TRANSPORTATION MEMORANDUM

For

Sunflower Landscapes
El Paso County, Colorado
PCD File No. VA265

June 2026
Revised August 2026
Revised October 2026

Prepared for:

Sunflower Landscapes
7620 Mohawk Road
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Prepared by:

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COLORADO LICENSED
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68282
10/01/2026
PROFESSIONAL ENGINEER

Project Engineer
Leo Ornelas, EIT

Engineer in Responsible Charge:
Brandon Wilson, PE

26-052670

I suggest a comment review meeting between staff and the applicant team may be beneficial regarding the comments provided with this review.

Traffic Engineer's Statement

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

Brandon Wilson 10/01/2026

Brandon Wilson, P.E. #68282 Date

Developer's Statement

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

10/1/2026

Dustin Hamilton Date
Sunflower Landscapes
7620 Mohawk Road
Colorado Springs, Colorado 80908

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I. Introduction

Project Overview

This transportation memorandum is provided as a planning document and addresses the capacity, geometric, and control requirements associated with the development entitled Sunflower Landscapes. This analysis was prepared in accordance with Section B.1.2.C of the County's Engineering Criteria Manual (ECM)[1].

This traffic impact study has been revised to address County review comments made to the August 2026 version regarding updated trip generation assumptions and changes to assumed trip distribution patterns. Updated to associated text, tables, and figures were also warranted.

This proposed industrial development consists of a Sunflower Landscapes contractor equipment yard. The development is located near the northwest corner of Woodmen Road and Mohawk Road in El Paso County, Colorado.

Study Area

The study area to be examined in this analysis encompasses the Mohawk Road intersections with Woodmen Road, Woodmen Frontage Road, and includes proposed site access drives.

Figure 1 illustrates location of the site and study intersections.

Site Description

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

The proposed development will be phased and is understood to entail the new construction of a contractor equipment yard with an associated shop and office building developed over approximately five acres of land. Phase One will entail the reuse of the existing buildings on approximately 2 acres of land, while Phase Two will entail the new construction for the associated shop and office building.

Access to the development site is existing and provided via two full-movement access drives onto Mohawk Road. Both access drives will remain and will be gated.

For purposes of this study, it is anticipated that overall development construction would be completed by end of Year 2028.

[1] El Paso County Engineering Criteria Manual, El Paso County, January 9, 2025.

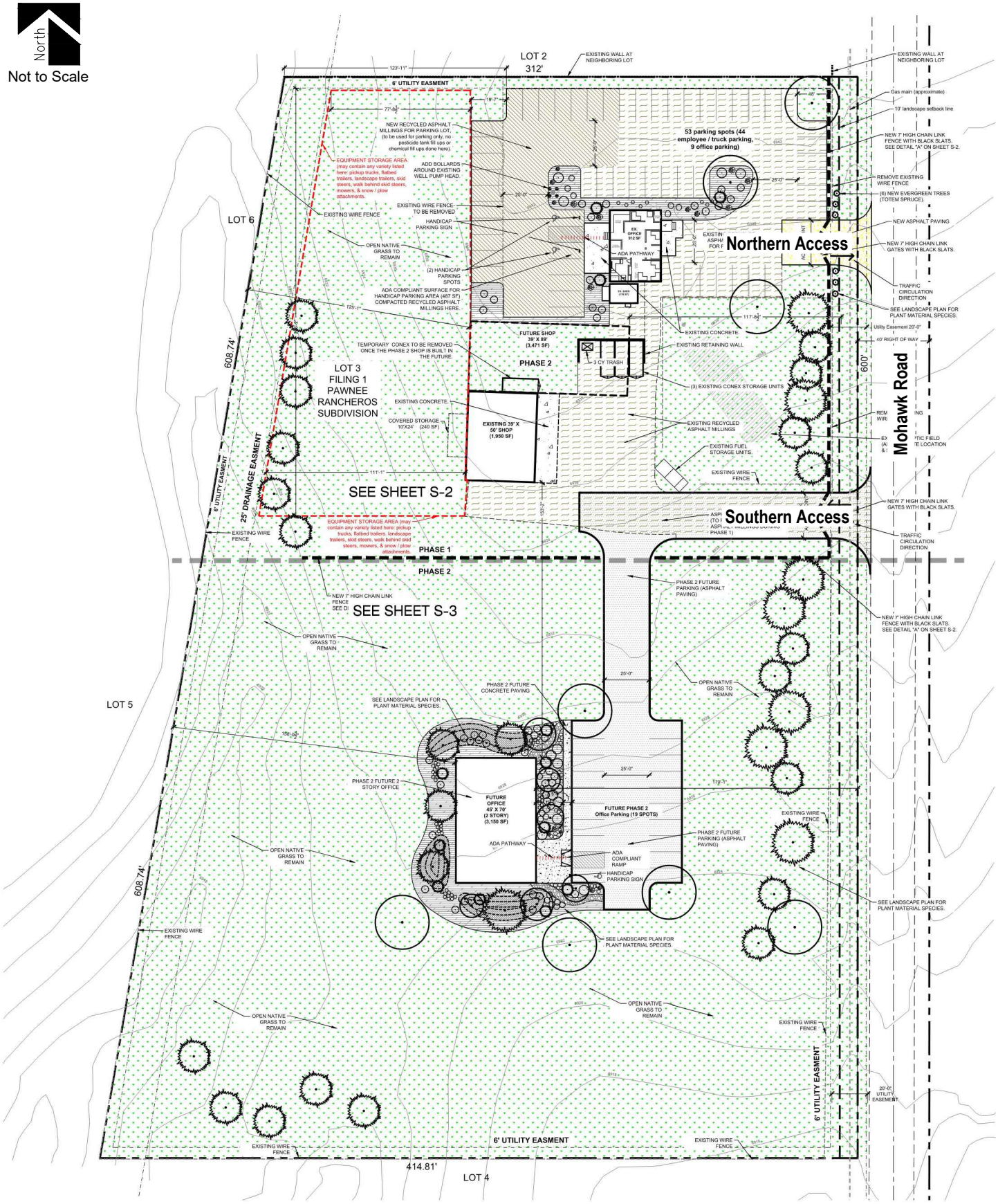
General site and access locations are shown on Figure 1.

An overall site plan, as prepared by Sunflower Landscapes, is shown in Figure 2. This plan is provided for illustrative purposes only.

A conceptual sight distance exhibit, illustrating approximate entering sight distance triangles, is included for reference in Appendix E. This two-dimensional exhibit does not consider the potential for landscaping, utility, nor vertical curve obstructions, and was prepared in accordance to Table 2-35 of the County's ECM and Section 9.5.3.2 of the American Association of State Highway and Transportation Officials' (AASHTO) A Policy on Geometric Design of Highway and Streets (Green Book)[2] and is provided for illustrative purposes only. As typical to the majority of development application, a final sight distance assessment will be provided by the site civil at the Site Development Plan stage of development.

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

North
Not to Scale
Kenosha Drive
Ponca Road
Development Site
Mohawk Road
Brule Road
Mounted Range Drive
Woodmen Frontage Road
Woodmen Road


North
Not to Scale
LOT 2
312'
EXISTING WALL AT NEIGHBORING LOT
6' UTILITY EASEMENT
53 parking spots (44 employee / truck parking, 9 office parking)
NEW RECYCLED ASPHALT MILLINGS FOR PARKING LOT. (to be used for parking only, no pesticide tank fill ups or chemical fill ups done here).
EQUIPMENT STORAGE AREA (may contain any variety listed here: pickup trucks, flatbed trailers, landscape trailers, skid steers, walk behind skid steers, mowers, & snow / plow attachments.
ADD BOLLARDS AROUND EXISTING WELL PUMP HEAD.
EXISTING WIRE FENCE- TO BE REMOVED
EXISTING WIRE FENCE
HANDICAP PARKING SIGN
OPEN NATIVE GRASS TO REMAIN
(2) HANDICAP PARKING SPOTS
ADA COMPLIANT SURFACE FOR HANDICAP PARKING AREA (487 SF) COMPACTED RECYCLED ASPHALT MILLINGS HERE.
EX. OFFICE 912 SF
ADA PATHWAY
Northern Access
LOT 6
608.74'
LOT 3
FILING 1
PAWNEE
RANCHEROS
SUBDIVISION
TEMPORARY CONEX TO BE REMOVED ONCE THE PHASE 2 SHOP IS BUILT IN THE FUTURE.
FUTURE SHOP 39' X 89' (3,471 SF)
PHASE 2
3 CY TRASH
EXISTING CONCRETE
EXISTING RETAINING WALL
(3) EXISTING CONEX STORAGE UNITS
EXISTING CONCRETE
COVERED STORAGE 10'X24' (240 SF)
EXISTING 39' X 50' SHOP (1,950 SF)
EXISTING RECYCLED ASPHALT MILLINGS
EXISTING FUEL STORAGE UNITS.
EXISTING WIRE FENCE
SEE SHEET S-2
25' DRAINAGE EASEMENT
6' UTILITY EASEMENT
EQUIPMENT STORAGE AREA (may contain any variety listed here: pickup trucks, flatbed trailers, landscape trailers, skid steers, walk behind skid steers, mowers, & snow / plow attachments.
EXISTING WIRE FENCE
Southern Access
PHASE 1
PHASE 2
SEE SHEET S-3
PHASE 2 FUTURE PARKING (ASPHALT PAVING)
OPEN NATIVE GRASS TO REMAIN
PHASE 2 FUTURE CONCRETE PAVING
SEE LANDSCAPE PLAN FOR PLANT MATERIAL SPECIES.
LOT 5
PHASE 2 FUTURE 2 STORY OFFICE
FUTURE OFFICE 45' X 70' (2 STORY) (3,150 SF)
FUTURE PHASE 2 Office Parking (19 SPOTS)
ADA PATHWAY
ADA COMPLIANT RAMP
HANDICAP PARKING SIGN
EXISTING WIRE FENCE
608.74'
6' UTILITY EASEMENT
414.81'
LOT 4
Mohawk Road
600'
EXISTING WALL AT NEIGHBORING LOT
Gas main (approximate)
10' landscape setback line
NEW 7' HIGH CHAIN LINK FENCE WITH BLACK SLATS. SEE DETAIL "A" ON SHEET S-2.
REMOVE EXISTING WIRE FENCE
(6) NEW EVERGREEN TREES (TOTEM SPRUCE).
NEW ASPHALT PAVING
NEW 7' HIGH CHAIN LINK GATES WITH BLACK SLATS.
TRAFFIC CIRCULATION DIRECTION
SEE LANDSCAPE PLAN FOR PLANT MATERIAL SPECIES.
Utility Easement 20'-0"
40' RIGHT OF WAY
NEW 7' HIGH CHAIN LINK GATES WITH BLACK SLATS.
TRAFFIC CIRCULATION DIRECTION
NEW 7' HIGH CHAIN LINK FENCE WITH BLACK SLATS. SEE DETAIL "A" ON SHEET S-2.
20'-0" UTILITY EASEMENT

Existing and Committed Surface Transportation Network

Within the study area, Woodmen Road is the primary roadway that will accommodate traffic to and from the proposed development. The secondary roadways include Woodmen Frontage Road and Mohawk Road. A brief description of each roadway, based on Colorado Springs Major Thoroughfare Plan (MTP)[3] and the County's Major Transportation Corridors Plan (MTCP)[4], is provided below.

> Woodmen Road is an east-west, City-owned, expressway roadway having six through lanes (three lanes in each direction) with exclusive turn lanes at the intersection within the study area. Woodmen Road provides a posted speed limit of 55 MPH.
>
> Woodmen Frontage Road is an east-west, City-owned roadway having two through lanes (one lane in each direction) with shared turn lanes at the intersection within the study area. Woodmen Frontage Road provides a 35 MPH posted speed limit, but is unclassified in the municipal transportation plans. However, per the roadway's apparent cross-section, Woodmen Frontage Road is assumed to be classified as a collector roadway, but appears to accommodate the County's rural minor collector roadway cross-section.
>
> Mohawk Road is a north-south, County-owned roadway having two through lanes (one lane in each direction) with a combination of shared and exclusive turn lanes at the intersections within the study area. Mohawk Road is unclassified in the municipal transportation plans. However, per Table 2-5 of the County's ECM and the roadway's apparent cross-section, Mohawk Road is assumed to be classified as a rural local roadway and provides a posted speed limit of 30 MPH.

The study intersection of Woodmen Road and Mohawk Road 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 the County's MTCP, Woodmen Road will be widened from four lanes to six lanes from Golden Sage Road to U.S. Highway 24. However, this improvement isn't anticipated until Year 2045 and therefore was not considered within this analysis.

[3] Major Thoroughfare Plan, City of Colorado Springs, May 2025.
[4] Major Transportation Corridors Plan, Felsburg Holt & Ullevig, July 18, 2024.

II. Existing Traffic Conditions

Morning (AM) and afternoon (PM) peak hour traffic counts were collected at the intersections of Mohawk Road with Woodmen Road and Woodmen Frontage Road. Average daily traffic (ADT) volumes were collected over a 24-hour period on Mohawk Road. Counts were collected on Tuesday, June 2, 2026, 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 Woodmen Road and Mohawk Road were obtained from the City of Colorado Springs and used throughout this study to the best extent possible in order to remain consistent with existing signal coordination plans. City signal timing information received is included for reference in Appendix A.

