3	0			None
4	0			None
5	0			None
6	0			None
7	0			None
8	0			None
9	0			None
10	0			None
11	0			None
12	0			None
13	0			None
14	0			None
15	0			None
16	0			None

Split 7		Coord	Ref	Mode
PH.	Time	PH	PH	
1	0			None
2	0			None
3	0			None
4	0			None
5	0			None
6	0			None
7	0			None
8	0			None
9	0			None
10	0			None
11	0			None
12	0			None
13	0			None
14	0			None
15	0			None
16	0			None

Split 8		Coord	Ref	Mode
PH.	Time	PH	PH	
1	0			None
2	0			None
3	0			None
4	0			None
5	0			None
6	0			None
7	0			None
8	0			None
9	0			None
10	0			None
11	0			None
12	0			None
13	0			None
14	0			None
15	0			None
16	0			None

Split 9

Split 10

PH.	Time	Coord PH	Ref PH	Mode
1	0			None
2	0			None
3	0			None
4	0			None
5	0			None
6	0			None
7	0			None
8	0			None
9	0			None

PH.	Time	Coord PH	Ref PH	Mode
1	0			None
2	0			None
3	0			None
4	0			None
5	0			None
6	0			None
7	0			None
8	0			None
9	0			None

Split 9		Coord PH	Ref PH	Mode
10	0			None
11	0			None
12	0			None
13	0			None
14	0			None
15	0			None
16	0			None

Split 10		Coord PH	Ref PH	Mode
10	0			None
11	0			None
12	0			None
13	0			None
14	0			None
15	0			None
16	0			None

Split 11		Coord PH	Ref PH	Mode
1	0			None
2	0			None
3	0			None
4	0			None
5	0			None
6	0			None
7	0			None
8	0			None
9	0			None
10	0			None
11	0			None
12	0			None
13	0			None
14	0			None
15	0			None
16	0			None

Split 12		Coord PH	Ref PH	Mode
1	0			None
2	0			None
3	0			None
4	0			None
5	0			None
6	0			None
7	0			None
8	0			None
9	0			None
10	0			None
11	0			None
12	0			None
13	0			None
14	0			None
15	0			None
16	0			None

Split 13		Coord PH	Ref PH	Mode
1	0			None
2	0			None
3	0			None
4	0			None
5	0			None
6	0			None
7	0			None
8	0			None
9	0			None
10	0			None
11	0			None
12	0			None
13	0			None
14	0			None
15	0			None
16	0			None

Split 14		Coord PH	Ref PH	Mode
1	0			None
2	0			None
3	0			None
4	0			None
5	0			None
6	0			None
7	0			None
8	0			None
9	0			None
10	0			None
11	0			None
12	0			None
13	0			None
14	0			None
15	0			None
16	0			None

Split 15		Coord PH	Ref PH	Mode
1	0			None
2	0			None

Split 16		Coord PH	Ref PH	Mode
1	0			None
2	0			None

3	0			None
4	0			None
5	0			None
6	0			None
7	0			None
8	0			None
9	0			None
10	0			None
11	0			None
12	0			None
13	0			None
14	0			None
15	0			None
16	0			None

3	0			None
4	0			None
5	0			None
6	0			None
7	0			None
8	0			None
9	0			None
10	0			None
11	0			None
12	0			None
13	0			None
14	0			None
15	0			None
16	0			None

Split 17		Coord	Ref	Mode
PH.	Time	PH	PH	
1	0			None
2	0			None
3	0			None
4	0			None
5	0			None
6	0			None
7	0			None
8	0			None
9	0			None
10	0			None
11	0			None
12	0			None
13	0			None
14	0			None
15	0			None
16	0			None

Split 18		Coord	Ref	Mode
PH.	Time	PH	PH	
1	0			None
2	0			None
3	0			None
4	0			None
5	0			None
6	0			None
7	0			None
8	0			None
9	0			None
10	0			None
11	0			None
12	0			None
13	0			None
14	0			None
15	0			None
16	0			None

Split 19		Coord	Ref	Mode
PH.	Time	PH	PH	
1	0			None
2	0			None
3	0			None
4	0			None
5	0			None
6	0			None

Split 20		Coord	Ref	Mode
PH.	Time	PH	PH	
1	0			None
2	0			None
3	0			None
4	0			None
5	0			None
6	0			None

Split 19		Coord	Ref	Mode
PH.	Time	PH	PH	
7	0			None
8	0			None
9	0			None
10	0			None
11	0			None
12	0			None
13	0			None
14	0			None
15	0			None
16	0			None

Split 20		Coord	Ref	Mode
PH.	Time	PH	PH	
7	0			None
8	0			None
9	0			None
10	0			None
11	0			None
12	0			None
13	0			None
14	0			None
15	0			None
16	0			None

Ring	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Offset																

Day Plan		1														
Month of Year		Days of Week					Days of Month									
J	F	M	A	M	J	S	M	T	W	T	F	S	1	2	3	4
													5	6	7	8
													9	10	11	12
													13	14	15	16

[illegible]

Day Plan	2
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[illegible]

Day Plan	3
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[illegible]

Day Plan	4
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[illegible]

Day Plan	5
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[illegible]

Day Plan	6
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[illegible]

Day Plan	7
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[illegible]

Day Plan	8
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[illegible]

Day Plan	9
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[illegible]

Day Plan	10
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[illegible]

J	A	S	O	N	D	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

Day Plan					11																													
Month of Year					Days of Week							Days of Month																						
J	F	M	A	M	J	S	M	T	W	T	F	S	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16						
J	A	S	O	N	D								17	18	19	20	21	22	23	24	25	26	27	28	29	30	31							

Day Plan					12																									
Month of Year					Days of Week							Days of Month																		
J	F	M	A	M	J	S	M	T	W	T	F	S	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
J	A	S	O	N	D								17	18	19	20	21	22	23	24	25	26	27	28	29	30	31			

Day Plan					13																													
Month of Year						Days of Week						Days of Month																						
J	F	M	A	M	J	S	M	T	W	T	F	S	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16						
J	A	S	O	N	D							17	18	19	20	21	22	23	24	25	26	27	28	29	30	31								

Day Plan					14																									
Month of Year					Days of Week							Days of Month																		
J	F	M	A	M	J	S	M	T	W	T	F	S	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
J	A	S	O	N	D								17	18	19	20	21	22	23	24	25	26	27	28	29	30	31			

Day Plan					15																									
Month of Year					Days of Week							Days of Month																		
J	F	M	A	M	J	S	M	T	W	T	F	S	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
J	A	S	O	N	D								17	18	19	20	21	22	23	24	25	26	27	28	29	30	31			

Day Plan 1				Day Plan 2				Day Plan 3				Day Plan 4			
Event	Hour	Min.	Act	Event	Hour	Min.	Act	Event	Hour	Min.	Act	Event	Hour	Min.	Act
1	5	0	1	1	0	0		1	0	0		1	0	0	
2	23	0	2	2	0	0		2	0	0		2	0	0	
3	0	0		3	0	0		3	0	0		3	0	0	
4	0	0		4	0	0		4	0	0		4	0	0	
5	0	0		5	0	0		5	0	0		5	0	0	

Day Plan 1				Day Plan 2				Day Plan 3				Day Plan 4			
Event	Hour	Min.	Act	Event	Hour	Min.	Act	Event	Hour	Min.	Act	Event	Hour	Min.	Act
6	0	0		6	0	0		6	0	0		6	0	0	
7	0	0		7	0	0		7	0	0		7	0	0	
8	0	0		8	0	0		8	0	0		8	0	0	
9	0	0		9	0	0		9	0	0		9	0	0	
10	0	0		10	0	0		10	0	0		10	0	0	

Day Plan 5				Day Plan 6				Day Plan 7				Day Plan 8			
Event	Hour	Min.	Act	Event	Hour	Min.	Act	Event	Hour	Min.	Act	Event	Hour	Min.	Act
1	0	0		1	0	0		1	0	0		1	0	0	
2	0	0		2	0	0		2	0	0		2	0	0	
3	0	0		3	0	0		3	0	0		3	0	0	
4	0	0		4	0	0		4	0	0		4	0	0	
5	0	0		5	0	0		5	0	0		5	0	0	
6	0	0		6	0	0		6	0	0		6	0	0	

7	0	0		7	0	0		7	0	0		7	0	0	
8	0	0		8	0	0		8	0	0		8	0	0	
9	0	0		9	0	0		9	0	0		9	0	0	
10	0	0		10	0	0		10	0	0		10	0	0	
Day Plan			9	Day Plan			10	Day Plan			11	Day Plan			12
Event	Hour	Min.	Act	Event	Hour	Min.	Act	Event	Hour	Min.	Act	Event	Hour	Min.	Act
1	0	0		1	0	0		1	0	0		1	0	0	
2	0	0		2	0	0		2	0	0		2	0	0	
3	0	0		3	0	0		3	0	0		3	0	0	
4	0	0		4	0	0		4	0	0		4	0	0	
5	0	0		5	0	0		5	0	0		5	0	0	
6	0	0		6	0	0		6	0	0		6	0	0	
7	0	0		7	0	0		7	0	0		7	0	0	
8	0	0		8	0	0		8	0	0		8	0	0	
9	0	0		9	0	0		9	0	0		9	0	0	
10	0	0		10	0	0		10	0	0		10	0	0	
Day Plan			13	Day Plan			14	Day Plan			15	Day Plan			16
Event	Hour	Min.	Act	Event	Hour	Min.	Act	Event	Hour	Min.	Act	Event	Hour	Min.	Act
1	0	0		1	0	0		1	0	0		1	0	0	
2	0	0		2	0	0		2	0	0		2	0	0	
3	0	0		3	0	0		3	0	0		3	0	0	
4	0	0		4	0	0		4	0	0		4	0	0	
5	0	0		5	0	0		5	0	0		5	0	0	
6	0	0		6	0	0		6	0	0		6	0	0	
7	0	0		7	0	0		7	0	0		7	0	0	
8	0	0		8	0	0		8	0	0		8	0	0	
9	0	0		9	0	0		9	0	0		9	0	0	
10	0	0		10	0	0		10	0	0		10	0	0	
Day Plan			17	Day Plan			18	Day Plan			19	Day Plan			20
Event	Hour	Min.	Act	Event	Hour	Min.	Act	Event	Hour	Min.	Act	Event	Hour	Min.	Act
1	0	0		1	0	0		1	0	0		1	0	0	
2	0	0		2	0	0		2	0	0		2	0	0	
3	0	0		3	0	0		3	0	0		3	0	0	
4	0	0		4	0	0		4	0	0		4	0	0	
5	0	0		5	0	0		5	0	0		5	0	0	
6	0	0		6	0	0		6	0	0		6	0	0	
7	0	0		7	0	0		7	0	0		7	0	0	
8	0	0		8	0	0		8	0	0		8	0	0	
9	0	0		9	0	0		9	0	0		9	0	0	
10	0	0		10	0	0		10	0	0		10	0	0	

Actions		Aux.			Special Functions							
Act	Pattern	1	2	3	1	2	3	4	5	6	7	8
1	Free											
2	Flash											
3	Pattern 3											
4	Pattern 4											
5	Pattern 5											
6	Pattern 6											
7	Pattern 7											
8	Pattern 8											
9	Pattern 9											
10	Pattern 10											
11	None											
12	None											
13	None											
14	None											
15	None											
16	None											
17	None											
18	None											
19	None											

Actions		Aux.			Special Functions							
Act	Pattern	1	2	3	1	2	3	4	5	6	7	8
33	None											
34	None											
35	None											
36	None											
37	None											
38	None											
39	None											
40	None											
41	None											
42	None											
43	None											
44	None											
45	None											
46	None											
47	None											
48	None											
49	None											
50	None											
51	None											

20	None								
21	None								
22	None								
23	None								
24	None								
25	None								
26	None								
27	None								
28	None								
29	None								
30	None								
31	None								
32	None								

52	None								
53	None								
54	None								
55	None								
56	None								
57	None								
58	None								
59	None								
60	None								
61	None								
62	None								
63	None								
64	None								

Preemption Parameters

Preempt	1	2	3	4	5	6	7	8
Link	0	0	0	0	0	0	0	0
Delay	0	0	0	0	0	0	0	0
Min Duration	0	0	0	0	0	0	0	0
Min Green	0	0	0	0	0	0	0	0
Min Walk	0	0	0	0	0	0	0	0
Ent. Ped Clear	255	255	255	255	255	255	255	255
Track Green	0	0	0	0	0	0	0	0
Dwell Green	0	0	0	0	0	0	0	0
Max Presence	0	0	0	0	0	0	0	0
Enter Yellow	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
Ent. Red Clear	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5

Preemption Parameters

Preempt	1	2	3	4	5	6	7	8
Track Yellow	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
Track Red Clear	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
Exit Red	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
Exit Ped Clear	255	255	255	255	255	255	255	255
Exit Yellow	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
Exit Red	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
Preempt	1	2	3	4	5	6	7	8
Non Lock Mem								
Not Override Flash								
NotOverrideNextPre								
Flash Dwell								

Preemption Configuration

Preempt	1	2	3	4	5	6	7	8
Track phase								
Dwell Phase								
Dwell Ped								
Exit Phase								
Track Overlap								
Dwell overlap								
Cycling phase								
Cycling Ped								
Cycling Overlap								

IO Modules

IO Mod	TYPE
1	Caltrans 332
2	None
3	None
4	None
5	None
6	None
7	None
8	None
9	None
10	None

Channel Configuration

Chan	Ctrl Type	Source
1	Olp	1
2	Phs Veh	2
3	Phs Veh	3
4	Phs Veh	4
5	Olp	5
6	Phs Veh	6
7	Phs Veh	7
8	Phs Veh	8
9	Phs Veh	1
10	Wrn Flash	2

Chan	Ctrl Type	Source
11	Phs Veh	5
12	Wrn Flash	6
13	Phs Ped	2
14	Phs Ped	4
15	Phs Ped	6
16	Phs Ped	8
17	Olp	5
18	Olp	6
19	None	0
20	None	0

Channel Options

Channel	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Flash Yellow																
Flash Red																
Alt Flash																
Channel	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Flash Yellow																
Flash Red																
Alt Flash																



**Startup Clearance Hold Type**

1=off, 2=On, 3=Flash and 4= Alt Flash

Channel	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Red																
Yellow																
Green																
Channel	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Red																
Yellow																
Green																

**Phase Intervals**

Interval	Description	Red	Yel	Grn	Type
1	notActive	On	Off	Off	Red
2	dltGrn	On	Off	Off	Red
3	PreGrn	Off	Off	On	Green
4	minGrn	Off	Off	On	Green
5	grnExt	Off	Off	On	Green
6	grnDwell	Off	Off	On	Green
7	preClear	Off	Off	On	Green
8	yelChange	Off	On	Off	Yellow
9	redClear	On	Off	Off	Red
10	redDwell	On	Off	Off	Red
11	Barrier	On	Off	Off	Red
12					

**Pedestrian Intervals**

Interval	Description	DWK	CLR	Wlk	Type
1	notActive	On	Off	Off	Dont Walk
2	dltPed	On	Off	Off	Dont Walk
3	walk	Off	Off	On	Walk
4	walkDwell	Off	Off	On	Walk
5	flashDtWlk	Flash	On	Off	Ped Clear
6	dWalk	On	Off	Off	Dont Walk
7					
8					

**Countdown Display**

Display	Addr	Phase	Time
1			
2			
3			
4			
5			
6			
7			
8			

Display	Addr	Phase	Time
9			
10			
11			
12			
13			
14			
15			
16			

Display	Addr	Phase	Time
17			
18			
19			
20			
21			
22			
23			
24			

Display	Addr	Phase	Time
25			
26			
27			
28			
29			
30			
31			
32			

**Manual Control Phase Groups**

Grp 1	Grp 2	Grp 3	Grp 4	Grp 5	Grp 6	Grp 7	Grp 8
Ring	Ph	Ring	Ph	Ring	Ph	Ring	Ph
1	0	1	0	1	0	1	0
2	0	2	0	2	0	2	0
3	0	3	0	3	0	3	0
4	0	4	0	4	0	4	0
5	0	5	0	5	0	5	0
6	0	6	0	6	0	6	0
7	0	7	0	7	0	7	0
8	0	8	0	8	0	8	0
9	0	9	0	9	0	9	0
10	0	10	0	10	0	10	0
11	0	11	0	11	0	11	0
12	0	12	0	12	0	12	0
13	0	13	0	13	0	13	0
14	0	14	0	14	0	14	0
15	0	15	0	15	0	15	0
16	0	16	0	16	0	16	0

**Prioritor Settings**

Prioritor	Priority Ph	Output Dly
1		0
2		0
3		0
4		0

Enabled	Lock Out Time
No	0

# Intersection 542 at Highway 83 and Shoup Rd - Timing table, page 1

Page 1	Phases											
	1	2	3	4	5	6	7	8	9	10	11	12
Min Green	4	20	0	0	0	20	0	4	0	0	0	0
Passage Time I	1.0	1.0	0.0	0.0	0.0	1.0	0.0	3.0	0.0	0.0	0.0	0.0
Passage Time II	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Green I	20	45	0	0	0	45	0	30	0	0	0	0
Max Green II	0	0	0	0	0	0	0	0	0	0	0	0
Yellow Clearance	3.0	5.5	0.0	0.0	0.0	5.5	0.0	4.0	0.0	0.0	0.0	0.0
Red Clearance	2.0	2.0	0.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	0.0	0.0
Added Initial	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Added Initial	0	0	0	0	0	0	0	0	0	0	0	0
Time Before Reduction	0	0	0	0	0	0	0	0	0	0	0	0
Cars Before Reduction	0	0	0	0	0	0	0	0	0	0	0	0
Time To Reduce	0	0	0	0	0	0	0	0	0	0	0	0
Min Passage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Green Time	0	0	0	0	0	0	0	0	0	0	0	0
Red Revert Time	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Walk Time	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Clearance	0	0	0	0	0	0	0	0	0	0	0	0
Handicap Walk	0	0	0	0	0	0	0	0	0	0	0	0
Handicap Ped Clearance	0	0	0	0	0	0	0	0	0	0	0	0
Highway 83	X	X				X						
Shoup Rd								X				
Compass Direction	S	N				S		W				
Through, Turn or XPed	Left,p/p	Thru				Thru		Thru				

**Intersection 542 at Highway 83 and Shoup Rd - Sequence table, page 1**

Page 1	Ring 1 Phases				Ring 2 Phases				Ring 3 Phases			
	1	2	3	4	5	6	7	8	9	10	11	12
State 1	Vehicle											
Barrier 1												
State 2		Vehicle				Vehicle						
Barrier 2	XXXXXXXXXXXXXXXXXXXX				XXXXXXXXXXXXXXXXXXXX							
State 3								Vehicle				
Barrier 3	XXXXXXXXXXXXXXXXXXXX				XXXXXXXXXXXXXXXXXXXX							
State 4												
Barrier 4												
State 5												
Barrier 5												
State 6												
Barrier 6												
State 7												
Barrier 7												
State 8												
Barrier 8												
State 9												
Barrier 9												
State 10												
Barrier 10												
State 11												
Barrier 11												
State 12												
Barrier 12												

**Intersection 598 at Highway 83 and North Gate Blvd. - Timing table, page 1**

Page 1	Phases											
	1	2	3	4	5	6	7	8	9	10	11	12
Min Green	0	23	0	6	6	23	0	6	0	0	0	0
Passage Time I	0.0	3.0	0.0	3.0	3.0	3.0	0.0	3.0	0.0	0.0	0.0	0.0
Passage Time II	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Green I	0	60	0	24	25	60	0	24	0	0	0	0
Max Green II	0	0	0	0	0	0	0	0	0	0	0	0
Yellow Clearance	0.0	5.0	0.0	4.0	3.0	5.0	0.0	4.0	0.0	0.0	0.0	0.0
Red Clearance	0.0	2.0	0.0	2.0	2.0	2.0	0.0	2.0	0.0	0.0	0.0	0.0
Added Initial	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Added Initial	0	0	0	0	0	0	0	0	0	0	0	0
Time Before Reduction	0	0	0	0	0	0	0	0	0	0	0	0
Cars Before Reduction	0	0	0	0	0	0	0	0	0	0	0	0
Time To Reduce	0	0	0	0	0	0	0	0	0	0	0	0
Min Passage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Green Time	0	0	0	0	0	0	0	0	0	0	0	0
Red Revert Time	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Walk Time	0	0	0	7	0	7	0	0	0	0	0	0
Pedestrian Clearance	0	0	0	37	0	33	0	0	0	0	0	0
Handicap Walk	0	0	0	0	0	0	0	0	0	0	0	0
Handicap Ped Clearance	0	0	0	0	0	0	0	0	0	0	0	0
Highway 83		X			X	X						
North Gate Blvd.				X				X				
Compass Direction		N		E	N	S		W				
Through, Turn or XPed		Thru		Thru	Left,prt	Thru		Thru				

**Intersection 598 at Highway 83 and North Gate Blvd. - Sequence table, page 1**

Page 1	Ring 1 Phases				Ring 2 Phases				Ring 3 Phases			
	1	2	3	4	5	6	7	8	9	10	11	12
State 1					Vehicle							
Barrier 1												
State 2		Vehicle				V & P						
Barrier 2	XXXXXXXXXXXXXXXXXXXX				XXXXXXXXXXXXXXXXXXXX							
State 3				V & P				Vehicle				
Barrier 3	XXXXXXXXXXXXXXXXXXXX				XXXXXXXXXXXXXXXXXXXX							
State 4												
Barrier 4												
State 5												
Barrier 5												
State 6												
Barrier 6												
State 7												
Barrier 7												
State 8												
Barrier 8												
State 9												
Barrier 9												
State 10												
Barrier 10												
State 11												
Barrier 11												
State 12												
Barrier 12												

## **APPENDIX B**

### **Internal Capture Worksheets**

NCHRP 684 Internal Trip Capture Estimation Tool					
Project Name:	Flying Horse North			Organization:	SM ROCHA, LLC
Project Location:	SWC Black Forest Road & Hodgen Road			Performed By:	BAW
Scenario Description:				Date:	9/19/2022
Analysis Year:				Checked By:	
Analysis Period:	AM Street Peak Hour			Date:	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips <sup>3</sup>		
	ITE LUCs <sup>1</sup>	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail	821	99	KSF	171	106	65
Restaurant				0		
Cinema/Entertainment				0		
Residential	210,215	709,138	DU	563	150	413
Hotel	330	275	KSF	88	63	25
All Other Land Uses <sup>2</sup>	492	45	KSF	59	30	29
				881	349	532

Table 2-A: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. <sup>4</sup>	% Transit	% Non-Motorized	Veh. Occ. <sup>4</sup>	% Transit	% Non-Motorized
Office						
Retail	1.17	0%	0%	1.16	0%	0%
Restaurant						
Cinema/Entertainment						
Residential	1.13	0%	4%	1.09	0%	2%
Hotel	1.26	1%	6%	1.26	0%	1%
All Other Land Uses <sup>2</sup>	1.00	0%	0%	1.00	0%	0%

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	3	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	5	0	0		0
Hotel	0	4	0	0	0	

Table 5-A: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	989	403	586
Internal Capture Percentage	2%	3%	2%
External Vehicle-Trips <sup>5</sup>	840	328	512
External Transit-Trips <sup>6</sup>	2	2	0
External Non-Motorized Trips <sup>6</sup>	21	11	10

Table 6-A: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	7%	4%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	2%	1%
Hotel	0%	13%

<sup>1</sup>Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

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

<sup>3</sup>Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

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

<sup>5</sup>Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.

<sup>6</sup>Person-Trips

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

<b>Project Name:</b>	Flying Horse North
<b>Analysis Period:</b>	AM Street Peak Hour

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends						
Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.17	106	124	1.16	65	75
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.13	150	170	1.09	413	450
Hotel	1.26	63	79	1.26	25	32

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	22		10	0	11	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	9	5	90	0		0
Hotel	24	4	3	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		40	0	0	0	0
Retail	0		0	0	3	0
Restaurant	0	10		0	9	3
Cinema/Entertainment	0	0	0		0	0
Residential	0	21	0	0		0
Hotel	0	5	0	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)						
Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles <sup>1</sup>	Transit <sup>2</sup>	Non-Motorized <sup>2</sup>
Office	0	0	0	0	0	0
Retail	9	115	124	98	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	3	167	170	142	1	6
Hotel	0	79	79	58	1	5
All Other Land Uses <sup>3</sup>	0	30	30	30	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)						
Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles <sup>1</sup>	Transit <sup>2</sup>	Non-Motorized <sup>2</sup>
Office	0	0	0	0	0	0
Retail	3	72	75	62	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	5	445	450	399	0	10
Hotel	4	28	32	22	0	0
All Other Land Uses <sup>3</sup>	0	29	29	29	0	0

<sup>1</sup> Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A
<sup>2</sup> Person-Trips
<sup>3</sup> Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator
*Indicates computation that has been rounded to the nearest whole number.



NCHRP 684 Internal Trip Capture Estimation Tool					
Project Name:	Flying Horse North			Organization:	SM ROCHA, LLC
Project Location:	SWC Black Forest Road & Hodgen Road			Performed By:	BAW
Scenario Description:				Date:	9/19/2022
Analysis Year:				Checked By:	
Analysis Period:	PM Street Peak Hour			Date:	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips <sup>3</sup>		
	ITE LUCs <sup>1</sup>	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail	821	99	KSF	514	252	262
Restaurant				0		
Cinema/Entertainment				0		
Residential	210,215	709,138	DU	744	464	280
Hotel	330	275	KSF	112	48	64
All Other Land Uses <sup>2</sup>	492	45	KSF	154	88	66
				1,524	852	672

Table 2-P: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. <sup>4</sup>	% Transit	% Non-Motorized	Veh. Occ. <sup>4</sup>	% Transit	% Non-Motorized
Office						
Retail	1.21	0%	0%	1.18	0%	0%
Restaurant						
Cinema/Entertainment						
Residential	1.15	0%	3%	1.21	0%	4%
Hotel	1.31	0%	1%	1.30	0%	2%
All Other Land Uses <sup>2</sup>	1.00	0%	0%	1.00	0%	0%

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	80	11
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	31	0	0		8
Hotel	0	6	0	0	0	

Table 5-P: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	1,787	990	797
Internal Capture Percentage	15%	14%	17%
External Vehicle-Trips <sup>5</sup>	1,274	726	548
External Transit-Trips <sup>6</sup>	1	1	0
External Non-Motorized Trips <sup>6</sup>	25	12	13

Table 6-P: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	12%	29%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	15%	12%
Hotel	30%	7%

<sup>1</sup>Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

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

<sup>3</sup>Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

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

<sup>5</sup>Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.

<sup>6</sup>Person-Trips

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

<b>Project Name:</b>	Flying Horse North
<b>Analysis Period:</b>	PM Street Peak Hour

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends						
Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.21	252	305	1.18	262	309
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.15	464	534	1.21	280	339
Hotel	1.31	48	63	1.30	64	83

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	6		90	12	80	15
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	14	142	71	0		10
Hotel	0	13	56	0	2	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		24	0	0	21	0
Retail	0		0	0	246	11
Restaurant	0	153		0	85	45
Cinema/Entertainment	0	12	0		21	1
Residential	0	31	0	0		8
Hotel	0	6	0	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)						
Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles <sup>1</sup>	Transit <sup>2</sup>	Non-Motorized <sup>2</sup>
Office	0	0	0	0	0	0
Retail	37	268	305	221	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	80	454	534	384	1	11
Hotel	19	44	63	33	0	1
All Other Land Uses <sup>3</sup>	0	88	88	88	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)						
Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles <sup>1</sup>	Transit <sup>2</sup>	Non-Motorized <sup>2</sup>
Office	0	0	0	0	0	0
Retail	91	218	309	185	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	39	300	339	239	0	11
Hotel	6	77	83	58	0	2
All Other Land Uses <sup>3</sup>	0	66	66	66	0	0

<sup>1</sup>Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

<sup>2</sup>Person-Trips

<sup>3</sup>Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

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

## **APPENDIX C**

### **Level of Service Definitions**

The following information can be found in the Highway Capacity Manual, Transportation Research Board, 2016:  
Chapter 19 – Signalized Intersections and Chapter 20 – Two-Way Stop Controlled Intersections.

### **Automobile 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.

### **Level of Service (LOS) for Unsignalized TWSC Intersections**

Level of Service ( $v/c \leq 1.0$ )	Average Control Delay (s/veh)
A	0 - 10
B	> 10 - 15
C	> 15 - 25
D	> 25 - 35
E	> 35 - 50
F	> 50

## **APPENDIX D**

























### **Capacity Worksheets**

# Timings

## 1: State Highway 83 & Hodgen Road

# Existing Traffic Conditions

AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	86	76	29	241	149	207	34	263	72	101	361	54
Future Volume (vph)	86	76	29	241	149	207	34	263	72	101	361	54
Satd. Flow (prot)	1719	1827	1568	1787	1845	1482	1703	1792	1568	1671	1799	0
Flt Permitted	0.660			0.687			0.370			0.564		
Satd. Flow (perm)	1194	1827	1568	1292	1845	1482	663	1792	1568	992	1799	0
Satd. Flow (RTOR)			135			211			121		13	
Lane Group Flow (vph)	123	109	41	246	152	211	37	289	79	119	489	0
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		
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	
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	0.46	0.27	0.09	0.86	0.37	0.43	0.08	0.34	0.10	0.20	0.58	
Control Delay	34.0	28.2	0.4	59.5	29.8	7.1	6.4	15.1	1.2	7.1	18.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	34.0	28.2	0.4	59.5	29.8	7.1	6.4	15.1	1.2	7.1	18.5	
LOS	C	C	A	E	C	A	A	B	A	A	B	
Approach Delay		26.6			33.9			11.6			16.3	
Approach LOS		C			C			B			B	
Queue Length 50th (ft)	54	46	0	120	66	0	6	89	0	21	167	
Queue Length 95th (ft)	80	68	0	#249	119	53	17	144	10	39	239	
Internal Link Dist (ft)		824			1611			1078			1286	
Turn Bay Length (ft)	420		420	350		350	120		650	525		
Base Capacity (vph)	265	406	453	287	410	493	445	840	799	601	850	
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	0.46	0.27	0.09	0.86	0.37	0.43	0.08	0.34	0.10	0.20	0.58	

### 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: 0.86

Intersection Signal Delay: 22.4

Intersection LOS: C

Intersection Capacity Utilization 75.6%

ICU Level of Service D

Analysis Period (min) 15

## Timings

### 1: State Highway 83 & Hodgen Road







## Existing Traffic Conditions

AM Peak Hour

# 95th percentile volume exceeds capacity, queue may be longer.






Queue shown is maximum after two cycles.

