TRAFFIC IMPACT STUDY

For

Kettle Creek Residential
Colorado Springs, Colorado

July 2025

Prepared for:

Challenger Homes
8605 Explorer Dr., Suite 250
Colorado Springs, CO 80920

Prepared by:

SM ROCHA, LLC
TRAFFIC & TRANSPORTATION ENGINEERING CONSULTANTS

8700 Turnpike Drive, Suite 240
Westminster, Colorado 80031
(303) 458-9798

6 South Tejon Street, Suite 618
Colorado Springs, Colorado 80903
(719) 203-6639

Project Manager:
Stephen Simon, PE

Project Engineer:
Megan Bock, EIT

Engineer in Responsible Charge:
Fred Lantz, PE

25-062449

Table of Contents

List of Figures

List of Tables

Appendices

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 Kettle Creek Residential.

This proposed residential development consists of a multifamily community. The development is located on the north side of Old Ranch Road, west of Otero Avenue in Colorado Springs, Colorado.

Study Area Boundaries

The study area to be examined in this analysis encompasses the Old Ranch Road intersections with Voyager Parkway, Kettle Creek Road, and Otero Avenue.

Figure 1 illustrates location of the site and study intersections.

Site Description

Land for the development is currently occupied by two single-family detached houses. The area is surrounded by a mix of industrial and residential land uses.

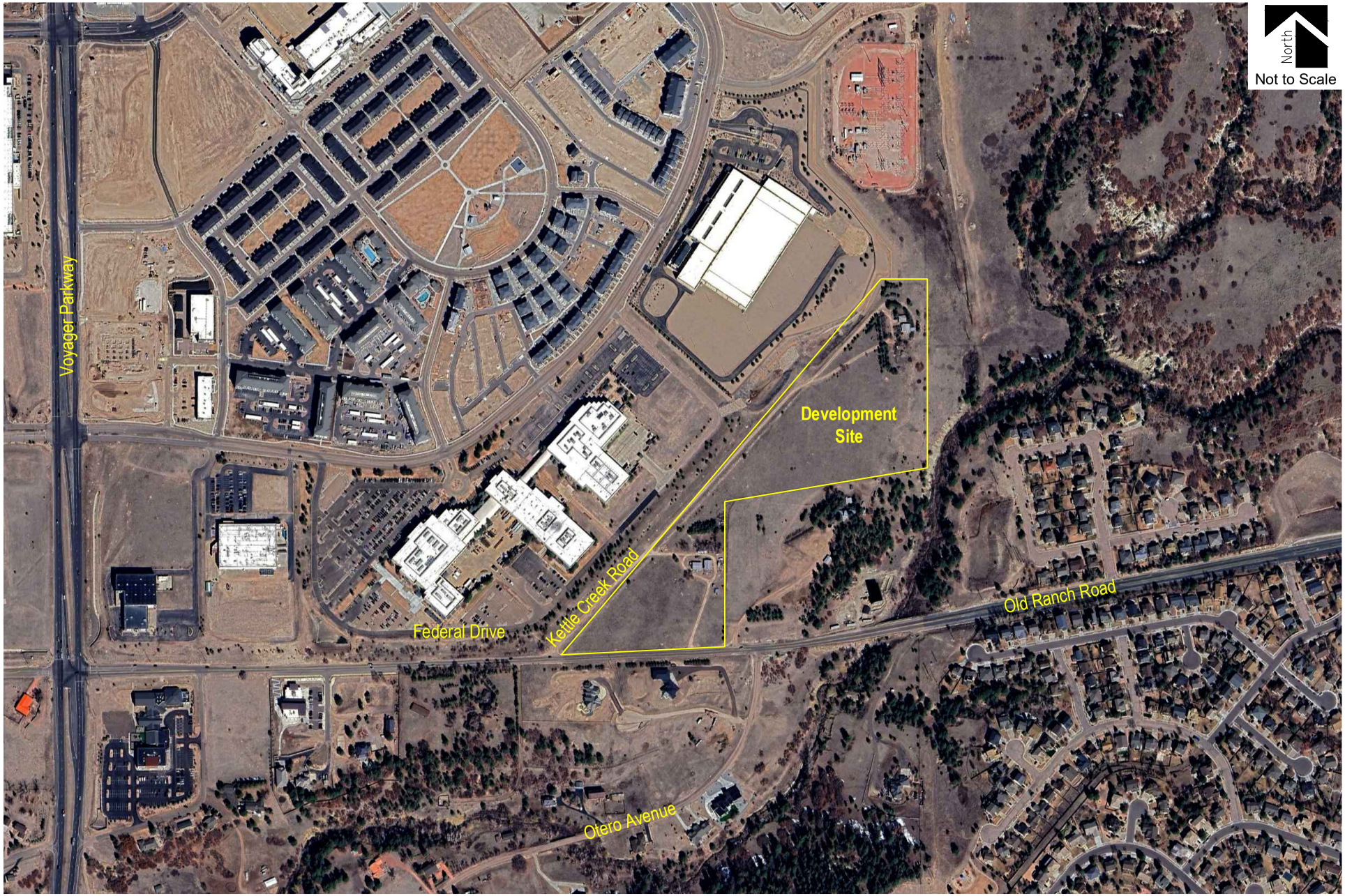
The proposed development is understood to entail the new construction of 122 multifamily dwelling units.

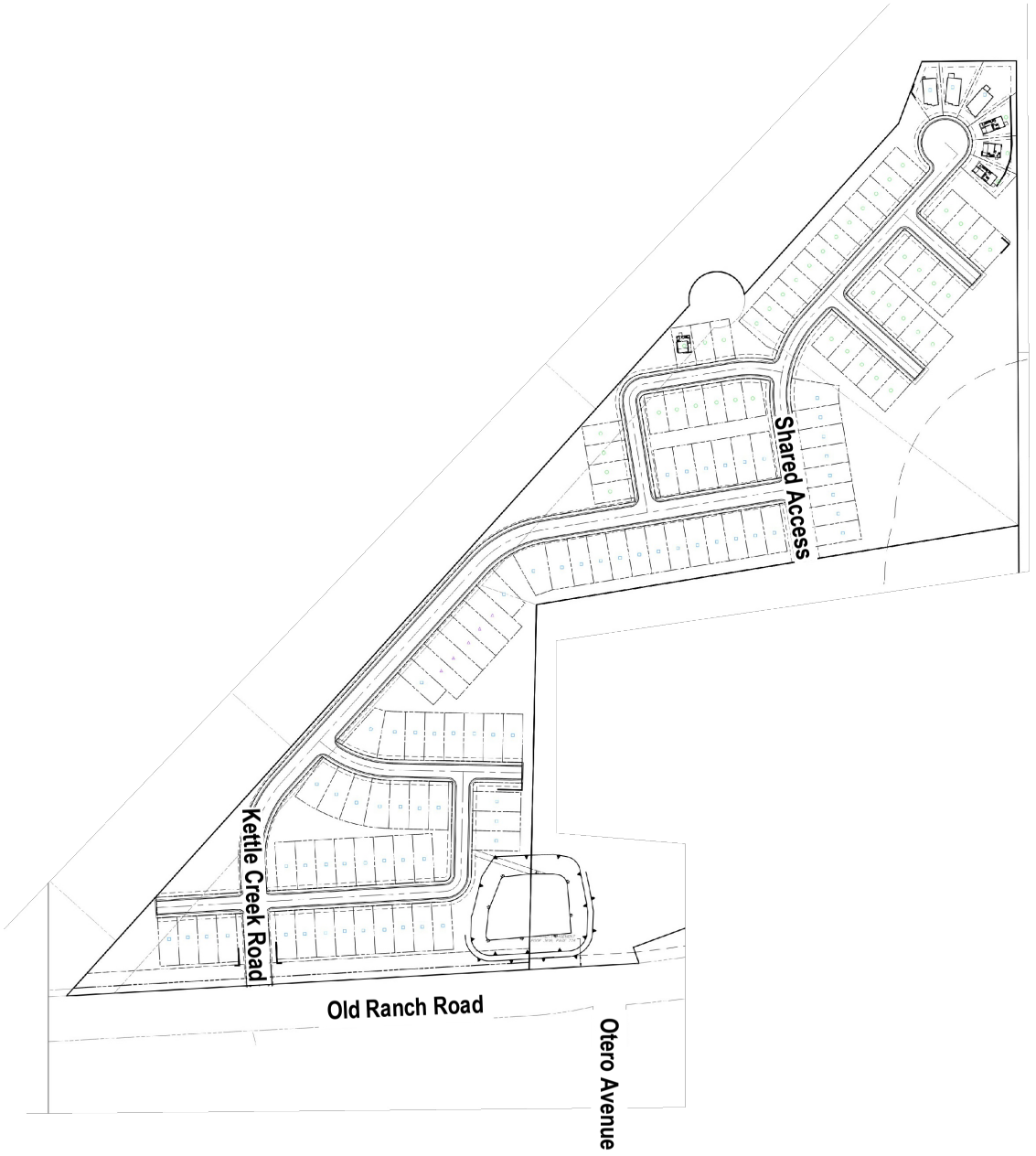
Existing access to the development is provided via the full-movement intersection of Kettle Creek Road with Old Ranch Road. Upon construction of the proposed development, it is expected that the existing Kettle Creek Road will be realigned and serve as the main point of access to the development. Additionally, shared access is also proposed with the adjacent Cottages at Kettle Creek development to the east. However, for purposes of this analysis, the planned shared access was not analyzed as specific construction timelines may be subject to change. This provides for a conservative analysis.

For purposes of this study, it is anticipated that development construction would be completed by end of Year 2027.

General site and access locations are shown on Figure 1.

A land plan, as prepared by All Terrain Engineering, is shown in Figure 2. This plan is provided for illustrative purposes only.


North
Not to Scale
Voyager Parkway
Development Site
Kettle Creek Road
Federal Drive
Old Ranch Road
Otero Avenue


North
Not to Scale
Shared Access
Kettle Creek Road
Old Ranch Road
Otero Avenue

Existing and Committed Surface Transportation Network

Within the study area, Old Ranch Road is the primary roadway that will accommodate traffic to and from the proposed development. The secondary roadways include Voyager Parkway, Otero Avenue, and Kettle Creek Road. A brief description of each roadway, based on the City's Major Thoroughfare Plan (MTP)[1] and Traffic Criteria Manual (TCM)[2], is provided below:

Old Ranch Road is an east-west minor arterial roadway having two through lanes (one lane in each direction) with a combination of shared and exclusive turn lanes at the intersections within the study area. Old Ranch Road provides a posted speed limit of 35 MPH.

Voyager Parkway is a north-south principal arterial roadway having four through lanes (two lanes in each direction) with exclusive turn lanes at the intersection within the study area. Voyager Parkway provides a posted speed limit of 55 MPH.

Otero Avenue 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. Otero Avenue is unclassified in the City's MTP. However, per Section 16.0 of the City's TCM and the roadway's estimated right-of-way (ROW) width, Otero Avenue is assumed to be classified as a collector roadway. Otero Avenue provides a posted speed limit of 30 MPH.

Kettle Creek 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. Kettle Creek Road is unclassified in the City's MTP. However, per Section 16.0 of the City's TCM and the roadway's estimated ROW width, Kettle Creek Road is assumed to be classified as a minor residential local roadway with an assumed speed limit of 25 MPH.

The study intersection of Old Ranch Road and Voyager Parkway is signalized. 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 City's ConnectCOS[3], Old Ranch Road will be widened from two to four through lanes. However, the City's ConnectCOS does not mention when this will occur. Therefore, for analysis purposes, no widening was assumed to occur within the performed analysis scenarios. This provides for a conservative analysis.

No other regional or specific improvements for the above-described roadways are known to be planned or committed at this time.

[1] Major Thoroughfare Plan, City of Colorado Springs, May 2025.
[2] Engineering Criteria Manual, Section III: Traffic Criteria Manual, City of Colorado Springs City Engineering, July 2010.
[3] ConnectCOS, City of Colorado Springs, March 2023.

II. Existing Traffic Conditions

Morning (AM) and afternoon (PM) peak hour traffic counts were collected at the Old Ranch Road intersections with Otero Avenue, Kettle Creek Road, and Voyager Parkway. Average daily traffic (ADT) volumes were collected over a 24-hour period on Old Ranch Road. Counts were collected on Tuesday, July 15, 2025, with AM peak hour counts being collected during the period of 7:00 a.m. to 9:00 a.m. and PM peak hour counts being collected during the period of 4:00 p.m. to 6:00 p.m.

Existing volumes and intersection geometry are shown in Figure 3. Traffic count data is included for reference in Appendix A.

Existing signal timing parameters for Old Ranch Road and Voyager Parkway were referenced from the Cottages at Kettle Creek traffic study[4] and used throughout this study to the best extent possible in order to remain consistent with existing signal coordination plans.

[4] Cottages at Kettle Creek: Traffic Impact Study, SM ROCHA, LLC, October 2024.

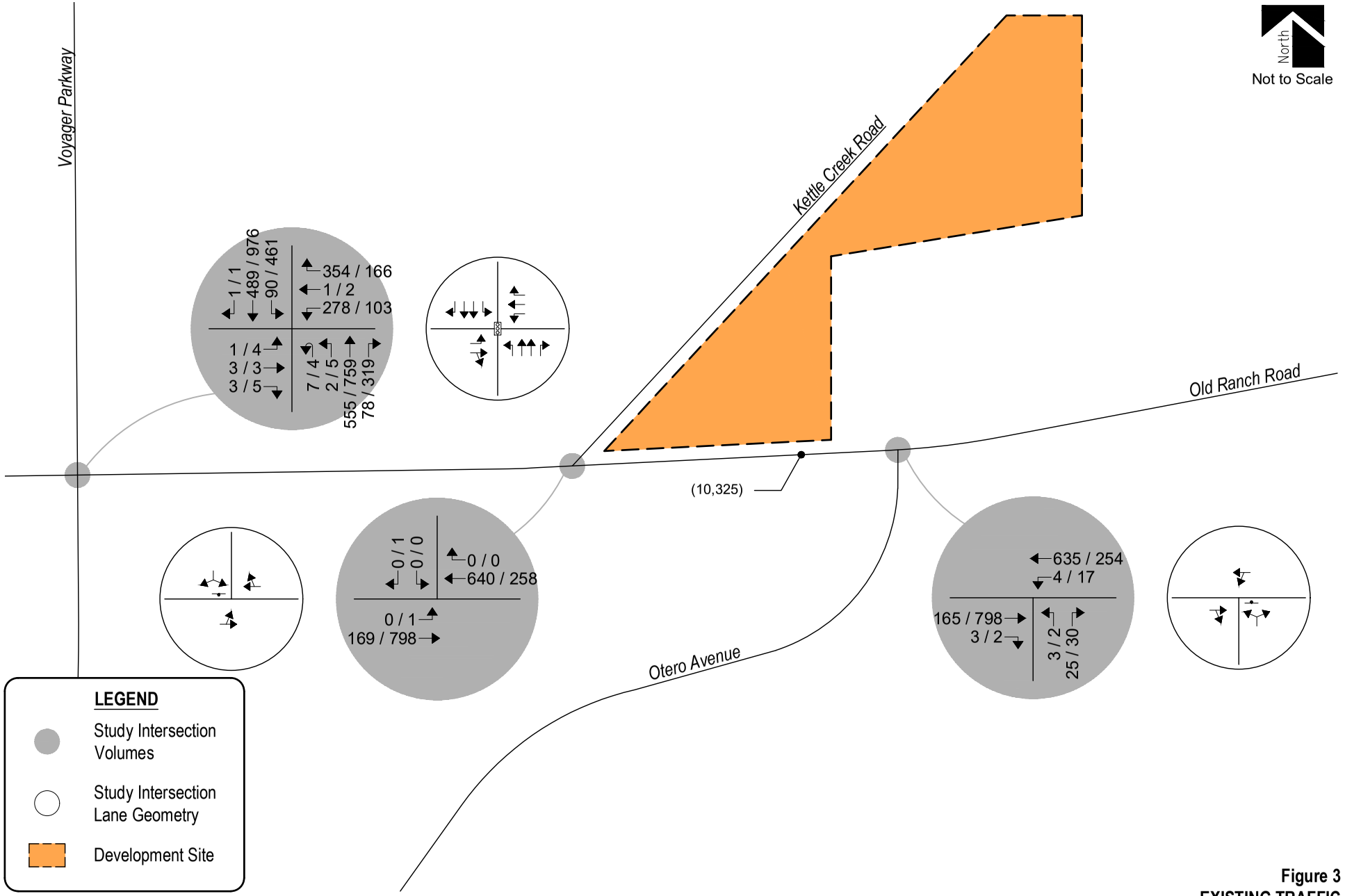


Figure 3
EXISTING TRAFFIC
Volumes & Intersection Geometry
AM / PM Peak Hour
(ADT) : Average Daily Traffic

Peak Hour Intersection Levels of Service – Existing Traffic

The Signalized and Unsignalized Intersection Analysis techniques, as published in the Highway Capacity Manual (HCM), 7th Edition, by the Transportation Research Board and as incorporated into the SYNCHRO computer program, were used to analyze the study intersections for existing and future traffic conditions. These nationally accepted techniques allow for the determination of intersection level of service (LOS) based on the congestion and delay of each traffic movement.

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 B 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 C.

Table 1 – Intersection Capacity Analysis Summary – Existing Traffic

INTERSECTION LANE GROUPS	LEVEL OF SERVICE AM PEAK HOUR	 PM PEAK HOUR
Old Ranch Road / Voyager Parkway (Signalized)	B (17.5)	B (17.6)
Old Ranch Road / Otero Avenue (Stop-Controlled) Westbound Left and Through Northbound Left and Right	 A B	 A C
Old Ranch Road / Kettle Creek Road (Stop-Controlled) Eastbound Left and Through Southbound Left and Right	 A A	 A A

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

Existing Traffic Analysis Results

Under existing conditions, operational analysis shows that the signalized intersection of Old Ranch Road and Voyager Parkway has overall operations at LOS B during the morning and afternoon peak traffic hours.

The stop-controlled intersection of Old Ranch Road and Otero Avenue has turning movement operations at LOS B or better during the morning peak traffic hour and LOS C or better during the afternoon peak traffic hour.

The stop-controlled intersection of Old Ranch Road and Kettle Creek Road has turning movement operations at LOS A during 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 2045, a compounded annual growth rate of two percent was applied to existing traffic volumes. This annual growth rate is consistent with assumptions made in the Cottages at Kettle Creek traffic study.

To account for projected traffic from adjacent developments not yet built, trip generations from the Cottages at Kettle Creek traffic study were added to background traffic volumes.

Pursuant to the proposed area roadway improvements discussed in Section I, Year 2027 and Year 2045 background traffic conditions assume no roadway improvements to accommodate regional transportation demands. This assumption provides for a conservative analysis. Year 2027 background traffic conditions assume the construction of eastbound and westbound left turn lanes along Old Ranch Road at its intersection with Otero Avenue, consistent with the Cottages at Kettle Creek traffic study.