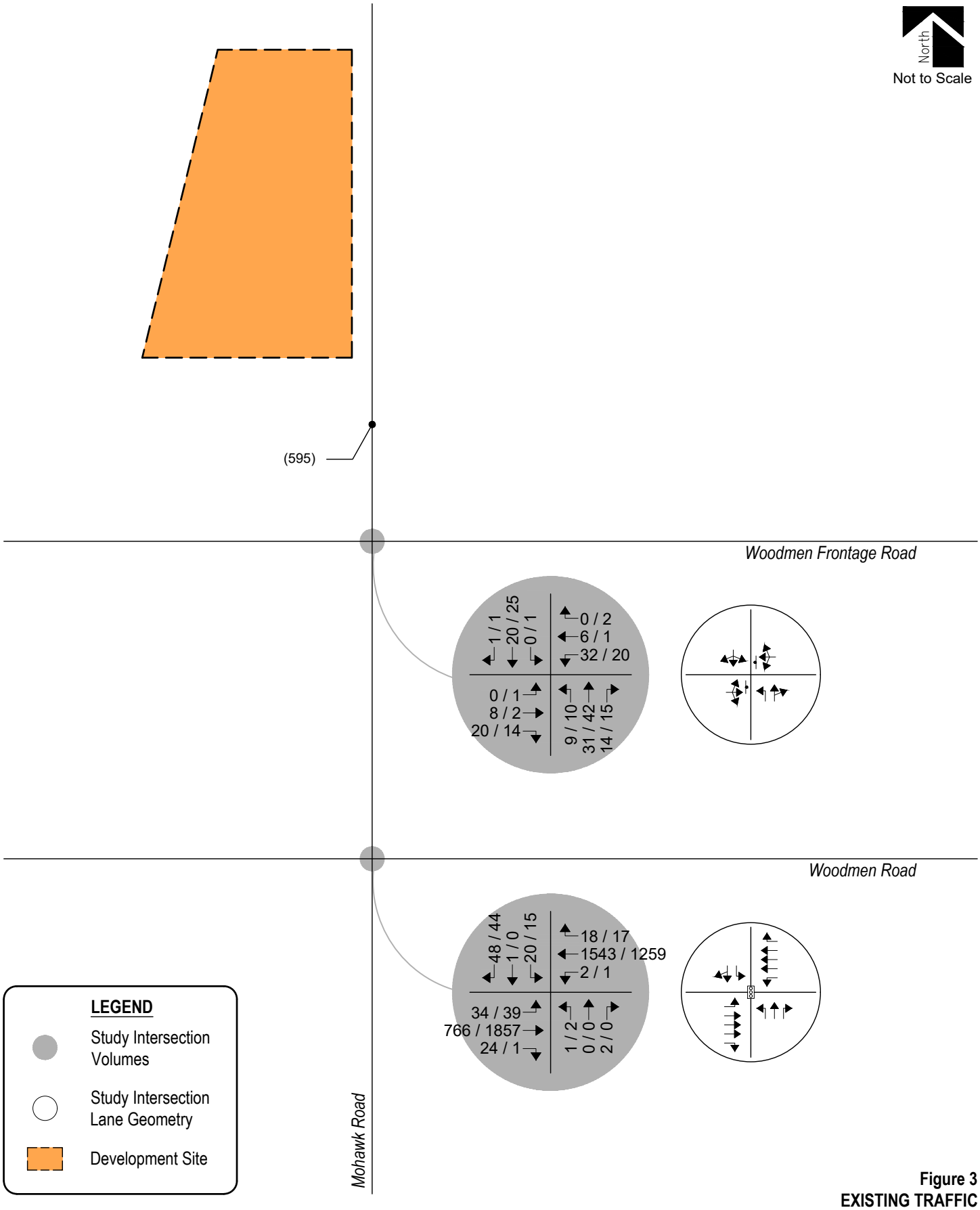


Figure 3
EXISTING TRAFFIC
Volumes & Intersection Geometry
AM / PM Peak Traffic Hour
(ADT) : Average Daily Traffic

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.

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

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

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

Table 1 – Intersection Capacity Analysis Summary – Existing Traffic

INTERSECTION	LEVEL OF SERVICE	
LANE GROUPS	AM PEAK HOUR	PM PEAK HOUR
Woodmen Road / Mohawk Road (Signalized)	A (7.4)	A (6.5)
Woodmen Frontage Road / Mohawk Road (Stop-Controlled)		
Eastbound Left, Through, and Right	A	A
Westbound Left, Through, and Right	A	A
Northbound Left	A	A
Southbound Left, Through, and Right	A	A

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

Existing Traffic Analysis Results

Under existing conditions, operational analysis shows that all study intersections have overall 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 Year 2028, a compounded annual growth rate was determined using population growth estimates provided by the County's MTCP, which anticipates a 10-year growth rate between one and two percent. Therefore, in order to provide for a conservative analysis, a growth rate of two percent was applied to existing traffic volumes.

To account for projected traffic from adjacent developments not yet built, trip generations from the Woodmen & Mohawk Residential[5], the Percheron Master Plan Amendment[6], and the Woodmen East Commercial Center Traffic Impact Analysis[7] were added to background traffic volumes.

Pursuant to the committed area roadway improvements discussed in Section I, Year 2028 background traffic conditions assume no roadway improvements to accommodate regional transportation demands. This assumption provides for a conservative analysis. However, in coordination with City of Colorado Springs Traffic Engineering, the City has plans to adjust the signal timing parameters for the Woodmen Road and Mohawk Road intersection. As such, Year 2028 background traffic conditions assume existing signal timing parameters for the intersection with optimized splits in effort to better presumed short-term intersection performance.

Projected background traffic volumes and intersection geometry for Year 2028 are shown in Figure 4.

This sentence doesn't make sense with the previous sentence. Please have this clearly state that the timing was adjusted for the background condition.

Please include in the appropriate section of the report that the timing was adjusted for the other scenarios as well.

[5] Woodmen & Mohawk Residential: Traffic Impact Study, SM ROCHA, LLC, July 2022.
[6] Percheron Master Plan Amendment: Traffic Impact Study, SM ROCHA, LLC, October 2025.
[7] Woodmen East Commercial Center: Traffic Impact Analysis, LSC Transportation Consultants, December 8, 2021.

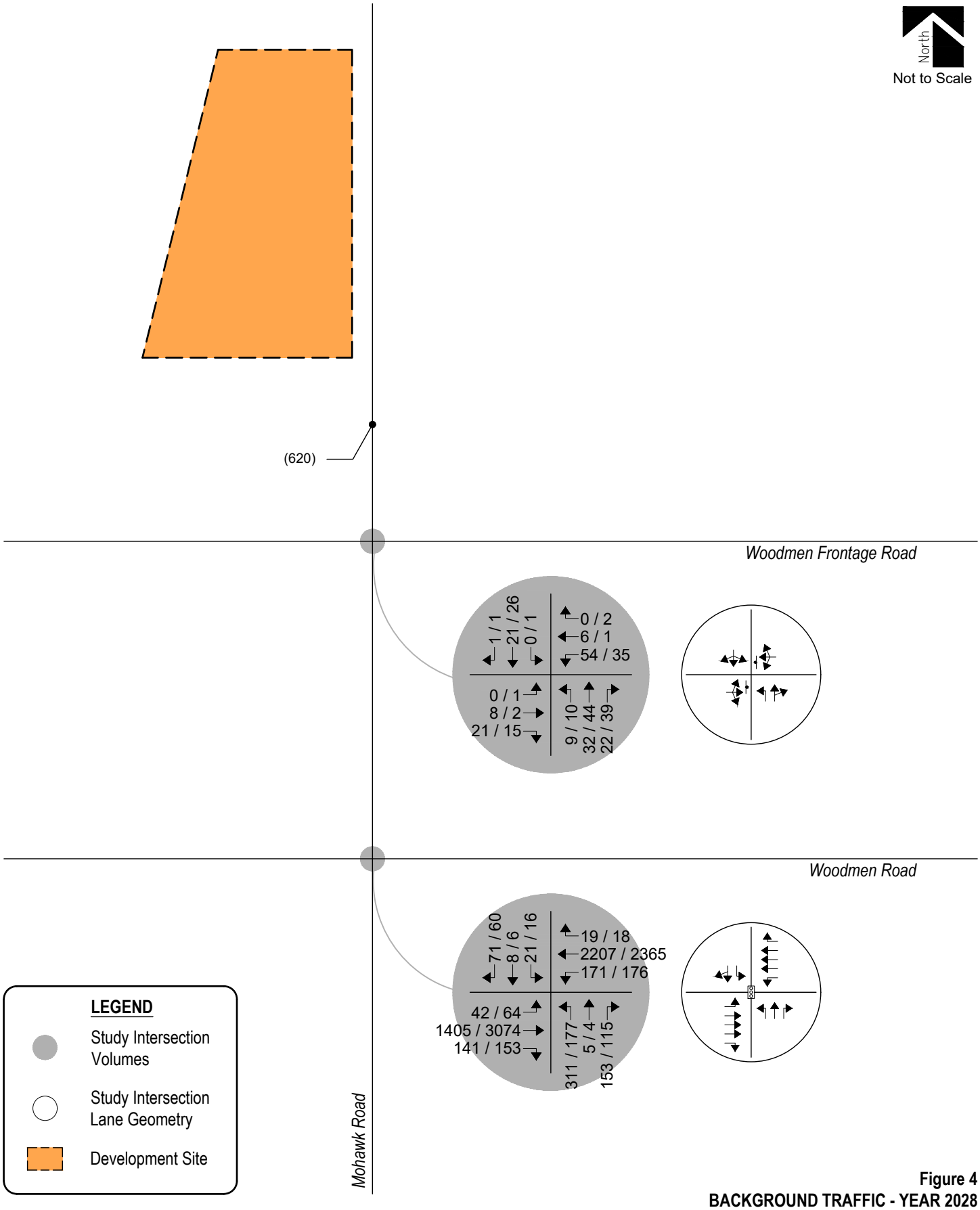


Figure 4
BACKGROUND TRAFFIC - YEAR 2028
Volumes & Intersection Geometry
AM / PM Peak Traffic Hour
(ADT) : Average Daily Traffic

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 2028 are listed in Table 2.

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

Table 2 – Intersection Capacity Analysis Summary – Background Traffic – Year 2028

INTERSECTION LANE GROUPS	LEVEL OF SERVICE	
	AM PEAK HOUR	PM PEAK HOUR
Woodmen Road / Mohawk Road (Signalized)	C (24.9)	C (33.1)
Woodmen Frontage Road / Mohawk Road (Stop-Controlled)		
Eastbound Left, Through, and Right	A	A
Westbound Left, Through, and Right	A	A
Northbound Left	A	A
Southbound Left, Through, and Right	A	A

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

Background Traffic Analysis Results – Year 2028

By Year 2028 and upon development build-out of the surrounding area, traffic analysis indicates that the signalized intersection of Woodmen Road with Mohawk Road will experience overall operations at LOS C during either peak traffic hour.

It is recognized, however, that the left turning movements in all directions are shown to operate at capacity, or be over-capacity, resulting in LOS E and F operations. However, provision of dual eastbound and westbound left turn decelerations lanes, in combination with widening Mohawk Road to support two receiving lanes in both directions, and upon optimizing signal timing parameters, was not shown to improve the capacity nor vehicular delay for the left turn movements.

While LOS D is recognized as the common goal for intersection operations, the latest HCM describes how signalized intersections that experience LOS E operations are still within capacity but experience an average delay of 55 to 80 seconds. Therefore, considering how future traffic projections were determined by applying a conservative growth rate higher than that reported by the County's MTCP (as described in Section III), the projected intersection operations shown in Table 2 and Appendix D are considered to be adequate.

Unsignalized intersections within the study area operate with turning movements at LOS A during both AM and PM peak traffic periods.

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, 12th Edition, were applied to the existing and proposed land uses in order to estimate average daily traffic (ADT), AM Peak Hour, and PM Peak Hour vehicle trips. A vehicle trip is defined as a one-way vehicle movement from a point of origin to a point of destination.

The ITE land use codes 210 (Single-Family Detached Housing) and 712 (Small Office Building) were used for estimating trip generation because of their conservative rates and best fit to the existing and proposed (Phase Two) land use descriptions.

However, ITE's Trip Generation Manual does not provide accurate traffic generation information specific for a contractor equipment yard (Phase One). Therefore, pursuant to Section B.3.3.A of the County's ECM, trip generation rates for the proposed contractor equipment yard were referenced from a local trip generation study prepared by LSC Transportation Consultants, Inc. This local study is provided for reference in Appendix B.

See comments regarding the local study on page 45.

ITE trip generation rates used in this study are presented in Table 3.

Table 3 – Trip Generation Rates

ITE CODE	LAND USE	UNIT	TRIP GENERATION RATES						
			24 HOUR	AM PEAK HOUR			PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
210	Single-Family Detached Housing	DU	9.09	0.19	0.51	0.70	0.58	0.35	0.93
712	Small Office Building	KSF	14.39	1.36	0.28	1.64	0.73	1.43	2.16
-	General Outdoor Storage	ACRE	37.68	2.02	1.33	3.35	2.19	1.74	3.93

Key: ACRE = Acres. DU = Dwelling Units. KSF = Thousand Square Feet Gross Floor Area.
Note: All data and calculations above are subject to being rounded to nearest value.

Table 4 illustrates projected ADT, AM Peak Hour, and PM Peak Hour traffic volumes likely generated by the proposed development upon build-out.

Unresolved Review 3 comment:
These numbers do not correlate with the employee information provided.

Review 4 comment:
Without an acceptable local study, the comment still stands that these numbers do not correlate with the employee information provided with this variance application. Although the employee information was removed from this version of the traffic study, the trip generation rate must still correlate to the number of employees proposed in this variance of use request. 80 trips doesn't account for all employees arriving in the morning and leaving in the evening, not to mention work vehicle trips. Similar with am/pm peak hour numbers.

Unresolved Review 3 comment: Please clearly state if the phase 1 trip gen includes employee and customer trips for the phase 1 office. If it doesn't currently include those, please revise numbers.

CODE	LAND USE	SIZE	HOUR	ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
Site Development - Existing									
210	Single-Family Detached Housing	1 DU	9	0	1	1	1	0	1
		Existing Total:	*9*	*0*	*1*	*1*	*1*	*0*	*1*
Site Development - Proposed Phase One									
-	General Outdoor Storage	2.1 ACRE	80	4	3	7	5	4	8
		Phase One Total:	*80*	*4*	*3*	*7*	*5*	*4*	*8*
Site Development - Proposed Phase Two									
712	Small Office Building	6.3 KSF	91	9	2	10	5	9	14
		Phase Two Total:	*91*	*9*	*2*	*10*	*5*	*9*	*14*
		Build-Out Total:	***171***	***13***	***5***	***17***	***9***	***13***	***22***
		Difference Total (Existing - Build-Out):	***161***	***13***	***4***	***17***	***9***	***12***	***21***

Key: ACRE = Acres. DU = Dwelling Units. KSF = Thousand Square Feet Gross Floor Area.
Note: All data and calculations above are subject to being rounded to nearest value.

