

TRAFFIC IMPACT STUDY

For

**Peacock Ranch South
Colorado Springs, Colorado**

August 2026

Prepared for:

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Prepared by:

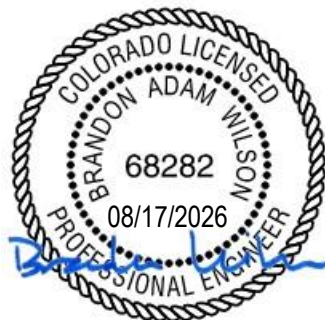


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26-012581

Traffic Engineer's Statement

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



08/17/2026

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.

James Morley
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Date

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I. Introduction

Project Overview

This traffic impact study is provided as a planning document and addresses the capacity, geometric, and control requirements associated with the development entitled Peacock Ranch South. This analysis was prepared in accordance with Appendix A of the City's Traffic Criteria Manual¹ and Appendix B of the County's Engineering Criteria Manual (ECM)².

This proposed land use plan and zone change application consists of a residential community and is located near the northwest corner of Tutt Boulevard and Cowpoke Road in Colorado Springs, Colorado.

Study Area Boundaries

The study area to be examined in this analysis encompasses the area bounded by Woodmen Road north to Research Parkway, N Powers Boulevard (State Highway 21) east to Black Forest Road, and includes proposed site access drives.

Figure 1 illustrates location of the site and study intersections.

Site Description

Land for the development is approximately 50 acres in size and predominantly vacant. The development site is located within unincorporated El Paso County and is surrounded by a mix of residential and commercial land uses.

The proposed development will annex the site into the City of Colorado Springs which will be developed with detached and attached single-family homes up to 5 dwelling units per acres.

Proposed access to the development is provided via the extensions of adjacent residential (local) roadways into the site, including Noreen Falls Drive, James Creek Drive, Roaring Fork Drive, and Williams Run Drive.

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

General site and access locations are shown on Figure 1. A land use plan, as prepared by N.E.S., Inc., is shown in Figure 2. This plan is provided for illustrative purposes only.

¹ Engineering Criteria Manual, Section III: Traffic Criteria Manual, City of Colorado Springs City Engineering, July 2010.

² Engineering Criteria Manual, El Paso County, January 9, 2025.



Figure 1
SITE LOCATION
August 2026
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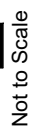
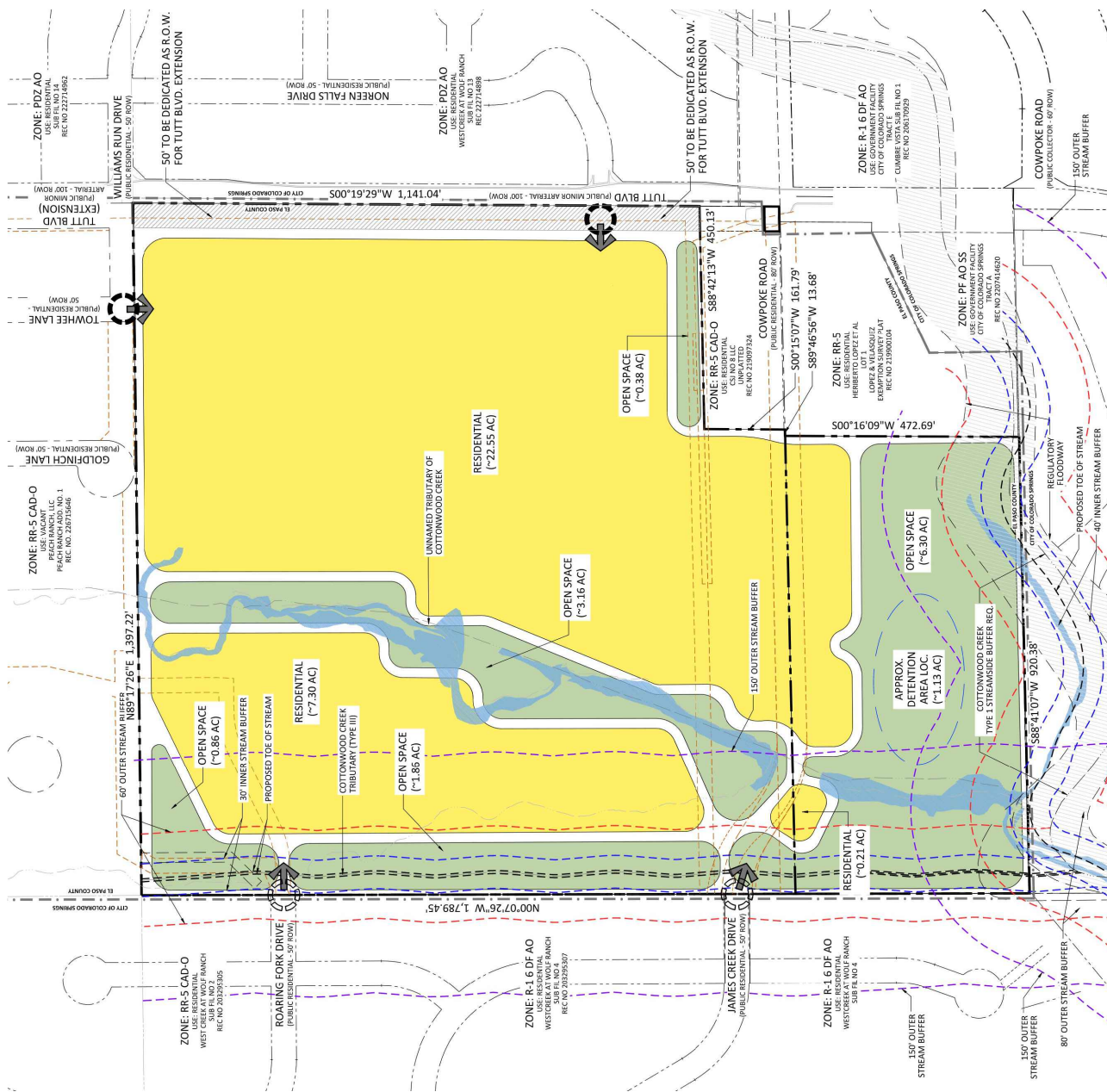


Figure 2

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Existing and Committed Surface Transportation Network

Within the study area, regional access to the proposed development area is provided by way of Woodmen Road, Research Parkway, and Black Forest Road. Local access is provided via Tutt Boulevard, Cowpoke Road, Cross Creek Drive, Roaring Fork Drive, Winding Passage Drive, Jacks Fork Drive, James Creek Drive, Noreen Falls Drive, and Williams Run Drive. A brief description of each roadway, based on the City's Major Thoroughfare Plan (MTP)³ and Traffic Criteria Manual, are provided below:

Woodmen Road is an east-west expressway roadway accommodating a six-lane cross-section (three lanes in each direction) with exclusive turn lanes at the intersection within the study area. Woodmen Road provides a posted speed limit of 45 MPH in either direction.

Research Parkway is an east-west principal arterial roadway accommodating a four-lane cross-section east of Cross Creek Drive (two through lanes in each direction) and a six-lane cross-section west of Cross Creek Drive (three through lanes in each direction). Research Parkway offers exclusive turn lanes at the intersection within the study area and provides a posted speed limit of 35 MPH in either direction east of State Highway 21 and 45 MPH in each direction west of State Highway 21.

Black Forest Road is a north-south principal arterial roadway accommodating a four-lane cross-section (two lanes in each direction) with exclusive turn lanes at the intersection within the study area. Black Forest Road provides a posted speed limit of 45 MPH in either direction.

Tutt Boulevard is a north-south minor arterial roadway accommodating a two-lane cross-section north of Cowpoke Road (one lane in each direction) and a four-lane cross-section south of Cowpoke Road (two lanes in each direction) with exclusive turn lanes at the intersections within the study area. Tutt Boulevard provides a posted speed limit of 35 MPH in each direction.

Cowpoke Road is an east-west roadway accommodating a three-lane cross-section (one through lane in each direction with a center two-way left-turn lane) with exclusive turn lanes at the intersections within the study area. Cowpoke Road is unclassified in municipal transportation plans. However, per Section 15.0 of the City's Traffic Criteria Manual, the roadway's estimated right-of-way (ROW) width, and its connection to adjacent arterial thoroughfares, Cowpoke Road is assumed to be classified as a collector roadway and provides a posted speed limit of 35 MPH in either direction.

³ City of Colorado Springs Major Thoroughfare Plan, City of Colorado Springs, Department of Public Works, May 16, 2025.

Cross Creek Drive is generally a north-south roadway and accommodates a two-lane cross-section (one through lane in each direction) with a combination of shared and exclusive turn lanes at the intersection within the study area. Cross Creek Drive is unclassified in the City's MTP. However, pursuant to Section 15.0 of the City's Traffic Criteria Manual, the roadway's estimated ROW width, and its connection to Research Parkway, Cross Creek Drive is assumed to be classified as a collector roadway and provides a posted speed limit of 25 MPH in either direction. Cross Creek Drive ends at Research Parkway and continues north as Grand Cordera Parkway, a four-lane minor arterial roadway.

Roaring Fork Drive is generally a north-south roadway accommodating a two-lane cross-section (one through lane in each direction) with shared turn lanes at the intersection within the study area. Roaring Fork Drive is unclassified in the City's MTP. However, per Section 15.0 of the City's Traffic Criteria Manual and the roadway's estimated ROW width, Roaring Fork Drive is assumed to be classified as a residential (local) roadway with an anticipated posted speed limit of 25 MPH in either direction.

Jacks Fork Drive is a north-south roadway accommodating a two-lane cross-section (one through lane in each direction) with shared turn lanes at the intersection within the study area. Jacks Fork Drive is unclassified in the City's MTP. However, per Section 15.0 of the City's Traffic Criteria Manual and the roadway's estimated ROW width, Jacks Fork Drive is assumed to be classified as a residential (local) roadway with an anticipated posted speed limit of 25 MPH in either direction.

Winding Passage Drive is generally a north-south roadway accommodating a two-lane cross-section (one through lane in each direction) with shared turn lanes at the intersection within the study area. Winding Passage Drive is unclassified in the City's MTP. However, per Section 15.0 of the City's Traffic Criteria Manual and the roadway's estimated ROW width, Winding Passage Drive is assumed to be classified as a residential (local) roadway with an anticipated posted speed limit of 25 MPH in either direction.

James Creek Drive is generally an east-west roadway accommodating a two-lane cross-section (one through lane in each direction) with shared turn lanes at the intersection within the study area. James Creek Drive is unclassified in the City's MTP. However, per Section 15.0 of the City's Traffic Criteria Manual and the roadway's estimated ROW width, James Creek Drive is assumed to be classified as a residential (local) roadway with an anticipated posted speed limit of 25 MPH in either direction.

Noreen Falls Drive is generally a north-south roadway accommodating a two-lane cross-section (one through lane in each direction) with shared turn lanes at the intersection within the study area. Noreen Falls Drive is unclassified in the City's MTP. However, per Section 15.0 of the City's Traffic Criteria Manual and the roadway's estimated ROW width, Noreen Falls Drive is assumed to be classified as a residential (local) roadway with an anticipated posted speed limit of 25 MPH in either direction.

Williams Run Drive is an east-west roadway accommodating a two-lane cross-section (one through lane in each direction) with shared turn lanes at the intersection within the study area. Williams Run Drive is unclassified in the City's MTP. However, per Section 15.0 of the City's Traffic Criteria Manual and the roadway's estimated ROW width, Williams Run Drive is assumed to be classified as a residential (local) roadway with an anticipated posted speed limit of 25 MPH in either direction.

The study intersections of Research Parkway with Cross Creek Drive, Black Forest Road with Cowpoke Road, and Woodmen Road with Tutt Boulevard, are 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 City's ConnectCOS Transportation Plan⁴, and in conjunction with the Pikes Peak Rural Transportation Authority's (PPRTA) capital projects list, Woodmen Road has plans for improvements from N Powers Boulevard east of U.S. Highway 24. Planned improvements include roadway widening (where needed), intersection improvements, multimodal facilities, drainage facilities, bus transit accommodations, and related safety improvements. The governing jurisdictions indicate how Woodmen Road improvements are still within the planning and design phase, therefore no timelines have been established. Additionally, no specific improvements have been identified as they will be dependent on the outcome of the anticipated corridor-wide traffic analysis.

No other regional or specific improvements for the above-described roadways are known to be planned or committed at this time. Black Forest Road just completed its roadway widening improvements to accommodate a four-lane cross-section. The remaining study area roadways appear to be built to their ultimate cross-sections.

⁴ ConnectCOS, City of Colorado Springs, March 2023.

II. Existing Traffic Conditions

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

- Research Parkway / Cross Creek Drive
- Roaring Fork Drive / Winding Passage Drive
- Black Forest Road / Cowpoke Road
- Tutt Boulevard / Cowpoke Road
- Woodmen Road / Tutt Boulevard

Average daily traffic (ADT) volumes were collected over a 24-hour period on Tutt Boulevard and Cowpoke Road.

Counts were collected on Thursday, April 16, 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.

Peak hour traffic counts shown for the intersections of Winding Passage Drive and James Creek Drive, Tutt Boulevard and Noreen Falls Drive, as well as Tutt Boulevard with Williams Run Drive, were estimated using standard traffic generation characteristics compiled by the Institute of Transportation Engineers (ITE) in their report titled Trip Generation Manual, 12th Edition. ITE land use code 210 (Single-Family Detached Housing) was used for estimating trip generation because of its best fit to the existing land use. Estimated trip generation for the existing land use is provided for reference in Appendix D.

Study area intersections and existing ADT's are shown on Figure 3. Existing intersection volumes and geometry are shown in Figure 3a. Traffic count data is included for reference in Appendix A.

Existing signal timing parameters for the intersections of Woodmen Road and Tutt Boulevard, Black Forest Road and Cowpoke Road, and Research Parkway and Cross Creek Drive 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.

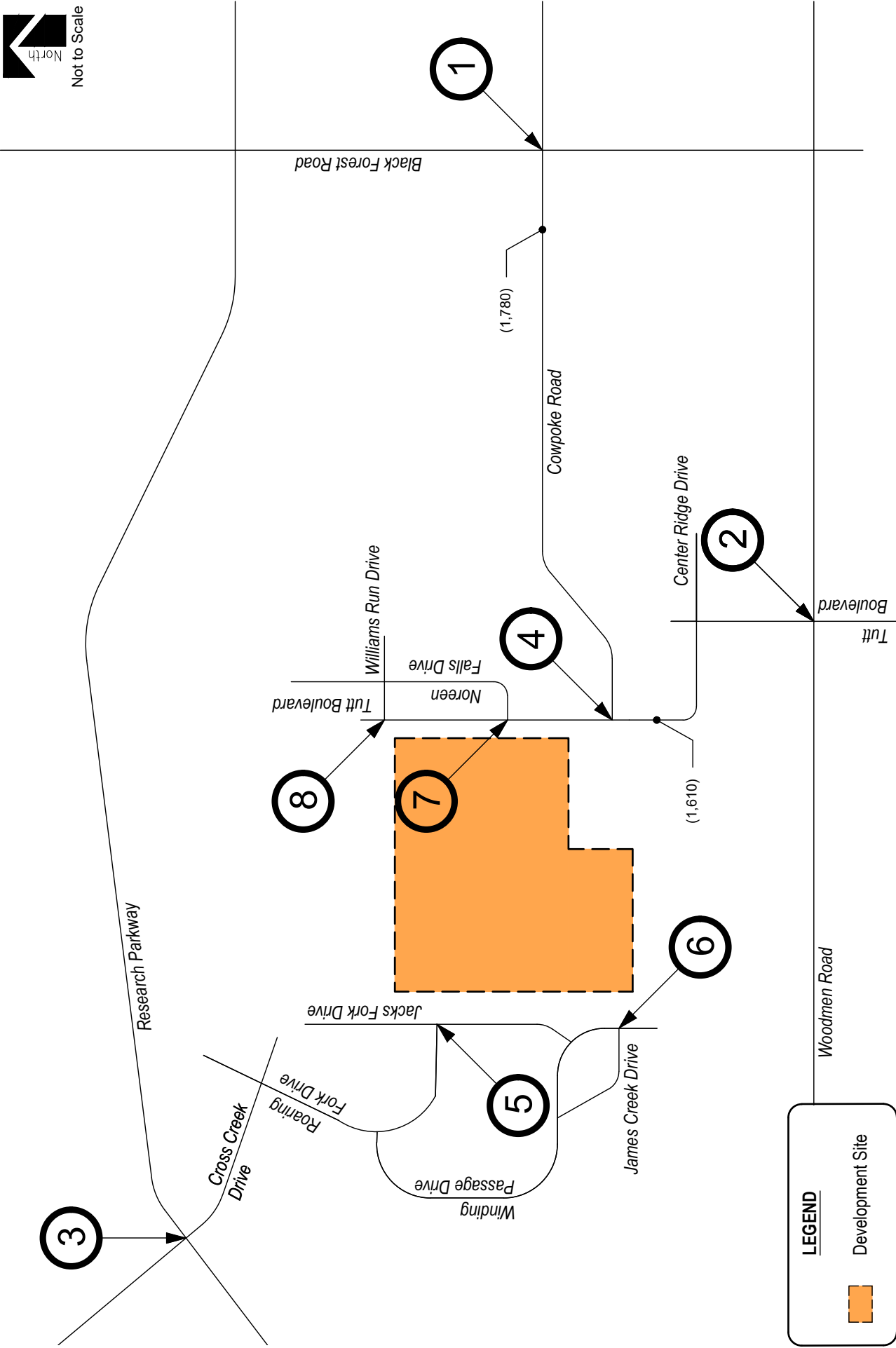
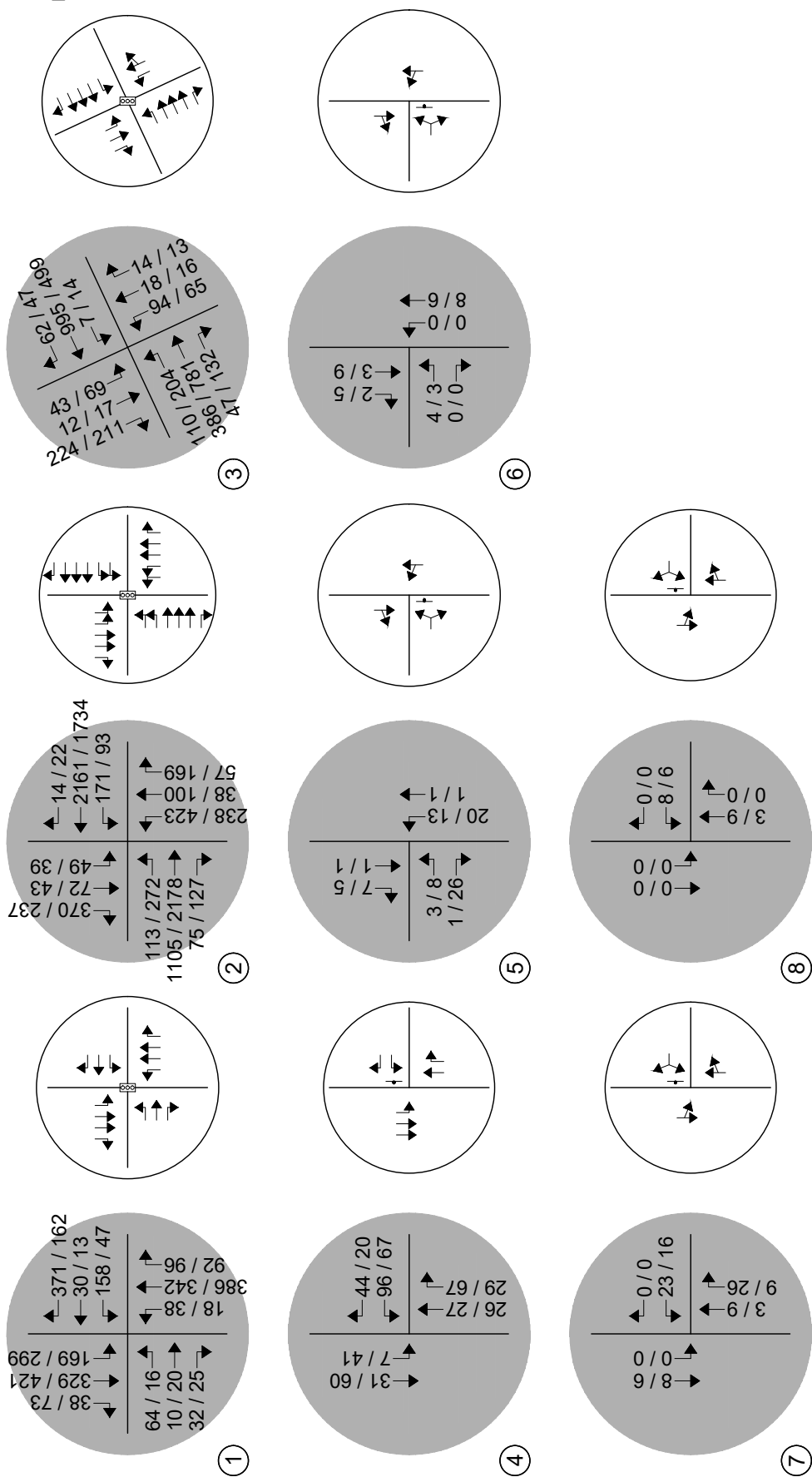


Figure 3
EXISTING TRAFFIC
(ADT) : Average Daily Traffic



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- Study Intersection Volumes
- Study Intersection Lane Geometry

Figure 3a
EXISTING TRAFFIC
Volumes & Intersection Geometry
AM / PM Peak Hour

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 B and have been used throughout this study.

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

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

Table 1 – Intersection Capacity Analysis Summary – Existing Traffic

INTERSECTION LANE GROUPS	LEVEL OF SERVICE	
	AM PEAK HOUR	PM PEAK HOUR
Black Forest Road / Cowpoke Road (Signalized)	B (16.2)	B (11.3)
Woodmen Road / Tutt Boulevard (Signalized)	D (45.4)	D (40.0)
Research Parkway / Cross Creek Drive (Signalized)	B (11.7)	A (9.9)
Cowpoke Road / Tutt Boulevard (Stop-Controlled)		
Westbound Left	A	A
Westbound Right	A	A
Southbound Left	A	A
Jacks Fork Drive / Roaring Fork Drive (Stop-Controlled)		
Eastbound Left and Right	A	A
Northbound Left and Through	A	A
Winding Passage Drive / James Creek Drive (Stop-Controlled)		
Eastbound Left and Right	A	A
Northbound Left and Through	A	A
Tutt Boulevard / Noreen Falls Drive (Stop-Controlled)		
Westbound Left and Right	A	A
Southbound Left and Through	A	A
Tutt Boulevard / Williams Run Drive (Stop-Controlled)		
Westbound Left and Right	A	A
Southbound Left and Through	A	A

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

Existing Traffic Analysis Results

Under existing conditions, operational analysis shows that the signalized intersection of Black Forest Road with Cowpoke Road has overall operations at LOS B during the morning and afternoon peak traffic hours.

The signalized intersection of Woodmen Road with Tutt Boulevard has overall operations at LOS D during the morning and afternoon peak traffic hours.

The signalized intersection of Research Parkway with Cross Creek Drive has overall operations at LOS B during the morning peak traffic hour and LOS A during the afternoon peak traffic hour.

The unsignalized intersections within the study area have turn movement operations at LOS A during the morning and afternoon peak traffic hours.

III. Future Traffic Conditions Without Proposed Development

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

To account for projected increases in background traffic for Years 2028 and 2045, a compounded annual growth rate was determined using historical traffic data provided by the Colorado Department of Transportation's (CDOT) Online Transportation Information System (OTIS) along the adjacent segment of N Powers Boulevard (State Highway 21), which shows a 20-year growth rate between one and two percent. Therefore, in order to provide for a conservative analysis, a growth rate of approximately two percent was applied to existing traffic volumes.

To account for projected traffic from the adjacent developments not yet built, the trip generation from the Peach Ranch Traffic Impact Study⁵ was added to background traffic volumes. As part of this adjacent development, Tutt Boulevard is expected to be connected from Cowpoke Road north to Research Parkway and accommodate a four-lane minor arterial cross-section.

Study area intersections and projected background ADT's for Year 2028 are shown on Figure 4. Projected background traffic volumes and intersection geometry for Year 2028 are shown in Figure 4a.

Study area intersections and projected background ADT's for Year 2045 are shown on Figure 5. Projected background traffic volumes and intersection geometry for Year 2045 are shown in Figure 5a.

⁵ Peach Ranch: Traffic Impact Study, Kimley-Horn and Associates, Inc., November 2024.

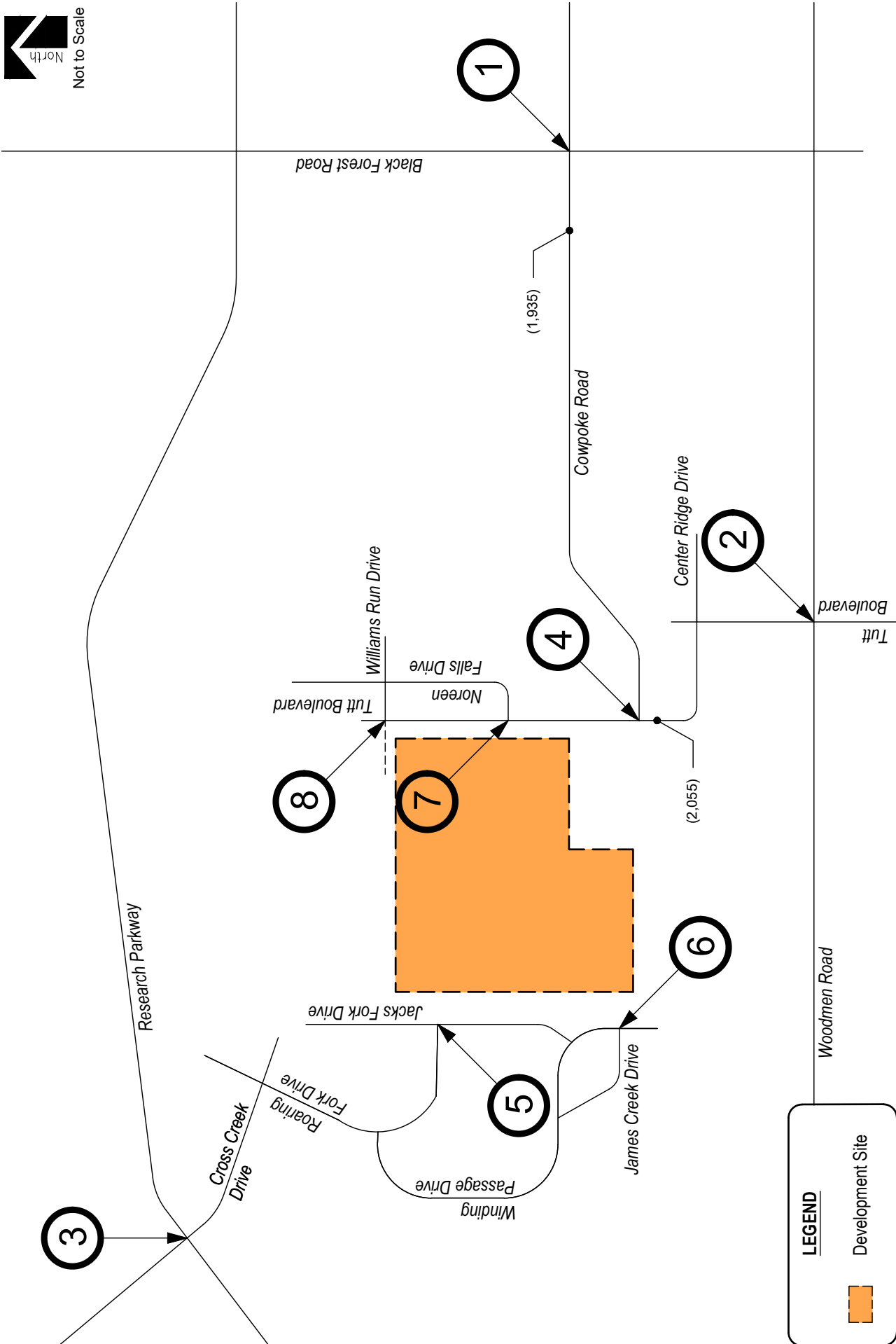
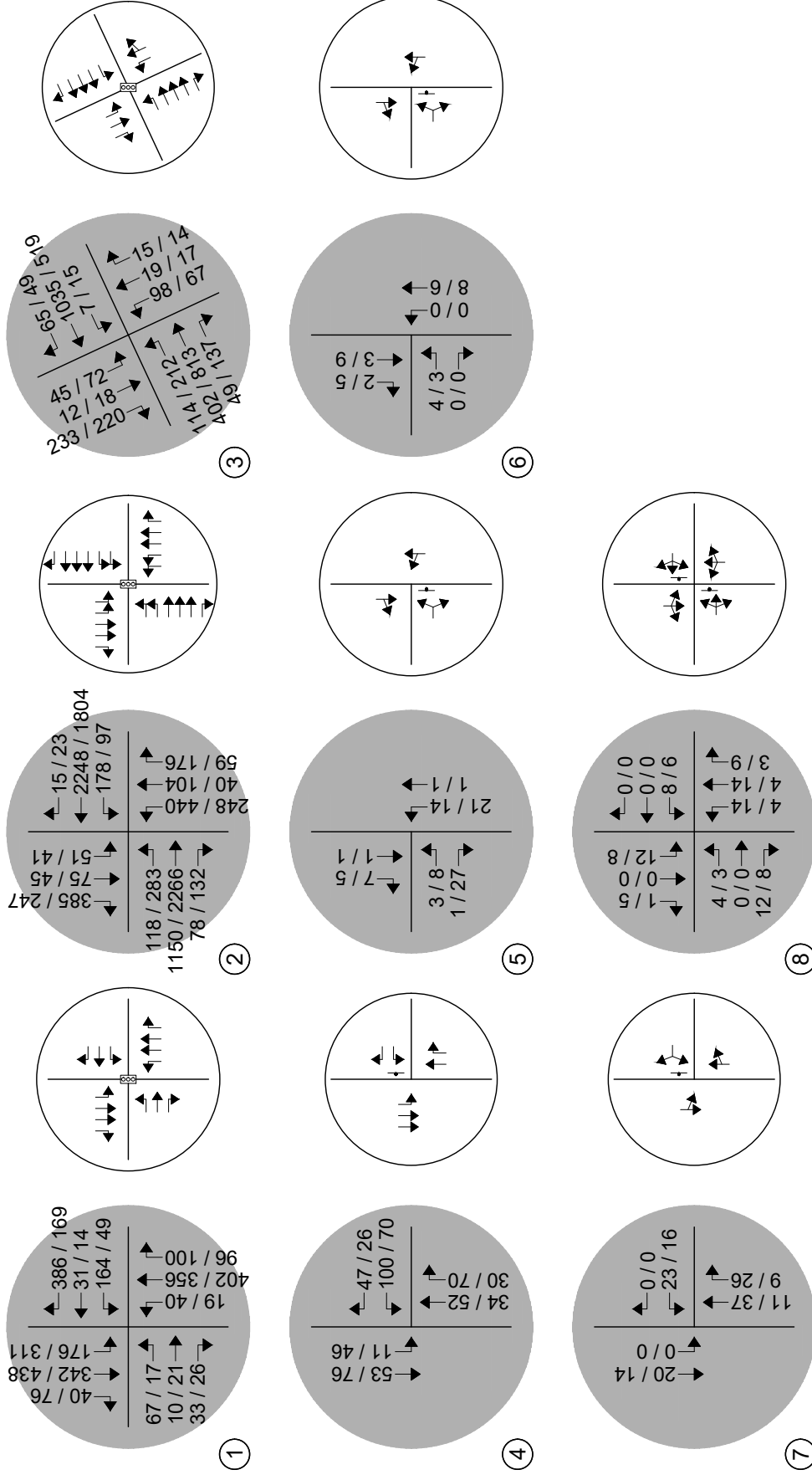


Figure 4
BACKGROUND TRAFFIC - YEAR 2028
(ADT) : Average Daily Traffic



Not to Scale



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- Study Intersection Volumes
- Study Intersection Lane Geometry

Figure 4a
BACKGROUND TRAFFIC - YEAR 2028
Volumes & Intersection Geometry
AM / PM Peak Hour
August 2026
Page 14

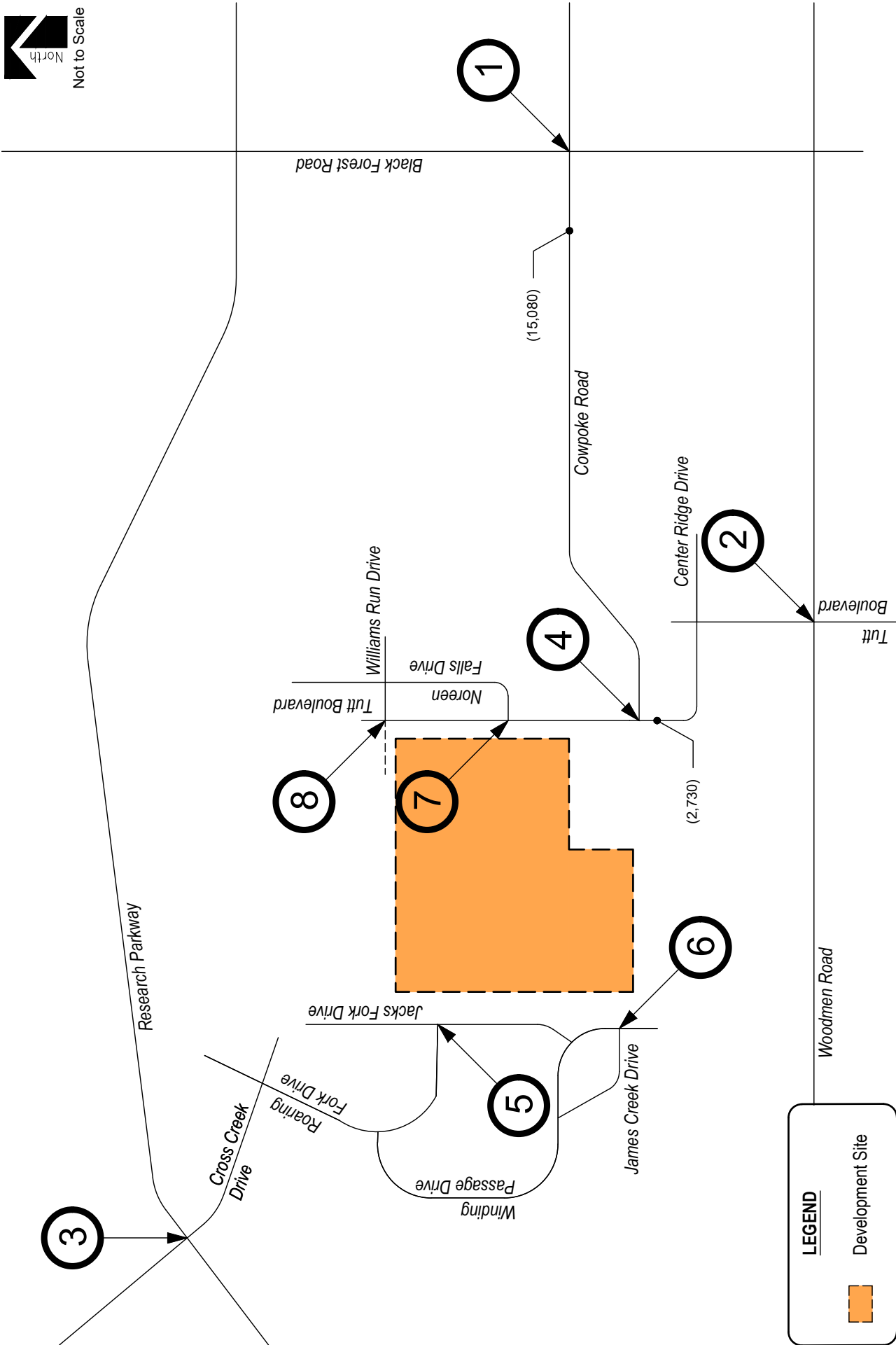


Figure 5
BACKGROUND TRAFFIC - YEAR 2045
(ADT) : Average Daily Traffic

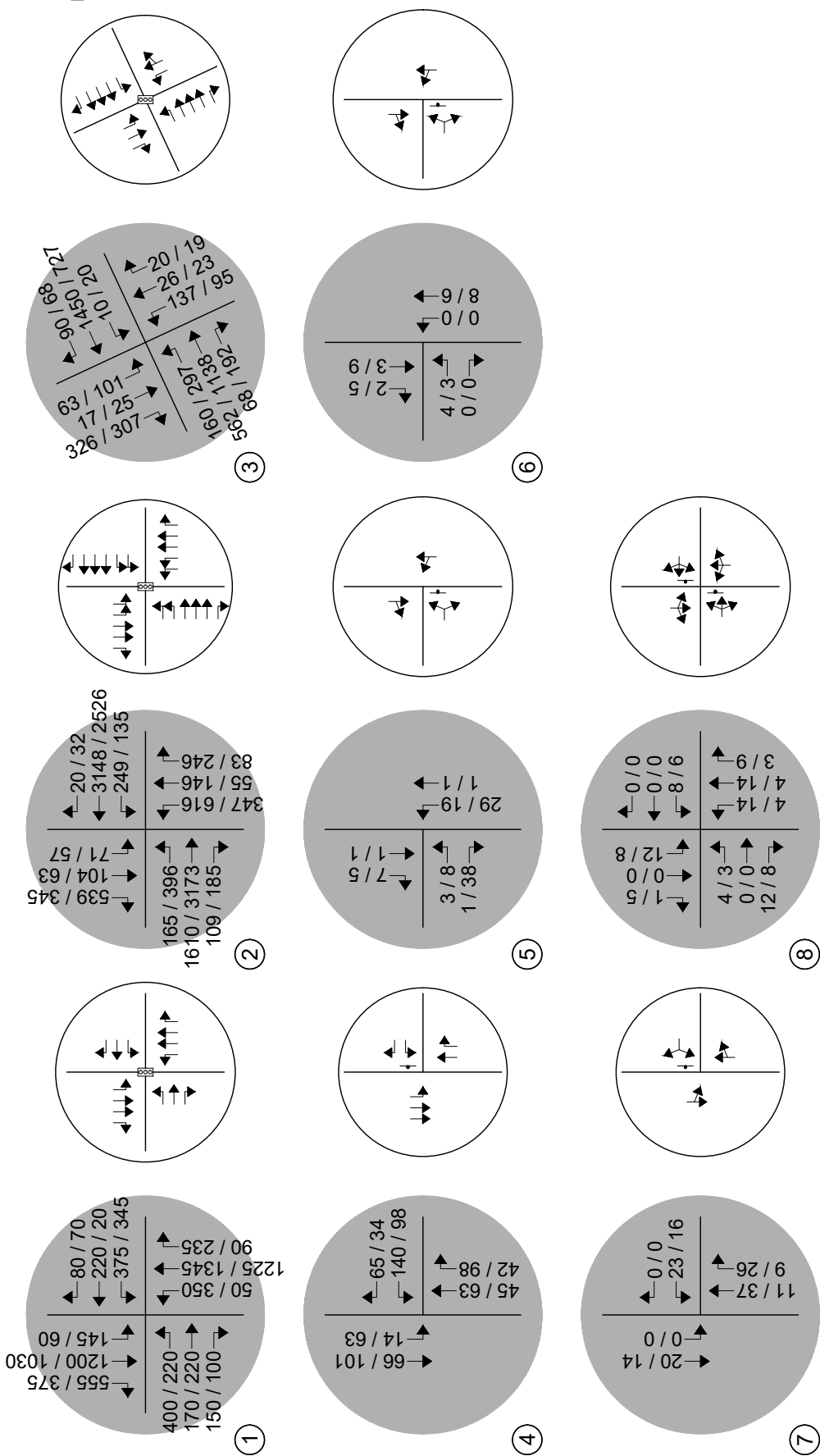


Figure 5a
BACKGROUND TRAFFIC - YEAR 2045
 Volumes & Intersection Geometry
 AM / PM Peak Hour
 August 2026
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Peak Hour Intersection Levels of Service – Background Traffic

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. Year 2045 operational results are summarized in Table 3.