Year 2045 assumes existing signal timing parameters for Old Ranch Road and Voyager Parkway with optimized intersection splits in effort to better long-term intersection performance.

Projected background traffic volumes and intersection geometry for Years 2027 and 2045 are shown in Figure 4 and Figure 5, respectively.

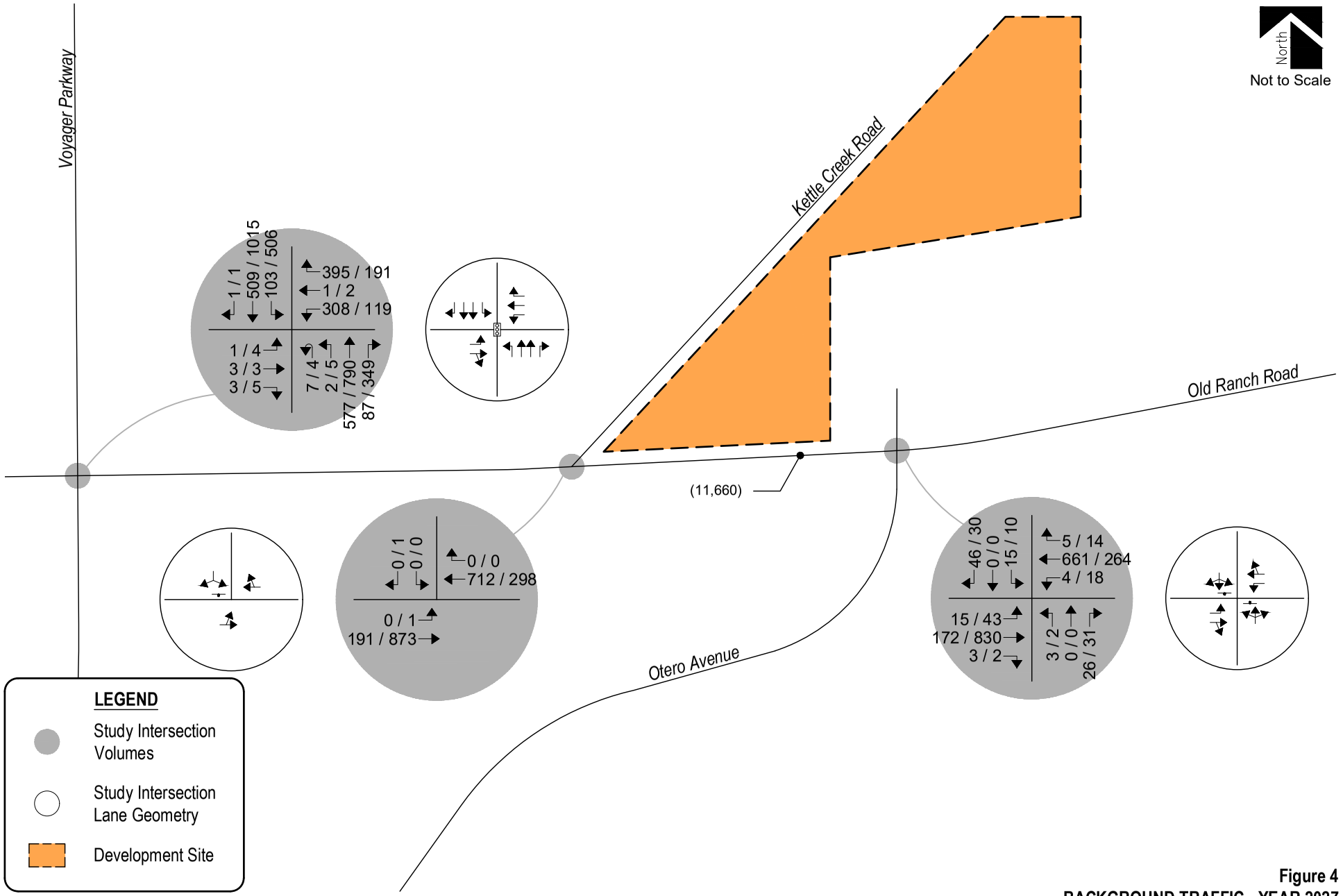


Figure 4
BACKGROUND TRAFFIC - YEAR 2027
Volumes & Intersection Geometry
AM / PM Peak Hour
(ADT) : Average Daily Traffic

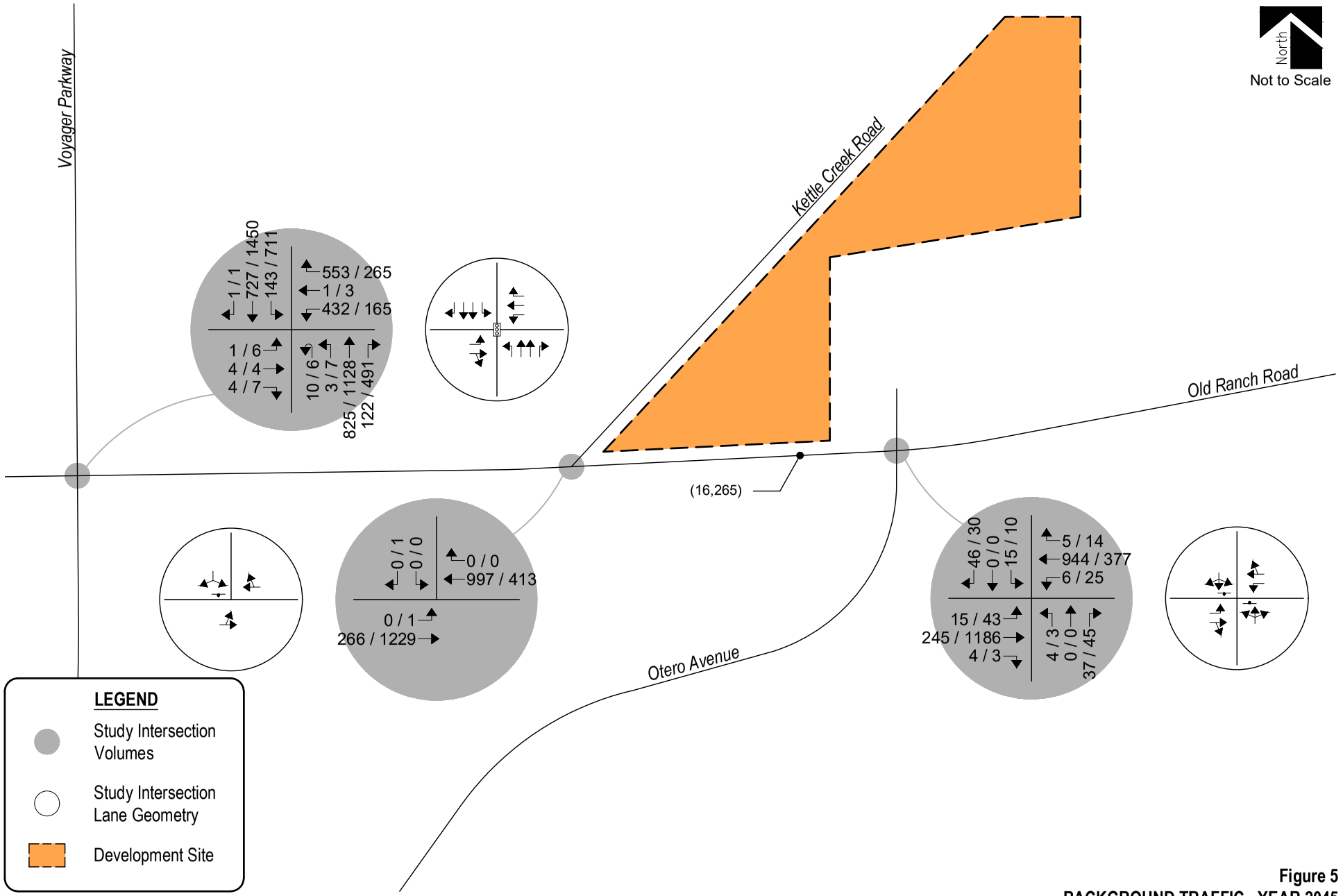


Figure 5
BACKGROUND TRAFFIC - YEAR 2045
Volumes & Intersection Geometry
AM / PM Peak Hour
(ADT) : Average Daily Traffic

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 2045 operational results are summarized in Table 3.

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

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

INTERSECTION LANE GROUPS	LEVEL OF SERVICE AM PEAK HOUR	 PM PEAK HOUR
Old Ranch Road / Voyager Parkway (Signalized)	B (19.7)	C (23.9)
Old Ranch Road / Otero Avenue (Stop-Controlled)		
Eastbound Left	A	A
Westbound Left	A	A
Northbound Left, Through and Right	B	C
Southbound Left, Through and Right	C	C
Old Ranch Road / Kettle Creek Road (Stop-Controlled)		
Eastbound Left and Through	A	A
Southbound Left and Right	A	B

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

Background Traffic Analysis Results – Year 2027

Year 2027 background traffic analysis indicates that the signalized intersection of Old Ranch Road and Voyager Parkway 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 Old Ranch Road and Otero Avenue projects turning movement operations at LOS C or better during the morning and afternoon peak traffic hours.

The stop-controlled intersection of Old Ranch Road and Kettle Creek Road expects turning movement operations at LOS A during the morning peak traffic hour and LOS B or better during the afternoon peak traffic hour.

Table 3 – Intersection Capacity Analysis Summary – Background Traffic – Year 2045

INTERSECTION LANE GROUPS	LEVEL OF SERVICE AM PEAK HOUR	 PM PEAK HOUR
Old Ranch Road / Voyager Parkway (Signalized)	C (29.7)	D (53.4)
Old Ranch Road / Otero Avenue (Stop-Controlled)		
Eastbound Left	B	A
Westbound Left	A	B
Northbound Left, Through and Right	B	E
Southbound Left, Through and Right	D	E
Old Ranch Road / Kettle Creek Road (Stop-Controlled)		
Eastbound Left and Through	A	A
Southbound Left and Right	A	B

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

Background Traffic Analysis Results – Year 2045

By Year 2045 and without the proposed development, the signalized intersection of Old Ranch Road and Voyager Parkway has overall operations at LOS C during the morning peak traffic hour and LOS D during the afternoon peak traffic hour.

The stop-controlled intersection of Old Ranch Road and Otero Avenue projects turning movement operations at LOS D or better during the morning peak traffic hour and LOS B or better during the afternoon peak traffic hour. Exceptions include the northbound and southbound turning movements which operate at LOS E during the PM peak traffic hour. The LOS E operations are attributed to the through traffic volume along Old Ranch Road and the stop-controlled nature of the intersection.

The stop-controlled intersection of Old Ranch Road and Kettle Creek Road expects turning movement operations at LOS A during the morning peak traffic hour and LOS B or better during the afternoon peak traffic hour.

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. The upstream signal control on Old Ranch Road will tend to create additional gaps in the traffic stream for turning movements at Otero Avenue and is likely to provide mitigation to the LOS E operations projected during the afternoon peak traffic hour.

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, 11th 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 code 220 (Multifamily Housing (Low-Rise)) was used for estimating trip generation because of its conservative rates and best fit to the proposed land use description.

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

Table 4 – Trip Generation Rates

			TRIP GENERATION RATES						
ITE			24	AM PEAK HOUR			PM PEAK HOUR		
CODE	LAND USE	UNIT	HOUR	ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
220	Multifamily Housing (Low-Rise)	DU	6.74	0.10	0.30	0.40	0.32	0.19	0.51

Key: DU = Dwelling Units.
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

			TOTAL TRIPS GENERATED						
ITE			24	AM PEAK HOUR			PM PEAK HOUR		
CODE	LAND USE	SIZE	HOUR	ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
220	Multifamily Housing (Low-Rise)	122 DU	822	12	37	49	39	23	62
		Total:	*822*	*12*	*37*	*49*	*39*	*23*	*62*

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

Upon build-out, Table 5 illustrates that the proposed development has the potential to generate approximately 822 daily vehicle trips with 49 of those occurring during the morning peak hour and 62 during the afternoon peak hour.

Adjustments to Trip Generation Rates

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

Trip Distribution

The overall directional distribution of site-generated traffic was determined based on the location of development site within the City, proposed and existing area land uses, allowed turning movements, available roadway network, and in reference to historical traffic count data provided by the Colorado Department of Transportation's (CDOT) Traffic Count Database System (TCDS)[5] as well as the Cottages at Kettle Creek traffic study.

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

Trip Assignment

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

Applying trip distribution patterns to site-generated traffic provides the overall site-generated trip assignments shown on Figure 6.

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

Figure 6
SITE DEVELOPMENT DISTRIBUTION
(%) : Overall
SITE-GENERATED TRIPS
AM / PM Peak Hour

V. Future Traffic Conditions With Proposed Development

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 2045 with consideration of site-generated traffic. For analysis purposes, it was assumed that development construction would be completed by end of Year 2027.

Pursuant to area roadway improvement discussions provided in Section III, Year 2027 and Year 2045 total traffic conditions assume no additional roadway improvements to accommodate regional transportation demands. Additional roadway improvements associated with site development are expected to be limited to site access and frontage as required by the governing agency.

Total Traffic Auxiliary Lane Analysis

Auxiliary lanes for the study intersections were evaluated and are to be based on the City's TCM.

Considering development build-out, an evaluation of auxiliary lane requirements, pursuant to Section 8.1, Table 2, of the City's TCM, reveals that an eastbound left turn deceleration lane at Site Access along Old Ranch Road is required since the development's projected peak hour left turn ingress volume exceeds the City's threshold of 25 vehicles per hour.

Projected Year 2027 total traffic volumes and intersection geometry are shown in Figure 7.

Figure 8 shows projected total traffic volumes and intersection geometry for Year 2045.

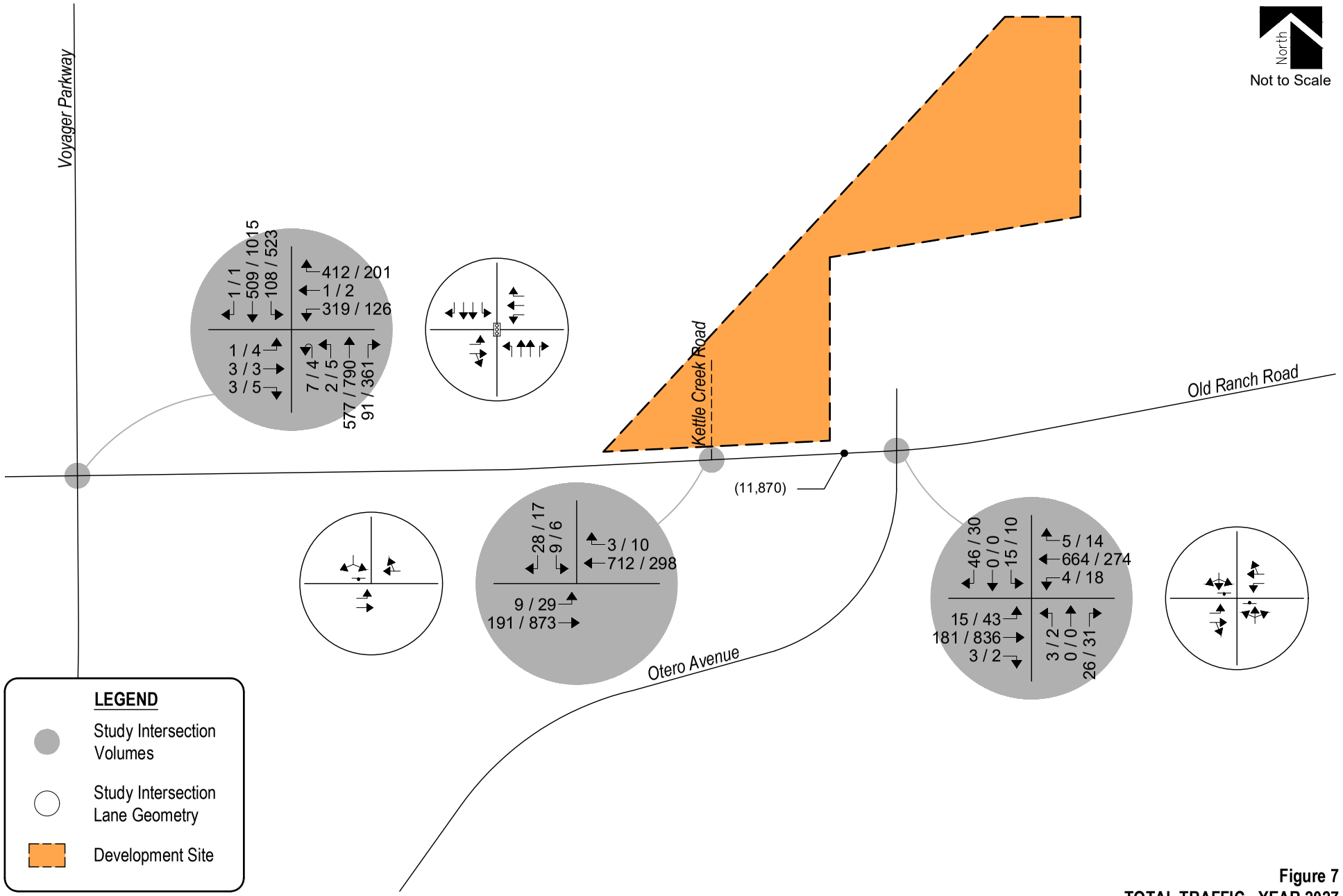


Figure 7
TOTAL TRAFFIC - YEAR 2027
Volumes & Intersection Geometry
AM / PM Peak Hour
(ADT) : Average Daily Traffic

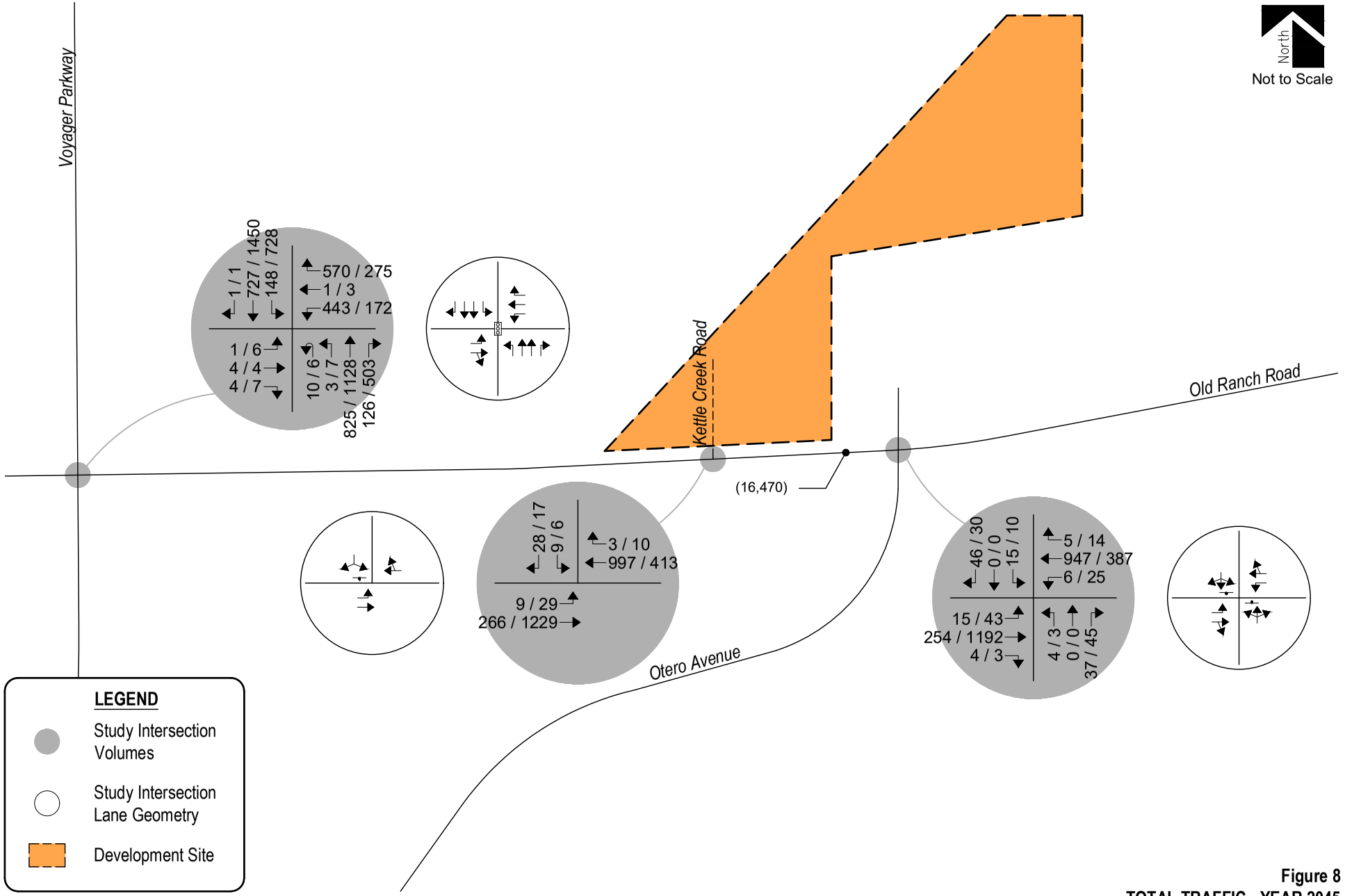


Figure 8
TOTAL TRAFFIC - YEAR 2045
Volumes & Intersection Geometry
AM / PM Peak Hour
(ADT) : Average Daily Traffic

Peak Hour Intersection Levels of Service – Total Traffic

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

Total traffic level of service analysis results for Years 2027 and 2045 are summarized in Table 6 and Table 7, respectively.