Upon build-out, Table 4 illustrates that the proposed development has the potential to generate approximately 171 daily vehicle trips with 17 of those occurring during the morning peak hour and 22 during the afternoon peak hour. Compared to the existing land uses, this represents a potential increase in site traffic generation of approximately 161 daily trips with 17 of those occurring during the morning peak hour and 21 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.

It is important to note that approximately 25 percent of the workers on-site are seasonal employees. Because of this, approximately 25 percent of trips will be reduced from the period of November to late April. Despite this, no trip reduction was taken for this analysis. This approach continues to allow for a conservative analysis.

Trip Distribution

The overall directional distribution of site-generated traffic was determined based on the location of development site within the County, proposed and existing area land uses, allowed turning movements, and available roadway network.

Overall trip distribution patterns for the development are shown on Figure 5.

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 5.

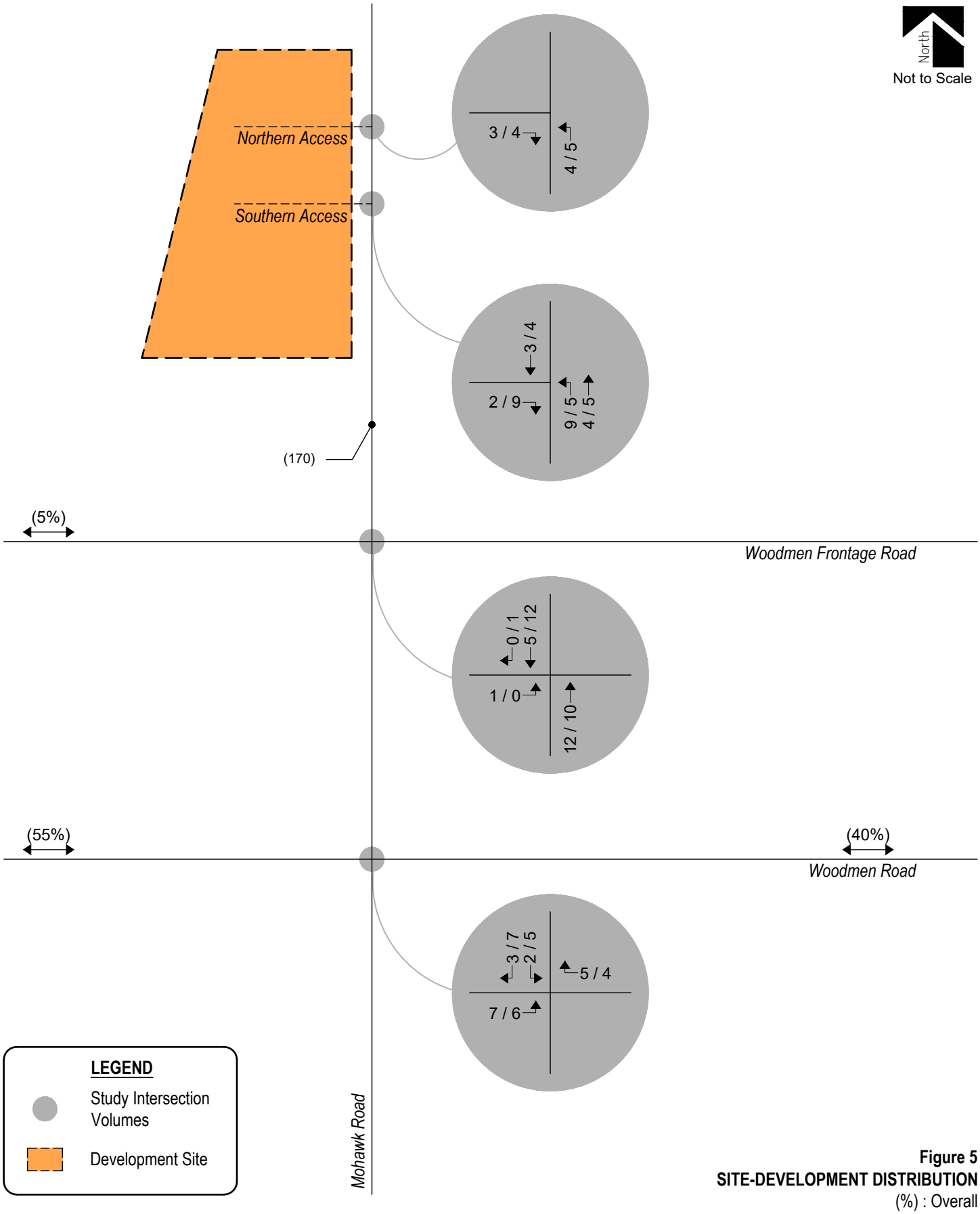


Figure 5
SITE-DEVELOPMENT DISTRIBUTION
(%) : Overall
SITE-GENERATED TRIPS
AM / PM Peak Hour
(ADT) : Average Daily Traffic

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 Year 2028 with consideration of site-generated traffic. For analysis purposes, it was assumed that development construction would be completed by end of Year 2028.

Pursuant to area roadway improvement discussions provided in Section III, Year 2028 total traffic conditions assume no roadway improvements to accommodate regional transportation demands. 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

An auxiliary lane analysis, using Year 2028 total traffic volumes, was conducted for the proposed site access drives onto Mohawk Road.

Pursuant to Section 2.3.7.D of the County's ECM, exclusive left turn deceleration lanes are required along minor arterial and lower classified roadways for any access whose projected peak hour left turning volumes meet or exceed 25 vehicles per hour (VPH). Additionally, exclusive right turn deceleration lanes are required along minor arterial and lower classified roadways for any access whose projected peak hour right turning volumes meet or exceed 50 VPH.

Considering development build-out, an evaluation of auxiliary lane requirements reveals that a northbound left turn deceleration lane along Mohawk Road at Northern Access and Southern Access are not warranted since the development's projected peak hour left turn ingress volumes do not exceed the County's threshold.

Similarly, a southbound right turn deceleration lane is not required at Northern Access nor at Southern Access since the development's projected peak hour right turn ingress volumes do not exceed the County's threshold.

Projected Year 2028 total traffic volumes and intersection geometry are shown in Figure 6.

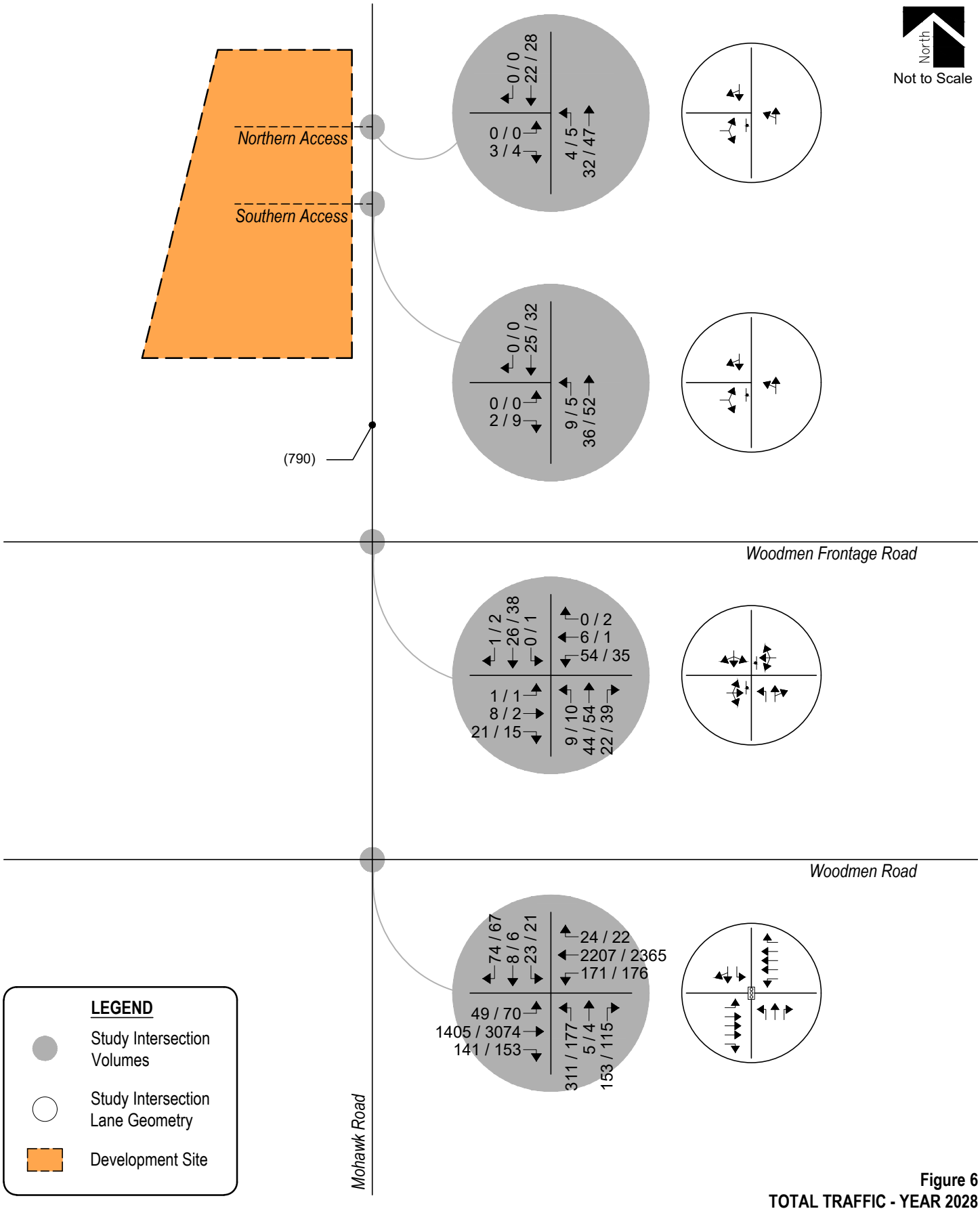


Figure 6
TOTAL TRAFFIC - YEAR 2028
Volumes & Intersection Geometry
AM / PM Peak Traffic Hour
(ADT) : Average Daily Traffic

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 Year 2028 are summarized in Table 5.

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

Table 5 – Intersection Capacity Analysis Summary – Total Traffic – Year 2028

INTERSECTION	LEVEL OF SERVICE	
LANE GROUPS	AM PEAK HOUR	PM PEAK HOUR
Woodmen Road / Mohawk Road (Signalized)	C (25.1)	C (33.3)
Woodmen Frontage Road / Mohawk Road (Stop-Controlled)		
Eastbound Left, Through, and Right	A	A
Westbound Left, Through, and Right	A	A
Northbound Left	A	A
Southbound Left, Through, and Right	A	A
Mohawk Road / Southern Access (Stop-Controlled)		
Eastbound Left and Right	A	A
Northbound Left	A	A
Mohawk Road / Northern Access (Stop-Controlled)		
Eastbound Left and Right	A	A
Northbound Left and Through	A	A

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 5 illustrates how, by Year 2028 and upon development build-out, the signalized intersection of Woodmen Road with Mohawk Road maintains overall LOS C operations during both peak traffic hours. Therefore, when 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.

It is emphasized that the left turning movements in all directions are shown to operate at capacity, or be over-capacity, resulting in LOS E and F operations. However, provision of dual eastbound and westbound left turn decelerations lanes, in combination with widening Mohawk Road to support two receiving lanes in both directions, and upon optimizing signal timing parameters, was not shown to improve the capacity nor vehicular delay for the left turn movements. Therefore, the signalized intersection should be monitored further by County Staff as area development occurs to determine when, or if, mitigating improvements are appropriate.

While LOS D is recognized as the common goal for intersection operations, the latest HCM describes how signalized intersections that experience LOS E operations are still within capacity but experience an average delay of 55 to 80 seconds. Therefore, considering how future traffic projections were determined by applying a conservative growth rate higher than that reported by the County's MTCP (as described in Section III), the projected intersection operations shown in Table 5 and Appendix D are considered to be adequate.

The stop-controlled intersections within the study area are projected to have turning movement operations at LOS A for both the morning and afternoon peak traffic hours.

These intersection operations are similar to background conditions.

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.

Multi-Modal Assessment

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

Due to the rural characteristics of the development site and surrounding area, this area currently does not accommodate pedestrians nor bicyclists with detached sidewalks, trails, nor bike lanes. It is important to note that, pursuant to existing roadway characteristics provided in Section I, typical roadway cross-sections defined within the County's ECM, and per the assumed classification, Mohawk Road is not expected to provide sidewalks nor bicycle lanes adjacent the development area due to the County's plans to maintain the rural characteristic of the surrounding area roadways.

Queue Length Analysis

Queue lengths for the study intersections were analyzed using Year 2028 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 D.

Table 6 summarizes the 95th percentile queue results in comparison to the projected storage requirements for turn movements within study area for Year 2028.

Table 6 – Turn Lane Queues and Storage Requirements – Total Traffic – Year 2028

Intersection	Turn Movement		Existing Turn Lane Length (feet)	Background 2028		Total 2028		Recommended Turn Lane Length (feet)
				AM Peak Hour (feet)	PM Peak Hour (feet)	AM Peak Hour (feet)	PM Peak Hour (feet)	
Signalized Intersections								
Woodmen Road / Mohawk Road	EB	L	300'	75'	100'	84'	107'	300'
		T	-	376'	1087'	376'	1087'	-
		R	400'	37'	23'	37'	23'	400'
	WB	L	315'	217'	308'	217'	308'	315'
		T	-	617'	554'	617'	554'	-
		R	375'	0'	0'	0'	0'	375'
	NB	L	165' x2	185'	168'	185'	169'	165' x2
		T	-	15'	15'	15'	15'	-
		R	165'	61'	61'	61'	61'	165'
	SB	L	35'	40'	38'	43'	46'	35'
		T,R	-	52'	53'	52'	56'	-
Stop-Controlled Intersections								
Woodmen Frontage Road / Mohawk Road	EB	L,T,R	-	3'	3'	3'	3'	-
	WB	L,T,R	-	5'	5'	8'	5'	-
	NB	L	25'	0'	0'	0'	0'	25'
		T,R	-	0'	0'	0'	0'	-
	SB	L,T,R	-	0'	0'	0'	0'	-
Mohawk Road / Southern Access	EB	L,R	-	-	-	0'	0'	-
	NB	L,T	-	-	-	0'	0'	-
	SB	T,R	-	-	-	0'	0'	-
Mohawk Road / Northern Access	EB	L,R	-	-	-	0'	0'	-
	NB	L,T	-	-	-	0'	0'	-
	SB	T,R	-	-	-	0'	0'	-

Note: Turn Lane Length does not include taper length.
Key: x2 = Dual Turn Lanes.

