

EAST HIGHLAND RANCH

TRAFFIC ANALYSIS

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Reference Number	Agency	Date
15974-02 TA Report	City of Highland	January 10, 2025

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LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
CAMUTCD	California Manual on Uniform Traffic Control Devices
Caltrans	California Department of Transportation
CMP	Congestion Management Program
DIF	Development Impact Fee
HCM	Highway Capacity Manual
ITE	Institute of Transportation Engineers
LOS	Level of Service
PHF	Peak Hour Factor
Project	East Highland Ranch
SBCTA	San Bernardino County Transportation Authority
SBTAM	San Bernardino Transportation Analysis Model
TA	Traffic Analysis
vphgpl	Vehicles per Hour Green per Lane

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1 INTRODUCTION

This report presents the results of the Traffic Analysis (TA) for East Highland Ranch (Project), which is located between Santa Ana Canyon Road and Greenspot Road on either side of Alta Vista in the City of Highland, as shown in Exhibit 1-1. The purpose of this TA is to evaluate the potential circulation system deficiencies that may result from the development of the proposed Project and, where necessary, recommend improvements to achieve acceptable operations consistent with General Plan level of service goals and policies. This traffic study has been prepared in accordance with the San Bernardino County Congestion Management Program (CMP) Guidelines for CMP Traffic Impact Analysis Reports (Appendix B, 2016 Update), and consultation with City staff during the traffic study scoping process. (1) The City-approved Project Traffic Study Scoping Agreement is provided in Appendix 1.1 of this TA.

1.1 SUMMARY OF FINDINGS

The Project is to construct the following improvements as design features in conjunction with development of the site:

- Project to install stop controls for egress traffic at Project driveways and construct applicable site adjacent roadway improvements.

Additional details and intersection lane geometrics are provided in Section 1.6 *Recommendations*.

1.2 PROJECT OVERVIEW

The Project consists of the development of 113 single-family residential dwelling units. A preliminary site plan for the proposed Project is shown in Exhibit 1-2. The Project is proposing to develop in a single phase with an anticipated Opening Year of 2027. Access to the proposed Project would be provided onto Santa Ana Canyon Road via Street B and Alta Vista via Street A and Street F. Exhibit 1-3 depicts the location of the proposed Project in relation to the existing roadway network and the study area intersections.

In order to develop the traffic characteristics of the proposed Project, trip-generation statistics published in the Institute of Transportation Engineers (ITE) Trip Generation Manual (11th Edition, 2021) for Single Family Detached Residential (ITE Land Use Code 210) has been utilized. (2) The Project is anticipated to generate a total of 1,066 two-way trips per day with 80 AM peak hour trips and 106 PM peak hour trips. The assumptions and methods used to estimate the Project's trip generation characteristics are discussed in greater detail in Section 4.1 *Project Trip Generation*.

EXHIBIT 1-1 : LOCATION MAP



EXHIBIT 1-2 : PRELIMINARY SITE PLAN

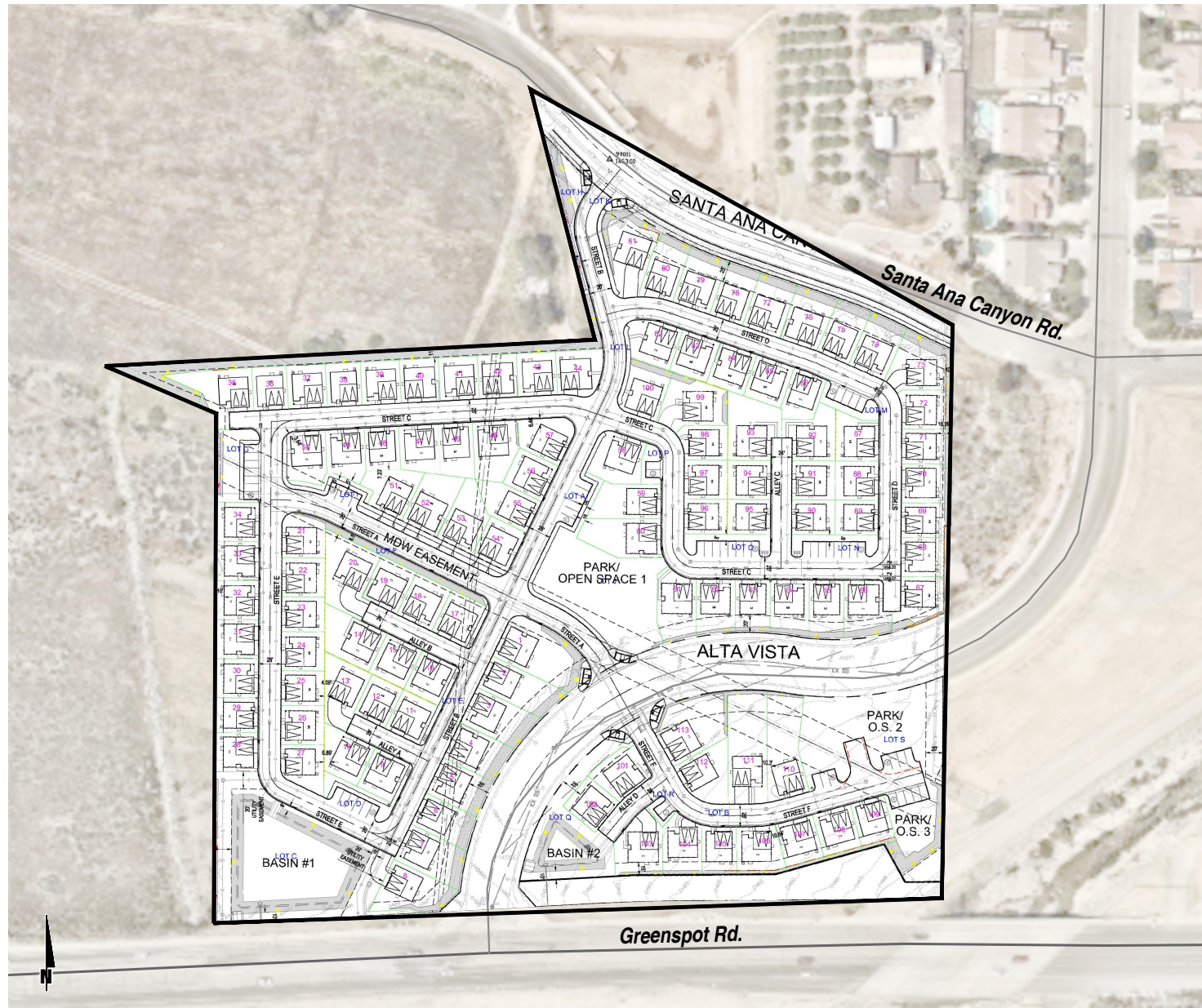
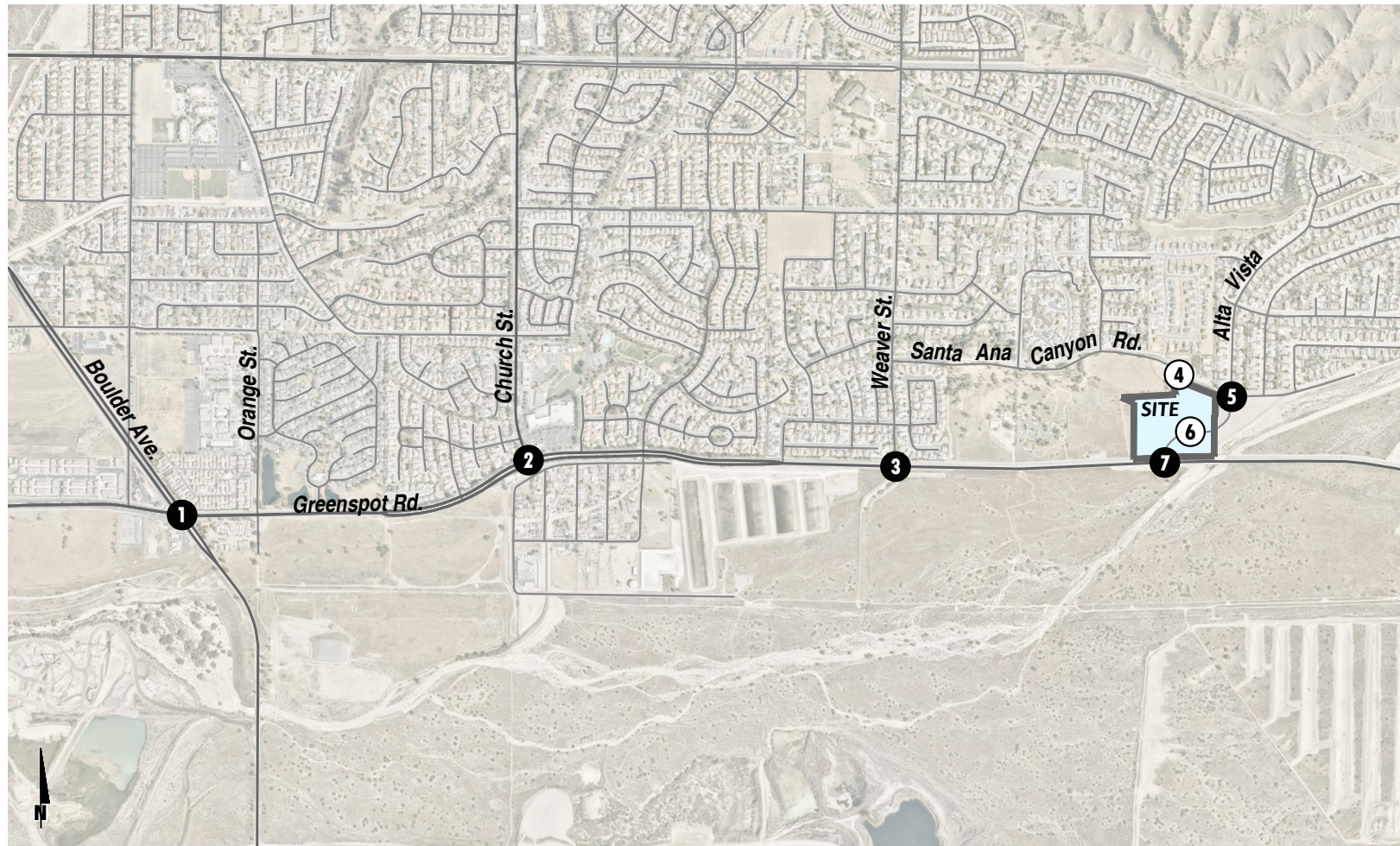


EXHIBIT 1-3 : STUDY AREA



LEGEND:

- ①** = Existing Intersection Analysis Location
- ②** = Future Intersection Analysis Location

1.3 ANALYSIS SCENARIOS

For the purposes of this traffic study, potential deficiencies to intersections and roadways have been assessed for each of the following conditions:

- Existing (2024) Conditions
- Opening Year (2027) Without Project
- Opening Year (2027) With Project
- Cumulative (2050) Without Project
- Cumulative (2050) With Project

1.3.1 EXISTING (2024) CONDITIONS

Information for Existing (2024) conditions is disclosed to represent the baseline traffic conditions as they existed at the time this report was prepared.

1.3.2 OPENING YEAR (2027) CONDITIONS

The Opening Year (2027) traffic conditions analysis determines traffic deficiencies that would occur on the existing roadway system with the addition of ambient growth and the addition of traffic generated by other known or probable related projects. To account for background traffic growth, an ambient growth factor from Existing conditions of 6.12% is included for Opening Year Without traffic conditions (2 percent per year for 3 years). The ambient growth is consistent with the growth used by other projects in the area within the City of Highland and is consistent with the County of San Bernardino traffic study guidelines. The related projects are at least in part already accounted for in the assumed 6.12% of ambient growth, and some of these related projects may not be implemented and operational within the 2027 Opening Year time frame assumed for the Project. The resulting traffic growth utilized in the TA (6.12% ambient growth factor plus traffic generated by related projects) would therefore tend to overstate rather than understate background cumulative traffic deficiencies under 2027 conditions. The Opening Year (2027) With Project traffic conditions analysis includes the Opening Year (2027) Without Project traffic forecasts plus the addition of Project traffic.

1.3.3 CUMULATIVE (2050) CONDITIONS

Traffic projections for Cumulative (2050) traffic conditions were derived from the San Bernardino Transportation Analysis Model (SBTAM) using accepted procedures for model forecast refinement and smoothing. The Cumulative conditions analysis will be utilized to determine if improvements funded through regional transportation mitigation fee programs can accommodate the long-range cumulative traffic at the target Level of Service (LOS) identified in the County of San Bernardino (lead agency) General Plan. Each of the applicable transportation fee programs are discussed in more detail in Section 7 *Local and Regional Funding Mechanisms*.

1.4 STUDY AREA

To ensure that this TA satisfies the City of Highland's traffic study requirements, Urban Crossroads, Inc. prepared a Project traffic study scoping package for review by City of Highland staff prior to the preparation of this report. This agreement provides an outline of the Project study area, trip generation, trip distribution, and analysis methodology. The agreement approved by the City is included in Appendix 1.1..

The 7 study area intersections shown in Exhibit 1-3 and listed in Table 1-1 were selected for evaluation in this TA based on consultation with City of Highland staff. At a minimum, the study area includes intersections where the Project is anticipated to contribute 50 or more peak hour trips per the County's traffic study guidelines. (1) The "50 peak hour trip" criterion represents a minimum number of trips at which a typical intersection would have the potential to be affected by a given development proposal. The 50 peak hour trip criterion is a traffic engineering rule of thumb that is accepted and widely used within San Bernardino County for estimating a potential area of influence (i.e., study area).

TABLE 1-1: INTERSECTION ANALYSIS LOCATIONS

#	Intersection	Jurisdiction	CMP?
1	Boulder Av. & Greenspot Rd.	County of San Bernardino, City of Highland	Yes
2	Church St. & Greenspot Rd.	County of San Bernardino, City of Highland	Yes
3	Weaver St. & Greenspot Rd.	County of San Bernardino, City of Highland	No
4	Street B & Santa Ana Canyon Rd.	County of San Bernardino, City of Highland	No
5	Alta Vista & Santa Ana Canyon Rd.	County of San Bernardino, City of Highland	No
6	Alta Vista & Street A/Street F	County of San Bernardino, City of Highland	No
7	Alta Vista & Greenspot Rd.	County of San Bernardino, City of Highland	Yes

The intent of a CMP is to link land use, transportation, and air quality, thereby prompting reasonable growth management programs that will effectively utilize new transportation funds, alleviate traffic congestion and related deficiencies, and improve air quality. The County of San Bernardino CMP became effective with the passage of Proposition 111 in 1990 and last updated in 2016 with an updated Nexus Study completed in 2023. (1) As shown in Table 1-1, there are 3 intersections identified as San Bernardino County Transportation Authority (SBCTA) CMP intersections.

1.5 DEFICIENCIES

This section provides a summary of deficiencies by analysis scenario. Section 2 *Methodologies* provides information on the methodologies used in the analysis and Section 5 *Opening Year (2027) Traffic Conditions*, Section 6 *Cumulative (2050) Traffic Conditions* includes the detailed analysis. A summary of LOS results for all analysis scenarios is presented in Table 1-2.

TABLE 1-2 : SUMMARY OF LOS

	Existing (2024)			Opening Day (2027) Without Project			Opening Day (2027) With Project			Cumulative (2050) Without Project			Cumulative (2050) With Project		
	AM	MD	PM	AM	MD	PM	AM	MD	PM	AM	MD	PM	AM	MD	PM
1 Boulder Av. & Greenspot Rd.	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
2 Church St. & Greenspot Rd.	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
3 Weaver St. & Greenspot Rd.	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
4 Street B & Santa Ana Canyon Rd.	N/A	N/A	N/A	N/A	N/A	N/A	●	●	●	N/A	N/A	N/A	●	●	●
5 Alta Vista & Santa Ana Canyon Rd.	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
6 Alta Vista & Street A / Street F	N/A	N/A	N/A	N/A	N/A	N/A	●	●	●	N/A	N/A	N/A	●	●	●
7 Alta Vista & Greenspot Rd.	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

LEGEND:

- = A-D
- = E
- = F

1.5.1 EXISTING (2024) CONDITIONS

All of the study area intersections are currently operating at an acceptable LOS during the weekday AM, Mid-Day, and PM peak hours.

1.5.2 OPENING YEAR (2027) CONDITIONS

All of the study area intersections are anticipated to continue to operate at an acceptable LOS during the weekday AM, Mid-Day, and PM peak hours.

1.5.3 CUMULATIVE (2050) CONDITIONS

The following study area intersections are anticipated to operate at an unacceptable LOS under Cumulative (2050) Without Project Traffic Conditions:

- Boulder Av. & Greenspot Rd. (#1) – LOS E Mid-Day and PM peak hours
- Alta Vista & Greenspot Rd. (#7) – LOS F AM peak hour only

The following study area intersections are anticipated to continue to operate at an unacceptable LOS during the peak hours with the addition of Project traffic under Cumulative (2050) With Project traffic conditions:

- Boulder Av. & Greenspot Rd. (#1) – LOS E Mid-Day and PM peak hours
- Alta Vista & Greenspot Rd. (#7) – LOS F AM peak hour; LOS E Mid-Day peak hour

1.6 RECOMMENDATIONS

1.6.1 SITE ADJACENT AND SITE ACCESS RECOMMENDATIONS

The following recommendations are based on the minimum improvements needed to accommodate site access and maintain acceptable peak hour operations for the proposed Project. The site adjacent recommendations are shown in Exhibit 1-4.

Recommendation 1 – Street B & Santa Ana Canyon Road (#4) – The following improvement is necessary to accommodate site access:

- Project to install a stop sign on the northbound approach (Street B).

Recommendation 2 – Alta Vista & Street A/Street F (#6) – The following improvements are necessary to accommodate site access:

- Project to install a stop sign on the eastbound approach (Street A).
- Project to install a stop sign on the westbound approach (Street F).

1.6.2 OFF-SITE RECOMMENDATIONS

The recommended improvements needed to address the cumulative deficiencies identified under Cumulative (2050) traffic conditions are shown in Table 1-3. For those improvements listed in Table 1-3 and not constructed as part of the Project, the Project Applicant's responsibility for the Project's

contributions towards deficient intersections is fulfilled through payment of fees or fair share that would be assigned to construction of the identified recommended improvements. The Project Applicant would be required to pay fair share fees consistent with the City's requirements (see Section 7 *Local and Regional Funding Mechanisms*).

TABLE 1-3: SUMMARY OF IMPROVEMENTS BY ANALYSIS SCENARIO

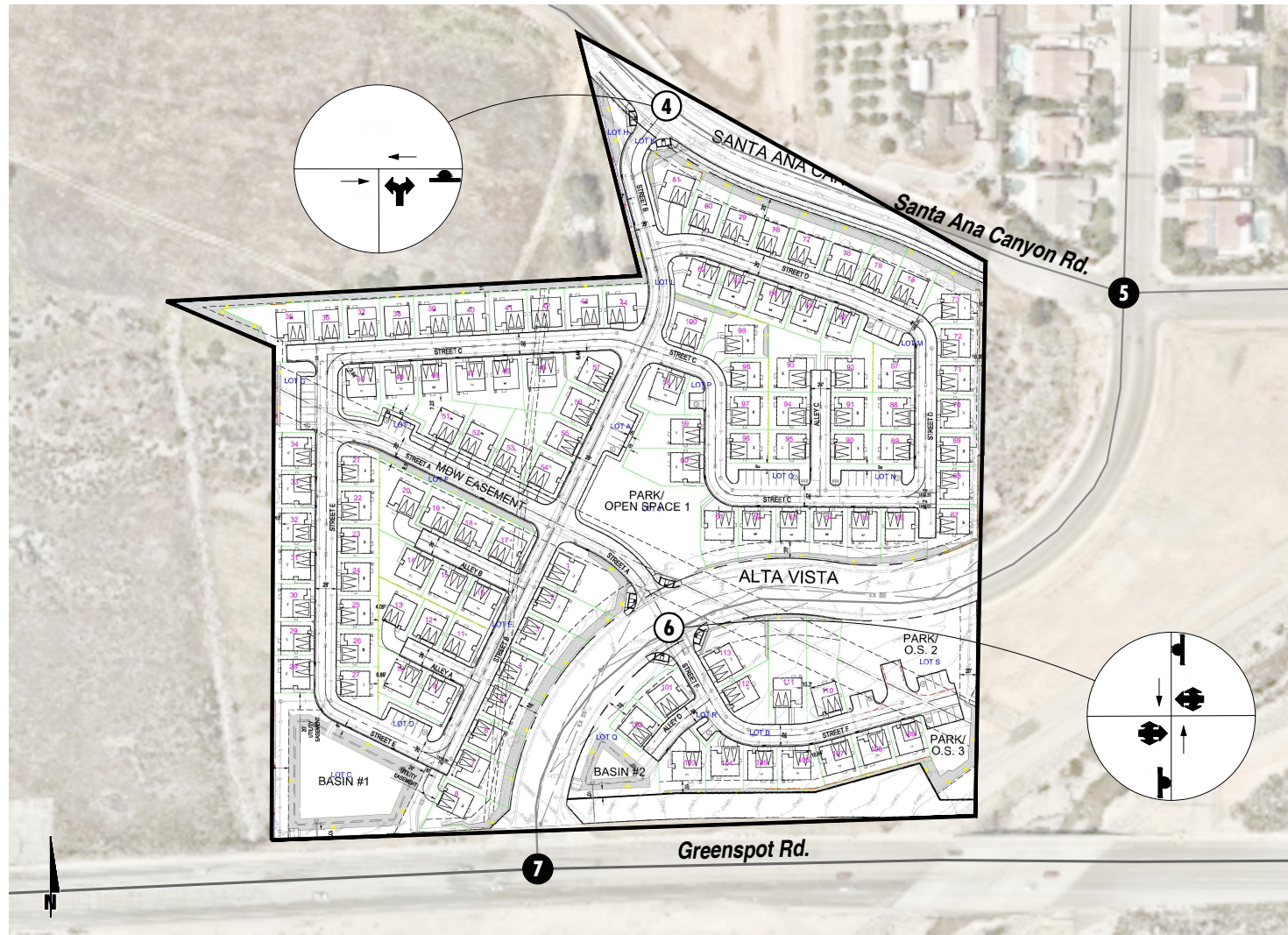
#	Intersection Location	Jurisdiction	Existing (2024)	Opening Year (2027) Without	Analysis Scenario		Fair Share % ¹
					Opening Year (2027) With	Cumulative (2050) Without Project	
1	Boulder Av. & Greenspot Rd.	County of San Bernardino, City of Highland	None	None	None	Add 2nd WB left-turn lane	4.8%
7	Alta Vista & Greenspot Rd.	County of San Bernardino, City of Highland	None	None	None	Install a Traffic Signal	8.1%

¹ See Table 7-1 for Fair Share Calculations

1.6.3 TRAFFIC GAP ASSESSMENT

At the City's request, a traffic gap evaluation has been conducted for southbound left-turning vehicles from Alta Vista to Greenspot Road for the weekday AM, Mid-Day, and PM peak hours. The Project is anticipated to contribute 3 trips to the southbound left turn at Alta Vista and Greenspot Road during the AM peak hour which experiences the highest southbound left-turning volume. The assessment suggests that there is a sufficient number of gaps in the traffic along Greenspot Road to accommodate the anticipated left-turning traffic in the morning peak hour and can therefore adequately accommodate Project traffic.

EXHIBIT 1-4 : SITE ACCESS RECOMMENDATIONS



LEGEND:

- 0** = Existing Intersection Analysis Location
- 0** = Future Intersection Analysis Location
- = Proposed Stop Sign
- = Existing Lane
- = Proposed Lane

2 METHODOLOGIES

This section of the report presents the methodologies used to perform the traffic analyses summarized in this report. The methodologies described are consistent with the City of Highland and the County of San Bernardino's Traffic Study Guidelines.

2.1 LEVEL OF SERVICE

Traffic operations of roadway facilities are described using the term "Level of Service" (LOS). LOS is a qualitative description of traffic flow based on several factors, such as speed, travel time, delay, and freedom to maneuver. Six levels are typically defined ranging from LOS A, representing completely free-flow conditions, to LOS F, representing a breakdown in flow resulting in stop-and-go conditions. LOS E represents operations at or near capacity, an unstable level where vehicles are operating with the minimum spacing for maintaining uniform flow.

2.2 INTERSECTION CAPACITY ANALYSIS

The definitions of LOS for interrupted traffic flow (flow restrained by the existence of traffic signals and other traffic control devices) differ slightly depending on the type of traffic control. The LOS is typically dependent on the quality of traffic flow at the intersections along a roadway. The 7th Edition Highway Capacity Manual (HCM) methodology expresses the LOS at an intersection in terms of delay time for the various intersection approaches. (3) The HCM uses different procedures depending on the type of intersection control.

2.2.1 SIGNALIZED INTERSECTIONS

The City of Highland requires signalized intersection operations analysis based on the methodology described in the HCM. (3) Intersection LOS operations are based on an intersection's average control delay. Control delays include initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. For signalized intersections, LOS is related to the average control delay per vehicle and is correlated to an LOS designation as described in Table 2-1.

The traffic modeling and signal timing optimization software package Synchro (Version 12) has been utilized to analyze signalized intersections. Synchro is a macroscopic traffic software program that is based on the signalized intersection capacity analysis as specified in the HCM. Macroscopic level models represent traffic in terms of aggregate measures for each movement at the study intersections. Equations are used to determine measures of effectiveness such as delay and queue length. The level of service and capacity analysis performed by Synchro takes into consideration optimization and coordination of signalized intersections within a network.

The peak hour traffic volumes have been adjusted using a peak hour factor (PHF) to reflect peak 15-minute volumes. Customary practice for LOS analysis is to use a peak 15-minute rate of flow. However, flow rates are typically expressed in vehicles per hour. The PHF is the relationship between the peak 15-minute flow rate and the full hourly volume (e.g., $PHF = [Hourly Volume] / [4 \times Peak\ 15\text{-minute Flow Rate}]$). The use of a 15-minute PHF produces a more detailed analysis as compared to analyzing vehicles per hour. Existing PHFs have been used for all analysis scenarios. Per the HCM, PHF values over 0.95 often are indicative of high traffic volumes with capacity constraints on peak hour flows while lower PHF values are indicative of greater variability of flow during the peak hour. (3)

TABLE 2-1: SIGNALIZED INTERSECTION LOS THRESHOLDS

Description	Average Control Delay (Seconds), $V/C \leq 1.0$	Level of Service, $V/C \leq 1.0^1$
Operations with very low delay occurring with favorable progression and/or short cycle length.	0 to 10.00	A
Operations with low delay occurring with good progression and/or short cycle lengths.	10.01 to 20.00	B
Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.01 to 35.00	C
Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	35.01 to 55.00	D
Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	55.01 to 80.00	E
Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths.	80.01 and up	F

Source: HCM, 7th Edition

¹ If V/C is greater than 1.0 then LOS is F per HCM.

Consistent with Appendix B of the San Bernardino County CMP, the following saturation flow rates, in vehicles per hour green per lane (vphgpl), will be utilized in the traffic analysis for signalized intersections:

Near-Term Traffic Conditions:

- Exclusive through: 1800 vphgpl
- Exclusive left: 1700 vphgpl
- Exclusive right: 1800 vphgpl
- Exclusive dual left: 1600 vphgpl
- Exclusive triple left: 1500 vphgpl

Cumulative (2050) Traffic Conditions:

- Exclusive through: 1900 vphgpl
- Exclusive left: 1800 vphgpl
- Exclusive right: 1900 vphgpl
- Exclusive dual left: 1700 vphgpl
- Exclusive triple left: 1600 vphgpl

2.2.2 UNSIGNALIZED INTERSECTIONS

The City of Highland requires the operations of unsignalized intersections to be evaluated using the methodology described in the HCM. (3) The LOS rating is based on the weighted average control delay expressed in seconds per vehicle (see Table 2-2). At two-way or side-street stop-controlled intersections, LOS is calculated for each controlled movement and for the left turn movement from the major street, as well as for the intersection as a whole. For approaches composed of a single lane, the delay is computed as the average of all movements in that lane. Delay for the intersection is reported for the worst individual movement at a two-way stop-controlled intersection. For all-way stop controlled intersections, LOS is computed for the intersection as a whole (average delay).

TABLE 2-2: UNSIGNALIZED INTERSECTION LOS THRESHOLDS

Description	Average Control Delay (Seconds), $V/C \leq 1.0$	Level of Service, $V/C \leq 1.0$ ¹
Little or no delays.	0 to 10.00	A
Short traffic delays.	10.01 to 15.00	B
Average traffic delays.	15.01 to 25.00	C
Long traffic delays.	25.01 to 35.00	D
Very long traffic delays.	35.01 to 50.00	E
Extreme traffic delays with intersection capacity exceeded.	> 50.00	F

Source: HCM, 7th Edition

¹ If V/C is greater than 1.0 then LOS is F per HCM.

2.3 TRAFFIC SIGNAL WARRANT ANALYSIS METHODOLOGY

The term “signal warrants” refers to the list of established criteria used by Caltrans and other public agencies to quantitatively justify or determine the potential need for installation of a traffic signal at an otherwise unsignalized intersection. This TA uses the signal warrant criteria presented in the latest edition of the Caltrans California Manual on Uniform Traffic Control Devices (CA MUTCD). (4)

The signal warrant criteria for Existing study area intersections are based upon several factors, including volume of vehicular and pedestrian traffic, frequency of accidents, and location of school areas. The CA MUTCD indicates that the installation of a traffic signal should be considered if one or more of the signal warrants are met. (4) Specifically, this TA utilizes the Peak Hour Volume-based Warrant 3 as the appropriate representative traffic signal warrant analysis for existing traffic conditions and for all future analysis scenarios for existing unsignalized intersections. Warrant 3 is appropriate to use for this TA because it provides specialized warrant criteria for intersections with rural characteristics. For the purposes of this study, the speed limit was the basis for determining whether Urban or Rural warrants were used for a given intersection. Urban warrants have been used where posted speed limits on the major roadways with unsignalized intersections are 40 miles per hour or below and rural warrants have been used where speeds exceed 40 miles per hour.

Future intersections that do not currently exist have been assessed regarding the potential need for new traffic signals based on future average daily traffic (ADT) volumes, using the Caltrans planning level ADT-based signal warrant analysis worksheets. Similarly, the speed limit has been used as the

basis for determining the use of Urban and Rural warrants. Traffic signal warrant analyses were performed for the following study area intersections shown in Table 2-3.

TABLE 2-3: TRAFFIC SIGNAL WARRANT ANALYSIS LOCATIONS

#	Intersection
4	Street B & Santa Ana Canyon Rd.
5	Alta Vista & Santa Ana Canyon Rd.
6	Alta Vista & Street A/Street F
7	Alta Vista & Greenspot Rd.

The Existing conditions traffic signal warrant analysis is presented in the subsequent section, Section 3 *Area Conditions*. The traffic signal warrant analyses for future conditions are presented in Section 5 *Opening Year (2027) Traffic Conditions*, and Section 6 *Cumulative (2050) Traffic Conditions*. It is important to note that a signal warrant defines the minimum condition under which the installation of a traffic signal might be warranted. Meeting this threshold condition does not require that a traffic control signal be installed at a particular location but rather that other traffic factors and conditions be evaluated in order to determine whether the signal is truly justified. It should also be noted that signal warrants do not necessarily correlate with LOS. An intersection may satisfy a signal warrant condition and operate at or above acceptable LOS or operate below acceptable LOS and not meet a signal warrant.

2.4 MINIMUM ACCEPTABLE LEVELS OF SERVICE (LOS)

Minimum Acceptable LOS and associated definitions of intersection deficiencies has been obtained from applicable surrounding jurisdictions.

2.4.1 CITY OF HIGHLAND

According to the City of Highland General Plan Circulation Element, LOS D is the minimum acceptable condition that should be maintained during the peak commute hours. Therefore, any intersection operating at LOS E or F is considered deficient/unsatisfactory.

2.4.2 CMP

The CMP definition of deficiency is based on maintaining a level of service standard of LOS E or better, where feasible, except where an existing LOS F condition is identified in the CMP document. (1)

2.5 DEFICIENCY CRITERIA

This section outlines the methodology used in this analysis to identify circulation system deficiencies. The following deficiency criteria has been utilized for the City of Highland. To determine whether the addition of Project-related traffic at a study intersection would result in a deficiency, the following will be utilized:

- Intersection critical movements shall be maintained at LOS D or better.

2.6 PROJECT FAIR SHARE CALCULATION METHODOLOGY

Improvements found to be included in the City's DIF will be identified as such. For improvements that do not appear to be in either of the pre-existing fee programs, a fair share contribution based on the Project's proportional share may be imposed in order to address the Project's share of deficiencies in lieu of construction. It should be noted that fair share calculations are for informational purposes only and the City Traffic Engineer will determine the appropriate improvements to be implemented by a project (to be identified in the conditions of approval). The Project's fair share contribution is determined based on the following equation, which is the ratio of Project traffic to net new traffic (where net new traffic is the future traffic less existing traffic):

$$\text{Project Fair Share \%} = \text{Project Buildout Traffic} / (\text{Cumulative (2050) With Project Traffic} - \text{Existing Traffic})$$

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3 AREA CONDITIONS

This section provides a summary of the existing circulation network, the City of Highland General Plan Circulation Network, and a review of existing peak hour intersection operations and traffic signal warrant analyses.

3.1 EXISTING CIRCULATION NETWORK

Pursuant to the agreement with City of Highland staff (Appendix 1.1), the study area includes a total of 7 existing and future intersections as shown previously in Exhibit 1-3. Exhibit 3-1 illustrates the study area intersections located near the proposed Project and identifies the number of through traffic lanes for existing roadways and intersection traffic controls.

3.2 GENERAL PLAN CIRCULATION ELEMENT

As noted previously, the Project site is located within the City of Highland. The roadway classifications and planned (ultimate) roadway cross-sections of the major roadways within the study area, as identified on the City of Highland General Plan Circulation Element, are described subsequently. Exhibit 3-2 shows the City of Highland General Plan Circulation Element and Exhibit 3-3 illustrates the City of Highland General Plan Roadway Cross-Sections.

A Modified Primary Arterial is identified as having a 135-foot right-of-way and 98-foot curb-to-curb measurement. Modified Primary Arterials include two lanes of travel in each direction and a 18.5-foot curbed and/or landscaped median. The following study area roadway within the City of Highland is classified as a Modified Primary Arterial:

- Boulder Avenue

A Major Highway is identified as having a 104-foot right-of-way and 80-foot curb-to-curb measurement. Major Highways include two lanes of travel in each direction and a 19-foot curbed and/or landscaped median. The following study area roadway within the City of Highland is classified as a Major Highway:

- Greenspot Road

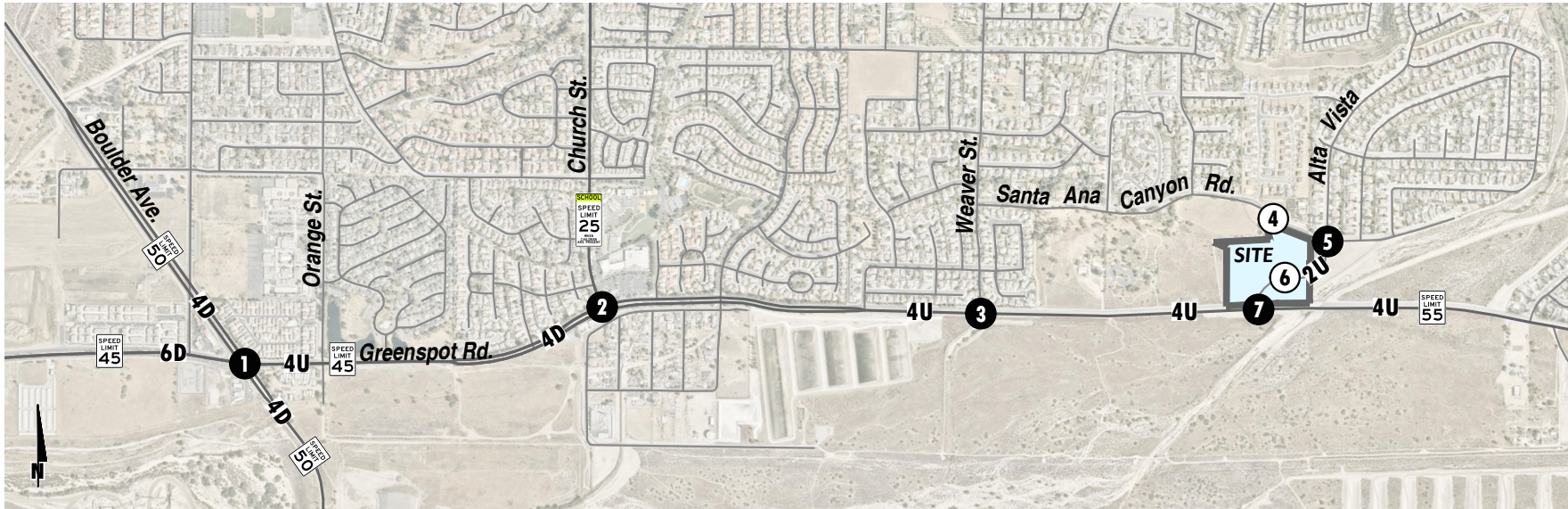
A Secondary Highway is identified as having an 88-foot right-of-way and 64-foot curb-to-curb measurement. Secondary Highways include two lanes of travel. The following study area roadway within the City of Highland is classified as a Secondary Highway:

- Church Street

A Collector is identified as having a 66-foot right-of-way and 44-foot curb-to-curb measurement. Collectors include two lanes of travel (one in each direction). The following study area roadways within the City of Highland are classified as a Collector:

- Weaver Street
- Alta Vista
- Santa Ana Canyon Road

EXHIBIT 3-1 : EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS



LEGEND:

- 1** = Existing Intersection Analysis Location

0 = Future Intersection Analysis Location
-  = Existing Stop Sign

 = Existing Lane

YIELD = Existing Yield Sign
- 6** = Number of Lanes

U/D = Undivided / Divided

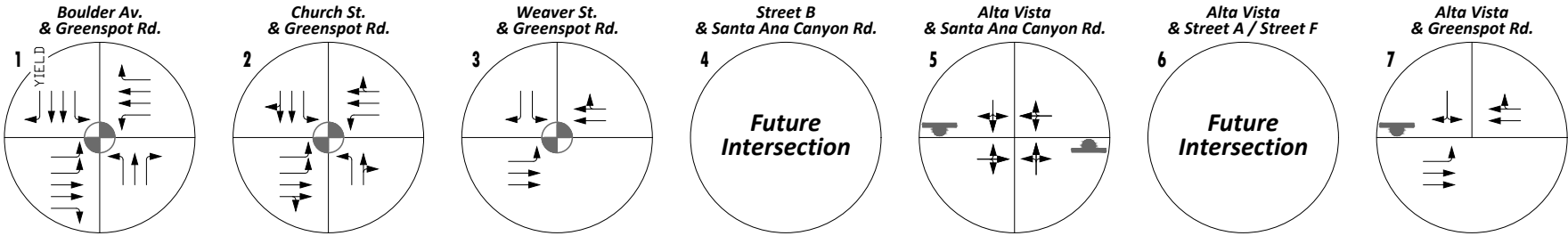
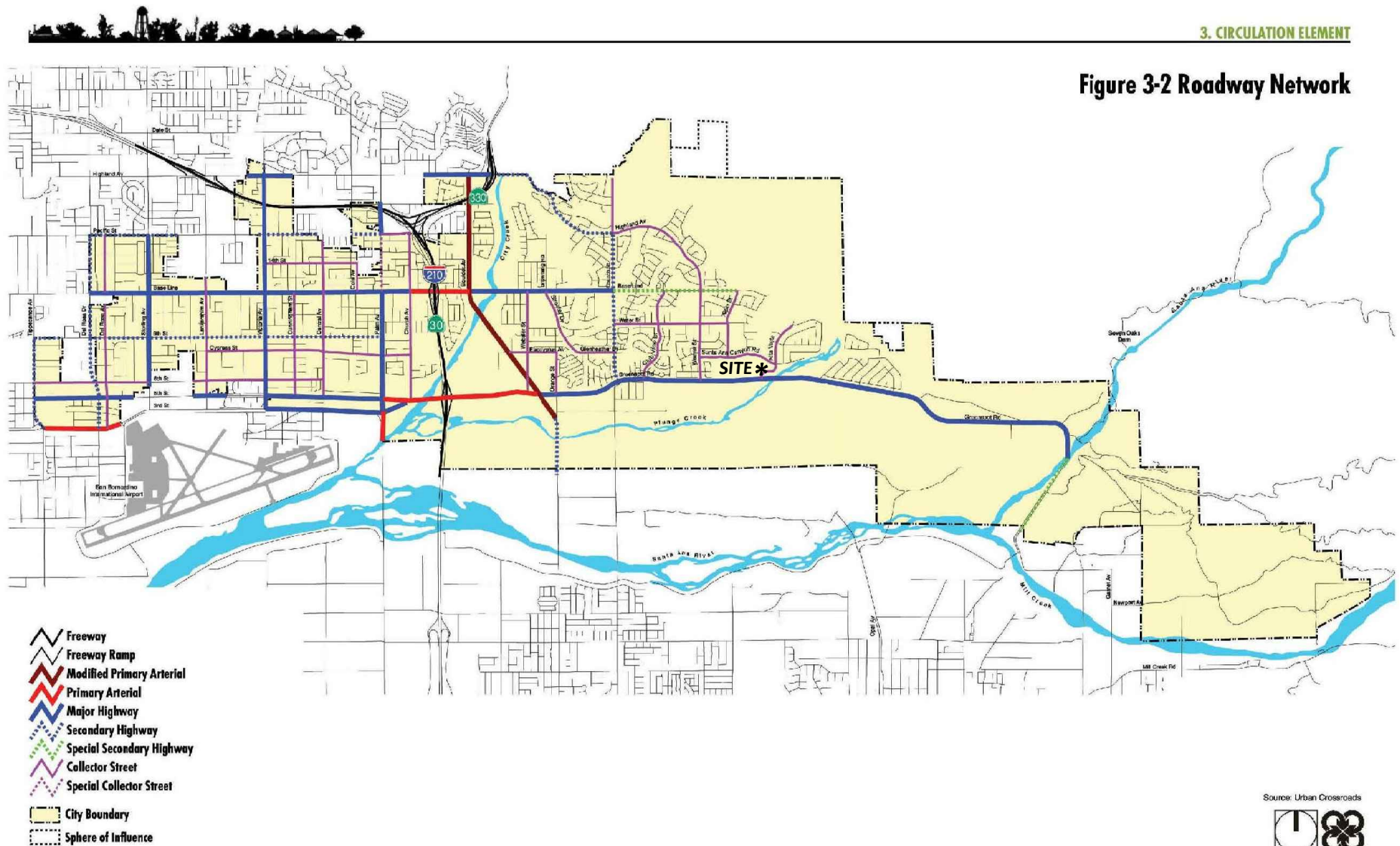


EXHIBIT 3-2 : CITY OF HIGHLAND GENERAL PLAN ROADWAY NETWORK

3. CIRCULATION ELEMENT

Figure 3-2 Roadway Network



City of Highland General Plan

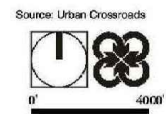
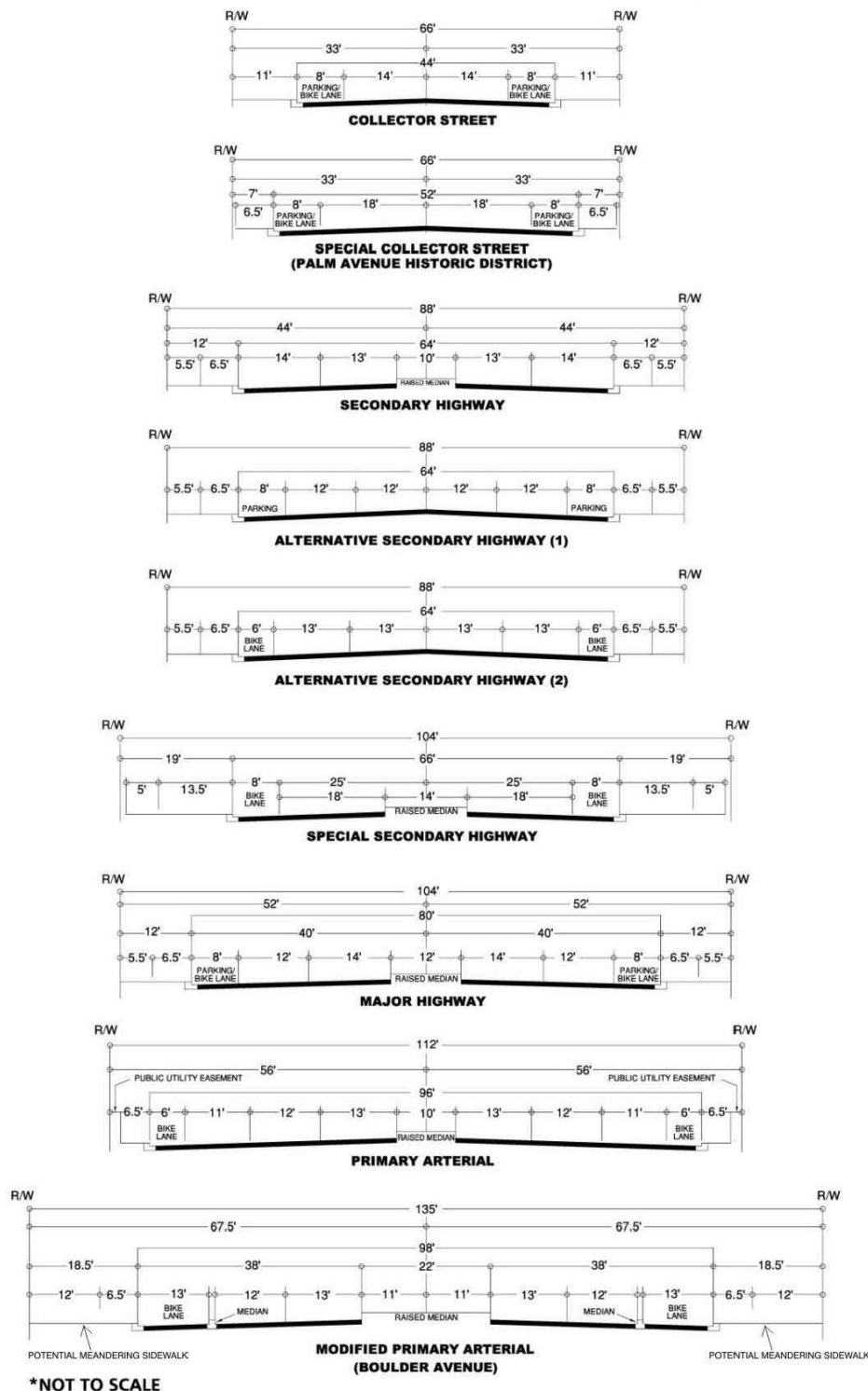


EXHIBIT 3-3 : CITY OF HIGHLAND GENERAL PLAN ROADWAY CROSS-SECTIONS



3. CIRCULATION ELEMENT

Figure 3-1 Roadway Cross-Sections



3.3 BICYCLE & PEDESTRIAN FACILITIES

Exhibit 3-4 illustrates the City of Highland bicycle facilities. Church Street is identified as a bicycle route within the City of Highland General Plan. Existing pedestrian facilities within the study area are shown in Exhibit 3-5. Field observations and traffic counts conducted in May 2024 indicate light pedestrian and bicycle activity within the study area.

3.4 TRANSIT SERVICE

The study area within the City of Highland is currently served by Omnitrans, a public transit agency serving various jurisdictions within San Bernardino County. Based on a review of the existing transit routes within the vicinity of the proposed Project, Route 15 currently runs along Greenspot Road. Transit service is reviewed and updated by Omnitrans periodically to address ridership, budget and community demand needs. Changes in land use can affect these periodic adjustments which may lead to either enhanced or reduced service where appropriate. As such, it is recommended that the applicant work in conjunction with Omnitrans to potentially provide bus service to the site. Existing transit routes in the vicinity of the study area are illustrated in Exhibit 3-6.

3.5 EXISTING (2024) TRAFFIC COUNTS

The intersection LOS analysis is based on the traffic volumes observed during the peak hour conditions using traffic count data collected in May 2024. The following peak hours were selected for analysis:

- Weekday AM Peak Hour (peak hour between 7:00 AM and 9:00 AM)
- Weekday Mid-Day Peak Hour (peak hour between 1:30 PM and 3:30 PM)
- Weekday PM Peak Hour (peak hour between 4:00 PM and 6:00 PM)

The 2024 weekday AM, weekday Mid-Day, and weekday PM peak hour count data is representative of typical weekday peak hour traffic conditions in the study area. There were no observations made in the field that would indicate atypical traffic conditions on the count dates, such as construction activity or detour routes and near-by schools were in session and operating on normal schedules. As such, no additional adjustments were made to the traffic counts to establish the baseline condition. The raw manual peak hour turning movement traffic count data sheets are included in Appendix 3.1.

EXHIBIT 3-4 : CITY OF HIGHLAND BICYCLE FACILITIES

3. CIRCULATION ELEMENT

Figure 3-5 Bikeways

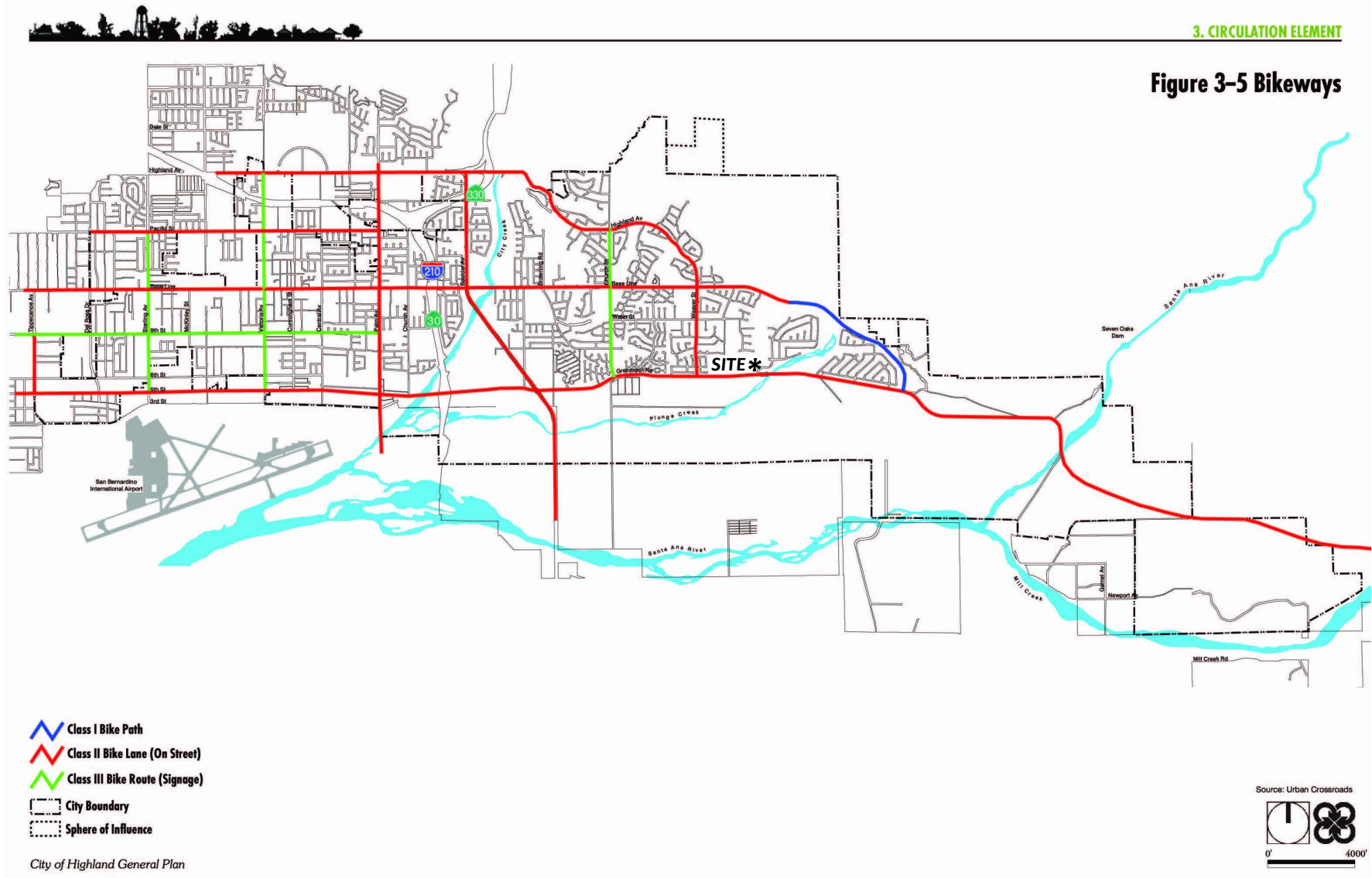


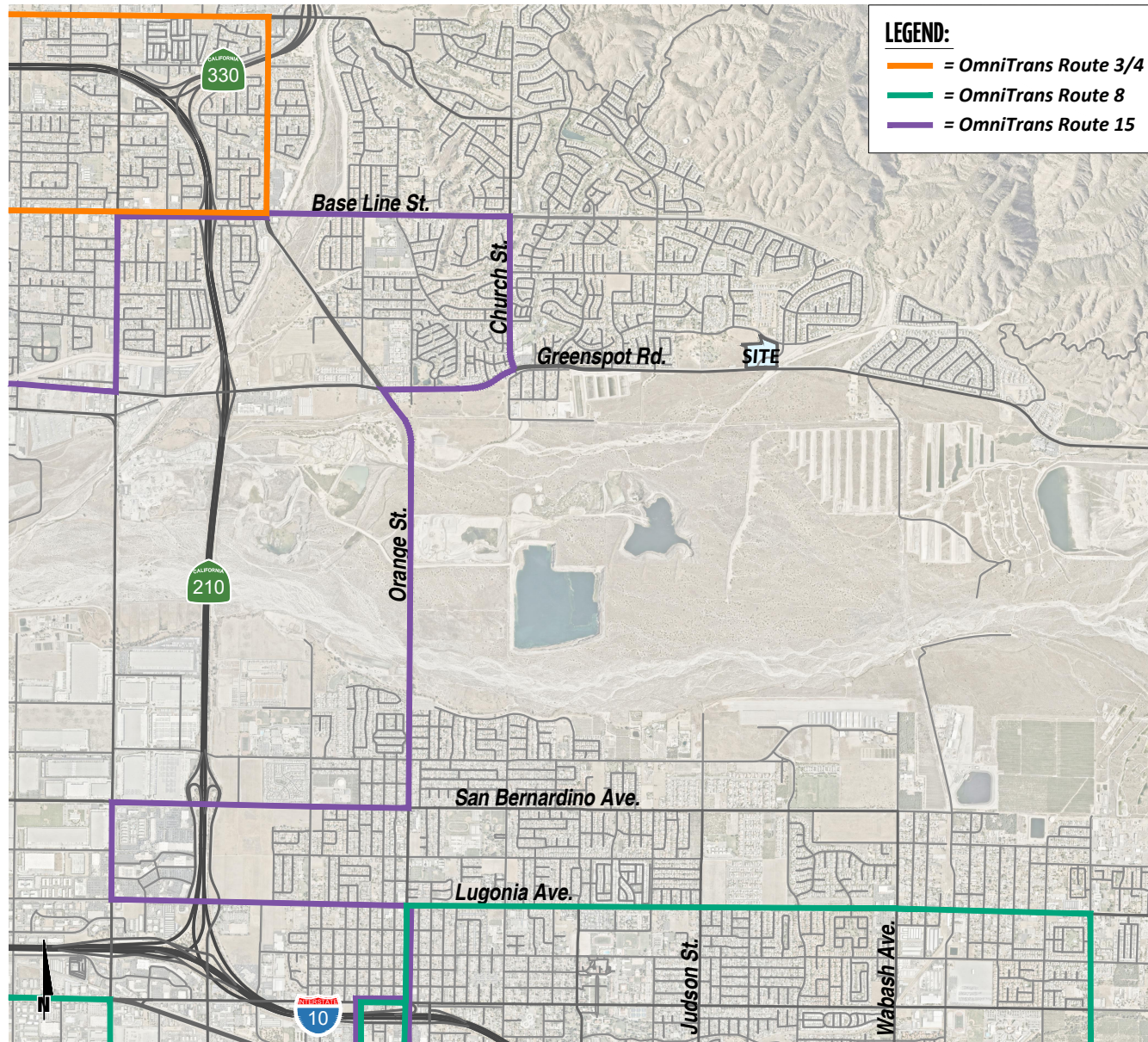
EXHIBIT 3-5 : EXISTING PEDESTRIAN FACILITIES



LEGEND:

- ◆ = 1 Approach
- ◆ = 2 Approaches
- ◆ = 3 Approaches
- ◆ = All Approaches
- = Sidewalks

EXHIBIT 3-6 : EXISTING TRANSIT ROUTES



Existing weekday ADT volumes are shown in Exhibit 3-7 for actual vehicles. Where actual 24-hour tube count data was not available, Existing ADT volumes were based upon factored intersection peak hour counts collected by Urban Crossroads, Inc. using the following formula for each intersection leg:

$$\text{Weekday PM Peak Hour (Approach Volume + Exit Volume)} \times 12.01 = \text{Leg Volume}$$

A comparison of the PM peak hour and daily traffic volumes of various roadway segments within the study area indicated that the peak-to-daily relationship is approximately 8.32 percent. As such, the above equation utilizing a factor of 12.01 estimates the ADT volumes on the study area roadway segments assuming a peak-to-daily relationship of approximately 12.01 percent (i.e., $1/0.0832 = 12.01$) and was assumed to sufficiently estimate ADT volumes for planning-level analyses. Existing weekday peak hour intersection volumes are also shown in Exhibit 3-7.

3.6 INTERSECTION OPERATIONS ANALYSIS

Existing peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2.2 *Intersection Capacity Analysis*. The intersection operations analysis results are summarized in Table 3-1, which indicates that all existing study area intersections are currently operating at acceptable LOS during the peak hours. The intersection operations analysis worksheets are included in Appendix 3.2.

TABLE 3-1: INTERSECTION ANALYSIS FOR EXISTING (2024) CONDITIONS

# Intersection	Traffic Control ²	Delay ¹ (secs.)			Level of Service		
		AM	MD	PM	AM	MD	PM
1 Boulder Av. & Greenspot Rd.	TS	23.3	25.1	27.3	C	C	C
2 Church St. & Greenspot Rd.	TS	15.3	13.1	13.3	B	B	B
3 Weaver St. & Greenspot Rd.	TS	7.1	5.3	5.5	A	A	A
4 Street B & Santa Ana Canyon Rd.	--	Future Intersection					
5 Alta Vista & Santa Ana Canyon Rd.	CSS	13.6	10.3	10.3	B	B	B
6 Alta Vista & Street A/Street F	--	Future Intersection					
7 Alta Vista & Greenspot Rd.	CSS	16.5	11.5	11.1	C	B	B

¹ Per the Highway Capacity Manual (7th Edition), overall average intersection Delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown. HCM delay reported in seconds.

² TS = Traffic Signal; CSS = Cross-street Stop

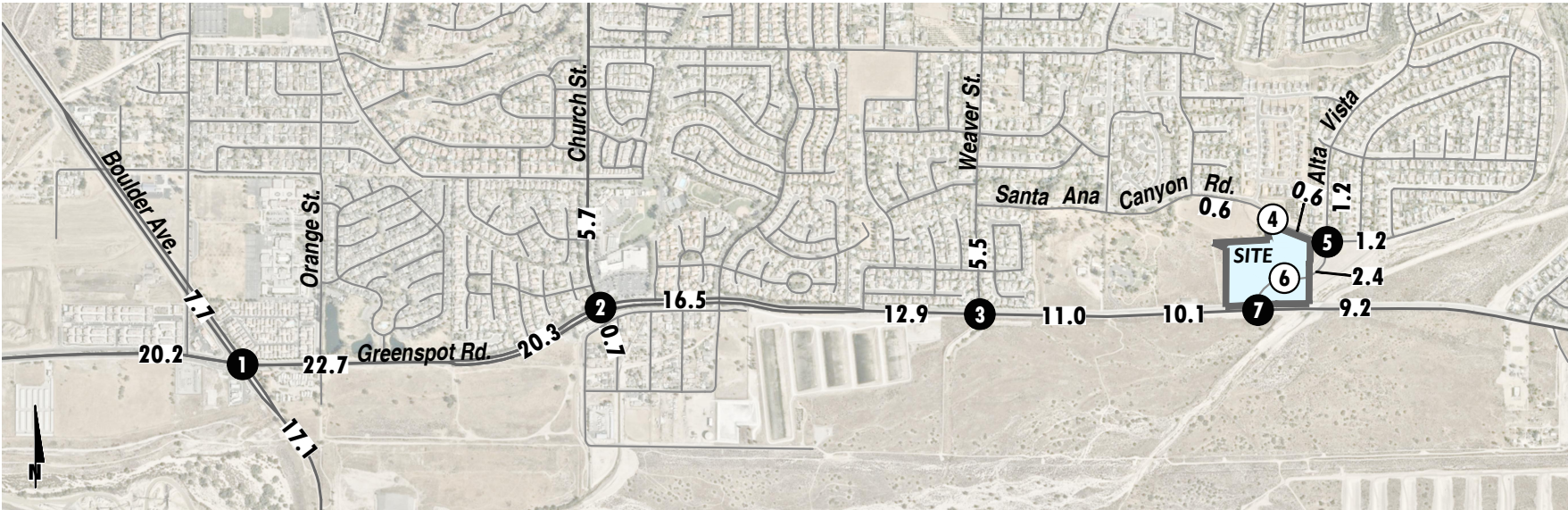
3.7 TRAFFIC SIGNAL WARRANTS ANALYSIS

Traffic signal warrants for Existing traffic conditions are based on existing peak hour intersection turning volumes. The following unsignalized study area intersection currently meets a peak hour traffic signal under Existing traffic conditions:

- Alta Vista & Greenspot Rd. (#7)

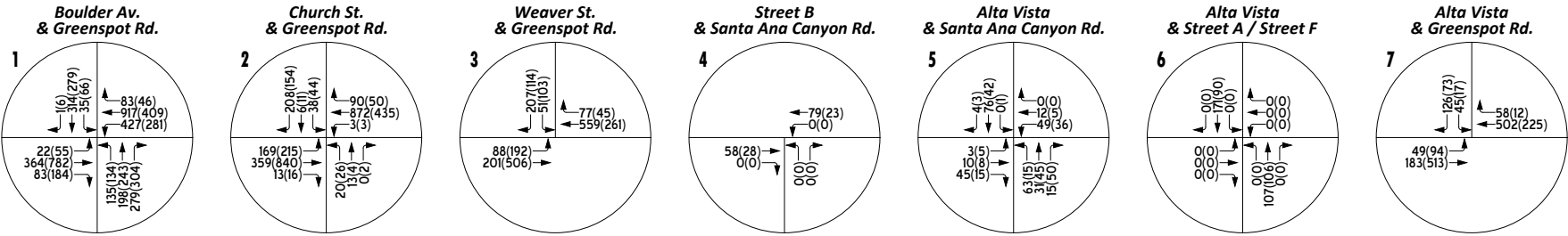
Existing conditions traffic signal warrant analysis worksheets are provided in Appendix 3.3.

EXHIBIT 3-7 : EXISTING (2024) TRAFFIC VOLUMES



LEGEND:

- = Existing Intersection Analysis Location
- = Future Intersection Analysis Location
- 00(00) = Peak Hour Volume AM(PM)
- 00 = Average Daily Traffic (ADT) In Thousands



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4 PROJECTED FUTURE TRAFFIC

This section presents the traffic volumes estimated to be generated by the Project, as well as the Project's trip assignment onto the study area roadway network. A preliminary site plan for the proposed Project is shown previously in Exhibit 1-2. The Project consists of the development of 113 single-family residential dwelling units. Access to the proposed Project would be provided onto Santa Ana Canyon Road via Street B and Alta Vista via Street A and Street F. The Project is anticipated to have an Opening Year of 2027.

4.1 PROJECT TRIP GENERATION

Trip generation represents the amount of traffic which is both attracted to and produced by a development. Determining traffic generation for a specific project is therefore based upon forecasting the amount of traffic that is expected to be both attracted to and produced by the specific land uses being proposed for a given development. The proposed Project trip generation will be based upon the trip-generation statistics published in the ITE Trip Generation Manual (11th Edition, 2021) for Single Family Detached Residential use (see also Table 4-1). (2)

Trip generation for the proposed Project are summarized in Table 4-1. As shown in Table 4-1, the proposed Project is anticipated to generate a total of 1,066 two-way trip-ends per day with 80 AM peak hour trips and 106 PM peak hour trips.

TABLE 4-1: TRIP GENERATION SUMMARY

Land Use ¹	Units ²	ITE LU Code	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Single Family Detached Residential	DU	210	0.18	0.52	0.70	0.59	0.35	0.94	9.43

¹ Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, 11th Edition (2021).

² DU = dwelling units

Land Use	Quantity Units ¹	AM Peak Hour			PM Peak Hour			Daily
		In	Out	Total	In	Out	Total	
Single Family Detached	113 DU	21	59	80	67	39	106	1,066

¹ DU = dwelling units

4.2 PROJECT TRIP DISTRIBUTION

The Project trip distribution represents the directional orientation of traffic to and from the Project site. The trip distribution pattern is heavily influenced by the geographical location of the site, the location of surrounding uses, and the proximity to the regional freeway system. The proposed Project trip distribution patterns are shown in Exhibit 4-1.

4.3 MODAL SPLIT

The potential for Project trips to be reduced by the use of public transit, walking or bicycling have not been included as part of the Project's estimated trip generation. Essentially, the Project's traffic

projections are “conservative” in that these alternative travel modes would reduce the forecasted traffic volumes.

4.4 PROJECT TRIP ASSIGNMENT

The assignment of traffic from the Project area to the adjoining roadway system is based upon the Project trip generation, trip distribution, and the arterial highway and local street system improvements that would be in place by the time of initial occupancy of the Project. Based on the identified Project traffic generation and trip distribution patterns, Project weekday ADT and weekday peak hour intersection turning movement volumes are shown in Exhibit 4-2.

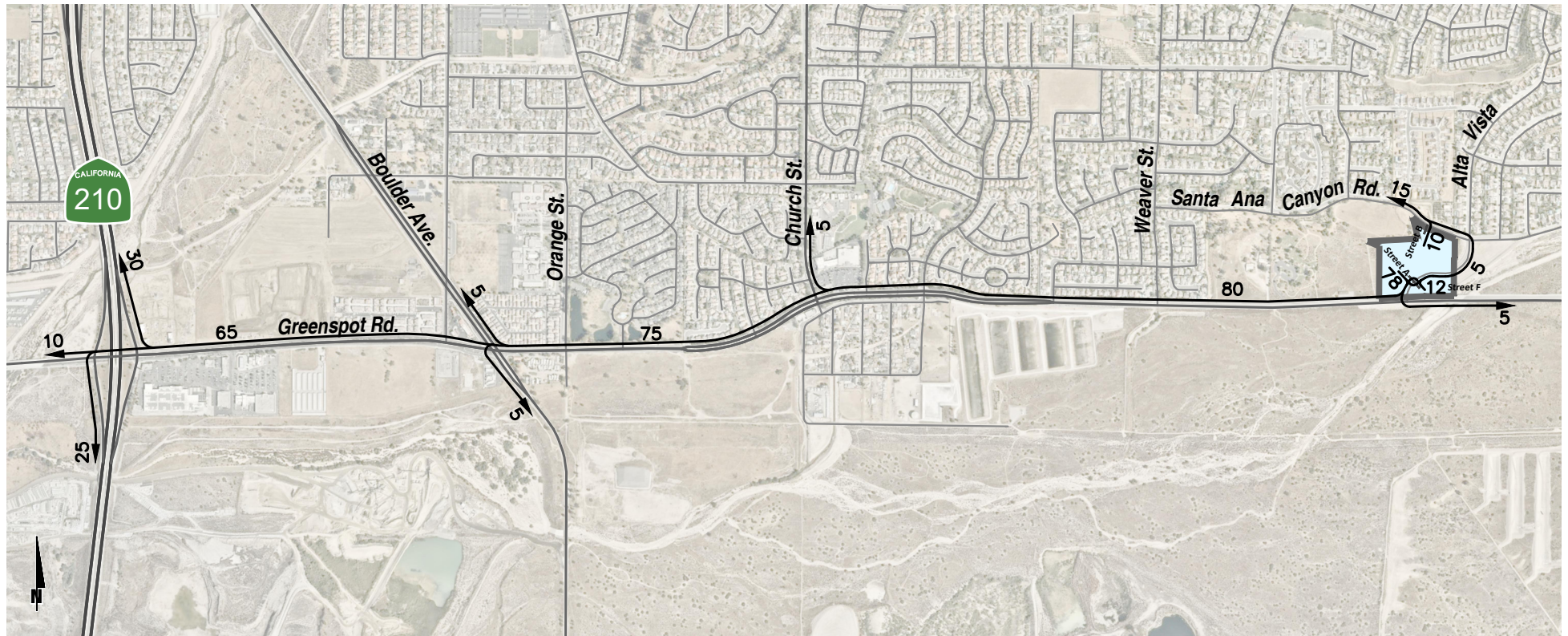
4.5 BACKGROUND TRAFFIC

Future year traffic forecasts have been based upon background (ambient) growth at 2% per year for 2027 traffic conditions. The total ambient growth is 6.12% for 2024 traffic conditions. The ambient growth factor is intended to approximate regional traffic growth. This ambient growth rate is added to existing traffic volumes to account for area-wide growth not reflected by cumulative development projects. Ambient growth has been added to daily and peak hour traffic volumes on surrounding roadways, in conjunction with traffic generated by the development of future projects that have been approved but not yet built and/or for which development applications have been filed and are under consideration by governing agencies. Opening Year (2027) traffic volumes are provided in Section 5. The traffic generated by the proposed Project was then manually added to the base volume to determine Opening Year with Project forecasts.

4.6 CUMULATIVE DEVELOPMENT TRAFFIC

A cumulative project list was developed for the purposes of this analysis through consultation with planning and engineering staff from the City of Highland, City of Redlands, and City of San Bernardino. The cumulative projects listed are those that would generate traffic and would contribute traffic to study area intersections. Exhibit 4-3 illustrates the cumulative development location map. A summary of cumulative development projects and their proposed land uses are shown in Table 4-2. If applicable, the traffic generated by individual cumulative projects was manually added to the Opening Year forecasts to ensure that traffic generated by the listed cumulative development projects in Table 4-2 are reflected as part of the background traffic. Cumulative ADT and peak hour intersection turning movement volumes, in actual vehicles, are shown in Exhibit 4-4.