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

Table 6 – Intersection Capacity Analysis Summary – Total Traffic – Year 2027

INTERSECTION LANE GROUPS	LEVEL OF SERVICE AM PEAK HOUR	 PM PEAK HOUR
Old Ranch Road / Voyager Parkway (Signalized)	C (20.5)	C (27.2)
Old Ranch Road / Otero Avenue (Stop-Controlled)		
Eastbound Left	A	A
Westbound Left	A	A
Northbound Left, Through and Right	B	C
Southbound Left, Through and Right	C	C
Old Ranch Road / Kettle Creek Road (Stop-Controlled)		
Eastbound Left	A	A
Southbound Left and Right	C	C

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

Table 7 – Intersection Capacity Analysis Summary – Total Traffic – Year 2045

INTERSECTION LANE GROUPS	LEVEL OF SERVICE AM PEAK HOUR	 PM PEAK HOUR
Old Ranch Road / Voyager Parkway (Signalized)	C (31.0)	E (56.5)
Old Ranch Road / Otero Avenue (Stop-Controlled)		
Eastbound Left	B	A
Westbound Left	A	B
Northbound Left, Through and Right	B	E
Southbound Left, Through and Right	D	E
Old Ranch Road / Kettle Creek Road (Stop-Controlled)		
Eastbound Left	B	A
Southbound Left and Right	C	C

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

Total Traffic Analysis Results Upon Development Build-Out

Table 7 illustrates how, by Year 2045 and upon development build-out, the signalized intersection of Old Ranch Road and Voyager Parkway has overall operations at LOS C during the morning peak traffic hour and LOS E during the afternoon peak traffic hour. The LOS E operation is attributed to the westbound and southbound left turning volumes. It is noted that the high volume of left turning volumes occur in background traffic and the proposed development does not contribute a significant increase in volumes for these movements. Potential solutions to mitigate the LOS E operation projected may include the implementation of permissive-protected left-turn phasing for the eastbound and westbound left movements, or provision of a dual southbound left turn lane upon widening of Old Ranch Road. Compared to the background traffic analysis, the traffic generated by the proposed development is not expected to significantly change the operations of the study intersection.

The stop-controlled intersection of Old Ranch Road and Otero Avenue projects turning movement operations at LOS D or better during the morning peak traffic hour and LOS B or better during the afternoon peak traffic hour. Exceptions include the northbound and southbound turning movements which operate at LOS E during the PM peak traffic hour. As with background traffic, the LOS E operations are attributed to the through traffic volume along Old Ranch Road and the stop-controlled nature of the intersection. It is noted that the LOS E operations anticipated are not expected to result in significant queuing.

The stop-controlled intersection of Old Ranch Road and Site Access expects turning movement operations at LOS C or better both peak traffic hours.

It is again 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. The upstream signal control on Old Ranch Road will tend to create additional gaps in the traffic stream for turning movements at Otero Avenue and is likely to provide mitigation to the LOS E operations projected during the afternoon peak traffic hour.

VI. Project Impacts

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

Queue Length Analysis

Queue lengths for the study intersections were analyzed using Year 2045 background and total traffic conditions. The analysis yields estimate of 95th percentile queue lengths, which have only a five percent probability of being exceeded during the analysis time period. An average vehicle length of 25 feet was assumed. Queue lengths were modeled and are included with the Synchro worksheets in Appendix C.

Table 8 summarizes the 95th percentile queue results in comparison to the projected storage requirements for turn movements within study area for Year 2045.

Table 8 – Turn Lane Queues and Storage Requirements –Background & Total Traffic – Year 2045

Intersection	Turn Movement		Existing Turn Lane Length (feet)	Background 2045		Total 2045		Recommended Turn Lane Length (feet)
				AM Peak Hour (feet)	PM Peak Hour (vehicles)	AM Peak Hour (feet)	PM Peak Hour (vehicles)	
Signalized Intersections								
Old Ranch Road / Voyager Parkway	EB	L	60'	3'	13'	3'	13'	60'
		T,R	-	9'	16'	9'	16'	-
	WB	L	210'	367'	206'	380'	215'	380'
		T	-	3'	9'	3'	9'	-
		R	210'	361'	74'	381'	85'	385'
	NB	L	320'	11'	6'	11'	6'	320'
		T	-	260'	428'	260'	428'	-
		R	250'	34'	148'	34'	161'	250'
	SB	L	285'	99'	566'	105'	585'	585'
		T	-	215'	345'	215'	345'	-
		R	170'	0'	0'	0'	0'	170'
Stop-Controlled Intersections								
Old Ranch Road / Otero Avenue	EB	L	-	3'	3'	3'	3'	155'
		T,R	-	0'	0'	0'	0'	-
	WB	L	-	0'	5'	0'	5'	155'
		T,R	-	0'	0'	0'	0'	-
	NB	L,T,R	-	8'	30'	8'	33'	-
	SB	L,T,R	-	33'	33'	33'	35'	-
Old Ranch Road / Site Access	EB	L	-	-	-	0'	3'	155'
		T	-	0'	0'	0'	0'	-
	WB	T,R	-	0'	0'	0'	0'	-
	SB	L,R	-	0'	0'	15'	10'	-

Note: Turn Lane Length does not include taper length.

As Table 8 shows, turn lane lengths should be modified to meet either the City's minimum length or the projected 95th percentile queue lengths, whichever is greater.

It is noted that some vehicle queues exceeding current available turn lane capacities are projected to occur at the Voyager Parkway and Old Ranch Road intersection during background traffic conditions. The addition of site-generated traffic volumes is not anticipated to significantly increase these queues. However, as previously discussed, the implementation of permissive-protected left-turn phasing for the eastbound and westbound left movements at the study intersection is a potential solution which may help to mitigate queues projected for the westbound left turn movement during either peak traffic hour. Alternatively future provision of a dual southbound left turn lane may be necessary upon widening of Old Ranch Road. It is recommended that City Staff continues to monitor the study intersection as area development occurs in order to determine when or if specific mitigation methods may be most appropriate.

Development Impacts

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 2045 background traffic conditions.

Recommended Improvements

Roadway and intersection improvement recommendations were assessed pursuant to roadway descriptions discussed in Section I, projected peak hour traffic volumes, level of service results, projected 95th percentile queue lengths, and per requirements defined within the City's TCM.

As discussed in Section V, and pursuant to the City's TCM, construction of an eastbound left turn deceleration lane at Site Access along Old Ranch Road is required.

Additionally, future improvements to the Voyager Parkway and Old Ranch Road intersection may be necessary in order to accommodate projected volumes both with or without the proposed development. As previously discussed, implementation of permissive-protected left-turn phasing for the eastbound and westbound left movements at the study intersection is a potential solution to mitigate the LOS E operation projected during the afternoon peak traffic hour under Year 2045 total traffic conditions. Alternatively, upon future widening of Old Ranch Road, provision of a dual southbound left turn lane may be viable. It is emphasized that the addition of site-generated trips does not significantly impact the study intersection.

VII. Conclusion

This traffic impact study addressed the capacity, geometric, and control requirements associated with the development entitled Kettle Creek Residential. This proposed residential development consists of a multifamily home community. The development is located on the north side of Old Ranch Road, west of Otero Avenue in Colorado Springs, Colorado.

The study area examined in this analysis encompassed the Old Ranch Road intersections with Voyager Parkway, Kettle Creek Road, Otero Avenue, and the proposed site access.

Analysis was conducted for critical AM Peak Hour and PM Peak Hour traffic operations for existing traffic conditions, Year 2027 and Year 2045 background traffic conditions, and Year 2027 and Year 2045 total traffic conditions.

Analysis of existing traffic conditions indicates that all signalized intersections operate under LOS B conditions during their respective peak hour periods, while all stop-controlled intersections operate with turn movements at or better than LOS C during their respective peak traffic periods.

Under Year 2027 and 2045 background traffic conditions, operational analysis shows that all signalized intersections are projected to operate with LOS D operations or better during peak traffic periods. All stop-controlled intersections anticipate turn movement operations at or better than LOS D during their respective peak traffic periods. Exceptions include the northbound and southbound movements at Old Ranch Road and Otero Avenue which operate at LOS E during the afternoon peak traffic hour.

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 2045 background traffic conditions. The proposed site access has long-term operations at LOS C or better during peak traffic periods and upon build-out.

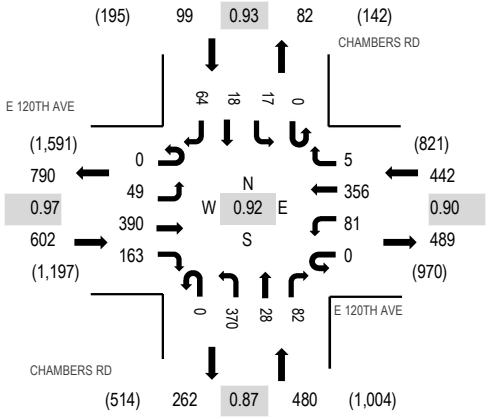
APPENDIX A

Traffic Count Data

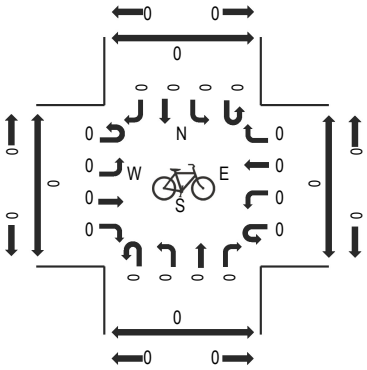
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 1 CHAMBERS RD & E 120TH AVE AM
Date: Tuesday, June 3, 2025
Peak Hour: 07:45 AM - 08:45 AM
Peak 15-Minutes: 08:30 AM - 08:45 AM

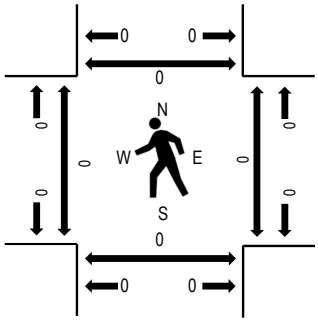
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

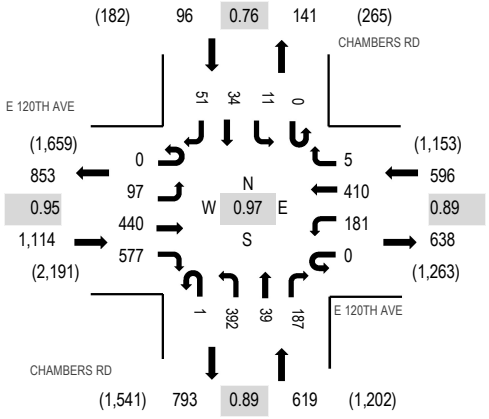
Traffic Counts - Motorized Vehicles

Interval Start Time	E 120TH AVE Eastbound				E 120TH AVE Westbound				CHAMBERS RD Northbound				CHAMBERS RD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	6	94	38	0	13	89	0	0	83	7	14	0	6	4	19	373	1,606	0	0	0	0
7:15 AM	0	8	108	40	0	12	95	0	0	115	5	28	0	1	6	23	441	1,614	0	0	0	0
7:30 AM	0	17	81	52	0	13	80	0	0	90	3	29	0	2	4	17	388	1,572	0	0	0	0
7:45 AM	0	15	88	44	0	24	93	0	0	80	5	25	0	4	6	20	404	1,623	0	0	0	0
8:00 AM	0	13	105	39	0	18	89	1	0	73	12	13	0	3	5	10	381	1,611	0	0	0	0
8:15 AM	0	11	93	45	0	20	73	1	0	100	6	22	0	6	2	20	399		0	0	0	0
8:30 AM	0	10	104	35	0	19	101	3	0	117	5	22	0	4	5	14	439		0	0	0	0
8:45 AM	0	9	91	51	0	13	64	0	0	121	5	24	0	3	6	5	392		0	0	0	0
Count Total	0	89	764	344	0	132	684	5	0	779	48	177	0	29	38	128	3,217		0	0	0	0
Peak Hour	0	49	390	163	0	81	356	5	0	370	28	82	0	17	18	64	1,623		0	0	0	0

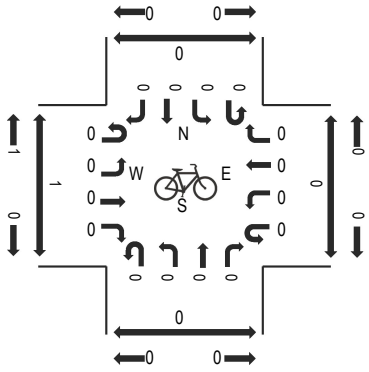
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 1 CHAMBERS RD & E 120TH AVE PM
Date: Tuesday, June 3, 2025
Peak Hour: 04:30 PM - 05:30 PM
Peak 15-Minutes: 05:00 PM - 05:15 PM

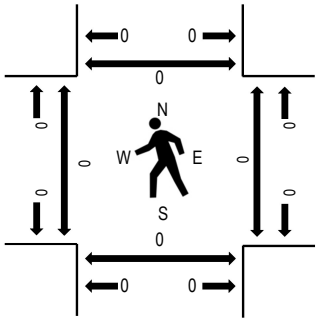
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

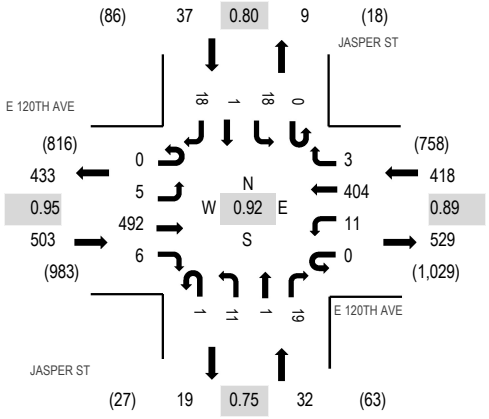
Traffic Counts - Motorized Vehicles

Interval Start Time	E 120TH AVE Eastbound				E 120TH AVE Westbound				CHAMBERS RD Northbound				CHAMBERS RD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00 PM	0	24	130	125	0	41	95	2	0	92	5	39	0	3	6	10	572	2,362	0	0	0	0
4:15 PM	0	26	112	141	0	51	122	1	0	73	12	39	0	6	8	11	602	2,416	0	0	0	0
4:30 PM	0	28	115	121	0	45	97	1	0	117	6	41	0	5	11	18	605	2,425	0	0	0	0
4:45 PM	0	14	101	152	0	45	97	2	1	97	11	45	0	3	7	8	583	2,418	0	0	0	0
5:00 PM	0	25	106	158	0	40	115	1	0	90	13	51	0	2	11	14	626	2,366	0	0	0	0
5:15 PM	0	30	118	146	0	51	101	1	0	88	9	50	0	1	5	11	611		0	0	0	0
5:30 PM	0	19	107	147	0	49	76	0	1	130	4	42	0	4	8	11	598		0	0	0	0
5:45 PM	0	15	96	135	0	35	84	1	0	85	15	46	0	1	1	17	531		0	0	0	0
Count Total	0	181	885	1,125	0	357	787	9	2	772	75	353	0	25	57	100	4,728		0	0	0	0
Peak Hour	0	97	440	577	0	181	410	5	1	392	39	187	0	11	34	51	2,425		0	0	0	0

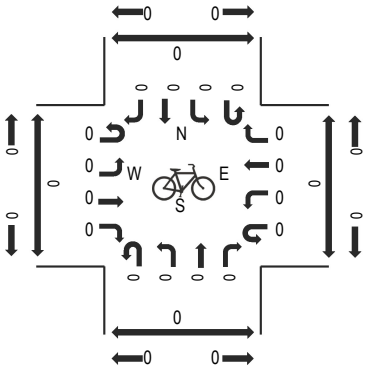
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 2 JASPER ST & E 120TH AVE AM
Date: Tuesday, June 3, 2025
Peak Hour: 07:45 AM - 08:45 AM
Peak 15-Minutes: 08:30 AM - 08:45 AM

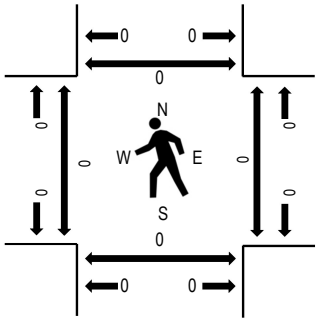
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