As Table 6 shows, the majority of turn lane lengths at the study intersections have sufficient storage to accommodate future traffic volumes. However, at the Woodmen Road and Mohawk Road intersection, vehicle queuing for the southbound left turn movement is indicated to exceed its existing left turn deceleration lane length.

It is acknowledged that existing conditions of the area may limit the availability for this projected queue to be accommodated. For example, the segment of Mohawk Road between Woodmen Road and Woodmen Frontage Road only allows approximately 115 feet of roadway striping. And while 115 feet of storage for the southbound left turn movement would resolve potential vehicle queuing, provision of the back-to-back left turn movement associated with the northbound left turn deceleration lane at Woodmen Frontage Road prevents the southbound left turn deceleration lane at Woodmen Road from being extended any further.

Development Impacts

Analysis of future traffic conditions indicates that the addition of site-generated traffic is expected to create no 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 2028 background traffic conditions.

Recommended Improvements

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

When considering Year 2028 total traffic conditions, failing operations were reported for individual left turning movements at the Woodmen Road and Mohawk Road intersection. These extended delays are a result of said left turning movements being at or over-capacity. However, this analysis found no mitigations that would allow LOS D operations, or better, for all turning movements. Therefore, since this condition occurs without the proposed development, it is our recommendation that the study intersection be monitored further by County Staff as area development occurs to determine what, if any, mitigating improvements are necessary.

No improvements associated with the proposed development are recommended. This analysis shows how the proposed development warrants no improvements to the surrounding roadway network, and is able to allow the surrounding roadway network to continue functioning within the County's design objectives.

VII. Conclusion

This transportation memorandum addressed the capacity, geometric, and control requirements associated with the development entitled Sunflower Landscapes. This proposed industrial development consisted of a Sunflower Landscapes contractor equipment yard. The development is located near the northwest corner of Woodmen Road and Mohawk Road in El Paso County, Colorado.

The study area to be examined in this analysis encompassed the Mohawk Road intersections with Woodmen Road and Woodmen Frontage Road and includes the proposed site access drives.

Analysis was conducted for critical AM Peak Hour and PM Peak Hour traffic operations for existing traffic conditions, Year 2028 background traffic conditions, and Year 2028 total traffic conditions.

Analysis of existing traffic conditions indicates that all intersections operate under LOS A conditions during both the morning and afternoon peak traffic hours.

Under Year 2028 background traffic conditions, operational analysis shows that the signalized intersection is projected to experience overall LOS C operations during the morning and afternoon peak traffic periods. The stop-controlled intersection of Woodmen Frontage Road with Mohawk Road is anticipated to have turn movement operations at LOS A during both peak traffic periods.

Analysis of future traffic conditions indicates that the addition of site-generated traffic is expected to create no negative impact to traffic operations for the existing and surrounding roadway system. With all conservative assumptions defined in this analysis, the study intersections are projected to operate at future levels of service comparable to Year 2028 background traffic conditions. Proposed site access drives project long-term operations at LOS A during peak traffic periods and upon build-out.

No improvements associated with the proposed development are recommended. This analysis concludes how the proposed development warrants no improvements to the surrounding roadway network, and is able to allow the surrounding roadway network to continue functioning within the County's design objectives.

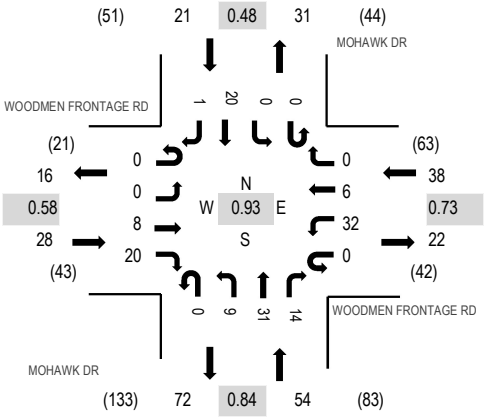
APPENDIX A

Traffic Count Data
Signal Timing Information

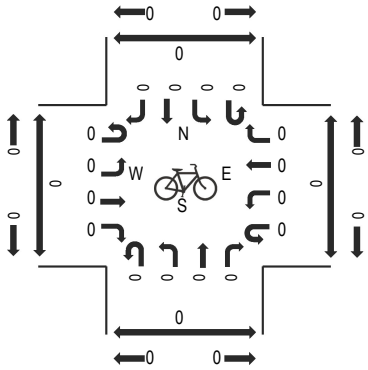
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 2 MOHAWK DR & WOODMEN FRONTAGE RD AM
Date: Tuesday, June 2, 2026
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 07:30 AM - 07:45 AM

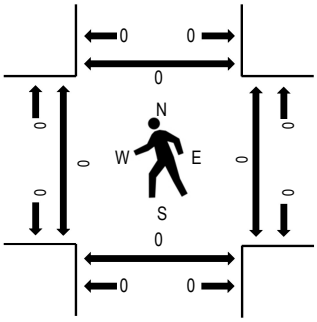
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

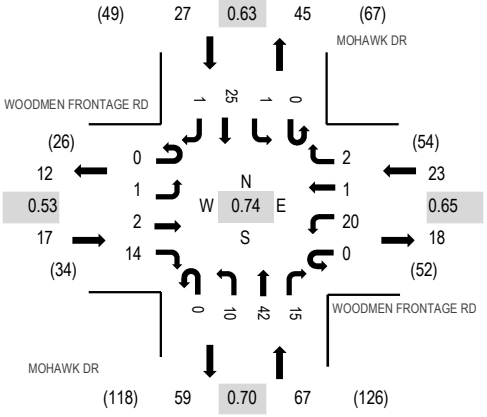
Traffic Counts - Motorized Vehicles

Interval Start Time	WOODMEN FRONTAGE RD Eastbound				WOODMEN FRONTAGE RD Westbound				MOHAWK DR Northbound				MOHAWK DR Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	0	1	1	0	4	0	0	0	1	2	3	0	0	15	0	27	118	0	0	0	0
7:15 AM	0	0	2	2	0	6	0	0	0	1	2	5	0	0	5	0	23	126	0	0	0	0
7:30 AM	0	0	4	8	0	9	0	0	0	3	5	4	0	0	5	0	38	141	0	0	0	0
7:45 AM	0	0	1	6	0	7	1	0	0	2	5	4	0	0	4	0	30	134	0	0	0	0
8:00 AM	0	0	0	3	0	7	1	0	0	3	9	4	0	0	7	1	35	122	0	0	0	0
8:15 AM	0	0	3	3	0	9	4	0	0	1	12	2	0	0	4	0	38		0	0	0	0
8:30 AM	0	1	0	5	0	7	2	0	0	0	3	6	0	1	6	0	31		0	0	0	0
8:45 AM	0	0	1	2	0	5	1	0	0	0	5	1	0	0	3	0	18		0	0	0	0
Count Total	0	1	12	30	0	54	9	0	0	11	43	29	0	1	49	1	240		0	0	0	0
Peak Hour	0	0	8	20	0	32	6	0	0	9	31	14	0	0	20	1	141		0	0	0	0

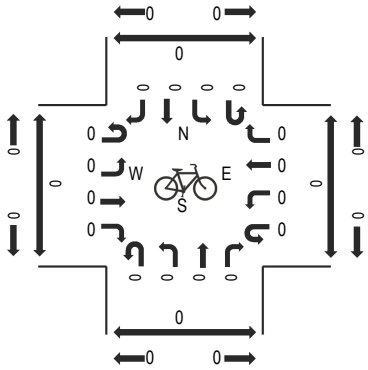
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 2 MOHAWK DR & WOODMEN FRONTAGE RD PM
Date: Tuesday, June 2, 2026
Peak Hour: 05:00 PM - 06:00 PM
Peak 15-Minutes: 05:45 PM - 06:00 PM

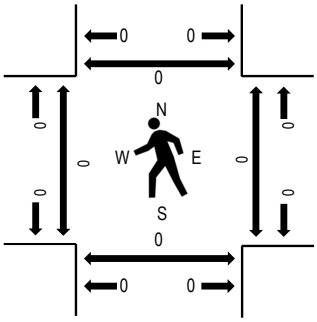
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

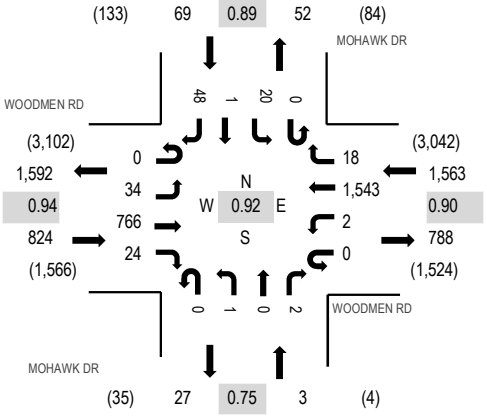
Traffic Counts - Motorized Vehicles

Interval Start Time	WOODMEN FRONTAGE RD Eastbound				WOODMEN FRONTAGE RD Westbound				MOHAWK DR Northbound				MOHAWK DR Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	0	3	2	0	7	0	1	0	3	8	4	0	0	4	0	32	129	0	0	0	0
4:15 PM	0	0	2	4	0	10	1	1	0	3	3	10	0	0	2	0	36	124	0	0	0	0
4:30 PM	0	0	1	2	0	4	0	0	0	4	5	6	0	0	5	0	27	118	0	0	0	0
4:45 PM	0	0	0	3	0	7	0	0	0	3	4	6	0	2	9	0	34	123	0	0	0	0
5:00 PM	0	0	0	3	0	2	1	0	0	1	10	3	0	1	6	0	27	134	0	0	0	0
5:15 PM	0	0	0	2	0	2	0	0	0	2	8	1	0	0	14	1	30		0	0	0	0
5:30 PM	0	1	2	5	0	3	0	0	0	4	9	5	0	0	3	0	32		0	0	0	0
5:45 PM	0	0	0	4	0	13	0	2	0	3	15	6	0	0	2	0	45		0	0	0	0
Count Total	0	1	8	25	0	48	2	4	0	23	62	41	0	3	45	1	263		0	0	0	0
Peak Hour	0	1	2	14	0	20	1	2	0	10	42	15	0	1	25	1	134		0	0	0	0

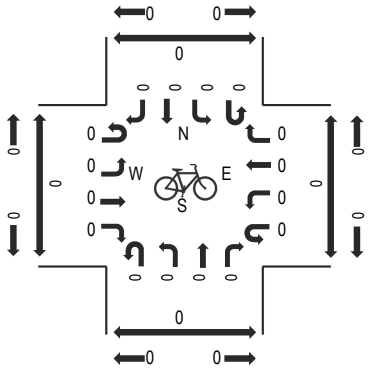
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 1 MOHAWK DR & WOODMEN RD AM
Date: Tuesday, June 2, 2026
Peak Hour: 07:30 AM - 08:30 AM
Peak 15-Minutes: 07:30 AM - 07:45 AM

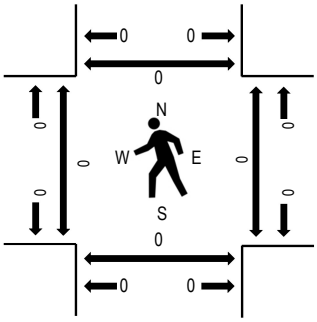
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

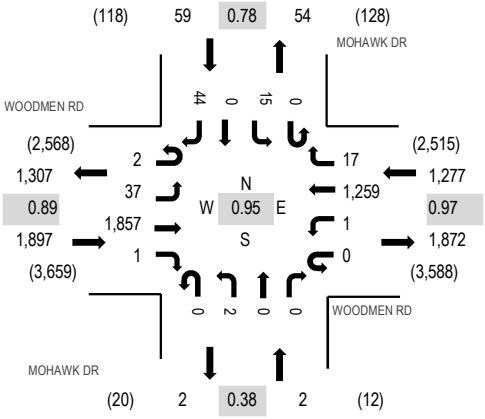
Traffic Counts - Motorized Vehicles

Interval Start Time	WOODMEN RD Eastbound				WOODMEN RD Westbound				MOHAWK DR Northbound				MOHAWK DR Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	2	170	2	0	0	336	3	0	0	0	1	0	1	0	17	532	2,434	0	0	0	0
7:15 AM	0	8	172	1	0	0	396	2	0	0	0	0	0	4	0	11	594	2,449	0	0	0	0
7:30 AM	0	9	197	2	0	0	437	3	0	0	0	1	0	3	0	17	669	2,459	0	0	0	0
7:45 AM	0	7	210	1	0	1	400	2	0	0	0	1	0	8	1	8	639	2,404	0	0	0	0
8:00 AM	0	10	173	8	0	1	328	8	0	0	0	0	0	8	0	11	547	2,311	0	0	0	0
8:15 AM	0	8	186	13	0	0	378	5	0	1	0	0	0	1	0	12	604		0	0	0	0
8:30 AM	0	6	187	1	0	1	395	3	0	0	0	0	0	9	1	11	614		0	0	0	0
8:45 AM	0	4	187	2	0	0	339	4	0	0	0	0	0	5	0	5	546		0	0	0	0
Count Total	0	54	1,482	30	0	3	3,009	30	0	1	0	3	0	39	2	92	4,745		0	0	0	0
Peak Hour	0	34	766	24	0	2	1,543	18	0	1	0	2	0	20	1	48	2,459		0	0	0	0