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

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

INTERSECTION LANE GROUPS	LEVEL OF SERVICE	
	AM PEAK HOUR	PM PEAK HOUR
Black Forest Road / Cowpoke Road (Signalized)	B (16.4)	B (11.8)
Woodmen Road / Tutt Boulevard (Signalized)	D (52.1)	D (45.0)
Research Parkway / Cross Creek Drive (Signalized)	B (12.0)	B (10.1)
Cowpoke Road / Tutt Boulevard (Stop-Controlled)		
Westbound Left	A	B
Westbound Right	A	A
Southbound Left	A	A
Jacks Fork Drive / Roaring Fork Drive (Stop-Controlled)		
Eastbound Left and Right	A	A
Northbound Left and Through	A	A
Winding Passage Drive / James Creek Drive (Stop-Controlled)		
Eastbound Left and Right	A	A
Northbound Left and Through	A	A
Tutt Boulevard / Noreen Falls Drive (Stop-Controlled)		
Westbound Left and Right	A	A
Southbound Left and Through	A	A
Tutt Boulevard / Williams Run Drive (Stop-Controlled)		
Eastbound Left, Through, and Right	A	A
Westbound Left, Through, and Right	A	A
Northbound Left, Through, and Right	A	A
Southbound Left, Through, and Right	A	A

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

Background Traffic Analysis Results – Year 2028

Year 2028 background traffic analysis indicates that the signalized intersection of Black Forest Road and Cowpoke Road anticipates overall operations at LOS B during the morning and afternoon peak traffic hours.

The signalized intersection of Woodmen Road and Tutt Boulevard projects overall operations at LOS D during the morning and afternoon peak traffic hours.

The signalized intersection of Research Parkway and Cross Creek Drive expects overall operations at LOS B during the morning and afternoon peak traffic hours.

The unsignalized intersection of Cowpoke Road and Tutt Boulevard is expected to have turn movement operations at LOS A during the AM peak traffic hour and LOS B or better during the PM peak traffic hour.

All other stop-controlled intersections are anticipated to have turn movement operations at LOS A during the morning and afternoon peak traffic hours.

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

INTERSECTION LANE GROUPS	LEVEL OF SERVICE	
	AM PEAK HOUR	PM PEAK HOUR
Black Forest Road / Cowpoke Road (Signalized)	D (41.9)	D (45.1)
Woodmen Road / Tutt Boulevard (Signalized)	F (132.8)	F (116.5)
Research Parkway / Cross Creek Drive (Signalized)	B (18.7)	B (12.4)
Cowpoke Road / Tutt Boulevard (Stop-Controlled)		
Westbound Left	B	B
Westbound Right	A	A
Southbound Left	A	A
Jacks Fork Drive / Roaring Fork Drive (Stop-Controlled)		
Eastbound Left and Right	A	A
Northbound Left and Through	A	A
Winding Passage Drive / James Creek Drive (Stop-Controlled)		
Eastbound Left and Right	A	A
Northbound Left and Through	A	A
Tutt Boulevard / Noreen Falls Drive (Stop-Controlled)		
Westbound Left and Right	A	A
Southbound Left and Through	A	A
Tutt Boulevard / Williams Run Drive (Stop-Controlled)		
Eastbound Left, Through, and Right	A	A
Westbound Left, Through, and Right	A	A
Northbound Left, Through, and Right	A	A
Southbound Left, Through, and Right	A	A

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

Background Traffic Analysis Results – Year 2045

By Year 2045 and without the proposed development, the study intersection of Black Forest Road with Cowpoke Road is expected to have overall LOS D operations during the AM and PM peak traffic hours.

The signalized intersection of Woodmen Road and Tutt Boulevard is anticipated to have overall operations at LOS F during both peak traffic hours. The LOS F operations are attributed to the westbound and eastbound through volumes. To mitigate the poor operations anticipated, adjustments to signal timing splits and intersection geometry were considered. However, since the poor operations are due to the intersection being over-capacity, these mitigations were not found to provide acceptable levels of service. It is recognized that the proximity of Black Forest Road may offer relief to Tutt Boulevard. For example, Black Forest Road (principal arterial) has potential to be widened to six through lanes and connect further south through the City in order to accommodate regional traffic. This potential improvement may provide relief to Tutt Boulevard and mitigate the extended delay projected.

The signalized intersection of Research Parkway and Cross Creek Drive is projected to have overall operations at LOS B during the morning and afternoon peak traffic hours.

The unsignalized intersection of Cowpoke Road and Tutt Boulevard is anticipated to have turn movement operations at LOS B or better during the morning and afternoon peak traffic hours.

All other stop-controlled intersections are expected to have turn movement operations at LOS A during the morning and afternoon peak traffic hours.

IV. Proposed Project Traffic

Trip Generation

Standard traffic generation characteristics compiled by the Institute of Transportation Engineers (ITE) in their report entitled Trip Generation Manual, 12th Edition, were applied to the 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 215 (Single-Family Attached Housing) were used for estimating trip generation because of their conservative rates and best fit to the proposed land use description.

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

Table 4 – Trip Generation Rates

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
215	Single-Family Attached Housing	DU	6.57	0.12	0.35	0.47	0.29	0.22	0.51

Key: DU = Dwelling Units.

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

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

Table 5 – Trip Generation Summary

ITE CODE	LAND USE	SIZE	DU	TOTAL TRIPS GENERATED						
				24 HOUR	AM PEAK HOUR			PM PEAK HOUR		
					ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
210	Single-Family Detached Housing	152	DU	1,382	29	78	106	88	54	141
215	Single-Family Attached Housing	86	DU	565	10	30	40	25	19	44
<i>Total:</i>				1,947	39	108	147	113	73	185

Key: DU = Dwelling Units.

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

Upon build-out, Table 5 illustrates that the proposed development has the potential to generate approximately 1,947 daily vehicle trips with 147 of those occurring during the morning peak hour and 185 during the afternoon peak hour.

Adjustments to Trip Generation Rates

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

Trip Distribution

The overall directional distribution of site-generated traffic was determined based on the location of development site within the City, proposed and existing area land uses, allowed turning movements, available roadway network, and in reference to distribution patterns assumed within the Peach Ranch Traffic Impact Study.

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

Trip Assignment

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

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

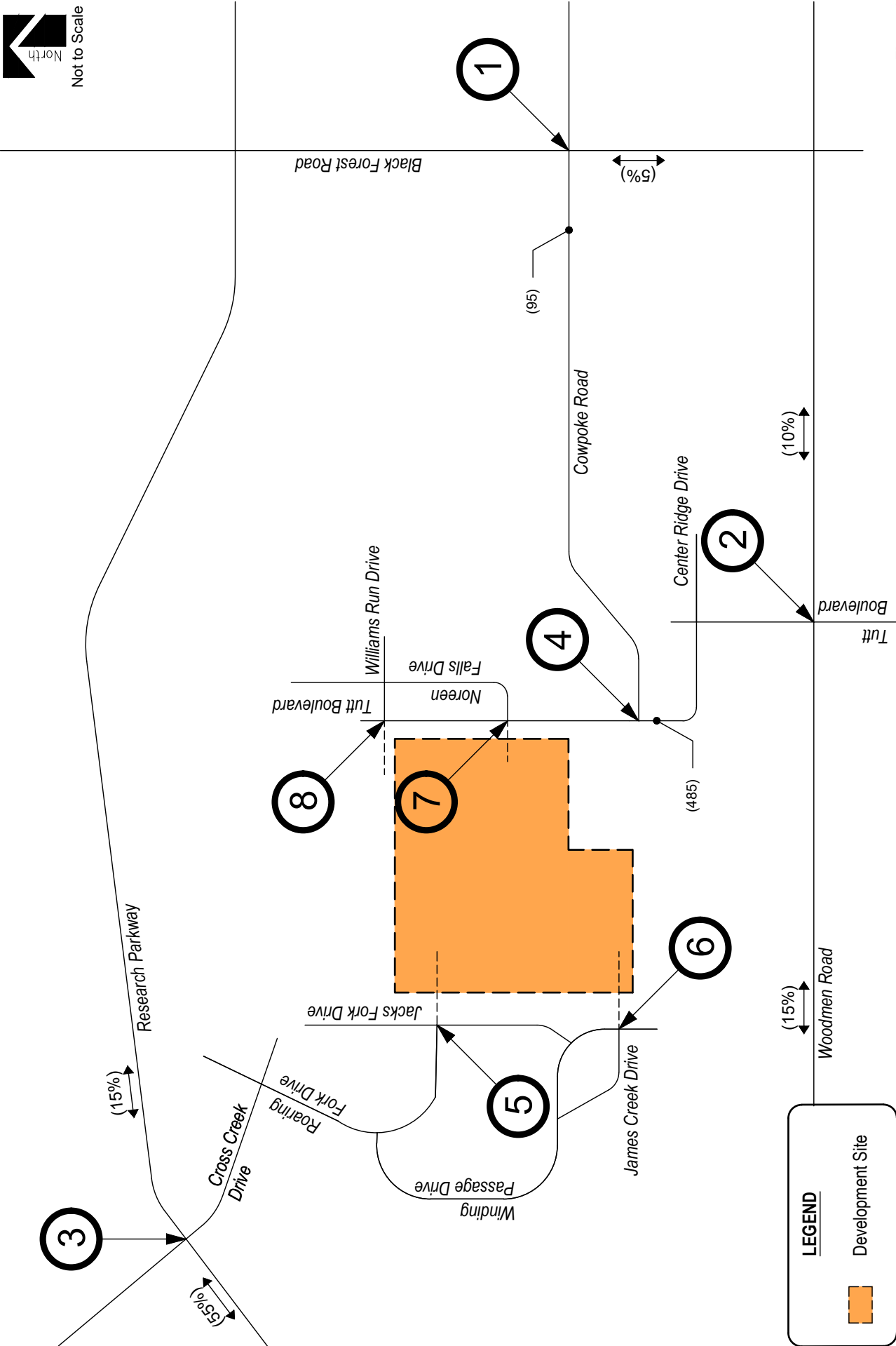
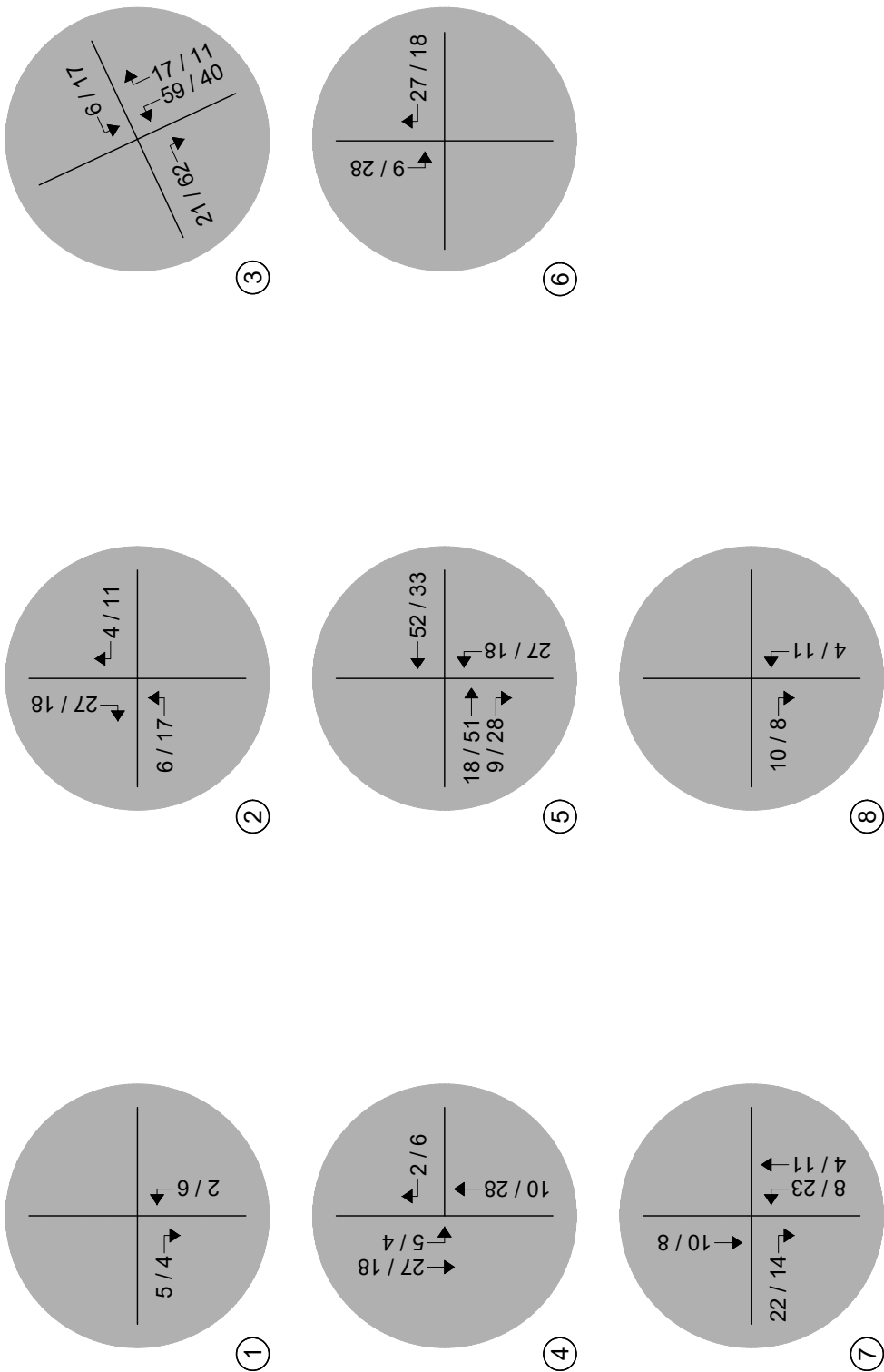


Figure 6
SITE DEVELOPMENT DISTRIBUTION
(%) : Overall
(ADT) : Average Daily Traffic

PEACOCK RANCH SOUTH
Traffic Impact Study

SM ROCHA, LLC

Traffic & Transportation Engineering



LEGEND

Study Intersection Volumes

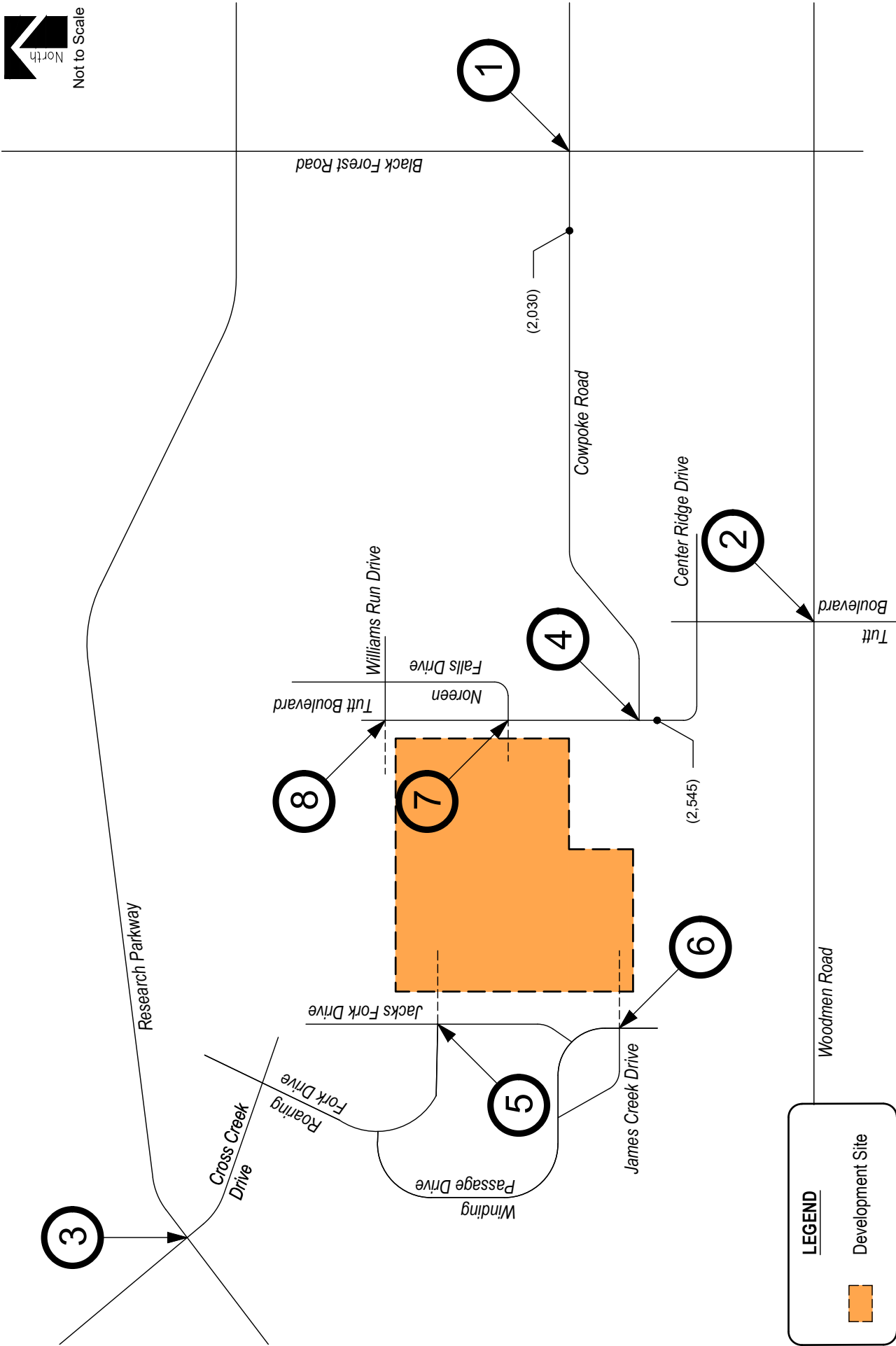
V. Future Traffic Conditions With Proposed Development

Total traffic is the traffic projected to be on area roadways with consideration of the proposed development. Total traffic includes background traffic projections for Years 2028 and 2045 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 and Year 2045 total traffic conditions assume no roadway improvements to accommodate regional transportation demands. This provides for a conservative analysis. Roadway improvements associated with site development are expected to be limited to site access and frontage as required by the governing agency.

Study area intersections and projected total ADT's for Year 2028 are shown on Figure 7. Projected total traffic volumes and intersection geometry for Year 2028 are shown on Figure 7a.

Study area intersections and projected total ADT's for Year 2045 are shown on Figure 8. Projected total traffic volumes and intersection geometry for Year 2045 are shown on Figure 8a.

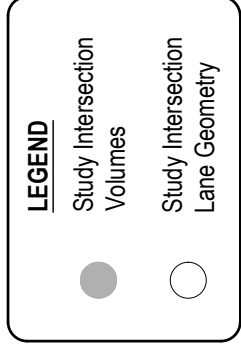
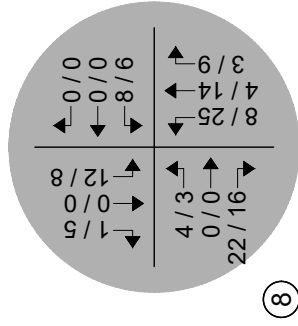
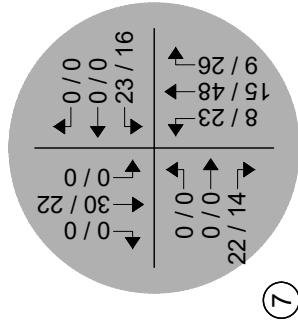
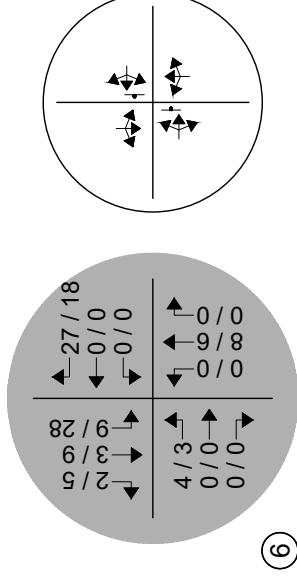
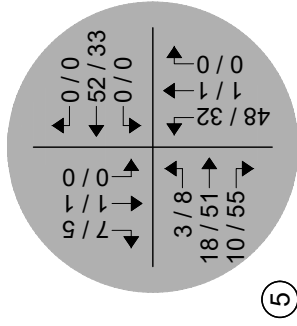
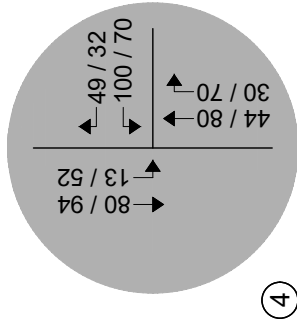
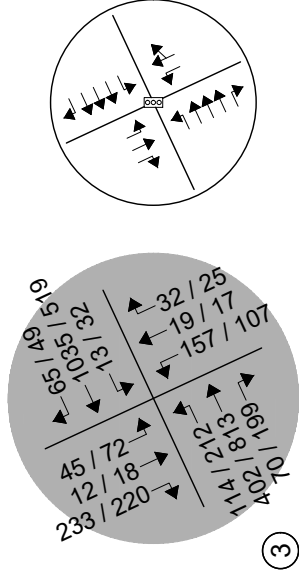
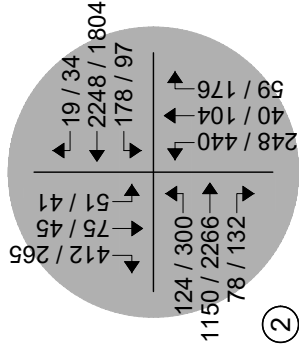
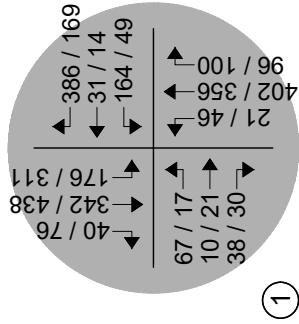


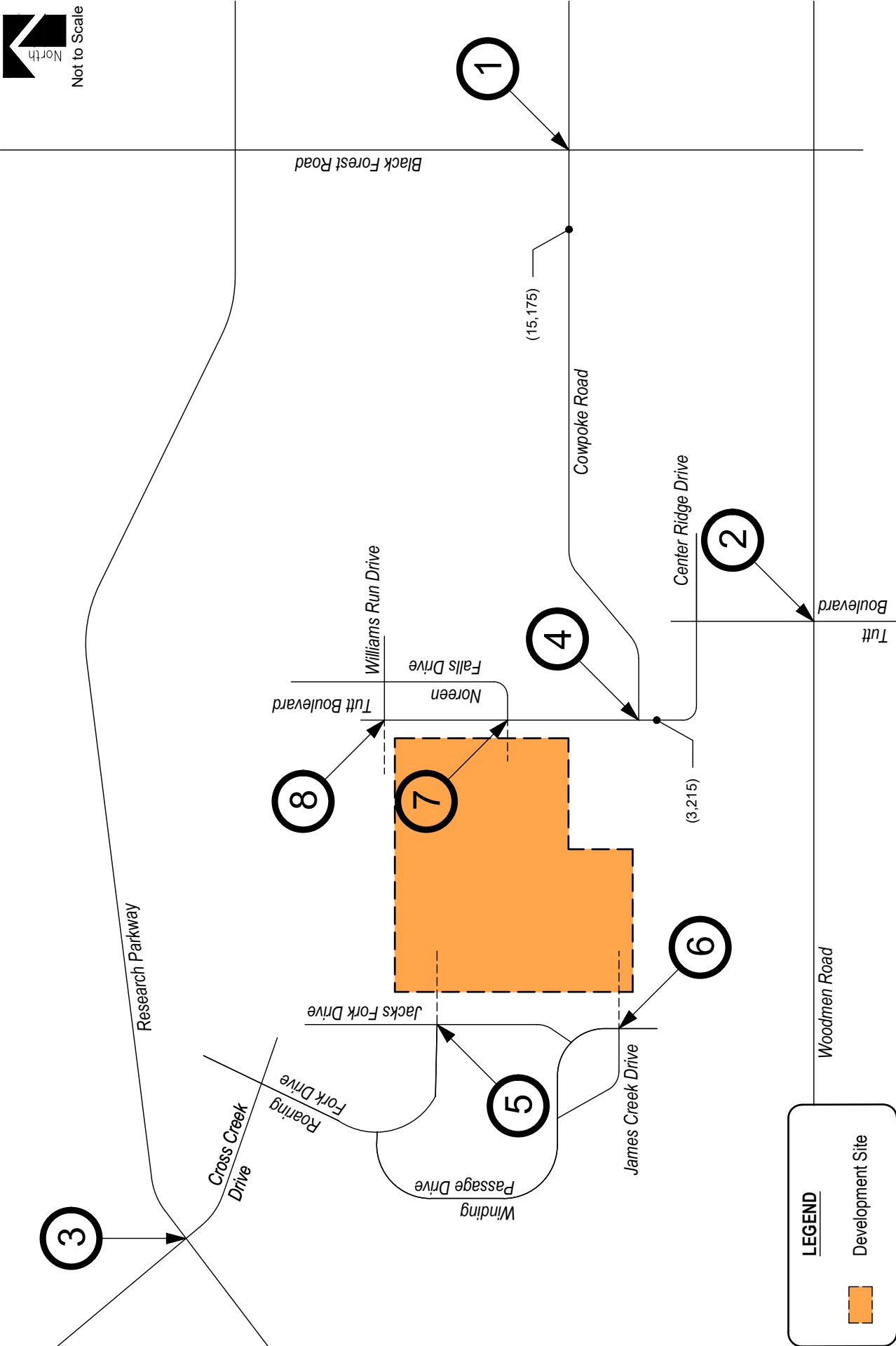
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- Development Site



Not to Scale





LEGEND

- Development Site

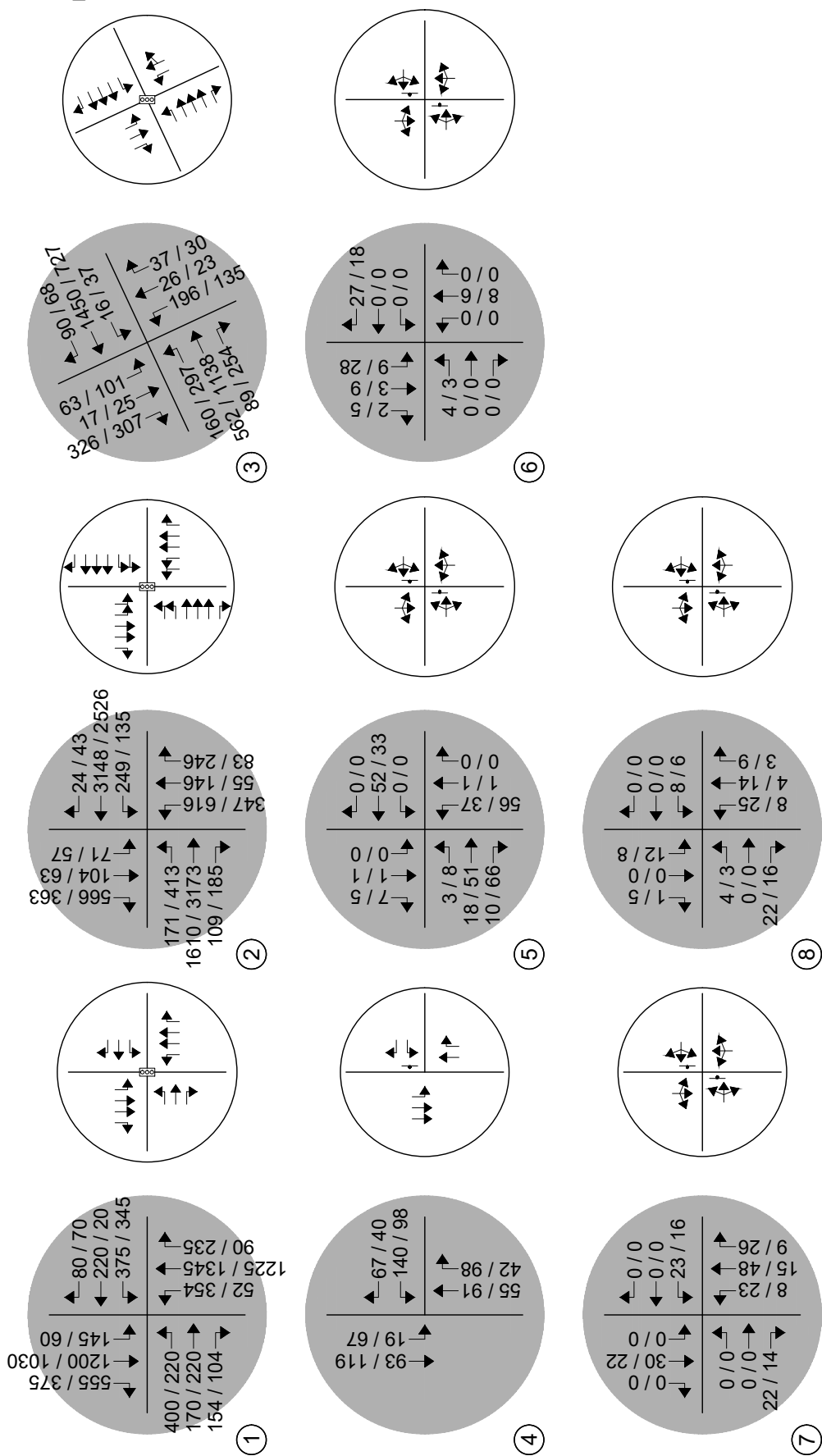


Figure 8a
TOTAL TRAFFIC - YEAR 2045
Volumes & Intersection Geometry
AM / PM Peak Hour
August 2026
Page 29

Peak Hour Intersection Levels of Service – Total Traffic

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

Total traffic level of service analysis results for Years 2028 and 2045 are summarized in Table 6 and Table 7, respectively.

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

Table 6 – Intersection Capacity Analysis Summary – Total Traffic – Year 2028

INTERSECTION LANE GROUPS	LEVEL OF SERVICE	
	AM PEAK HOUR	PM PEAK HOUR
Black Forest Road / Cowpoke Road (Signalized)	B (16.3)	B (11.7)
Woodmen Road / Tutt Boulevard (Signalized)	E (56.6)	D (47.1)
Research Parkway / Cross Creek Drive (Signalized)	B (14.2)	B (11.7)
Cowpoke Road / Tutt Boulevard (Stop-Controlled)		
Westbound Left	A	B
Westbound Right	A	A
Southbound Left	A	A
Jacks Fork Drive / Roaring Fork Drive (Stop-Controlled)		
Eastbound Left, Through, and Right	A	A
Westbound Left, Through, and Right	B	A
Northbound Left, Through, and Right	A	A
Southbound Left, Through, and Right	A	A
Winding Passage Drive / James Creek Drive (Stop-Controlled)		
Eastbound Left, Through, and Right	A	A
Westbound Left, Through, and Right	A	A
Northbound Left, Through, and Right	A	A
Southbound Left, Through, and Right	A	A
Tutt Boulevard / Noreen Falls Drive (Stop-Controlled)		
Eastbound Left, Through, and Right	A	A
Westbound Left, Through, and Right	A	A
Northbound Left, Through, and Right	A	A
Southbound Left, Through, and Right	A	A
Tutt Boulevard / Williams Run Drive (Stop-Controlled)		
Eastbound Left, Through, and Right	A	A
Westbound Left, Through, and Right	A	A
Northbound Left, Through, and Right	A	A
Southbound Left, Through, and Right	A	A

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

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

INTERSECTION LANE GROUPS	LEVEL OF SERVICE	
	AM PEAK HOUR	PM PEAK HOUR
Black Forest Road / Cowpoke Road (Signalized)	D (41.9)	D (45.4)
Woodmen Road / Tutt Boulevard (Signalized)	F (136.7)	F (119.2)
Research Parkway / Cross Creek Drive (Signalized)	C (20.0)	B (13.6)
Cowpoke Road / Tutt Boulevard (Stop-Controlled)		
Westbound Left	B	B
Westbound Right	A	A
Southbound Left	A	A
Jacks Fork Drive / Roaring Fork Drive (Stop-Controlled)		
Eastbound Left, Through, and Right	A	A
Westbound Left, Through, and Right	B	A
Northbound Left, Through, and Right	A	A
Southbound Left, Through, and Right	A	A
Winding Passage Drive / James Creek Drive (Stop-Controlled)		
Eastbound Left, Through and Right	A	A
Westbound Left, Through, and Right	A	A
Northbound Left, Through, and Right	A	A
Southbound Left, Through, and Right	A	A
Tutt Boulevard / Noreen Falls Drive (Stop-Controlled)		
Eastbound Left, Through and Right	A	A
Westbound Left, Through, and Right	A	A
Northbound Left, Through, and Right	A	A
Southbound Left, Through, and Right	A	A
Tutt Boulevard / Williams Run Drive (Stop-Controlled)		
Eastbound Left, Through and Right	A	A
Westbound Left, Through, and Right	A	A
Northbound Left, Through, and Right	A	A
Southbound Left, Through, and Right	A	A

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

Total Traffic Analysis Results Upon Development Build-Out

Table 7 illustrates how, by Year 2045 and upon development build-out, the signalized intersection of Black Forest Road with Cowpoke Road shows an overall LOS D operation during the morning and afternoon peak traffic hours.