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

 Ø1	 Ø2 (R)	 Ø4
12 s	45 s	24 s
 Ø5	 Ø6 (R)	 Ø8
12 s	45 s	24 s

HCM 6th TWSC  
2: State Highway 83 & Stagecoach Road

Existing Traffic Conditions  
AM Peak Hour

Intersection												
Int Delay, s/veh	0.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	1	4	20	0	6	0	374	28	2	627	1
Future Vol, veh/h	1	1	4	20	0	6	0	374	28	2	627	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	-	-	-	-	-	135	-	-	320	415	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	56	56	56	84	84	84	91	91	91	81	81	81
Heavy Vehicles, %	0	0	50	0	0	33	0	8	14	50	2	100
Mvmt Flow	2	2	7	24	0	7	0	411	31	2	774	1
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1209	1221	775	1194	1190	411	775	0	0	442	0	0
Stage 1	779	779	-	411	411	-	-	-	-	-	-	-
Stage 2	430	442	-	783	779	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.7	7.1	6.5	6.53	4.1	-	-	4.6	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.75	3.5	4	3.597	2.2	-	-	2.65	-	-
Pot Cap-1 Maneuver	161	181	331	165	189	579	850	-	-	905	-	-
Stage 1	392	409	-	622	598	-	-	-	-	-	-	-
Stage 2	607	580	-	390	409	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	159	181	331	160	189	579	850	-	-	905	-	-
Mov Cap-2 Maneuver	159	181	-	160	189	-	-	-	-	-	-	-
Stage 1	392	408	-	622	598	-	-	-	-	-	-	-
Stage 2	600	580	-	379	408	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	20		26.8		0		0					
HCM LOS	C		D									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1WBLn2	SBL	SBT	SBR					
Capacity (veh/h)	850	-	-	251 160 579	905	-	-					
HCM Lane V/C Ratio	-	-	-	0.043 0.149 0.012	0.003	-	-					
HCM Control Delay (s)	0	-	-	20 31.4 11.3	9	-	-					
HCM Lane LOS	A	-	-	C D B	A	-	-					
HCM 95th %tile Q(veh)	0	-	-	0.1 0.5 0	0	-	-					
























# Timings

## 3: State Highway 83 & North Gate Boulevard

### Existing Traffic Conditions

AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	0	322	0	0	0	517	388	0	0	678	128
Future Volume (vph)	46	0	322	0	0	0	517	388	0	0	678	128
Satd. Flow (prot)	1656	1900	1583	0	1900	0	1770	3438	0	1900	3539	1583
Flt Permitted	0.757						0.219					
Satd. Flow (perm)	1320	1900	1583	0	1900	0	408	3438	0	1900	3539	1583
Satd. Flow (RTOR)			484									149
Lane Group Flow (vph)	51	0	354	0	0	0	615	462	0	0	788	149
Turn Type	Perm		Perm				pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		6
Detector Phase	4	4	4	8	8		5	2		6	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	5.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0		10.0	12.0		11.0	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	35.0
Total Split (%)	28.6%	28.6%	28.6%	28.6%	28.6%		29.8%	71.4%		41.7%	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	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	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0		5.0	7.0		6.0	6.0	6.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None	None	None	None	None		Max	Max		Max	Max	Max
Act Effct Green (s)	8.3		8.3				55.1	53.1			29.0	29.0
Actuated g/C Ratio	0.11		0.11				0.74	0.71			0.39	0.39
v/c Ratio	0.35		0.58				0.92	0.19			0.57	0.21
Control Delay	37.0		4.6				34.7	4.0			20.1	3.9
Queue Delay	0.0		0.0				0.0	0.0			0.0	0.0
Total Delay	37.0		4.6				34.7	4.0			20.1	3.9
LOS	D		A				C	A			C	A
Approach Delay		8.7						21.5			17.6	
Approach LOS		A						C			B	
Queue Length 50th (ft)	22		0				163	29			145	0
Queue Length 95th (ft)	54		11				#345	48			202	31
Internal Link Dist (ft)		997			136			1617			2154	
Turn Bay Length (ft)	225		285				900					730
Base Capacity (vph)	319		750				668	2452			1381	708
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	0.16		0.47				0.92	0.19			0.57	0.21

### Intersection Summary

Cycle Length: 84

Actuated Cycle Length: 74.4

Natural Cycle: 55

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.92

# Timings 3: State Highway 83 & North Gate Boulevard

Existing Traffic Conditions  
AM Peak Hour

Intersection Signal Delay: 17.8

Intersection LOS: B

Intersection Capacity Utilization 65.7%






ICU Level of Service C

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

 Ø2 60 s		 Ø4 24 s	
 Ø5 25 s	 Ø6 35 s	 Ø8 24 s	

# Timings

## 4: State Highway 83 & Shoup Road

Existing Traffic Conditions  
AM Peak Hour

	↑	↗	↘	↓	↙	↖
Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↑↑	↗	↘	↑↑	↘	↗
Traffic Volume (vph)	790	97	70	960	288	206
Future Volume (vph)	790	97	70	960	288	206
Satd. Flow (prot)	3438	1568	1703	3539	1787	1583
Flt Permitted			0.238			
Satd. Flow (perm)	3438	1568	427	3539	1881	1583
Satd. Flow (RTOR)		110				226
Lane Group Flow (vph)	898	110	78	1067	316	226
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 Effect Green (s)	47.8	47.8	60.1	57.6	19.5	19.5
Actuated g/C Ratio	0.53	0.53	0.66	0.64	0.22	0.22
v/c Ratio	0.50	0.13	0.20	0.47	0.78	0.44
Control Delay	16.5	3.4	7.5	10.0	47.7	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.5	3.4	7.5	10.0	47.7	7.0
LOS	B	A	A	A	D	A
Approach Delay	15.1			9.8	30.7	
Approach LOS	B			A	C	
Queue Length 50th (ft)	176	0	14	155	172	0
Queue Length 95th (ft)	252	27	33	224	264	56
Internal Link Dist (ft)	1042			1734	675	
Turn Bay Length (ft)		710	980			500
Base Capacity (vph)	1814	879	495	2250	499	586
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	0.50	0.13	0.16	0.47	0.63	0.39
Intersection Summary						
Cycle Length: 95						
Actuated Cycle Length: 90.6						
Natural Cycle: 55						
Control Type: Actuated-Uncoordinated						
Maximum v/c Ratio: 0.78						

## Timings

### 4: State Highway 83 & Shoup Road

## Existing Traffic Conditions

AM Peak Hour

Intersection Signal Delay: 16.0

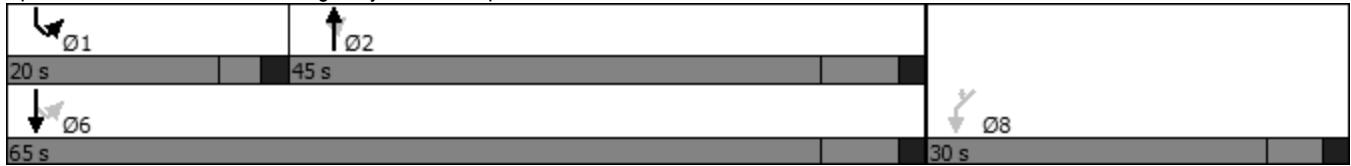
Intersection LOS: B

Intersection Capacity Utilization 57.1%

ICU Level of Service B

Analysis Period (min) 15

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



















# Timings

## 5: Black Forest Road & Shoup Road

### Existing Traffic Conditions

AM Peak Hour





												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	53	39	14	110	8	84	140	9	5	151	100
Future Volume (vph)	59	53	39	14	110	8	84	140	9	5	151	100
Satd. Flow (prot)	0	1678	0	0	1832	0	0	1687	0	0	1669	0
Flt Permitted		0.816			0.959			0.764			0.994	
Satd. Flow (perm)	0	1396	0	0	1766	0	0	1313	0	0	1661	0
Satd. Flow (RTOR)		21			4			3			56	
Lane Group Flow (vph)	0	174	0	0	142	0	0	264	0	0	389	0
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 Effect Green (s)		13.4			13.4			49.1			49.1	
Actuated g/C Ratio		0.18			0.18			0.66			0.66	
v/c Ratio		0.65			0.44			0.30			0.35	
Control Delay		36.4			30.5			7.3			6.4	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		36.4			30.5			7.3			6.4	
LOS		D			C			A			A	
Approach Delay		36.4			30.5			7.3			6.4	
Approach LOS		D			C			A			A	
Queue Length 50th (ft)		66			57			44			56	
Queue Length 95th (ft)		122			107			99			78	
Internal Link Dist (ft)		965			1070			1292			16527	
Turn Bay Length (ft)												
Base Capacity (vph)		557			690			866			1113	
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		0.31			0.21			0.30			0.35	
Intersection Summary												
Cycle Length: 90												
Actuated Cycle Length: 74.6												
Natural Cycle: 40												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.65												

# Timings 5: Black Forest Road & Shoup Road

Existing Traffic Conditions  
AM Peak Hour

Intersection Signal Delay: 15.6      Intersection LOS: B  
Intersection Capacity Utilization 57.0%      ICU Level of Service B  
Analysis Period (min) 15

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

 Ø2 55 s	 Ø4 35 s
 Ø6 55 s	 Ø8 35 s

HCM 6th TWSC  
6: Black Forest Road & Old Stagecoach Road/Terra Ridge Circle

Existing Traffic Conditions

AM Peak Hour

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	1	0	4	5	1	2	7	83	1	1	114	3
Future Vol, veh/h	1	0	4	5	1	2	7	83	1	1	114	3
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	2	0	9	7	1	3	9	106	1	1	143	4










Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	274	272	145	277	274	107	147	0	0	107	0	0
Stage 1	147	147	-	125	125	-	-	-	-	-	-	-
Stage 2	127	125	-	152	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	520	638	845	679	637	953	1447	-	-	1045	-	-
Stage 1	669	779	-	884	796	-	-	-	-	-	-	-
Stage 2	688	796	-	855	778	-	-	-	-	-	-	-
Platoon blocked, %												
Mov Cap-1 Maneuver	514	633	845	667	632	953	1447	-	-	1045	-	-
Mov Cap-2 Maneuver	514	633	-	667	632	-	-	-	-	-	-	-
Stage 1	664	778	-	878	790	-	-	-	-	-	-	-
Stage 2	680	790	-	845	777	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	9.9		10.1		0.6		0.1	
HCM LOS	A		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1447	-	-	749	716	1045	-
HCM Lane V/C Ratio	0.006	-	-	0.015	0.017	0.001	-
HCM Control Delay (s)	7.5	0	-	9.9	10.1	8.4	0
HCM Lane LOS	A	A	-	A	B	A	A
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-

HCM 6th TWSC  
7: Ridge Run Road/Black Forest Road & Hodgen Road

Existing Traffic Conditions  
AM Peak Hour

Intersection												
Int Delay, s/veh	1.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	143	5	0	439	11	7	0	0	11	0	42
Future Vol, veh/h	12	143	5	0	439	11	7	0	0	11	0	42
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	17	204	7	0	482	12	9	0	0	17	0	67

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	494	0	0	211	0	0	760	732	204	730	733	488
Stage 1	-	-	-	-	-	-	238	238	-	488	488	-
Stage 2	-	-	-	-	-	-	522	494	-	242	245	-
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	892	-	-	1372	-	-	308	351	842	329	350	584
Stage 1	-	-	-	-	-	-	739	712	-	548	553	-
Stage 2	-	-	-	-	-	-	517	550	-	746	707	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	892	-	-	1372	-	-	269	344	842	324	343	584
Mov Cap-2 Maneuver	-	-	-	-	-	-	269	344	-	324	343	-
Stage 1	-	-	-	-	-	-	725	698	-	538	553	-
Stage 2	-	-	-	-	-	-	458	550	-	732	694	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0	18.9	13
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	269	-	892	-	-	1372	-	-	324	584
HCM Lane V/C Ratio	0.035	-	0.019	-	-	-	-	-	0.054	0.114
HCM Control Delay (s)	18.9	0	9.1	-	-	0	-	-	16.7	12
HCM Lane LOS	C	A	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-	0	-	-	0.2	0.4



HCM 6th TWSC  
8: Black Forest Road/Black Forrest Road & Hodgen Road

Existing Traffic Conditions

AM Peak Hour

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	152	57	61	437	1	92	0	31	0	0	2
Future Vol, veh/h	2	152	57	61	437	1	92	0	31	0	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	2	183	69	64	460	1	102	0	34	0	0	3
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	461	0	0	252	0	0	777	776	183	828	845	461
Stage 1	-	-	-	-	-	-	187	187	-	589	589	-
Stage 2	-	-	-	-	-	-	590	589	-	239	256	-
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	732	-	-	1313	-	-	307	331	839	293	302	605
Stage 1	-	-	-	-	-	-	801	749	-	498	499	-
Stage 2	-	-	-	-	-	-	484	499	-	769	699	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	732	-	-	1313	-	-	293	314	839	270	286	605
Mov Cap-2 Maneuver	-	-	-	-	-	-	293	314	-	270	286	-
Stage 1	-	-	-	-	-	-	799	747	-	497	475	-
Stage 2	-	-	-	-	-	-	458	475	-	735	697	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			1			21.7			11		
HCM LOS							C			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	350	732	-	-	1313	-	-	605				
HCM Lane V/C Ratio	0.39	0.003	-	-	0.049	-	-	0.004				
HCM Control Delay (s)	21.7	9.9	0	-	7.9	-	-	11				
HCM Lane LOS	C	A	A	-	A	-	-	B				
HCM 95th %tile Q(veh)	1.8	0	-	-	0.2	-	-	0				

HCM 6th Roundabout  
9: Allen Ranch Road & Old Stagecoach Road

Existing Traffic Conditions  
AM Peak Hour

Intersection			
Intersection Delay, s/veh	3.2		
Intersection LOS	A		
Approach	EB	WB	NB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	16	28	4
Demand Flow Rate, veh/h	18	33	5
Vehicles Circulating, veh/h	4	0	8
Vehicles Exiting, veh/h	29	13	14
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	3.1	3.3	3.3
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
Entry Flow, veh/h	18	33	5
Cap Entry Lane, veh/h	1374	1380	1369
Entry HV Adj Factor	0.889	0.847	0.800
Flow Entry, veh/h	16	28	4
Cap Entry, veh/h	1222	1169	1095
V/C Ratio	0.013	0.024	0.004
Control Delay, s/veh	3.1	3.3	3.3
LOS	A	A	A
95th %tile Queue, veh	0	0	0

HCM 6th Roundabout  
10: Shortwall Drive & Old Stagecoach Road & Stagecoach Road

Existing Traffic Conditions

AM Peak Hour

























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	11	38	19
Demand Flow Rate, veh/h	13	42	20
Vehicles Circulating, veh/h	16	5	5
Vehicles Exiting, veh/h	31	20	23
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	3.2	3.1	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
Entry Flow, veh/h	13	42	20
Cap Entry Lane, veh/h	1358	1373	1373
Entry HV Adj Factor	0.846	0.905	0.950
Flow Entry, veh/h	11	38	19
Cap Entry, veh/h	1149	1242	1304
V/C Ratio	0.010	0.031	0.015
Control Delay, s/veh	3.2	3.1	2.9
LOS	A	A	A
95th %tile Queue, veh	0	0	0

# Timings

## 1: State Highway 83 & Hodgen Road

# Existing Traffic Conditions

PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	178	52	110	96	144	51	341	169	207	331	60
Future Volume (vph)	26	178	52	110	96	144	51	341	169	207	331	60
Satd. Flow (prot)	1736	1827	1524	1787	1863	1553	1770	1863	1599	1687	1841	0
Flt Permitted	0.688			0.575			0.392			0.481		
Satd. Flow (perm)	1257	1827	1524	1082	1863	1553	730	1863	1599	854	1841	0
Satd. Flow (RTOR)			135			160			184		15	
Lane Group Flow (vph)	29	196	57	122	107	160	55	371	184	246	465	0
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		
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	
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	0.10	0.48	0.13	0.51	0.26	0.34	0.11	0.42	0.22	0.46	0.53	
Control Delay	26.3	32.1	0.6	36.2	28.0	6.9	6.6	16.2	2.8	10.4	17.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	26.3	32.1	0.6	36.2	28.0	6.9	6.6	16.2	2.8	10.4	17.5	
LOS	C	C	A	D	C	A	A	B	A	B	B	
Approach Delay		25.2			21.9			11.3			15.0	
Approach LOS		C			C			B			B	
Queue Length 50th (ft)	12	87	0	54	45	0	10	119	0	48	154	
Queue Length 95th (ft)	33	151	0	109	88	46	22	188	32	74	216	
Internal Link Dist (ft)		824			1611			1078			1286	
Turn Bay Length (ft)	420		420	350		350	120		650	525		
Base Capacity (vph)	279	406	443	240	414	469	482	874	847	536	871	
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	0.10	0.48	0.13	0.51	0.26	0.34	0.11	0.42	0.22	0.46	0.53	

### 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: 70

Control Type: Pretimed

Maximum v/c Ratio: 0.53

Intersection Signal Delay: 16.7

Intersection LOS: B

Intersection Capacity Utilization 77.5%

ICU Level of Service D

Analysis Period (min) 15







## Timings

### 1: State Highway 83 & Hodgen Road

## Existing Traffic Conditions

PM Peak Hour

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

 Ø1	 Ø2 (R)	 Ø4
12 s	45 s	24 s
 Ø5	 Ø6 (R)	 Ø8
12 s	45 s	24 s

HCM 6th TWSC  
2: State Highway 83 & Stagecoach Road

Existing Traffic Conditions  
PM Peak Hour






















Intersection												
Int Delay, s/veh	1.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	0	3	26	3	5	1	595	13	4	457	0
Future Vol, veh/h	1	0	3	26	3	5	1	595	13	4	457	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	-	-	-	-	-	135	-	-	320	415	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	50	50	50	60	60	60	84	84	84	88	88	88
Heavy Vehicles, %	0	0	0	0	0	20	0	2	8	0	2	0
Mvmt Flow	2	0	6	43	5	8	1	708	15	5	519	0
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1253	1254	519	1242	1239	708	519	0	0	723	0	0
Stage 1	529	529	-	710	710	-	-	-	-	-	-	-
Stage 2	724	725	-	532	529	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.4	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.48	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	150	173	561	153	177	406	1057	-	-	889	-	-
Stage 1	537	530	-	428	440	-	-	-	-	-	-	-
Stage 2	420	433	-	535	530	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	143	172	561	151	176	406	1057	-	-	889	-	-
Mov Cap-2 Maneuver	143	172	-	151	176	-	-	-	-	-	-	-
Stage 1	536	527	-	427	439	-	-	-	-	-	-	-
Stage 2	406	432	-	526	527	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	16.4		35.3		0		0.1					
HCM LOS	C		E									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1WBLn2	SBL	SBT	SBR					
Capacity (veh/h)	1057	-	-	324 153 406	889	-	-					
HCM Lane V/C Ratio	0.001	-	-	0.025 0.316 0.021	0.005	-	-					
HCM Control Delay (s)	8.4	0	-	16.4 39 14.1	9.1	-	-					
HCM Lane LOS	A	A	-	C E B	A	-	-					
HCM 95th %tile Q(veh)	0	-	-	0.1 1.3 0.1	0	-	-					

# Timings

## 3: State Highway 83 & North Gate Boulevard

### Existing Traffic Conditions

PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	106	0	411	0	0	0	400	646	2	1	498	79
Future Volume (vph)	106	0	411	0	0	0	400	646	2	1	498	79
Satd. Flow (prot)	1787	1900	1615	0	1900	0	1787	3610	0	1805	3539	1615
Flt Permitted	0.757						0.321			0.390		
Satd. Flow (perm)	1424	1900	1615	0	1900	0	604	3610	0	741	3539	1615
Satd. Flow (RTOR)			526					1				104
Lane Group Flow (vph)	113	0	437	0	0	0	426	689	0	1	572	91
Turn Type	Perm		Perm				pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		6
Detector Phase	4	4	4	8	8		5	2		6	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	5.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0		10.0	12.0		11.0	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	35.0
Total Split (%)	28.6%	28.6%	28.6%	28.6%	28.6%		29.8%	71.4%		41.7%	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	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	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0		5.0	7.0		6.0	6.0	6.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None	None	None	None	None		Max	Max		Max	Max	Max
Act Effct Green (s)	11.6		11.6				55.1	53.1		29.1	29.1	29.1
Actuated g/C Ratio	0.15		0.15				0.71	0.68		0.37	0.37	0.37
v/c Ratio	0.54		0.64				0.58	0.28		0.00	0.43	0.14
Control Delay	39.8		5.6				8.4	5.6		17.0	20.1	4.0
Queue Delay	0.0		0.0				0.0	0.0		0.0	0.0	0.0
Total Delay	39.8		5.6				8.4	5.6		17.0	20.1	4.0
LOS	D		A				A	A		B	C	A
Approach Delay		12.6						6.7			17.9	
Approach LOS		B						A			B	
Queue Length 50th (ft)	51		0				64	57		0	105	0
Queue Length 95th (ft)	100		31				137	104		3	162	23
Internal Link Dist (ft)		997			136			1617			2154	
Turn Bay Length (ft)	225		285				900			750		730
Base Capacity (vph)	330		778				733	2468		277	1323	669
Starvation Cap Reductn	0		0				0	0		0	0	0
Spillback Cap Reductn	0		0				0	0		0	0	0
Storage Cap Reductn	0		0				0	0		0	0	0
Reduced v/c Ratio	0.34		0.56				0.58	0.28		0.00	0.43	0.14

### Intersection Summary

Cycle Length: 84

Actuated Cycle Length: 77.7

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.64

# Timings 3: State Highway 83 & North Gate Boulevard

## Existing Traffic Conditions

PM Peak Hour

Intersection Signal Delay: 11.3






Intersection LOS: B

Intersection Capacity Utilization 56.0%

ICU Level of Service B

Analysis Period (min) 15







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

 Ø2 60 s		 Ø4 24 s	
 Ø5 25 s		 Ø6 35 s	
		 Ø8 24 s	



Timings  
4: State Highway 83 & Shoup Road

Existing Traffic Conditions  
PM Peak Hour

						
Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↑↑	↑	↵	↑↑	↵	↑
Traffic Volume (vph)	1035	247	183	804	112	86
Future Volume (vph)	1035	247	183	804	112	86
Satd. Flow (prot)	3574	1615	1805	3539	1736	1599
Flt Permitted			0.187			
Satd. Flow (perm)	3574	1615	355	3539	1827	1599
Satd. Flow (RTOR)		255				96
Lane Group Flow (vph)	1067	255	197	865	124	96
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 Effect Green (s)	43.7	43.7	60.1	57.6	10.8	10.8
Actuated g/C Ratio	0.53	0.53	0.73	0.70	0.13	0.13
v/c Ratio	0.56	0.26	0.47	0.35	0.51	0.33
Control Delay	15.1	2.6	7.5	5.5	40.8	10.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.1	2.6	7.5	5.5	40.8	10.4
LOS	B	A	A	A	D	B
Approach Delay	12.7			5.9	27.5	
Approach LOS	B			A	C	
Queue Length 50th (ft)	174	0	24	76	60	0
Queue Length 95th (ft)	296	40	53	125	112	40
Internal Link Dist (ft)	1042			1734	675	
Turn Bay Length (ft)		710	980			500
Base Capacity (vph)	1906	980	526	2487	536	536
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	0.56	0.26	0.37	0.35	0.23	0.18
Intersection Summary						
Cycle Length: 95						
Actuated Cycle Length: 81.9						
Natural Cycle: 60						
Control Type: Actuated-Uncoordinated						
Maximum v/c Ratio: 0.56						

## Timings

### 4: State Highway 83 & Shoup Road

## Existing Traffic Conditions

PM Peak Hour

Intersection Signal Delay: 11.2

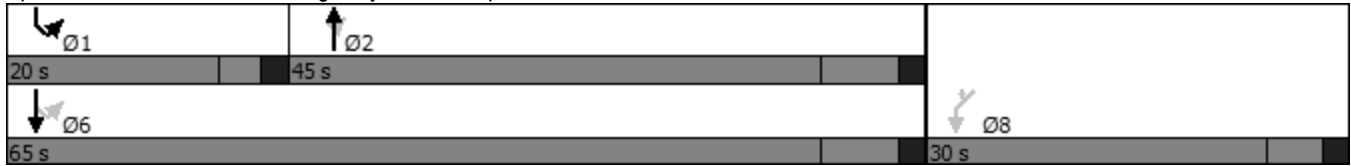
Intersection LOS: B

Intersection Capacity Utilization 60.4%

ICU Level of Service B

Analysis Period (min) 15

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



















# Timings

## 5: Black Forest Road & Shoup Road

### Existing Traffic Conditions

PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	146	92	16	45	6	47	156	20	15	142	56
Future Volume (vph)	62	146	92	16	45	6	47	156	20	15	142	56
Satd. Flow (prot)	0	1770	0	0	1803	0	0	1817	0	0	1760	0
Flt Permitted		0.907			0.864			0.896			0.973	
Satd. Flow (perm)	0	1622	0	0	1577	0	0	1645	0	0	1718	0
Satd. Flow (RTOR)		26			6			9			31	
Lane Group Flow (vph)	0	337	0	0	84	0	0	276	0	0	229	0
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 Effect Green (s)		20.5			20.5			49.2			49.2	
Actuated g/C Ratio		0.25			0.25			0.60			0.60	
v/c Ratio		0.79			0.21			0.28			0.22	
Control Delay		40.2			23.1			9.5			8.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		40.2			23.1			9.5			8.1	
LOS		D			C			A			A	
Approach Delay		40.2			23.1			9.5			8.1	
Approach LOS		D			C			A			A	
Queue Length 50th (ft)		149			31			59			42	
Queue Length 95th (ft)		238			57			110			95	
Internal Link Dist (ft)		965			1070			1292			16527	
Turn Bay Length (ft)												
Base Capacity (vph)		594			565			993			1046	
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		0.57			0.15			0.28			0.22	
Intersection Summary												
Cycle Length: 90												
Actuated Cycle Length: 81.8												
Natural Cycle: 40												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.79												

Timings  
5: Black Forest Road & Shoup Road

Existing Traffic Conditions  
PM Peak Hour

Intersection Signal Delay: 21.6





Intersection LOS: C

Intersection Capacity Utilization 55.8%

ICU Level of Service B

Analysis Period (min) 15

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

 Ø2	 Ø4
55 s	35 s
 Ø6	 Ø8
55 s	35 s










HCM 6th TWSC  
6: Black Forest Road & Old Stagecoach Road/Terra Ridge Circle

Existing Traffic Conditions  
PM Peak Hour

Intersection													
Int Delay, s/veh	1												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↕			↕			↕			↕			
Traffic Vol, veh/h	3	2	6	2	2	2	3	111	0	5	111	1	
Future Vol, veh/h	3	2	6	2	2	2	3	111	0	5	111	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	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	4	3	9	2	2	2	4	156	0	5	121	1	
Major/Minor	Minor2		Minor1			Major1			Major2				
Conflicting Flow All	298	296	122	302	296	156	122	0	0	156	0	0	
Stage 1	132	132	-	164	164	-	-	-	-	-	-	-	
Stage 2	166	164	-	138	132	-	-	-	-	-	-	-	
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	597	619	935	654	619	895	1478	-	-	1436	-	-	
Stage 1	802	791	-	843	766	-	-	-	-	-	-	-	
Stage 2	768	766	-	870	791	-	-	-	-	-	-	-	
Platoon blocked, %								-	-	-			-
Mov Cap-1 Maneuver	590	615	935	642	615	895	1478	-	-	1436	-	-	
Mov Cap-2 Maneuver	590	615	-	642	615	-	-	-	-	-	-	-	
Stage 1	800	788	-	840	764	-	-	-	-	-	-	-	
Stage 2	761	764	-	855	788	-	-	-	-	-	-	-	
Approach	EB		WB			NB			SB				
HCM Control Delay, s	9.9		10.2			0.2			0.3				
HCM LOS	A		B										
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1478	-	-	746	698	1436	-	-					
HCM Lane V/C Ratio	0.003	-	-	0.021	0.01	0.004	-	-					
HCM Control Delay (s)	7.4	0	-	9.9	10.2	7.5	0	-					
HCM Lane LOS	A	A	-	A	B	A	A	-					
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	-	-					

HCM 6th TWSC  
7: Ridge Run Road/Black Forest Road & Hodgen Road

Existing Traffic Conditions  
PM Peak Hour

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	59	384	17	2	209	11	16	2	4	27	1	21
Future Vol, veh/h	59	384	17	2	209	11	16	2	4	27	1	21
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	66	431	19	2	238	13	26	3	7	39	1	30

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	251	0	0	450	0	0	827	818	431	827	831	245
Stage 1	-	-	-	-	-	-	563	563	-	249	249	-
Stage 2	-	-	-	-	-	-	264	255	-	578	582	-
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	1326	-	-	1121	-	-	286	313	578	288	307	799
Stage 1	-	-	-	-	-	-	504	512	-	751	704	-
Stage 2	-	-	-	-	-	-	732	700	-	498	502	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1326	-	-	1121	-	-	263	297	578	271	291	799
Mov Cap-2 Maneuver	-	-	-	-	-	-	263	297	-	271	291	-
Stage 1	-	-	-	-	-	-	479	486	-	713	703	-
Stage 2	-	-	-	-	-	-	701	699	-	465	477	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	1			0.1			18.3			15.8		
HCM LOS							C			C		

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	263	439	1326	-	-	1121	-	-	271	740
HCM Lane V/C Ratio	0.1	0.022	0.05	-	-	0.002	-	-	0.144	0.043
HCM Control Delay (s)	20.2	13.4	7.9	-	-	8.2	-	-	20.5	10.1
HCM Lane LOS	C	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.3	0.1	0.2	-	-	0	-	-	0.5	0.1

HCM 6th TWSC  
8: Black Forest Road/Black Forrest Road & Hodgen Road

Existing Traffic Conditions  
PM Peak Hour

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	2	402	85	30	214	0	55	1	59	0	0	0
Future Vol, veh/h	2	402	85	30	214	0	55	1	59	0	0	0
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	462	98	33	235	0	71	1	76	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	235	0	0	560	0	0	767	767	462	855	865	235
Stage 1	-	-	-	-	-	-	466	466	-	301	301	-
Stage 2	-	-	-	-	-	-	301	301	-	554	564	-
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	1344	-	-	1021	-	-	319	335	594	281	294	809
Stage 1	-	-	-	-	-	-	577	566	-	712	669	-
Stage 2	-	-	-	-	-	-	708	669	-	520	512	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1344	-	-	1021	-	-	311	324	594	238	284	809
Mov Cap-2 Maneuver	-	-	-	-	-	-	311	324	-	238	284	-
Stage 1	-	-	-	-	-	-	576	565	-	711	648	-
Stage 2	-	-	-	-	-	-	685	648	-	452	511	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.1	18.5	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	412	1344	-	-	1021	-	-	-
HCM Lane V/C Ratio	0.358	0.002	-	-	0.032	-	-	-
HCM Control Delay (s)	18.5	7.7	0	-	8.6	-	-	0
HCM Lane LOS	C	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	1.6	0	-	-	0.1	-	-	-

HCM 6th Roundabout  
9: Allen Ranch Road & Old Stagecoach Road

Existing Traffic Conditions  
PM Peak Hour

Intersection			
Intersection Delay, s/veh	2.7		
Intersection LOS	A		
Approach	EB	WB	NB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	24	8	4
Demand Flow Rate, veh/h	24	8	4
Vehicles Circulating, veh/h	3	0	24
Vehicles Exiting, veh/h	5	28	3
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	2.8	2.7	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
Entry Flow, veh/h	24	8	4
Cap Entry Lane, veh/h	1376	1380	1346
Entry HV Adj Factor	1.000	1.000	1.000
Flow Entry, veh/h	24	8	4
Cap Entry, veh/h	1376	1380	1346
V/C Ratio	0.017	0.006	0.003
Control Delay, s/veh	2.8	2.7	2.7
LOS	A	A	A
95th %tile Queue, veh	0	0	0



HCM 6th Roundabout  
10: Shortwall Drive & Old Stagecoach Road & Stagecoach Road

Existing Traffic Conditions  
PM Peak Hour

























Intersection			
Intersection Delay, s/veh	2.8		
Intersection LOS	A		
Approach	WB	NB	SE
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	32	24	16
Demand Flow Rate, veh/h	32	24	16
Vehicles Circulating, veh/h	9	1	28
Vehicles Exiting, veh/h	16	43	13
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	2.8	2.7	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
Entry Flow, veh/h	32	24	16
Cap Entry Lane, veh/h	1367	1378	1341
Entry HV Adj Factor	1.000	1.000	1.000
Flow Entry, veh/h	32	24	16
Cap Entry, veh/h	1367	1378	1341
V/C Ratio	0.023	0.017	0.012
Control Delay, s/veh	2.8	2.7	2.8
LOS	A	A	A
95th %tile Queue, veh	0	0	0

# Timings

## 1: State Highway 83 & Hodgen Road

# Background Traffic Conditions

Year 2027 - AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	88	34	279	173	240	39	305	83	117	418	63
Future Volume (vph)	100	88	34	279	173	240	39	305	83	117	418	63
Satd. Flow (prot)	1719	1827	1568	1787	1845	1482	1703	1792	1568	1671	1799	0
Flt Permitted	0.614			0.676			0.301			0.517		
Satd. Flow (perm)	1111	1827	1568	1272	1845	1482	540	1792	1568	910	1799	0
Satd. Flow (RTOR)			135			245			121		13	
Lane Group Flow (vph)	143	126	49	285	177	245	43	335	91	138	566	0
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		
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	
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	0.58	0.31	0.11	1.01	0.43	0.47	0.11	0.40	0.11	0.25	0.67	
Control Delay	38.9	28.9	0.5	91.0	31.0	7.2	6.6	15.8	1.7	7.5	20.9	
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	38.9	28.9	0.5	91.0	31.0	7.2	6.6	15.8	1.7	7.5	20.9	
LOS	D	C	A	F	C	A	A	B	A	A	C	
Approach Delay		29.0			46.9			12.3			18.3	
Approach LOS		C			D			B			B	
Queue Length 50th (ft)	65	54	0	~147	78	0	7	106	0	25	207	
Queue Length 95th (ft)	92	76	0	#301	137	56	18	170	15	44	290	
Internal Link Dist (ft)		824			1611			1078			1286	
Turn Bay Length (ft)	420		420	350		350	120		650	525		
Base Capacity (vph)	246	406	453	282	410	519	386	840	799	561	850	
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	0.58	0.31	0.11	1.01	0.43	0.47	0.11	0.40	0.11	0.25	0.67	

### 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: 1.01

Intersection Signal Delay: 27.8

Intersection LOS: C

Intersection Capacity Utilization 78.6%

ICU Level of Service D

Analysis Period (min) 15

## Timings

### 1: State Highway 83 & Hodgen Road

## Background Traffic Conditions

Year 2027 - AM Peak Hour







~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

 Ø1	 Ø2 (R)	 Ø4
12 s	45 s	24 s
 Ø5	 Ø6 (R)	 Ø8
12 s	45 s	24 s

HCM 6th TWSC  
2: State Highway 83 & Stagecoach Road

Background Traffic Conditions  
Year 2027 - AM Peak Hour






















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	1	1	5	23	0	7	0	434	32	2	727	1
Future Vol, veh/h	1	1	5	23	0	7	0	434	32	2	727	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	-	-	-	-	-	135	-	-	320	415	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	56	56	56	84	84	84	91	91	91	81	81	81
Heavy Vehicles, %	0	0	50	0	0	33	0	8	14	50	2	100
Mvmt Flow	2	2	9	27	0	8	0	477	35	2	898	1
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1402	1415	899	1385	1380	477	899	0	0	512	0	0
Stage 1	903	903	-	477	477	-	-	-	-	-	-	-
Stage 2	499	512	-	908	903	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.7	7.1	6.5	6.53	4.1	-	-	4.6	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.75	3.5	4	3.597	2.2	-	-	2.65	-	-
Pot Cap-1 Maneuver	119	139	277	122	146	530	764	-	-	848	-	-
Stage 1	335	359	-	573	559	-	-	-	-	-	-	-
Stage 2	557	540	-	332	359	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	117	139	277	117	146	530	764	-	-	848	-	-
Mov Cap-2 Maneuver	117	139	-	117	146	-	-	-	-	-	-	-
Stage 1	335	358	-	573	559	-	-	-	-	-	-	-
Stage 2	548	540	-	319	358	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	23.5		37.2		0		0					
HCM LOS	C		E									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1WBLn2	SBL	SBT	SBR					
Capacity (veh/h)	764	-	-	207 117 530	848	-	-					
HCM Lane V/C Ratio	-	-	-	0.06 0.234 0.016	0.003	-	-					
HCM Control Delay (s)	0	-	-	23.5 44.9 11.9	9.3	-	-					
HCM Lane LOS	A	-	-	C E B	A	-	-					
HCM 95th %tile Q(veh)	0	-	-	0.2 0.9 0	0	-	-					

# Timings

## 3: State Highway 83 & North Gate Boulevard

### Background Traffic Conditions

Year 2027 - AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	0	373	0	0	0	599	450	0	0	786	148
Future Volume (vph)	53	0	373	0	0	0	599	450	0	0	786	148
Satd. Flow (prot)	1656	1900	1583	0	1900	0	1770	3438	0	1900	3539	1583
Flt Permitted	0.757						0.164					
Satd. Flow (perm)	1320	1900	1583	0	1900	0	305	3438	0	1900	3539	1583
Satd. Flow (RTOR)			472									172
Lane Group Flow (vph)	58	0	410	0	0	0	713	536	0	0	914	172
Turn Type	Perm		Perm				pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		6
Detector Phase	4	4	4	8	8		5	2		6	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	5.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0		10.0	12.0		11.0	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	35.0
Total Split (%)	28.6%	28.6%	28.6%	28.6%	28.6%		29.8%	71.4%		41.7%	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	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	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0		5.0	7.0		6.0	6.0	6.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None	None	None	None	None		Max	Max		Max	Max	Max
Act Effct Green (s)	8.9		8.9				55.0	53.0			29.0	29.0
Actuated g/C Ratio	0.12		0.12				0.73	0.71			0.39	0.39
v/c Ratio	0.37		0.68				1.16	0.22			0.67	0.24
Control Delay	36.9		7.9				109.9	4.4			22.4	3.9
Queue Delay	0.0		0.0				0.0	0.0			0.0	0.0
Total Delay	36.9		7.9				109.9	4.4			22.4	3.9
LOS	D		A				F	A			C	A
Approach Delay		11.5						64.6			19.5	
Approach LOS		B						E			B	
Queue Length 50th (ft)	25		0				~325	36			178	0
Queue Length 95th (ft)	59		44				#521	62			252	34
Internal Link Dist (ft)		997			136			1617			2154	
Turn Bay Length (ft)	225		285				900					730
Base Capacity (vph)	317		738				614	2431			1369	718
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	0.18		0.56				1.16	0.22			0.67	0.24