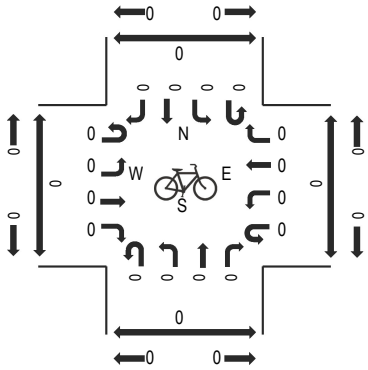
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 1 MOHAWK DR & WOODMEN RD PM
Date: Tuesday, June 2, 2026
Peak Hour: 04:30 PM - 05:30 PM
Peak 15-Minutes: 05:15 PM - 05:30 PM

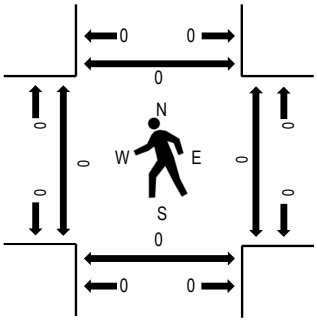
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

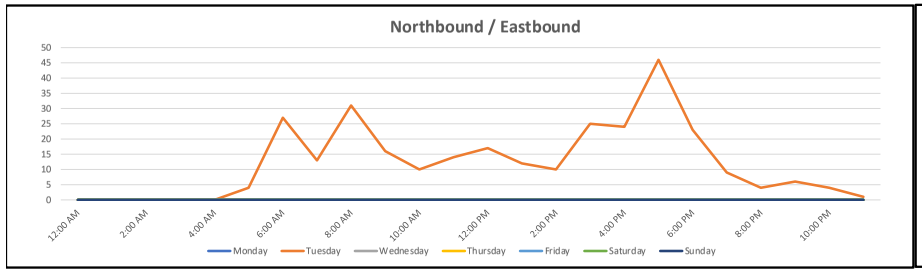
Traffic Counts - Motorized Vehicles

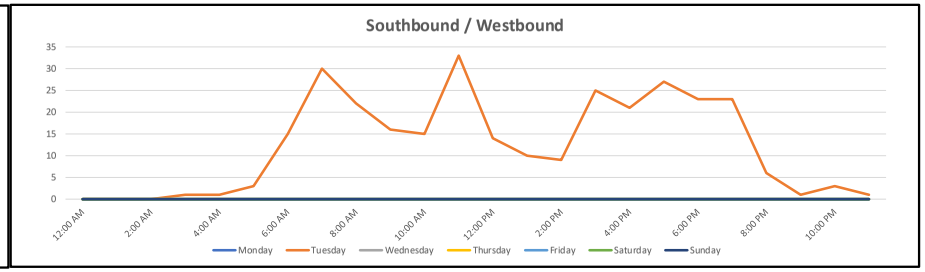
Interval Start Time	WOODMEN RD Eastbound				WOODMEN RD Westbound				MOHAWK DR Northbound				MOHAWK DR Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	1	7	404	2	0	0	325	8	0	2	0	0	0	4	0	9	762	3,158	0	0	0	0
4:15 PM	1	9	433	2	0	0	327	7	0	0	0	0	0	3	0	13	795	3,175	0	0	0	0
4:30 PM	0	8	484	0	0	0	315	6	0	0	0	0	0	4	0	7	824	3,235	0	0	0	0
4:45 PM	0	10	430	0	0	1	311	5	0	1	0	0	0	3	0	16	777	3,220	0	0	0	0
5:00 PM	1	10	419	0	0	0	335	3	0	0	0	0	0	2	0	9	779	3,146	0	0	0	0
5:15 PM	1	9	524	1	0	0	298	3	0	1	0	0	0	6	0	12	855		0	0	0	0
5:30 PM	5	14	449	5	0	2	318	3	0	1	0	1	0	4	0	7	809		0	0	0	0
5:45 PM	0	17	408	5	0	2	237	9	0	4	0	2	0	8	0	11	703		0	0	0	0
Count Total	9	84	3,551	15	0	5	2,466	44	0	9	0	3	0	34	0	84	6,304		0	0	0	0
Peak Hour	2	37	1,857	1	0	1	1,259	17	0	2	0	0	0	15	0	44	3,235		0	0	0	0

Vehicle Volume Report - Hourly

Site Description: MOHAWK RD N.O. WOODMEN FRONTAGE RD
Site Number: 3
Start Date: 06/02/2026
End Date: 06/02/2026

Time	Monday 6/8/26			Tuesday 6/2/26			Wednesday 6/3/26			Thursday 6/4/26			Friday 6/5/26			Saturday 6/6/26			Sunday 6/7/26			3 Day Avg Tue-Thu		5 Day Avg Mon-Fri		7 Day Avg Mon-Sun	
	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	NB	SB	NB	SB
12:00 AM	-	-	-	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1:00 AM	-	-	-	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2:00 AM	-	-	-	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 AM	-	-	-	0	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 AM	-	-	-	0	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5:00 AM	-	-	-	4	3	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6:00 AM	-	-	-	27	15	42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7:00 AM	-	-	-	13	30	43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8:00 AM	-	-	-	31	22	53	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9:00 AM	-	-	-	16	16	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10:00 AM	-	-	-	10	15	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	-	-	-	14	33	47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12:00 PM	-	-	-	17	14	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1:00 PM	-	-	-	12	10	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2:00 PM	-	-	-	10	9	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	-	-	-	25	25	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	-	-	-	24	21	45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5:00 PM	-	-	-	46	27	73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6:00 PM	-	-	-	23	23	46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7:00 PM	-	-	-	9	23	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8:00 PM	-	-	-	4	6	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9:00 PM	-	-	-	6	1	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10:00 PM	-	-	-	4	3	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 PM	-	-	-	1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6:00 AM - 9:00 AM	-	-	-	71	67	138	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM - 6:00 PM	-	-	-	95	73	168	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6:00 AM - 7:00 PM	-	-	-	268	260	528	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12:00 AM - 12:00 AM	-	-	-	296	299	595	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Percent	-	-	-	*49.7%*	*50.3%*	*100.0%*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AM Peak	-	-		8:00 AM	9:00 AM		-	-		-	-		-	-		-	-		-	-							
PM Peak	-	-		5:00 PM	6:00 PM		-	-		-	-		-	-		-	-		-	-							





Intersection 644 at Woodmen Rd and Mohawk Rd - Timing table, page 1

Page 1	Phases											
	1	2	3	4	5	6	7	8	9	10	11	12
Min Green	5	10	0	6	5	10	0	6	0	0	0	0
Passage Time I	1.5	1.5	0.0	1.5	1.5	1.5	0.0	1.5	0.0	0.0	0.0	0.0
Passage Time II	1.5	1.5	0.0	1.5	1.5	1.5	0.0	1.5	0.0	0.0	0.0	0.0
Max Green I	12	40	0	15	12	40	0	15	0	0	0	0
Max Green II	12	40	0	15	12	40	0	15	0	0	0	0
Yellow Clearance	3.0	5.5	0.0	6.0	3.0	5.5	0.0	6.0	0.0	0.0	0.0	0.0
Red Clearance	2.0	2.0	0.0	2.0	2.0	2.0	0.0	2.0	0.0	0.0	0.0	0.0
Added Initial	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Added Initial	0	0	0	0	0	0	0	0	0	0	0	0
Time Before Reduction	0	0	0	0	0	0	0	0	0	0	0	0
Cars Before Reduction	0	0	0	0	0	0	0	0	0	0	0	0
Time To Reduce	0	0	0	0	0	0	0	0	0	0	0	0
Min Passage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Green Time	0	0	0	0	0	0	0	0	0	0	0	0
Red Revert Time	0.0	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0	0.0	0.0	0.0
Advance Walk Time	0	0	0	0	0	0	0	0	0	0	0	0
Walk Time	0	7	0	7	0	7	0	7	0	0	0	0
Pedestrian Clearance	0	23	0	52	0	26	0	50	0	0	0	0
Handicap Walk	0	12	0	12	0	12	0	12	0	0	0	0
Handicap Ped Clearance	0	26	0	60	0	30	0	58	0	0	0	0
Woodmen Rd	X	X			X	X						
Mohawk Rd				X				X				
Compass Direction	W	E		S	E	W		N				
Through, Turn or XPed	Left,prt	Thru		Thru	Left,prt	Thru		Thru				

Intersection 644 at Woodmen Rd and Mohawk Rd - Sequence table, page 1

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

Intersection 644 at Woodmen Rd and Mohawk Rd - Phases control table, page 1

Page 1	Vehicle Phases _____111 123456789012		Ped Phases _____111 123456789012
Min Recalls		Ped Recalls	
Max Recalls	2 6	Handicap Ped Recalls	
Recall If Maxed		Soft Ped Recalls	
Dual Entry	4 8	Don't Recall (FDW Offset)	2 4 6 8
Do Not Skip		Allow Walk Reduction	
Simultaneous Gap Out		Hold In Walk	
Restricted Phases		Allow Ped Re-service	2 6
Sequential Initial Timing		Rest In Walk	No
Max Timer Starts For Call			
Reduction Starts For Call			
Red To Avoid Left Turn Trap			
Rest In Red	No		

Intersection 644 at Woodmen Rd and Mohawk Rd - Coordination table, plans 1-2

	_____111	Cycle Length	0			Alternate	Alternate	Alternate	No Ped
Plan 1	123456789012	Offset 1	0	Phases	Splits	Mins	Walks	Maxes	Splits
Coordinated		Offset 2	0	1	0	0	0	0	0
Phases		Offset 3	0	2	0	0	0	0	0
Secondary		Offset 4	0	3	0	0	0	0	0
Coordinated		Relative Secondary Offset	0	4	0	0	0	0	0
Phases		Permissive Period	Auto	5	0	0	0	0	0
Extra Time		Max Cycle Addition	0	6	0	0	0	0	0
Phases		Max Cycle Subtraction	0	7	0	0	0	0	0
Additional		Coord Actuated Period	0	8	0	0	0	0	0
Max Recalls		Top Of Cycle Green Point	End	9	0	0	0	0	0
Units	Seconds	Big Bang Preempt Recvry	No	10	0	0	0	0	0
		Big Bang Ped Recovery	No	11	0	0	0	0	0
		Min Lagging Left Split	0%	12	0	0	0	0	0
	_____111	Cycle Length	110			Alternate	Alternate	Alternate	No Ped
Plan 2	123456789012	Offset 1	77	Phases	Splits	Mins	Walks	Maxes	Splits
Coordinated		Offset 2	0	1	17	0	0	17	17
Phases	2 6	Offset 3	0	2	77	0	0	89	77
Secondary		Offset 4	0	3	0	0	0	0	0
Coordinated		Relative Secondary Offset	0	4	16	4	0	13	16
Phases		Permissive Period	Auto	5	17	0	0	17	17
Extra Time		Max Cycle Addition	36	6	77	0	0	89	77
Phases		Max Cycle Subtraction	0	7	0	0	0	0	0
Additional		Coord Actuated Period	0	8	16	4	0	13	16
Max Recalls		Top Of Cycle Green Point	End	9	0	0	0	0	0
Units	Seconds	Big Bang Preempt Recvry	No	10	0	0	0	0	0
		Big Bang Ped Recovery	No	11	0	0	0	0	0
		Min Lagging Left Split	0%	12	0	0	0	0	0

Intersection 644 at Woodmen Rd and Mohawk Rd - Coordination table, plans 1-2

Alternate Maxes

Intersection 644 at Woodmen Rd and Mohawk Rd - Coordination table, plans 3-4

	_____111	Cycle Length	110			Alternate	Alternate	Alternate	No Ped
Plan 3	123456789012	Offset 1	52	Phases	Splits	Mins	Walks	Maxes	Splits
Coordinated		Offset 2	0	1	17	0	0	17	17
Phases	_2___6_____	Offset 3	0	2	65	0	0	74	65
Secondary		Offset 4	0	3	0	0	0	0	0
Coordinated		Relative Secondary Offset	0	4	28	0	0	28	28
Phases		Permissive Period	Auto	5	17	0	0	17	17
Extra Time		Max Cycle Addition	36	6	65	0	0	74	65
Phases		Max Cycle Subtraction	0	7	0	0	0	0	0
Additional		Coord Actuated Period	0	8	28	0	0	28	28
Max Recalls		Top Of Cycle Green Point	End	9	0	0	0	0	0
Units	Seconds	Big Bang Preempt Recvry	No	10	0	0	0	0	0
		Big Bang Ped Recovery	No	11	0	0	0	0	0
		Min Lagging Left Split	0%	12	0	0	0	0	0
	_____111	Cycle Length	120			Alternate	Alternate	Alternate	No Ped
Plan 4	123456789012	Offset 1	72	Phases	Splits	Mins	Walks	Maxes	Splits
Coordinated		Offset 2	0	1	19	0	0	19	19
Phases	2___6_____	Offset 3	0	2	56	0	0	63	56
Secondary		Offset 4	0	3	0	0	0	0	0
Coordinated		Relative Secondary Offset	0	4	45	0	0	49	45
Phases		Permissive Period	Auto	5	19	0	0	19	19
Extra Time		Max Cycle Addition	40	6	56	0	0	63	56
Phases		Max Cycle Subtraction	0	7	0	0	0	0	0
Additional		Coord Actuated Period	0	8	45	0	0	49	45
Max Recalls		Top Of Cycle Green Point	End	9	0	0	0	0	0
Units	Seconds	Big Bang Preempt Recvry	No	10	0	0	0	0	0
		Big Bang Ped Recovery	No	11	0	0	0	0	0
		Min Lagging Left Split	0%	12	0	0	0	0	0