The signalized intersection of Woodmen Road and Tutt Boulevard is anticipated to have overall operations at LOS F during the morning and afternoon peak traffic hours. The projected LOS F operations are attributed to the westbound and eastbound through volumes.

As previously mentioned, the poor operations indicate that the intersection is over-capacity, and geometric improvements to the intersection did not provide acceptable results. However, the proximity of Black Forest Road may offer relief to Tutt Boulevard. For example, Black Forest Road has potential to be widened to six through lanes and connect further south through the City to accommodate regional traffic. This potential improvement may provide relief to Tutt Boulevard and mitigate extended delay anticipated.

CDOT's ICAT was also completed to help determine appropriate mitigations for the study intersection. This analysis concluded that due to the proximity of the grade-separated interchange of Woodmen Road and N Powers Boulevard, traffic signal control remains the recommended intersection control type. Therefore, it is recommended that the City monitor the intersection further as area development occurs to determine what, if any, improvements are necessary to mitigate anticipated poor operations.

The signalized intersection of Research Parkway and Cross Creek Drive is expected to have overall operations at LOS C during the morning peak traffic hour and LOS B during the afternoon peak traffic hour.

The stop-controlled intersection of Cowpoke Road and Tutt Boulevard is anticipated to have turn movement operations at LOS B or better during the morning and afternoon peak traffic hours.

The stop-controlled intersection of Jacks Fork Drive and Roaring Fork Drive is projected to have turn movement operations at LOS B or better during the morning peak traffic hour and LOS A during the afternoon peak traffic hour.

All other stop-controlled intersections are anticipated to have turn-movement operations at LOS A during 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.

Queue Length Analysis

Queue lengths were analyzed using Year 2045 total traffic conditions. The analysis yields estimate of 95th percentile queue lengths, which have only a five percent probability of being exceeded during the analysis time period. Queue lengths were modeled and are included with the Synchro worksheets in Appendix C.

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

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

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

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

Intersection	Turn Movement		Existing Turn Lane Length (feet)	Background 2045		Total 2045		Recommended
				AM Peak Hour (feet)	PM Peak Hour (feet)	AM Peak Hour (feet)	PM Peak Hour (feet)	Turn Lane Length (feet)
Signalized Intersections								
Black Forest Road / Cowpoke Road	EB	L	215'	476'	217'	476'	217'	240' x2
		T	-	245'	366'	245'	366'	-
		R	150'	85'	11'	89'	14'	150'
	WB	L	145'	359'	415'	359'	415'	210' x2
		T	-	328'	40'	328'	40'	-
		R	145'	15'	0'	15'	0'	145'
	NB	L	370'	38'	471'	40'	481'	245' x2
		T	-	611'	620'	611'	620'	-
		R	270'	14'	56'	14'	56'	270'
	SB	L	310'	196'	43'	196'	43'	310'
		T	-	533'	563'	533'	563'	-
		R	275'	65'	85'	65'	85'	275'
Woodmen Road / Tutt Boulevard	EB	L	495' x2	163'	335'	170'	353'	495' x2
		R	-	438'	1302'	438'	1302'	-
		T	280'	4'	45'	4'	45'	280'
	WB	L	225' x2	162'	145'	162'	145'	225' x2
		T	-	1244'	980'	1244'	980'	-
		R	505'	0'	0'	0'	0'	505'
	NB	L	365' x2	280'	469'	280'	469'	365' x2
		T	-	38'	91'	38'	91'	-
		R	365'	0'	159'	0'	159'	365'
	SB	L	175' x2	54'	53'	54'	53'	175' x2
		T	-	66'	52'	66'	52'	-
		R	235'	683'	389'	728'	427'	235'
Research Parkway / Cross Creek Drive	EB	L	200'	109'	109'	111'	118'	200'
		T	-	94'	197'	94'	200'	-
		R	200'	11'	33'	20'	38'	200'
	WB	L	310'	9'	12'	11'	19'	310'
		T	-	324'	154'	324'	163'	-
		R	245'	4'	0'	4'	0'	245'
	NB	L	80'	130'	100'	186'	133'	190'
		T,R	-	41'	41'	45'	42'	-
		L	90'	67'	106'	67'	103'	110'
	SB	T	-	25'	35'	25'	34'	35'
		R	80'	197'	70'	197'	67'	200'
		Stop-Controlled Intersections						
Cowpoke Road / Tutt Boulevard	WB	L	150'	15'	15'	18'	15'	150'
		R	-	5'	3'	5'	3'	-
	NB	T	-	0'	0'	0'	0'	-
		R	-	0'	0'	0'	0'	-
	SB	L	120'	0'	5'	0'	5'	120'
		T	-	0'	0'	0'	0'	-
Roaring Fork Drive / Jacks Fork Drive	EB	L,T,R	-	0'	3'	5'	13'	-
	WB	L,T,R	-	-	-	8'	3'	-
	NB	L,T,R	-	3'	0'	3'	3'	-
	SB	L,T,R	-	0'	0'	0'	0'	-

Note: Turn Lane Length does not include taper length.

Key: x2 = Dual Turn Lanes.

Table 8 (Contd.) – Turn Lane Queues and Storage Requirements – Total Traffic – Year 2045

Intersection	Turn Movement		Existing Turn Lane Length (feet)	Background 2045		Total 2045		Recommended Turn Lane Length (feet)
				AM Peak Hour (feet)	PM Peak Hour (feet)	AM Peak Hour (feet)	PM Peak Hour (feet)	
Stop-Controlled Intersections								
Winding Passage Drive / James Creek Drive	EB	L, T, R	-	0'	0'	0'	0'	-
	WB	L, T, R	-	-	-	3'	3'	-
	NB	L, T, R	-	0'	0'	0'	0'	-
	SB	L, T, R	-	0'	0'	0'	3'	-
Tutt Boulevard / Noreen Falls Drive	EB	L, T, R	-	-	-	3'	0'	-
	WB	L, T, R	-	3'	3'	3'	3'	-
	NB	L, T, R	-	0'	0'	0'	0'	-
	SB	L, T, R	-	0'	0'	0'	0'	-
Tutt Boulevard / Williams Run Drive	EB	L, T, R	-	3'	0'	3'	3'	-
	WB	L, T, R	-	0'	0'	0'	0'	-
	NB	L, T, R	-	0'	0'	0'	3'	-
	SB	L, T, R	-	0'	0'	0'	0'	-

Note: Turn Lane Length does not include taper length.

As Table 8 shows, the majority of turn lane lengths at the study intersections have sufficient storage to accommodate future traffic volumes. Synchro analysis results indicate that the greatest queue length occurred along Tutt Boulevard at Woodmen Road during the morning peak hour. Synchro's analysis results indicate that the queue length is approximately 29-30 vehicles for the southbound right turn movement and has the potential to extend beyond the adjacent residential access.

It is to be noted that this significant queueing exists during background traffic conditions without the proposed development.

As previously mentioned, the proximity of Black Forest Road may offer relief to Tutt Boulevard. The potential widening and expansion of Black Forest Road may also reduce forecasted congestion at the intersection of Tutt Boulevard and Woodmen Road.

Development Impacts

Analysis of future traffic conditions indicates that the addition of site-generated traffic is expected to create minimal negative impact to traffic operations for the existing and surrounding roadway system upon roadway and intersection control improvements assumed within this analysis. With all conservative assumptions defined in this analysis, the study intersections are projected to operate at future levels of service comparable to Year 2045 background traffic conditions.

Due to significant vehicle delay reported, the Woodmen Road and Tutt Boulevard intersection should be monitored further by City Staff to determine what mitigation, if any, is appropriate.

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.

It is emphasized that exclusive left turn deceleration lanes at the Black Forest Road and Cowpoke Road intersection, as well as the Research Parkway and Cross Creek Drive intersection, already exist. However, as previously mentioned, various existing turn lane lengths do not meet minimum storage lengths based on predicted 95th percentile queue lengths. Therefore, improvements to these left turn lanes at the Black Forest Road and Cowpoke Road intersection are recommended where appropriate. It is noted that not all turn lanes are able to be lengthened to accommodate projected queue lengths due to proximity of nearby access drives and potential right-of-way constraints. Therefore, adjustments to signal timing is a possible mitigation to improve exceeded queue lengths in these situations. It is recognized, however, that since 95th percentile queues are expected to exceed storage lane lengths without the proposed development, these improvements are recommended to be completed by others as area development occurs.

As discussed in Section III, the Woodmen Road intersection with Tutt Boulevard should be evaluated further by the City as area development occurs to determine what, if any, improvements should be completed to relieve forecasted operations.

VII. Conclusion

This traffic impact study was provided as a planning document and addressed the capacity, geometric, and control requirements associated with the development entitled Peacock Ranch South. This proposed land use plan and zone change application consisted of a residential community and is located near the northwest corner of Tutt Boulevard and Cowpoke Road in Colorado Springs, Colorado.

The study area to be examined in this analysis encompassed the area bounded by Woodmen Road north to Research Parkway, N Powers Boulevard (State Highway 21) east to Black Forest Road, and includes proposed site access drives.

Analysis was conducted for critical AM Peak Hour and PM Peak Hour traffic operations for existing traffic conditions, Year 2028 and Year 2045 background traffic conditions, and Year 2028 and Year 2045 total traffic conditions.

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

Under Year 2028 and 2045 background traffic conditions, operational analysis shows that all signalized intersections are projected to operate with LOS F or better operations during peak traffic periods. All stop-controlled intersections anticipate turn movement operations at or better than LOS B or better during their respective peak traffic periods.

Analysis of future traffic conditions indicates that the addition of site-generated traffic is expected to create minimal negative impact to traffic operations for the existing and the surrounding roadway. With all conservative assumptions defined in this analysis, the study intersections are projected to operate at future levels of service comparable to Year 2045 background traffic conditions. Proposed site accesses have long-term operations at LOS B or better during peak traffic periods and upon build-out.

APPENDIX A

**Traffic Count Data
Signal Timing Information**



ALL TRAFFIC DATA SERVICES

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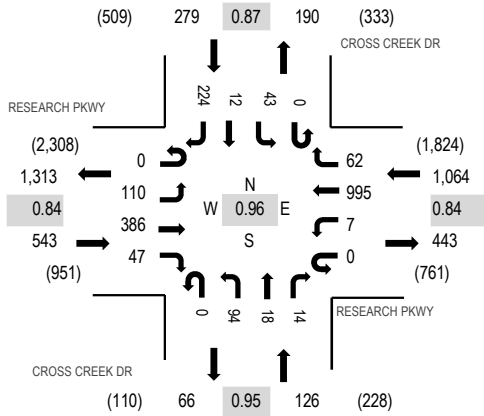
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Date: Thursday, April 16, 2026

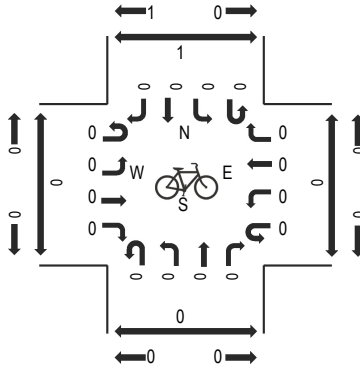
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Peak 15-Minutes: 07:30 AM - 07:45 AM

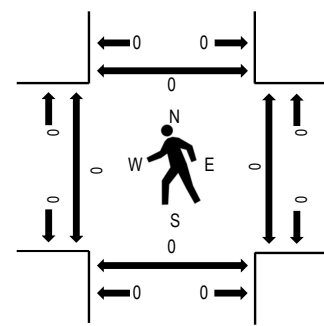
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

Traffic Counts - Motorized Vehicles

Interval Start Time	RESEARCH PKWY Eastbound				RESEARCH PKWY Westbound				CROSS CREEK DR Northbound				CROSS CREEK 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	18	36	4	0	0	207	10	0	32	1	3	0	3	1	57	372	1,911	0	0	0	0
7:15 AM	0	25	60	9	0	0	301	14	0	29	5	2	0	3	0	51	499	2,012	0	0	0	0
7:30 AM	0	21	110	11	0	1	244	17	0	27	6	2	0	18	2	63	522	1,935	0	0	0	0
7:45 AM	0	34	128	12	0	0	229	15	0	19	6	5	0	14	6	50	518	1,785	0	0	0	0
8:00 AM	0	30	88	15	0	6	221	16	0	19	1	5	0	8	4	60	473	1,601	0	0	0	0
8:15 AM	0	23	98	13	0	2	184	12	0	22	3	0	0	9	2	54	422		0	0	0	0
8:30 AM	0	21	88	8	0	3	164	13	0	20	1	0	0	5	1	48	372		0	0	0	0
8:45 AM	0	27	64	8	0	1	153	11	0	14	3	3	0	9	1	40	334		0	0	0	0
Count Total	0	199	672	80	0	13	1,703	108	0	182	26	20	0	69	17	423	3,512		0	0	0	0
Peak Hour	0	110	386	47	0	7	995	62	0	94	18	14	0	43	12	224	2,012		0	0	0	0



ALL TRAFFIC DATA SERVICES

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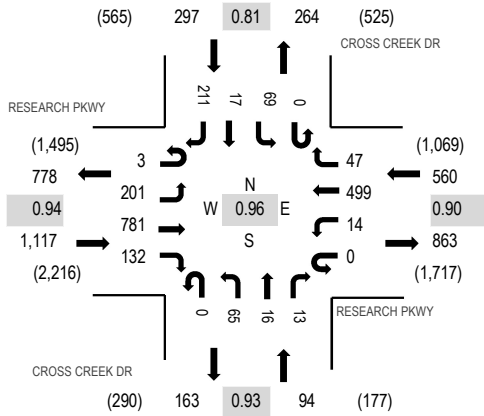
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Date: Thursday, April 16, 2026

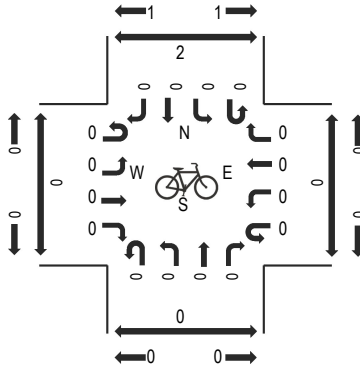
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Peak 15-Minutes: 05:00 PM - 05:15 PM

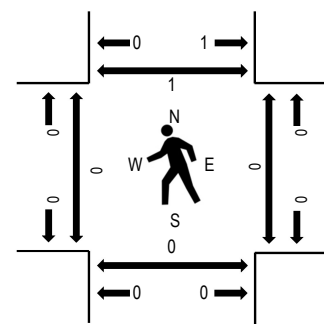
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

Traffic Counts - Motorized Vehicles

Interval Start Time	RESEARCH PKWY Eastbound				RESEARCH PKWY Westbound				CROSS CREEK DR Northbound				CROSS CREEK 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	62	216	24	0	1	127	13	0	17	2	4	0	25	8	54	554	2,041	0	0	0	0
4:15 PM	1	51	223	26	0	2	109	6	0	12	5	0	0	14	1	51	501	2,023	0	0	0	0
4:30 PM	2	51	170	29	0	0	114	14	0	17	1	3	0	15	5	37	458	2,055	0	0	0	1
4:45 PM	1	46	202	30	0	4	126	16	0	19	4	2	0	18	7	53	528	2,068	0	0	0	0
5:00 PM	1	45	214	26	0	4	123	6	0	17	4	4	0	21	4	67	536	1,986	0	0	0	1
5:15 PM	1	53	191	40	0	5	134	18	0	15	6	5	0	13	4	48	533		0	0	0	0
5:30 PM	0	57	174	36	0	1	116	7	0	14	2	2	0	17	2	43	471		0	0	0	0
5:45 PM	0	47	170	26	0	2	116	5	0	16	4	2	0	12	3	43	446		0	0	0	0
Count Total	7	412	1,560	237	0	19	965	85	0	127	28	22	0	135	34	396	4,027		0	0	0	2
Peak Hour	3	201	781	132	0	14	499	47	0	65	16	13	0	69	17	211	2,068		0	0	0	1



ALL TRAFFIC DATA SERVICES

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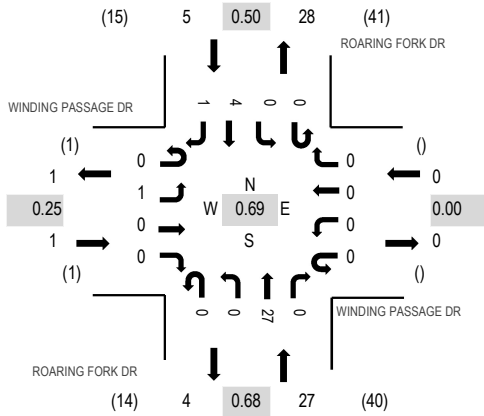
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Date: Thursday, April 16, 2026

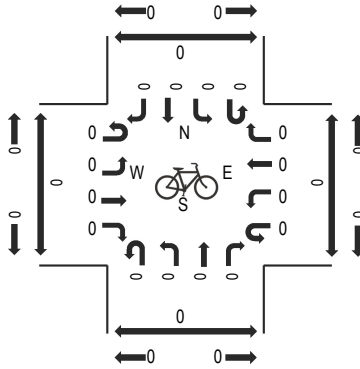
Peak Hour: 07:00 AM - 08:00 AM

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

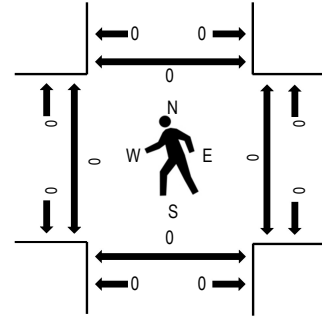
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

Traffic Counts - Motorized Vehicles

Interval Start Time	WINDING PASSAGE DR Eastbound				WINDING PASSAGE DR Westbound				ROARING FORK DR Northbound				ROARING FORK 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	0	0	0	0	0	0	0	0	8	0	0	0	0	0	8	33	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	10	0	0	0	1	1	12	31	0	0	0	0
7:30 AM	0	1	0	0	0	0	0	0	0	0	6	0	0	0	1	0	8	29	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	3	0	0	0	2	0	5	22	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	5	0	0	0	1	0	6	23	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	5	0	0	0	5	0	10		1	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1		0	1	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	0	6		0	1	0	2
Count Total	0	1	0	0	0	0	0	0	0	0	40	0	0	0	14	1	56		1	2	0	2
Peak Hour	0	1	0	0	0	0	0	0	0	0	27	0	0	0	4	1	33		0	0	0	0



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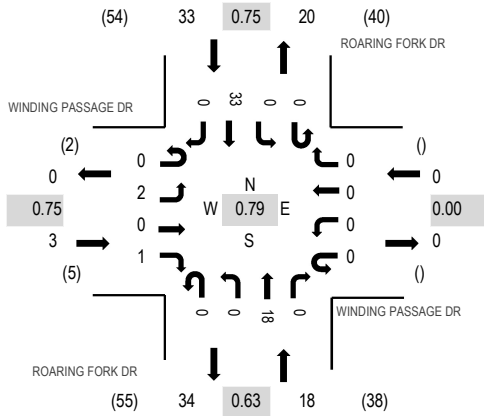
Location: 2 ROARING FORK DR & WINDING PASSAGE DR PM

Date: Thursday, April 16, 2026

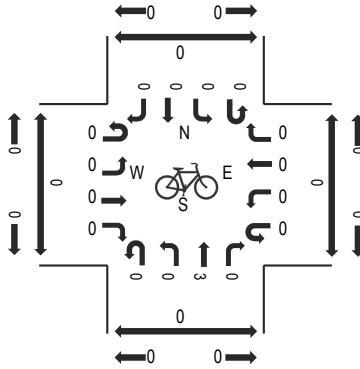
Peak Hour: 04:00 PM - 05:00 PM

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

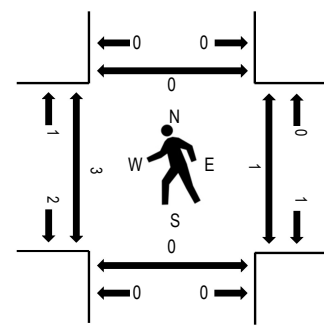
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

Traffic Counts - Motorized Vehicles

Interval Start Time	WINDING PASSAGE DR Eastbound				WINDING PASSAGE DR Westbound				ROARING FORK DR Northbound				ROARING FORK 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	0	1	0	0	0	0	0	0	6	0	0	0	9	0	16	54	1	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	6	0	0	0	6	0	12	47	1	0	0	0
4:30 PM	0	1	0	0	0	0	0	0	0	0	5	0	0	0	11	0	17	46	0	1	0	0
4:45 PM	0	1	0	0	0	0	0	0	0	0	1	0	0	0	7	0	9	39	1	0	0	0
5:00 PM	0	1	0	0	0	0	0	0	0	0	2	0	0	0	6	0	9	43	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	6	0	0	0	5	0	11		1	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	1	3	0	0	0	6	0	10		0	0	0	0
5:45 PM	0	1	0	0	0	0	0	0	0	1	7	0	0	0	4	0	13		0	0	0	0
Count Total	0	4	0	1	0	0	0	0	0	2	36	0	0	0	54	0	97		4	1	0	0
Peak Hour	0	2	0	1	0	0	0	0	0	0	18	0	0	0	33	0	54		3	1	0	0



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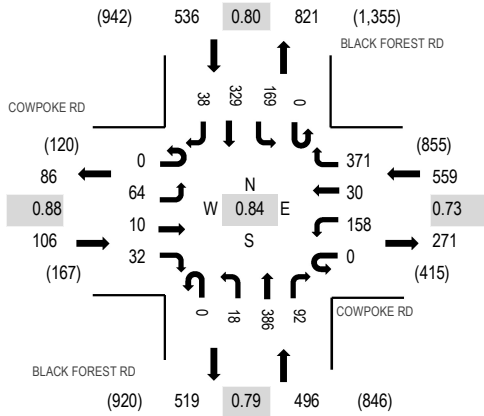
Location: 3 BLACK FOREST RD & COWPOKE RD AM

Date: Thursday, April 16, 2026

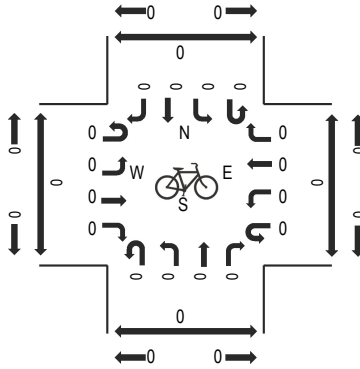
Peak Hour: 07:30 AM - 08:30 AM

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

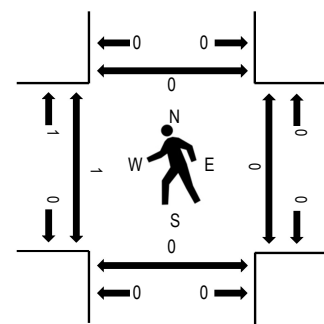
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

Traffic Counts - Motorized Vehicles

Interval Start Time	COWPOKE RD Eastbound				COWPOKE RD Westbound				BLACK FOREST RD Northbound				BLACK FOREST RD Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	5	3	10	0	14	3	67	0	6	65	10	0	12	72	1	268	1,514	0	0	0	0
7:15 AM	0	8	4	9	0	18	2	94	0	3	60	21	0	23	71	1	314	1,676	0	0	0	0
7:30 AM	0	16	4	9	0	32	12	109	0	3	100	32	0	38	65	6	426	1,697	0	0	0	0
7:45 AM	0	13	4	11	0	72	10	120	0	3	111	42	0	41	74	5	506	1,532	0	0	0	0
8:00 AM	0	24	1	6	0	40	7	76	0	5	90	13	0	43	107	18	430	1,296	1	0	0	0
8:15 AM	0	11	1	6	0	14	1	66	0	7	85	5	0	47	83	9	335		0	0	0	0
8:30 AM	0	3	4	4	0	8	2	48	0	2	73	10	0	17	84	6	261		0	0	0	0
8:45 AM	0	0	2	9	0	15	0	25	0	5	86	9	0	29	87	3	270		0	0	0	0
Count Total	0	80	23	64	0	213	37	605	0	34	670	142	0	250	643	49	2,810		1	0	0	0
Peak Hour	0	64	10	32	0	158	30	371	0	18	386	92	0	169	329	38	1,697		1	0	0	0



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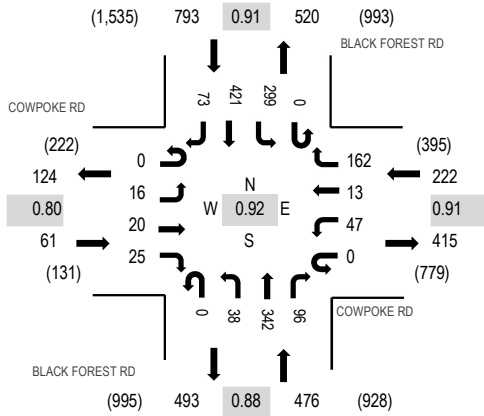
Location: 3 BLACK FOREST RD & COWPOKE RD PM

Date: Thursday, April 16, 2026

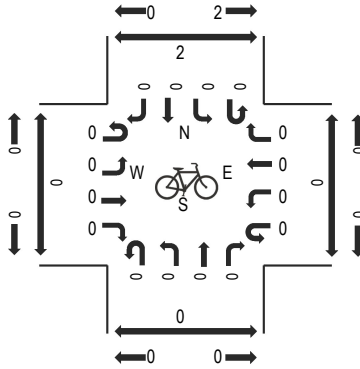
Peak Hour: 04:00 PM - 05:00 PM

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

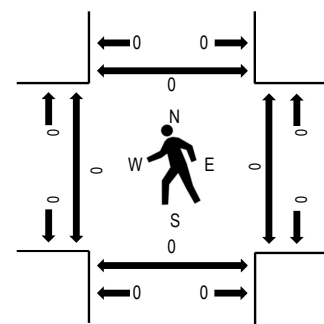
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

Traffic Counts - Motorized Vehicles

Interval Start Time	COWPOKE RD Eastbound				COWPOKE RD Westbound				BLACK FOREST RD Northbound				BLACK FOREST RD Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	7	7	7	0	20	3	37	0	9	87	21	0	86	113	18	415	1,552	0	0	0	0
4:15 PM	0	5	3	9	0	9	5	47	0	9	99	28	0	69	116	24	423	1,506	0	0	0	0
4:30 PM	0	2	2	5	0	7	2	40	0	6	66	25	0	64	100	19	338	1,467	0	0	0	0
4:45 PM	0	2	8	4	0	11	3	38	0	14	90	22	0	80	92	12	376	1,449	0	0	0	0
5:00 PM	0	7	3	7	0	15	6	33	0	11	79	24	0	59	115	10	369	1,437	2	0	0	0
5:15 PM	0	5	4	10	0	17	0	37	0	9	88	19	0	76	106	13	384		0	0	0	0
5:30 PM	0	7	3	2	0	6	1	18	0	7	67	14	0	70	112	13	320		0	0	0	0
5:45 PM	0	11	5	6	0	10	5	25	0	11	96	27	0	60	96	12	364		0	0	0	0
Count Total	0	46	35	50	0	95	25	275	0	76	672	180	0	564	850	121	2,989		2	0	0	0
Peak Hour	0	16	20	25	0	47	13	162	0	38	342	96	0	299	421	73	1,552		0	0	0	0



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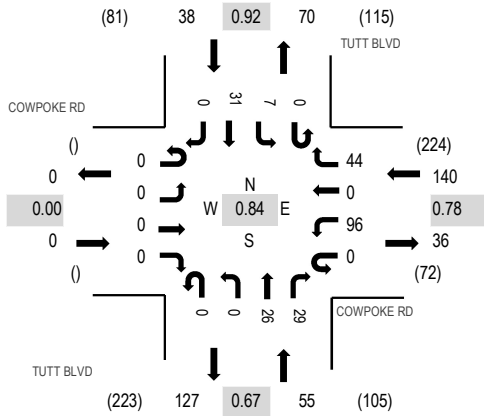
Location: 4 TUTT BLVD & COWPOKE RD AM

Date: Thursday, April 16, 2026

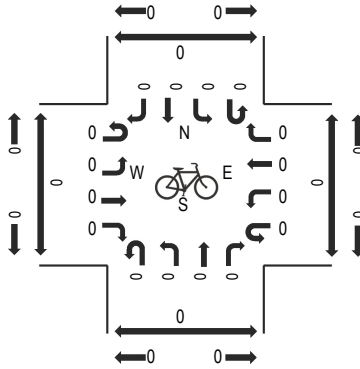
Peak Hour: 07:00 AM - 08:00 AM

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

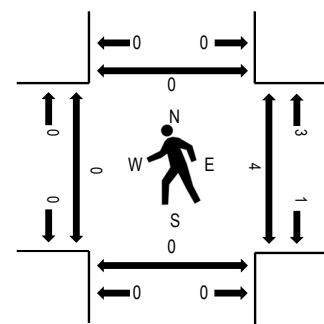
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

Traffic Counts - Motorized Vehicles

Interval Start Time	COWPOKE RD Eastbound				COWPOKE RD Westbound				TUTT BLVD Northbound				TUTT BLVD Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	0	0	0	0	24	0	11	0	0	6	6	0	1	11	0	59	233	0	2	0	0
7:15 AM	0	0	0	0	0	13	0	11	0	0	7	5	0	1	6	0	43	229	0	0	0	0
7:30 AM	0	0	0	0	0	32	0	13	0	0	4	5	0	3	5	0	62	226	0	2	0	0
7:45 AM	0	0	0	0	0	27	0	9	0	0	9	13	0	2	9	0	69	205	0	0	0	0
8:00 AM	0	0	0	0	0	23	0	5	0	0	10	5	0	5	7	0	55	177	0	1	0	0
8:15 AM	0	0	0	0	0	18	0	3	0	0	3	4	0	2	10	0	40		0	0	0	0
8:30 AM	0	0	0	0	0	11	0	6	0	0	5	10	0	0	9	0	41		1	0	0	0
8:45 AM	0	0	0	0	0	11	0	7	0	0	6	7	0	3	7	0	41		0	1	0	0
Count Total	0	0	0	0	0	159	0	65	0	0	50	55	0	17	64	0	410		1	6	0	0
Peak Hour	0	0	0	0	0	96	0	44	0	0	26	29	0	7	31	0	233		0	4	0	0



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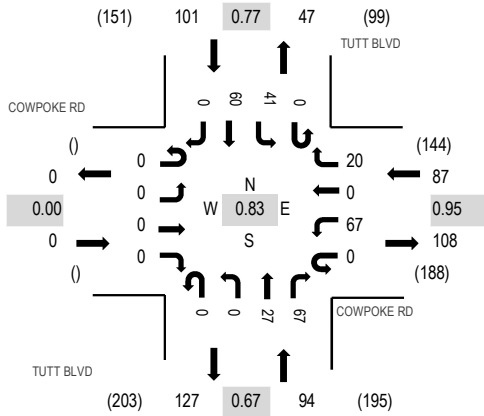
Location: 4 TUTT BLVD & COWPOKE RD PM

Date: Thursday, April 16, 2026

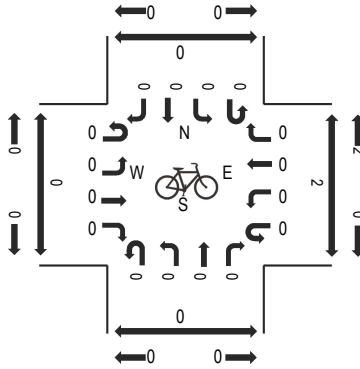
Peak Hour: 04:00 PM - 05:00 PM

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

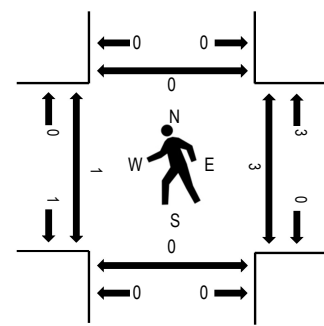
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

Traffic Counts - Motorized Vehicles

Interval Start Time	COWPOKE RD Eastbound				COWPOKE RD Westbound				TUTT BLVD Northbound				TUTT BLVD Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	0	0	0	0	14	0	6	0	0	10	22	0	12	21	0	85	282	1	0	0	0
4:15 PM	0	0	0	0	0	16	0	6	0	0	6	15	0	10	12	0	65	261	0	1	0	0
4:30 PM	0	0	0	0	0	20	0	3	0	0	6	15	0	6	19	0	69	255	0	2	0	0
4:45 PM	0	0	0	0	0	17	0	5	0	0	5	15	0	13	8	0	63	228	0	0	0	0
5:00 PM	0	0	0	0	0	13	0	3	0	0	11	28	0	4	5	0	64	208	0	1	0	0
5:15 PM	0	0	0	0	0	7	0	7	0	0	14	10	0	4	17	0	59		0	2	0	0
5:30 PM	0	0	0	0	0	8	0	3	0	0	8	14	0	4	5	0	42		1	0	0	1
5:45 PM	0	0	0	0	0	14	0	2	0	0	4	12	0	4	7	0	43		0	1	0	0
Count Total	0	0	0	0	0	109	0	35	0	0	64	131	0	57	94	0	490		2	7	0	1
Peak Hour	0	0	0	0	0	67	0	20	0	0	27	67	0	41	60	0	282		1	3	0	0



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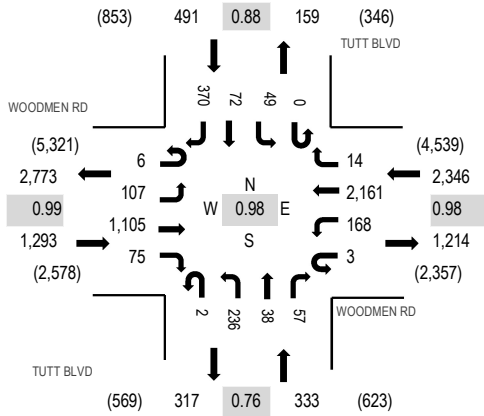
Location: 5 TUTT BLVD & WOODMEN RD AM