### Intersection Summary

Cycle Length: 84

Actuated Cycle Length: 75

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.16

# Timings 3: State Highway 83 & North Gate Boulevard

Background Traffic Conditions  
Year 2027 - AM Peak Hour

Intersection Signal Delay: 38.2

Intersection LOS: D

Intersection Capacity Utilization 73.2%

ICU Level of Service D

Analysis Period (min) 15






~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

 Ø2 60 s		 Ø4 24 s	
 Ø5 25 s	 Ø6 35 s	 Ø8 24 s	

# Timings

## 4: State Highway 83 & Shoup Road

### Background Traffic Conditions

Year 2027 - AM Peak Hour

	↑	↗	↘	↓	↙	↖
Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↑↑	↗	↘	↑↑	↘	↗
Traffic Volume (vph)	916	112	81	1113	334	239
Future Volume (vph)	916	112	81	1113	334	239
Satd. Flow (prot)	3438	1568	1703	3539	1787	1583
Flt Permitted			0.182			
Satd. Flow (perm)	3438	1568	326	3539	1881	1583
Satd. Flow (RTOR)		127				263
Lane Group Flow (vph)	1041	127	90	1237	367	263
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 Effect Green (s)	47.5	47.5	60.1	57.6	21.5	21.5
Actuated g/C Ratio	0.51	0.51	0.65	0.62	0.23	0.23
v/c Ratio	0.59	0.15	0.28	0.56	0.84	0.46
Control Delay	19.0	3.3	8.9	11.8	52.2	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.0	3.3	8.9	11.8	52.2	6.7
LOS	B	A	A	B	D	A
Approach Delay	17.3			11.6	33.2	
Approach LOS	B			B	C	
Queue Length 50th (ft)	238	0	19	218	206	0
Queue Length 95th (ft)	309	29	37	277	#338	59
Internal Link Dist (ft)	1042			1734	675	
Turn Bay Length (ft)		710	980			500
Base Capacity (vph)	1763	866	435	2201	488	605
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	0.15	0.21	0.56	0.75	0.43
Intersection Summary						
Cycle Length: 95						
Actuated Cycle Length: 92.6						
Natural Cycle: 60						
Control Type: Actuated-Uncoordinated						
Maximum v/c Ratio: 0.84						

## Timings

### 4: State Highway 83 & Shoup Road

## Background Traffic Conditions

Year 2027 - AM Peak Hour

Intersection Signal Delay: 18.1

Intersection LOS: B

Intersection Capacity Utilization 63.7%





ICU Level of Service B

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

 Ø1	 Ø2	
20 s	45 s	
 Ø6		 Ø8
65 s		30 s



















# Timings

## 5: Black Forest Road & Shoup Road

### Background Traffic Conditions

Year 2027 - AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	61	45	16	128	9	97	162	10	6	175	116
Future Volume (vph)	68	61	45	16	128	9	97	162	10	6	175	116
Satd. Flow (prot)	0	1678	0	0	1836	0	0	1688	0	0	1670	0
Flt Permitted		0.780			0.957			0.733			0.993	
Satd. Flow (perm)	0	1334	0	0	1765	0	0	1260	0	0	1660	0
Satd. Flow (RTOR)		21			4			3			56	
Lane Group Flow (vph)	0	200	0	0	165	0	0	305	0	0	450	0
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 Effect Green (s)		14.9			14.9			49.2			49.2	
Actuated g/C Ratio		0.20			0.20			0.65			0.65	
v/c Ratio		0.72			0.48			0.37			0.41	
Control Delay		40.6			30.7			8.8			7.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		40.6			30.7			8.8			7.8	
LOS		D			C			A			A	
Approach Delay		40.6			30.7			8.8			7.8	
Approach LOS		D			C			A			A	
Queue Length 50th (ft)		80			68			57			75	
Queue Length 95th (ft)		141			122			130			103	
Internal Link Dist (ft)		965			1070			1292			16527	
Turn Bay Length (ft)												
Base Capacity (vph)		523			677			815			1092	
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		0.38			0.24			0.37			0.41	
Intersection Summary												
Cycle Length: 90												
Actuated Cycle Length: 76.1												
Natural Cycle: 40												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.72												





Timings  
5: Black Forest Road & Shoup Road

Background Traffic Conditions  
Year 2027 - AM Peak Hour

Intersection Signal Delay: 17.3  
Intersection Capacity Utilization 69.0%  
Analysis Period (min) 15

Intersection LOS: B  
ICU Level of Service C










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

 Ø2	 Ø4
55 s	35 s
 Ø6	 Ø8
55 s	35 s

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	1	0	5	6	1	2	8	96	1	1	132	3
Future Vol, veh/h	1	0	5	6	1	2	8	96	1	1	132	3
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	2	0	11	9	1	3	10	123	1	1	165	4
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	315	313	167	319	315	124	169	0	0	124	0	0
Stage 1	169	169	-	144	144	-	-	-	-	-	-	-
Stage 2	146	144	-	175	171	-	-	-	-	-	-	-
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	485	606	821	638	604	932	1421	-	-	1027	-	-
Stage 1	649	763	-	864	782	-	-	-	-	-	-	-
Stage 2	670	782	-	832	761	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	479	601	821	625	599	932	1421	-	-	1027	-	-
Mov Cap-2 Maneuver	479	601	-	625	599	-	-	-	-	-	-	-
Stage 1	644	762	-	857	776	-	-	-	-	-	-	-
Stage 2	661	776	-	820	760	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	10		10.5			0.6			0.1			
HCM LOS	B		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1421	-	-	734	671	1027	-	-				
HCM Lane V/C Ratio	0.007	-	-	0.019	0.02	0.001	-	-				
HCM Control Delay (s)	7.6	0	-	10	10.5	8.5	0	-				
HCM Lane LOS	A	A	-	B	B	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-				

HCM 6th TWSC  
7: Ridge Run Road/Black Forest Road & Hodgen Road

Background Traffic Conditions  
Year 2027 - AM Peak Hour

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	14	166	6	0	509	13	8	0	0	13	0	49
Future Vol, veh/h	14	166	6	0	509	13	8	0	0	13	0	49
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	20	237	9	0	559	14	11	0	0	21	0	78
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	573	0	0	246	0	0	882	850	237	848	852	566
Stage 1	-	-	-	-	-	-	277	277	-	566	566	-
Stage 2	-	-	-	-	-	-	605	573	-	282	286	-
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	829	-	-	1332	-	-	254	300	807	274	299	528
Stage 1	-	-	-	-	-	-	704	685	-	497	511	-
Stage 2	-	-	-	-	-	-	465	507	-	710	679	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	829	-	-	1332	-	-	213	293	807	269	292	528
Mov Cap-2 Maneuver	-	-	-	-	-	-	213	293	-	269	292	-
Stage 1	-	-	-	-	-	-	687	669	-	485	511	-
Stage 2	-	-	-	-	-	-	397	507	-	693	663	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.7			0			22.8			14.4		
HCM LOS							C			B		
Minor Lane/Major Mvmt	NBLn1 NBLn2		EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2		
Capacity (veh/h)	213		-	829	-	-	1332	-	-	269	528	
HCM Lane V/C Ratio	0.05		-	0.024	-	-	-	-	-	0.077	0.147	
HCM Control Delay (s)	22.8		0	9.4	-	-	0	-	-	19.5	13	
HCM Lane LOS	C		A	A	-	-	A	-	-	C	B	
HCM 95th %tile Q(veh)	0.2		-	0.1	-	-	0	-	-	0.2	0.5	

Intersection												
Int Delay, s/veh	5.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↖	↕			↕			↕	
Traffic Vol, veh/h	2	176	66	71	507	1	107	0	36	0	0	2
Future Vol, veh/h	2	176	66	71	507	1	107	0	36	0	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	2	212	80	75	534	1	119	0	40	0	0	3
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	535	0	0	292	0	0	902	901	212	961	981	535
Stage 1	-	-	-	-	-	-	216	216	-	685	685	-
Stage 2	-	-	-	-	-	-	686	685	-	276	296	-
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	679	-	-	1270	-	-	252	280	808	238	251	549
Stage 1	-	-	-	-	-	-	773	728	-	441	451	-
Stage 2	-	-	-	-	-	-	428	451	-	735	672	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	679	-	-	1270	-	-	239	262	808	215	235	549
Mov Cap-2 Maneuver	-	-	-	-	-	-	239	262	-	215	235	-
Stage 1	-	-	-	-	-	-	770	725	-	439	424	-
Stage 2	-	-	-	-	-	-	401	424	-	696	669	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			1			31.3			11.6		
HCM LOS							D			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	291	679	-	-	1270	-	-	549				
HCM Lane V/C Ratio	0.546	0.004	-	-	0.059	-	-	0.005				
HCM Control Delay (s)	31.3	10.3	0	-	8	-	-	11.6				
HCM Lane LOS	D	B	A	-	A	-	-	B				
HCM 95th %tile Q(veh)	3	0	-	-	0.2	-	-	0				

HCM 6th Roundabout  
9: Allen Ranch Road & Old Stagecoach Road

Background Traffic Conditions  
Year 2027 - AM Peak Hour

Intersection			
Intersection Delay, s/veh	3.2		
Intersection LOS	A		
Approach	EB	WB	NB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	20	32	4
Demand Flow Rate, veh/h	22	38	5
Vehicles Circulating, veh/h	4	0	10
Vehicles Exiting, veh/h	34	15	16
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	3.0	3.3	3.3
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
Entry Flow, veh/h	22	38	5
Cap Entry Lane, veh/h	1374	1380	1366
Entry HV Adj Factor	0.909	0.845	0.800
Flow Entry, veh/h	20	32	4
Cap Entry, veh/h	1249	1166	1093
V/C Ratio	0.016	0.028	0.004
Control Delay, s/veh	3.0	3.3	3.3
LOS	A	A	A
95th %tile Queue, veh	0	0	0

HCM 6th Roundabout  
10: Shortwall Drive & Old Stagecoach Road & Stagecoach Road

Background Traffic Conditions  
Year 2027 - AM Peak Hour

























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	13	44	22
Demand Flow Rate, veh/h	13	53	24
Vehicles Circulating, veh/h	21	6	5
Vehicles Exiting, veh/h	38	23	29
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	2.7	3.5	3.0
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
Entry Flow, veh/h	13	53	24
Cap Entry Lane, veh/h	1351	1371	1373
Entry HV Adj Factor	1.000	0.830	0.917
Flow Entry, veh/h	13	44	22
Cap Entry, veh/h	1351	1139	1258
V/C Ratio	0.010	0.039	0.017
Control Delay, s/veh	2.7	3.5	3.0
LOS	A	A	A
95th %tile Queue, veh	0	0	0

# Timings

## 1: State Highway 83 & Hodgen Road

# Background Traffic Conditions

Year 2027 - PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	206	60	128	111	167	59	395	196	240	384	70
Future Volume (vph)	30	206	60	128	111	167	59	395	196	240	384	70
Satd. Flow (prot)	1736	1827	1524	1787	1863	1553	1770	1863	1599	1687	1841	0
Flt Permitted	0.678			0.513			0.324			0.426		
Satd. Flow (perm)	1239	1827	1524	965	1863	1553	604	1863	1599	756	1841	0
Satd. Flow (RTOR)			135			186			213		15	
Lane Group Flow (vph)	33	226	66	142	123	186	64	429	213	286	540	0
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		
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	
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	0.12	0.56	0.15	0.66	0.30	0.38	0.15	0.49	0.25	0.59	0.62	
Control Delay	26.6	34.0	0.7	46.0	28.6	6.9	6.9	17.2	2.7	13.6	19.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	26.6	34.0	0.7	46.0	28.6	6.9	6.9	17.2	2.7	13.6	19.5	
LOS	C	C	A	D	C	A	A	B	A	B	B	
Approach Delay		26.5			25.1			11.9			17.4	
Approach LOS		C			C			B			B	
Queue Length 50th (ft)	13	102	0	66	52	0	11	143	0	58	190	
Queue Length 95th (ft)	37	173	2	#149	99	50	25	222	34	87	263	
Internal Link Dist (ft)		824			1611			1078			1286	
Turn Bay Length (ft)	420		420	350		350	120		650	525		
Base Capacity (vph)	275	406	443	214	414	489	421	874	863	488	871	
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	0.12	0.56	0.15	0.66	0.30	0.38	0.15	0.49	0.25	0.59	0.62	

### 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: 70

Control Type: Pretimed

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 18.5

Intersection LOS: B

Intersection Capacity Utilization 81.2%

ICU Level of Service D

Analysis Period (min) 15



## Timings

### 1: State Highway 83 & Hodgen Road







## Background Traffic Conditions

Year 2027 - PM Peak Hour

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

 Ø1	 Ø2 (R)	 Ø4
12 s	45 s	24 s
 Ø5	 Ø6 (R)	 Ø8
12 s	45 s	24 s

HCM 6th TWSC  
2: State Highway 83 & Stagecoach Road

Background Traffic Conditions  
Year 2027 - PM Peak Hour






















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	1	0	3	30	3	6	1	690	15	5	530	0
Future Vol, veh/h	1	0	3	30	3	6	1	690	15	5	530	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	-	-	-	-	-	135	-	-	320	415	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	50	50	50	60	60	60	84	84	84	88	88	88
Heavy Vehicles, %	0	0	0	0	0	20	0	2	8	0	2	0
Mvmt Flow	2	0	6	50	5	10	1	821	18	6	602	0
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1454	1455	602	1440	1437	821	602	0	0	839	0	0
Stage 1	614	614	-	823	823	-	-	-	-	-	-	-
Stage 2	840	841	-	617	614	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.4	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.48	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	109	131	503	112	135	348	985	-	-	804	-	-
Stage 1	483	486	-	371	391	-	-	-	-	-	-	-
Stage 2	363	383	-	481	486	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	102	130	503	110	134	348	985	-	-	804	-	-
Mov Cap-2 Maneuver	102	130	-	110	134	-	-	-	-	-	-	-
Stage 1	482	483	-	370	390	-	-	-	-	-	-	-
Stage 2	347	382	-	472	483	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	19.6		57.2		0		0.1					
HCM LOS	C		F									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1WBLn2	SBL	SBT	SBR					
Capacity (veh/h)	985	-	-	254	112	348	804	-	-	-	-	-
HCM Lane V/C Ratio	0.001	-	-	0.031	0.491	0.029	0.007	-	-	-	-	-
HCM Control Delay (s)	8.7	0	-	19.6	64.8	15.7	9.5	-	-	-	-	-
HCM Lane LOS	A	A	-	C	F	C	A	-	-	-	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	2.2	0.1	0	-	-	-	-	-

# Timings

## 3: State Highway 83 & North Gate Boulevard

### Background Traffic Conditions

Year 2027 - PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	123	0	476	0	0	0	464	749	2	1	577	92
Future Volume (vph)	123	0	476	0	0	0	464	749	2	1	577	92
Satd. Flow (prot)	1787	1900	1615	0	1900	0	1787	3610	0	1805	3539	1615
Flt Permitted	0.757						0.268			0.350		
Satd. Flow (perm)	1424	1900	1615	0	1900	0	504	3610	0	665	3539	1615
Satd. Flow (RTOR)			504					1				106
Lane Group Flow (vph)	131	0	506	0	0	0	494	799	0	1	663	106
Turn Type	Perm		Perm				pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		6
Detector Phase	4	4	4	8	8		5	2		6	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	5.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0		10.0	12.0		11.0	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	35.0
Total Split (%)	28.6%	28.6%	28.6%	28.6%	28.6%		29.8%	71.4%		41.7%	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	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	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0		5.0	7.0		6.0	6.0	6.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None	None	None	None	None		Max	Max		Max	Max	Max
Act Effct Green (s)	12.5		12.5				55.1	53.1		29.1	29.1	29.1
Actuated g/C Ratio	0.16		0.16				0.70	0.67		0.37	0.37	0.37
v/c Ratio	0.58		0.74				0.73	0.33		0.00	0.51	0.16
Control Delay	40.9		10.5				15.4	6.2		18.0	21.6	4.9
Queue Delay	0.0		0.0				0.0	0.0		0.0	0.0	0.0
Total Delay	40.9		10.5				15.4	6.2		18.0	21.6	4.9
LOS	D		B				B	A		B	C	A
Approach Delay		16.8						9.7			19.3	
Approach LOS		B						A			B	
Queue Length 50th (ft)	60		1				83	72		0	129	0
Queue Length 95th (ft)	114		85				#259	125		3	190	30
Internal Link Dist (ft)		997			136			1617			2154	
Turn Bay Length (ft)	225		285				900			750		730
Base Capacity (vph)	326		758				679	2437		245	1307	663
Starvation Cap Reductn	0		0				0	0		0	0	0
Spillback Cap Reductn	0		0				0	0		0	0	0
Storage Cap Reductn	0		0				0	0		0	0	0
Reduced v/c Ratio	0.40		0.67				0.73	0.33		0.00	0.51	0.16
Intersection Summary												
Cycle Length: 84												
Actuated Cycle Length: 78.7												
Natural Cycle: 60												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.74												

# Timings 3: State Highway 83 & North Gate Boulevard

## Background Traffic Conditions

Year 2027 - PM Peak Hour

Intersection Signal Delay: 14.1

Intersection LOS: B

Intersection Capacity Utilization 62.6%






ICU Level of Service B

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

 Ø2 60 s		 Ø4 24 s	
 Ø5 25 s		 Ø6 35 s	
		 Ø8 24 s	

# Timings

## 4: State Highway 83 & Shoup Road

### Background Traffic Conditions

Year 2027 - PM Peak Hour

	↑	↗	↘	↓	↙	↖
Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↑↑	↗	↘	↑↑	↙	↖
Traffic Volume (vph)	1200	286	212	932	130	100
Future Volume (vph)	1200	286	212	932	130	100
Satd. Flow (prot)	3574	1615	1805	3539	1736	1599
Flt Permitted			0.128			
Satd. Flow (perm)	3574	1615	243	3539	1827	1599
Satd. Flow (RTOR)		295				111
Lane Group Flow (vph)	1237	295	228	1002	144	111
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 Effect Green (s)	42.1	42.1	60.1	57.6	11.7	11.7
Actuated g/C Ratio	0.51	0.51	0.73	0.70	0.14	0.14
v/c Ratio	0.68	0.31	0.61	0.41	0.56	0.34
Control Delay	19.1	2.9	15.2	6.3	41.5	9.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.1	2.9	15.2	6.3	41.5	9.8
LOS	B	A	B	A	D	A
Approach Delay	15.9			8.0	27.7	
Approach LOS	B			A	C	
Queue Length 50th (ft)	238	0	30	98	71	0
Queue Length 95th (ft)	391	44	105	160	127	43
Internal Link Dist (ft)	1042			1734	675	
Turn Bay Length (ft)		710	980			500
Base Capacity (vph)	1817	966	459	2459	530	542
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	0.68	0.31	0.50	0.41	0.27	0.20
Intersection Summary						
Cycle Length: 95						
Actuated Cycle Length: 82.8						
Natural Cycle: 60						
Control Type: Actuated-Uncoordinated						
Maximum v/c Ratio: 0.68						

## Timings

### 4: State Highway 83 & Shoup Road

## Background Traffic Conditions

Year 2027 - PM Peak Hour

Intersection Signal Delay: 13.7

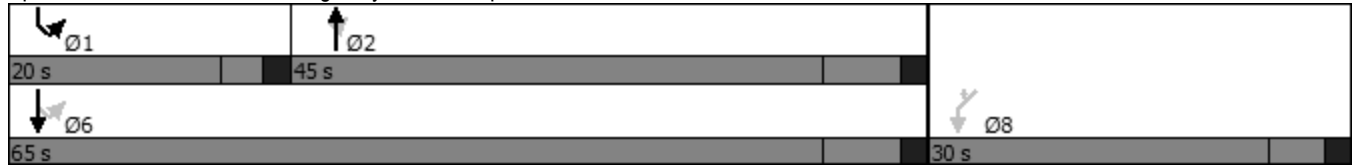
Intersection LOS: B

Intersection Capacity Utilization 67.5%

ICU Level of Service C

Analysis Period (min) 15

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



















# Timings

## 5: Black Forest Road & Shoup Road

# Background Traffic Conditions

Year 2027 - PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	169	107	19	52	7	54	181	23	17	165	65
Future Volume (vph)	72	169	107	19	52	7	54	181	23	17	165	65
Satd. Flow (prot)	0	1770	0	0	1804	0	0	1817	0	0	1758	0
Flt Permitted		0.906			0.838			0.882			0.970	
Satd. Flow (perm)	0	1620	0	0	1530	0	0	1619	0	0	1710	0
Satd. Flow (RTOR)		26			6			8			32	
Lane Group Flow (vph)	0	391	0	0	98	0	0	318	0	0	265	0
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 Effect Green (s)		23.3			23.3			49.2			49.2	
Actuated g/C Ratio		0.28			0.28			0.58			0.58	
v/c Ratio		0.84			0.23			0.34			0.26	
Control Delay		43.7			22.9			11.2			9.3	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		43.7			22.9			11.2			9.3	
LOS		D			C			B			A	
Approach Delay		43.7			22.9			11.2			9.3	
Approach LOS		D			C			B			A	
Queue Length 50th (ft)		183			37			81			57	
Queue Length 95th (ft)		285			66			130			112	
Internal Link Dist (ft)		965			1070			1292			16527	
Turn Bay Length (ft)												
Base Capacity (vph)		574			530			945			1008	
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		0.68			0.18			0.34			0.26	
Intersection Summary												
Cycle Length: 90												
Actuated Cycle Length: 84.6												
Natural Cycle: 40												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.84												





Timings  
5: Black Forest Road & Shoup Road

Background Traffic Conditions  
Year 2027 - PM Peak Hour

Intersection Signal Delay: 23.7  
Intersection Capacity Utilization 63.1%  
Analysis Period (min) 15

Intersection LOS: C  
ICU Level of Service B

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










 Ø2	 Ø4
55 s	35 s
 Ø6	 Ø8
55 s	35 s



Intersection												
Int Delay, s/veh	0.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	2	8	2	2	2	3	129	0	6	129	1
Future Vol, veh/h	3	2	8	2	2	2	3	129	0	6	129	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	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	4	3	11	2	2	2	4	182	0	7	140	1
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	347	345	141	352	345	182	141	0	0	182	0	0
Stage 1	155	155	-	190	190	-	-	-	-	-	-	-
Stage 2	192	190	-	162	155	-	-	-	-	-	-	-
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	553	581	912	607	581	866	1455	-	-	1405	-	-
Stage 1	779	773	-	816	747	-	-	-	-	-	-	-
Stage 2	743	747	-	845	773	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	546	576	912	594	576	866	1455	-	-	1405	-	-
Mov Cap-2 Maneuver	546	576	-	594	576	-	-	-	-	-	-	-
Stage 1	777	769	-	814	745	-	-	-	-	-	-	-
Stage 2	737	745	-	827	769	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	10		10.5		0.2		0.3					
HCM LOS	B		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1455	-	-	733	656	1405	-	-				
HCM Lane V/C Ratio	0.003	-	-	0.025	0.01	0.005	-	-				
HCM Control Delay (s)	7.5	0	-	10	10.5	7.6	0	-				
HCM Lane LOS	A	A	-	B	B	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	-	-				

HCM 6th TWSC  
7: Ridge Run Road/Black Forest Road & Hodgen Road

Background Traffic Conditions  
Year 2027 - PM Peak Hour

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	68	445	20	2	242	13	19	2	5	31	1	24
Future Vol, veh/h	68	445	20	2	242	13	19	2	5	31	1	24
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	76	500	22	2	275	15	31	3	8	45	1	35

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	290	0	0	522	0	0	957	946	500	956	961	283
Stage 1	-	-	-	-	-	-	652	652	-	287	287	-
Stage 2	-	-	-	-	-	-	305	294	-	669	674	-
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	1283	-	-	1055	-	-	233	264	527	236	258	761
Stage 1	-	-	-	-	-	-	450	467	-	716	678	-
Stage 2	-	-	-	-	-	-	696	673	-	444	457	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1283	-	-	1055	-	-	211	248	527	219	242	761
Mov Cap-2 Maneuver	-	-	-	-	-	-	211	248	-	219	242	-
Stage 1	-	-	-	-	-	-	423	439	-	674	677	-
Stage 2	-	-	-	-	-	-	662	672	-	408	430	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	1			0.1			22.1			18.8		
HCM LOS							C			C		

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	211	399	1283	-	-	1055	-	-	219	701
HCM Lane V/C Ratio	0.148	0.029	0.06	-	-	0.002	-	-	0.205	0.052
HCM Control Delay (s)	25	14.3	8	-	-	8.4	-	-	25.6	10.4
HCM Lane LOS	D	B	A	-	-	A	-	-	D	B
HCM 95th %tile Q(veh)	0.5	0.1	0.2	-	-	0	-	-	0.7	0.2

HCM 6th TWSC  
8: Black Forest Road/Black Forrest Road & Hodgen Road

Background Traffic Conditions  
Year 2027 - PM Peak Hour

Intersection												
Int Delay, s/veh	4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↖	↗			↕			↕	
Traffic Vol, veh/h	2	466	99	35	248	0	64	1	68	0	0	0
Future Vol, veh/h	2	466	99	35	248	0	64	1	68	0	0	0
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	536	114	38	273	0	82	1	87	0	0	0
Major/Minor	Major1		Major2			Minor1			Minor2			
Conflicting Flow All	273	0	0	650	0	0	889	889	536	990	1003	273
Stage 1	-	-	-	-	-	-	540	540	-	349	349	-
Stage 2	-	-	-	-	-	-	349	349	-	641	654	-
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	1302	-	-	946	-	-	264	285	539	227	244	771
Stage 1	-	-	-	-	-	-	526	524	-	671	637	-
Stage 2	-	-	-	-	-	-	667	637	-	466	466	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1302	-	-	946	-	-	256	273	539	183	234	771
Mov Cap-2 Maneuver	-	-	-	-	-	-	256	273	-	183	234	-
Stage 1	-	-	-	-	-	-	525	523	-	670	612	-
Stage 2	-	-	-	-	-	-	640	612	-	389	465	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	0		1.1			24.7			0			
HCM LOS						C			A			
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	350	1302	-	-	946	-	-	-				
HCM Lane V/C Ratio	0.487	0.002	-	-	0.041	-	-	-				
HCM Control Delay (s)	24.7	7.8	0	-	9	-	-	0				
HCM Lane LOS	C	A	A	-	A	-	-	A				
HCM 95th %tile Q(veh)	2.6	0	-	-	0.1	-	-	-				

HCM 6th Roundabout  
9: Allen Ranch Road & Old Stagecoach Road

Background Traffic Conditions  
Year 2027 - PM Peak Hour

Intersection			
Intersection Delay, s/veh	2.7		
Intersection LOS	A		
Approach	EB	WB	NB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	28	8	4
Demand Flow Rate, veh/h	28	8	4
Vehicles Circulating, veh/h	3	0	28
Vehicles Exiting, veh/h	5	32	3
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	2.8	2.7	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
Entry Flow, veh/h	28	8	4
Cap Entry Lane, veh/h	1376	1380	1341
Entry HV Adj Factor	1.000	1.000	1.000
Flow Entry, veh/h	28	8	4
Cap Entry, veh/h	1376	1380	1341
V/C Ratio	0.020	0.006	0.003
Control Delay, s/veh	2.8	2.7	2.7
LOS	A	A	A
95th %tile Queue, veh	0	0	0

HCM 6th Roundabout  
10: Shortwall Drive & Old Stagecoach Road & Stagecoach Road

Background Traffic Conditions

Year 2027 - PM Peak Hour

























Intersection			
Intersection Delay, s/veh	2.8		
Intersection LOS	A		
Approach	WB	NB	SE
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	36	28	19
Demand Flow Rate, veh/h	36	28	19
Vehicles Circulating, veh/h	11	1	32
Vehicles Exiting, veh/h	18	50	15
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	2.8	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
Entry Flow, veh/h	36	28	19
Cap Entry Lane, veh/h	1364	1378	1336
Entry HV Adj Factor	1.000	1.000	1.000
Flow Entry, veh/h	36	28	19
Cap Entry, veh/h	1364	1378	1336
V/C Ratio	0.026	0.020	0.014
Control Delay, s/veh	2.8	2.8	2.8
LOS	A	A	A
95th %tile Queue, veh	0	0	0

# Timings

## 1: State Highway 83 & Hodgen Road

# Background Traffic Conditions

Year 2042 - AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	137	52	435	269	374	61	475	130	182	652	98
Future Volume (vph)	155	137	52	435	269	374	61	475	130	182	652	98
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1825	0
Flt Permitted	0.468			0.649			0.083			0.234		
Satd. Flow (perm)	872	1863	1583	1209	1863	1583	155	1863	1583	436	1825	0
Satd. Flow (RTOR)			91			295			141		8	
Lane Group Flow (vph)	168	149	57	473	292	407	66	516	141	198	816	0
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)	51.0	51.0	51.0	51.0	51.0	51.0	12.0	54.0	54.0	15.0	57.0	
Total Split (%)	42.5%	42.5%	42.5%	42.5%	42.5%	42.5%	10.0%	45.0%	45.0%	12.5%	47.5%	
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	None	None	None	None	None	None	None	Max	Max	None	Max	
Act Effct Green (s)	45.0	45.0	45.0	45.0	45.0	45.0	54.0	47.0	47.0	60.6	52.4	
Actuated g/C Ratio	0.38	0.38	0.38	0.38	0.38	0.38	0.45	0.39	0.39	0.50	0.44	
v/c Ratio	0.51	0.21	0.09	1.04	0.42	0.52	0.44	0.71	0.20	0.62	1.02	
Control Delay	35.9	26.5	1.8	91.5	30.1	10.5	24.4	37.1	4.5	25.0	71.0	
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	35.9	26.5	1.8	91.5	30.1	10.5	24.4	37.1	4.5	25.0	71.0	
LOS	D	C	A	F	C	B	C	D	A	C	E	
Approach Delay		27.0			48.0			29.6			62.0	
Approach LOS		C			D			C			E	
Queue Length 50th (ft)	100	78	0	~397	166	58	24	332	0	79	~696	
Queue Length 95th (ft)	175	128	11	#605	245	151	48	464	40	124	#942	
Internal Link Dist (ft)		824			1611			1078			1286	
Turn Bay Length (ft)	420		420	350		350	120		650	525		
Base Capacity (vph)	327	698	650	453	698	778	150	729	705	320	801	
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	0.51	0.21	0.09	1.04	0.42	0.52	0.44	0.71	0.20	0.62	1.02	

### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Natural Cycle: 130

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.04

# Timings 1: State Highway 83 & Hodgen Road

Background Traffic Conditions  
Year 2042 - AM Peak Hour

Intersection Signal Delay: 45.9

Intersection LOS: D

Intersection Capacity Utilization 97.4%

ICU Level of Service F

Analysis Period (min) 15







~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.






Queue shown is maximum after two cycles.