Intersection 644 at Woodmen Rd and Mohawk Rd - Coordination table, plans 3-4

Alternate Maxes

Intersection 644 at Woodmen Rd and Mohawk Rd - Coordination table, plans 5-6

	_____111	Cycle Length	120			Alternate	Alternate	Alternate	No Ped
Plan 5	123456789012	Offset 1	104	Phases	Splits	Mins	Walks	Maxes	Splits
Coordinated		Offset 2	0	1	20	0	0	21	20
Phases	_2___6_____	Offset 3	0	2	60	0	0	68	60
Secondary		Offset 4	0	3	0	0	0	0	0
Coordinated		Relative Secondary Offset	0	4	40	0	0	43	40
Phases		Permissive Period	Auto	5	20	0	0	21	20
Extra Time		Max Cycle Addition	40	6	60	0	0	68	60
Phases		Max Cycle Subtraction	0	7	0	0	0	0	0
Additional		Coord Actuated Period	0	8	40	0	0	43	40
Max Recalls		Top Of Cycle Green Point	End	9	0	0	0	0	0
Units	Seconds	Big Bang Preempt Recvry	No	10	0	0	0	0	0
		Big Bang Ped Recovery	No	11	0	0	0	0	0
		Min Lagging Left Split	0%	12	0	0	0	0	0
	_____111	Cycle Length	90			Alternate	Alternate	Alternate	No Ped
Plan 6	123456789012	Offset 1	63	Phases	Splits	Mins	Walks	Maxes	Splits
Coordinated		Offset 2	0	1	15	0	0	14	15
Phases	2___6_____	Offset 3	0	2	40	0	0	43	40
Secondary		Offset 4	0	3	0	0	0	0	0
Coordinated		Relative Secondary Offset	0	4	35	0	0	36	35
Phases		Permissive Period	Auto	5	15	0	0	14	15
Extra Time		Max Cycle Addition	30	6	40	0	0	43	40
Phases		Max Cycle Subtraction	0	7	0	0	0	0	0
Additional		Coord Actuated Period	0	8	35	0	0	36	35
Max Recalls		Top Of Cycle Green Point	End	9	0	0	0	0	0
Units	Seconds	Big Bang Preempt Recvry	No	10	0	0	0	0	0
		Big Bang Ped Recovery	No	11	0	0	0	0	0
		Min Lagging Left Split	0%	12	0	0	0	0	0

Intersection 644 at Woodmen Rd and Mohawk Rd - Coordination table, plans 5-6

Alternate Maxes

Intersection 644 at Woodmen Rd and Mohawk Rd - Schedule table, events 1-25

Event	Ena-		Event Parameters		Start					Duration	Stop		Repetition		
Num	bled	Event Type	Param 1	Param 2	Mon	Day	Hour	Min	Sec	Minutes	Mon	Day	Repeat	Intervals	Priority
1	Yes	Run Plan	Plan 2	Ofst #1	1	1	05	00	00	300	12	31	Weekly	_MTWTF_	Low
2	Yes	Run Plan	Plan 3	Ofst #1	1	1	10	00	00	240	12	31	Weekly	_MTWTF_	Low
3	Yes	Run Plan	Plan 4	Ofst #1	1	1	14	00	00	480	12	31	Weekly	MTWTF	Very Low
4	Yes	Run Plan	Plan 5	Ofst #1	1	1	10	00	00	600	12	31	Weekly	S S	Low
5	Yes	Run Plan	Plan 6	Ofst #1	1	1	06	00	00	240	12	31	Weekly	S S	Medium
6	Yes	Run Plan	Plan 6	Ofst #1	1	1	18	00	00	240	12	31	Weekly	S S	Medium
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															
21															
22															
23															
24															
25															

APPENDIX B

Local Trip Generation Study

Comments regarding the local trip study that was submitted:
1. If using a local study that another consultant produced, it must have been used in a TIS approved by the County and the project number shall be included. The report narrative shall also include an explanation/justification as to why the study used provides a good trip generation estimate for the proposed use.
2. The local study must be for a comparable land use. Sunflower Landscapes is a landscape yard for a single owner, where a set number of employees arrive and leave with a majority of the equipment stored on site. It is not comparable to a land use where multiple businesses and individuals store equipment, boats, and RVs. The intent listed in the study used is to provide separate, lease-able spaces, for several tenants rather than a single tenant.owner. 24-hour access also does not characterize the proposed business...trips are concentrated during business hours and are not spread out over a 24-hour period.
3. If intending to perform your own local study for the next submittal, please survey at least 3 sites and follow ITE's guidlines for a local study.

LSC estimates of trip-generation rates for a "General Outdoor Storage Yard" land use for this project have been based on data collected at similar sites in Colorado Springs and Arapahoe County, CO.

A "General Outdoor Storage Yard" land use is a commercial business which provides leasable outdoor spaces for businesses, including construction and industrial businesses, contractors, and others needing space store and vehicles, equipment, large machinery, materials, etc. The tenants are commonly, but not limited to, maintenance contractors, design-build contractors, and other contractors needing properly zoned storage space. The intent is to provide separate leasable spaces for several tenants, rather than for a single tenant.

Generally, this use does not include permanent buildings such as offices, warehouses or maintenance shops, although one of the sites counted did have a building on the site. As permanent buildings are not typically included, the independent/predictor variable used is "Acres."

The businesses may offer 24-hour access with a gate and access keypad.

This use is similar to mini warehouse/self-storage but is primarily outdoor storage space for businesses and contractors, generally without permanent buildings. The use is also similar to outdoor RV/Boat storage and some of the sites surveyed allow for lease of space for RVs and boats and appear to provide vehicle parking spaces. However, this use allows for storage of materials and equipment other than or in addition to vehicles/trailers and has fenced off yard areas for storage in addition to vehicle/trailer parking spaces and is primarily intended for lease by contractors.

The data and average trip-generation rates are summarized in the following table:

ITE Code	Land Use	Survey Location	Value	Units [1]	Driveway Trips Counted[1]					Calculated Trip Generation Rates				
						A.M. Peak Hour		P.M. Peak Hour			A.M. Peak Hour		P.M. Peak Hour	
					Weekday	In	Out	In	Out	Weekday	In	Out	In	Out
N/A	General Outdoor Storage	Site No. 1 - Colorado Springs, CO	8.7	Acres	350	27	21	11	11	40.28	3.11	2.42	1.27	1.27
N/A	General Outdoor Storage	Site No. 2 - Arapahoe County, CO	9.8	Acres	517	13	10	45	28	52.76	1.33	1.02	4.59	2.86
N/A	General Outdoor Storage	Site No. 3 - Arapahoe County, CO	5.5	Acres	110	9	3	4	6	20.00	1.64	0.55	0.73	1.09
									Average	37.68	2.02	1.33	2.19	1.74

[1] Source: local entering and exiting count data at contractor storage yards in Colorado Springs, CO and Araphoe County, CO in October and November 2023

LSC estimates of trip-generation rates shown in the table above have been used to estimate the trip generation for the General Outdoor Storage land use for this project.

LSC #S234310
Feb 21, 2024

APPENDIX C

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 D

Capacity Worksheets

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	766	24	2	1543	18	1	0	2	20	1	48
Future Volume (vph)	34	766	24	2	1543	18	1	0	2	20	1	48
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	3433	1863	1583	1770	1589	0
Flt Permitted	0.950			0.950			0.722			0.757		
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	2609	1863	1583	1410	1589	0
Satd. Flow (RTOR)			99			99			326		52	
Lane Group Flow (vph)	37	833	26	2	1677	20	1	0	2	22	53	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm		Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	10.0	17.5	17.5	10.0	17.5	17.5	14.0	14.0	14.0	14.0	14.0	
Total Split (s)	17.0	77.0	77.0	17.0	77.0	77.0	16.0	16.0	16.0	16.0	16.0	
Total Split (%)	15.5%	70.0%	70.0%	15.5%	70.0%	70.0%	14.5%	14.5%	14.5%	14.5%	14.5%	
Yellow Time (s)	3.0	5.5	5.5	3.0	5.5	5.5	6.0	6.0	6.0	6.0	6.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	7.5	7.5	5.0	7.5	7.5	8.0	8.0	8.0	8.0	8.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	None	None	None	C-Max	C-Max	None	None	None	None	None	
Act Effct Green (s)	7.8	89.5	89.5	5.7	83.4	83.4	7.0		7.0	7.0	7.0	
Actuated g/C Ratio	0.07	0.81	0.81	0.05	0.76	0.76	0.06		0.06	0.06	0.06	
v/c Ratio	0.30	0.20	0.02	0.02	0.44	0.02	0.01		0.00	0.24	0.35	
Control Delay (s/veh)	53.9	3.5	0.0	50.0	7.4	0.0	47.0		0.0	55.4	20.8	
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)	53.9	3.5	0.0	50.0	7.4	0.0	47.0		0.0	55.4	20.8	
LOS	D	A	A	D	A	A	D		A	E	C	
Approach Delay (s/veh)		5.5			7.3			15.7			30.9	
Approach LOS		A			A			B			C	
Queue Length 50th (ft)	26	42	0	1	189	0	0		0	15	1	
Queue Length 95th (ft)	59	91	0	10	248	0	3		0	42	41	
Internal Link Dist (ft)		438			432			595			160	
Turn Bay Length (ft)	300		400	315		375	195		150	35		
Base Capacity (vph)	193	4138	1306	193	3854	1223	189		417	102	163	
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	0.19	0.20	0.02	0.01	0.44	0.02	0.01		0.00	0.22	0.33	

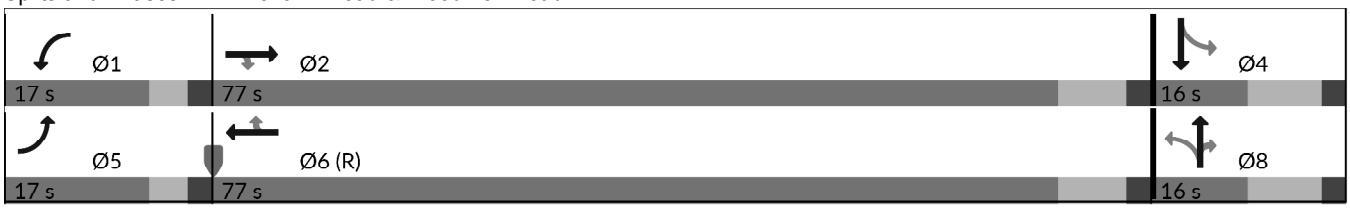
Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 77 (70%), Referenced to phase 6:WBT, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.44

Intersection Signal Delay (s/veh): 7.4	Intersection LOS: A
Intersection Capacity Utilization 50.5%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Mohawk Road & Woodmen Road



Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	8	20	32	6	0	9	31	14	0	20	1
Future Vol, veh/h	0	8	20	32	6	0	9	31	14	0	20	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	25	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	9	22	35	7	0	10	34	15	0	22	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	79	91	22	87	84	41	23	0	0	49	0	0
Stage 1	22	22	-	61	61	-	-	-	-	-	-	-
Stage 2	57	68	-	26	23	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	910	799	1055	899	806	1030	1592	-	-	1558	-	-
Stage 1	996	877	-	950	844	-	-	-	-	-	-	-
Stage 2	955	838	-	991	876	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	897	794	1055	865	802	1030	1592	-	-	1558	-	-
Mov Cap-2 Maneuver	897	794	-	865	802	-	-	-	-	-	-	-
Stage 1	996	877	-	945	839	-	-	-	-	-	-	-
Stage 2	942	833	-	961	876	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	8.85	9.43	1.21	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1592	-	-	964	855	1558	-	-
HCM Lane V/C Ratio	0.006	-	-	0.032	0.048	-	-	-
HCM Ctrl Dly (s/v)	7.3	-	-	8.9	9.4	0	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	1857	1	1	1259	17	2	0	0	15	0	44
Future Volume (vph)	39	1857	1	1	1259	17	2	0	0	15	0	44
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	3433	1863	1863	1770	1583	0
Flt Permitted	0.950			0.950			0.726			0.757		
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	2624	1863	1863	1410	1583	0
Satd. Flow (RTOR)			91			91					252	
Lane Group Flow (vph)	42	2018	1	1	1368	18	2	0	0	16	48	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm		Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	10.0	17.5	17.5	10.0	17.5	17.5	14.0	14.0	14.0	14.0	14.0	
Total Split (s)	19.0	56.0	56.0	19.0	56.0	56.0	45.0	45.0	45.0	45.0	45.0	
Total Split (%)	15.8%	46.7%	46.7%	15.8%	46.7%	46.7%	37.5%	37.5%	37.5%	37.5%	37.5%	
Yellow Time (s)	3.0	5.5	5.5	3.0	5.5	5.5	6.0	6.0	6.0	6.0	6.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	7.5	7.5	5.0	7.5	7.5	8.0	8.0	8.0	8.0	8.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	None	None	None	C-Max	C-Max	None	None	None	None	None	
Act Effct Green (s)	8.3	99.5	99.5	5.6	90.5	90.5	7.1			7.1	7.1	
Actuated g/C Ratio	0.07	0.83	0.83	0.05	0.75	0.75	0.06			0.06	0.06	
v/c Ratio	0.34	0.48	0.00	0.01	0.36	0.01	0.01			0.19	0.15	
Control Delay (s/veh)	60.1	4.7	0.0	55.0	7.1	0.0	52.0			58.4	0.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0	
Total Delay (s/veh)	60.1	4.7	0.0	55.0	7.1	0.0	52.0			58.4	0.9	
LOS	E	A	A	D	A	A	D			E	A	
Approach Delay (s/veh)		5.9			7.0			52.0			15.3	
Approach LOS		A			A			D			B	
Queue Length 50th (ft)	32	141	0	1	142	0	1			12	0	
Queue Length 95th (ft)	69	292	0	7	197	0	5			36	0	
Internal Link Dist (ft)		418			402			595			160	
Turn Bay Length (ft)	300		400	315		375	195			35		
Base Capacity (vph)	206	4214	1327	206	3833	1215	809			434	662	
Starvation Cap Reductn	0	0	0	0	0	0	0			0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0			0	0	
Storage Cap Reductn	0	0	0	0	0	0	0			0	0	
Reduced v/c Ratio	0.20	0.48	0.00	0.00	0.36	0.01	0.00			0.04	0.07	