EXHIBIT 4-1 : PROJECT TRIP DISTRIBUTION

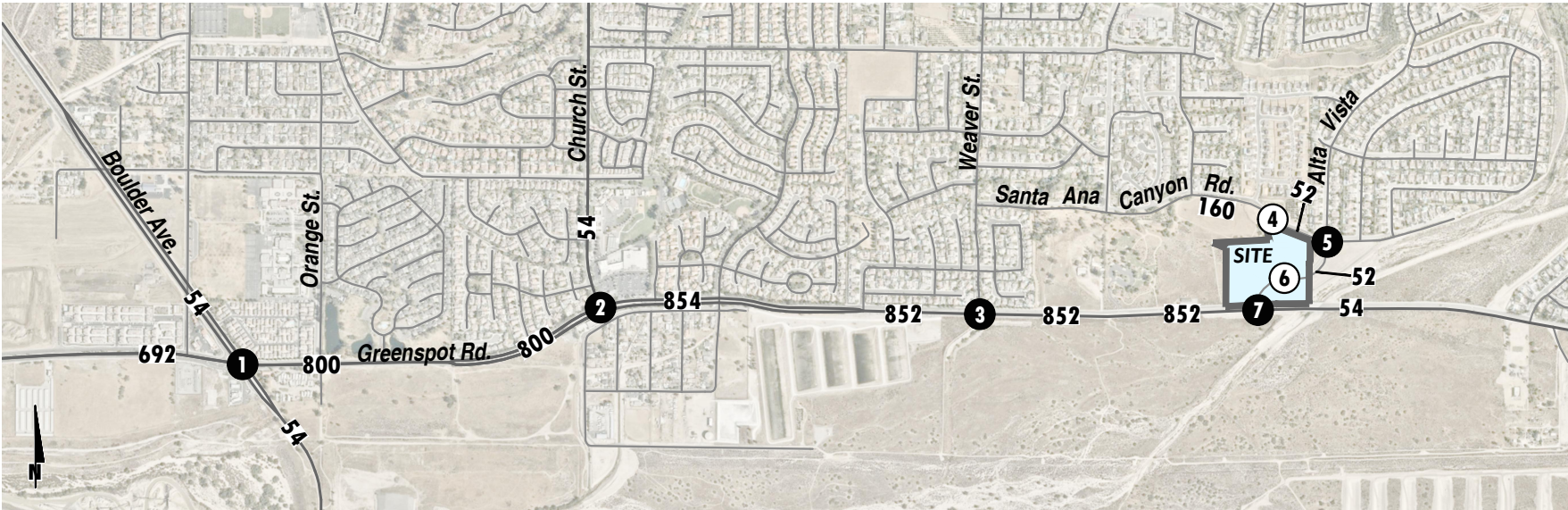


LEGEND:

10 = Percent To/From Project

→ = Trip Distribution

EXHIBIT 4-2 : PROJECT ONLY TRAFFIC VOLUMES



LEGEND:

- 1 = Existing Intersection Analysis Location
- 2 = Future Intersection Analysis Location
- 00(00) = Peak Hour Volume AM(PM)
- 00 = Average Daily Traffic (ADT)

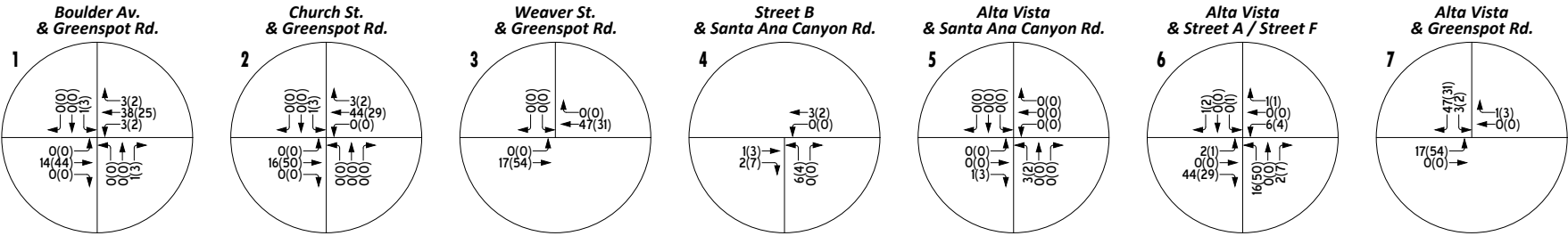


EXHIBIT 4-3 : CUMULATIVE DEVELOPMENT LOCATION MAP

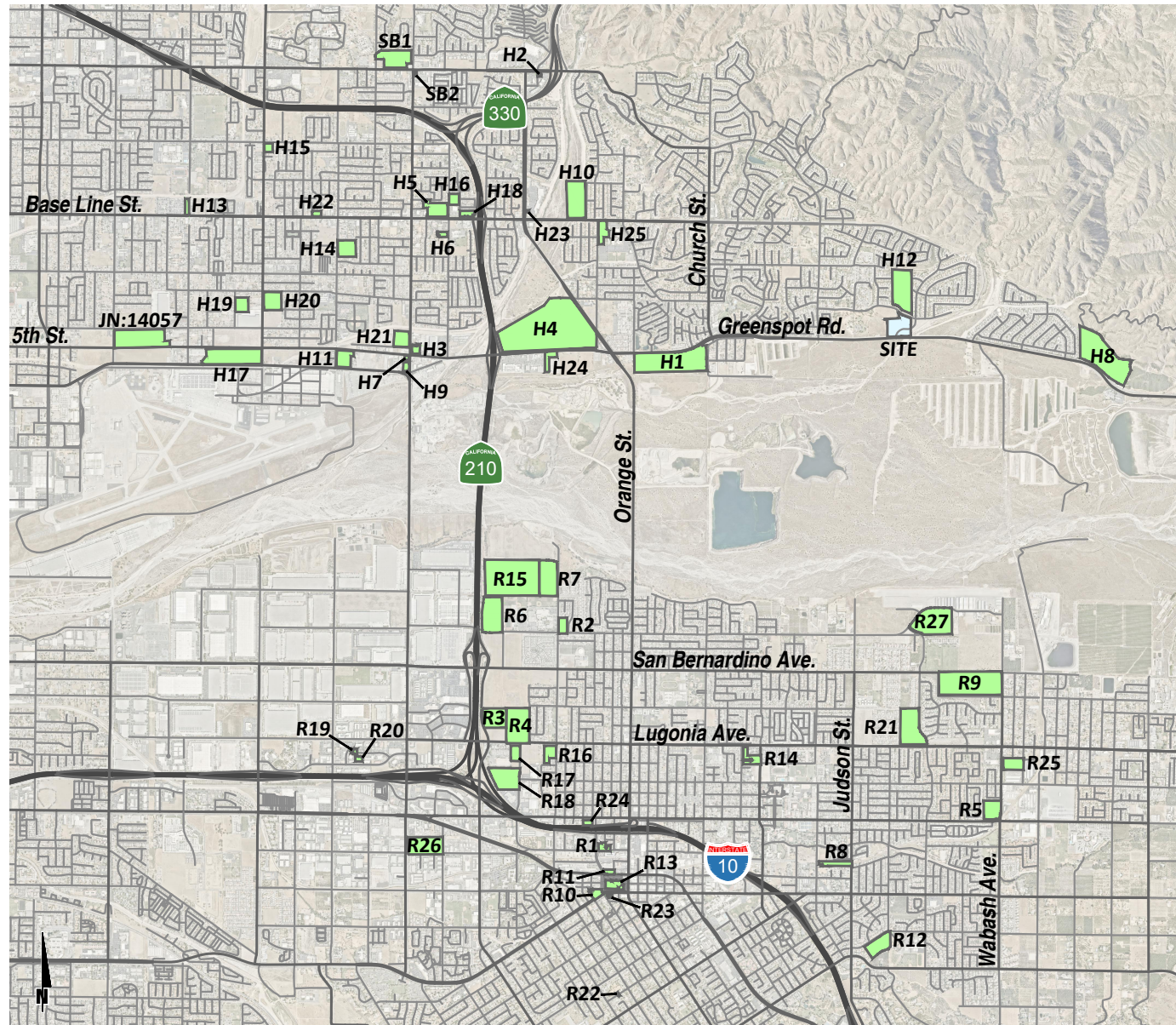
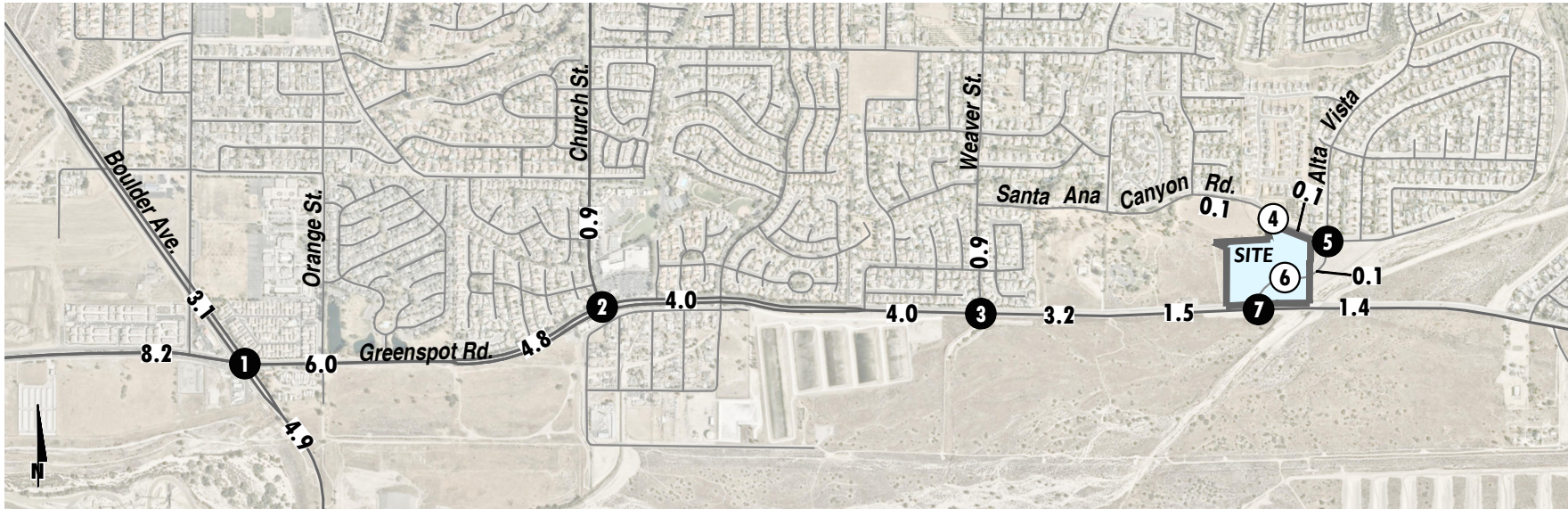


EXHIBIT 4-4 : CUMULATIVE ONLY TRAFFIC VOLUMES



LEGEND:

- 1 = Existing Intersection Analysis Location
- 0 = Future Intersection Analysis Location
- 00(00) = Peak Hour Volume AM(PM)
- 00 = Average Daily Traffic (ADT) In Thousands

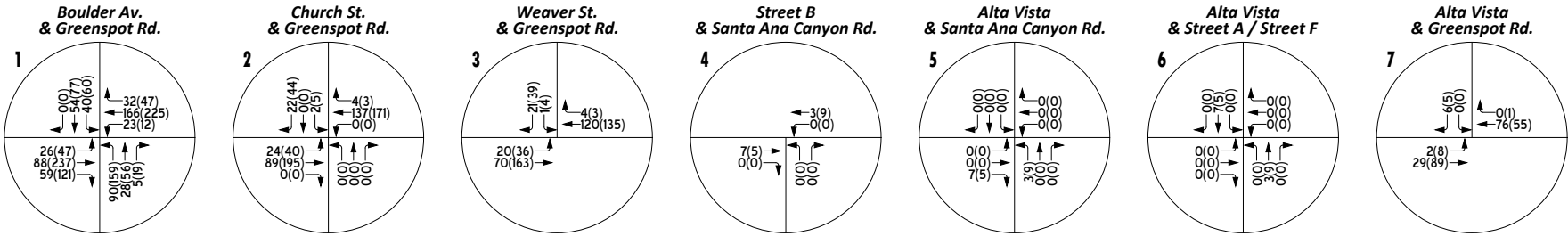


TABLE 4-2: CUMULATIVE DEVELOPMENT LAND USE SUMMARY

#	Project/Location	Land Use	Quantity Units ¹
City of Highland			
H1	Blossom Trails/East Highlands Ranch	Single Family Residential	137 DU
H2	San Miguel Village	Restaurant w/ Drive Thru	3,500 TSF
H3	Citrus Gas Station	Gas Station w Convenience Market and Car Wash	4,000 TSF
H4	Greenspot Village & Marketplace SP	Multifamily Residential (10% Complete)	980 DU
		Commercial Retail	680,000 TSF
H5	Woodcrest Real Estate Development (Tractor Supply Co.)	General Light Industrial	22,000 TSF
		Multifamily Residential	21 DU
H6	St. Adelaide Expansion - New Ministry Offices	General Office	9,000 TSF
H7	Gas Station - 8020 Palm Av.	Gas Station w Convenience Market	8 VFP
H8	Mediterra SP Phase I (50% Complete)	Single Family Residential	151 DU
H9	Express Car Wash - 8054 Palm Av.	Automated Car Wash	1,800 TSF
H10	Highland Park - Mastercraft Homes	Single Family Residential	46 DU
H11	Crow West Warehouse	Warehouse	307.0 TSF
H12	Kiel 54 - Beazer Homes (75% Complete)	Single Family Residential	54 DU
H13	Hacienda Apartments	Multifamily Residential	40 DU
H14	Highland Housing Authority/Wakeland	Multifamily Residential	90 DU
H15	Victoria Square Commercial Strip Center	Commercial Retail	22,000 TSF
H16	Highland Heights/Crestwood Communities	Single Family Residential	34 DU
H17	Patriot Partners Warehouse (3rd Street & Central Avenue)	High-Cube Warehouse	188,000 TSF
H18	Marinnita	Quick Service Restaurant	6,500 TSF
H19	Patriot Partners Warehouse (Cypress & Grape)	Warehouse	90,000 TSF
H20	Patriot Warehouse (Victoria & Cypress)	Warehouse	187,000 TSF
H21	Lovett Warehouse	Warehouse	284,000 TSF
H22	O'Reily	Retail	7,400 TSF
H23	Dutch Bros	Drive Thru Café	1,000 TSF
H24	Extra Space Storage	Self-Storage	119,000 TSF
H25	Immanuel Baptist Church	Church Expansion	90,000 TSF
City of Redlands			
R1	Northeast corner of W. Stuart Av. and Eureka St.	Multifamily Residential	85 DU
		Retail	7,686 TSF
R2	TTM 20645	Single Family Residential	11 DU
R3	Tennessee Village	Multifamily Residential	460 DU
		Commercial Retail	17,899 TSF
R4	Lugonia Village	Multifamily Residential	451 DU
		Single Family Residential	18 DU
		Condo	72 DU
R5	TTM 20571, CUP 1171	Single Family Residential	103 DU
R6	East Valley Corridor SP SP Amendment 45 SP Amendment 49 SP Amendment 50	Multifamily Residential	328 DU
		Multifamily Residential	460 DU
		Commercial Retail	18,000 TSF
		Retail	47,085 TSF
		Sit Down Restaurant	5,710 TSF
		Restaurant w/ Drive Thru	7,590 TSF
R7	TTM 20520	Single Family Residential	35 DU
R8	Village at Orange Blossom (CUP 1169)	Multifamily Residential	108 DU
R9	TTM 20473	Single Family Residential	98 DU
R10	City Center Mixed Use Project	Multifamily Residential	138 DU
		Commercial Retail	10,430 TSF
R11	The Grand Apartments	Multifamily Residential	149 DU
R12	TTM 20065	Single Family Residential	29 DU
R13	State Street Village Mixed Use Project	Multifamily Residential	700 DU
		Office	12,000 TSF
		Retail	65,468 TSF
		Pedestrian Plaza	22,742 TSF

#	Project/Location	Land Use	Quantity Units ¹
R14	Casa Loma Apartments	Multifamily Residential	147 DU
R15	Bergamont SP (25% Complete)	Single Family Residential	317 DU
R16	Liberty Lane Apartments	Multifamily Residential	80 DU
R17	CUP 1198	Grocery Store	16.000 TSF
		Restaurant w/ Drive Thru	6.047 TSF
R18	Carmax Dealership	Car Dealership	53.800 TSF
R19	Northeast corner of Plum Ln. and Idaho St.	Hotel	52 RM
R20	Plum Lane Plaza	Office	16.768 TSF
R21	CUP 1136	Church	161.804 TSF
R22	CUP 1145	Senior Assisted Living Facility	28 Beds
R23	CUP 1156	Pharmacy	14.500 TSF
R24	Tru Hotel by Hilton	Hotel	90 RM
R25	Go-Stor-It Self Storage Facility	Self-Storage	28.000 TSF
R26	10616 Kansas St.	Office Building	83.424 TSF
R27	Sessums Dr. east of Aviation Dr.	Light Industrial	251.726 TSF
City of San Bernardino			
SB 1	Warmington Residential at Palm	Single Family Residential	133 DU
SB 2	Rally's	Restaurant w/ Drive Thru	1.008 TSF

¹ TSF = Thousand Square Feet; DU = Dwelling Unit; VFP = Vehicle Fueling Position ; RM = Rooms

4.7 CUMULATIVE (2050) VOLUME DEVELOPMENT

Traffic projections for Cumulative (2050) Without Project conditions were derived from the San Bernardino County Transportation Analysis Model (SBTAM) using accepted procedures for model forecast refinement and smoothing for study area intersections located within the County of San Bernardino. The traffic forecasts reflect the area-wide growth anticipated between Existing (2024) conditions and Cumulative (2050) traffic conditions. In most instances the traffic model zone structure is not designed to provide accurate turning movements along arterial roadways unless refinement and reasonableness checking is performed. Therefore, the Cumulative (2050) peak hour forecasts were refined using the model derived long range forecasts, base (validation) year model forecasts, along with existing peak hour traffic count data collected at each analysis location in 2024. The SBTAM has a base (validation) year of 2016 and a horizon (future forecast) year of 2040. The difference in model volumes (2040-2016) defines the growth in traffic over the 24-year period.

The refined future peak hour approach and departure volumes obtained from the model output data are then entered into a spreadsheet program consistent with the National Cooperative Highway Research Program (NCHRP Report 765), along with initial estimates of turning movement proportions. A linear programming algorithm is used to calculate individual turning movements which match the known directional roadway segment forecast volumes computed in the previous step. This program computes a likely set of intersection turning movements from intersection approach counts and the initial turning proportions from each approach leg.

The SBTAM uses an AM peak period-to-peak hour factor of 0.35 and a PM peak period-to-peak hour factor of 0.27. These factors represent the relationship of the highest single AM peak hour to the modeled 3-hour AM peak period (an even distribution would result in a factor of 0.33) and the highest single PM peak hour to the modeled 4-hour PM peak period (an even distribution would result in a factor of 0.25).

Typically, the model growth is prorated and is subsequently added to the existing (base validation) traffic volumes to represent Horizon Year traffic conditions. In an effort to conduct a conservative analysis, reductions to traffic forecasts from either Existing or Opening Year traffic conditions were not assumed as part of this analysis. As such, in conjunction with the addition of cumulative projects that are not consistent with the General Plan, additional growth has also been applied on a movement-by-movement basis, where applicable, to estimate reasonable Cumulative (2050) forecasts. Cumulative (2050) turning volumes were compared to Opening Year (2027) volumes in order to ensure a minimum growth as a part of the refinement process. The minimum growth includes any additional growth between Opening Year (2027) and Cumulative (2050) traffic conditions that is not accounted for by the traffic generated by cumulative development projects and ambient growth rates assumed between Existing (2024) and Opening Year (2027) conditions. Future estimated peak hour traffic data was used for new intersections and intersections with an anticipated change in travel patterns to further refine the Cumulative (2050) peak hour forecasts.

The future Cumulative (2050) Without Project peak hour turning movements were then reviewed by Urban Crossroads, Inc. for reasonableness, and in some cases, were adjusted to achieve flow conservation, reasonable growth, and reasonable diversion between parallel routes. Flow conservation checks ensure that traffic flow between two closely spaced intersections, such as two adjacent driveway locations, is verified in order to make certain that vehicles leaving one intersection are entering the adjacent intersection and that there is no unexplained loss of vehicles. The result of this traffic forecasting procedure is a series of traffic volumes which are suitable for traffic operations analysis. Post processing has been performed for the weekday AM and PM peak hours only as these are the only time periods where traffic model data was readily available. Weekday Mid-Day peak hour volumes for Cumulative (2050) traffic conditions were derived based on a similar ratio observed between the Weekday PM and Mid-Day for existing traffic conditions. Project traffic was then added for all With Project traffic conditions. Post processing worksheets are included in Appendix 4.1.

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5 OPENING YEAR (2027) TRAFFIC CONDITIONS

This section discusses the methods used to develop Opening Year (2027) traffic forecasts, and the resulting intersection operations and traffic signal warrant analyses.

5.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Opening Year (2027) conditions are consistent with those shown previously in Exhibit 3-1, with the exception of the following:

- Project driveways assumed to be constructed by the Project to provide site access are also assumed to be in place for Opening Year (2027) With Project conditions only (e.g., intersection and roadway improvements along the Project's frontage and driveways).
- Cumulative development driveways and those facilities assumed to be constructed by cumulative development projects to provide site access are also assumed to be in place for Opening Year (2027) conditions (e.g., intersection and roadway improvements along the Project's frontage and driveways).

5.2 OPENING YEAR (2027) WITHOUT PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Existing (2024) traffic volumes plus an ambient growth factor of 6.12% and the addition of traffic generated by known cumulative development projects. The weekday AM, Mid-Day, and PM peak hour volumes which can be expected for Opening Year (2027) Without Project traffic conditions are shown in Exhibit 5-1.

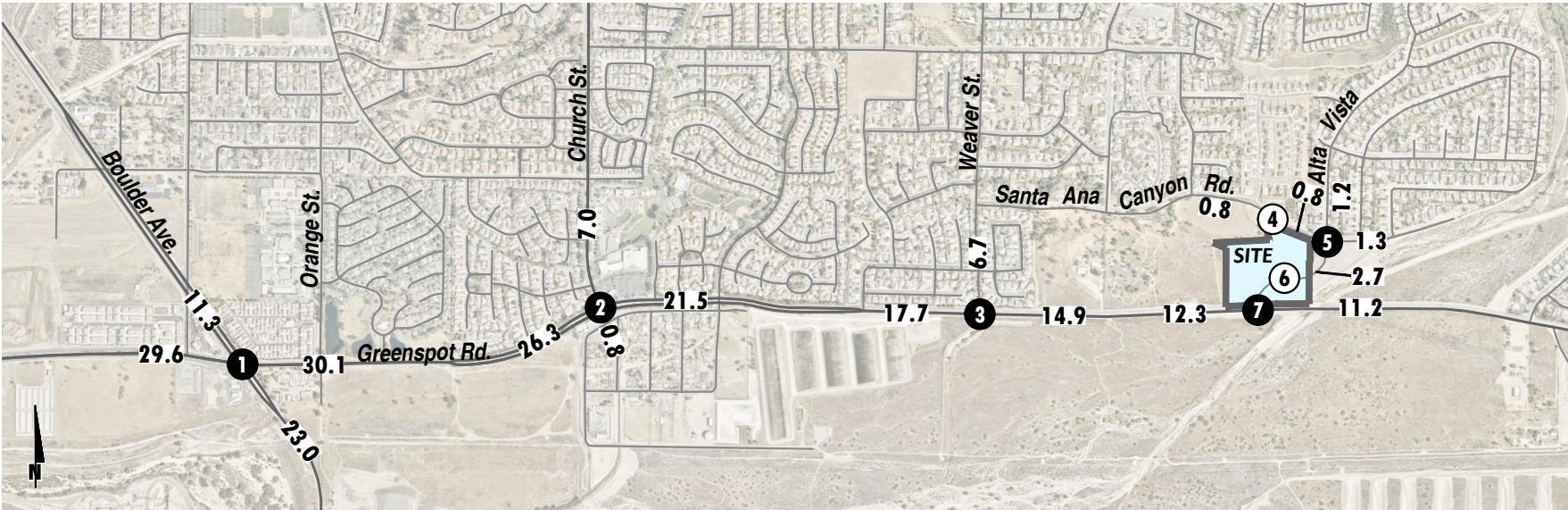
5.3 OPENING YEAR (2027) WITH PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Existing (2024) traffic volumes plus an ambient growth factor of 6.12% and the addition of Project traffic plus the addition of traffic generated by known cumulative development projects. The weekday AM, Mid-Day, and PM peak hour volumes which can be expected for Opening Year (2027) With Project traffic conditions are shown in Exhibit 5-2.

5.4 INTERSECTION OPERATIONS ANALYSIS

Opening Year (2027) peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2 *Methodologies*. The intersection analysis results are summarized in Table 5-1 for Opening Year (2027) traffic conditions, which indicate that all of the study area intersections are anticipated to operate at an acceptable LOS under Opening Year (2027) Without and With Project traffic conditions. The intersection operations analysis worksheets for Opening Year (2027) Without and With Project traffic conditions are included in Appendices 5.1 and 5.2, respectively.

EXHIBIT 5-1 : PROJECT OPENING YEAR (2027) WITHOUT PROJECT VOLUMES



LEGEND:

- 1 = Existing Intersection Analysis Location
- 2 = Future Intersection Analysis Location
- 00(00) = Peak Hour Volume AM(PM)
- 00 = Average Daily Traffic (ADT) In Thousands

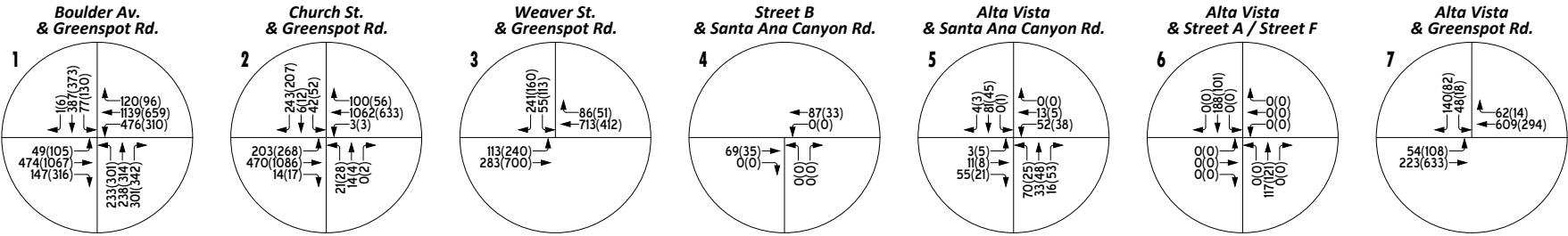
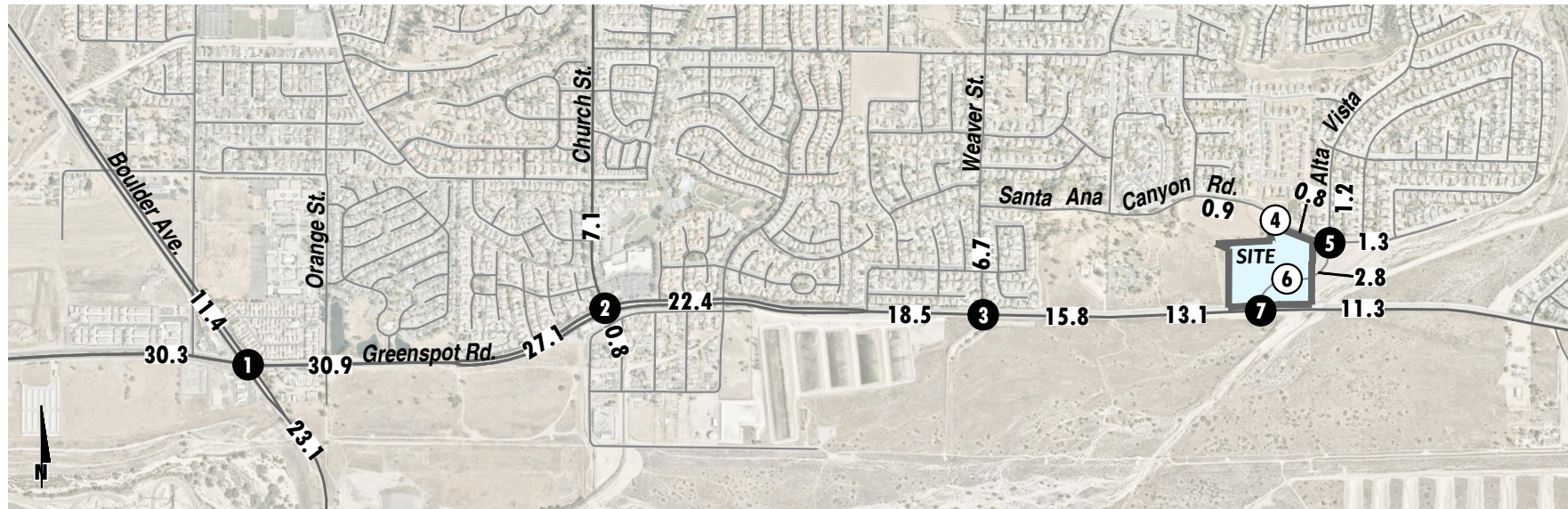


EXHIBIT 5-2 : PROJECT OPENING YEAR (2027) WITH PROJECT VOLUMES



LEGEND:

- 0** = Existing Intersection Analysis Location
- 0** = Future Intersection Analysis Location
- 00(00) = Peak Hour Volume AM(PM)
- 00 = Average Daily Traffic (ADT) In Thousands

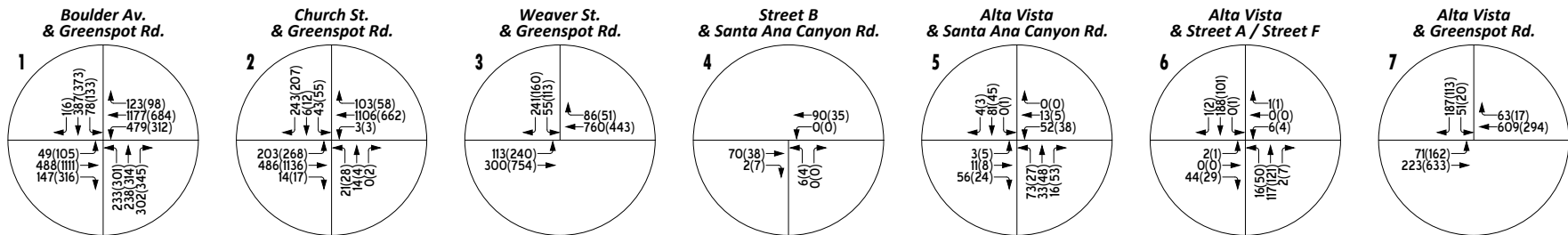


TABLE 5-1: INTERSECTION ANALYSIS FOR OPENING YEAR (2027) CONDITIONS

# Intersection	Traffic Control ²	Opening Year (2027) Without Project						Opening Year (2027) With Project					
		Delay ¹ (secs.)			Level of Service			Delay ¹ (secs.)			Level of Service		
		AM	MD	PM	AM	MD	PM	AM	MD	PM	AM	MD	PM
1 Boulder Av. & Greenspot Rd.	TS	33.9	52.5	54.7	C	D	D	34.5	54.0	55.0	C	D	D
2 Church St. & Greenspot Rd.	TS	16.7	14.2	13.8	B	B	B	20.9	14.3	14.5	C	B	B
3 Weaver St. & Greenspot Rd.	TS	8.0	7.2	6.8	A	A	A	8.1	7.2	6.8	A	A	A
4 Street B & Santa Ana Canyon Rd.	CSS	Future Intersection						9.5	9.1	8.9	A	A	A
5 Alta Vista & Santa Ana Canyon Rd.	CSS	14.6	10.7	10.7	B	B	B	14.8	10.8	10.8	B	B	B
6 Alta Vista & Street A/Street F	CSS	Future Intersection						11.3	10.9	11.0	B	B	B
7 Alta Vista & Greenspot Rd.	CSS	21.2	12.8	12.2	C	B	B	25.7	14.1	13.1	D	B	B

¹ Per the Highway Capacity Manual (7th Edition), overall average intersection Delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown. HCM delay reported in seconds.

² TS = Traffic Signal; CSS = Cross-street Stop; AWS = All-way Stop; IS = Improvement

5.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

Traffic signal warrants have been performed for Opening Year (2027) traffic conditions based on peak hour intersection turning movements volumes or planning level (ADT) volumes. There are no unsignalized study area intersections anticipated to meet a traffic signal warrant under Opening Year (2027) traffic conditions. The Opening Year (2027) Without and With Project traffic conditions traffic signal warrant analysis worksheets are provided in Appendices 5.3 and 5.4, respectively.

5.6 TRAFFIC GAP ASSESSMENT

In order to evaluate the ability for vehicles turning left from Alta Vista onto Greenspot Road, the two-way gaps in the flow of eastbound and westbound traffic along Greenspot Road was captured on May 9, 2024 during the morning, mid-day, and evening peak periods (7-9 AM, 1:30-3:30 PM, and 4-6 PM). Two-way gaps reflect the condition when there is no eastbound or westbound traffic at the location of the proposed Project. The gaps in traffic can then be utilized by left-turning vehicles from the proposed Project. Two-way gaps longer than 2.0 seconds have been recorded for this study (see Appendix 3.1).

The traffic gap collected was evaluated based on the critical gap and follow-up time methodologies outlined in the Federal Highway Administration's (FHWA) Highway Capacity Manual (HCM). Critical gap is defined as "the minimum time interval in the major-street traffic stream that allows intersection entry for one minor-street vehicle." The time between the departure of one vehicle from the minor street to the next along the same major street is called the follow-up time.

Traffic gap results are summarized on Table 5-2 for weekday morning, mid-day, and evening peak hours, respectively. The morning peak hour occurred between 7:15 AM and 8:15 AM, the mid-day peak hour occurring between 2:30-3:30, and the evening peak hour occurring between 4:45 PM and 5:45 PM. There was a total of 423 two-way gaps in the east-west traffic along Greenspot Road during the morning peak hour which could potentially allow up to 572 vehicles to turn left from the proposed Project driveway. Based on the Project trip generation and distribution patterns

presented in the approved scoping agreement, the Project is anticipated to have 3 southbound left turning vehicles from Alta Vista during the morning peak hour. As such, the data suggests there is a sufficient number of gaps in traffic along Greenspot Road to accommodate the anticipated left-turning traffic during the morning peak hour.

There was a total of 388 two-way gaps in the east-west traffic along Greenspot Road during the mid-day peak hour which could potentially allow up to 602 vehicles to turn left from Alta Vista. Based on the Project trip generation and distribution patterns presented in the approved scoping agreement, the Project is anticipated to have 1 southbound left turning vehicle from Alta Vista during the mid-day peak hour. As such, the data suggests there is a sufficient number of gaps in traffic along Greenspot Road to accommodate the anticipated left-turning traffic during the mid-day peak hour.

There was a total of 414 two-way gaps in the east-west traffic along Greenspot Road during the evening peak hour which could potentially allow up to 572 vehicles to turn left from Alta Vista. Based on the Project trip generation and distribution patterns presented in the approved scoping agreement, the Project is anticipated to have 1 southbound left turning vehicle from Alta Vista during the evening peak hour. As such, the data suggests there is a sufficient number of gaps in traffic along Greenspot Road to accommodate the anticipated left-turning traffic during the evening peak hour.

TABLE 5-2: GAP STUDY FOR ALTA VISTA & GREENSPOT ROAD

Gap Length ¹ (seconds)	Number of Veh. Using Gap ¹	Number of Combined Gaps	Number of Veh. Accessing Roadway
AM Peak Hour: 7:15-8:15 AM			
7.1 - 10.6	1	344	344
10.7 - 14.2	2	45	90
14.3 - 17.8	3	15	45
17.9 - 21.4	4	9	36
21.5 - 25.0	5	5	25
25.1 - 28.6	6	3	18
>28.7	7	2	14
Total		423	572
Average = 4-5 seconds during the peak hour			
Mid-Day Peak Hour: 2:30-3:30 PM			
7.1 - 10.6	1	287	287
10.7 - 14.2	2	40	80
14.3 - 17.8	3	30	90
17.9 - 21.4	4	18	72
21.5 - 25.0	5	7	35
25.1 - 28.6	6	4	24
>28.7	7	2	14
Total		388	602
Average = 4-5 seconds during the peak hour			
PM Peak Hour: 4:45-5:45 PM			
7.1 - 10.6	1	329	329
10.7 - 14.2	2	45	90
14.3 - 17.8	3	17	51
17.9 - 21.4	4	17	68
21.5 - 25.0	5	4	20
25.1 - 28.6	6	0	0
>28.7	7	2	14
Total		414	572
Average = 4-5 seconds during the peak hour			

¹ Source: Highway Capacity Manual, 7th Edition.

As shown, the existing signalized intersection at Alta Vista and Greenspot Road currently provides sufficient gaps in traffic to accommodate left-turning traffic from Alta Vista.

Alta Vista is currently a 2-lane undivided roadway with one lane in each direction of travel separated by a painted median. Table 5-3 summarizes the time gap for cars needed to complete a maneuver (either left or right turn) from the minor leg per the Caltrans Highway Design Manual (HDM) Table 405.1A. Note that additional time has been added to the values shown in Table 405.1A to account for the left-turning vehicles crossing the painted median.

TABLE 5-3: CORNER SIGHT DISTANCE TIME GAP (T_G) FOR UNSIGNALIZED INTERSECTIONS

Design Vehicle	Left turn from Stop (s)	Right turn from Stop and Crossing Maneuver (s)
Passenger Car	8.0	6.5

Source: Caltrans Highway Design Manual, July 1, 2020, Table 405.1A.

Note: Times include additional time to account for the painted median: additional 0.5s for passenger cars

The number of instances during the AM peak hour where the gap was greater than 8 seconds is 79, 101 for Mid-Day, and 85 for the PM peak hour, see table 5-4. Based on the number of instances of gap occurrences during the peak hour, the gaps at the driveway location on Alta Vista and Greenspot Road are more than adequate to accommodate the anticipated Project traffic.

TABLE 5-4: IDENTIFICATION OF GAPS FOR PROJECT DRIVEWAY

Gap Length ¹ (seconds)	Number of Veh. Using Gap ¹	Number of Combined Gaps
AM Peak Hour: 7:15-8:15 AM		
7.1 - 10.6	1	344
10.7 - 14.2	2	45
14.3 - 17.8	3	15
17.9 - 21.4	4	9
21.5 - 25.0	5	5
25.1 - 28.6	6	3
>28.7	7	2
Total		79
Mid-Day Peak Hour: 2:30-3:30 PM		
7.1 - 10.6	1	287
10.7 - 14.2	2	40
14.3 - 17.8	3	30
17.9 - 21.4	4	18
21.5 - 25.0	5	7
25.1 - 28.6	6	4
>28.7	7	2
Total		101
PM Peak Hour: 4:45-5:45 PM		
7.1 - 10.6	1	329
10.7 - 14.2	2	45
14.3 - 17.8	3	17
17.9 - 21.4	4	17
21.5 - 25.0	5	4
25.1 - 28.6	6	0
>28.7	7	2
Total		85

¹ Source: Highway Capacity Manual, 7th Edition.

6 CUMULATIVE (2050) TRAFFIC CONDITIONS

This section discusses the traffic forecasts for Cumulative (2050) conditions and the resulting intersection operations, traffic signal warrant, and improvements.

6.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Cumulative (2050) conditions are consistent with those shown previously in Exhibit 3-1, with the exception of the following:

- Project driveways assumed to be constructed by the Project to provide site access are also assumed to be in place for Cumulative (2050) With Project conditions only (e.g., intersection and roadway improvements along the Project's frontage and driveways).
- Cumulative development driveways and those facilities assumed to be constructed by cumulative development projects to provide site access are also assumed to be in place for Cumulative (2050) conditions (e.g., intersection and roadway improvements along the Project's frontage and driveways).

6.2 CUMULATIVE (2050) TRAFFIC VOLUME FORECASTS

This scenario includes the refined post-process volumes obtained from the SBTAM, plus the traffic generated by the proposed Project for With Project conditions only. The weekday AM, Mid-Day, and PM peak hour volumes which can be expected for Cumulative (2050) Without Project traffic conditions is shown in Exhibit 6-1. Similarly, the weekday AM, Mid-Day, and PM peak hour volumes which can be expected for Cumulative (2050) With Project traffic conditions is shown in Exhibit 6-2.

6.3 INTERSECTION OPERATIONS ANALYSIS

Cumulative (2050) peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2 *Methodologies*. The intersection analysis results are summarized in Table 6-1 for Cumulative (2050) traffic conditions, which indicates that the following study area intersections are anticipated to operate at an unacceptable LOS under Cumulative (2050) Without Project traffic conditions:

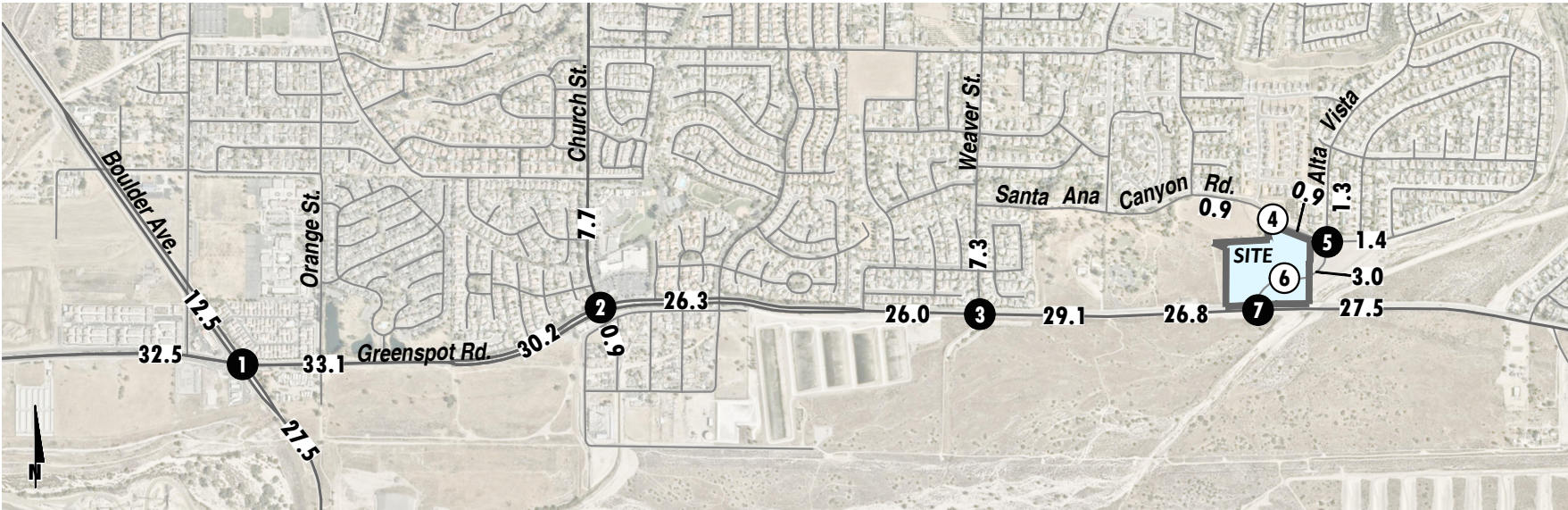
- Boulder Av. & Greenspot Rd. (#1) – LOS E Mid-Day and PM peak hours
- Alta Vista & Greenspot Rd. (#7) – LOS F AM peak hour only

The following study area intersections are anticipated to continue to operate at an unacceptable LOS during the peak hours with the addition of Project traffic under Cumulative (2050) With Project traffic conditions:

- Boulder Av. & Greenspot Rd. (#1) – LOS E Mid-Day and PM peak hours
- Alta Vista & Greenspot Rd. (#7) – LOS F AM peak hour; LOS E Mid-Day peak hour

The intersection operations analysis worksheets for Cumulative (2050) Without and With Project traffic conditions are included in Appendices 6.1 and 6.2, respectively.

EXHIBIT 6-1 : CUMULATIVE (2050) WITHOUT PROJECT TRAFFIC VOLUMES



LEGEND:

- 1 = Existing Intersection Analysis Location
- 0 = Future Intersection Analysis Location
- 00(00) = Peak Hour Volume AM(PM)
- 00 = Average Daily Traffic (ADT) In Thousands

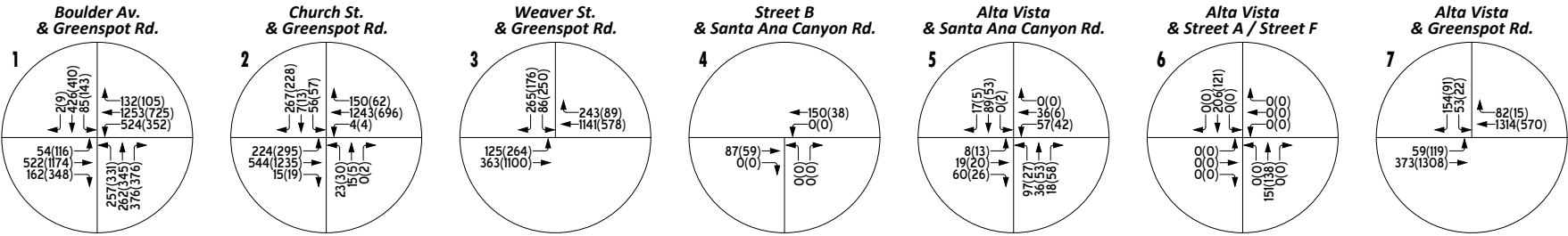
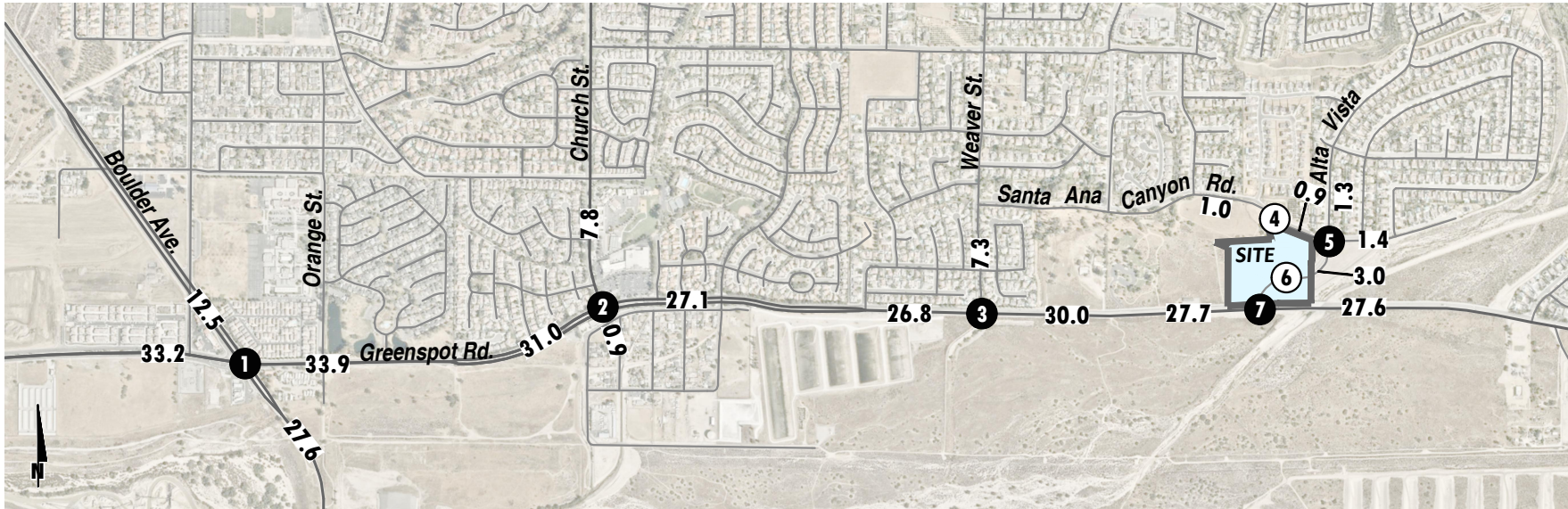


EXHIBIT 6-2 : CUMULATIVE (2050) WITH PROJECT TRAFFIC VOLUMES



LEGEND:

- 1 = Existing Intersection Analysis Location
- 0 = Future Intersection Analysis Location
- 00(00) = Peak Hour Volume AM(PM)
- 00 = Average Daily Traffic (ADT) In Thousands

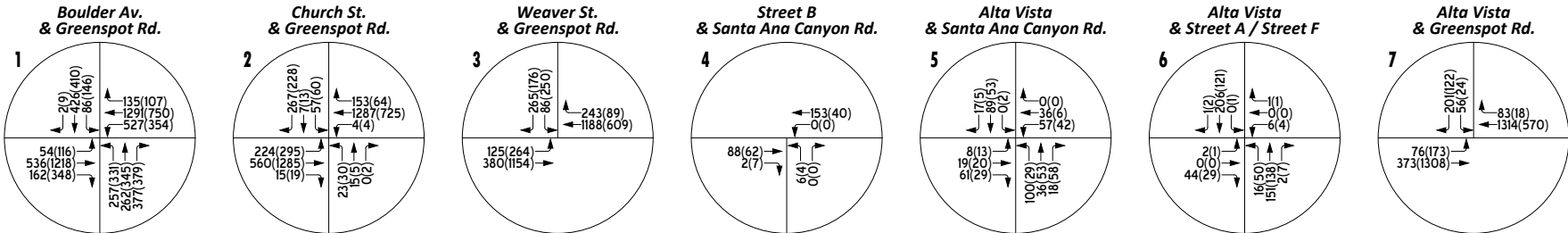


TABLE 6-1: INTERSECTION ANALYSIS FOR CUMULATIVE (2050) CONDITIONS

# Intersection	Traffic Control ²	Cumulative (2050) Without Project						Cumulative (2050) With Project					
		Delay ¹ (secs.)			Level of Service			Delay ¹ (secs.)			Level of Service		
		AM	MD	PM	AM	MD	PM	AM	MD	PM	AM	MD	PM
1 Boulder Av. & Greenspot Rd.	TS	38.0	59.3	60.9	D	E	E	39.0	63.3	66.0	D	E	E
2 Church St. & Greenspot Rd.	TS	21.4	14.4	13.8	C	B	B	33.2	14.6	15.0	C	B	B
3 Weaver St. & Greenspot Rd.	TS	12.6	8.4	9.7	B	A	A	13.5	8.4	9.7	B	A	A
4 Street B & Santa Ana Canyon Rd.	CSS	Future Intersection						10.0	9.3	9.1	B	A	A
5 Alta Vista & Santa Ana Canyon Rd.	CSS	19.4	11.3	11.3	C	B	B	19.8	11.4	11.4	C	B	B
6 Alta Vista & Street A/Street F	CSS	Future Intersection						11.8	11.4	11.4	B	B	B
7 Alta Vista & Greenspot Rd.	CSS	>100	28.5	24.4	F	D	C	>100	41.4	31.7	F	E	D

* **BOLD** = Level of Service (LOS) does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

¹ Per the Highway Capacity Manual (7th Edition), overall average intersection Delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown. HCM delay reported in seconds.

² TS = Traffic Signal; CSS = Cross-street Stop; AWS = All-way Stop; IS = Improvement

6.4 TRAFFIC SIGNAL WARRANTS ANALYSIS

The traffic signal warrant analysis for Cumulative (2050) traffic conditions are based on the peak hour volumes or planning level ADT volume-based traffic signal warrants. No study area intersections are anticipated to meet either peak hour volume or ADT volume-based warrants with the addition of Project traffic (see Appendices 6.3 and 6.4, respectively).

6.5 DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

This section provides a summary of deficiencies and recommended improvements based on the City of Highland deficiency criteria discussed in Section 2.5 *Deficiency Criteria*.

6.5.1 INTERSECTIONS

Improvement strategies have been recommended at intersections that have been identified as deficient under Cumulative (2050) traffic conditions in an effort to achieve an acceptable LOS. The effectiveness of the recommended improvement strategies to address Cumulative (2050) traffic deficiencies are presented in Table 6-2. Worksheets for Cumulative (2050) Without Project and With Project, with improvements, are provided in Appendices 6.5 and 6.6, respectively.

TABLE 6-2: INTERSECTION ANALYSIS FOR CUMULATIVE (2050) CONDITIONS WITH IMPROVEMENTS

#	Intersection	Traffic Control ³	Intersection Approach Lanes ¹												Delay ² (secs.)			Level of Service		
			Northbound			Southbound			Eastbound			Westbound			AM	MD	PM	AM	MD	PM
1	Boulder Av. & Greenspot Rd.		L	T	R	L	T	R	L	T	R	L	T	R						
	- Without Project	TS	2	2	0	1	2	1	2	2	1	2	2	1	29.2	37.9	40.2	C	D	D
	-With Project	TS	2	2	0	1	2	1	2	2	1	2	2	1	30.1	40.8	44.9	C	D	D
7	Alta Vista & Greenspot Rd.		L	T	R	L	T	R	L	T	R	L	T	R						
	- Without Project	TS	0	0	0	0	1	0	1	2	0	0	2	0	8.6	5.3	5.1	A	A	A
	-With Project	TS	0	0	0	0	1	0	1	2	0	0	2	0	11.2	5.9	5.8	B	A	A

BOLD = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

¹ When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; > = Right-Turn Overlap Phasing; **1** = Improvement

² Per the Highway Capacity Manual (7th Edition), overall average intersection Delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown. HCM delay reported in seconds.

³ TS = Traffic Signal; CSS = Cross-Street Stop; **TS** = Improvement

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7 LOCAL AND REGIONAL FUNDING MECHANISMS

Transportation improvements within the City of Highland are funded through a combination of improvements constructed by the Project, development impact fee programs or fair share contributions. Fee programs applicable to the Project are described below.

7.1 CITY OF HIGHLAND DEVELOPMENT IMPACT FEE (DIF) PROGRAM

The City of San Bernardino has created its own local Development Impact Fee (DIF) program to impose and collect fees from new residential, commercial, and industrial development for the purpose of funding roadways and intersections necessary to accommodate City growth as identified in the City's General Plan Circulation Element. The City's DIF includes a Regional Circulation System Fee to comply with Measure "I" and a Local Circulation System Fee to address transportation improvements which are locally significant. The fee schedule was recently updated in August 2023 and is adjusted annually based upon changes in the construction cost index. Under the City's DIF program, the City may grant to developers a credit against specific components of fees when those developers construct certain facilities and landscaped medians identified in the list of improvements funded by the DIF program.

The timing to use the DIF fees is established through periodic capital improvement programs which are overseen by the City's Public Works Department. Periodic traffic counts, review of traffic accidents, and a review of traffic trends throughout the City are also periodically performed by City staff and consultants. The City uses this data to determine the timing of implementing the improvements listed in its facilities list. The City also uses this data to ensure that the improvements listed on the facilities list are constructed before the LOS falls below the LOS performance standards adopted by the City.

The Project Applicant will be subject to the City's DIF program and will pay the requisite City DIF at the rates then in effect. The Project Applicant's payment of the requisite DIF at the rates then in effect pursuant to the DIF Program will mitigate its impacts to DIF-funded facilities. After the City's DIF are collected, they are placed in a separate interest-bearing account pursuant to the requirements of Government Code § 66000 et seq. The timing to use the DIF is established through periodic capital improvement programs which are overseen by the City's Public Works Department.

7.2 MEASURE "I"

In 2004, the voters of San Bernardino County approved the 30-year extension of Measure "I", a one-half of one percent sales tax on retail transactions, through the year 2040, for transportation projects including, but not limited to, infrastructure improvements, commuter rail, public transit, and other identified improvements. The Measure "I" extension requires that a regional traffic impact fee be created to ensure development is paying its fair share. A regional Nexus study was prepared by the San Bernardino County Transportation Authority (SBCTA) and concluded that each jurisdiction should include a regional fee component in their local programs in order to meet the Measure "I" requirement. The regional component assigns specific facilities and cost sharing formulas to each jurisdiction and was most recently updated in March 2019. Revenues collected through these programs are used in tandem with the City's DIF funds to deliver projects identified in the Nexus Study. While Measure "I" is a self-executing sales tax administered by SBCTA, it bears

discussion here because the funds raised through Measure “I” have funded in the past and will continue to fund new transportation facilities in San Bernardino County.

7.3 FAIR SHARE CONTRIBUTION

Project improvements may include a combination of fee payments to established programs, construction of specific improvements, payment of a fair share contribution toward future improvements or a combination of these approaches. Improvements constructed by development may be eligible for a fee credit or reimbursement through the program where appropriate (to be determined at the City’s discretion). When off-site improvements are identified with a minor share of responsibility assigned to proposed development, the approving jurisdiction may elect to collect a fair share contribution or require the development to construct improvements. Detailed fair share calculations, for each peak hour, have been provided in Table 7-1 for the applicable deficient study area intersection and for each applicable phase. These fees are collected with the proceeds solely used as part of a funding mechanism aimed at ensuring that regional highways and arterial expansions keep pace with the projected population increases.

TABLE 7-1: PROJECT FAIR SHARE CALCULATIONS

#	Intersection		Existing (2024)	Project	2050 With Project	Total New Traffic	Project % of New Traffic ¹
1	Boulder Av. & Greenspot Rd.						
		AM:	2,858	60	4,114	1,256	4.8%
		MD:	2,448	79	4,115	1,667	4.7%
		PM:	2,789	79	4,513	1,724	4.6%
7	Alta Vista & Greenspot Rd.						
		AM:	963	68	2,103	1,140	6.0%
		MD:	787	90	1,899	1,112	8.1%
		PM:	934	90	2,214	1,280	7.0%

¹ **BOLD** = Highest fair share percentage is highlighted.

8 REFERENCES

1. **San Bernardino County Transportation Authority.** *Congestion Management Program for County of San Bernardino*. County of San Bernardino : s.n., Updated 2023.
2. **Institute of Transportation Engineers.** *Trip Generation Manual*. 11th Edition. 2021.
3. **Transportation Research Board.** *Highway Capacity Manual (HCM)*. 7th Edition. s.l. : National Academy of Sciences, 2022.
4. **California Department of Transportation.** California Manual on Uniform Traffic Control Devices (CA MUTCD). [book auth.] California Department of Transportation. *California Manual on Uniform Traffic Control Devices (CA MUTCD)*. 2014, Updated March 30, 2021 (Revision 6).

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APPENDIX 1.1: TRAFFIC STUDY SCOPING AGREEMENT

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DATE: August 9, 2024
TO: Matt Bennett, City of Highland
FROM: Charlene So, Urban Crossroads
JOB NO: 15974-01 TA Scope

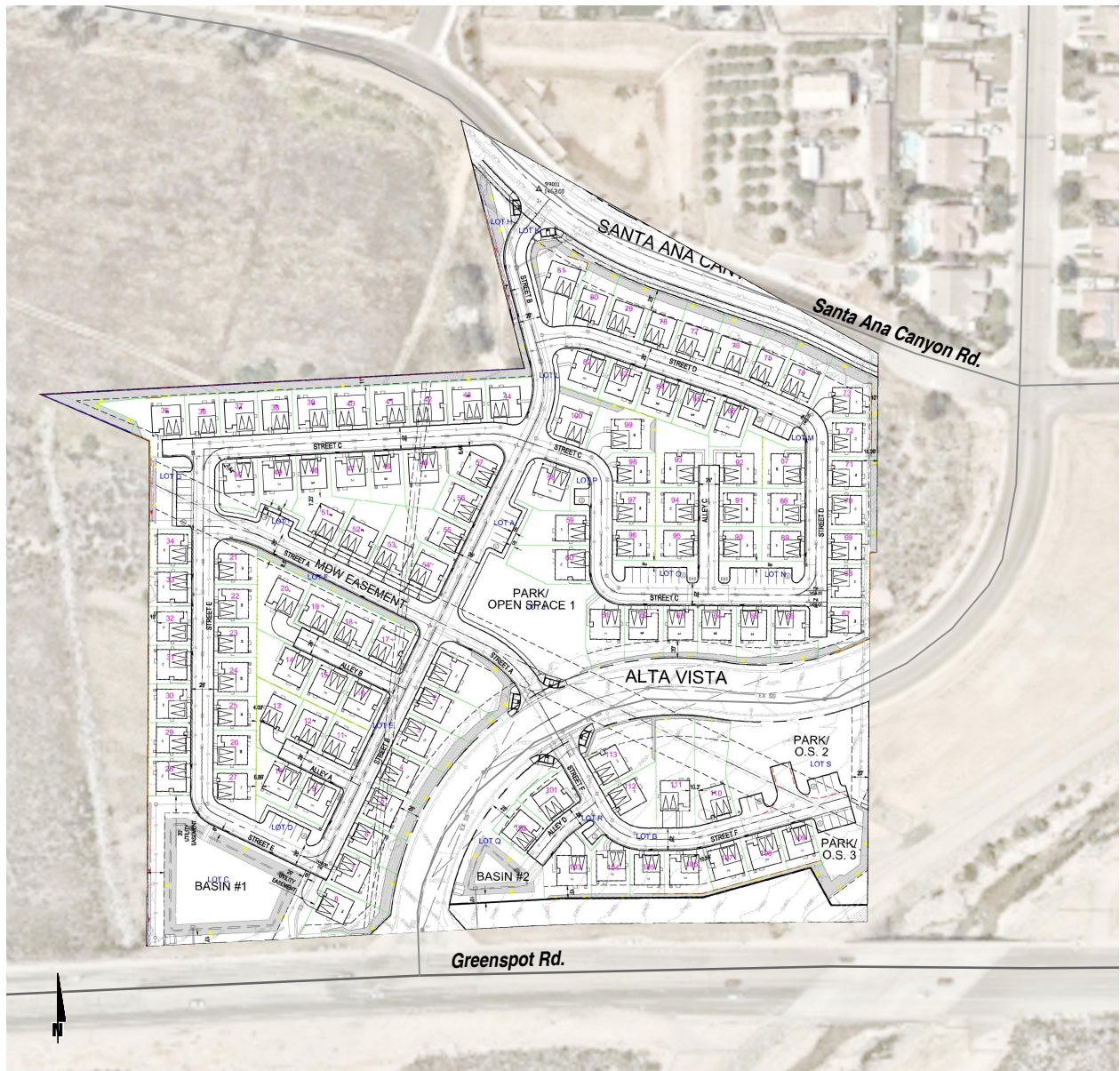
EAST HIGHLAND RANCH (TENTATIVE TRACT MAP NO. 20721) TRAFFIC STUDY SCOPING AGREEMENT

Urban Crossroads, Inc. is pleased to submit the following Traffic Study Scoping Agreement for East Highland Ranch development (referred to as Project), to establish a traffic analysis (TA) scope of work that would be prepared in support of the proposed Project. The Project is located between Santa Ana Canyon Road and Greenspot Road on either side of Alta Vista in the City of Highland. The following memo outlines the project-related trip generation, trip distribution patterns, proposed study area and analysis scenarios expected to be included in the Project traffic analysis.

PROPOSED PROJECT

It is our understanding that the Project is to consist of the development of 113 single family residential dwelling units. Exhibit 1 shows the preliminary site plan. The Project is proposing to develop in single phase with an anticipated Opening Year of 2027. Access to the proposed Project would be provided onto Santa Ana Canyon Road via Street B and Alta Vista via Street A and Street F.

EXHIBIT 1: PRELIMINARY SITE PLAN



TRIP GENERATION

Trip generation represents the amount of traffic, which is both attracted to, and produced by, a development. Determining traffic generation for a specific project is therefore based upon forecasting the amount of traffic that is expected to be both attracted to and produced by the specific land uses being proposed for a given development. The proposed Project trip generation will be based upon information collected by the Institute of Transportation Engineers (ITE) as provided in their latest Trip Generation Manual (11th Edition, 2021) for the proposed uses. Table 1 summarizes the ITE trip generation rates and resulting Project trip generation. As shown in Table 1, the proposed Project is anticipated to generate a net total of 1,066 two-way trips per day with 80 AM peak hour trips and 106 PM peak hour trips.

TABLE 1: PROJECT TRIP GENERATION SUMMARY

Land Use ¹	Units ²	ITE LU Code	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Single Family Detached Residential	DU	210	0.18	0.52	0.70	0.59	0.35	0.94	9.43

¹ Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, 11th Edition (2021).

² DU = dwelling units

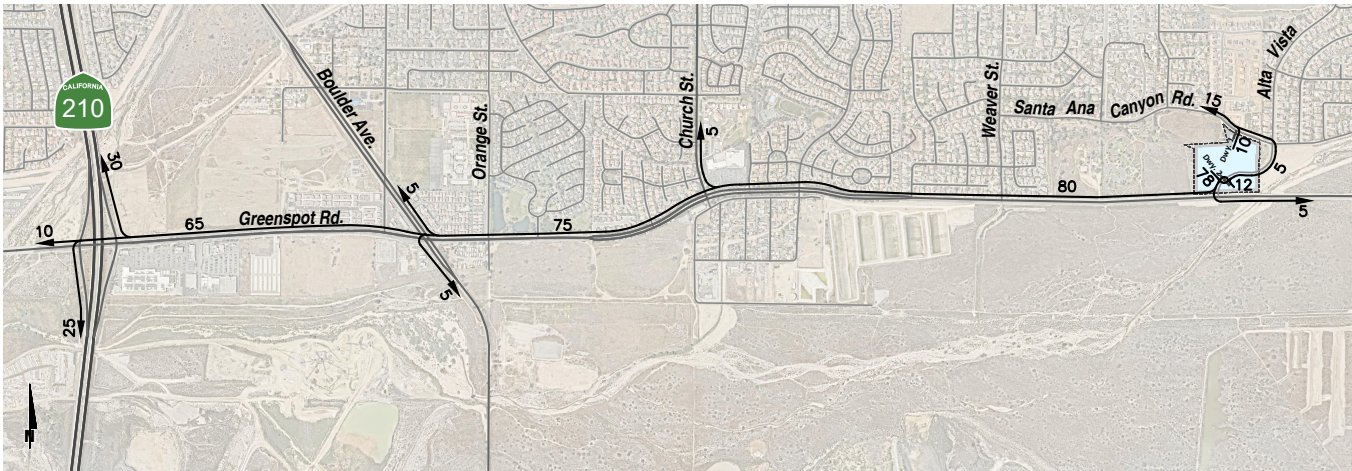
Land Use	Quantity Units ¹	AM Peak Hour			PM Peak Hour			Daily
		In	Out	Total	In	Out	Total	
Single Family Detached	113 DU	21	59	80	67	39	106	1,066

¹ DU = dwelling units

TRIP DISTRIBUTION

The Project trip distribution represents the directional orientation of traffic to and from the Project site. Trip distribution is the process of identifying the probable destinations, directions or traffic routes that will be utilized by Project traffic. The potential interaction between the planned land uses and surrounding regional access routes are considered, to identify the route where the Project traffic would distribute. The proposed Project trip distributions are shown in Exhibit 2.

EXHIBIT 2: PROJECT TRIP DISTRIBUTION



LEGEND:
10 = Car Percent To/From Project
→ = Trip Distribution

PROPOSED ANALYSIS SCENARIOS

The following analysis scenarios are proposed to be evaluated in the Traffic Study:

- 1. Existing (2024)
- 2. Project Opening Day (2027) Without Project
- 3. Project Opening Day (2027) With Project
- 4. Cumulative (2045) Without Project
- 5. Cumulative (2045) With Project

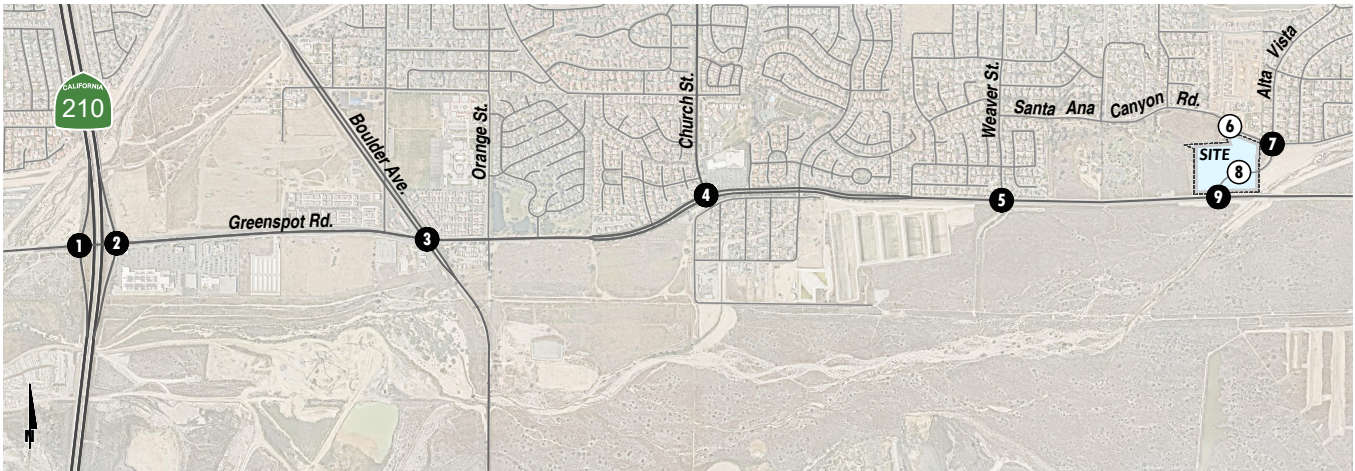
All study area intersections will be evaluated using the Highway Capacity Manual (HCM) 7th Edition analysis methodology. Cumulative (2045) traffic forecasts will be derived using the SBTAM Traffic Model.

INTERSECTION ANALYSIS LOCATIONS

Consistent with the City Guidelines, the study area limits have been set based upon a threshold of 50 peak hour project trips. In other words, at a minimum, the study area includes any intersection of Collector roadway or higher classification street with another Collector roadway or higher classification street, at which the proposed Project will add 50 or more peak hour trips. This methodology has been utilized to establish the study area for the proposed Project. The proposed intersection analysis locations have been identified graphically in Exhibit 3 and listed below.

#	Intersection
1	I-210 SB Ramps & Greenspot Rd.
2	I-210 NB Ramps & Greenspot Rd.
3	Boulder Av. & Greenspot Rd.
4	Church St. & Greenspot Rd.
5	Weaver St. & Greenspot Rd.
6	Street B & Santa Ana Canyon Rd.
7	Alta Vista & Santa Ana Canyon Rd.
8	Alta Vista & Street A/Street F
9	Alta Vista & Greenspot Rd.

EXHIBIT 3: INTERSECTION ANALYSIS LOCATIONS



- LEGEND:**
- ① = Existing Intersection Analysis Location
 - ② = Future Intersection Analysis Location

EXISTING COUNT DATA

Traffic counts were conducted May 9, 2024, while local schools were in session and operating on normal bell schedules. No adjustments are proposed to the collected data other than those needed to preserve traffic flow between closely spaced intersections (such as the freeway ramps) so there is no unexplained loss of vehicles.

AMBIENT GROWTH

An ambient growth rate of 2 percent per year, compounded annually, will be used for this analysis (2% per year over 3 years or 6.12%).

TRAFFIC SIGNAL WARRANTS

Traffic signal warrant analysis will be conducted for all unsignalized full access driveways/intersections following the guidance of the California Manual on Uniform Control Devices (CA MUTCD).

OPEN ITEMS – CUMULATIVE DEVELOPMENT PROJECTS

It is requested that the City provide a current list of cumulative development projects for inclusion in our traffic study.

OPEN ITEMS – SIGNAL TIMING

It is requested that the City provide traffic signal timing for any City controlled intersections that we should take into consideration in our operations analysis. Applicable signal timing for Caltrans facilities will be obtained from District 8.

If you have any questions or comments, I can be reached at cso@urbanxroads.com.

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APPENDIX 3.1: TRAFFIC COUNTS

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City of Highland
N/S: Boulder Avenue
E/W: Greenspot Road
Weather: Clear

File Name : 03_HLD_Bou_GS AM
Site Code : 05124443
Start Date : 5/9/2024
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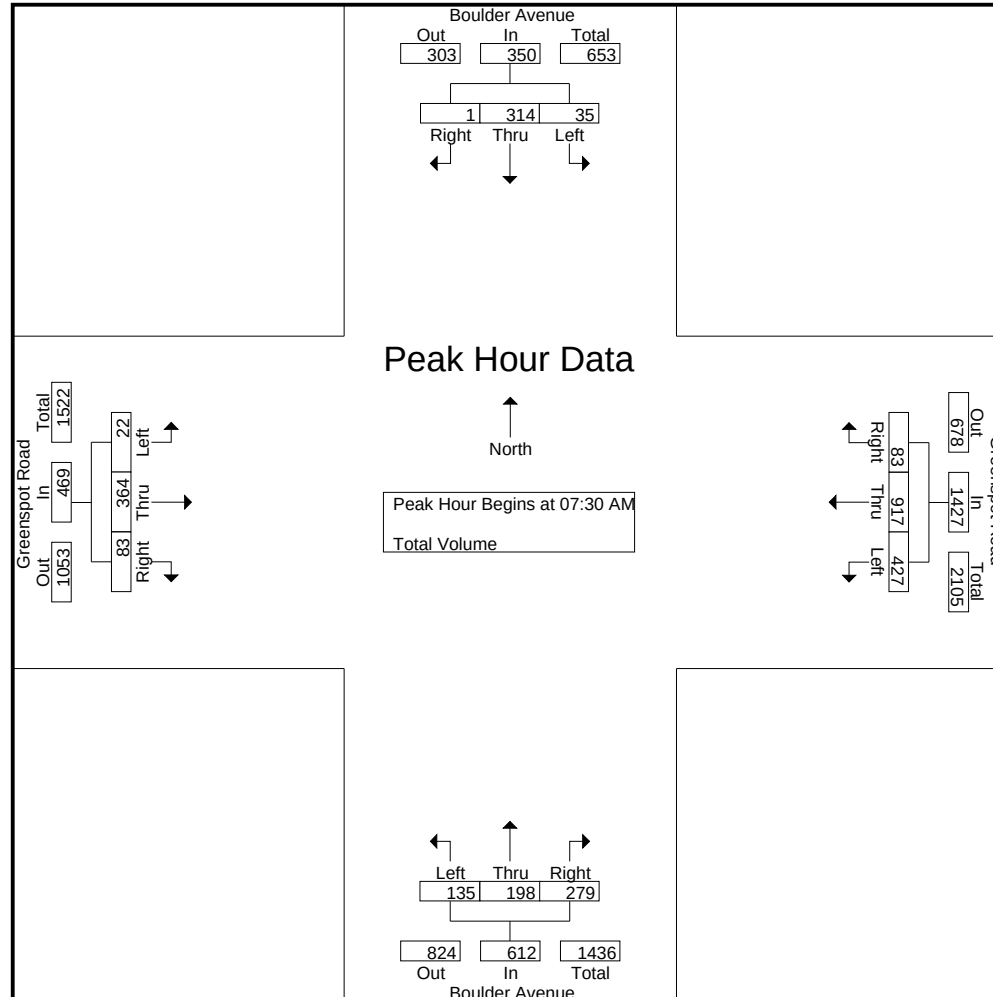
Groups Printed- Total Volume

	Boulder Avenue Southbound					Greenspot Road Westbound					Boulder Avenue Northbound					Greenspot Road Eastbound					Exclu. Total	Inclu. Total	Int. Total
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total			
07:00 AM	4	28	0	0	32	45	195	6	1	246	13	17	16	9	46	4	73	10	4	87	14	411	425
07:15 AM	5	38	0	0	43	82	225	11	3	318	38	36	32	22	106	6	75	14	3	95	28	562	590
07:30 AM	4	59	0	0	63	103	280	20	2	403	28	44	53	38	125	4	107	16	6	127	46	718	764
07:45 AM	12	88	0	0	100	122	215	23	4	360	46	43	64	33	153	4	87	30	11	121	48	734	782
Total	25	213	0	0	238	352	915	60	10	1327	125	140	165	102	430	18	342	70	24	430	136	2425	2561
08:00 AM	12	115	1	0	128	122	210	16	6	348	31	58	53	30	142	11	90	20	9	121	45	739	784
08:15 AM	7	52	0	0	59	80	212	24	7	316	30	53	109	47	192	3	80	17	5	100	59	667	726
08:30 AM	11	32	1	0	44	77	182	32	12	291	30	66	66	25	162	7	85	22	9	114	46	611	657
08:45 AM	8	25	2	0	35	42	154	21	9	217	21	40	31	19	92	9	82	13	4	104	32	448	480
Total	38	224	4	0	266	321	758	93	34	1172	112	217	259	121	588	30	337	72	27	439	182	2465	2647
Grand Total	63	437	4	0	504	673	1673	153	44	2499	237	357	424	223	1018	48	679	142	51	869	318	4890	5208
Apprch %	12.5	86.7	0.8			26.9	66.9	6.1			23.3	35.1	41.7			5.5	78.1	16.3					
Total %	1.3	8.9	0.1		10.3	13.8	34.2	3.1		51.1	4.8	7.3	8.7		20.8	1	13.9	2.9		17.8	6.1	93.9	

	Boulder Avenue Southbound				Greenspot Road Westbound				Boulder Avenue Northbound				Greenspot Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	4	59	0	63	103	280	20	403	28	44	53	125	4	107	16	127	718
07:45 AM	12	88	0	100	122	215	23	360	46	43	64	153	4	87	30	121	734
08:00 AM	12	115	1	128	122	210	16	348	31	58	53	142	11	90	20	121	739
08:15 AM	7	52	0	59	80	212	24	316	30	53	109	192	3	80	17	100	667
Total Volume	35	314	1	350	427	917	83	1427	135	198	279	612	22	364	83	469	2858
% App. Total	10	89.7	0.3		29.9	64.3	5.8		22.1	32.4	45.6		4.7	77.6	17.7		
PHF	.729	.683	.250	.684	.875	.819	.865	.885	.734	.853	.640	.797	.500	.850	.692	.923	.967

City of Highland
 N/S: Boulder Avenue
 E/W: Greenspot Road
 Weather: Clear

File Name : 03_HLD_Bou_GS AM
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City of Highland
N/S: Boulder Avenue
E/W: Greenspot Road
Weather: Clear

File Name : 03_HLD_Bou_GS AM
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	Boulder Avenue Southbound				Greenspot Road Westbound				Boulder Avenue Northbound				Greenspot Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	07:30 AM				07:15 AM				07:45 AM				07:30 AM				
+0 mins.	4	59	0	63	82	225	11	318	46	43	64	153	4	107	16	127	
+15 mins.	12	88	0	100	103	280	20	403	31	58	53	142	4	87	30	121	
+30 mins.	12	115	1	128	122	215	23	360	30	53	109	192	11	90	20	121	
+45 mins.	7	52	0	59	122	210	16	348	30	66	66	162	3	80	17	100	
Total Volume	35	314	1	350	429	930	70	1429	137	220	292	649	22	364	83	469	
% App. Total	10	89.7	0.3		30	65.1	4.9		21.1	33.9	45		4.7	77.6	17.7		
PHF	.729	.683	.250	.684	.879	.830	.761	.886	.745	.833	.670	.845	.500	.850	.692	.923	

City of Highland
N/S: Boulder Avenue
E/W: Greenspot Road
Weather: Clear

File Name : 03_HLD_Bou_GS PM
Site Code : 05124443
Start Date : 5/9/2024
Page No : 1

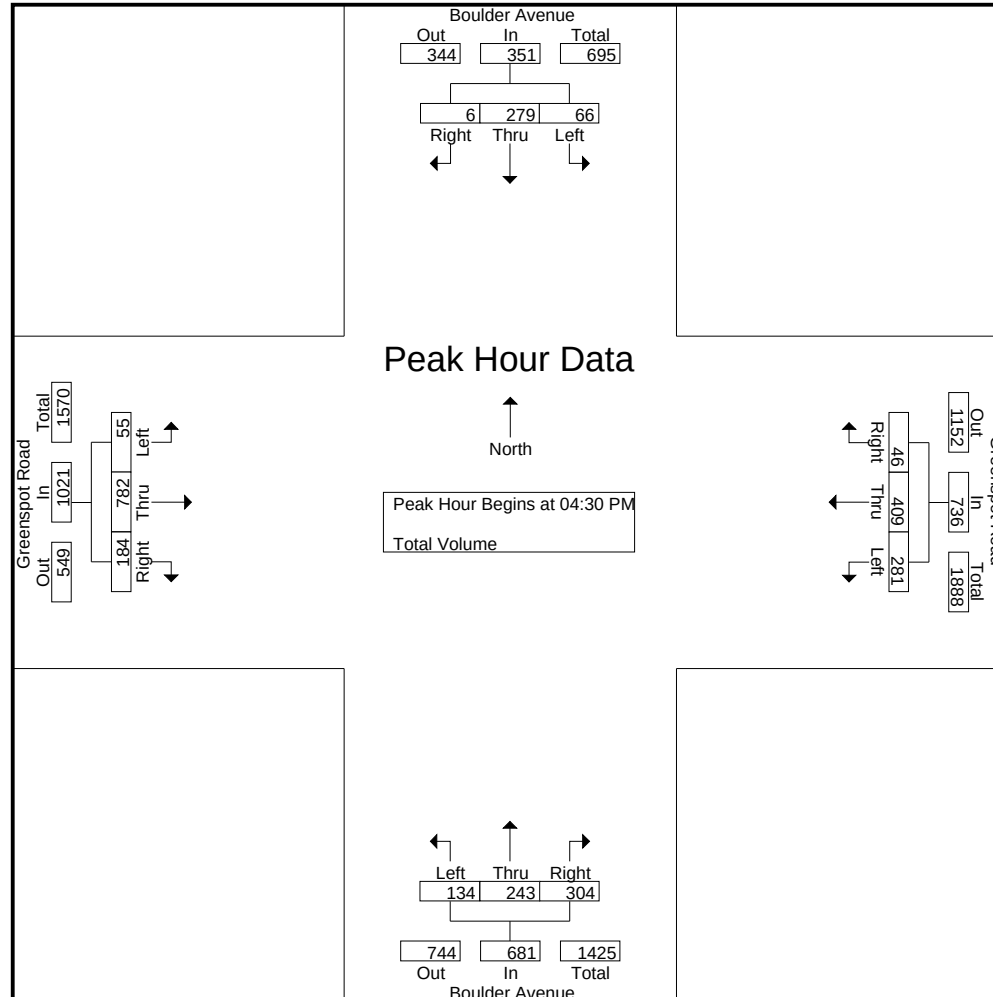
Groups Printed- Total Volume

	Boulder Avenue Southbound					Greenspot Road Westbound					Boulder Avenue Northbound					Greenspot Road Eastbound					Exclu. Total	Inclu. Total	Int. Total
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total			
04:00 PM	27	80	0	0	107	68	108	17	6	193	32	64	79	30	175	7	153	44	28	204	64	679	743
04:15 PM	15	72	2	0	89	53	106	10	3	169	29	55	62	38	146	11	182	42	26	235	67	639	706
04:30 PM	5	70	1	0	76	70	115	14	4	199	36	55	67	42	158	14	184	51	28	249	74	682	756
04:45 PM	17	73	2	0	92	77	96	4	1	177	36	61	71	45	168	12	191	39	21	242	67	679	746
Total	64	295	5	0	364	268	425	45	14	738	133	235	279	155	647	44	710	176	103	930	272	2679	2951
05:00 PM	21	62	2	0	85	79	107	16	4	202	27	51	79	49	157	14	202	46	22	262	75	706	781
05:15 PM	23	74	1	0	98	55	91	12	5	158	35	76	87	51	198	15	205	48	23	268	79	722	801
05:30 PM	18	58	2	0	78	56	101	7	2	164	22	49	76	38	147	10	206	58	23	274	63	663	726
05:45 PM	8	66	1	0	75	71	97	11	3	179	24	43	52	29	119	13	182	50	17	245	49	618	667
Total	70	260	6	0	336	261	396	46	14	703	108	219	294	167	621	52	795	202	85	1049	266	2709	2975
Grand Total	134	555	11	0	700	529	821	91	28	1441	241	454	573	322	1268	96	1505	378	188	1979	538	5388	5926
Apprch %	19.1	79.3	1.6			36.7	57	6.3			19	35.8	45.2			4.9	76	19.1					
Total %	2.5	10.3	0.2		13	9.8	15.2	1.7		26.7	4.5	8.4	10.6		23.5	1.8	27.9	7		36.7	9.1	90.9	

	Boulder Avenue Southbound				Greenspot Road Westbound				Boulder Avenue Northbound				Greenspot Road Eastbound				Int. Total
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	5	70	1	76	70	115	14	199	36	55	67	158	14	184	51	249	682
04:45 PM	17	73	2	92	77	96	4	177	36	61	71	168	12	191	39	242	679
05:00 PM	21	62	2	85	79	107	16	202	27	51	79	157	14	202	46	262	706
05:15 PM	23	74	1	98	55	91	12	158	35	76	87	198	15	205	48	268	722
Total Volume	66	279	6	351	281	409	46	736	134	243	304	681	55	782	184	1021	2789
% App. Total	18.8	79.5	1.7		38.2	55.6	6.2		19.7	35.7	44.6		5.4	76.6	18		
PHF	.717	.943	.750	.895	.889	.889	.719	.911	.931	.799	.874	.860	.917	.954	.902	.952	.966

City of Highland
 N/S: Boulder Avenue
 E/W: Greenspot Road
 Weather: Clear

File Name : 03_HLD_Bou_GS PM
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City of Highland
N/S: Boulder Avenue
E/W: Greenspot Road
Weather: Clear

File Name : 03_HLD_Bou_GS PM
Site Code : 05124443
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	Boulder Avenue Southbound				Greenspot Road Westbound				Boulder Avenue Northbound				Greenspot Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	04:00 PM				04:15 PM				04:30 PM				05:00 PM				
+0 mins.	27	80	0	107	53	106	10	169	36	55	67	158	14	202	46	262	
+15 mins.	15	72	2	89	70	115	14	199	36	61	71	168	15	205	48	268	
+30 mins.	5	70	1	76	77	96	4	177	27	51	79	157	10	206	58	274	
+45 mins.	17	73	2	92	79	107	16	202	35	76	87	198	13	182	50	245	
Total Volume	64	295	5	364	279	424	44	747	134	243	304	681	52	795	202	1049	
% App. Total	17.6	81	1.4		37.3	56.8	5.9		19.7	35.7	44.6		5	75.8	19.3		
PHF	.593	.922	.625	.850	.883	.922	.688	.925	.931	.799	.874	.860	.867	.965	.871	.957	