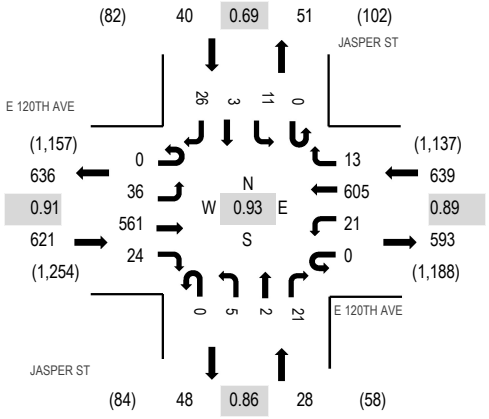
Traffic Counts - Motorized Vehicles

Interval Start Time	E 120TH AVE Eastbound				E 120TH AVE Westbound				JASPER ST Northbound				JASPER ST Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	2	103	1	0	0	94	0	0	5	0	5	0	4	0	6	220	954	0	0	0	0
7:15 AM	0	3	143	1	0	2	91	0	0	5	0	2	0	4	1	10	262	972	0	0	0	0
7:30 AM	0	0	106	0	0	0	87	0	0	2	0	5	1	6	0	4	211	933	0	0	0	0
7:45 AM	0	0	124	0	0	4	107	2	0	5	0	7	0	5	1	6	261	990	0	0	0	0
8:00 AM	0	0	124	1	0	0	101	0	0	0	0	4	0	4	0	4	238	936	0	0	0	0
8:15 AM	0	4	115	3	0	5	82	0	1	3	0	1	0	2	0	7	223		0	0	0	0
8:30 AM	0	1	129	2	0	2	114	1	0	3	1	7	0	7	0	1	268		0	0	0	0
8:45 AM	0	3	115	3	0	0	66	0	0	5	0	2	0	5	0	8	207		0	0	0	0
Count Total	0	13	959	11	0	13	742	3	1	28	1	33	1	37	2	46	1,890		0	0	0	0
Peak Hour	0	5	492	6	0	11	404	3	1	11	1	19	0	18	1	18	990		0	0	0	0

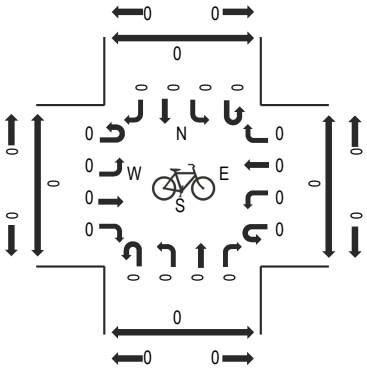
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 2 JASPER ST & E 120TH AVE PM
Date: Tuesday, June 3, 2025
Peak Hour: 04:15 PM - 05:15 PM
Peak 15-Minutes: 04:15 PM - 04:30 PM

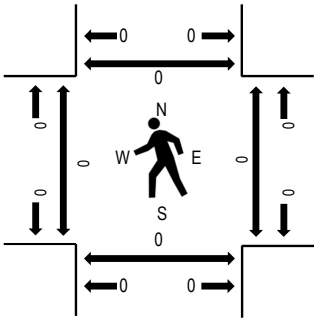
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

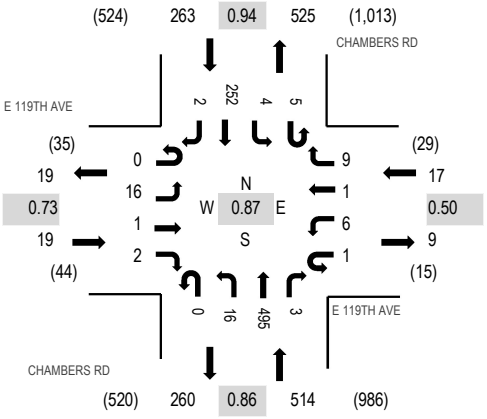
Traffic Counts - Motorized Vehicles

Interval Start Time	E 120TH AVE Eastbound				E 120TH AVE Westbound				JASPER ST Northbound				JASPER ST Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00 PM	1	9	153	3	0	2	131	3	0	2	0	1	0	2	0	7	314	1,306	0	0	0	0
4:15 PM	0	6	148	6	0	4	172	3	0	2	1	4	0	2	1	7	356	1,328	0	0	0	0
4:30 PM	0	10	145	7	0	7	130	5	0	1	1	6	0	3	0	8	323	1,315	0	0	0	0
4:45 PM	0	11	131	6	0	5	147	3	0	0	0	2	0	3	2	3	313	1,268	0	0	0	0
5:00 PM	0	9	137	5	0	5	156	2	0	2	0	9	0	3	0	8	336	1,225	0	0	0	0
5:15 PM	1	10	155	9	0	4	137	2	0	3	2	3	0	7	0	10	343		0	0	0	0
5:30 PM	0	7	136	6	0	3	105	1	0	3	1	6	0	3	0	5	276		0	0	0	0
5:45 PM	0	15	122	6	0	3	107	0	0	5	1	3	0	4	0	4	270		0	0	0	0
Count Total	2	77	1,127	48	0	33	1,085	19	0	18	6	34	0	27	3	52	2,531		0	0	0	0
Peak Hour	0	36	561	24	0	21	605	13	0	5	2	21	0	11	3	26	1,328		0	0	0	0

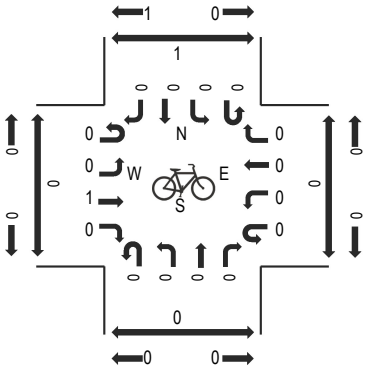
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 3 CHAMBERS RD & E 119TH AVE AM
Date: Tuesday, June 3, 2025
Peak Hour: 08:00 AM - 09:00 AM
Peak 15-Minutes: 08:45 AM - 09:00 AM

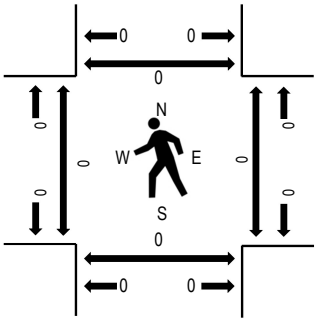
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

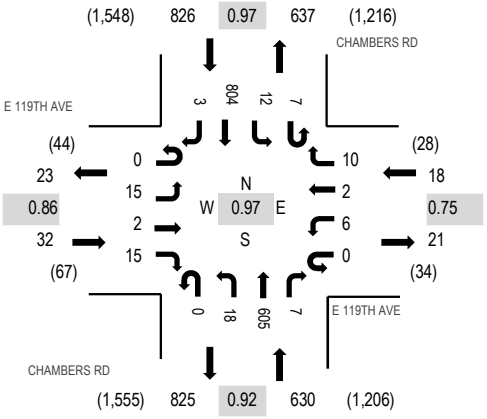
Traffic Counts - Motorized Vehicles

Interval Start Time	E 119TH AVE Eastbound				E 119TH AVE Westbound				CHAMBERS RD Northbound				CHAMBERS RD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	3	0	0	0	0	0	1	0	4	100	0	1	1	54	0	164	770	0	0	0	0
7:15 AM	0	4	0	1	0	1	0	1	0	5	142	0	1	0	58	0	213	778	0	2	0	0
7:30 AM	0	5	0	2	0	2	1	6	0	3	111	0	2	3	67	0	202	768	0	0	0	0
7:45 AM	0	8	0	2	0	0	0	0	0	3	102	2	1	0	73	0	191	771	0	0	0	0
8:00 AM	0	2	0	1	0	2	1	2	0	5	95	0	1	1	61	1	172	813	0	0	0	0
8:15 AM	0	8	0	1	0	1	0	3	0	4	117	1	1	1	66	0	203		0	0	0	0
8:30 AM	0	3	0	0	1	1	0	1	0	2	139	1	0	0	56	1	205		0	0	0	0
8:45 AM	0	3	1	0	0	2	0	3	0	5	144	1	3	2	69	0	233		0	0	0	0
Count Total	0	36	1	7	1	9	2	17	0	31	950	5	10	8	504	2	1,583		0	2	0	0
Peak Hour	0	16	1	2	1	6	1	9	0	16	495	3	5	4	252	2	813		0	0	0	0

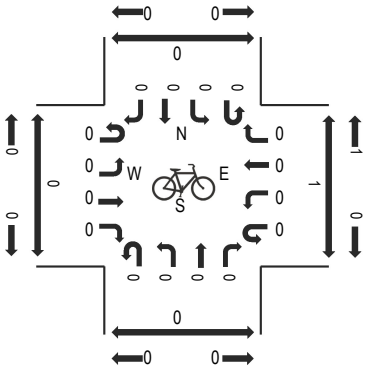
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 3 CHAMBERS RD & E 119TH AVE PM
Date: Tuesday, June 3, 2025
Peak Hour: 04:45 PM - 05:45 PM
Peak 15-Minutes: 05:30 PM - 05:45 PM

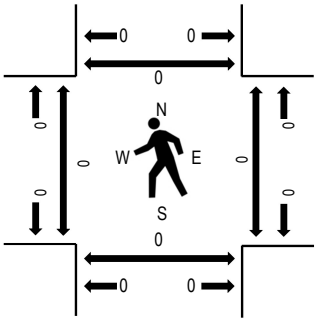
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

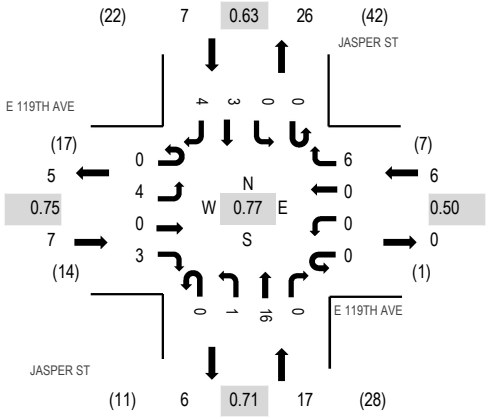
Traffic Counts - Motorized Vehicles

Interval Start Time	E 119TH AVE Eastbound				E 119TH AVE Westbound				CHAMBERS RD Northbound				CHAMBERS RD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00 PM	0	7	0	2	0	3	0	0	0	4	131	2	1	2	170	0	322	1,391	0	0	0	0
4:15 PM	0	5	0	5	1	0	0	1	0	5	119	0	3	4	194	0	337	1,449	0	0	0	0
4:30 PM	0	3	1	7	0	2	0	1	0	8	159	1	1	0	175	0	358	1,475	0	0	0	0
4:45 PM	0	3	1	4	0	0	1	2	0	8	148	2	1	5	199	0	374	1,506	0	0	0	0
5:00 PM	0	5	0	2	0	3	0	2	0	3	148	4	4	4	205	0	380	1,458	0	0	0	0
5:15 PM	0	4	0	5	0	2	1	1	0	4	142	0	1	2	199	2	363		0	0	0	0
5:30 PM	0	3	1	4	0	1	0	5	0	3	167	1	1	1	201	1	389		0	0	0	0
5:45 PM	0	4	1	0	0	1	0	1	0	4	142	1	1	0	171	0	326		0	0	0	0
Count Total	0	34	4	29	1	12	2	13	0	39	1,156	11	13	18	1,514	3	2,849		0	0	0	0
Peak Hour	0	15	2	15	0	6	2	10	0	18	605	7	7	12	804	3	1,506		0	0	0	0

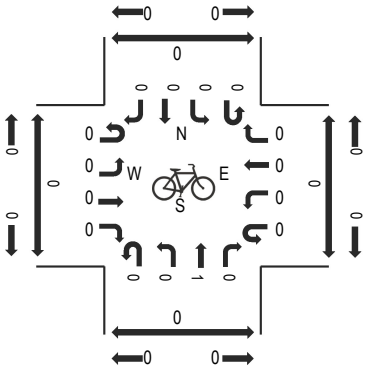
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 4 JASPER ST & E 119TH AVE AM
Date: Tuesday, June 3, 2025
Peak Hour: 07:00 AM - 08:00 AM
Peak 15-Minutes: 07:15 AM - 07:30 AM

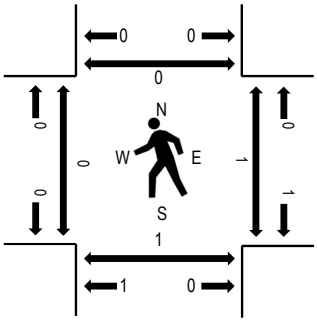
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

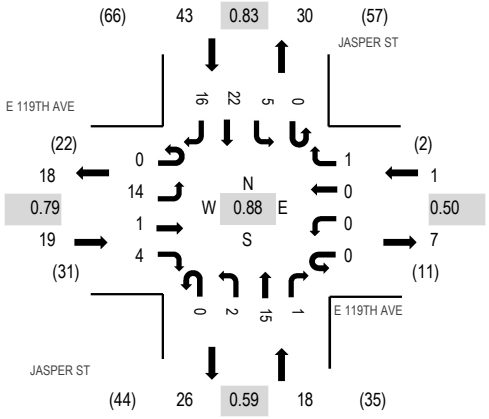
Traffic Counts - Motorized Vehicles

Interval Start Time	E 119TH AVE Eastbound				E 119TH AVE Westbound				JASPER ST Northbound				JASPER ST Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	0	0	0	0	0	0	3	0	1	5	0	0	0	0	0	9	37	0	1	0	0
7:15 AM	0	1	0	1	0	0	0	1	0	0	5	0	0	0	2	2	12	33	0	0	0	0
7:30 AM	0	1	0	2	0	0	0	2	0	0	1	0	0	0	0	0	6	31	0	0	1	0
7:45 AM	0	2	0	0	0	0	0	0	0	0	5	0	0	0	1	2	10	35	0	0	0	0
8:00 AM	0	2	0	0	0	0	0	0	0	0	1	0	0	0	1	1	5	34	0	0	0	0
8:15 AM	0	2	0	0	0	0	0	0	0	0	2	0	0	1	1	4	10		0	0	0	0
8:30 AM	0	2	0	0	0	0	1	0	0	0	4	0	0	0	1	2	10		0	0	0	0
8:45 AM	0	0	0	1	0	0	0	0	0	1	3	0	0	0	1	3	9		0	0	0	0
Count Total	0	10	0	4	0	0	1	6	0	2	26	0	0	1	7	14	71		0	1	1	0
Peak Hour	0	4	0	3	0	0	0	6	0	1	16	0	0	0	3	4	37		0	1	1	0

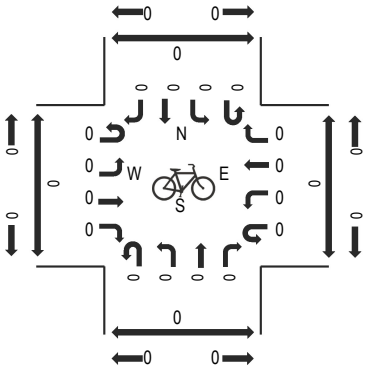
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 4 JASPER ST & E 119TH AVE PM
Date: Tuesday, June 3, 2025
Peak Hour: 04:30 PM - 05:30 PM
Peak 15-Minutes: 04:30 PM - 04:45 PM

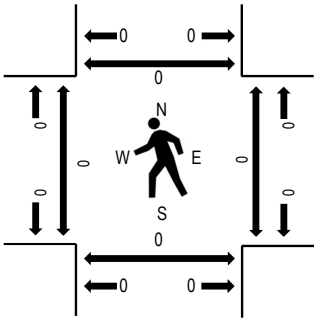
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

Traffic Counts - Motorized Vehicles

Interval Start Time	E 119TH AVE Eastbound				E 119TH AVE Westbound				JASPER ST Northbound				JASPER ST Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00 PM	0	3	1	0	0	1	0	0	0	0	5	0	0	0	5	0	15	67	0	0	0	0
4:15 PM	0	3	0	0	0	0	0	0	0	0	4	0	0	1	1	2	11	73	0	0	0	0
4:30 PM	0	4	0	2	0	0	0	1	0	1	2	1	0	2	7	3	23	81	0	0	0	0
4:45 PM	0	1	0	1	0	0	0	0	0	1	2	0	0	0	6	7	18	72	0	0	0	0
5:00 PM	0	3	1	1	0	0	0	0	0	0	8	0	0	1	5	2	21	67	0	0	0	0
5:15 PM	0	6	0	0	0	0	0	0	0	0	3	0	0	2	4	4	19		0	0	0	0
5:30 PM	0	2	0	1	0	0	0	0	0	0	4	0	0	2	3	2	14		0	0	0	0
5:45 PM	0	2	0	0	0	0	0	0	0	0	4	0	0	0	7	0	13		0	0	0	0
Count Total	0	24	2	5	0	1	0	1	0	2	32	1	0	8	38	20	134		0	0	0	0
Peak Hour	0	14	1	4	0	0	0	1	0	2	15	1	0	5	22	16	81		0	0	0	0

All Traffic Data Services

5 - CHAMBERS RD SOUTH OF E 119TH AVE

Time	NB	SB	Total
6/3/2025	7	11	18
6/3/2025 12:15:00 AM	7	21	28
6/3/2025 12:30:00 AM	10	11	21
6/3/2025 12:45:00 AM	5	14	19
6/3/2025 1:00:00 AM	4	10	14
6/3/2025 1:15:00 AM	5	5	10
6/3/2025 1:30:00 AM	4	5	9
6/3/2025 1:45:00 AM	3	3	6
6/3/2025 2:00:00 AM	3	5	8
6/3/2025 2:15:00 AM	4	4	8
6/3/2025 2:30:00 AM	9	9	18
6/3/2025 2:45:00 AM	1	1	2
6/3/2025 3:00:00 AM	2	2	4
6/3/2025 3:15:00 AM	6	2	8
6/3/2025 3:30:00 AM	7	4	11
6/3/2025 3:45:00 AM	14	5	19
6/3/2025 4:00:00 AM	12	8	20
6/3/2025 4:15:00 AM	19	8	27
6/3/2025 4:30:00 AM	33	5	38
6/3/2025 4:45:00 AM	26	15	41
6/3/2025 5:00:00 AM	42	13	55
6/3/2025 5:15:00 AM	70	24	94
6/3/2025 5:30:00 AM	81	32	113
6/3/2025 5:45:00 AM	81	39	120
6/3/2025 6:00:00 AM	85	24	109
6/3/2025 6:15:00 AM	106	42	148
6/3/2025 6:30:00 AM	111	53	164
6/3/2025 6:45:00 AM	117	55	172
6/3/2025 7:00:00 AM	104	54	158
6/3/2025 7:15:00 AM	147	60	207
6/3/2025 7:30:00 AM	114	71	185
6/3/2025 7:45:00 AM	107	75	182
6/3/2025 8:00:00 AM	100	64	164
6/3/2025 8:15:00 AM	122	68	190
6/3/2025 8:30:00 AM	142	57	199
6/3/2025 8:45:00 AM	150	71	221
6/3/2025 9:00:00 AM	122	80	202
6/3/2025 9:15:00 AM	112	81	193
6/3/2025 9:30:00 AM	108	73	181
6/3/2025 9:45:00 AM	118	75	193
6/3/2025 10:00:00 AM	111	81	192
6/3/2025 10:15:00 AM	128	100	228
6/3/2025 10:30:00 AM	137	86	223
6/3/2025 10:45:00 AM	100	76	176
6/3/2025 11:00:00 AM	94	92	186
6/3/2025 11:15:00 AM	121	105	226
6/3/2025 11:30:00 AM	113	129	242
6/3/2025 11:45:00 AM	109	140	249
Total	3,233	2,068	5,301
Percentage	61.0%	39.0%	
Peak Hour	8:15 AM	11:00 AM	11:00 AM
Volume	536	466	903
PHF	0.893	0.832	0.907