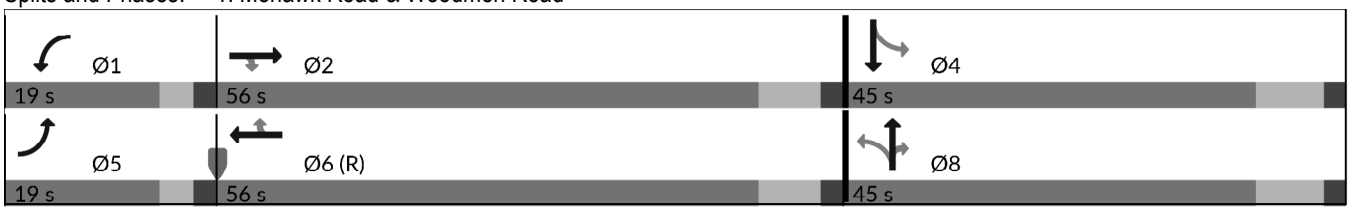
Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 72 (60%), Referenced to phase 6:WBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.48

Intersection Signal Delay (s/veh): 6.5	Intersection LOS: A
Intersection Capacity Utilization 56.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 1: Mohawk Road & Woodmen Road



Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	2	14	20	1	2	10	42	15	1	25	1
Future Vol, veh/h	1	2	14	20	1	2	10	42	15	1	25	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	25	-	-	-	-	-
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	1	2	15	22	1	2	11	46	16	1	27	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	98	114	28	106	106	54	28	0	0	62	0	0
Stage 1	30	30	-	76	76	-	-	-	-	-	-	-
Stage 2	68	84	-	30	30	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	884	777	1048	874	784	1013	1585	-	-	1541	-	-
Stage 1	987	870	-	934	832	-	-	-	-	-	-	-
Stage 2	942	825	-	986	870	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	874	771	1048	852	778	1013	1585	-	-	1541	-	-
Mov Cap-2 Maneuver	874	771	-	852	778	-	-	-	-	-	-	-
Stage 1	986	870	-	927	826	-	-	-	-	-	-	-
Stage 2	933	820	-	969	869	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	8.69	9.31	1.09	0.27
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1585	-	-	994	860	66	-	-
HCM Lane V/C Ratio	0.007	-	-	0.019	0.029	0.001	-	-
HCM Ctrl Dly (s/v)	7.3	-	-	8.7	9.3	7.3	0	-
HCM Lane LOS	A	-	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

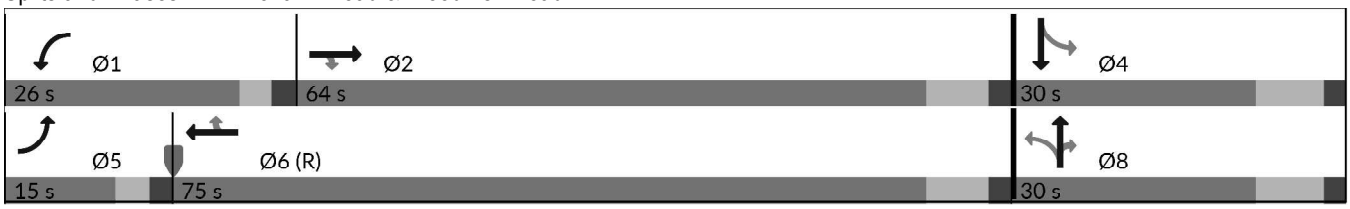
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	1405	141	171	2207	19	311	5	153	21	8	71
Future Volume (vph)	42	1405	141	171	2207	19	311	5	153	21	8	71
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	3433	1863	1583	1770	1613	0
Flt Permitted	0.950			0.950			0.701			0.754		
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	2533	1863	1583	1405	1613	0
Satd. Flow (RTOR)			153			91			166		77	
Lane Group Flow (vph)	46	1527	153	186	2399	21	338	5	166	23	86	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	10.0	17.5	17.5	10.0	17.5	17.5	14.0	14.0	14.0	14.0	14.0	
Total Split (s)	15.0	64.0	64.0	26.0	75.0	75.0	30.0	30.0	30.0	30.0	30.0	
Total Split (%)	12.5%	53.3%	53.3%	21.7%	62.5%	62.5%	25.0%	25.0%	25.0%	25.0%	25.0%	
Yellow Time (s)	3.0	5.5	5.5	3.0	5.5	5.5	6.0	6.0	6.0	6.0	6.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	7.5	7.5	5.0	7.5	7.5	8.0	8.0	8.0	8.0	8.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	Max	Max	None	C-Max	C-Max	None	None	None	None	None	
Act Effct Green (s)	8.2	62.6	62.6	17.1	73.6	73.6	19.8	19.8	19.8	19.8	19.8	
Actuated g/C Ratio	0.07	0.52	0.52	0.14	0.61	0.61	0.17	0.17	0.17	0.17	0.17	
v/c Ratio	0.38	0.58	0.17	0.74	0.77	0.02	0.81	0.02	0.42	0.10	0.26	
Control Delay (s/veh)	62.0	21.6	3.2	66.2	20.5	0.1	63.7	40.6	9.6	42.4	13.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay (s/veh)	62.0	21.6	3.2	66.2	20.5	0.1	63.7	40.6	9.6	42.4	13.4	
LOS	E	C	A	E	C	A	E	D	A	D	B	
Approach Delay (s/veh)		21.1			23.6			45.9			19.5	
Approach LOS		C			C			D			B	
Queue Length 50th (ft)	35	301	0	141	517	0	131	3	0	15	6	
Queue Length 95th (ft)	75	376	37	217	617	0	185	15	61	40	52	
Internal Link Dist (ft)		438			412			595			160	
Turn Bay Length (ft)	300		400	315		375	165		165	35		
Base Capacity (vph)	147	2650	898	309	3118	1006	464	341	425	257	358	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.31	0.58	0.17	0.60	0.77	0.02	0.73	0.01	0.39	0.09	0.24	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 6:WBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay (s/veh): 24.9	Intersection LOS: C
Intersection Capacity Utilization 79.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 1: Mohawk Road & Woodmen Road



Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	8	21	54	6	0	9	32	22	0	21	1
Future Vol, veh/h	0	8	21	54	6	0	9	32	22	0	21	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	25	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	9	23	59	7	0	10	35	24	0	23	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	81	102	23	93	90	47	24	0	0	59	0	0
Stage 1	23	23	-	66	66	-	-	-	-	-	-	-
Stage 2	58	78	-	27	24	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	907	788	1053	890	800	1023	1591	-	-	1545	-	-
Stage 1	995	876	-	944	840	-	-	-	-	-	-	-
Stage 2	954	830	-	990	875	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	894	784	1053	856	795	1023	1591	-	-	1545	-	-
Mov Cap-2 Maneuver	894	784	-	856	795	-	-	-	-	-	-	-
Stage 1	995	876	-	938	835	-	-	-	-	-	-	-
Stage 2	941	825	-	959	875	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	8.87	9.59	1.04	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1591	-	-	962	849	1545	-	-
HCM Lane V/C Ratio	0.006	-	-	0.033	0.077	-	-	-
HCM Ctrl Dly (s/v)	7.3	-	-	8.9	9.6	0	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	64	3074	153	176	2365	18	177	4	115	16	6	60
Future Volume (vph)	64	3074	153	176	2365	18	177	4	115	16	6	60
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	3433	1863	1583	1770	1611	0
Flt Permitted	0.950			0.950			0.710			0.755		
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	2566	1863	1583	1406	1611	0
Satd. Flow (RTOR)			166			91			125		65	
Lane Group Flow (vph)	70	3341	166	191	2571	20	192	4	125	17	72	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	10.0	17.5	17.5	10.0	17.5	17.5	14.0	14.0	14.0	14.0	14.0	
Total Split (s)	19.0	86.0	86.0	18.0	85.0	85.0	16.0	16.0	16.0	16.0	16.0	
Total Split (%)	15.8%	71.7%	71.7%	15.0%	70.8%	70.8%	13.3%	13.3%	13.3%	13.3%	13.3%	
Yellow Time (s)	3.0	5.5	5.5	3.0	5.5	5.5	6.0	6.0	6.0	6.0	6.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	7.5	7.5	5.0	7.5	7.5	8.0	8.0	8.0	8.0	8.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	Max	Max	None	C-Max	C-Max	None	None	None	None	None	
Act Effct Green (s)	10.1	78.5	78.5	13.0	83.6	83.6	8.0	8.0	8.0	8.0	8.0	
Actuated g/C Ratio	0.08	0.65	0.65	0.11	0.70	0.70	0.07	0.07	0.07	0.07	0.07	
v/c Ratio	0.47	1.00	0.15	1.00	0.73	0.02	1.12	0.03	0.56	0.18	0.43	
Control Delay (s/veh)	62.0	37.8	1.5	119.0	13.7	0.1	156.0	53.0	19.7	57.8	23.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay (s/veh)	62.0	37.8	1.5	119.0	13.7	0.1	156.0	53.0	19.7	57.8	23.6	
LOS	E	D	A	F	B	A	F	D	B	E	C	
Approach Delay (s/veh)		36.6			20.8			101.6			30.1	
Approach LOS		D			C			F			C	
Queue Length 50th (ft)	53	~906	0	153	438	0	~89	3	0	13	5	
Queue Length 95th (ft)	100	#1087	23	#308	554	0	#168	15	61	38	53	
Internal Link Dist (ft)		438			402			595			160	
Turn Bay Length (ft)	300		400	315		375	165		165	35		
Base Capacity (vph)	206	3326	1092	191	3544	1130	171	124	222	93	168	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.34	1.00	0.15	1.00	0.73	0.02	1.12	0.03	0.56	0.18	0.43	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 72 (60%), Referenced to phase 6:WBT, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated

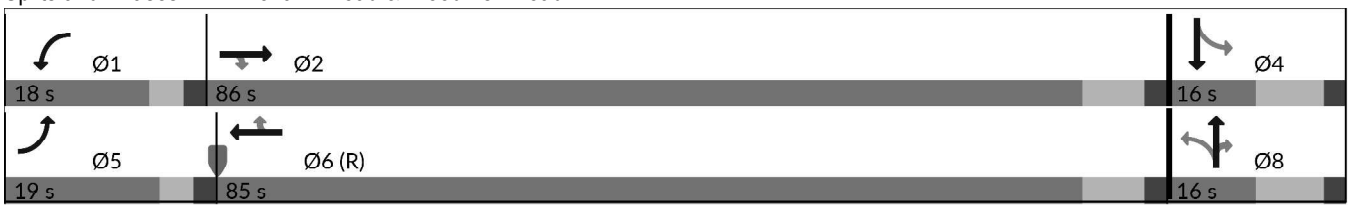
Maximum v/c Ratio: 1.12

Intersection Signal Delay (s/veh): 33.1	Intersection LOS: C
Intersection Capacity Utilization 97.9%	ICU Level of Service F
Analysis Period (min) 15	

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

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

Splits and Phases: 1: Mohawk Road & Woodmen Road



Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	2	15	35	1	2	10	44	39	1	26	1
Future Vol, veh/h	1	2	15	35	1	2	10	44	39	1	26	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	25	-	-	-	-	-
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	1	2	16	38	1	2	11	48	42	1	28	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	101	143	29	122	122	69	29	0	0	90	0	0
Stage 1	31	31	-	91	91	-	-	-	-	-	-	-
Stage 2	70	112	-	32	32	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	880	748	1046	852	768	994	1584	-	-	1505	-	-
Stage 1	986	869	-	916	820	-	-	-	-	-	-	-
Stage 2	940	803	-	985	869	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	870	743	1046	830	762	994	1584	-	-	1505	-	-
Mov Cap-2 Maneuver	870	743	-	830	762	-	-	-	-	-	-	-
Stage 1	985	869	-	910	814	-	-	-	-	-	-	-
Stage 2	930	797	-	966	868	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	8.71	9.53	0.78	0.26
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1584	-	-	990	836	64	-	-
HCM Lane V/C Ratio	0.007	-	-	0.02	0.049	0.001	-	-
HCM Ctrl Dly (s/v)	7.3	-	-	8.7	9.5	7.4	0	-
HCM Lane LOS	A	-	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	1405	141	171	2207	24	311	5	153	23	8	74
Future Volume (vph)	49	1405	141	171	2207	24	311	5	153	23	8	74
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	3433	1863	1583	1770	1611	0
Flt Permitted	0.950			0.950			0.699			0.754		
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	2526	1863	1583	1405	1611	0
Satd. Flow (RTOR)			153			91			166		80	
Lane Group Flow (vph)	53	1527	153	186	2399	26	338	5	166	25	89	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	10.0	17.5	17.5	10.0	17.5	17.5	14.0	14.0	14.0	14.0	14.0	
Total Split (s)	15.0	64.0	64.0	26.0	75.0	75.0	30.0	30.0	30.0	30.0	30.0	
Total Split (%)	12.5%	53.3%	53.3%	21.7%	62.5%	62.5%	25.0%	25.0%	25.0%	25.0%	25.0%	
Yellow Time (s)	3.0	5.5	5.5	3.0	5.5	5.5	6.0	6.0	6.0	6.0	6.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	7.5	7.5	5.0	7.5	7.5	8.0	8.0	8.0	8.0	8.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	Max	Max	None	C-Max	C-Max	None	None	None	None	None	
Act Effct Green (s)	8.4	62.5	62.5	17.1	73.3	73.3	19.8	19.8	19.8	19.8	19.8	
Actuated g/C Ratio	0.07	0.52	0.52	0.14	0.61	0.61	0.17	0.17	0.17	0.17	0.17	
v/c Ratio	0.43	0.58	0.17	0.74	0.77	0.03	0.81	0.02	0.42	0.11	0.27	
Control Delay (s/veh)	63.6	21.7	3.2	66.2	20.8	0.0	63.7	40.6	9.6	42.6	13.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay (s/veh)	63.6	21.7	3.2	66.2	20.8	0.0	63.7	40.6	9.6	42.6	13.2	
LOS	E	C	A	E	C	A	E	D	A	D	B	
Approach Delay (s/veh)		21.3			23.8			45.9			19.6	
Approach LOS		C			C			D			B	
Queue Length 50th (ft)	41	301	0	141	524	0	131	3	0	17	6	
Queue Length 95th (ft)	84	376	37	217	617	0	185	15	61	43	52	
Internal Link Dist (ft)		438			412			595			160	
Turn Bay Length (ft)	300		400	315		375	165		165	35		
Base Capacity (vph)	147	2649	897	309	3107	1002	463	341	425	257	360	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.36	0.58	0.17	0.60	0.77	0.03	0.73	0.01	0.39	0.10	0.25	