Location: Highland
 N/S: Boulder Avenue
 E/W: Greenspot Road



Date: 5/9/2024
 Day: Thursday

PEDESTRIANS

		North Leg Boulder Avenue	East Leg Greenspot Road	South Leg Boulder Avenue	West Leg Greenspot Road	
		Pedestrians	Pedestrians	Pedestrians	Pedestrians	
	7:00 AM	0	0	0	0	0
	7:15 AM	0	0	0	0	0
	7:30 AM	0	0	0	0	0
	7:45 AM	0	0	0	1	1
	8:00 AM	0	0	0	1	1
	8:15 AM	0	0	0	0	0
	8:30 AM	0	0	0	0	0
	8:45 AM	4	0	2	2	8
	TOTAL VOLUMES:	4	0	2	4	10

		North Leg Boulder Avenue	East Leg Greenspot Road	South Leg Boulder Avenue	West Leg Greenspot Road	
		Pedestrians	Pedestrians	Pedestrians	Pedestrians	
	4:00 PM	0	0	0	0	0
	4:15 PM	1	0	0	0	1
	4:30 PM	2	0	0	0	2
	4:45 PM	0	0	1	0	1
	5:00 PM	2	0	0	0	2
	5:15 PM	0	0	0	0	0
	5:30 PM	0	0	0	0	0
	5:45 PM	0	0	0	0	0
	TOTAL VOLUMES:	5	0	1	0	6

Location: Highland
 N/S: Boulder Avenue
 E/W: Greenspot Road



Date: 5/9/2024
 Day: Thursday

BICYCLES

		Southbound Boulder Avenue			Westbound Greenspot Road			Northbound Boulder Avenue			Eastbound Greenspot Road			
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:45 AM	0	0	1	0	1	0	0	0	0	0	0	0	2
	8:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	1
	8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:30 AM	0	0	0	1	0	0	0	0	0	0	0	0	1
	8:45 AM	0	0	0	0	0	2	0	0	0	0	0	0	2
TOTAL VOLUMES:		0	0	1	1	1	2	0	0	0	0	1	0	6

		Southbound Boulder Avenue			Westbound Greenspot Road			Northbound Boulder Avenue			Eastbound Greenspot Road			
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:30 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1
	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:45 PM	0	0	0	0	0	0	0	0	2	0	0	0	2
TOTAL VOLUMES:		0	0	0	0	1	0	0	0	2	0	1	0	4

City of Highland
N/S: Boulder Avenue
E/W: Greenspot Road
Weather: Clear

File Name : 03_HLD_Bo_GS MD
Site Code : 241037
Start Date : 5/9/2024
Page No : 1

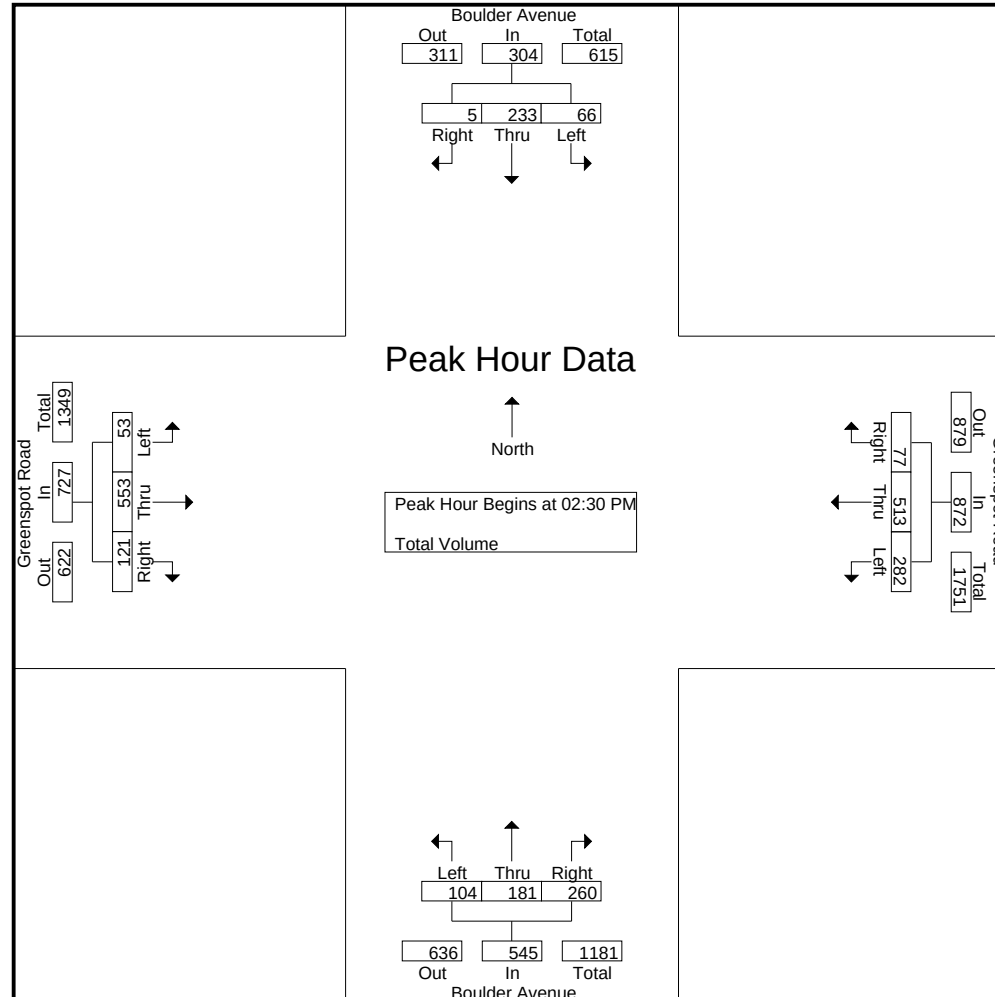
Groups Printed- Total Volume

	Boulder Avenue Southbound					Greenspot Road Westbound					Boulder Avenue Northbound					Greenspot Road Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
01:30 PM	10	30	1	0	41	31	125	14	6	170	12	31	42	26	85	14	148	23	2	185	34	481	515
01:45 PM	21	44	0	0	65	53	106	17	2	176	19	44	32	13	95	11	162	26	10	199	25	535	560
Total	31	74	1	0	106	84	231	31	8	346	31	75	74	39	180	25	310	49	12	384	59	1016	1075
02:00 PM	14	58	4	0	76	72	148	18	6	238	22	27	40	22	89	8	129	25	14	162	42	565	607
02:15 PM	13	38	0	0	51	64	143	13	3	220	21	53	71	41	145	13	113	26	17	152	61	568	629
02:30 PM	18	46	1	0	65	50	98	17	0	165	29	54	62	31	145	9	126	26	12	161	43	536	579
02:45 PM	13	48	2	0	63	59	114	13	5	186	23	42	63	36	128	11	143	26	13	180	54	557	611
Total	58	190	7	0	255	245	503	61	14	809	95	176	236	130	507	41	511	103	56	655	200	2226	2426
03:00 PM	21	85	0	0	106	93	124	13	4	230	23	44	52	26	119	13	131	34	13	178	43	633	676
03:15 PM	14	54	2	0	70	80	177	34	9	291	29	41	83	69	153	20	153	35	16	208	94	722	816
Grand Total	124	403	10	0	537	502	1035	139	35	1676	178	336	445	264	959	99	1105	221	97	1425	396	4597	4993
Apprch %	23.1	75	1.9			30	61.8	8.3			18.6	35	46.4			6.9	77.5	15.5					
Total %	2.7	8.8	0.2		11.7	10.9	22.5	3		36.5	3.9	7.3	9.7		20.9	2.2	24	4.8		31	7.9	92.1	

	Boulder Avenue Southbound				Greenspot Road Westbound				Boulder Avenue Northbound				Greenspot Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 01:30 PM to 03:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 02:30 PM																	
02:30 PM	18	46	1	65	50	98	17	165	29	54	62	145	9	126	26	161	536
02:45 PM	13	48	2	63	59	114	13	186	23	42	63	128	11	143	26	180	557
03:00 PM	21	85	0	106	93	124	13	230	23	44	52	119	13	131	34	178	633
03:15 PM	14	54	2	70	80	177	34	291	29	41	83	153	20	153	35	208	722
Total Volume	66	233	5	304	282	513	77	872	104	181	260	545	53	553	121	727	2448
% App. Total	21.7	76.6	1.6		32.3	58.8	8.8		19.1	33.2	47.7		7.3	76.1	16.6		
PHF	.786	.685	.625	.717	.758	.725	.566	.749	.897	.838	.783	.891	.663	.904	.864	.874	.848

City of Highland
 N/S: Boulder Avenue
 E/W: Greenspot Road
 Weather: Clear

File Name : 03_HLD_Bo_GS MD
 Site Code : 241037
 Start Date : 5/9/2024
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City of Highland
N/S: Boulder Avenue
E/W: Greenspot Road
Weather: Clear

File Name : 03_HLD_Bo_GS MD
Site Code : 241037
Start Date : 5/9/2024
Page No : 3

	Boulder Avenue Southbound				Greenspot Road Westbound				Boulder Avenue Northbound				Greenspot Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 01:30 PM to 03:15 PM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	02:30 PM				02:30 PM				02:30 PM				02:30 PM				
+0 mins.	18	46	1	65	50	98	17	165	29	54	62	145	9	126	26	161	
+15 mins.	13	48	2	63	59	114	13	186	23	42	63	128	11	143	26	180	
+30 mins.	21	85	0	106	93	124	13	230	23	44	52	119	13	131	34	178	
+45 mins.	14	54	2	70	80	177	34	291	29	41	83	153	20	153	35	208	
Total Volume	66	233	5	304	282	513	77	872	104	181	260	545	53	553	121	727	
% App. Total	21.7	76.6	1.6		32.3	58.8	8.8		19.1	33.2	47.7		7.3	76.1	16.6		
PHF	.786	.685	.625	.717	.758	.725	.566	.749	.897	.838	.783	.891	.663	.904	.864	.874	

Location: Highland
 N/S: Boulder Avenue
 E/W: Greenspot Road



Date: 5/9/2024
 Day: Thursday

PEDESTRIANS

	North Leg Boulder Avenue Pedestrians	East Leg Greenspot Road Pedestrians	South Leg Boulder Avenue Pedestrians	West Leg Greenspot Road Pedestrians	
1:30 PM	0	0	0	0	0
1:45 PM	0	0	0	0	0
2:00 PM	0	0	0	1	1
2:15 PM	1	0	0	0	1
2:30 PM	0	0	0	0	0
2:45 PM	0	0	0	0	0
3:00 PM	0	0	1	0	1
3:15 PM	0	0	0	0	0
TOTAL VOLUMES:	1	0	1	1	3

Location: Highland
 N/S: Boulder Avenue
 E/W: Greenspot Road



Date: 5/9/2024
 Day: Thursday

BICYCLES

	Southbound Boulder Avenue			Westbound Greenspot Road			Northbound Boulder Avenue			Eastbound Greenspot Road			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	1
2:15 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	1
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES:	0	1	0	0	1	0	0	0	1	0	0	0	3

City of Highland
N/S: Church Street
E/W: Greenspot Road
Weather: Clear

File Name : 04_HLD_Church_GS AM
Site Code : 05124443
Start Date : 5/9/2024
Page No : 1

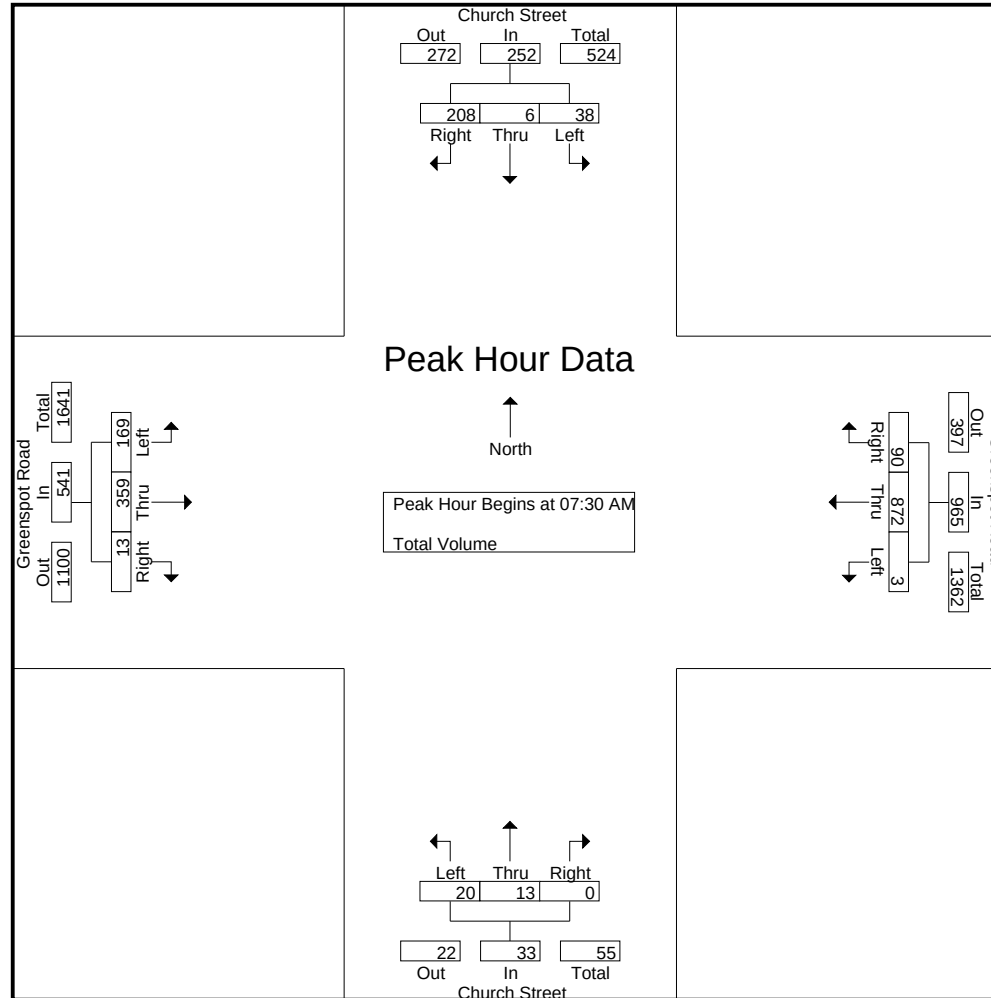
Groups Printed- Total Volume

	Church Street Southbound					Greenspot Road Westbound					Church Street Northbound					Greenspot Road Eastbound					Exclu. Total	Inclu. Total	Int. Total
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total			
07:00 AM	3	0	34	18	37	1	169	9	0	179	5	4	0	0	9	12	61	2	1	75	19	300	319
07:15 AM	0	0	49	17	49	0	225	6	0	231	6	3	0	0	9	23	68	4	0	95	17	384	401
07:30 AM	8	2	42	22	52	1	243	18	0	262	6	3	0	0	9	43	81	5	1	129	23	452	475
07:45 AM	14	3	73	36	90	0	210	48	2	258	1	6	0	0	7	59	90	2	0	151	38	506	544
Total	25	5	198	93	228	2	847	81	2	930	18	16	0	0	34	137	300	13	2	450	97	1642	1739
08:00 AM	10	0	59	22	69	0	233	12	0	245	8	1	0	0	9	28	88	2	0	118	22	441	463
08:15 AM	6	1	34	19	41	2	186	12	0	200	5	3	0	0	8	39	100	4	1	143	20	392	412
08:30 AM	6	1	35	15	42	0	151	9	0	160	7	2	1	0	10	54	107	7	3	168	18	380	398
08:45 AM	5	1	27	14	33	2	131	6	0	139	5	4	2	0	11	35	84	4	1	123	15	306	321
Total	27	3	155	70	185	4	701	39	0	744	25	10	3	0	38	156	379	17	5	552	75	1519	1594
Grand Total	52	8	353	163	413	6	1548	120	2	1674	43	26	3	0	72	293	679	30	7	1002	172	3161	3333
Apprch %	12.6	1.9	85.5			0.4	92.5	7.2			59.7	36.1	4.2			29.2	67.8	3					
Total %	1.6	0.3	11.2		13.1	0.2	49	3.8		53	1.4	0.8	0.1		2.3	9.3	21.5	0.9		31.7	5.2	94.8	

	Church Street Southbound				Greenspot Road Westbound				Church Street Northbound				Greenspot Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	8	2	42	52	1	243	18	262	6	3	0	9	43	81	5	129	452
07:45 AM	14	3	73	90	0	210	48	258	1	6	0	7	59	90	2	151	506
08:00 AM	10	0	59	69	0	233	12	245	8	1	0	9	28	88	2	118	441
08:15 AM	6	1	34	41	2	186	12	200	5	3	0	8	39	100	4	143	392
Total Volume	38	6	208	252	3	872	90	965	20	13	0	33	169	359	13	541	1791
% App. Total	15.1	2.4	82.5		0.3	90.4	9.3		60.6	39.4	0		31.2	66.4	2.4		
PHF	.679	.500	.712	.700	.375	.897	.469	.921	.625	.542	.000	.917	.716	.898	.650	.896	.885

City of Highland
 N/S: Church Street
 E/W: Greenspot Road
 Weather: Clear

File Name : 04_HLD_Chru_GS AM
 Site Code : 05124443
 Start Date : 5/9/2024
 Page No : 2



City of Highland
N/S: Church Street
E/W: Greenspot Road
Weather: Clear

File Name : 04_HLD_Church_GS AM
Site Code : 05124443
Start Date : 5/9/2024
Page No : 3

	Church Street Southbound				Greenspot Road Westbound				Church Street Northbound				Greenspot Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	07:15 AM				07:15 AM				08:00 AM				07:45 AM				
+0 mins.	0	0	49	49	0	225	6	231	8	1	0	9	59	90	2	151	
+15 mins.	8	2	42	52	1	243	18	262	5	3	0	8	28	88	2	118	
+30 mins.	14	3	73	90	0	210	48	258	7	2	1	10	39	100	4	143	
+45 mins.	10	0	59	69	0	233	12	245	5	4	2	11	54	107	7	168	
Total Volume	32	5	223	260	1	911	84	996	25	10	3	38	180	385	15	580	
% App. Total	12.3	1.9	85.8		0.1	91.5	8.4		65.8	26.3	7.9		31	66.4	2.6		
PHF	.571	.417	.764	.722	.250	.937	.438	.950	.781	.625	.375	.864	.763	.900	.536	.863	

City of Highland
N/S: Church Street
E/W: Greenspot Road
Weather: Clear

File Name : 04_HLD_Chū_GS PM
Site Code : 05124443
Start Date : 5/9/2024
Page No : 1

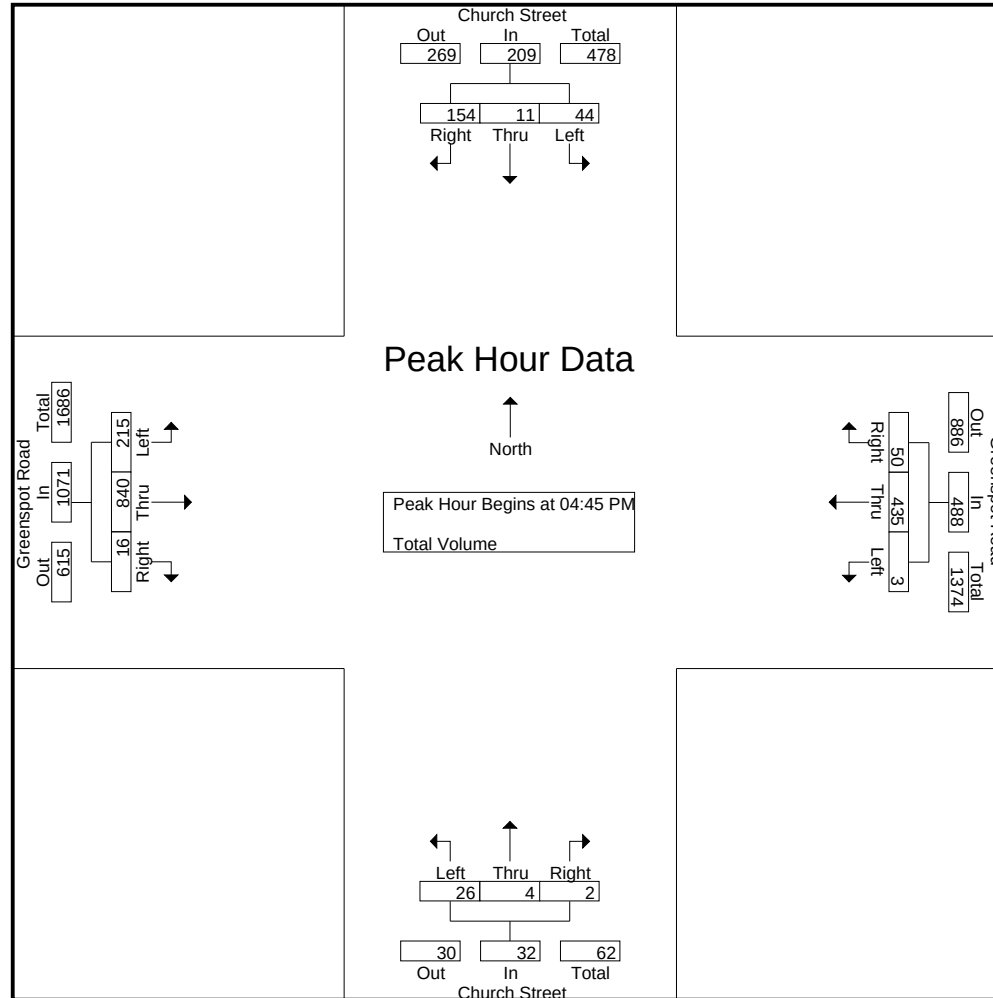
Groups Printed- Total Volume

	Church Street Southbound					Greenspot Road Westbound					Church Street Northbound					Greenspot Road Eastbound					Exclu. Total	Inclu. Total	Int. Total
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	10	2	56	31	68	0	106	12	0	118	6	4	0	0	10	65	171	2	1	238	32	434	466
04:15 PM	16	3	47	20	66	1	106	7	0	114	1	0	1	0	2	56	185	4	0	245	20	427	447
04:30 PM	12	1	48	30	61	2	112	10	0	124	4	0	0	0	4	38	187	4	1	229	31	418	449
04:45 PM	11	1	41	23	53	2	108	18	1	128	5	0	0	0	5	46	205	4	2	255	26	441	467
Total	49	7	192	104	248	5	432	47	1	484	16	4	1	0	21	205	748	14	4	967	109	1720	1829
05:00 PM	9	5	46	31	60	1	120	8	0	129	11	0	2	1	13	56	188	2	0	246	32	448	480
05:15 PM	16	1	37	21	54	0	107	19	1	126	4	2	0	0	6	53	227	6	2	286	24	472	496
05:30 PM	8	4	30	22	42	0	100	5	0	105	6	2	0	0	8	60	220	4	1	284	23	439	462
05:45 PM	9	0	42	19	51	2	98	9	0	109	2	1	1	0	4	49	152	4	1	205	20	369	389
Total	42	10	155	93	207	3	425	41	1	469	23	5	3	1	31	218	787	16	4	1021	99	1728	1827
Grand Total	91	17	347	197	455	8	857	88	2	953	39	9	4	1	52	423	1535	30	8	1988	208	3448	3656
Apprch %	20	3.7	76.3			0.8	89.9	9.2			75	17.3	7.7			21.3	77.2	1.5					
Total %	2.6	0.5	10.1		13.2	0.2	24.9	2.6		27.6	1.1	0.3	0.1		1.5	12.3	44.5	0.9		57.7	5.7	94.3	

	Church Street Southbound				Greenspot Road Westbound				Church Street Northbound				Greenspot Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	11	1	41	53	2	108	18	128	5	0	0	5	46	205	4	255	441
05:00 PM	9	5	46	60	1	120	8	129	11	0	2	13	56	188	2	246	448
05:15 PM	16	1	37	54	0	107	19	126	4	2	0	6	53	227	6	286	472
05:30 PM	8	4	30	42	0	100	5	105	6	2	0	8	60	220	4	284	439
Total Volume	44	11	154	209	3	435	50	488	26	4	2	32	215	840	16	1071	1800
% App. Total	21.1	5.3	73.7		0.6	89.1	10.2		81.2	12.5	6.2		20.1	78.4	1.5		
PHF	.688	.550	.837	.871	.375	.906	.658	.946	.591	.500	.250	.615	.896	.925	.667	.936	.953

City of Highland
 N/S: Church Street
 E/W: Greenspot Road
 Weather: Clear

File Name : 04_HLD_Ch_u_GS PM
 Site Code : 05124443
 Start Date : 5/9/2024
 Page No : 2



City of Highland
N/S: Church Street
E/W: Greenspot Road
Weather: Clear

File Name : 04_HLD_Church_GS PM
Site Code : 05124443
Start Date : 5/9/2024
Page No : 3

	Church Street Southbound				Greenspot Road Westbound				Church Street Northbound				Greenspot Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	04:00 PM				04:30 PM				04:45 PM				04:45 PM				
+0 mins.	10	2	56	68	2	112	10	124	5	0	0	5	46	205	4	255	
+15 mins.	16	3	47	66	2	108	18	128	11	0	2	13	56	188	2	246	
+30 mins.	12	1	48	61	1	120	8	129	4	2	0	6	53	227	6	286	
+45 mins.	11	1	41	53	0	107	19	126	6	2	0	8	60	220	4	284	
Total Volume	49	7	192	248	5	447	55	507	26	4	2	32	215	840	16	1071	
% App. Total	19.8	2.8	77.4		1	88.2	10.8		81.2	12.5	6.2		20.1	78.4	1.5		
PHF	.766	.583	.857	.912	.625	.931	.724	.983	.591	.500	.250	.615	.896	.925	.667	.936	

Location: Highland
 N/S: Church Street
 E/W: Greenspot Road



Date: 5/9/2024
 Day: Thursday

PEDESTRIANS

	North Leg Church Street	East Leg Greenspot Road	South Leg Church Street	West Leg Greenspot Road	
	Pedestrians	Pedestrians	Pedestrians	Pedestrians	
7:00 AM	0	0	0	0	0
7:15 AM	0	0	0	0	0
7:30 AM	1	0	0	0	1
7:45 AM	2	2	0	0	4
8:00 AM	0	1	0	0	1
8:15 AM	0	1	0	0	1
8:30 AM	2	0	0	0	2
8:45 AM	0	0	0	0	0
TOTAL VOLUMES:	5	4	0	0	9

	North Leg Church Street	East Leg Greenspot Road	South Leg Church Street	West Leg Greenspot Road	
	Pedestrians	Pedestrians	Pedestrians	Pedestrians	
4:00 PM	0	0	0	0	0
4:15 PM	1	0	0	0	1
4:30 PM	1	0	0	0	1
4:45 PM	0	0	0	0	0
5:00 PM	1	2	2	0	5
5:15 PM	0	0	0	0	0
5:30 PM	0	1	0	0	1
5:45 PM	2	0	0	1	3
TOTAL VOLUMES:	5	3	2	1	11

Location: Highland
 N/S: Church Street
 E/W: Greenspot Road



Date: 5/9/2024
 Day: Thursday

BICYCLES

		Southbound Church Street			Westbound Greenspot Road			Northbound Church Street			Eastbound Greenspot Road			
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:45 AM	0	0	1	0	0	0	0	0	0	0	0	0	1
	8:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	1
	8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:30 AM	0	0	1	0	0	1	0	0	0	0	0	0	2
	8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES:		0	0	2	0	0	1	0	0	0	0	1	0	4

		Southbound Church Street			Westbound Greenspot Road			Northbound Church Street			Eastbound Greenspot Road			
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:15 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:30 PM	0	0	0	1	0	0	0	0	0	0	1	0	2
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES:		0	0	0	1	1	0	0	0	0	0	1	0	3

City of Highland
N/S: Church Street
E/W: Greenspot Road
Weather: Clear

File Name : 04_HLD_Ch_u_GS MD
Site Code : 241037
Start Date : 5/9/2024
Page No : 1

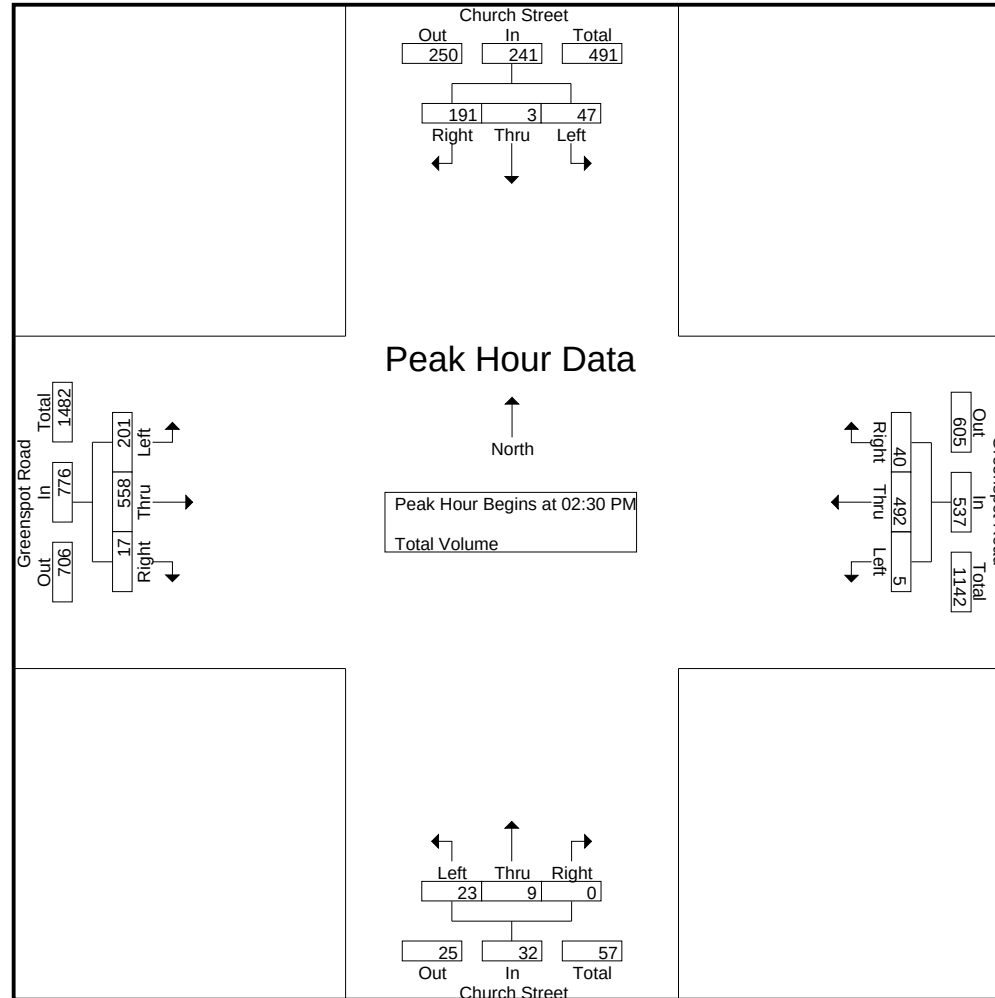
Groups Printed- Total Volume

	Church Street Southbound					Greenspot Road Westbound					Church Street Northbound					Greenspot Road Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
01:30 PM	10	1	44	26	55	0	110	19	3	129	4	2	0	0	6	52	126	1	0	179	29	369	398
01:45 PM	9	2	43	30	54	1	113	11	1	125	5	4	0	0	9	48	105	5	0	158	31	346	377
Total	19	3	87	56	109	1	223	30	4	254	9	6	0	0	15	100	231	6	0	337	60	715	775
02:00 PM	15	5	53	29	73	3	129	19	4	151	1	2	1	1	4	55	115	5	0	175	34	403	437
02:15 PM	13	9	52	25	74	2	107	11	0	120	3	3	0	0	6	65	127	3	0	195	25	395	420
02:30 PM	11	0	42	32	53	0	94	9	1	103	3	0	0	0	3	49	131	3	1	183	34	342	376
02:45 PM	7	0	33	23	40	1	125	14	3	140	6	3	0	0	9	48	133	2	0	183	26	372	398
Total	46	14	180	109	240	6	455	53	8	514	13	8	1	1	22	217	506	13	1	736	119	1512	1631
03:00 PM	16	2	71	38	89	0	140	6	2	146	8	0	0	0	8	49	124	5	0	178	40	421	461
03:15 PM	13	1	45	30	59	4	133	11	4	148	6	6	0	0	12	55	170	7	0	232	34	451	485
Grand Total	94	20	383	233	497	11	951	100	18	1062	36	20	1	1	57	421	1031	31	1	1483	253	3099	3352
Apprch %	18.9	4	77.1			1	89.5	9.4			63.2	35.1	1.8			28.4	69.5	2.1					
Total %	3	0.6	12.4		16	0.4	30.7	3.2		34.3	1.2	0.6	0		1.8	13.6	33.3	1		47.9	7.5	92.5	

	Church Street Southbound				Greenspot Road Westbound				Church Street Northbound				Greenspot Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 01:30 PM to 03:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 02:30 PM																	
02:30 PM	11	0	42	53	0	94	9	103	3	0	0	3	49	131	3	183	342
02:45 PM	7	0	33	40	1	125	14	140	6	3	0	9	48	133	2	183	372
03:00 PM	16	2	71	89	0	140	6	146	8	0	0	8	49	124	5	178	421
03:15 PM	13	1	45	59	4	133	11	148	6	6	0	12	55	170	7	232	451
Total Volume	47	3	191	241	5	492	40	537	23	9	0	32	201	558	17	776	1586
% App. Total	19.5	1.2	79.3		0.9	91.6	7.4		71.9	28.1	0		25.9	71.9	2.2		
PHF	.734	.375	.673	.677	.313	.879	.714	.907	.719	.375	.000	.667	.914	.821	.607	.836	.879

City of Highland
 N/S: Church Street
 E/W: Greenspot Road
 Weather: Clear

File Name : 04_HLD_Church_GS MD
 Site Code : 241037
 Start Date : 5/9/2024
 Page No : 2



City of Highland
N/S: Church Street
E/W: Greenspot Road
Weather: Clear

File Name : 04_HLD_Church_GS MD
Site Code : 241037
Start Date : 5/9/2024
Page No : 3

	Church Street Southbound				Greenspot Road Westbound				Church Street Northbound				Greenspot Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 01:30 PM to 03:15 PM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	01:30 PM				02:30 PM				02:30 PM				02:30 PM				
+0 mins.	10	1	44	55	0	94	9	103	3	0	0	3	49	131	3	183	
+15 mins.	9	2	43	54	1	125	14	140	6	3	0	9	48	133	2	183	
+30 mins.	15	5	53	73	0	140	6	146	8	0	0	8	49	124	5	178	
+45 mins.	13	9	52	74	4	133	11	148	6	6	0	12	55	170	7	232	
Total Volume	47	17	192	256	5	492	40	537	23	9	0	32	201	558	17	776	
% App. Total	18.4	6.6	75		0.9	91.6	7.4		71.9	28.1	0		25.9	71.9	2.2		
PHF	.783	.472	.906	.865	.313	.879	.714	.907	.719	.375	.000	.667	.914	.821	.607	.836	

Location: Highland
 N/S: Church Street
 E/W: Greenspot Road



Date: 5/9/2024
 Day: Thursday

PEDESTRIANS

	North Leg Church Street	East Leg Greenspot Road	South Leg Church Street	West Leg Greenspot Road	
	Pedestrians	Pedestrians	Pedestrians	Pedestrians	
1:30 PM	0	0	0	0	0
1:45 PM	0	0	0	0	0
2:00 PM	0	0	0	0	0
2:15 PM	1	0	0	0	1
2:30 PM	0	0	0	0	0
2:45 PM	0	0	0	0	0
3:00 PM	1	0	0	0	1
3:15 PM	0	0	0	0	0
TOTAL VOLUMES:	2	0	0	0	2

Location: Highland
 N/S: Church Street
 E/W: Greenspot Road



Date: 5/9/2024
 Day: Thursday

BICYCLES

	Southbound Church Street			Westbound Greenspot Road			Northbound Church Street			Eastbound Greenspot Road			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 PM	0	1	0	0	1	0	0	0	0	0	0	0	2
2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1
TOTAL VOLUMES:	0	1	0	0	1	0	0	0	0	0	1	0	3

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Highland
N/S: Weaver Street
E/W: Greenspot Road
Weather: Clear

File Name : 05_HLD_Wea_GS AM
Site Code : 05124443
Start Date : 5/9/2024
Page No : 1

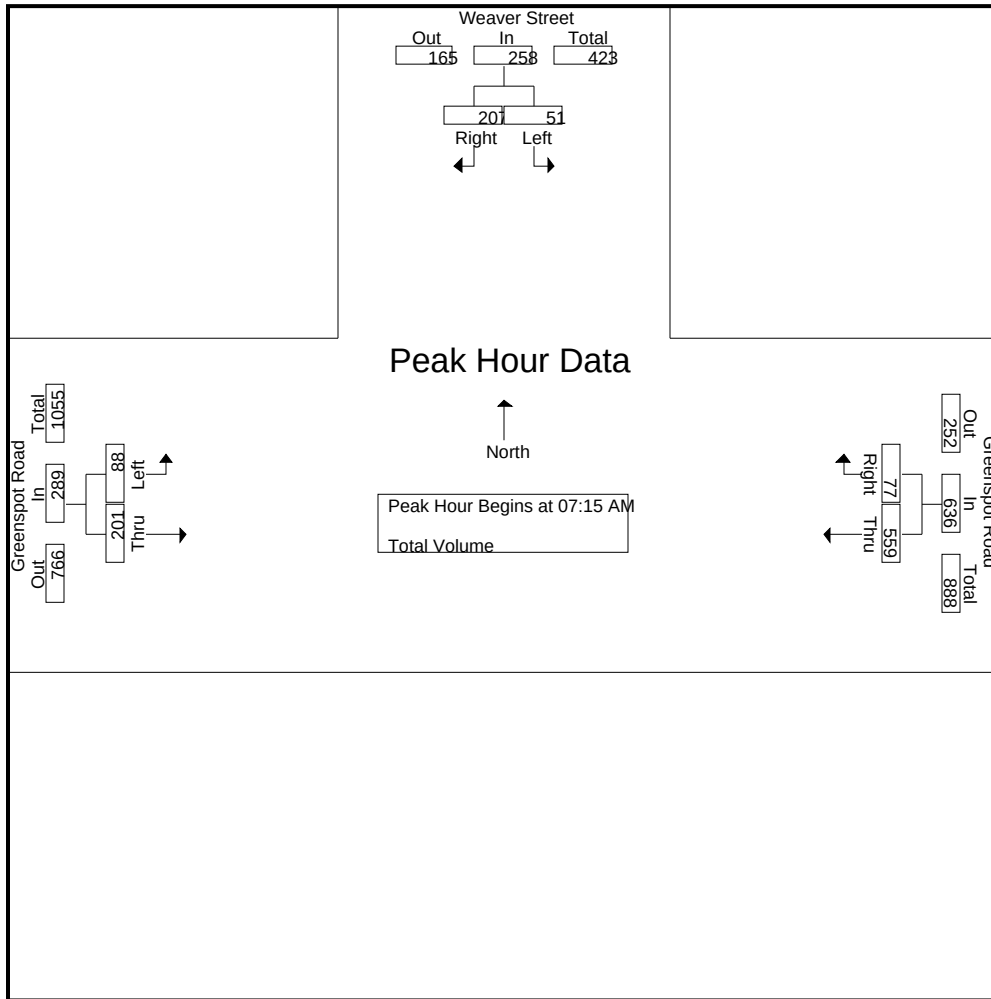
Groups Printed- Total Volume

	Weaver Street Southbound				Greenspot Road Westbound				Greenspot Road Eastbound						
Start Time	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Left	Thru	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	7	25	15	32	113	9	0	122	10	41	0	51	15	205	220
07:15 AM	14	47	20	61	140	18	0	158	20	38	0	58	20	277	297
07:30 AM	12	64	22	76	144	11	0	155	31	47	0	78	22	309	331
07:45 AM	15	53	27	68	135	20	1	155	25	61	0	86	28	309	337
Total	48	189	84	237	532	58	1	590	86	187	0	273	85	1100	1185
08:00 AM	10	43	16	53	140	28	2	168	12	55	0	67	18	288	306
08:15 AM	5	37	21	42	118	12	1	130	35	50	0	85	22	257	279
08:30 AM	14	27	19	41	92	16	1	108	30	51	0	81	20	230	250
08:45 AM	7	28	18	35	72	8	0	80	22	51	0	73	18	188	206
Total	36	135	74	171	422	64	4	486	99	207	0	306	78	963	1041
Grand Total	84	324	158	408	954	122	5	1076	185	394	0	579	163	2063	2226
Apprch %	20.6	79.4			88.7	11.3			32	68					
Total %	4.1	15.7		19.8	46.2	5.9		52.2	9	19.1		28.1	7.3	92.7	

	Weaver Street Southbound			Greenspot Road Westbound			Greenspot Road Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:15 AM										
07:15 AM	14	47	61	140	18	158	20	38	58	277
07:30 AM	12	64	76	144	11	155	31	47	78	309
07:45 AM	15	53	68	135	20	155	25	61	86	309
08:00 AM	10	43	53	140	28	168	12	55	67	288
Total Volume	51	207	258	559	77	636	88	201	289	1183
% App. Total	19.8	80.2		87.9	12.1		30.4	69.6		
PHF	.850	.809	.849	.970	.688	.946	.710	.824	.840	.957

City of Highland
N/S: Weaver Street
E/W: Greenspot Road
Weather: Clear

File Name : 05_HLD_Wea_GS AM
Site Code : 05124443
Start Date : 5/9/2024
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Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:15 AM			07:15 AM			07:45 AM		
+0 mins.	14	47	61	140	18	158	25	61	86
+15 mins.	12	64	76	144	11	155	12	55	67
+30 mins.	15	53	68	135	20	155	35	50	85
+45 mins.	10	43	53	140	28	168	30	51	81
Total Volume	51	207	258	559	77	636	102	217	319
% App. Total	19.8	80.2		87.9	12.1		32	68	
PHF	.850	.809	.849	.970	.688	.946	.729	.889	.927

City of Highland
N/S: Weaver Street
E/W: Greenspot Road
Weather: Clear

File Name : 05_HLD_Wea_GS PM
Site Code : 05124443
Start Date : 5/9/2024
Page No : 1

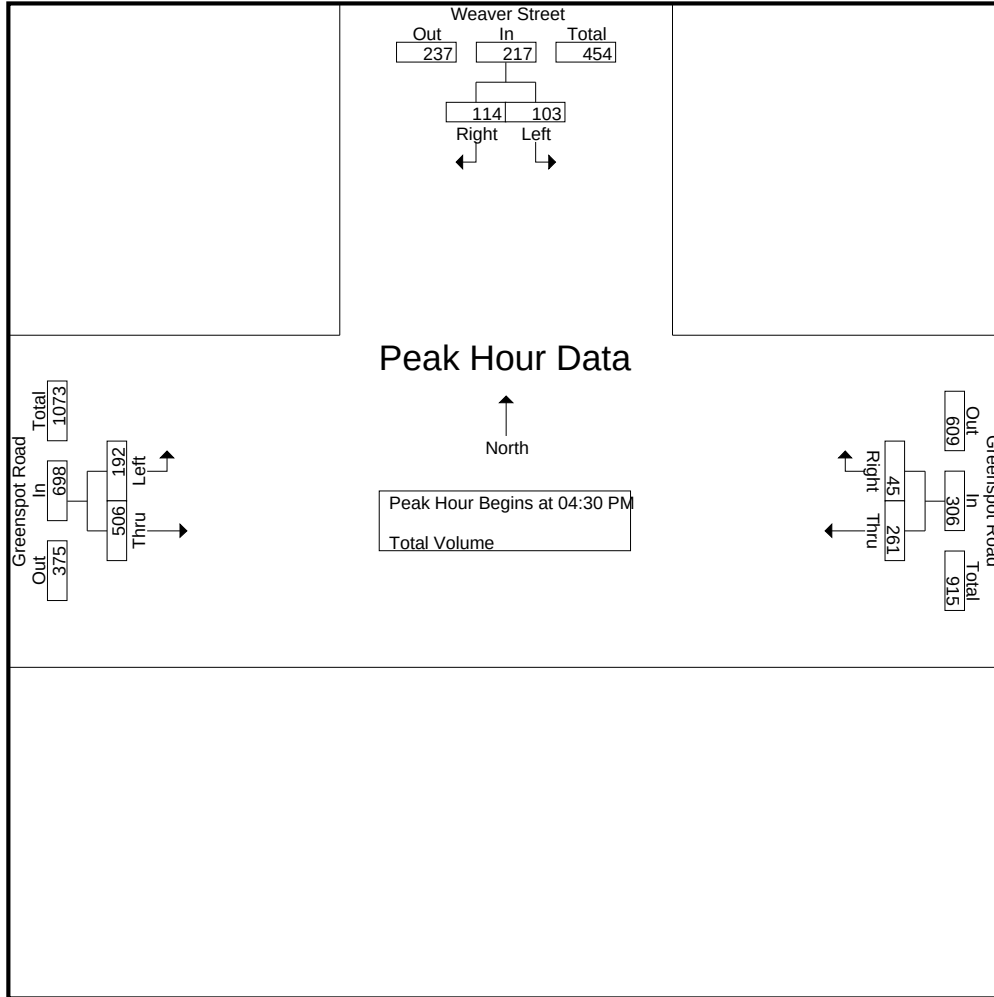
Groups Printed- Total Volume

	Weaver Street Southbound				Greenspot Road Westbound				Greenspot Road Eastbound						
Start Time	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Left	Thru	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	32	24	10	56	65	14	1	79	45	102	0	147	11	282	293
04:15 PM	22	25	11	47	62	10	0	72	45	118	0	163	11	282	293
04:30 PM	31	39	17	70	58	15	2	73	51	127	0	178	19	321	340
04:45 PM	30	20	12	50	60	12	1	72	62	110	0	172	13	294	307
Total	115	108	50	223	245	51	4	296	203	457	0	660	54	1179	1233
05:00 PM	22	31	20	53	75	6	1	81	32	142	0	174	21	308	329
05:15 PM	20	24	13	44	68	12	0	80	47	127	0	174	13	298	311
05:30 PM	27	29	18	56	64	10	0	74	55	123	0	178	18	308	326
05:45 PM	18	26	12	44	50	12	0	62	41	107	0	148	12	254	266
Total	87	110	63	197	257	40	1	297	175	499	0	674	64	1168	1232
Grand Total	202	218	113	420	502	91	5	593	378	956	0	1334	118	2347	2465
Apprch %	48.1	51.9			84.7	15.3			28.3	71.7					
Total %	8.6	9.3		17.9	21.4	3.9		25.3	16.1	40.7		56.8	4.8	95.2	

	Weaver Street Southbound			Greenspot Road Westbound			Greenspot Road Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	31	39	70	58	15	73	51	127	178	321
04:45 PM	30	20	50	60	12	72	62	110	172	294
05:00 PM	22	31	53	75	6	81	32	142	174	308
05:15 PM	20	24	44	68	12	80	47	127	174	298
Total Volume	103	114	217	261	45	306	192	506	698	1221
% App. Total	47.5	52.5		85.3	14.7		27.5	72.5		
PHF	.831	.731	.775	.870	.750	.944	.774	.891	.980	.951

City of Highland
N/S: Weaver Street
E/W: Greenspot Road
Weather: Clear

File Name : 05_HLD_Wea_GS PM
Site Code : 05124443
Start Date : 5/9/2024
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Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM			04:45 PM			04:30 PM		
+0 mins.	32	24	56	60	12	72	51	127	178
+15 mins.	22	25	47	75	6	81	62	110	172
+30 mins.	31	39	70	68	12	80	32	142	174
+45 mins.	30	20	50	64	10	74	47	127	174
Total Volume	115	108	223	267	40	307	192	506	698
% App. Total	51.6	48.4		87	13		27.5	72.5	
PHF	.898	.692	.796	.890	.833	.948	.774	.891	.980

Location: Highland
 N/S: Weaver Street
 E/W: Greenspot Road



Date: 5/9/2024
 Day: Thursday

PEDESTRIANS

		North Leg Weaver Street	East Leg Greenspot Road	South Leg Dead End	West Leg Greenspot Road	
		Pedestrians	Pedestrians	Pedestrians	Pedestrians	
	7:00 AM	0	0	0	0	0
	7:15 AM	0	0	0	0	0
	7:30 AM	0	0	0	0	0
	7:45 AM	1	0	0	0	1
	8:00 AM	0	0	0	0	0
	8:15 AM	0	0	0	0	0
	8:30 AM	1	0	0	0	1
	8:45 AM	0	0	0	0	0
	TOTAL VOLUMES:	2	0	0	0	2

		North Leg Weaver Street	East Leg Greenspot Road	South Leg Dead End	West Leg Greenspot Road	
		Pedestrians	Pedestrians	Pedestrians	Pedestrians	
	4:00 PM	0	0	0	0	0
	4:15 PM	0	0	0	0	0
	4:30 PM	0	0	0	0	0
	4:45 PM	0	0	0	0	0
	5:00 PM	0	0	0	0	0
	5:15 PM	0	0	0	0	0
	5:30 PM	2	0	0	0	2
	5:45 PM	1	0	0	0	1
	TOTAL VOLUMES:	3	0	0	0	3

Location: Highland
 N/S: Weaver Street
 E/W: Greenspot Road



Date: 5/9/2024
 Day: Thursday

BICYCLES

	Southbound Weaver Street			Westbound Greenspot Road			Northbound Dead End			Eastbound Greenspot Road			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	1
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	1
8:30 AM	0	0	0	0	1	0	0	0	0	0	0	0	1
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES:	0	0	0	0	1	0	0	0	0	0	2	0	3

	Southbound Weaver Street			Westbound Greenspot Road			Northbound Dead End			Eastbound Greenspot Road			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	1
4:15 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	1
5:00 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES:	0	0	0	0	2	0	0	0	0	0	2	0	4

City of Highland
N/S: Weaver Street
E/W: Greenspot Road
Weather: Clear

File Name : 05_HLD_Wea_GS MD
Site Code : 241037
Start Date : 5/9/2024
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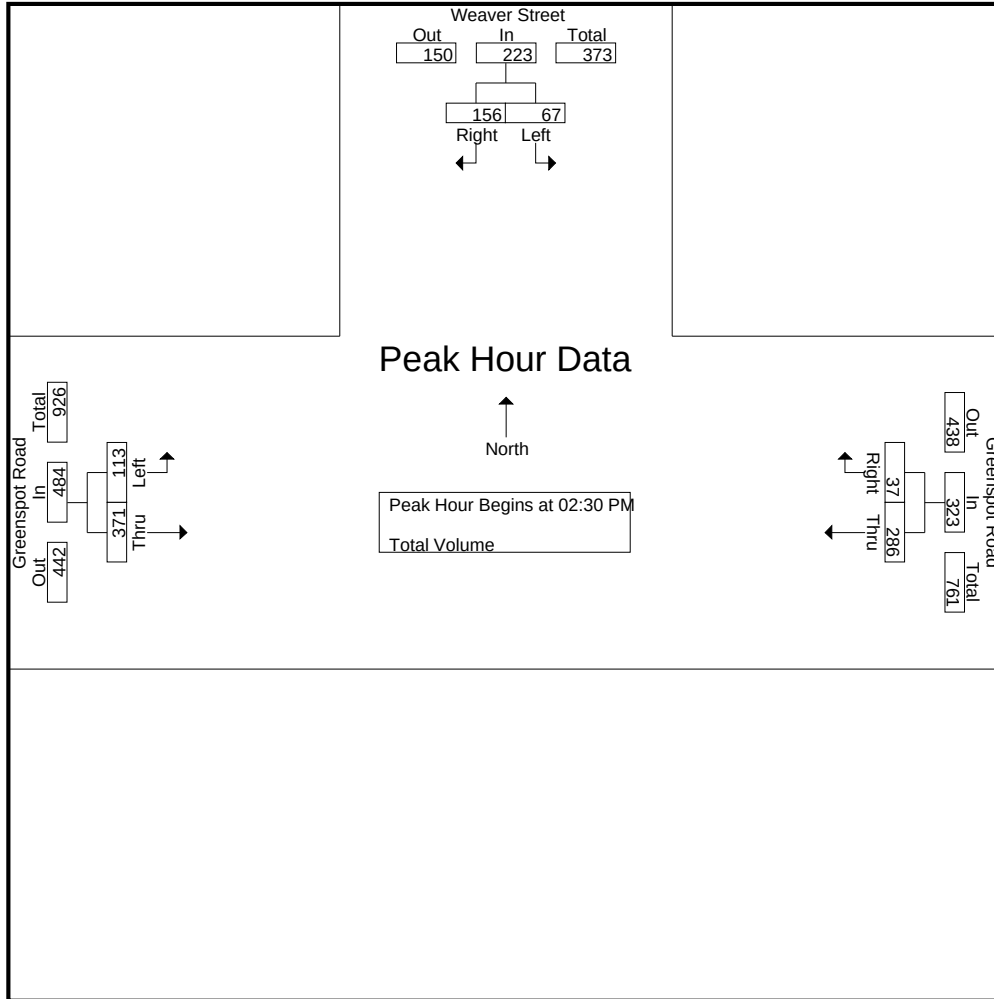
Groups Printed- Total Volume

	Weaver Street Southbound				Greenspot Road Westbound				Greenspot Road Eastbound						
Start Time	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Left	Thru	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
01:30 PM	13	28	17	41	68	12	2	80	32	69	0	101	19	222	241
01:45 PM	15	37	22	52	76	9	0	85	37	56	0	93	22	230	252
Total	28	65	39	93	144	21	2	165	69	125	0	194	41	452	493
02:00 PM	11	44	30	55	74	7	0	81	28	65	0	93	30	229	259
02:15 PM	20	23	14	43	61	8	0	69	30	85	0	115	14	227	241
02:30 PM	23	33	22	56	52	7	1	59	28	92	0	120	23	235	258
02:45 PM	14	35	23	49	78	10	0	88	25	76	0	101	23	238	261
Total	68	135	89	203	265	32	1	297	111	318	0	429	90	929	1019
03:00 PM	15	49	25	64	77	14	0	91	20	98	0	118	25	273	298
03:15 PM	15	39	26	54	79	6	0	85	40	105	0	145	26	284	310
Grand Total	126	288	179	414	565	73	3	638	240	646	0	886	182	1938	2120
Apprch %	30.4	69.6			88.6	11.4			27.1	72.9					
Total %	6.5	14.9		21.4	29.2	3.8		32.9	12.4	33.3		45.7	8.6	91.4	

	Weaver Street Southbound			Greenspot Road Westbound			Greenspot Road Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 01:30 PM to 03:15 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 02:30 PM										
02:30 PM	23	33	56	52	7	59	28	92	120	235
02:45 PM	14	35	49	78	10	88	25	76	101	238
03:00 PM	15	49	64	77	14	91	20	98	118	273
03:15 PM	15	39	54	79	6	85	40	105	145	284
Total Volume	67	156	223	286	37	323	113	371	484	1030
% App. Total	30	70		88.5	11.5		23.3	76.7		
PHF	.728	.796	.871	.905	.661	.887	.706	.883	.834	.907

City of Highland
N/S: Weaver Street
E/W: Greenspot Road
Weather: Clear

File Name : 05_HLD_Wea_GS MD
Site Code : 241037
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Peak Hour Analysis From 01:30 PM to 03:15 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	02:30 PM			02:30 PM			02:30 PM		
+0 mins.	23	33	56	52	7	59	28	92	120
+15 mins.	14	35	49	78	10	88	25	76	101
+30 mins.	15	49	64	77	14	91	20	98	118
+45 mins.	15	39	54	79	6	85	40	105	145
Total Volume	67	156	223	286	37	323	113	371	484
% App. Total	30	70		88.5	11.5		23.3	76.7	
PHF	.728	.796	.871	.905	.661	.887	.706	.883	.834

Location: Highland
 N/S: Weaver Street
 E/W: Greenspot Road



Date: 5/9/2024
 Day: Thursday

PEDESTRIANS

	North Leg Weaver Street	East Leg Greenspot Road	South Leg Dead End	West Leg Greenspot Road	
	Pedestrians	Pedestrians	Pedestrians	Pedestrians	
1:30 PM	1	0	0	0	1
1:45 PM	1	0	0	0	1
2:00 PM	0	0	0	0	0
2:15 PM	1	0	0	0	1
2:30 PM	1	0	0	0	1
2:45 PM	2	0	0	0	2
3:00 PM	0	0	0	1	1
3:15 PM	0	0	0	0	0
TOTAL VOLUMES:	6	0	0	1	7

Location: Highland
 N/S: Weaver Street
 E/W: Greenspot Road



Date: 5/9/2024
 Day: Thursday

BICYCLES

	Southbound Weaver Street			Westbound Greenspot Road			Northbound Dead End			Eastbound Greenspot Road			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 PM	0	0	1	0	0	0	0	0	0	0	0	0	1
2:15 PM	0	0	0	0	0	0	0	0	0	1	0	0	1
2:30 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	2	0	0	0	0	0	0	0	2
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES:	0	0	1	0	3	0	0	0	0	1	0	0	5

City of Highland
N/S: Alta Vista
E/W: Greenspot Road
Weather: Clear

File Name : 06_HLD_AV_GS AM
Site Code : 05124443
Start Date : 5/9/2024
Page No : 1

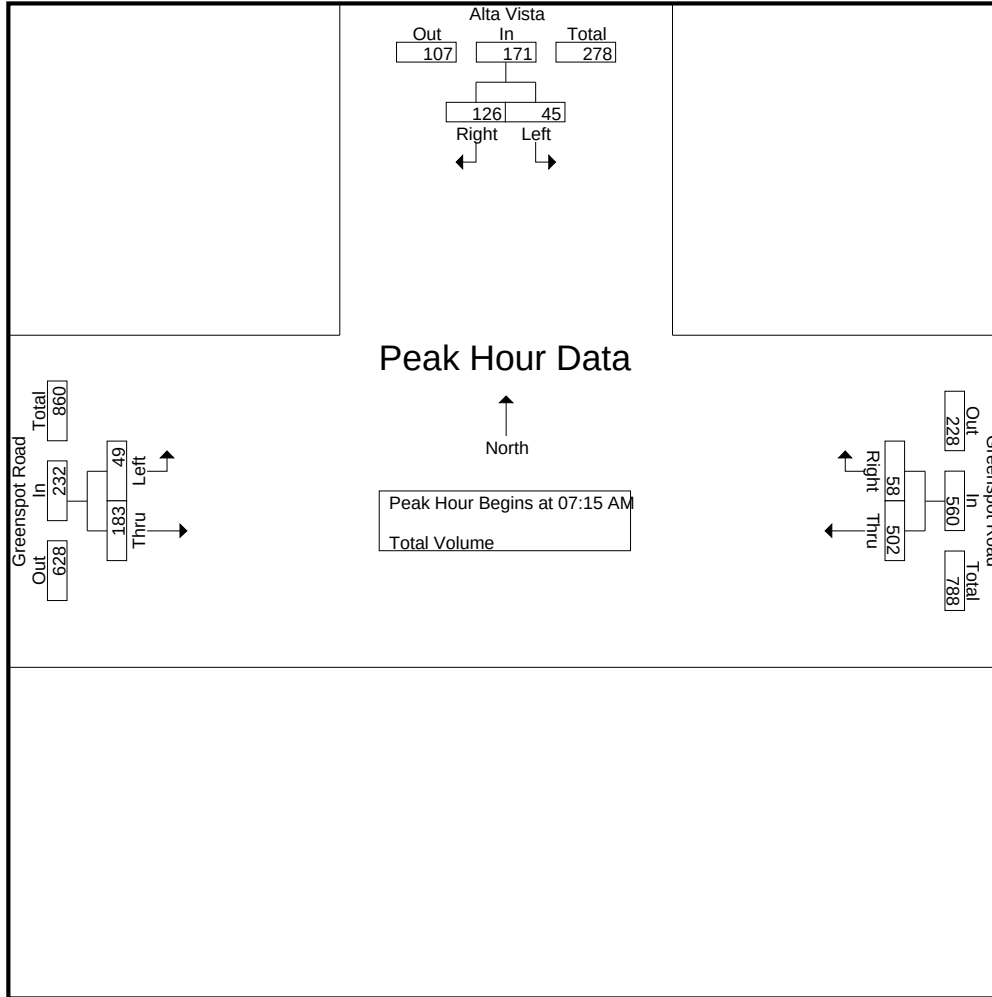
Groups Printed- Total Volume

	Alta Vista Southbound			Greenspot Road Westbound			Greenspot Road Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
07:00 AM	4	30	34	94	8	102	10	40	50	186
07:15 AM	4	33	37	119	17	136	10	37	47	220
07:30 AM	20	33	53	128	32	160	13	46	59	272
07:45 AM	19	31	50	121	5	126	9	58	67	243
Total	47	127	174	462	62	524	42	181	223	921
08:00 AM	2	29	31	134	4	138	17	42	59	228
08:15 AM	4	27	31	94	6	100	11	44	55	186
08:30 AM	5	17	22	91	3	94	12	56	68	184
08:45 AM	0	16	16	61	3	64	15	44	59	139
Total	11	89	100	380	16	396	55	186	241	737
Grand Total	58	216	274	842	78	920	97	367	464	1658
Apprch %	21.2	78.8		91.5	8.5		20.9	79.1		
Total %	3.5	13	16.5	50.8	4.7	55.5	5.9	22.1	28	

	Alta Vista Southbound			Greenspot Road Westbound			Greenspot Road Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:15 AM										
07:15 AM	4	33	37	119	17	136	10	37	47	220
07:30 AM	20	33	53	128	32	160	13	46	59	272
07:45 AM	19	31	50	121	5	126	9	58	67	243
08:00 AM	2	29	31	134	4	138	17	42	59	228
Total Volume	45	126	171	502	58	560	49	183	232	963
% App. Total	26.3	73.7		89.6	10.4		21.1	78.9		
PHF	.563	.955	.807	.937	.453	.875	.721	.789	.866	.885

City of Highland
N/S: Alta Vista
E/W: Greenspot Road
Weather: Clear

File Name : 06_HLD_AV_GS AM
Site Code : 05124443
Start Date : 5/9/2024
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Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM			07:15 AM			07:45 AM		
+0 mins.	4	30	34	119	17	136	9	58	67
+15 mins.	4	33	37	128	32	160	17	42	59
+30 mins.	20	33	53	121	5	126	11	44	55
+45 mins.	19	31	50	134	4	138	12	56	68
Total Volume	47	127	174	502	58	560	49	200	249
% App. Total	27	73		89.6	10.4		19.7	80.3	
PHF	.588	.962	.821	.937	.453	.875	.721	.862	.915

City of Highland
N/S: Alta Vista
E/W: Greenspot Road
Weather: Clear

File Name : 06_HLD_AV_GS PM
Site Code : 05124443
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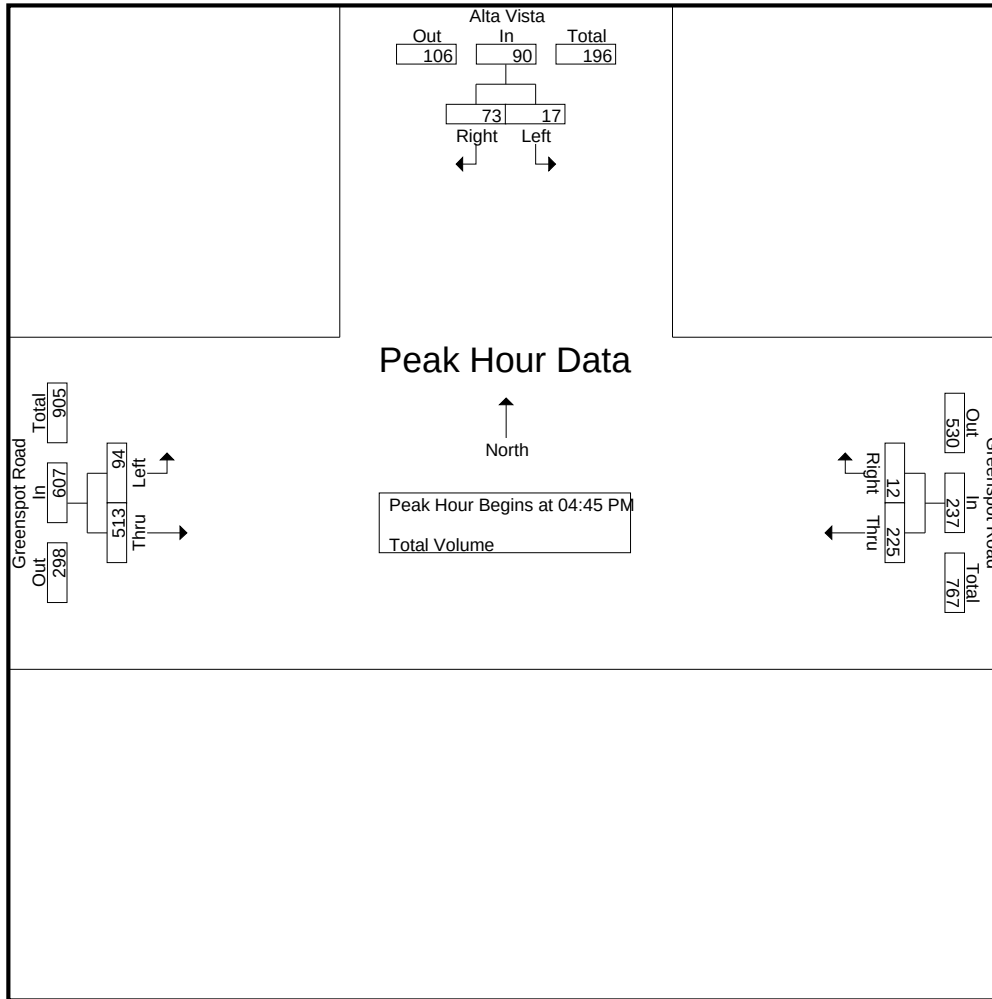
Groups Printed- Total Volume

	Alta Vista Southbound			Greenspot Road Westbound			Greenspot Road Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
04:00 PM	2	9	11	71	3	74	24	103	127	212
04:15 PM	7	9	16	58	5	63	30	108	138	217
04:30 PM	6	18	24	54	4	58	18	125	143	225
04:45 PM	6	18	24	54	2	56	20	132	152	232
Total	21	54	75	237	14	251	92	468	560	886
05:00 PM	2	26	28	55	6	61	28	128	156	245
05:15 PM	3	12	15	60	2	62	21	126	147	224
05:30 PM	6	17	23	56	2	58	25	127	152	233
05:45 PM	5	14	19	50	7	57	20	93	113	189
Total	16	69	85	221	17	238	94	474	568	891
Grand Total	37	123	160	458	31	489	186	942	1128	1777
Apprch %	23.1	76.9		93.7	6.3		16.5	83.5		
Total %	2.1	6.9	9	25.8	1.7	27.5	10.5	53	63.5	

	Alta Vista Southbound			Greenspot Road Westbound			Greenspot Road Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:45 PM										
04:45 PM	6	18	24	54	2	56	20	132	152	232
05:00 PM	2	26	28	55	6	61	28	128	156	245
05:15 PM	3	12	15	60	2	62	21	126	147	224
05:30 PM	6	17	23	56	2	58	25	127	152	233
Total Volume	17	73	90	225	12	237	94	513	607	934
% App. Total	18.9	81.1		94.9	5.1		15.5	84.5		
PHF	.708	.702	.804	.938	.500	.956	.839	.972	.973	.953

City of Highland
N/S: Alta Vista
E/W: Greenspot Road
Weather: Clear

File Name : 06_HLD_AV_GS PM
Site Code : 05124443
Start Date : 5/9/2024
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:15 PM			04:00 PM			04:45 PM		
+0 mins.	7	9	16	71	3	74	20	132	152
+15 mins.	6	18	24	58	5	63	28	128	156
+30 mins.	6	18	24	54	4	58	21	126	147
+45 mins.	2	26	28	54	2	56	25	127	152
Total Volume	21	71	92	237	14	251	94	513	607
% App. Total	22.8	77.2		94.4	5.6		15.5	84.5	
PHF	.750	.683	.821	.835	.700	.848	.839	.972	.973

Location: Highland
 N/S: Alta Vista
 E/W: Greenspot Road



Date: 5/9/2024
 Day: Thursday

PEDESTRIANS

	North Leg Alta Vista	East Leg Greenspot Road	South Leg Dead End	West Leg Greenspot Road	
	Pedestrians	Pedestrians	Pedestrians	Pedestrians	
7:00 AM	0	0	0	0	0
7:15 AM	0	0	0	0	0
7:30 AM	0	0	0	0	0
7:45 AM	0	0	0	0	0
8:00 AM	0	0	0	0	0
8:15 AM	0	0	0	0	0
8:30 AM	0	0	0	0	0
8:45 AM	2	0	0	0	2
TOTAL VOLUMES:	2	0	0	0	2

	North Leg Alta Vista	East Leg Greenspot Road	South Leg Dead End	West Leg Greenspot Road	
	Pedestrians	Pedestrians	Pedestrians	Pedestrians	
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
TOTAL VOLUMES:	0	0	0	0	0

Location: Highland
 N/S: Alta Vista
 E/W: Greenspot Road



Date: 5/9/2024
 Day: Thursday

BICYCLES

		Southbound Alta Vista			Westbound Greenspot Road			Northbound Dead End			Eastbound Greenspot Road			
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	1
	8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	1
	8:30 AM	0	0	0	0	1	0	0	0	0	0	1	0	2
	8:45 AM	2	0	0	0	0	0	0	0	0	0	0	0	2
TOTAL VOLUMES:		2	0	0	0	1	0	0	0	0	0	3	0	6

		Southbound Alta Vista			Westbound Greenspot Road			Northbound Dead End			Eastbound Greenspot Road			
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
	4:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	1
	4:15 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
	5:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	1
	5:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	1
	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES:		0	0	0	0	2	2	0	0	0	0	1	0	5

City of Highland
N/S: Alta Vista
E/W: Greenspot Road
Weather: Clear

File Name : HLDVGRMD
Site Code : 241037
Start Date : 5/9/2024
Page No : 1

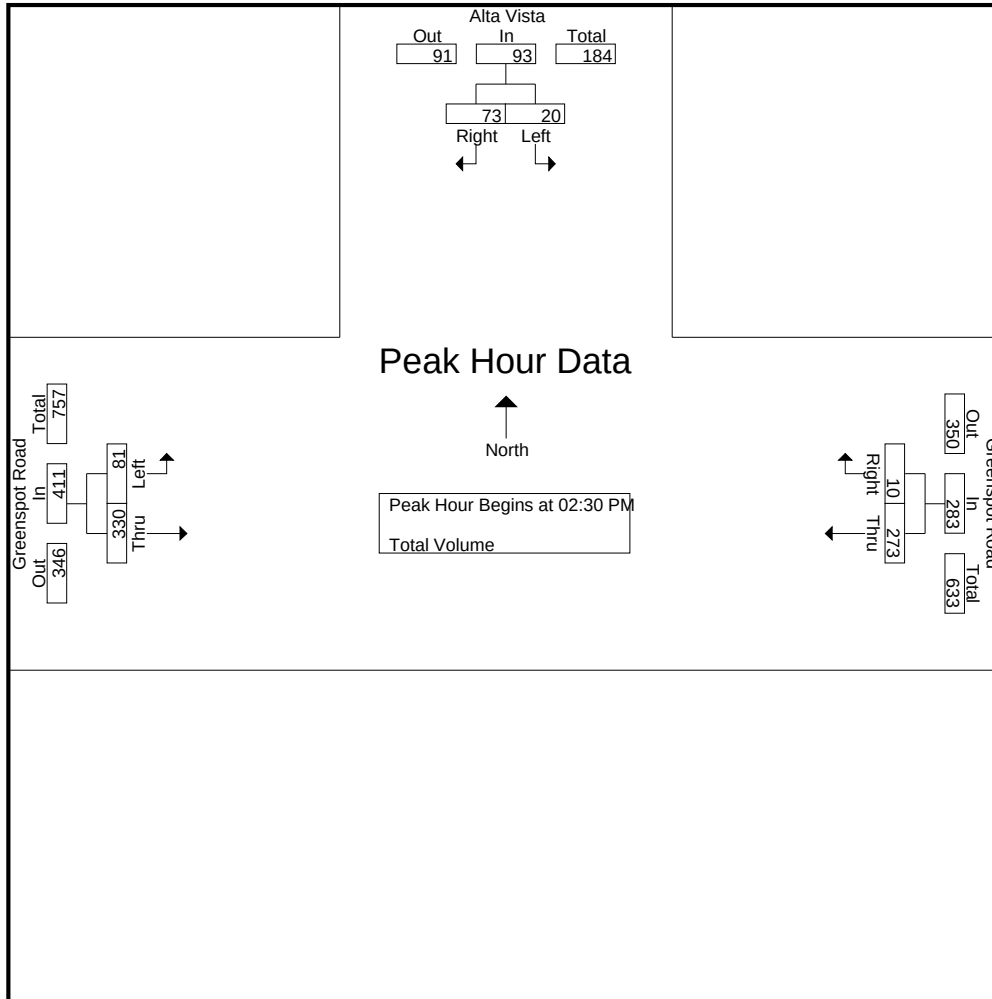
Groups Printed- Total Volume

	Alta Vista Southbound			Greenspot Road Westbound			Greenspot Road Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
01:30 PM	3	15	18	51	8	59	11	66	77	154
01:45 PM	16	20	36	37	7	44	19	63	82	162
Total	19	35	54	88	15	103	30	129	159	316
02:00 PM	17	15	32	67	5	72	23	62	85	189
02:15 PM	6	21	27	64	2	66	18	68	86	179
02:30 PM	4	23	27	60	2	62	15	78	93	182
02:45 PM	3	16	19	71	3	74	19	76	95	188
Total	30	75	105	262	12	274	75	284	359	738
03:00 PM	5	18	23	69	1	70	19	84	103	196
03:15 PM	8	16	24	73	4	77	28	92	120	221
Grand Total	62	144	206	492	32	524	152	589	741	1471
Apprch %	30.1	69.9		93.9	6.1		20.5	79.5		
Total %	4.2	9.8	14	33.4	2.2	35.6	10.3	40	50.4	

	Alta Vista Southbound			Greenspot Road Westbound			Greenspot Road Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 01:30 PM to 03:15 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 02:30 PM										
02:30 PM	4	23	27	60	2	62	15	78	93	182
02:45 PM	3	16	19	71	3	74	19	76	95	188
03:00 PM	5	18	23	69	1	70	19	84	103	196
03:15 PM	8	16	24	73	4	77	28	92	120	221
Total Volume	20	73	93	273	10	283	81	330	411	787
% App. Total	21.5	78.5		96.5	3.5		19.7	80.3		
PHF	.625	.793	.861	.935	.625	.919	.723	.897	.856	.890

City of Highland
 N/S: Alta Vista
 E/W: Greenspot Road
 Weather: Clear

File Name : HLDVAVGRMD
 Site Code : 241037
 Start Date : 5/9/2024
 Page No : 2



Peak Hour Analysis From 01:30 PM to 03:15 PM - Peak 1 of 1
 Peak Hour for Each Approach Begins at:

	01:45 PM			02:30 PM			02:30 PM		
+0 mins.	16	20	36	60	2	62	15	78	93
+15 mins.	17	15	32	71	3	74	19	76	95
+30 mins.	6	21	27	69	1	70	19	84	103
+45 mins.	4	23	27	73	4	77	28	92	120
Total Volume	43	79	122	273	10	283	81	330	411
% App. Total	35.2	64.8		96.5	3.5		19.7	80.3	
PHF	.632	.859	.847	.935	.625	.919	.723	.897	.856

Location: Highland
 N/S: Alta Vista
 E/W: Greenspot Road



Date: 5/9/2024
 Day: Thursday

PEDESTRIANS

		North Leg Alta Vista	East Leg Greenspot Road	South Leg Alta Vista	West Leg Greenspot Road	
		Pedestrians	Pedestrians	Pedestrians	Pedestrians	
1:30 PM		0	0	0	0	0
1:45 PM		0	0	0	0	0
2:00 PM		0	0	0	0	0
2:15 PM		0	0	0	0	0
2:30 PM		0	0	0	0	0
2:45 PM		1	0	0	0	1
3:00 PM		0	0	0	0	0
3:15 PM		0	0	0	0	0
TOTAL VOLUMES:		1	0	0	0	1

Location: Highland
 N/S: Alta Vista
 E/W: Greenspot Road



Date: 5/9/2024
 Day: Thursday

BICYCLES

		Southbound Alta Vista			Westbound Greenspot Road			Northbound Alta Vista			Eastbound Greenspot Road			
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
1:30 PM		0	0	0	0	1	0	0	0	0	0	0	0	1
1:45 PM		0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 PM		0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM		0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 PM		0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM		0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM		0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM		0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES:		0	0	0	0	1	0	0	0	0	0	0	0	1

Counts Unlimited, Inc.
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 Corona, CA 92878
 (951) 268-6268
 counts@countsunlimited.com

City of Highland
 N/S: Alta Vista
 E/W: Greenspot Road
 Weather: Clear

File Name : HLD_Alta Vista_Greenspot_AM Gap
 Site Code : 0512443
 Start Date : 5/9/2024
 Page No : 1

Gap Count for Southbound Left Turns - Gaps in EB/WB Combined Traffic

Directions Printed: Combined

Start Time	Volume	2 - 3	4 - 5	6 - 7	8 - 9	10 - 11	12 - 13	14 - 15	16 - 17	18 - 19	20 - 21	22 - 23	24 - 25	26 - 27	28 - 29	>29	Int. Total	Average
07:15 AM	172	39	19	20	9	6	5	3	4	0	2	0	0	1	0	0	108	4 - 5
07:30 AM	189	37	18	15	19	10	4	0	1	0	1	1	0	0	0	1	107	4 - 5
07:45 AM	194	39	25	16	8	7	7	1	1	1	2	1	1	0	0	0	109	4 - 5
Total	555	115	62	51	36	23	16	4	6	1	5	2	1	1	0	1	324	4 - 5
08:00 AM	195	42	21	11	6	3	3	2	3	3	0	1	1	1	1	1	99	4 - 5
Grand Total	750	157	83	62	42	26	19	6	9	4	5	3	2	2	1	2	423	4 - 5
Total %		37.1	19.6	14.7	9.9	6.1	4.5	1.4	2.1	0.9	1.2	0.7	0.5	0.5	0.2	0.5		

Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1

Peak Occurred: 07:15 AM
 Volume 750
 High Int. 08:00 AM
 Volume 195
 PHF 0.962

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City of Highland
 N/S: Alta Vista
 E/W: Greenspot Road
 Weather: Clear