Date: Thursday, April 16, 2026

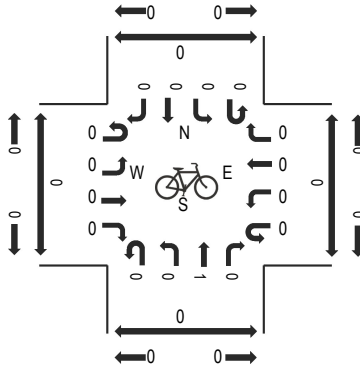
Peak Hour: 07:15 AM - 08:15 AM

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

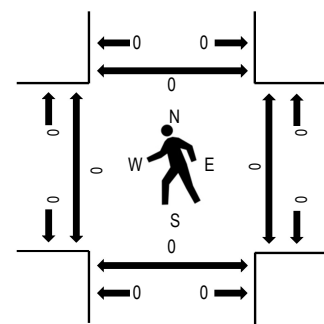
Peak Hour - Motorized Vehicles



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				TUTT BLVD Northbound				TUTT BLVD 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	31	219	20	0	24	542	4	0	37	9	10	0	9	14	89	1,008	4,393	0	0	0	0
7:15 AM	1	25	295	15	0	35	553	2	1	56	7	8	0	15	12	100	1,125	4,463	0	0	0	0
7:30 AM	3	30	250	19	2	43	530	4	0	81	11	18	0	13	27	105	1,136	4,369	0	0	0	0
7:45 AM	1	31	264	19	0	56	540	2	1	53	12	19	0	11	24	91	1,124	4,291	0	0	0	0
8:00 AM	1	21	296	22	1	34	538	6	0	46	8	12	0	10	9	74	1,078	4,200	0	0	0	0
8:15 AM	4	36	282	21	1	32	492	6	0	49	7	12	0	9	11	69	1,031		1	0	0	0
8:30 AM	5	37	276	11	0	29	532	6	0	58	15	13	0	6	9	61	1,058		0	0	0	0
8:45 AM	6	27	290	20	0	51	469	5	0	64	4	12	0	4	10	71	1,033		0	0	0	0
Count Total	21	238	2,172	147	4	304	4,196	35	2	444	73	104	0	77	116	660	8,593		1	0	0	0
Peak Hour	6	107	1,105	75	3	168	2,161	14	2	236	38	57	0	49	72	370	4,463		0	0	0	0



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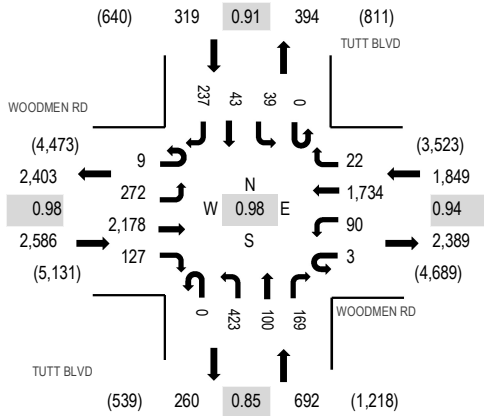
Location: 5 TUTT BLVD & WOODMEN RD PM

Date: Thursday, April 16, 2026

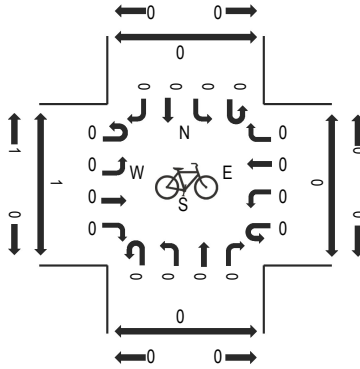
Peak Hour: 04:00 PM - 05:00 PM

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

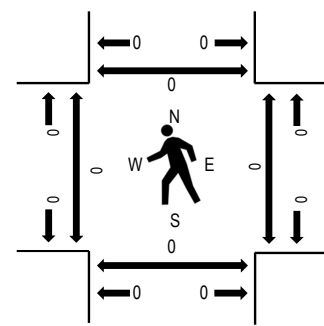
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

Traffic Counts - Motorized Vehicles

Interval Start Time	WOODMEN RD Eastbound				WOODMEN RD Westbound				TUTT BLVD Northbound				TUTT BLVD 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	3	71	535	27	0	19	387	5	0	114	30	59	0	12	10	52	1,324	5,446	0	0	0	0
4:15 PM	2	67	565	27	2	24	463	5	0	91	22	32	0	8	8	71	1,387	5,397	0	0	0	0
4:30 PM	4	64	530	38	0	21	468	4	0	115	28	39	0	13	11	57	1,392	5,337	0	0	0	0
4:45 PM	0	70	548	35	1	26	416	8	0	103	20	39	0	6	14	57	1,343	5,160	0	0	0	0
5:00 PM	2	66	496	24	0	20	379	10	0	115	32	46	0	12	10	63	1,275	5,066	0	0	0	0
5:15 PM	0	76	560	36	1	16	415	14	0	70	31	16	0	12	21	59	1,327		0	0	0	0
5:30 PM	3	60	533	33	0	27	356	6	0	68	24	29	0	6	17	53	1,215		0	0	0	0
5:45 PM	3	73	545	35	1	27	396	6	0	39	19	37	0	6	13	49	1,249		0	0	0	0
Count Total	17	547	4,312	255	5	180	3,280	58	0	715	206	297	0	75	104	461	10,512		0	0	0	0
Peak Hour	9	272	2,178	127	3	90	1,734	22	0	423	100	169	0	39	43	237	5,446		0	0	0	0

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12200 W 52nd Ave

Wheat Ridge, CO 80033

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Site Code: 6
Station ID: 6
TUTT BLVD S.O. COWPOKE RD

Start Time	16-Apr-26 Thu	NB	SB	Total
12:00 AM		1	2	3
01:00		0	0	0
02:00		1	0	1
03:00		0	0	0
04:00		2	2	4
05:00		3	5	8
06:00		31	24	55
07:00		55	127	182
08:00		50	96	146
09:00		20	35	55
10:00		34	26	60
11:00		27	48	75
12:00 PM		33	39	72
01:00		38	30	68
02:00		74	39	113
03:00		45	82	127
04:00		94	127	221
05:00		101	76	177
06:00		46	45	91
07:00		19	28	47
08:00		25	23	48
09:00		19	12	31
10:00		5	13	18
11:00		6	4	10
Total		729	883	1612
Percent		45.2%	54.8%	
AM Peak	-	07:00	07:00	-
Vol.	-	55	127	-
PM Peak	-	17:00	16:00	-
Vol.	-	101	127	-
Grand Total		729	883	1612
Percent		45.2%	54.8%	
ADT		ADT 1,612		AADT 1,612

All Traffic Data Services

12200 W 52nd Ave

Wheat Ridge, CO 80033

www.alltrafficdata.net

Site Code: 7
Station ID: 7
COWPOKE RD W.O. BLACK FOREST RD

Start Time	16-Apr-26 Thu	EB	WB	Total
12:00 AM		1	0	1
01:00		2	1	3
02:00		0	1	1
03:00		2	1	3
04:00		4	2	6
05:00		19	1	20
06:00		40	8	48
07:00		96	55	151
08:00		71	65	136
09:00		38	35	73
10:00		39	43	82
11:00		38	34	72
12:00 PM		45	56	101
01:00		37	46	83
02:00		48	62	110
03:00		84	97	181
04:00		61	124	185
05:00		70	98	168
06:00		48	67	115
07:00		39	60	99
08:00		27	46	73
09:00		15	28	43
10:00		9	12	21
11:00		2	5	7
Total		835	947	1782
Percent		46.9%	53.1%	
AM Peak	-	07:00	08:00	-
Vol.	-	96	65	-
PM Peak	-	15:00	16:00	-
Vol.	-	84	124	-
Grand Total		835	947	1782
Percent		46.9%	53.1%	
ADT		ADT 1,782	AADT 1,782	

Intersection 556 at Woodmen Rd and Tuttle Blvd - Timing table, page 1

Page 1	Phases											
	1	2	3	4	5	6	7	8	9	10	11	12
Min Green	4	10	4	4	4	10	4	4	0	0	0	0
Passage Time I	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	0.0	0.0	0.0	0.0
Passage Time II	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Green I	15	60	15	15	15	60	20	15	0	0	0	0
Max Green II	0	0	0	0	14	0	0	0	0	0	0	0
Yellow Clearance	3.0	5.5	3.0	5.0	3.0	5.5	3.0	5.0	0.0	0.0	0.0	0.0
Red Clearance	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	5.0	5.0	5.0	5.0	5.0	5.0	5.0	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	25	0	34	0	25	0	34	0	0	0	0
Handicap Walk	0	0	0	0	0	0	0	0	0	0	0	0
Handicap Ped Clearance	0	0	0	0	0	0	0	0	0	0	0	0
Woodmen Rd	X	X			X	X						
Tuttle Blvd			X	X			X	X				
Compass Direction	W	E	S	N	E	W	N	S				
Through, Turn or XPed	Left,prt	Thru	Left,prt	Thru	Left,prt	Thru	Left,prt	Thru				

Intersection 556 at Woodmen Rd and Tutt Blvd - Sequence table, page 1

Page 1	Ring 1 Phases				Ring 2 Phases				Ring 3 Phases			
	1	2	3	4	5	6	7	8	9	10	11	12
State 1	Vehicle				Vehicle							
Barrier 1												
State 2		V & P				V & P						
Barrier 2	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXX				
State 3				V & P			Vehicle					
Barrier 3												
State 4			Vehicle					V & P				
Barrier 4	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXX				
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 556 at Woodmen Rd and Tutt Blvd - Phases control table, page 1

Page 1	Vehicle Phases			Ped Phases	
		111			111
		123456789012			123456789012
Min Recalls			Ped Recalls		
Max Recalls		2 6	Handicap Ped Recalls		
Recall If Maxed			Soft Ped Recalls		
Dual Entry			Don't Recall (FDW Offset)	2 4 6 8	
Do Not Skip			Allow Walk Reduction		
Simultaneous Gap Out			Hold In Walk		
Restricted Phases		3 7	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 556 at Woodmen Rd and Tutt Blvd - Schedule table, events 1-25

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

Intersection 614 at Research Pkwy and Cordera Pkwy - Timing table, page 1

Page 1	Phases											
	1	2	3	4	5	6	7	8	9	10	11	12
Min Green	4	10	0	4	4	10	0	4	0	0	0	0
Passage Time I	2.0	2.0	0.0	2.0	2.0	2.0	0.0	2.0	0.0	0.0	0.0	0.0
Passage Time II	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Green I	10	30	0	30	10	30	0	30	0	0	0	0
Max Green II	0	0	0	0	0	0	0	0	0	0	0	0
Yellow Clearance	3.0	4.5	0.0	5.0	3.0	4.5	0.0	5.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	26	0	40	0	26	0	40	0	0	0	0
Handicap Walk	0	0	0	0	0	0	0	0	0	0	0	0
Handicap Ped Clearance	0	0	0	0	0	0	0	0	0	0	0	0
Research Pkwy	X	X			X	X						
Cordera Pkwy				X				X				
Compass Direction	SW	NE		NW	NE	SW		SE				
Through, Turn or XPed	Left,prt	Thru		Thru	Left,prt	Thru		Thru				

Intersection 614 at Research Pkwy and Cordera Pkwy - 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	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX
State 3				V & P				V & P				
Barrier 3	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX
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 614 at Research Pkwy and Cordera Pkwy - Phases control table, page 1

Page 1	Vehicle Phases		Ped Phases
	111 123456789012		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	
Sequential Initial Timing		Rest In Walk	No
Max Timer Starts For Call			
Reduction Starts For Call			
Red To Avoid Left Turn Trap	2 6		
Rest In Red	No		

Intersection 614 at Research Pkwy and Cordera Pkwy - Spec signaling cntrl tbl, pg 1

Page 1									
Signaling Control 1					Signaling Control 2				
Function	Flashing permissive left turn	Timer 1	2.0		Function	Flashing permissive left turn	Timer 1	2.0	
Operand	0	Timer 2	0.0		Operand	0	Timer 2	0.0	
Trigger	Always enabled	Timer 3	0.0		Trigger	Always enabled	Timer 3	0.0	
	111	Output 1	25			111	Output 1	1	
	123456789012	Output 2	34			123456789012	Output 2	35	
Phases 1	5	Output 3	41		Phases 1	1	Output 3	40	
Phases 2	2	Output 4	1		Phases 2	6	Output 4	1	
Overlaps 1					Overlaps 1				
Overlaps 2					Overlaps 2				
Signaling Control 3					Signaling Control 4				
Function	None	Timer 1	0.0		Function	None	Timer 1	0.0	
Operand	0	Timer 2	0.0		Operand	0	Timer 2	0.0	
Trigger	Always enabled	Timer 3	0.0		Trigger	Always enabled	Timer 3	0.0	
	111	Output 1	1			111	Output 1	1	
	123456789012	Output 2	1			123456789012	Output 2	1	
Phases 1		Output 3	1		Phases 1		Output 3	1	
Phases 2		Output 4	1		Phases 2		Output 4	1	
Overlaps 1					Overlaps 1				
Overlaps 2					Overlaps 2				

Intersection 614 at Research Pkwy and Cordera Pkwy - Coordination table, plans 1-2

Alternate Maxes

Intersection 614 at Research Pkwy and Cordera Pkwy - Schedule table, events 1-25

Event Num	Enabled	Event Type	Event Parameters			Start			Duration			Stop		Repetition		Priority
			Param 1	Param 2		Mon	Day	Hour	Min	Sec	Minutes	Mon	Day	Repeat	Intervals	
1	Yes	Run Plan	Plan 1	Ofst #1		1	1	06	00	00	780	12	31	Weekly	MTWTF	Very Low
2	Yes	Run Plan	Plan 1	Ofst #1		1	1	07	00	00	720	12	31	Weekly	S	Very Low
3																
4																
5																
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																
24																
25																

Intersection 626 at Black Forrest Rd and Cowpoke Rd - Timing table, page 1

Page 1	Phases											
	1	2	3	4	5	6	7	8	9	10	11	12
Min Green	4	15	4	4	4	15	4	4	0	0	0	0
Passage Time I	1.0	3.0	1.0	2.0	1.0	3.0	1.0	2.0	0.0	0.0	0.0	0.0
Passage Time II	1.0	3.0	1.0	2.0	1.0	3.0	1.0	2.0	0.0	0.0	0.0	0.0
Max Green I	10	35	10	20	10	35	10	20	0	0	0	0
Max Green II	0	0	0	0	0	0	0	0	0	0	0	0
Yellow Clearance	3.0	4.5	3.0	5.0	3.0	4.5	3.0	5.0	0.0	0.0	0.0	0.0
Red Clearance	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	5.0	5.0	5.0	5.0	5.0	5.0	5.0	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	29	0	38	0	29	0	38	0	0	0	0
Handicap Walk	0	0	0	0	0	0	0	0	0	0	0	0
Handicap Ped Clearance	0	0	0	0	0	0	0	0	0	0	0	0
Black Forrest Rd	X	X			X	X						
Cowpoke Rd			X	X			X	X				
Compass Direction	S	N	W	E	N	S	E	W				
Through, Turn or XPed	Left,prt	Thru	Left,prt	Thru	Left,prt	Thru	Left,prt	Thru				

Intersection 626 at Black Forrest Rd and Cowpoke 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	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXX	XXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXX	XXXXXXXXXXXX	XXXXXXXXXXXX	XXXXXXXXXXXX	XXXXXXXXXXXX	XXXXXXXXXXXX	XXXXXXXXXXXX
State 3			Vehicle				Vehicle					
Barrier 3												
State 4				V & P				V & P				
Barrier 4	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXX	XXXXXXXXXXXX	XXXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXX	XXXXXXXXXXXX	XXXXXXXXXXXX	XXXXXXXXXXXX	XXXXXXXXXXXX	XXXXXXXXXXXX	XXXXXXXXXXXX
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 626 at Black Forrest Rd and Cowpoke Rd - Phases control table, page 1

Page 1	Vehicle Phases		Ped Phases
	111 123456789012		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	
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 626 at Black Forrest Rd and Cowpoke Rd - Spec signaling cntrl tbl, pg 1

Page 1									
Signaling Control 1					Signaling Control 2				
Function	Flashing permissive left turn	Timer 1	2.0		Function	Flashing permissive left turn	Timer 1	2.0	
Operand	2	Timer 2	0.0		Operand	2	Timer 2	0.0	
Trigger	Always enabled	Timer 3	0.0		Trigger	Always enabled	Timer 3	0.0	
	111	Output 1	1			111	Output 1	25	
	123456789012	Output 2	35			123456789012	Output 2	34	
Phases 1	1	Output 3	40		Phases 1	5	Output 3	41	
Phases 2	2 6	Output 4	1		Phases 2	2 6	Output 4	1	
Overlaps 1					Overlaps 1				
Overlaps 2					Overlaps 2				
Signaling Control 3					Signaling Control 4				
Function	Flashing permissive left turn	Timer 1	2.0		Function	Flashing permissive left turn	Timer 1	2.0	
Operand	1	Timer 2	0.0		Operand	1	Timer 2	0.0	
Trigger	Always enabled	Timer 3	0.0		Trigger	Always enabled	Timer 3	0.0	
	111	Output 1	17			111	Output 1	9	
	123456789012	Output 2	36			123456789012	Output 2	33	
Phases 1	3	Output 3	44		Phases 1	7	Output 3	43	
Phases 2	8	Output 4	1		Phases 2	4	Output 4	1	
Overlaps 1					Overlaps 1				
Overlaps 2					Overlaps 2				

Intersection 626 at Black Forrest Rd and Cowpoke Rd - Schedule table, events 1-25

Event Num	Enabled	Event Type	Event Parameters						Start		Duration			Stop		Repetition		Priority
			Param 1	Param 2	Param 3	Param 4	Param 5	Param 6	Mon	Tue	Wed	Thurs	Min	Sec	Day	Hour	Min	
1	Yes	Run Plan	Plan 2	Ofst #1	1	1	1	05	00	00	00	300	12	31	Weekly	MTWTF	Low	
2	Yes	Run Plan	Plan 3	Ofst #1	1	1	1	10	00	00	00	240	12	31	Weekly	MTWTF	Low	
3	Yes	Run Plan	Plan 4	Ofst #1	1	1	1	14	00	00	00	480	12	31	Weekly	MTWTF	Very Low	
4	Yes	Run Plan	Plan 5	Ofst #1	1	1	1	10	00	00	00	600	12	31	Weekly	S	Low	
5	Yes	Run Plan	Plan 6	Ofst #1	1	1	1	06	00	00	00	240	12	31	Weekly	S	Medium	
6	Yes	Run Plan	Plan 6	Ofst #1	1	1	1	18	00	00	00	240	12	31	Weekly	S	Medium	
7																		
8																		
9																		
10																		
11																		
12																		
13																		
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25																		

APPENDIX B

Level of Service Definitions

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

Motorized Vehicle Level of Service (LOS) for Signalized Intersections

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

APPENDIX C

Capacity Worksheets

Timings

1: Black Forest Road & Cowpoke Road

Existing Traffic Conditions

AM Peak Traffic Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	64	10	32	158	30	371	18	386	92	169	329	38
Future Volume (vph)	64	10	32	158	30	371	18	386	92	169	329	38
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.930			0.430			0.538			0.456		
Satd. Flow (perm)	1732	1863	1583	801	1863	1583	1002	3539	1583	849	3539	1583
Satd. Flow (RTOR)			183			403			188			188
Lane Group Flow (vph)	70	11	35	172	33	403	20	420	100	184	358	41
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	15.0	15.0	4.0	15.0	15.0
Minimum Split (s)	9.0	11.0	11.0	9.0	11.0	11.0	9.0	21.5	21.5	9.0	21.5	21.5
Total Split (s)	14.0	25.0	25.0	27.0	38.0	38.0	15.0	41.0	41.0	17.0	43.0	43.0
Total Split (%)	12.7%	22.7%	22.7%	24.5%	34.5%	34.5%	13.6%	37.3%	37.3%	15.5%	39.1%	39.1%
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	0.0
Total Lost Time (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	6.5	6.5	5.0	6.5	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effect Green (s)	13.7	6.5	6.5	24.9	11.9	11.9	66.1	58.6	58.6	75.1	69.0	69.0
Actuated g/C Ratio	0.12	0.06	0.06	0.23	0.11	0.11	0.60	0.53	0.53	0.68	0.63	0.63
v/c Ratio	0.32	0.10	0.13	0.53	0.16	0.76	0.03	0.22	0.11	0.28	0.16	0.04
Control Delay (s/veh)	37.1	50.1	1.0	40.4	43.9	14.3	8.7	16.2	0.2	8.9	11.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	37.1	50.1	1.0	40.4	43.9	14.3	8.7	16.2	0.2	8.9	11.2	0.1
LOS	D	D	A	D	D	B	A	B	A	A	B	A
Approach Delay (s/veh)		27.4			23.3			13.0			9.7	
Approach LOS		C			C			B			A	
Queue Length 50th (ft)	39	8	0	103	22	0	5	84	0	46	48	0
Queue Length 95th (ft)	71	26	0	153	49	92	16	144	0	92	108	0
Internal Link Dist (ft)		2876			510			1147			1070	
Turn Bay Length (ft)	215		150	145		145	370		270	310		275
Base Capacity (vph)	231	304	412	393	525	735	708	1885	931	683	2219	1062
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.04	0.08	0.44	0.06	0.55	0.03	0.22	0.11	0.27	0.16	0.04

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 27 (25%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Timings
 1: Black Forest Road & Cowpoke Road

Existing Traffic Conditions
 AM Peak Traffic Hour

Maximum v/c Ratio: 0.76

Intersection Signal Delay (s/veh): 16.2

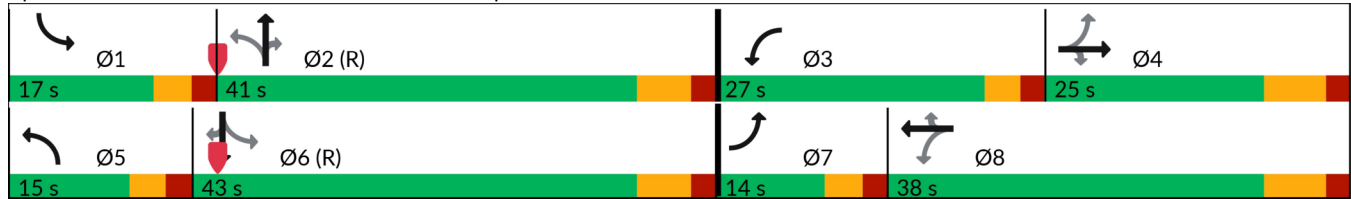
Intersection LOS: B

Intersection Capacity Utilization 54.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1: Black Forest Road & Cowpoke Road



Timings

2: Tutt Boulevard & Woodmen Road

Existing Traffic Conditions

AM Peak Traffic Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	113	1105	75	171	2161	14	238	38	57	49	72	370
Future Volume (vph)	113	1105	75	171	2161	14	238	38	57	49	72	370
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Satd. Flow (RTOR)			139			139			144			194
Lane Group Flow (vph)	123	1201	82	186	2349	15	259	41	62	53	78	402
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	4.0	10.0	10.0	4.0	10.0	10.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	17.5	17.5	9.0	17.5	17.5	9.0	11.0	11.0	9.0	11.0	11.0
Total Split (s)	16.0	53.0	53.0	21.0	58.0	58.0	20.0	21.0	21.0	15.0	16.0	16.0
Total Split (%)	14.5%	48.2%	48.2%	19.1%	52.7%	52.7%	18.2%	19.1%	19.1%	13.6%	14.5%	14.5%
Yellow Time (s)	3.0	5.5	5.5	3.0	5.5	5.5	3.0	5.0	5.0	3.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	0.0
Total Lost Time (s)	5.0	7.5	7.5	5.0	7.5	7.5	5.0	7.0	7.0	5.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effect Green (s)	9.1	50.2	50.2	11.3	52.4	52.4	13.1	19.0	19.0	7.1	10.9	10.9
Actuated g/C Ratio	0.08	0.46	0.46	0.10	0.48	0.48	0.12	0.17	0.17	0.06	0.10	0.10
v/c Ratio	0.43	0.52	0.10	0.53	0.97	0.02	0.63	0.07	0.16	0.24	0.22	1.21
Control Delay (s/veh)	52.4	22.6	0.7	52.1	41.3	0.1	53.3	41.1	0.9	51.0	48.4	143.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	52.4	22.6	0.7	52.1	41.3	0.1	53.3	41.1	0.9	51.0	48.4	143.5
LOS	D	C	A	D	D	A	D	D	A	D	D	F
Approach Delay (s/veh)		23.9			41.9			43.0			120.4	
Approach LOS		C			D			D			F	
Queue Length 50th (ft)	43	218	0	66	584	0	92	13	0	19	27	~223
Queue Length 95th (ft)	73	276	4	100	#744	0	134	31	0	39	53	#434
Internal Link Dist (ft)		1314			1884			512			467	
Turn Bay Length (ft)	495		280	225		505	365		365	175		235
Base Capacity (vph)	343	2322	798	499	2420	826	468	610	392	312	351	331
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.52	0.10	0.37	0.97	0.02	0.55	0.07	0.16	0.17	0.22	1.21

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 27 (25%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Timings
2: Tutt Boulevard & Woodmen Road

Existing Traffic Conditions
AM Peak Traffic Hour

Maximum v/c Ratio: 1.21

Intersection Signal Delay (s/veh): 45.4

Intersection LOS: D

Intersection Capacity Utilization 87.7%

ICU Level of Service E

Analysis Period (min) 15

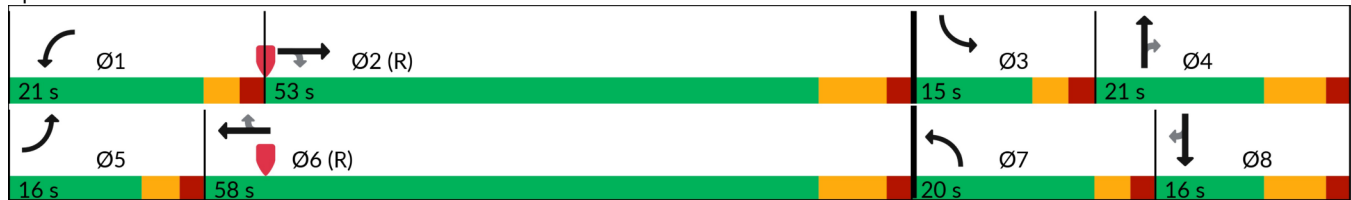
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: Tutt Boulevard & Woodmen Road



Timings

3: Cross Creek Drive/Grand Cordera Parkway & Research Parkway

Existing Traffic Conditions

AM Peak Traffic Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  							
Traffic Volume (vph)	110	386	47	7	995	62	94	18	14	43	12	224
Future Volume (vph)	110	386	47	7	995	62	94	18	14	43	12	224
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	1770	1744	0	1770	1863	1583
Flt Permitted	0.211			0.498			0.749			0.734		
Satd. Flow (perm)	393	5085	1583	928	5085	1583	1395	1744	0	1367	1863	1583
Satd. Flow (RTOR)			109			170		15				243
Lane Group Flow (vph)	120	420	51	8	1082	67	102	35	0	47	13	243
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2		2	6		6	4			8		8
Detector Phase	5	2	2	1	6	6	4	4		8	8	8
Switch Phase												
Minimum Initial (s)	4.0	10.0	10.0	4.0	10.0	10.0	4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	9.0	16.5	16.5	9.0	16.5	16.5	11.0	11.0		11.0	11.0	11.0
Total Split (s)	22.0	45.0	45.0	13.0	36.0	36.0	32.0	32.0		32.0	32.0	32.0
Total Split (%)	24.4%	50.0%	50.0%	14.4%	40.0%	40.0%	35.6%	35.6%		35.6%	35.6%	35.6%
Yellow Time (s)	3.0	4.5	4.5	3.0	4.5	4.5	5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	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	6.5	6.5	5.0	6.5	6.5	7.0	7.0		7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	None
Act Effect Green (s)	65.8	62.4	62.4	59.4	52.2	52.2	11.9	11.9		11.9	11.9	11.9
Actuated g/C Ratio	0.73	0.69	0.69	0.66	0.58	0.58	0.13	0.13		0.13	0.13	0.13
v/c Ratio	0.30	0.12	0.05	0.01	0.37	0.07	0.55	0.14		0.26	0.05	0.58
Control Delay (s/veh)	6.0	5.8	0.1	4.6	11.2	0.1	47.1	23.0		37.0	32.0	10.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay (s/veh)	6.0	5.8	0.1	4.6	11.2	0.1	47.1	23.0		37.0	32.0	10.5
LOS	A	A	A	A	B	A	D	C		D	C	B
Approach Delay (s/veh)		5.3			10.5			40.9			15.6	
Approach LOS		A			B			D			B	
Queue Length 50th (ft)	16	23	0	1	112	0	56	10		25	7	0
Queue Length 95th (ft)	39	58	1	6	172	0	101	35		54	22	62
Internal Link Dist (ft)		685			520			536			282	
Turn Bay Length (ft)	200		200	310		245	80			90		80
Base Capacity (vph)	548	3525	1131	711	2951	990	387	495		379	517	615
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	0.22	0.12	0.05	0.01	0.37	0.07	0.26	0.07		0.12	0.03	0.40

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 58 (64%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 45

Control Type: Actuated-Coordinated

Timings

3: Cross Creek Drive/Grand Cordera Parkway & Research Parkway

Existing Traffic Conditions

AM Peak Traffic Hour

Maximum v/c Ratio: 0.58

Intersection Signal Delay (s/veh): 11.7

Intersection LOS: B

Intersection Capacity Utilization 55.4%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3: Cross Creek Drive/Grand Cordera Parkway & Research Parkway



Intersection						
Int Delay, s/veh	5.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	96	44	26	29	7	31
Future Vol, veh/h	96	44	26	29	7	31
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	150	0	-	0	120	-
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	104	48	28	32	8	34
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	60	28	0	0	60	0
Stage 1	28	-	-	-	-	-
Stage 2	32	-	-	-	-	-
Critical Hdwy	6.63	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.83	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	-	-	2.219	-
Pot Cap-1 Maneuver	943	1046	-	-	1543	-
Stage 1	994	-	-	-	-	-
Stage 2	987	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	938	1046	-	-	1543	-
Mov Cap-2 Maneuver	938	-	-	-	-	-
Stage 1	994	-	-	-	-	-
Stage 2	982	-	-	-	-	-
Approach	WB	NB	SB			
HCM Ctrl Dly, s/v	9.09	0	1.35			
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	-	938	1046	1543	-
HCM Lane V/C Ratio	-	-	0.111	0.046	0.005	-
HCM Ctrl Dly (s/v)	-	-	9.3	8.6	7.3	-
HCM Lane LOS	-	-	A	A	A	-
HCM 95th %tile Q(veh)	-	-	0.4	0.1	0	-

Intersection						
Int Delay, s/veh	5.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	1	20	1	1	7
Future Vol, veh/h	3	1	20	1	1	7
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	3	1	22	1	1	8

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	49	5	9	0	-	0
Stage 1	5	-	-	-	-	-
Stage 2	45	-	-	-	-	-
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	960	1078	1611	-	-	-
Stage 1	1018	-	-	-	-	-
Stage 2	978	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	947	1078	1611	-	-	-
Mov Cap-2 Maneuver	947	-	-	-	-	-
Stage 1	1004	-	-	-	-	-
Stage 2	978	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	8.7	6.92	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT EBLn1	SBT	SBR
Capacity (veh/h)	1610	-	977	-
HCM Lane V/C Ratio	0.013	-	0.004	-
HCM Ctrl Dly (s/v)	7.3	0	8.7	-
HCM Lane LOS	A	A	A	-
HCM 95th %tile Q(veh)	0	-	0	-

Intersection						
Int Delay, s/veh	2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	4	0	0	8	3	2
Future Vol, veh/h	4	0	0	8	3	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	0	0	9	3	2
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	13	4	5	0	-	0
Stage 1	4	-	-	-	-	-
Stage 2	9	-	-	-	-	-
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	1006	1079	1616	-	-	-
Stage 1	1019	-	-	-	-	-
Stage 2	1014	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	1006	1079	1616	-	-	-
Mov Cap-2 Maneuver	1006	-	-	-	-	-
Stage 1	1019	-	-	-	-	-
Stage 2	1014	-	-	-	-	-
Approach	EB	NB		SB		
HCM Ctrl Dly, s/v	8.59	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1616	-	1006	-	-	
HCM Lane V/C Ratio	-	-	0.004	-	-	
HCM Ctrl Dly (s/v)	0	-	8.6	-	-	
HCM Lane LOS	A	-	A	-	-	
HCM 95th %tile Q(veh)	0	-	0	-	-	

Intersection						
Int Delay, s/veh	4.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	23	0	3	9	0	8
Future Vol, veh/h	23	0	3	9	0	8
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	25	0	3	10	0	9

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	17	8	0
Stage 1	8	-	-
Stage 2	9	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	1001	1074	-
Stage 1	1015	-	-
Stage 2	1014	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	1001	1074	-
Mov Cap-2 Maneuver	1001	-	-
Stage 1	1015	-	-
Stage 2	1014	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	8.69	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	1001	1605
HCM Lane V/C Ratio	-	-	0.025	-
HCM Ctrl Dly (s/v)	-	-	8.7	0
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0

Intersection						
Int Delay, s/veh	5.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	8	0	0	3	0	0
Future Vol, veh/h	8	0	0	3	0	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	9	0	0	3	0	0
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	3	2	0	0	3	0
Stage 1	2	-	-	-	-	-
Stage 2	1	-	-	-	-	-
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	1020	1083	-	-	1619	-
Stage 1	1022	-	-	-	-	-
Stage 2	1022	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	1020	1083	-	-	1619	-
Mov Cap-2 Maneuver	1020	-	-	-	-	-
Stage 1	1022	-	-	-	-	-
Stage 2	1022	-	-	-	-	-
Approach	WB		NB		SB	
HCM Ctrl Dly, s/v	8.56		0		0	
HCM LOS	A					
Minor Lane/Major Mvmt		NBT	NBRWBLn1	SBL	SBT	
Capacity (veh/h)		-	-	1020	1619	-
HCM Lane V/C Ratio		-	-	0.009	-	-
HCM Ctrl Dly (s/v)		-	-	8.6	0	-
HCM Lane LOS		-	-	A	A	-
HCM 95th %tile Q(veh)		-	-	0	0	-

Timings

1: Black Forest Road & Cowpoke Road

Existing Traffic Conditions

PM Peak Traffic Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	20	25	47	13	162	38	342	96	299	421	73
Future Volume (vph)	16	20	25	47	13	162	38	342	96	299	421	73
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.748			0.453			0.488			0.495		
Satd. Flow (perm)	1393	1863	1583	844	1863	1583	909	3539	1583	922	3539	1583
Satd. Flow (RTOR)			168			176			173			127
Lane Group Flow (vph)	17	22	27	51	14	176	41	372	104	325	458	79
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	15.0	15.0	4.0	15.0	15.0
Minimum Split (s)	9.0	11.0	11.0	9.0	11.0	11.0	9.0	21.5	21.5	9.0	21.5	21.5
Total Split (s)	14.0	30.0	30.0	18.0	34.0	34.0	16.0	37.0	37.0	35.0	56.0	56.0
Total Split (%)	11.7%	25.0%	25.0%	15.0%	28.3%	28.3%	13.3%	30.8%	30.8%	29.2%	46.7%	46.7%
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	0.0
Total Lost Time (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	6.5	6.5	5.0	6.5	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effect Green (s)	13.0	7.2	7.2	17.1	11.0	11.0	80.8	73.1	73.1	91.6	81.4	81.4
Actuated g/C Ratio	0.11	0.06	0.06	0.14	0.09	0.09	0.67	0.61	0.61	0.76	0.68	0.68
v/c Ratio	0.10	0.20	0.11	0.28	0.08	0.58	0.06	0.17	0.10	0.41	0.19	0.07
Control Delay (s/veh)	39.9	56.9	0.8	44.3	49.2	15.4	6.1	12.7	0.3	6.8	9.2	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	39.9	56.9	0.8	44.3	49.2	15.4	6.1	12.7	0.3	6.8	9.2	0.5
LOS	D	E	A	D	D	B	A	B	A	A	A	A
Approach Delay (s/veh)		29.6			23.5			9.7			7.5	
Approach LOS		C			C			A			A	
Queue Length 50th (ft)	11	17	0	34	9	0	8	70	0	74	75	0
Queue Length 95th (ft)	31	44	0	67	31	68	21	121	1	132	120	5
Internal Link Dist (ft)		2876			510			1147			1070	
Turn Bay Length (ft)	215		150	145		145	370		270	310		275
Base Capacity (vph)	203	357	439	241	419	492	727	2154	1031	919	2399	1114
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.06	0.06	0.21	0.03	0.36	0.06	0.17	0.10	0.35	0.19	0.07