All Traffic Data Services

5 - CHAMBERS RD SOUTH OF E 119TH AVE

Time	NB	SB	Total
6/3/2025 12:00:00 PM	106	102	208
6/3/2025 12:15:00 PM	114	128	242
6/3/2025 12:30:00 PM	140	122	262
6/3/2025 12:45:00 PM	120	121	241
6/3/2025 1:00:00 PM	103	113	216
6/3/2025 1:15:00 PM	113	127	240
6/3/2025 1:30:00 PM	126	113	239
6/3/2025 1:45:00 PM	128	122	250
6/3/2025 2:00:00 PM	114	135	249
6/3/2025 2:15:00 PM	105	154	259
6/3/2025 2:30:00 PM	99	144	243
6/3/2025 2:45:00 PM	116	140	256
6/3/2025 3:00:00 PM	112	122	234
6/3/2025 3:15:00 PM	120	148	268
6/3/2025 3:30:00 PM	147	137	284
6/3/2025 3:45:00 PM	117	181	298
6/3/2025 4:00:00 PM	137	175	312
6/3/2025 4:15:00 PM	124	199	323
6/3/2025 4:30:00 PM	168	184	352
6/3/2025 4:45:00 PM	158	203	361
6/3/2025 5:00:00 PM	155	210	365
6/3/2025 5:15:00 PM	146	206	352
6/3/2025 5:30:00 PM	171	206	377
6/3/2025 5:45:00 PM	147	172	319
6/3/2025 6:00:00 PM	124	169	293
6/3/2025 6:15:00 PM	125	164	289
6/3/2025 6:30:00 PM	127	188	315
6/3/2025 6:45:00 PM	114	178	292
6/3/2025 7:00:00 PM	91	157	248
6/3/2025 7:15:00 PM	77	123	200
6/3/2025 7:30:00 PM	95	107	202
6/3/2025 7:45:00 PM	67	98	165
6/3/2025 8:00:00 PM	47	111	158
6/3/2025 8:15:00 PM	63	101	164
6/3/2025 8:30:00 PM	62	106	168
6/3/2025 8:45:00 PM	46	88	134
6/3/2025 9:00:00 PM	44	82	126
6/3/2025 9:15:00 PM	49	92	141
6/3/2025 9:30:00 PM	41	68	109
6/3/2025 9:45:00 PM	39	68	107
6/3/2025 10:00:00 PM	24	62	86
6/3/2025 10:15:00 PM	35	46	81
6/3/2025 10:30:00 PM	29	40	69
6/3/2025 10:45:00 PM	12	29	41
6/3/2025 11:00:00 PM	17	35	52
6/3/2025 11:15:00 PM	19	28	47
6/3/2025 11:30:00 PM	13	17	30
6/3/2025 11:45:00 PM	9	23	32
Total	4,455	5,844	10,299
Percentage	43.3%	56.7%	
Peak Hour	4:45 PM	4:45 PM	4:45 PM
Volume	630	825	1,455
PHF	0.921	0.982	0.965
Grand Total	7,688	7,912	15,600
Percentage	49.3%	50.7%	

APPENDIX B

Level of Service Definitions

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

Motorized Vehicle Level of Service (LOS) for Signalized Intersections

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

APPENDIX C

Capacity Worksheets

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	1	3	3	278	1	354	7	2	555	78	90	489
Future Volume (vph)	1	3	3	278	1	354	7	2	555	78	90	489
Satd. Flow (prot)	1770	1723	0	1770	1863	1583	0	1770	3539	1583	1770	3539
Flt Permitted	0.757			0.754				0.454			0.339	
Satd. Flow (perm)	1410	1723	0	1405	1863	1583	0	846	3539	1583	631	3539
Satd. Flow (RTOR)		3				355				134		
Lane Group Flow (vph)	1	6	0	302	1	385	0	10	603	85	98	532
Turn Type	Perm	NA		Perm	NA	Perm	custom	pm+pt	NA	Perm	pm+pt	NA
Protected Phases		4			8			5	2		1	6
Permitted Phases	4			8		8	5	2		2	6	
Detector Phase	4	4		8	8	8	5	5	2	2	1	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	3.0	3.0	4.0	3.0
Minimum Split (s)	10.5	10.5		10.5	10.5	10.5	9.0	9.0	10.5	10.5	9.0	10.5
Total Split (s)	25.0	25.0		25.0	25.0	25.0	13.0	13.0	31.0	31.0	13.0	31.0
Total Split (%)	36.2%	36.2%		36.2%	36.2%	36.2%	18.8%	18.8%	44.9%	44.9%	18.8%	44.9%
Yellow Time (s)	4.5	4.5		4.5	4.5	4.5	3.0	3.0	5.5	5.5	3.0	5.5
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)	6.5	6.5		6.5	6.5	6.5		5.0	7.5	7.5	5.0	7.5
Lead/Lag							Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	None	C-Max	C-Max	None	C-Max
Act Effct Green (s)	17.4	17.4		17.4	17.4	17.4		34.8	27.7	27.7	39.5	35.4
Actuated g/C Ratio	0.25	0.25		0.25	0.25	0.25		0.50	0.40	0.40	0.57	0.51
v/c Ratio	0.00	0.01		0.86	0.00	0.58		0.02	0.42	0.12	0.21	0.29
Control Delay (s/veh)	19.0	15.3		48.9	19.0	7.5		7.0	17.6	1.6	8.0	11.4
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	19.0	15.3		48.9	19.0	7.5		7.0	17.6	1.6	8.0	11.4
LOS	B	B		D	B	A		A	B	A	A	B
Approach Delay (s/veh)		15.9			25.7				15.5			10.8
Approach LOS		B			C				B			B
Queue Length 50th (ft)	0	1		119	0	9		2	102	0	17	61
Queue Length 95th (ft)	4	9		#243	4	73		7	150	12	36	125
Internal Link Dist (ft)		514			2081				380			985
Turn Bay Length (ft)	30			210		210		320		250	285	
Base Capacity (vph)	378	464		376	499	684		556	1421	716	493	1816
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	0
Reduced v/c Ratio	0.00	0.01		0.80	0.00	0.56		0.02	0.42	0.12	0.20	0.29

Intersection Summary

Cycle Length: 69

Actuated Cycle Length: 69

Offset: 26 (38%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	1
Future Volume (vph)	1
Satd. Flow (prot)	1583
Flt Permitted	
Satd. Flow (perm)	1583
Satd. Flow (RTOR)	134
Lane Group Flow (vph)	1
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Detector Phase	6
Switch Phase	
Minimum Initial (s)	3.0
Minimum Split (s)	10.5
Total Split (s)	31.0
Total Split (%)	44.9%
Yellow Time (s)	5.5
All-Red Time (s)	2.0
Lost Time Adjust (s)	0.0
Total Lost Time (s)	7.5
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	C-Max
Act Effct Green (s)	35.4
Actuated g/C Ratio	0.51
v/c Ratio	0.00
Control Delay (s/veh)	0.0
Queue Delay	0.0
Total Delay (s/veh)	0.0
LOS	A
Approach Delay (s/veh)	
Approach LOS	
Queue Length 50th (ft)	0
Queue Length 95th (ft)	0
Internal Link Dist (ft)	
Turn Bay Length (ft)	170
Base Capacity (vph)	877
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.00

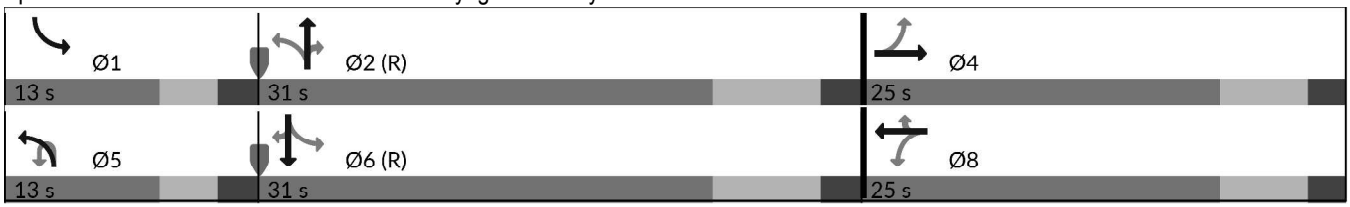
Intersection Summary

Maximum v/c Ratio: 0.86

Intersection Signal Delay (s/veh): 17.5	Intersection LOS: B
Intersection Capacity Utilization 58.2%	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: 1: Old Ranch Road & Voyager Parkway



Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	165	3	4	635	3	25
Future Vol, veh/h	165	3	4	635	3	25
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	179	3	4	690	3	27

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	183	0	880	181
Stage 1	-	-	-	-	181	-
Stage 2	-	-	-	-	699	-
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	-	-	1392	-	318	862
Stage 1	-	-	-	-	850	-
Stage 2	-	-	-	-	493	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1392	-	316	862
Mov Cap-2 Maneuver	-	-	-	-	316	-
Stage 1	-	-	-	-	850	-
Stage 2	-	-	-	-	491	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.05	10.17
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	727	-	-	11	-
HCM Lane V/C Ratio	0.042	-	-	0.003	-
HCM Ctrl Dly (s/v)	10.2	-	-	7.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	0	169	640	0	0	0
Future Vol, veh/h	0	169	640	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	0	184	696	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	696	0	-	0	879	696
Stage 1	-	-	-	-	696	-
Stage 2	-	-	-	-	184	-
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	900	-	-	-	318	442
Stage 1	-	-	-	-	495	-
Stage 2	-	-	-	-	848	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	900	-	-	-	318	442
Mov Cap-2 Maneuver	-	-	-	-	318	-
Stage 1	-	-	-	-	495	-
Stage 2	-	-	-	-	848	-

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

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SWLn1
Capacity (veh/h)	900	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Ctrl Dly (s/v)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	4	3	5	103	2	166	4	5	759	319	461	976
Future Volume (vph)	4	3	5	103	2	166	4	5	759	319	461	976
Satd. Flow (prot)	1770	1688	0	1770	1863	1583	0	1770	3539	1583	1770	3539
Flt Permitted	0.757			0.752				0.270			0.198	
Satd. Flow (perm)	1410	1688	0	1401	1863	1583	0	503	3539	1583	369	3539
Satd. Flow (RTOR)		5				180				347		
Lane Group Flow (vph)	4	8	0	112	2	180	0	9	825	347	501	1061
Turn Type	Perm	NA		Perm	NA	Perm	custom	pm+pt	NA	Perm	pm+pt	NA
Protected Phases		4			8			5	2		1	6
Permitted Phases	4			8		8	5	2		2	6	
Detector Phase	4	4		8	8	8	5	5	2	2	1	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	3.0	3.0	4.0	3.0
Minimum Split (s)	10.5	10.5		10.5	10.5	10.5	9.0	9.0	10.5	10.5	9.0	10.5
Total Split (s)	25.0	25.0		25.0	25.0	25.0	13.0	13.0	31.0	31.0	13.0	31.0
Total Split (%)	36.2%	36.2%		36.2%	36.2%	36.2%	18.8%	18.8%	44.9%	44.9%	18.8%	44.9%
Yellow Time (s)	4.5	4.5		4.5	4.5	4.5	3.0	3.0	5.5	5.5	3.0	5.5
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)	6.5	6.5		6.5	6.5	6.5		5.0	7.5	7.5	5.0	7.5
Lead/Lag							Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	None	C-Max	C-Max	None	C-Max
Act Effct Green (s)	10.8	10.8		10.8	10.8	10.8		31.7	23.5	23.5	46.7	42.0
Actuated g/C Ratio	0.16	0.16		0.16	0.16	0.16		0.46	0.34	0.34	0.68	0.61
v/c Ratio	0.02	0.03		0.51	0.01	0.45		0.03	0.68	0.45	0.88	0.49
Control Delay (s/veh)	22.3	16.9		34.1	22.0	8.2		6.0	23.1	4.3	33.6	10.2
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	22.3	16.9		34.1	22.0	8.2		6.0	23.1	4.3	33.6	10.2
LOS	C	B		C	C	A		A	C	A	C	B
Approach Delay (s/veh)		18.7			18.1				17.4			17.7
Approach LOS		B			B				B			B
Queue Length 50th (ft)	1	1		44	1	0		1	155	0	119	104
Queue Length 95th (ft)	8	11		84	6	45		6	215	50	#347	260
Internal Link Dist (ft)		514			2111				380			985
Turn Bay Length (ft)	30			210		210		320		250	285	
Base Capacity (vph)	378	456		375	499	556		394	1205	767	569	2155
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	0
Reduced v/c Ratio	0.01	0.02		0.30	0.00	0.32		0.02	0.68	0.45	0.88	0.49

Intersection Summary
Cycle Length: 69
Actuated Cycle Length: 69
Offset: 26 (38%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	1
Future Volume (vph)	1
Satd. Flow (prot)	1583
Flt Permitted	
Satd. Flow (perm)	1583
Satd. Flow (RTOR)	134
Lane Group Flow (vph)	1
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Detector Phase	6
Switch Phase	
Minimum Initial (s)	3.0
Minimum Split (s)	10.5
Total Split (s)	31.0
Total Split (%)	44.9%
Yellow Time (s)	5.5
All-Red Time (s)	2.0
Lost Time Adjust (s)	0.0
Total Lost Time (s)	7.5
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	C-Max
Act Effct Green (s)	42.0
Actuated g/C Ratio	0.61
v/c Ratio	0.00
Control Delay (s/veh)	0.0
Queue Delay	0.0
Total Delay (s/veh)	0.0
LOS	A
Approach Delay (s/veh)	
Approach LOS	
Queue Length 50th (ft)	0
Queue Length 95th (ft)	0
Internal Link Dist (ft)	
Turn Bay Length (ft)	170
Base Capacity (vph)	1016
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.00

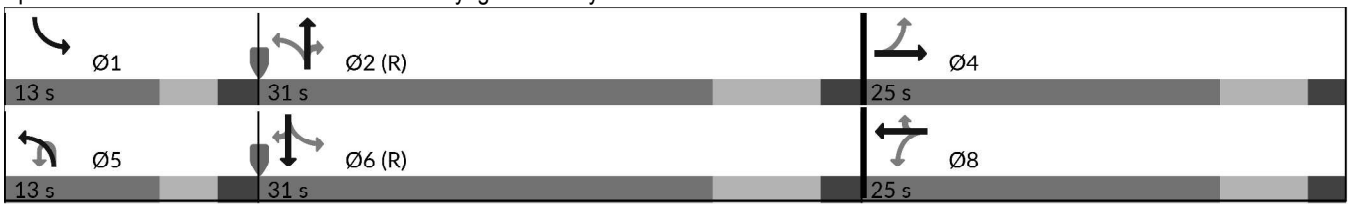
Intersection Summary

Maximum v/c Ratio: 0.88

Intersection Signal Delay (s/veh): 17.6	Intersection LOS: B
Intersection Capacity Utilization 74.7%	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: 1: Old Ranch Road & Voyager Parkway



Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	797	2	17	254	2	30
Future Vol, veh/h	797	2	17	254	2	30
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	866	2	18	276	2	33

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	868	0	1180	867
Stage 1	-	-	-	-	867	-
Stage 2	-	-	-	-	313	-
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	-	-	776	-	210	352
Stage 1	-	-	-	-	411	-
Stage 2	-	-	-	-	741	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	776	-	204	352
Mov Cap-2 Maneuver	-	-	-	-	204	-
Stage 1	-	-	-	-	411	-
Stage 2	-	-	-	-	721	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.61	16.91
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	337	-	-	113	-
HCM Lane V/C Ratio	0.103	-	-	0.024	-
HCM Ctrl Dly (s/v)	16.9	-	-	9.8	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0.1	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	1	798	258	0	0	1
Future Vol, veh/h	1	798	258	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	867	280	0	0	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	280	0	-	0	1150	280
Stage 1	-	-	-	-	280	-
Stage 2	-	-	-	-	870	-
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	1282	-	-	-	219	758
Stage 1	-	-	-	-	767	-
Stage 2	-	-	-	-	410	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1282	-	-	-	219	758
Mov Cap-2 Maneuver	-	-	-	-	219	-
Stage 1	-	-	-	-	766	-
Stage 2	-	-	-	-	410	-

Approach	EB	WB	SW
HCM Ctrl Dly, s/v	0.01	0	9.75
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SWLn1
Capacity (veh/h)	2	-	-	-	758
HCM Lane V/C Ratio	0.001	-	-	-	0.001
HCM Ctrl Dly (s/v)	7.8	0	-	-	9.8
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	1	3	3	308	1	395	7	2	577	87	103	509
Future Volume (vph)	1	3	3	308	1	395	7	2	577	87	103	509
Satd. Flow (prot)	1770	1723	0	1770	1863	1583	0	1770	3539	1583	1770	3539
Flt Permitted	0.757			0.754				0.445			0.321	
Satd. Flow (perm)	1410	1723	0	1405	1863	1583	0	829	3539	1583	598	3539
Satd. Flow (RTOR)		3				348				134		
Lane Group Flow (vph)	1	6	0	335	1	429	0	10	627	95	112	553
Turn Type	Perm	NA		Perm	NA	Perm	custom	pm+pt	NA	Perm	pm+pt	NA
Protected Phases		4			8			5	2		1	6
Permitted Phases	4			8		8	5	2		2	6	
Detector Phase	4	4		8	8	8	5	5	2	2	1	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	3.0	3.0	4.0	3.0
Minimum Split (s)	10.5	10.5		10.5	10.5	10.5	9.0	9.0	10.5	10.5	9.0	10.5
Total Split (s)	25.0	25.0		25.0	25.0	25.0	13.0	13.0	31.0	31.0	13.0	31.0
Total Split (%)	36.2%	36.2%		36.2%	36.2%	36.2%	18.8%	18.8%	44.9%	44.9%	18.8%	44.9%
Yellow Time (s)	4.5	4.5		4.5	4.5	4.5	3.0	3.0	5.5	5.5	3.0	5.5
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)	6.5	6.5		6.5	6.5	6.5		5.0	7.5	7.5	5.0	7.5
Lead/Lag							Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	None	C-Max	C-Max	None	C-Max
Act Effct Green (s)	18.0	18.0		18.0	18.0	18.0		34.0	26.9	26.9	38.9	34.8
Actuated g/C Ratio	0.26	0.26		0.26	0.26	0.26		0.49	0.39	0.39	0.56	0.50
v/c Ratio	0.00	0.01		0.92	0.00	0.64		0.02	0.45	0.14	0.24	0.31
Control Delay (s/veh)	19.0	15.3		57.4	19.0	10.0		7.0	18.2	2.1	8.4	11.7
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	19.0	15.3		57.4	19.0	10.0		7.0	18.2	2.1	8.4	11.7
LOS	B	B		E	B	B		A	B	A	A	B
Approach Delay (s/veh)		15.9			30.8				15.9			11.1
Approach LOS		B			C				B			B
Queue Length 50th (ft)	0	1		136	0	26		2	108	0	20	63
Queue Length 95th (ft)	4	9		#279	4	107		7	157	16	41	130
Internal Link Dist (ft)		514			2102				380			985
Turn Bay Length (ft)	30			210		210		320		250	285	
Base Capacity (vph)	378	464		376	499	679		539	1381	699	472	1783
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	0
Reduced v/c Ratio	0.00	0.01		0.89	0.00	0.63		0.02	0.45	0.14	0.24	0.31