File Name : HLD_Alta Vista_Greenspot_MD Gap
 Site Code : 0512443
 Start Date : 5/9/2024
 Page No : 1

Gap Count for Southbound Left Turns - Gaps in EB/WB Combined Traffic

Directions Printed: Combined

Start Time	Volume	2 - 3	4 - 5	6 - 7	8 - 9	10 - 11	12 - 13	14 - 15	16 - 17	18 - 19	20 - 21	22 - 23	24 - 25	26 - 27	28 - 29	>29	Int. Total	Average
02:30 PM	152	31	20	10	4	6	9	2	5	7	2	1	0	0	0	0	97	4 - 5
02:45 PM	171	32	21	10	10	6	4	3	3	1	1	0	2	2	0	1	96	4 - 5
Total	323	63	41	20	14	12	13	5	8	8	3	1	2	2	0	1	193	4 - 5
03:00 PM	168	26	26	14	12	4	4	5	2	3	1	1	0	1	0	1	100	4 - 5
03:15 PM	193	34	15	16	6	4	3	4	6	2	1	2	1	0	1	0	95	4 - 5
Grand Total	684	123	82	50	32	20	20	14	16	13	5	4	3	3	1	2	388	4 - 5
Total %		31.7	21.1	12.9	8.2	5.2	5.2	3.6	4.1	3.4	1.3	1.0	0.8	0.8	0.3	0.5		

Peak Hour Analysis From 02:30 PM to 03:15 PM - Peak 1 of 1

Peak Occurred: 02:30 PM
 Volume 684
 High Int. 03:15 PM
 Volume 193
 PHF 0.886

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City of Highland
 N/S: Alta Vista
 E/W: Greenspot Road
 Weather: Clear

File Name : HLD_Alta Vista_Greenspot_PM Gap
 Site Code : 0512443
 Start Date : 5/9/2024
 Page No : 1

Gap Count for Southbound Left Turns - Gaps in EB/WB Combined Traffic

Directions Printed: Combined

Start Time	Volume	2 - 3	4 - 5	6 - 7	8 - 9	10 - 11	12 - 13	14 - 15	16 - 17	18 - 19	20 - 21	22 - 23	24 - 25	26 - 27	28 - 29	>29	Int. Total	Average
04:45 PM	202	24	21	18	12	6	4	3	2	5	2	0	0	0	0	0	97	6 - 7
Total	202	24	21	18	12	6	4	3	2	5	2	0	0	0	0	0	97	6 - 7
05:00 PM	209	41	23	13	7	7	8	2	1	2	2	0	0	0	0	1	107	4 - 5
05:15 PM	210	44	22	8	14	4	7	4	0	1	0	1	0	0	0	1	106	4 - 5
05:30 PM	213	39	22	14	7	5	4	4	1	5	0	1	2	0	0	0	104	4 - 5
Grand Total	834	148	88	53	40	22	23	13	4	13	4	2	2	0	0	2	414	4 - 5
Total %		35.7	21.3	12.8	9.7	5.3	5.6	3.1	1.0	3.1	1.0	0.5	0.5	0.0	0.0	0.5		

Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1

Peak Occurred: 04:45 PM
 Volume 834
 High Int. 05:30 PM
 Volume 213
 PHF 0.979

City of Highland
N/S: Alta Vista
E/W: Santa Ana Canyon Road
Weather: Clear

File Name : 07_HLD_AV_SAC AM
Site Code : 05124443
Start Date : 5/9/2024
Page No : 1

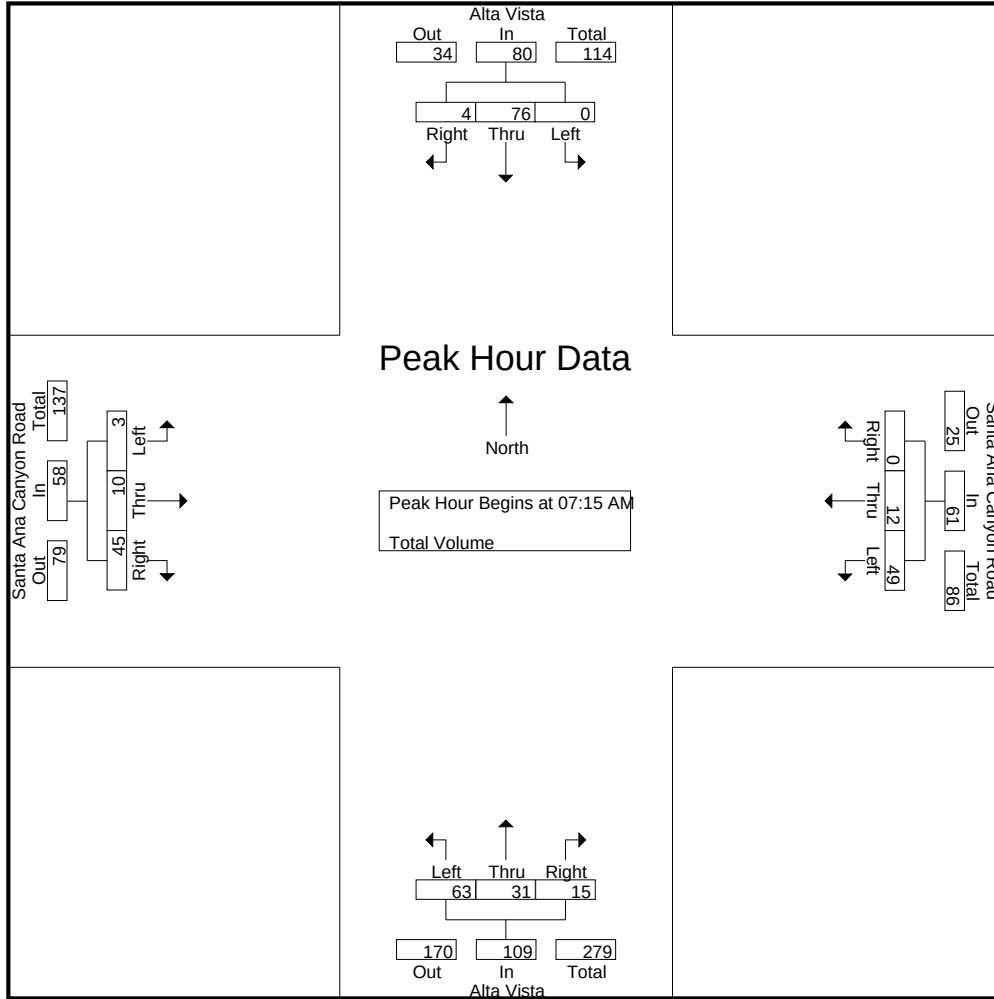
Groups Printed- Total Volume

Start Time	Alta Vista Southbound				Santa Ana Canyon Road Westbound				Alta Vista Northbound				Santa Ana Canyon Road Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
07:00 AM	0	17	0	17	14	0	0	14	8	6	3	17	0	0	4	4	52
07:15 AM	0	18	0	18	13	3	0	16	18	5	0	23	0	1	4	5	62
07:30 AM	0	22	2	24	12	4	0	16	34	6	6	46	0	8	19	27	113
07:45 AM	0	23	1	24	12	3	0	15	7	8	2	17	0	1	16	17	73
Total	0	80	3	83	51	10	0	61	67	25	11	103	0	10	43	53	300
08:00 AM	0	13	1	14	12	2	0	14	4	12	7	23	3	0	6	9	60
08:15 AM	1	18	0	19	8	2	0	10	4	5	8	17	0	2	5	7	53
08:30 AM	0	11	2	13	8	2	0	10	5	5	6	16	1	1	2	4	43
08:45 AM	0	8	1	9	8	2	1	11	3	6	8	17	1	1	0	2	39
Total	1	50	4	55	36	8	1	45	16	28	29	73	5	4	13	22	195
Grand Total	1	130	7	138	87	18	1	106	83	53	40	176	5	14	56	75	495
Apprch %	0.7	94.2	5.1		82.1	17	0.9		47.2	30.1	22.7		6.7	18.7	74.7		
Total %	0.2	26.3	1.4	27.9	17.6	3.6	0.2	21.4	16.8	10.7	8.1	35.6	1	2.8	11.3	15.2	

	Alta Vista Southbound				Santa Ana Canyon Road Westbound				Alta Vista Northbound				Santa Ana Canyon Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	18	0	18	13	3	0	16	18	5	0	23	0	1	4	5	62
07:30 AM	0	22	2	24	12	4	0	16	34	6	6	46	0	8	19	27	113
07:45 AM	0	23	1	24	12	3	0	15	7	8	2	17	0	1	16	17	73
08:00 AM	0	13	1	14	12	2	0	14	4	12	7	23	3	0	6	9	60
Total Volume	0	76	4	80	49	12	0	61	63	31	15	109	3	10	45	58	308
% App. Total	0	95	5		80.3	19.7	0		57.8	28.4	13.8		5.2	17.2	77.6		
PHF	.000	.826	.500	.833	.942	.750	.000	.953	.463	.646	.536	.592	.250	.313	.592	.537	.681

City of Highland
N/S: Alta Vista
E/W: Santa Ana Canyon Road
Weather: Clear

File Name : 07_HLD_AV_SAC AM
Site Code : 05124443
Start Date : 5/9/2024
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				07:00 AM				07:15 AM				07:30 AM			
+0 mins.	0	17	0	17	14	0	0	14	18	5	0	23	0	8	19	27
+15 mins.	0	18	0	18	13	3	0	16	34	6	6	46	0	1	16	17
+30 mins.	0	22	2	24	12	4	0	16	7	8	2	17	3	0	6	9
+45 mins.	0	23	1	24	12	3	0	15	4	12	7	23	0	2	5	7
Total Volume	0	80	3	83	51	10	0	61	63	31	15	109	3	11	46	60
% App. Total	0	96.4	3.6		83.6	16.4	0		57.8	28.4	13.8		5	18.3	76.7	
PHF	.000	.870	.375	.865	.911	.625	.000	.953	.463	.646	.536	.592	.250	.344	.605	.556

City of Highland
N/S: Alta Vista
E/W: Santa Ana Canyon Road
Weather: Clear

File Name : 07_HLD_AV_SAC PM
Site Code : 05124443
Start Date : 5/9/2024
Page No : 1

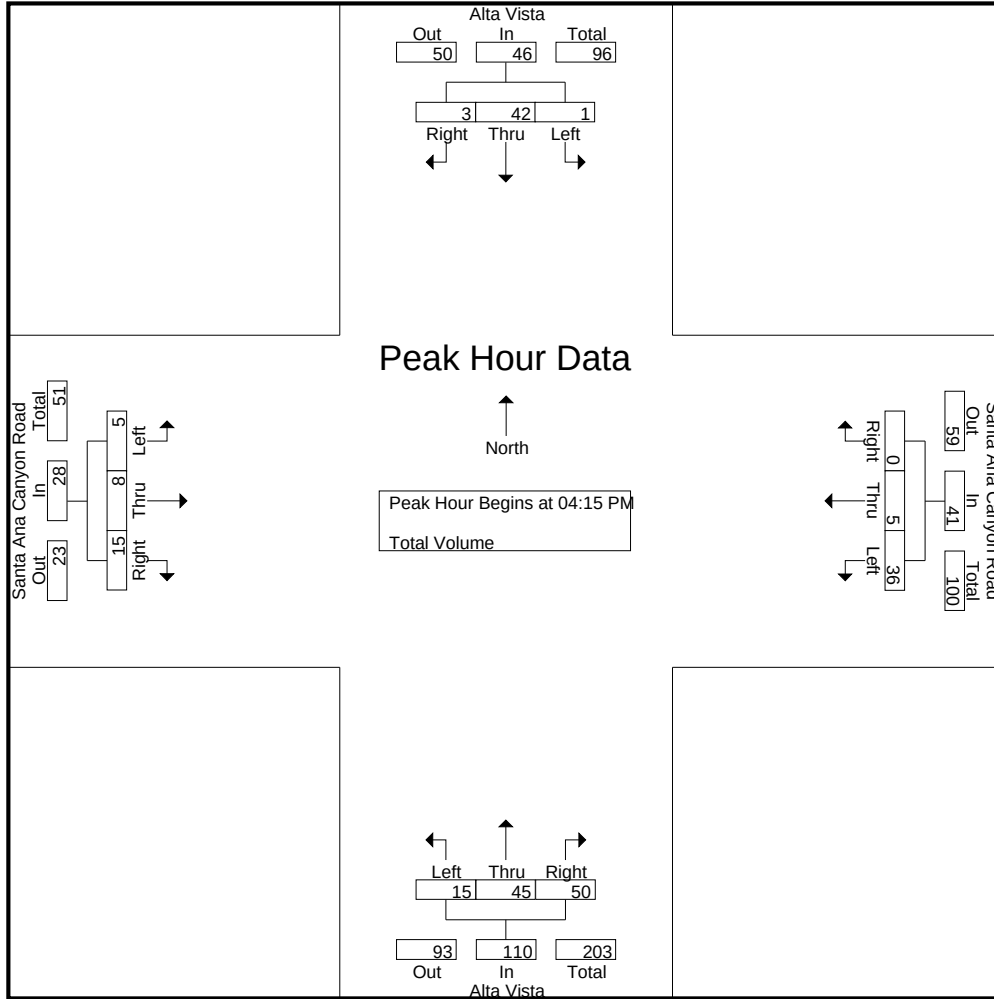
Groups Printed- Total Volume

	Alta Vista Southbound				Santa Ana Canyon Road Westbound				Alta Vista Northbound				Santa Ana Canyon Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	1	2	1	4	7	0	0	7	4	10	13	27	1	0	2	3	41
04:15 PM	0	8	0	8	3	0	0	3	4	17	14	35	1	2	4	7	53
04:30 PM	1	9	0	10	14	2	0	16	5	6	13	24	2	1	1	4	54
04:45 PM	0	11	2	13	10	1	0	11	1	7	11	19	1	1	3	5	48
Total	2	30	3	35	34	3	0	37	14	40	51	105	5	4	10	19	196
05:00 PM	0	14	1	15	9	2	0	11	5	15	12	32	1	4	7	12	70
05:15 PM	0	10	1	11	1	0	0	1	0	8	13	21	1	4	2	7	40
05:30 PM	0	9	0	9	7	2	0	9	5	8	16	29	3	4	7	14	61
05:45 PM	0	7	0	7	6	1	0	7	6	11	9	26	0	2	6	8	48
Total	0	40	2	42	23	5	0	28	16	42	50	108	5	14	22	41	219
Grand Total	2	70	5	77	57	8	0	65	30	82	101	213	10	18	32	60	415
Apprch %	2.6	90.9	6.5		87.7	12.3	0		14.1	38.5	47.4		16.7	30	53.3		
Total %	0.5	16.9	1.2	18.6	13.7	1.9	0	15.7	7.2	19.8	24.3	51.3	2.4	4.3	7.7	14.5	

	Alta Vista Southbound				Santa Ana Canyon Road Westbound				Alta Vista Northbound				Santa Ana Canyon Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	0	8	0	8	3	0	0	3	4	17	14	35	1	2	4	7	53
04:30 PM	1	9	0	10	14	2	0	16	5	6	13	24	2	1	1	4	54
04:45 PM	0	11	2	13	10	1	0	11	1	7	11	19	1	1	3	5	48
05:00 PM	0	14	1	15	9	2	0	11	5	15	12	32	1	4	7	12	70
Total Volume	1	42	3	46	36	5	0	41	15	45	50	110	5	8	15	28	225
% App. Total	2.2	91.3	6.5		87.8	12.2	0		13.6	40.9	45.5		17.9	28.6	53.6		
PHF	.250	.750	.375	.767	.643	.625	.000	.641	.750	.662	.893	.786	.625	.500	.536	.583	.804

City of Highland
N/S: Alta Vista
E/W: Santa Ana Canyon Road
Weather: Clear

File Name : 07_HLD_AV_SAC PM
Site Code : 05124443
Start Date : 5/9/2024
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:15 PM				04:15 PM				05:00 PM			
+0 mins.	1	9	0	10	3	0	0	3	4	17	14	35	1	4	7	12
+15 mins.	0	11	2	13	14	2	0	16	5	6	13	24	1	4	2	7
+30 mins.	0	14	1	15	10	1	0	11	1	7	11	19	3	4	7	14
+45 mins.	0	10	1	11	9	2	0	11	5	15	12	32	0	2	6	8
Total Volume	1	44	4	49	36	5	0	41	15	45	50	110	5	14	22	41
% App. Total	2	89.8	8.2		87.8	12.2	0		13.6	40.9	45.5		12.2	34.1	53.7	
PHF	.250	.786	.500	.817	.643	.625	.000	.641	.750	.662	.893	.786	.417	.875	.786	.732

Location: Highland
 N/S: Alta Vista
 E/W: Santa Ana Canyon Road



Date: 5/9/2024
 Day: Thursday

PEDESTRIANS

		North Leg Alta Vista	East Leg Santa Ana Canyon Road	South Leg Alta Vista	West Leg Santa Ana Canyon Road		
		Pedestrians	Pedestrians	Pedestrians	Pedestrians		
	7:00 AM	2	1	0	1		4
	7:15 AM	1	0	0	0		1
	7:30 AM	2	0	0	0		2
	7:45 AM	1	0	0	0		1
	8:00 AM	0	0	0	0		0
	8:15 AM	3	0	0	0		3
	8:30 AM	0	0	0	0		0
	8:45 AM	0	0	0	0		0
	TOTAL VOLUMES:	9	1	0	1		11

		North Leg Alta Vista	East Leg Santa Ana Canyon Road	South Leg Alta Vista	West Leg Santa Ana Canyon Road		
		Pedestrians	Pedestrians	Pedestrians	Pedestrians		
	4:00 PM	2	2	0	0		4
	4:15 PM	0	0	0	0		0
	4:30 PM	1	0	0	0		1
	4:45 PM	1	0	0	0		1
	5:00 PM	0	0	0	0		0
	5:15 PM	0	0	0	0		0
	5:30 PM	0	1	0	0		1
	5:45 PM	0	0	0	0		0
	TOTAL VOLUMES:	4	3	0	0		7

Location: Highland
 N/S: Alta Vista
 E/W: Santa Ana Canyon Road



Date: 5/9/2024
 Day: Thursday

BICYCLES

		Southbound Alta Vista			Westbound Santa Ana Canyon Road			Northbound Alta Vista			Eastbound Santa Ana Canyon Road			
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:45 AM	0	0	0	2	0	0	0	0	0	0	0	0	2
TOTAL VOLUMES:		0	0	0	2	0	0	0	0	0	0	0	0	2

		Southbound Alta Vista			Westbound Santa Ana Canyon Road			Northbound Alta Vista			Eastbound Santa Ana Canyon Road			
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:30 PM	0	0	0	1	0	0	1	0	0	0	0	0	2
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:00 PM	0	0	0	0	0	0	0	1	0	0	0	0	1
	5:15 PM	0	0	0	0	0	0	0	1	0	0	0	0	1
	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES:		0	0	0	1	0	0	1	2	0	0	0	0	4

City of Highland
N/S: Alta Vista
E/W: Santa Ana Canyon Road
Weather: Clear

File Name : 07_HLD_AV_SAC MD
Site Code : 241037
Start Date : 5/9/2024
Page No : 1

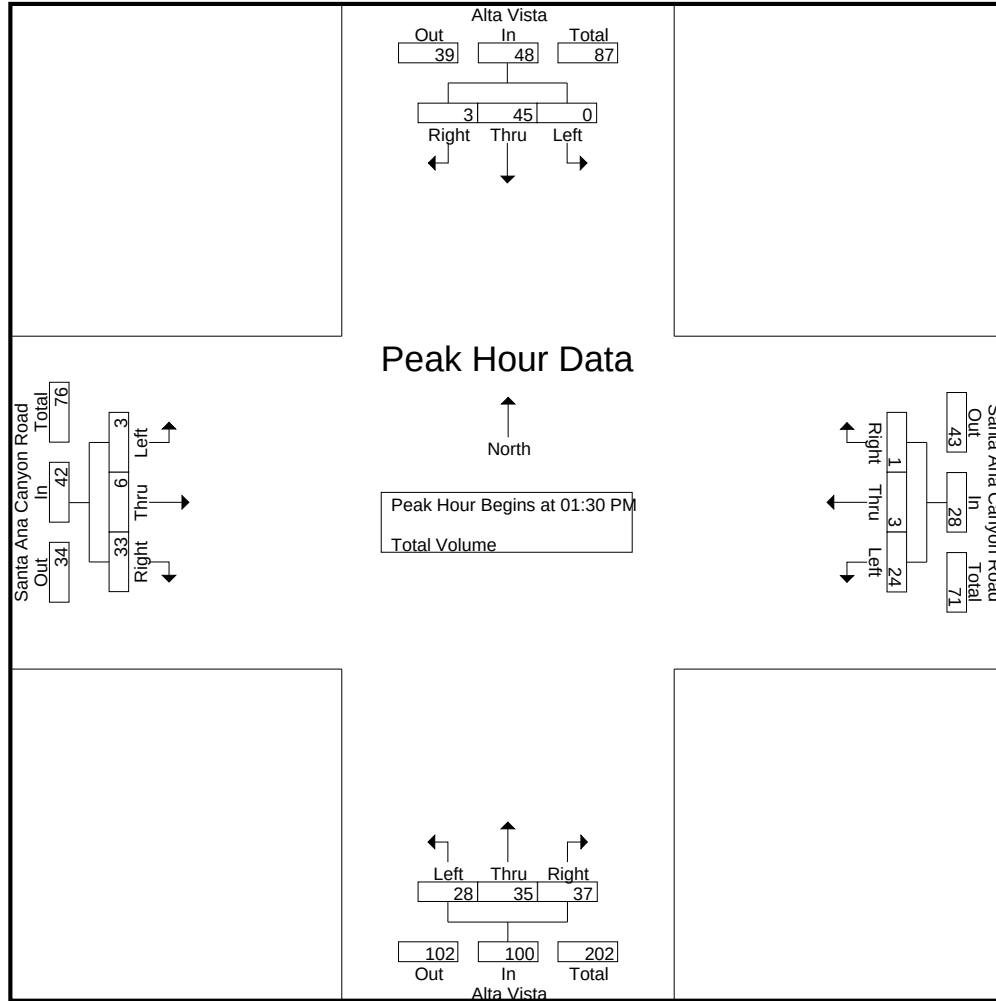
Groups Printed- Total Volume

	Alta Vista Southbound				Santa Ana Canyon Road Westbound				Alta Vista Northbound				Santa Ana Canyon Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
01:30 PM	0	14	1	15	7	1	0	8	6	7	4	17	0	0	2	2	42
01:45 PM	0	12	1	13	9	0	0	9	10	8	11	29	1	1	15	17	68
Total	0	26	2	28	16	1	0	17	16	15	15	46	1	1	17	19	110
02:00 PM	0	8	1	9	3	2	0	5	8	8	7	23	0	2	12	14	51
02:15 PM	0	11	0	11	5	0	1	6	4	12	15	31	2	3	4	9	57
02:30 PM	0	5	1	6	4	2	0	6	4	8	11	23	1	1	1	3	38
02:45 PM	1	13	3	17	6	0	0	6	2	4	4	10	1	1	6	8	41
Total	1	37	5	43	18	4	1	23	18	32	37	87	4	7	23	34	187
03:00 PM	0	5	0	5	8	1	0	9	3	10	15	28	0	1	8	9	51
03:15 PM	0	13	2	15	4	2	0	6	7	9	4	20	0	1	7	8	49
Grand Total	1	81	9	91	46	8	1	55	44	66	71	181	5	10	55	70	397
Apprch %	1.1	89	9.9		83.6	14.5	1.8		24.3	36.5	39.2		7.1	14.3	78.6		
Total %	0.3	20.4	2.3	22.9	11.6	2	0.3	13.9	11.1	16.6	17.9	45.6	1.3	2.5	13.9	17.6	

	Alta Vista Southbound				Santa Ana Canyon Road Westbound				Alta Vista Northbound				Santa Ana Canyon Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 01:30 PM to 03:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 01:30 PM																	
01:30 PM	0	14	1	15	7	1	0	8	6	7	4	17	0	0	2	2	42
01:45 PM	0	12	1	13	9	0	0	9	10	8	11	29	1	1	15	17	68
02:00 PM	0	8	1	9	3	2	0	5	8	8	7	23	0	2	12	14	51
02:15 PM	0	11	0	11	5	0	1	6	4	12	15	31	2	3	4	9	57
Total Volume	0	45	3	48	24	3	1	28	28	35	37	100	3	6	33	42	218
% App. Total	0	93.8	6.2		85.7	10.7	3.6		28	35	37		7.1	14.3	78.6		
PHF	.000	.804	.750	.800	.667	.375	.250	.778	.700	.729	.617	.806	.375	.500	.550	.618	.801

City of Highland
N/S: Alta Vista
E/W: Santa Ana Canyon Road
Weather: Clear

File Name : 07_HLD_AV_SAC MD
Site Code : 241037
Start Date : 5/9/2024
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Peak Hour Analysis From 01:30 PM to 03:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	01:30 PM				01:30 PM				01:45 PM				01:45 PM			
+0 mins.	0	14	1	15	7	1	0	8	10	8	11	29	1	1	15	17
+15 mins.	0	12	1	13	9	0	0	9	8	8	7	23	0	2	12	14
+30 mins.	0	8	1	9	3	2	0	5	4	12	15	31	2	3	4	9
+45 mins.	0	11	0	11	5	0	1	6	4	8	11	23	1	1	1	3
Total Volume	0	45	3	48	24	3	1	28	26	36	44	106	4	7	32	43
% App. Total	0	93.8	6.2		85.7	10.7	3.6		24.5	34	41.5		9.3	16.3	74.4	
PHF	.000	.804	.750	.800	.667	.375	.250	.778	.650	.750	.733	.855	.500	.583	.533	.632

Location: Highland
 N/S: Alta Vista
 E/W: Santa Ana Canyon Road



Date: 5/9/2024
 Day: Thursday

PEDESTRIANS

	North Leg Alta Vista	East Leg Santa Ana Canyon Road	South Leg Alta Vista	West Leg Santa Ana Canyon Road	
	Pedestrians	Pedestrians	Pedestrians	Pedestrians	
1:30 PM	0	0	0	0	0
1:45 PM	0	0	0	1	1
2:00 PM	0	0	0	0	0
2:15 PM	0	0	0	0	0
2:30 PM	0	0	0	0	0
2:45 PM	0	0	0	0	0
3:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
TOTAL VOLUMES:	0	0	0	1	1

Location: Highland
 N/S: Alta Vista
 E/W: Santa Ana Canyon Road



Date: 5/9/2024
 Day: Thursday

BICYCLES

	Southbound Alta Vista			Westbound Santa Ana Canyon Road			Northbound Alta Vista			Eastbound Santa Ana Canyon Road			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	1
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
TOTAL VOLUMES:	0	1	0	0	1	0	0	0	0	0	0	0	2

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APPENDIX 3.2: EXISTING (2024) CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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Timings

East Highland Ranch (JN 15974)

1: Greenspot Rd. & Boulder Av.

12/17/2024

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT
Lane Configurations	 	 			 			 		 	 
Traffic Volume (vph)	22	364	83	427	917	83	35	314	1	135	198
Future Volume (vph)	22	364	83	427	917	83	35	314	1	135	198
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA
Protected Phases	7	4		3	8		1	6		5	2
Permitted Phases			4			8			6		
Detector Phase	7	4	4	3	8	8	1	6	6	5	2
Switch Phase											
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0
Minimum Split (s)	9.6	22.8	22.8	14.6	22.8	22.8	9.6	23.2	23.2	9.6	23.2
Total Split (s)	9.6	25.0	25.0	54.0	69.4	69.4	12.0	25.0	25.0	16.0	29.0
Total Split (%)	8.0%	20.8%	20.8%	45.0%	57.8%	57.8%	10.0%	20.8%	20.8%	13.3%	24.2%
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	4.8	3.6	5.2	5.2	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	4.6	5.8	5.8	4.6	5.8	5.8	4.6	6.2	6.2	4.6	6.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min
Act Effct Green (s)	5.2	15.2	15.2	32.5	49.5	49.5	6.5	14.4	14.4	9.2	22.2
Actuated g/C Ratio	0.06	0.16	0.16	0.35	0.53	0.53	0.07	0.15	0.15	0.10	0.24
v/c Ratio	0.16	0.65	0.23	0.85	0.51	0.10	0.35	0.60	0.00	0.53	0.51
Control Delay (s/veh)	53.0	45.1	1.5	45.2	16.1	1.6	58.3	44.6	0.0	52.5	18.4
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)	53.0	45.1	1.5	45.2	16.1	1.6	58.3	44.6	0.0	52.5	18.4
LOS	D	D	A	D	B	A	E	D	A	D	B
Approach Delay (s/veh)		37.7			23.9			45.9			25.9
Approach LOS		D			C			D			C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 93.6

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay (s/veh): 29.3

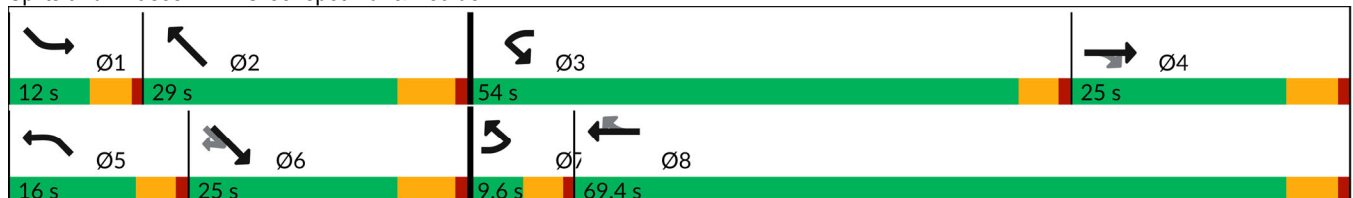
Intersection LOS: C

Intersection Capacity Utilization 74.2%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: Greenspot Rd. & Boulder Av.



HCM 7th Signalized Intersection Summary
1: Greenspot Rd. & Boulder Av.

East Highland Ranch (JN 15974)

12/17/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations	 	 			 			 		 	 	
Traffic Volume (veh/h)	22	364	83	427	917	83	35	314	1	135	198	279
Future Volume (veh/h)	22	364	83	427	917	83	35	314	1	135	198	279
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	23	375	54	440	945	66	36	324	0	139	204	135
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	69	543	227	479	1586	663	54	517		201	377	237
Arrive On Green	0.03	0.15	0.15	0.32	0.45	0.45	0.04	0.15	0.00	0.08	0.19	0.19
Sat Flow, veh/h	2670	3544	1481	1498	3544	1483	1498	3544	1502	2670	2033	1281
Grp Volume(v), veh/h	23	375	54	440	945	66	36	324	0	139	176	163
Grp Sat Flow(s),veh/h/ln	1335	1772	1481	1498	1772	1483	1498	1772	1502	1335	1772	1541
Q Serve(g_s), s	0.6	7.0	2.2	19.6	14.0	1.8	1.6	6.0	0.0	3.5	6.3	6.7
Cycle Q Clear(g_c), s	0.6	7.0	2.2	19.6	14.0	1.8	1.6	6.0	0.0	3.5	6.3	6.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.83
Lane Grp Cap(c), veh/h	69	543	227	479	1586	663	54	517		201	329	286
V/C Ratio(X)	0.33	0.69	0.24	0.92	0.60	0.10	0.67	0.63		0.69	0.54	0.57
Avail Cap(c_a), veh/h	192	980	410	1066	3246	1358	160	960		438	582	506
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.2	27.8	25.8	22.7	14.5	11.1	33.1	27.9	0.0	31.3	25.6	25.8
Incr Delay (d2), s/veh	1.0	1.6	0.5	3.1	0.4	0.1	5.2	1.3	0.0	1.6	1.4	1.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	2.8	0.7	6.2	4.5	0.5	0.6	2.3	0.0	1.1	2.5	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	34.3	29.4	26.4	25.8	14.8	11.2	38.2	29.1	0.0	32.9	27.0	27.5
LnGrp LOS	C	C	C	C	B	B	D	C		C	C	C
Approach Vol, veh/h	452				1451		360				478	
Approach Delay, s/veh	29.3				18.0		30.0				28.9	
Approach LOS	C				B		C				C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.1	19.1	26.8	16.4	9.8	16.3	6.4	36.9				
Change Period (Y+Rc), s	4.6	6.2	4.6	5.8	4.6	6.2	4.6	5.8				
Max Green Setting (Gmax), s	7.4	22.8	49.4	19.2	11.4	18.8	5.0	63.6				
Max Q Clear Time (g_c+I1), s	3.6	8.7	21.6	9.0	5.5	8.0	2.6	16.0				
Green Ext Time (p_c), s	0.0	1.5	0.6	1.7	0.1	1.3	0.0	7.4				

Intersection Summary

HCM 7th Control Delay, s/veh	23.3
HCM 7th LOS	C

Notes

Unsignalized Delay for [SER] is excluded from calculations of the approach delay and intersection delay.

Timings

East Highland Ranch (JN 15974)

2: Greenspot Rd. & Church St.

12/17/2024

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	 	 		 		 		 
Traffic Volume (vph)	169	359	3	872	20	13	38	6
Future Volume (vph)	169	359	3	872	20	13	38	6
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA
Protected Phases	7	4	3	8		2		6
Permitted Phases					2		6	
Detector Phase	7	4	3	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	10.0	5.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.6	27.8	9.6	27.8	21.6	21.6	21.6	21.6
Total Split (s)	21.6	34.8	21.6	34.8	33.6	33.6	33.6	33.6
Total Split (%)	24.0%	38.7%	24.0%	38.7%	37.3%	37.3%	37.3%	37.3%
Yellow Time (s)	3.6	4.8	3.6	4.8	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	5.8	4.6	4.6	4.6	4.6
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	Min	Min	Min	Min
Act Effect Green (s)	9.1	40.6	5.1	28.6	11.3	11.3	11.3	11.3
Actuated g/C Ratio	0.14	0.63	0.08	0.45	0.18	0.18	0.18	0.18
v/c Ratio	0.52	0.19	0.02	0.72	0.14	0.05	0.21	0.34
Control Delay (s/veh)	31.2	6.1	30.7	18.5	25.2	23.1	26.1	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	31.2	6.1	30.7	18.5	25.2	23.1	26.1	5.5
LOS	C	A	C	B	C	C	C	A
Approach Delay (s/veh)		14.0		18.5		24.4		8.6
Approach LOS		B		B		C		A

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 64.1

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.72

Intersection Signal Delay (s/veh): 15.9

Intersection LOS: B

Intersection Capacity Utilization 65.3%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 2: Greenspot Rd. & Church St.

 Ø2	 Ø3	 Ø4
33.6 s	21.6 s	34.8 s
 Ø6	 Ø7	 Ø8
33.6 s	21.6 s	34.8 s

HCM 7th Signalized Intersection Summary

2: Greenspot Rd. & Church St.

East Highland Ranch (JN 15974)

12/17/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	169	359	13	3	872	90	20	13	0	38	6	208
Future Volume (veh/h)	169	359	13	3	872	90	20	13	0	38	6	208
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	197	417	13	3	1014	103	23	15	0	44	7	127
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	286	1773	55	6	1313	133	267	342	0	366	342	286
Arrive On Green	0.11	0.52	0.52	0.00	0.42	0.42	0.19	0.19	0.00	0.19	0.19	0.19
Sat Flow, veh/h	2670	3417	106	1594	3160	321	1115	1772	0	1234	1772	1482
Grp Volume(v), veh/h	197	216	214	3	568	549	23	15	0	44	7	127
Grp Sat Flow(s),veh/h/ln	1335	1772	1751	1594	1772	1709	1115	1772	0	1234	1772	1482
Q Serve(g_s), s	3.8	3.5	3.5	0.1	14.6	14.6	1.0	0.4	0.0	1.6	0.2	4.0
Cycle Q Clear(g_c), s	3.8	3.5	3.5	0.1	14.6	14.6	5.0	0.4	0.0	2.0	0.2	4.0
Prop In Lane	1.00		0.06	1.00		0.19	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	286	919	909	6	737	710	267	342	0	366	342	286
V/C Ratio(X)	0.69	0.23	0.24	0.46	0.77	0.77	0.09	0.04	0.00	0.12	0.02	0.44
Avail Cap(c_a), veh/h	859	973	961	513	973	938	664	973	0	805	973	813
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.7	7.0	7.0	26.3	13.3	13.3	21.0	17.3	0.0	18.1	17.3	18.8
Incr Delay (d2), s/veh	1.1	0.1	0.1	17.8	2.8	2.9	0.1	0.1	0.0	0.1	0.0	1.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.9	0.9	0.1	4.8	4.6	0.3	0.1	0.0	0.4	0.1	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	23.8	7.1	7.1	44.0	16.1	16.2	21.1	17.4	0.0	18.3	17.3	19.9
LnGrp LOS	C	A	A	D	B	B	C	B		B	B	B
Approach Vol, veh/h	627		1120				38		178			
Approach Delay, s/veh	12.4		16.2				19.7		19.4			
Approach LOS	B		B				B		B			
Timer - Assigned Phs	2		3		4		6		7		8	
Phs Duration (G+Y+Rc), s	14.8		4.8		33.2		14.8		10.3		27.8	
Change Period (Y+Rc), s	4.6		4.6		5.8		4.6		4.6		5.8	
Max Green Setting (Gmax), s	29.0		17.0		29.0		29.0		17.0		29.0	
Max Q Clear Time (g_c+I1), s	7.0		2.1		5.5		6.0		5.8		16.6	
Green Ext Time (p_c), s	0.1		0.0		2.2		0.9		0.2		5.4	
Intersection Summary												
HCM 7th Control Delay, s/veh			15.3									
HCM 7th LOS			B									

Timings

East Highland Ranch (JN 15974)

3: Greenspot Rd. & Weaver St.

12/17/2024



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	88	201	559	51	207
Future Volume (vph)	88	201	559	51	207
Turn Type	Perm	NA	NA	Prot	Perm
Protected Phases		4	8	1	
Permitted Phases	4				6
Detector Phase	4	4	8	1	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	22.8	22.8	22.8	9.6	22.4
Total Split (s)	46.8	46.8	46.8	43.2	43.2
Total Split (%)	52.0%	52.0%	52.0%	48.0%	48.0%
Yellow Time (s)	4.8	4.8	4.8	3.6	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	4.6	5.4
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	Min
Act Effect Green (s)	12.8	12.8	12.8	7.5	11.3
Actuated g/C Ratio	0.36	0.36	0.36	0.21	0.32
v/c Ratio	0.40	0.16	0.53	0.17	0.35
Control Delay (s/veh)	14.9	8.3	10.5	12.2	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	14.9	8.3	10.5	12.2	4.3
LOS	B	A	B	B	A
Approach Delay (s/veh)		10.3	10.5	5.8	
Approach LOS		B	B	A	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 35.5

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.53

Intersection Signal Delay (s/veh): 9.4

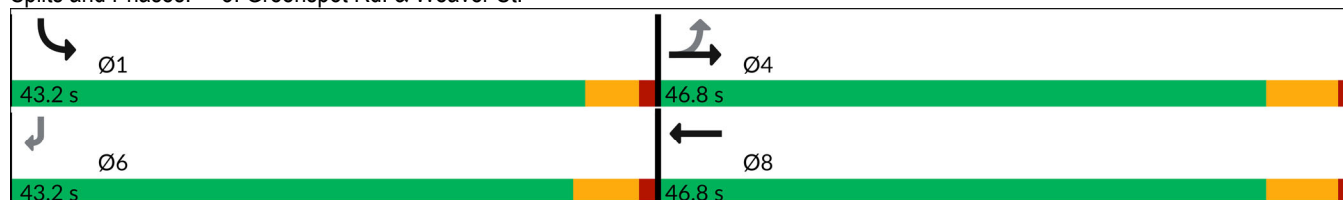
Intersection LOS: A

Intersection Capacity Utilization 44.9%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: Greenspot Rd. & Weaver St.



HCM 7th Signalized Intersection Summary

3: Greenspot Rd. & Weaver St.

East Highland Ranch (JN 15974)

12/17/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	88	201	559	77	51	207
Future Volume (veh/h)	88	201	559	77	51	207
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1673	1772	1772	1772	1673	1772
Adj Flow Rate, veh/h	92	209	582	80	53	216
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	458	1447	1245	171	293	294
Arrive On Green	0.41	0.41	0.41	0.41	0.20	0.20
Sat Flow, veh/h	686	3544	3050	418	1498	1502
Grp Volume(v), veh/h	92	209	338	324	53	216
Grp Sat Flow(s),veh/h/ln	686	1772	1772	1696	1498	1502
Q Serve(g_s), s	3.0	1.0	3.7	3.7	0.8	3.5
Cycle Q Clear(g_c), s	6.6	1.0	3.7	3.7	0.8	3.5
Prop In Lane	1.00			0.25	1.00	1.00
Lane Grp Cap(c), veh/h	458	1447	723	692	293	294
V/C Ratio(X)	0.20	0.14	0.47	0.47	0.18	0.74
Avail Cap(c_a), veh/h	1250	5536	2768	2649	2203	2208
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.1	4.9	5.7	5.7	8.8	9.9
Incr Delay (d2), s/veh	0.2	0.0	0.5	0.5	0.1	1.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.1	0.4	0.4	0.1	0.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	8.3	4.9	6.1	6.2	8.9	11.3
LnGrp LOS	A	A	A	A	A	B
Approach Vol, veh/h		301	662		269	
Approach Delay, s/veh		6.0	6.2		10.8	
Approach LOS		A	A		B	
Timer - Assigned Phs				4	6	8
Phs Duration (G+Y+Rc), s				16.5	9.7	16.5
Change Period (Y+Rc), s				5.8	4.6	5.8
Max Green Setting (Gmax), s				41.0	38.6	41.0
Max Q Clear Time (g_c+I1), s				8.6	5.5	5.7
Green Ext Time (p_c), s				2.1	0.4	4.0
Intersection Summary						
HCM 7th Control Delay, s/veh			7.1			
HCM 7th LOS			A			

Intersection												
Int Delay, s/veh	6.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	10	45	49	12	0	63	31	15	0	76	4
Future Vol, veh/h	3	10	45	49	12	0	63	31	15	0	76	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	68	68	68	68	68	68	68	68	68	68	68	68
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	15	66	72	18	0	93	46	22	0	112	6

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	354	368	115	361	360	57	118	0	0	68	0	0
Stage 1	115	115	-	242	242	-	-	-	-	-	-	-
Stage 2	240	253	-	119	118	-	-	-	-	-	-	-
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	601	561	938	595	567	1010	1471	-	-	1534	-	-
Stage 1	890	801	-	762	706	-	-	-	-	-	-	-
Stage 2	764	698	-	885	798	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	544	524	938	503	530	1010	1471	-	-	1534	-	-
Mov Cap-2 Maneuver	544	524	-	503	530	-	-	-	-	-	-	-
Stage 1	890	801	-	712	659	-	-	-	-	-	-	-
Stage 2	694	652	-	808	798	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v10.04		13.6	4.4	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	977	-	-	799	508	1534	-
HCM Lane V/C Ratio	0.063	-	-	0.107	0.177	-	-
HCM Control Delay (s/veh)	7.6	0	-	10	13.6	0	-
HCM Lane LOS	A	A	-	B	B	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.4	0.6	0	-

Intersection						
Int Delay, s/veh	3.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	49	183	502	58	45	126
Future Vol, veh/h	49	183	502	58	45	126
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	60	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	56	208	570	66	51	143

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	636	0	-	0	819
Stage 1	-	-	-	-	603
Stage 2	-	-	-	-	215
Critical Hdwy	4.14	-	-	-	6.84
Critical Hdwy Stg 1	-	-	-	-	5.84
Critical Hdwy Stg 2	-	-	-	-	5.84
Follow-up Hdwy	2.22	-	-	-	3.52
Pot Cap-1 Maneuver	943	-	-	-	314
Stage 1	-	-	-	-	509
Stage 2	-	-	-	-	800
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	943	-	-	-	295
Mov Cap-2 Maneuver	-	-	-	-	295
Stage 1	-	-	-	-	479
Stage 2	-	-	-	-	800

Approach	EB	WB	SB
HCM Control Delay, s/v	1.91	0	16.51
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	943	-	-	-	505
HCM Lane V/C Ratio	0.059	-	-	-	0.385
HCM Control Delay (s/veh)	9.1	-	-	-	16.5
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	1.8

Timings

East Highland Ranch (JN 15974)

1: Greenspot Rd. & Boulder Av.

12/17/2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	
Lane Configurations												
Traffic Volume (vph)	53	553	121	282	513	77	66	233	5	104	181	
Future Volume (vph)	53	553	121	282	513	77	66	233	5	104	181	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4			8			6			
Detector Phase	7	4	4	3	8	8	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	
Minimum Split (s)	9.6	22.8	22.8	14.6	22.8	22.8	9.6	23.2	23.2	9.6	23.2	
Total Split (s)	11.4	34.0	34.0	42.0	64.6	64.6	17.0	28.5	28.5	15.5	27.0	
Total Split (%)	9.5%	28.3%	28.3%	35.0%	53.8%	53.8%	14.2%	23.8%	23.8%	12.9%	22.5%	
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	4.8	3.6	5.2	5.2	3.6	5.2	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
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)	4.6	5.8	5.8	4.6	5.8	5.8	4.6	6.2	6.2	4.6	6.2	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	
Act Effct Green (s)	6.4	23.1	23.1	25.8	45.2	45.2	9.3	15.3	15.3	8.8	17.7	
Actuated g/C Ratio	0.07	0.24	0.24	0.27	0.47	0.47	0.10	0.16	0.16	0.09	0.19	
v/c Ratio	0.35	0.76	0.30	0.83	0.36	0.12	0.54	0.48	0.02	0.50	0.64	
Control Delay (s/veh)	54.9	41.9	6.6	51.8	17.4	2.2	60.7	41.7	0.0	53.5	23.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay (s/veh)	54.9	41.9	6.6	51.8	17.4	2.2	60.7	41.7	0.0	53.5	23.7	
LOS	D	D	A	D	B	A	E	D	A	D	C	
Approach Delay (s/veh)		37.0			27.2			45.2			29.4	
Approach LOS		D			C			D			C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 95.2

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay (s/veh): 32.8

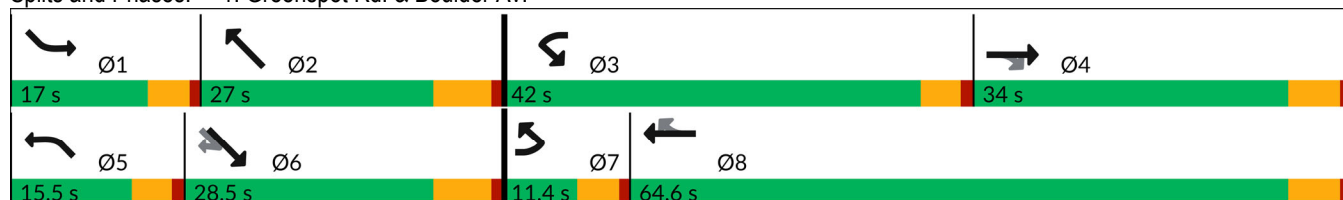
Intersection LOS: C

Intersection Capacity Utilization 69.5%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 1: Greenspot Rd. & Boulder Av.



HCM 7th Signalized Intersection Summary
1: Greenspot Rd. & Boulder Av.

East Highland Ranch (JN 15974)

12/17/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	53	553	121	282	513	77	66	233	5	104	181	260
Future Volume (veh/h)	53	553	121	282	513	77	66	233	5	104	181	260
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	62	651	78	332	604	70	78	274	0	122	213	115
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	132	880	372	371	1582	670	94	496		180	317	164
Arrive On Green	0.05	0.25	0.25	0.25	0.45	0.45	0.06	0.14	0.00	0.07	0.14	0.14
Sat Flow, veh/h	2670	3544	1500	1498	3544	1502	1498	3544	1502	2670	2200	1139
Grp Volume(v), veh/h	62	651	78	332	604	70	78	274	0	122	170	158
Grp Sat Flow(s),veh/h/ln	1335	1772	1500	1498	1772	1502	1498	1772	1502	1335	1772	1567
Q Serve(g_s), s	1.6	12.1	2.9	15.3	8.1	1.9	3.7	5.1	0.0	3.2	6.5	6.9
Cycle Q Clear(g_c), s	1.6	12.1	2.9	15.3	8.1	1.9	3.7	5.1	0.0	3.2	6.5	6.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.73
Lane Grp Cap(c), veh/h	132	880	372	371	1582	670	94	496		180	256	226
V/C Ratio(X)	0.47	0.74	0.21	0.89	0.38	0.10	0.83	0.55		0.68	0.66	0.70
Avail Cap(c_a), veh/h	254	1399	592	785	2918	1236	260	1107		408	516	456
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.0	24.7	21.3	26.0	13.2	11.5	33.1	28.6	0.0	32.6	28.9	29.1
Incr Delay (d2), s/veh	1.0	1.2	0.3	3.1	0.2	0.1	6.7	1.0	0.0	1.7	2.9	3.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	4.7	0.9	5.1	2.7	0.5	1.4	2.0	0.0	1.0	2.7	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	34.0	26.0	21.6	29.1	13.3	11.5	39.8	29.6	0.0	34.2	31.9	33.0
LnGrp LOS	C	C	C	C	B	B	D	C		C	C	C
Approach Vol, veh/h	791			1006			352			450		
Approach Delay, s/veh	26.2			18.4			31.9			32.9		
Approach LOS	C			B			C			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.1	16.5	22.3	23.5	9.4	16.2	8.1	37.7				
Change Period (Y+Rc), s	4.6	6.2	4.6	5.8	4.6	6.2	4.6	5.8				
Max Green Setting (Gmax), s	12.4	20.8	37.4	28.2	10.9	22.3	6.8	58.8				
Max Q Clear Time (g_c+I1), s	5.7	8.9	17.3	14.1	5.2	7.1	3.6	10.1				
Green Ext Time (p_c), s	0.0	1.3	0.4	3.6	0.1	1.3	0.0	4.2				

Intersection Summary

HCM 7th Control Delay, s/veh	25.1
HCM 7th LOS	C

Notes

Unsignalized Delay for [SER] is excluded from calculations of the approach delay and intersection delay.

Timings

East Highland Ranch (JN 15974)

2: Greenspot Rd. & Church St.

12/17/2024

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	 	 		 				 
Traffic Volume (vph)	201	558	5	492	23	9	47	3
Future Volume (vph)	201	558	5	492	23	9	47	3
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA
Protected Phases	7	4	3	8		2		6
Permitted Phases					2		6	
Detector Phase	7	4	3	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	10.0	5.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.6	27.8	9.6	27.8	21.6	21.6	21.6	21.6
Total Split (s)	21.6	34.8	21.6	34.8	33.6	33.6	33.6	33.6
Total Split (%)	24.0%	38.7%	24.0%	38.7%	37.3%	37.3%	37.3%	37.3%
Yellow Time (s)	3.6	4.8	3.6	4.8	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	5.8	4.6	4.6	4.6	4.6
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	Min	Min	Min	Min
Act Effct Green (s)	9.2	27.1	5.2	14.7	11.3	11.3	11.3	11.3
Actuated g/C Ratio	0.18	0.53	0.10	0.29	0.22	0.22	0.22	0.22
v/c Ratio	0.48	0.35	0.04	0.59	0.12	0.03	0.20	0.21
Control Delay (s/veh)	23.5	8.2	25.8	18.2	19.8	18.2	20.5	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	23.5	8.2	25.8	18.2	19.8	18.2	20.5	0.5
LOS	C	A	C	B	B	B	C	A
Approach Delay (s/veh)		12.1		18.2		19.4		4.3
Approach LOS		B		B		B		A

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 50.7

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.59

Intersection Signal Delay (s/veh): 13.2

Intersection LOS: B

Intersection Capacity Utilization 55.6%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 2: Greenspot Rd. & Church St.

 Ø2	 Ø3	 Ø4
33.6 s	21.6 s	34.8 s
 Ø6	 Ø7	 Ø8
33.6 s	21.6 s	34.8 s

HCM 7th Signalized Intersection Summary

2: Greenspot Rd. & Church St.

East Highland Ranch (JN 15974)

12/17/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	201	558	17	5	492	40	23	9	0	47	3	191
Future Volume (veh/h)	201	558	17	5	492	40	23	9	0	47	3	191
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	228	634	18	6	559	34	26	10	0	53	3	77
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	339	1344	38	13	903	55	406	425	0	467	425	360
Arrive On Green	0.13	0.39	0.39	0.01	0.27	0.27	0.24	0.24	0.00	0.24	0.24	0.24
Sat Flow, veh/h	2670	3428	97	1594	3307	201	1171	1772	0	1247	1772	1502
Grp Volume(v), veh/h	228	328	324	6	299	294	26	10	0	53	3	77
Grp Sat Flow(s),veh/h/ln	1335	1772	1753	1594	1772	1736	1171	1772	0	1247	1772	1502
Q Serve(g_s), s	3.4	5.7	5.8	0.2	6.2	6.2	0.8	0.2	0.0	1.4	0.1	1.7
Cycle Q Clear(g_c), s	3.4	5.7	5.8	0.2	6.2	6.2	2.5	0.2	0.0	1.6	0.1	1.7
Prop In Lane	1.00		0.06	1.00		0.12	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	339	695	687	13	484	474	406	425	0	467	425	360
V/C Ratio(X)	0.67	0.47	0.47	0.47	0.62	0.62	0.06	0.02	0.00	0.11	0.01	0.21
Avail Cap(c_a), veh/h	1089	1233	1220	650	1233	1208	939	1233	0	1035	1233	1045
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.4	9.4	9.5	20.6	13.2	13.3	13.7	12.1	0.0	12.7	12.1	12.7
Incr Delay (d2), s/veh	0.9	0.5	0.5	9.5	1.3	1.3	0.1	0.0	0.0	0.1	0.0	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	1.5	1.5	0.1	1.9	1.9	0.2	0.1	0.0	0.3	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	18.2	9.9	10.0	30.1	14.5	14.6	13.7	12.1	0.0	12.8	12.1	13.0
LnGrp LOS	B	A	A	C	B	B	B	B		B	B	B
Approach Vol, veh/h	880			599			36			133		
Approach Delay, s/veh	12.1			14.7			13.3			12.9		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	2		3	4		6	7	8				
Phs Duration (G+Y+Rc), s	14.6		4.9	22.1		14.6	9.9	17.2				
Change Period (Y+Rc), s	4.6		4.6	5.8		4.6	4.6	5.8				
Max Green Setting (Gmax), s	29.0		17.0	29.0		29.0	17.0	29.0				
Max Q Clear Time (g_c+I1), s	4.5		2.2	7.8		3.7	5.4	8.2				
Green Ext Time (p_c), s	0.1		0.0	3.5		0.6	0.3	3.1				
Intersection Summary												
HCM 7th Control Delay, s/veh				13.1								
HCM 7th LOS				B								

Timings

East Highland Ranch (JN 15974)

3: Greenspot Rd. & Weaver St.

12/17/2024



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	113	371	286	67	156
Future Volume (vph)	113	371	286	67	156
Turn Type	Perm	NA	NA	Prot	Perm
Protected Phases		4	8	1	
Permitted Phases	4				6
Detector Phase	4	4	8	1	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	22.8	22.8	22.8	9.6	22.4
Total Split (s)	46.8	46.8	46.8	43.2	43.2
Total Split (%)	52.0%	52.0%	52.0%	48.0%	48.0%
Yellow Time (s)	4.8	4.8	4.8	3.6	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	4.6	5.4
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	Min
Act Effct Green (s)	11.8	11.8	11.8	8.5	11.3
Actuated g/C Ratio	0.34	0.34	0.34	0.25	0.33
v/c Ratio	0.42	0.34	0.30	0.20	0.29
Control Delay (s/veh)	14.4	9.5	8.7	10.8	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	14.4	9.5	8.7	10.8	3.6
LOS	B	A	A	B	A
Approach Delay (s/veh)		10.7	8.7	5.8	
Approach LOS		B	A	A	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 34.5

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.42

Intersection Signal Delay (s/veh): 9.0

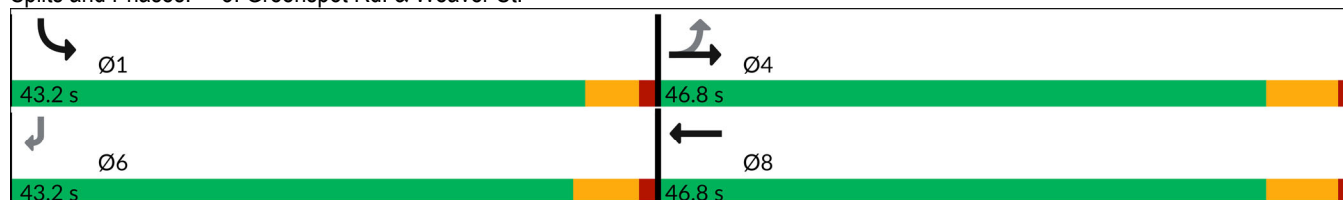
Intersection LOS: A

Intersection Capacity Utilization 36.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: Greenspot Rd. & Weaver St.

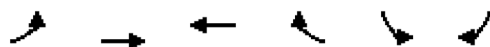


HCM 7th Signalized Intersection Summary

3: Greenspot Rd. & Weaver St.

East Highland Ranch (JN 15974)

12/17/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	113	371	286	37	67	156
Future Volume (veh/h)	113	371	286	37	67	156
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1673	1772	1772	1772	1673	1772
Adj Flow Rate, veh/h	124	408	314	40	74	66
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	637	1518	1317	166	191	192
Arrive On Green	0.43	0.43	0.43	0.43	0.13	0.13
Sat Flow, veh/h	910	3544	3074	387	1498	1502
Grp Volume(v), veh/h	124	408	180	174	74	66
Grp Sat Flow(s),veh/h/ln	910	1772	1772	1690	1498	1502
Q Serve(g_s), s	2.4	1.7	1.5	1.5	1.1	0.9
Cycle Q Clear(g_c), s	3.9	1.7	1.5	1.5	1.1	0.9
Prop In Lane	1.00			0.23	1.00	1.00
Lane Grp Cap(c), veh/h	637	1518	759	724	191	192
V/C Ratio(X)	0.19	0.27	0.24	0.24	0.39	0.34
Avail Cap(c_a), veh/h	1840	6202	3101	2958	2468	2474
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.5	4.3	4.3	4.3	9.4	9.3
Incr Delay (d2), s/veh	0.1	0.1	0.2	0.2	0.5	0.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.1	0.1	0.2	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	5.7	4.4	4.4	4.4	9.9	9.7
LnGrp LOS	A	A	A	A	A	A
Approach Vol, veh/h		532	354		140	
Approach Delay, s/veh		4.7	4.4		9.8	
Approach LOS		A	A		A	
Timer - Assigned Phs				4	6	8
Phs Duration (G+Y+Rc), s				15.8	7.6	15.8
Change Period (Y+Rc), s				5.8	4.6	5.8
Max Green Setting (Gmax), s				41.0	38.6	41.0
Max Q Clear Time (g_c+I1), s				5.9	3.1	3.5
Green Ext Time (p_c), s				3.3	0.2	1.9
Intersection Summary						
HCM 7th Control Delay, s/veh			5.3			
HCM 7th LOS			A			

Intersection												
Int Delay, s/veh	4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	6	33	24	3	1	28	35	37	0	45	3
Future Vol, veh/h	3	6	33	24	3	1	28	35	37	0	45	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	1
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	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	8	41	30	4	1	35	44	46	0	56	4

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	175	219	59	197	198	67	61	0	0	90	0	0
Stage 1	59	59	-	137	137	-	-	-	-	-	-	-
Stage 2	116	160	-	60	61	-	-	-	-	-	-	-
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	788	679	1007	762	698	997	1542	-	-	1505	-	-
Stage 1	952	846	-	866	783	-	-	-	-	-	-	-
Stage 2	889	766	-	951	844	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	763	662	1006	705	680	997	1541	-	-	1505	-	-
Mov Cap-2 Maneuver	763	662	-	705	680	-	-	-	-	-	-	-
Stage 1	952	845	-	845	764	-	-	-	-	-	-	-
Stage 2	862	747	-	904	843	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s/v	9.16		10.33		2.07		0	
HCM LOS	A		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	457	-	-	917	710	1505	-
HCM Lane V/C Ratio	0.023	-	-	0.057	0.049	-	-
HCM Control Delay (s/veh)	7.4	0	-	9.2	10.3	0	-
HCM Lane LOS	A	A	-	A	B	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.2	0	-

Intersection						
Int Delay, s/veh	2.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	81	330	273	10	20	73
Future Vol, veh/h	81	330	273	10	20	73
Conflicting Peds, #/hr	0	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	60	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	91	371	307	11	22	82

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	319	0	0	681	160
Stage 1	-	-	-	313	-
Stage 2	-	-	-	367	-
Critical Hdwy	4.14	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	3.52	3.32
Pot Cap-1 Maneuver	1238	-	-	384	857
Stage 1	-	-	-	714	-
Stage 2	-	-	-	671	-
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1237	-	-	355	856
Mov Cap-2 Maneuver	-	-	-	355	-
Stage 1	-	-	-	661	-
Stage 2	-	-	-	670	-

Approach	EB	WB	SB
HCM Control Delay, s/v	1.6	0	11.51
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1237	-	-	-	657
HCM Lane V/C Ratio	0.074	-	-	-	0.159
HCM Control Delay (s/veh)	8.1	-	-	-	11.5
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.6

Timings

East Highland Ranch (JN 15974)

1: Greenspot Rd. & Boulder Av.

12/17/2024

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT
Lane Configurations											
Traffic Volume (vph)	55	782	184	281	409	46	66	279	6	134	243
Future Volume (vph)	55	782	184	281	409	46	66	279	6	134	243
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA
Protected Phases	7	4		3	8		1	6		5	2
Permitted Phases			4			8			6		
Detector Phase	7	4	4	3	8	8	1	6	6	5	2
Switch Phase											
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0
Minimum Split (s)	9.6	22.8	22.8	14.6	22.8	22.8	9.6	23.2	23.2	9.6	23.2
Total Split (s)	11.2	40.0	40.0	37.0	65.8	65.8	14.0	26.5	26.5	16.5	29.0
Total Split (%)	9.3%	33.3%	33.3%	30.8%	54.8%	54.8%	11.7%	22.1%	22.1%	13.8%	24.2%
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	4.8	3.6	5.2	5.2	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	4.6	5.8	5.8	4.6	5.8	5.8	4.6	6.2	6.2	4.6	6.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min
Act Effct Green (s)	6.2	28.6	28.6	23.8	49.0	49.0	8.1	15.8	15.8	9.5	20.0
Actuated g/C Ratio	0.06	0.29	0.29	0.24	0.49	0.49	0.08	0.16	0.16	0.10	0.20
v/c Ratio	0.35	0.80	0.34	0.82	0.24	0.06	0.56	0.52	0.02	0.55	0.68
Control Delay (s/veh)	57.3	41.1	6.5	56.8	16.1	0.2	68.2	44.4	0.0	55.7	28.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	57.3	41.1	6.5	56.8	16.1	0.2	68.2	44.4	0.0	55.7	28.2
LOS	E	D	A	E	B	A	E	D	A	E	C
Approach Delay (s/veh)		35.7			30.7			48.2			33.6
Approach LOS		D			C			D			C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 99.9

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay (s/veh): 35.4

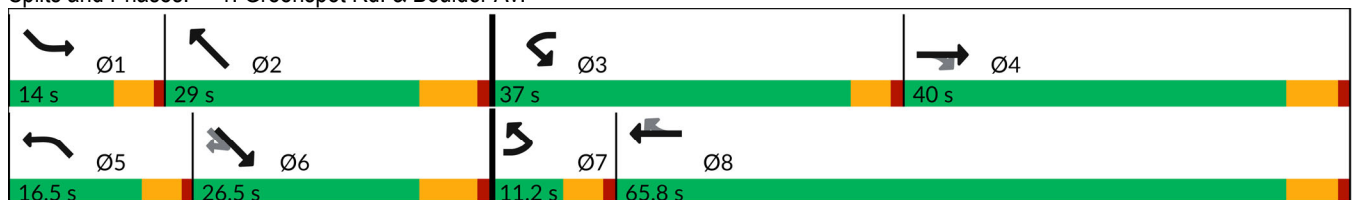
Intersection LOS: D

Intersection Capacity Utilization 79.5%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: Greenspot Rd. & Boulder Av.



HCM 7th Signalized Intersection Summary

East Highland Ranch (JN 15974)

1: Greenspot Rd. & Boulder Av.

12/17/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	55	782	184	281	409	46	66	279	6	134	243	304
Future Volume (veh/h)	55	782	184	281	409	46	66	279	6	134	243	304
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	57	806	93	290	422	33	68	288	0	138	251	120
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	122	1054	440	326	1663	694	82	478		197	353	164
Arrive On Green	0.05	0.30	0.30	0.22	0.47	0.47	0.05	0.13	0.00	0.07	0.15	0.15
Sat Flow, veh/h	2670	3544	1481	1498	3544	1479	1498	3544	1502	2670	2292	1061
Grp Volume(v), veh/h	57	806	93	290	422	33	68	288	0	138	192	179
Grp Sat Flow(s),veh/h/ln	1335	1772	1481	1498	1772	1479	1498	1772	1502	1335	1772	1581
Q Serve(g_s), s	1.6	15.9	3.6	14.4	5.5	0.9	3.5	5.9	0.0	3.9	7.9	8.3
Cycle Q Clear(g_c), s	1.6	15.9	3.6	14.4	5.5	0.9	3.5	5.9	0.0	3.9	7.9	8.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.67
Lane Grp Cap(c), veh/h	122	1054	440	326	1663	694	82	478		197	273	244
V/C Ratio(X)	0.47	0.76	0.21	0.89	0.25	0.05	0.83	0.60		0.70	0.70	0.73
Avail Cap(c_a), veh/h	230	1579	660	632	2770	1156	183	937		414	526	470
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.7	24.5	20.2	29.1	12.3	11.1	35.9	31.3	0.0	34.7	30.8	31.0
Incr Delay (d2), s/veh	1.0	1.3	0.2	3.3	0.1	0.0	7.9	1.2	0.0	1.7	3.3	4.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	6.2	1.1	4.9	1.8	0.3	1.3	2.4	0.0	1.2	3.4	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	36.7	25.8	20.5	32.4	12.4	11.1	43.9	32.5	0.0	36.4	34.1	35.2
LnGrp LOS	D	C	C	C	B	B	D	C		D	C	D
Approach Vol, veh/h	956				745				356			
Approach Delay, s/veh	25.9				20.1				34.7			
Approach LOS	C				C				C			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.8	18.0	21.3	28.6	10.3	16.6	8.1	41.8				
Change Period (Y+Rc), s	4.6	6.2	4.6	5.8	4.6	6.2	4.6	5.8				
Max Green Setting (Gmax), s	9.4	22.8	32.4	34.2	11.9	20.3	6.6	60.0				
Max Q Clear Time (g_c+I1), s	5.5	10.3	16.4	17.9	5.9	7.9	3.6	7.5				
Green Ext Time (p_c), s	0.0	1.6	0.3	4.9	0.1	1.2	0.0	2.7				

Intersection Summary

HCM 7th Control Delay, s/veh	27.3
HCM 7th LOS	C

Notes

Unsignalized Delay for [SER] is excluded from calculations of the approach delay and intersection delay.

Timings

East Highland Ranch (JN 15974)

2: Greenspot Rd. & Church St.

12/17/2024

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	 	 		 				 
Traffic Volume (vph)	215	840	3	435	26	4	44	11
Future Volume (vph)	215	840	3	435	26	4	44	11
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA
Protected Phases	7	4	3	8		2		6
Permitted Phases					2		6	
Detector Phase	7	4	3	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	10.0	5.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.6	27.8	9.6	27.8	21.6	21.6	21.6	21.6
Total Split (s)	21.6	34.8	21.6	34.8	33.6	33.6	33.6	33.6
Total Split (%)	24.0%	38.7%	24.0%	38.7%	37.3%	37.3%	37.3%	37.3%
Yellow Time (s)	3.6	4.8	3.6	4.8	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	5.8	4.6	4.6	4.6	4.6
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	Min	Min	Min	Min
Act Effct Green (s)	8.9	25.7	5.2	13.5	11.3	11.3	11.3	11.3
Actuated g/C Ratio	0.18	0.52	0.11	0.27	0.23	0.23	0.23	0.23
v/c Ratio	0.47	0.49	0.02	0.53	0.12	0.02	0.17	0.21
Control Delay (s/veh)	22.9	9.5	25.0	17.2	18.8	15.5	19.2	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	22.9	9.5	25.0	17.2	18.8	15.5	19.2	5.4
LOS	C	A	C	B	B	B	B	A
Approach Delay (s/veh)		12.2		17.2		18.2		8.2
Approach LOS		B		B		B		A

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 49.2

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.53

Intersection Signal Delay (s/veh): 13.2

Intersection LOS: B

Intersection Capacity Utilization 62.8%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 2: Greenspot Rd. & Church St.

 Ø2	 Ø3	 Ø4
33.6 s	21.6 s	34.8 s
 Ø6	 Ø7	 Ø8
33.6 s	21.6 s	34.8 s

HCM 7th Signalized Intersection Summary

2: Greenspot Rd. & Church St.

East Highland Ranch (JN 15974)

12/17/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	215	840	16	3	435	50	26	4	2	44	11	154
Future Volume (veh/h)	215	840	16	3	435	50	26	4	2	44	11	154
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	226	884	12	3	458	51	27	4	1	46	12	60
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	338	1332	18	7	813	90	431	338	85	482	438	371
Arrive On Green	0.13	0.38	0.38	0.00	0.26	0.26	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	2670	3487	47	1594	3129	347	1179	1367	342	1248	1772	1502
Grp Volume(v), veh/h	226	449	447	3	258	251	27	0	5	46	12	60
Grp Sat Flow(s),veh/h/ln	1335	1772	1763	1594	1772	1704	1179	0	1709	1248	1772	1502
Q Serve(g_s), s	3.3	8.6	8.6	0.1	5.2	5.2	0.8	0.0	0.1	1.2	0.2	1.3
Cycle Q Clear(g_c), s	3.3	8.6	8.6	0.1	5.2	5.2	2.0	0.0	0.1	1.3	0.2	1.3
Prop In Lane	1.00		0.03	1.00		0.20	1.00		0.20	1.00		1.00
Lane Grp Cap(c), veh/h	338	677	673	7	460	443	431	0	423	482	438	371
V/C Ratio(X)	0.67	0.66	0.66	0.46	0.56	0.57	0.06	0.00	0.01	0.10	0.03	0.16
Avail Cap(c_a), veh/h	1109	1256	1249	662	1256	1207	975	0	1211	1058	1256	1064
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.1	10.5	10.5	20.3	13.1	13.1	12.9	0.0	11.6	12.1	11.7	12.1
Incr Delay (d2), s/veh	0.9	1.1	1.1	17.5	1.1	1.1	0.1	0.0	0.0	0.1	0.0	0.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	2.3	2.3	0.1	1.6	1.6	0.2	0.0	0.0	0.3	0.1	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	17.9	11.6	11.6	37.9	14.2	14.3	12.9	0.0	11.6	12.2	11.7	12.3
LnGrp LOS	B	B	B	D	B	B	B		B	B	B	B
Approach Vol, veh/h	1122			512			32			118		
Approach Delay, s/veh	12.9			14.4			12.7			12.2		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	2		3	4		6	7	8				
Phs Duration (G+Y+Rc), s	14.7		4.8	21.4		14.7	9.8	16.4				
Change Period (Y+Rc), s	4.6		4.6	5.8		4.6	4.6	5.8				
Max Green Setting (Gmax), s	29.0		17.0	29.0		29.0	17.0	29.0				
Max Q Clear Time (g_c+I1), s	4.0		2.1	10.6		3.3	5.3	7.2				
Green Ext Time (p_c), s	0.1		0.0	4.9		0.5	0.3	2.7				
Intersection Summary												
HCM 7th Control Delay, s/veh				13.3								
HCM 7th LOS				B								

Timings

East Highland Ranch (JN 15974)

3: Greenspot Rd. & Weaver St.

12/17/2024



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	←	↑↑	↑↑	←	←
Traffic Volume (vph)	192	506	261	103	114
Future Volume (vph)	192	506	261	103	114
Turn Type	Perm	NA	NA	Prot	Perm
Protected Phases		4	8	1	
Permitted Phases	4				6
Detector Phase	4	4	8	1	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	22.8	22.8	22.8	9.6	22.4
Total Split (s)	46.8	46.8	46.8	43.2	43.2
Total Split (%)	52.0%	52.0%	52.0%	48.0%	48.0%
Yellow Time (s)	4.8	4.8	4.8	3.6	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	4.6	5.4
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	Min
Act Effect Green (s)	15.0	15.0	15.0	9.7	11.4
Actuated g/C Ratio	0.39	0.39	0.39	0.26	0.30
v/c Ratio	0.58	0.38	0.23	0.29	0.23
Control Delay (s/veh)	16.5	8.9	7.2	13.7	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	16.5	8.9	7.2	13.7	4.6
LOS	B	A	A	B	A
Approach Delay (s/veh)		11.0	7.2	8.9	
Approach LOS		B	A	A	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 38

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.58

Intersection Signal Delay (s/veh): 9.7

Intersection LOS: A

Intersection Capacity Utilization 40.9%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: Greenspot Rd. & Weaver St.

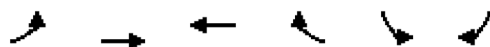


HCM 7th Signalized Intersection Summary

3: Greenspot Rd. & Weaver St.