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 108 (90%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Timings
 1: Black Forest Road & Cowpoke Road

Existing Traffic Conditions
 PM Peak Traffic Hour

Maximum v/c Ratio: 0.58

Intersection Signal Delay (s/veh): 11.3

Intersection LOS: B

Intersection Capacity Utilization 53.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1: Black Forest Road & Cowpoke Road



Timings

2: Tutt Boulevard & Woodmen Road

Existing Traffic Conditions

PM Peak Traffic Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	272	2178	127	93	1734	22	423	100	169	39	43	237
Future Volume (vph)	272	2178	127	93	1734	22	423	100	169	39	43	237
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Satd. Flow (RTOR)			173			173			184			191
Lane Group Flow (vph)	296	2367	138	101	1885	24	460	109	184	42	47	258
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	4.0	10.0	10.0	4.0	10.0	10.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	17.5	17.5	9.0	17.5	17.5	9.0	11.0	11.0	9.0	11.0	11.0
Total Split (s)	20.0	60.0	60.0	18.0	58.0	58.0	22.0	26.0	26.0	16.0	20.0	20.0
Total Split (%)	16.7%	50.0%	50.0%	15.0%	48.3%	48.3%	18.3%	21.7%	21.7%	13.3%	16.7%	16.7%
Yellow Time (s)	3.0	5.5	5.5	3.0	5.5	5.5	3.0	5.0	5.0	3.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	0.0
Total Lost Time (s)	5.0	7.5	7.5	5.0	7.5	7.5	5.0	7.0	7.0	5.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effect Green (s)	14.2	59.3	59.3	8.9	54.0	54.0	17.0	22.5	22.5	6.9	10.3	10.3
Actuated g/C Ratio	0.12	0.49	0.49	0.07	0.45	0.45	0.14	0.19	0.19	0.06	0.09	0.09
v/c Ratio	0.73	0.94	0.16	0.40	0.82	0.03	0.95	0.16	0.41	0.21	0.15	0.83
Control Delay (s/veh)	62.2	38.5	1.7	57.2	33.4	0.1	80.8	42.2	9.0	56.0	50.5	37.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	62.2	38.5	1.7	57.2	33.4	0.1	80.8	42.2	9.0	56.0	50.5	37.9
LOS	E	D	A	E	C	A	F	D	A	E	D	D
Approach Delay (s/veh)		39.2			34.2			57.7			41.8	
Approach LOS		D			C			E			D	
Queue Length 50th (ft)	115	642	0	39	485	0	187	38	0	16	17	51
Queue Length 95th (ft)	165	#825	21	68	563	0	#291	66	63	35	37	#171
Internal Link Dist (ft)		1314			1884			512			467	
Turn Bay Length (ft)	495		280	225		505	365		365	175		235
Base Capacity (vph)	432	2511	869	371	2287	807	486	665	447	314	383	341
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.94	0.16	0.27	0.82	0.03	0.95	0.16	0.41	0.13	0.12	0.76

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 8 (7%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Timings
2: Tutt Boulevard & Woodmen Road

Existing Traffic Conditions
PM Peak Traffic Hour

Maximum v/c Ratio: 0.95

Intersection Signal Delay (s/veh): 40.0

Intersection LOS: D

Intersection Capacity Utilization 80.4%

ICU Level of Service D

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: Tutt Boulevard & Woodmen Road



Timings

3: Cross Creek Drive/Grand Cordera Parkway & Research Parkway

Existing Traffic Conditions

PM Peak Traffic Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  			 			 	
Traffic Volume (vph)	204	781	132	14	499	47	65	16	13	69	17	211
Future Volume (vph)	204	781	132	14	499	47	65	16	13	69	17	211
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	1770	1736	0	1770	1863	1583
Flt Permitted	0.401			0.321			0.746			0.737		
Satd. Flow (perm)	747	5085	1583	598	5085	1583	1390	1736	0	1373	1863	1583
Satd. Flow (RTOR)			143			170		14				229
Lane Group Flow (vph)	222	849	143	15	542	51	71	31	0	75	18	229
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2		2	6		6	4			8		8
Detector Phase	5	2	2	1	6	6	4	4		8	8	8
Switch Phase												
Minimum Initial (s)	4.0	10.0	10.0	4.0	10.0	10.0	4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	9.0	16.5	16.5	9.0	16.5	16.5	11.0	11.0		11.0	11.0	11.0
Total Split (s)	22.0	45.0	45.0	13.0	36.0	36.0	32.0	32.0		32.0	32.0	32.0
Total Split (%)	24.4%	50.0%	50.0%	14.4%	40.0%	40.0%	35.6%	35.6%		35.6%	35.6%	35.6%
Yellow Time (s)	3.0	4.5	4.5	3.0	4.5	4.5	5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	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	6.5	6.5	5.0	6.5	6.5	7.0	7.0		7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	None
Act Effect Green (s)	67.7	64.0	64.0	59.5	52.3	52.3	10.3	10.3		10.3	10.3	10.3
Actuated g/C Ratio	0.75	0.71	0.71	0.66	0.58	0.58	0.11	0.11		0.11	0.11	0.11
v/c Ratio	0.33	0.23	0.12	0.03	0.18	0.05	0.45	0.15		0.48	0.08	0.60
Control Delay (s/veh)	5.0	5.6	1.7	4.3	9.8	0.1	45.1	24.1		46.5	34.4	12.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay (s/veh)	5.0	5.6	1.7	4.3	9.8	0.1	45.1	24.1		46.5	34.4	12.0
LOS	A	A	A	A	A	A	D	C		D	C	B
Approach Delay (s/veh)		5.0			8.8			38.7			21.3	
Approach LOS		A			A			D			C	
Queue Length 50th (ft)	29	46	0	2	49	0	39	9		41	9	0
Queue Length 95th (ft)	62	112	25	8	83	0	78	33		82	28	62
Internal Link Dist (ft)		685			520			536			282	
Turn Bay Length (ft)	200		200	310		245	80			90		80
Base Capacity (vph)	755	3614	1166	514	2956	991	386	492		381	517	605
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	0.29	0.23	0.12	0.03	0.18	0.05	0.18	0.06		0.20	0.03	0.38

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 58 (64%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 40

Control Type: Actuated-Coordinated

Timings

3: Cross Creek Drive/Grand Cordera Parkway & Research Parkway

Existing Traffic Conditions

PM Peak Traffic Hour

Maximum v/c Ratio: 0.60

Intersection Signal Delay (s/veh): 9.9

Intersection LOS: A

Intersection Capacity Utilization 46.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: Cross Creek Drive/Grand Cordera Parkway & Research Parkway



Intersection						
Int Delay, s/veh	4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						 
Traffic Vol, veh/h	67	20	27	67	41	60
Future Vol, veh/h	67	20	27	67	41	60
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	150	0	-	0	120	-
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	73	22	29	73	45	65
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	151	29	0	0	102	0
Stage 1	29	-	-	-	-	-
Stage 2	122	-	-	-	-	-
Critical Hdwy	6.63	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.83	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	-	-	2.219	-
Pot Cap-1 Maneuver	833	1045	-	-	1489	-
Stage 1	993	-	-	-	-	-
Stage 2	891	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	808	1045	-	-	1489	-
Mov Cap-2 Maneuver	808	-	-	-	-	-
Stage 1	993	-	-	-	-	-
Stage 2	864	-	-	-	-	-
Approach	WB	NB		SB		
HCM Ctrl Dly, s/v	9.58	0		3.04		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	808	1045	1489	-
HCM Lane V/C Ratio	-	-	0.09	0.021	0.03	-
HCM Ctrl Dly (s/v)	-	-	9.9	8.5	7.5	-
HCM Lane LOS	-	-	A	A	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0.1	0.1	-

Intersection						
Int Delay, s/veh	7.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	26	13	1	1	5
Future Vol, veh/h	8	26	13	1	1	5
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	9	28	14	1	1	5
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	33	4	7	0	-	0
Stage 1	4	-	-	-	-	-
Stage 2	29	-	-	-	-	-
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	980	1080	1614	-	-	-
Stage 1	1019	-	-	-	-	-
Stage 2	993	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	972	1080	1614	-	-	-
Mov Cap-2 Maneuver	972	-	-	-	-	-
Stage 1	1010	-	-	-	-	-
Stage 2	993	-	-	-	-	-
Approach	EB	NB		SB		
HCM Ctrl Dly, s/v	8.55	6.73		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1613	-	1052	-	-	
HCM Lane V/C Ratio	0.009	-	0.035	-	-	
HCM Ctrl Dly (s/v)	7.2	0	8.5	-	-	
HCM Lane LOS	A	A	A	-	-	
HCM 95th %tile Q(veh)	0	-	0.1	-	-	

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	0	0	6	9	5
Future Vol, veh/h	3	0	0	6	9	5
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	3	0	0	7	10	5
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	19	13	15	0	-	0
Stage 1	13	-	-	-	-	-
Stage 2	7	-	-	-	-	-
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	998	1068	1603	-	-	-
Stage 1	1010	-	-	-	-	-
Stage 2	1017	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	998	1068	1603	-	-	-
Mov Cap-2 Maneuver	998	-	-	-	-	-
Stage 1	1010	-	-	-	-	-
Stage 2	1017	-	-	-	-	-
Approach	EB	NB		SB		
HCM Ctrl Dly, s/v	8.62	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1603	-	998	-	-	
HCM Lane V/C Ratio	-	-	0.003	-	-	
HCM Ctrl Dly (s/v)	0	-	8.6	-	-	
HCM Lane LOS	A	-	A	-	-	
HCM 95th %tile Q(veh)	0	-	0	-	-	

Intersection

Int Delay, s/veh 2.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	16	0	9	26	0	6
Future Vol, veh/h	16	0	9	26	0	6
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	17	0	10	28	0	7

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	30	24	0
Stage 1	24	-	-
Stage 2	7	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	984	1053	-
Stage 1	999	-	-
Stage 2	1017	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	984	1053	-
Mov Cap-2 Maneuver	984	-	-
Stage 1	999	-	-
Stage 2	1017	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	8.73	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	984	1572
HCM Lane V/C Ratio	-	-	0.018	-
HCM Ctrl Dly (s/v)	-	-	8.7	0
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0

Intersection						
Int Delay, s/veh	3.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	6	0	0	9	0	0
Future Vol, veh/h	6	0	0	9	0	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	7	0	0	10	0	0
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	6	5	0	0	10	0
Stage 1	5	-	-	-	-	-
Stage 2	1	-	-	-	-	-
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	1015	1078	-	-	1610	-
Stage 1	1018	-	-	-	-	-
Stage 2	1022	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	1015	1078	-	-	1610	-
Mov Cap-2 Maneuver	1015	-	-	-	-	-
Stage 1	1018	-	-	-	-	-
Stage 2	1022	-	-	-	-	-
Approach	WB		NB		SB	
HCM Ctrl Dly, s/v	8.57		0		0	
HCM LOS	A					
Minor Lane/Major Mvmt		NBT	NBRWBLn1	SBL	SBT	
Capacity (veh/h)		-	-	1015	1610	-
HCM Lane V/C Ratio		-	-	0.006	-	-
HCM Ctrl Dly (s/v)		-	-	8.6	0	-
HCM Lane LOS		-	-	A	A	-
HCM 95th %tile Q(veh)		-	-	0	0	-

Timings

Background Traffic Conditions - Year 2028

1: Black Forest Road & Cowpoke Road

AM Peak Traffic Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	67	10	33	164	31	386	19	402	96	176	342	40
Future Volume (vph)	67	10	33	164	31	386	19	402	96	176	342	40
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.930			0.430			0.531			0.444		
Satd. Flow (perm)	1732	1863	1583	801	1863	1583	989	3539	1583	827	3539	1583
Satd. Flow (RTOR)			183			420			188			188
Lane Group Flow (vph)	73	11	36	178	34	420	21	437	104	191	372	43
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	15.0	15.0	4.0	15.0	15.0
Minimum Split (s)	9.0	11.0	11.0	9.0	11.0	11.0	9.0	21.5	21.5	9.0	21.5	21.5
Total Split (s)	14.0	25.0	25.0	27.0	38.0	38.0	15.0	41.0	41.0	17.0	43.0	43.0
Total Split (%)	12.7%	22.7%	22.7%	24.5%	34.5%	34.5%	13.6%	37.3%	37.3%	15.5%	39.1%	39.1%
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	0.0
Total Lost Time (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	6.5	6.5	5.0	6.5	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effect Green (s)	13.8	6.5	6.5	25.2	12.2	12.2	65.6	58.1	58.1	74.8	68.6	68.6
Actuated g/C Ratio	0.13	0.06	0.06	0.23	0.11	0.11	0.60	0.53	0.53	0.68	0.62	0.62
v/c Ratio	0.33	0.10	0.14	0.54	0.17	0.77	0.03	0.23	0.11	0.29	0.17	0.04
Control Delay (s/veh)	37.1	50.0	1.1	40.4	43.6	14.2	8.9	16.6	0.3	9.1	11.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	37.1	50.0	1.1	40.4	43.6	14.2	8.9	16.6	0.3	9.1	11.5	0.1
LOS	D	D	A	D	D	B	A	B	A	A	B	A
Approach Delay (s/veh)		27.5			23.1			13.3			9.9	
Approach LOS		C			C			B			A	
Queue Length 50th (ft)	41	8	0	106	23	0	5	90	0	48	51	0
Queue Length 95th (ft)	72	26	0	157	50	94	17	152	0	96	114	0
Internal Link Dist (ft)		2876			510			1147			1070	
Turn Bay Length (ft)	215		150	145		145	370		270	310		275
Base Capacity (vph)	231	304	412	395	525	747	696	1868	924	669	2207	1058
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.04	0.09	0.45	0.06	0.56	0.03	0.23	0.11	0.29	0.17	0.04

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 27 (25%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Timings

1: Black Forest Road & Cowpoke Road

Background Traffic Conditions - Year 2028

AM Peak Traffic Hour

Maximum v/c Ratio: 0.77

Intersection Signal Delay (s/veh): 16.4

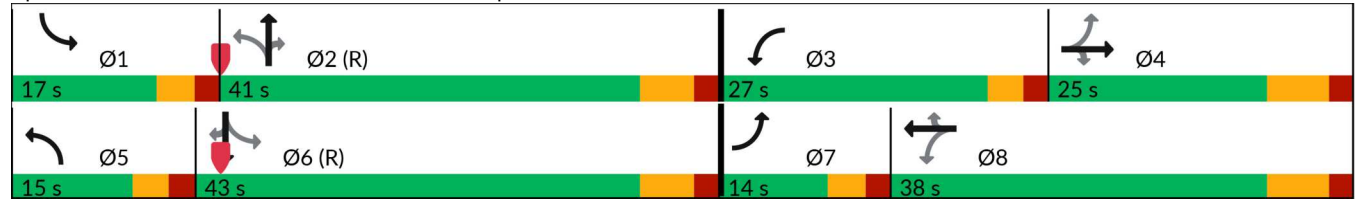
Intersection LOS: B

Intersection Capacity Utilization 55.5%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: Black Forest Road & Cowpoke Road



Timings

2: Tutt Boulevard & Woodmen Road

Background Traffic Conditions - Year 2028

AM Peak Traffic Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	118	1150	78	178	2248	15	248	40	59	51	75	385
Future Volume (vph)	118	1150	78	178	2248	15	248	40	59	51	75	385
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Satd. Flow (RTOR)			139			139			144			193
Lane Group Flow (vph)	128	1250	85	193	2443	16	270	43	64	55	82	418
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	4.0	10.0	10.0	4.0	10.0	10.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	17.5	17.5	9.0	17.5	17.5	9.0	11.0	11.0	9.0	11.0	11.0
Total Split (s)	16.0	53.0	53.0	21.0	58.0	58.0	20.0	21.0	21.0	15.0	16.0	16.0
Total Split (%)	14.5%	48.2%	48.2%	19.1%	52.7%	52.7%	18.2%	19.1%	19.1%	13.6%	14.5%	14.5%
Yellow Time (s)	3.0	5.5	5.5	3.0	5.5	5.5	3.0	5.0	5.0	3.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	0.0
Total Lost Time (s)	5.0	7.5	7.5	5.0	7.5	7.5	5.0	7.0	7.0	5.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effect Green (s)	9.2	50.0	50.0	11.5	52.3	52.3	13.3	18.9	18.9	7.2	10.7	10.7
Actuated g/C Ratio	0.08	0.45	0.45	0.10	0.48	0.48	0.12	0.17	0.17	0.07	0.10	0.10
v/c Ratio	0.44	0.54	0.11	0.54	1.01	0.02	0.65	0.07	0.16	0.25	0.24	1.27
Control Delay (s/veh)	52.6	23.1	0.9	52.0	50.6	0.1	53.8	41.2	0.9	51.0	48.7	168.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	52.6	23.1	0.9	52.0	50.6	0.1	53.8	41.2	0.9	51.0	48.7	168.5
LOS	D	C	A	D	D	A	D	D	A	D	D	F
Approach Delay (s/veh)		24.4			50.4			43.4			139.2	
Approach LOS		C			D			D			F	
Queue Length 50th (ft)	45	231	0	69	~648	0	95	14	0	19	29	~252
Queue Length 95th (ft)	76	293	7	103	#794	0	139	32	0	40	55	#461
Internal Link Dist (ft)		1314			1884			512			467	
Turn Bay Length (ft)	495		280	225		505	365		365	175		235
Base Capacity (vph)	343	2311	795	499	2415	824	468	608	391	312	344	328
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.54	0.11	0.39	1.01	0.02	0.58	0.07	0.16	0.18	0.24	1.27

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 27 (25%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Timings

2: Tutt Boulevard & Woodmen Road

Background Traffic Conditions - Year 2028

AM Peak Traffic Hour

Maximum v/c Ratio: 1.27

Intersection Signal Delay (s/veh): 52.1

Intersection LOS: D

Intersection Capacity Utilization 90.6%

ICU Level of Service E

Analysis Period (min) 15

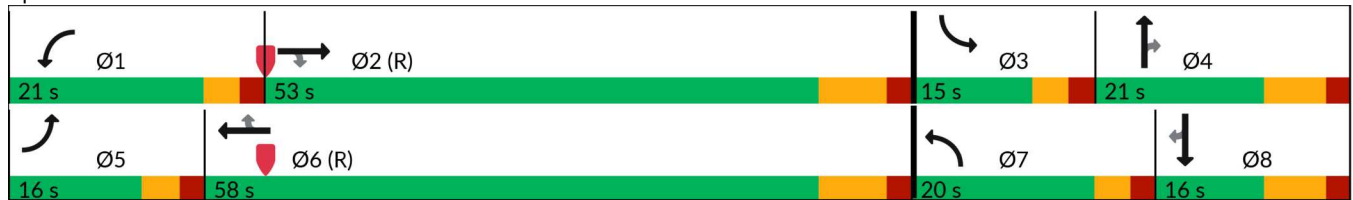
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: Tutt Boulevard & Woodmen Road



Timings

3: Cross Creek Drive/Grand Cordera Parkway & Research Parkway

Background Traffic Conditions - Year 2028

AM Peak Traffic Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  			 				
Traffic Volume (vph)	114	402	49	7	1035	65	98	19	15	45	12	233
Future Volume (vph)	114	402	49	7	1035	65	98	19	15	45	12	233
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	1770	1742	0	1770	1863	1583
Flt Permitted	0.199			0.489			0.749			0.733		
Satd. Flow (perm)	371	5085	1583	911	5085	1583	1395	1742	0	1365	1863	1583
Satd. Flow (RTOR)			109			170		16				253
Lane Group Flow (vph)	124	437	53	8	1125	71	107	37	0	49	13	253
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2		2	6		6	4			8		8
Detector Phase	5	2	2	1	6	6	4	4		8	8	8
Switch Phase												
Minimum Initial (s)	4.0	10.0	10.0	4.0	10.0	10.0	4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	9.0	16.5	16.5	9.0	16.5	16.5	11.0	11.0		11.0	11.0	11.0
Total Split (s)	22.0	45.0	45.0	13.0	36.0	36.0	32.0	32.0		32.0	32.0	32.0
Total Split (%)	24.4%	50.0%	50.0%	14.4%	40.0%	40.0%	35.6%	35.6%		35.6%	35.6%	35.6%
Yellow Time (s)	3.0	4.5	4.5	3.0	4.5	4.5	5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	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	6.5	6.5	5.0	6.5	6.5	7.0	7.0		7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	None
Act Effect Green (s)	65.5	62.1	62.1	59.0	51.8	51.8	12.2	12.2		12.2	12.2	12.2
Actuated g/C Ratio	0.73	0.69	0.69	0.66	0.58	0.58	0.14	0.14		0.14	0.14	0.14
v/c Ratio	0.32	0.12	0.05	0.01	0.38	0.07	0.57	0.15		0.26	0.05	0.58
Control Delay (s/veh)	6.4	5.9	0.2	4.7	11.6	0.1	47.1	22.6		36.7	31.6	10.3
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)	6.4	5.9	0.2	4.7	11.6	0.1	47.1	22.6		36.7	31.6	10.3
LOS	A	A	A	A	B	A	D	C		D	C	B
Approach Delay (s/veh)		5.5			10.9			40.8			15.3	
Approach LOS		A			B			D			B	
Queue Length 50th (ft)	17	24	0	1	119	0	59	11		26	7	0
Queue Length 95th (ft)	41	62	2	6	183	0	106	36		56	22	63
Internal Link Dist (ft)		685			520			536			282	
Turn Bay Length (ft)	200		200	310		245	80			90		80
Base Capacity (vph)	535	3507	1125	696	2927	983	387	495		379	517	622
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	0.23	0.12	0.05	0.01	0.38	0.07	0.28	0.07		0.13	0.03	0.41

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 58 (64%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

Timings

Background Traffic Conditions - Year 2028

3: Cross Creek Drive/Grand Cordera Parkway & Research Parkway

AM Peak Traffic Hour

Maximum v/c Ratio: 0.58

Intersection Signal Delay (s/veh): 12.0

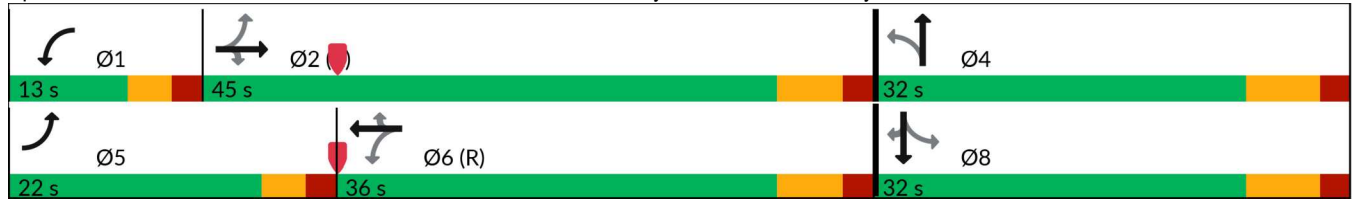
Intersection LOS: B

Intersection Capacity Utilization 56.9%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3: Cross Creek Drive/Grand Cordera Parkway & Research Parkway



Intersection						
Int Delay, s/veh	5.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	100	47	34	30	11	53
Future Vol, veh/h	100	47	34	30	11	53
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	150	0	-	0	120	-
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	109	51	37	33	12	58
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	90	37	0	0	70	0
Stage 1	37	-	-	-	-	-
Stage 2	53	-	-	-	-	-
Critical Hdwy	6.63	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.83	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	-	-	2.219	-
Pot Cap-1 Maneuver	906	1035	-	-	1530	-
Stage 1	985	-	-	-	-	-
Stage 2	964	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	899	1035	-	-	1530	-
Mov Cap-2 Maneuver	899	-	-	-	-	-
Stage 1	985	-	-	-	-	-
Stage 2	956	-	-	-	-	-
Approach	WB	NB	SB			
HCM Ctrl Dly, s/v	9.27	0	1.27			
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	-	899	1035	1530	-
HCM Lane V/C Ratio	-	-	0.121	0.049	0.008	-
HCM Ctrl Dly (s/v)	-	-	9.6	8.7	7.4	-
HCM Lane LOS	-	-	A	A	A	-
HCM 95th %tile Q(veh)	-	-	0.4	0.2	0	-

Intersection						
Int Delay, s/veh	5.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	1	21	1	1	7
Future Vol, veh/h	3	1	21	1	1	7
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	3	1	23	1	1	8

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	52	5	9	0	-	0
Stage 1	5	-	-	-	-	-
Stage 2	47	-	-	-	-	-
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	957	1078	1611	-	-	-
Stage 1	1018	-	-	-	-	-
Stage 2	976	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	943	1078	1611	-	-	-
Mov Cap-2 Maneuver	943	-	-	-	-	-
Stage 1	1004	-	-	-	-	-
Stage 2	976	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	8.71	6.94	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1610	-	974	-	-
HCM Lane V/C Ratio	0.014	-	0.004	-	-
HCM Ctrl Dly (s/v)	7.3	0	8.7	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection						
Int Delay, s/veh	2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	4	0	0	8	3	2
Future Vol, veh/h	4	0	0	8	3	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	0	0	9	3	2
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	13	4	5	0	-	0
Stage 1	4	-	-	-	-	-
Stage 2	9	-	-	-	-	-
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	1006	1079	1616	-	-	-
Stage 1	1019	-	-	-	-	-
Stage 2	1014	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	1006	1079	1616	-	-	-
Mov Cap-2 Maneuver	1006	-	-	-	-	-
Stage 1	1019	-	-	-	-	-
Stage 2	1014	-	-	-	-	-
Approach	EB	NB		SB		
HCM Ctrl Dly, s/v	8.59	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1616	-	1006	-	-	
HCM Lane V/C Ratio	-	-	0.004	-	-	
HCM Ctrl Dly (s/v)	0	-	8.6	-	-	
HCM Lane LOS	A	-	A	-	-	
HCM 95th %tile Q(veh)	0	-	0	-	-	

Intersection

Int Delay, s/veh 3.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	23	0	11	9	0	20
Future Vol, veh/h	23	0	11	9	0	20
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	25	0	12	10	0	22

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	39	17	0
Stage 1	17	-	-
Stage 2	22	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	973	1062	-
Stage 1	1006	-	-
Stage 2	1001	-	-
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	973	1062	-
Mov Cap-2 Maneuver	973	-	-
Stage 1	1006	-	-
Stage 2	1001	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	8.8	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	973	1594
HCM Lane V/C Ratio	-	-	0.026	-
HCM Ctrl Dly (s/v)	-	-	8.8	0
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0

Intersection												
Int Delay, s/veh	6.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	0	12	8	0	0	4	4	3	12	0	1
Future Vol, veh/h	4	0	12	8	0	0	4	4	3	12	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	0	13	9	0	0	4	4	3	13	0	1
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	40	43	1	41	42	6	1	0	0	8	0	0
Stage 1	27	27	-	15	15	-	-	-	-	-	-	-
Stage 2	13	16	-	26	27	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	965	849	1084	963	850	1077	1622	-	-	1613	-	-
Stage 1	991	873	-	1005	883	-	-	-	-	-	-	-
Stage 2	1007	882	-	991	873	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	954	840	1084	941	841	1077	1622	-	-	1613	-	-
Mov Cap-2 Maneuver	954	840	-	941	841	-	-	-	-	-	-	-
Stage 1	983	866	-	1003	881	-	-	-	-	-	-	-
Stage 2	1005	879	-	972	865	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Ctrl Dly, s/v	8.49		8.86		2.63		6.69					
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	603	-	-	1049	941	1385	-	-				
HCM Lane V/C Ratio	0.003	-	-	0.017	0.009	0.008	-	-				
HCM Ctrl Dly (s/v)	7.2	0	-	8.5	8.9	7.3	0	-				
HCM Lane LOS	A	A	-	A	A	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	-	-				

Timings

1: Black Forest Road & Cowpoke Road

Background Traffic Conditions - Year 2028

PM Peak Traffic Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	21	26	49	14	169	40	356	100	311	438	76
Future Volume (vph)	17	21	26	49	14	169	40	356	100	311	438	76
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.748			0.504			0.480			0.484		
Satd. Flow (perm)	1393	1863	1583	939	1863	1583	894	3539	1583	902	3539	1583
Satd. Flow (RTOR)			168			184			173			127
Lane Group Flow (vph)	18	23	28	53	15	184	43	387	109	338	476	83
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	15.0	15.0	4.0	15.0	15.0
Minimum Split (s)	9.0	11.0	11.0	9.0	11.0	11.0	9.0	21.5	21.5	9.0	21.5	21.5
Total Split (s)	14.0	30.0	30.0	18.0	34.0	34.0	16.0	37.0	37.0	35.0	56.0	56.0
Total Split (%)	11.7%	25.0%	25.0%	15.0%	28.3%	28.3%	13.3%	30.8%	30.8%	29.2%	46.7%	46.7%
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	0.0
Total Lost Time (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	6.5	6.5	5.0	6.5	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effect Green (s)	14.8	7.3	7.3	19.9	13.7	13.7	77.4	69.5	69.5	89.3	78.5	78.5
Actuated g/C Ratio	0.12	0.06	0.06	0.17	0.11	0.11	0.65	0.58	0.58	0.74	0.65	0.65
v/c Ratio	0.09	0.20	0.11	0.25	0.07	0.54	0.07	0.19	0.11	0.44	0.21	0.08
Control Delay (s/veh)	38.9	56.9	0.9	42.0	48.3	13.3	6.6	14.1	0.5	7.7	10.1	0.7
Queue Delay	0.0	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)	38.9	56.9	0.9	42.0	48.3	13.3	6.6	14.1	0.5	7.7	10.1	0.7
LOS	D	E	A	D	D	B	A	B	A	A	B	A
Approach Delay (s/veh)		29.5			21.4			10.7			8.3	
Approach LOS		C			C			B			A	
Queue Length 50th (ft)	12	18	0	35	10	0	8	74	0	78	80	0
Queue Length 95th (ft)	31	45	0	69	33	69	22	128	4	140	126	7
Internal Link Dist (ft)		2876			510			1147			1070	
Turn Bay Length (ft)	215		150	145		145	370		270	310		275
Base Capacity (vph)	223	357	439	260	419	498	691	2049	989	888	2316	1080
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.06	0.06	0.20	0.04	0.37	0.06	0.19	0.11	0.38	0.21	0.08

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 108 (90%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Timings

1: Black Forest Road & Cowpoke Road

Background Traffic Conditions - Year 2028

PM Peak Traffic Hour

Maximum v/c Ratio: 0.54

Intersection Signal Delay (s/veh): 11.8

Intersection LOS: B

Intersection Capacity Utilization 54.5%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1: Black Forest Road & Cowpoke Road



Timings

2: Tutt Boulevard & Woodmen Road

Background Traffic Conditions - Year 2028

PM Peak Traffic Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	283	2266	132	97	1804	23	440	104	176	41	45	247
Future Volume (vph)	283	2266	132	97	1804	23	440	104	176	41	45	247
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Satd. Flow (RTOR)			173			173			191			191
Lane Group Flow (vph)	308	2463	143	105	1961	25	478	113	191	45	49	268
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	4.0	10.0	10.0	4.0	10.0	10.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	17.5	17.5	9.0	17.5	17.5	9.0	11.0	11.0	9.0	11.0	11.0
Total Split (s)	20.0	60.0	60.0	18.0	58.0	58.0	22.0	26.0	26.0	16.0	20.0	20.0
Total Split (%)	16.7%	50.0%	50.0%	15.0%	48.3%	48.3%	18.3%	21.7%	21.7%	13.3%	16.7%	16.7%
Yellow Time (s)	3.0	5.5	5.5	3.0	5.5	5.5	3.0	5.0	5.0	3.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	0.0
Total Lost Time (s)	5.0	7.5	7.5	5.0	7.5	7.5	5.0	7.0	7.0	5.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effect Green (s)	14.3	58.7	58.7	9.0	53.4	53.4	17.0	22.9	22.9	7.0	10.8	10.8
Actuated g/C Ratio	0.12	0.49	0.49	0.08	0.45	0.45	0.14	0.19	0.19	0.06	0.09	0.09
v/c Ratio	0.75	0.99	0.17	0.41	0.87	0.03	0.98	0.17	0.42	0.23	0.15	0.85
Control Delay (s/veh)	63.6	47.1	1.9	57.3	35.8	0.1	88.5	42.1	8.9	56.1	50.2	40.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	63.6	47.1	1.9	57.3	35.8	0.1	88.5	42.1	8.9	56.1	50.2	40.5
LOS	E	D	A	E	D	A	F	D	A	E	D	D
Approach Delay (s/veh)		46.6			36.4			62.4			43.8	
Approach LOS		D			D			E			D	
Queue Length 50th (ft)	121	~756	0	41	524	0	195	39	0	17	18	58
Queue Length 95th (ft)	171	#884	23	69	599	0	#307	68	65	37	38	#189
Internal Link Dist (ft)		1314			1884			512			467	
Turn Bay Length (ft)	495		280	225		505	365		365	175		235
Base Capacity (vph)	430	2486	862	371	2264	800	486	675	456	314	383	341
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.99	0.17	0.28	0.87	0.03	0.98	0.17	0.42	0.14	0.13	0.79

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 8 (7%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Timings

2: Tutt Boulevard & Woodmen Road

Background Traffic Conditions - Year 2028

PM Peak Traffic Hour

Maximum v/c Ratio: 0.99

Intersection Signal Delay (s/veh): 45.0

Intersection LOS: D

Intersection Capacity Utilization 82.6%

ICU Level of Service E

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: Tutt Boulevard & Woodmen Road



Timings

3: Cross Creek Drive/Grand Cordera Parkway & Research Parkway

Background Traffic Conditions - Year 2028

PM Peak Traffic Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  							
Traffic Volume (vph)	212	813	137	15	519	49	67	17	14	72	18	220
Future Volume (vph)	212	813	137	15	519	49	67	17	14	72	18	220
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	1770	1736	0	1770	1863	1583
Flt Permitted	0.392			0.309			0.744			0.736		
Satd. Flow (perm)	730	5085	1583	576	5085	1583	1386	1736	0	1371	1863	1583
Satd. Flow (RTOR)			149			170		15				239
Lane Group Flow (vph)	230	884	149	16	564	53	73	33	0	78	20	239
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2		2	6		6	4			8		8
Detector Phase	5	2	2	1	6	6	4	4		8	8	8
Switch Phase												
Minimum Initial (s)	4.0	10.0	10.0	4.0	10.0	10.0	4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	9.0	16.5	16.5	9.0	16.5	16.5	11.0	11.0		11.0	11.0	11.0
Total Split (s)	22.0	45.0	45.0	13.0	36.0	36.0	32.0	32.0		32.0	32.0	32.0
Total Split (%)	24.4%	50.0%	50.0%	14.4%	40.0%	40.0%	35.6%	35.6%		35.6%	35.6%	35.6%
Yellow Time (s)	3.0	4.5	4.5	3.0	4.5	4.5	5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	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	6.5	6.5	5.0	6.5	6.5	7.0	7.0		7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	None
Act Effect Green (s)	67.5	63.8	63.8	59.2	52.0	52.0	10.5	10.5		10.5	10.5	10.5
Actuated g/C Ratio	0.75	0.71	0.71	0.66	0.58	0.58	0.12	0.12		0.12	0.12	0.12
v/c Ratio	0.35	0.25	0.13	0.04	0.19	0.05	0.45	0.15		0.49	0.09	0.61
Control Delay (s/veh)	5.2	5.7	1.7	4.4	10.1	0.1	45.1	23.9		46.7	34.4	11.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay (s/veh)	5.2	5.7	1.7	4.4	10.1	0.1	45.1	23.9		46.7	34.4	11.8
LOS	A	A	A	A	B	A	D	C		D	C	B
Approach Delay (s/veh)		5.2			9.1			38.5			21.2	
Approach LOS		A			A			D			C	
Queue Length 50th (ft)	31	49	0	2	52	0	40	9		43	10	0
Queue Length 95th (ft)	65	119	25	8	87	0	79	35		84	30	64
Internal Link Dist (ft)		685			520			536			282	
Turn Bay Length (ft)	200		200	310		245	80			90		80
Base Capacity (vph)	744	3604	1165	499	2935	985	385	493		380	517	612
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	0.25	0.13	0.03	0.19	0.05	0.19	0.07		0.21	0.04	0.39