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

 Ø1	 Ø2	 Ø4
15 s	54 s	51 s
 Ø5	 Ø6	 Ø8
12 s	57 s	51 s

HCM 6th TWSC  
2: State Highway 83 & Stagecoach Road

Background Traffic Conditions  
Year 2042 - AM Peak Hour

Intersection												
Int Delay, s/veh	1.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	2	7	36	0	11	0	675	51	4	1132	2
Future Vol, veh/h	2	2	7	36	0	11	0	675	51	4	1132	2
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	-	-	-	-	-	135	-	-	320	415	-	-
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	2	8	39	0	12	0	734	55	4	1230	2
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1606	2028	616	1358	1974	367	1232	0	0	789	0	0
Stage 1	1239	1239	-	734	734	-	-	-	-	-	-	-
Stage 2	367	789	-	624	1240	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	70	57	433	107	61	630	561	-	-	827	-	-
Stage 1	186	246	-	378	424	-	-	-	-	-	-	-
Stage 2	625	400	-	440	245	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	68	57	433	102	61	630	561	-	-	827	-	-
Mov Cap-2 Maneuver	68	57	-	102	61	-	-	-	-	-	-	-
Stage 1	186	245	-	378	424	-	-	-	-	-	-	-
Stage 2	613	400	-	426	244	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	34		49.1		0		0					
HCM LOS	D		E									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1WBLn2	SBL	SBT	SBR					
Capacity (veh/h)	561	-	-	136 102 630	827	-	-					
HCM Lane V/C Ratio	-	-	-	0.088 0.384 0.019	0.005	-	-					
HCM Control Delay (s)	0	-	-	34 60.8 10.8	9.4	-	-					
HCM Lane LOS	A	-	-	D F B	A	-	-					
HCM 95th %tile Q(veh)	0	-	-	0.3 1.6 0.1	0	-	-					

























# Timings

## 3: State Highway 83 & North Gate Boulevard

### Background Traffic Conditions

Year 2042 - AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	0	582	0	0	0	934	701	0	0	1225	231
Future Volume (vph)	83	0	582	0	0	0	934	701	0	0	1225	231
Satd. Flow (prot)	1770	1863	1583	0	1863	0	1770	3539	1863	1863	3539	1583
Flt Permitted	0.757						0.125					
Satd. Flow (perm)	1410	1863	1583	0	1863	0	233	3539	1863	1863	3539	1583
Satd. Flow (RTOR)			594									235
Lane Group Flow (vph)	90	0	633	0	0	0	1015	762	0	0	1332	251
Turn Type	Perm		Perm				pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2		2	6		6
Detector Phase	4	4	4	8	8		5	2	2	6	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	5.0	5.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0		10.0	12.0	12.0	11.0	11.0	11.0
Total Split (s)	13.0	13.0	13.0	13.0	13.0		37.0	71.0	71.0	34.0	34.0	34.0
Total Split (%)	15.5%	15.5%	15.5%	15.5%	15.5%		44.0%	84.5%	84.5%	40.5%	40.5%	40.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	5.0	5.0	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	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
Total Lost Time (s)	6.0	6.0	6.0		6.0		5.0	7.0	7.0	6.0	6.0	6.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None	None	None	None	None		Max	Max	Max	Max	Max	Max
Act Effct Green (s)	7.0		7.0				66.0	64.0			28.0	28.0
Actuated g/C Ratio	0.08		0.08				0.79	0.76			0.33	0.33
v/c Ratio	0.77		0.94				1.32	0.28			1.13	0.37
Control Delay	78.5		28.6				176.2	3.3			98.0	5.3
Queue Delay	0.0		0.0				0.0	0.0			0.0	0.0
Total Delay	78.5		28.6				176.2	3.3			98.0	5.3
LOS	E		C				F	A			F	A
Approach Delay		34.8						102.1			83.3	
Approach LOS		C						F			F	
Queue Length 50th (ft)	47		20				~653	49			~434	6
Queue Length 95th (ft)	#127		#215				#889	66			#563	55
Internal Link Dist (ft)		997			136			1617			2154	
Turn Bay Length (ft)	225		285				900					730
Base Capacity (vph)	117		676				768	2696			1179	684
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	0.77		0.94				1.32	0.28			1.13	0.37

### Intersection Summary

Cycle Length: 84

Actuated Cycle Length: 84

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.32

## Timings

### 3: State Highway 83 & North Gate Boulevard

Background Traffic Conditions  
Year 2042 - AM Peak Hour

Intersection Signal Delay: 82.9

Intersection LOS: F

Intersection Capacity Utilization 104.4%

ICU Level of Service G

Analysis Period (min) 15





~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

 Ø2	 Ø4
71 s	13 s
 Ø5	 Ø8
37 s	34 s

# Timings

## 4: State Highway 83 & Shoup Road

### Background Traffic Conditions

Year 2042 - AM Peak Hour

	↑	↗	↘	↓	↙	↖
Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↑↑↑	↗	↘	↑↑↑	↘	↗
Traffic Volume (vph)	1427	175	126	1734	520	372
Future Volume (vph)	1427	175	126	1734	520	372
Satd. Flow (prot)	5085	1583	1770	5085	1770	1583
Flt Permitted			0.098			
Satd. Flow (perm)	5085	1583	183	5085	1863	1583
Satd. Flow (RTOR)		190				138
Lane Group Flow (vph)	1551	190	137	1885	565	404
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)	43.0	43.0	10.0	53.0	42.0	42.0
Total Split (%)	45.3%	45.3%	10.5%	55.8%	44.2%	44.2%
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)	35.6	35.6	48.2	45.7	31.4	31.4
Actuated g/C Ratio	0.39	0.39	0.53	0.50	0.35	0.35
v/c Ratio	0.78	0.26	0.74	0.74	0.88	0.63
Control Delay	28.0	4.1	39.3	20.7	43.8	20.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.0	4.1	39.3	20.7	43.8	20.5
LOS	C	A	D	C	D	C
Approach Delay	25.4			21.9	34.1	
Approach LOS	C			C	C	
Queue Length 50th (ft)	298	0	41	324	298	124
Queue Length 95th (ft)	364	43	#126	393	#470	221
Internal Link Dist (ft)	1042			1734	675	
Turn Bay Length (ft)		710	980			500
Base Capacity (vph)	2000	738	184	2563	743	714
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	0.78	0.26	0.74	0.74	0.76	0.57
Intersection Summary						
Cycle Length: 95						
Actuated Cycle Length: 90.6						
Natural Cycle: 65						
Control Type: Actuated-Uncoordinated						
Maximum v/c Ratio: 0.88						

## Timings

### 4: State Highway 83 & Shoup Road

## Background Traffic Conditions

Year 2042 - AM Peak Hour

Intersection Signal Delay: 25.7

Intersection LOS: C

Intersection Capacity Utilization 78.8%





ICU Level of Service D

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

















 Ø1	 Ø2	
10 s	43 s	
 Ø6	 Ø8	
53 s	42 s	

# Timings

## 5: Black Forest Road & Shoup Road

### Background Traffic Conditions

Year 2042 - AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	96	70	25	199	14	152	253	16	9	273	181
Future Volume (vph)	107	96	70	25	199	14	152	253	16	9	273	181
Satd. Flow (prot)	0	1763	0	0	1839	0	0	1820	0	0	1762	0
Flt Permitted		0.677			0.944			0.672			0.990	
Satd. Flow (perm)	0	1217	0	0	1744	0	0	1246	0	0	1746	0
Satd. Flow (RTOR)		20			4			3			56	
Lane Group Flow (vph)	0	296	0	0	258	0	0	457	0	0	504	0
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 Effect Green (s)		22.7			22.7			49.2			49.2	
Actuated g/C Ratio		0.27			0.27			0.59			0.59	
v/c Ratio		0.86			0.54			0.63			0.48	
Control Delay		51.5			30.0			17.5			11.7	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		51.5			30.0			17.5			11.7	
LOS		D			C			B			B	
Approach Delay		51.5			30.0			17.5			11.7	
Approach LOS		D			C			B			B	
Queue Length 50th (ft)		138			114			150			128	
Queue Length 95th (ft)		#261			185			290			235	
Internal Link Dist (ft)		965			1070			1292			16527	
Turn Bay Length (ft)												
Base Capacity (vph)		435			607			731			1046	
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		0.68			0.43			0.63			0.48	
Intersection Summary												
Cycle Length: 90												
Actuated Cycle Length: 84												
Natural Cycle: 45												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.86												

# Timings

## 5: Black Forest Road & Shoup Road

# Background Traffic Conditions

Year 2042 - AM Peak Hour

Intersection Signal Delay: 24.3

Intersection LOS: C

Intersection Capacity Utilization 96.6%





ICU Level of Service F

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

 Ø2	 Ø4
55 s	35 s
 Ø6	 Ø8
55 s	35 s

HCM 6th TWSC  
6: Black Forest Road & Old Stagecoach Road/Terra Ridge Circle

Background Traffic Conditions  
Year 2042 - AM Peak Hour























Intersection												
Int Delay, s/veh	0.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	2	0	7	9	2	4	13	150	2	2	206	5
Future Vol, veh/h	2	0	7	9	2	4	13	150	2	2	206	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
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	0	8	10	2	4	14	163	2	2	224	5
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	426	424	227	427	425	164	229	0	0	165	0	0
Stage 1	231	231	-	192	192	-	-	-	-	-	-	-
Stage 2	195	193	-	235	233	-	-	-	-	-	-	-
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	539	522	812	538	521	881	1339	-	-	1413	-	-
Stage 1	772	713	-	810	742	-	-	-	-	-	-	-
Stage 2	807	741	-	768	712	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	529	515	812	527	514	881	1339	-	-	1413	-	-
Mov Cap-2 Maneuver	529	515	-	527	514	-	-	-	-	-	-	-
Stage 1	763	712	-	800	733	-	-	-	-	-	-	-
Stage 2	791	732	-	759	711	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	10		11.3		0.6		0.1					
HCM LOS	B		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1339	-	-	726	588	1413	-	-				
HCM Lane V/C Ratio	0.011	-	-	0.013	0.028	0.002	-	-				
HCM Control Delay (s)	7.7	0	-	10	11.3	7.6	0	-				
HCM Lane LOS	A	A	-	B	B	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-				

# Timings

## 7: Black Forest Road & Hodgen Road

### Background Traffic Conditions

Year 2042 - AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	258	112	110	793	20	179	0	56	20	0	76
Future Volume (vph)	22	258	112	110	793	20	179	0	56	20	0	76
Satd. Flow (prot)	1770	1863	1583	1770	1855	0	1770	1583	0	1770	1583	0
Flt Permitted	0.109			0.541			0.703			0.717		
Satd. Flow (perm)	203	1863	1583	1008	1855	0	1310	1583	0	1336	1583	0
Satd. Flow (RTOR)			122		2			607			220	
Lane Group Flow (vph)	24	280	122	120	884	0	195	61	0	22	83	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	12.0	12.0	5.0	12.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	11.0	18.0	18.0	11.0	18.0		14.0	14.0		14.0	14.0	
Total Split (s)	11.0	54.0	54.0	11.0	54.0		25.0	25.0		25.0	25.0	
Total Split (%)	12.2%	60.0%	60.0%	12.2%	60.0%		27.8%	27.8%		27.8%	27.8%	
Yellow Time (s)	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	
Lost Time Adjust (s)	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		6.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes							
Recall Mode	None	Min	Min	None	Min		None	None		None	None	
Act Effct Green (s)	37.9	34.0	34.0	40.6	39.0		15.5	15.5		15.5	15.5	
Actuated g/C Ratio	0.54	0.48	0.48	0.57	0.55		0.22	0.22		0.22	0.22	
v/c Ratio	0.11	0.31	0.15	0.19	0.86		0.68	0.07		0.08	0.16	
Control Delay	6.8	13.1	2.7	6.9	26.0		42.4	0.2		27.8	0.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	6.8	13.1	2.7	6.9	26.0		42.4	0.2		27.8	0.7	
LOS	A	B	A	A	C		D	A		C	A	
Approach Delay		9.7			23.8			32.4			6.3	
Approach LOS		A			C			C			A	
Queue Length 50th (ft)	4	78	0	21	269		75	0		7	0	
Queue Length 95th (ft)	12	131	24	42	#694		#200	0		30	0	
Internal Link Dist (ft)		1250			847			4848			905	
Turn Bay Length (ft)	400		335	280			125			65		
Base Capacity (vph)	226	1337	1171	634	1332		375	886		383	610	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.11	0.21	0.10	0.19	0.66		0.52	0.07		0.06	0.14	
Intersection Summary												
Cycle Length: 90												
Actuated Cycle Length: 70.8												
Natural Cycle: 80												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.86												



## Timings

### 7: Black Forest Road & Hodgen Road

## Background Traffic Conditions

Year 2042 - AM Peak Hour

Intersection Signal Delay: 20.6

Intersection LOS: C

Intersection Capacity Utilization 78.7%







ICU Level of Service D

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.





Splits and Phases: 7: Black Forest Road & Hodgen Road

 Ø2	 Ø3	 Ø4
25 s	11 s	54 s
 Ø6	 Ø7	 Ø8
25 s	11 s	54 s

# HCM 6th TWSC

## 8: Hodgen Road & Black Forrest Road

Background Traffic Conditions  
Year 2042 - AM Peak Hour

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	275	789	2	0	4
Future Vol, veh/h	4	275	789	2	0	4
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	4	299	858	2	0	4
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	860	0	-	0	1166	859
Stage 1	-	-	-	-	859	-
Stage 2	-	-	-	-	307	-
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	781	-	-	-	214	356
Stage 1	-	-	-	-	415	-
Stage 2	-	-	-	-	746	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	781	-	-	-	213	356
Mov Cap-2 Maneuver	-	-	-	-	213	-
Stage 1	-	-	-	-	413	-
Stage 2	-	-	-	-	746	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.1	0		15.2		
HCM LOS	C					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	781	-	-	-	356	
HCM Lane V/C Ratio	0.006	-	-	-	0.012	
HCM Control Delay (s)	9.6	0	-	-	15.2	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0	-	-	-	0	

HCM 6th Roundabout  
9: Allen Ranch Road & Old Stagecoach Road

Background Traffic Conditions  
Year 2042 - AM Peak Hour

Intersection			
Intersection Delay, s/veh	2.8		
Intersection LOS	A		
Approach	EB	WB	NB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	16	42	5
Demand Flow Rate, veh/h	16	43	5
Vehicles Circulating, veh/h	5	0	8
Vehicles Exiting, veh/h	38	13	13
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	2.7	2.9	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
Entry Flow, veh/h	16	43	5
Cap Entry Lane, veh/h	1373	1380	1369
Entry HV Adj Factor	0.990	0.983	1.000
Flow Entry, veh/h	16	42	5
Cap Entry, veh/h	1359	1356	1369
V/C Ratio	0.012	0.031	0.004
Control Delay, s/veh	2.7	2.9	2.7
LOS	A	A	A
95th %tile Queue, veh	0	0	0

HCM 6th Roundabout  
10: Shortwall Drive & Old Stagecoach Road & Stagecoach Road

Background Traffic Conditions  
Year 2042 - AM Peak Hour

























Intersection			
Intersection Delay, s/veh	2.9		
Intersection LOS	A		
Approach	WB	NB	SE
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	13	49	35
Demand Flow Rate, veh/h	13	50	36
Vehicles Circulating, veh/h	20	10	5
Vehicles Exiting, veh/h	40	30	28
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	2.7	3.0	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
Entry Flow, veh/h	13	50	36
Cap Entry Lane, veh/h	1352	1366	1373
Entry HV Adj Factor	1.000	0.980	0.972
Flow Entry, veh/h	13	49	35
Cap Entry, veh/h	1352	1339	1335
V/C Ratio	0.010	0.037	0.026
Control Delay, s/veh	2.7	3.0	2.9
LOS	A	A	A
95th %tile Queue, veh	0	0	0

# Timings

## 1: State Highway 83 & Hodgen Road

# Background Traffic Conditions

Year 2042 - PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	321	94	199	173	260	92	616	305	374	598	108
Future Volume (vph)	47	321	94	199	173	260	92	616	305	374	598	108
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1820	0
Flt Permitted	0.579			0.352			0.154			0.083		
Satd. Flow (perm)	1079	1863	1583	656	1863	1583	287	1863	1583	155	1820	0
Satd. Flow (RTOR)			145			283			209		10	
Lane Group Flow (vph)	51	349	102	216	188	283	100	670	332	407	767	0
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)	44.0	44.0	44.0	44.0	44.0	44.0	12.0	49.0	49.0	27.0	64.0	
Total Split (%)	36.7%	36.7%	36.7%	36.7%	36.7%	36.7%	10.0%	40.8%	40.8%	22.5%	53.3%	
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	None	None	None	None	None	None	None	Max	Max	None	Max	
Act Effect Green (s)	38.0	38.0	38.0	38.0	38.0	38.0	49.0	42.0	42.0	70.0	57.0	
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.32	0.32	0.41	0.35	0.35	0.58	0.48	
v/c Ratio	0.15	0.59	0.17	1.04	0.32	0.41	0.52	1.03	0.48	1.09	0.88	
Control Delay	31.0	39.5	2.2	115.4	33.0	5.3	24.5	81.3	13.4	107.6	41.6	
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	31.0	39.5	2.2	115.4	33.0	5.3	24.5	81.3	13.4	107.6	41.6	
LOS	C	D	A	F	C	A	C	F	B	F	D	
Approach Delay		31.0			47.5			55.7			64.5	
Approach LOS		C			D			E			E	
Queue Length 50th (ft)	28	227	0	~181	110	0	32	~554	67	~304	517	
Queue Length 95th (ft)	61	327	16	#337	175	62	58	#785	153	#505	#771	
Internal Link Dist (ft)		824			1611			1078			1286	
Turn Bay Length (ft)	420		420	350		350	120		650	525		
Base Capacity (vph)	341	589	600	207	589	694	191	652	689	373	869	
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	0.15	0.59	0.17	1.04	0.32	0.41	0.52	1.03	0.48	1.09	0.88	

### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Natural Cycle: 110

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.09

## Timings

### 1: State Highway 83 & Hodgen Road

## Background Traffic Conditions

Year 2042 - PM Peak Hour

Intersection Signal Delay: 53.5

Intersection LOS: D

Intersection Capacity Utilization 101.9%

ICU Level of Service G

Analysis Period (min) 15







~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

 Ø1		 Ø2		 Ø4	
27 s		49 s			
 Ø5	 Ø6			 Ø8	
12 s	64 s			44 s	

# HCM 6th TWSC

## 2: State Highway 83 & Stagecoach Road

Background Traffic Conditions  
Year 2042 - PM Peak Hour























Intersection												
Int Delay, s/veh	5.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕↕		↕		↕↕
Traffic Vol, veh/h	2	0	5	47	5	9	2	1075	23	7	825	0
Future Vol, veh/h	2	0	5	47	5	9	2	1075	23	7	825	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	-	-	-	-	-	135	-	-	320	415	-	-
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	0	5	51	5	10	2	1168	25	8	897	0
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	1504	2110	449	1637	2085	584	897	0	0	1193	0	0
Stage 1	913	913	-	1172	1172	-	-	-	-	-	-	-
Stage 2	591	1197	-	465	913	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	84	50	557	67	52	455	753	-	-	581	-	-
Stage 1	294	350	-	204	264	-	-	-	-	-	-	-
Stage 2	460	257	-	547	350	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	74	49	557	65	51	455	753	-	-	581	-	-
Mov Cap-2 Maneuver	74	49	-	65	51	-	-	-	-	-	-	-
Stage 1	292	345	-	202	262	-	-	-	-	-	-	-
Stage 2	437	255	-	534	345	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	24.3		166.1			0			0.1			
HCM LOS	C		F									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1WBLn2	SBL	SBT	SBR					
Capacity (veh/h)	753	-	-	194	63	455	581	-	-			
HCM Lane V/C Ratio	0.003	-	-	0.039	0.897	0.022	0.013	-	-			
HCM Control Delay (s)	9.8	0	-	24.3	192.6	13.1	11.3	-	-			
HCM Lane LOS	A	A	-	C	F	B	B	-	-			
HCM 95th %tile Q(veh)	0	-	-	0.1	4.2	0.1	0	-	-			

# Timings

## 3: State Highway 83 & North Gate Boulevard

### Background Traffic Conditions

Year 2042 - PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	191	0	742	0	0	0	722	1167	4	2	899	143
Future Volume (vph)	191	0	742	0	0	0	722	1167	4	2	899	143
Satd. Flow (prot)	1770	1863	1583	0	1863	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.757						0.154			0.219		
Satd. Flow (perm)	1410	1863	1583	0	1863	0	287	3539	1583	408	3539	1583
Satd. Flow (RTOR)			626						39			155
Lane Group Flow (vph)	208	0	807	0	0	0	785	1268	4	2	977	155
Turn Type	Perm		Perm				pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2		2	6		6
Detector Phase	4	4	4	8	8		5	2	2	6	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	5.0	5.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0		10.0	12.0	12.0	11.0	11.0	11.0
Total Split (s)	23.0	23.0	23.0	23.0	23.0		33.0	61.0	61.0	28.0	28.0	28.0
Total Split (%)	27.4%	27.4%	27.4%	27.4%	27.4%		39.3%	72.6%	72.6%	33.3%	33.3%	33.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	5.0	5.0	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	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
Total Lost Time (s)	6.0	6.0	6.0		6.0		5.0	7.0	7.0	6.0	6.0	6.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None	None	None	None	None		Max	Max	Max	Max	Max	Max
Act Effct Green (s)	17.0		17.0				56.0	54.0	54.0	22.0	22.0	22.0
Actuated g/C Ratio	0.20		0.20				0.67	0.64	0.64	0.26	0.26	0.26
v/c Ratio	0.73		0.99				1.15	0.56	0.00	0.02	1.06	0.29
Control Delay	48.2		38.0				104.9	9.5	0.0	24.0	77.1	6.0
Queue Delay	0.0		0.0				0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.2		38.0				104.9	9.5	0.0	24.0	77.1	6.0
LOS	D		D				F	A	A	C	E	A
Approach Delay		40.1						45.9			67.3	
Approach LOS		D						D			E	
Queue Length 50th (ft)	103		104				~439	173	0	1	~300	0
Queue Length 95th (ft)	#205		#372				#658	225	0	6	#421	44
Internal Link Dist (ft)		997			136			1617			2154	
Turn Bay Length (ft)	225		285				900		400	750		730
Base Capacity (vph)	285		819				685	2275	1031	106	926	529
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	0.73		0.99				1.15	0.56	0.00	0.02	1.06	0.29

### Intersection Summary

Cycle Length: 84

Actuated Cycle Length: 84

Natural Cycle: 100

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.15



## Timings

### 3: State Highway 83 & North Gate Boulevard

Background Traffic Conditions  
Year 2042 - PM Peak Hour

Intersection Signal Delay: 50.3

Intersection LOS: D

Intersection Capacity Utilization 89.6%

ICU Level of Service E

Analysis Period (min) 15

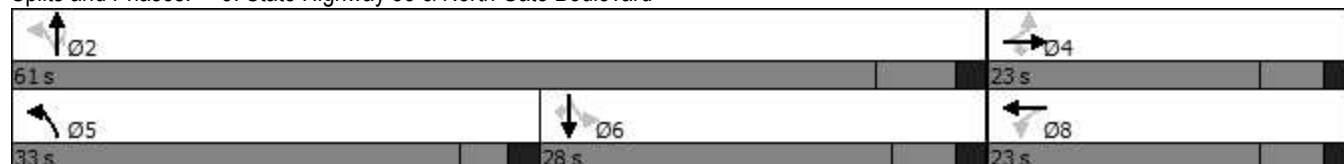
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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



Timings  
4: State Highway 83 & Shoup Road

Background Traffic Conditions  
Year 2042 - PM Peak Hour

	↑	↗	↘	↓	↙	↖
Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↑↑↑	↗	↘	↑↑↑	↘	↗
Traffic Volume (vph)	1869	446	331	1452	202	155
Future Volume (vph)	1869	446	331	1452	202	155
Satd. Flow (prot)	5085	1583	1770	5085	1770	1583
Flt Permitted			0.080			
Satd. Flow (perm)	5085	1583	149	5085	1863	1583
Satd. Flow (RTOR)		485				168
Lane Group Flow (vph)	2032	485	360	1578	220	168
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)	51.0	51.0	23.0	74.0	21.0	21.0
Total Split (%)	53.7%	53.7%	24.2%	77.9%	22.1%	22.1%
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 Effect Green (s)	44.7	44.7	69.0	66.5	14.0	14.0
Actuated g/C Ratio	0.48	0.48	0.73	0.71	0.15	0.15
v/c Ratio	0.84	0.48	0.90	0.44	0.79	0.44
Control Delay	26.3	3.3	51.2	6.4	59.8	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.3	3.3	51.2	6.4	59.8	9.9
LOS	C	A	D	A	E	A
Approach Delay	21.9			14.7	38.2	
Approach LOS	C			B	D	
Queue Length 50th (ft)	391	0	157	131	128	0
Queue Length 95th (ft)	463	53	#315	157	#235	55
Internal Link Dist (ft)	1042			1734	675	
Turn Bay Length (ft)		710	980			500
Base Capacity (vph)	2414	1005	419	3596	297	393
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	0.84	0.48	0.86	0.44	0.74	0.43
Intersection Summary						
Cycle Length: 95						
Actuated Cycle Length: 94.1						
Natural Cycle: 75						
Control Type: Actuated-Uncoordinated						
Maximum v/c Ratio: 0.90						

## Timings

### 4: State Highway 83 & Shoup Road

## Background Traffic Conditions

Year 2042 - PM Peak Hour

Intersection Signal Delay: 20.3

Intersection LOS: C

Intersection Capacity Utilization 81.1%

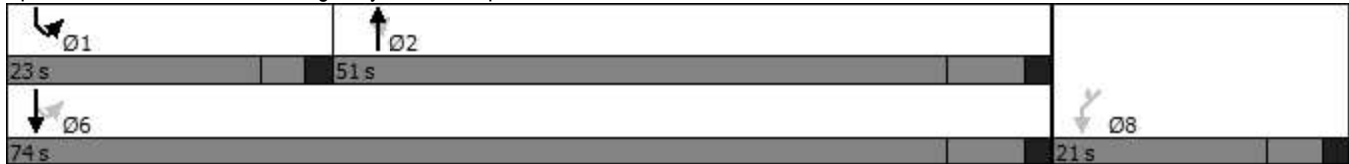
ICU Level of Service D

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

















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



Timings  
5: Black Forest Road & Shoup Road

Background Traffic Conditions

Year 2042 - PM Peak Hour





												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	112	264	166	29	81	11	85	282	36	27	256	101
Future Volume (vph)	112	264	166	29	81	11	85	282	36	27	256	101
Satd. Flow (prot)	0	1769	0	0	1818	0	0	1822	0	0	1790	0
Flt Permitted		0.896			0.826			0.822			0.952	
Satd. Flow (perm)	0	1601	0	0	1520	0	0	1513	0	0	1709	0
Satd. Flow (RTOR)		32			7			7			24	
Lane Group Flow (vph)	0	589	0	0	132	0	0	438	0	0	417	0
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)	47.0	47.0		47.0	47.0		43.0	43.0		43.0	43.0	
Total Split (%)	52.2%	52.2%		52.2%	52.2%		47.8%	47.8%		47.8%	47.8%	
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 Effect Green (s)		33.0			33.0			37.3			37.3	
Actuated g/C Ratio		0.40			0.40			0.45			0.45	
v/c Ratio		0.89			0.22			0.64			0.53	
Control Delay		39.0			15.5			24.0			19.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		39.0			15.5			24.0			19.9	
LOS		D			B			C			B	
Approach Delay		39.0			15.5			24.0			19.9	
Approach LOS		D			B			C			B	
Queue Length 50th (ft)		261			41			171			146	
Queue Length 95th (ft)		#421			77			311			263	
Internal Link Dist (ft)		965			1070			1292			16527	
Turn Bay Length (ft)												
Base Capacity (vph)		819			766			689			787	
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		0.72			0.17			0.64			0.53	
Intersection Summary												
Cycle Length: 90												
Actuated Cycle Length: 82.4												
Natural Cycle: 60												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.89												

Timings  
5: Black Forest Road & Shoup Road

Background Traffic Conditions  
Year 2042 - PM Peak Hour

Intersection Signal Delay: 27.8      Intersection LOS: C  
Intersection Capacity Utilization 91.2%      ICU Level of Service F  
Analysis Period (min) 15  
# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.

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

 Ø2	 Ø4
43 s	47 s
 Ø6	 Ø8
43 s	47 s

HCM 6th TWSC  
6: Black Forest Road & Old Stagecoach Road/Terra Ridge Circle

Background Traffic Conditions

Year 2042 - PM Peak Hour























Intersection												
Int Delay, s/veh	1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Traffic Vol, veh/h	5	4	11	4	4	4	5	200	0	9	200	2
Future Vol, veh/h	5	4	11	4	4	4	5	200	0	9	200	2
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	5	4	12	4	4	4	5	217	0	10	217	2
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	469	465	218	473	466	217	219	0	0	217	0	0
Stage 1	238	238	-	227	227	-	-	-	-	-	-	-
Stage 2	231	227	-	246	239	-	-	-	-	-	-	-
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	505	495	822	501	494	823	1350	-	-	1353	-	-
Stage 1	765	708	-	776	716	-	-	-	-	-	-	-
Stage 2	772	716	-	758	708	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	494	489	822	486	488	823	1350	-	-	1353	-	-
Mov Cap-2 Maneuver	494	489	-	486	488	-	-	-	-	-	-	-
Stage 1	762	702	-	773	713	-	-	-	-	-	-	-
Stage 2	760	713	-	736	702	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	10.9		11.5		0.2		0.3					
HCM LOS	B		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1350	-	-	631	564	1353	-	-				
HCM Lane V/C Ratio	0.004	-	-	0.034	0.023	0.007	-	-				
HCM Control Delay (s)	7.7	0	-	10.9	11.5	7.7	0	-				
HCM Lane LOS	A	A	-	B	B	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-				

# Timings

## 7: Black Forest Road & Hodgen Road

# Background Traffic Conditions

Year 2042 - PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	694	185	58	377	20	128	6	114	49	2	38
Future Volume (vph)	107	694	185	58	377	20	128	6	114	49	2	38
Satd. Flow (prot)	1770	1863	1583	1770	1848	0	1770	1598	0	1770	1596	0
Flt Permitted	0.420			0.190			0.729			0.673		
Satd. Flow (perm)	782	1863	1583	354	1848	0	1358	1598	0	1254	1596	0
Satd. Flow (RTOR)			201		5			124			41	
Lane Group Flow (vph)	116	754	201	63	432	0	139	131	0	53	43	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	12.0	12.0	5.0	12.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	11.0	18.0	18.0	11.0	18.0		14.0	14.0		14.0	14.0	
Total Split (s)	11.0	57.0	57.0	11.0	57.0		22.0	22.0		22.0	22.0	
Total Split (%)	12.2%	63.3%	63.3%	12.2%	63.3%		24.4%	24.4%		24.4%	24.4%	
Yellow Time (s)	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	
Lost Time Adjust (s)	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		6.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes							
Recall Mode	None	Min	Min	None	Min		None	None		None	None	
Act Effct Green (s)	36.9	34.4	34.4	35.3	31.5		12.5	12.5		12.5	12.5	
Actuated g/C Ratio	0.56	0.52	0.52	0.54	0.48		0.19	0.19		0.19	0.19	
v/c Ratio	0.22	0.77	0.22	0.20	0.49		0.54	0.32		0.22	0.13	
Control Delay	6.2	19.8	2.2	6.6	13.7		37.6	9.9		30.7	12.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	6.2	19.8	2.2	6.6	13.7		37.6	9.9		30.7	12.0	
LOS	A	B	A	A	B		D	A		C	B	
Approach Delay		15.0			12.8			24.2			22.3	
Approach LOS		B			B			C			C	
Queue Length 50th (ft)	16	258	0	8	113		54	2		19	1	
Queue Length 95th (ft)	35	431	28	22	194		135	51		60	29	
Internal Link Dist (ft)		1250			847			4848			905	
Turn Bay Length (ft)	400		335	280			125			65		
Base Capacity (vph)	522	1469	1290	309	1458		363	518		335	457	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.22	0.51	0.16	0.20	0.30		0.38	0.25		0.16	0.09	
Intersection Summary												
Cycle Length: 90												
Actuated Cycle Length: 65.6												
Natural Cycle: 60												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.77												

## Timings

### 7: Black Forest Road & Hodgen Road

## Background Traffic Conditions

Year 2042 - PM Peak Hour

Intersection Signal Delay: 16.1







Intersection LOS: B

Intersection Capacity Utilization 69.5%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 7: Black Forest Road & Hodgen Road

 Ø2	 Ø3	 Ø4
22 s	11 s	57 s
 Ø6	 Ø7	 Ø8
22 s	11 s	57 s



HCM 6th TWSC  
8: Hodgen Road & Black Forrest Road

Background Traffic Conditions  
Year 2042 - PM Peak Hour

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↱		↰	↱
Traffic Vol, veh/h	4	726	387	0	0	0
Future Vol, veh/h	4	726	387	0	0	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	4	789	421	0	0	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	421	0	0 1218 421
Stage 1	-	-	- 421 -
Stage 2	-	-	- 797 -
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	1138	-	- 199 632
Stage 1	-	-	- 662 -
Stage 2	-	-	- 444 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1138	-	- 198 632
Mov Cap-2 Maneuver	-	-	- 198 -
Stage 1	-	-	- 658 -
Stage 2	-	-	- 444 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1138	-	-	-	-
HCM Lane V/C Ratio	0.004	-	-	-	-
HCM Control Delay (s)	8.2	0	-	-	0
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

HCM 6th Roundabout  
9: Allen Ranch Road & Old Stagecoach Road

Background Traffic Conditions  
Year 2042 - PM Peak Hour

Intersection			
Intersection Delay, s/veh	2.8		
Intersection LOS	A		
Approach	EB	WB	NB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	22	9	2
Demand Flow Rate, veh/h	22	9	2
Vehicles Circulating, veh/h	4	0	22
Vehicles Exiting, veh/h	5	24	4
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	2.8	2.7	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
Entry Flow, veh/h	22	9	2
Cap Entry Lane, veh/h	1374	1380	1349
Entry HV Adj Factor	0.980	0.989	1.000
Flow Entry, veh/h	22	9	2
Cap Entry, veh/h	1347	1365	1349
V/C Ratio	0.016	0.007	0.001
Control Delay, s/veh	2.8	2.7	2.7
LOS	A	A	A
95th %tile Queue, veh	0	0	0

HCM 6th Roundabout  
10: Shortwall Drive & Old Stagecoach Road & Stagecoach Road

Background Traffic Conditions

Year 2042 - PM Peak Hour

























Intersection			
Intersection Delay, s/veh	2.8		
Intersection LOS	A		
Approach	WB	NB	SE
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	33	25	26
Demand Flow Rate, veh/h	34	25	26
Vehicles Circulating, veh/h	10	2	30
Vehicles Exiting, veh/h	17	54	14
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	2.9	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
Entry Flow, veh/h	34	25	26
Cap Entry Lane, veh/h	1366	1377	1338
Entry HV Adj Factor	0.971	1.000	1.000
Flow Entry, veh/h	33	25	26
Cap Entry, veh/h	1326	1377	1338
V/C Ratio	0.025	0.018	0.019
Control Delay, s/veh	2.9	2.8	2.8
LOS	A	A	A
95th %tile Queue, veh	0	0	0

# Timings

## 1: State Highway 83 & Hodgen Road

# Total Traffic Conditions

Year 2027 - AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	105	102	279	199	266	143	357	83	134	452	63
Future Volume (vph)	100	105	102	279	199	266	143	357	83	134	452	63
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1829	0
Flt Permitted	0.533			0.684			0.307			0.465		
Satd. Flow (perm)	993	1863	1583	1274	1863	1583	572	1863	1583	866	1829	0
Satd. Flow (RTOR)			135			289			121		12	
Lane Group Flow (vph)	109	114	111	303	216	289	155	388	90	146	559	0
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		
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	
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	0.50	0.28	0.24	1.07	0.52	0.50	0.38	0.44	0.11	0.27	0.65	
Control Delay	36.5	28.3	4.9	107.1	33.0	6.9	9.3	16.5	1.7	7.7	20.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	36.5	28.3	4.9	107.1	33.0	6.9	9.3	16.5	1.7	7.7	20.3	
LOS	D	C	A	F	C	A	A	B	A	A	C	
Approach Delay		23.2			51.5			12.6			17.7	
Approach LOS		C			D			B			B	
Queue Length 50th (ft)	49	48	0	~173	97	0	28	126	0	27	202	
Queue Length 95th (ft)	100	93	29	#325	164	60	52	198	14	49	311	
Internal Link Dist (ft)		824			1611			1078			1286	
Turn Bay Length (ft)	420		420	350		350	120		650	525		
Base Capacity (vph)	220	414	456	283	414	576	406	874	806	548	864	
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	0.50	0.28	0.24	1.07	0.52	0.50	0.38	0.44	0.11	0.27	0.65	

### 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: 1.07

Intersection Signal Delay: 28.1

Intersection LOS: C

Intersection Capacity Utilization 80.0%

ICU Level of Service D

Analysis Period (min) 15

## Timings

### 1: State Highway 83 & Hodgen Road

## Total Traffic Conditions

Year 2027 - AM Peak Hour







~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

 Ø1	 Ø2 (R)	 Ø4
12 s	45 s	24 s
 Ø5	 Ø6 (R)	 Ø8
12 s	45 s	24 s

HCM 6th Roundabout  
2: State Highway 83 & Stagecoach Road

Total Traffic Conditions  
Year 2027 - AM Peak Hour




















Intersection				
Intersection Delay, s/veh 13.3				
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	7	343	598	904
Demand Flow Rate, veh/h	7	350	610	922
Vehicles Circulating, veh/h	1090	482	117	169
Vehicles Exiting, veh/h	1	245	980	663
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	8.2	9.5	8.4	18.0
Approach LOS	A	A	A	C
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
Entry Flow, veh/h	7	350	610	922
Cap Entry Lane, veh/h	454	844	1225	1161
Entry HV Adj Factor	0.997	0.980	0.980	0.981
Flow Entry, veh/h	7	343	598	904
Cap Entry, veh/h	453	827	1200	1139
V/C Ratio	0.015	0.415	0.498	0.794
Control Delay, s/veh	8.2	9.5	8.4	18.0
LOS	A	A	A	C
95th %tile Queue, veh	0	2	3	9

# Timings

## 2: State Highway 83 & Stagecoach Road

# Total Traffic Conditions

Year 2027 - AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	1	5	153	0	163	0	434	116	104	727	1
Future Volume (vph)	1	1	5	153	0	163	0	434	116	104	727	1
Satd. Flow (prot)	0	1672	0	0	1770	1583	0	1863	1583	1770	1863	0
Flt Permitted		0.953			0.753					0.330		
Satd. Flow (perm)	0	1605	0	0	1403	1583	0	1863	1583	615	1863	0
Satd. Flow (RTOR)		5				177			130			
Lane Group Flow (vph)	0	7	0	0	166	177	0	472	126	113	791	0
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0	8.0	35.0	35.0	35.0	14.0	35.0	
Minimum Split (s)	13.5	13.5		13.5	13.5	13.5	42.0	42.0	42.0	21.0	42.0	
Total Split (s)	17.0	17.0		17.0	17.0	17.0	42.0	42.0	42.0	21.0	63.0	
Total Split (%)	21.3%	21.3%		21.3%	21.3%	21.3%	52.5%	52.5%	52.5%	26.3%	78.8%	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	5.0	5.0	5.0	5.0	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	
Lost Time Adjust (s)		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.5			5.5	5.5		7.0	7.0	7.0	7.0	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Act Effct Green (s)		11.2			11.2	11.2		39.5	39.5	56.3	56.3	
Actuated g/C Ratio		0.14			0.14	0.14		0.49	0.49	0.70	0.70	
v/c Ratio		0.03			0.85	0.47		0.51	0.15	0.18	0.60	
Control Delay		21.5			70.1	10.0		18.2	3.1	4.5	8.6	
Queue Delay		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay		21.5			70.1	10.0		18.2	3.1	4.5	8.6	
LOS		C			E	A		B	A	A	A	
Approach Delay		21.5			39.1			15.0			8.1	
Approach LOS		C			D			B			A	
Queue Length 50th (ft)		1			82	0		171	0	15	172	
Queue Length 95th (ft)		12			#186	54		265	27	29	265	
Internal Link Dist (ft)		862			898			913			1101	
Turn Bay Length (ft)						135			320	415		
Base Capacity (vph)		235			201	379		919	846	634	1310	
Starvation Cap Reductn		0			0	0		0	0	0	0	
Spillback Cap Reductn		0			0	0		0	0	0	0	
Storage Cap Reductn		0			0	0		0	0	0	0	
Reduced v/c Ratio		0.03			0.83	0.47		0.51	0.15	0.18	0.60	
Intersection Summary												
Cycle Length: 80												
Actuated Cycle Length: 80												
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green												
Natural Cycle: 80												
Control Type: Actuated-Coordinated												