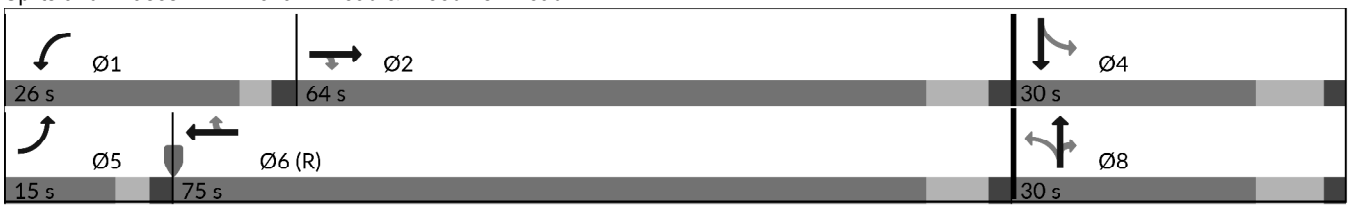
Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 6:WBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay (s/veh): 25.1	Intersection LOS: C
Intersection Capacity Utilization 79.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 1: Mohawk Road & Woodmen Road



Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	8	21	54	6	0	9	44	22	0	26	1
Future Vol, veh/h	1	8	21	54	6	0	9	44	22	0	26	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	25	-	-	-	-	-
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	1	9	23	59	7	0	10	48	24	0	28	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	99	120	29	112	109	60	29	0	0	72	0	0
Stage 1	29	29	-	79	79	-	-	-	-	-	-	-
Stage 2	71	91	-	33	29	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	882	770	1046	866	781	1006	1584	-	-	1528	-	-
Stage 1	988	871	-	929	829	-	-	-	-	-	-	-
Stage 2	939	819	-	984	871	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	869	765	1046	832	777	1006	1584	-	-	1528	-	-
Mov Cap-2 Maneuver	869	765	-	832	777	-	-	-	-	-	-	-
Stage 1	988	871	-	924	824	-	-	-	-	-	-	-
Stage 2	926	814	-	953	871	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	8.94	9.73	0.87	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1584	-	-	947	826	1528	-	-
HCM Lane V/C Ratio	0.006	-	-	0.034	0.079	-	-	-
HCM Ctrl Dly (s/v)	7.3	-	-	8.9	9.7	0	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.3	0	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	2	9	36	25	0
Future Vol, veh/h	0	2	9	36	25	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	2	10	39	27	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	86	27	27	0	-	0
Stage 1	27	-	-	-	-	-
Stage 2	59	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	915	1048	1587	-	-	-
Stage 1	995	-	-	-	-	-
Stage 2	964	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	910	1048	1587	-	-	-
Mov Cap-2 Maneuver	910	-	-	-	-	-
Stage 1	989	-	-	-	-	-
Stage 2	964	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	8.44	1.46	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	360	-	1048	-	-
HCM Lane V/C Ratio	0.006	-	0.002	-	-
HCM Ctrl Dly (s/v)	7.3	0	8.4	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.9

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

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	67	24	24	0	-	0
Stage 1	24	-	-	-	-	-
Stage 2	43	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	938	1053	1591	-	-	-
Stage 1	999	-	-	-	-	-
Stage 2	979	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	935	1053	1591	-	-	-
Mov Cap-2 Maneuver	935	-	-	-	-	-
Stage 1	996	-	-	-	-	-
Stage 2	979	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	8.43	0.81	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	200	-	1053	-	-
HCM Lane V/C Ratio	0.003	-	0.003	-	-
HCM Ctrl Dly (s/v)	7.3	0	8.4	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	3074	153	176	2365	22	177	4	115	21	6	67
Future Volume (vph)	70	3074	153	176	2365	22	177	4	115	21	6	67
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	3433	1863	1583	1770	1608	0
Flt Permitted	0.950			0.950			0.705			0.755		
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	2548	1863	1583	1406	1608	0
Satd. Flow (RTOR)			166			91			125		73	
Lane Group Flow (vph)	76	3341	166	191	2571	24	192	4	125	23	80	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	10.0	17.5	17.5	10.0	17.5	17.5	14.0	14.0	14.0	14.0	14.0	
Total Split (s)	19.0	86.0	86.0	18.0	85.0	85.0	16.0	16.0	16.0	16.0	16.0	
Total Split (%)	15.8%	71.7%	71.7%	15.0%	70.8%	70.8%	13.3%	13.3%	13.3%	13.3%	13.3%	
Yellow Time (s)	3.0	5.5	5.5	3.0	5.5	5.5	6.0	6.0	6.0	6.0	6.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	7.5	7.5	5.0	7.5	7.5	8.0	8.0	8.0	8.0	8.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	Max	Max	None	C-Max	C-Max	None	None	None	None	None	
Act Effct Green (s)	10.4	78.5	78.5	13.0	83.4	83.4	8.0	8.0	8.0	8.0	8.0	
Actuated g/C Ratio	0.09	0.65	0.65	0.11	0.70	0.70	0.07	0.07	0.07	0.07	0.07	
v/c Ratio	0.50	1.00	0.15	1.00	0.73	0.02	1.14	0.03	0.56	0.25	0.46	
Control Delay (s/veh)	62.9	37.8	1.5	119.0	13.8	0.0	160.3	53.0	19.7	60.1	23.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay (s/veh)	62.9	37.8	1.5	119.0	13.8	0.0	160.3	53.0	19.7	60.1	23.3	
LOS	E	D	A	F	B	A	F	D	B	E	C	
Approach Delay (s/veh)		36.6			20.9			104.2			31.5	
Approach LOS		D			C			F			C	
Queue Length 50th (ft)	58	~906	0	153	443	0	~90	3	0	18	5	
Queue Length 95th (ft)	107	#1087	23	#308	554	0	#169	15	61	46	56	
Internal Link Dist (ft)		438			402			595			160	
Turn Bay Length (ft)	300		400	315		375	165		165	35		
Base Capacity (vph)	206	3326	1092	191	3535	1128	169	124	222	93	175	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.37	1.00	0.15	1.00	0.73	0.02	1.14	0.03	0.56	0.25	0.46	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 6:WBT, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated

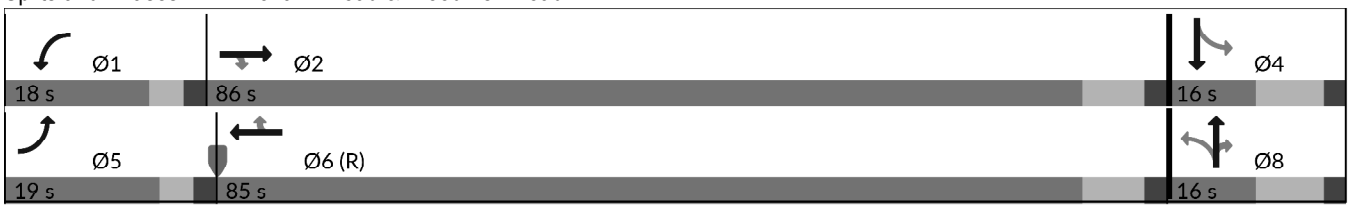
Maximum v/c Ratio: 1.14

Intersection Signal Delay (s/veh): 33.3	Intersection LOS: C
Intersection Capacity Utilization 97.9%	ICU Level of Service F
Analysis Period (min) 15	

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

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

Splits and Phases: 1: Mohawk Road & Woodmen Road



Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	2	15	35	1	2	10	54	39	1	38	2
Future Vol, veh/h	1	2	15	35	1	2	10	54	39	1	38	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	25	-	-	-	-	-
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	1	2	16	38	1	2	11	59	42	1	41	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	126	167	42	146	147	80	43	0	0	101	0	0
Stage 1	45	45	-	102	102	-	-	-	-	-	-	-
Stage 2	81	123	-	45	46	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	848	725	1028	822	744	980	1565	-	-	1491	-	-
Stage 1	969	858	-	904	811	-	-	-	-	-	-	-
Stage 2	927	794	-	969	857	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	839	720	1028	801	738	980	1565	-	-	1491	-	-
Mov Cap-2 Maneuver	839	720	-	801	738	-	-	-	-	-	-	-
Stage 1	969	857	-	898	805	-	-	-	-	-	-	-
Stage 2	918	789	-	951	856	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	8.79	9.7	0.71	0.18
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1565	-	-	970	807	43	-	-
HCM Lane V/C Ratio	0.007	-	-	0.02	0.051	0.001	-	-
HCM Ctrl Dly (s/v)	7.3	-	-	8.8	9.7	7.4	0	-
HCM Lane LOS	A	-	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	9	5	52	32	0
Future Vol, veh/h	0	9	5	52	32	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	115	-	-	-
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	10	5	57	35	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	102	35	35	0	-	0
Stage 1	35	-	-	-	-	-
Stage 2	67	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	896	1038	1577	-	-	-
Stage 1	988	-	-	-	-	-
Stage 2	955	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	893	1038	1577	-	-	-
Mov Cap-2 Maneuver	893	-	-	-	-	-
Stage 1	984	-	-	-	-	-
Stage 2	955	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	8.5	0.64	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1577	-	1038	-	-
HCM Lane V/C Ratio	0.003	-	0.009	-	-
HCM Ctrl Dly (s/v)	7.3	-	8.5	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	4	5	47	28	0
Future Vol, veh/h	0	4	5	47	28	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	4	5	51	30	0

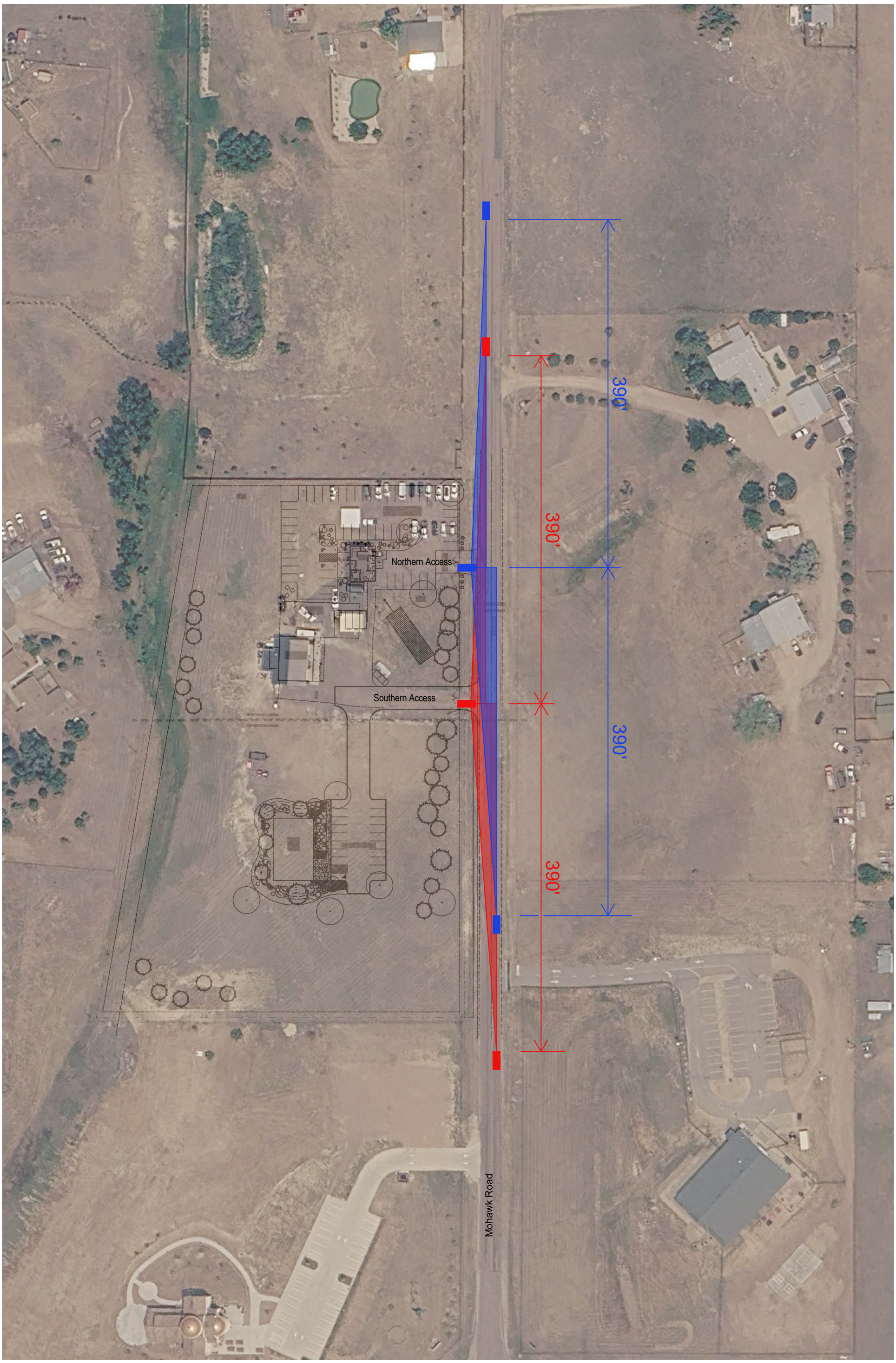
Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	92	30	30	0	-	0
Stage 1	30	-	-	-	-	-
Stage 2	62	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	908	1044	1582	-	-	-
Stage 1	992	-	-	-	-	-
Stage 2	961	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	904	1044	1582	-	-	-
Mov Cap-2 Maneuver	904	-	-	-	-	-
Stage 1	989	-	-	-	-	-
Stage 2	961	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	8.46	0.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	173	-	1044	-	-
HCM Lane V/C Ratio	0.003	-	0.004	-	-
HCM Ctrl Dly (s/v)	7.3	0	8.5	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

APPENDIX E

Sight Distance Exhibit



SUNFLOWER LANDSCAPES
Conceptual Sight Distance Exhibit

August 2026

SM ROCHA, LLC
Traffic & Transportation Engineering

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North