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 58 (64%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 40

Control Type: Actuated-Coordinated

Timings

Background Traffic Conditions - Year 2028

3: Cross Creek Drive/Grand Cordera Parkway & Research Parkway

PM Peak Traffic Hour

Maximum v/c Ratio: 0.61

Intersection Signal Delay (s/veh): 10.1

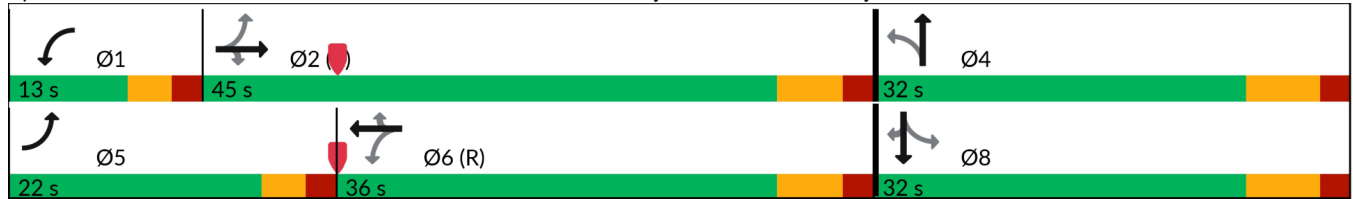
Intersection LOS: B

Intersection Capacity Utilization 47.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: Cross Creek Drive/Grand Cordera Parkway & Research Parkway



Intersection						
Int Delay, s/veh	3.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	70	26	52	70	46	76
Future Vol, veh/h	70	26	52	70	46	76
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	150	0	-	0	120	-
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	76	28	57	76	50	83
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	198	57	0	0	133	0
Stage 1	57	-	-	-	-	-
Stage 2	141	-	-	-	-	-
Critical Hdwy	6.63	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.83	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	-	-	2.219	-
Pot Cap-1 Maneuver	782	1009	-	-	1451	-
Stage 1	966	-	-	-	-	-
Stage 2	871	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	755	1009	-	-	1451	-
Mov Cap-2 Maneuver	755	-	-	-	-	-
Stage 1	966	-	-	-	-	-
Stage 2	841	-	-	-	-	-
Approach	WB	NB	SB			
HCM Ctrl Dly, s/v	9.86	0	2.85			
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	-	755	1009	1451	-
HCM Lane V/C Ratio	-	-	0.101	0.028	0.034	-
HCM Ctrl Dly (s/v)	-	-	10.3	8.7	7.6	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0.1	0.1	-

Intersection						
Int Delay, s/veh	7.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	27	14	1	1	5
Future Vol, veh/h	8	27	14	1	1	5
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	9	29	15	1	1	5
Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	35	4	7	0	-	0
Stage 1	4	-	-	-	-	-
Stage 2	32	-	-	-	-	-
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	978	1080	1614	-	-	-
Stage 1	1019	-	-	-	-	-
Stage 2	991	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	968	1080	1614	-	-	-
Mov Cap-2 Maneuver	968	-	-	-	-	-
Stage 1	1010	-	-	-	-	-
Stage 2	991	-	-	-	-	-
Approach	EB		NB		SB	
HCM Ctrl Dly, s/v	8.55		6.77		0	
HCM LOS	A					
Minor Lane/Major Mvmt	NBL		NBT		EBLn1	SBT SBR
Capacity (veh/h)	1613		-		1052	- -
HCM Lane V/C Ratio	0.009		-		0.036	- -
HCM Ctrl Dly (s/v)	7.3		0		8.6	- -
HCM Lane LOS	A		A		A	- -
HCM 95th %tile Q(veh)	0		-		0.1	- -

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	0	0	6	9	5
Future Vol, veh/h	3	0	0	6	9	5
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	3	0	0	7	10	5
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	19	13	15	0	-	0
Stage 1	13	-	-	-	-	-
Stage 2	7	-	-	-	-	-
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	998	1068	1603	-	-	-
Stage 1	1010	-	-	-	-	-
Stage 2	1017	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	998	1068	1603	-	-	-
Mov Cap-2 Maneuver	998	-	-	-	-	-
Stage 1	1010	-	-	-	-	-
Stage 2	1017	-	-	-	-	-
Approach	EB	NB		SB		
HCM Ctrl Dly, s/v	8.62	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1603	-	998	-	-	
HCM Lane V/C Ratio	-	-	0.003	-	-	
HCM Ctrl Dly (s/v)	0	-	8.6	-	-	
HCM Lane LOS	A	-	A	-	-	
HCM 95th %tile Q(veh)	0	-	0	-	-	

Intersection						
Int Delay, s/veh	1.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	16	0	37	26	0	14
Future Vol, veh/h	16	0	37	26	0	14
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	17	0	40	28	0	15
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	70	54	0	0	68	0
Stage 1	54	-	-	-	-	-
Stage 2	15	-	-	-	-	-
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	935	1013	-	-	1533	-
Stage 1	968	-	-	-	-	-
Stage 2	1008	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	935	1013	-	-	1533	-
Mov Cap-2 Maneuver	935	-	-	-	-	-
Stage 1	968	-	-	-	-	-
Stage 2	1008	-	-	-	-	-
Approach	WB	NB		SB		
HCM Ctrl Dly, s/v	8.92	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	-	935	1533	-	
HCM Lane V/C Ratio	-	-	0.019	-	-	
HCM Ctrl Dly (s/v)	-	-	8.9	0	-	
HCM Lane LOS	-	-	A	A	-	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

Intersection												
Int Delay, s/veh	4.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	0	8	6	0	0	14	14	9	8	0	5
Future Vol, veh/h	3	0	8	6	0	0	14	14	9	8	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	0	9	7	0	0	15	15	10	9	0	5
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	66	76	3	68	73	20	5	0	0	25	0	0
Stage 1	20	20	-	51	51	-	-	-	-	-	-	-
Stage 2	46	55	-	17	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	928	815	1081	925	817	1058	1616	-	-	1589	-	-
Stage 1	999	879	-	962	853	-	-	-	-	-	-	-
Stage 2	968	849	-	1002	876	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	914	803	1081	903	805	1058	1616	-	-	1589	-	-
Mov Cap-2 Maneuver	914	803	-	903	805	-	-	-	-	-	-	-
Stage 1	993	874	-	953	845	-	-	-	-	-	-	-
Stage 2	959	841	-	988	871	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Ctrl Dly, s/v	8.54		9.01		2.74		4.48					
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	632	-	-	1030	903	923	-	-				
HCM Lane V/C Ratio	0.009	-	-	0.012	0.007	0.005	-	-				
HCM Ctrl Dly (s/v)	7.2	0	-	8.5	9	7.3	0	-				
HCM Lane LOS	A	A	-	A	A	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-				

Timings

1: Black Forest Road & Cowpoke Road

Background Traffic Conditions - Year 2045

AM Peak Traffic Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	400	170	150	375	220	80	50	1225	90	145	1200	555
Future Volume (vph)	400	170	150	375	220	80	50	1225	90	145	1200	555
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.318			0.442			0.088			0.083		
Satd. Flow (perm)	592	1863	1583	823	1863	1583	164	3539	1583	155	3539	1583
Satd. Flow (RTOR)			134			134			139			603
Lane Group Flow (vph)	435	185	163	408	239	87	54	1332	98	158	1304	603
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	15.0	15.0	4.0	15.0	15.0
Minimum Split (s)	9.0	11.0	11.0	9.0	11.0	11.0	9.0	21.5	21.5	9.0	21.5	21.5
Total Split (s)	25.0	21.0	21.0	26.0	22.0	22.0	9.0	52.0	52.0	11.0	54.0	54.0
Total Split (%)	22.7%	19.1%	19.1%	23.6%	20.0%	20.0%	8.2%	47.3%	47.3%	10.0%	49.1%	49.1%
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	0.0
Total Lost Time (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	6.5	6.5	5.0	6.5	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effect Green (s)	36.3	14.3	14.3	37.7	15.0	15.0	51.0	45.5	45.5	55.6	49.3	49.3
Actuated g/C Ratio	0.33	0.13	0.13	0.34	0.14	0.14	0.46	0.41	0.41	0.51	0.45	0.45
v/c Ratio	1.07	0.77	0.51	0.89	0.94	0.26	0.40	0.91	0.13	0.95	0.82	0.58
Control Delay (s/veh)	92.8	67.8	17.7	50.8	91.2	3.9	22.1	40.9	1.6	81.6	32.5	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	92.8	67.8	17.7	50.8	91.2	3.9	22.1	40.9	1.6	81.6	32.5	4.1
LOS	F	E	B	D	F	A	C	D	A	F	C	A
Approach Delay (s/veh)		71.3			58.4			37.6			28.0	
Approach LOS		E			E			D			C	
Queue Length 50th (ft)	~279	130	19	232	172	0	18	464	0	61	433	0
Queue Length 95th (ft)	#476	#245	85	#359	#328	15	38	#611	14	#196	533	65
Internal Link Dist (ft)		2876			510			1147			1070	
Turn Bay Length (ft)	215		150	145		145	370		270	310		275
Base Capacity (vph)	408	241	321	465	254	331	134	1463	736	166	1586	1042
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.07	0.77	0.51	0.88	0.94	0.26	0.40	0.91	0.13	0.95	0.82	0.58

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 27 (25%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Timings

1: Black Forest Road & Cowpoke Road

Background Traffic Conditions - Year 2045

AM Peak Traffic Hour

Maximum v/c Ratio: 1.07

Intersection Signal Delay (s/veh): 41.9

Intersection LOS: D

Intersection Capacity Utilization 95.2%

ICU Level of Service F

Analysis Period (min) 15

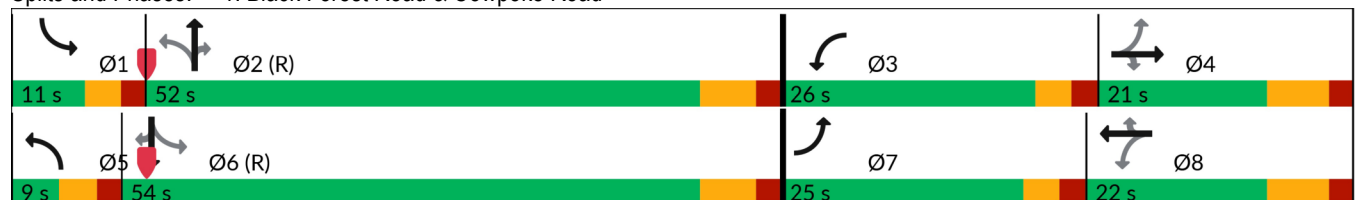
~ Volume exceeds capacity, queue is theoretically infinite.

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: Black Forest Road & Cowpoke Road



Timings

2: Tutt Boulevard & Woodmen Road

Background Traffic Conditions - Year 2045

AM Peak Traffic Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	1610	109	249	3148	20	347	55	83	71	104	539
Future Volume (vph)	165	1610	109	249	3148	20	347	55	83	71	104	539
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Satd. Flow (RTOR)			188			139			193			193
Lane Group Flow (vph)	179	1750	118	271	3422	22	377	60	90	77	113	586
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	4.0	10.0	10.0	4.0	10.0	10.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	17.5	17.5	9.0	17.5	17.5	9.0	11.0	11.0	9.0	11.0	11.0
Total Split (s)	9.0	57.0	57.0	16.0	64.0	64.0	14.0	27.0	27.0	10.0	23.0	23.0
Total Split (%)	8.2%	51.8%	51.8%	14.5%	58.2%	58.2%	12.7%	24.5%	24.5%	9.1%	20.9%	20.9%
Yellow Time (s)	3.0	5.5	5.5	3.0	5.5	5.5	3.0	5.0	5.0	3.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	0.0
Total Lost Time (s)	5.0	7.5	7.5	5.0	7.5	7.5	5.0	7.0	7.0	5.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effect Green (s)	4.0	49.6	49.6	10.9	56.5	56.5	9.0	22.0	22.0	5.0	16.0	16.0
Actuated g/C Ratio	0.04	0.45	0.45	0.10	0.51	0.51	0.08	0.20	0.20	0.05	0.15	0.15
v/c Ratio	1.44	0.76	0.14	0.80	1.31	0.03	1.35	0.08	0.19	0.49	0.22	1.48
Control Delay (s/veh)	277.4	28.1	0.7	66.5	169.0	0.1	217.2	37.9	0.9	62.4	42.8	254.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	277.4	28.1	0.7	66.5	169.0	0.1	217.2	37.9	0.9	62.4	42.8	254.9
LOS	F	C	A	E	F	A	F	D	A	E	D	F
Approach Delay (s/veh)		48.3			160.6			159.8			204.9	
Approach LOS		D			F			F			F	
Queue Length 50th (ft)	~89	376	0	99	~1160	0	~182	18	0	28	38	~459
Queue Length 95th (ft)	#163	438	4	#162	#1244	0	#280	38	0	54	66	#683
Internal Link Dist (ft)		1314			1884			512			467	
Turn Bay Length (ft)	495		280	225		505	365		365	175		235
Base Capacity (vph)	124	2293	816	343	2611	880	280	707	470	156	514	395
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.44	0.76	0.14	0.79	1.31	0.03	1.35	0.08	0.19	0.49	0.22	1.48

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 27 (25%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Timings

2: Tutt Boulevard & Woodmen Road

Background Traffic Conditions - Year 2045

AM Peak Traffic Hour

Maximum v/c Ratio: 1.48

Intersection Signal Delay (s/veh): 132.8

Intersection LOS: F

Intersection Capacity Utilization 120.3%

ICU Level of Service H

Analysis Period (min) 15

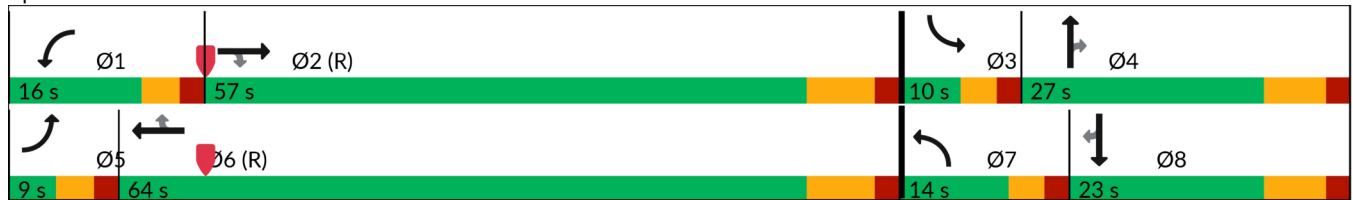
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: Tutt Boulevard & Woodmen Road



Timings

3: Cross Creek Drive/Grand Cordera Parkway & Research Parkway

Background Traffic Conditions - Year 2045

AM Peak Traffic Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  							
Traffic Volume (vph)	160	562	68	10	1450	90	137	26	20	63	17	326
Future Volume (vph)	160	562	68	10	1450	90	137	26	20	63	17	326
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	1770	1740	0	1770	1863	1583
Flt Permitted	0.093			0.410			0.746			0.724		
Satd. Flow (perm)	173	5085	1583	764	5085	1583	1390	1740	0	1349	1863	1583
Satd. Flow (RTOR)			109			170		22				164
Lane Group Flow (vph)	174	611	74	11	1576	98	149	50	0	68	18	354
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2		2	6		6	4			8		8
Detector Phase	5	2	2	1	6	6	4	4		8	8	8
Switch Phase												
Minimum Initial (s)	4.0	10.0	10.0	4.0	10.0	10.0	4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	9.0	16.5	16.5	9.0	16.5	16.5	11.0	11.0		11.0	11.0	11.0
Total Split (s)	15.0	51.0	51.0	9.0	45.0	45.0	30.0	30.0		30.0	30.0	30.0
Total Split (%)	16.7%	56.7%	56.7%	10.0%	50.0%	50.0%	33.3%	33.3%		33.3%	33.3%	33.3%
Yellow Time (s)	3.0	4.5	4.5	3.0	4.5	4.5	5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	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	6.5	6.5	5.0	6.5	6.5	7.0	7.0		7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	None
Act Effect Green (s)	61.4	58.1	58.1	52.9	46.1	46.1	16.6	16.6		16.6	16.6	16.6
Actuated g/C Ratio	0.68	0.65	0.65	0.59	0.51	0.51	0.18	0.18		0.18	0.18	0.18
v/c Ratio	0.64	0.19	0.07	0.02	0.61	0.11	0.58	0.15		0.27	0.05	0.83
Control Delay (s/veh)	22.6	7.9	1.2	7.1	18.1	0.5	41.5	18.9		32.0	27.3	34.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay (s/veh)	22.6	7.9	1.2	7.1	18.1	0.5	41.5	18.9		32.0	27.3	34.9
LOS	C	A	A	A	B	A	D	B		C	C	C
Approach Delay (s/veh)		10.3			17.0			35.8			34.2	
Approach LOS		B			B			D			C	
Queue Length 50th (ft)	32	44	0	2	226	0	79	13		34	9	107
Queue Length 95th (ft)	109	94	11	9	324	4	130	41		67	25	197
Internal Link Dist (ft)		685			520			536			282	
Turn Bay Length (ft)	200		200	310		245	80			90		80
Base Capacity (vph)	300	3280	1059	507	2602	893	355	461		344	476	526
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.58	0.19	0.07	0.02	0.61	0.11	0.42	0.11		0.20	0.04	0.67

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 58 (64%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Timings

Background Traffic Conditions - Year 2045

3: Cross Creek Drive/Grand Cordera Parkway & Research Parkway

AM Peak Traffic Hour

Maximum v/c Ratio: 0.83

Intersection Signal Delay (s/veh): 18.7

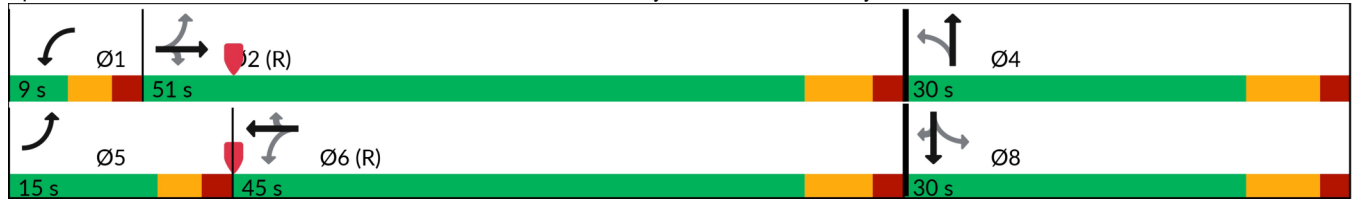
Intersection LOS: B

Intersection Capacity Utilization 72.9%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 3: Cross Creek Drive/Grand Cordera Parkway & Research Parkway



Intersection						
Int Delay, s/veh	5.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	140	65	45	42	14	66
Future Vol, veh/h	140	65	45	42	14	66
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	150	0	-	0	120	-
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	152	71	49	46	15	72
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	115	49	0	0	95	0
Stage 1	49	-	-	-	-	-
Stage 2	66	-	-	-	-	-
Critical Hdwy	6.63	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.83	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	-	-	2.219	-
Pot Cap-1 Maneuver	875	1019	-	-	1498	-
Stage 1	973	-	-	-	-	-
Stage 2	949	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	866	1019	-	-	1498	-
Mov Cap-2 Maneuver	866	-	-	-	-	-
Stage 1	973	-	-	-	-	-
Stage 2	939	-	-	-	-	-
Approach	WB	NB		SB		
HCM Ctrl Dly, s/v	9.65	0		1.3		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	866	1019	1498	-
HCM Lane V/C Ratio	-	-	0.176	0.069	0.01	-
HCM Ctrl Dly (s/v)	-	-	10	8.8	7.4	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.6	0.2	0	-

Intersection						
Int Delay, s/veh	5.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	1	29	1	1	7
Future Vol, veh/h	3	1	29	1	1	7
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	3	1	32	1	1	8
Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	69	5	9	0	-	0
Stage 1	5	-	-	-	-	-
Stage 2	64	-	-	-	-	-
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	936	1078	1611	-	-	-
Stage 1	1018	-	-	-	-	-
Stage 2	959	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	917	1078	1611	-	-	-
Mov Cap-2 Maneuver	917	-	-	-	-	-
Stage 1	998	-	-	-	-	-
Stage 2	959	-	-	-	-	-
Approach	EB		NB		SB	
HCM Ctrl Dly, s/v	8.8		7.04		0	
HCM LOS	A					
Minor Lane/Major Mvmt	NBL		NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1610		-	953	-	-
HCM Lane V/C Ratio	0.02		-	0.005	-	-
HCM Ctrl Dly (s/v)	7.3		0	8.8	-	-
HCM Lane LOS	A		A	A	-	-
HCM 95th %tile Q(veh)	0.1		-	0	-	-

Intersection						
Int Delay, s/veh	2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	4	0	0	8	3	2
Future Vol, veh/h	4	0	0	8	3	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	0	0	9	3	2
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	13	4	5	0	-	0
Stage 1	4	-	-	-	-	-
Stage 2	9	-	-	-	-	-
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	1006	1079	1616	-	-	-
Stage 1	1019	-	-	-	-	-
Stage 2	1014	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	1006	1079	1616	-	-	-
Mov Cap-2 Maneuver	1006	-	-	-	-	-
Stage 1	1019	-	-	-	-	-
Stage 2	1014	-	-	-	-	-
Approach	EB	NB		SB		
HCM Ctrl Dly, s/v	8.59	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1616	-	1006	-	-	
HCM Lane V/C Ratio	-	-	0.004	-	-	
HCM Ctrl Dly (s/v)	0	-	8.6	-	-	
HCM Lane LOS	A	-	A	-	-	
HCM 95th %tile Q(veh)	0	-	0	-	-	

Intersection						
Int Delay, s/veh	3.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	23	0	11	9	0	20
Future Vol, veh/h	23	0	11	9	0	20
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	25	0	12	10	0	22
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	39	17	0	0	22	0
Stage 1	17	-	-	-	-	-
Stage 2	22	-	-	-	-	-
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	973	1062	-	-	1594	-
Stage 1	1006	-	-	-	-	-
Stage 2	1001	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	973	1062	-	-	1594	-
Mov Cap-2 Maneuver	973	-	-	-	-	-
Stage 1	1006	-	-	-	-	-
Stage 2	1001	-	-	-	-	-
Approach	WB	NB		SB		
HCM Ctrl Dly, s/v	8.8	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	-	973	1594	-	
HCM Lane V/C Ratio	-	-	0.026	-	-	
HCM Ctrl Dly (s/v)	-	-	8.8	0	-	
HCM Lane LOS	-	-	A	A	-	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

Intersection												
Int Delay, s/veh	6.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	0	4	8	0	0	4	4	3	12	0	1
Future Vol, veh/h	12	0	4	8	0	0	4	4	3	12	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	0	4	9	0	0	4	4	3	13	0	1
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	40	43	1	41	42	6	1	0	0	8	0	0
Stage 1	27	27	-	15	15	-	-	-	-	-	-	-
Stage 2	13	16	-	26	27	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	965	849	1084	963	850	1077	1622	-	-	1613	-	-
Stage 1	991	873	-	1005	883	-	-	-	-	-	-	-
Stage 2	1007	882	-	991	873	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	954	840	1084	949	841	1077	1622	-	-	1613	-	-
Mov Cap-2 Maneuver	954	840	-	949	841	-	-	-	-	-	-	-
Stage 1	983	866	-	1003	881	-	-	-	-	-	-	-
Stage 2	1005	879	-	979	865	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Ctrl Dly, s/v	8.73		8.83		2.63		6.69					
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	603	-	-	984	949	1385	-	-				
HCM Lane V/C Ratio	0.003	-	-	0.018	0.009	0.008	-	-				
HCM Ctrl Dly (s/v)	7.2	0	-	8.7	8.8	7.3	0	-				
HCM Lane LOS	A	A	-	A	A	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	-	-				

Timings

Background Traffic Conditions - Year 2045

1: Black Forest Road & Cowpoke Road

PM Peak Traffic Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	220	220	100	345	20	70	350	1345	235	60	1030	375
Future Volume (vph)	220	220	100	345	20	70	350	1345	235	60	1030	375
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.689			0.303			0.087			0.097		
Satd. Flow (perm)	1283	1863	1583	564	1863	1583	162	3539	1583	181	3539	1583
Satd. Flow (RTOR)			168			168			229			386
Lane Group Flow (vph)	239	239	109	375	22	76	380	1462	255	65	1120	408
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	15.0	15.0	4.0	15.0	15.0
Minimum Split (s)	9.0	11.0	11.0	9.0	11.0	11.0	9.0	21.5	21.5	9.0	21.5	21.5
Total Split (s)	20.0	22.0	22.0	24.0	26.0	26.0	25.0	65.0	65.0	9.0	49.0	49.0
Total Split (%)	16.7%	18.3%	18.3%	20.0%	21.7%	21.7%	20.8%	54.2%	54.2%	7.5%	40.8%	40.8%
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	0.0
Total Lost Time (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	6.5	6.5	5.0	6.5	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effect Green (s)	33.8	15.0	15.0	35.8	16.3	16.3	69.0	60.3	60.3	48.0	42.5	42.5
Actuated g/C Ratio	0.28	0.13	0.13	0.30	0.14	0.14	0.58	0.50	0.50	0.40	0.35	0.35
v/c Ratio	0.54	1.03	0.32	1.05	0.09	0.21	1.05	0.82	0.28	0.52	0.89	0.50
Control Delay (s/veh)	36.2	118.6	3.6	96.5	44.1	1.3	96.0	30.7	3.9	30.0	47.1	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	36.2	118.6	3.6	96.5	44.1	1.3	96.0	30.7	3.9	30.0	47.1	5.9
LOS	D	F	A	F	D	A	F	C	A	C	D	A
Approach Delay (s/veh)		63.7			78.8			39.3			35.8	
Approach LOS		E			E			D			D	
Queue Length 50th (ft)	142	~201	0	245	15	0	~271	513	10	22	434	11
Queue Length 95th (ft)	217	#366	11	#415	40	0	#471	620	56	43	#563	85
Internal Link Dist (ft)		2876			510			1147			1070	
Turn Bay Length (ft)	215		150	145		145	370		270	310		275
Base Capacity (vph)	443	232	344	358	294	392	361	1778	909	125	1253	809
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	1.03	0.32	1.05	0.07	0.19	1.05	0.82	0.28	0.52	0.89	0.50
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 108 (90%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green												
Natural Cycle: 110												
Control Type: Actuated-Coordinated												

Timings

1: Black Forest Road & Cowpoke Road

Background Traffic Conditions - Year 2045

PM Peak Traffic Hour

Maximum v/c Ratio: 1.05

Intersection Signal Delay (s/veh): 45.1

Intersection LOS: D

Intersection Capacity Utilization 98.1%

ICU Level of Service F

Analysis Period (min) 15

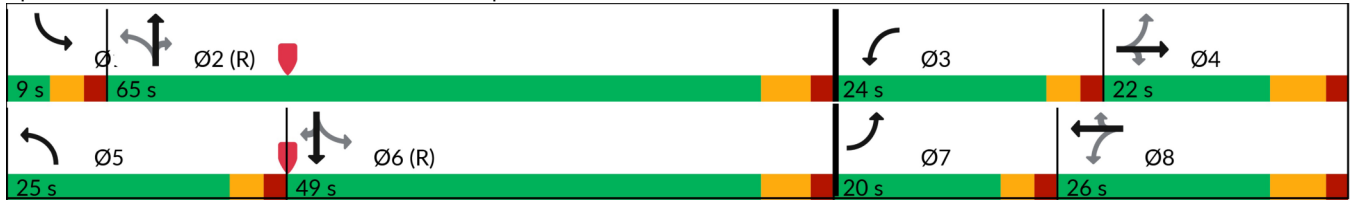
~ Volume exceeds capacity, queue is theoretically infinite.

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: Black Forest Road & Cowpoke Road



Timings

2: Tutt Boulevard & Woodmen Road

Background Traffic Conditions - Year 2045

PM Peak Traffic Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	396	3173	185	135	2526	32	616	146	246	57	63	345
Future Volume (vph)	396	3173	185	135	2526	32	616	146	246	57	63	345
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Satd. Flow (RTOR)			173			218			177			223
Lane Group Flow (vph)	430	3449	201	147	2746	35	670	159	267	62	68	375
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	4.0	10.0	10.0	4.0	10.0	10.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	17.5	17.5	9.0	17.5	17.5	9.0	11.0	11.0	9.0	11.0	11.0
Total Split (s)	16.0	74.0	74.0	9.0	67.0	67.0	23.0	28.0	28.0	9.0	14.0	14.0
Total Split (%)	13.3%	61.7%	61.7%	7.5%	55.8%	55.8%	19.2%	23.3%	23.3%	7.5%	11.7%	11.7%
Yellow Time (s)	3.0	5.5	5.5	3.0	5.5	5.5	3.0	5.0	5.0	3.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	0.0
Total Lost Time (s)	5.0	7.5	7.5	5.0	7.5	7.5	5.0	7.0	7.0	5.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effect Green (s)	11.0	66.5	66.5	4.0	59.5	59.5	18.0	22.8	22.8	4.0	7.0	7.0
Actuated g/C Ratio	0.09	0.55	0.55	0.03	0.50	0.50	0.15	0.19	0.19	0.03	0.06	0.06
v/c Ratio	1.37	1.22	0.21	1.29	1.09	0.04	1.30	0.24	0.60	0.54	0.33	1.24
Control Delay (s/veh)	226.2	131.1	3.4	226.3	77.5	0.1	191.0	43.2	22.2	74.8	58.8	152.7
Queue Delay	0.0	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)	226.2	131.1	3.4	226.3	77.5	0.1	191.0	43.2	22.2	74.8	58.8	152.7
LOS	F	F	A	F	E	A	F	D	C	E	E	F
Approach Delay (s/veh)		134.9			84.1			128.4			130.5	
Approach LOS		F			F			F			F	
Queue Length 50th (ft)	~230	~1223	10	~75	~890	0	~348	57	63	25	27	~191
Queue Length 95th (ft)	#335	#1302	45	#145	#980	0	#469	91	159	#53	52	#389
Internal Link Dist (ft)		1314			1884			512			467	
Turn Bay Length (ft)	495		280	225		505	365		365	175		235
Base Capacity (vph)	314	2817	954	114	2521	894	514	672	444	114	206	302
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.37	1.22	0.21	1.29	1.09	0.04	1.30	0.24	0.60	0.54	0.33	1.24

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 8 (7%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 130

Control Type: Actuated-Coordinated

Timings
2: Tutt Boulevard & Woodmen Road

Background Traffic Conditions - Year 2045
PM Peak Traffic Hour

Maximum v/c Ratio: 1.37

Intersection Signal Delay (s/veh): 116.5

Intersection LOS: F

Intersection Capacity Utilization 105.8%

ICU Level of Service G

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: Tutt Boulevard & Woodmen Road



Timings

3: Cross Creek Drive/Grand Cordera Parkway & Research Parkway

Background Traffic Conditions - Year 2045

PM Peak Traffic Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  							
Traffic Volume (vph)	297	1138	192	20	727	68	95	23	19	101	25	307
Future Volume (vph)	297	1138	192	20	727	68	95	23	19	101	25	307
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	1770	1736	0	1770	1863	1583
Flt Permitted	0.297			0.214			0.740			0.727		
Satd. Flow (perm)	553	5085	1583	399	5085	1583	1378	1736	0	1354	1863	1583
Satd. Flow (RTOR)			209			170		21				334
Lane Group Flow (vph)	323	1237	209	22	790	74	103	46	0	110	27	334
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2		2	6		6	4			8		8
Detector Phase	5	2	2	1	6	6	4	4		8	8	8
Switch Phase												
Minimum Initial (s)	4.0	10.0	10.0	4.0	10.0	10.0	4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	9.0	16.5	16.5	9.0	16.5	16.5	11.0	11.0		11.0	11.0	11.0
Total Split (s)	28.0	52.0	52.0	9.0	33.0	33.0	29.0	29.0		29.0	29.0	29.0
Total Split (%)	31.1%	57.8%	57.8%	10.0%	36.7%	36.7%	32.2%	32.2%		32.2%	32.2%	32.2%
Yellow Time (s)	3.0	4.5	4.5	3.0	4.5	4.5	5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	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	6.5	6.5	5.0	6.5	6.5	7.0	7.0		7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	None
Act Effect Green (s)	65.2	59.2	59.2	54.3	47.0	47.0	12.8	12.8		12.8	12.8	12.8
Actuated g/C Ratio	0.72	0.66	0.66	0.60	0.52	0.52	0.14	0.14		0.14	0.14	0.14
v/c Ratio	0.58	0.37	0.19	0.07	0.30	0.08	0.53	0.17		0.58	0.10	0.65
Control Delay (s/veh)	9.2	8.8	2.1	6.2	14.0	0.2	44.5	21.6		46.9	32.0	10.4
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)	9.2	8.8	2.1	6.2	14.0	0.2	44.5	21.6		46.9	32.0	10.4
LOS	A	A	A	A	B	A	D	C		D	C	B
Approach Delay (s/veh)		8.1			12.6			37.5			20.2	
Approach LOS		A			B			D			C	
Queue Length 50th (ft)	52	84	0	3	87	0	56	13		60	14	0
Queue Length 95th (ft)	109	197	33	12	154	0	100	41		106	35	70
Internal Link Dist (ft)		685			520			536			282	
Turn Bay Length (ft)	200		200	310		245	80			90		80
Base Capacity (vph)	711	3347	1113	329	2653	907	336	440		330	455	639
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	0.45	0.37	0.19	0.07	0.30	0.08	0.31	0.10		0.33	0.06	0.52

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 58 (64%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Timings

Background Traffic Conditions - Year 2045

3: Cross Creek Drive/Grand Cordera Parkway & Research Parkway

PM Peak Traffic Hour

Maximum v/c Ratio: 0.65

Intersection Signal Delay (s/veh): 12.4

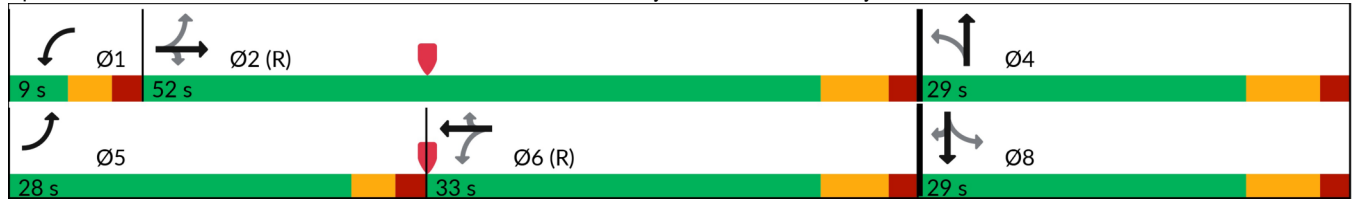
Intersection LOS: B

Intersection Capacity Utilization 58.2%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3: Cross Creek Drive/Grand Cordera Parkway & Research Parkway