# Timings 2: State Highway 83 & Stagecoach Road

Total Traffic Conditions  
Year 2027 - AM Peak Hour

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 16.1

Intersection LOS: B

Intersection Capacity Utilization 98.9%






ICU Level of Service F

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: State Highway 83 & Stagecoach Road






















 Ø1	 Ø2 (R)	 Ø4
21 s	42 s	17 s
 Ø6 (R)	 Ø8	
63 s		17 s



# Timings

## 3: State Highway 83 & North Gate Boulevard

Total Traffic Conditions  
Year 2027 - AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	0	373	0	0	0	599	500	0	0	864	200
Future Volume (vph)	87	0	373	0	0	0	599	500	0	0	864	200
Satd. Flow (prot)	1770	1863	1583	0	1863	0	1770	3539	0	1863	3539	1583
Flt Permitted	0.757						0.148					
Satd. Flow (perm)	1410	1863	1583	0	1863	0	276	3539	0	1863	3539	1583
Satd. Flow (RTOR)			470									217
Lane Group Flow (vph)	95	0	405	0	0	0	651	543	0	0	939	217
Turn Type	Perm		Perm				pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2		6		6
Permitted Phases	4		4	8			2			6		6
Detector Phase	4	4	4	8	8		5	2		6	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	5.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0		10.0	12.0		11.0	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	35.0
Total Split (%)	28.6%	28.6%	28.6%	28.6%	28.6%		29.8%	71.4%		41.7%	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	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	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0		5.0	7.0		6.0	6.0	6.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None	None	None	None	None		Max	Max		Max	Max	Max
Act Effct Green (s)	10.6		10.6				55.1	53.1			29.0	29.0
Actuated g/C Ratio	0.14		0.14				0.72	0.69			0.38	0.38
v/c Ratio	0.49		0.65				1.11	0.22			0.70	0.30
Control Delay	39.0		6.8				91.7	5.0			24.2	4.0
Queue Delay	0.0		0.0				0.0	0.0			0.0	0.0
Total Delay	39.0		6.8				91.7	5.0			24.2	4.0
LOS	D		A				F	A			C	A
Approach Delay		12.9						52.2			20.4	
Approach LOS		B						D			C	
Queue Length 50th (ft)	42		0				~293	41			193	0
Queue Length 95th (ft)	87		41				#553	76			292	43
Internal Link Dist (ft)		997			136			1617			2154	
Turn Bay Length (ft)	225		285				900					730
Base Capacity (vph)	331		731				588	2449			1340	734
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	0.29		0.55				1.11	0.22			0.70	0.30

### Intersection Summary

Cycle Length: 84

Actuated Cycle Length: 76.7

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.11

# Timings 3: State Highway 83 & North Gate Boulevard

Total Traffic Conditions  
Year 2027 - AM Peak Hour

Intersection Signal Delay: 32.4

Intersection LOS: C

Intersection Capacity Utilization 76.1%

ICU Level of Service D

Analysis Period (min) 15






~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

 Ø2 60 s		 Ø4 24 s	
 Ø5 25 s	 Ø6 35 s	 Ø8 24 s	

Timings  
4: State Highway 83 & Shoup Road

Total Traffic Conditions  
Year 2027 - AM Peak Hour

	↑	↗	↘	↓	↙	↖
Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↑↑	↗	↘	↑↑	↘	↗
Traffic Volume (vph)	996	129	81	1191	360	239
Future Volume (vph)	996	129	81	1191	360	239
Satd. Flow (prot)	3539	1583	1770	3539	1770	1583
Flt Permitted			0.167			
Satd. Flow (perm)	3539	1583	311	3539	1863	1583
Satd. Flow (RTOR)		140				260
Lane Group Flow (vph)	1083	140	88	1295	391	260
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)	47.5	47.5	60.0	57.5	22.3	22.3
Actuated g/C Ratio	0.51	0.51	0.64	0.62	0.24	0.24
v/c Ratio	0.60	0.16	0.28	0.59	0.88	0.45
Control Delay	19.3	3.1	9.0	12.5	56.5	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.3	3.1	9.0	12.5	56.5	6.5
LOS	B	A	A	B	E	A
Approach Delay	17.5			12.3	36.5	
Approach LOS	B			B	D	
Queue Length 50th (ft)	250	0	19	235	223	0
Queue Length 95th (ft)	331	32	37	297	#375	59
Internal Link Dist (ft)	1042			1734	675	
Turn Bay Length (ft)		710	980			500
Base Capacity (vph)	1801	874	434	2182	479	600
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	0.60	0.16	0.20	0.59	0.82	0.43
Intersection Summary						
Cycle Length: 95						
Actuated Cycle Length: 93.3						
Natural Cycle: 60						
Control Type: Actuated-Uncoordinated						
Maximum v/c Ratio: 0.88						

## Timings

### 4: State Highway 83 & Shoup Road

## Total Traffic Conditions

Year 2027 - AM Peak Hour

Intersection Signal Delay: 19.1

Intersection LOS: B

Intersection Capacity Utilization 67.4%

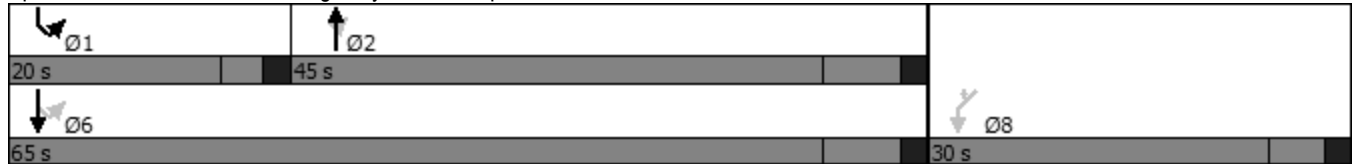
ICU Level of Service C

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

















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



# Timings

## 5: Black Forest Road & Shoup Road

Total Traffic Conditions  
Year 2027 - AM Peak Hour





												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	61	45	16	128	26	97	229	10	32	279	142
Future Volume (vph)	85	61	45	16	128	26	97	229	10	32	279	142
Satd. Flow (prot)	0	1763	0	0	1815	0	0	1829	0	0	1777	0
Flt Permitted		0.725			0.962			0.762			0.958	
Satd. Flow (perm)	0	1307	0	0	1754	0	0	1414	0	0	1710	0
Satd. Flow (RTOR)		18			11			3			40	
Lane Group Flow (vph)	0	207	0	0	184	0	0	365	0	0	492	0
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)		15.6			15.6			49.2			49.2	
Actuated g/C Ratio		0.20			0.20			0.64			0.64	
v/c Ratio		0.74			0.50			0.40			0.44	
Control Delay		42.2			30.0			9.3			8.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		42.2			30.0			9.3			8.8	
LOS		D			C			A			A	
Approach Delay		42.2			30.0			9.3			8.8	
Approach LOS		D			C			A			A	
Queue Length 50th (ft)		85			73			73			93	
Queue Length 95th (ft)		155			131			164			203	
Internal Link Dist (ft)		965			1070			1292			16527	
Turn Bay Length (ft)												
Base Capacity (vph)		506			671			906			1109	
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		0.41			0.27			0.40			0.44	
Intersection Summary												
Cycle Length: 90												
Actuated Cycle Length: 76.9												
Natural Cycle: 40												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.74												

Timings  
5: Black Forest Road & Shoup Road

Total Traffic Conditions  
Year 2027 - AM Peak Hour

Intersection Signal Delay: 17.6      Intersection LOS: B  
Intersection Capacity Utilization 80.0%      ICU Level of Service D  
Analysis Period (min) 15

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

 Ø2	 Ø4
55 s	35 s
 Ø6	 Ø8
55 s	35 s

HCM 6th TWSC  
6: Black Forest Road & Old Stagecoach Road/Terra Ridge Circle

Total Traffic Conditions  
Year 2027 - AM Peak Hour



















Intersection													
Int Delay, s/veh	6.6												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕			↕		↗		↘		↕		↗
Traffic Vol, veh/h	79	0	161	6	1	2	109	96	1	1	132	54	
Future Vol, veh/h	79	0	161	6	1	2	109	96	1	1	132	54	
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	-	-	-	-	-	-	195	-	-	-	-	195	
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	86	0	175	7	1	2	118	104	1	1	143	59	
Major/Minor	Minor2		Minor1		Major1		Major2						
Conflicting Flow All	487	486	143	603	545	105	202	0	0	105	0	0	
Stage 1	145	145	-	341	341	-	-	-	-	-	-	-	
Stage 2	342	341	-	262	204	-	-	-	-	-	-	-	
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	491	481	905	411	446	949	1370	-	-	1486	-	-	
Stage 1	858	777	-	674	639	-	-	-	-	-	-	-	
Stage 2	673	639	-	743	733	-	-	-	-	-	-	-	
Platoon blocked, %								-	-		-	-	
Mov Cap-1 Maneuver	456	439	905	309	407	949	1370	-	-	1486	-	-	
Mov Cap-2 Maneuver	456	439	-	309	407	-	-	-	-	-	-	-	
Stage 1	784	776	-	616	584	-	-	-	-	-	-	-	
Stage 2	612	584	-	599	732	-	-	-	-	-	-	-	
Approach	EB		WB		NB		SB						
HCM Control Delay, s	13.5		14.9		4.2		0						
HCM LOS	B		B										
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1370	-	-	683	375	1486	-	-					
HCM Lane V/C Ratio	0.086	-	-	0.382	0.026	0.001	-	-					
HCM Control Delay (s)	7.9	-	-	13.5	14.9	7.4	0	-					
HCM Lane LOS	A	-	-	B	B	A	A	-					
HCM 95th %tile Q(veh)	0.3	-	-	1.8	0.1	0	-	-					

# Timings

## 6: Black Forest Road & Old Stagecoach Road/Terra Ridge Circle

# Total Traffic Conditions

Year 2027 - AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	0	161	6	1	2	109	96	1	1	132	54
Future Volume (vph)	79	0	161	6	1	2	109	96	1	1	132	54
Satd. Flow (prot)	0	1666	0	0	1751	0	1770	1861	0	0	1863	1583
Flt Permitted		0.886			0.725		0.542				0.999	
Satd. Flow (perm)	0	1500	0	0	1314	0	1010	1861	0	0	1861	1583
Satd. Flow (RTOR)		175			2			1				155
Lane Group Flow (vph)	0	261	0	0	10	0	118	105	0	0	144	59
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	8.0		8.0	8.0	8.0
Minimum Split (s)	10.5	10.5		10.5	10.5		11.0	14.0		14.0	14.0	14.0
Total Split (s)	26.0	26.0		26.0	26.0		13.0	34.0		21.0	21.0	21.0
Total Split (%)	43.3%	43.3%		43.3%	43.3%		21.7%	56.7%		35.0%	35.0%	35.0%
Yellow Time (s)	3.5	3.5		3.5	3.5		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
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)		5.5			5.5		6.0	6.0			6.0	6.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)		9.9			9.9		38.6	38.6			27.8	27.8
Actuated g/C Ratio		0.16			0.16		0.64	0.64			0.46	0.46
v/c Ratio		0.67			0.05		0.16	0.09			0.17	0.07
Control Delay		16.7			16.9		5.8	5.4			13.7	0.2
Queue Delay		0.0			0.0		0.0	0.0			0.0	0.0
Total Delay		16.7			16.9		5.8	5.4			13.7	0.2
LOS		B			B		A	A			B	A
Approach Delay		16.7			16.9			5.6			9.8	
Approach LOS		B			B			A			A	
Queue Length 50th (ft)		28			3		13	11			30	0
Queue Length 95th (ft)		79			12		40	36			81	0
Internal Link Dist (ft)		750			806			16527			4563	
Turn Bay Length (ft)							195					195
Base Capacity (vph)		627			450		747	1199			860	815
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		0.42			0.02		0.16	0.09			0.17	0.07

### Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 60

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 40

Control Type: Actuated-Coordinated



## Timings

### 6: Black Forest Road & Old Stagecoach Road/Terra Ridge Circle

## Total Traffic Conditions

Year 2027 - AM Peak Hour

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 11.1





Intersection LOS: B

Intersection Capacity Utilization 42.7%

ICU Level of Service A










Analysis Period (min) 15

Splits and Phases: 6: Black Forest Road & Old Stagecoach Road/Terra Ridge Circle

 Ø2 (R)		 Ø4	
34 s		26 s	
 Ø5		 Ø8	
13 s	21 s	26 s	

HCM 6th TWSC  
7: Ridge Run Road/Black Forest Road & Hodgen Road

Total Traffic Conditions  
Year 2027 - AM Peak Hour

Intersection												
Int Delay, s/veh	1.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	192	6	0	526	13	8	0	0	13	0	49
Future Vol, veh/h	14	192	6	0	526	13	8	0	0	13	0	49
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	15	209	7	0	572	14	9	0	0	14	0	53

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	586	0	0	216	0	0	845	825	209	822	825	579
Stage 1	-	-	-	-	-	-	239	239	-	579	579	-
Stage 2	-	-	-	-	-	-	606	586	-	243	246	-
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	989	-	-	1354	-	-	283	308	831	293	308	515
Stage 1	-	-	-	-	-	-	764	708	-	501	501	-
Stage 2	-	-	-	-	-	-	484	497	-	761	703	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	989	-	-	1354	-	-	251	303	831	289	303	515
Mov Cap-2 Maneuver	-	-	-	-	-	-	251	303	-	289	303	-
Stage 1	-	-	-	-	-	-	753	697	-	493	501	-
Stage 2	-	-	-	-	-	-	434	497	-	749	692	-







Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0	19.9	13.9
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	251	-	989	-	-	1354	-	-	289	515
HCM Lane V/C Ratio	0.035	-	0.015	-	-	-	-	-	0.049	0.103
HCM Control Delay (s)	19.9	0	8.7	-	-	0	-	-	18.1	12.8
HCM Lane LOS	C	A	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.1	-	0	-	-	0	-	-	0.2	0.3

HCM 6th TWSC  
8: Black Forest Road/Black Forrest Road & Hodgen Road

Total Traffic Conditions  
Year 2027 - AM Peak Hour

Intersection												
Int Delay, s/veh	12.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	176	100	88	507	1	159	0	62	0	0	2
Future Vol, veh/h	2	176	100	88	507	1	159	0	62	0	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	2	191	109	96	551	1	173	0	67	0	0	2
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	552	0	0	300	0	0	940	939	191	1027	1048	552
Stage 1	-	-	-	-	-	-	195	195	-	744	744	-
Stage 2	-	-	-	-	-	-	745	744	-	283	304	-
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	1018	-	-	1261	-	-	244	264	851	213	228	533
Stage 1	-	-	-	-	-	-	807	739	-	407	421	-
Stage 2	-	-	-	-	-	-	406	421	-	724	663	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1018	-	-	1261	-	-	229	243	851	184	210	533
Mov Cap-2 Maneuver	-	-	-	-	-	-	229	243	-	184	210	-
Stage 1	-	-	-	-	-	-	805	738	-	406	389	-
Stage 2	-	-	-	-	-	-	374	389	-	665	662	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			1.2			58.2			11.8		
HCM LOS							F			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	288	1018	-	-	1261	-	-	533				
HCM Lane V/C Ratio	0.834	0.002	-	-	0.076	-	-	0.004				
HCM Control Delay (s)	58.2	8.5	0	-	8.1	-	-	11.8				
HCM Lane LOS	F	A	A	-	A	-	-	B				
HCM 95th %tile Q(veh)	7	0	-	-	0.2	-	-	0				

HCM 6th Roundabout  
9: Allen Ranch Road & Old Stagecoach Road

Total Traffic Conditions  
Year 2027 - AM Peak Hour

Intersection			
Intersection Delay, s/veh	4.3		
Intersection LOS	A		
Approach	EB	WB	NB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	195	300	60
Demand Flow Rate, veh/h	198	306	62
Vehicles Circulating, veh/h	22	29	174
Vehicles Exiting, veh/h	313	207	46
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	3.9	4.7	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
Entry Flow, veh/h	198	306	62
Cap Entry Lane, veh/h	1349	1340	1155
Entry HV Adj Factor	0.983	0.982	0.968
Flow Entry, veh/h	195	300	60
Cap Entry, veh/h	1326	1315	1118
V/C Ratio	0.147	0.228	0.054
Control Delay, s/veh	3.9	4.7	3.7
LOS	A	A	A
95th %tile Queue, veh	1	1	0

HCM 6th Roundabout  
10: Shortwall Drive & Old Stagecoach Road & Stagecoach Road

Total Traffic Conditions  
Year 2027 - AM Peak Hour

























Intersection			
Intersection Delay, s/veh	4.3		
Intersection LOS	A		
Approach	WB	NB	SE
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	291	59	225
Demand Flow Rate, veh/h	297	60	230
Vehicles Circulating, veh/h	42	194	3
Vehicles Exiting, veh/h	212	39	336
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	4.7	3.7	4.0
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
Entry Flow, veh/h	297	60	230
Cap Entry Lane, veh/h	1322	1132	1376
Entry HV Adj Factor	0.980	0.983	0.978
Flow Entry, veh/h	291	59	225
Cap Entry, veh/h	1295	1113	1346
V/C Ratio	0.225	0.053	0.167
Control Delay, s/veh	4.7	3.7	4.0
LOS	A	A	A
95th %tile Queue, veh	1	0	1

# Timings

## 1: State Highway 83 & Hodgen Road

# Total Traffic Conditions

Year 2027 - PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	243	208	128	139	195	171	451	196	277	458	70
Future Volume (vph)	30	243	208	128	139	195	171	451	196	277	458	70
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1825	0
Flt Permitted	0.661			0.436			0.293			0.369		
Satd. Flow (perm)	1231	1863	1583	812	1863	1583	546	1863	1583	687	1825	0
Satd. Flow (RTOR)			226			212			213		13	
Lane Group Flow (vph)	33	264	226	139	151	212	186	490	213	301	574	0
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		
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	
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	0.12	0.64	0.43	0.77	0.36	0.41	0.47	0.56	0.25	0.65	0.67	
Control Delay	26.6	36.6	6.8	59.6	29.7	6.8	10.8	18.6	2.7	15.9	20.8	
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	26.6	36.6	6.8	59.6	29.7	6.8	10.8	18.6	2.7	15.9	20.8	
LOS	C	D	A	E	C	A	B	B	A	B	C	
Approach Delay		23.1			28.3			13.2			19.2	
Approach LOS		C			C			B			B	
Queue Length 50th (ft)	13	122	0	66	65	0	35	171	0	61	210	
Queue Length 95th (ft)	37	201	54	#161	118	53	61	263	34	98	323	
Internal Link Dist (ft)		824			1611			1078			1286	
Turn Bay Length (ft)	420		420	350		350	120		650	525		
Base Capacity (vph)	273	414	527	180	414	516	394	874	855	461	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	0.12	0.64	0.43	0.77	0.36	0.41	0.47	0.56	0.25	0.65	0.67	

### 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: 0.77

Intersection Signal Delay: 19.6

Intersection LOS: B

Intersection Capacity Utilization 85.2%

ICU Level of Service E

Analysis Period (min) 15

## Timings

### 1: State Highway 83 & Hodgen Road







## Total Traffic Conditions

Year 2027 - PM Peak Hour

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

 Ø1	 Ø2 (R)	 Ø4
12 s	45 s	24 s
 Ø5	 Ø6 (R)	 Ø8
12 s	45 s	24 s

HCM 6th Roundabout  
2: State Highway 83 & Stagecoach Road

Total Traffic Conditions  
Year 2027 - PM Peak Hour

Intersection				
Intersection Delay, s/veh 23.5				
Intersection LOS C				
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	4	377	967	823
Demand Flow Rate, veh/h	4	385	986	840
Vehicles Circulating, veh/h	1029	767	253	193
Vehicles Exiting, veh/h	4	472	780	959
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	7.6	17.6	32.6	15.6
Approach LOS	A	C	D	C
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
Entry Flow, veh/h	4	385	986	840
Cap Entry Lane, veh/h	483	631	1066	1133
Entry HV Adj Factor	1.000	0.979	0.981	0.980
Flow Entry, veh/h	4	377	967	823
Cap Entry, veh/h	483	618	1045	1111
V/C Ratio	0.008	0.610	0.925	0.741
Control Delay, s/veh	7.6	17.6	32.6	15.6
LOS	A	C	D	C
95th %tile Queue, veh	0	4	15	7






















# Timings

## 2: State Highway 83 & Stagecoach Road

### Total Traffic Conditions

Year 2027 - PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	3	170	3	174	1	690	199	227	530	0
Future Volume (vph)	1	0	3	170	3	174	1	690	199	227	530	0
Satd. Flow (prot)	0	1655	0	0	1775	1583	0	1863	1583	1770	1863	0
Flt Permitted		0.932			0.727					0.118		
Satd. Flow (perm)	0	1561	0	0	1354	1583	0	1863	1583	220	1863	0
Satd. Flow (RTOR)		133				189			216			
Lane Group Flow (vph)	0	4	0	0	188	189	0	751	216	247	576	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0	8.0	35.0	35.0	35.0	14.0	35.0	
Minimum Split (s)	13.5	13.5		13.5	13.5	13.5	42.0	42.0	42.0	21.0	42.0	
Total Split (s)	20.0	20.0		20.0	20.0	20.0	49.0	49.0	49.0	21.0	70.0	
Total Split (%)	22.2%	22.2%		22.2%	22.2%	22.2%	54.4%	54.4%	54.4%	23.3%	77.8%	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	5.0	5.0	5.0	5.0	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	
Lost Time Adjust (s)		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.5			5.5	5.5		7.0	7.0	7.0	7.0	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Act Effect Green (s)		14.1			14.1	14.1		42.4	42.4	63.4	63.4	
Actuated g/C Ratio		0.16			0.16	0.16		0.47	0.47	0.70	0.70	
v/c Ratio		0.01			0.89	0.46		0.86	0.25	0.62	0.44	
Control Delay		0.0			77.2	9.4		33.1	2.8	18.9	7.0	
Queue Delay		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay		0.0			77.2	9.4		33.1	2.8	18.9	7.0	
LOS		A			E	A		C	A	B	A	
Approach Delay					43.2			26.3			10.6	
Approach LOS					D			C			B	
Queue Length 50th (ft)		0			105	0		367	0	53	122	
Queue Length 95th (ft)		0			#226	57		#594	37	133	181	
Internal Link Dist (ft)		862			898			913			1101	
Turn Bay Length (ft)						135			320	415		
Base Capacity (vph)		363			218	413		877	859	396	1312	
Starvation Cap Reductn		0			0	0		0	0	0	0	
Spillback Cap Reductn		0			0	0		0	0	0	0	
Storage Cap Reductn		0			0	0		0	0	0	0	
Reduced v/c Ratio		0.01			0.86	0.46		0.86	0.25	0.62	0.44	
Intersection Summary												
Cycle Length: 90												
Actuated Cycle Length: 90												
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green												
Natural Cycle: 90												
Control Type: Actuated-Coordinated												

# Timings 2: State Highway 83 & Stagecoach Road

Total Traffic Conditions  
Year 2027 - PM Peak Hour

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 23.2

Intersection LOS: C

Intersection Capacity Utilization 98.0%

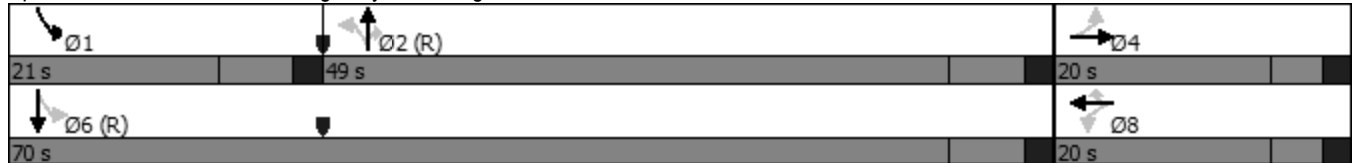
ICU Level of Service F

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.






















Splits and Phases: 2: State Highway 83 & Stagecoach Road



# Timings

## 3: State Highway 83 & North Gate Boulevard

Total Traffic Conditions  
Year 2027 - PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	197	0	476	0	0	0	464	859	2	1	661	148
Future Volume (vph)	197	0	476	0	0	0	464	859	2	1	661	148
Satd. Flow (prot)	1770	1863	1583	0	1863	0	1770	3539	0	1770	3539	1583
Flt Permitted	0.757						0.229			0.305		
Satd. Flow (perm)	1410	1863	1583	0	1863	0	427	3539	0	568	3539	1583
Satd. Flow (RTOR)			494									161
Lane Group Flow (vph)	214	0	517	0	0	0	504	936	0	1	718	161
Turn Type	Perm		Perm				pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		6
Detector Phase	4	4	4	8	8		5	2		6	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	5.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0		10.0	12.0		11.0	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	35.0
Total Split (%)	28.6%	28.6%	28.6%	28.6%	28.6%		29.8%	71.4%		41.7%	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	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	0.0
Total Lost Time (s)	6.0	6.0	6.0		6.0		5.0	7.0		6.0	6.0	6.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None	None	None	None	None		Max	Max		Max	Max	Max
Act Effct Green (s)	15.9		15.9				55.1	53.1		29.1	29.1	29.1
Actuated g/C Ratio	0.19		0.19				0.67	0.65		0.35	0.35	0.35
v/c Ratio	0.78		0.73				0.82	0.41		0.00	0.57	0.24
Control Delay	52.4		10.7				24.4	7.9		18.0	24.0	4.5
Queue Delay	0.0		0.0				0.0	0.0		0.0	0.0	0.0
Total Delay	52.4		10.7				24.4	7.9		18.0	24.0	4.5
LOS	D		B				C	A		B	C	A
Approach Delay		22.9						13.7			20.5	
Approach LOS		C						B			C	
Queue Length 50th (ft)	105		10				139	116		0	161	0
Queue Length 95th (ft)	#205		105				#311	153		4	218	39
Internal Link Dist (ft)		997			136			1617			2154	
Turn Bay Length (ft)	225		285				900			750		730
Base Capacity (vph)	310		733				615	2291		201	1253	664
Starvation Cap Reductn	0		0				0	0		0	0	0
Spillback Cap Reductn	0		0				0	0		0	0	0
Storage Cap Reductn	0		0				0	0		0	0	0
Reduced v/c Ratio	0.69		0.71				0.82	0.41		0.00	0.57	0.24
Intersection Summary												
Cycle Length: 84												
Actuated Cycle Length: 82												
Natural Cycle: 60												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.82												

# Timings

## 3: State Highway 83 & North Gate Boulevard

# Total Traffic Conditions

Year 2027 - PM Peak Hour

Intersection Signal Delay: 17.8

Intersection LOS: B

Intersection Capacity Utilization 69.1%






ICU Level of Service C

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

 Ø2	 Ø4
60 s	24 s
 Ø5	 Ø8
25 s	24 s
 Ø6	
35 s	

Timings  
4: State Highway 83 & Shoup Road

Total Traffic Conditions  
Year 2027 - PM Peak Hour

	↑	↗	↘	↓	↙	↖
Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↑↑	↗	↘	↑↑	↘	↗
Traffic Volume (vph)	1310	323	212	1016	158	100
Future Volume (vph)	1310	323	212	1016	158	100
Satd. Flow (prot)	3539	1583	1770	3539	1770	1583
Flt Permitted			0.085			
Satd. Flow (perm)	3539	1583	158	3539	1863	1583
Satd. Flow (RTOR)		351				109
Lane Group Flow (vph)	1424	351	230	1104	172	109
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 Effect Green (s)	41.9	41.9	60.1	57.6	12.9	12.9
Actuated g/C Ratio	0.50	0.50	0.71	0.68	0.15	0.15
v/c Ratio	0.81	0.36	0.72	0.46	0.60	0.33
Control Delay	24.2	3.1	28.9	7.2	42.1	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.2	3.1	28.9	7.2	42.1	9.2
LOS	C	A	C	A	D	A
Approach Delay	20.1			10.9	29.4	
Approach LOS	C			B	C	
Queue Length 50th (ft)	315	0	61	119	86	0
Queue Length 95th (ft)	#555	49	144	194	148	42
Internal Link Dist (ft)	1042			1734	675	
Turn Bay Length (ft)		710	980			500
Base Capacity (vph)	1760	964	401	2424	532	530
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	0.81	0.36	0.57	0.46	0.32	0.21
Intersection Summary						
Cycle Length: 95						
Actuated Cycle Length: 84.1						
Natural Cycle: 60						
Control Type: Actuated-Uncoordinated						
Maximum v/c Ratio: 0.81						

## Timings

### 4: State Highway 83 & Shoup Road

## Total Traffic Conditions

Year 2027 - PM Peak Hour

Intersection Signal Delay: 17.2

Intersection LOS: B

Intersection Capacity Utilization 72.1%





ICU Level of Service C

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

















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

 Ø1	 Ø2	
20 s	45 s	
 Ø6		 Ø8
65 s		30 s

# Timings

## 5: Black Forest Road & Shoup Road

Total Traffic Conditions  
Year 2027 - PM Peak Hour





												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	109	169	107	19	52	44	54	328	23	45	277	93
Future Volume (vph)	109	169	107	19	52	44	54	328	23	45	277	93
Satd. Flow (prot)	0	1769	0	0	1754	0	0	1835	0	0	1798	0
Flt Permitted		0.872			0.897			0.893			0.917	
Satd. Flow (perm)	0	1564	0	0	1586	0	0	1650	0	0	1657	0
Satd. Flow (RTOR)		23			36			5			25	
Lane Group Flow (vph)	0	418	0	0	126	0	0	441	0	0	451	0
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 Effect Green (s)		25.5			25.5			49.1			49.1	
Actuated g/C Ratio		0.29			0.29			0.57			0.57	
v/c Ratio		0.88			0.26			0.47			0.47	
Control Delay		48.3			17.7			13.8			13.2	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		48.3			17.7			13.8			13.2	
LOS		D			B			B			B	
Approach Delay		48.3			17.7			13.8			13.2	
Approach LOS		D			B			B			B	
Queue Length 50th (ft)		205			36			143			140	
Queue Length 95th (ft)		#360			79			223			221	
Internal Link Dist (ft)		965			1070			1292			16527	
Turn Bay Length (ft)												
Base Capacity (vph)		540			556			937			950	
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		0.77			0.23			0.47			0.47	
Intersection Summary												
Cycle Length: 90												
Actuated Cycle Length: 86.6												
Natural Cycle: 55												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.88												

# Timings 5: Black Forest Road & Shoup Road

Total Traffic Conditions  
Year 2027 - PM Peak Hour

Intersection Signal Delay: 24.0 Intersection LOS: C  
Intersection Capacity Utilization 68.7% ICU Level of Service C  
Analysis Period (min) 15  
# 95th percentile volume exceeds capacity, queue may be longer.  
Queue shown is maximum after two cycles.