Intersection Summary

Cycle Length: 69

Actuated Cycle Length: 69

Offset: 26 (38%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	1
Future Volume (vph)	1
Satd. Flow (prot)	1583
Flt Permitted	
Satd. Flow (perm)	1583
Satd. Flow (RTOR)	134
Lane Group Flow (vph)	1
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Detector Phase	6
Switch Phase	
Minimum Initial (s)	3.0
Minimum Split (s)	10.5
Total Split (s)	31.0
Total Split (%)	44.9%
Yellow Time (s)	5.5
All-Red Time (s)	2.0
Lost Time Adjust (s)	0.0
Total Lost Time (s)	7.5
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	C-Max
Act Effct Green (s)	34.8
Actuated g/C Ratio	0.50
v/c Ratio	0.00
Control Delay (s/veh)	0.0
Queue Delay	0.0
Total Delay (s/veh)	0.0
LOS	A
Approach Delay (s/veh)	
Approach LOS	
Queue Length 50th (ft)	0
Queue Length 95th (ft)	0
Internal Link Dist (ft)	
Turn Bay Length (ft)	170
Base Capacity (vph)	863
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.00

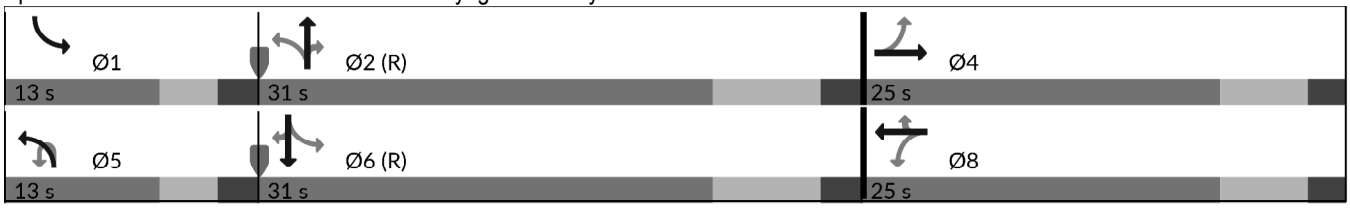
Intersection Summary

Maximum v/c Ratio: 0.92

Intersection Signal Delay (s/veh): 19.7	Intersection LOS: B
Intersection Capacity Utilization 61.2%	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: 1: Old Ranch Road & Voyager Parkway



Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	172	3	4	661	5	3	0	26	15	0	46
Future Vol, veh/h	15	172	3	4	661	5	3	0	26	15	0	46
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	155	-	-	155	-	-	-	-	-	-	-	-
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	16	187	3	4	718	5	3	0	28	16	0	50

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	724	0	0	190	0	0	948	954	189	949	953	721
Stage 1	-	-	-	-	-	-	221	221	-	730	730	-
Stage 2	-	-	-	-	-	-	727	733	-	220	223	-
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	879	-	-	1384	-	-	241	259	853	240	259	427
Stage 1	-	-	-	-	-	-	781	720	-	414	428	-
Stage 2	-	-	-	-	-	-	415	427	-	783	719	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	879	-	-	1384	-	-	208	253	853	227	254	427
Mov Cap-2 Maneuver	-	-	-	-	-	-	208	253	-	227	254	-
Stage 1	-	-	-	-	-	-	767	707	-	413	426	-
Stage 2	-	-	-	-	-	-	366	425	-	743	706	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0.72	0.05	10.86	17.62
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	646	879	-	-	1384	-	-	351
HCM Lane V/C Ratio	0.049	0.019	-	-	0.003	-	-	0.189
HCM Ctrl Dly (s/v)	10.9	9.2	-	-	7.6	-	-	17.6
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	-	0.7

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	0	191	712	0	0	0
Future Vol, veh/h	0	191	712	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	0	208	774	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	774	0	-	0	982	774
Stage 1	-	-	-	-	774	-
Stage 2	-	-	-	-	208	-
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	842	-	-	-	276	399
Stage 1	-	-	-	-	455	-
Stage 2	-	-	-	-	827	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	842	-	-	-	276	399
Mov Cap-2 Maneuver	-	-	-	-	276	-
Stage 1	-	-	-	-	455	-
Stage 2	-	-	-	-	827	-

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

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SWLn1
Capacity (veh/h)	842	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Ctrl Dly (s/v)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	4	3	5	119	2	191	4	5	790	349	506	1015
Future Volume (vph)	4	3	5	119	2	191	4	5	790	349	506	1015
Satd. Flow (prot)	1770	1688	0	1770	1863	1583	0	1770	3539	1583	1770	3539
Flt Permitted	0.757			0.752				0.259			0.182	
Satd. Flow (perm)	1410	1688	0	1401	1863	1583	0	482	3539	1583	339	3539
Satd. Flow (RTOR)		5				208				379		
Lane Group Flow (vph)	4	8	0	129	2	208	0	9	859	379	550	1103
Turn Type	Perm	NA		Perm	NA	Perm	custom	pm+pt	NA	Perm	pm+pt	NA
Protected Phases		4			8			5	2		1	6
Permitted Phases	4			8		8	5	2		2	6	
Detector Phase	4	4		8	8	8	5	5	2	2	1	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	3.0	3.0	4.0	3.0
Minimum Split (s)	10.5	10.5		10.5	10.5	10.5	9.0	9.0	10.5	10.5	9.0	10.5
Total Split (s)	25.0	25.0		25.0	25.0	25.0	13.0	13.0	31.0	31.0	13.0	31.0
Total Split (%)	36.2%	36.2%		36.2%	36.2%	36.2%	18.8%	18.8%	44.9%	44.9%	18.8%	44.9%
Yellow Time (s)	4.5	4.5		4.5	4.5	4.5	3.0	3.0	5.5	5.5	3.0	5.5
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)	6.5	6.5		6.5	6.5	6.5		5.0	7.5	7.5	5.0	7.5
Lead/Lag							Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	None	C-Max	C-Max	None	C-Max
Act Effct Green (s)	11.6	11.6		11.6	11.6	11.6		31.7	23.5	23.5	45.7	41.2
Actuated g/C Ratio	0.17	0.17		0.17	0.17	0.17		0.46	0.34	0.34	0.66	0.60
v/c Ratio	0.02	0.03		0.55	0.01	0.47		0.03	0.71	0.48	1.03	0.52
Control Delay (s/veh)	21.5	16.1		34.3	21.0	7.7		6.3	23.8	4.4	67.4	11.1
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	21.5	16.1		34.3	21.0	7.7		6.3	23.8	4.4	67.4	11.1
LOS	C	B		C	C	A		A	C	A	E	B
Approach Delay (s/veh)		17.9			17.9				17.8			29.8
Approach LOS		B			B				B			C
Queue Length 50th (ft)	1	1		51	1	0		1	163	0	~172	114
Queue Length 95th (ft)	8	11		92	6	47		6	226	52	#432	283
Internal Link Dist (ft)		514			2101				380			985
Turn Bay Length (ft)	30			210		210		320		250	285	
Base Capacity (vph)	378	456		375	499	576		386	1205	789	533	2113
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	0
Reduced v/c Ratio	0.01	0.02		0.34	0.00	0.36		0.02	0.71	0.48	1.03	0.52

Intersection Summary
Cycle Length: 69
Actuated Cycle Length: 69
Offset: 26 (38%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	1
Future Volume (vph)	1
Satd. Flow (prot)	1583
Flt Permitted	
Satd. Flow (perm)	1583
Satd. Flow (RTOR)	134
Lane Group Flow (vph)	1
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Detector Phase	6
Switch Phase	
Minimum Initial (s)	3.0
Minimum Split (s)	10.5
Total Split (s)	31.0
Total Split (%)	44.9%
Yellow Time (s)	5.5
All-Red Time (s)	2.0
Lost Time Adjust (s)	0.0
Total Lost Time (s)	7.5
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	C-Max
Act Effct Green (s)	41.2
Actuated g/C Ratio	0.60
v/c Ratio	0.00
Control Delay (s/veh)	0.0
Queue Delay	0.0
Total Delay (s/veh)	0.0
LOS	A
Approach Delay (s/veh)	
Approach LOS	
Queue Length 50th (ft)	0
Queue Length 95th (ft)	0
Internal Link Dist (ft)	
Turn Bay Length (ft)	170
Base Capacity (vph)	999
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.00

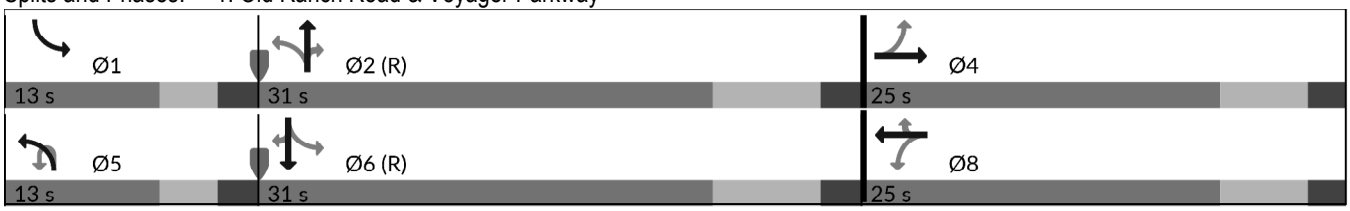
Intersection Summary

Maximum v/c Ratio: 1.03

Intersection Signal Delay (s/veh): 23.9	Intersection LOS: C
Intersection Capacity Utilization 79.0%	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: 1: Old Ranch Road & Voyager Parkway



Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	43	830	2	18	264	14	2	0	31	10	0	30
Future Vol, veh/h	43	830	2	18	264	14	2	0	31	10	0	30
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	155	-	-	155	-	-	-	-	-	-	-	-
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	47	902	2	20	287	15	2	0	34	11	0	33

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	302	0	0	904	0	0	1323	1338	903	1329	1332	295
Stage 1	-	-	-	-	-	-	997	997	-	334	334	-
Stage 2	-	-	-	-	-	-	326	341	-	996	998	-
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	1259	-	-	752	-	-	133	153	336	132	154	745
Stage 1	-	-	-	-	-	-	294	322	-	680	643	-
Stage 2	-	-	-	-	-	-	686	638	-	295	322	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1259	-	-	752	-	-	119	143	336	111	145	745
Mov Cap-2 Maneuver	-	-	-	-	-	-	119	143	-	111	145	-
Stage 1	-	-	-	-	-	-	283	310	-	662	627	-
Stage 2	-	-	-	-	-	-	639	622	-	255	310	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0.39	0.6	18.49	18.64
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	303	1259	-	-	752	-	-	307
HCM Lane V/C Ratio	0.119	0.037	-	-	0.026	-	-	0.141
HCM Ctrl Dly (s/v)	18.5	8	-	-	9.9	-	-	18.6
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0.1	-	-	0.5

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	1	873	298	0	0	1
Future Vol, veh/h	1	873	298	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	949	324	0	0	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	324	0	-	0	1275	324
Stage 1	-	-	-	-	324	-
Stage 2	-	-	-	-	951	-
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	1236	-	-	-	184	717
Stage 1	-	-	-	-	733	-
Stage 2	-	-	-	-	375	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1236	-	-	-	184	717
Mov Cap-2 Maneuver	-	-	-	-	184	-
Stage 1	-	-	-	-	732	-
Stage 2	-	-	-	-	375	-

Approach	EB	WB	SW
HCM Ctrl Dly, s/v	0.01	0	10.03
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SWLn1
Capacity (veh/h)	2	-	-	-	717
HCM Lane V/C Ratio	0.001	-	-	-	0.002
HCM Ctrl Dly (s/v)	7.9	0	-	-	10
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	1	4	4	432	1	553	10	3	825	122	143	727
Future Volume (vph)	1	4	4	432	1	553	10	3	825	122	143	727
Satd. Flow (prot)	1770	1723	0	1770	1863	1583	0	1770	3539	1583	1770	3539
Flt Permitted	0.757			0.752				0.316			0.160	
Satd. Flow (perm)	1410	1723	0	1401	1863	1583	0	589	3539	1583	298	3539
Satd. Flow (RTOR)		4				189				134		
Lane Group Flow (vph)	1	8	0	470	1	601	0	14	897	133	155	790
Turn Type	Perm	NA		Perm	NA	Perm	custom	pm+pt	NA	Perm	pm+pt	NA
Protected Phases		4			8			5	2		1	6
Permitted Phases	4			8		8	5	2		2	6	
Detector Phase	4	4		8	8	8	5	5	2	2	1	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	3.0	3.0	4.0	3.0
Minimum Split (s)	10.5	10.5		10.5	10.5	10.5	9.0	9.0	10.5	10.5	9.0	10.5
Total Split (s)	31.0	31.0		31.0	31.0	31.0	9.0	9.0	29.0	29.0	9.0	29.0
Total Split (%)	44.9%	44.9%		44.9%	44.9%	44.9%	13.0%	13.0%	42.0%	42.0%	13.0%	42.0%
Yellow Time (s)	4.5	4.5		4.5	4.5	4.5	3.0	3.0	5.5	5.5	3.0	5.5
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)	6.5	6.5		6.5	6.5	6.5		5.0	7.5	7.5	5.0	7.5
Lead/Lag							Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	None	C-Max	C-Max	None	C-Max
Act Effct Green (s)	24.2	24.2		24.2	24.2	24.2		28.3	21.5	21.5	32.3	29.0
Actuated g/C Ratio	0.35	0.35		0.35	0.35	0.35		0.41	0.31	0.31	0.47	0.42
v/c Ratio	0.00	0.01		0.96	0.00	0.89		0.04	0.81	0.23	0.67	0.53
Control Delay (s/veh)	14.0	11.7		55.9	14.0	32.1		10.1	29.3	4.8	30.0	17.5
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	14.0	11.7		55.9	14.0	32.1		10.1	29.3	4.8	30.0	17.5
LOS	B	B		E	B	C		B	C	A	C	B
Approach Delay (s/veh)		12.0			42.5				26.0			19.5
Approach LOS		B			D				C			B
Queue Length 50th (ft)	0	1		189	0	165		3	182	0	35	121
Queue Length 95th (ft)	3	9		#367	3	#361		11	#260	34	#99	215
Internal Link Dist (ft)		514			2109				380			985
Turn Bay Length (ft)	30			210		210		320		250	285	
Base Capacity (vph)	500	614		497	661	683		314	1102	585	230	1485
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	0
Reduced v/c Ratio	0.00	0.01		0.95	0.00	0.88		0.04	0.81	0.23	0.67	0.53

Intersection Summary

Cycle Length: 69

Actuated Cycle Length: 69

Offset: 26 (38%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	1
Future Volume (vph)	1
Satd. Flow (prot)	1583
Flt Permitted	
Satd. Flow (perm)	1583
Satd. Flow (RTOR)	134
Lane Group Flow (vph)	1
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Detector Phase	6
Switch Phase	
Minimum Initial (s)	3.0
Minimum Split (s)	10.5
Total Split (s)	29.0
Total Split (%)	42.0%
Yellow Time (s)	5.5
All-Red Time (s)	2.0
Lost Time Adjust (s)	0.0
Total Lost Time (s)	7.5
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	C-Max
Act Effct Green (s)	29.0
Actuated g/C Ratio	0.42
v/c Ratio	0.00
Control Delay (s/veh)	0.0
Queue Delay	0.0
Total Delay (s/veh)	0.0
LOS	A
Approach Delay (s/veh)	
Approach LOS	
Queue Length 50th (ft)	0
Queue Length 95th (ft)	0
Internal Link Dist (ft)	
Turn Bay Length (ft)	170
Base Capacity (vph)	742
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.00

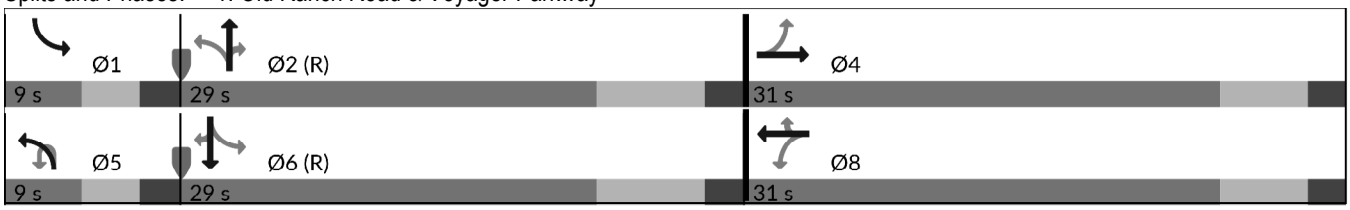
Intersection Summary

Maximum v/c Ratio: 0.96

Intersection Signal Delay (s/veh): 29.7	Intersection LOS: C
Intersection Capacity Utilization 77.5%	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: 1: Old Ranch Road & Voyager Parkway



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	15	245	4	6	944	5	4	0	37	15	0	46
Future Vol, veh/h	15	245	4	6	944	5	4	0	37	15	0	46
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	155	-	-	155	-	-	-	-	-	-	-	-
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	16	266	4	7	1026	5	4	0	40	16	0	50

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1032	0	0	271	0	0	1340	1346	268	1341	1345	1029
Stage 1	-	-	-	-	-	-	301	301	-	1042	1042	-
Stage 2	-	-	-	-	-	-	1039	1045	-	299	303	-
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	674	-	-	1293	-	-	130	151	770	129	151	284
Stage 1	-	-	-	-	-	-	708	665	-	278	307	-
Stage 2	-	-	-	-	-	-	278	306	-	710	663	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	674	-	-	1293	-	-	104	147	770	119	147	284
Mov Cap-2 Maneuver	-	-	-	-	-	-	104	147	-	119	147	-
Stage 1	-	-	-	-	-	-	691	649	-	276	305	-
Stage 2	-	-	-	-	-	-	228	304	-	657	647	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0.6	0.05	13.4	29.54
HCM LOS			B	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	473	674	-	-	1293	-	-	212
HCM Lane V/C Ratio	0.094	0.024	-	-	0.005	-	-	0.313
HCM Ctrl Dly (s/v)	13.4	10.5	-	-	7.8	-	-	29.5
HCM Lane LOS	B	B	-	-	A	-	-	D
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	1.3