Intersection						
Int Delay, s/veh	4.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	98	34	63	98	63	101
Future Vol, veh/h	98	34	63	98	63	101
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	150	0	-	0	120	-
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	107	37	68	107	68	110
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	260	68	0	0	175	0
Stage 1	68	-	-	-	-	-
Stage 2	192	-	-	-	-	-
Critical Hdwy	6.63	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.83	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	-	-	2.219	-
Pot Cap-1 Maneuver	717	994	-	-	1400	-
Stage 1	954	-	-	-	-	-
Stage 2	822	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	682	994	-	-	1400	-
Mov Cap-2 Maneuver	682	-	-	-	-	-
Stage 1	954	-	-	-	-	-
Stage 2	782	-	-	-	-	-
Approach	WB	NB	SB			
HCM Ctrl Dly, s/v	10.61	0	2.96			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	-	682	994	1400	-
HCM Lane V/C Ratio	-	-	0.156	0.037	0.049	-
HCM Ctrl Dly (s/v)	-	-	11.2	8.8	7.7	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.6	0.1	0.2	-

Intersection						
Int Delay, s/veh	7.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	38	19	1	1	5
Future Vol, veh/h	8	38	19	1	1	5
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	9	41	21	1	1	5
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	46	4	7	0	-	0
Stage 1	4	-	-	-	-	-
Stage 2	42	-	-	-	-	-
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	964	1080	1614	-	-	-
Stage 1	1019	-	-	-	-	-
Stage 2	980	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	951	1080	1614	-	-	-
Mov Cap-2 Maneuver	951	-	-	-	-	-
Stage 1	1006	-	-	-	-	-
Stage 2	980	-	-	-	-	-
Approach	EB	NB		SB		
HCM Ctrl Dly, s/v	8.58	6.9		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1613	-	1055	-	-	
HCM Lane V/C Ratio	0.013	-	0.047	-	-	
HCM Ctrl Dly (s/v)	7.3	0	8.6	-	-	
HCM Lane LOS	A	A	A	-	-	
HCM 95th %tile Q(veh)	0	-	0.1	-	-	

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	0	0	6	9	5
Future Vol, veh/h	3	0	0	6	9	5
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	3	0	0	7	10	5
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	19	13	15	0	-	0
Stage 1	13	-	-	-	-	-
Stage 2	7	-	-	-	-	-
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	998	1068	1603	-	-	-
Stage 1	1010	-	-	-	-	-
Stage 2	1017	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	998	1068	1603	-	-	-
Mov Cap-2 Maneuver	998	-	-	-	-	-
Stage 1	1010	-	-	-	-	-
Stage 2	1017	-	-	-	-	-
Approach	EB	NB		SB		
HCM Ctrl Dly, s/v	8.62	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1603	-	998	-	-	
HCM Lane V/C Ratio	-	-	0.003	-	-	
HCM Ctrl Dly (s/v)	0	-	8.6	-	-	
HCM Lane LOS	A	-	A	-	-	
HCM 95th %tile Q(veh)	0	-	0	-	-	

Intersection						
Int Delay, s/veh	1.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	16	0	37	26	0	14
Future Vol, veh/h	16	0	37	26	0	14
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	17	0	40	28	0	15
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	70	54	0	0	68	0
Stage 1	54	-	-	-	-	-
Stage 2	15	-	-	-	-	-
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	935	1013	-	-	1533	-
Stage 1	968	-	-	-	-	-
Stage 2	1008	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	935	1013	-	-	1533	-
Mov Cap-2 Maneuver	935	-	-	-	-	-
Stage 1	968	-	-	-	-	-
Stage 2	1008	-	-	-	-	-
Approach	WB	NB		SB		
HCM Ctrl Dly, s/v	8.92	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	-	935	1533	-	
HCM Lane V/C Ratio	-	-	0.019	-	-	
HCM Ctrl Dly (s/v)	-	-	8.9	0	-	
HCM Lane LOS	-	-	A	A	-	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

Intersection												
Int Delay, s/veh	4.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	0	8	6	0	0	14	14	9	8	0	5
Future Vol, veh/h	3	0	8	6	0	0	14	14	9	8	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	0	9	7	0	0	15	15	10	9	0	5
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	66	76	3	68	73	20	5	0	0	25	0	0
Stage 1	20	20	-	51	51	-	-	-	-	-	-	-
Stage 2	46	55	-	17	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	928	815	1081	925	817	1058	1616	-	-	1589	-	-
Stage 1	999	879	-	962	853	-	-	-	-	-	-	-
Stage 2	968	849	-	1002	876	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	914	803	1081	903	805	1058	1616	-	-	1589	-	-
Mov Cap-2 Maneuver	914	803	-	903	805	-	-	-	-	-	-	-
Stage 1	993	874	-	953	845	-	-	-	-	-	-	-
Stage 2	959	841	-	988	871	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Ctrl Dly, s/v	8.54		9.01		2.74		4.48					
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	632	-	-	1030	903	923	-	-				
HCM Lane V/C Ratio	0.009	-	-	0.012	0.007	0.005	-	-				
HCM Ctrl Dly (s/v)	7.2	0	-	8.5	9	7.3	0	-				
HCM Lane LOS	A	A	-	A	A	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-				

Timings

Total Traffic Conditions - Year 2028

1: Black Forest Road & Cowpoke Road

AM Peak Traffic Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	67	10	38	164	31	386	21	402	96	176	342	40
Future Volume (vph)	67	10	38	164	31	386	21	402	96	176	342	40
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.930			0.430			0.531			0.444		
Satd. Flow (perm)	1732	1863	1583	801	1863	1583	989	3539	1583	827	3539	1583
Satd. Flow (RTOR)			183			420			188			188
Lane Group Flow (vph)	73	11	41	178	34	420	23	437	104	191	372	43
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	15.0	15.0	4.0	15.0	15.0
Minimum Split (s)	9.0	11.0	11.0	9.0	11.0	11.0	9.0	21.5	21.5	9.0	21.5	21.5
Total Split (s)	14.0	25.0	25.0	27.0	38.0	38.0	15.0	41.0	41.0	17.0	43.0	43.0
Total Split (%)	12.7%	22.7%	22.7%	24.5%	34.5%	34.5%	13.6%	37.3%	37.3%	15.5%	39.1%	39.1%
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	0.0
Total Lost Time (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	6.5	6.5	5.0	6.5	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effect Green (s)	13.8	6.5	6.5	25.2	12.2	12.2	65.7	58.1	58.1	74.8	68.6	68.6
Actuated g/C Ratio	0.13	0.06	0.06	0.23	0.11	0.11	0.60	0.53	0.53	0.68	0.62	0.62
v/c Ratio	0.33	0.10	0.15	0.54	0.17	0.77	0.04	0.23	0.11	0.29	0.17	0.04
Control Delay (s/veh)	37.1	50.0	1.2	40.4	43.6	14.2	8.9	16.6	0.3	9.1	11.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	37.1	50.0	1.2	40.4	43.6	14.2	8.9	16.6	0.3	9.1	11.5	0.1
LOS	D	D	A	D	D	B	A	B	A	A	B	A
Approach Delay (s/veh)		26.5			23.1			13.3			9.9	
Approach LOS		C			C			B			A	
Queue Length 50th (ft)	41	8	0	106	23	0	5	90	0	48	51	0
Queue Length 95th (ft)	72	26	0	157	50	94	18	152	0	96	114	0
Internal Link Dist (ft)		2876			510			1147			1070	
Turn Bay Length (ft)	215		150	145		145	370		270	310		275
Base Capacity (vph)	231	304	412	395	525	747	696	1868	924	669	2206	1057
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.04	0.10	0.45	0.06	0.56	0.03	0.23	0.11	0.29	0.17	0.04

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 27 (25%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Timings

Total Traffic Conditions - Year 2028

1: Black Forest Road & Cowpoke Road

AM Peak Traffic Hour

Maximum v/c Ratio: 0.77

Intersection Signal Delay (s/veh): 16.3

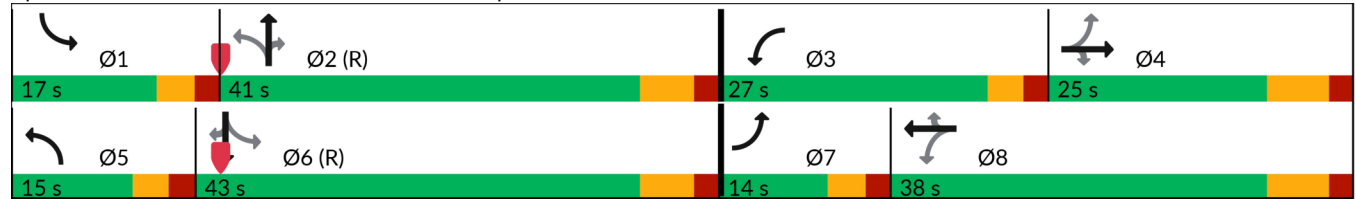
Intersection LOS: B

Intersection Capacity Utilization 55.5%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: Black Forest Road & Cowpoke Road



Timings

2: Tutt Boulevard & Woodmen Road

Total Traffic Conditions - Year 2028

AM Peak Traffic Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	124	1150	78	178	2248	19	248	40	59	51	75	412
Future Volume (vph)	124	1150	78	178	2248	19	248	40	59	51	75	412
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Satd. Flow (RTOR)			139			139			144			193
Lane Group Flow (vph)	135	1250	85	193	2443	21	270	43	64	55	82	448
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	4.0	10.0	10.0	4.0	10.0	10.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	17.5	17.5	9.0	17.5	17.5	9.0	11.0	11.0	9.0	11.0	11.0
Total Split (s)	16.0	53.0	53.0	21.0	58.0	58.0	20.0	21.0	21.0	15.0	16.0	16.0
Total Split (%)	14.5%	48.2%	48.2%	19.1%	52.7%	52.7%	18.2%	19.1%	19.1%	13.6%	14.5%	14.5%
Yellow Time (s)	3.0	5.5	5.5	3.0	5.5	5.5	3.0	5.0	5.0	3.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	0.0
Total Lost Time (s)	5.0	7.5	7.5	5.0	7.5	7.5	5.0	7.0	7.0	5.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effect Green (s)	9.4	50.0	50.0	11.5	52.1	52.1	13.3	18.9	18.9	7.2	10.7	10.7
Actuated g/C Ratio	0.09	0.45	0.45	0.10	0.47	0.47	0.12	0.17	0.17	0.07	0.10	0.10
v/c Ratio	0.46	0.54	0.11	0.54	1.01	0.03	0.65	0.07	0.16	0.25	0.24	1.37
Control Delay (s/veh)	52.7	23.1	0.9	52.0	51.6	0.1	53.8	41.2	0.9	51.0	48.7	206.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	52.7	23.1	0.9	52.0	51.6	0.1	53.8	41.2	0.9	51.0	48.7	206.3
LOS	D	C	A	D	D	A	D	D	A	D	D	F
Approach Delay (s/veh)		24.5			51.3			43.4			169.6	
Approach LOS		C			D			D			F	
Queue Length 50th (ft)	48	231	0	69	~682	0	95	14	0	19	29	~298
Queue Length 95th (ft)	79	293	7	103	#794	0	139	32	0	40	55	#512
Internal Link Dist (ft)		1314			1884			512			467	
Turn Bay Length (ft)	495		280	225		505	365		365	175		235
Base Capacity (vph)	343	2311	795	499	2407	822	468	608	391	312	344	328
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.54	0.11	0.39	1.01	0.03	0.58	0.07	0.16	0.18	0.24	1.37

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 27 (25%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Timings
2: Tutt Boulevard & Woodmen Road

Total Traffic Conditions - Year 2028
AM Peak Traffic Hour

Maximum v/c Ratio: 1.37

Intersection Signal Delay (s/veh): 56.6

Intersection LOS: E

Intersection Capacity Utilization 92.3%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: Tutt Boulevard & Woodmen Road



Timings

Total Traffic Conditions - Year 2028

3: Cross Creek Drive/Grand Cordera Parkway & Research Parkway

AM Peak Traffic Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  			 			 	
Traffic Volume (vph)	114	402	70	13	1035	65	157	19	32	45	12	233
Future Volume (vph)	114	402	70	13	1035	65	157	19	32	45	12	233
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	1770	1688	0	1770	1863	1583
Flt Permitted	0.190			0.489			0.749			0.720		
Satd. Flow (perm)	354	5085	1583	911	5085	1583	1395	1688	0	1341	1863	1583
Satd. Flow (RTOR)			109			170		35				253
Lane Group Flow (vph)	124	437	76	14	1125	71	171	56	0	49	13	253
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2		2	6		6	4			8		8
Detector Phase	5	2	2	1	6	6	4	4		8	8	8
Switch Phase												
Minimum Initial (s)	4.0	10.0	10.0	4.0	10.0	10.0	4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	9.0	16.5	16.5	9.0	16.5	16.5	11.0	11.0		11.0	11.0	11.0
Total Split (s)	22.0	45.0	45.0	13.0	36.0	36.0	32.0	32.0		32.0	32.0	32.0
Total Split (%)	24.4%	50.0%	50.0%	14.4%	40.0%	40.0%	35.6%	35.6%		35.6%	35.6%	35.6%
Yellow Time (s)	3.0	4.5	4.5	3.0	4.5	4.5	5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	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	6.5	6.5	5.0	6.5	6.5	7.0	7.0		7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	None
Act Effect Green (s)	61.5	58.0	58.0	54.7	47.4	47.4	16.3	16.3		16.3	16.3	16.3
Actuated g/C Ratio	0.68	0.64	0.64	0.61	0.53	0.53	0.18	0.18		0.18	0.18	0.18
v/c Ratio	0.34	0.13	0.07	0.02	0.42	0.08	0.68	0.17		0.20	0.04	0.51
Control Delay (s/veh)	8.3	7.8	1.4	6.5	14.6	0.2	47.4	15.6		31.1	27.5	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay (s/veh)	8.3	7.8	1.4	6.5	14.6	0.2	47.4	15.6		31.1	27.5	7.8
LOS	A	A	A	A	B	A	D	B		C	C	A
Approach Delay (s/veh)		7.1			13.6			39.5			12.3	
Approach LOS		A			B			D			B	
Queue Length 50th (ft)	21	29	0	2	135	0	93	10		24	6	0
Queue Length 95th (ft)	50	71	12	10	211	0	148	39		52	20	57
Internal Link Dist (ft)		685			520			536			282	
Turn Bay Length (ft)	200		200	310		245	80			90		80
Base Capacity (vph)	510	3275	1058	652	2679	914	387	494		372	517	622
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	0.24	0.13	0.07	0.02	0.42	0.08	0.44	0.11		0.13	0.03	0.41

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 58 (64%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Timings

Total Traffic Conditions - Year 2028

3: Cross Creek Drive/Grand Cordera Parkway & Research Parkway

AM Peak Traffic Hour

Maximum v/c Ratio: 0.68

Intersection Signal Delay (s/veh): 14.2

Intersection LOS: B

Intersection Capacity Utilization 60.2%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3: Cross Creek Drive/Grand Cordera Parkway & Research Parkway



Intersection						
Int Delay, s/veh	4.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	100	49	44	30	13	80
Future Vol, veh/h	100	49	44	30	13	80
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	150	0	-	0	120	-
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	109	53	48	33	14	87
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	120	48	0	0	80	0
Stage 1	48	-	-	-	-	-
Stage 2	72	-	-	-	-	-
Critical Hdwy	6.63	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.83	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	-	-	2.219	-
Pot Cap-1 Maneuver	870	1021	-	-	1516	-
Stage 1	974	-	-	-	-	-
Stage 2	943	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	862	1021	-	-	1516	-
Mov Cap-2 Maneuver	862	-	-	-	-	-
Stage 1	974	-	-	-	-	-
Stage 2	934	-	-	-	-	-
Approach	WB	NB		SB		
HCM Ctrl Dly, s/v	9.43	0		1.03		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	862	1021	1516	-
HCM Lane V/C Ratio	-	-	0.126	0.052	0.009	-
HCM Ctrl Dly (s/v)	-	-	9.8	8.7	7.4	-
HCM Lane LOS	-	-	A	A	A	-
HCM 95th %tile Q(veh)	-	-	0.4	0.2	0	-

Intersection												
Int Delay, s/veh	8.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	18	10	0	52	0	48	1	0	0	1	7
Future Vol, veh/h	3	18	10	0	52	0	48	1	0	0	1	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	20	11	0	57	0	52	1	0	0	1	8
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	139	110	5	116	114	1	9	0	0	1	0	0
Stage 1	5	5	-	105	105	-	-	-	-	-	-	-
Stage 2	134	105	-	11	9	-	-	-	-	-	-	-
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	832	780	1078	860	776	1083	1611	-	-	1622	-	-
Stage 1	1017	892	-	900	808	-	-	-	-	-	-	-
Stage 2	870	808	-	1010	888	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	746	755	1078	803	751	1083	1611	-	-	1622	-	-
Mov Cap-2 Maneuver	746	755	-	803	751	-	-	-	-	-	-	-
Stage 1	1017	892	-	871	782	-	-	-	-	-	-	-
Stage 2	781	782	-	978	888	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Ctrl Dly, s/v	9.5		10.18		7.16		0					
HCM LOS	A		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1610	-	-	834	751	1622	-	-				
HCM Lane V/C Ratio	0.032	-	-	0.04	0.075	-	-	-				
HCM Ctrl Dly (s/v)	7.3	0	-	9.5	10.2	0	-	-				
HCM Lane LOS	A	A	-	A	B	A	-	-				
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.2	0	-	-				

Intersection												
Int Delay, s/veh	6.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	0	0	0	0	27	0	8	0	9	3	2
Future Vol, veh/h	4	0	0	0	0	27	0	8	0	9	3	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	0	0	0	0	29	0	9	0	10	3	2
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	33	33	4	32	34	9	5	0	0	9	0	0
Stage 1	24	24	-	9	9	-	-	-	-	-	-	-
Stage 2	9	9	-	23	25	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	975	860	1079	976	859	1073	1616	-	-	1611	-	-
Stage 1	994	875	-	1013	888	-	-	-	-	-	-	-
Stage 2	1013	888	-	995	874	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	942	855	1079	970	854	1073	1616	-	-	1611	-	-
Mov Cap-2 Maneuver	942	855	-	970	854	-	-	-	-	-	-	-
Stage 1	988	870	-	1013	888	-	-	-	-	-	-	-
Stage 2	985	888	-	989	869	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Ctrl Dly, s/v	8.84		8.45		0		4.66					
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1616	-	-	942	1073	1071	-	-				
HCM Lane V/C Ratio	-	-	-	0.005	0.027	0.006	-	-				
HCM Ctrl Dly (s/v)	0	-	-	8.8	8.4	7.2	0	-				
HCM Lane LOS	A	-	-	A	A	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-				

Intersection												
Int Delay, s/veh	4.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	22	23	0	0	8	15	9	0	30	0
Future Vol, veh/h	0	0	22	23	0	0	8	15	9	0	30	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	24	25	0	0	9	16	10	0	33	0
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	66	76	33	71	71	21	33	0	0	26	0	0
Stage 1	33	33	-	39	39	-	-	-	-	-	-	-
Stage 2	34	43	-	33	33	-	-	-	-	-	-	-
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	927	814	1041	920	819	1056	1579	-	-	1588	-	-
Stage 1	984	868	-	977	863	-	-	-	-	-	-	-
Stage 2	982	859	-	984	868	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	922	810	1041	894	815	1056	1579	-	-	1588	-	-
Mov Cap-2 Maneuver	922	810	-	894	815	-	-	-	-	-	-	-
Stage 1	984	868	-	971	858	-	-	-	-	-	-	-
Stage 2	977	854	-	961	868	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Ctrl Dly, s/v	8.54		9.14		1.82		0					
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	419	-	-	1041	894	1588	-	-				
HCM Lane V/C Ratio	0.006	-	-	0.023	0.028	-	-	-				
HCM Ctrl Dly (s/v)	7.3	0	-	8.5	9.1	0	-	-				
HCM Lane LOS	A	A	-	A	A	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-				

Intersection												
Int Delay, s/veh	7.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	0	22	8	0	0	8	4	3	12	0	1
Future Vol, veh/h	4	0	22	8	0	0	8	4	3	12	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	0	24	9	0	0	9	4	3	13	0	1
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	48	52	1	49	51	6	1	0	0	8	0	0
Stage 1	27	27	-	23	23	-	-	-	-	-	-	-
Stage 2	22	25	-	26	27	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	952	840	1084	951	841	1077	1622	-	-	1613	-	-
Stage 1	991	873	-	995	876	-	-	-	-	-	-	-
Stage 2	997	874	-	991	873	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	939	828	1084	917	830	1077	1622	-	-	1613	-	-
Mov Cap-2 Maneuver	939	828	-	917	830	-	-	-	-	-	-	-
Stage 1	983	866	-	989	871	-	-	-	-	-	-	-
Stage 2	991	870	-	962	865	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Ctrl Dly, s/v	8.49		8.96		3.86		6.69					
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	884	-	-	1059	917	1385	-	-				
HCM Lane V/C Ratio	0.005	-	-	0.027	0.009	0.008	-	-				
HCM Ctrl Dly (s/v)	7.2	0	-	8.5	9	7.3	0	-				
HCM Lane LOS	A	A	-	A	A	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	-	-				

Timings

Total Traffic Conditions - Year 2028

1: Black Forest Road & Cowpoke Road

PM Peak Traffic Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	21	30	49	14	169	46	356	100	311	438	76
Future Volume (vph)	17	21	30	49	14	169	46	356	100	311	438	76
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.748			0.504			0.480			0.484		
Satd. Flow (perm)	1393	1863	1583	939	1863	1583	894	3539	1583	902	3539	1583
Satd. Flow (RTOR)			168			184			173			127
Lane Group Flow (vph)	18	23	33	53	15	184	50	387	109	338	476	83
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	15.0	15.0	4.0	15.0	15.0
Minimum Split (s)	9.0	11.0	11.0	9.0	11.0	11.0	9.0	21.5	21.5	9.0	21.5	21.5
Total Split (s)	14.0	30.0	30.0	18.0	34.0	34.0	16.0	37.0	37.0	35.0	56.0	56.0
Total Split (%)	11.7%	25.0%	25.0%	15.0%	28.3%	28.3%	13.3%	30.8%	30.8%	29.2%	46.7%	46.7%
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	0.0
Total Lost Time (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	6.5	6.5	5.0	6.5	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effect Green (s)	14.8	7.3	7.3	19.9	13.7	13.7	77.5	69.5	69.5	89.3	78.4	78.4
Actuated g/C Ratio	0.12	0.06	0.06	0.17	0.11	0.11	0.65	0.58	0.58	0.74	0.65	0.65
v/c Ratio	0.09	0.20	0.13	0.25	0.07	0.54	0.08	0.19	0.11	0.44	0.21	0.08
Control Delay (s/veh)	38.9	56.9	1.1	42.0	48.3	13.3	6.6	14.1	0.5	7.7	10.2	0.7
Queue Delay	0.0	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)	38.9	56.9	1.1	42.0	48.3	13.3	6.6	14.1	0.5	7.7	10.2	0.7
LOS	D	E	A	D	D	B	A	B	A	A	B	A
Approach Delay (s/veh)		27.6			21.4			10.7			8.4	
Approach LOS		C			C			B			A	
Queue Length 50th (ft)	12	18	0	35	10	0	10	74	0	78	80	0
Queue Length 95th (ft)	31	45	0	69	33	69	25	128	4	140	127	7
Internal Link Dist (ft)		2876			510			1147			1070	
Turn Bay Length (ft)	215		150	145		145	370		270	310		275
Base Capacity (vph)	223	357	439	260	419	498	691	2049	989	888	2312	1078
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.06	0.08	0.20	0.04	0.37	0.07	0.19	0.11	0.38	0.21	0.08

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 108 (90%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Timings

1: Black Forest Road & Cowpoke Road

Total Traffic Conditions - Year 2028

PM Peak Traffic Hour

Maximum v/c Ratio: 0.54

Intersection Signal Delay (s/veh): 11.7

Intersection LOS: B

Intersection Capacity Utilization 54.5%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1: Black Forest Road & Cowpoke Road



Timings

2: Tutt Boulevard & Woodmen Road

Total Traffic Conditions - Year 2028

PM Peak Traffic Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	300	2266	132	97	1804	34	440	104	176	41	45	265
Future Volume (vph)	300	2266	132	97	1804	34	440	104	176	41	45	265
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Satd. Flow (RTOR)			173			173			191			191
Lane Group Flow (vph)	326	2463	143	105	1961	37	478	113	191	45	49	288
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	4.0	10.0	10.0	4.0	10.0	10.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	17.5	17.5	9.0	17.5	17.5	9.0	11.0	11.0	9.0	11.0	11.0
Total Split (s)	20.0	60.0	60.0	18.0	58.0	58.0	22.0	26.0	26.0	16.0	20.0	20.0
Total Split (%)	16.7%	50.0%	50.0%	15.0%	48.3%	48.3%	18.3%	21.7%	21.7%	13.3%	16.7%	16.7%
Yellow Time (s)	3.0	5.5	5.5	3.0	5.5	5.5	3.0	5.0	5.0	3.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	0.0
Total Lost Time (s)	5.0	7.5	7.5	5.0	7.5	7.5	5.0	7.0	7.0	5.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effect Green (s)	14.5	58.0	58.0	9.0	52.5	52.5	17.0	23.6	23.6	7.0	11.5	11.5
Actuated g/C Ratio	0.12	0.48	0.48	0.08	0.44	0.44	0.14	0.20	0.20	0.06	0.10	0.10
v/c Ratio	0.79	1.00	0.17	0.41	0.88	0.05	0.98	0.16	0.41	0.23	0.14	0.89
Control Delay (s/veh)	65.4	50.4	1.9	57.3	37.2	0.1	88.5	41.6	8.8	56.1	49.8	47.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	65.4	50.4	1.9	57.3	37.2	0.1	88.5	41.6	8.8	56.1	49.8	47.3
LOS	E	D	A	E	D	A	F	D	A	E	D	D
Approach Delay (s/veh)		49.7			37.5			62.3			48.7	
Approach LOS		D			D			E			D	
Queue Length 50th (ft)	129	~759	0	41	524	0	195	39	0	17	18	75
Queue Length 95th (ft)	#190	#884	23	69	599	0	#307	68	65	37	38	#228
Internal Link Dist (ft)		1314			1884			512			467	
Turn Bay Length (ft)	495		280	225		505	365		365	175		235
Base Capacity (vph)	429	2456	854	371	2224	789	486	696	464	314	383	341
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.76	1.00	0.17	0.28	0.88	0.05	0.98	0.16	0.41	0.14	0.13	0.84

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 8 (7%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Timings

2: Tutt Boulevard & Woodmen Road

Total Traffic Conditions - Year 2028

PM Peak Traffic Hour

Maximum v/c Ratio: 1.00

Intersection Signal Delay (s/veh): 47.1

Intersection LOS: D

Intersection Capacity Utilization 82.6%

ICU Level of Service E

Analysis Period (min) 15

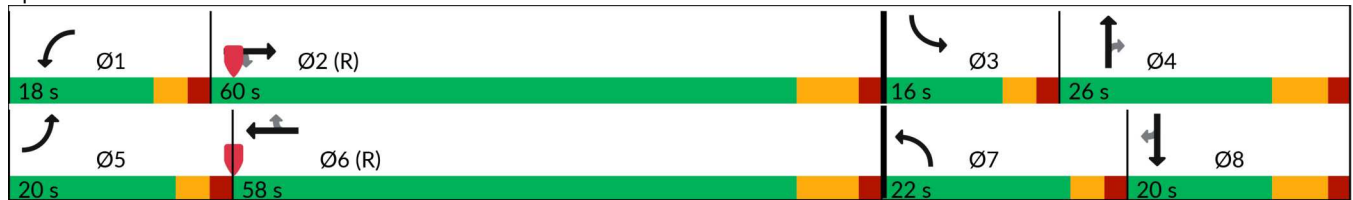
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: Tutt Boulevard & Woodmen Road



Timings

Total Traffic Conditions - Year 2028

3: Cross Creek Drive/Grand Cordera Parkway & Research Parkway

PM Peak Traffic Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  							
Traffic Volume (vph)	212	813	199	32	519	49	107	17	25	72	18	220
Future Volume (vph)	212	813	199	32	519	49	107	17	25	72	18	220
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	1770	1695	0	1770	1863	1583
Flt Permitted	0.390			0.309			0.744			0.728		
Satd. Flow (perm)	726	5085	1583	576	5085	1583	1386	1695	0	1356	1863	1583
Satd. Flow (RTOR)			216			170		27				239
Lane Group Flow (vph)	230	884	216	35	564	53	116	45	0	78	20	239
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2		2	6		6	4			8		8
Detector Phase	5	2	2	1	6	6	4	4		8	8	8
Switch Phase												
Minimum Initial (s)	4.0	10.0	10.0	4.0	10.0	10.0	4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	9.0	16.5	16.5	9.0	16.5	16.5	11.0	11.0		11.0	11.0	11.0
Total Split (s)	22.0	45.0	45.0	13.0	36.0	36.0	32.0	32.0		32.0	32.0	32.0
Total Split (%)	24.4%	50.0%	50.0%	14.4%	40.0%	40.0%	35.6%	35.6%		35.6%	35.6%	35.6%
Yellow Time (s)	3.0	4.5	4.5	3.0	4.5	4.5	5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	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	6.5	6.5	5.0	6.5	6.5	7.0	7.0		7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	None
Act Effect Green (s)	64.7	56.8	56.8	56.8	49.2	49.2	12.8	12.8		12.8	12.8	12.8
Actuated g/C Ratio	0.72	0.63	0.63	0.63	0.55	0.55	0.14	0.14		0.14	0.14	0.14
v/c Ratio	0.36	0.28	0.20	0.08	0.20	0.06	0.59	0.17		0.40	0.08	0.56
Control Delay (s/veh)	6.3	9.1	2.1	5.4	11.7	0.1	47.4	18.6		40.0	31.6	9.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay (s/veh)	6.3	9.1	2.1	5.4	11.7	0.1	47.4	18.6		40.0	31.6	9.8
LOS	A	A	A	A	B	A	D	B		D	C	A
Approach Delay (s/veh)		7.5			10.4			39.4			18.1	
Approach LOS		A			B			D			B	
Queue Length 50th (ft)	35	86	0	5	56	0	64	9		42	10	0
Queue Length 95th (ft)	75	132	33	16	96	0	111	37		80	29	61
Internal Link Dist (ft)		685			520			536			282	
Turn Bay Length (ft)	200		200	310		245	80			90		80
Base Capacity (vph)	722	3211	1079	481	2779	942	385	490		376	517	612
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	0.32	0.28	0.20	0.07	0.20	0.06	0.30	0.09		0.21	0.04	0.39

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 58 (64%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 40

Control Type: Actuated-Coordinated

Timings

Total Traffic Conditions - Year 2028

3: Cross Creek Drive/Grand Cordera Parkway & Research Parkway

PM Peak Traffic Hour

Maximum v/c Ratio: 0.59

Intersection Signal Delay (s/veh): 11.7

Intersection LOS: B

Intersection Capacity Utilization 49.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: Cross Creek Drive/Grand Cordera Parkway & Research Parkway



Intersection						
Int Delay, s/veh	3.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	70	32	80	70	52	94
Future Vol, veh/h	70	32	80	70	52	94
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	150	0	-	0	120	-
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	76	35	87	76	57	102
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	251	87	0	0	163	0
Stage 1	87	-	-	-	-	-
Stage 2	164	-	-	-	-	-
Critical Hdwy	6.63	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.83	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	-	-	2.219	-
Pot Cap-1 Maneuver	727	971	-	-	1414	-
Stage 1	936	-	-	-	-	-
Stage 2	849	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	698	971	-	-	1414	-
Mov Cap-2 Maneuver	698	-	-	-	-	-
Stage 1	936	-	-	-	-	-
Stage 2	815	-	-	-	-	-
Approach	WB	NB	SB			
HCM Ctrl Dly, s/v	10.18	0	2.73			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	698	971	1414	-
HCM Lane V/C Ratio	-	-	0.109	0.036	0.04	-
HCM Ctrl Dly (s/v)	-	-	10.8	8.8	7.7	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.4	0.1	0.1	-

Intersection												
Int Delay, s/veh	8.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	51	55	0	33	0	32	1	0	0	1	5
Future Vol, veh/h	8	51	55	0	33	0	32	1	0	0	1	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	55	60	0	36	0	35	1	0	0	1	5
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	92	74	4	99	77	1	7	0	0	1	0	0
Stage 1	4	4	-	71	71	-	-	-	-	-	-	-
Stage 2	89	71	-	29	7	-	-	-	-	-	-	-
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	891	816	1080	882	813	1083	1614	-	-	1622	-	-
Stage 1	1019	893	-	939	836	-	-	-	-	-	-	-
Stage 2	919	836	-	988	890	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	834	798	1080	760	796	1083	1614	-	-	1622	-	-
Mov Cap-2 Maneuver	834	798	-	760	796	-	-	-	-	-	-	-
Stage 1	1019	893	-	919	818	-	-	-	-	-	-	-
Stage 2	860	818	-	876	890	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Ctrl Dly, s/v	9.54		9.74		7.06		0					
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1613	-	-	916	796	1622	-	-				
HCM Lane V/C Ratio	0.022	-	-	0.135	0.045	-	-	-				
HCM Ctrl Dly (s/v)	7.3	0	-	9.5	9.7	0	-	-				
HCM Lane LOS	A	A	-	A	A	A	-	-				
HCM 95th %tile Q(veh)	0.1	-	-	0.5	0.1	0	-	-				

Intersection												
Int Delay, s/veh	5.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	0	0	0	0	18	0	6	0	28	9	5
Future Vol, veh/h	3	0	0	0	0	18	0	6	0	28	9	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	0	0	0	0	20	0	7	0	30	10	5
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	80	80	13	77	83	7	15	0	0	7	0	0
Stage 1	73	73	-	7	7	-	-	-	-	-	-	-
Stage 2	7	7	-	71	76	-	-	-	-	-	-	-
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	908	810	1068	912	808	1076	1603	-	-	1614	-	-
Stage 1	936	834	-	1015	890	-	-	-	-	-	-	-
Stage 2	1015	890	-	939	832	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	875	795	1068	895	792	1076	1603	-	-	1614	-	-
Mov Cap-2 Maneuver	875	795	-	895	792	-	-	-	-	-	-	-
Stage 1	918	818	-	1015	890	-	-	-	-	-	-	-
Stage 2	997	890	-	921	816	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Ctrl Dly, s/v	9.13		8.41		0		4.85					
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1603	-	-	875	1076	1120	-	-				
HCM Lane V/C Ratio	-	-	-	0.004	0.018	0.019	-	-				
HCM Ctrl Dly (s/v)	0	-	-	9.1	8.4	7.3	0	-				
HCM Lane LOS	A	-	-	A	A	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0.1	-	-				

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	0	0	14	16	0	0	23	48	26	0	22	0
Future Vol, veh/h	0	0	14	16	0	0	23	48	26	0	22	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	15	17	0	0	25	52	28	0	24	0
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	126	154	24	140	140	66	24	0	0	80	0	0
Stage 1	24	24	-	116	116	-	-	-	-	-	-	-
Stage 2	102	130	-	24	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	848	737	1053	830	751	997	1591	-	-	1517	-	-
Stage 1	994	875	-	888	799	-	-	-	-	-	-	-
Stage 2	904	788	-	994	875	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	834	725	1053	804	738	997	1591	-	-	1517	-	-
Mov Cap-2 Maneuver	834	725	-	804	738	-	-	-	-	-	-	-
Stage 1	994	875	-	874	786	-	-	-	-	-	-	-
Stage 2	889	775	-	980	875	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Ctrl Dly, s/v	8.47		9.57		1.73		0					
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	399	-	-	1053	804	1517	-	-				
HCM Lane V/C Ratio	0.016	-	-	0.014	0.022	-	-	-				
HCM Ctrl Dly (s/v)	7.3	0	-	8.5	9.6	0	-	-				
HCM Lane LOS	A	A	-	A	A	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-				