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

 Ø2 55 s	 Ø4 35 s
 Ø6 55 s	 Ø8 35 s



HCM 6th TWSC  
6: Black Forest Road & Old Stagecoach Road/Terra Ridge Circle

Total Traffic Conditions  
Year 2027 - PM Peak Hour



















Intersection												
Int Delay, s/veh	8.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	87	2	175	2	2	2	224	129	0	6	129	112
Future Vol, veh/h	87	2	175	2	2	2	224	129	0	6	129	112
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	-	-	-	-	-	-	195	-	-	-	-	195
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	95	2	190	2	2	2	243	140	0	7	140	122
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	782	780	140	937	902	140	262	0	0	140	0	0
Stage 1	154	154	-	626	626	-	-	-	-	-	-	-
Stage 2	628	626	-	311	276	-	-	-	-	-	-	-
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	312	327	908	245	277	908	1302	-	-	1443	-	-
Stage 1	848	770	-	472	477	-	-	-	-	-	-	-
Stage 2	471	477	-	699	682	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	264	264	908	164	224	908	1302	-	-	1443	-	-
Mov Cap-2 Maneuver	264	264	-	164	224	-	-	-	-	-	-	-
Stage 1	689	765	-	384	388	-	-	-	-	-	-	-
Stage 2	380	388	-	548	678	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	21.6		19.4		5.3		0.2					
HCM LOS	C		C									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1302	-	-	498	257	1443	-	-				
HCM Lane V/C Ratio	0.187	-	-	0.576	0.025	0.005	-	-				
HCM Control Delay (s)	8.4	-	-	21.6	19.4	7.5	0	-				
HCM Lane LOS	A	-	-	C	C	A	A	-				
HCM 95th %tile Q(veh)	0.7	-	-	3.6	0.1	0	-	-				

# Timings

## 6: Black Forest Road & Old Stagecoach Road/Terra Ridge Circle

# Total Traffic Conditions

Year 2027 - PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	2	175	2	2	2	224	129	0	6	129	112
Future Volume (vph)	87	2	175	2	2	2	224	129	0	6	129	112
Satd. Flow (prot)	0	1670	0	0	1750	0	1770	1863	0	0	1859	1583
Flt Permitted		0.887			0.890		0.525				0.987	
Satd. Flow (perm)	0	1505	0	0	1583	0	978	1863	0	0	1839	1583
Satd. Flow (RTOR)		174			2							155
Lane Group Flow (vph)	0	287	0	0	6	0	243	140	0	0	147	122
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	2		6	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)	10.5	10.5		10.5	10.5		11.0	14.0		14.0	14.0	14.0
Total Split (s)	25.0	25.0		25.0	25.0		15.0	35.0		20.0	20.0	20.0
Total Split (%)	41.7%	41.7%		41.7%	41.7%		25.0%	58.3%		33.3%	33.3%	33.3%
Yellow Time (s)	3.5	3.5		3.5	3.5		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
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)		5.5			5.5		6.0	6.0			6.0	6.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)		10.8			10.8		37.7	37.7			22.8	22.8
Actuated g/C Ratio		0.18			0.18		0.63	0.63			0.38	0.38
v/c Ratio		0.69			0.02		0.33	0.12			0.21	0.18
Control Delay		18.1			14.8		7.4	6.1			16.4	3.2
Queue Delay		0.0			0.0		0.0	0.0			0.0	0.0
Total Delay		18.1			14.8		7.4	6.1			16.4	3.2
LOS		B			B		A	A			B	A
Approach Delay		18.1			14.8			6.9			10.4	
Approach LOS		B			B			A			B	
Queue Length 50th (ft)		37			1		31	17			34	0
Queue Length 95th (ft)		90			8		83	49			88	24
Internal Link Dist (ft)		750			806			16527			4563	
Turn Bay Length (ft)							195					195
Base Capacity (vph)		606			515		742	1170			698	697
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		0.47			0.01		0.33	0.12			0.21	0.18
Intersection Summary												
Cycle Length: 60												
Actuated Cycle Length: 60												
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green												
Natural Cycle: 40												
Control Type: Actuated-Coordinated												

## Timings

### 6: Black Forest Road & Old Stagecoach Road/Terra Ridge Circle

## Total Traffic Conditions

Year 2027 - PM Peak Hour

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 11.4

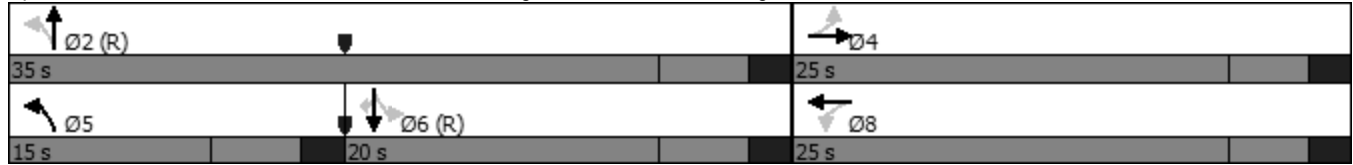
Intersection LOS: B

Intersection Capacity Utilization 54.6%

ICU Level of Service A













Analysis Period (min) 15

Splits and Phases: 6: Black Forest Road & Old Stagecoach Road/Terra Ridge Circle



HCM 6th TWSC  
7: Ridge Run Road/Black Forest Road & Hodgen Road

Total Traffic Conditions  
Year 2027 - PM Peak Hour

Intersection												
Int Delay, s/veh	2.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	68	473	20	2	279	13	19	2	5	31	1	24
Future Vol, veh/h	68	473	20	2	279	13	19	2	5	31	1	24
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	74	514	22	2	303	14	21	2	5	34	1	26

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	317	0	0	536	0	0	990	983	514	991	998	310
Stage 1	-	-	-	-	-	-	662	662	-	314	314	-
Stage 2	-	-	-	-	-	-	328	321	-	677	684	-
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	1243	-	-	1032	-	-	225	249	560	225	244	730
Stage 1	-	-	-	-	-	-	451	459	-	697	656	-
Stage 2	-	-	-	-	-	-	685	652	-	443	449	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1243	-	-	1032	-	-	206	234	560	211	229	730
Mov Cap-2 Maneuver	-	-	-	-	-	-	206	234	-	211	229	-
Stage 1	-	-	-	-	-	-	424	431	-	655	655	-
Stage 2	-	-	-	-	-	-	658	651	-	411	422	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	1	-	-	0.1	-	-	21.7	-	-	18.7	-	-
HCM LOS	-	-	-	-	-	-	C	-	-	C	-	-

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	206	401	1243	-	-	1032	-	-	211	671
HCM Lane V/C Ratio	0.1	0.019	0.059	-	-	0.002	-	-	0.16	0.04
HCM Control Delay (s)	24.4	14.2	8.1	-	-	8.5	-	-	25.3	10.6
HCM Lane LOS	C	B	A	-	-	A	-	-	D	B
HCM 95th %tile Q(veh)	0.3	0.1	0.2	-	-	0	-	-	0.6	0.1

HCM 6th TWSC  
8: Black Forest Road/Black Forrest Road & Hodgen Road

Total Traffic Conditions  
Year 2027 - PM Peak Hour

Intersection												
Int Delay, s/veh	9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↖	↗			↕			↕	
Traffic Vol, veh/h	2	466	173	72	248	0	120	1	96	0	0	0
Future Vol, veh/h	2	466	173	72	248	0	120	1	96	0	0	0
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	507	188	78	270	0	130	1	104	0	0	0
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	270	0	0	695	0	0	937	937	507	1084	1125	270
Stage 1	-	-	-	-	-	-	511	511	-	426	426	-
Stage 2	-	-	-	-	-	-	426	426	-	658	699	-
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	-	-	901	-	-	245	265	566	194	205	769
Stage 1	-	-	-	-	-	-	545	537	-	606	586	-
Stage 2	-	-	-	-	-	-	606	586	-	453	442	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1293	-	-	901	-	-	228	241	566	147	187	769
Mov Cap-2 Maneuver	-	-	-	-	-	-	228	241	-	147	187	-
Stage 1	-	-	-	-	-	-	543	535	-	604	535	-
Stage 2	-	-	-	-	-	-	554	535	-	368	441	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			2.1			45.7			0		
HCM LOS							E			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	310	1293	-	-	901	-	-	-				
HCM Lane V/C Ratio	0.761	0.002	-	-	0.087	-	-	-				
HCM Control Delay (s)	45.7	7.8	0	-	9.4	-	-	0				
HCM Lane LOS	E	A	A	-	A	-	-	A				
HCM 95th %tile Q(veh)	5.9	0	-	-	0.3	-	-	-				

HCM 6th Roundabout  
9: Allen Ranch Road & Old Stagecoach Road

Total Traffic Conditions  
Year 2027 - PM Peak Hour

Intersection			
Intersection Delay, s/veh	5.3		
Intersection LOS	A		
Approach	EB	WB	NB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	415	319	62
Demand Flow Rate, veh/h	423	326	64
Vehicles Circulating, veh/h	43	31	382
Vehicles Exiting, veh/h	314	415	84
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	5.7	4.9	4.6
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
Entry Flow, veh/h	423	326	64
Cap Entry Lane, veh/h	1321	1337	935
Entry HV Adj Factor	0.980	0.980	0.969
Flow Entry, veh/h	415	319	62
Cap Entry, veh/h	1294	1310	905
V/C Ratio	0.320	0.244	0.068
Control Delay, s/veh	5.7	4.9	4.6
LOS	A	A	A
95th %tile Queue, veh	1	1	0

HCM 6th Roundabout  
10: Shortwall Drive & Old Stagecoach Road & Stagecoach Road

Total Traffic Conditions  
Year 2027 - PM Peak Hour

























Intersection			
Intersection Delay, s/veh	5.4		
Intersection LOS	A		
Approach	WB	NB	SE
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	325	47	457
Demand Flow Rate, veh/h	331	48	466
Vehicles Circulating, veh/h	38	410	18
Vehicles Exiting, veh/h	420	74	351
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	4.9	4.5	5.8
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
Entry Flow, veh/h	331	48	466
Cap Entry Lane, veh/h	1327	908	1355
Entry HV Adj Factor	0.982	0.979	0.981
Flow Entry, veh/h	325	47	457
Cap Entry, veh/h	1303	889	1329
V/C Ratio	0.249	0.053	0.344
Control Delay, s/veh	4.9	4.5	5.8
LOS	A	A	A
95th %tile Queue, veh	1	0	2

# Timings

## 1: State Highway 83 & Hodgen Road

# Total Traffic Conditions

Year 2042 - AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	154	120	435	295	400	165	527	130	199	686	98
Future Volume (vph)	155	154	120	435	295	400	165	527	130	199	686	98
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1827	0
Flt Permitted	0.437			0.627			0.085			0.179		
Satd. Flow (perm)	814	1863	1583	1168	1863	1583	158	1863	1583	333	1827	0
Satd. Flow (RTOR)			130			265			141		7	
Lane Group Flow (vph)	168	167	130	473	321	435	179	573	141	216	853	0
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)	51.0	51.0	51.0	51.0	51.0	51.0	12.0	54.0	54.0	15.0	57.0	
Total Split (%)	42.5%	42.5%	42.5%	42.5%	42.5%	42.5%	10.0%	45.0%	45.0%	12.5%	47.5%	
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	None	None	None	None	None	None	None	Max	Max	None	Max	
Act Effct Green (s)	45.0	45.0	45.0	45.0	45.0	45.0	54.0	47.0	47.0	60.0	50.0	
Actuated g/C Ratio	0.38	0.38	0.38	0.38	0.38	0.38	0.45	0.39	0.39	0.50	0.42	
v/c Ratio	0.55	0.24	0.19	1.08	0.46	0.57	1.19	0.79	0.20	0.79	1.12	
Control Delay	37.9	26.9	4.9	102.8	31.0	14.3	157.0	41.2	4.5	38.4	102.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	37.9	26.9	4.9	102.8	31.0	14.3	157.0	41.2	4.5	38.4	102.5	
LOS	D	C	A	F	C	B	F	D	A	D	F	
Approach Delay		24.7			52.7			58.6			89.5	
Approach LOS		C			D			E			F	
Queue Length 50th (ft)	102	88	0	~409	186	97	~114	385	0	87	~757	
Queue Length 95th (ft)	180	142	40	#617	271	203	#264	534	40	#170	#1005	
Internal Link Dist (ft)		824			1611			1078			1286	
Turn Bay Length (ft)	420		420	350		350	120		650	525		
Base Capacity (vph)	305	698	674	438	698	759	151	729	705	274	765	
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	0.24	0.19	1.08	0.46	0.57	1.19	0.79	0.20	0.79	1.12	

### Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Natural Cycle: 120

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.19



## Timings

### 1: State Highway 83 & Hodgen Road

## Total Traffic Conditions

Year 2042 - AM Peak Hour

Intersection Signal Delay: 61.4

Intersection LOS: E

Intersection Capacity Utilization 104.2%

ICU Level of Service G

Analysis Period (min) 15







~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

 Ø1	 Ø2	 Ø4
15 s	54 s	51 s
 Ø5	 Ø6	 Ø8
12 s	57 s	51 s

HCM 6th Roundabout  
2: State Highway 83 & Stagecoach Road




















Total Traffic Conditions  
Year 2042 - AM Peak Hour

Intersection						
Intersection Delay, s/veh 9.2						
Intersection LOS A						
Approach	EB	WB	NB	SB		
Entry Lanes	1	1	2	2		
Conflicting Circle Lanes	2	2	2	2		
Adj Approach Flow, veh/h	12	362	881	1347		
Demand Flow Rate, veh/h	12	370	899	1374		
Vehicles Circulating, veh/h	1556	751	121	184		
Vehicles Exiting, veh/h	2	269	1447	937		
Ped Vol Crossing Leg, #/h	0	0	0	0		
Ped Cap Adj	1.000	1.000	1.000	1.000		
Approach Delay, s/veh	10.0	12.1	6.4	10.3		
Approach LOS	B	B	A	B		
Lane	Left	Left	Left	Right	Left	Right
Designated Moves	LTR	LTR	LT	TR	LT	TR
Assumed Moves	LTR	LTR	LT	TR	LT	TR
RT Channelized						
Lane Util	1.000	1.000	0.471	0.529	0.470	0.530
Follow-Up Headway, s	2.535	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.328	4.328	4.645	4.328	4.645	4.328
Entry Flow, veh/h	12	370	423	476	646	728
Cap Entry Lane, veh/h	378	750	1208	1281	1140	1214
Entry HV Adj Factor	0.997	0.978	0.979	0.981	0.980	0.981
Flow Entry, veh/h	12	362	414	467	633	714
Cap Entry, veh/h	377	734	1183	1257	1117	1191
V/C Ratio	0.032	0.493	0.350	0.371	0.567	0.599
Control Delay, s/veh	10.0	12.1	6.4	6.4	10.2	10.4
LOS	B	B	A	A	B	B
95th %tile Queue, veh	0	3	2	2	4	4

# Timings

## 2: State Highway 83 & Stagecoach Road

Total Traffic Conditions  
Year 2042 - AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	2	7	166	0	167	0	675	135	106	1132	2
Future Volume (vph)	2	2	7	166	0	167	0	675	135	106	1132	2
Satd. Flow (prot)	0	1682	0	0	1770	1583	0	3539	1583	1770	3539	0
Flt Permitted		0.941			0.750					0.277		
Satd. Flow (perm)	0	1595	0	0	1397	1583	0	3539	1583	516	3539	0
Satd. Flow (RTOR)		8				182			147			
Lane Group Flow (vph)	0	12	0	0	180	182	0	734	147	115	1232	0
Turn Type	Perm	NA		Perm	NA	Perm		NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0	8.0	35.0	35.0	35.0	14.0	35.0	
Minimum Split (s)	13.5	13.5		13.5	13.5	13.5	42.0	42.0	42.0	21.0	42.0	
Total Split (s)	17.0	17.0		17.0	17.0	17.0	42.0	42.0	42.0	21.0	63.0	
Total Split (%)	21.3%	21.3%		21.3%	21.3%	21.3%	52.5%	52.5%	52.5%	26.3%	78.8%	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	5.0	5.0	5.0	5.0	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	
Lost Time Adjust (s)		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.5			5.5	5.5		7.0	7.0	7.0	7.0	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Act Effect Green (s)		11.5			11.5	11.5		39.2	39.2	56.0	56.0	
Actuated g/C Ratio		0.14			0.14	0.14		0.49	0.49	0.70	0.70	
v/c Ratio		0.05			0.90	0.48		0.42	0.17	0.20	0.50	
Control Delay		21.0			79.0	9.9		15.5	3.1	4.7	6.4	
Queue Delay		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay		21.0			79.0	9.9		15.5	3.1	4.7	6.4	
LOS		C			E	A		B	A	A	A	
Approach Delay		21.0			44.2			13.5			6.2	
Approach LOS		C			D			B			A	
Queue Length 50th (ft)		2			90	0		132	0	15	124	
Queue Length 95th (ft)		16			#206	54		180	31	30	163	
Internal Link Dist (ft)		862			898			913			1101	
Turn Bay Length (ft)						135			320	415		
Base Capacity (vph)		236			200	383		1734	850	580	2477	
Starvation Cap Reductn		0			0	0		0	0	0	0	
Spillback Cap Reductn		0			0	0		0	0	0	0	
Storage Cap Reductn		0			0	0		0	0	0	0	
Reduced v/c Ratio		0.05			0.90	0.48		0.42	0.17	0.20	0.50	
Intersection Summary												
Cycle Length: 80												
Actuated Cycle Length: 80												
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green												
Natural Cycle: 80												
Control Type: Actuated-Coordinated												

# Timings 2: State Highway 83 & Stagecoach Road

Total Traffic Conditions  
Year 2042 - AM Peak Hour

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 14.0

Intersection LOS: B

Intersection Capacity Utilization 92.6%






ICU Level of Service F

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.























Splits and Phases: 2: State Highway 83 & Stagecoach Road

 Ø1	 Ø2 (R)	 Ø4
21 s	42 s	17 s
 Ø6 (R)	 Ø8	
63 s		17 s

# Timings

## 3: State Highway 83 & North Gate Boulevard

Total Traffic Conditions  
Year 2042 - AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	117	0	582	0	0	0	934	751	0	0	1303	283
Future Volume (vph)	117	0	582	0	0	0	934	751	0	0	1303	283
Satd. Flow (prot)	1770	1863	1583	0	1863	0	1770	3539	1863	1863	3539	1583
Flt Permitted	0.757						0.125					
Satd. Flow (perm)	1410	1863	1583	0	1863	0	233	3539	1863	1863	3539	1583
Satd. Flow (RTOR)			593									235
Lane Group Flow (vph)	127	0	633	0	0	0	1015	816	0	0	1416	308
Turn Type	Perm		Perm				pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2		2	6		6
Detector Phase	4	4	4	8	8		5	2	2	6	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	5.0	5.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0		10.0	12.0	12.0	11.0	11.0	11.0
Total Split (s)	13.0	13.0	13.0	13.0	13.0		37.0	71.0	71.0	34.0	34.0	34.0
Total Split (%)	15.5%	15.5%	15.5%	15.5%	15.5%		44.0%	84.5%	84.5%	40.5%	40.5%	40.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	5.0	5.0	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	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
Total Lost Time (s)	6.0	6.0	6.0		6.0		5.0	7.0	7.0	6.0	6.0	6.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None	None	None	None	None		Max	Max	Max	Max	Max	Max
Act Effct Green (s)	7.0		7.0				66.0	64.0			28.0	28.0
Actuated g/C Ratio	0.08		0.08				0.79	0.76			0.33	0.33
v/c Ratio	1.09		0.94				1.32	0.30			1.20	0.45
Control Delay	148.4		28.8				176.2	3.4			126.7	8.2
Queue Delay	0.0		0.0				0.0	0.0			0.0	0.0
Total Delay	148.4		28.8				176.2	3.4			126.7	8.2
LOS	F		C				F	A			F	A
Approach Delay		48.8						99.2			105.6	
Approach LOS		D						F			F	
Queue Length 50th (ft)	~76		20				~653	54			~483	27
Queue Length 95th (ft)	#183		#216				#889	72			#614	89
Internal Link Dist (ft)		997			136			1617			2154	
Turn Bay Length (ft)	225		285				900					730
Base Capacity (vph)	117		675				768	2696			1179	684
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	1.09		0.94				1.32	0.30			1.20	0.45

### Intersection Summary

Cycle Length: 84

Actuated Cycle Length: 84

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.32

# Timings 3: State Highway 83 & North Gate Boulevard

Total Traffic Conditions  
Year 2042 - AM Peak Hour

Intersection Signal Delay: 92.9

Intersection LOS: F

Intersection Capacity Utilization 108.4%

ICU Level of Service G

Analysis Period (min) 15






~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

 Ø2 71 s		 Ø4 13 s	
 Ø5 37 s		 Ø6 34 s	
		 Ø8 13 s	

# Timings

## 4: State Highway 83 & Shoup Road

# Total Traffic Conditions

Year 2042 - AM Peak Hour

	↑	↗	↘	↓	↙	↖
Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↑↑↑	↗	↘	↑↑↑	↘	↗
Traffic Volume (vph)	1477	192	126	1812	546	372
Future Volume (vph)	1477	192	126	1812	546	372
Satd. Flow (prot)	5085	1583	1770	5085	1770	1583
Flt Permitted			0.099			
Satd. Flow (perm)	5085	1583	184	5085	1863	1583
Satd. Flow (RTOR)		209				137
Lane Group Flow (vph)	1605	209	137	1970	593	404
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)	43.0	43.0	10.0	53.0	42.0	42.0
Total Split (%)	45.3%	45.3%	10.5%	55.8%	44.2%	44.2%
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)	35.6	35.6	48.2	45.6	32.4	32.4
Actuated g/C Ratio	0.39	0.39	0.53	0.50	0.35	0.35
v/c Ratio	0.81	0.28	0.75	0.78	0.90	0.62
Control Delay	29.7	4.1	40.2	22.2	46.4	20.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.7	4.1	40.2	22.2	46.4	20.2
LOS	C	A	D	C	D	C
Approach Delay	26.7			23.3	35.8	
Approach LOS	C			C	D	
Queue Length 50th (ft)	319	0	42	356	320	124
Queue Length 95th (ft)	382	44	#126	421	#510	222
Internal Link Dist (ft)	1042			1734	675	
Turn Bay Length (ft)		710	980			500
Base Capacity (vph)	1977	743	183	2534	734	706
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	0.81	0.28	0.75	0.78	0.81	0.57
Intersection Summary						
Cycle Length: 95						
Actuated Cycle Length: 91.6						
Natural Cycle: 80						
Control Type: Actuated-Uncoordinated						
Maximum v/c Ratio: 0.90						

## Timings

### 4: State Highway 83 & Shoup Road

## Total Traffic Conditions

Year 2042 - AM Peak Hour

Intersection Signal Delay: 27.1

Intersection LOS: C

Intersection Capacity Utilization 81.2%





ICU Level of Service D

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

















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

 Ø1	 Ø2	
10 s	43 s	
 Ø6	 Ø8	
53 s	42 s	



Timings  
5: Black Forest Road & Shoup Road

Total Traffic Conditions  
Year 2042 - AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	124	96	70	25	199	31	152	320	16	35	377	207
Future Volume (vph)	124	96	70	25	199	31	152	320	16	35	377	207
Satd. Flow (prot)	0	1763	0	0	1822	0	0	1827	0	0	1774	0
Flt Permitted		0.644			0.947			0.616			0.951	
Satd. Flow (perm)	0	1160	0	0	1734	0	0	1143	0	0	1692	0
Satd. Flow (RTOR)		19			8			3			44	
Lane Group Flow (vph)	0	315	0	0	277	0	0	530	0	0	673	0
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)		25.0			25.0			49.2			49.2	
Actuated g/C Ratio		0.29			0.29			0.57			0.57	
v/c Ratio		0.90			0.55			0.81			0.68	
Control Delay		57.7			29.2			28.4			17.5	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		57.7			29.2			28.4			17.5	
LOS		E			C			C			B	
Approach Delay		57.7			29.2			28.4			17.5	
Approach LOS		E			C			C			B	
Queue Length 50th (ft)		154			122			235			247	
Queue Length 95th (ft)		#300			198			#457			389	
Internal Link Dist (ft)		965			1070			1292			16527	
Turn Bay Length (ft)												
Base Capacity (vph)		404			591			653			984	
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		0.78			0.47			0.81			0.68	
Intersection Summary												
Cycle Length: 90												
Actuated Cycle Length: 86.2												
Natural Cycle: 60												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.90												

Timings  
5: Black Forest Road & Shoup Road

Total Traffic Conditions  
Year 2042 - AM Peak Hour

Intersection Signal Delay: 29.6

Intersection LOS: C

Intersection Capacity Utilization 110.5%





ICU Level of Service H

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

 Ø2	 Ø4
55 s	35 s
 Ø6	 Ø8
55 s	35 s

HCM 6th TWSC  
6: Black Forest Road & Old Stagecoach Road/Terra Ridge Circle

Total Traffic Conditions  
Year 2042 - AM Peak Hour



















Intersection												
Int Delay, s/veh	6.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↖			↖	↗
Traffic Vol, veh/h	80	0	163	9	2	4	114	150	2	2	206	56
Future Vol, veh/h	80	0	163	9	2	4	114	150	2	2	206	56
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	-	-	-	-	-	-	195	-	-	-	-	195
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	87	0	177	10	2	4	124	163	2	2	224	61
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	643	641	224	759	701	164	285	0	0	165	0	0
Stage 1	228	228	-	412	412	-	-	-	-	-	-	-
Stage 2	415	413	-	347	289	-	-	-	-	-	-	-
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	386	393	815	323	363	881	1277	-	-	1413	-	-
Stage 1	775	715	-	617	594	-	-	-	-	-	-	-
Stage 2	615	594	-	669	673	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	353	354	815	234	327	881	1277	-	-	1413	-	-
Mov Cap-2 Maneuver	353	354	-	234	327	-	-	-	-	-	-	-
Stage 1	700	714	-	557	536	-	-	-	-	-	-	-
Stage 2	550	536	-	523	672	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	16.7		17.5		3.5		0.1					
HCM LOS	C		C									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1277	-	-	570	305	1413	-	-				
HCM Lane V/C Ratio	0.097	-	-	0.463	0.053	0.002	-	-				
HCM Control Delay (s)	8.1	-	-	16.7	17.5	7.6	0	-				
HCM Lane LOS	A	-	-	C	C	A	A	-				
HCM 95th %tile Q(veh)	0.3	-	-	2.4	0.2	0	-	-				

# Timings

## 6: Black Forest Road & Old Stagecoach Road/Terra Ridge Circle

# Total Traffic Conditions

Year 2042 - AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	0	163	9	2	4	114	150	2	2	206	56
Future Volume (vph)	80	0	163	9	2	4	114	150	2	2	206	56
Satd. Flow (prot)	0	1666	0	0	1745	0	1770	1859	0	0	1863	1583
Flt Permitted		0.884			0.718		0.505				0.998	
Satd. Flow (perm)	0	1497	0	0	1292	0	941	1859	0	0	1859	1583
Satd. Flow (RTOR)		172			4			2				155
Lane Group Flow (vph)	0	264	0	0	16	0	124	165	0	0	226	61
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	8.0		8.0	8.0	8.0
Minimum Split (s)	10.5	10.5		10.5	10.5		11.0	14.0		14.0	14.0	14.0
Total Split (s)	23.0	23.0		23.0	23.0		11.0	37.0		26.0	26.0	26.0
Total Split (%)	38.3%	38.3%		38.3%	38.3%		18.3%	61.7%		43.3%	43.3%	43.3%
Yellow Time (s)	3.5	3.5		3.5	3.5		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
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)		5.5			5.5		6.0	6.0			6.0	6.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)		10.0			10.0		38.5	38.5			28.2	28.2
Actuated g/C Ratio		0.17			0.17		0.64	0.64			0.47	0.47
v/c Ratio		0.67			0.07		0.18	0.14			0.26	0.07
Control Delay		17.2			16.6		6.0	5.6			13.4	0.2
Queue Delay		0.0			0.0		0.0	0.0			0.0	0.0
Total Delay		17.2			16.6		6.0	5.6			13.4	0.2
LOS		B			B		A	A			B	A
Approach Delay		17.2			16.6			5.8			10.6	
Approach LOS		B			B			A			B	
Queue Length 50th (ft)		30			4		14	19			50	0
Queue Length 95th (ft)		82			15		42	53			111	0
Internal Link Dist (ft)		750			806			16527			4848	
Turn Bay Length (ft)							195					195
Base Capacity (vph)		558			379		694	1192			873	825
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		0.47			0.04		0.18	0.14			0.26	0.07

### Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 60

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 40

Control Type: Actuated-Coordinated

## Timings

### 6: Black Forest Road & Old Stagecoach Road/Terra Ridge Circle

## Total Traffic Conditions

Year 2042 - AM Peak Hour

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 11.1






Intersection LOS: B

Intersection Capacity Utilization 48.6%

ICU Level of Service A

Analysis Period (min) 15























Splits and Phases: 6: Black Forest Road & Old Stagecoach Road/Terra Ridge Circle

 Ø2 (R) 37 s		 Ø4 23 s	
 Ø5 11 s		 Ø8 23 s	
 Ø6 (R) 26 s			

# Timings

## 7: Black Forest Road & Hodgen Road

Total Traffic Conditions  
Year 2042 - AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	284	146	127	810	20	231	0	82	20	0	76
Future Volume (vph)	22	284	146	127	810	20	231	0	82	20	0	76
Satd. Flow (prot)	1770	1863	1583	1770	1855	0	1770	1583	0	1770	1583	0
Flt Permitted	0.108			0.486			0.703			0.699		
Satd. Flow (perm)	201	1863	1583	905	1855	0	1310	1583	0	1302	1583	0
Satd. Flow (RTOR)			159		2			572			215	
Lane Group Flow (vph)	24	309	159	138	902	0	251	89	0	22	83	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	12.0	12.0	5.0	12.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	11.0	18.0	18.0	11.0	18.0		14.0	14.0		14.0	14.0	
Total Split (s)	11.0	54.0	54.0	11.0	54.0		25.0	25.0		25.0	25.0	
Total Split (%)	12.2%	60.0%	60.0%	12.2%	60.0%		27.8%	27.8%		27.8%	27.8%	
Yellow Time (s)	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	
Lost Time Adjust (s)	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		6.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes							
Recall Mode	None	Min	Min	None	Min		None	None		None	None	
Act Effct Green (s)	37.9	32.8	32.8	42.2	40.5		18.5	18.5		18.5	18.5	
Actuated g/C Ratio	0.50	0.44	0.44	0.56	0.54		0.25	0.25		0.25	0.25	
v/c Ratio	0.11	0.38	0.20	0.24	0.90		0.78	0.11		0.07	0.15	
Control Delay	7.1	14.8	2.6	7.6	30.4		49.3	0.3		27.8	0.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	7.1	14.8	2.6	7.6	30.4		49.3	0.3		27.8	0.6	
LOS	A	B	A	A	C		D	A		C	A	
Approach Delay		10.5			27.4			36.4			6.3	
Approach LOS		B			C			D			A	
Queue Length 50th (ft)	4	93	0	26	304		107	0		8	0	
Queue Length 95th (ft)	12	145	27	47	#717		#282	0		30	0	
Internal Link Dist (ft)		1250			847			4848			905	
Turn Bay Length (ft)	400		335	280			125			65		
Base Capacity (vph)	210	1236	1103	568	1231		344	837		341	574	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.11	0.25	0.14	0.24	0.73		0.73	0.11		0.06	0.14	
Intersection Summary												
Cycle Length: 90												
Actuated Cycle Length: 75.1												
Natural Cycle: 90												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.90												

## Timings

### 7: Black Forest Road & Hodgen Road

## Total Traffic Conditions

Year 2042 - AM Peak Hour

Intersection Signal Delay: 23.6

Intersection LOS: C

Intersection Capacity Utilization 82.5%







ICU Level of Service E

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.




Queue shown is maximum after two cycles.

Splits and Phases: 7: Black Forest Road & Hodgen Road

 Ø2	 Ø3	 Ø4
25 s	11 s	54 s
 Ø6	 Ø7	 Ø8
25 s	11 s	54 s

HCM 6th TWSC  
8: Hodgen Road & Black Forrest Road

Total Traffic Conditions  
Year 2042 - AM Peak Hour

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	452	1115	2	0	4
Future Vol, veh/h	4	452	1115	2	0	4
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	4	491	1212	2	0	4
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	1214	0	-	0	1712	1213
Stage 1	-	-	-	-	1213	-
Stage 2	-	-	-	-	499	-
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	575	-	-	-	100	222
Stage 1	-	-	-	-	281	-
Stage 2	-	-	-	-	610	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	575	-	-	-	99	222
Mov Cap-2 Maneuver	-	-	-	-	99	-
Stage 1	-	-	-	-	278	-
Stage 2	-	-	-	-	610	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.1	0		21.5		
HCM LOS	C					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	575	-	-	-	222	
HCM Lane V/C Ratio	0.008	-	-	-	0.02	
HCM Control Delay (s)	11.3	0	-	-	21.5	
HCM Lane LOS	B	A	-	-	C	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	



HCM 6th Roundabout  
9: Allen Ranch Road & Old Stagecoach Road

Total Traffic Conditions  
Year 2042 - AM Peak Hour

Intersection			
Intersection Delay, s/veh	4.4		
Intersection LOS	A		
Approach	EB	WB	NB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	199	315	62
Demand Flow Rate, veh/h	203	321	64
Vehicles Circulating, veh/h	24	29	176
Vehicles Exiting, veh/h	326	211	51
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	4.0	4.8	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
Entry Flow, veh/h	203	321	64
Cap Entry Lane, veh/h	1346	1340	1153
Entry HV Adj Factor	0.978	0.982	0.969
Flow Entry, veh/h	199	315	62
Cap Entry, veh/h	1317	1315	1117
V/C Ratio	0.151	0.240	0.056
Control Delay, s/veh	4.0	4.8	3.7
LOS	A	A	A
95th %tile Queue, veh	1	1	0

HCM 6th Roundabout  
10: Shortwall Drive & Old Stagecoach Road & Stagecoach Road

Total Traffic Conditions  
Year 2042 - AM Peak Hour

























Intersection			
Intersection Delay, s/veh	4.4		
Intersection LOS	A		
Approach	WB	NB	SE
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	295	77	236
Demand Flow Rate, veh/h	301	79	241
Vehicles Circulating, veh/h	49	197	5
Vehicles Exiting, veh/h	227	49	345
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	4.8	3.9	4.1
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
Entry Flow, veh/h	301	79	241
Cap Entry Lane, veh/h	1313	1129	1373
Entry HV Adj Factor	0.980	0.975	0.979
Flow Entry, veh/h	295	77	236
Cap Entry, veh/h	1286	1100	1344
V/C Ratio	0.229	0.070	0.176
Control Delay, s/veh	4.8	3.9	4.1
LOS	A	A	A
95th %tile Queue, veh	1	0	1

# Timings

## 1: State Highway 83 & Hodgen Road

# Total Traffic Conditions

Year 2042 - PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	358	242	199	201	288	204	672	305	411	672	108
Future Volume (vph)	47	358	242	199	201	288	204	672	305	411	672	108
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1824	0
Flt Permitted	0.535			0.299			0.095			0.083		
Satd. Flow (perm)	997	1863	1583	557	1863	1583	177	1863	1583	155	1824	0
Satd. Flow (RTOR)			244			313			175		9	
Lane Group Flow (vph)	51	389	263	216	218	313	222	730	332	447	847	0
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)	44.0	44.0	44.0	44.0	44.0	44.0	12.0	49.0	49.0	27.0	64.0	
Total Split (%)	36.7%	36.7%	36.7%	36.7%	36.7%	36.7%	10.0%	40.8%	40.8%	22.5%	53.3%	
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	None	None	None	None	None	None	None	Max	Max	None	Max	
Act Effect Green (s)	38.0	38.0	38.0	38.0	38.0	38.0	49.0	42.0	42.0	70.0	57.0	
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.32	0.32	0.41	0.35	0.35	0.58	0.48	
v/c Ratio	0.16	0.66	0.39	1.23	0.37	0.44	1.47	1.12	0.50	1.20	0.97	
Control Delay	31.4	41.8	6.8	178.7	34.0	5.4	268.9	109.9	16.7	145.2	55.6	
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	31.4	41.8	6.8	178.7	34.0	5.4	268.9	109.9	16.7	145.2	55.6	
LOS	C	D	A	F	C	A	F	F	B	F	E	
Approach Delay		28.0			63.8			113.3			86.6	
Approach LOS		C			E			F			F	
Queue Length 50th (ft)	28	260	10	~206	130	0	~184	~651	90	~369	619	
Queue Length 95th (ft)	61	371	72	#362	201	64	#345	#886	179	#576	#906	
Internal Link Dist (ft)		824			1611			1078			1286	
Turn Bay Length (ft)	420		420	350		350	120		650	525		
Base Capacity (vph)	315	589	668	176	589	715	151	652	667	373	871	
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	0.16	0.66	0.39	1.23	0.37	0.44	1.47	1.12	0.50	1.20	0.97	
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Natural Cycle: 120												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 1.47												

## Timings

### 1: State Highway 83 & Hodgen Road

## Total Traffic Conditions

Year 2042 - PM Peak Hour

Intersection Signal Delay: 80.6

Intersection LOS: F

Intersection Capacity Utilization 108.8%

ICU Level of Service G

Analysis Period (min) 15







~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

 Ø1 27 s		 Ø2 49 s		 Ø4 44 s	
 Ø5 12 s		 Ø6 64 s		 Ø8 44 s	




















HCM 6th Roundabout  
2: State Highway 83 & Stagecoach Road

Total Traffic Conditions  
Year 2042 - PM Peak Hour

Intersection						
Intersection Delay, s/veh 13.9						
Intersection LOS B						
Approach	EB	WB	NB	SB		
Entry Lanes	1	1	2	2		
Conflicting Circle Lanes	2	2	2	2		
Adj Approach Flow, veh/h	7	400	1395	1146		
Demand Flow Rate, veh/h	7	408	1423	1169		
Vehicles Circulating, veh/h	1376	1195	256	214		
Vehicles Exiting, veh/h	7	483	1127	1389		
Ped Vol Crossing Leg, #/h	0	0	0	0		
Ped Cap Adj	1.000	1.000	1.000	1.000		
Approach Delay, s/veh	8.4	33.3	12.4	9.0		
Approach LOS	A	D	B	A		
Lane	Left	Left	Left	Right	Left	Right
Designated Moves	LTR	LTR	LT	TR	LT	TR
Assumed Moves	LTR	LTR	LT	TR	LT	TR
RT Channelized						
Lane Util	1.000	1.000	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.535	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.328	4.328	4.645	4.328	4.645	4.328
Entry Flow, veh/h	7	408	669	754	549	620
Cap Entry Lane, veh/h	441	514	1067	1142	1109	1184
Entry HV Adj Factor	1.000	0.980	0.980	0.980	0.981	0.980
Flow Entry, veh/h	7	400	655	739	539	607
Cap Entry, veh/h	441	504	1045	1120	1088	1160
V/C Ratio	0.016	0.793	0.627	0.660	0.495	0.524
Control Delay, s/veh	8.4	33.3	12.2	12.5	9.0	9.1
LOS	A	D	B	B	A	A
95th %tile Queue, veh	0	7	5	5	3	3

Timings  
2: State Highway 83 & Stagecoach Road

Total Traffic Conditions  
Year 2042 - PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	0	5	187	5	177	2	1075	207	229	825	0
Future Volume (vph)	2	0	5	187	5	177	2	1075	207	229	825	0
Satd. Flow (prot)	0	1660	0	0	1775	1583	0	3539	1583	1770	3539	0
Flt Permitted		0.900			0.727			0.954		0.107		
Satd. Flow (perm)	0	1516	0	0	1354	1583	0	3376	1583	199	3539	0
Satd. Flow (RTOR)		150				192			225			
Lane Group Flow (vph)	0	7	0	0	208	192	0	1170	225	249	897	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	4	4		8	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0	8.0	35.0	35.0	35.0	14.0	35.0	
Minimum Split (s)	13.5	13.5		13.5	13.5	13.5	42.0	42.0	42.0	21.0	42.0	
Total Split (s)	17.0	17.0		17.0	17.0	17.0	42.0	42.0	42.0	21.0	63.0	
Total Split (%)	21.3%	21.3%		21.3%	21.3%	21.3%	52.5%	52.5%	52.5%	26.3%	78.8%	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	5.0	5.0	5.0	5.0	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	
Lost Time Adjust (s)		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.5			5.5	5.5		7.0	7.0	7.0	7.0	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	
Act Effect Green (s)		11.5			11.5	11.5		35.0	35.0	56.0	56.0	
Actuated g/C Ratio		0.14			0.14	0.14		0.44	0.44	0.70	0.70	
v/c Ratio		0.02			1.07	0.49		0.79	0.27	0.60	0.36	
Control Delay		0.2			121.6	9.9		24.3	3.1	18.3	5.3	
Queue Delay		0.0			0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay		0.2			121.6	9.9		24.3	3.1	18.3	5.3	
LOS		A			F	A		C	A	B	A	
Approach Delay		0.2			68.0			20.8			8.1	
Approach LOS		A			E			C			A	
Queue Length 50th (ft)		0			~117	0		255	0	53	78	
Queue Length 95th (ft)		0			#246	56		337	37	128	105	
Internal Link Dist (ft)		862			898			913			1101	
Turn Bay Length (ft)						135			320	415		
Base Capacity (vph)		346			194	391		1477	819	414	2477	
Starvation Cap Reductn		0			0	0		0	0	0	0	
Spillback Cap Reductn		0			0	0		0	0	0	0	
Storage Cap Reductn		0			0	0		0	0	0	0	
Reduced v/c Ratio		0.02			1.07	0.49		0.79	0.27	0.60	0.36	
Intersection Summary												
Cycle Length: 80												
Actuated Cycle Length: 80												
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green												
Natural Cycle: 80												
Control Type: Actuated-Coordinated												

## Timings

### 2: State Highway 83 & Stagecoach Road

Total Traffic Conditions  
Year 2042 - PM Peak Hour

Maximum v/c Ratio: 1.07

Intersection Signal Delay: 22.2

Intersection LOS: C

Intersection Capacity Utilization 92.5%

ICU Level of Service F

Analysis Period (min) 15







~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.