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	0	266	997	0	0	0
Future Vol, veh/h	0	266	997	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	0	289	1084	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1084	0	-	0	1373	1084
Stage 1	-	-	-	-	1084	-
Stage 2	-	-	-	-	289	-
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	644	-	-	-	161	264
Stage 1	-	-	-	-	325	-
Stage 2	-	-	-	-	760	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	644	-	-	-	161	264
Mov Cap-2 Maneuver	-	-	-	-	161	-
Stage 1	-	-	-	-	325	-
Stage 2	-	-	-	-	760	-

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

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SWLn1
Capacity (veh/h)	644	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Ctrl Dly (s/v)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	6	4	7	165	3	265	6	7	1128	491	711	1450
Future Volume (vph)	6	4	7	165	3	265	6	7	1128	491	711	1450
Satd. Flow (prot)	1770	1676	0	1770	1863	1583	0	1770	3539	1583	1770	3539
Flt Permitted	0.756			0.750				0.178			0.145	
Satd. Flow (perm)	1408	1676	0	1397	1863	1583	0	332	3539	1583	270	3539
Satd. Flow (RTOR)		8				288				387		
Lane Group Flow (vph)	7	12	0	179	3	288	0	15	1226	534	773	1576
Turn Type	Perm	NA		Perm	NA	Perm	custom	pm+pt	NA	Perm	pm+pt	NA
Protected Phases		4			8			5	2		1	6
Permitted Phases	4			8		8	5	2		2	6	
Detector Phase	4	4		8	8	8	5	5	2	2	1	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	3.0	3.0	4.0	3.0
Minimum Split (s)	10.5	10.5		10.5	10.5	10.5	9.0	9.0	10.5	10.5	9.0	10.5
Total Split (s)	14.0	14.0		14.0	14.0	14.0	9.0	9.0	30.0	30.0	25.0	46.0
Total Split (%)	20.3%	20.3%		20.3%	20.3%	20.3%	13.0%	13.0%	43.5%	43.5%	36.2%	66.7%
Yellow Time (s)	4.5	4.5		4.5	4.5	4.5	3.0	3.0	5.5	5.5	3.0	5.5
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)	6.5	6.5		6.5	6.5	6.5		5.0	7.5	7.5	5.0	7.5
Lead/Lag							Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	None	C-Max	C-Max	None	C-Max
Act Effct Green (s)	7.5	7.5		7.5	7.5	7.5		29.0	22.5	22.5	50.0	45.7
Actuated g/C Ratio	0.11	0.11		0.11	0.11	0.11		0.42	0.33	0.33	0.72	0.66
v/c Ratio	0.05	0.06		1.19	0.01	0.67		0.07	1.06	0.69	1.23	0.67
Control Delay (s/veh)	28.5	20.3		164.6	27.7	13.2		6.9	70.0	11.0	136.3	9.7
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	28.5	20.3		164.6	27.7	13.2		6.9	70.0	11.0	136.3	9.7
LOS	C	C		F	C	B		A	E	B	F	A
Approach Delay (s/veh)		23.3			70.9				51.7			51.3
Approach LOS		C			E				D			D
Queue Length 50th (ft)	3	2		~93	1	0		2	~308	46	~361	161
Queue Length 95th (ft)	13	16		#206	9	#74		6	#428	148	#566	345
Internal Link Dist (ft)		514			2092				380			985
Turn Bay Length (ft)	30			210		210		320		250	285	
Base Capacity (vph)	153	189		151	202	428		222	1154	777	630	2344
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	0
Reduced v/c Ratio	0.05	0.06		1.19	0.01	0.67		0.07	1.06	0.69	1.23	0.67

Intersection Summary
Cycle Length: 69
Actuated Cycle Length: 69
Offset: 26 (38%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	1
Future Volume (vph)	1
Satd. Flow (prot)	1583
Flt Permitted	
Satd. Flow (perm)	1583
Satd. Flow (RTOR)	134
Lane Group Flow (vph)	1
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Detector Phase	6
Switch Phase	
Minimum Initial (s)	3.0
Minimum Split (s)	10.5
Total Split (s)	46.0
Total Split (%)	66.7%
Yellow Time (s)	5.5
All-Red Time (s)	2.0
Lost Time Adjust (s)	0.0
Total Lost Time (s)	7.5
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	C-Max
Act Effct Green (s)	45.7
Actuated g/C Ratio	0.66
v/c Ratio	0.00
Control Delay (s/veh)	0.0
Queue Delay	0.0
Total Delay (s/veh)	0.0
LOS	A
Approach Delay (s/veh)	
Approach LOS	
Queue Length 50th (ft)	0
Queue Length 95th (ft)	0
Internal Link Dist (ft)	
Turn Bay Length (ft)	170
Base Capacity (vph)	1093
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.00

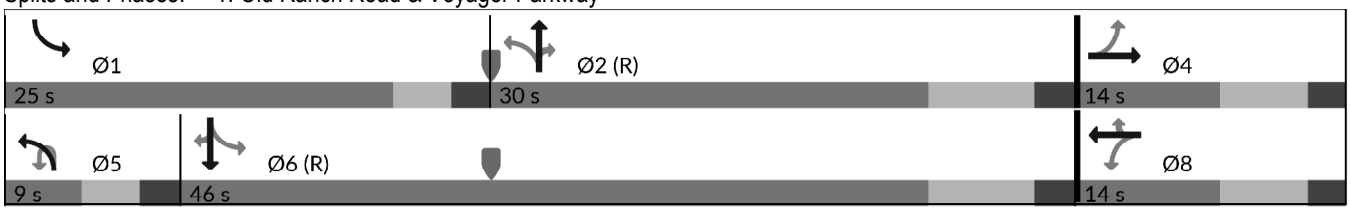
Intersection Summary

Maximum v/c Ratio: 1.23

Intersection Signal Delay (s/veh): 53.4	Intersection LOS: D
Intersection Capacity Utilization 102.2%	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: Old Ranch Road & Voyager Parkway



Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	43	1186	3	25	377	14	3	0	45	10	0	30
Future Vol, veh/h	43	1186	3	25	377	14	3	0	45	10	0	30
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	155	-	-	155	-	-	-	-	-	-	-	-
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	47	1289	3	27	410	15	3	0	49	11	0	33

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	425	0	0	1292	0	0	1848	1864	1291	1854	1858	417
Stage 1	-	-	-	-	-	-	1384	1384	-	472	472	-
Stage 2	-	-	-	-	-	-	464	479	-	1383	1386	-
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	1134	-	-	536	-	-	57	73	199	57	73	635
Stage 1	-	-	-	-	-	-	177	211	-	573	559	-
Stage 2	-	-	-	-	-	-	578	555	-	178	210	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1134	-	-	536	-	-	49	66	199	39	67	635
Mov Cap-2 Maneuver	-	-	-	-	-	-	49	66	-	39	67	-
Stage 1	-	-	-	-	-	-	170	202	-	544	531	-
Stage 2	-	-	-	-	-	-	521	527	-	129	202	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0.29	0.73	35.9	45.37
HCM LOS			E	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	168	1134	-	-	536	-	-	131
HCM Lane V/C Ratio	0.311	0.041	-	-	0.051	-	-	0.331
HCM Ctrl Dly (s/v)	35.9	8.3	-	-	12.1	-	-	45.4
HCM Lane LOS	E	A	-	-	B	-	-	E
HCM 95th %tile Q(veh)	1.2	0.1	-	-	0.2	-	-	1.3

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	1	1229	413	0	0	1
Future Vol, veh/h	1	1229	413	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	1336	449	0	0	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	449	0	-	0	1787	449
Stage 1	-	-	-	-	449	-
Stage 2	-	-	-	-	1338	-
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	1111	-	-	-	89	610
Stage 1	-	-	-	-	643	-
Stage 2	-	-	-	-	245	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1111	-	-	-	89	610
Mov Cap-2 Maneuver	-	-	-	-	89	-
Stage 1	-	-	-	-	641	-
Stage 2	-	-	-	-	245	-

Approach	EB	WB	SW
HCM Ctrl Dly, s/v	0.01	0	10.91
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SWLn1
Capacity (veh/h)	~ 1	-	-	-	610
HCM Lane V/C Ratio	0.001	-	-	-	0.002
HCM Ctrl Dly (s/v)	8.2	0	-	-	10.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

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

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	1	3	3	319	1	412	7	2	577	91	108	509
Future Volume (vph)	1	3	3	319	1	412	7	2	577	91	108	509
Satd. Flow (prot)	1770	1723	0	1770	1863	1583	0	1770	3539	1583	1770	3539
Flt Permitted	0.757			0.754				0.445			0.317	
Satd. Flow (perm)	1410	1723	0	1405	1863	1583	0	829	3539	1583	590	3539
Satd. Flow (RTOR)		3				348				134		
Lane Group Flow (vph)	1	6	0	347	1	448	0	10	627	99	117	553
Turn Type	Perm	NA		Perm	NA	Perm	custom	pm+pt	NA	Perm	pm+pt	NA
Protected Phases		4			8			5	2		1	6
Permitted Phases	4			8		8	5	2		2	6	
Detector Phase	4	4		8	8	8	5	5	2	2	1	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	3.0	3.0	4.0	3.0
Minimum Split (s)	10.5	10.5		10.5	10.5	10.5	9.0	9.0	10.5	10.5	9.0	10.5
Total Split (s)	25.0	25.0		25.0	25.0	25.0	13.0	13.0	31.0	31.0	13.0	31.0
Total Split (%)	36.2%	36.2%		36.2%	36.2%	36.2%	18.8%	18.8%	44.9%	44.9%	18.8%	44.9%
Yellow Time (s)	4.5	4.5		4.5	4.5	4.5	3.0	3.0	5.5	5.5	3.0	5.5
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)	6.5	6.5		6.5	6.5	6.5		5.0	7.5	7.5	5.0	7.5
Lead/Lag							Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	None	C-Max	C-Max	None	C-Max
Act Effct Green (s)	18.3	18.3		18.3	18.3	18.3		33.7	26.6	26.6	38.6	34.5
Actuated g/C Ratio	0.27	0.27		0.27	0.27	0.27		0.49	0.39	0.39	0.56	0.50
v/c Ratio	0.00	0.01		0.93	0.00	0.66		0.02	0.46	0.14	0.26	0.31
Control Delay (s/veh)	19.0	15.3		60.5	19.0	11.1		7.0	18.3	2.3	8.6	11.8
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	19.0	15.3		60.5	19.0	11.1		7.0	18.3	2.3	8.6	11.8
LOS	B	B		E	B	B		A	B	A	A	B
Approach Delay (s/veh)		15.9			32.6				16.0			11.2
Approach LOS		B			C				B			B
Queue Length 50th (ft)	0	1		142	0	33		2	108	0	21	63
Queue Length 95th (ft)	4	9		#292	4	120		7	157	17	42	130
Internal Link Dist (ft)		514			2341				380			985
Turn Bay Length (ft)	30			210		210		320		250	285	
Base Capacity (vph)	378	464		376	499	679		535	1365	692	466	1768
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	0
Reduced v/c Ratio	0.00	0.01		0.92	0.00	0.66		0.02	0.46	0.14	0.25	0.31

Intersection Summary
Cycle Length: 69
Actuated Cycle Length: 69
Offset: 26 (38%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	1
Future Volume (vph)	1
Satd. Flow (prot)	1583
Flt Permitted	
Satd. Flow (perm)	1583
Satd. Flow (RTOR)	134
Lane Group Flow (vph)	1
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Detector Phase	6
Switch Phase	
Minimum Initial (s)	3.0
Minimum Split (s)	10.5
Total Split (s)	31.0
Total Split (%)	44.9%
Yellow Time (s)	5.5
All-Red Time (s)	2.0
Lost Time Adjust (s)	0.0
Total Lost Time (s)	7.5
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	C-Max
Act Effct Green (s)	34.5
Actuated g/C Ratio	0.50
v/c Ratio	0.00
Control Delay (s/veh)	0.0
Queue Delay	0.0
Total Delay (s/veh)	0.0
LOS	A
Approach Delay (s/veh)	
Approach LOS	
Queue Length 50th (ft)	0
Queue Length 95th (ft)	0
Internal Link Dist (ft)	
Turn Bay Length (ft)	170
Base Capacity (vph)	858
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.00

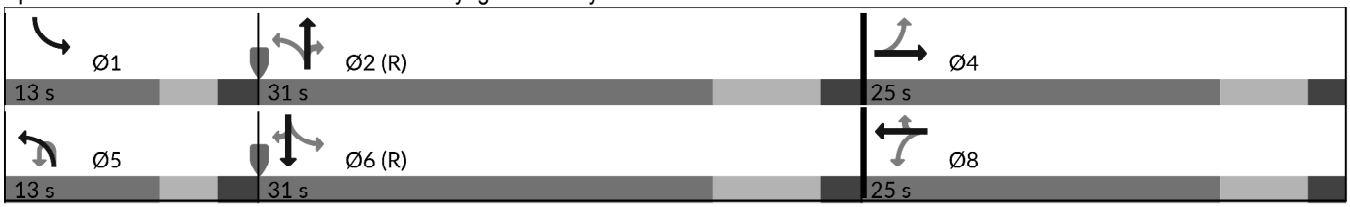
Intersection Summary

Maximum v/c Ratio: 0.93

Intersection Signal Delay (s/veh): 20.5	Intersection LOS: C
Intersection Capacity Utilization 62.1%	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: 1: Old Ranch Road & Voyager Parkway



Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	181	3	4	664	5	3	0	26	15	0	46
Future Vol, veh/h	15	181	3	4	664	5	3	0	26	15	0	46
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	155	-	-	155	-	-	-	-	-	-	-	-
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	16	197	3	4	722	5	3	0	28	16	0	50

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	727	0	0	200	0	0	961	967	198	963	966	724
Stage 1	-	-	-	-	-	-	231	231	-	733	733	-
Stage 2	-	-	-	-	-	-	730	736	-	229	233	-
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	876	-	-	1372	-	-	236	254	843	235	255	425
Stage 1	-	-	-	-	-	-	772	713	-	412	426	-
Stage 2	-	-	-	-	-	-	414	425	-	773	712	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	876	-	-	1372	-	-	203	249	843	222	249	425
Mov Cap-2 Maneuver	-	-	-	-	-	-	203	249	-	222	249	-
Stage 1	-	-	-	-	-	-	758	700	-	411	425	-
Stage 2	-	-	-	-	-	-	364	424	-	734	699	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0.69	0.05	10.96	17.79
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	636	876	-	-	1372	-	-	347
HCM Lane V/C Ratio	0.05	0.019	-	-	0.003	-	-	0.191
HCM Ctrl Dly (s/v)	11	9.2	-	-	7.6	-	-	17.8
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	-	0.7

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	9	191	712	3	9	28
Future Vol, veh/h	9	191	712	3	9	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	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	10	208	774	3	10	30

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	777	0	-	0	1003	776
Stage 1	-	-	-	-	776	-
Stage 2	-	-	-	-	227	-
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	839	-	-	-	269	398
Stage 1	-	-	-	-	454	-
Stage 2	-	-	-	-	811	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	839	-	-	-	265	398
Mov Cap-2 Maneuver	-	-	-	-	265	-
Stage 1	-	-	-	-	449	-
Stage 2	-	-	-	-	811	-

Approach	EB	WB	SB
HCM Ctrl Dly, s/v	0.42	0	16.45
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	839	-	-	-	355
HCM Lane V/C Ratio	0.012	-	-	-	0.113
HCM Ctrl Dly (s/v)	9.3	-	-	-	16.4
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	4	3	5	126	2	201	4	5	790	361	523	1015
Future Volume (vph)	4	3	5	126	2	201	4	5	790	361	523	1015
Satd. Flow (prot)	1770	1688	0	1770	1863	1583	0	1770	3539	1583	1770	3539
Flt Permitted	0.757			0.752				0.259			0.182	
Satd. Flow (perm)	1410	1688	0	1401	1863	1583	0	482	3539	1583	339	3539
Satd. Flow (RTOR)		5				218				392		
Lane Group Flow (vph)	4	8	0	137	2	218	0	9	859	392	568	1103
Turn Type	Perm	NA		Perm	NA	Perm	custom	pm+pt	NA	Perm	pm+pt	NA
Protected Phases		4			8			5	2		1	6
Permitted Phases	4			8		8	5	2		2	6	
Detector Phase	4	4		8	8	8	5	5	2	2	1	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	3.0	3.0	4.0	3.0
Minimum Split (s)	10.5	10.5		10.5	10.5	10.5	9.0	9.0	10.5	10.5	9.0	10.5
Total Split (s)	25.0	25.0		25.0	25.0	25.0	13.0	13.0	31.0	31.0	13.0	31.0
Total Split (%)	36.2%	36.2%		36.2%	36.2%	36.2%	18.8%	18.8%	44.9%	44.9%	18.8%	44.9%
Yellow Time (s)	4.5	4.5		4.5	4.5	4.5	3.0	3.0	5.5	5.5	3.0	5.5
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)	6.5	6.5		6.5	6.5	6.5		5.0	7.5	7.5	5.0	7.5
Lead/Lag							Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	None	C-Max	C-Max	None	C-Max
Act Effct Green (s)	12.0	12.0		12.0	12.0	12.0		31.7	23.5	23.5	45.2	40.8
Actuated g/C Ratio	0.17	0.17		0.17	0.17	0.17		0.46	0.34	0.34	0.66	0.59
v/c Ratio	0.02	0.03		0.56	0.01	0.48		0.03	0.71	0.49	1.09	0.53
Control Delay (s/veh)	21.0	15.9		34.3	20.5	7.5		6.4	23.8	4.4	85.0	11.6
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	21.0	15.9		34.3	20.5	7.5		6.4	23.8	4.4	85.0	11.6
LOS	C	B		C	C	A		A	C	A	F	B
Approach Delay (s/veh)		17.6			17.9				17.6			36.5
Approach LOS		B			B				B			D
Queue Length 50th (ft)	1	1		54	1	0		1	163	0	~205	117
Queue Length 95th (ft)	8	11		96	5	47		7	226	53	#460	287
Internal Link Dist (ft)		514			2313				380			985
Turn Bay Length (ft)	30			210		210		320		250	285	
Base Capacity (vph)	378	456		375	499	583		386	1205	797	523	2092
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	0
Reduced v/c Ratio	0.01	0.02		0.37	0.00	0.37		0.02	0.71	0.49	1.09	0.53

Intersection Summary
Cycle Length: 69
Actuated Cycle Length: 69
Offset: 26 (38%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	1
Future Volume (vph)	1
Satd. Flow (prot)	1583
Flt Permitted	
Satd. Flow (perm)	1583
Satd. Flow (RTOR)	134
Lane Group Flow (vph)	1
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Detector Phase	6
Switch Phase	
Minimum Initial (s)	3.0
Minimum Split (s)	10.5
Total Split (s)	31.0
Total Split (%)	44.9%
Yellow Time (s)	5.5
All-Red Time (s)	2.0
Lost Time Adjust (s)	0.0
Total Lost Time (s)	7.5
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	C-Max
Act Effct Green (s)	40.8
Actuated g/C Ratio	0.59
v/c Ratio	0.00
Control Delay (s/veh)	0.0
Queue Delay	0.0
Total Delay (s/veh)	0.0
LOS	A
Approach Delay (s/veh)	
Approach LOS	
Queue Length 50th (ft)	0
Queue Length 95th (ft)	0
Internal Link Dist (ft)	
Turn Bay Length (ft)	170
Base Capacity (vph)	990
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.00