East Highland Ranch (JN 15974)

12/17/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	192	506	261	45	103	114
Future Volume (veh/h)	192	506	261	45	103	114
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1673	1772	1772	1772	1673	1772
Adj Flow Rate, veh/h	202	533	275	43	108	55
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	667	1668	1407	217	199	199
Arrive On Green	0.47	0.47	0.47	0.47	0.13	0.13
Sat Flow, veh/h	942	3544	2989	461	1498	1502
Grp Volume(v), veh/h	202	533	161	157	108	55
Grp Sat Flow(s), veh/h/ln	942	1772	1772	1677	1498	1502
Q Serve(g_s), s	4.2	2.5	1.4	1.4	1.8	0.9
Cycle Q Clear(g_c), s	5.6	2.5	1.4	1.4	1.8	0.9
Prop In Lane	1.00			0.27	1.00	1.00
Lane Grp Cap(c), veh/h	667	1668	834	790	199	199
V/C Ratio(X)	0.30	0.32	0.19	0.20	0.54	0.28
Avail Cap(c_a), veh/h	1697	5543	2771	2624	2206	2211
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.7	4.3	4.0	4.0	10.6	10.2
Incr Delay (d2), s/veh	0.3	0.1	0.1	0.1	0.9	0.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.1	0.1	0.1	0.4	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	5.9	4.4	4.2	4.2	11.5	10.5
LnGrp LOS	A	A	A	A	B	B
Approach Vol, veh/h		735	318		163	
Approach Delay, s/veh		4.8	4.2		11.2	
Approach LOS		A	A		B	
Timer - Assigned Phs				4	6	8
Phs Duration (G+Y+Rc), s				18.1	8.1	18.1
Change Period (Y+Rc), s				5.8	4.6	5.8
Max Green Setting (Gmax), s				41.0	38.6	41.0
Max Q Clear Time (g_c+I1), s				7.6	3.8	3.4
Green Ext Time (p_c), s				4.7	0.2	1.7
Intersection Summary						
HCM 7th Control Delay, s/veh			5.5			
HCM 7th LOS			A			

Intersection												
Int Delay, s/veh	3.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	8	15	36	5	0	15	45	50	1	42	3
Future Vol, veh/h	5	8	15	36	5	0	15	45	50	1	42	3
Conflicting Peds, #/hr	0	0	2	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	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	10	19	45	6	0	19	56	63	1	53	4

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	154	213	56	187	184	88	56	0	0	119	0	0
Stage 1	57	57	-	125	125	-	-	-	-	-	-	-
Stage 2	97	156	-	62	59	-	-	-	-	-	-	-
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	813	684	1010	774	710	971	1548	-	-	1469	-	-
Stage 1	955	847	-	879	792	-	-	-	-	-	-	-
Stage 2	910	768	-	949	846	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	795	675	1008	736	701	971	1548	-	-	1469	-	-
Mov Cap-2 Maneuver	795	675	-	736	701	-	-	-	-	-	-	-
Stage 1	954	847	-	867	782	-	-	-	-	-	-	-
Stage 2	891	758	-	918	845	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	9.43	10.29	1	0.16
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	222	-	-	848	732	39	-
HCM Lane V/C Ratio	0.012	-	-	0.041	0.07	0.001	-
HCM Control Delay (s/veh)	7.4	0	-	9.4	10.3	7.5	0
HCM Lane LOS	A	A	-	A	B	A	A
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0	-

Intersection						
Int Delay, s/veh	1.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	94	513	225	12	17	73
Future Vol, veh/h	94	513	225	12	17	73
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	60	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	99	540	237	13	18	77

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	249	0	0	711	125
Stage 1	-	-	-	243	-
Stage 2	-	-	-	468	-
Critical Hdwy	4.14	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	3.52	3.32
Pot Cap-1 Maneuver	1313	-	-	368	903
Stage 1	-	-	-	775	-
Stage 2	-	-	-	597	-
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1313	-	-	340	903
Mov Cap-2 Maneuver	-	-	-	340	-
Stage 1	-	-	-	716	-
Stage 2	-	-	-	597	-

Approach	EB	WB	SB
HCM Control Delay, s/v	1.23	0	11.07
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1313	-	-	-	688
HCM Lane V/C Ratio	0.075	-	-	-	0.138
HCM Control Delay (s/veh)	8	-	-	-	11.1
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.5

APPENDIX 3.3: EXISTING (2024) CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **Existing (2024) Conditions - Weekday AM Peak Hour**

Major Street Name = **Alta Vista**

Total of Both Approaches (VPH) = **189**

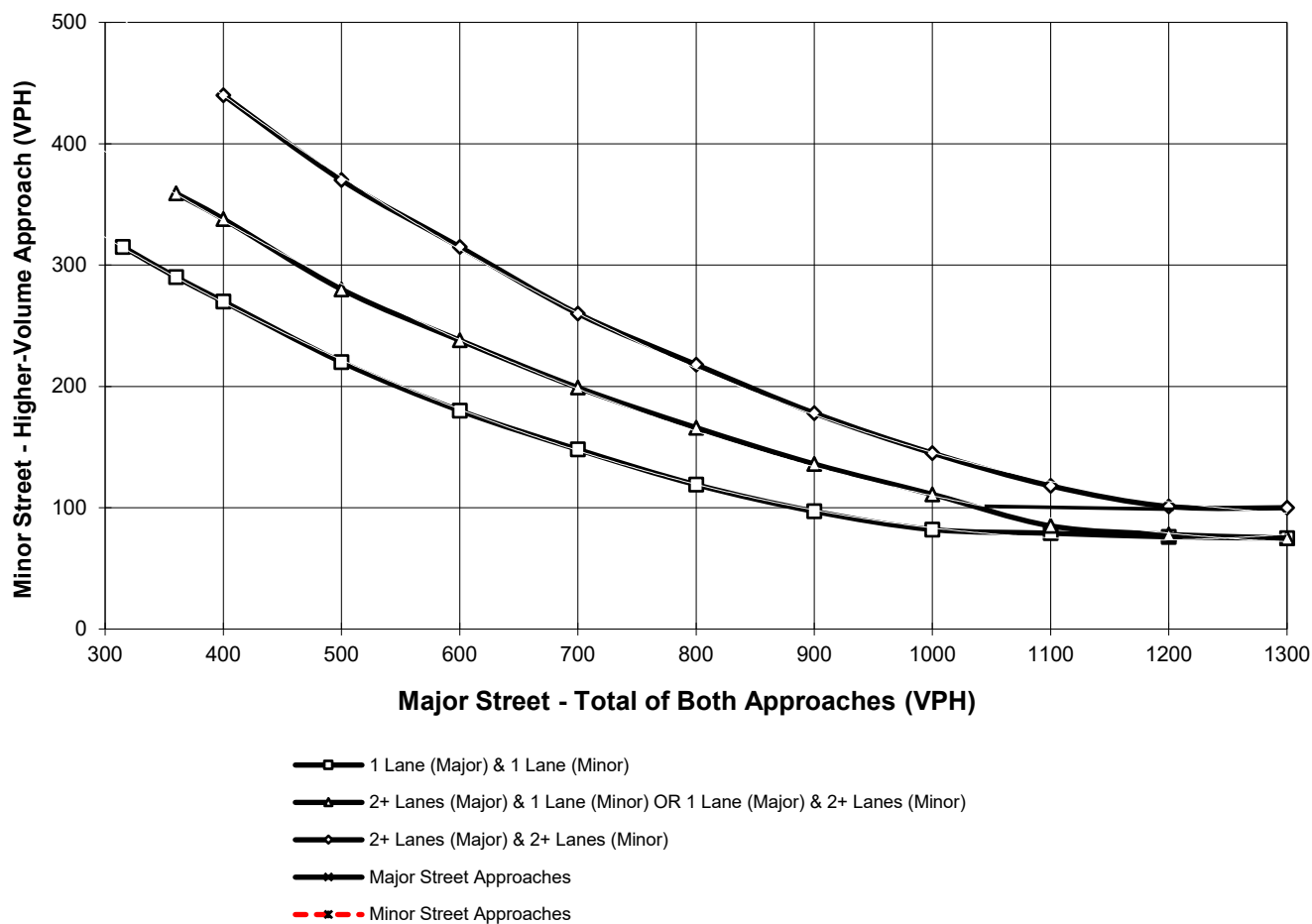
Number of Approach Lanes Major Street = **1**

Minor Street Name = **Santa Ana Canyon Rd.**

High Volume Approach (VPH) = **119**

Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes
and 75 vph applies as the lower threshold for a minor-street approach with one lane

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

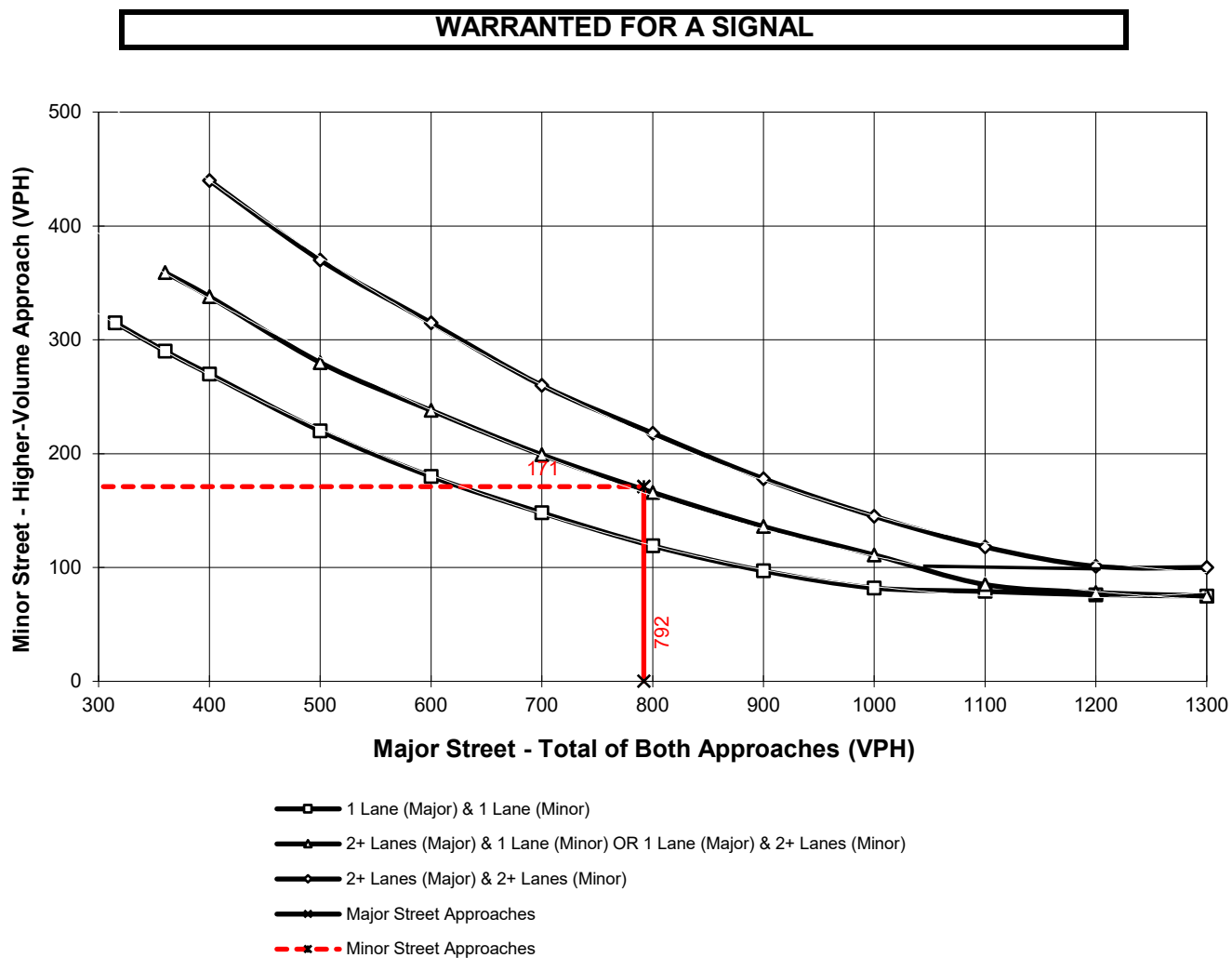
Traffic Conditions = **Existing (2024) Conditions - Weekday AM Peak Hour**

Major Street Name = **Greenspot Rd.**

Total of Both Approaches (VPH) = **792**
Number of Approach Lanes Major Street = **2**

Minor Street Name = **Alta Vista**

High Volume Approach (VPH) = **171**
Number of Approach Lanes Minor Street = **1**



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes
and 75 vph applies as the lower threshold for a minor-street approach with one lane

APPENDIX 4.1: POST PROCESSING WORKSHEETS

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Job #: 15974
Analyst: IA
Date: 12/19/24

INDIVIDUAL TURN VOLUME GROWTH REVIEW									
APPROACH	TURNING MOVEMENT	AM PEAK HOUR INPUT DATA				PM PEAK HOUR INPUT DATA			
		EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE
NORTH BOUND	Left	135	252	117	87%	134	190	56	42%
	Through	198	261	63	32%	243	304	61	25%
	Right	279	376	97	35%	304	282	-22	-7%
	NB Total	612	889	277	45%	681	776	95	14%
SOUTH BOUND	Left	35	47	12	34%	66	62	-4	-6%
	Through	314	422	108	34%	279	364	85	30%
	Right	1	2	1	100%	6	9	3	50%
	SB Total	350	471	121	35%	351	435	84	24%
EAST BOUND	Left	22	27	5	23%	55	91	36	65%
	Through	364	457	93	26%	782	956	174	22%
	Right	83	105	22	27%	184	314	130	71%
	EB Total	469	589	120	26%	1,021	1,361	340	33%
WEST BOUND	Left	427	383	-44	-10%	281	352	71	25%
	Through	917	1,126	209	23%	409	561	152	37%
	Right	83	72	-11	-13%	46	56	10	22%
	WB Total	1,427	1,581	154	11%	736	969	233	32%
TOTAL ENTERING VOLUME		2,858	3,530	672	24%	2,789	3,541	752	27%

FORECAST PEAK HOUR TO ADT COMPARISON						
		VOLUMES		PERCENT OF ADT		ADT
		AM	PM	AM	PM	
North Leg	Inbound	471	435	8%	8%	10,497
North Leg	Outbound	360	451			
North Leg	TOTAL	831	886			
South Leg	Inbound	889	776	7%	7%	27,539
South Leg	Outbound	910	1,030			
South Leg	TOTAL	1,799	1,806			
East Leg	Inbound	1,581	969	8%	8%	30,113
East Leg	Outbound	880	1,300			
East Leg	TOTAL	2,461	2,269			
West Leg	Inbound	589	1,361	7%	7%	29,820
West Leg	Outbound	1,380	760			
West Leg	TOTAL	1,969	2,121			
OVERALL TOTAL		7,060	7,082	7%	7%	97,968

Project: East Highland Ranch
Scenario: Horizon Year (2050) Without Project

Job #: 15974
Analyst: IA
Date: 12/19/24

LOCATION: Church St. & Greenspot Rd.
FORECAST YEAR: 2050

INDIVIDUAL TURN VOLUME GROWTH REVIEW									
APPROACH	TURNING MOVEMENT	AM PEAK HOUR INPUT DATA				PM PEAK HOUR INPUT DATA			
		EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE
NORTH BOUND	Left	20	17	-3	-15%	26	26	0	0%
	Through	13	13	0	0%	4	3	-1	-25%
	Right	0	0	0	0%	2	2	0	0%
	NB Total	33	30	-3	-9%	32	31	-1	-3%
SOUTH BOUND	Left	38	56	18	47%	44	43	-1	-2%
	Through	6	5	-1	-17%	11	8	-3	-27%
	Right	208	190	-18	-9%	154	170	16	10%
	SB Total	252	251	-1	0%	209	221	12	6%
EAST BOUND	Left	169	187	18	11%	215	230	15	7%
	Through	359	544	185	52%	840	1,235	395	47%
	Right	13	11	-2	-15%	16	18	2	13%
	EB Total	541	742	201	37%	1,071	1,483	412	38%
WEST BOUND	Left	3	4	1	33%	3	3	0	0%
	Through	872	1,243	371	43%	435	644	209	48%
	Right	90	150	60	67%	50	48	-2	-4%
	WB Total	965	1,397	432	45%	488	695	207	42%
TOTAL ENTERING VOLUME		1,791	2,420	629	35%	1,800	2,430	630	35%

FORECAST PEAK HOUR TO ADT COMPARISON					
		VOLUMES		PERCENT OF ADT	
		AM	PM	AM	PM
North Leg	Inbound	251	221		
North Leg	Outbound	350	281		
North Leg	TOTAL	601	502	10%	9%
South Leg	Inbound	30	31		
South Leg	Outbound	20	29		
South Leg	TOTAL	50	60	#DIV/0!	#DIV/0!
East Leg	Inbound	1,397	695		
East Leg	Outbound	600	1,280		
East Leg	TOTAL	1,997	1,975	8%	8%
West Leg	Inbound	742	1,483		
West Leg	Outbound	1,450	840		
West Leg	TOTAL	2,192	2,323	7%	8%
OVERALL TOTAL		4,840	4,860	8%	8%

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Project: East Highland Ranch
Scenario: Horizon Year (2050) Without Project

Job #: 15974
Analyst: IA
Date: 12/19/24

LOCATION: Weaver St. & Greenspot Rd.
FORECAST YEAR: 2050

INDIVIDUAL TURN VOLUME GROWTH REVIEW									
APPROACH	TURNING MOVEMENT	AM PEAK HOUR INPUT DATA				PM PEAK HOUR INPUT DATA			
		EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE
NORTH BOUND	Left	0	0	0	0%	0	0	0	0%
	Through	0	0	0	0%	0	0	0	0%
	Right	0	0	0	0%	0	0	0	0%
	NB Total	0	0	0	0%	0	0	0	0%
SOUTH BOUND	Left	51	86	35	69%	103	250	147	143%
	Through	0	0	0	0%	0	0	0	0%
	Right	207	174	-33	-16%	114	112	-2	-2%
	SB Total	258	260	2	1%	217	362	145	67%
EAST BOUND	Left	88	122	34	39%	192	151	-41	-21%
	Through	201	363	162	81%	506	1,100	594	117%
	Right	0	0	0	0%	0	0	0	0%
	EB Total	289	485	196	68%	698	1,251	553	79%
WEST BOUND	Left	0	0	0	0%	0	0	0	0%
	Through	559	1,141	582	104%	261	578	317	121%
	Right	77	243	166	216%	45	89	44	98%
	WB Total	636	1,384	748	118%	306	667	361	118%
TOTAL ENTERING VOLUME		1,183	2,129	946	80%	1,221	2,280	1059	87%

FORECAST PEAK HOUR TO ADT COMPARISON					
		VOLUMES		PERCENT OF ADT	
		AM	PM	AM	PM
North Leg	Inbound	260	362		
North Leg	Outbound	365	240		
North Leg	TOTAL	625	602	9%	9%
South Leg	Inbound	0	0		
South Leg	Outbound	0	0		
South Leg	TOTAL	0	0	-	-
East Leg	Inbound	1,384	667		
East Leg	Outbound	449	1,350		
East Leg	TOTAL	1,833	2,017	6%	7%
West Leg	Inbound	485	1,251		
West Leg	Outbound	1,315	690		
West Leg	TOTAL	1,800	1,941	7%	7%
OVERALL TOTAL		4,258	4,560	7%	7%

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Job #: 15974
Analyst: IA
Date: 12/19/24

INDIVIDUAL TURN VOLUME GROWTH REVIEW									
APPROACH	TURNING MOVEMENT	AM PEAK HOUR INPUT DATA				PM PEAK HOUR INPUT DATA			
		EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE
NORTH BOUND	Left	63	97	34	54%	15	12	-3	-20%
	Through	31	32	1	3%	45	43	-2	-4%
	Right	15	11	-4	-27%	50	46	-4	-8%
	NB Total	109	140	31	28%	110	101	-9	-8%
SOUTH BOUND	Left	0	0	0	0%	1	2	1	100%
	Through	76	75	-1	-1%	42	53	11	26%
	Right	4	17	13	325%	3	5	2	67%
	SB Total	80	92	12	15%	46	60	14	30%
EAST BOUND	Left	3	8	5	167%	5	13	8	160%
	Through	10	19	9	90%	8	20	12	150%
	Right	45	42	-3	-7%	15	26	11	73%
	EB Total	58	69	11	19%	28	59	31	111%
WEST BOUND	Left	49	33	-16	-33%	36	34	-2	-6%
	Through	12	36	24	200%	5	6	1	20%
	Right	0	0	0	0%	0	0	0	0%
	WB Total	61	69	8	13%	41	40	-1	-2%
TOTAL ENTERING VOLUME		308	370	62	20%	225	260	35	16%

FORECAST PEAK HOUR TO ADT COMPARISON						
		VOLUMES		PERCENT OF ADT		ADT
		AM	PM	AM	PM	
North Leg	Inbound	92	60	11%	9%	1,243
North Leg	Outbound	40	56			
North Leg	TOTAL	132	116			
South Leg	Inbound	140	101	14%	10%	2,129
South Leg	Outbound	150	113			
South Leg	TOTAL	290	214			
East Leg	Inbound	69	40	-	-	-
East Leg	Outbound	30	68			
East Leg	TOTAL	99	108			
West Leg	Inbound	69	59	-	-	-
West Leg	Outbound	150	23			
West Leg	TOTAL	219	82			
OVERALL TOTAL		740	520	22%	15%	3,372

Project: East Highland Ranch
 Scenario: Horizon Year (2050) Without Project

Job #: 15974
 Analyst: IA
 Date: 12/20/24

LOCATION: Alta Vista & Greenspot Rd.
 FORECAST YEAR: 2045

INDIVIDUAL TURN VOLUME GROWTH REVIEW									
APPROACH	TURNING MOVEMENT	AM PEAK HOUR INPUT DATA				PM PEAK HOUR INPUT DATA			
		EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE
NORTH BOUND	Left	0	0	0	0%	0	0	0	0%
	Through	0	0	0	0%	0	0	0	0%
	Right	0	0	0	0%	0	0	0	0%
	NB Total	0	0	0	0%	0	0	0	0%
SOUTH BOUND	Left	45	50	5	11%	17	21	4	24%
	Through	0	0	0	0%	0	0	0	0%
	Right	126	100	-26	-21%	73	81	8	11%
	SB Total	171	150	-21	-12%	90	102	12	13%
EAST BOUND	Left	49	39	-10	-20%	94	87	-7	-7%
	Through	183	366	183	100%	513	1,279	766	149%
	Right	0	0	0	0%	0	0	0	0%
	EB Total	232	405	173	75%	607	1,366	759	125%
WEST BOUND	Left	0	0	0	0%	0	0	0	0%
	Through	502	1,281	779	155%	225	559	334	148%
	Right	58	83	25	43%	12	13	1	8%
	WB Total	560	1,364	804	144%	237	572	335	141%
TOTAL ENTERING VOLUME		963	1,919	956	99%	934	2,040	1106	118%

FORECAST PEAK HOUR TO ADT COMPARISON					
		VOLUMES		PERCENT OF ADT	
		AM	PM	AM	PM
North Leg	Inbound	150	102		
North Leg	Outbound	122	100		
North Leg	TOTAL	272	202	12%	9%
South Leg	Inbound	0	0		
South Leg	Outbound	0	0		
South Leg	TOTAL	0	0	-	-
East Leg	Inbound	1,364	572		
East Leg	Outbound	416	1,300		
East Leg	TOTAL	1,780	1,872	6%	7%
West Leg	Inbound	405	1,366		
West Leg	Outbound	1,381	640		
West Leg	TOTAL	1,786	2,006	7%	7%
OVERALL TOTAL		3,838	4,080	7%	7%

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APPENDIX 5.1: OPENING YEAR (2027) WITHOUT PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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Timings

East Highland Ranch (JN 15974)

1: Greenspot Rd. & Boulder Av.

12/23/2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	
Lane Configurations												
Traffic Volume (vph)	49	474	147	476	1139	120	77	387	1	233	238	
Future Volume (vph)	49	474	147	476	1139	120	77	387	1	233	238	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4			8			6			
Detector Phase	7	4	4	3	8	8	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	
Minimum Split (s)	9.6	22.8	22.8	14.6	22.8	22.8	9.6	23.2	23.2	9.6	23.2	
Total Split (s)	10.9	26.0	26.0	51.0	66.1	66.1	14.8	24.3	24.3	18.7	28.2	
Total Split (%)	9.1%	21.7%	21.7%	42.5%	55.1%	55.1%	12.3%	20.3%	20.3%	15.6%	23.5%	
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	4.8	3.6	5.2	5.2	3.6	5.2	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
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)	4.6	5.8	5.8	4.6	5.8	5.8	4.6	6.2	6.2	4.6	6.2	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	
Act Effct Green (s)	6.0	18.6	18.6	39.2	54.4	54.4	8.9	16.3	16.3	12.8	23.0	
Actuated g/C Ratio	0.06	0.17	0.17	0.36	0.50	0.50	0.08	0.15	0.15	0.12	0.21	
v/c Ratio	0.35	0.81	0.40	0.91	0.66	0.16	0.65	0.75	0.00	0.77	0.64	
Control Delay (s/veh)	60.8	56.3	10.0	56.9	23.3	4.1	76.7	55.7	0.0	65.6	28.1	
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)	60.8	56.3	10.0	56.9	23.3	4.1	76.7	55.7	0.0	65.6	28.1	
LOS	E	E	A	E	C	A	E	E	A	E	C	
Approach Delay (s/veh)		46.5			31.2			59.0			39.4	
Approach LOS		D			C			E			D	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 108.6

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay (s/veh): 39.3

Intersection LOS: D

Intersection Capacity Utilization 82.9%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 1: Greenspot Rd. & Boulder Av.

	Ø1		Ø2		Ø3		Ø4
14.8 s		28.2 s		51 s		26 s	
	Ø5		Ø6		Ø7		Ø8
18.7 s		24.3 s		10.9 s		66.1 s	

HCM 7th Signalized Intersection Summary

East Highland Ranch (JN 15974)

1: Greenspot Rd. & Boulder Av.

12/23/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	49	474	147	476	1139	120	77	387	1	233	238	302
Future Volume (veh/h)	49	474	147	476	1139	120	77	387	1	233	238	302
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	51	489	120	491	1174	104	79	399	0	240	245	158
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	105	610	255	519	1699	711	96	507		296	388	241
Arrive On Green	0.04	0.17	0.17	0.35	0.48	0.48	0.06	0.14	0.00	0.11	0.19	0.19
Sat Flow, veh/h	2670	3544	1482	1498	3544	1483	1498	3544	1502	2670	2046	1269
Grp Volume(v), veh/h	51	489	120	491	1174	104	79	399	0	240	211	192
Grp Sat Flow(s),veh/h/ln	1335	1772	1482	1498	1772	1483	1498	1772	1502	1335	1772	1543
Q Serve(g_s), s	1.7	12.4	6.8	29.7	24.1	3.7	4.9	10.1	0.0	8.2	10.2	10.7
Cycle Q Clear(g_c), s	1.7	12.4	6.8	29.7	24.1	3.7	4.9	10.1	0.0	8.2	10.2	10.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.82
Lane Grp Cap(c), veh/h	105	610	255	519	1699	711	96	507		296	336	293
V/C Ratio(X)	0.49	0.80	0.47	0.95	0.69	0.15	0.82	0.79		0.81	0.63	0.66
Avail Cap(c_a), veh/h	180	768	321	745	2291	959	164	688		404	418	364
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.9	37.1	34.8	29.6	18.9	13.6	43.1	38.6	0.0	40.5	34.8	35.0
Incr Delay (d2), s/veh	1.3	4.9	1.3	14.2	0.6	0.1	6.4	4.3	0.0	6.2	2.0	3.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	5.5	2.4	11.6	8.6	1.1	1.9	4.4	0.0	2.8	4.4	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	45.2	42.0	36.1	43.8	19.5	13.7	49.5	42.8	0.0	46.7	36.7	38.0
LnGrp LOS	D	D	D	D	B	B	D	D		D	D	D
Approach Vol, veh/h	660			1769			478			643		
Approach Delay, s/veh	41.2			25.9			43.9			40.8		
Approach LOS	D			C			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.6	23.9	36.9	21.8	14.9	19.6	8.3	50.5				
Change Period (Y+Rc), s	4.6	6.2	4.6	5.8	4.6	6.2	4.6	5.8				
Max Green Setting (Gmax), s	10.2	22.0	46.4	20.2	14.1	18.1	6.3	60.3				
Max Q Clear Time (g_c+I1), s	6.9	12.7	31.7	14.4	10.2	12.1	3.7	26.1				
Green Ext Time (p_c), s	0.0	1.5	0.6	1.7	0.2	1.1	0.0	9.7				

Intersection Summary

HCM 7th Control Delay, s/veh	33.9
HCM 7th LOS	C

Notes

Unsignalized Delay for [SER] is excluded from calculations of the approach delay and intersection delay.

Timings

East Highland Ranch (JN 15974)

2: Greenspot Rd. & Church St.

12/23/2024

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	 	 		 		 		 
Traffic Volume (vph)	203	470	3	1062	21	14	42	6
Future Volume (vph)	203	470	3	1062	21	14	42	6
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA
Protected Phases	7	4	3	8		2		6
Permitted Phases					2		6	
Detector Phase	7	4	3	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	10.0	5.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.6	27.8	9.6	27.8	21.6	21.6	21.6	21.6
Total Split (s)	18.0	57.3	9.7	49.0	23.0	23.0	23.0	23.0
Total Split (%)	20.0%	63.7%	10.8%	54.4%	25.6%	25.6%	25.6%	25.6%
Yellow Time (s)	3.6	4.8	3.6	4.8	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	5.8	4.6	4.6	4.6	4.6
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	Min	Min	Min	Min
Act Effct Green (s)	10.7	48.8	5.2	35.0	11.5	11.5	11.5	11.5
Actuated g/C Ratio	0.15	0.67	0.07	0.48	0.16	0.16	0.16	0.16
v/c Ratio	0.61	0.24	0.03	0.80	0.18	0.06	0.27	0.45
Control Delay (s/veh)	37.9	5.5	38.0	20.2	33.8	30.2	34.2	12.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	37.9	5.5	38.0	20.2	33.8	30.2	34.2	12.0
LOS	D	A	D	C	C	C	C	B
Approach Delay (s/veh)		15.0		20.3		32.3		15.2
Approach LOS		B		C		C		B

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 72.6

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay (s/veh): 18.1

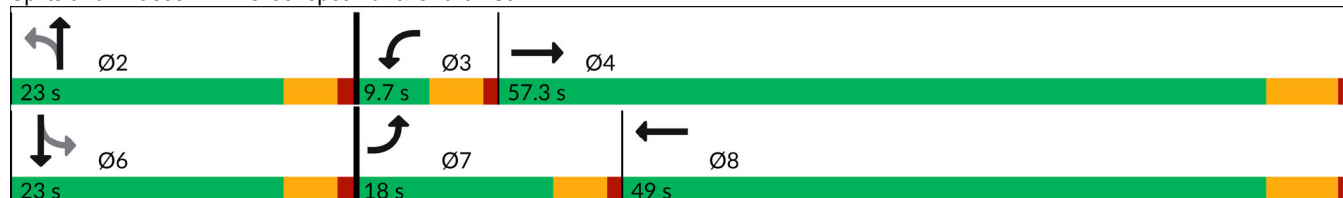
Intersection LOS: B

Intersection Capacity Utilization 73.3%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 2: Greenspot Rd. & Church St.



HCM 7th Signalized Intersection Summary

2: Greenspot Rd. & Church St.

East Highland Ranch (JN 15974)

12/23/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	203	470	14	3	1062	100	21	14	0	42	6	243
Future Volume (veh/h)	203	470	14	3	1062	100	21	14	0	42	6	243
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	236	547	14	3	1235	114	24	16	0	49	7	168
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	314	2071	53	6	1560	144	171	290	0	303	290	242
Arrive On Green	0.12	0.60	0.60	0.00	0.49	0.49	0.16	0.16	0.00	0.16	0.16	0.16
Sat Flow, veh/h	2670	3439	88	1594	3192	294	1074	1772	0	1232	1772	1482
Grp Volume(v), veh/h	236	282	279	3	684	665	24	16	0	49	7	168
Grp Sat Flow(s),veh/h/ln	1335	1772	1755	1594	1772	1714	1074	1772	0	1232	1772	1482
Q Serve(g_s), s	5.6	4.9	4.9	0.1	21.0	21.1	1.4	0.5	0.0	2.3	0.2	7.0
Cycle Q Clear(g_c), s	5.6	4.9	4.9	0.1	21.0	21.1	8.4	0.5	0.0	2.8	0.2	7.0
Prop In Lane	1.00		0.05	1.00		0.17	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	314	1067	1057	6	866	837	171	290	0	303	290	242
V/C Ratio(X)	0.75	0.26	0.26	0.46	0.79	0.79	0.14	0.06	0.00	0.16	0.02	0.69
Avail Cap(c_a), veh/h	549	1399	1386	125	1174	1135	299	500	0	449	500	418
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.8	6.1	6.1	32.4	13.9	13.9	29.7	23.0	0.0	24.2	22.9	25.7
Incr Delay (d2), s/veh	1.4	0.1	0.1	18.0	2.6	2.8	0.4	0.1	0.0	0.2	0.0	3.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	1.3	1.2	0.1	7.0	6.8	0.4	0.2	0.0	0.7	0.1	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	29.2	6.3	6.3	50.4	16.5	16.7	30.0	23.1	0.0	24.4	22.9	29.3
LnGrp LOS	C	A	A	D	B	B	C	C		C	C	C
Approach Vol, veh/h	797		1352				40		224			
Approach Delay, s/veh	13.1		16.7				27.3		28.0			
Approach LOS	B		B				C		C			
Timer - Assigned Phs	2		3		4		6		7		8	
Phs Duration (G+Y+Rc), s	15.3		4.9		45.1		15.3		12.3		37.7	
Change Period (Y+Rc), s	4.6		4.6		5.8		4.6		4.6		5.8	
Max Green Setting (Gmax), s	18.4		5.1		51.5		18.4		13.4		43.2	
Max Q Clear Time (g_c+I1), s	10.4		2.1		6.9		9.0		7.6		23.1	
Green Ext Time (p_c), s	0.0		0.0		3.3		0.8		0.2		8.7	
Intersection Summary												
HCM 7th Control Delay, s/veh			16.7									
HCM 7th LOS			B									

Timings

East Highland Ranch (JN 15974)

3: Greenspot Rd. & Weaver St.

12/23/2024



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	←	↑↑	↑↑	←	←
Traffic Volume (vph)	113	283	713	55	241
Future Volume (vph)	113	283	713	55	241
Turn Type	Perm	NA	NA	Prot	Perm
Protected Phases		4	8	1	
Permitted Phases	4				6
Detector Phase	4	4	8	1	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	22.8	22.8	22.8	9.6	22.4
Total Split (s)	58.0	58.0	58.0	32.0	32.0
Total Split (%)	64.4%	64.4%	64.4%	35.6%	35.6%
Yellow Time (s)	4.8	4.8	4.8	3.6	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	4.6	5.4
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	Min
Act Effect Green (s)	16.4	16.4	16.4	8.4	11.4
Actuated g/C Ratio	0.42	0.42	0.42	0.21	0.29
v/c Ratio	0.55	0.20	0.57	0.18	0.44
Control Delay (s/veh)	19.6	7.5	10.1	14.2	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	19.6	7.5	10.1	14.2	6.9
LOS	B	A	B	B	A
Approach Delay (s/veh)		11.0	10.1	8.2	
Approach LOS		B	B	A	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 39.5

Natural Cycle: 55

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.57

Intersection Signal Delay (s/veh): 10.0

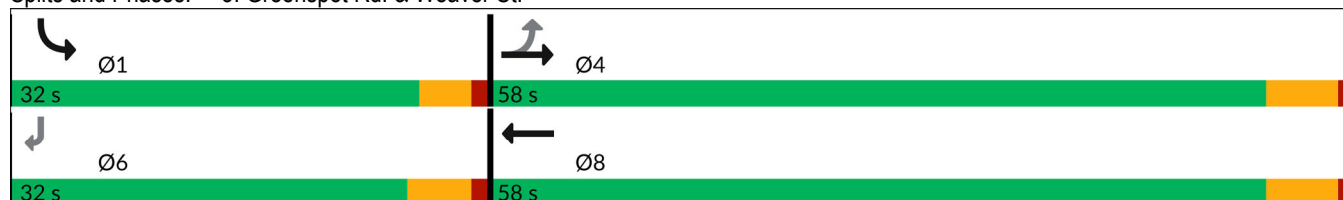
Intersection LOS: A

Intersection Capacity Utilization 49.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: Greenspot Rd. & Weaver St.



HCM 7th Signalized Intersection Summary

3: Greenspot Rd. & Weaver St.

East Highland Ranch (JN 15974)

12/23/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	113	283	713	86	55	241
Future Volume (veh/h)	113	283	713	86	55	241
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1673	1772	1772	1772	1673	1772
Adj Flow Rate, veh/h	118	295	743	90	57	251
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	395	1718	1503	182	324	325
Arrive On Green	0.48	0.48	0.48	0.48	0.22	0.22
Sat Flow, veh/h	585	3544	3100	375	1498	1502
Grp Volume(v), veh/h	118	295	424	409	57	251
Grp Sat Flow(s), veh/h/ln	585	1772	1772	1704	1498	1502
Q Serve(g_s), s	6.0	1.6	5.7	5.7	1.1	5.5
Cycle Q Clear(g_c), s	11.6	1.6	5.7	5.7	1.1	5.5
Prop In Lane	1.00			0.22	1.00	1.00
Lane Grp Cap(c), veh/h	395	1718	859	826	324	325
V/C Ratio(X)	0.30	0.17	0.49	0.49	0.18	0.77
Avail Cap(c_a), veh/h	989	5313	2656	2554	1179	1182
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.0	5.0	6.1	6.1	11.1	12.8
Incr Delay (d2), s/veh	0.4	0.0	0.4	0.5	0.1	1.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.2	0.9	0.9	0.3	1.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	10.4	5.1	6.5	6.5	11.2	14.3
LnGrp LOS	B	A	A	A	B	B
Approach Vol, veh/h		413	833		308	
Approach Delay, s/veh		6.6	6.5		13.7	
Approach LOS		A	A		B	
Timer - Assigned Phs				4	6	8
Phs Duration (G+Y+Rc), s				22.7	12.1	22.7
Change Period (Y+Rc), s				5.8	4.6	5.8
Max Green Setting (Gmax), s				52.2	27.4	52.2
Max Q Clear Time (g_c+I1), s				13.6	7.5	7.7
Green Ext Time (p_c), s				3.3	0.5	5.4
Intersection Summary						
HCM 7th Control Delay, s/veh			8.0			
HCM 7th LOS			A			

Intersection												
Int Delay, s/veh	6.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	11	55	52	13	0	70	33	16	0	81	4
Future Vol, veh/h	3	11	55	52	13	0	70	33	16	0	81	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	68	68	68	68	68	68	68	68	68	68	68	68
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	16	81	76	19	0	103	49	24	0	119	6

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	386	400	122	393	391	60	125	0	0	72	0	0
Stage 1	122	122	-	266	266	-	-	-	-	-	-	-
Stage 2	264	278	-	127	125	-	-	-	-	-	-	-
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	572	538	929	566	544	1005	1462	-	-	1528	-	-
Stage 1	882	795	-	739	689	-	-	-	-	-	-	-
Stage 2	741	681	-	877	792	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	512	499	929	464	504	1005	1462	-	-	1528	-	-
Mov Cap-2 Maneuver	512	499	-	464	504	-	-	-	-	-	-	-
Stage 1	882	795	-	685	638	-	-	-	-	-	-	-
Stage 2	666	630	-	784	792	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v10.21		14.56	4.5	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	994	-	-	792	472	1528	-
HCM Lane V/C Ratio	0.07	-	-	0.128	0.203	-	-
HCM Control Delay (s/veh)	7.6	0	-	10.2	14.6	0	-
HCM Lane LOS	A	A	-	B	B	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.4	0.8	0	-

Intersection						
Int Delay, s/veh	4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	54	223	609	62	48	140
Future Vol, veh/h	54	223	609	62	48	140
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	60	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	61	253	692	70	55	159

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	763	0	977
Stage 1	-	-	727
Stage 2	-	-	249
Critical Hdwy	4.14	-	6.84
Critical Hdwy Stg 1	-	-	5.84
Critical Hdwy Stg 2	-	-	5.84
Follow-up Hdwy	2.22	-	3.52
Pot Cap-1 Maneuver	846	-	248
Stage 1	-	-	439
Stage 2	-	-	769
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	846	-	230
Mov Cap-2 Maneuver	-	-	230
Stage 1	-	-	407
Stage 2	-	-	769

Approach	EB	WB	SB
HCM Control Delay, s/v	1.87	0	21.24
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	846	-	-	-	432
HCM Lane V/C Ratio	0.073	-	-	-	0.495
HCM Control Delay (s/veh)	9.6	-	-	-	21.2
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	2.7

Timings

East Highland Ranch (JN 15974)

1: Greenspot Rd. & Boulder Av.

12/23/2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	
Lane Configurations	 	 			 			 		 	 	
Traffic Volume (vph)	103	824	249	311	769	129	130	324	5	269	248	
Future Volume (vph)	103	824	249	311	769	129	130	324	5	269	248	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4			8			6			
Detector Phase	7	4	4	3	8	8	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	
Minimum Split (s)	9.6	22.8	22.8	14.6	22.8	22.8	9.6	23.2	23.2	9.6	23.2	
Total Split (s)	14.7	39.0	39.0	36.2	60.5	60.5	19.3	24.2	24.2	20.6	25.5	
Total Split (%)	12.3%	32.5%	32.5%	30.2%	50.4%	50.4%	16.1%	20.2%	20.2%	17.2%	21.3%	
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	4.8	3.6	5.2	5.2	3.6	5.2	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
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)	4.6	5.8	5.8	4.6	5.8	5.8	4.6	6.2	6.2	4.6	6.2	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	
Act Effct Green (s)	8.9	33.3	33.3	30.3	54.7	54.7	13.9	16.9	16.9	15.5	18.6	
Actuated g/C Ratio	0.08	0.28	0.28	0.26	0.47	0.47	0.12	0.14	0.14	0.13	0.16	
v/c Ratio	0.61	0.97	0.47	0.95	0.55	0.20	0.87	0.75	0.02	0.90	0.92	
Control Delay (s/veh)	66.1	64.1	7.8	79.2	24.5	6.7	92.3	58.3	0.0	79.8	52.5	
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)	66.1	64.1	7.8	79.2	24.5	6.7	92.3	58.3	0.0	79.8	52.5	
LOS	E	E	A	E	C	A	F	E	A	E	D	
Approach Delay (s/veh)		52.3			36.6			67.3			61.5	
Approach LOS		D			D			E			E	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 117.3

Natural Cycle: 110

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay (s/veh): 51.1

Intersection LOS: D

Intersection Capacity Utilization 86.3%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 1: Greenspot Rd. & Boulder Av.

 Ø1	 Ø2	 Ø3	 Ø4
19.3 s	25.5 s	36.2 s	39 s
 Ø5	 Ø6	 Ø7	 Ø8
20.6 s	24.2 s	14.7 s	60.5 s

HCM 7th Signalized Intersection Summary

East Highland Ranch (JN 15974)

1: Greenspot Rd. & Boulder Av.

12/23/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	103	824	249	311	769	129	130	324	5	269	248	295
Future Volume (veh/h)	103	824	249	311	769	129	130	324	5	269	248	295
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	121	969	257	366	905	130	153	381	0	316	292	173
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	163	1008	422	386	1706	714	175	504		357	336	193
Arrive On Green	0.06	0.28	0.28	0.26	0.48	0.48	0.12	0.14	0.00	0.13	0.16	0.16
Sat Flow, veh/h	2670	3544	1482	1498	3544	1483	1498	3544	1502	2670	2110	1215
Grp Volume(v), veh/h	121	969	257	366	905	130	153	381	0	316	244	221
Grp Sat Flow(s),veh/h/ln	1335	1772	1482	1498	1772	1483	1498	1772	1502	1335	1772	1553
Q Serve(g_s), s	5.2	31.4	17.5	28.0	20.8	5.8	11.7	12.1	0.0	13.6	15.7	16.3
Cycle Q Clear(g_c), s	5.2	31.4	17.5	28.0	20.8	5.8	11.7	12.1	0.0	13.6	15.7	16.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.78
Lane Grp Cap(c), veh/h	163	1008	422	386	1706	714	175	504		357	282	247
V/C Ratio(X)	0.74	0.96	0.61	0.95	0.53	0.18	0.87	0.76		0.89	0.86	0.89
Avail Cap(c_a), veh/h	231	1008	422	406	1706	714	189	546		366	293	257
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.9	41.1	36.2	42.5	21.1	17.2	50.7	48.1	0.0	49.7	47.9	48.1
Incr Delay (d2), s/veh	3.9	19.6	2.5	30.2	0.3	0.1	30.2	5.5	0.0	20.8	22.1	29.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	15.8	6.3	13.1	8.0	1.9	5.7	5.5	0.0	5.4	8.4	8.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	57.8	60.8	38.7	72.7	21.4	17.3	80.9	53.6	0.0	70.5	69.9	77.9
LnGrp LOS	E	E	D	E	C	B	F	D		E	E	E
Approach Vol, veh/h	1347			1401			534			781		
Approach Delay, s/veh	56.3			34.4			61.4			72.4		
Approach LOS	E			C			E			E		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	18.2	24.8	34.7	39.0	20.2	22.8	11.7	62.0				
Change Period (Y+Rc), s	4.6	6.2	4.6	5.8	4.6	6.2	4.6	5.8				
Max Green Setting (Gmax), s	14.7	19.3	31.6	33.2	16.0	18.0	10.1	54.7				
Max Q Clear Time (g_c+I1), s	13.7	18.3	30.0	33.4	15.6	14.1	7.2	22.8				
Green Ext Time (p_c), s	0.0	0.3	0.1	0.0	0.0	0.8	0.0	6.9				

Intersection Summary

HCM 7th Control Delay, s/veh	52.5
HCM 7th LOS	D

Notes

Unsignalized Delay for [SER] is excluded from calculations of the approach delay and intersection delay.

Timings

East Highland Ranch (JN 15974)

2: Greenspot Rd. & Church St.

12/23/2024

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	 	 		 		 		 
Traffic Volume (vph)	253	787	5	693	24	10	55	3
Future Volume (vph)	253	787	5	693	24	10	55	3
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA
Protected Phases	7	4	3	8		2		6
Permitted Phases					2		6	
Detector Phase	7	4	3	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	10.0	5.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.6	27.8	9.6	27.8	21.6	21.6	21.6	21.6
Total Split (s)	24.0	54.0	10.0	40.0	26.0	26.0	26.0	26.0
Total Split (%)	26.7%	60.0%	11.1%	44.4%	28.9%	28.9%	28.9%	28.9%
Yellow Time (s)	3.6	4.8	3.6	4.8	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	5.8	4.6	4.6	4.6	4.6
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	Min	Min	Min	Min
Act Effct Green (s)	11.4	35.9	5.3	21.2	11.5	11.5	11.5	11.5
Actuated g/C Ratio	0.19	0.60	0.09	0.36	0.19	0.19	0.19	0.19
v/c Ratio	0.57	0.43	0.04	0.67	0.15	0.03	0.28	0.32
Control Delay (s/veh)	28.3	7.7	32.4	19.4	26.4	24.1	27.6	2.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	28.3	7.7	32.4	19.4	26.4	24.1	27.6	2.0
LOS	C	A	C	B	C	C	C	A
Approach Delay (s/veh)		12.6		19.5		25.7		6.6
Approach LOS		B		B		C		A

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 59.7

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.67

Intersection Signal Delay (s/veh): 14.4

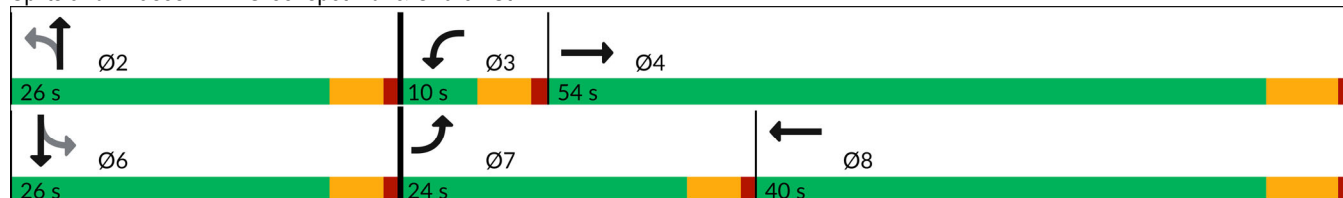
Intersection LOS: B

Intersection Capacity Utilization 64.1%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 2: Greenspot Rd. & Church St.



HCM 7th Signalized Intersection Summary

2: Greenspot Rd. & Church St.

East Highland Ranch (JN 15974)

12/23/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	253	787	18	5	693	45	24	10	0	55	3	247
Future Volume (veh/h)	253	787	18	5	693	45	24	10	0	55	3	247
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		1.00	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	288	894	18	6	788	49	27	11	0	62	3	169
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	397	1681	34	13	1139	71	255	363	0	392	363	304
Arrive On Green	0.15	0.49	0.49	0.01	0.35	0.35	0.20	0.20	0.00	0.20	0.20	0.20
Sat Flow, veh/h	2670	3461	70	1594	3298	205	1077	1772	0	1239	1772	1482
Grp Volume(v), veh/h	288	458	454	6	423	414	27	11	0	62	3	169
Grp Sat Flow(s),veh/h/ln	1335	1772	1758	1594	1772	1731	1077	1772	0	1239	1772	1482
Q Serve(g_s), s	5.1	8.9	8.9	0.2	10.2	10.2	1.1	0.2	0.0	2.1	0.1	5.1
Cycle Q Clear(g_c), s	5.1	8.9	8.9	0.2	10.2	10.2	6.2	0.2	0.0	2.3	0.1	5.1
Prop In Lane	1.00		0.04	1.00		0.12	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	397	861	854	13	612	598	255	363	0	392	363	304
V/C Ratio(X)	0.73	0.53	0.53	0.47	0.69	0.69	0.11	0.03	0.00	0.16	0.01	0.56
Avail Cap(c_a), veh/h	1041	1716	1703	173	1218	1190	498	762	0	671	762	637
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.2	8.9	8.9	24.6	14.0	14.0	20.6	15.8	0.0	16.8	15.8	17.8
Incr Delay (d2), s/veh	1.0	0.5	0.5	9.7	1.4	1.4	0.2	0.0	0.0	0.2	0.0	1.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	2.3	2.3	0.1	3.3	3.2	0.3	0.1	0.0	0.6	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	21.2	9.4	9.4	34.3	15.4	15.5	20.7	15.9	0.0	17.0	15.8	19.4
LnGrp LOS	C	A	A	C	B	B	C	B		B	B	B
Approach Vol, veh/h	1200			843			38			234		
Approach Delay, s/veh	12.2			15.6			19.3			18.7		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	2		3	4		6		7	8			
Phs Duration (G+Y+Rc), s	14.8		5.0	30.0		14.8		12.0	23.0			
Change Period (Y+Rc), s	4.6		4.6	5.8		4.6		4.6	5.8			
Max Green Setting (Gmax), s	21.4		5.4	48.2		21.4		19.4	34.2			
Max Q Clear Time (g_c+I1), s	8.2		2.2	10.9		7.1		7.1	12.2			
Green Ext Time (p_c), s	0.1		0.0	6.0		1.0		0.4	4.8			
Intersection Summary												
HCM 7th Control Delay, s/veh	14.2											
HCM 7th LOS	B											

Timings

East Highland Ranch (JN 15974)

3: Greenspot Rd. & Weaver St.

12/23/2024



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	←	↑↑	↑↑	←	←
Traffic Volume (vph)	156	557	439	75	205
Future Volume (vph)	156	557	439	75	205
Turn Type	Perm	NA	NA	Prot	Perm
Protected Phases		4	8	1	
Permitted Phases	4				6
Detector Phase	4	4	8	1	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	22.8	22.8	22.8	9.6	22.4
Total Split (s)	57.0	57.0	57.0	33.0	33.0
Total Split (%)	63.3%	63.3%	63.3%	36.7%	36.7%
Yellow Time (s)	4.8	4.8	4.8	3.6	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	4.6	5.4
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	Min
Act Effect Green (s)	16.0	16.0	16.0	9.5	11.4
Actuated g/C Ratio	0.41	0.41	0.41	0.24	0.29
v/c Ratio	0.57	0.43	0.37	0.23	0.38
Control Delay (s/veh)	17.4	9.0	8.3	13.9	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	17.4	9.0	8.3	13.9	4.8
LOS	B	A	A	B	A
Approach Delay (s/veh)		10.8	8.3	7.3	
Approach LOS		B	A	A	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 39.1

Natural Cycle: 55

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.57

Intersection Signal Delay (s/veh): 9.3

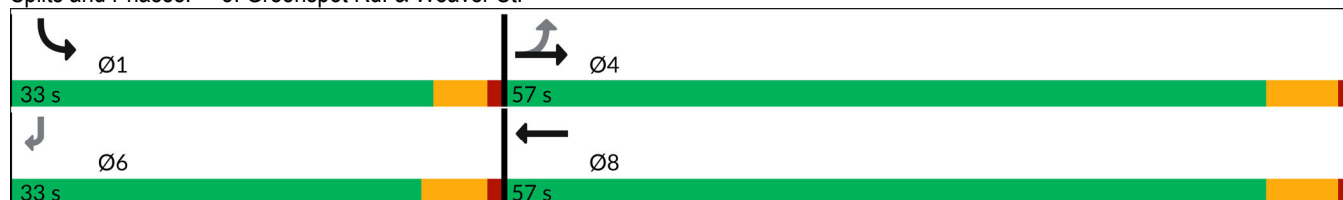
Intersection LOS: A

Intersection Capacity Utilization 42.0%

ICU Level of Service A

Analysis Period (min) 15

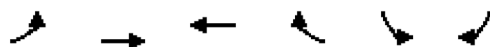
Splits and Phases: 3: Greenspot Rd. & Weaver St.



HCM 7th Signalized Intersection Summary 3: Greenspot Rd. & Weaver St.

East Highland Ranch (JN 15974)

12/23/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	156	557	439	42	75	205
Future Volume (veh/h)	156	557	439	42	75	205
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1673	1772	1772	1772	1673	1772
Adj Flow Rate, veh/h	171	612	482	46	82	225
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	523	1736	1561	148	302	303
Arrive On Green	0.49	0.49	0.49	0.49	0.20	0.20
Sat Flow, veh/h	777	3544	3186	303	1498	1502
Grp Volume(v), veh/h	171	612	267	261	82	225
Grp Sat Flow(s), veh/h/ln	777	1772	1772	1717	1498	1502
Q Serve(g_s), s	5.7	3.6	3.1	3.1	1.6	4.7
Cycle Q Clear(g_c), s	8.8	3.6	3.1	3.1	1.6	4.7
Prop In Lane	1.00			0.18	1.00	1.00
Lane Grp Cap(c), veh/h	523	1736	868	841	302	303
V/C Ratio(X)	0.33	0.35	0.31	0.31	0.27	0.74
Avail Cap(c_a), veh/h	1321	5379	2690	2606	1261	1264
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	7.8	5.3	5.2	5.2	11.4	12.6
Incr Delay (d2), s/veh	0.4	0.1	0.2	0.2	0.2	1.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.5	0.4	0.4	0.4	1.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	8.2	5.4	5.4	5.4	11.5	14.0
LnGrp LOS	A	A	A	A	B	B
Approach Vol, veh/h		783	528		307	
Approach Delay, s/veh		6.0	5.4		13.3	
Approach LOS		A	A		B	
Timer - Assigned Phs				4	6	8
Phs Duration (G+Y+Rc), s				22.3	11.4	22.3
Change Period (Y+Rc), s				5.8	4.6	5.8
Max Green Setting (Gmax), s				51.2	28.4	51.2
Max Q Clear Time (g_c+I1), s				10.8	6.7	5.1
Green Ext Time (p_c), s				5.7	0.5	3.1
Intersection Summary						
HCM 7th Control Delay, s/veh			7.2			
HCM 7th LOS			A			

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	3	6	40	25	3	1	39	37	39	0	48	3
Future Vol, veh/h	3	6	40	25	3	1	39	37	39	0	48	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	8	50	31	4	1	49	46	49	0	60	4
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	208	254	62	232	232	71	64	0	0	95	0	0
Stage 1	62	62	-	168	168	-	-	-	-	-	-	-
Stage 2	146	193	-	64	64	-	-	-	-	-	-	-
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	750	649	1003	723	668	992	1539	-	-	1499	-	-
Stage 1	949	843	-	834	759	-	-	-	-	-	-	-
Stage 2	857	741	-	947	842	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	720	627	1003	656	646	992	1539	-	-	1499	-	-
Mov Cap-2 Maneuver	720	627	-	656	646	-	-	-	-	-	-	-
Stage 1	949	843	-	806	734	-	-	-	-	-	-	-
Stage 2	823	716	-	892	842	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s/v	9.22		10.75		2.52		0					
HCM LOS	A		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	554	-	-	914	663	1499	-	-				
HCM Lane V/C Ratio	0.032	-	-	0.067	0.055	-	-	-				
HCM Control Delay (s/veh)	7.4	0	-	9.2	10.7	0	-	-				
HCM Lane LOS	A	A	-	A	B	A	-	-				
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.2	0	-	-				

Intersection						
Int Delay, s/veh	2.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	94	439	345	12	21	82
Future Vol, veh/h	94	439	345	12	21	82
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	60	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	106	493	388	13	24	92

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	401	0	0	852	201
Stage 1	-	-	-	394	-
Stage 2	-	-	-	458	-
Critical Hdwy	4.14	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	3.52	3.32
Pot Cap-1 Maneuver	1154	-	-	299	807
Stage 1	-	-	-	650	-
Stage 2	-	-	-	604	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	1154	-	-	271	807
Mov Cap-2 Maneuver	-	-	-	271	-
Stage 1	-	-	-	591	-
Stage 2	-	-	-	604	-

Approach	EB	WB	SB
HCM Control Delay, s/v	1.49	0	12.83
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1154	-	-	-	575
HCM Lane V/C Ratio	0.092	-	-	-	0.201
HCM Control Delay (s/veh)	8.4	-	-	-	12.8
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.3	-	-	-	0.7

Timings

East Highland Ranch (JN 15974)

1: Greenspot Rd. & Boulder Av.

12/23/2024

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT
Lane Configurations											
Traffic Volume (vph)	105	1067	316	310	659	96	130	373	6	301	314
Future Volume (vph)	105	1067	316	310	659	96	130	373	6	301	314
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA
Protected Phases	7	4		3	8		1	6		5	2
Permitted Phases			4			8			6		
Detector Phase	7	4	4	3	8	8	1	6	6	5	2
Switch Phase											
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0
Minimum Split (s)	9.6	22.8	22.8	14.6	22.8	22.8	9.6	23.2	23.2	9.6	23.2
Total Split (s)	14.8	44.2	44.2	31.4	60.8	60.8	16.6	24.8	24.8	19.6	27.8
Total Split (%)	12.3%	36.8%	36.8%	26.2%	50.7%	50.7%	13.8%	20.7%	20.7%	16.3%	23.2%
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	4.8	3.6	5.2	5.2	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	4.6	5.8	5.8	4.6	5.8	5.8	4.6	6.2	6.2	4.6	6.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min
Act Effct Green (s)	8.7	38.4	38.4	26.5	56.3	56.3	11.9	17.7	17.7	15.0	20.8
Actuated g/C Ratio	0.07	0.32	0.32	0.22	0.47	0.47	0.10	0.15	0.15	0.13	0.18
v/c Ratio	0.56	0.96	0.48	0.96	0.41	0.13	0.91	0.73	0.02	0.93	0.92
Control Delay (s/veh)	64.6	59.4	8.1	87.7	21.7	3.0	106.1	57.4	0.2	86.0	52.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	64.6	59.4	8.1	87.7	21.7	3.0	106.1	57.4	0.2	86.0	52.6
LOS	E	E	A	F	C	A	F	E	A	F	D
Approach Delay (s/veh)		48.8			39.2			69.2			63.1
Approach LOS		D			D			E			E

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 118.8

Natural Cycle: 110

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.96

Intersection Signal Delay (s/veh): 52.3

Intersection LOS: D

Intersection Capacity Utilization 96.8%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 1: Greenspot Rd. & Boulder Av.

 Ø1	 Ø2	 Ø3	 Ø4
16.6 s	27.8 s	31.4 s	44.2 s
 Ø5	 Ø6	 Ø7	 Ø8
19.6 s	24.8 s	14.8 s	60.8 s

HCM 7th Signalized Intersection Summary

East Highland Ranch (JN 15974)

1: Greenspot Rd. & Boulder Av.

12/23/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	105	1067	316	310	659	96	130	373	6	301	314	342
Future Volume (veh/h)	105	1067	316	310	659	96	130	373	6	301	314	342
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	108	1100	294	320	679	79	134	385	0	310	324	180
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	148	1145	479	338	1749	732	151	518		337	370	201
Arrive On Green	0.06	0.32	0.32	0.23	0.49	0.49	0.10	0.15	0.00	0.13	0.17	0.17
Sat Flow, veh/h	2670	3544	1483	1498	3544	1483	1498	3544	1502	2670	2160	1173
Grp Volume(v), veh/h	108	1100	294	320	679	79	134	385	0	310	264	240
Grp Sat Flow(s),veh/h/ln	1335	1772	1483	1498	1772	1483	1498	1772	1502	1335	1772	1561
Q Serve(g_s), s	4.7	36.2	19.9	25.0	14.3	3.4	10.5	12.4	0.0	13.6	17.3	17.8
Cycle Q Clear(g_c), s	4.7	36.2	19.9	25.0	14.3	3.4	10.5	12.4	0.0	13.6	17.3	17.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.75
Lane Grp Cap(c), veh/h	148	1145	479	338	1749	732	151	518		337	304	268
V/C Ratio(X)	0.73	0.96	0.61	0.95	0.39	0.11	0.88	0.74		0.92	0.87	0.90
Avail Cap(c_a), veh/h	229	1147	480	338	1749	732	151	555		337	322	284
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.2	39.4	33.9	45.2	18.8	16.1	52.7	48.5	0.0	51.2	47.9	48.1
Incr Delay (d2), s/veh	2.6	17.9	2.3	34.6	0.1	0.1	40.4	5.0	0.0	28.7	21.0	27.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	17.8	7.1	12.1	5.5	1.1	5.5	5.6	0.0	5.8	9.2	8.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	57.8	57.3	36.2	79.9	19.0	16.2	93.1	53.5	0.0	80.0	68.9	75.6
LnGrp LOS	E	E	D	E	B	B	F	D		E	E	E
Approach Vol, veh/h	1502			1078			519			814		
Approach Delay, s/veh	53.2			36.8			63.7			75.1		
Approach LOS	D			D			E			E		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.6	26.5	31.4	44.1	19.6	23.5	11.2	64.4				
Change Period (Y+Rc), s	4.6	6.2	4.6	5.8	4.6	6.2	4.6	5.8				
Max Green Setting (Gmax), s	12.0	21.6	26.8	38.4	15.0	18.6	10.2	55.0				
Max Q Clear Time (g_c+I1), s	12.5	19.8	27.0	38.2	15.6	14.4	6.7	16.3				
Green Ext Time (p_c), s	0.0	0.5	0.0	0.2	0.0	0.8	0.0	4.8				

Intersection Summary

HCM 7th Control Delay, s/veh 54.7

HCM 7th LOS D

Notes

Unsignalized Delay for [SER] is excluded from calculations of the approach delay and intersection delay.

Timings

East Highland Ranch (JN 15974)

2: Greenspot Rd. & Church St.

12/23/2024

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	 	 		 		 		 
Traffic Volume (vph)	268	1086	3	633	28	4	52	12
Future Volume (vph)	268	1086	3	633	28	4	52	12
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA
Protected Phases	7	4	3	8		2		6
Permitted Phases					2		6	
Detector Phase	7	4	3	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	10.0	5.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.6	27.8	9.6	27.8	21.6	21.6	21.6	21.6
Total Split (s)	25.0	54.0	10.0	39.0	26.0	26.0	26.0	26.0
Total Split (%)	27.8%	60.0%	11.1%	43.3%	28.9%	28.9%	28.9%	28.9%
Yellow Time (s)	3.6	4.8	3.6	4.8	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	5.8	4.6	4.6	4.6	4.6
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	Min	Min	Min	Min
Act Effect Green (s)	10.8	32.2	5.2	18.1	11.4	11.4	11.4	11.4
Actuated g/C Ratio	0.19	0.58	0.09	0.32	0.20	0.20	0.20	0.20
v/c Ratio	0.55	0.57	0.02	0.64	0.15	0.02	0.23	0.29
Control Delay (s/veh)	26.2	9.5	29.7	19.0	23.8	19.3	24.4	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	26.2	9.5	29.7	19.0	23.8	19.3	24.4	5.8
LOS	C	A	C	B	C	B	C	A
Approach Delay (s/veh)		12.8		19.0		23.1		9.4
Approach LOS		B		B		C		A

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 55.8

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.64

Intersection Signal Delay (s/veh): 14.3

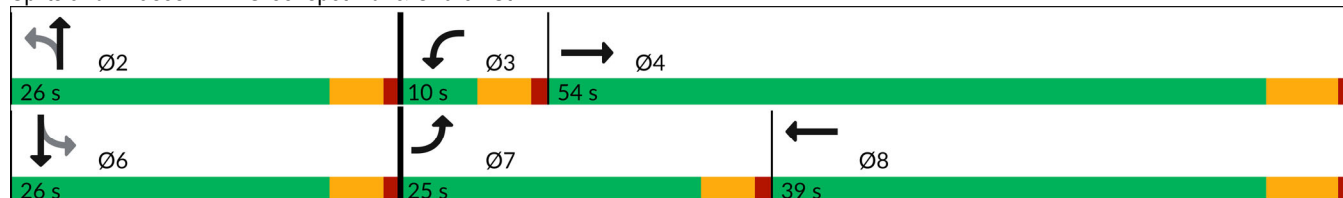
Intersection LOS: B

Intersection Capacity Utilization 70.2%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 2: Greenspot Rd. & Church St.



HCM 7th Signalized Intersection Summary

2: Greenspot Rd. & Church St.

East Highland Ranch (JN 15974)

12/23/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	268	1086	17	3	633	56	28	4	2	52	12	207
Future Volume (veh/h)	268	1086	17	3	633	56	28	4	2	52	12	207
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	282	1143	16	3	666	57	29	4	2	55	13	114
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	394	1645	23	7	1057	90	314	236	118	410	375	314
Arrive On Green	0.15	0.47	0.47	0.00	0.33	0.33	0.21	0.21	0.21	0.21	0.21	0.21
Sat Flow, veh/h	2670	3486	49	1594	3215	275	1122	1112	556	1245	1772	1482
Grp Volume(v), veh/h	282	581	578	3	367	356	29	0	6	55	13	114
Grp Sat Flow(s),veh/h/ln	1335	1772	1762	1594	1772	1717	1122	0	1668	1245	1772	1482
Q Serve(g_s), s	4.8	12.4	12.4	0.1	8.4	8.4	1.1	0.0	0.1	1.8	0.3	3.2
Cycle Q Clear(g_c), s	4.8	12.4	12.4	0.1	8.4	8.4	4.2	0.0	0.1	1.9	0.3	3.2
Prop In Lane	1.00		0.03	1.00		0.16	1.00		0.33	1.00		1.00
Lane Grp Cap(c), veh/h	394	836	832	7	582	565	314	0	353	410	375	314
V/C Ratio(X)	0.72	0.69	0.69	0.46	0.63	0.63	0.09	0.00	0.02	0.13	0.03	0.36
Avail Cap(c_a), veh/h	1133	1776	1767	179	1224	1186	575	0	742	700	789	660
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.5	10.0	10.0	23.9	13.7	13.7	18.0	0.0	15.0	15.7	15.0	16.2
Incr Delay (d2), s/veh	0.9	1.0	1.1	17.7	1.1	1.2	0.1	0.0	0.0	0.1	0.0	0.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	3.3	3.2	0.1	2.7	2.6	0.3	0.0	0.0	0.5	0.1	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	20.5	11.0	11.0	41.6	14.8	14.8	18.1	0.0	15.0	15.9	15.1	16.9
LnGrp LOS	C	B	B	D	B	B	B		B	B	B	B
Approach Vol, veh/h	1441			726			35			182		
Approach Delay, s/veh	12.9			14.9			17.6			16.4		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	2			3			4			6		
Phs Duration (G+Y+Rc), s	14.8			4.8			28.5			14.8		
Change Period (Y+Rc), s	4.6			4.6			5.8			4.6		
Max Green Setting (Gmax), s	21.4			5.4			48.2			21.4		
Max Q Clear Time (g_c+I1), s	6.2			2.1			14.4			5.2		
Green Ext Time (p_c), s	0.1			0.0			8.3			0.8		
Intersection Summary												
HCM 7th Control Delay, s/veh				13.8								
HCM 7th LOS				B								

Timings

East Highland Ranch (JN 15974)

3: Greenspot Rd. & Weaver St.

12/23/2024



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	240	700	412	113	160
Future Volume (vph)	240	700	412	113	160
Turn Type	Perm	NA	NA	Prot	Perm
Protected Phases		4	8	1	
Permitted Phases	4				6
Detector Phase	4	4	8	1	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	22.8	22.8	22.8	9.6	22.4
Total Split (s)	64.0	64.0	64.0	26.0	26.0
Total Split (%)	71.1%	71.1%	71.1%	28.9%	28.9%
Yellow Time (s)	4.8	4.8	4.8	3.6	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	4.6	5.4
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	Min
Act Effct Green (s)	22.2	22.2	22.2	10.9	11.7
Actuated g/C Ratio	0.48	0.48	0.48	0.24	0.25
v/c Ratio	0.69	0.43	0.29	0.34	0.34
Control Delay (s/veh)	19.3	7.9	6.5	19.9	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	19.3	7.9	6.5	19.9	6.3
LOS	B	A	A	B	A
Approach Delay (s/veh)		10.8	6.5	11.9	
Approach LOS		B	A	B	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 45.9

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay (s/veh): 9.8

Intersection LOS: A

Intersection Capacity Utilization 49.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: Greenspot Rd. & Weaver St.

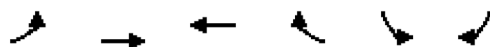
	Ø1		Ø4
26 s		64 s	
	Ø6		Ø8
26 s		64 s	

HCM 7th Signalized Intersection Summary

3: Greenspot Rd. & Weaver St.

East Highland Ranch (JN 15974)

12/23/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	240	700	412	51	113	160
Future Volume (veh/h)	240	700	412	51	113	160
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1673	1772	1772	1772	1673	1772
Adj Flow Rate, veh/h	253	737	434	54	119	168
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	587	1995	1741	215	241	241
Arrive On Green	0.56	0.56	0.56	0.56	0.16	0.16
Sat Flow, veh/h	806	3544	3092	383	1498	1502
Grp Volume(v), veh/h	253	737	248	240	119	168
Grp Sat Flow(s), veh/h/ln	806	1772	1772	1703	1498	1502
Q Serve(g_s), s	8.8	4.3	2.7	2.7	2.7	4.0
Cycle Q Clear(g_c), s	11.5	4.3	2.7	2.7	2.7	4.0
Prop In Lane	1.00			0.22	1.00	1.00
Lane Grp Cap(c), veh/h	587	1995	998	959	241	241
V/C Ratio(X)	0.43	0.37	0.25	0.25	0.49	0.70
Avail Cap(c_a), veh/h	1379	5479	2739	2632	852	854
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	7.1	4.5	4.2	4.2	14.4	14.9
Incr Delay (d2), s/veh	0.5	0.1	0.1	0.1	0.6	1.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.5	0.3	0.3	0.7	1.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	7.6	4.7	4.3	4.3	15.0	16.3
LnGrp LOS	A	A	A	A	B	B
Approach Vol, veh/h		990	488		287	
Approach Delay, s/veh		5.4	4.3		15.8	
Approach LOS		A	A		B	
Timer - Assigned Phs				4	6	8
Phs Duration (G+Y+Rc), s				27.0	10.6	27.0
Change Period (Y+Rc), s				5.8	4.6	5.8
Max Green Setting (Gmax), s				58.2	21.4	58.2
Max Q Clear Time (g_c+I1), s				13.5	6.0	4.7
Green Ext Time (p_c), s				7.7	0.4	2.8
Intersection Summary						
HCM 7th Control Delay, s/veh			6.8			
HCM 7th LOS			A			

Intersection												
Int Delay, s/veh	3.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	8	21	38	5	0	25	48	53	1	45	3
Future Vol, veh/h	5	8	21	38	5	0	25	48	53	1	45	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	10	26	48	6	0	31	60	66	1	56	4

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	186	249	58	219	218	93	60	0	0	126	0	0
Stage 1	61	61	-	156	156	-	-	-	-	-	-	-
Stage 2	126	189	-	64	63	-	-	-	-	-	-	-
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	774	653	1008	737	680	964	1544	-	-	1460	-	-
Stage 1	951	844	-	847	769	-	-	-	-	-	-	-
Stage 2	878	744	-	947	843	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	750	638	1008	690	665	964	1544	-	-	1460	-	-
Mov Cap-2 Maneuver	750	638	-	690	665	-	-	-	-	-	-	-
Stage 1	950	844	-	828	752	-	-	-	-	-	-	-
Stage 2	852	728	-	911	842	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	9.46	10.68	1.46	0.15
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	323	-	-	849	687	36	-
HCM Lane V/C Ratio	0.02	-	-	0.05	0.078	0.001	-
HCM Control Delay (s/veh)	7.4	0	-	9.5	10.7	7.5	0
HCM Lane LOS	A	A	-	A	B	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.3	0	-

Intersection						
Int Delay, s/veh	1.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	108	633	294	14	18	82
Future Vol, veh/h	108	633	294	14	18	82
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	60	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	114	666	309	15	19	86

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	324	0	0	877	162
Stage 1	-	-	-	317	-
Stage 2	-	-	-	561	-
Critical Hdwy	4.14	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	3.52	3.32
Pot Cap-1 Maneuver	1232	-	-	288	854
Stage 1	-	-	-	711	-
Stage 2	-	-	-	535	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	1232	-	-	261	854
Mov Cap-2 Maneuver	-	-	-	261	-
Stage 1	-	-	-	646	-
Stage 2	-	-	-	535	-

Approach	EB	WB	SB
HCM Control Delay, s/v	1.2	0	12.18
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1232	-	-	-	606
HCM Lane V/C Ratio	0.092	-	-	-	0.174
HCM Control Delay (s/veh)	8.2	-	-	-	12.2
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.3	-	-	-	0.6

APPENDIX 5.2: OPENING YEAR (2027) WITH PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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Timings

East Highland Ranch (JN 15974)

1: Greenspot Rd. & Boulder Av.

12/23/2024

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT
Lane Configurations											
Traffic Volume (vph)	49	488	147	479	1177	123	78	387	1	233	238
Future Volume (vph)	49	488	147	479	1177	123	78	387	1	233	238
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA
Protected Phases	7	4		3	8		1	6		5	2
Permitted Phases			4			8			6		
Detector Phase	7	4	4	3	8	8	1	6	6	5	2
Switch Phase											
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0
Minimum Split (s)	9.6	22.8	22.8	14.6	22.8	22.8	9.6	23.2	23.2	9.6	23.2
Total Split (s)	10.9	26.4	26.4	51.2	66.7	66.7	14.8	23.7	23.7	18.7	27.6
Total Split (%)	9.1%	22.0%	22.0%	42.7%	55.6%	55.6%	12.3%	19.8%	19.8%	15.6%	23.0%
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	4.8	3.6	5.2	5.2	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	4.6	5.8	5.8	4.6	5.8	5.8	4.6	6.2	6.2	4.6	6.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min
Act Effct Green (s)	6.0	19.2	19.2	39.6	55.4	55.4	8.9	16.1	16.1	12.8	22.7
Actuated g/C Ratio	0.05	0.18	0.18	0.36	0.51	0.51	0.08	0.15	0.15	0.12	0.21
v/c Ratio	0.35	0.81	0.39	0.92	0.68	0.16	0.66	0.77	0.00	0.77	0.65
Control Delay (s/veh)	61.1	56.1	9.8	57.5	23.4	4.2	77.9	57.3	0.0	66.4	28.8
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)	61.1	56.1	9.8	57.5	23.4	4.2	77.9	57.3	0.0	66.4	28.8
LOS	E	E	A	E	C	A	E	E	A	E	C
Approach Delay (s/veh)		46.5			31.3			60.6			40.1
Approach LOS		D			C			E			D

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 109.3

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.92

Intersection Signal Delay (s/veh): 39.6

Intersection LOS: D

Intersection Capacity Utilization 83.6%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 1: Greenspot Rd. & Boulder Av.

 Ø1	 Ø2	 Ø3	 Ø4
14.8 s	27.6 s	51.2 s	26.4 s
 Ø5	 Ø6	 Ø7	 Ø8
18.7 s	23.7 s	10.9 s	66.7 s

HCM 7th Signalized Intersection Summary

East Highland Ranch (JN 15974)

1: Greenspot Rd. & Boulder Av.

12/23/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	49	488	147	479	1177	123	78	387	1	233	238	302
Future Volume (veh/h)	49	488	147	479	1177	123	78	387	1	233	238	302
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	51	503	120	494	1213	107	80	399	0	240	245	158
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	104	622	260	522	1718	719	97	502		295	383	237
Arrive On Green	0.04	0.18	0.18	0.35	0.48	0.48	0.07	0.14	0.00	0.11	0.19	0.19
Sat Flow, veh/h	2670	3544	1482	1498	3544	1483	1498	3544	1502	2670	2046	1269
Grp Volume(v), veh/h	51	503	120	494	1213	107	80	399	0	240	211	192
Grp Sat Flow(s),veh/h/ln	1335	1772	1482	1498	1772	1483	1498	1772	1502	1335	1772	1543
Q Serve(g_s), s	1.8	12.9	6.9	30.3	25.4	3.8	5.0	10.3	0.0	8.3	10.4	10.9
Cycle Q Clear(g_c), s	1.8	12.9	6.9	30.3	25.4	3.8	5.0	10.3	0.0	8.3	10.4	10.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.82
Lane Grp Cap(c), veh/h	104	622	260	522	1718	719	97	502		295	332	289
V/C Ratio(X)	0.49	0.81	0.46	0.95	0.71	0.15	0.82	0.79		0.81	0.64	0.67
Avail Cap(c_a), veh/h	178	771	322	738	2280	954	161	655		398	401	349
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.6	37.5	35.0	30.0	19.1	13.5	43.7	39.3	0.0	41.1	35.5	35.7
Incr Delay (d2), s/veh	1.3	5.2	1.3	14.8	0.7	0.1	6.3	5.1	0.0	6.7	2.4	3.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	5.8	2.4	12.0	9.2	1.1	1.9	4.6	0.0	2.9	4.5	4.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	45.9	42.7	36.3	44.8	19.8	13.6	50.0	44.4	0.0	47.8	37.9	39.3
LnGrp LOS	D	D	D	D	B	B	D	D		D	D	D
Approach Vol, veh/h	674			1814			479			643		
Approach Delay, s/veh	41.8			26.2			45.3			42.0		
Approach LOS	D			C			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.8	23.9	37.6	22.4	15.1	19.6	8.3	51.7				
Change Period (Y+Rc), s	4.6	6.2	4.6	5.8	4.6	6.2	4.6	5.8				
Max Green Setting (Gmax), s	10.2	21.4	46.6	20.6	14.1	17.5	6.3	60.9				
Max Q Clear Time (g_c+I1), s	7.0	12.9	32.3	14.9	10.3	12.3	3.8	27.4				
Green Ext Time (p_c), s	0.0	1.4	0.6	1.7	0.2	1.0	0.0	10.2				

Intersection Summary

HCM 7th Control Delay, s/veh	34.5
HCM 7th LOS	C

Notes

Unsignalized Delay for [SER] is excluded from calculations of the approach delay and intersection delay.

Timings

East Highland Ranch (JN 15974)

2: Greenspot Rd. & Church St.

12/23/2024

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	 	 	 	 	 	 	 	 
Traffic Volume (vph)	203	486	3	1106	21	14	43	6
Future Volume (vph)	203	486	3	1106	21	14	43	6
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA
Protected Phases	7	4	3	8		2		6
Permitted Phases					2		6	
Detector Phase	7	4	3	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	10.0	5.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.6	27.8	9.6	27.8	21.6	21.6	21.6	21.6
Total Split (s)	21.6	34.8	21.6	34.8	33.6	33.6	33.6	33.6
Total Split (%)	24.0%	38.7%	24.0%	38.7%	37.3%	37.3%	37.3%	37.3%
Yellow Time (s)	3.6	4.8	3.6	4.8	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	5.8	4.6	4.6	4.6	4.6
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	Min	Min	Min	Min
Act Effct Green (s)	10.2	42.2	5.1	29.2	11.3	11.3	11.3	11.3
Actuated g/C Ratio	0.16	0.64	0.08	0.44	0.17	0.17	0.17	0.17
v/c Ratio	0.58	0.26	0.02	0.91	0.16	0.05	0.25	0.39
Control Delay (s/veh)	31.9	6.3	31.3	28.5	26.6	23.8	27.6	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	31.9	6.3	31.3	28.5	26.6	23.8	27.6	5.5
LOS	C	A	C	C	C	C	C	A
Approach Delay (s/veh)		13.7		28.5		25.5		8.8
Approach LOS		B		C		C		A

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 65.7

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay (s/veh): 21.2

Intersection LOS: C

Intersection Capacity Utilization 74.6%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 2: Greenspot Rd. & Church St.

 Ø2	 Ø3	 Ø4
33.6 s	21.6 s	34.8 s
 Ø6	 Ø7	 Ø8
33.6 s	21.6 s	34.8 s

HCM 7th Signalized Intersection Summary

2: Greenspot Rd. & Church St.

East Highland Ranch (JN 15974)

12/23/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	203	486	14	3	1106	103	21	14	0	43	6	243
Future Volume (veh/h)	203	486	14	3	1106	103	21	14	0	43	6	243
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	236	565	14	3	1286	118	24	16	0	50	7	168
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	323	1978	49	6	1462	134	190	303	0	321	303	253
Arrive On Green	0.12	0.57	0.57	0.00	0.46	0.46	0.17	0.17	0.00	0.17	0.17	0.17
Sat Flow, veh/h	2670	3442	85	1594	3194	292	1074	1772	0	1232	1772	1482
Grp Volume(v), veh/h	236	291	288	3	711	693	24	16	0	50	7	168
Grp Sat Flow(s),veh/h/ln	1335	1772	1755	1594	1772	1714	1074	1772	0	1232	1772	1482
Q Serve(g_s), s	5.1	5.0	5.0	0.1	21.8	22.0	1.3	0.5	0.0	2.1	0.2	6.4
Cycle Q Clear(g_c), s	5.1	5.0	5.0	0.1	21.8	22.0	7.6	0.5	0.0	2.6	0.2	6.4
Prop In Lane	1.00		0.05	1.00		0.17	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	323	1018	1009	6	811	785	190	303	0	321	303	253
V/C Ratio(X)	0.73	0.29	0.29	0.46	0.88	0.88	0.13	0.05	0.00	0.16	0.02	0.66
Avail Cap(c_a), veh/h	758	1018	1009	452	858	830	526	858	0	707	858	717
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.4	6.5	6.5	29.8	14.7	14.8	26.8	20.8	0.0	21.9	20.7	23.2
Incr Delay (d2), s/veh	1.2	0.2	0.2	17.9	9.8	10.6	0.3	0.1	0.0	0.2	0.0	3.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	1.3	1.2	0.1	8.7	8.6	0.3	0.2	0.0	0.6	0.1	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	26.6	6.6	6.6	47.7	24.5	25.4	27.1	20.9	0.0	22.1	20.7	26.2
LnGrp LOS	C	A	A	D	C	C	C	C		C	C	C
Approach Vol, veh/h	815			1407			40			225		
Approach Delay, s/veh	12.4			25.0			24.6			25.1		
Approach LOS	B			C			C			C		
Timer - Assigned Phs	2		3	4		6		7	8			
Phs Duration (G+Y+Rc), s	14.8		4.8	40.2		14.8		11.8	33.2			
Change Period (Y+Rc), s	4.6		4.6	5.8		4.6		4.6	5.8			
Max Green Setting (Gmax), s	29.0		17.0	29.0		29.0		17.0	29.0			
Max Q Clear Time (g_c+I1), s	9.6		2.1	7.0		8.4		7.1	24.0			
Green Ext Time (p_c), s	0.1		0.0	3.1		1.2		0.3	3.4			
Intersection Summary												
HCM 7th Control Delay, s/veh	20.9											
HCM 7th LOS	C											

Timings

East Highland Ranch (JN 15974)

3: Greenspot Rd. & Weaver St.