Splits and Phases: 2: State Highway 83 & Stagecoach Road

 Ø1	 Ø2 (R)	 Ø4
21 s	42 s	17 s
 Ø6 (R)	 Ø8	 Ø8
63 s		17 s

# Timings

## 3: State Highway 83 & North Gate Boulevard

Total Traffic Conditions  
Year 2042 - PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	265	0	742	0	0	0	722	1277	4	2	983	199
Future Volume (vph)	265	0	742	0	0	0	722	1277	4	2	983	199
Satd. Flow (prot)	1770	1863	1583	0	1863	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.757						0.154			0.194		
Satd. Flow (perm)	1410	1863	1583	0	1863	0	287	3539	1583	361	3539	1583
Satd. Flow (RTOR)			625						39			216
Lane Group Flow (vph)	288	0	807	0	0	0	785	1388	4	2	1068	216
Turn Type	Perm		Perm				pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2		2	6		6
Detector Phase	4	4	4	8	8		5	2	2	6	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	5.0	5.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0		10.0	12.0	12.0	11.0	11.0	11.0
Total Split (s)	23.0	23.0	23.0	23.0	23.0		33.0	61.0	61.0	28.0	28.0	28.0
Total Split (%)	27.4%	27.4%	27.4%	27.4%	27.4%		39.3%	72.6%	72.6%	33.3%	33.3%	33.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	5.0	5.0	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	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
Total Lost Time (s)	6.0	6.0	6.0		6.0		5.0	7.0	7.0	6.0	6.0	6.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None	None	None	None	None		Max	Max	Max	Max	Max	Max
Act Effct Green (s)	17.0		17.0				56.0	54.0	54.0	22.0	22.0	22.0
Actuated g/C Ratio	0.20		0.20				0.67	0.64	0.64	0.26	0.26	0.26
v/c Ratio	1.01		0.99				1.15	0.61	0.00	0.02	1.15	0.38
Control Delay	92.3		38.3				104.9	10.3	0.0	24.0	112.0	5.9
Queue Delay	0.0		0.0				0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	92.3		38.3				104.9	10.3	0.0	24.0	112.0	5.9
LOS	F		D				F	B	A	C	F	A
Approach Delay		52.5						44.4			94.1	
Approach LOS		D						D			F	
Queue Length 50th (ft)	~155		105				~439	200	0	1	~353	0
Queue Length 95th (ft)	#313		#373				#658	259	0	6	#476	51
Internal Link Dist (ft)		997			136			1617			2154	
Turn Bay Length (ft)	225		285				900		400	750		730
Base Capacity (vph)	285		818				685	2275	1031	94	926	574
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	1.01		0.99				1.15	0.61	0.00	0.02	1.15	0.38

### Intersection Summary

Cycle Length: 84

Actuated Cycle Length: 84

Natural Cycle: 120

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.15



# Timings 3: State Highway 83 & North Gate Boulevard

Total Traffic Conditions  
Year 2042 - PM Peak Hour

Intersection Signal Delay: 60.3

Intersection LOS: E

Intersection Capacity Utilization 96.0%

ICU Level of Service F

Analysis Period (min) 15






~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

 Ø2 61 s		 Ø4 23 s	
 Ø5 33 s		 Ø6 28 s	
		 Ø8 23 s	

# Timings

## 4: State Highway 83 & Shoup Road

Total Traffic Conditions  
Year 2042 - PM Peak Hour

	↑	↗	↘	↓	↙	↖
Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↑↑↑	↗	↘	↑↑↑	↘	↗
Traffic Volume (vph)	1979	483	331	1536	230	155
Future Volume (vph)	1979	483	331	1536	230	155
Satd. Flow (prot)	5085	1583	1770	5085	1770	1583
Flt Permitted			0.081			
Satd. Flow (perm)	5085	1583	151	5085	1863	1583
Satd. Flow (RTOR)		525				168
Lane Group Flow (vph)	2151	525	360	1670	250	168
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)	51.0	51.0	23.0	74.0	21.0	21.0
Total Split (%)	53.7%	53.7%	24.2%	77.9%	22.1%	22.1%
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 Effect Green (s)	44.6	44.6	69.0	66.5	14.6	14.6
Actuated g/C Ratio	0.47	0.47	0.73	0.70	0.15	0.15
v/c Ratio	0.90	0.51	0.90	0.47	0.87	0.44
Control Delay	29.8	3.4	51.1	6.8	68.8	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.8	3.4	51.1	6.8	68.8	9.7
LOS	C	A	D	A	E	A
Approach Delay	24.6			14.6	45.1	
Approach LOS	C			B	D	
Queue Length 50th (ft)	431	0	156	142	148	0
Queue Length 95th (ft)	#522	55	#314	169	#281	55
Internal Link Dist (ft)	1042			1734	675	
Turn Bay Length (ft)		710	980			500
Base Capacity (vph)	2395	1023	418	3574	295	392
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	0.90	0.51	0.86	0.47	0.85	0.43
Intersection Summary						
Cycle Length: 95						
Actuated Cycle Length: 94.6						
Natural Cycle: 80						
Control Type: Actuated-Uncoordinated						
Maximum v/c Ratio: 0.90						

## Timings

### 4: State Highway 83 & Shoup Road

## Total Traffic Conditions

Year 2042 - PM Peak Hour

Intersection Signal Delay: 22.3

Intersection LOS: C

Intersection Capacity Utilization 84.7%





ICU Level of Service E

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

















Queue shown is maximum after two cycles.

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

 Ø1	 Ø2	
23 s	51 s	
 Ø6		 Ø8
74 s		21 s

Timings  
5: Black Forest Road & Shoup Road

Total Traffic Conditions  
Year 2042 - PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	149	264	166	29	81	48	85	429	36	55	368	129
Future Volume (vph)	149	264	166	29	81	48	85	429	36	55	368	129
Satd. Flow (prot)	0	1767	0	0	1770	0	0	1831	0	0	1794	0
Flt Permitted		0.864			0.856			0.774			0.882	
Satd. Flow (perm)	0	1547	0	0	1529	0	0	1429	0	0	1590	0
Satd. Flow (RTOR)		29			32			5			21	
Lane Group Flow (vph)	0	629	0	0	172	0	0	597	0	0	600	0
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)	47.0	47.0		47.0	47.0		43.0	43.0		43.0	43.0	
Total Split (%)	52.2%	52.2%		52.2%	52.2%		47.8%	47.8%		47.8%	47.8%	
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)		36.7			36.7			37.2			37.2	
Actuated g/C Ratio		0.43			0.43			0.43			0.43	
v/c Ratio		0.93			0.26			0.96			0.86	
Control Delay		44.3			13.4			54.9			36.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		44.3			13.4			54.9			36.9	
LOS		D			B			D			D	
Approach Delay		44.3			13.4			54.9			36.9	
Approach LOS		D			B			D			D	
Queue Length 50th (ft)		300			46			~339			302	
Queue Length 95th (ft)		#519			88			#566			#517	
Internal Link Dist (ft)		965			1070			1292			16527	
Turn Bay Length (ft)												
Base Capacity (vph)		756			749			620			699	
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		0.83			0.23			0.96			0.86	
Intersection Summary												
Cycle Length: 90												
Actuated Cycle Length: 85.9												
Natural Cycle: 80												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.96												

Timings  
5: Black Forest Road & Shoup Road

Total Traffic Conditions  
Year 2042 - PM Peak Hour

Intersection Signal Delay: 42.6

Intersection LOS: D

Intersection Capacity Utilization 101.3%

ICU Level of Service G

Analysis Period (min) 15





~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

 Ø2	 Ø4
43 s	47 s
 Ø6	 Ø8
43 s	47 s

HCM 6th TWSC  
6: Black Forest Road & Old Stagecoach Road/Terra Ridge Circle

Total Traffic Conditions  
Year 2042 - PM Peak Hour

Intersection												
Int Delay, s/veh	11.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕			↕	↕
Traffic Vol, veh/h	89	4	179	4	4	4	226	200	0	9	200	113
Future Vol, veh/h	89	4	179	4	4	4	226	200	0	9	200	113
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	-	-	-	-	-	-	195	-	-	-	-	195
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	97	4	195	4	4	4	246	217	0	10	217	123

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	950	946	217	1107	1069	217	340	0	0	217	0	0
Stage 1	237	237	-	709	709	-	-	-	-	-	-	-
Stage 2	713	709	-	398	360	-	-	-	-	-	-	-
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	240	262	823	188	221	823	1219	-	-	1353	-	-
Stage 1	766	709	-	425	437	-	-	-	-	-	-	-
Stage 2	423	437	-	628	626	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	197	207	823	119	175	823	1219	-	-	1353	-	-
Mov Cap-2 Maneuver	197	207	-	119	175	-	-	-	-	-	-	-
Stage 1	611	703	-	339	349	-	-	-	-	-	-	-
Stage 2	332	349	-	472	620	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	36.7		24.7		4.6		0.2	
HCM LOS	E		C					



















Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1219	-	-	395	196	1353	-
HCM Lane V/C Ratio	0.202	-	-	0.748	0.067	0.007	-
HCM Control Delay (s)	8.7	-	-	36.7	24.7	7.7	0
HCM Lane LOS	A	-	-	E	C	A	A
HCM 95th %tile Q(veh)	0.8	-	-	6	0.2	0	-

# Timings

## 6: Black Forest Road & Old Stagecoach Road/Terra Ridge Circle

# Total Traffic Conditions

Year 2042 - PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	89	4	179	4	4	4	226	200	0	9	200	113
Future Volume (vph)	89	4	179	4	4	4	226	200	0	9	200	113
Satd. Flow (prot)	0	1670	0	0	1750	0	1770	1863	0	0	1859	1583
Flt Permitted		0.886			0.878		0.488				0.984	
Satd. Flow (perm)	0	1504	0	0	1562	0	909	1863	0	0	1833	1583
Satd. Flow (RTOR)		164			4							155
Lane Group Flow (vph)	0	296	0	0	12	0	246	217	0	0	227	123
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	8.0		8.0	8.0	8.0
Minimum Split (s)	10.5	10.5		10.5	10.5		11.0	14.0		14.0	14.0	14.0
Total Split (s)	23.2	23.2		23.2	23.2		14.0	36.8		22.8	22.8	22.8
Total Split (%)	38.7%	38.7%		38.7%	38.7%		23.3%	61.3%		38.0%	38.0%	38.0%
Yellow Time (s)	3.5	3.5		3.5	3.5		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
Lost Time Adjust (s)		0.0			0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)		5.5			5.5		6.0	6.0			6.0	6.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None	None		None	None		None	C-Max		C-Max	C-Max	C-Max
Act Effct Green (s)		11.3			11.3		37.2	37.2			22.7	22.7
Actuated g/C Ratio		0.19			0.19		0.62	0.62			0.38	0.38
v/c Ratio		0.71			0.04		0.36	0.19			0.33	0.18
Control Delay		19.5			14.5		7.9	6.6			17.0	3.0
Queue Delay		0.0			0.0		0.0	0.0			0.0	0.0
Total Delay		19.5			14.5		7.9	6.6			17.0	3.0
LOS		B			B		A	A			B	A
Approach Delay		19.5			14.5			7.3			12.1	
Approach LOS		B			B			A			B	
Queue Length 50th (ft)		43			2		33	28			57	0
Queue Length 95th (ft)		100			12		84	73			123	23
Internal Link Dist (ft)		750			806			16527			4848	
Turn Bay Length (ft)							195					195
Base Capacity (vph)		559			463		689	1154			694	696
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		0.53			0.03		0.36	0.19			0.33	0.18

### Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 60

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 45

Control Type: Actuated-Coordinated

## Timings

### 6: Black Forest Road & Old Stagecoach Road/Terra Ridge Circle

## Total Traffic Conditions

Year 2042 - PM Peak Hour

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 12.1






Intersection LOS: B

Intersection Capacity Utilization 59.2%

ICU Level of Service B

Analysis Period (min) 15























Splits and Phases: 6: Black Forest Road & Old Stagecoach Road/Terra Ridge Circle

 Ø2 (L) 36.8 s	 Ø4 23.2 s
 Ø5 14 s	 Ø8 23.2 s
 Ø6 (R) 22.8 s	



Timings  
7: Black Forest Road & Hodgen Road

Total Traffic Conditions  
Year 2042 - PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	722	259	95	414	20	184	6	142	49	2	38
Future Volume (vph)	107	722	259	95	414	20	184	6	142	49	2	38
Satd. Flow (prot)	1770	1863	1583	1770	1850	0	1770	1596	0	1770	1596	0
Flt Permitted	0.396			0.138			0.729			0.655		
Satd. Flow (perm)	738	1863	1583	257	1850	0	1358	1596	0	1220	1596	0
Satd. Flow (RTOR)			282		5			154			41	
Lane Group Flow (vph)	116	785	282	103	472	0	200	161	0	53	43	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	12.0	12.0	5.0	12.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	11.0	18.0	18.0	11.0	18.0		14.0	14.0		14.0	14.0	
Total Split (s)	11.0	57.0	57.0	11.0	57.0		22.0	22.0		22.0	22.0	
Total Split (%)	12.2%	63.3%	63.3%	12.2%	63.3%		24.4%	24.4%		24.4%	24.4%	
Yellow Time (s)	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	
Lost Time Adjust (s)	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		6.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes							
Recall Mode	None	Min	Min	None	Min		None	None		None	None	
Act Effct Green (s)	39.3	35.6	35.6	39.3	35.6		15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.55	0.50	0.50	0.55	0.50		0.21	0.21		0.21	0.21	
v/c Ratio	0.24	0.85	0.30	0.40	0.51		0.71	0.35		0.21	0.12	
Control Delay	6.6	25.8	2.2	10.3	14.3		47.1	9.2		31.4	11.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	6.6	25.8	2.2	10.3	14.3		47.1	9.2		31.4	11.7	
LOS	A	C	A	B	B		D	A		C	B	
Approach Delay		18.3			13.6			30.2			22.6	
Approach LOS		B			B			C			C	
Queue Length 50th (ft)	19	311	0	17	144		89	3		21	1	
Queue Length 95th (ft)	35	462	32	32	216		#229	56		61	29	
Internal Link Dist (ft)		1250			847			4848			905	
Turn Bay Length (ft)	400		335	280			125			65		
Base Capacity (vph)	482	1333	1213	256	1325		331	506		297	420	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.24	0.59	0.23	0.40	0.36		0.60	0.32		0.18	0.10	
Intersection Summary												
Cycle Length: 90												
Actuated Cycle Length: 71.7												
Natural Cycle: 65												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.85												

## Timings

### 7: Black Forest Road & Hodgen Road

## Total Traffic Conditions

Year 2042 - PM Peak Hour

Intersection Signal Delay: 19.2

Intersection LOS: B

Intersection Capacity Utilization 80.1%







ICU Level of Service D

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.




Queue shown is maximum after two cycles.

Splits and Phases: 7: Black Forest Road & Hodgen Road

 Ø2	 Ø3	 Ø4
22 s	11 s	57 s
 Ø6	 Ø7	 Ø8
22 s	11 s	57 s

HCM 6th TWSC  
8: Hodgen Road & Black Forrest Road

Total Traffic Conditions  
Year 2042 - PM Peak Hour

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	1088	636	0	0	0
Future Vol, veh/h	4	1088	636	0	0	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	4	1183	691	0	0	0
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	691	0	-	0	1882	691
Stage 1	-	-	-	-	691	-
Stage 2	-	-	-	-	1191	-
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	904	-	-	-	78	445
Stage 1	-	-	-	-	497	-
Stage 2	-	-	-	-	288	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	904	-	-	-	77	445
Mov Cap-2 Maneuver	-	-	-	-	77	-
Stage 1	-	-	-	-	491	-
Stage 2	-	-	-	-	288	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	904	-	-	-	-	
HCM Lane V/C Ratio	0.005	-	-	-	-	
HCM Control Delay (s)	9	0	-	-	0	
HCM Lane LOS	A	A	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	-	

HCM 6th Roundabout  
9: Allen Ranch Road & Old Stagecoach Road

Total Traffic Conditions  
Year 2042 - PM Peak Hour

Intersection			
Intersection Delay, s/veh	5.3		
Intersection LOS	A		
Approach	EB	WB	NB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	423	324	63
Demand Flow Rate, veh/h	432	331	65
Vehicles Circulating, veh/h	46	31	391
Vehicles Exiting, veh/h	316	425	87
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	5.8	4.9	4.7
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
Entry Flow, veh/h	432	331	65
Cap Entry Lane, veh/h	1317	1337	926
Entry HV Adj Factor	0.980	0.980	0.969
Flow Entry, veh/h	423	324	63
Cap Entry, veh/h	1290	1310	898
V/C Ratio	0.328	0.248	0.070
Control Delay, s/veh	5.8	4.9	4.7
LOS	A	A	A
95th %tile Queue, veh	1	1	0

HCM 6th Roundabout  
10: Shortwall Drive & Old Stagecoach Road & Stagecoach Road

Total Traffic Conditions  
Year 2042 - PM Peak Hour

Intersection			
Intersection Delay, s/veh	5.6		
Intersection LOS	A		
Approach	WB	NB	SE
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	338	55	467
Demand Flow Rate, veh/h	345	56	476
Vehicles Circulating, veh/h	41	411	30
Vehicles Exiting, veh/h	426	95	356
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	5.1	4.6	6.0
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
Entry Flow, veh/h	345	56	476
Cap Entry Lane, veh/h	1323	907	1338
Entry HV Adj Factor	0.980	0.982	0.981
Flow Entry, veh/h	338	55	467
Cap Entry, veh/h	1296	891	1313
V/C Ratio	0.261	0.062	0.356
Control Delay, s/veh	5.1	4.6	6.0
LOS	A	A	A
95th %tile Queue, veh	1	0	2

## **APPENDIX E**

### **Warrant Analysis Forms**

**Standard:**

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

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

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

**Option:**

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

**Guidance:**

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

**Standard:**

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

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

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

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

**Condition A—Minimum Vehicular Volume**

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

**Condition B—Interruption of Continuous Traffic**

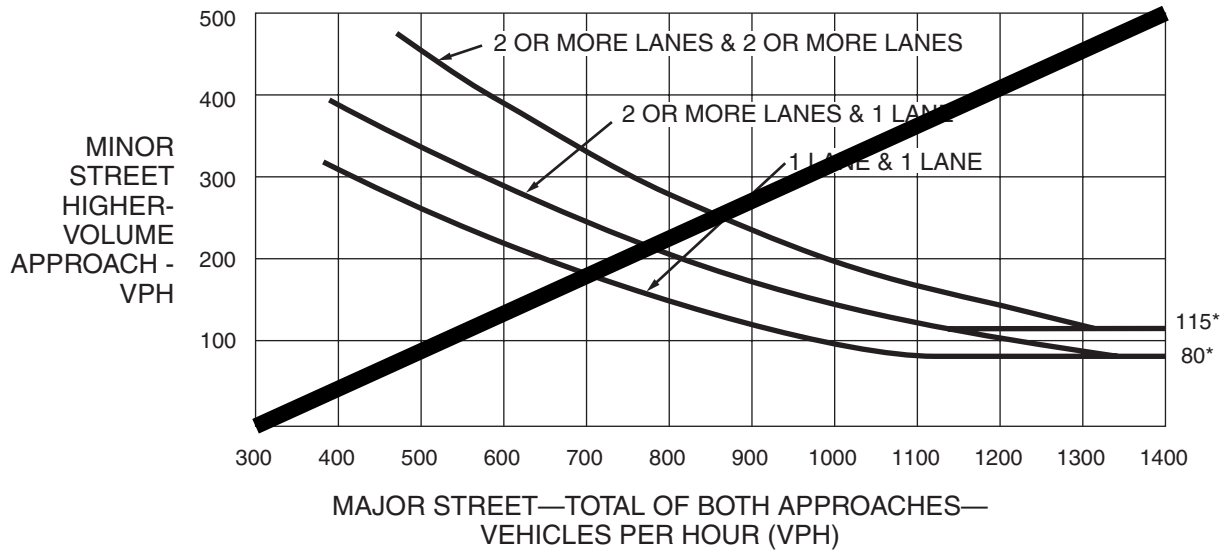
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100% <sup>a</sup>	80% <sup>b</sup>	70% <sup>c</sup>	56% <sup>d</sup>	100% <sup>a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

<sup>a</sup> Basic minimum hourly volume

<sup>b</sup> Used for combination of Conditions A and B after adequate trial of other remedial measures

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

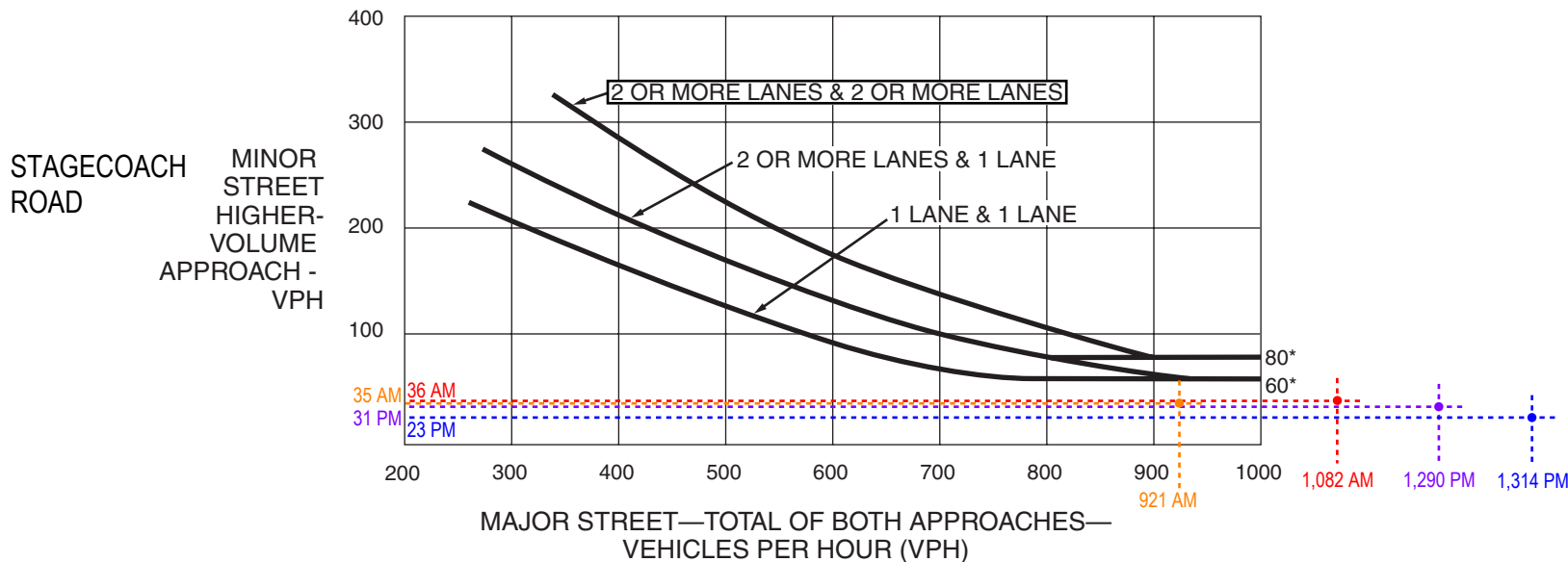
<sup>d</sup> May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

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

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

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

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



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

Key:

7:00 AM - 8:00 AM

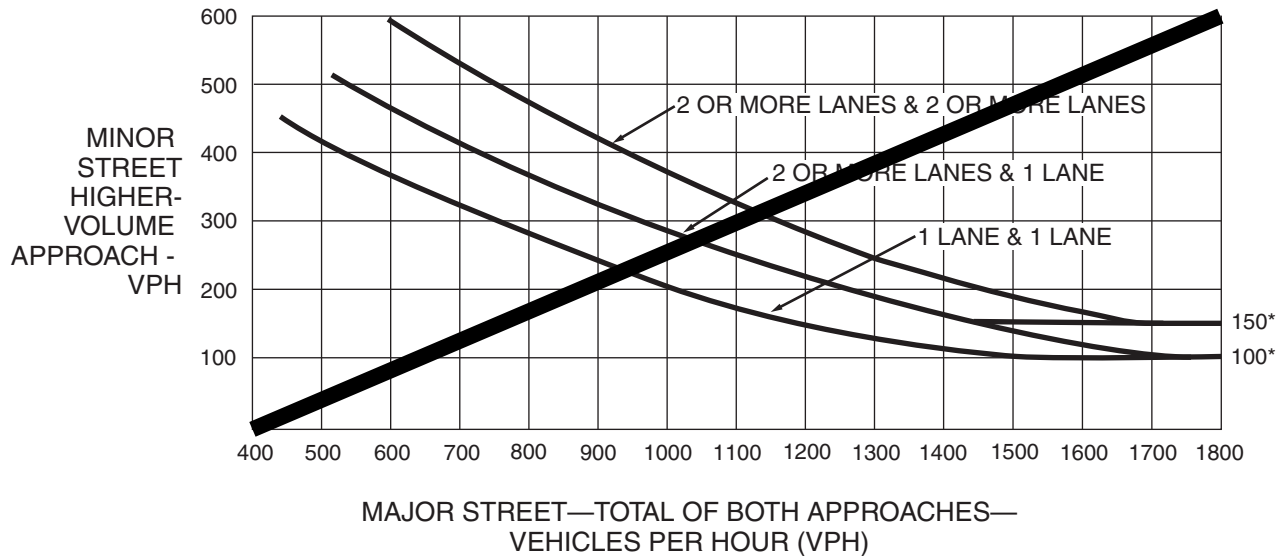
8:00 AM - 9:00 AM

4:00 PM - 5:00 PM

5:00 PM - 6:00 PM

STATE HIGHWAY 83 (55 MPH)



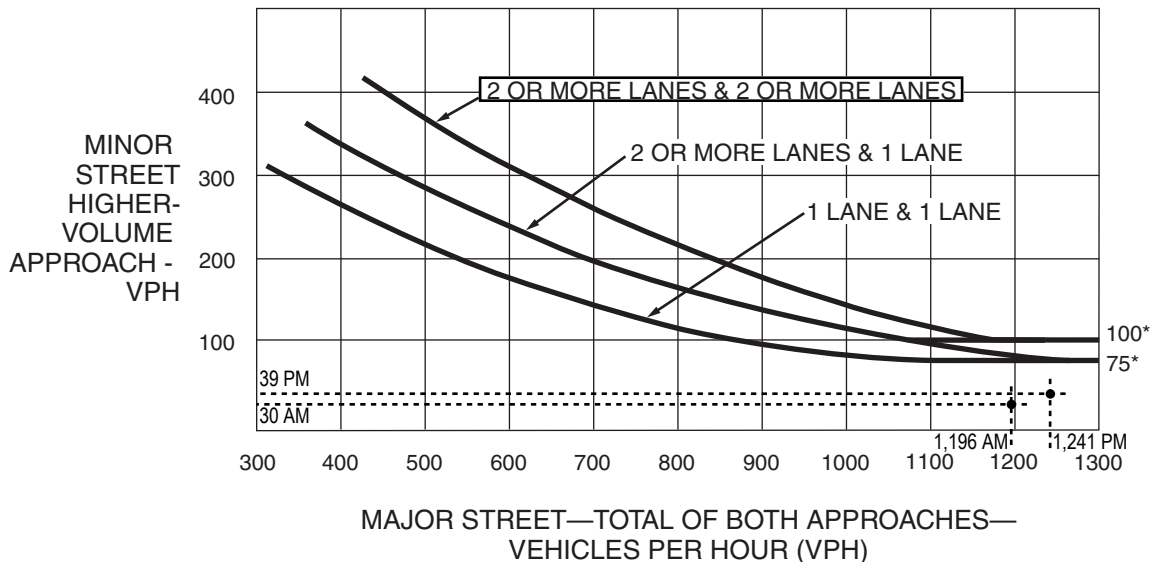
**Figure 4C-3. Warrant 3, Peak Hour**

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

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

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

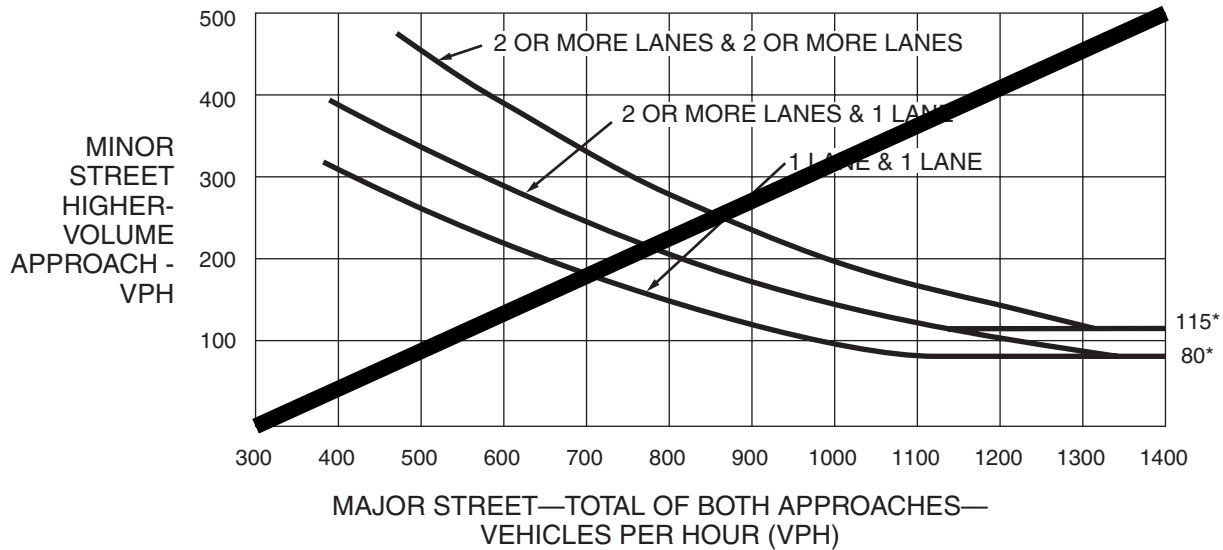
STAGECOACH ROAD



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

Note: No right turn reduction applied.