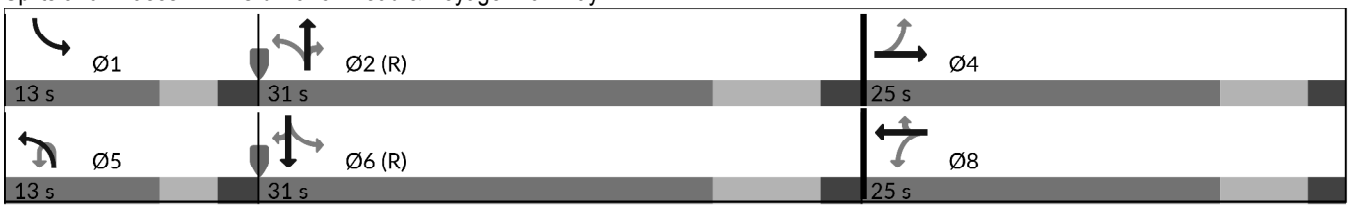
Intersection Summary

Maximum v/c Ratio: 1.09

Intersection Signal Delay (s/veh): 27.2	Intersection LOS: C
Intersection Capacity Utilization 80.3%	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: 1: Old Ranch Road & Voyager Parkway



Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	43	836	2	18	274	14	2	0	31	10	0	30
Future Vol, veh/h	43	836	2	18	274	14	2	0	31	10	0	30
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	155	-	-	155	-	-	-	-	-	-	-	-
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	47	909	2	20	298	15	2	0	34	11	0	33

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	313	0	0	911	0	0	1340	1355	910	1347	1349	305
Stage 1	-	-	-	-	-	-	1003	1003	-	345	345	-
Stage 2	-	-	-	-	-	-	337	352	-	1002	1004	-
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	1247	-	-	748	-	-	130	149	333	128	151	734
Stage 1	-	-	-	-	-	-	292	320	-	671	636	-
Stage 2	-	-	-	-	-	-	677	631	-	292	319	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1247	-	-	748	-	-	116	140	333	108	141	734
Mov Cap-2 Maneuver	-	-	-	-	-	-	116	140	-	108	141	-
Stage 1	-	-	-	-	-	-	281	308	-	653	620	-
Stage 2	-	-	-	-	-	-	630	615	-	253	307	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0.39	0.58	18.68	19.03
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	299	1247	-	-	748	-	-	300
HCM Lane V/C Ratio	0.12	0.037	-	-	0.026	-	-	0.145
HCM Ctrl Dly (s/v)	18.7	8	-	-	9.9	-	-	19
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0.1	-	-	0.5

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	29	873	298	10	6	17
Future Vol, veh/h	29	873	298	10	6	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	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	32	949	324	11	7	18

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	335	0	-	0	1341	329
Stage 1	-	-	-	-	329	-
Stage 2	-	-	-	-	1012	-
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	1225	-	-	-	168	712
Stage 1	-	-	-	-	729	-
Stage 2	-	-	-	-	351	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1225	-	-	-	164	712
Mov Cap-2 Maneuver	-	-	-	-	164	-
Stage 1	-	-	-	-	710	-
Stage 2	-	-	-	-	351	-

Approach	EB	WB	SB
HCM Ctrl Dly, s/v	0.26	0	15.14
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1225	-	-	-	380
HCM Lane V/C Ratio	0.026	-	-	-	0.066
HCM Ctrl Dly (s/v)	8	-	-	-	15.1
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	1	4	4	443	1	570	10	3	825	126	148	727
Future Volume (vph)	1	4	4	443	1	570	10	3	825	126	148	727
Satd. Flow (prot)	1770	1723	0	1770	1863	1583	0	1770	3539	1583	1770	3539
Flt Permitted	0.757			0.752				0.310			0.162	
Satd. Flow (perm)	1410	1723	0	1401	1863	1583	0	577	3539	1583	302	3539
Satd. Flow (RTOR)		4				189				137		
Lane Group Flow (vph)	1	8	0	482	1	620	0	14	897	137	161	790
Turn Type	Perm	NA		Perm	NA	Perm	custom	pm+pt	NA	Perm	pm+pt	NA
Protected Phases		4			8			5	2		1	6
Permitted Phases	4			8		8	5	2		2	6	
Detector Phase	4	4		8	8	8	5	5	2	2	1	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	3.0	3.0	4.0	3.0
Minimum Split (s)	10.5	10.5		10.5	10.5	10.5	9.0	9.0	10.5	10.5	9.0	10.5
Total Split (s)	31.0	31.0		31.0	31.0	31.0	9.0	9.0	29.0	29.0	9.0	29.0
Total Split (%)	44.9%	44.9%		44.9%	44.9%	44.9%	13.0%	13.0%	42.0%	42.0%	13.0%	42.0%
Yellow Time (s)	4.5	4.5		4.5	4.5	4.5	3.0	3.0	5.5	5.5	3.0	5.5
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)	6.5	6.5		6.5	6.5	6.5		5.0	7.5	7.5	5.0	7.5
Lead/Lag							Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	None	C-Max	C-Max	None	C-Max
Act Effct Green (s)	24.5	24.5		24.5	24.5	24.5		28.0	21.5	21.5	32.0	28.7
Actuated g/C Ratio	0.36	0.36		0.36	0.36	0.36		0.41	0.31	0.31	0.46	0.42
v/c Ratio	0.00	0.01		0.97	0.00	0.91		0.05	0.81	0.23	0.72	0.54
Control Delay (s/veh)	14.0	11.7		58.8	14.0	35.0		10.1	29.3	4.8	33.4	17.6
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	14.0	11.7		58.8	14.0	35.0		10.1	29.3	4.8	33.4	17.6
LOS	B	B		E	B	D		B	C	A	C	B
Approach Delay (s/veh)		12.0			45.4				25.9			20.2
Approach LOS		B			D				C			C
Queue Length 50th (ft)	0	1		197	0	177		3	182	0	37	121
Queue Length 95th (ft)	3	9		#380	3	#381		11	#260	34	#105	215
Internal Link Dist (ft)		514			2355				380			985
Turn Bay Length (ft)	30			210		210		320		250	285	
Base Capacity (vph)	500	614		497	661	683		303	1102	587	225	1472
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	0
Reduced v/c Ratio	0.00	0.01		0.97	0.00	0.91		0.05	0.81	0.23	0.72	0.54

Intersection Summary

Cycle Length: 69

Actuated Cycle Length: 69

Offset: 26 (38%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	1
Future Volume (vph)	1
Satd. Flow (prot)	1583
Flt Permitted	
Satd. Flow (perm)	1583
Satd. Flow (RTOR)	134
Lane Group Flow (vph)	1
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Detector Phase	6
Switch Phase	
Minimum Initial (s)	3.0
Minimum Split (s)	10.5
Total Split (s)	29.0
Total Split (%)	42.0%
Yellow Time (s)	5.5
All-Red Time (s)	2.0
Lost Time Adjust (s)	0.0
Total Lost Time (s)	7.5
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	C-Max
Act Effct Green (s)	28.7
Actuated g/C Ratio	0.42
v/c Ratio	0.00
Control Delay (s/veh)	0.0
Queue Delay	0.0
Total Delay (s/veh)	0.0
LOS	A
Approach Delay (s/veh)	
Approach LOS	
Queue Length 50th (ft)	0
Queue Length 95th (ft)	0
Internal Link Dist (ft)	
Turn Bay Length (ft)	170
Base Capacity (vph)	736
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.00

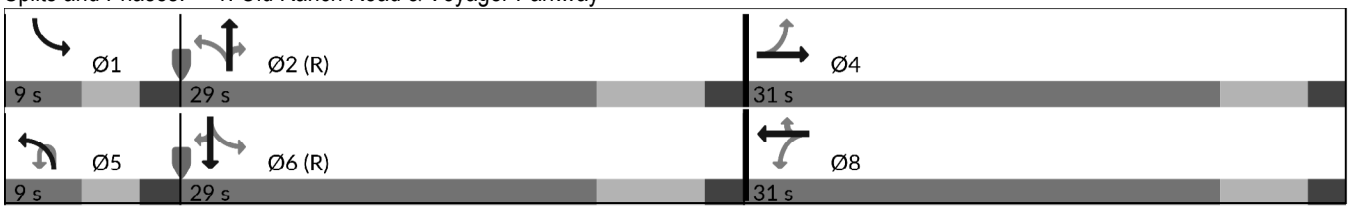
Intersection Summary

Maximum v/c Ratio: 0.97

Intersection Signal Delay (s/veh): 31.0	Intersection LOS: C
Intersection Capacity Utilization 78.5%	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: 1: Old Ranch Road & Voyager Parkway



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	15	245	4	6	947	5	4	0	37	15	0	46
Future Vol, veh/h	15	245	4	6	947	5	4	0	37	15	0	46
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	155	-	-	155	-	-	-	-	-	-	-	-
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	16	266	4	7	1029	5	4	0	40	16	0	50

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1035	0	0	271	0	0	1343	1349	268	1344	1348	1032
Stage 1	-	-	-	-	-	-	301	301	-	1045	1045	-
Stage 2	-	-	-	-	-	-	1042	1048	-	299	303	-
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	672	-	-	1293	-	-	129	151	770	129	151	283
Stage 1	-	-	-	-	-	-	708	665	-	276	306	-
Stage 2	-	-	-	-	-	-	277	305	-	710	663	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	672	-	-	1293	-	-	103	146	770	119	146	283
Mov Cap-2 Maneuver	-	-	-	-	-	-	103	146	-	119	146	-
Stage 1	-	-	-	-	-	-	691	649	-	275	304	-
Stage 2	-	-	-	-	-	-	227	303	-	657	647	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0.6	0.05	13.42	29.71
HCM LOS			B	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	472	672	-	-	1293	-	-	211
HCM Lane V/C Ratio	0.094	0.024	-	-	0.005	-	-	0.314
HCM Ctrl Dly (s/v)	13.4	10.5	-	-	7.8	-	-	29.7
HCM Lane LOS	B	B	-	-	A	-	-	D
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	1.3

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	9	266	997	3	9	28
Future Vol, veh/h	9	266	997	3	9	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	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	10	289	1084	3	10	30

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1087	0	-	0	1394	1085
Stage 1	-	-	-	-	1085	-
Stage 2	-	-	-	-	309	-
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	642	-	-	-	156	263
Stage 1	-	-	-	-	324	-
Stage 2	-	-	-	-	745	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	642	-	-	-	154	263
Mov Cap-2 Maneuver	-	-	-	-	154	-
Stage 1	-	-	-	-	319	-
Stage 2	-	-	-	-	745	-

Approach	EB	WB	SB
HCM Ctrl Dly, s/v	0.35	0	24.53
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	642	-	-	-	224
HCM Lane V/C Ratio	0.015	-	-	-	0.179
HCM Ctrl Dly (s/v)	10.7	-	-	-	24.5
HCM Lane LOS	B	-	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	6	4	7	172	3	275	6	7	1128	503	728	1450
Future Volume (vph)	6	4	7	172	3	275	6	7	1128	503	728	1450
Satd. Flow (prot)	1770	1676	0	1770	1863	1583	0	1770	3539	1583	1770	3539
Flt Permitted	0.756			0.750				0.178			0.145	
Satd. Flow (perm)	1408	1676	0	1397	1863	1583	0	332	3539	1583	270	3539
Satd. Flow (RTOR)		8				299				384		
Lane Group Flow (vph)	7	12	0	187	3	299	0	15	1226	547	791	1576
Turn Type	Perm	NA		Perm	NA	Perm	custom	pm+pt	NA	Perm	pm+pt	NA
Protected Phases		4			8			5	2		1	6
Permitted Phases	4			8		8	5	2		2	6	
Detector Phase	4	4		8	8	8	5	5	2	2	1	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	3.0	3.0	4.0	3.0
Minimum Split (s)	10.5	10.5		10.5	10.5	10.5	9.0	9.0	10.5	10.5	9.0	10.5
Total Split (s)	14.0	14.0		14.0	14.0	14.0	9.0	9.0	30.0	30.0	25.0	46.0
Total Split (%)	20.3%	20.3%		20.3%	20.3%	20.3%	13.0%	13.0%	43.5%	43.5%	36.2%	66.7%
Yellow Time (s)	4.5	4.5		4.5	4.5	4.5	3.0	3.0	5.5	5.5	3.0	5.5
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)	6.5	6.5		6.5	6.5	6.5		5.0	7.5	7.5	5.0	7.5
Lead/Lag							Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	None	C-Max	C-Max	None	C-Max
Act Effct Green (s)	7.5	7.5		7.5	7.5	7.5		29.0	22.5	22.5	50.0	45.7
Actuated g/C Ratio	0.11	0.11		0.11	0.11	0.11		0.42	0.33	0.33	0.72	0.66
v/c Ratio	0.05	0.06		1.24	0.01	0.68		0.07	1.06	0.71	1.26	0.67
Control Delay (s/veh)	28.5	20.3		183.1	27.7	13.3		6.9	70.0	11.9	148.3	9.7
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	28.5	20.3		183.1	27.7	13.3		6.9	70.0	11.9	148.3	9.7
LOS	C	C		F	C	B		A	E	B	F	A
Approach Delay (s/veh)		23.3			78.3				51.7			56.0
Approach LOS		C			E				D			E
Queue Length 50th (ft)	3	2		~100	1	0		2	~308	51	~378	161
Queue Length 95th (ft)	13	16		#215	9	#85		6	#428	161	#585	345
Internal Link Dist (ft)		514			2307				380			985
Turn Bay Length (ft)	30			210		210		320		250	285	
Base Capacity (vph)	153	189		151	202	438		222	1154	774	630	2344
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	0
Reduced v/c Ratio	0.05	0.06		1.24	0.01	0.68		0.07	1.06	0.71	1.26	0.67

Intersection Summary
Cycle Length: 69
Actuated Cycle Length: 69
Offset: 26 (38%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	1
Future Volume (vph)	1
Satd. Flow (prot)	1583
Flt Permitted	
Satd. Flow (perm)	1583
Satd. Flow (RTOR)	134
Lane Group Flow (vph)	1
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Detector Phase	6
Switch Phase	
Minimum Initial (s)	3.0
Minimum Split (s)	10.5
Total Split (s)	46.0
Total Split (%)	66.7%
Yellow Time (s)	5.5
All-Red Time (s)	2.0
Lost Time Adjust (s)	0.0
Total Lost Time (s)	7.5
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	C-Max
Act Effct Green (s)	45.7
Actuated g/C Ratio	0.66
v/c Ratio	0.00
Control Delay (s/veh)	0.0
Queue Delay	0.0
Total Delay (s/veh)	0.0
LOS	A
Approach Delay (s/veh)	
Approach LOS	
Queue Length 50th (ft)	0
Queue Length 95th (ft)	0
Internal Link Dist (ft)	
Turn Bay Length (ft)	170
Base Capacity (vph)	1093
Starvation Cap Reductn	0
Spillback Cap Reductn	0
Storage Cap Reductn	0
Reduced v/c Ratio	0.00

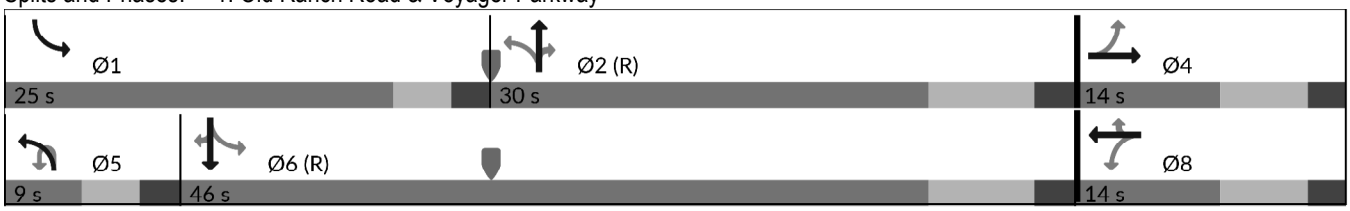
Intersection Summary

Maximum v/c Ratio: 1.26

Intersection Signal Delay (s/veh): 56.5	Intersection LOS: E
Intersection Capacity Utilization 103.5%	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: Old Ranch Road & Voyager Parkway



Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	43	1192	3	25	387	14	3	0	45	10	0	30
Future Vol, veh/h	43	1192	3	25	387	14	3	0	45	10	0	30
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	155	-	-	155	-	-	-	-	-	-	-	-
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	47	1296	3	27	421	15	3	0	49	11	0	33

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	436	0	0	1299	0	0	1866	1881	1297	1872	1875	428
Stage 1	-	-	-	-	-	-	1391	1391	-	483	483	-
Stage 2	-	-	-	-	-	-	475	490	-	1389	1392	-
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	1124	-	-	533	-	-	56	71	198	55	72	627
Stage 1	-	-	-	-	-	-	176	209	-	565	553	-
Stage 2	-	-	-	-	-	-	570	549	-	176	209	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1124	-	-	533	-	-	48	65	198	38	65	627
Mov Cap-2 Maneuver	-	-	-	-	-	-	48	65	-	38	65	-
Stage 1	-	-	-	-	-	-	169	200	-	536	525	-
Stage 2	-	-	-	-	-	-	513	521	-	127	200	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	0.29	0.71	36.49	47.12
HCM LOS			E	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	165	1124	-	-	533	-	-	128
HCM Lane V/C Ratio	0.315	0.042	-	-	0.051	-	-	0.341
HCM Ctrl Dly (s/v)	36.5	8.3	-	-	12.1	-	-	47.1
HCM Lane LOS	E	A	-	-	B	-	-	E
HCM 95th %tile Q(veh)	1.3	0.1	-	-	0.2	-	-	1.4

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	29	1229	413	10	6	17
Future Vol, veh/h	29	1229	413	10	6	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	150	-	-	-	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	32	1336	449	11	7	18

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	460	0	-	0	1853	454
Stage 1	-	-	-	-	454	-
Stage 2	-	-	-	-	1399	-
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	1101	-	-	-	81	606
Stage 1	-	-	-	-	639	-
Stage 2	-	-	-	-	228	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1101	-	-	-	79	606
Mov Cap-2 Maneuver	-	-	-	-	79	-
Stage 1	-	-	-	-	621	-
Stage 2	-	-	-	-	228	-

Approach	EB	WB	SB
HCM Ctrl Dly, s/v	0.19	0	23.35
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1101	-	-	-	221
HCM Lane V/C Ratio	0.029	-	-	-	0.113
HCM Ctrl Dly (s/v)	8.4	-	-	-	23.3
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4