12/23/2024



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↰	↱↱	↰↱	↰	↰
Traffic Volume (vph)	113	300	760	55	241
Future Volume (vph)	113	300	760	55	241
Turn Type	Perm	NA	NA	Prot	Perm
Protected Phases		4	8	1	
Permitted Phases	4				6
Detector Phase	4	4	8	1	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	22.8	22.8	22.8	9.6	22.4
Total Split (s)	46.8	46.8	46.8	43.2	43.2
Total Split (%)	52.0%	52.0%	52.0%	48.0%	48.0%
Yellow Time (s)	4.8	4.8	4.8	3.6	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	4.6	5.4
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	Min
Act Effect Green (s)	21.1	21.1	21.1	9.5	12.9
Actuated g/C Ratio	0.46	0.46	0.46	0.21	0.28
v/c Ratio	0.54	0.19	0.55	0.19	0.51
Control Delay (s/veh)	19.2	7.3	9.8	18.0	14.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	19.2	7.3	9.8	18.0	14.3
LOS	B	A	A	B	B
Approach Delay (s/veh)		10.5	9.8	15.0	
Approach LOS		B	A	B	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 46.1

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.55

Intersection Signal Delay (s/veh): 11.0

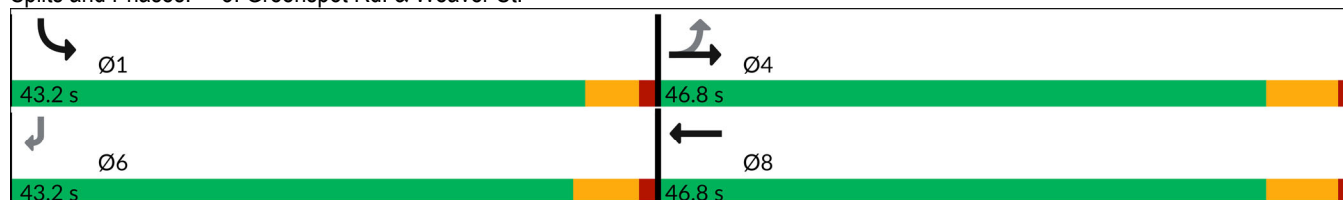
Intersection LOS: B

Intersection Capacity Utilization 51.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: Greenspot Rd. & Weaver St.

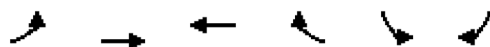


HCM 7th Signalized Intersection Summary

3: Greenspot Rd. & Weaver St.

East Highland Ranch (JN 15974)

12/23/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	113	300	760	86	55	241
Future Volume (veh/h)	113	300	760	86	55	241
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1673	1772	1772	1772	1673	1772
Adj Flow Rate, veh/h	118	312	792	90	57	251
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	381	1760	1552	176	324	324
Arrive On Green	0.50	0.50	0.50	0.50	0.22	0.22
Sat Flow, veh/h	559	3544	3125	355	1498	1502
Grp Volume(v), veh/h	118	312	449	433	57	251
Grp Sat Flow(s), veh/h/ln	559	1772	1772	1708	1498	1502
Q Serve(g_s), s	6.5	1.8	6.2	6.2	1.1	5.7
Cycle Q Clear(g_c), s	12.7	1.8	6.2	6.2	1.1	5.7
Prop In Lane	1.00			0.21	1.00	1.00
Lane Grp Cap(c), veh/h	381	1760	880	848	324	324
V/C Ratio(X)	0.31	0.18	0.51	0.51	0.18	0.77
Avail Cap(c_a), veh/h	736	4015	2008	1935	1598	1602
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.4	5.0	6.1	6.1	11.6	13.4
Incr Delay (d2), s/veh	0.5	0.0	0.5	0.5	0.1	1.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.3	1.0	1.0	0.3	1.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	10.9	5.1	6.6	6.6	11.7	14.9
LnGrp LOS	B	A	A	A	B	B
Approach Vol, veh/h		430	882		308	
Approach Delay, s/veh		6.7	6.6		14.3	
Approach LOS		A	A		B	
Timer - Assigned Phs				4	6	8
Phs Duration (G+Y+Rc), s				23.8	12.4	23.8
Change Period (Y+Rc), s				5.8	4.6	5.8
Max Green Setting (Gmax), s				41.0	38.6	41.0
Max Q Clear Time (g_c+I1), s				14.7	7.7	8.2
Green Ext Time (p_c), s				3.2	0.5	5.7
Intersection Summary						
HCM 7th Control Delay, s/veh			8.1			
HCM 7th LOS			A			

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	70	2	0	90	6	0
Future Vol, veh/h	70	2	0	90	6	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	76	2	0	98	7	0
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	78	0	175	77
Stage 1	-	-	-	-	77	-
Stage 2	-	-	-	-	98	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1520	-	815	984
Stage 1	-	-	-	-	946	-
Stage 2	-	-	-	-	926	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1520	-	815	984
Mov Cap-2 Maneuver	-	-	-	-	815	-
Stage 1	-	-	-	-	946	-
Stage 2	-	-	-	-	926	-
Approach	EB		WB		NE	
HCM Control Delay, s/v	0		0		9.45	
HCM LOS	A					
Minor Lane/Major Mvmt	NELn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	815	-	-	1520	-	
HCM Lane V/C Ratio	0.008	-	-	-	-	
HCM Control Delay (s/veh)	9.5	-	-	0	-	
HCM Lane LOS	A	-	-	A	-	
HCM 95th %tile Q(veh)	0	-	-	0	-	

Intersection												
Int Delay, s/veh	6.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	11	56	52	13	0	73	33	16	0	81	4
Future Vol, veh/h	3	11	56	52	13	0	73	33	16	0	81	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	68	68	68	68	68	68	68	68	68	68	68	68
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	16	82	76	19	0	107	49	24	0	119	6

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	395	409	122	402	400	60	125	0	0	72	0	0
Stage 1	122	122	-	275	275	-	-	-	-	-	-	-
Stage 2	273	287	-	127	125	-	-	-	-	-	-	-
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	565	532	929	559	538	1005	1462	-	-	1528	-	-
Stage 1	882	795	-	731	683	-	-	-	-	-	-	-
Stage 2	733	674	-	877	792	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	503	491	929	456	497	1005	1462	-	-	1528	-	-
Mov Cap-2 Maneuver	503	491	-	456	497	-	-	-	-	-	-	-
Stage 1	882	795	-	675	630	-	-	-	-	-	-	-
Stage 2	656	623	-	783	792	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v10.24		14.78	4.58	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1011	-	-	790 463	1528	-	-
HCM Lane V/C Ratio	0.073	-	-	0.13 0.206	-	-	-
HCM Control Delay (s/veh)	7.7	0	-	10.2 14.8	0	-	-
HCM Lane LOS	A	A	-	B B	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.4 0.8	0	-	-

Intersection												
Int Delay, s/veh	1.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	2	0	44	6	0	1	0	188	1	16	117	2
Future Vol, veh/h	2	0	44	6	0	1	0	188	1	16	117	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	2	0	48	7	0	1	0	204	1	17	127	2

Major/Minor	Minor1		Minor2		Major1			Major2				
Conflicting Flow All	367	369	205	367	368	128	129	0	0	205	0	0
Stage 1	205	205	-	163	163	-	-	-	-	-	-	-
Stage 2	162	164	-	204	205	-	-	-	-	-	-	-
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	589	560	836	589	561	922	1456	-	-	1366	-	-
Stage 1	797	732	-	839	763	-	-	-	-	-	-	-
Stage 2	840	762	-	798	732	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	581	553	836	548	553	922	1456	-	-	1366	-	-
Mov Cap-2 Maneuver	581	553	-	548	553	-	-	-	-	-	-	-
Stage 1	797	732	-	828	753	-	-	-	-	-	-	-
Stage 2	828	752	-	752	732	-	-	-	-	-	-	-

Approach	EB		WB		SE		NW	
HCM Control Delay, s/v	9.67		11.27		0		0.91	
HCM LOS	A		B					

Minor Lane/Major Mvmt	NWL	NWT	NWR	EBLn1WBLn1	SEL	SET	SER
Capacity (veh/h)	213	-	-	820	581	1456	-
HCM Lane V/C Ratio	0.013	-	-	0.061	0.013	-	-
HCM Control Delay (s/veh)	7.7	0	-	9.7	11.3	0	-
HCM Lane LOS	A	A	-	A	B	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0	0	-

Intersection						
Int Delay, s/veh	5.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	71	223	609	63	51	187
Future Vol, veh/h	71	223	609	63	51	187
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	60	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	81	253	692	72	58	213

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	764	0	-	0	1016
Stage 1	-	-	-	-	728
Stage 2	-	-	-	-	288
Critical Hdwy	4.14	-	-	-	6.84
Critical Hdwy Stg 1	-	-	-	-	5.84
Critical Hdwy Stg 2	-	-	-	-	5.84
Follow-up Hdwy	2.22	-	-	-	3.52
Pot Cap-1 Maneuver	845	-	-	-	234
Stage 1	-	-	-	-	439
Stage 2	-	-	-	-	735
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	845	-	-	-	212
Mov Cap-2 Maneuver	-	-	-	-	212
Stage 1	-	-	-	-	397
Stage 2	-	-	-	-	735

Approach	EB	WB	SB
HCM Control Delay, s/v	2.34	0	25.68
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	845	-	-	-	437
HCM Lane V/C Ratio	0.095	-	-	-	0.619
HCM Control Delay (s/veh)	9.7	-	-	-	25.7
HCM Lane LOS	A	-	-	-	D
HCM 95th %tile Q(veh)	0.3	-	-	-	4.1

Timings

East Highland Ranch (JN 15974)

1: Greenspot Rd. & Boulder Av.

12/23/2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	
Lane Configurations												
Traffic Volume (vph)	103	868	249	313	794	131	133	324	5	269	248	
Future Volume (vph)	103	868	249	313	794	131	133	324	5	269	248	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4			8			6			
Detector Phase	7	4	4	3	8	8	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	
Minimum Split (s)	9.6	22.8	22.8	14.6	22.8	22.8	9.6	23.2	23.2	9.6	23.2	
Total Split (s)	15.4	41.5	41.5	35.3	61.4	61.4	18.2	23.3	23.3	19.9	25.0	
Total Split (%)	12.8%	34.6%	34.6%	29.4%	51.2%	51.2%	15.2%	19.4%	19.4%	16.6%	20.8%	
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	4.8	3.6	5.2	5.2	3.6	5.2	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
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)	4.6	5.8	5.8	4.6	5.8	5.8	4.6	6.2	6.2	4.6	6.2	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	
Act Effct Green (s)	9.2	35.7	35.7	30.4	56.9	56.9	13.1	16.9	16.9	14.7	18.4	
Actuated g/C Ratio	0.08	0.30	0.30	0.26	0.48	0.48	0.11	0.14	0.14	0.12	0.15	
v/c Ratio	0.59	0.96	0.46	0.97	0.55	0.20	0.89	0.76	0.02	0.86	0.94	
Control Delay (s/veh)	65.1	61.6	7.8	83.7	23.9	6.6	97.7	60.1	0.0	73.6	56.0	
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)	65.1	61.6	7.8	83.7	23.9	6.6	97.7	60.1	0.0	73.6	56.0	
LOS	E	E	A	F	C	A	F	E	A	E	E	
Approach Delay (s/veh)		50.9			37.2			70.2			61.8	
Approach LOS		D			D			E			E	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 118.9

Natural Cycle: 110

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay (s/veh): 51.2

Intersection LOS: D

Intersection Capacity Utilization 88.0%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 1: Greenspot Rd. & Boulder Av.

 Ø1	 Ø2	 Ø3	 Ø4
18.2 s	25 s	35.3 s	41.5 s
 Ø5	 Ø6	 Ø7	 Ø8
19.9 s	23.3 s	15.4 s	61.4 s

HCM 7th Signalized Intersection Summary
1: Greenspot Rd. & Boulder Av.

East Highland Ranch (JN 15974)

12/23/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	103	868	249	313	794	131	133	324	5	269	248	298
Future Volume (veh/h)	103	868	249	313	794	131	133	324	5	269	248	298
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	121	1021	240	368	934	132	156	381	0	316	292	176
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	162	1055	442	384	1748	732	179	526		362	329	192
Arrive On Green	0.06	0.30	0.30	0.26	0.49	0.49	0.11	0.15	0.00	0.12	0.16	0.16
Sat Flow, veh/h	2670	3544	1482	1498	3544	1483	1594	3544	1502	3000	2096	1227
Grp Volume(v), veh/h	121	1021	240	368	934	132	156	381	0	316	246	222
Grp Sat Flow(s),veh/h/ln	1335	1772	1482	1498	1772	1483	1594	1772	1502	1500	1772	1551
Q Serve(g_s), s	5.3	34.1	16.3	29.0	21.7	5.9	11.5	12.3	0.0	12.4	16.3	16.9
Cycle Q Clear(g_c), s	5.3	34.1	16.3	29.0	21.7	5.9	11.5	12.3	0.0	12.4	16.3	16.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.79
Lane Grp Cap(c), veh/h	162	1055	442	384	1748	732	179	526		362	278	243
V/C Ratio(X)	0.75	0.97	0.54	0.96	0.53	0.18	0.87	0.72		0.87	0.88	0.91
Avail Cap(c_a), veh/h	241	1055	442	384	1748	732	181	526		383	278	243
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.4	41.5	35.3	44.0	20.9	16.9	52.3	48.7	0.0	51.8	49.5	49.7
Incr Delay (d2), s/veh	2.8	20.2	1.4	35.0	0.3	0.1	32.5	4.9	0.0	17.6	26.7	35.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	17.2	5.8	14.0	8.4	1.9	6.1	5.6	0.0	5.4	9.0	8.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	58.2	61.7	36.6	79.0	21.2	17.0	84.9	53.6	0.0	69.4	76.1	85.3
LnGrp LOS	E	E	D	E	C	B	F	D		E	E	F
Approach Vol, veh/h	1382			1434			537			784		
Approach Delay, s/veh	57.0			35.7			62.7			76.0		
Approach LOS	E			D			E			E		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	18.1	25.0	35.3	41.5	19.1	24.0	11.9	64.9				
Change Period (Y+Rc), s	4.6	6.2	4.6	5.8	4.6	6.2	4.6	5.8				
Max Green Setting (Gmax), s	13.6	18.8	30.7	35.7	15.3	17.1	10.8	55.6				
Max Q Clear Time (g_c+I1), s	13.5	18.9	31.0	36.1	14.4	14.3	7.3	23.7				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.1	0.6	0.1	7.2				

Intersection Summary

HCM 7th Control Delay, s/veh	54.0
HCM 7th LOS	D

Notes

Unsignalized Delay for [SER] is excluded from calculations of the approach delay and intersection delay.

Timings

East Highland Ranch (JN 15974)

2: Greenspot Rd. & Church St.

12/23/2024

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	253	837	5	722	24	10	58	3
Future Volume (vph)	253	837	5	722	24	10	58	3
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA
Protected Phases	7	4	3	8		2		6
Permitted Phases					2		6	
Detector Phase	7	4	3	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	10.0	5.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.6	27.8	9.6	27.8	21.6	21.6	21.6	21.6
Total Split (s)	21.6	34.8	21.6	34.8	33.6	33.6	33.6	33.6
Total Split (%)	24.0%	38.7%	24.0%	38.7%	37.3%	37.3%	37.3%	37.3%
Yellow Time (s)	3.6	4.8	3.6	4.8	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	5.8	4.6	4.6	4.6	4.6
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	Min	Min	Min	Min
Act Effect Green (s)	11.3	35.9	5.3	21.4	11.5	11.5	11.5	11.5
Actuated g/C Ratio	0.19	0.60	0.09	0.36	0.19	0.19	0.19	0.19
v/c Ratio	0.57	0.46	0.04	0.69	0.15	0.03	0.29	0.31
Control Delay (s/veh)	28.1	8.2	31.2	20.0	25.5	23.2	27.2	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	28.1	8.2	31.2	20.0	25.5	23.2	27.2	1.0
LOS	C	A	C	B	C	C	C	A
Approach Delay (s/veh)		12.7		20.1		24.8		5.9
Approach LOS		B		C		C		A

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 59.7

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay (s/veh): 14.5

Intersection LOS: B

Intersection Capacity Utilization 65.0%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 2: Greenspot Rd. & Church St.

 Ø2	 Ø3	 Ø4
33.6 s	21.6 s	34.8 s
 Ø6	 Ø7	 Ø8
33.6 s	21.6 s	34.8 s

HCM 7th Signalized Intersection Summary

2: Greenspot Rd. & Church St.

East Highland Ranch (JN 15974)

12/23/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 			 						 	
Traffic Volume (veh/h)	253	837	18	5	722	47	24	10	0	58	3	247
Future Volume (veh/h)	253	837	18	5	722	47	24	10	0	58	3	247
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		1.00	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	288	951	18	6	820	51	27	11	0	66	3	169
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	394	1693	32	13	1150	72	253	361	0	390	361	302
Arrive On Green	0.15	0.49	0.49	0.01	0.35	0.35	0.20	0.20	0.00	0.20	0.20	0.20
Sat Flow, veh/h	2670	3465	66	1594	3298	205	1077	1772	0	1239	1772	1482
Grp Volume(v), veh/h	288	486	483	6	440	431	27	11	0	66	3	169
Grp Sat Flow(s),veh/h/ln	1335	1772	1759	1594	1772	1731	1077	1772	0	1239	1772	1482
Q Serve(g_s), s	5.2	9.7	9.7	0.2	10.8	10.8	1.2	0.2	0.0	2.3	0.1	5.1
Cycle Q Clear(g_c), s	5.2	9.7	9.7	0.2	10.8	10.8	6.3	0.2	0.0	2.5	0.1	5.1
Prop In Lane	1.00		0.04	1.00		0.12	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	394	865	859	13	618	604	253	361	0	390	361	302
V/C Ratio(X)	0.73	0.56	0.56	0.47	0.71	0.71	0.11	0.03	0.00	0.17	0.01	0.56
Avail Cap(c_a), veh/h	907	1027	1020	542	1027	1003	658	1027	0	856	1027	859
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.4	9.0	9.0	24.7	14.1	14.1	20.7	16.0	0.0	17.0	15.9	17.9
Incr Delay (d2), s/veh	1.0	0.6	0.6	9.7	1.5	1.6	0.2	0.0	0.0	0.2	0.0	1.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	2.5	2.5	0.1	3.5	3.4	0.3	0.1	0.0	0.6	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	21.4	9.6	9.6	34.4	15.7	15.7	20.9	16.0	0.0	17.2	15.9	19.5
LnGrp LOS	C	A	A	C	B	B	C	B		B	B	B
Approach Vol, veh/h	1257			877			38			238		
Approach Delay, s/veh	12.3			15.8			19.5			18.8		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	2		3	4		6	7	8				
Phs Duration (G+Y+Rc), s	14.8		5.0	30.2		14.8	12.0	23.2				
Change Period (Y+Rc), s	4.6		4.6	5.8		4.6	4.6	5.8				
Max Green Setting (Gmax), s	29.0		17.0	29.0		29.0	17.0	29.0				
Max Q Clear Time (g_c+I1), s	8.3		2.2	11.7		7.1	7.2	12.8				
Green Ext Time (p_c), s	0.1		0.0	5.3		1.3	0.4	4.6				
Intersection Summary												
HCM 7th Control Delay, s/veh	14.3											
HCM 7th LOS	B											

Timings

East Highland Ranch (JN 15974)

3: Greenspot Rd. & Weaver St.

12/23/2024



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	156	611	470	75	205
Future Volume (vph)	156	611	470	75	205
Turn Type	Perm	NA	NA	Prot	Perm
Protected Phases		4	8	1	
Permitted Phases	4				6
Detector Phase	4	4	8	1	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	22.8	22.8	22.8	9.6	22.4
Total Split (s)	46.8	46.8	46.8	43.2	43.2
Total Split (%)	52.0%	52.0%	52.0%	48.0%	48.0%
Yellow Time (s)	4.8	4.8	4.8	3.6	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	4.6	5.4
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	Min
Act Effct Green (s)	17.3	17.3	17.3	9.6	11.5
Actuated g/C Ratio	0.43	0.43	0.43	0.24	0.28
v/c Ratio	0.57	0.45	0.38	0.23	0.39
Control Delay (s/veh)	16.7	8.9	8.1	15.2	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	16.7	8.9	8.1	15.2	5.2
LOS	B	A	A	B	A
Approach Delay (s/veh)		10.5	8.1	7.9	
Approach LOS		B	A	A	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 40.6

Natural Cycle: 55

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.57

Intersection Signal Delay (s/veh): 9.2

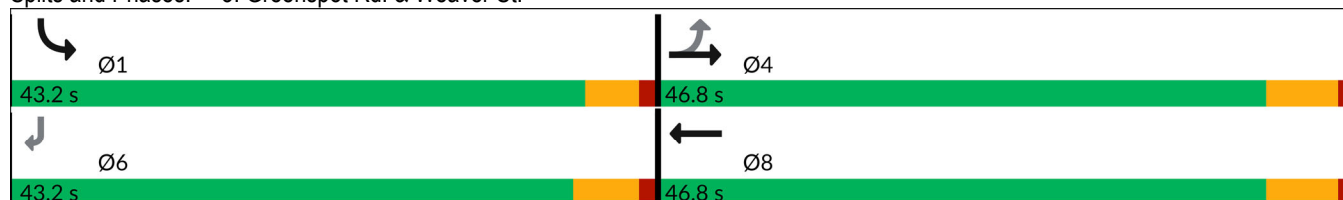
Intersection LOS: A

Intersection Capacity Utilization 42.9%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: Greenspot Rd. & Weaver St.



HCM 7th Signalized Intersection Summary

3: Greenspot Rd. & Weaver St.

East Highland Ranch (JN 15974)

12/23/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	156	611	470	42	75	205
Future Volume (veh/h)	156	611	470	42	75	205
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1673	1772	1772	1772	1673	1772
Adj Flow Rate, veh/h	171	671	516	46	82	225
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	511	1775	1607	143	301	302
Arrive On Green	0.50	0.50	0.50	0.50	0.20	0.20
Sat Flow, veh/h	753	3544	3207	285	1498	1502
Grp Volume(v), veh/h	171	671	284	278	82	225
Grp Sat Flow(s),veh/h/ln	753	1772	1772	1720	1498	1502
Q Serve(g_s), s	6.1	4.1	3.3	3.4	1.6	4.9
Cycle Q Clear(g_c), s	9.5	4.1	3.3	3.4	1.6	4.9
Prop In Lane	1.00			0.17	1.00	1.00
Lane Grp Cap(c), veh/h	511	1775	888	862	301	302
V/C Ratio(X)	0.33	0.38	0.32	0.32	0.27	0.75
Avail Cap(c_a), veh/h	1018	4162	2081	2021	1657	1660
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.0	5.4	5.2	5.2	11.8	13.1
Incr Delay (d2), s/veh	0.4	0.1	0.2	0.2	0.2	1.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.6	0.5	0.5	0.4	1.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	8.4	5.5	5.4	5.4	12.0	14.5
LnGrp LOS	A	A	A	A	B	B
Approach Vol, veh/h		842	562		307	
Approach Delay, s/veh		6.1	5.4		13.8	
Approach LOS		A	A		B	
Timer - Assigned Phs				4	6	8
Phs Duration (G+Y+Rc), s				23.3	11.6	23.3
Change Period (Y+Rc), s				5.8	4.6	5.8
Max Green Setting (Gmax), s				41.0	38.6	41.0
Max Q Clear Time (g_c+I1), s				11.5	6.9	5.4
Green Ext Time (p_c), s				6.0	0.5	3.3
Intersection Summary						
HCM 7th Control Delay, s/veh			7.2			
HCM 7th LOS			A			

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	53	7	0	47	4	0
Future Vol, veh/h	53	7	0	47	4	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	58	8	0	51	4	0

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	65	0	113
Stage 1	-	-	-	-	61
Stage 2	-	-	-	-	51
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1537	-	884
Stage 1	-	-	-	-	961
Stage 2	-	-	-	-	971
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1537	-	884
Mov Cap-2 Maneuver	-	-	-	-	884
Stage 1	-	-	-	-	961
Stage 2	-	-	-	-	971

Approach	EB	WB	NE
HCM Control Delay, s/v	0	0	9.09
HCM LOS			A

Minor Lane/Major Mvmt	NELn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	884	-	-	1537	-
HCM Lane V/C Ratio	0.005	-	-	-	-
HCM Control Delay (s/veh)	9.1	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection												
Int Delay, s/veh	4.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	6	43	25	3	1	41	37	39	0	48	3
Future Vol, veh/h	3	6	43	25	3	1	41	37	39	0	48	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	8	54	31	4	1	51	46	49	0	60	4

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	213	259	62	237	237	71	64	0	0	95	0	0
Stage 1	62	62	-	173	173	-	-	-	-	-	-	-
Stage 2	151	198	-	64	64	-	-	-	-	-	-	-
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	744	645	1003	718	664	992	1539	-	-	1499	-	-
Stage 1	949	843	-	829	756	-	-	-	-	-	-	-
Stage 2	852	737	-	947	842	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	713	622	1003	647	640	992	1539	-	-	1499	-	-
Mov Cap-2 Maneuver	713	622	-	647	640	-	-	-	-	-	-	-
Stage 1	949	843	-	799	729	-	-	-	-	-	-	-
Stage 2	816	711	-	888	842	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s/v	9.23		10.82		2.6		0	
HCM LOS	A		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	572	-	-	917	655	1499	-
HCM Lane V/C Ratio	0.033	-	-	0.071	0.055	-	-
HCM Control Delay (s/veh)	7.4	0	-	9.2	10.8	0	-
HCM Lane LOS	A	A	-	A	B	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.2	0	-

Intersection												
Int Delay, s/veh	2.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	0	29	4	0	1	1	104	2	50	106	7
Future Vol, veh/h	1	0	29	4	0	1	1	104	2	50	106	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	0	32	4	0	1	1	113	2	54	115	8

Major/Minor	Minor1		Minor2		Major1			Major2				
Conflicting Flow All	340	348	114	343	345	119	123	0	0	115	0	0
Stage 1	116	116	-	228	228	-	-	-	-	-	-	-
Stage 2	224	232	-	115	117	-	-	-	-	-	-	-
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	614	576	938	611	578	933	1464	-	-	1474	-	-
Stage 1	888	799	-	775	716	-	-	-	-	-	-	-
Stage 2	779	713	-	890	798	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	588	553	938	567	555	933	1464	-	-	1474	-	-
Mov Cap-2 Maneuver	588	553	-	567	555	-	-	-	-	-	-	-
Stage 1	888	799	-	744	687	-	-	-	-	-	-	-
Stage 2	747	685	-	859	798	-	-	-	-	-	-	-

Approach	EB		WB		SE		NW	
HCM Control Delay, s/v	9.06		10.91		0.07		2.31	
HCM LOS	A		B					

Minor Lane/Major Mvmt	NWL	NWT	NWR	EBLn1WBLn1	SEL	SET	SER
Capacity (veh/h)	545	-	-	920	615	17	-
HCM Lane V/C Ratio	0.037	-	-	0.035	0.009	0.001	-
HCM Control Delay (s/veh)	7.5	0	-	9.1	10.9	7.5	0
HCM Lane LOS	A	A	-	A	B	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0	0	-

Intersection						
Int Delay, s/veh	3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	148	439	345	15	23	113
Future Vol, veh/h	148	439	345	15	23	113
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	60	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	166	493	388	17	26	127

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	404	0	0 975 202
Stage 1	-	-	- - 396 -
Stage 2	-	-	- - 579 -
Critical Hdwy	4.14	-	- - 6.84 6.94
Critical Hdwy Stg 1	-	-	- - 5.84 -
Critical Hdwy Stg 2	-	-	- - 5.84 -
Follow-up Hdwy	2.22	-	- - 3.52 3.32
Pot Cap-1 Maneuver	1151	-	- - 249 805
Stage 1	-	-	- - 649 -
Stage 2	-	-	- - 523 -
Platoon blocked, %		-	- -
Mov Cap-1 Maneuver	1151	-	- - 213 805
Mov Cap-2 Maneuver	-	-	- - 213 -
Stage 1	-	-	- - 555 -
Stage 2	-	-	- - 523 -

Approach	EB	WB	SB
HCM Control Delay, s/v	2.18	0	14.11
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1151	-	-	-	547
HCM Lane V/C Ratio	0.145	-	-	-	0.279
HCM Control Delay (s/veh)	8.7	-	-	-	14.1
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.5	-	-	-	1.1

Timings

East Highland Ranch (JN 15974)

1: Greenspot Rd. & Boulder Av.

12/23/2024

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT
Lane Configurations											
Traffic Volume (vph)	103	868	249	313	794	131	133	324	5	269	248
Future Volume (vph)	103	868	249	313	794	131	133	324	5	269	248
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA
Protected Phases	7	4		3	8		1	6		5	2
Permitted Phases			4			8			6		
Detector Phase	7	4	4	3	8	8	1	6	6	5	2
Switch Phase											
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0
Minimum Split (s)	9.6	22.8	22.8	14.6	22.8	22.8	9.6	23.2	23.2	9.6	23.2
Total Split (s)	15.4	41.5	41.5	35.3	61.4	61.4	18.2	23.3	23.3	19.9	25.0
Total Split (%)	12.8%	34.6%	34.6%	29.4%	51.2%	51.2%	15.2%	19.4%	19.4%	16.6%	20.8%
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	4.8	3.6	5.2	5.2	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	4.6	5.8	5.8	4.6	5.8	5.8	4.6	6.2	6.2	4.6	6.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min
Act Effct Green (s)	9.2	35.7	35.7	30.4	56.9	56.9	13.1	16.9	16.9	14.7	18.4
Actuated g/C Ratio	0.08	0.30	0.30	0.26	0.48	0.48	0.11	0.14	0.14	0.12	0.15
v/c Ratio	0.59	0.96	0.46	0.97	0.55	0.20	0.89	0.76	0.02	0.86	0.94
Control Delay (s/veh)	65.1	61.6	7.8	83.7	23.9	6.6	97.7	60.1	0.0	73.6	56.0
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)	65.1	61.6	7.8	83.7	23.9	6.6	97.7	60.1	0.0	73.6	56.0
LOS	E	E	A	F	C	A	F	E	A	E	E
Approach Delay (s/veh)		50.9			37.2			70.2			61.8
Approach LOS		D			D			E			E

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 118.9

Natural Cycle: 110

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay (s/veh): 51.2

Intersection LOS: D

Intersection Capacity Utilization 88.0%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 1: Greenspot Rd. & Boulder Av.

 Ø1	 Ø2	 Ø3	 Ø4
18.2 s	25 s	35.3 s	41.5 s
 Ø5	 Ø6	 Ø7	 Ø8
19.9 s	23.3 s	15.4 s	61.4 s

HCM 7th Signalized Intersection Summary
1: Greenspot Rd. & Boulder Av.

East Highland Ranch (JN 15974)

12/23/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	103	868	249	313	794	131	133	324	5	269	248	298
Future Volume (veh/h)	103	868	249	313	794	131	133	324	5	269	248	298
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	121	1021	240	368	934	132	156	381	0	316	292	176
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	162	1055	442	384	1748	732	179	526		362	329	192
Arrive On Green	0.06	0.30	0.30	0.26	0.49	0.49	0.11	0.15	0.00	0.12	0.16	0.16
Sat Flow, veh/h	2670	3544	1482	1498	3544	1483	1594	3544	1502	3000	2096	1227
Grp Volume(v), veh/h	121	1021	240	368	934	132	156	381	0	316	246	222
Grp Sat Flow(s),veh/h/ln	1335	1772	1482	1498	1772	1483	1594	1772	1502	1500	1772	1551
Q Serve(g_s), s	5.3	34.1	16.3	29.0	21.7	5.9	11.5	12.3	0.0	12.4	16.3	16.9
Cycle Q Clear(g_c), s	5.3	34.1	16.3	29.0	21.7	5.9	11.5	12.3	0.0	12.4	16.3	16.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.79
Lane Grp Cap(c), veh/h	162	1055	442	384	1748	732	179	526		362	278	243
V/C Ratio(X)	0.75	0.97	0.54	0.96	0.53	0.18	0.87	0.72		0.87	0.88	0.91
Avail Cap(c_a), veh/h	241	1055	442	384	1748	732	181	526		383	278	243
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.4	41.5	35.3	44.0	20.9	16.9	52.3	48.7	0.0	51.8	49.5	49.7
Incr Delay (d2), s/veh	2.8	20.2	1.4	35.0	0.3	0.1	32.5	4.9	0.0	17.6	26.7	35.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	17.2	5.8	14.0	8.4	1.9	6.1	5.6	0.0	5.4	9.0	8.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	58.2	61.7	36.6	79.0	21.2	17.0	84.9	53.6	0.0	69.4	76.1	85.3
LnGrp LOS	E	E	D	E	C	B	F	D		E	E	F
Approach Vol, veh/h	1382			1434			537			784		
Approach Delay, s/veh	57.0			35.7			62.7			76.0		
Approach LOS	E			D			E			E		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	18.1	25.0	35.3	41.5	19.1	24.0	11.9	64.9				
Change Period (Y+Rc), s	4.6	6.2	4.6	5.8	4.6	6.2	4.6	5.8				
Max Green Setting (Gmax), s	13.6	18.8	30.7	35.7	15.3	17.1	10.8	55.6				
Max Q Clear Time (g_c+I1), s	13.5	18.9	31.0	36.1	14.4	14.3	7.3	23.7				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.1	0.6	0.1	7.2				

Intersection Summary

HCM 7th Control Delay, s/veh	54.0
HCM 7th LOS	D

Notes

Unsignalized Delay for [SER] is excluded from calculations of the approach delay and intersection delay.

Timings

East Highland Ranch (JN 15974)

2: Greenspot Rd. & Church St.

12/23/2024

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	 	 		 				 
Traffic Volume (vph)	268	1136	3	662	28	4	55	12
Future Volume (vph)	268	1136	3	662	28	4	55	12
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA
Protected Phases	7	4	3	8		2		6
Permitted Phases					2		6	
Detector Phase	7	4	3	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	10.0	5.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.6	27.8	9.6	27.8	21.6	21.6	21.6	21.6
Total Split (s)	21.6	34.8	21.6	34.8	33.6	33.6	33.6	33.6
Total Split (%)	24.0%	38.7%	24.0%	38.7%	37.3%	37.3%	37.3%	37.3%
Yellow Time (s)	3.6	4.8	3.6	4.8	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	5.8	4.6	4.6	4.6	4.6
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	Min	Min	Min	Min
Act Effect Green (s)	10.9	34.3	5.2	20.1	11.3	11.3	11.3	11.3
Actuated g/C Ratio	0.19	0.59	0.09	0.35	0.20	0.20	0.20	0.20
v/c Ratio	0.56	0.58	0.02	0.62	0.15	0.02	0.25	0.30
Control Delay (s/veh)	26.9	9.5	30.0	18.5	24.3	19.5	25.2	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	26.9	9.5	30.0	18.5	24.3	19.5	25.2	5.8
LOS	C	A	C	B	C	B	C	A
Approach Delay (s/veh)		12.8		18.6		23.4		9.7
Approach LOS		B		B		C		A

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 57.8

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.62

Intersection Signal Delay (s/veh): 14.3

Intersection LOS: B

Intersection Capacity Utilization 71.6%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 2: Greenspot Rd. & Church St.

 Ø2	 Ø3	 Ø4
33.6 s	21.6 s	34.8 s
 Ø6	 Ø7	 Ø8
33.6 s	21.6 s	34.8 s

HCM 7th Signalized Intersection Summary

2: Greenspot Rd. & Church St.

East Highland Ranch (JN 15974)

12/23/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	268	1136	17	3	662	58	28	4	2	55	12	207
Future Volume (veh/h)	268	1136	17	3	662	58	28	4	2	55	12	207
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	282	1196	16	3	697	59	29	4	2	58	13	114
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	393	1613	22	7	1027	87	321	240	120	418	382	320
Arrive On Green	0.15	0.46	0.46	0.00	0.32	0.32	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	2670	3488	47	1594	3218	272	1122	1112	556	1245	1772	1482
Grp Volume(v), veh/h	282	607	605	3	384	372	29	0	6	58	13	114
Grp Sat Flow(s),veh/h/ln	1335	1772	1763	1594	1772	1718	1122	0	1668	1245	1772	1482
Q Serve(g_s), s	4.8	13.2	13.2	0.1	8.9	8.9	1.1	0.0	0.1	1.8	0.3	3.1
Cycle Q Clear(g_c), s	4.8	13.2	13.2	0.1	8.9	8.9	4.1	0.0	0.1	1.9	0.3	3.1
Prop In Lane	1.00		0.03	1.00		0.16	1.00		0.33	1.00		1.00
Lane Grp Cap(c), veh/h	393	819	815	7	566	548	321	0	360	418	382	320
V/C Ratio(X)	0.72	0.74	0.74	0.46	0.68	0.68	0.09	0.00	0.02	0.14	0.03	0.36
Avail Cap(c_a), veh/h	962	1089	1083	574	1089	1055	768	0	1025	914	1089	911
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.2	10.4	10.4	23.5	14.0	14.0	17.5	0.0	14.6	15.3	14.6	15.7
Incr Delay (d2), s/veh	0.9	1.9	1.9	17.7	1.4	1.5	0.1	0.0	0.0	0.2	0.0	0.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	3.6	3.6	0.1	2.9	2.8	0.3	0.0	0.0	0.5	0.1	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	20.1	12.3	12.3	41.1	15.4	15.4	17.6	0.0	14.6	15.5	14.7	16.4
LnGrp LOS	C	B	B	D	B	B	B		B	B	B	B
Approach Vol, veh/h	1494			759			35			185		
Approach Delay, s/veh	13.8			15.5			17.1			16.0		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	2		3	4		6	7	8				
Phs Duration (G+Y+Rc), s	14.8		4.8	27.6		14.8	11.5	20.9				
Change Period (Y+Rc), s	4.6		4.6	5.8		4.6	4.6	5.8				
Max Green Setting (Gmax), s	29.0		17.0	29.0		29.0	17.0	29.0				
Max Q Clear Time (g_c+I1), s	6.1		2.1	15.2		5.1	6.8	10.9				
Green Ext Time (p_c), s	0.1		0.0	6.2		0.9	0.4	4.0				
Intersection Summary												
HCM 7th Control Delay, s/veh	14.5											
HCM 7th LOS	B											

Timings

East Highland Ranch (JN 15974)

3: Greenspot Rd. & Weaver St.

12/23/2024



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	240	754	443	113	160
Future Volume (vph)	240	754	443	113	160
Turn Type	Perm	NA	NA	Prot	Perm
Protected Phases		4	8	1	
Permitted Phases	4				6
Detector Phase	4	4	8	1	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	22.8	22.8	22.8	9.6	22.4
Total Split (s)	46.8	46.8	46.8	43.2	43.2
Total Split (%)	52.0%	52.0%	52.0%	48.0%	48.0%
Yellow Time (s)	4.8	4.8	4.8	3.6	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	4.6	5.4
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	Min
Act Effect Green (s)	26.3	26.3	26.3	10.8	11.5
Actuated g/C Ratio	0.53	0.53	0.53	0.22	0.23
v/c Ratio	0.65	0.42	0.28	0.37	0.36
Control Delay (s/veh)	17.0	7.5	6.3	22.0	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	17.0	7.5	6.3	22.0	6.7
LOS	B	A	A	C	A
Approach Delay (s/veh)		9.8	6.3	13.0	
Approach LOS		A	A	B	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 49.6

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay (s/veh): 9.3

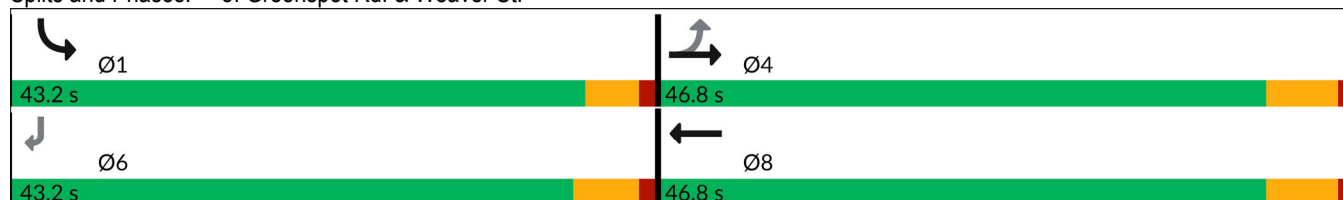
Intersection LOS: A

Intersection Capacity Utilization 50.0%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: Greenspot Rd. & Weaver St.

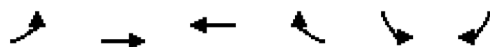


HCM 7th Signalized Intersection Summary

3: Greenspot Rd. & Weaver St.

East Highland Ranch (JN 15974)

12/23/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	240	754	443	51	113	160
Future Volume (veh/h)	240	754	443	51	113	160
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1673	1772	1772	1772	1673	1772
Adj Flow Rate, veh/h	253	794	466	54	119	168
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	573	2016	1774	205	241	242
Arrive On Green	0.57	0.57	0.57	0.57	0.16	0.16
Sat Flow, veh/h	782	3544	3119	360	1498	1502
Grp Volume(v), veh/h	253	794	264	256	119	168
Grp Sat Flow(s),veh/h/ln	782	1772	1772	1707	1498	1502
Q Serve(g_s), s	9.3	4.8	2.9	2.9	2.8	4.1
Cycle Q Clear(g_c), s	12.3	4.8	2.9	2.9	2.8	4.1
Prop In Lane	1.00			0.21	1.00	1.00
Lane Grp Cap(c), veh/h	573	2016	1008	971	241	242
V/C Ratio(X)	0.44	0.39	0.26	0.26	0.49	0.70
Avail Cap(c_a), veh/h	961	3776	1888	1819	1503	1506
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	7.3	4.6	4.2	4.2	14.7	15.2
Incr Delay (d2), s/veh	0.5	0.1	0.1	0.1	0.6	1.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.6	0.4	0.4	0.8	1.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	7.9	4.7	4.3	4.4	15.3	16.6
LnGrp LOS	A	A	A	A	B	B
Approach Vol, veh/h		1047	520		287	
Approach Delay, s/veh		5.5	4.3		16.1	
Approach LOS		A	A		B	
Timer - Assigned Phs				4	6	8
Phs Duration (G+Y+Rc), s				27.7	10.8	27.7
Change Period (Y+Rc), s				5.8	4.6	5.8
Max Green Setting (Gmax), s				41.0	38.6	41.0
Max Q Clear Time (g_c+I1), s				14.3	6.1	4.9
Green Ext Time (p_c), s				7.6	0.4	3.0
Intersection Summary						
HCM 7th Control Delay, s/veh			6.8			
HCM 7th LOS			A			

Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	38	7	0	35	4	0
Future Vol, veh/h	38	7	0	35	4	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	41	8	0	38	4	0
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	49	0	83	45
Stage 1	-	-	-	-	45	-
Stage 2	-	-	-	-	38	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1558	-	919	1025
Stage 1	-	-	-	-	977	-
Stage 2	-	-	-	-	984	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1558	-	919	1025
Mov Cap-2 Maneuver	-	-	-	-	919	-
Stage 1	-	-	-	-	977	-
Stage 2	-	-	-	-	984	-
Approach	EB		WB		NE	
HCM Control Delay, s/v	0		0		8.94	
HCM LOS	A					
Minor Lane/Major Mvmt	NELn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	919	-	-	1558	-	
HCM Lane V/C Ratio	0.005	-	-	-	-	
HCM Control Delay (s/veh)	8.9	-	-	0	-	
HCM Lane LOS	A	-	-	A	-	
HCM 95th %tile Q(veh)	0	-	-	0	-	

Intersection												
Int Delay, s/veh	4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	8	24	38	5	0	27	48	53	1	45	3
Future Vol, veh/h	5	8	24	38	5	0	27	48	53	1	45	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	10	30	48	6	0	34	60	66	1	56	4

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	191	254	58	224	223	93	60	0	0	126	0	0
Stage 1	61	61	-	161	161	-	-	-	-	-	-	-
Stage 2	131	194	-	64	63	-	-	-	-	-	-	-
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	769	649	1008	731	676	964	1544	-	-	1460	-	-
Stage 1	951	844	-	842	765	-	-	-	-	-	-	-
Stage 2	873	740	-	947	843	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	743	633	1008	681	659	964	1544	-	-	1460	-	-
Mov Cap-2 Maneuver	743	633	-	681	659	-	-	-	-	-	-	-
Stage 1	950	844	-	822	747	-	-	-	-	-	-	-
Stage 2	845	723	-	907	842	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	9.44	10.76	1.56	0.15
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	344	-	-	857	679	36	-
HCM Lane V/C Ratio	0.022	-	-	0.054	0.079	0.001	-
HCM Control Delay (s/veh)	7.4	0	-	9.4	10.8	7.5	0
HCM Lane LOS	A	A	-	A	B	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.3	0	-

Intersection												
Int Delay, s/veh	2.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	0	29	4	0	1	1	101	2	50	121	7
Future Vol, veh/h	1	0	29	4	0	1	1	101	2	50	121	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	1	0	32	4	0	1	1	110	2	54	132	8

Major/Minor	Minor1		Minor2		Major1		Major2					
Conflicting Flow All	353	361	111	356	358	135	139	0	0	112	0	0
Stage 1	113	113	-	244	244	-	-	-	-	-	-	-
Stage 2	240	248	-	112	114	-	-	-	-	-	-	-
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	602	566	942	599	568	913	1444	-	-	1478	-	-
Stage 1	892	802	-	760	704	-	-	-	-	-	-	-
Stage 2	763	701	-	893	801	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	577	543	942	556	545	913	1444	-	-	1478	-	-
Mov Cap-2 Maneuver	577	543	-	556	545	-	-	-	-	-	-	-
Stage 1	891	801	-	729	676	-	-	-	-	-	-	-
Stage 2	732	673	-	863	800	-	-	-	-	-	-	-

Approach	EB		WB		SE		NW	
HCM Control Delay, s/v	9.04		11.03		0.07		2.11	
HCM LOS	A		B					

Minor Lane/Major Mvmt	NWL	NWT	NWR	EBLn1WBLn1	SEL	SET	SER
Capacity (veh/h)	500	-	-	923	603	17	-
HCM Lane V/C Ratio	0.037	-	-	0.035	0.009	0.001	-
HCM Control Delay (s/veh)	7.5	0	-	9	11	7.5	0
HCM Lane LOS	A	A	-	A	B	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0	0	-

Intersection						
Int Delay, s/veh	2.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	162	633	294	17	20	113
Future Vol, veh/h	162	633	294	17	20	113
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	60	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	171	666	309	18	21	119

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	327	0	0	993	164
Stage 1	-	-	-	318	-
Stage 2	-	-	-	674	-
Critical Hdwy	4.14	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	3.52	3.32
Pot Cap-1 Maneuver	1229	-	-	242	852
Stage 1	-	-	-	710	-
Stage 2	-	-	-	468	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	1229	-	-	209	852
Mov Cap-2 Maneuver	-	-	-	209	-
Stage 1	-	-	-	612	-
Stage 2	-	-	-	468	-

Approach	EB	WB	SB
HCM Control Delay, s/v	1.71	0	13.13
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1229	-	-	-	582
HCM Lane V/C Ratio	0.139	-	-	-	0.24
HCM Control Delay (s/veh)	8.4	-	-	-	13.1
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.5	-	-	-	0.9

APPENDIX 5.3: OPENING YEAR (2027) WITHOUT PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **OY (2027) NP Conditions - Weekday AM Peak Hour**

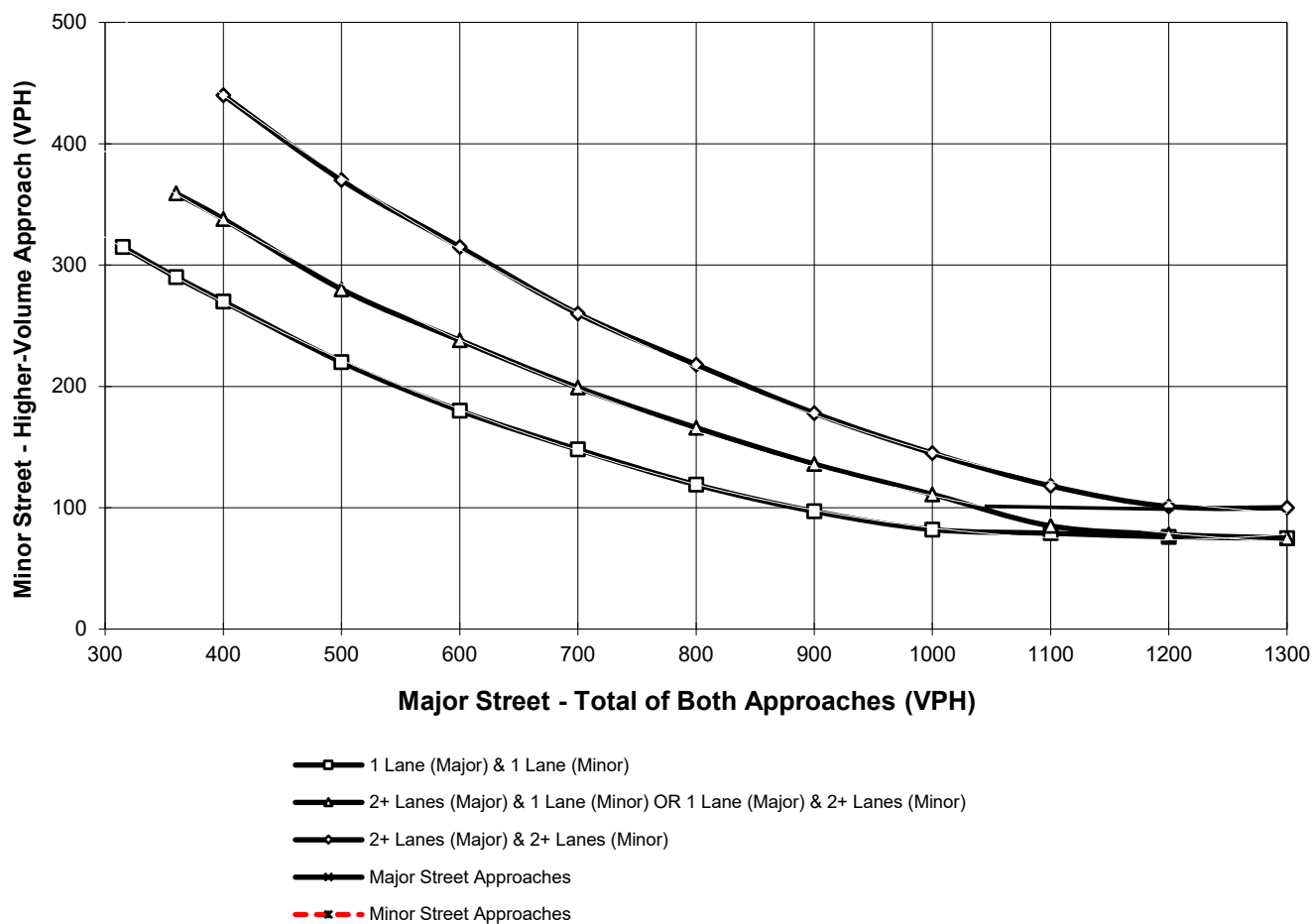
Major Street Name = **Alta Vista**

Total of Both Approaches (VPH) = **204**
Number of Approach Lanes Major Street = **1**

Minor Street Name = **Santa Ana Canyon Rd.**

High Volume Approach (VPH) = **133**
Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes
and 75 vph applies as the lower threshold for a minor-street approach with one lane

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APPENDIX 5.4: OPENING YEAR (2027) WITH PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

<u>DIST</u>	<u>CO</u>	<u>RTE</u>	<u>PM</u>	CALC	TRAFFIC CONDITIONS	OY (2027) WP
Jurisdiction: <u>City of Highland</u>				CHK	<u>IA</u>	DATE <u>12/20/24</u>
Major Street: <u>Santa Ana Canyon Rd.</u>						DATE <u>12/20/24</u>
Minor Street: <u>Street B</u>					Critical Approach Speed (Major) <u>25</u> mph	
					Critical Approach Speed (Minor) <u>25</u> mph	
Major Street Approach Lanes = <u>1</u> lane				Minor Street Approach Lane: <u>1</u> lane		
Major Street Future ADT = <u>888</u> vpd				Minor Street Future ADT = <u>54</u> vpd		
Speed limit or critical speed on major street traffic > 64 km/h (40 mph);						
						or
In built up area of isolated community of < 10,000 population						
URBAN (U)						

(Based on Estimated Average Daily Traffic - See Note)

<u>URBAN</u>		<u>RURAL</u>		Minimum Requirements EADT			
CONDITION A - Minimum Vehicular Volume		XX		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
<u>Satisfied</u>	<u>Not Satisfied</u>	XX					
Number of lanes for moving traffic on each approach							
<u>Major Street</u>	<u>Minor Street</u>			<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>
<u>1 888</u>	<u>1 54</u>			8,000	5,600	2,400	1,680
<u>2 +</u>	<u>1</u>			9,600	6,720	2,400	1,680
<u>2 +</u>	<u>2 +</u>			9,600	6,720	3,200	2,240
<u>1</u>	<u>2 +</u>			8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic		XX		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
<u>Satisfied</u>	<u>Not Satisfied</u>	XX					
Number of lanes for moving traffic on each approach							
<u>Major Street</u>	<u>Minor Street</u>			<u>Urban</u>	<u>Rural</u>	<u>Urban</u>	<u>Rural</u>
<u>1 888</u>	<u>1 54</u>			12,000	8,400	1,200	850
<u>2 +</u>	<u>1</u>			14,400	10,080	1,200	850
<u>2 +</u>	<u>2 +</u>			14,400	10,080	1,600	1,120
<u>1</u>	<u>2 +</u>			12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B		XX		2 CONDITIONS 80%		2 CONDITIONS 80%	
<u>Satisfied</u>	<u>Not Satisfied</u>	XX					
No one condition satisfied, but following conditions fulfilled 80% of more							
		<u>A</u>	<u>B</u>				
		3%	6%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **OY (2027) WP Conditions - Weekday AM Peak Hour**

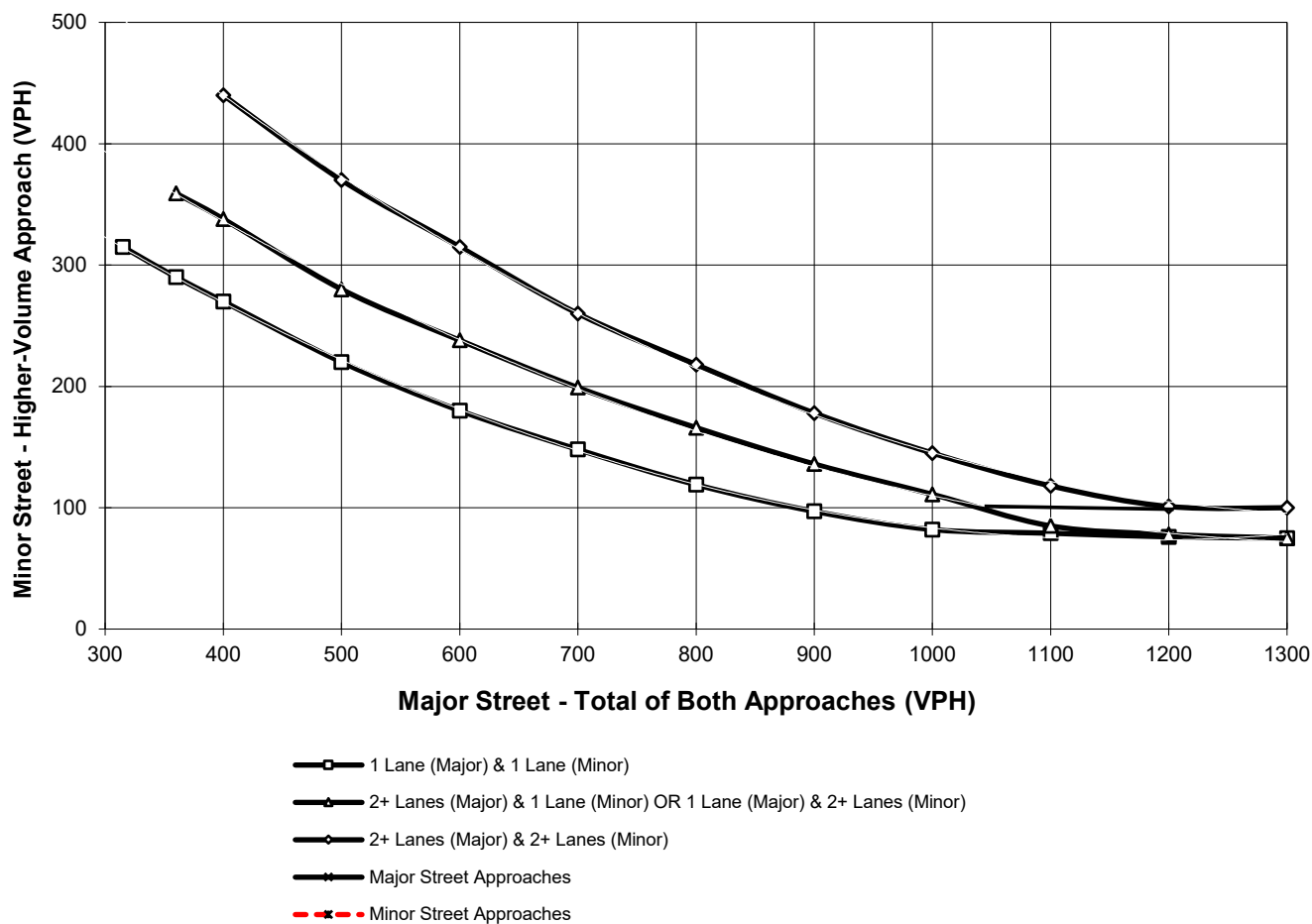
Major Street Name = **Alta Vista**

Total of Both Approaches (VPH) = **207**
Number of Approach Lanes Major Street = **1**

Minor Street Name = **Santa Ana Canyon Rd.**

High Volume Approach (VPH) = **134**
Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes
and 75 vph applies as the lower threshold for a minor-street approach with one lane

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

<u>DIST</u>	<u>CO</u>	<u>RTE</u>	<u>PM</u>	CALC	TRAFFIC CONDITIONS	OY (2027) WP
Jurisdiction: <u>City of Highland</u>				CHK	<u>IA</u>	DATE <u>12/20/24</u>
Major Street: <u>Alta Vista</u>						DATE <u>12/20/24</u>
Minor Street: <u>Street A/Street F</u>					Critical Approach Speed (Major)	<u>25</u> mph
					Critical Approach Speed (Minor)	<u>25</u> mph
Major Street Approach Lanes = <u>1</u> lane				Minor Street Approach Lane: <u>1</u> lane		
Major Street Future ADT = <u>3,110</u> vpd				Minor Street Future ADT = <u>479</u> vpd		
Speed limit or critical speed on major street traffic > 64 km/h (40 mph);						
						or
In built up area of isolated community of < 10,000 population						
URBAN (U)						

(Based on Estimated Average Daily Traffic - See Note)

<u>URBAN</u>		<u>RURAL</u>		Minimum Requirements	
		XX		EADT	
CONDITION A - Minimum Vehicular Volume					
<u>Satisfied</u>		<u>Not Satisfied</u>		Vehicles Per Day on	Vehicles Per Day
		XX		Major Street	on Higher-Volume
Number of lanes for moving traffic on each approach				(Total of Both Approaches)	Minor Street Approach
<u>Major Street</u>	<u>Minor Street</u>				(One Direction Only)
<u>1 3,110</u>	<u>1 479</u>			<u>Urban</u> <u>Rural</u>	<u>Urban</u> <u>Rural</u>
<u>2 +</u>	<u>1</u>			8,000 5,600	2,400 1,680
<u>2 +</u>	<u>2 +</u>			9,600 6,720	2,400 1,680
<u>1</u>	<u>2 +</u>			9,600 6,720	3,200 2,240
				8,000 5,600	3,200 2,240
CONDITION B - Interruption of Continuous Traffic					
<u>Satisfied</u>		<u>Not Satisfied</u>		Vehicles Per Day	Vehicles Per Day
		XX		on Major Street	on Higher-Volume
Number of lanes for moving traffic on each approach				(Total of Both Approaches)	Minor Street Approach
<u>Major Street</u>	<u>Minor Street</u>				(One Direction Only)
<u>1 3,110</u>	<u>1 479</u>			<u>Urban</u> <u>Rural</u>	<u>Urban</u> <u>Rural</u>
<u>2 +</u>	<u>1</u>			12,000 8,400	1,200 850
<u>2 +</u>	<u>2 +</u>			14,400 10,080	1,200 850
<u>1</u>	<u>2 +</u>			14,400 10,080	1,600 1,120
				12,000 8,400	1,600 1,120
Combination of CONDITIONS A + B					
<u>Satisfied</u>		<u>Not Satisfied</u>			
		XX			
No one condition satisfied, but following conditions fulfilled 80% of more				2 CONDITIONS	2 CONDITIONS
				80%	80%
		<u>A</u>	<u>B</u>		
		29%	37%		

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

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APPENDIX 6.1: CUMULATIVE (2050) WITHOUT PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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Timings

East Highland Ranch (JN 15974)

1: Greenspot Rd. & Boulder Av.

12/23/2024

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT
Lane Configurations											
Traffic Volume (vph)	54	522	162	524	1253	132	85	426	2	257	262
Future Volume (vph)	54	522	162	524	1253	132	85	426	2	257	262
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA
Protected Phases	7	4		3	8		1	6		5	2
Permitted Phases			4			8			6		
Detector Phase	7	4	4	3	8	8	1	6	6	5	2
Switch Phase											
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0
Minimum Split (s)	9.6	22.8	22.8	14.6	22.8	22.8	9.6	23.2	23.2	9.6	23.2
Total Split (s)	11.2	26.0	26.0	51.0	65.8	65.8	13.0	25.0	25.0	18.0	30.0
Total Split (%)	9.3%	21.7%	21.7%	42.5%	54.8%	54.8%	10.8%	20.8%	20.8%	15.0%	25.0%
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	4.8	3.6	5.2	5.2	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	4.6	5.8	5.8	4.6	5.8	5.8	4.6	6.2	6.2	4.6	6.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min
Act Effct Green (s)	6.1	19.2	19.2	41.2	56.7	56.7	8.2	17.0	17.0	12.8	21.7
Actuated g/C Ratio	0.05	0.17	0.17	0.37	0.51	0.51	0.07	0.15	0.15	0.11	0.19
v/c Ratio	0.36	0.84	0.39	0.93	0.68	0.16	0.77	0.77	0.01	0.82	0.75
Control Delay (s/veh)	61.2	58.9	6.3	58.5	23.9	2.2	92.6	56.8	0.0	71.0	31.4
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)	61.2	58.9	6.3	58.5	23.9	2.2	92.6	56.8	0.0	71.0	31.4
LOS	E	E	A	E	C	A	F	E	A	E	C
Approach Delay (s/veh)		47.5			31.9			62.5			42.8
Approach LOS		D			C			E			D

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 111.8

Natural Cycle: 100

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay (s/veh): 41.0

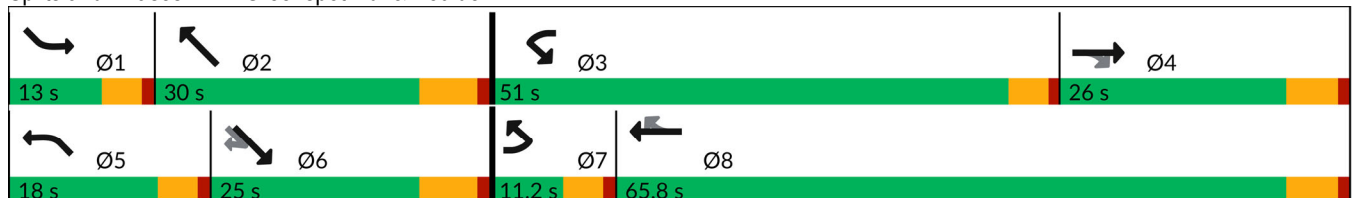
Intersection LOS: D

Intersection Capacity Utilization 87.1%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 1: Greenspot Rd. & Boulder Av.



HCM 7th Signalized Intersection Summary
1: Greenspot Rd. & Boulder Av.

East Highland Ranch (JN 15974)

12/23/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations	 	 			 			 		 	 	
Traffic Volume (veh/h)	54	522	162	524	1253	132	85	426	2	257	262	376
Future Volume (veh/h)	54	522	162	524	1253	132	85	426	2	257	262	376
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1673	1870	1870	1772	1870	1870	1772	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	56	538	135	540	1292	116	88	439	0	265	270	207
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	112	648	271	568	1840	770	108	545		319	379	281
Arrive On Green	0.04	0.17	0.17	0.36	0.49	0.49	0.07	0.15	0.00	0.11	0.19	0.19
Sat Flow, veh/h	2837	3741	1564	1586	3741	1565	1586	3741	1585	2837	1997	1478
Grp Volume(v), veh/h	56	538	135	540	1292	116	88	439	0	265	252	225
Grp Sat Flow(s),veh/h/ln	1418	1870	1564	1586	1870	1565	1586	1870	1585	1418	1870	1604
Q Serve(g_s), s	1.9	14.0	7.9	33.3	27.0	4.1	5.5	11.4	0.0	9.2	12.7	13.3
Cycle Q Clear(g_c), s	1.9	14.0	7.9	33.3	27.0	4.1	5.5	11.4	0.0	9.2	12.7	13.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.92
Lane Grp Cap(c), veh/h	112	648	271	568	1840	770	108	545		319	355	305
V/C Ratio(X)	0.50	0.83	0.50	0.95	0.70	0.15	0.81	0.81		0.83	0.71	0.74
Avail Cap(c_a), veh/h	186	751	314	732	2231	934	132	699		378	442	380
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.4	40.2	37.6	31.4	19.8	14.0	46.2	41.6	0.0	43.7	38.2	38.4
Incr Delay (d2), s/veh	1.3	6.9	1.4	17.7	0.8	0.1	21.9	5.4	0.0	10.9	3.9	5.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	6.8	3.0	14.4	10.5	1.3	2.7	5.4	0.0	3.6	6.0	5.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	48.7	47.0	39.0	49.2	20.6	14.1	68.1	47.0	0.0	54.6	42.1	44.1
LnGrp LOS	D	D	D	D	C	B	E	D		D	D	D
Approach Vol, veh/h	729			1948			527			742		
Approach Delay, s/veh	45.7			28.2			50.5			47.2		
Approach LOS	D			C			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.5	25.3	40.6	23.2	15.9	20.9	8.6	55.3				
Change Period (Y+Rc), s	4.6	6.2	4.6	5.8	4.6	6.2	4.6	5.8				
Max Green Setting (Gmax), s	8.4	23.8	46.4	20.2	13.4	18.8	6.6	60.0				
Max Q Clear Time (g_c+I1), s	7.5	15.3	35.3	16.0	11.2	13.4	3.9	29.0				
Green Ext Time (p_c), s	0.0	1.7	0.7	1.5	0.1	1.2	0.0	10.9				

Intersection Summary

HCM 7th Control Delay, s/veh	38.0
HCM 7th LOS	D

Notes

Unsignalized Delay for [SER] is excluded from calculations of the approach delay and intersection delay.

Timings

East Highland Ranch (JN 15974)

2: Greenspot Rd. & Church St.

12/23/2024

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	 	 		 		 		 
Traffic Volume (vph)	224	544	4	1243	23	15	56	7
Future Volume (vph)	224	544	4	1243	23	15	56	7
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA
Protected Phases	7	4	3	8		2		6
Permitted Phases					2		6	
Detector Phase	7	4	3	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	10.0	5.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.6	27.8	9.6	27.8	21.6	21.6	21.6	21.6
Total Split (s)	16.4	56.7	9.7	50.0	23.6	23.6	23.6	23.6
Total Split (%)	18.2%	63.0%	10.8%	55.6%	26.2%	26.2%	26.2%	26.2%
Yellow Time (s)	3.6	4.8	3.6	4.8	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	5.8	4.6	4.6	4.6	4.6
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	Min	Min	Min	Min
Act Effct Green (s)	10.7	54.4	5.1	40.8	11.8	11.8	11.8	11.8
Actuated g/C Ratio	0.14	0.69	0.06	0.52	0.15	0.15	0.15	0.15
v/c Ratio	0.68	0.25	0.05	0.85	0.23	0.06	0.35	0.52
Control Delay (s/veh)	43.6	5.5	39.3	21.7	36.4	30.5	37.2	18.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	43.6	5.5	39.3	21.7	36.4	30.5	37.2	18.1
LOS	D	A	D	C	D	C	D	B
Approach Delay (s/veh)		16.3		21.7		34.2		21.3
Approach LOS		B		C		C		C

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 78.5

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay (s/veh): 20.2

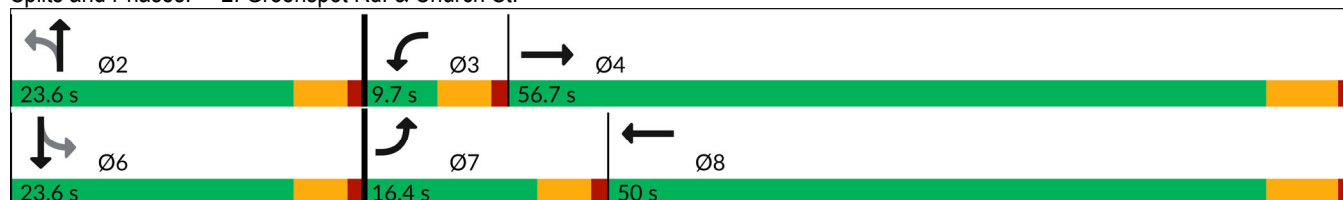
Intersection LOS: C

Intersection Capacity Utilization 79.0%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 2: Greenspot Rd. & Church St.



HCM 7th Signalized Intersection Summary 2: Greenspot Rd. & Church St.

East Highland Ranch (JN 15974)

12/23/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	224	544	15	4	1243	150	23	15	0	56	7	267
Future Volume (veh/h)	224	544	15	4	1243	150	23	15	0	56	7	267
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1673	1870	1870	1772	1870	1870	1772	1870	1870	1772	1870	1870
Adj Flow Rate, veh/h	260	633	15	5	1445	172	27	17	0	65	8	195
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	331	2284	54	11	1697	200	152	319	0	306	319	267
Arrive On Green	0.12	0.63	0.63	0.01	0.52	0.52	0.17	0.17	0.00	0.17	0.17	0.17
Sat Flow, veh/h	2837	3638	86	1688	3278	386	1108	1870	0	1303	1870	1564
Grp Volume(v), veh/h	260	325	323	5	818	799	27	17	0	65	8	195
Grp Sat Flow(s),veh/h/ln	1418	1870	1854	1688	1870	1794	1108	1870	0	1303	1870	1564
Q Serve(g_s), s	6.9	6.0	6.0	0.2	28.8	29.8	1.8	0.6	0.0	3.4	0.3	9.1
Cycle Q Clear(g_c), s	6.9	6.0	6.0	0.2	28.8	29.8	10.9	0.6	0.0	4.0	0.3	9.1
Prop In Lane	1.00		0.05	1.00		0.22	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	331	1174	1164	11	968	929	152	319	0	306	319	267
V/C Ratio(X)	0.79	0.28	0.28	0.45	0.84	0.86	0.18	0.05	0.00	0.21	0.03	0.73
Avail Cap(c_a), veh/h	435	1238	1227	112	1075	1031	237	462	0	406	462	386
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.0	6.5	6.5	38.1	15.9	16.1	35.4	26.7	0.0	28.4	26.6	30.2
Incr Delay (d2), s/veh	4.9	0.1	0.1	10.2	5.8	6.9	0.6	0.1	0.0	0.3	0.0	4.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	1.8	1.8	0.1	11.3	11.5	0.5	0.3	0.0	1.1	0.1	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	38.0	6.6	6.6	48.3	21.7	23.1	35.9	26.8	0.0	28.7	26.6	34.2
LnGrp LOS	D	A	A	D	C	C	D	C		C	C	C
Approach Vol, veh/h	908				1622				44			
Approach Delay, s/veh	15.6				22.5				32.4			
Approach LOS	B				C				C			
Timer - Assigned Phs	2		3		4		6		7		8	
Phs Duration (G+Y+Rc), s	17.7		5.1		54.1		17.7		13.6		45.6	
Change Period (Y+Rc), s	4.6		4.6		5.8		4.6		4.6		5.8	
Max Green Setting (Gmax), s	19.0		5.1		50.9		19.0		11.8		44.2	
Max Q Clear Time (g_c+I1), s	12.9		2.2		8.0		11.1		8.9		31.8	
Green Ext Time (p_c), s	0.0		0.0		3.9		0.9		0.1		8.0	
Intersection Summary												
HCM 7th Control Delay, s/veh	21.4											
HCM 7th LOS	C											

Timings

East Highland Ranch (JN 15974)

3: Greenspot Rd. & Weaver St.

12/23/2024



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↰	↑↑	↑↑	↰	↰
Traffic Volume (vph)	125	363	1141	86	265
Future Volume (vph)	125	363	1141	86	265
Turn Type	Perm	NA	NA	Prot	Perm
Protected Phases		4	8	1	
Permitted Phases	4				6
Detector Phase	4	4	8	1	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	22.8	22.8	22.8	9.6	22.4
Total Split (s)	67.0	67.0	67.0	23.0	23.0
Total Split (%)	74.4%	74.4%	74.4%	25.6%	25.6%
Yellow Time (s)	4.8	4.8	4.8	3.6	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	4.6	5.4
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	Min
Act Effect Green (s)	41.8	41.8	41.8	11.8	14.1
Actuated g/C Ratio	0.61	0.61	0.61	0.17	0.21
v/c Ratio	0.88	0.17	0.64	0.33	0.68
Control Delay (s/veh)	65.9	5.4	8.8	31.7	28.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	65.9	5.4	8.8	31.7	28.2
LOS	E	A	A	C	C
Approach Delay (s/veh)		20.8	8.8	29.1	
Approach LOS		C	A	C	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 68.4

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay (s/veh): 14.7

Intersection LOS: B

Intersection Capacity Utilization 66.2%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 3: Greenspot Rd. & Weaver St.



HCM 7th Signalized Intersection Summary

3: Greenspot Rd. & Weaver St.

East Highland Ranch (JN 15974)

12/23/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	125	363	1141	243	86	265
Future Volume (veh/h)	125	363	1141	243	86	265
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1772	1870	1870	1870	1772	1870
Adj Flow Rate, veh/h	130	378	1189	253	90	276
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	248	2461	1970	416	317	317
Arrive On Green	0.66	0.66	0.66	0.66	0.20	0.20
Sat Flow, veh/h	348	3741	2995	632	1586	1585
Grp Volume(v), veh/h	130	378	739	703	90	276
Grp Sat Flow(s), veh/h/ln	348	1870	1870	1756	1586	1585
Q Serve(g_s), s	24.9	2.8	16.3	16.7	3.5	12.3
Cycle Q Clear(g_c), s	41.6	2.8	16.3	16.7	3.5	12.3
Prop In Lane	1.00			0.36	1.00	1.00
Lane Grp Cap(c), veh/h	248	2461	1231	1155	317	317
V/C Ratio(X)	0.52	0.15	0.60	0.61	0.28	0.87
Avail Cap(c_a), veh/h	310	3133	1567	1471	399	399
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.0	4.8	7.1	7.1	24.8	28.3
Incr Delay (d2), s/veh	1.7	0.0	0.5	0.5	0.2	13.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.7	4.3	4.1	1.2	5.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	20.7	4.8	7.5	7.7	25.0	41.9
LnGrp LOS	C	A	A	A	C	D
Approach Vol, veh/h		508	1442		366	
Approach Delay, s/veh		8.9	7.6		37.7	
Approach LOS		A	A		D	
Timer - Assigned Phs				4	6	8
Phs Duration (G+Y+Rc), s				53.9	19.2	53.9
Change Period (Y+Rc), s				5.8	4.6	5.8
Max Green Setting (Gmax), s				61.2	18.4	61.2
Max Q Clear Time (g_c+I1), s				43.6	14.3	18.7
Green Ext Time (p_c), s				4.5	0.3	12.9
Intersection Summary						
HCM 7th Control Delay, s/veh			12.6			
HCM 7th LOS			B			

Intersection												
Int Delay, s/veh	8.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	8	19	60	57	36	0	97	36	18	0	89	17
Future Vol, veh/h	8	19	60	57	36	0	97	36	18	0	89	17
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	68	68	68	68	68	68	68	68	68	68	68	68
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	28	88	84	53	0	143	53	26	0	131	25

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	508	508	143	496	507	66	156	0	0	79	0	0
Stage 1	143	143	-	351	351	-	-	-	-	-	-	-
Stage 2	365	365	-	145	156	-	-	-	-	-	-	-
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	475	468	904	484	468	998	1424	-	-	1519	-	-
Stage 1	859	778	-	665	632	-	-	-	-	-	-	-
Stage 2	654	623	-	858	769	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	377	419	904	367	419	998	1424	-	-	1519	-	-
Mov Cap-2 Maneuver	377	419	-	367	419	-	-	-	-	-	-	-
Stage 1	859	778	-	595	565	-	-	-	-	-	-	-
Stage 2	531	558	-	746	769	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v11.84		19.37	5.02	0
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1084	-	-	654	386	1519	-
HCM Lane V/C Ratio	0.1	-	-	0.196	0.355	-	-
HCM Control Delay (s/veh)	7.8	0	-	11.8	19.4	0	-
HCM Lane LOS	A	A	-	B	C	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0.7	1.6	0	-

Intersection						
Int Delay, s/veh	40.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	59	373	1314	82	53	154
Future Vol, veh/h	59	373	1314	82	53	154
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	60	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	67	424	1493	93	60	175

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1586	0	0 1886 793
Stage 1	-	-	- 1540 -
Stage 2	-	-	- 346 -
Critical Hdwy	4.14	-	- 6.84 6.94
Critical Hdwy Stg 1	-	-	- 5.84 -
Critical Hdwy Stg 2	-	-	- 5.84 -
Follow-up Hdwy	2.22	-	- 3.52 3.32
Pot Cap-1 Maneuver	410	-	- 62 331
Stage 1	-	-	- 163 -
Stage 2	-	-	- 688 -
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	410	-	- ~ 52 331
Mov Cap-2 Maneuver	-	-	- ~ 52 -
Stage 1	-	-	- 136 -
Stage 2	-	-	- 688 -

Approach	EB	WB	SB
HCM Control Delay, s/v	2.11	0	\$ 392.81
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	410	-	-	-	140
HCM Lane V/C Ratio	0.163	-	-	-	1.685
HCM Control Delay (s/veh)	15.5	-	-	-	\$ 392.8
HCM Lane LOS	C	-	-	-	F
HCM 95th %tile Q(veh)	0.6	-	-	-	17.1

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

Timings

East Highland Ranch (JN 15974)

1: Greenspot Rd. & Boulder Av.