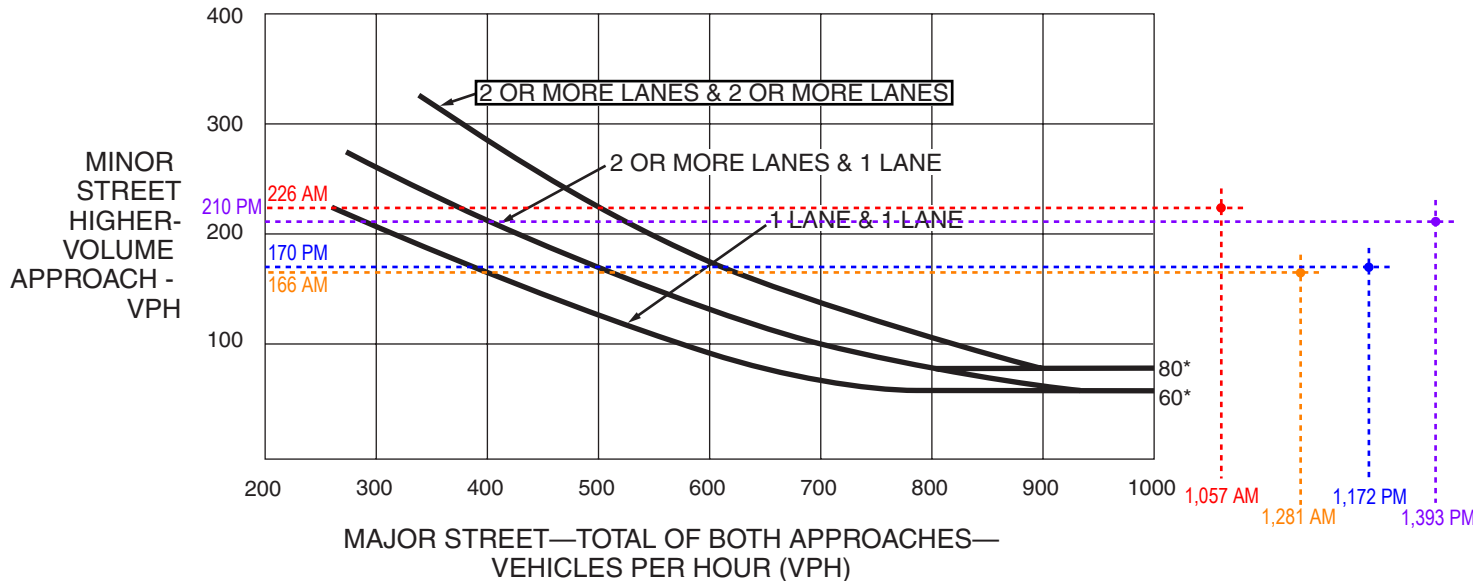
STATE HIGHWAY 83 (55 MPH)

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

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

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

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



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

**Key:**

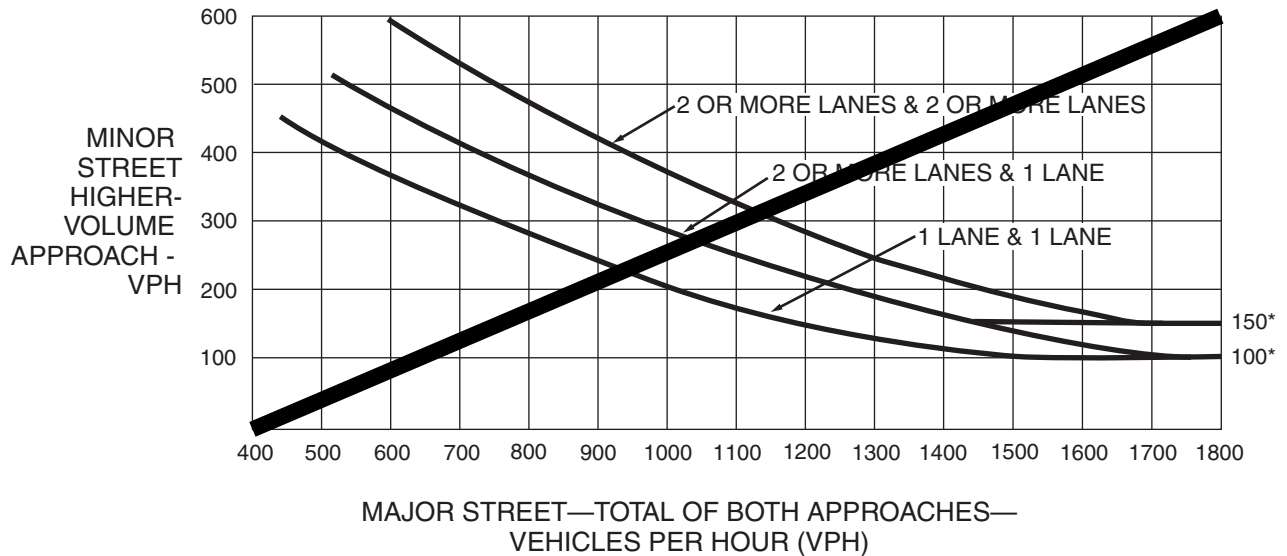
7:00 AM - 8:00 AM

8:00 AM - 9:00 AM

4:00 PM - 5:00 PM

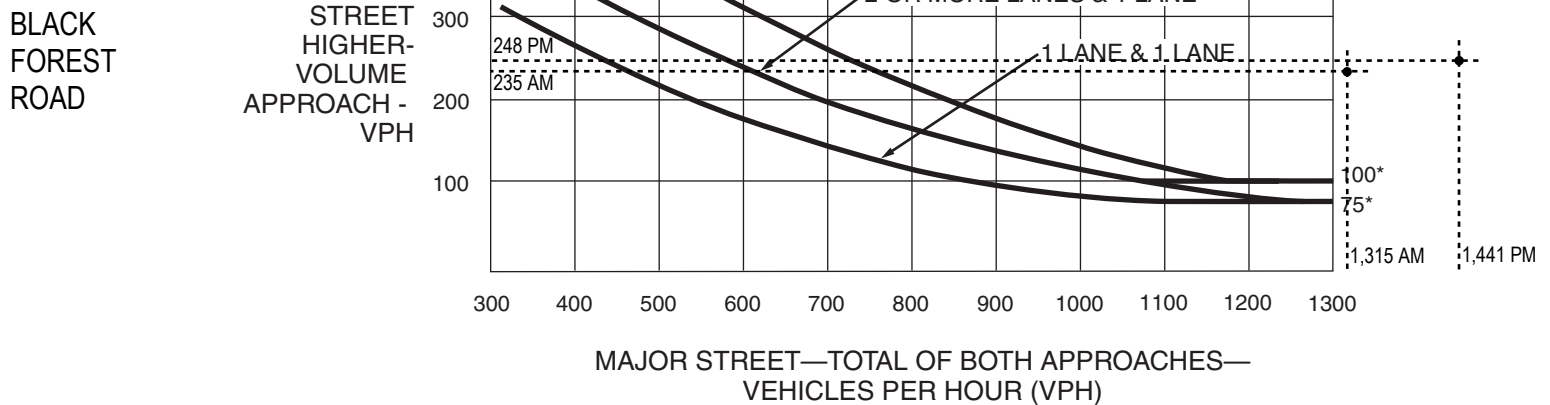
5:00 PM - 6:00 PM

HODGEN ROAD (55 MPH)

**Figure 4C-3. Warrant 3, Peak Hour**

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

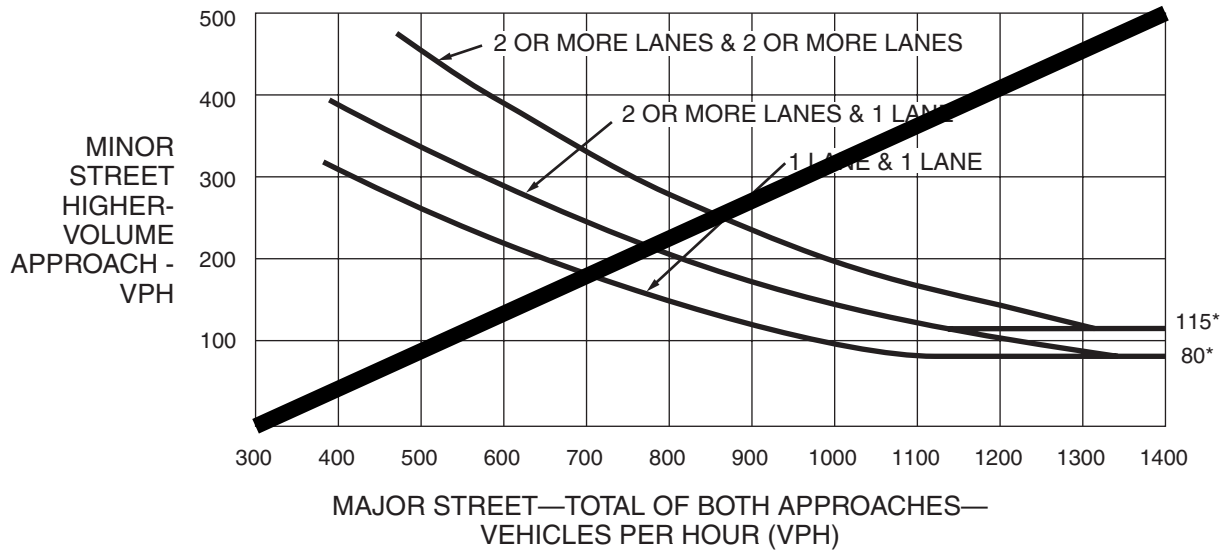
**Figure 4C-4. Warrant 3, Peak Hour (70% Factor)**  
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



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

Note: No right turn reduction applied.

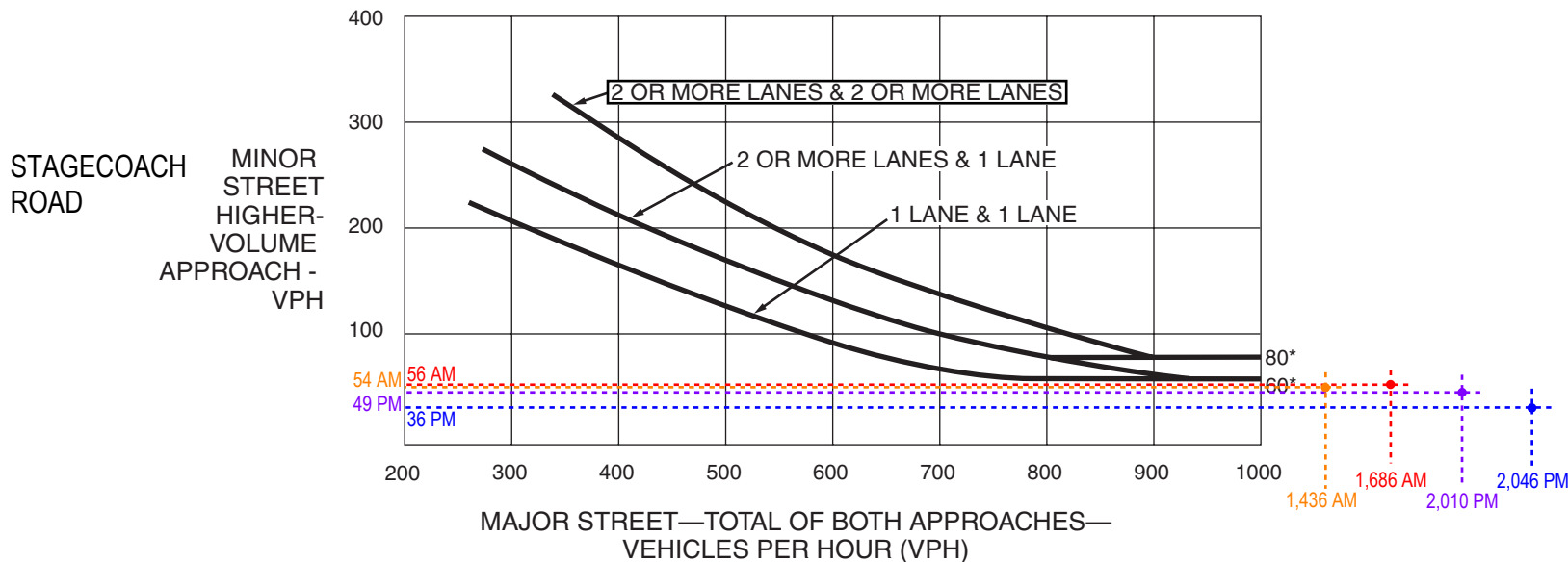
HODGEN ROAD (55 MPH)

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

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

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

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



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

**Key:**

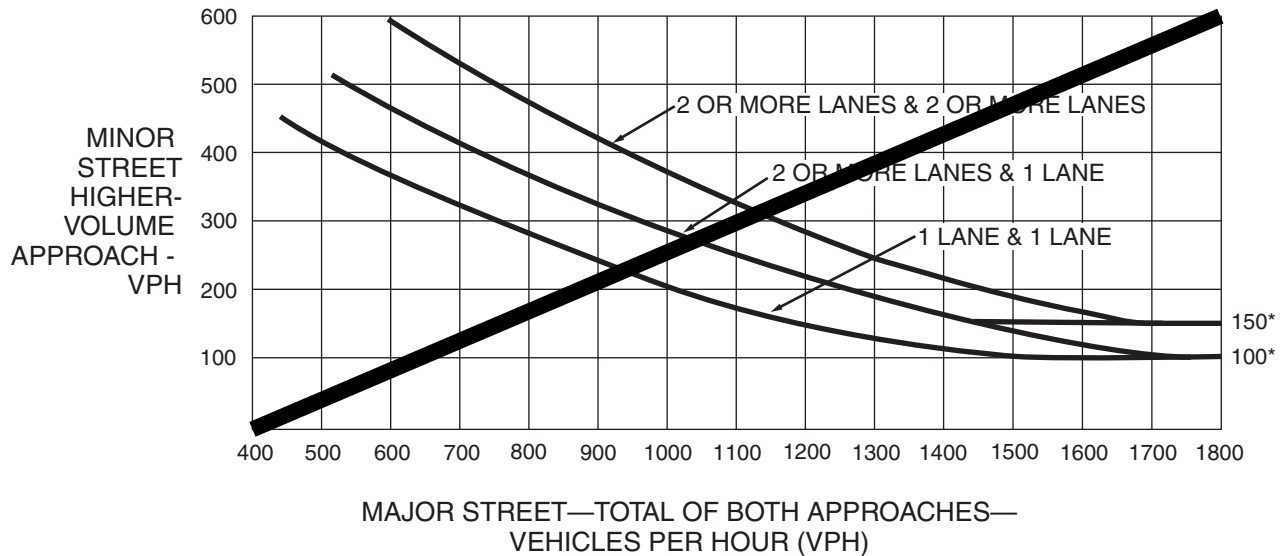
7:00 AM - 8:00 AM

8:00 AM - 9:00 AM

4:00 PM - 5:00 PM

5:00 PM - 6:00 PM

STATE HIGHWAY 83 (55 MPH)

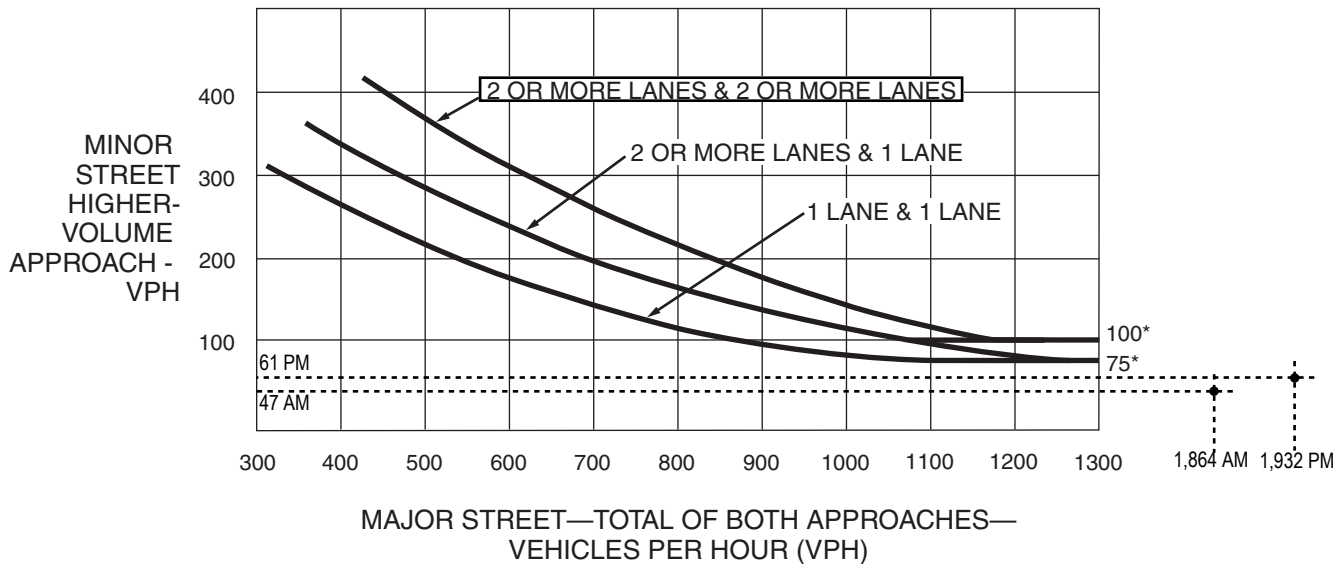
**Figure 4C-3. Warrant 3, Peak Hour**

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

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

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

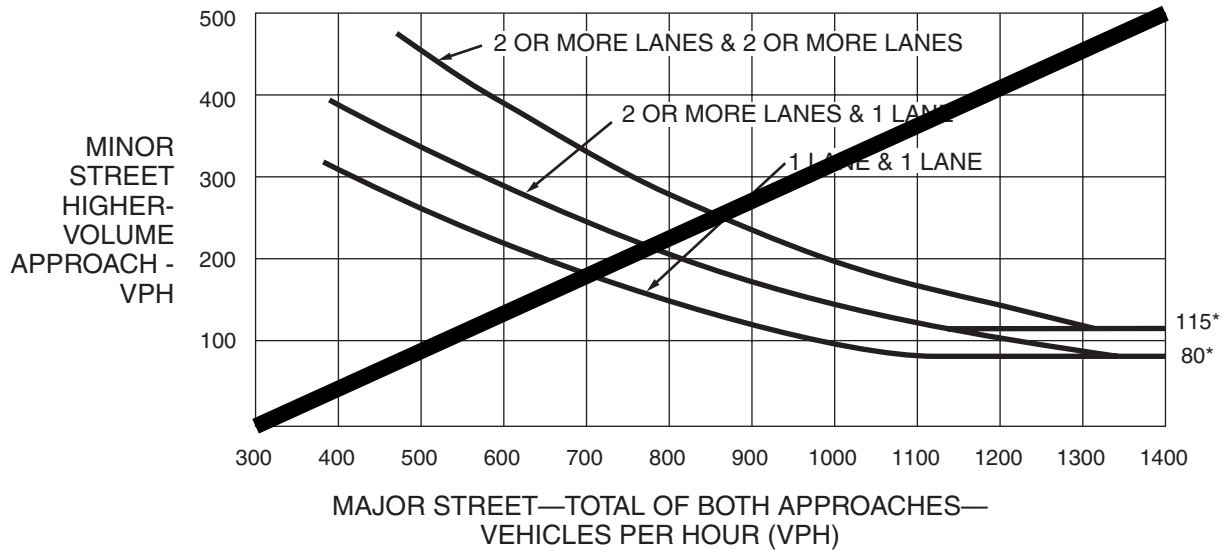
STAGECOACH ROAD



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

Note: No right turn reduction applied.

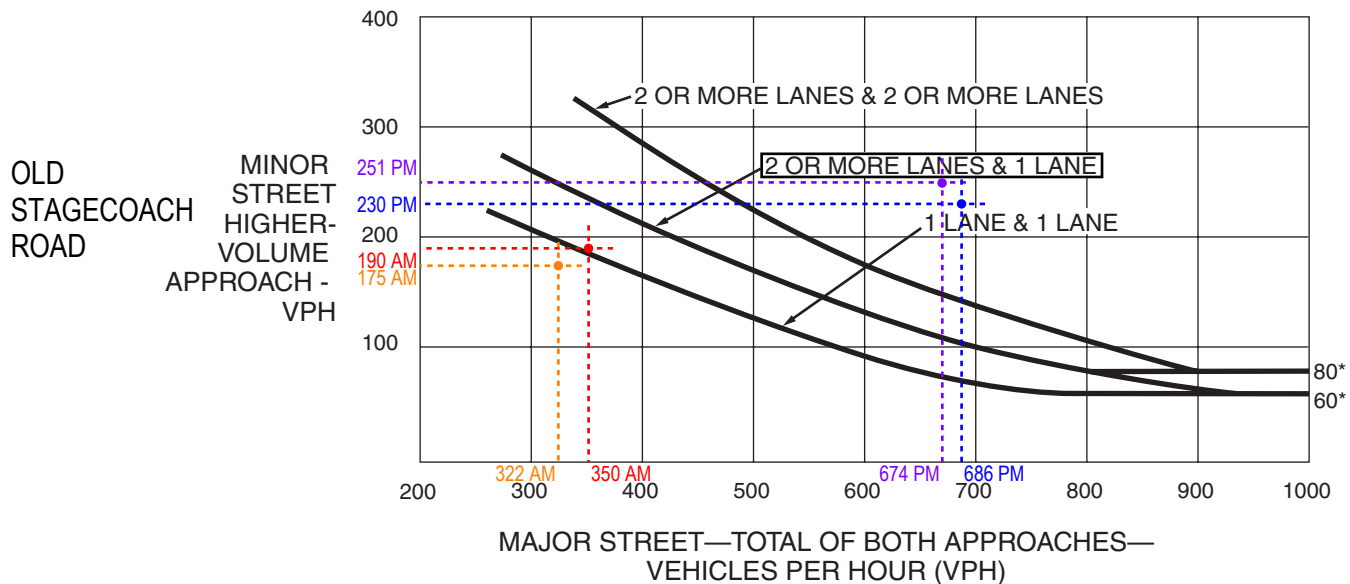
STATE HIGHWAY 83 (55 MPH)

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

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

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

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



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

Key:

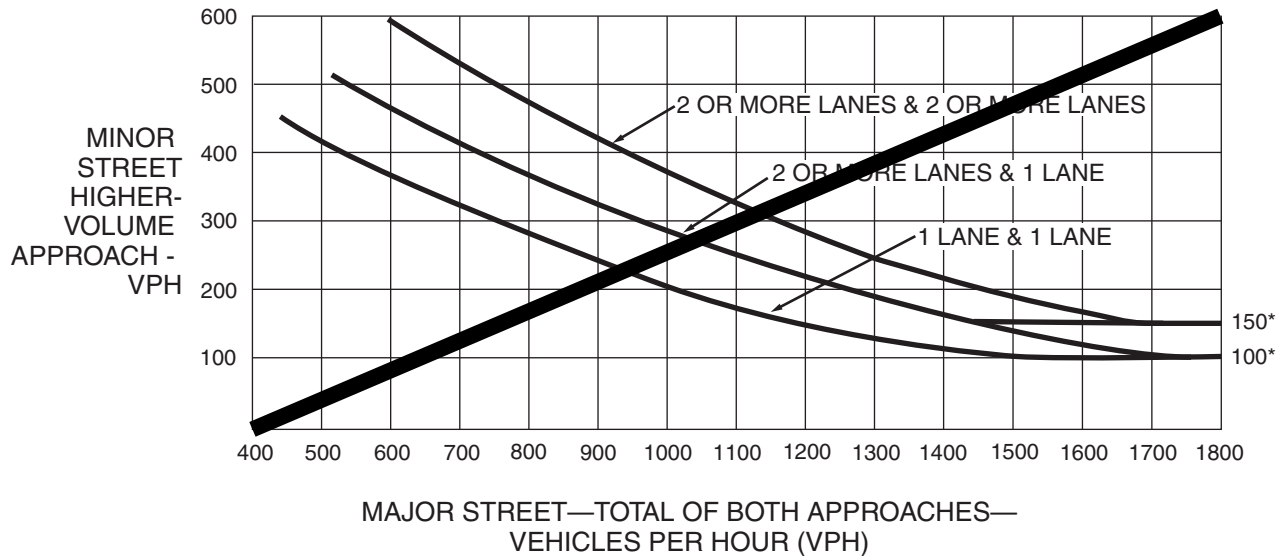
7:00 AM - 8:00 AM

8:00 AM - 9:00 AM

4:00 PM - 5:00 PM

5:00 PM - 6:00 PM

BLACK FOREST ROAD (45 MPH)

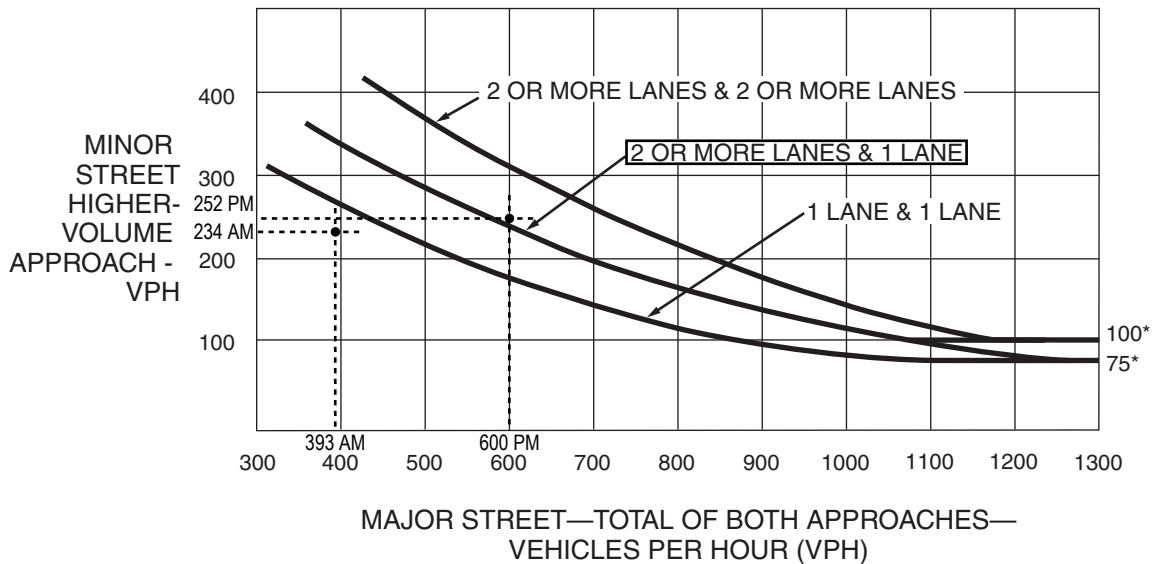
**Figure 4C-3. Warrant 3, Peak Hour**

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

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

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

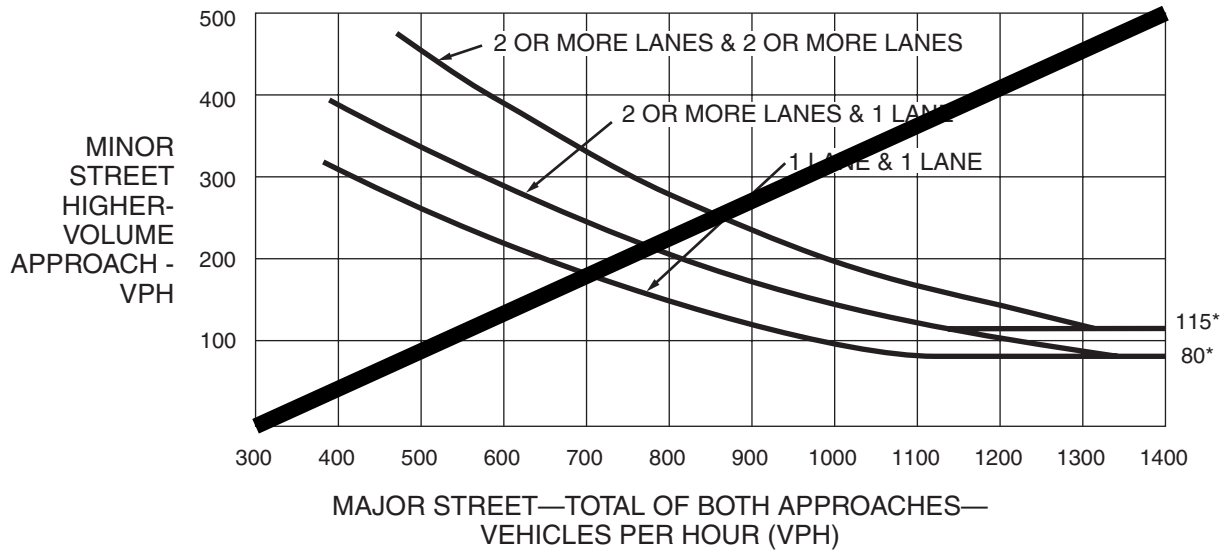
OLD STAGECOACH ROAD



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

Note: No right turn reduction applied.

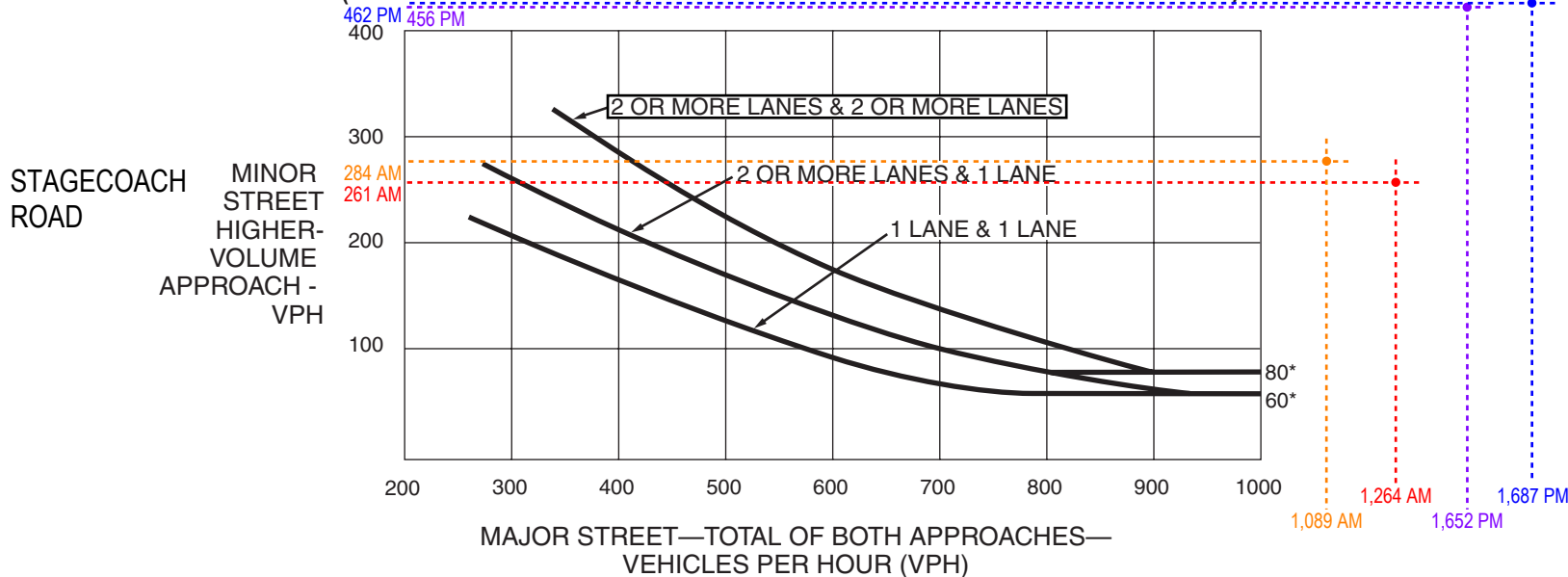
BLACK FOREST ROAD (45 MPH)

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

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

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

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



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

Key:

7:00 AM - 8:00 AM

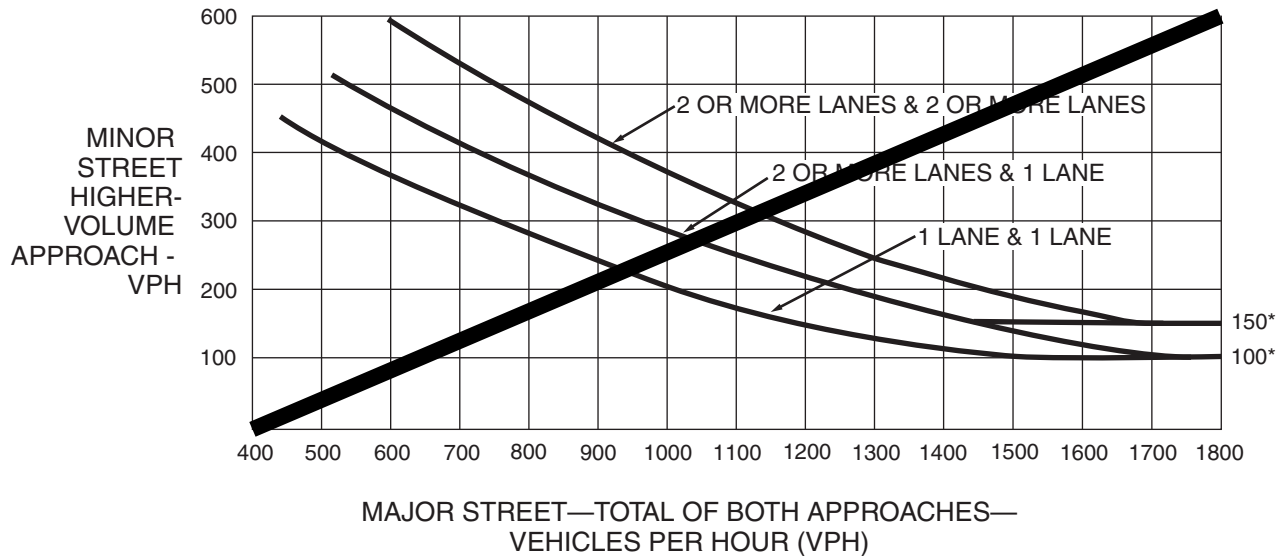
8:00 AM - 9:00 AM

4:00 PM - 5:00 PM

5:00 PM - 6:00 PM

STATE HIGHWAY 83 (55 MPH)



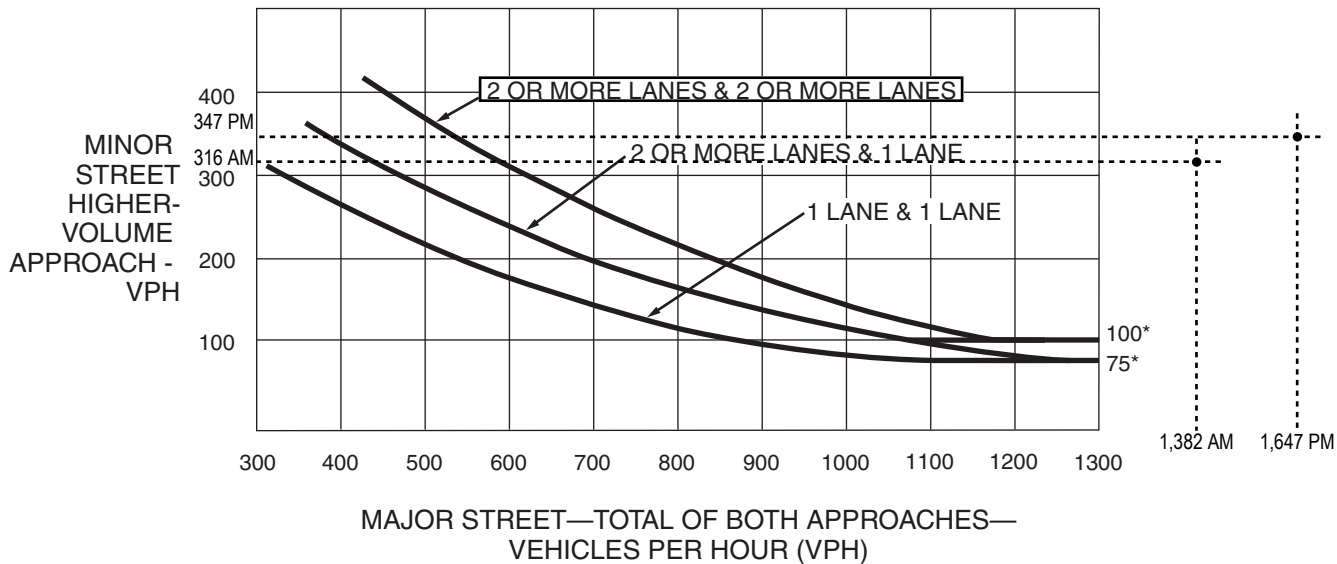
**Figure 4C-3. Warrant 3, Peak Hour**

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

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

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

STAGECOACH ROAD



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

Note: No right turn reduction applied.

STATE HIGHWAY 83 (55 MPH)