Intersection												
Int Delay, s/veh	5.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	0	16	6	0	0	25	14	9	8	0	5
Future Vol, veh/h	3	0	16	6	0	0	25	14	9	8	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	0	17	7	0	0	27	15	10	9	0	5
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	90	99	3	92	97	20	5	0	0	25	0	0
Stage 1	20	20	-	74	74	-	-	-	-	-	-	-
Stage 2	70	79	-	17	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	895	791	1081	892	793	1058	1616	-	-	1589	-	-
Stage 1	999	879	-	935	833	-	-	-	-	-	-	-
Stage 2	940	829	-	1002	876	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	875	773	1081	858	775	1058	1616	-	-	1589	-	-
Mov Cap-2 Maneuver	875	773	-	858	775	-	-	-	-	-	-	-
Stage 1	993	874	-	919	819	-	-	-	-	-	-	-
Stage 2	924	815	-	980	871	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Ctrl Dly, s/v	8.52		9.23		3.78		4.48					
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	869	-	-	1042	858	923	-	-				
HCM Lane V/C Ratio	0.017	-	-	0.02	0.008	0.005	-	-				
HCM Ctrl Dly (s/v)	7.3	0	-	8.5	9.2	7.3	0	-				
HCM Lane LOS	A	A	-	A	A	A	A	-				
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0	0	-	-				

Timings

Total Traffic Conditions - Year 2045

1: Black Forest Road & Cowpoke Road

AM Peak Traffic Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	400	170	154	375	220	80	52	1225	90	145	1200	555
Future Volume (vph)	400	170	154	375	220	80	52	1225	90	145	1200	555
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.318			0.442			0.088			0.083		
Satd. Flow (perm)	592	1863	1583	823	1863	1583	164	3539	1583	155	3539	1583
Satd. Flow (RTOR)			134			134			139			603
Lane Group Flow (vph)	435	185	167	408	239	87	57	1332	98	158	1304	603
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	15.0	15.0	4.0	15.0	15.0
Minimum Split (s)	9.0	11.0	11.0	9.0	11.0	11.0	9.0	21.5	21.5	9.0	21.5	21.5
Total Split (s)	25.0	21.0	21.0	26.0	22.0	22.0	9.0	52.0	52.0	11.0	54.0	54.0
Total Split (%)	22.7%	19.1%	19.1%	23.6%	20.0%	20.0%	8.2%	47.3%	47.3%	10.0%	49.1%	49.1%
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	0.0
Total Lost Time (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	6.5	6.5	5.0	6.5	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effect Green (s)	36.3	14.3	14.3	37.7	15.0	15.0	51.0	45.5	45.5	55.6	49.3	49.3
Actuated g/C Ratio	0.33	0.13	0.13	0.34	0.14	0.14	0.46	0.41	0.41	0.51	0.45	0.45
v/c Ratio	1.07	0.77	0.52	0.89	0.94	0.26	0.43	0.91	0.13	0.95	0.82	0.58
Control Delay (s/veh)	92.8	67.8	18.4	50.8	91.2	3.9	23.0	40.9	1.6	81.6	32.5	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	92.8	67.8	18.4	50.8	91.2	3.9	23.0	40.9	1.6	81.6	32.5	4.1
LOS	F	E	B	D	F	A	C	D	A	F	C	A
Approach Delay (s/veh)		71.2			58.4			37.6			28.0	
Approach LOS		E			E			D			C	
Queue Length 50th (ft)	~279	130	21	232	172	0	19	464	0	61	433	0
Queue Length 95th (ft)	#476	#245	89	#359	#328	15	40	#611	14	#196	533	65
Internal Link Dist (ft)		2876			510			1147			1070	
Turn Bay Length (ft)	215		150	145		145	370		270	310		275
Base Capacity (vph)	408	241	321	465	254	331	134	1463	736	166	1586	1042
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.07	0.77	0.52	0.88	0.94	0.26	0.43	0.91	0.13	0.95	0.82	0.58

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 27 (25%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Timings

1: Black Forest Road & Cowpoke Road

Total Traffic Conditions - Year 2045
AM Peak Traffic Hour

Maximum v/c Ratio: 1.07	
Intersection Signal Delay (s/veh): 41.9	Intersection LOS: D
Intersection Capacity Utilization 95.2%	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: Black Forest Road & Cowpoke Road

 Ø1 11 s	 Ø2 (R) 52 s	 Ø3 26 s	 Ø4 21 s
 Ø5 9 s	 Ø6 (R) 54 s	 Ø7 25 s	 Ø8 22 s

Timings

2: Tutt Boulevard & Woodmen Road

Total Traffic Conditions - Year 2045

AM Peak Traffic Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	171	1610	109	249	3148	24	347	55	83	71	104	566
Future Volume (vph)	171	1610	109	249	3148	24	347	55	83	71	104	566
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Satd. Flow (RTOR)			188			139			193			193
Lane Group Flow (vph)	186	1750	118	271	3422	26	377	60	90	77	113	615
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	4.0	10.0	10.0	4.0	10.0	10.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	17.5	17.5	9.0	17.5	17.5	9.0	11.0	11.0	9.0	11.0	11.0
Total Split (s)	9.0	57.0	57.0	16.0	64.0	64.0	14.0	27.0	27.0	10.0	23.0	23.0
Total Split (%)	8.2%	51.8%	51.8%	14.5%	58.2%	58.2%	12.7%	24.5%	24.5%	9.1%	20.9%	20.9%
Yellow Time (s)	3.0	5.5	5.5	3.0	5.5	5.5	3.0	5.0	5.0	3.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	0.0
Total Lost Time (s)	5.0	7.5	7.5	5.0	7.5	7.5	5.0	7.0	7.0	5.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effect Green (s)	4.0	49.6	49.6	10.9	56.5	56.5	9.0	22.0	22.0	5.0	16.0	16.0
Actuated g/C Ratio	0.04	0.45	0.45	0.10	0.51	0.51	0.08	0.20	0.20	0.05	0.15	0.15
v/c Ratio	1.50	0.76	0.14	0.80	1.31	0.03	1.35	0.08	0.19	0.49	0.22	1.56
Control Delay (s/veh)	299.4	28.1	0.7	66.5	169.0	0.0	217.2	37.9	0.9	62.4	42.8	286.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	299.4	28.1	0.7	66.5	169.0	0.0	217.2	37.9	0.9	62.4	42.8	286.5
LOS	F	C	A	E	F	A	F	D	A	E	D	F
Approach Delay (s/veh)		51.0			160.4			159.8			230.8	
Approach LOS		D			F			F			F	
Queue Length 50th (ft)	~95	376	0	99	~1160	0	~182	18	0	28	38	~503
Queue Length 95th (ft)	#170	438	4	#162	#1244	0	#280	38	0	54	66	#728
Internal Link Dist (ft)		1314			1884			512			467	
Turn Bay Length (ft)	495		280	225		505	365		365	175		235
Base Capacity (vph)	124	2293	816	343	2611	880	280	707	470	156	514	395
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.50	0.76	0.14	0.79	1.31	0.03	1.35	0.08	0.19	0.49	0.22	1.56

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 27 (25%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Timings

2: Tutt Boulevard & Woodmen Road

Total Traffic Conditions - Year 2045

AM Peak Traffic Hour

Maximum v/c Ratio: 1.56

Intersection Signal Delay (s/veh): 136.7

Intersection LOS: F

Intersection Capacity Utilization 122.0%

ICU Level of Service H

Analysis Period (min) 15

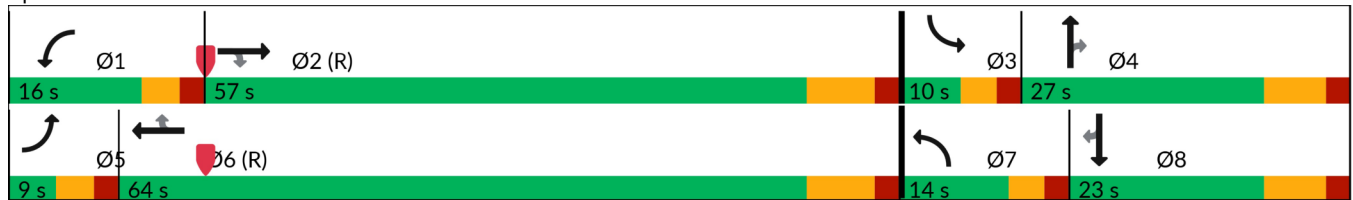
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: Tutt Boulevard & Woodmen Road



Timings

Total Traffic Conditions - Year 2045

3: Cross Creek Drive/Grand Cordera Parkway & Research Parkway

AM Peak Traffic Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  			 			 	
Traffic Volume (vph)	160	562	89	16	1450	90	196	26	37	63	17	326
Future Volume (vph)	160	562	89	16	1450	90	196	26	37	63	17	326
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	1770	1699	0	1770	1863	1583
Flt Permitted	0.089			0.410			0.746			0.713		
Satd. Flow (perm)	166	5085	1583	764	5085	1583	1390	1699	0	1328	1863	1583
Satd. Flow (RTOR)			109			170		40				164
Lane Group Flow (vph)	174	611	97	17	1576	98	213	68	0	68	18	354
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2		2	6		6	4			8		8
Detector Phase	5	2	2	1	6	6	4	4		8	8	8
Switch Phase												
Minimum Initial (s)	4.0	10.0	10.0	4.0	10.0	10.0	4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	9.0	16.5	16.5	9.0	16.5	16.5	11.0	11.0		11.0	11.0	11.0
Total Split (s)	15.0	51.0	51.0	9.0	45.0	45.0	30.0	30.0		30.0	30.0	30.0
Total Split (%)	16.7%	56.7%	56.7%	10.0%	50.0%	50.0%	33.3%	33.3%		33.3%	33.3%	33.3%
Yellow Time (s)	3.0	4.5	4.5	3.0	4.5	4.5	5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	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	6.5	6.5	5.0	6.5	6.5	7.0	7.0		7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	None
Act Effect Green (s)	59.8	54.4	54.4	51.1	44.4	44.4	18.2	18.2		18.2	18.2	18.2
Actuated g/C Ratio	0.66	0.60	0.60	0.57	0.49	0.49	0.20	0.20		0.20	0.20	0.20
v/c Ratio	0.65	0.20	0.10	0.03	0.63	0.11	0.76	0.18		0.25	0.05	0.78
Control Delay (s/veh)	24.9	9.5	2.4	7.3	19.2	0.5	50.5	15.2		30.8	26.7	30.3
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)	24.9	9.5	2.4	7.3	19.2	0.5	50.5	15.2		30.8	26.7	30.3
LOS	C	A	A	A	B	A	D	B		C	C	C
Approach Delay (s/veh)		11.8			18.0			41.9			30.3	
Approach LOS		B			B			D			C	
Queue Length 50th (ft)	37	47	0	3	237	0	115	13		33	8	103
Queue Length 95th (ft)	#111	94	20	11	324	4	186	45		67	25	197
Internal Link Dist (ft)		685			520			536			282	
Turn Bay Length (ft)	200		200	310		245	80			90		80
Base Capacity (vph)	292	3075	1000	491	2511	867	355	463		339	476	526
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	0.60	0.20	0.10	0.03	0.63	0.11	0.60	0.15		0.20	0.04	0.67

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 58 (64%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.78	
Intersection Signal Delay (s/veh): 20.0	Intersection LOS: C
Intersection Capacity Utilization 76.1%	ICU Level of Service D
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: Cross Creek Drive/Grand Cordera Parkway & Research Parkway



Intersection						
Int Delay, s/veh	5.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	140	67	55	42	19	93
Future Vol, veh/h	140	67	55	42	19	93
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	150	0	-	0	120	-
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	152	73	60	46	21	101
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	152	60	0	0	105	0
Stage 1	60	-	-	-	-	-
Stage 2	92	-	-	-	-	-
Critical Hdwy	6.63	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.83	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	-	-	2.219	-
Pot Cap-1 Maneuver	833	1005	-	-	1485	-
Stage 1	962	-	-	-	-	-
Stage 2	922	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	821	1005	-	-	1485	-
Mov Cap-2 Maneuver	821	-	-	-	-	-
Stage 1	962	-	-	-	-	-
Stage 2	909	-	-	-	-	-
Approach	WB	NB	SB			
HCM Ctrl Dly, s/v	9.89	0	1.27			
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	-	821	1005	1485	-
HCM Lane V/C Ratio	-	-	0.185	0.072	0.014	-
HCM Ctrl Dly (s/v)	-	-	10.4	8.9	7.5	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.7	0.2	0	-

Intersection												
Int Delay, s/veh	8.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	18	10	0	52	0	56	1	0	0	1	7
Future Vol, veh/h	3	18	10	0	52	0	56	1	0	0	1	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	20	11	0	57	0	61	1	0	0	1	8
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	156	128	5	134	132	1	9	0	0	1	0	0
Stage 1	5	5	-	123	123	-	-	-	-	-	-	-
Stage 2	151	123	-	11	9	-	-	-	-	-	-	-
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	810	763	1078	838	759	1083	1611	-	-	1622	-	-
Stage 1	1017	892	-	881	794	-	-	-	-	-	-	-
Stage 2	851	794	-	1010	888	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	722	734	1078	778	730	1083	1611	-	-	1622	-	-
Mov Cap-2 Maneuver	722	734	-	778	730	-	-	-	-	-	-	-
Stage 1	1017	892	-	848	764	-	-	-	-	-	-	-
Stage 2	759	764	-	978	888	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Ctrl Dly, s/v	9.6		10.34		7.19		0					
HCM LOS	A		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1610	-	-	817	730	1622	-	-				
HCM Lane V/C Ratio	0.038	-	-	0.041	0.077	-	-	-				
HCM Ctrl Dly (s/v)	7.3	0	-	9.6	10.3	0	-	-				
HCM Lane LOS	A	A	-	A	B	A	-	-				
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.3	0	-	-				

Intersection												
Int Delay, s/veh	6.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	0	0	0	0	27	0	8	0	9	3	2
Future Vol, veh/h	4	0	0	0	0	27	0	8	0	9	3	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	0	0	0	0	29	0	9	0	10	3	2
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	33	33	4	32	34	9	5	0	0	9	0	0
Stage 1	24	24	-	9	9	-	-	-	-	-	-	-
Stage 2	9	9	-	23	25	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	975	860	1079	976	859	1073	1616	-	-	1611	-	-
Stage 1	994	875	-	1013	888	-	-	-	-	-	-	-
Stage 2	1013	888	-	995	874	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	942	855	1079	970	854	1073	1616	-	-	1611	-	-
Mov Cap-2 Maneuver	942	855	-	970	854	-	-	-	-	-	-	-
Stage 1	988	870	-	1013	888	-	-	-	-	-	-	-
Stage 2	985	888	-	989	869	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Ctrl Dly, s/v	8.84		8.45		0		4.66					
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1616	-	-	942	1073	1071	-	-				
HCM Lane V/C Ratio	-	-	-	0.005	0.027	0.006	-	-				
HCM Ctrl Dly (s/v)	0	-	-	8.8	8.4	7.2	0	-				
HCM Lane LOS	A	-	-	A	A	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-				

Intersection

Int Delay, s/veh 4.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	22	23	0	0	8	15	9	0	30	0
Future Vol, veh/h	0	0	22	23	0	0	8	15	9	0	30	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	24	25	0	0	9	16	10	0	33	0

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	66	76	33	71	71	21	33	0	0	26	0	0
Stage 1	33	33	-	39	39	-	-	-	-	-	-	-
Stage 2	34	43	-	33	33	-	-	-	-	-	-	-
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	927	814	1041	920	819	1056	1579	-	-	1588	-	-
Stage 1	984	868	-	977	863	-	-	-	-	-	-	-
Stage 2	982	859	-	984	868	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	922	810	1041	894	815	1056	1579	-	-	1588	-	-
Mov Cap-2 Maneuver	922	810	-	894	815	-	-	-	-	-	-	-
Stage 1	984	868	-	971	858	-	-	-	-	-	-	-
Stage 2	977	854	-	961	868	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Ctrl Dly, s/v	8.54		9.14		1.82		0	
HCM LOS	A		A					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	419	-	-	1041	894	1588	-
HCM Lane V/C Ratio	0.006	-	-	0.023	0.028	-	-
HCM Ctrl Dly (s/v)	7.3	0	-	8.5	9.1	0	-
HCM Lane LOS	A	A	-	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-

Intersection												
Int Delay, s/veh	7.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	0	22	8	0	0	8	4	3	12	0	1
Future Vol, veh/h	4	0	22	8	0	0	8	4	3	12	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	0	24	9	0	0	9	4	3	13	0	1
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	48	52	1	49	51	6	1	0	0	8	0	0
Stage 1	27	27	-	23	23	-	-	-	-	-	-	-
Stage 2	22	25	-	26	27	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	952	840	1084	951	841	1077	1622	-	-	1613	-	-
Stage 1	991	873	-	995	876	-	-	-	-	-	-	-
Stage 2	997	874	-	991	873	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	939	828	1084	917	830	1077	1622	-	-	1613	-	-
Mov Cap-2 Maneuver	939	828	-	917	830	-	-	-	-	-	-	-
Stage 1	983	866	-	989	871	-	-	-	-	-	-	-
Stage 2	991	870	-	962	865	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Ctrl Dly, s/v	8.49		8.96		3.86		6.69					
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	884	-	-	1059	917	1385	-	-				
HCM Lane V/C Ratio	0.005	-	-	0.027	0.009	0.008	-	-				
HCM Ctrl Dly (s/v)	7.2	0	-	8.5	9	7.3	0	-				
HCM Lane LOS	A	A	-	A	A	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	-	-				

Timings

Total Traffic Conditions - Year 2045

1: Black Forest Road & Cowpoke Road

PM Peak Traffic Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	220	220	104	345	20	70	354	1345	235	60	1030	375
Future Volume (vph)	220	220	104	345	20	70	354	1345	235	60	1030	375
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.689			0.303			0.087			0.097		
Satd. Flow (perm)	1283	1863	1583	564	1863	1583	162	3539	1583	181	3539	1583
Satd. Flow (RTOR)			168			168			229			386
Lane Group Flow (vph)	239	239	113	375	22	76	385	1462	255	65	1120	408
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	15.0	15.0	4.0	15.0	15.0
Minimum Split (s)	9.0	11.0	11.0	9.0	11.0	11.0	9.0	21.5	21.5	9.0	21.5	21.5
Total Split (s)	20.0	22.0	22.0	24.0	26.0	26.0	25.0	65.0	65.0	9.0	49.0	49.0
Total Split (%)	16.7%	18.3%	18.3%	20.0%	21.7%	21.7%	20.8%	54.2%	54.2%	7.5%	40.8%	40.8%
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	0.0
Total Lost Time (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	6.5	6.5	5.0	6.5	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effect Green (s)	33.8	15.0	15.0	35.8	16.3	16.3	69.0	60.3	60.3	48.0	42.5	42.5
Actuated g/C Ratio	0.28	0.13	0.13	0.30	0.14	0.14	0.58	0.50	0.50	0.40	0.35	0.35
v/c Ratio	0.54	1.03	0.33	1.05	0.09	0.21	1.07	0.82	0.28	0.52	0.89	0.50
Control Delay (s/veh)	36.2	118.6	4.2	96.5	44.1	1.3	100.1	30.7	3.9	30.0	47.1	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	36.2	118.6	4.2	96.5	44.1	1.3	100.1	30.7	3.9	30.0	47.1	5.9
LOS	D	F	A	F	D	A	F	C	A	C	D	A
Approach Delay (s/veh)		63.4			78.8			40.2			35.8	
Approach LOS		E			E			D			D	
Queue Length 50th (ft)	142	~201	0	245	15	0	~279	513	10	22	434	11
Queue Length 95th (ft)	217	#366	14	#415	40	0	#481	620	56	43	#563	85
Internal Link Dist (ft)		2876			510			1147			1070	
Turn Bay Length (ft)	215		150	145		145	370		270	310		275
Base Capacity (vph)	443	232	344	358	294	392	361	1778	909	125	1253	809
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	1.03	0.33	1.05	0.07	0.19	1.07	0.82	0.28	0.52	0.89	0.50

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 108 (90%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Timings

1: Black Forest Road & Cowpoke Road

Total Traffic Conditions - Year 2045

PM Peak Traffic Hour

Maximum v/c Ratio: 1.07

Intersection Signal Delay (s/veh): 45.4

Intersection LOS: D

Intersection Capacity Utilization 98.4%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Black Forest Road & Cowpoke Road



Timings

2: Tutt Boulevard & Woodmen Road

Total Traffic Conditions - Year 2045

PM Peak Traffic Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	413	3173	185	135	2526	43	616	146	246	57	63	363
Future Volume (vph)	413	3173	185	135	2526	43	616	146	246	57	63	363
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Satd. Flow (RTOR)			173			218			177			223
Lane Group Flow (vph)	449	3449	201	147	2746	47	670	159	267	62	68	395
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	4.0	10.0	10.0	4.0	10.0	10.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	17.5	17.5	9.0	17.5	17.5	9.0	11.0	11.0	9.0	11.0	11.0
Total Split (s)	16.0	74.0	74.0	9.0	67.0	67.0	23.0	28.0	28.0	9.0	14.0	14.0
Total Split (%)	13.3%	61.7%	61.7%	7.5%	55.8%	55.8%	19.2%	23.3%	23.3%	7.5%	11.7%	11.7%
Yellow Time (s)	3.0	5.5	5.5	3.0	5.5	5.5	3.0	5.0	5.0	3.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	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	0.0
Total Lost Time (s)	5.0	7.5	7.5	5.0	7.5	7.5	5.0	7.0	7.0	5.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effect Green (s)	11.0	66.5	66.5	4.0	59.5	59.5	18.0	22.8	22.8	4.0	7.0	7.0
Actuated g/C Ratio	0.09	0.55	0.55	0.03	0.50	0.50	0.15	0.19	0.19	0.03	0.06	0.06
v/c Ratio	1.43	1.22	0.21	1.29	1.09	0.05	1.30	0.24	0.60	0.54	0.33	1.31
Control Delay (s/veh)	250.2	131.1	3.4	226.3	77.5	0.1	191.0	43.2	22.2	74.8	58.8	179.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	250.2	131.1	3.4	226.3	77.5	0.1	191.0	43.2	22.2	74.8	58.8	179.9
LOS	F	F	A	F	E	A	F	D	C	E	E	F
Approach Delay (s/veh)		137.9			83.7			128.4			151.8	
Approach LOS		F			F			F			F	
Queue Length 50th (ft)	~246	~1223	10	~75	~890	0	~348	57	63	25	27	~224
Queue Length 95th (ft)	#353	#1302	45	#145	#980	0	#469	91	159	#53	52	#427
Internal Link Dist (ft)		1314			1884			512			467	
Turn Bay Length (ft)	495		280	225		505	365		365	175		235
Base Capacity (vph)	314	2817	954	114	2521	894	514	672	444	114	206	302
Starvation Cap Reductn	0	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	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.43	1.22	0.21	1.29	1.09	0.05	1.30	0.24	0.60	0.54	0.33	1.31

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 8 (7%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 120

Control Type: Actuated-Coordinated

Timings
2: Tutt Boulevard & Woodmen Road

Total Traffic Conditions - Year 2045
PM Peak Traffic Hour

Maximum v/c Ratio: 1.43

Intersection Signal Delay (s/veh): 119.2

Intersection LOS: F

Intersection Capacity Utilization 105.8%

ICU Level of Service G

Analysis Period (min) 15

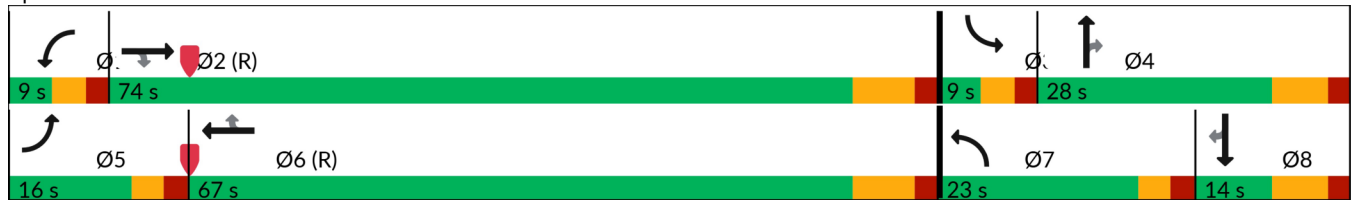
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 2: Tutt Boulevard & Woodmen Road



Timings

Total Traffic Conditions - Year 2045

3: Cross Creek Drive/Grand Cordera Parkway & Research Parkway

PM Peak Traffic Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  							
Traffic Volume (vph)	297	1138	254	37	727	68	135	23	30	101	25	307
Future Volume (vph)	297	1138	254	37	727	68	135	23	30	101	25	307
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	1770	1704	0	1770	1863	1583
Flt Permitted	0.291			0.214			0.740			0.719		
Satd. Flow (perm)	542	5085	1583	399	5085	1583	1378	1704	0	1339	1863	1583
Satd. Flow (RTOR)			276			170		33				334
Lane Group Flow (vph)	323	1237	276	40	790	74	147	58	0	110	27	334
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2		2	6		6	4			8		8
Detector Phase	5	2	2	1	6	6	4	4		8	8	8
Switch Phase												
Minimum Initial (s)	4.0	10.0	10.0	4.0	10.0	10.0	4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	9.0	16.5	16.5	9.0	16.5	16.5	11.0	11.0		11.0	11.0	11.0
Total Split (s)	28.0	52.0	52.0	9.0	33.0	33.0	29.0	29.0		29.0	29.0	29.0
Total Split (%)	31.1%	57.8%	57.8%	10.0%	36.7%	36.7%	32.2%	32.2%		32.2%	32.2%	32.2%
Yellow Time (s)	3.0	4.5	4.5	3.0	4.5	4.5	5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	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	6.5	6.5	5.0	6.5	6.5	7.0	7.0		7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	None
Act Effect Green (s)	63.2	55.2	55.2	51.7	44.4	44.4	14.8	14.8		14.8	14.8	14.8
Actuated g/C Ratio	0.70	0.61	0.61	0.57	0.49	0.49	0.16	0.16		0.16	0.16	0.16
v/c Ratio	0.59	0.40	0.26	0.13	0.31	0.09	0.65	0.19		0.50	0.09	0.62
Control Delay (s/veh)	10.3	10.9	2.2	7.6	15.7	0.2	47.7	17.4		40.9	30.0	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay (s/veh)	10.3	10.9	2.2	7.6	15.7	0.2	47.7	17.4		40.9	30.0	9.1
LOS	B	B	A	A	B	A	D	B		D	C	A
Approach Delay (s/veh)		9.5			14.1			39.2			17.7	
Approach LOS		A			B			D			B	
Queue Length 50th (ft)	58	141	0	6	93	0	80	12		59	13	0
Queue Length 95th (ft)	118	200	38	19	163	0	133	42		103	34	67
Internal Link Dist (ft)		685			520			536			282	
Turn Bay Length (ft)	200		200	310		245	80			90		80
Base Capacity (vph)	694	3116	1077	317	2509	867	336	441		327	455	639
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	0.47	0.40	0.26	0.13	0.31	0.09	0.44	0.13		0.34	0.06	0.52

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 58 (64%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Timings

Total Traffic Conditions - Year 2045

3: Cross Creek Drive/Grand Cordera Parkway & Research Parkway

PM Peak Traffic Hour

Maximum v/c Ratio: 0.65

Intersection Signal Delay (s/veh): 13.6

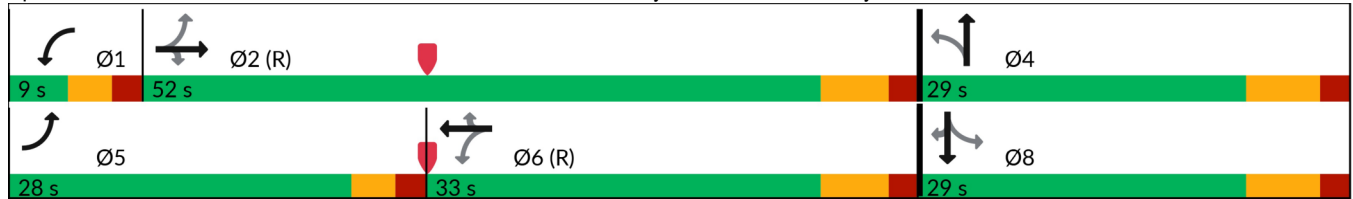
Intersection LOS: B

Intersection Capacity Utilization 60.1%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3: Cross Creek Drive/Grand Cordera Parkway & Research Parkway



Intersection						
Int Delay, s/veh	4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	98	40	91	98	67	119
Future Vol, veh/h	98	40	91	98	67	119
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	150	0	-	0	120	-
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	107	43	99	107	73	129
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	309	99	0	0	205	0
Stage 1	99	-	-	-	-	-
Stage 2	210	-	-	-	-	-
Critical Hdwy	6.63	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.83	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	-	-	2.219	-
Pot Cap-1 Maneuver	671	956	-	-	1365	-
Stage 1	925	-	-	-	-	-
Stage 2	805	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	635	956	-	-	1365	-
Mov Cap-2 Maneuver	635	-	-	-	-	-
Stage 1	925	-	-	-	-	-
Stage 2	762	-	-	-	-	-
Approach	WB	NB	SB			
HCM Ctrl Dly, s/v	10.98	0	2.8			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	-	635	956	1365	-
HCM Lane V/C Ratio	-	-	0.168	0.045	0.053	-
HCM Ctrl Dly (s/v)	-	-	11.8	8.9	7.8	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.6	0.1	0.2	-

Intersection												
Int Delay, s/veh	8.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	51	66	0	33	0	37	1	0	0	1	5
Future Vol, veh/h	8	51	66	0	33	0	37	1	0	0	1	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	9	55	72	0	36	0	40	1	0	0	1	5
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	103	85	4	110	88	1	7	0	0	1	0	0
Stage 1	4	4	-	82	82	-	-	-	-	-	-	-
Stage 2	99	82	-	29	7	-	-	-	-	-	-	-
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	877	805	1080	868	802	1083	1614	-	-	1622	-	-
Stage 1	1019	893	-	927	827	-	-	-	-	-	-	-
Stage 2	907	827	-	988	890	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	817	785	1080	735	782	1083	1614	-	-	1622	-	-
Mov Cap-2 Maneuver	817	785	-	735	782	-	-	-	-	-	-	-
Stage 1	1019	893	-	904	807	-	-	-	-	-	-	-
Stage 2	845	807	-	865	890	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Ctrl Dly, s/v	9.59		9.82		7.1		0					
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1613	-	-	920	782	1622	-	-				
HCM Lane V/C Ratio	0.025	-	-	0.148	0.046	-	-	-				
HCM Ctrl Dly (s/v)	7.3	0	-	9.6	9.8	0	-	-				
HCM Lane LOS	A	A	-	A	A	A	-	-				
HCM 95th %tile Q(veh)	0.1	-	-	0.5	0.1	0	-	-				

Intersection												
Int Delay, s/veh	5.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	0	0	0	0	18	0	6	0	28	9	5
Future Vol, veh/h	3	0	0	0	0	18	0	6	0	28	9	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	0	0	0	0	20	0	7	0	30	10	5
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	80	80	13	77	83	7	15	0	0	7	0	0
Stage 1	73	73	-	7	7	-	-	-	-	-	-	-
Stage 2	7	7	-	71	76	-	-	-	-	-	-	-
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	908	810	1068	912	808	1076	1603	-	-	1614	-	-
Stage 1	936	834	-	1015	890	-	-	-	-	-	-	-
Stage 2	1015	890	-	939	832	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	875	795	1068	895	792	1076	1603	-	-	1614	-	-
Mov Cap-2 Maneuver	875	795	-	895	792	-	-	-	-	-	-	-
Stage 1	918	818	-	1015	890	-	-	-	-	-	-	-
Stage 2	997	890	-	921	816	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Ctrl Dly, s/v	9.13		8.41		0		4.85					
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1603	-	-	875	1076	1120	-	-				
HCM Lane V/C Ratio	-	-	-	0.004	0.018	0.019	-	-				
HCM Ctrl Dly (s/v)	0	-	-	9.1	8.4	7.3	0	-				
HCM Lane LOS	A	-	-	A	A	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0.1	-	-				

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	0	0	14	16	0	0	23	48	26	0	22	0
Future Vol, veh/h	0	0	14	16	0	0	23	48	26	0	22	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	15	17	0	0	25	52	28	0	24	0
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	126	154	24	140	140	66	24	0	0	80	0	0
Stage 1	24	24	-	116	116	-	-	-	-	-	-	-
Stage 2	102	130	-	24	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	848	737	1053	830	751	997	1591	-	-	1517	-	-
Stage 1	994	875	-	888	799	-	-	-	-	-	-	-
Stage 2	904	788	-	994	875	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	834	725	1053	804	738	997	1591	-	-	1517	-	-
Mov Cap-2 Maneuver	834	725	-	804	738	-	-	-	-	-	-	-
Stage 1	994	875	-	874	786	-	-	-	-	-	-	-
Stage 2	889	775	-	980	875	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Ctrl Dly, s/v	8.47		9.57		1.73		0					
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	399	-	-	1053	804	1517	-	-				
HCM Lane V/C Ratio	0.016	-	-	0.014	0.022	-	-	-				
HCM Ctrl Dly (s/v)	7.3	0	-	8.5	9.6	0	-	-				
HCM Lane LOS	A	A	-	A	A	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-				

Intersection												
Int Delay, s/veh	5.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	0	16	6	0	0	25	14	9	8	0	5
Future Vol, veh/h	3	0	16	6	0	0	25	14	9	8	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	0	17	7	0	0	27	15	10	9	0	5
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	90	99	3	92	97	20	5	0	0	25	0	0
Stage 1	20	20	-	74	74	-	-	-	-	-	-	-
Stage 2	70	79	-	17	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	895	791	1081	892	793	1058	1616	-	-	1589	-	-
Stage 1	999	879	-	935	833	-	-	-	-	-	-	-
Stage 2	940	829	-	1002	876	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	875	773	1081	858	775	1058	1616	-	-	1589	-	-
Mov Cap-2 Maneuver	875	773	-	858	775	-	-	-	-	-	-	-
Stage 1	993	874	-	919	819	-	-	-	-	-	-	-
Stage 2	924	815	-	980	871	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Ctrl Dly, s/v	8.52		9.23		3.78		4.48					
HCM LOS	A		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	869	-	-	1042	858	923	-	-				
HCM Lane V/C Ratio	0.017	-	-	0.02	0.008	0.005	-	-				
HCM Ctrl Dly (s/v)	7.3	0	-	8.5	9.2	7.3	0	-				
HCM Lane LOS	A	A	-	A	A	A	A	-				
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0	0	-	-				

APPENDIX D

Existing Adjacent Residential Development Estimates

ITE CODE LAND USE UNIT			TRIP GENERATION RATES						
			24	AM PEAK HOUR			PM PEAK HOUR		
			HOUR	ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
210	Single-Family Detached Housing	DU	9.09	0.19	0.51	0.70	0.57	0.35	0.92

Key: DU = Dwelling Units.

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

ITE CODE LAND USE SIZE			TOTAL TRIPS GENERATED						
			24	AM PEAK HOUR			PM PEAK HOUR		
			HOUR	ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
210	Single-Family Detached Housing	16 DU	145	3	8	11	9	6	15
<i>Total:</i>			145	3	8	11	9	6	15

Key: DU = Dwelling Units.

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

ITE CODE LAND USE UNIT			TRIP GENERATION RATES						
			24	AM PEAK HOUR			PM PEAK HOUR		
			HOUR	ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
210	Single-Family Detached Housing	DU	9.09	0.19	0.51	0.70	0.57	0.35	0.92

Key: DU = Dwelling Units.

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

ITE CODE LAND USE SIZE DU				TOTAL TRIPS GENERATED					
				24	AM PEAK HOUR			PM PEAK HOUR	
				HOUR	ENTER	EXIT	TOTAL	ENTER	EXIT TOTAL
210	Single-Family Detached Housing	45	DU	409	9	23	32	26	16 42
<i>Total:</i>				409	9	23	32	26	16 42

Key: DU = Dwelling Units.

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

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	0.57	0.35	0.92

Key: DU = Dwelling Units.

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

ITE CODE LAND USE SIZE			TOTAL TRIPS GENERATED						
			24 HOUR	AM PEAK HOUR			PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
210	Single-Family Detached Housing	16 DU	145	3	8	11	9	6	15
<i>Total:</i>			145	3	8	11	9	6	15

Key: DU = Dwelling Units.

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