12/23/2024

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT
Lane Configurations											
Traffic Volume (vph)	114	906	274	353	846	142	143	357	8	296	273
Future Volume (vph)	114	906	274	353	846	142	143	357	8	296	273
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA
Protected Phases	7	4		3	8		1	6		5	2
Permitted Phases			4			8			6		
Detector Phase	7	4	4	3	8	8	1	6	6	5	2
Switch Phase											
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0
Minimum Split (s)	9.6	22.8	22.8	14.6	22.8	22.8	9.6	23.2	23.2	9.6	23.2
Total Split (s)	15.3	39.0	39.0	36.0	59.7	59.7	18.0	25.0	25.0	20.0	27.0
Total Split (%)	12.8%	32.5%	32.5%	30.0%	49.8%	49.8%	15.0%	20.8%	20.8%	16.7%	22.5%
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	4.8	3.6	5.2	5.2	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	4.6	5.8	5.8	4.6	5.8	5.8	4.6	6.2	6.2	4.6	6.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min
Act Effct Green (s)	9.3	33.2	33.2	31.4	55.3	55.3	13.4	18.2	18.2	15.4	20.2
Actuated g/C Ratio	0.08	0.28	0.28	0.26	0.46	0.46	0.11	0.15	0.15	0.13	0.17
v/c Ratio	0.61	1.03	0.51	1.00	0.58	0.21	0.95	0.74	0.02	0.96	0.93
Control Delay (s/veh)	65.1	78.3	9.8	89.3	25.5	7.8	110.2	57.2	0.1	90.0	53.0
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)	65.1	78.3	9.8	89.3	25.5	7.8	110.2	57.2	0.1	90.0	53.0
LOS	E	E	A	F	C	A	F	E	A	F	D
Approach Delay (s/veh)		62.6			40.4			71.2			65.3
Approach LOS		E			D			E			E

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 119.4

Natural Cycle: 120

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.03

Intersection Signal Delay (s/veh): 56.9

Intersection LOS: E

Intersection Capacity Utilization 89.7%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 1: Greenspot Rd. & Boulder Av.

 Ø1	 Ø2	 Ø3	 Ø4
18 s	27 s	36 s	39 s
 Ø5	 Ø6	 Ø7	 Ø8
20 s	25 s	15.3 s	59.7 s

HCM 7th Signalized Intersection Summary

East Highland Ranch (JN 15974)

1: Greenspot Rd. & Boulder Av.

12/23/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	114	906	274	353	846	142	143	357	8	296	273	324
Future Volume (veh/h)	114	906	274	353	846	142	143	357	8	296	273	324
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1673	1870	1870	1772	1870	1870	1772	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	134	1066	286	415	995	145	168	420	0	348	321	190
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	179	1045	437	419	1797	752	179	556		367	368	213
Arrive On Green	0.06	0.28	0.28	0.26	0.48	0.48	0.11	0.15	0.00	0.13	0.17	0.17
Sat Flow, veh/h	2837	3741	1565	1586	3741	1565	1586	3741	1585	2837	2224	1285
Grp Volume(v), veh/h	134	1066	286	415	995	145	168	420	0	348	269	242
Grp Sat Flow(s),veh/h/ln	1418	1870	1565	1586	1870	1565	1586	1870	1585	1418	1870	1639
Q Serve(g_s), s	5.5	33.2	19.2	31.0	22.4	6.3	12.5	12.8	0.0	14.5	16.6	17.2
Cycle Q Clear(g_c), s	5.5	33.2	19.2	31.0	22.4	6.3	12.5	12.8	0.0	14.5	16.6	17.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.78
Lane Grp Cap(c), veh/h	179	1045	437	419	1797	752	179	556		367	310	271
V/C Ratio(X)	0.75	1.02	0.65	0.99	0.55	0.19	0.94	0.75		0.95	0.87	0.89
Avail Cap(c_a), veh/h	255	1045	437	419	1797	752	179	592		367	327	287
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.8	42.8	37.8	43.6	21.9	17.7	52.3	48.5	0.0	51.3	48.3	48.6
Incr Delay (d2), s/veh	3.7	33.1	3.5	41.3	0.4	0.1	49.4	5.2	0.0	33.1	20.4	26.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	19.5	7.4	16.3	9.2	2.2	7.2	6.2	0.0	6.7	9.3	8.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	58.5	75.9	41.3	84.9	22.2	17.8	101.7	53.7	0.0	84.4	68.8	75.4
LnGrp LOS	E	F	D	F	C	B	F	D		F	E	E
Approach Vol, veh/h	1486			1555			588			859		
Approach Delay, s/veh	67.7			38.5			67.4			77.0		
Approach LOS	E			D			E			E		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	18.0	25.9	36.0	39.0	20.0	23.9	12.1	62.9				
Change Period (Y+Rc), s	4.6	6.2	4.6	5.8	4.6	6.2	4.6	5.8				
Max Green Setting (Gmax), s	13.4	20.8	31.4	33.2	15.4	18.8	10.7	53.9				
Max Q Clear Time (g_c+I1), s	14.5	19.2	33.0	35.2	16.5	14.8	7.5	24.4				
Green Ext Time (p_c), s	0.0	0.5	0.0	0.0	0.0	0.9	0.1	7.7				

Intersection Summary

HCM 7th Control Delay, s/veh 59.3

HCM 7th LOS E

Notes

Unsignalized Delay for [SER] is excluded from calculations of the approach delay and intersection delay.

Timings

East Highland Ranch (JN 15974)

2: Greenspot Rd. & Church St.

12/23/2024

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	 	 		 		 	 	 
Traffic Volume (vph)	279	895	6	762	27	11	60	4
Future Volume (vph)	279	895	6	762	27	11	60	4
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA
Protected Phases	7	4	3	8		2		6
Permitted Phases					2		6	
Detector Phase	7	4	3	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	10.0	5.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.6	27.8	9.6	27.8	21.6	21.6	21.6	21.6
Total Split (s)	24.0	55.0	10.0	41.0	25.0	25.0	25.0	25.0
Total Split (%)	26.7%	61.1%	11.1%	45.6%	27.8%	27.8%	27.8%	27.8%
Yellow Time (s)	3.6	4.8	3.6	4.8	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	5.8	4.6	4.6	4.6	4.6
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	Min	Min	Min	Min
Act Effct Green (s)	11.8	37.7	5.3	22.6	11.5	11.5	11.5	11.5
Actuated g/C Ratio	0.19	0.61	0.09	0.37	0.19	0.19	0.19	0.19
v/c Ratio	0.59	0.46	0.05	0.68	0.18	0.04	0.29	0.37
Control Delay (s/veh)	28.8	7.7	33.2	19.4	27.9	24.9	28.6	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	28.8	7.7	33.2	19.4	27.9	24.9	28.6	5.3
LOS	C	A	C	B	C	C	C	A
Approach Delay (s/veh)		12.6		19.5		27.0		9.5
Approach LOS		B		B		C		A

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 61.5

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay (s/veh): 14.8

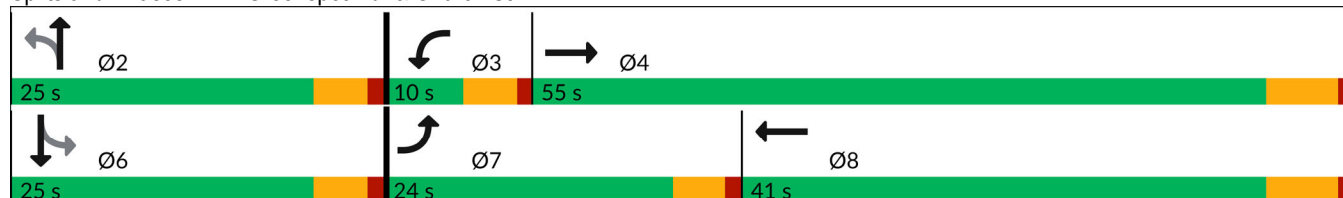
Intersection LOS: B

Intersection Capacity Utilization 65.3%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 2: Greenspot Rd. & Church St.



HCM 7th Signalized Intersection Summary

2: Greenspot Rd. & Church St.

East Highland Ranch (JN 15974)

12/23/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	279	895	20	6	762	50	27	11	0	60	4	271
Future Volume (veh/h)	279	895	20	6	762	50	27	11	0	60	4	271
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		1.00	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1673	1870	1870	1772	1870	1870	1772	1870	1870	1772	1870	1870
Adj Flow Rate, veh/h	317	1017	21	7	866	55	31	12	0	68	5	196
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	433	1834	38	16	1249	79	231	370	0	392	370	309
Arrive On Green	0.15	0.50	0.50	0.01	0.36	0.36	0.20	0.20	0.00	0.20	0.20	0.20
Sat Flow, veh/h	2837	3651	75	1688	3476	221	1110	1870	0	1310	1870	1564
Grp Volume(v), veh/h	317	521	517	7	466	455	31	12	0	68	5	196
Grp Sat Flow(s),veh/h/ln	1418	1870	1856	1688	1870	1827	1110	1870	0	1310	1870	1564
Q Serve(g_s), s	5.5	9.9	9.9	0.2	11.0	11.0	1.4	0.3	0.0	2.3	0.1	5.9
Cycle Q Clear(g_c), s	5.5	9.9	9.9	0.2	11.0	11.0	7.3	0.3	0.0	2.5	0.1	5.9
Prop In Lane	1.00		0.04	1.00		0.12	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	433	940	932	16	672	656	231	370	0	392	370	309
V/C Ratio(X)	0.73	0.55	0.55	0.45	0.69	0.69	0.13	0.03	0.00	0.17	0.01	0.63
Avail Cap(c_a), veh/h	1066	1783	1769	177	1276	1246	451	739	0	651	739	618
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.9	8.9	8.9	25.4	14.1	14.1	22.3	16.7	0.0	17.7	16.7	19.0
Incr Delay (d2), s/veh	0.9	0.5	0.5	7.3	1.3	1.3	0.3	0.0	0.0	0.2	0.0	2.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	2.7	2.7	0.1	3.7	3.6	0.4	0.1	0.0	0.6	0.0	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	21.8	9.4	9.4	32.7	15.4	15.4	22.6	16.8	0.0	18.0	16.7	21.1
LnGrp LOS	C	A	A	C	B	B	C	B		B	B	C
Approach Vol, veh/h	1355			928			43			269		
Approach Delay, s/veh	12.3			15.6			21.0			20.3		
Approach LOS	B			B			C			C		
Timer - Assigned Phs	2		3	4		6	7	8				
Phs Duration (G+Y+Rc), s	14.8		5.1	31.7		14.8	12.5	24.3				
Change Period (Y+Rc), s	4.6		4.6	5.8		4.6	4.6	5.8				
Max Green Setting (Gmax), s	20.4		5.4	49.2		20.4	19.4	35.2				
Max Q Clear Time (g_c+I1), s	9.3		2.2	11.9		7.9	7.5	13.0				
Green Ext Time (p_c), s	0.1		0.0	7.2		1.1	0.5	5.5				
Intersection Summary												
HCM 7th Control Delay, s/veh	14.4											
HCM 7th LOS	B											

Timings

East Highland Ranch (JN 15974)

3: Greenspot Rd. & Weaver St.

12/23/2024



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	172	875	615	166	225
Future Volume (vph)	172	875	615	166	225
Turn Type	Perm	NA	NA	Prot	Perm
Protected Phases		4	8	1	
Permitted Phases	4				6
Detector Phase	4	4	8	1	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	22.8	22.8	22.8	9.6	22.4
Total Split (s)	62.0	62.0	62.0	28.0	28.0
Total Split (%)	68.9%	68.9%	68.9%	31.1%	31.1%
Yellow Time (s)	4.8	4.8	4.8	3.6	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	4.6	5.4
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	Min
Act Effect Green (s)	24.4	24.4	24.4	11.7	12.2
Actuated g/C Ratio	0.50	0.50	0.50	0.24	0.25
v/c Ratio	0.61	0.52	0.41	0.48	0.43
Control Delay (s/veh)	17.8	8.6	7.4	23.4	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	17.8	8.6	7.4	23.4	6.2
LOS	B	A	A	C	A
Approach Delay (s/veh)		10.1	7.4	13.5	
Approach LOS		B	A	B	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 48.7

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.61

Intersection Signal Delay (s/veh): 9.9

Intersection LOS: A

Intersection Capacity Utilization 52.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: Greenspot Rd. & Weaver St.

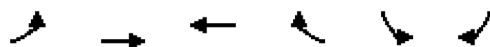


HCM 7th Signalized Intersection Summary

3: Greenspot Rd. & Weaver St.

East Highland Ranch (JN 15974)

12/23/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	172	875	615	74	166	225
Future Volume (veh/h)	172	875	615	74	166	225
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1772	1870	1870	1870	1772	1870
Adj Flow Rate, veh/h	189	962	676	81	182	247
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	463	2158	1890	226	320	320
Arrive On Green	0.58	0.58	0.58	0.58	0.20	0.20
Sat Flow, veh/h	665	3741	3277	392	1586	1585
Grp Volume(v), veh/h	189	962	385	372	182	247
Grp Sat Flow(s), veh/h/ln	665	1870	1870	1799	1586	1585
Q Serve(g_s), s	10.0	6.9	5.2	5.2	4.9	6.9
Cycle Q Clear(g_c), s	15.1	6.9	5.2	5.2	4.9	6.9
Prop In Lane	1.00			0.22	1.00	1.00
Lane Grp Cap(c), veh/h	463	2158	1079	1038	320	320
V/C Ratio(X)	0.41	0.45	0.36	0.36	0.57	0.77
Avail Cap(c_a), veh/h	875	4473	2236	2152	790	789
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.3	5.7	5.3	5.3	16.9	17.7
Incr Delay (d2), s/veh	0.6	0.1	0.2	0.2	0.6	1.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	1.3	1.0	1.0	1.5	2.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	9.9	5.8	5.5	5.5	17.5	19.2
LnGrp LOS	A	A	A	A	B	B
Approach Vol, veh/h		1151	757		429	
Approach Delay, s/veh		6.5	5.5		18.5	
Approach LOS		A	A		B	
Timer - Assigned Phs				4	6	8
Phs Duration (G+Y+Rc), s				32.9	14.1	32.9
Change Period (Y+Rc), s				5.8	4.6	5.8
Max Green Setting (Gmax), s				56.2	23.4	56.2
Max Q Clear Time (g_c+I1), s				17.1	8.9	7.2
Green Ext Time (p_c), s				10.0	0.6	4.8
Intersection Summary						
HCM 7th Control Delay, s/veh			8.4			
HCM 7th LOS			A			

Intersection												
Int Delay, s/veh	4.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	8	15	50	28	4	1	43	41	43	0	57	5
Future Vol, veh/h	8	15	50	28	4	1	43	41	43	0	57	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	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	19	63	35	5	1	54	51	54	0	71	6

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	236	287	74	266	263	78	78	0	0	105	0	0
Stage 1	74	74	-	186	186	-	-	-	-	-	-	-
Stage 2	161	213	-	81	78	-	-	-	-	-	-	-
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	719	623	987	686	642	983	1521	-	-	1486	-	-
Stage 1	935	833	-	816	746	-	-	-	-	-	-	-
Stage 2	841	727	-	928	830	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	685	599	987	600	618	983	1521	-	-	1486	-	-
Mov Cap-2 Maneuver	685	599	-	600	618	-	-	-	-	-	-	-
Stage 1	935	833	-	785	718	-	-	-	-	-	-	-
Stage 2	802	699	-	850	830	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	9.83	11.34	2.52	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	553	-	-	836	609	1486	-
HCM Lane V/C Ratio	0.035	-	-	0.109	0.068	-	-
HCM Control Delay (s/veh)	7.5	0	-	9.8	11.3	0	-
HCM Lane LOS	A	A	-	A	B	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.2	0	-

Intersection						
Int Delay, s/veh	2.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	103	907	669	13	26	91
Future Vol, veh/h	103	907	669	13	26	91
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	60	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	116	1019	752	15	29	102

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	766	0	0 1500 383
Stage 1	-	-	- - 759 -
Stage 2	-	-	- - 741 -
Critical Hdwy	4.14	-	- - 6.84 6.94
Critical Hdwy Stg 1	-	-	- - 5.84 -
Critical Hdwy Stg 2	-	-	- - 5.84 -
Follow-up Hdwy	2.22	-	- - 3.52 3.32
Pot Cap-1 Maneuver	843	-	- - 113 615
Stage 1	-	-	- - 423 -
Stage 2	-	-	- - 432 -
Platoon blocked, %		-	- -
Mov Cap-1 Maneuver	843	-	- - 97 615
Mov Cap-2 Maneuver	-	-	- - 97 -
Stage 1	-	-	- - 365 -
Stage 2	-	-	- - 432 -

Approach	EB	WB	SB
HCM Control Delay, s/v	1.01	0	28.47
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	843	-	-	-	282
HCM Lane V/C Ratio	0.137	-	-	-	0.467
HCM Control Delay (s/veh)	9.9	-	-	-	28.5
HCM Lane LOS	A	-	-	-	D
HCM 95th %tile Q(veh)	0.5	-	-	-	2.3

Timings

East Highland Ranch (JN 15974)

1: Greenspot Rd. & Boulder Av.

12/23/2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	
Lane Configurations												
Traffic Volume (vph)	116	1174	348	352	725	105	143	410	9	331	345	
Future Volume (vph)	116	1174	348	352	725	105	143	410	9	331	345	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4			8			6			
Detector Phase	7	4	4	3	8	8	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	
Minimum Split (s)	9.6	22.8	22.8	14.6	22.8	22.8	9.6	23.2	23.2	9.6	23.2	
Total Split (s)	14.8	44.0	44.0	32.0	61.2	61.2	16.2	24.6	24.6	19.4	27.8	
Total Split (%)	12.3%	36.7%	36.7%	26.7%	51.0%	51.0%	13.5%	20.5%	20.5%	16.2%	23.2%	
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	4.8	3.6	5.2	5.2	3.6	5.2	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
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)	4.6	5.8	5.8	4.6	5.8	5.8	4.6	6.2	6.2	4.6	6.2	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	
Act Effct Green (s)	8.9	38.2	38.2	27.4	56.7	56.7	11.6	18.4	18.4	14.8	21.6	
Actuated g/C Ratio	0.07	0.32	0.32	0.23	0.47	0.47	0.10	0.15	0.15	0.12	0.18	
v/c Ratio	0.58	1.02	0.52	1.01	0.42	0.14	0.97	0.74	0.02	0.98	0.95	
Control Delay (s/veh)	64.8	72.2	10.2	96.7	22.0	3.5	119.3	57.3	0.1	96.9	58.1	
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)	64.8	72.2	10.2	96.7	22.0	3.5	119.3	57.3	0.1	96.9	58.1	
LOS	E	E	B	F	C	A	F	E	A	F	E	
Approach Delay (s/veh)		58.5			42.6			72.1			70.3	
Approach LOS		E			D			E			E	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Natural Cycle: 120

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.02

Intersection Signal Delay (s/veh): 58.8

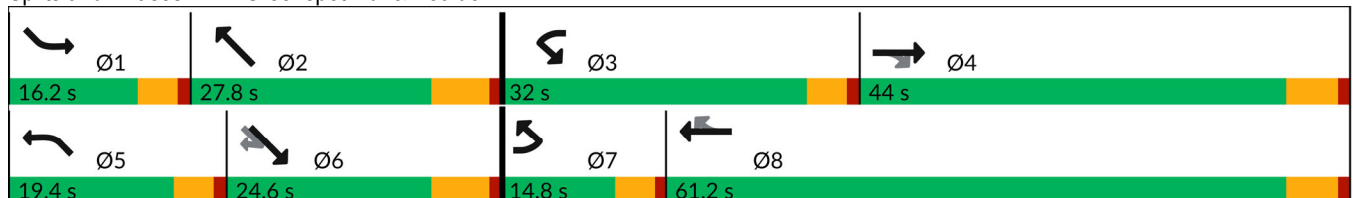
Intersection LOS: E

Intersection Capacity Utilization 100.7%

ICU Level of Service G

Analysis Period (min) 15

Splits and Phases: 1: Greenspot Rd. & Boulder Av.



HCM 7th Signalized Intersection Summary

East Highland Ranch (JN 15974)

12/23/2024

1: Greenspot Rd. & Boulder Av.

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	116	1174	348	352	725	105	143	410	9	331	345	376
Future Volume (veh/h)	116	1174	348	352	725	105	143	410	9	331	345	376
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1673	1870	1870	1772	1870	1870	1772	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	120	1210	313	363	747	88	147	423	0	341	356	194
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	164	1198	501	364	1842	771	154	554		352	401	215
Arrive On Green	0.06	0.32	0.32	0.23	0.49	0.49	0.10	0.15	0.00	0.12	0.17	0.17
Sat Flow, veh/h	2837	3741	1565	1586	3741	1565	1586	3741	1585	2837	2293	1227
Grp Volume(v), veh/h	120	1210	313	363	747	88	147	423	0	341	289	261
Grp Sat Flow(s),veh/h/ln	1418	1870	1565	1586	1870	1565	1586	1870	1585	1418	1870	1650
Q Serve(g_s), s	5.0	38.2	20.3	27.3	15.1	3.6	11.0	13.0	0.0	14.3	18.0	18.5
Cycle Q Clear(g_c), s	5.0	38.2	20.3	27.3	15.1	3.6	11.0	13.0	0.0	14.3	18.0	18.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.74
Lane Grp Cap(c), veh/h	164	1198	501	364	1842	771	154	554		352	327	288
V/C Ratio(X)	0.73	1.01	0.62	1.00	0.41	0.11	0.95	0.76		0.97	0.88	0.90
Avail Cap(c_a), veh/h	243	1198	501	364	1842	771	154	577		352	339	299
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.3	40.5	34.4	45.9	19.2	16.3	53.6	48.8	0.0	52.0	48.0	48.2
Incr Delay (d2), s/veh	2.4	28.4	2.4	46.0	0.1	0.1	57.8	5.8	0.0	39.3	22.6	28.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	21.4	7.7	14.9	6.1	1.2	6.7	6.3	0.0	6.9	10.2	9.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	57.7	69.0	36.9	91.9	19.3	16.3	111.3	54.6	0.0	91.3	70.6	76.6
LnGrp LOS	E	F	D	F	B	B	F	D		F	E	E
Approach Vol, veh/h	1643			1198			570			891		
Approach Delay, s/veh	62.0			41.1			69.2			80.3		
Approach LOS	E			D			E			F		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.2	27.1	32.0	44.0	19.4	23.9	11.5	64.5				
Change Period (Y+Rc), s	4.6	6.2	4.6	5.8	4.6	6.2	4.6	5.8				
Max Green Setting (Gmax), s	11.6	21.6	27.4	38.2	14.8	18.4	10.2	55.4				
Max Q Clear Time (g_c+I1), s	13.0	20.5	29.3	40.2	16.3	15.0	7.0	17.1				
Green Ext Time (p_c), s	0.0	0.4	0.0	0.0	0.0	0.8	0.0	5.4				

Intersection Summary

HCM 7th Control Delay, s/veh 60.9

HCM 7th LOS E

Notes

Unsignalized Delay for [SER] is excluded from calculations of the approach delay and intersection delay.

Timings

East Highland Ranch (JN 15974)

2: Greenspot Rd. & Church St.

12/23/2024

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	 	 		 		 		 
Traffic Volume (vph)	295	1235	4	696	30	5	57	13
Future Volume (vph)	295	1235	4	696	30	5	57	13
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA
Protected Phases	7	4	3	8		2		6
Permitted Phases					2		6	
Detector Phase	7	4	3	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	10.0	5.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.6	27.8	9.6	27.8	21.6	21.6	21.6	21.6
Total Split (s)	24.0	55.0	10.0	41.0	25.0	25.0	25.0	25.0
Total Split (%)	26.7%	61.1%	11.1%	45.6%	27.8%	27.8%	27.8%	27.8%
Yellow Time (s)	3.6	4.8	3.6	4.8	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	5.8	4.6	4.6	4.6	4.6
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	Min	Min	Min	Min
Act Effct Green (s)	11.3	34.4	5.3	19.8	11.4	11.4	11.4	11.4
Actuated g/C Ratio	0.19	0.59	0.09	0.34	0.20	0.20	0.20	0.20
v/c Ratio	0.57	0.60	0.03	0.63	0.16	0.02	0.24	0.31
Control Delay (s/veh)	27.1	9.4	31.5	18.6	25.6	21.0	26.1	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	27.1	9.4	31.5	18.6	25.6	21.0	26.1	5.9
LOS	C	A	C	B	C	C	C	A
Approach Delay (s/veh)		12.8		18.6		24.8		9.8
Approach LOS		B		B		C		A

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 58.1

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.63

Intersection Signal Delay (s/veh): 14.3

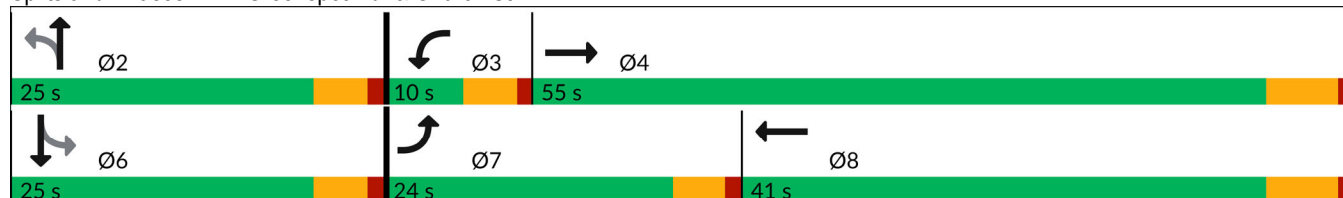
Intersection LOS: B

Intersection Capacity Utilization 72.6%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 2: Greenspot Rd. & Church St.



HCM 7th Signalized Intersection Summary

2: Greenspot Rd. & Church St.

East Highland Ranch (JN 15974)

12/23/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	295	1235	19	4	696	62	30	5	2	57	13	228
Future Volume (veh/h)	295	1235	19	4	696	62	30	5	2	57	13	228
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1673	1870	1870	1772	1870	1870	1772	1870	1870	1772	1870	1870
Adj Flow Rate, veh/h	311	1300	18	4	733	63	32	5	2	60	14	136
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	426	1860	26	9	1223	105	281	251	100	396	370	310
Arrive On Green	0.15	0.51	0.51	0.01	0.36	0.36	0.20	0.20	0.20	0.20	0.20	0.20
Sat Flow, veh/h	2837	3680	51	1688	3392	291	1163	1268	507	1316	1870	1564
Grp Volume(v), veh/h	311	661	657	4	404	392	32	0	7	60	14	136
Grp Sat Flow(s),veh/h/ln	1418	1870	1860	1688	1870	1813	1163	0	1775	1316	1870	1564
Q Serve(g_s), s	5.4	13.9	13.9	0.1	9.1	9.1	1.3	0.0	0.2	2.0	0.3	3.9
Cycle Q Clear(g_c), s	5.4	13.9	13.9	0.1	9.1	9.1	5.2	0.0	0.2	2.1	0.3	3.9
Prop In Lane	1.00		0.03	1.00		0.16	1.00		0.29	1.00		1.00
Lane Grp Cap(c), veh/h	426	945	940	9	674	653	281	0	352	396	370	310
V/C Ratio(X)	0.73	0.70	0.70	0.44	0.60	0.60	0.11	0.00	0.02	0.15	0.04	0.44
Avail Cap(c_a), veh/h	1068	1786	1777	177	1278	1239	512	0	703	657	741	619
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.9	9.7	9.7	25.5	13.4	13.4	20.4	0.0	16.6	17.5	16.7	18.1
Incr Delay (d2), s/veh	0.9	0.9	1.0	11.8	0.9	0.9	0.2	0.0	0.0	0.2	0.0	1.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	3.8	3.8	0.1	3.0	2.9	0.3	0.0	0.1	0.6	0.1	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	21.8	10.7	10.7	37.4	14.3	14.3	20.6	0.0	16.7	17.7	16.7	19.1
LnGrp LOS	C	B	B	D	B	B	C		B	B	B	B
Approach Vol, veh/h	1629			800			39			210		
Approach Delay, s/veh	12.8			14.4			19.9			18.5		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	2			3			4			6		
Phs Duration (G+Y+Rc), s	14.8			4.9			31.8			14.8		
Change Period (Y+Rc), s	4.6			4.6			5.8			4.6		
Max Green Setting (Gmax), s	20.4			5.4			49.2			20.4		
Max Q Clear Time (g_c+I1), s	7.2			2.1			15.9			5.9		
Green Ext Time (p_c), s	0.1			0.0			10.1			0.9		
Intersection Summary												
HCM 7th Control Delay, s/veh				13.8								
HCM 7th LOS				B								

Timings

East Highland Ranch (JN 15974)

3: Greenspot Rd. & Weaver St.

12/23/2024



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	264	1100	578	250	176
Future Volume (vph)	264	1100	578	250	176
Turn Type	Perm	NA	NA	Prot	Perm
Protected Phases		4	8	1	
Permitted Phases	4				6
Detector Phase	4	4	8	1	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	22.8	22.8	22.8	9.6	22.4
Total Split (s)	62.0	62.0	62.0	28.0	28.0
Total Split (%)	68.9%	68.9%	68.9%	31.1%	31.1%
Yellow Time (s)	4.8	4.8	4.8	3.6	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	4.6	5.4
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	Min
Act Effect Green (s)	37.0	37.0	37.0	16.6	15.7
Actuated g/C Ratio	0.57	0.57	0.57	0.25	0.24
v/c Ratio	0.76	0.55	0.34	0.66	0.36
Control Delay (s/veh)	25.9	9.5	7.1	34.3	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	25.9	9.5	7.1	34.3	6.8
LOS	C	A	A	C	A
Approach Delay (s/veh)		12.6	7.1	22.9	
Approach LOS		B	A	C	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 65.3

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay (s/veh): 12.9

Intersection LOS: B

Intersection Capacity Utilization 62.4%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3: Greenspot Rd. & Weaver St.

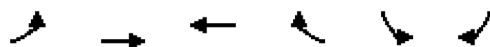


HCM 7th Signalized Intersection Summary

3: Greenspot Rd. & Weaver St.

East Highland Ranch (JN 15974)

12/23/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	264	1100	578	89	250	176
Future Volume (veh/h)	264	1100	578	89	250	176
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1772	1870	1870	1870	1772	1870
Adj Flow Rate, veh/h	278	1158	608	94	263	185
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	496	2351	1989	307	319	319
Arrive On Green	0.63	0.63	0.63	0.63	0.20	0.20
Sat Flow, veh/h	700	3741	3164	488	1586	1585
Grp Volume(v), veh/h	278	1158	359	343	263	185
Grp Sat Flow(s), veh/h/ln	700	1870	1870	1782	1586	1585
Q Serve(g_s), s	18.5	10.2	5.4	5.4	9.7	6.4
Cycle Q Clear(g_c), s	23.9	10.2	5.4	5.4	9.7	6.4
Prop In Lane	1.00			0.27	1.00	1.00
Lane Grp Cap(c), veh/h	496	2351	1176	1120	319	319
V/C Ratio(X)	0.56	0.49	0.31	0.31	0.83	0.58
Avail Cap(c_a), veh/h	701	3446	1723	1642	608	608
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.7	6.1	5.2	5.2	23.3	22.0
Incr Delay (d2), s/veh	1.0	0.2	0.1	0.2	2.1	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	2.3	1.3	1.2	3.4	2.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	11.7	6.3	5.4	5.4	25.4	22.7
LnGrp LOS	B	A	A	A	C	C
Approach Vol, veh/h		1436	702		448	
Approach Delay, s/veh		7.3	5.4		24.3	
Approach LOS		A	A		C	
Timer - Assigned Phs				4	6	8
Phs Duration (G+Y+Rc), s				44.1	16.9	44.1
Change Period (Y+Rc), s				5.8	4.6	5.8
Max Green Setting (Gmax), s				56.2	23.4	56.2
Max Q Clear Time (g_c+I1), s				25.9	11.7	7.4
Green Ext Time (p_c), s				12.5	0.6	4.4
Intersection Summary						
HCM 7th Control Delay, s/veh			9.7			
HCM 7th LOS			A			

Intersection												
Int Delay, s/veh	4.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	13	20	26	42	6	0	27	53	58	2	53	5
Future Vol, veh/h	13	20	26	42	6	0	27	53	58	2	53	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	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	25	33	53	8	0	34	66	73	3	66	6

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	212	281	69	254	248	103	73	0	0	139	0	0
Stage 1	74	74	-	170	170	-	-	-	-	-	-	-
Stage 2	138	206	-	84	78	-	-	-	-	-	-	-
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	745	628	994	699	655	953	1527	-	-	1445	-	-
Stage 1	935	833	-	832	758	-	-	-	-	-	-	-
Stage 2	866	731	-	924	830	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	717	612	994	633	638	953	1527	-	-	1445	-	-
Mov Cap-2 Maneuver	717	612	-	633	638	-	-	-	-	-	-	-
Stage 1	933	832	-	812	740	-	-	-	-	-	-	-
Stage 2	836	713	-	866	829	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s/v	10.2		11.28		1.45		0.25	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	319	-	-	766	633	59	-
HCM Lane V/C Ratio	0.022	-	-	0.096	0.095	0.002	-
HCM Control Delay (s/veh)	7.4	0	-	10.2	11.3	7.5	0
HCM Lane LOS	A	A	-	B	B	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.3	0.3	0	-

Intersection						
Int Delay, s/veh	1.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	119	1308	570	15	22	91
Future Vol, veh/h	119	1308	570	15	22	91
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	60	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	125	1377	600	16	23	96

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	616	0	0 1547 308
Stage 1	-	-	- 608 -
Stage 2	-	-	- 939 -
Critical Hdwy	4.14	-	- 6.84 6.94
Critical Hdwy Stg 1	-	-	- 5.84 -
Critical Hdwy Stg 2	-	-	- 5.84 -
Follow-up Hdwy	2.22	-	- 3.52 3.32
Pot Cap-1 Maneuver	960	-	- 105 688
Stage 1	-	-	- 506 -
Stage 2	-	-	- 341 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	960	-	- 91 688
Mov Cap-2 Maneuver	-	-	- 91 -
Stage 1	-	-	- 440 -
Stage 2	-	-	- 341 -

Approach	EB	WB	SB
HCM Control Delay, s/v	0.78	0	24.38
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	960	-	-	-	303
HCM Lane V/C Ratio	0.13	-	-	-	0.393
HCM Control Delay (s/veh)	9.3	-	-	-	24.4
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.4	-	-	-	1.8

APPENDIX 6.2: CUMULATIVE (2050) WITH PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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Timings

East Highland Ranch (JN 15974)

1: Greenspot Rd. & Boulder Av.

12/23/2024

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT
Lane Configurations											
Traffic Volume (vph)	54	536	162	527	1291	135	86	426	2	257	262
Future Volume (vph)	54	536	162	527	1291	135	86	426	2	257	262
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA
Protected Phases	7	4		3	8		1	6		5	2
Permitted Phases			4			8			6		
Detector Phase	7	4	4	3	8	8	1	6	6	5	2
Switch Phase											
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0
Minimum Split (s)	9.6	22.8	22.8	14.6	22.8	22.8	9.6	23.2	23.2	9.6	23.2
Total Split (s)	10.8	26.0	26.0	51.0	66.2	66.2	14.0	25.0	25.0	18.0	29.0
Total Split (%)	9.0%	21.7%	21.7%	42.5%	55.2%	55.2%	11.7%	20.8%	20.8%	15.0%	24.2%
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	4.8	3.6	5.2	5.2	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	4.6	5.8	5.8	4.6	5.8	5.8	4.6	6.2	6.2	4.6	6.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min
Act Effct Green (s)	5.9	19.4	19.4	41.5	57.4	57.4	8.8	17.1	17.1	12.8	21.1
Actuated g/C Ratio	0.05	0.17	0.17	0.37	0.51	0.51	0.08	0.15	0.15	0.11	0.19
v/c Ratio	0.38	0.86	0.41	0.93	0.70	0.16	0.72	0.77	0.01	0.83	0.77
Control Delay (s/veh)	62.3	60.6	9.9	59.0	24.1	4.9	84.6	56.9	0.0	71.4	32.9
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)	62.3	60.6	9.9	59.0	24.1	4.9	84.6	56.9	0.0	71.4	32.9
LOS	E	E	A	E	C	A	F	E	A	E	C
Approach Delay (s/veh)		49.8			32.2			61.4			43.9
Approach LOS		D			C			E			D

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 112.3

Natural Cycle: 100

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay (s/veh): 41.6

Intersection LOS: D

Intersection Capacity Utilization 87.7%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 1: Greenspot Rd. & Boulder Av.



HCM 7th Signalized Intersection Summary

East Highland Ranch (JN 15974)

12/23/2024

1: Greenspot Rd. & Boulder Av.

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	54	536	162	527	1291	135	86	426	2	257	262	377
Future Volume (veh/h)	54	536	162	527	1291	135	86	426	2	257	262	377
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1673	1870	1870	1772	1870	1870	1772	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	56	553	135	543	1331	119	89	439	0	265	270	236
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	111	657	275	570	1855	776	110	543		318	353	297
Arrive On Green	0.04	0.18	0.18	0.36	0.50	0.50	0.07	0.15	0.00	0.11	0.19	0.19
Sat Flow, veh/h	2837	3741	1564	1586	3741	1565	1586	3741	1585	2837	1875	1581
Grp Volume(v), veh/h	56	553	135	543	1331	119	89	439	0	265	269	237
Grp Sat Flow(s),veh/h/ln	1418	1870	1564	1586	1870	1565	1586	1870	1585	1418	1870	1586
Q Serve(g_s), s	2.0	14.6	7.9	34.0	28.4	4.2	5.6	11.6	0.0	9.3	13.9	14.5
Cycle Q Clear(g_c), s	2.0	14.6	7.9	34.0	28.4	4.2	5.6	11.6	0.0	9.3	13.9	14.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	111	657	275	570	1855	776	110	543		318	352	298
V/C Ratio(X)	0.51	0.84	0.49	0.95	0.72	0.15	0.81	0.81		0.83	0.77	0.79
Avail Cap(c_a), veh/h	172	741	310	722	2215	927	146	689		373	418	354
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.0	40.7	37.9	31.8	20.1	14.0	46.8	42.2	0.0	44.3	39.3	39.5
Incr Delay (d2), s/veh	1.3	7.9	1.4	18.5	0.9	0.1	16.7	5.7	0.0	11.5	6.9	10.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	7.1	3.0	14.8	11.1	1.4	2.6	5.5	0.0	3.7	6.8	6.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	49.4	48.6	39.3	50.3	21.0	14.1	63.5	47.9	0.0	55.8	46.2	49.5
LnGrp LOS	D	D	D	D	C	B	E	D		E	D	D
Approach Vol, veh/h	744			1993			528			771		
Approach Delay, s/veh	47.0			28.6			50.5			50.5		
Approach LOS	D			C			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.6	25.4	41.3	23.7	16.0	21.0	8.6	56.4				
Change Period (Y+Rc), s	4.6	6.2	4.6	5.8	4.6	6.2	4.6	5.8				
Max Green Setting (Gmax), s	9.4	22.8	46.4	20.2	13.4	18.8	6.2	60.4				
Max Q Clear Time (g_c+I1), s	7.6	16.5	36.0	16.6	11.3	13.6	4.0	30.4				
Green Ext Time (p_c), s	0.0	1.5	0.6	1.3	0.1	1.1	0.0	11.2				

Intersection Summary

HCM 7th Control Delay, s/veh	39.0
HCM 7th LOS	D

Notes

Unsignalized Delay for [SER] is excluded from calculations of the approach delay and intersection delay.

Timings

East Highland Ranch (JN 15974)

2: Greenspot Rd. & Church St.

12/23/2024

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	 	 		 		 		 
Traffic Volume (vph)	224	560	4	1287	23	15	57	7
Future Volume (vph)	224	560	4	1287	23	15	57	7
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA
Protected Phases	7	4	3	8		2		6
Permitted Phases					2		6	
Detector Phase	7	4	3	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	10.0	5.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.6	27.8	9.6	27.8	21.6	21.6	21.6	21.6
Total Split (s)	21.6	34.8	21.6	34.8	33.6	33.6	33.6	33.6
Total Split (%)	24.0%	38.7%	24.0%	38.7%	37.3%	37.3%	37.3%	37.3%
Yellow Time (s)	3.6	4.8	3.6	4.8	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	5.8	4.6	4.6	4.6	4.6
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	Min	Min	Min	Min
Act Effct Green (s)	10.4	42.4	5.1	29.2	11.6	11.6	11.6	11.6
Actuated g/C Ratio	0.16	0.64	0.08	0.44	0.18	0.18	0.18	0.18
v/c Ratio	0.59	0.28	0.04	1.03	0.18	0.05	0.31	0.40
Control Delay (s/veh)	31.9	6.6	31.8	52.9	27.0	23.7	28.5	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	31.9	6.6	31.8	52.9	27.0	23.7	28.5	5.3
LOS	C	A	C	D	C	C	C	A
Approach Delay (s/veh)		13.7		52.9		25.7		9.3
Approach LOS		B		D		C		A

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 66.2

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.03

Intersection Signal Delay (s/veh): 35.0

Intersection LOS: C

Intersection Capacity Utilization 80.3%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 2: Greenspot Rd. & Church St.

 Ø2	 Ø3	 Ø4
33.6 s	21.6 s	34.8 s
 Ø6	 Ø7	 Ø8
33.6 s	21.6 s	34.8 s

HCM 7th Signalized Intersection Summary 2: Greenspot Rd. & Church St.

East Highland Ranch (JN 15974)

12/23/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	224	560	15	4	1287	153	23	15	0	57	7	267
Future Volume (veh/h)	224	560	15	4	1287	153	23	15	0	57	7	267
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1673	1870	1870	1772	1870	1870	1772	1870	1870	1772	1870	1870
Adj Flow Rate, veh/h	260	651	15	5	1497	176	27	17	0	66	8	195
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	351	2103	48	11	1512	176	181	332	0	336	332	278
Arrive On Green	0.12	0.58	0.58	0.01	0.46	0.46	0.18	0.18	0.00	0.18	0.18	0.18
Sat Flow, veh/h	2837	3641	84	1688	3284	382	1108	1870	0	1304	1870	1564
Grp Volume(v), veh/h	260	334	332	5	845	828	27	17	0	66	8	195
Grp Sat Flow(s),veh/h/ln	1418	1870	1854	1688	1870	1795	1108	1870	0	1304	1870	1564
Q Serve(g_s), s	5.6	5.8	5.8	0.2	28.0	29.0	1.5	0.5	0.0	2.8	0.2	7.4
Cycle Q Clear(g_c), s	5.6	5.8	5.8	0.2	28.0	29.0	8.9	0.5	0.0	3.3	0.2	7.4
Prop In Lane	1.00		0.05	1.00		0.21	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	351	1081	1071	11	861	827	181	332	0	336	332	278
V/C Ratio(X)	0.74	0.31	0.31	0.45	0.98	1.00	0.15	0.05	0.00	0.20	0.02	0.70
Avail Cap(c_a), veh/h	766	1081	1071	456	861	827	495	861	0	705	861	720
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.6	6.8	6.8	31.2	16.7	17.0	28.5	21.5	0.0	22.9	21.4	24.3
Incr Delay (d2), s/veh	1.2	0.2	0.2	9.9	25.9	31.7	0.4	0.1	0.0	0.3	0.0	3.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	1.6	1.6	0.1	15.3	16.3	0.4	0.2	0.0	0.8	0.1	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	27.8	7.0	7.0	41.1	42.7	48.7	28.9	21.6	0.0	23.1	21.4	27.6
LnGrp LOS	C	A	A	D	D	F	C	C		C	C	C
Approach Vol, veh/h	926		1678				44		269			
Approach Delay, s/veh	12.8		45.7				26.1		26.3			
Approach LOS	B		D				C		C			
Timer - Assigned Phs	2		3		4		6		7		8	
Phs Duration (G+Y+Rc), s	15.8		5.0		42.2		15.8		12.4		34.8	
Change Period (Y+Rc), s	4.6		4.6		5.8		4.6		4.6		5.8	
Max Green Setting (Gmax), s	29.0		17.0		29.0		29.0		17.0		29.0	
Max Q Clear Time (g_c+I1), s	10.9		2.2		7.8		9.4		7.6		31.0	
Green Ext Time (p_c), s	0.1		0.0		3.6		1.4		0.3		0.0	
Intersection Summary												
HCM 7th Control Delay, s/veh			33.2									
HCM 7th LOS			C									

Timings

East Highland Ranch (JN 15974)

3: Greenspot Rd. & Weaver St.

12/23/2024



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations	↰	↑↑	↑↑	↰	↰
Traffic Volume (vph)	125	380	1188	86	265
Future Volume (vph)	125	380	1188	86	265
Turn Type	Perm	NA	NA	Prot	Perm
Protected Phases		4	8	1	
Permitted Phases	4				6
Detector Phase	4	4	8	1	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	22.8	22.8	22.8	9.6	22.4
Total Split (s)	67.0	67.0	67.0	23.0	23.0
Total Split (%)	74.4%	74.4%	74.4%	25.6%	25.6%
Yellow Time (s)	4.8	4.8	4.8	3.6	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	4.6	5.4
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	Min
Act Effect Green (s)	46.1	46.1	46.1	13.6	14.7
Actuated g/C Ratio	0.63	0.63	0.63	0.19	0.20
v/c Ratio	0.90	0.17	0.65	0.31	0.71
Control Delay (s/veh)	71.3	5.3	8.9	32.3	31.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	71.3	5.3	8.9	32.3	31.9
LOS	E	A	A	C	C
Approach Delay (s/veh)		21.6	8.9	32.0	
Approach LOS		C	A	C	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 73.2

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay (s/veh): 15.2

Intersection LOS: B

Intersection Capacity Utilization 67.5%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 3: Greenspot Rd. & Weaver St.

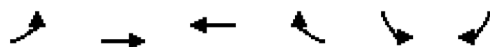


HCM 7th Signalized Intersection Summary

3: Greenspot Rd. & Weaver St.

East Highland Ranch (JN 15974)

12/23/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	125	380	1188	243	86	265
Future Volume (veh/h)	125	380	1188	243	86	265
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1772	1870	1870	1870	1772	1870
Adj Flow Rate, veh/h	130	396	1238	253	90	276
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	237	2508	2024	409	313	313
Arrive On Green	0.67	0.67	0.67	0.67	0.20	0.20
Sat Flow, veh/h	332	3741	3020	611	1586	1585
Grp Volume(v), veh/h	130	396	762	729	90	276
Grp Sat Flow(s), veh/h/ln	332	1870	1870	1760	1586	1585
Q Serve(g_s), s	28.5	3.1	17.8	18.3	3.8	13.3
Cycle Q Clear(g_c), s	46.9	3.1	17.8	18.3	3.8	13.3
Prop In Lane	1.00			0.35	1.00	1.00
Lane Grp Cap(c), veh/h	237	2508	1254	1180	313	313
V/C Ratio(X)	0.55	0.16	0.61	0.62	0.29	0.88
Avail Cap(c_a), veh/h	272	2910	1455	1369	371	371
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.5	4.8	7.2	7.3	26.9	30.7
Incr Delay (d2), s/veh	2.0	0.0	0.6	0.7	0.2	17.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.8	4.9	4.8	1.4	6.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	22.5	4.8	7.8	8.0	27.0	47.9
LnGrp LOS	C	A	A	A	C	D
Approach Vol, veh/h		526	1491		366	
Approach Delay, s/veh		9.2	7.9		42.8	
Approach LOS		A	A		D	
Timer - Assigned Phs				4	6	8
Phs Duration (G+Y+Rc), s				58.5	20.1	58.5
Change Period (Y+Rc), s				5.8	4.6	5.8
Max Green Setting (Gmax), s				61.2	18.4	61.2
Max Q Clear Time (g_c+I1), s				48.9	15.3	20.3
Green Ext Time (p_c), s				3.9	0.2	13.5
Intersection Summary						
HCM 7th Control Delay, s/veh			13.5			
HCM 7th LOS			B			

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	88	2	0	153	6	0
Future Vol, veh/h	88	2	0	153	6	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	96	2	0	166	7	0

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	98	0	263	97
Stage 1	-	-	-	-	97	-
Stage 2	-	-	-	-	166	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1495	-	726	960
Stage 1	-	-	-	-	927	-
Stage 2	-	-	-	-	863	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1495	-	726	960
Mov Cap-2 Maneuver	-	-	-	-	726	-
Stage 1	-	-	-	-	927	-
Stage 2	-	-	-	-	863	-

Approach	EB	WB	NE
HCM Control Delay, s/v	0	0	10
HCM LOS			B

Minor Lane/Major Mvmt	NELn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	726	-	-	1495	-
HCM Lane V/C Ratio	0.009	-	-	-	-
HCM Control Delay (s/veh)	10	-	-	0	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection												
Int Delay, s/veh	8.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	8	19	61	57	36	0	100	36	18	0	89	17
Future Vol, veh/h	8	19	61	57	36	0	100	36	18	0	89	17
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	68	68	68	68	68	68	68	68	68	68	68	68
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	28	90	84	53	0	147	53	26	0	131	25

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	517	517	143	505	516	66	156	0	0	79	0	0
Stage 1	143	143	-	360	360	-	-	-	-	-	-	-
Stage 2	374	374	-	145	156	-	-	-	-	-	-	-
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	469	462	904	477	463	998	1424	-	-	1519	-	-
Stage 1	859	778	-	658	626	-	-	-	-	-	-	-
Stage 2	647	618	-	858	769	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	370	412	904	360	413	998	1424	-	-	1519	-	-
Mov Cap-2 Maneuver	370	412	-	360	413	-	-	-	-	-	-	-
Stage 1	859	778	-	587	558	-	-	-	-	-	-	-
Stage 2	522	551	-	745	769	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	11.9	19.78	5.08	0
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1096	-	-	651	379	1519	-
HCM Lane V/C Ratio	0.103	-	-	0.199	0.361	-	-
HCM Control Delay (s/veh)	7.8	0	-	11.9	19.8	0	-
HCM Lane LOS	A	A	-	B	C	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0.7	1.6	0	-

Intersection												
Int Delay, s/veh	1.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	2	0	44	6	0	1	0	206	1	16	151	2
Future Vol, veh/h	2	0	44	6	0	1	0	206	1	16	151	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	2	0	48	7	0	1	0	224	1	17	164	2

Major/Minor	Minor1		Minor2		Major1		Major2					
Conflicting Flow All	423	426	224	424	425	165	166	0	0	225	0	0
Stage 1	224	224	-	200	200	-	-	-	-	-	-	-
Stage 2	199	201	-	224	225	-	-	-	-	-	-	-
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	541	521	815	540	521	879	1412	-	-	1344	-	-
Stage 1	778	718	-	802	736	-	-	-	-	-	-	-
Stage 2	803	735	-	779	718	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	533	513	815	501	514	879	1412	-	-	1344	-	-
Mov Cap-2 Maneuver	533	513	-	501	514	-	-	-	-	-	-	-
Stage 1	778	718	-	790	725	-	-	-	-	-	-	-
Stage 2	790	724	-	733	718	-	-	-	-	-	-	-

Approach	EB		WB		SE		NW	
HCM Control Delay, s/v	9.82		11.84		0		0.73	
HCM LOS	A		B					

Minor Lane/Major Mvmt	NWL	NWT	NWR	EBLn1WBLn1	SEL	SET	SER
Capacity (veh/h)	170	-	-	797	534	1412	-
HCM Lane V/C Ratio	0.013	-	-	0.063	0.014	-	-
HCM Control Delay (s/veh)	7.7	0	-	9.8	11.8	0	-
HCM Lane LOS	A	A	-	A	B	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0	0	-

Intersection						
Int Delay, s/veh	68.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	76	373	1314	83	56	201
Future Vol, veh/h	76	373	1314	83	56	201
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	60	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	86	424	1493	94	64	228

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1588	0	0 1925 794
Stage 1	-	-	- 1540 -
Stage 2	-	-	- 385 -
Critical Hdwy	4.14	-	- 6.84 6.94
Critical Hdwy Stg 1	-	-	- 5.84 -
Critical Hdwy Stg 2	-	-	- 5.84 -
Follow-up Hdwy	2.22	-	- 3.52 3.32
Pot Cap-1 Maneuver	410	-	- ~ 59 331
Stage 1	-	-	- 163 -
Stage 2	-	-	- 657 -
Platoon blocked, %		-	-
Mov Cap-1 Maneuver	410	-	- ~ 46 331
Mov Cap-2 Maneuver	-	-	- ~ 46 -
Stage 1	-	-	- 128 -
Stage 2	-	-	- 657 -

Approach	EB	WB	SB
HCM Control Delay, s/v 2.73		0	\$ 555.49
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	410	-	-	-	141
HCM Lane V/C Ratio	0.211	-	-	-	2.066
HCM Control Delay (s/veh)	16.1	-	-	-	\$ 555.5
HCM Lane LOS	C	-	-	-	F
HCM 95th %tile Q(veh)	0.8	-	-	-	23.5

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

Timings

East Highland Ranch (JN 15974)

1: Greenspot Rd. & Boulder Av.

12/23/2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	
Lane Configurations												
Traffic Volume (vph)	114	950	274	355	871	144	146	357	8	296	273	
Future Volume (vph)	114	950	274	355	871	144	146	357	8	296	273	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4			8			6			
Detector Phase	7	4	4	3	8	8	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	
Minimum Split (s)	9.6	22.8	22.8	14.6	22.8	22.8	9.6	23.2	23.2	9.6	23.2	
Total Split (s)	15.4	41.0	41.0	35.8	61.4	61.4	18.0	23.5	23.5	19.7	25.2	
Total Split (%)	12.8%	34.2%	34.2%	29.8%	51.2%	51.2%	15.0%	19.6%	19.6%	16.4%	21.0%	
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	4.8	3.6	5.2	5.2	3.6	5.2	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
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)	4.6	5.8	5.8	4.6	5.8	5.8	4.6	6.2	6.2	4.6	6.2	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	
Act Effct Green (s)	9.4	35.2	35.2	31.2	57.0	57.0	13.4	17.3	17.3	15.1	19.0	
Actuated g/C Ratio	0.08	0.29	0.29	0.26	0.48	0.48	0.11	0.14	0.14	0.13	0.16	
v/c Ratio	0.61	1.02	0.50	1.02	0.58	0.21	0.98	0.78	0.03	0.98	0.98	
Control Delay (s/veh)	65.1	75.4	9.7	94.4	24.7	7.5	117.4	60.7	0.1	96.4	64.1	
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)	65.1	75.4	9.7	94.4	24.7	7.5	117.4	60.7	0.1	96.4	64.1	
LOS	E	E	A	F	C	A	F	E	A	F	E	
Approach Delay (s/veh)		61.1			41.0			76.0			74.7	
Approach LOS		E			D			E			E	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Natural Cycle: 120

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.02

Intersection Signal Delay (s/veh): 59.2

Intersection LOS: E

Intersection Capacity Utilization 91.3%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 1: Greenspot Rd. & Boulder Av.

 Ø1	 Ø2	 Ø3	 Ø4
18 s	25.2 s	35.8 s	41 s
 Ø5	 Ø6	 Ø7	 Ø8
19.7 s	23.5 s	15.4 s	61.4 s

HCM 7th Signalized Intersection Summary

East Highland Ranch (JN 15974)

1: Greenspot Rd. & Boulder Av.

12/23/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	114	950	274	355	871	144	146	357	8	296	273	327
Future Volume (veh/h)	114	950	274	355	871	144	146	357	8	296	273	327
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1673	1870	1870	1772	1870	1870	1772	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	134	1118	286	418	1025	147	172	420	0	348	321	211
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	178	1097	459	412	1835	768	177	539		357	337	216
Arrive On Green	0.06	0.29	0.29	0.26	0.49	0.49	0.11	0.14	0.00	0.13	0.16	0.16
Sat Flow, veh/h	2837	3741	1565	1586	3741	1565	1586	3741	1585	2837	2129	1366
Grp Volume(v), veh/h	134	1118	286	418	1025	147	172	420	0	348	281	251
Grp Sat Flow(s),veh/h/ln	1418	1870	1565	1586	1870	1565	1586	1870	1585	1418	1870	1624
Q Serve(g_s), s	5.6	35.2	19.0	31.2	23.1	6.3	13.0	13.0	0.0	14.7	17.9	18.4
Cycle Q Clear(g_c), s	5.6	35.2	19.0	31.2	23.1	6.3	13.0	13.0	0.0	14.7	17.9	18.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.84
Lane Grp Cap(c), veh/h	178	1097	459	412	1835	768	177	539		357	296	257
V/C Ratio(X)	0.75	1.02	0.62	1.01	0.56	0.19	0.97	0.78		0.97	0.95	0.98
Avail Cap(c_a), veh/h	255	1097	459	412	1835	768	177	539		357	296	257
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.3	42.4	36.7	44.4	21.5	17.2	53.1	49.5	0.0	52.3	50.0	50.3
Incr Delay (d2), s/veh	3.7	32.0	2.6	47.8	0.4	0.1	58.6	7.2	0.0	40.6	38.8	49.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	20.4	7.3	17.1	9.4	2.2	7.9	6.4	0.0	7.1	11.3	10.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	59.0	74.4	39.3	92.2	21.8	17.3	111.7	56.7	0.0	92.9	88.8	99.4
LnGrp LOS	E	F	D	F	C	B	F	E		F	F	F
Approach Vol, veh/h	1538			1590			592			880		
Approach Delay, s/veh	66.5			39.9			72.7			93.4		
Approach LOS	E			D			E			F		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	18.0	25.2	35.8	41.0	19.7	23.5	12.1	64.7				
Change Period (Y+Rc), s	4.6	6.2	4.6	5.8	4.6	6.2	4.6	5.8				
Max Green Setting (Gmax), s	13.4	19.0	31.2	35.2	15.1	17.3	10.8	55.6				
Max Q Clear Time (g_c+I1), s	15.0	20.4	33.2	37.2	16.7	15.0	7.6	25.1				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.5	0.1	8.1				

Intersection Summary

HCM 7th Control Delay, s/veh 63.3

HCM 7th LOS E

Notes

Unsignalized Delay for [SER] is excluded from calculations of the approach delay and intersection delay.

Timings

East Highland Ranch (JN 15974)

2: Greenspot Rd. & Church St.

12/23/2024

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	 	 		 		 		 
Traffic Volume (vph)	279	945	6	791	27	11	63	4
Future Volume (vph)	279	945	6	791	27	11	63	4
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA
Protected Phases	7	4	3	8		2		6
Permitted Phases					2		6	
Detector Phase	7	4	3	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	10.0	5.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.6	27.8	9.6	27.8	21.6	21.6	21.6	21.6
Total Split (s)	21.6	34.8	21.6	34.8	33.6	33.6	33.6	33.6
Total Split (%)	24.0%	38.7%	24.0%	38.7%	37.3%	37.3%	37.3%	37.3%
Yellow Time (s)	3.6	4.8	3.6	4.8	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	5.8	4.6	4.6	4.6	4.6
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	Min	Min	Min	Min
Act Effct Green (s)	11.7	37.3	5.3	22.5	11.7	11.7	11.7	11.7
Actuated g/C Ratio	0.19	0.61	0.09	0.37	0.19	0.19	0.19	0.19
v/c Ratio	0.59	0.49	0.05	0.71	0.18	0.04	0.30	0.37
Control Delay (s/veh)	28.7	8.4	32.0	20.2	26.6	23.6	27.8	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	28.7	8.4	32.0	20.2	26.6	23.6	27.8	5.1
LOS	C	A	C	C	C	C	C	A
Approach Delay (s/veh)		12.9		20.3		25.7		9.3
Approach LOS		B		C		C		A

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 61.4

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.71

Intersection Signal Delay (s/veh): 15.2

Intersection LOS: B

Intersection Capacity Utilization 66.2%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 2: Greenspot Rd. & Church St.

 Ø2	 Ø3	 Ø4
33.6 s	21.6 s	34.8 s
 Ø6	 Ø7	 Ø8
33.6 s	21.6 s	34.8 s

HCM 7th Signalized Intersection Summary

2: Greenspot Rd. & Church St.

East Highland Ranch (JN 15974)

12/23/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	279	945	20	6	791	52	27	11	0	63	4	271
Future Volume (veh/h)	279	945	20	6	791	52	27	11	0	63	4	271
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		1.00	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1673	1870	1870	1772	1870	1870	1772	1870	1870	1772	1870	1870
Adj Flow Rate, veh/h	317	1074	21	7	899	57	31	12	0	72	5	196
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	431	1838	36	16	1252	79	231	369	0	391	369	309
Arrive On Green	0.15	0.50	0.50	0.01	0.36	0.36	0.20	0.20	0.00	0.20	0.20	0.20
Sat Flow, veh/h	2837	3655	71	1688	3477	220	1110	1870	0	1310	1870	1564
Grp Volume(v), veh/h	317	550	545	7	484	472	31	12	0	72	5	196
Grp Sat Flow(s),veh/h/ln	1418	1870	1856	1688	1870	1827	1110	1870	0	1310	1870	1564
Q Serve(g_s), s	5.5	10.7	10.7	0.2	11.5	11.5	1.4	0.3	0.0	2.4	0.1	5.9
Cycle Q Clear(g_c), s	5.5	10.7	10.7	0.2	11.5	11.5	7.3	0.3	0.0	2.7	0.1	5.9
Prop In Lane	1.00		0.04	1.00		0.12	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	431	940	933	16	674	658	231	369	0	391	369	309
V/C Ratio(X)	0.74	0.58	0.58	0.45	0.72	0.72	0.13	0.03	0.00	0.18	0.01	0.63
Avail Cap(c_a), veh/h	934	1050	1043	556	1050	1026	635	1050	0	868	1050	878
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.9	9.0	9.0	25.5	14.3	14.3	22.4	16.7	0.0	17.8	16.7	19.0
Incr Delay (d2), s/veh	0.9	0.7	0.7	7.3	1.5	1.5	0.3	0.0	0.0	0.2	0.0	2.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	2.9	2.9	0.1	3.9	3.8	0.4	0.1	0.0	0.7	0.0	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	21.8	9.7	9.7	32.8	15.7	15.7	22.6	16.8	0.0	18.0	16.7	21.2
LnGrp LOS	C	A	A	C	B	B	C	B		B	B	C
Approach Vol, veh/h	1412			963			43			273		
Approach Delay, s/veh	12.4			15.8			21.0			20.3		
Approach LOS	B			B			C			C		
Timer - Assigned Phs	2		3	4		6	7	8				
Phs Duration (G+Y+Rc), s	14.8		5.1	31.8		14.8	12.4	24.4				
Change Period (Y+Rc), s	4.6		4.6	5.8		4.6	4.6	5.8				
Max Green Setting (Gmax), s	29.0		17.0	29.0		29.0	17.0	29.0				
Max Q Clear Time (g_c+I1), s	9.3		2.2	12.7		7.9	7.5	13.5				
Green Ext Time (p_c), s	0.1		0.0	6.0		1.4	0.4	5.0				
Intersection Summary												
HCM 7th Control Delay, s/veh	14.6											
HCM 7th LOS	B											

Timings

3: Greenspot Rd. & Weaver St.

East Highland Ranch (JN 15974)

12/23/2024



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	172	929	646	166	225
Future Volume (vph)	172	929	646	166	225
Turn Type	Perm	NA	NA	Prot	Perm
Protected Phases		4	8	1	
Permitted Phases	4				6
Detector Phase	4	4	8	1	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	22.8	22.8	22.8	9.6	22.4
Total Split (s)	46.8	46.8	46.8	43.2	43.2
Total Split (%)	52.0%	52.0%	52.0%	48.0%	48.0%
Yellow Time (s)	4.8	4.8	4.8	3.6	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	4.6	5.4
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	Min
Act Effect Green (s)	31.8	31.8	31.8	13.0	12.1
Actuated g/C Ratio	0.57	0.57	0.57	0.23	0.22
v/c Ratio	0.56	0.48	0.38	0.50	0.55
Control Delay (s/veh)	15.2	7.7	6.7	26.3	15.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	15.2	7.7	6.7	26.3	15.6
LOS	B	A	A	C	B
Approach Delay (s/veh)		8.9	6.7	20.2	
Approach LOS		A	A	C	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 55.6

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.56

Intersection Signal Delay (s/veh): 10.2

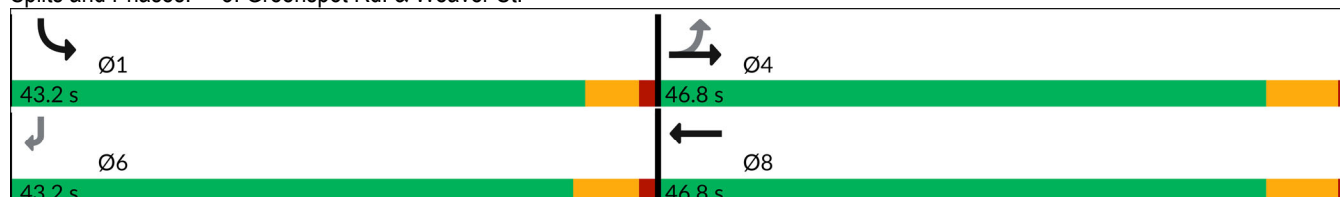
Intersection LOS: B

Intersection Capacity Utilization 53.5%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: Greenspot Rd. & Weaver St.

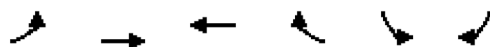


HCM 7th Signalized Intersection Summary

3: Greenspot Rd. & Weaver St.

East Highland Ranch (JN 15974)

12/23/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	172	929	646	74	166	225
Future Volume (veh/h)	172	929	646	74	166	225
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1772	1870	1870	1870	1772	1870
Adj Flow Rate, veh/h	189	1021	710	81	182	247
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	449	2155	1899	216	322	322
Arrive On Green	0.58	0.58	0.58	0.58	0.20	0.20
Sat Flow, veh/h	644	3741	3297	376	1586	1585
Grp Volume(v), veh/h	189	1021	403	388	182	247
Grp Sat Flow(s),veh/h/ln	644	1870	1870	1802	1586	1585
Q Serve(g_s), s	10.6	7.5	5.5	5.5	4.9	6.9
Cycle Q Clear(g_c), s	16.0	7.5	5.5	5.5	4.9	6.9
Prop In Lane	1.00			0.21	1.00	1.00
Lane Grp Cap(c), veh/h	449	2155	1077	1038	322	322
V/C Ratio(X)	0.42	0.47	0.37	0.37	0.57	0.77
Avail Cap(c_a), veh/h	640	3261	1630	1571	1302	1301
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.7	5.8	5.4	5.4	16.9	17.7
Incr Delay (d2), s/veh	0.6	0.2	0.2	0.2	0.6	1.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	1.4	1.1	1.0	1.5	2.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	10.3	6.0	5.6	5.6	17.5	19.2
LnGrp LOS	B	A	A	A	B	B
Approach Vol, veh/h		1210	791		429	
Approach Delay, s/veh		6.7	5.6		18.4	
Approach LOS		A	A		B	
Timer - Assigned Phs				4	6	8
Phs Duration (G+Y+Rc), s				32.9	14.1	32.9
Change Period (Y+Rc), s				5.8	4.6	5.8
Max Green Setting (Gmax), s				41.0	38.6	41.0
Max Q Clear Time (g_c+I1), s				18.0	8.9	7.5
Green Ext Time (p_c), s				9.1	0.7	4.9
Intersection Summary						
HCM 7th Control Delay, s/veh			8.4			
HCM 7th LOS			A			

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	76	7	0	53	4	0
Future Vol, veh/h	76	7	0	53	4	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	83	8	0	58	4	0

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	90	0	144	86
Stage 1	-	-	-	-	86	-
Stage 2	-	-	-	-	58	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1505	-	849	972
Stage 1	-	-	-	-	937	-
Stage 2	-	-	-	-	965	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1505	-	849	972
Mov Cap-2 Maneuver	-	-	-	-	849	-
Stage 1	-	-	-	-	937	-
Stage 2	-	-	-	-	965	-

Approach	EB	WB	NE
HCM Control Delay, s/v	0	0	9.26
HCM LOS			A

Minor Lane/Major Mvmt	NELn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	849	-	-	1505	-
HCM Lane V/C Ratio	0.005	-	-	-	-
HCM Control Delay (s/veh)	9.3	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection												
Int Delay, s/veh	4.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	8	15	53	28	4	1	45	41	43	0	57	5
Future Vol, veh/h	8	15	53	28	4	1	45	41	43	0	57	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	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	19	66	35	5	1	56	51	54	0	71	6

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	241	292	74	271	268	78	78	0	0	105	0	0
Stage 1	74	74	-	191	191	-	-	-	-	-	-	-
Stage 2	166	218	-	81	78	-	-	-	-	-	-	-
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	713	619	987	681	638	983	1521	-	-	1486	-	-
Stage 1	935	833	-	811	743	-	-	-	-	-	-	-
Stage 2	836	723	-	928	830	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	679	594	987	592	613	983	1521	-	-	1486	-	-
Mov Cap-2 Maneuver	679	594	-	592	613	-	-	-	-	-	-	-
Stage 1	935	833	-	779	713	-	-	-	-	-	-	-
Stage 2	796	694	-	846	830	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	9.85	11.42	2.6	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	570	-	-	838	602	1486	-
HCM Lane V/C Ratio	0.037	-	-	0.113	0.069	-	-
HCM Control Delay (s/veh)	7.5	0	-	9.8	11.4	0	-
HCM Lane LOS	A	A	-	A	B	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.2	0	-

Intersection												
Int Delay, s/veh	2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	0	29	4	0	1	1	135	2	50	127	7
Future Vol, veh/h	1	0	29	4	0	1	1	135	2	50	127	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	1	0	32	4	0	1	1	147	2	54	138	8

Major/Minor	Minor1		Minor2		Major1			Major2				
Conflicting Flow All	397	404	148	399	402	142	146	0	0	149	0	0
Stage 1	150	150	-	251	251	-	-	-	-	-	-	-
Stage 2	247	254	-	149	151	-	-	-	-	-	-	-
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	563	535	899	561	537	906	1436	-	-	1433	-	-
Stage 1	853	773	-	754	699	-	-	-	-	-	-	-
Stage 2	757	697	-	854	772	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	539	513	899	518	515	906	1436	-	-	1433	-	-
Mov Cap-2 Maneuver	539	513	-	518	515	-	-	-	-	-	-	-
Stage 1	852	772	-	722	671	-	-	-	-	-	-	-
Stage 2	725	668	-	823	772	-	-	-	-	-	-	-

Approach	EB		WB		SE		NW	
HCM Control Delay, s/v	9.25		11.41		0.05		2.07	
HCM LOS	A		B					

Minor Lane/Major Mvmt	NWL	NWT	NWR	EBLn1WBLn1	SEL	SET	SER
Capacity (veh/h)	484	-	-	879	567	13	-
HCM Lane V/C Ratio	0.038	-	-	0.037	0.01	0.001	-
HCM Control Delay (s/veh)	7.6	0	-	9.3	11.4	7.5	0
HCM Lane LOS	A	A	-	A	B	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0	0	-

Intersection						
Int Delay, s/veh	4.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	157	907	669	16	28	122
Future Vol, veh/h	157	907	669	16	28	122
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	60	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	176	1019	752	18	31	137

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	770	0	0 1623 385
Stage 1	-	-	- - 761 -
Stage 2	-	-	- - 862 -
Critical Hdwy	4.14	-	- - 6.84 6.94
Critical Hdwy Stg 1	-	-	- - 5.84 -
Critical Hdwy Stg 2	-	-	- - 5.84 -
Follow-up Hdwy	2.22	-	- - 3.52 3.32
Pot Cap-1 Maneuver	841	-	- - 93 613
Stage 1	-	-	- - 422 -
Stage 2	-	-	- - 374 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	841	-	- - 74 613
Mov Cap-2 Maneuver	-	-	- - 74 -
Stage 1	-	-	- - 333 -
Stage 2	-	-	- - 374 -

Approach	EB	WB	SB
HCM Control Delay, s/v	1.54	0	41.4
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	841	-	-	-	259
HCM Lane V/C Ratio	0.21	-	-	-	0.65
HCM Control Delay (s/veh)	10.4	-	-	-	41.4
HCM Lane LOS	B	-	-	-	E
HCM 95th %tile Q(veh)	0.8	-	-	-	4.1

Timings

East Highland Ranch (JN 15974)

1: Greenspot Rd. & Boulder Av.

12/23/2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	
Lane Configurations												
Traffic Volume (vph)	116	1218	348	354	750	107	146	410	9	331	345	
Future Volume (vph)	116	1218	348	354	750	107	146	410	9	331	345	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4			8			6			
Detector Phase	7	4	4	3	8	8	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	
Minimum Split (s)	9.6	22.8	22.8	14.6	22.8	22.8	9.6	23.2	23.2	9.6	23.2	
Total Split (s)	14.8	45.0	45.0	31.0	61.2	61.2	16.0	25.0	25.0	19.0	28.0	
Total Split (%)	12.3%	37.5%	37.5%	25.8%	51.0%	51.0%	13.3%	20.8%	20.8%	15.8%	23.3%	
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	4.8	3.6	5.2	5.2	3.6	5.2	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
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)	4.6	5.8	5.8	4.6	5.8	5.8	4.6	6.2	6.2	4.6	6.2	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	
Act Effct Green (s)	8.9	39.2	39.2	26.4	56.7	56.7	11.4	18.8	18.8	14.4	21.8	
Actuated g/C Ratio	0.07	0.33	0.33	0.22	0.47	0.47	0.10	0.16	0.16	0.12	0.18	
v/c Ratio	0.58	1.03	0.51	1.05	0.44	0.14	1.01	0.73	0.02	1.01	0.95	
Control Delay (s/veh)	64.8	74.5	10.4	108.9	22.3	3.6	131.3	56.2	0.1	103.8	57.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay (s/veh)	64.8	74.5	10.4	108.9	22.3	3.6	131.3	56.2	0.1	103.8	57.2	
LOS	E	E	B	F	C	A	F	E	A	F	E	
Approach Delay (s/veh)		60.6			45.9			74.8			71.8	
Approach LOS		E			D			E			E	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Natural Cycle: 120

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.05

Intersection Signal Delay (s/veh): 61.1

Intersection LOS: E

Intersection Capacity Utilization 102.3%

ICU Level of Service G

Analysis Period (min) 15

Splits and Phases: 1: Greenspot Rd. & Boulder Av.

 Ø1	 Ø2	 Ø3	 Ø4
16 s	28 s	31 s	45 s
 Ø5	 Ø6	 Ø7	 Ø8
19 s	25 s	14.8 s	61.2 s

HCM 7th Signalized Intersection Summary

East Highland Ranch (JN 15974)

1: Greenspot Rd. & Boulder Av.

12/23/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	116	1218	348	354	750	107	146	410	9	331	345	379
Future Volume (veh/h)	116	1218	348	354	750	107	146	410	9	331	345	379
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1673	1870	1870	1772	1870	1870	1772	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	120	1256	327	365	773	90	151	423	0	341	356	238
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	163	1222	511	349	1829	766	151	586		340	383	251
Arrive On Green	0.06	0.33	0.33	0.22	0.49	0.49	0.09	0.16	0.00	0.12	0.18	0.18
Sat Flow, veh/h	2837	3741	1565	1586	3741	1565	1586	3741	1585	2837	2108	1384
Grp Volume(v), veh/h	120	1256	327	365	773	90	151	423	0	341	315	279
Grp Sat Flow(s),veh/h/ln	1418	1870	1565	1586	1870	1565	1586	1870	1585	1418	1870	1621
Q Serve(g_s), s	5.0	39.2	21.3	26.4	16.0	3.7	11.4	12.9	0.0	14.4	19.9	20.4
Cycle Q Clear(g_c), s	5.0	39.2	21.3	26.4	16.0	3.7	11.4	12.9	0.0	14.4	19.9	20.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.85
Lane Grp Cap(c), veh/h	163	1222	511	349	1829	766	151	586		340	340	295
V/C Ratio(X)	0.73	1.03	0.64	1.05	0.42	0.12	1.00	0.72		1.00	0.93	0.95
Avail Cap(c_a), veh/h	241	1222	511	349	1829	766	151	586		340	340	295
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.6	40.4	34.4	46.8	19.7	16.6	54.3	48.1	0.0	52.8	48.3	48.5
Incr Delay (d2), s/veh	2.4	33.1	2.7	60.7	0.2	0.1	73.8	4.3	0.0	49.2	30.9	38.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	22.7	8.1	15.8	6.5	1.3	7.5	6.2	0.0	7.3	11.9	11.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	58.0	73.5	37.1	107.5	19.9	16.7	128.1	52.5	0.0	102.0	79.2	86.8
LnGrp LOS	E	F	D	F	B	B	F	D		F	E	F
Approach Vol, veh/h	1703			1228			574			935		
Approach Delay, s/veh	65.4			45.7			72.4			89.8		
Approach LOS	E			D			E			F		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.0	28.0	31.0	45.0	19.0	25.0	11.5	64.5				
Change Period (Y+Rc), s	4.6	6.2	4.6	5.8	4.6	6.2	4.6	5.8				
Max Green Setting (Gmax), s	11.4	21.8	26.4	39.2	14.4	18.8	10.2	55.4				
Max Q Clear Time (g_c+I1), s	13.4	22.4	28.4	41.2	16.4	14.9	7.0	18.0				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.9	0.0	5.7				

Intersection Summary

HCM 7th Control Delay, s/veh 66.0

HCM 7th LOS E

Notes

Unsignalized Delay for [SER] is excluded from calculations of the approach delay and intersection delay.

Timings

East Highland Ranch (JN 15974)

2: Greenspot Rd. & Church St.

12/23/2024

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	 	 		 				 
Traffic Volume (vph)	295	1285	4	725	30	5	60	13
Future Volume (vph)	295	1285	4	725	30	5	60	13
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA
Protected Phases	7	4	3	8		2		6
Permitted Phases					2		6	
Detector Phase	7	4	3	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	10.0	5.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	9.6	27.8	9.6	27.8	21.6	21.6	21.6	21.6
Total Split (s)	21.6	34.8	21.6	34.8	33.6	33.6	33.6	33.6
Total Split (%)	24.0%	38.7%	24.0%	38.7%	37.3%	37.3%	37.3%	37.3%
Yellow Time (s)	3.6	4.8	3.6	4.8	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	5.8	4.6	4.6	4.6	4.6
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	Min	Min	Min	Min
Act Effct Green (s)	11.3	35.2	5.2	20.7	11.4	11.4	11.4	11.4
Actuated g/C Ratio	0.19	0.60	0.09	0.35	0.19	0.19	0.19	0.19
v/c Ratio	0.58	0.62	0.03	0.64	0.17	0.02	0.26	0.32
Control Delay (s/veh)	27.2	9.9	30.5	18.7	25.0	20.3	25.8	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	27.2	9.9	30.5	18.7	25.0	20.3	25.8	5.7
LOS	C	A	C	B	C	C	C	A
Approach Delay (s/veh)		13.1		18.7		24.1		9.7
Approach LOS		B		B		C		A

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 58.8

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.64

Intersection Signal Delay (s/veh): 14.5

Intersection LOS: B

Intersection Capacity Utilization 74.0%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 2: Greenspot Rd. & Church St.

 Ø2	 Ø3	 Ø4
33.6 s	21.6 s	34.8 s
 Ø6	 Ø7	 Ø8
33.6 s	21.6 s	34.8 s

HCM 7th Signalized Intersection Summary

2: Greenspot Rd. & Church St.

East Highland Ranch (JN 15974)

12/23/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	295	1285	19	4	725	64	30	5	2	60	13	228
Future Volume (veh/h)	295	1285	19	4	725	64	30	5	2	60	13	228
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.99	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1673	1870	1870	1772	1870	1870	1772	1870	1870	1772	1870	1870
Adj Flow Rate, veh/h	311	1353	18	4	763	65	32	5	2	63	14	136
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	430	1764	23	9	1130	96	302	265	106	418	390	326
Arrive On Green	0.15	0.48	0.48	0.01	0.33	0.33	0.21	0.21	0.21	0.21	0.21	0.21
Sat Flow, veh/h	2837	3682	49	1688	3394	289	1163	1268	507	1317	1870	1564
Grp Volume(v), veh/h	311	687	684	4	420	408	32	0	7	63	14	136
Grp Sat Flow(s),veh/h/ln	1418	1870	1861	1688	1870	1813	1163	0	1776	1317	1870	1564
Q Serve(g_s), s	5.1	14.8	14.8	0.1	9.4	9.5	1.2	0.0	0.2	2.0	0.3	3.7
Cycle Q Clear(g_c), s	5.1	14.8	14.8	0.1	9.4	9.5	4.9	0.0	0.2	2.1	0.3	3.7
Prop In Lane	1.00		0.03	1.00		0.16	1.00		0.29	1.00		1.00
Lane Grp Cap(c), veh/h	430	896	891	9	623	603	302	0	370	418	390	326
V/C Ratio(X)	0.72	0.77	0.77	0.44	0.68	0.68	0.11	0.00	0.02	0.15	0.04	0.42
Avail Cap(c_a), veh/h	987	1110	1105	587	1110	1076	750	0	1054	925	1110	929
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.8	10.5	10.5	24.2	14.0	14.0	18.9	0.0	15.4	16.2	15.4	16.8
Incr Delay (d2), s/veh	0.9	2.6	2.6	11.8	1.3	1.3	0.2	0.0	0.0	0.2	0.0	0.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	4.4	4.4	0.1	3.2	3.1	0.3	0.0	0.1	0.5	0.1	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	20.6	13.1	13.1	36.0	15.3	15.4	19.0	0.0	15.4	16.4	15.5	17.6
LnGrp LOS	C	B	B	D	B	B	B		B	B	B	B
Approach Vol, veh/h	1682			832			39			213		
Approach Delay, s/veh	14.5			15.4			18.4			17.1		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	2		3	4		6	7	8				
Phs Duration (G+Y+Rc), s	14.8		4.9	29.2		14.8	12.0	22.1				
Change Period (Y+Rc), s	4.6		4.6	5.8		4.6	4.6	5.8				
Max Green Setting (Gmax), s	29.0		17.0	29.0		29.0	17.0	29.0				
Max Q Clear Time (g_c+I1), s	6.9		2.1	16.8		5.7	7.1	11.5				
Green Ext Time (p_c), s	0.1		0.0	6.6		1.1	0.4	4.4				
Intersection Summary												
HCM 7th Control Delay, s/veh	15.0											
HCM 7th LOS	B											

Timings

East Highland Ranch (JN 15974)

3: Greenspot Rd. & Weaver St.

12/23/2024



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	264	1154	609	250	176
Future Volume (vph)	264	1154	609	250	176
Turn Type	Perm	NA	NA	Prot	Perm
Protected Phases		4	8	1	
Permitted Phases	4				6
Detector Phase	4	4	8	1	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	22.8	22.8	22.8	9.6	22.4
Total Split (s)	46.8	46.8	46.8	43.2	43.2
Total Split (%)	52.0%	52.0%	52.0%	48.0%	48.0%
Yellow Time (s)	4.8	4.8	4.8	3.6	4.4
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	4.6	5.4
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	Min
Act Effect Green (s)	41.1	41.1	41.1	15.6	14.8
Actuated g/C Ratio	0.61	0.61	0.61	0.23	0.22
v/c Ratio	0.73	0.53	0.33	0.72	0.39
Control Delay (s/veh)	25.2	9.2	7.2	35.3	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	25.2	9.2	7.2	35.3	7.2
LOS	C	A	A	D	A
Approach Delay (s/veh)		12.2	7.2	23.7	
Approach LOS		B	A	C	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 67.2

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay (s/veh): 12.7

Intersection LOS: B

Intersection Capacity Utilization 63.2%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3: Greenspot Rd. & Weaver St.

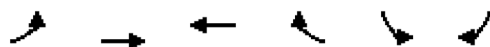


HCM 7th Signalized Intersection Summary

3: Greenspot Rd. & Weaver St.

East Highland Ranch (JN 15974)

12/23/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	264	1154	609	89	250	176
Future Volume (veh/h)	264	1154	609	89	250	176
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1772	1870	1870	1870	1772	1870
Adj Flow Rate, veh/h	278	1215	641	94	263	185
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	477	2301	1962	287	324	324
Arrive On Green	0.62	0.62	0.62	0.62	0.20	0.20
Sat Flow, veh/h	679	3741	3189	467	1586	1585
Grp Volume(v), veh/h	278	1215	375	360	263	185
Grp Sat Flow(s), veh/h/ln	679	1870	1870	1786	1586	1585
Q Serve(g_s), s	19.2	10.7	5.6	5.6	9.1	6.1
Cycle Q Clear(g_c), s	24.8	10.7	5.6	5.6	9.1	6.1
Prop In Lane	1.00			0.26	1.00	1.00
Lane Grp Cap(c), veh/h	477	2301	1150	1098	324	324
V/C Ratio(X)	0.58	0.53	0.33	0.33	0.81	0.57
Avail Cap(c_a), veh/h	543	2665	1333	1273	1064	1063
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.3	6.3	5.3	5.3	21.8	20.6
Incr Delay (d2), s/veh	1.2	0.2	0.2	0.2	1.9	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	2.4	1.3	1.2	3.1	2.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	12.6	6.5	5.5	5.5	23.7	21.2
LnGrp LOS	B	A	A	A	C	C
Approach Vol, veh/h		1493	735		448	
Approach Delay, s/veh		7.6	5.5		22.7	
Approach LOS		A	A		C	
Timer - Assigned Phs				4	6	8
Phs Duration (G+Y+Rc), s				41.2	16.4	41.2
Change Period (Y+Rc), s				5.8	4.6	5.8
Max Green Setting (Gmax), s				41.0	38.6	41.0
Max Q Clear Time (g_c+I1), s				26.8	11.1	7.6
Green Ext Time (p_c), s				8.6	0.7	4.5
Intersection Summary						
HCM 7th Control Delay, s/veh			9.6			
HCM 7th LOS			A			

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	62	7	0	40	4	0
Future Vol, veh/h	62	7	0	40	4	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	67	8	0	43	4	0

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	75	0	115	71
Stage 1	-	-	-	-	71	-
Stage 2	-	-	-	-	43	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1524	-	882	991
Stage 1	-	-	-	-	952	-
Stage 2	-	-	-	-	979	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1524	-	882	991
Mov Cap-2 Maneuver	-	-	-	-	882	-
Stage 1	-	-	-	-	952	-
Stage 2	-	-	-	-	979	-

Approach	EB	WB	NE
HCM Control Delay, s/v	0	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	NELn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	882	-	-	1524	-
HCM Lane V/C Ratio	0.005	-	-	-	-
HCM Control Delay (s/veh)	9.1	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection												
Int Delay, s/veh	4.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	13	20	29	42	6	0	29	53	58	2	53	5
Future Vol, veh/h	13	20	29	42	6	0	29	53	58	2	53	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	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	25	36	53	8	0	36	66	73	3	66	6

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	217	286	69	259	253	103	73	0	0	139	0	0
Stage 1	74	74	-	175	175	-	-	-	-	-	-	-
Stage 2	143	211	-	84	78	-	-	-	-	-	-	-
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	739	624	994	694	651	953	1527	-	-	1445	-	-
Stage 1	935	833	-	827	754	-	-	-	-	-	-	-
Stage 2	860	727	-	924	830	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	711	606	994	624	633	953	1527	-	-	1445	-	-
Mov Cap-2 Maneuver	711	606	-	624	633	-	-	-	-	-	-	-
Stage 1	933	832	-	805	735	-	-	-	-	-	-	-
Stage 2	829	709	-	862	829	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v10.19		11.37	1.54	0.25
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	338	-	-	771	625	59	-
HCM Lane V/C Ratio	0.024	-	-	0.101	0.096	0.002	-
HCM Control Delay (s/veh)	7.4	0	-	10.2	11.4	7.5	0
HCM Lane LOS	A	A	-	B	B	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.3	0.3	0	-

Intersection												
Int Delay, s/veh	2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	0	29	4	0	1	1	121	2	50	138	7
Future Vol, veh/h	1	0	29	4	0	1	1	121	2	50	138	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	1	0	32	4	0	1	1	132	2	54	150	8

Major/Minor	Minor1		Minor2		Major1			Major2				
Conflicting Flow All	393	401	133	396	398	154	158	0	0	134	0	0
Stage 1	135	135	-	262	262	-	-	-	-	-	-	-
Stage 2	259	266	-	134	136	-	-	-	-	-	-	-
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	566	538	917	564	539	892	1422	-	-	1451	-	-
Stage 1	869	785	-	743	691	-	-	-	-	-	-	-
Stage 2	746	688	-	870	784	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	542	515	917	522	517	892	1422	-	-	1451	-	-
Mov Cap-2 Maneuver	542	515	-	522	517	-	-	-	-	-	-	-
Stage 1	868	784	-	712	663	-	-	-	-	-	-	-
Stage 2	714	660	-	839	783	-	-	-	-	-	-	-

Approach	EB		WB		SE		NW	
HCM Control Delay, s/v	9.17		11.39		0.06		1.94	
HCM LOS	A		B					

Minor Lane/Major Mvmt	NWL	NWT	NWR	EBLn1WBLn1	SEL	SET	SER
Capacity (veh/h)	457	-	-	896	569	14	-
HCM Lane V/C Ratio	0.037	-	-	0.036	0.01	0.001	-
HCM Control Delay (s/veh)	7.6	0	-	9.2	11.4	7.5	0
HCM Lane LOS	A	A	-	A	B	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0	0	-

Intersection						
Int Delay, s/veh	2.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	173	1308	570	18	24	122
Future Vol, veh/h	173	1308	570	18	24	122
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	60	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	182	1377	600	19	25	128

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	619	0	0 1662 309
Stage 1	-	-	- 609 -
Stage 2	-	-	- 1053 -
Critical Hdwy	4.14	-	- 6.84 6.94
Critical Hdwy Stg 1	-	-	- 5.84 -
Critical Hdwy Stg 2	-	-	- 5.84 -
Follow-up Hdwy	2.22	-	- 3.52 3.32
Pot Cap-1 Maneuver	957	-	- 88 686
Stage 1	-	-	- 505 -
Stage 2	-	-	- 297 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	957	-	- 71 686
Mov Cap-2 Maneuver	-	-	- 71 -
Stage 1	-	-	- 409 -
Stage 2	-	-	- 297 -

Approach	EB	WB	SB
HCM Control Delay, s/v	1.13	0	31.73
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	957	-	-	-	284
HCM Lane V/C Ratio	0.19	-	-	-	0.542
HCM Control Delay (s/veh)	9.6	-	-	-	31.7
HCM Lane LOS	A	-	-	-	D
HCM 95th %tile Q(veh)	0.7	-	-	-	3

APPENDIX 6.3: CUMULATIVE (2050) WITHOUT PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **HY (2050) NP Conditions - Weekday AM Peak Hour**

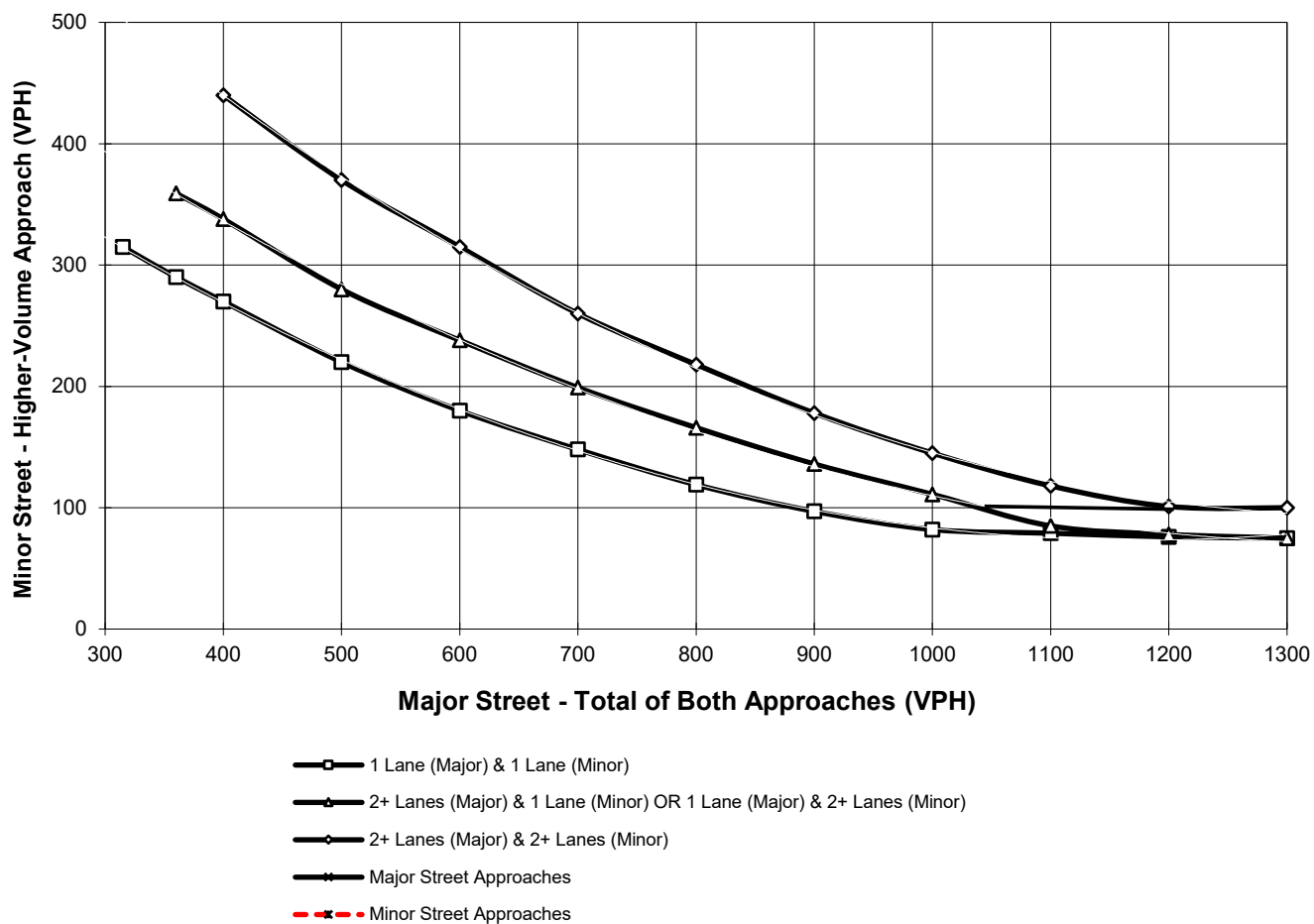
Major Street Name = **Alta Vista**

Total of Both Approaches (VPH) = **256**
Number of Approach Lanes Major Street = **1**

Minor Street Name = **Santa Ana Canyon Rd.**

High Volume Approach (VPH) = **180**
Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes
and 75 vph applies as the lower threshold for a minor-street approach with one lane

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APPENDIX 6.4: CUMULATIVE (2050) WITH PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

<u>DIST</u>	<u>CO</u>	<u>RTE</u>	<u>PM</u>	CALC	TRAFFIC CONDITIONS	HY (2045) WP
Jurisdiction: <u>City of Highland</u>				CHK	<u>IA</u>	DATE <u>12/20/24</u>
Major Street: <u>Santa Ana Canyon Rd.</u>						DATE <u>12/20/24</u>
Minor Street: <u>Street B</u>					Critical Approach Speed (Major)	<u>25</u> mph
					Critical Approach Speed (Minor)	<u>25</u> mph
Major Street Approach Lanes = <u>1</u> lane				Minor Street Approach Lanes: <u>1</u> lane		
Major Street Future ADT = <u>967</u> vpd				Minor Street Future ADT = <u>54</u> vpd		
Speed limit or critical speed on major street traffic > 64 km/h (40 mph);						
						or
In built up area of isolated community of < 10,000 population						
URBAN (U)						

(Based on Estimated Average Daily Traffic - See Note)

<u>URBAN</u>		<u>RURAL</u>		Minimum Requirements	
		XX		EADT	
CONDITION A - Minimum Vehicular Volume					
<u>Satisfied</u>		<u>Not Satisfied</u>		Vehicles Per Day on	Vehicles Per Day
		XX		Major Street	on Higher-Volume
Number of lanes for moving traffic on each approach				(Total of Both Approaches)	Minor Street Approach
<u>Major Street</u>	<u>Minor Street</u>				(One Direction Only)
<u>1 967</u>	<u>1 54</u>			<u>Urban</u> <u>Rural</u>	<u>Urban</u> <u>Rural</u>
				8,000 5,600	2,400 1,680
<u>2 +</u>	<u>1</u>			9,600 6,720	2,400 1,680
<u>2 +</u>	<u>2 +</u>			9,600 6,720	3,200 2,240
<u>1</u>	<u>2 +</u>			8,000 5,600	3,200 2,240
CONDITION B - Interruption of Continuous Traffic					
<u>Satisfied</u>		<u>Not Satisfied</u>		Vehicles Per Day	Vehicles Per Day
		XX		on Major Street	on Higher-Volume
Number of lanes for moving traffic on each approach				(Total of Both Approaches)	Minor Street Approach
<u>Major Street</u>	<u>Minor Street</u>				(One Direction Only)
<u>1 967</u>	<u>1 54</u>			<u>Urban</u> <u>Rural</u>	<u>Urban</u> <u>Rural</u>
				12,000 8,400	1,200 850
<u>2 +</u>	<u>1</u>			14,400 10,080	1,200 850
<u>2 +</u>	<u>2 +</u>			14,400 10,080	1,600 1,120
<u>1</u>	<u>2 +</u>			12,000 8,400	1,600 1,120
Combination of CONDITIONS A + B					
<u>Satisfied</u>		<u>Not Satisfied</u>			
		XX			
No one condition satisfied, but following conditions fulfilled 80% of more				2 CONDITIONS	2 CONDITIONS
				80%	80%
		<u>A</u>	<u>B</u>		
		3%	6%		

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **HY (2045) WP Conditions - Weekday AM Peak Hour**

Major Street Name = **Alta Vista**

Total of Both Approaches (VPH) = **259**

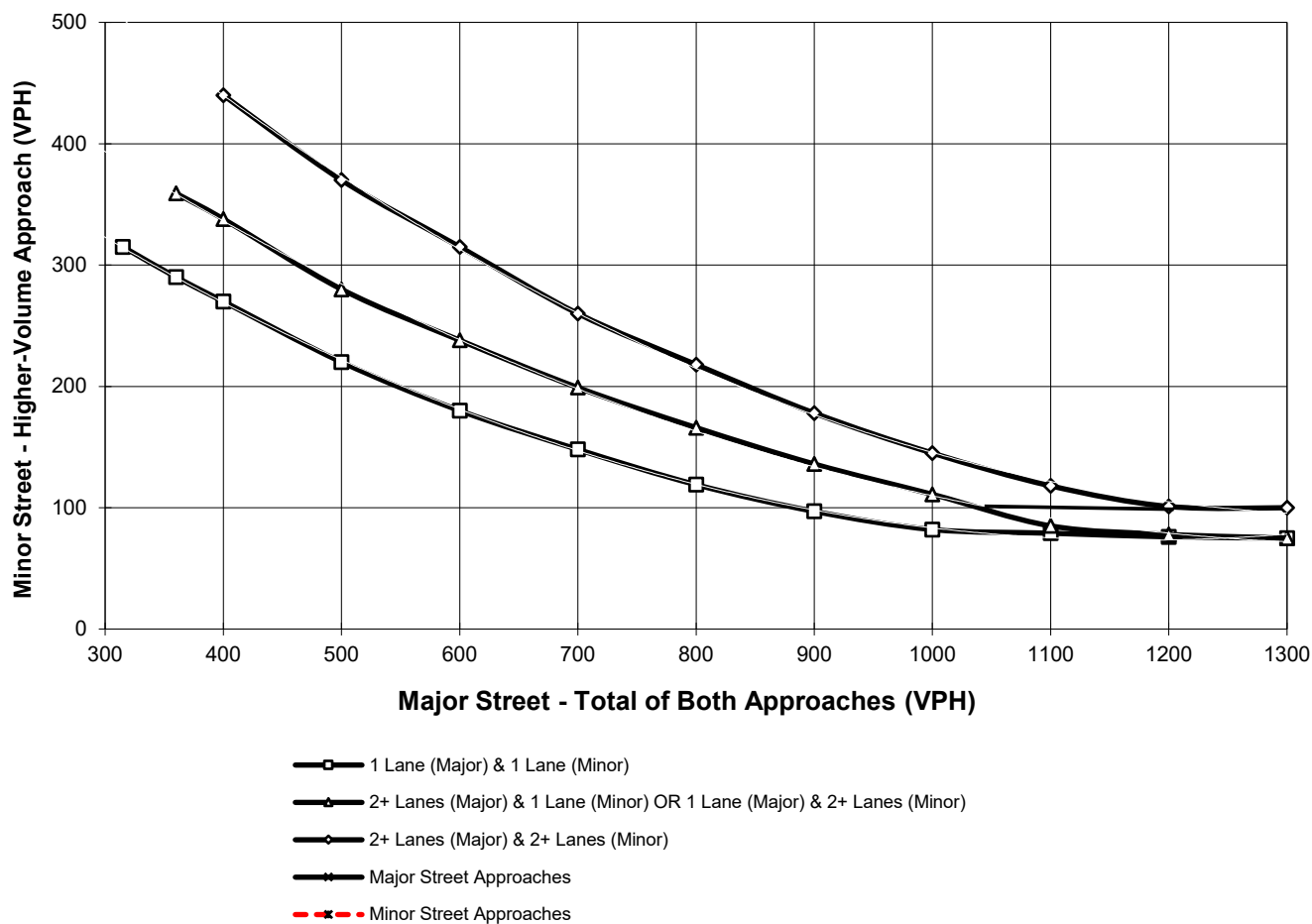
Number of Approach Lanes Major Street = **1**

Minor Street Name = **Santa Ana Canyon Rd.**

High Volume Approach (VPH) = **181**

Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

<u>DIST</u>	<u>CO</u>	<u>RTE</u>	<u>PM</u>	<u>CALC</u>	<u>TRAFFIC CONDITIONS</u>	<u>HY (2050) WP</u>
Jurisdiction: <u>City of Highland</u>				CHK <u>IA</u>		DATE <u>12/20/24</u>
Major Street: <u>Alta Vista</u>					Critical Approach Speed (Major)	<u>25</u> mph
Minor Street: <u>Street A/Street F</u>					Critical Approach Speed (Minor)	<u>25</u> mph
Major Street Approach Lanes = <u>1</u> lane				Minor Street Approach Lanes: <u>1</u> lane		
Major Street Future ADT = <u>3,471</u> vpd				Minor Street Future ADT = <u>479</u> vpd		
Speed limit or critical speed on major street traffic > 64 km/h (40 mph);						
						or
In built up area of isolated community of < 10,000 population						
URBAN (U)						

(Based on Estimated Average Daily Traffic - See Note)

<u>URBAN</u>		<u>RURAL</u>		Minimum Requirements	
		XX		EADT	
CONDITION A - Minimum Vehicular Volume					
<u>Satisfied</u>		<u>Not Satisfied</u>		Vehicles Per Day on	Vehicles Per Day
		XX		Major Street	on Higher-Volume
Number of lanes for moving traffic on each approach				(Total of Both Approaches)	Minor Street Approach
<u>Major Street</u>	<u>Minor Street</u>				(One Direction Only)
<u>1 3,471</u>	<u>1 479</u>			<u>Urban</u> <u>Rural</u>	<u>Urban</u> <u>Rural</u>
<u>2 +</u>	<u>1</u>			8,000 5,600	2,400 1,680
<u>2 +</u>	<u>2 +</u>			9,600 6,720	2,400 1,680
<u>1</u>	<u>2 +</u>			9,600 6,720	3,200 2,240
				8,000 5,600	3,200 2,240
CONDITION B - Interruption of Continuous Traffic					
<u>Satisfied</u>		<u>Not Satisfied</u>		Vehicles Per Day	Vehicles Per Day
		XX		on Major Street	on Higher-Volume
Number of lanes for moving traffic on each approach				(Total of Both Approaches)	Minor Street Approach
<u>Major Street</u>	<u>Minor Street</u>				(One Direction Only)
<u>1 3,471</u>	<u>1 479</u>			<u>Urban</u> <u>Rural</u>	<u>Urban</u> <u>Rural</u>
<u>2 +</u>	<u>1</u>			12,000 8,400	1,200 850
<u>2 +</u>	<u>2 +</u>			14,400 10,080	1,200 850
<u>1</u>	<u>2 +</u>			14,400 10,080	1,600 1,120
				12,000 8,400	1,600 1,120
Combination of CONDITIONS A + B					
<u>Satisfied</u>		<u>Not Satisfied</u>			
		XX			
No one condition satisfied, but following conditions fulfilled 80% of more				2 CONDITIONS	2 CONDITIONS
				80%	80%
		<u>A</u>	<u>B</u>		
		29%	41%		

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

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**APPENDIX 6.5: CUMULATIVE (2050) WITHOUT PROJECT CONDITIONS
INTERSECTION OPERATIONS ANALYSIS WORKSHEETS WITH
IMPROVEMENTS**

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Timings

East Highland Ranch (JN 15974)

1: Greenspot Rd. & Boulder Av.

12/23/2024

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT
Lane Configurations	 	 		 	 			 		 	 
Traffic Volume (vph)	54	522	162	524	1253	132	85	426	2	257	262
Future Volume (vph)	54	522	162	524	1253	132	85	426	2	257	262
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA
Protected Phases	7	4		3	8		1	6		5	2
Permitted Phases			4			8			6		
Detector Phase	7	4	4	3	8	8	1	6	6	5	2
Switch Phase											
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0
Minimum Split (s)	9.6	22.8	22.8	14.6	22.8	22.8	9.6	23.2	23.2	9.6	23.2
Total Split (s)	10.8	35.6	35.6	33.8	58.6	58.6	18.5	27.6	27.6	23.0	32.1
Total Split (%)	9.0%	29.7%	29.7%	28.2%	48.8%	48.8%	15.4%	23.0%	23.0%	19.2%	26.8%
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	4.8	3.6	5.2	5.2	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	4.6	5.8	5.8	4.6	5.8	5.8	4.6	6.2	6.2	4.6	6.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min
Act Effect Green (s)	6.0	25.2	25.2	21.9	44.1	44.1	10.0	17.2	17.2	14.0	24.3
Actuated g/C Ratio	0.06	0.25	0.25	0.22	0.44	0.44	0.10	0.17	0.17	0.14	0.24
v/c Ratio	0.33	0.58	0.32	0.79	0.79	0.18	0.56	0.69	0.01	0.68	0.64
Control Delay (s/veh)	57.6	36.9	7.3	47.7	29.8	6.1	62.5	47.5	0.0	53.2	25.1
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)	57.6	36.9	7.3	47.7	29.8	6.1	62.5	47.5	0.0	53.2	25.1
LOS	E	D	A	D	C	A	E	D	A	D	C
Approach Delay (s/veh)		31.9			33.0			49.8			33.2
Approach LOS		C			C			D			C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 100.6

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay (s/veh): 35.0

Intersection LOS: C

Intersection Capacity Utilization 80.8%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: Greenspot Rd. & Boulder Av.

 Ø1	 Ø2	 Ø3	 Ø4
18.5 s	32.1 s	33.8 s	35.6 s
 Ø5	 Ø6	 Ø7	 Ø8
23 s	27.6 s	10.8 s	58.6 s

HCM 7th Signalized Intersection Summary

East Highland Ranch (JN 15974)

1: Greenspot Rd. & Boulder Av.

12/23/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	54	522	162	524	1253	132	85	426	2	257	262	376
Future Volume (veh/h)	54	522	162	524	1253	132	85	426	2	257	262	376
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1673	1870	1870	1772	1870	1870	1772	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	56	538	135	540	1292	116	88	439	0	265	270	207
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	122	1056	442	627	1635	684	109	585		333	410	303
Arrive On Green	0.04	0.28	0.28	0.20	0.44	0.44	0.07	0.16	0.00	0.12	0.21	0.21
Sat Flow, veh/h	2837	3741	1565	3173	3741	1565	1586	3741	1585	2837	1997	1478
Grp Volume(v), veh/h	56	538	135	540	1292	116	88	439	0	265	252	225
Grp Sat Flow(s),veh/h/ln	1418	1870	1565	1586	1870	1565	1586	1870	1585	1418	1870	1604
Q Serve(g_s), s	1.7	10.4	5.8	14.2	25.6	3.9	4.7	9.7	0.0	7.8	10.7	11.2
Cycle Q Clear(g_c), s	1.7	10.4	5.8	14.2	25.6	3.9	4.7	9.7	0.0	7.8	10.7	11.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.92
Lane Grp Cap(c), veh/h	122	1056	442	627	1635	684	109	585		333	384	329
V/C Ratio(X)	0.46	0.51	0.31	0.86	0.79	0.17	0.81	0.75		0.79	0.66	0.68
Avail Cap(c_a), veh/h	204	1294	541	1075	2292	959	256	929		606	562	482
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.3	25.9	24.3	33.4	20.9	14.7	39.6	34.7	0.0	37.0	31.5	31.7
Incr Delay (d2), s/veh	1.0	0.4	0.4	1.5	1.3	0.1	5.2	2.0	0.0	1.6	1.9	2.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	4.3	2.0	5.1	9.9	1.2	1.9	4.2	0.0	2.6	4.7	4.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	41.3	26.3	24.7	34.9	22.1	14.9	44.7	36.7	0.0	38.7	33.4	34.2
LnGrp LOS	D	C	C	C	C	B	D	D		D	C	C
Approach Vol, veh/h	729			1948			527			742		
Approach Delay, s/veh	27.2			25.2			38.0			35.5		
Approach LOS	C			C			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.5	23.9	21.6	30.1	14.7	19.7	8.3	43.5				
Change Period (Y+Rc), s	4.6	6.2	4.6	5.8	4.6	6.2	4.6	5.8				
Max Green Setting (Gmax), s	13.9	25.9	29.2	29.8	18.4	21.4	6.2	52.8				
Max Q Clear Time (g_c+I1), s	6.7	13.2	16.2	12.4	9.8	11.7	3.7	27.6				
Green Ext Time (p_c), s	0.0	2.1	0.9	3.4	0.3	1.7	0.0	10.1				

Intersection Summary

HCM 7th Control Delay, s/veh	29.2
HCM 7th LOS	C

Notes

Unsignalized Delay for [SER] is excluded from calculations of the approach delay and intersection delay.

Timings

East Highland Ranch (JN 15974)

12/23/2024

7: Greenspot Rd. & Alta Vista



Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	59	373	1314	53
Future Volume (vph)	59	373	1314	53
Turn Type	Perm	NA	NA	Prot
Protected Phases		4	8	6
Permitted Phases	4			
Detector Phase	4	4	8	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	5.0
Minimum Split (s)	22.8	22.8	22.8	21.6
Total Split (s)	66.0	66.0	66.0	24.0
Total Split (%)	73.3%	73.3%	73.3%	26.7%
Yellow Time (s)	4.8	4.8	4.8	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	4.6
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	None	Min
Act Effect Green (s)	40.2	40.2	40.2	11.8
Actuated g/C Ratio	0.64	0.64	0.64	0.19
v/c Ratio	0.52	0.18	0.67	0.67
Control Delay (s/veh)	24.4	5.0	9.0	30.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay (s/veh)	24.4	5.0	9.0	30.5
LOS	C	A	A	C
Approach Delay (s/veh)		7.7	9.0	30.5
Approach LOS		A	A	C

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 63.2

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.67

Intersection Signal Delay (s/veh): 10.9

Intersection LOS: B

Intersection Capacity Utilization 72.8%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 7: Greenspot Rd. & Alta Vista

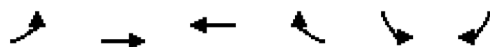


HCM 7th Signalized Intersection Summary

7: Greenspot Rd. & Alta Vista

East Highland Ranch (JN 15974)

12/23/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	59	373	1314	82	53	154
Future Volume (veh/h)	59	373	1314	82	53	154
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1772	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	67	424	1493	93	60	175
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	237	2365	2204	137	75	218
Arrive On Green	0.63	0.63	0.63	0.63	0.18	0.18
Sat Flow, veh/h	303	3741	3486	216	415	1210
Grp Volume(v), veh/h	67	424	798	788	236	0
Grp Sat Flow(s), veh/h/ln	303	1870	1870	1831	1632	0
Q Serve(g_s), s	10.2	2.6	15.2	15.4	7.7	0.0
Cycle Q Clear(g_c), s	25.5	2.6	15.2	15.4	7.7	0.0
Prop In Lane	1.00			0.12	0.25	0.74
Lane Grp Cap(c), veh/h	237	2365	1182	1158	294	0
V/C Ratio(X)	0.28	0.18	0.67	0.68	0.80	0.00
Avail Cap(c_a), veh/h	375	4068	2034	1992	572	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	14.8	4.2	6.5	6.6	21.8	0.0
Incr Delay (d2), s/veh	0.6	0.0	0.7	0.7	2.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.7	4.1	4.1	2.8	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	15.5	4.3	7.2	7.3	23.7	0.0
LnGrp LOS	B	A	A	A	C	
Approach Vol, veh/h		491	1586		236	
Approach Delay, s/veh		5.8	7.2		23.7	
Approach LOS		A	A		C	
Timer - Assigned Phs				4	6	8
Phs Duration (G+Y+Rc), s				40.8	14.6	40.8
Change Period (Y+Rc), s				5.8	4.6	5.8
Max Green Setting (Gmax), s				60.2	19.4	60.2
Max Q Clear Time (g_c+I1), s				27.5	9.7	17.4
Green Ext Time (p_c), s				5.1	0.3	17.6
Intersection Summary						
HCM 7th Control Delay, s/veh			8.6			
HCM 7th LOS			A			

Timings

East Highland Ranch (JN 15974)

1: Greenspot Rd. & Boulder Av.

12/23/2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	
Lane Configurations												
Traffic Volume (vph)	114	906	274	353	846	142	143	357	8	296	273	
Future Volume (vph)	114	906	274	353	846	142	143	357	8	296	273	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4			8			6			
Detector Phase	7	4	4	3	8	8	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	
Minimum Split (s)	9.6	22.8	22.8	14.6	22.8	22.8	9.6	23.2	23.2	9.6	23.2	
Total Split (s)	15.4	44.7	44.7	24.0	53.3	53.3	21.8	28.1	28.1	23.2	29.5	
Total Split (%)	12.8%	37.3%	37.3%	20.0%	44.4%	44.4%	18.2%	23.4%	23.4%	19.3%	24.6%	
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	4.8	3.6	5.2	5.2	3.6	5.2	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
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)	4.6	5.8	5.8	4.6	5.8	5.8	4.6	6.2	6.2	4.6	6.2	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	
Act Effct Green (s)	9.2	36.8	36.8	17.7	45.2	45.2	15.0	19.1	19.1	16.8	20.9	
Actuated g/C Ratio	0.08	0.33	0.33	0.16	0.40	0.40	0.13	0.17	0.17	0.15	0.19	
v/c Ratio	0.58	0.87	0.45	0.84	0.66	0.24	0.80	0.66	0.02	0.82	0.86	
Control Delay (s/veh)	62.0	45.1	7.0	62.4	30.4	9.6	75.5	49.7	0.1	64.1	41.8	
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)	62.0	45.1	7.0	62.4	30.4	9.6	75.5	49.7	0.1	64.1	41.8	
LOS	E	D	A	E	C	A	E	D	A	E	D	
Approach Delay (s/veh)		38.5			36.6			56.2			49.2	
Approach LOS		D			D			E			D	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 111.9

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay (s/veh): 42.5

Intersection LOS: D

Intersection Capacity Utilization 79.7%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: Greenspot Rd. & Boulder Av.

 Ø1	 Ø2	 Ø3	 Ø4
21.8 s	29.5 s	24 s	44.7 s
 Ø5	 Ø6	 Ø7	 Ø8
23.2 s	28.1 s	15.4 s	53.3 s

HCM 7th Signalized Intersection Summary

East Highland Ranch (JN 15974)

1: Greenspot Rd. & Boulder Av.

12/23/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	114	906	274	353	846	142	143	357	8	296	273	324
Future Volume (veh/h)	114	906	274	353	846	142	143	357	8	296	273	324
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1673	1870	1870	1772	1870	1870	1772	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	134	1066	286	415	995	145	168	420	0	348	321	190
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	185	1265	529	480	1586	664	196	594		404	396	229
Arrive On Green	0.07	0.34	0.34	0.15	0.42	0.42	0.12	0.16	0.00	0.14	0.18	0.18
Sat Flow, veh/h	2837	3741	1565	3173	3741	1565	1586	3741	1585	2837	2224	1285
Grp Volume(v), veh/h	134	1066	286	415	995	145	168	420	0	348	269	242
Grp Sat Flow(s),veh/h/ln	1418	1870	1565	1586	1870	1565	1586	1870	1585	1418	1870	1639
Q Serve(g_s), s	4.7	26.7	15.0	12.9	21.1	6.0	10.5	10.8	0.0	12.1	14.0	14.4
Cycle Q Clear(g_c), s	4.7	26.7	15.0	12.9	21.1	6.0	10.5	10.8	0.0	12.1	14.0	14.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.78
Lane Grp Cap(c), veh/h	185	1265	529	480	1586	664	196	594		404	333	292
V/C Ratio(X)	0.72	0.84	0.54	0.87	0.63	0.22	0.86	0.71		0.86	0.81	0.83
Avail Cap(c_a), veh/h	303	1437	601	608	1755	734	269	809		521	430	377
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.4	31.0	27.1	42.0	22.9	18.5	43.5	40.3	0.0	42.4	39.9	40.1
Incr Delay (d2), s/veh	2.0	4.3	0.9	8.8	0.6	0.2	14.1	1.8	0.0	9.3	8.5	11.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	12.0	5.3	5.4	8.6	2.0	4.7	4.8	0.0	4.6	6.9	6.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	48.4	35.3	28.0	50.7	23.5	18.7	57.6	42.1	0.0	51.7	48.4	51.6
LnGrp LOS	D	D	C	D	C	B	E	D		D	D	D
Approach Vol, veh/h	1486			1555			588			859		
Approach Delay, s/veh	35.1			30.3			46.5			50.6		
Approach LOS	D			C			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.1	24.2	19.9	40.0	19.0	22.3	11.2	48.7				
Change Period (Y+Rc), s	4.6	6.2	4.6	5.8	4.6	6.2	4.6	5.8				
Max Green Setting (Gmax), s	17.2	23.3	19.4	38.9	18.6	21.9	10.8	47.5				
Max Q Clear Time (g_c+l1), s	12.5	16.4	14.9	28.7	14.1	12.8	6.7	23.1				
Green Ext Time (p_c), s	0.1	1.6	0.4	5.5	0.3	1.6	0.1	7.3				

Intersection Summary

HCM 7th Control Delay, s/veh	37.9
HCM 7th LOS	D

Notes

Unsignalized Delay for [SER] is excluded from calculations of the approach delay and intersection delay.

Timings 7: Greenspot Rd. & Alta Vista

East Highland Ranch (JN 15974)
12/23/2024



Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	103	907	669	26
Future Volume (vph)	103	907	669	26
Turn Type	Perm	NA	NA	Prot
Protected Phases		4	8	6
Permitted Phases	4			
Detector Phase	4	4	8	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	5.0
Minimum Split (s)	22.8	22.8	22.8	21.6
Total Split (s)	60.0	60.0	60.0	30.0
Total Split (%)	66.7%	66.7%	66.7%	33.3%
Yellow Time (s)	4.8	4.8	4.8	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	4.6
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	None	Min
Act Effct Green (s)	20.3	20.3	20.3	7.2
Actuated g/C Ratio	0.52	0.52	0.52	0.19
v/c Ratio	0.36	0.52	0.39	0.34
Control Delay (s/veh)	9.6	7.3	6.3	8.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay (s/veh)	9.6	7.3	6.3	8.7
LOS	A	A	A	A
Approach Delay (s/veh)		7.5	6.3	8.7
Approach LOS		A	A	A

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 38.7

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.52

Intersection Signal Delay (s/veh): 7.1

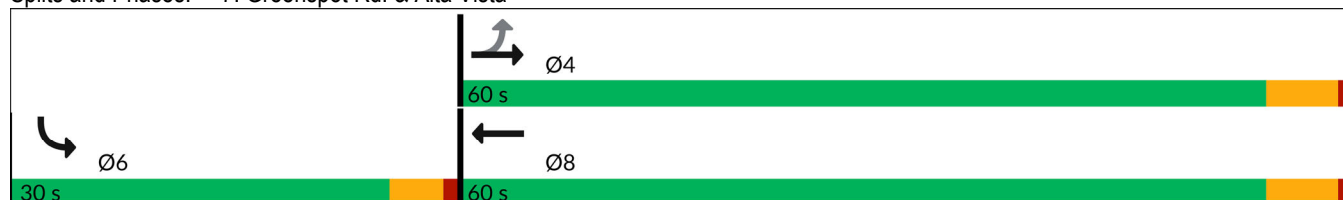
Intersection LOS: A

Intersection Capacity Utilization 47.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 7: Greenspot Rd. & Alta Vista

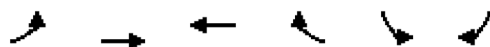


HCM 7th Signalized Intersection Summary

7: Greenspot Rd. & Alta Vista

East Highland Ranch (JN 15974)

12/23/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	103	907	669	13	26	91
Future Volume (veh/h)	103	907	669	13	26	91
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1772	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	116	1019	752	15	29	102
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	507	2175	2125	42	49	171
Arrive On Green	0.58	0.58	0.58	0.58	0.14	0.14
Sat Flow, veh/h	659	3741	3655	73	357	1257
Grp Volume(v), veh/h	116	1019	385	382	132	0
Grp Sat Flow(s),veh/h/ln	659	1870	1870	1857	1626	0
Q Serve(g_s), s	4.1	5.8	4.0	4.0	2.8	0.0
Cycle Q Clear(g_c), s	8.1	5.8	4.0	4.0	2.8	0.0
Prop In Lane	1.00			0.04	0.22	0.77
Lane Grp Cap(c), veh/h	507	2175	1087	1080	221	0
V/C Ratio(X)	0.23	0.47	0.35	0.35	0.60	0.00
Avail Cap(c_a), veh/h	1095	5511	2756	2736	1123	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	6.2	4.4	4.1	4.1	14.9	0.0
Incr Delay (d2), s/veh	0.2	0.2	0.2	0.2	1.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	1.0	0.7	0.7	0.9	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	6.4	4.6	4.3	4.3	15.9	0.0
LnGrp LOS	A	A	A	A	B	
Approach Vol, veh/h		1135	767		132	
Approach Delay, s/veh		4.8	4.3		15.9	
Approach LOS		A	A		B	
Timer - Assigned Phs				4	6	8
Phs Duration (G+Y+Rc), s				27.2	9.6	27.2
Change Period (Y+Rc), s				5.8	4.6	5.8
Max Green Setting (Gmax), s				54.2	25.4	54.2
Max Q Clear Time (g_c+I1), s				10.1	4.8	6.0
Green Ext Time (p_c), s				11.3	0.2	5.7
Intersection Summary						
HCM 7th Control Delay, s/veh			5.3			
HCM 7th LOS			A			

Timings

East Highland Ranch (JN 15974)

1: Greenspot Rd. & Boulder Av.

12/23/2024

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT
Lane Configurations											
Traffic Volume (vph)	116	1174	348	352	725	105	143	410	9	331	345
Future Volume (vph)	116	1174	348	352	725	105	143	410	9	331	345
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA
Protected Phases	7	4		3	8		1	6		5	2
Permitted Phases			4			8			6		
Detector Phase	7	4	4	3	8	8	1	6	6	5	2
Switch Phase											
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0
Minimum Split (s)	9.6	22.8	22.8	14.6	22.8	22.8	9.6	23.2	23.2	9.6	23.2
Total Split (s)	14.8	48.0	48.0	21.0	54.2	54.2	19.0	28.4	28.4	22.6	32.0
Total Split (%)	12.3%	40.0%	40.0%	17.5%	45.2%	45.2%	15.8%	23.7%	23.7%	18.8%	26.7%
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	4.8	3.6	5.2	5.2	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	4.6	5.8	5.8	4.6	5.8	5.8	4.6	6.2	6.2	4.6	6.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min
Act Effect Green (s)	8.7	40.9	40.9	15.6	47.7	47.7	13.1	19.9	19.9	16.6	23.3
Actuated g/C Ratio	0.08	0.36	0.36	0.14	0.42	0.42	0.11	0.17	0.17	0.15	0.20
v/c Ratio	0.56	0.91	0.48	0.85	0.48	0.15	0.81	0.65	0.02	0.84	0.86
Control Delay (s/veh)	62.7	46.6	7.9	67.9	26.2	4.3	82.9	49.7	0.1	66.9	42.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	62.7	46.6	7.9	67.9	26.2	4.3	82.9	49.7	0.1	66.9	42.6
LOS	E	D	A	E	C	A	F	D	A	E	D
Approach Delay (s/veh)		39.5			36.7			57.3			50.2
Approach LOS		D			D			E			D

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 114.3

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay (s/veh): 43.6

Intersection LOS: D

Intersection Capacity Utilization 90.7%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 1: Greenspot Rd. & Boulder Av.

			
Ø1	Ø2	Ø3	Ø4
19 s	32 s	21 s	48 s
			
Ø5	Ø6	Ø7	Ø8
22.6 s	28.4 s	14.8 s	54.2 s

HCM 7th Signalized Intersection Summary

East Highland Ranch (JN 15974)

1: Greenspot Rd. & Boulder Av.

12/23/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	116	1174	348	352	725	105	143	410	9	331	345	376
Future Volume (veh/h)	116	1174	348	352	725	105	143	410	9	331	345	376
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1673	1870	1870	1772	1870	1870	1772	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	120	1210	313	363	747	88	147	423	0	341	356	194
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	168	1383	579	421	1659	694	173	594		394	433	232
Arrive On Green	0.06	0.37	0.37	0.13	0.44	0.44	0.11	0.16	0.00	0.14	0.19	0.19
Sat Flow, veh/h	2837	3741	1565	3173	3741	1565	1586	3741	1585	2837	2293	1227
Grp Volume(v), veh/h	120	1210	313	363	747	88	147	423	0	341	289	261
Grp Sat Flow(s),veh/h/ln	1418	1870	1565	1586	1870	1565	1586	1870	1585	1418	1870	1650
Q Serve(g_s), s	4.4	32.0	16.7	11.9	14.7	3.5	9.7	11.4	0.0	12.5	15.7	16.2
Cycle Q Clear(g_c), s	4.4	32.0	16.7	11.9	14.7	3.5	9.7	11.4	0.0	12.5	15.7	16.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.74
Lane Grp Cap(c), veh/h	168	1383	579	421	1659	694	173	594		394	353	311
V/C Ratio(X)	0.71	0.87	0.54	0.86	0.45	0.13	0.85	0.71		0.87	0.82	0.84
Avail Cap(c_a), veh/h	273	1488	623	490	1707	714	215	783		481	455	401
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.0	31.1	26.3	45.0	20.5	17.4	46.4	42.3	0.0	44.7	41.3	41.5
Incr Delay (d2), s/veh	2.1	5.8	0.8	11.7	0.2	0.1	19.3	2.1	0.0	11.5	8.9	11.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	14.5	5.9	5.2	5.9	1.2	4.6	5.2	0.0	4.9	7.8	7.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	51.2	37.0	27.1	56.8	20.7	17.5	65.7	44.4	0.0	56.2	50.2	53.1
LnGrp LOS	D	D	C	E	C	B	E	D		E	D	D
Approach Vol, veh/h	1643			1198			570			891		
Approach Delay, s/veh	36.1			31.4			49.9			53.3		
Approach LOS	D			C			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.1	26.2	18.7	45.0	19.3	23.1	10.9	52.8				
Change Period (Y+Rc), s	4.6	6.2	4.6	5.8	4.6	6.2	4.6	5.8				
Max Green Setting (Gmax), s	14.4	25.8	16.4	42.2	18.0	22.2	10.2	48.4				
Max Q Clear Time (g_c+I1), s	11.7	18.2	13.9	34.0	14.5	13.4	6.4	16.7				
Green Ext Time (p_c), s	0.0	1.9	0.2	5.3	0.2	1.6	0.1	5.3				

Intersection Summary

HCM 7th Control Delay, s/veh	40.2
HCM 7th LOS	D

Notes

Unsignalized Delay for [SER] is excluded from calculations of the approach delay and intersection delay.

Timings

East Highland Ranch (JN 15974)

7: Greenspot Rd. & Alta Vista

12/23/2024



Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	119	1308	570	22
Future Volume (vph)	119	1308	570	22
Turn Type	Perm	NA	NA	Prot
Protected Phases		4	8	6
Permitted Phases	4			
Detector Phase	4	4	8	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	5.0
Minimum Split (s)	22.8	22.8	22.8	21.6
Total Split (s)	63.0	63.0	63.0	27.0
Total Split (%)	70.0%	70.0%	70.0%	30.0%
Yellow Time (s)	4.8	4.8	4.8	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	4.6
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	None	Min
Act Effct Green (s)	31.2	31.2	31.2	7.3
Actuated g/C Ratio	0.63	0.63	0.63	0.15
v/c Ratio	0.28	0.59	0.27	0.37
Control Delay (s/veh)	6.3	6.7	4.4	12.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay (s/veh)	6.3	6.7	4.4	12.1
LOS	A	A	A	B
Approach Delay (s/veh)		6.7	4.4	12.1
Approach LOS		A	A	B

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 49.9

Natural Cycle: 55

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.59

Intersection Signal Delay (s/veh): 6.3

Intersection LOS: A

Intersection Capacity Utilization 51.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 7: Greenspot Rd. & Alta Vista



HCM 7th Signalized Intersection Summary

7: Greenspot Rd. & Alta Vista

East Highland Ranch (JN 15974)

12/23/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	119	1308	570	15	22	91
Future Volume (veh/h)	119	1308	570	15	22	91
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1772	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	125	1377	600	16	23	96
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	599	2408	2335	62	37	155
Arrive On Green	0.64	0.64	0.64	0.64	0.12	0.12
Sat Flow, veh/h	758	3741	3627	97	311	1297
Grp Volume(v), veh/h	125	1377	309	307	120	0
Grp Sat Flow(s), veh/h/ln	758	1870	1870	1853	1621	0
Q Serve(g_s), s	3.7	9.1	3.1	3.1	3.1	0.0
Cycle Q Clear(g_c), s	6.8	9.1	3.1	3.1	3.1	0.0
Prop In Lane	1.00			0.05	0.19	0.80
Lane Grp Cap(c), veh/h	599	2408	1204	1193	194	0
V/C Ratio(X)	0.21	0.57	0.26	0.26	0.62	0.00
Avail Cap(c_a), veh/h	1098	4872	2436	2413	827	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	4.8	4.4	3.3	3.3	18.4	0.0
Incr Delay (d2), s/veh	0.2	0.2	0.1	0.1	1.2	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	1.7	0.6	0.6	1.1	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	5.0	4.6	3.5	3.5	19.6	0.0
LnGrp LOS	A	A	A	A	B	
Approach Vol, veh/h		1502	616		120	
Approach Delay, s/veh		4.7	3.5		19.6	
Approach LOS		A	A		B	
Timer - Assigned Phs				4	6	8
Phs Duration (G+Y+Rc), s				34.1	9.8	34.1
Change Period (Y+Rc), s				5.8	4.6	5.8
Max Green Setting (Gmax), s				57.2	22.4	57.2
Max Q Clear Time (g_c+I1), s				11.1	5.1	5.1
Green Ext Time (p_c), s				17.2	0.2	4.3
Intersection Summary						
HCM 7th Control Delay, s/veh			5.1			
HCM 7th LOS			A			

**APPENDIX 6.6: CUMULATIVE (2050) WITH PROJECT CONDITIONS
INTERSECTION OPERATIONS ANALYSIS WORKSHEETS WITH
IMPROVEMENTS**

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Timings

East Highland Ranch (JN 15974)

1: Greenspot Rd. & Boulder Av.

12/23/2024

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT
Lane Configurations											
Traffic Volume (vph)	54	536	162	527	1291	135	86	426	2	257	262
Future Volume (vph)	54	536	162	527	1291	135	86	426	2	257	262
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA
Protected Phases	7	4		3	8		1	6		5	2
Permitted Phases			4			8			6		
Detector Phase	7	4	4	3	8	8	1	6	6	5	2
Switch Phase											
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0
Minimum Split (s)	9.6	22.8	22.8	14.6	22.8	22.8	9.6	23.2	23.2	9.6	23.2
Total Split (s)	10.0	35.0	35.0	34.0	59.0	59.0	18.0	29.0	29.0	22.0	33.0
Total Split (%)	8.3%	29.2%	29.2%	28.3%	49.2%	49.2%	15.0%	24.2%	24.2%	18.3%	27.5%
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	4.8	3.6	5.2	5.2	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	4.6	5.8	5.8	4.6	5.8	5.8	4.6	6.2	6.2	4.6	6.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min
Act Effct Green (s)	5.5	25.4	25.4	22.1	44.9	44.9	10.0	17.6	17.6	13.8	24.5
Actuated g/C Ratio	0.05	0.25	0.25	0.22	0.44	0.44	0.10	0.17	0.17	0.14	0.24
v/c Ratio	0.36	0.59	0.32	0.79	0.81	0.18	0.57	0.68	0.01	0.69	0.64
Control Delay (s/veh)	59.7	37.4	7.3	47.8	30.0	6.2	63.4	46.9	0.0	54.2	24.9
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)	59.7	37.4	7.3	47.8	30.0	6.2	63.4	46.9	0.0	54.2	24.9
LOS	E	D	A	D	C	A	E	D	A	D	C
Approach Delay (s/veh)		32.5			33.1			49.5			33.3
Approach LOS		C			C			D			C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 101.1

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay (s/veh): 35.1

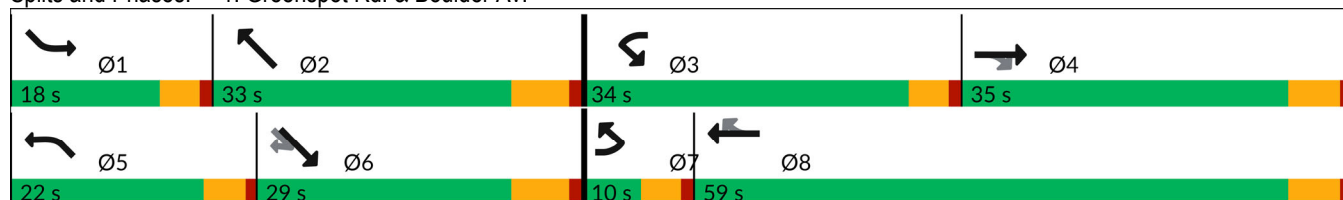
Intersection LOS: D

Intersection Capacity Utilization 81.9%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: Greenspot Rd. & Boulder Av.



HCM 7th Signalized Intersection Summary

East Highland Ranch (JN 15974)

1: Greenspot Rd. & Boulder Av.

12/23/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	54	536	162	527	1291	135	86	426	2	257	262	377
Future Volume (veh/h)	54	536	162	527	1291	135	86	426	2	257	262	377
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1673	1870	1870	1772	1870	1870	1772	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	56	553	135	543	1331	119	89	439	0	265	270	236
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	120	1082	453	628	1665	697	110	586		331	382	322
Arrive On Green	0.04	0.29	0.29	0.20	0.45	0.45	0.07	0.16	0.00	0.12	0.20	0.20
Sat Flow, veh/h	2837	3741	1565	3173	3741	1565	1586	3741	1585	2837	1875	1581
Grp Volume(v), veh/h	56	553	135	543	1331	119	89	439	0	265	269	237
Grp Sat Flow(s),veh/h/ln	1418	1870	1565	1586	1870	1565	1586	1870	1585	1418	1870	1586
Q Serve(g_s), s	1.7	10.9	5.9	14.7	27.1	4.0	4.9	9.9	0.0	8.1	11.9	12.4
Cycle Q Clear(g_c), s	1.7	10.9	5.9	14.7	27.1	4.0	4.9	9.9	0.0	8.1	11.9	12.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	120	1082	453	628	1665	697	110	586		331	381	323
V/C Ratio(X)	0.47	0.51	0.30	0.86	0.80	0.17	0.81	0.75		0.80	0.71	0.73
Avail Cap(c_a), veh/h	173	1234	516	1054	2248	941	240	964		558	566	480
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.4	26.2	24.5	34.4	21.2	14.8	40.6	35.7	0.0	38.1	32.8	33.0
Incr Delay (d2), s/veh	1.1	0.4	0.4	1.9	1.5	0.1	5.1	2.0	0.0	1.7	2.4	3.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	4.6	2.1	5.4	10.5	1.3	2.0	4.4	0.0	2.7	5.3	4.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	42.5	26.6	24.8	36.3	22.7	14.9	45.7	37.6	0.0	39.8	35.2	36.2
LnGrp LOS	D	C	C	D	C	B	D	D		D	D	D
Approach Vol, veh/h	744			1993			528			771		
Approach Delay, s/veh	27.5			25.9			39.0			37.1		
Approach LOS	C			C			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.8	24.2	22.1	31.4	14.9	20.1	8.3	45.2				
Change Period (Y+Rc), s	4.6	6.2	4.6	5.8	4.6	6.2	4.6	5.8				
Max Green Setting (Gmax), s	13.4	26.8	29.4	29.2	17.4	22.8	5.4	53.2				
Max Q Clear Time (g_c+I1), s	6.9	14.4	16.7	12.9	10.1	11.9	3.7	29.1				
Green Ext Time (p_c), s	0.0	2.3	0.9	3.5	0.3	1.8	0.0	10.3				

Intersection Summary

HCM 7th Control Delay, s/veh	30.1
HCM 7th LOS	C

Notes

Unsignalized Delay for [SER] is excluded from calculations of the approach delay and intersection delay.

Timings 7: Greenspot Rd. & Alta Vista

East Highland Ranch (JN 15974)
12/23/2024



Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	76	373	1314	56
Future Volume (vph)	76	373	1314	56
Turn Type	Perm	NA	NA	Prot
Protected Phases		4	8	6
Permitted Phases	4			
Detector Phase	4	4	8	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	5.0
Minimum Split (s)	22.8	22.8	22.8	21.6
Total Split (s)	65.0	65.0	65.0	25.0
Total Split (%)	72.2%	72.2%	72.2%	27.8%
Yellow Time (s)	4.8	4.8	4.8	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	4.6
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	None	Min
Act Effct Green (s)	43.3	43.3	43.3	14.6
Actuated g/C Ratio	0.63	0.63	0.63	0.21
v/c Ratio	0.71	0.18	0.69	0.75
Control Delay (s/veh)	45.6	5.7	10.2	36.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay (s/veh)	45.6	5.7	10.2	36.5
LOS	D	A	B	D
Approach Delay (s/veh)		12.5	10.2	36.5
Approach LOS		B	B	D

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 69.2

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay (s/veh): 13.9

Intersection LOS: B

Intersection Capacity Utilization 76.3%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 7: Greenspot Rd. & Alta Vista

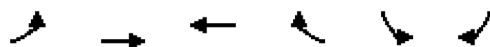


HCM 7th Signalized Intersection Summary

7: Greenspot Rd. & Alta Vista

East Highland Ranch (JN 15974)

12/23/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	76	373	1314	83	56	201
Future Volume (veh/h)	76	373	1314	83	56	201
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1772	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	86	424	1493	94	64	228
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	217	2376	2212	139	74	264
Arrive On Green	0.64	0.64	0.64	0.64	0.21	0.21
Sat Flow, veh/h	302	3741	3483	218	355	1265
Grp Volume(v), veh/h	86	424	799	788	293	0
Grp Sat Flow(s), veh/h/ln	302	1870	1870	1831	1625	0
Q Serve(g_s), s	17.0	3.1	18.1	18.4	11.6	0.0
Cycle Q Clear(g_c), s	35.3	3.1	18.1	18.4	11.6	0.0
Prop In Lane	1.00			0.12	0.22	0.78
Lane Grp Cap(c), veh/h	217	2376	1188	1163	339	0
V/C Ratio(X)	0.40	0.18	0.67	0.68	0.86	0.00
Avail Cap(c_a), veh/h	293	3324	1662	1627	498	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	19.1	5.0	7.7	7.8	25.4	0.0
Incr Delay (d2), s/veh	1.2	0.0	0.7	0.7	7.3	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.9	5.6	5.6	4.9	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	20.3	5.0	8.4	8.5	32.8	0.0
LnGrp LOS	C	A	A	A	C	
Approach Vol, veh/h		510	1587		293	
Approach Delay, s/veh		7.6	8.4		32.8	
Approach LOS		A	A		C	
Timer - Assigned Phs				4	6	8
Phs Duration (G+Y+Rc), s				48.1	18.5	48.1
Change Period (Y+Rc), s				5.8	4.6	5.8
Max Green Setting (Gmax), s				59.2	20.4	59.2
Max Q Clear Time (g_c+I1), s				37.3	13.6	20.4
Green Ext Time (p_c), s				5.0	0.3	17.0
Intersection Summary						
HCM 7th Control Delay, s/veh			11.2			
HCM 7th LOS			B			

Timings

East Highland Ranch (JN 15974)

1: Greenspot Rd. & Boulder Av.

12/23/2024

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT
Lane Configurations											
Traffic Volume (vph)	114	950	274	355	871	144	146	357	8	296	273
Future Volume (vph)	114	950	274	355	871	144	146	357	8	296	273
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA
Protected Phases	7	4		3	8		1	6		5	2
Permitted Phases			4			8			6		
Detector Phase	7	4	4	3	8	8	1	6	6	5	2
Switch Phase											
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0
Minimum Split (s)	9.6	22.8	22.8	14.6	22.8	22.8	9.6	23.2	23.2	9.6	23.2
Total Split (s)	15.4	45.0	45.0	23.0	52.6	52.6	21.0	28.9	28.9	23.1	31.0
Total Split (%)	12.8%	37.5%	37.5%	19.2%	43.8%	43.8%	17.5%	24.1%	24.1%	19.3%	25.8%
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	4.8	3.6	5.2	5.2	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
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)	4.6	5.8	5.8	4.6	5.8	5.8	4.6	6.2	6.2	4.6	6.2
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min
Act Effect Green (s)	9.2	37.8	37.8	17.4	46.0	46.0	14.9	19.5	19.5	16.9	21.5
Actuated g/C Ratio	0.08	0.33	0.33	0.15	0.41	0.41	0.13	0.17	0.17	0.15	0.19
v/c Ratio	0.59	0.90	0.45	0.86	0.68	0.24	0.83	0.65	0.02	0.83	0.85
Control Delay (s/veh)	62.5	47.3	7.7	65.9	31.0	9.8	80.5	49.3	0.1	65.0	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
Total Delay (s/veh)	62.5	47.3	7.7	65.9	31.0	9.8	80.5	49.3	0.1	65.0	40.5
LOS	E	D	A	E	C	A	F	D	A	E	D
Approach Delay (s/veh)		40.5			37.8			57.5			48.6
Approach LOS		D			D			E			D

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 113

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay (s/veh): 43.5

Intersection LOS: D

Intersection Capacity Utilization 81.2%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: Greenspot Rd. & Boulder Av.

 Ø1	 Ø2	 Ø3	 Ø4
21 s	31 s	23 s	45 s
 Ø5	 Ø6	 Ø7	 Ø8
23.1 s	28.9 s	15.4 s	52.6 s

HCM 7th Signalized Intersection Summary
1: Greenspot Rd. & Boulder Av.

East Highland Ranch (JN 15974)

12/23/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations	 	 		 	 			 		 	 	
Traffic Volume (veh/h)	114	950	274	355	871	144	146	357	8	296	273	327
Future Volume (veh/h)	114	950	274	355	871	144	146	357	8	296	273	327
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1673	1870	1870	1772	1870	1870	1772	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	134	1118	286	418	1025	147	172	420	0	348	321	211
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	183	1278	535	476	1599	669	198	627		401	391	251
Arrive On Green	0.06	0.34	0.34	0.15	0.43	0.43	0.13	0.17	0.00	0.14	0.18	0.18
Sat Flow, veh/h	2837	3741	1565	3173	3741	1565	1586	3741	1585	2837	2129	1366
Grp Volume(v), veh/h	134	1118	286	418	1025	147	172	420	0	348	281	251
Grp Sat Flow(s),veh/h/ln	1418	1870	1565	1586	1870	1565	1586	1870	1585	1418	1870	1624
Q Serve(g_s), s	4.9	29.8	15.7	13.7	23.0	6.3	11.3	11.2	0.0	12.8	15.4	15.9
Cycle Q Clear(g_c), s	4.9	29.8	15.7	13.7	23.0	6.3	11.3	11.2	0.0	12.8	15.4	15.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.84
Lane Grp Cap(c), veh/h	183	1278	535	476	1599	669	198	627		401	344	299
V/C Ratio(X)	0.73	0.87	0.53	0.88	0.64	0.22	0.87	0.67		0.87	0.82	0.84
Avail Cap(c_a), veh/h	288	1378	577	549	1646	689	245	798		493	436	379
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.9	32.9	28.2	44.2	24.0	19.3	45.7	41.5	0.0	44.7	41.7	41.9
Incr Delay (d2), s/veh	2.1	6.2	0.8	12.4	0.8	0.2	20.1	1.5	0.0	11.4	9.3	12.7
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	13.8	5.6	6.0	9.5	2.2	5.4	5.1	0.0	5.0	7.7	7.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	51.0	39.1	29.0	56.7	24.8	19.4	65.8	43.0	0.0	56.1	51.0	54.6
LnGrp LOS	D	D	C	E	C	B	E	D		E	D	D
Approach Vol, veh/h	1538			1590			592			880		
Approach Delay, s/veh	38.3			32.7			49.6			54.0		
Approach LOS	D			C			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.9	25.8	20.6	42.2	19.6	24.0	11.5	51.3				
Change Period (Y+Rc), s	4.6	6.2	4.6	5.8	4.6	6.2	4.6	5.8				
Max Green Setting (Gmax), s	16.4	24.8	18.4	39.2	18.5	22.7	10.8	46.8				
Max Q Clear Time (g_c+l1), s	13.3	17.9	15.7	31.8	14.8	13.2	6.9	25.0				
Green Ext Time (p_c), s	0.1	1.7	0.3	4.5	0.3	1.6	0.1	7.3				

Intersection Summary

HCM 7th Control Delay, s/veh	40.8
HCM 7th LOS	D

Notes

Unsignalized Delay for [SER] is excluded from calculations of the approach delay and intersection delay.

Timings

East Highland Ranch (JN 15974)

7: Greenspot Rd. & Alta Vista

12/23/2024



Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	157	907	669	28
Future Volume (vph)	157	907	669	28
Turn Type	Perm	NA	NA	Prot
Protected Phases		4	8	6
Permitted Phases	4			
Detector Phase	4	4	8	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	5.0
Minimum Split (s)	22.8	22.8	22.8	22.8
Total Split (s)	63.0	63.0	63.0	27.0
Total Split (%)	70.0%	70.0%	70.0%	30.0%
Yellow Time (s)	4.8	4.8	4.8	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	4.6
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	None	Min
Act Effct Green (s)	23.9	23.9	23.9	7.5
Actuated g/C Ratio	0.56	0.56	0.56	0.17
v/c Ratio	0.51	0.49	0.37	0.42
Control Delay (s/veh)	12.0	6.5	5.6	10.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay (s/veh)	12.0	6.5	5.6	10.2
LOS	B	A	A	B
Approach Delay (s/veh)		7.3	5.6	10.2
Approach LOS		A	A	B

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 43

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.51

Intersection Signal Delay (s/veh): 6.9

Intersection LOS: A

Intersection Capacity Utilization 50.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 7: Greenspot Rd. & Alta Vista

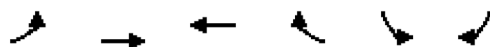


HCM 7th Signalized Intersection Summary

7: Greenspot Rd. & Alta Vista

East Highland Ranch (JN 15974)

12/23/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	157	907	669	16	28	122
Future Volume (veh/h)	157	907	669	16	28	122
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1772	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	176	1019	752	18	31	137
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	500	2280	2217	53	45	198
Arrive On Green	0.61	0.61	0.61	0.61	0.15	0.15
Sat Flow, veh/h	657	3741	3638	87	297	1313
Grp Volume(v), veh/h	176	1019	387	383	169	0
Grp Sat Flow(s),veh/h/ln	657	1870	1870	1855	1619	0
Q Serve(g_s), s	7.8	6.3	4.4	4.4	4.3	0.0
Cycle Q Clear(g_c), s	12.2	6.3	4.4	4.4	4.3	0.0
Prop In Lane	1.00			0.05	0.18	0.81
Lane Grp Cap(c), veh/h	500	2280	1140	1130	244	0
V/C Ratio(X)	0.35	0.45	0.34	0.34	0.69	0.00
Avail Cap(c_a), veh/h	967	4939	2469	2449	837	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	7.2	4.5	4.2	4.2	17.5	0.0
Incr Delay (d2), s/veh	0.4	0.1	0.2	0.2	1.3	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	1.3	0.9	0.9	1.5	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	7.6	4.7	4.3	4.3	18.8	0.0
LnGrp LOS	A	A	A	A	B	
Approach Vol, veh/h		1195	770		169	
Approach Delay, s/veh		5.1	4.3		18.8	
Approach LOS		A	A		B	
Timer - Assigned Phs				4	6	8
Phs Duration (G+Y+Rc), s				32.2	11.1	32.2
Change Period (Y+Rc), s				5.8	4.6	5.8
Max Green Setting (Gmax), s				57.2	22.4	57.2
Max Q Clear Time (g_c+I1), s				14.2	6.3	6.4
Green Ext Time (p_c), s				12.2	0.2	5.7
Intersection Summary						
HCM 7th Control Delay, s/veh			5.9			
HCM 7th LOS			A			

Timings

East Highland Ranch (JN 15974)

1: Greenspot Rd. & Boulder Av.

12/23/2024

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SET	SER	NWL	NWT	Ø1
Lane Configurations											
Traffic Volume (vph)	116	1218	348	354	750	107	410	9	331	345	
Future Volume (vph)	116	1218	348	354	750	107	410	9	331	345	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		6		5	2	1
Permitted Phases			4			8		6			
Detector Phase	7	4	4	3	8	8	6	6	5	2	
Switch Phase											
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	10.0	10.0	5.0	10.0	5.0
Minimum Split (s)	9.6	22.8	22.8	14.6	22.8	22.8	23.2	23.2	9.6	23.2	9.6
Total Split (s)	12.2	32.0	32.0	16.0	35.8	35.8	59.0	59.0	13.0	62.4	9.6
Total Split (%)	10.2%	26.7%	26.7%	13.3%	29.8%	29.8%	49.2%	49.2%	10.8%	52.0%	8%
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	4.8	5.2	5.2	3.6	5.2	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.6	5.8	5.8	4.6	5.8	5.8	6.2	6.2	4.6	6.2	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	Min	None	Min	None
Act Effct Green (s)	7.4	26.2	26.2	11.4	30.2	30.2	52.8	52.8	8.4	65.8	
Actuated g/C Ratio	0.06	0.22	0.22	0.10	0.25	0.25	0.44	0.44	0.07	0.55	
v/c Ratio	0.69	1.54	0.68	1.22	0.82	0.23	2.24	0.01	1.73	0.38	
Control Delay (s/veh)	76.1	284.7	21.2	171.0	51.0	7.4	592.9	0.0	382.6	10.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay (s/veh)	76.1	284.7	21.2	171.0	51.0	7.4	592.9	0.0	382.6	10.7	
LOS	E	F	C	F	D	A	F	A	F	B	
Approach Delay (s/veh)		215.7			82.2		583.7			127.3	
Approach LOS		F			F		F			F	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 2.24

Intersection Signal Delay (s/veh): 205.4

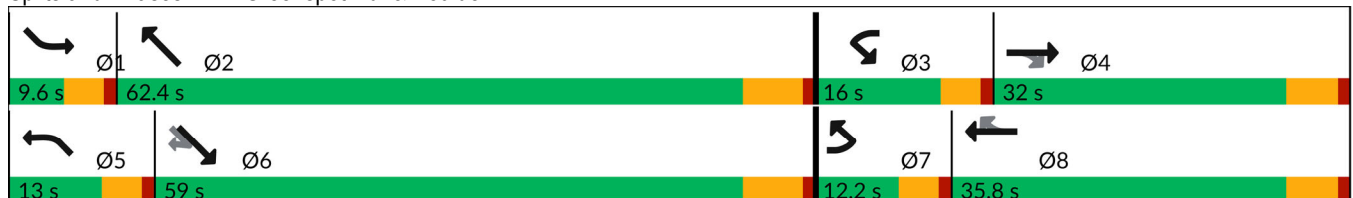
Intersection LOS: F

Intersection Capacity Utilization 100.6%

ICU Level of Service G

Analysis Period (min) 15

Splits and Phases: 1: Greenspot Rd. & Boulder Av.



HCM 7th Signalized Intersection Summary
1: Greenspot Rd. & Boulder Av.

East Highland Ranch (JN 15974)

12/23/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations	 	 		 	 			 		 	 	 
Traffic Volume (veh/h)	116	1218	348	354	750	107	146	410	9	331	345	379
Future Volume (veh/h)	116	1218	348	354	750	107	146	410	9	331	345	379
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1673	1870	1870	1772	1870	1870	1772	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	120	1256	327	365	773	90	151	423	0	341	356	226
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	177	1225	512	436	1506	630	0	618		298	706	440
Arrive On Green	0.06	0.33	0.33	0.14	0.40	0.40	0.00	0.17	0.00	0.10	0.33	0.33
Sat Flow, veh/h	2837	3741	1565	3173	3741	1565	0	3741	1585	2837	2155	1344
Grp Volume(v), veh/h	120	1256	327	365	773	90	0	423	0	341	308	274
Grp Sat Flow(s),veh/h/ln	1418	1870	1565	1586	1870	1565	0	1870	1585	1418	1870	1629
Q Serve(g_s), s	3.3	26.2	14.2	9.0	12.5	2.9	0.0	8.5	0.0	8.4	10.6	10.9
Cycle Q Clear(g_c), s	3.3	26.2	14.2	9.0	12.5	2.9	0.0	8.5	0.0	8.4	10.6	10.9
Prop In Lane	1.00		1.00	1.00		1.00	0.00		1.00	1.00		0.82
Lane Grp Cap(c), veh/h	177	1225	512	436	1506	630	0	618		298	613	534
V/C Ratio(X)	0.68	1.03	0.64	0.84	0.51	0.14	0.00	0.68		1.15	0.50	0.51
Avail Cap(c_a), veh/h	269	1225	512	452	1506	630	0	2468		298	1313	1144
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.7	26.9	22.9	33.6	18.0	15.1	0.0	31.4	0.0	35.8	21.7	21.7
Incr Delay (d2), s/veh	1.7	32.5	2.6	11.7	0.3	0.1	0.0	1.4	0.0	97.4	0.6	0.8
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	15.9	5.0	3.9	4.7	0.9	0.0	3.6	0.0	6.7	4.3	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	38.5	59.4	25.5	45.4	18.3	15.3	0.0	32.8	0.0	133.2	22.3	22.5
LnGrp LOS	D	F	C	D	B	B		C		F	C	C
Approach Vol, veh/h	1703			1228			423			923		
Approach Delay, s/veh	51.4			26.1			32.8			63.3		
Approach LOS	D			C			C			E		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	0.0	32.4	15.6	32.0	13.0	19.4	9.6	38.0				
Change Period (Y+Rc), s	4.6	6.2	4.6	5.8	4.6	6.2	4.6	5.8				
Max Green Setting (Gmax), s	5.0	56.2	11.4	26.2	8.4	52.8	7.6	30.0				
Max Q Clear Time (g_c+I1), s	0.0	12.9	11.0	28.2	10.4	10.5	5.3	14.5				
Green Ext Time (p_c), s	0.0	3.6	0.0	0.0	0.0	2.6	0.0	4.5				

Intersection Summary

HCM 7th Control Delay, s/veh	44.9
HCM 7th LOS	D

Notes

Unsignalized Delay for [SER] is excluded from calculations of the approach delay and intersection delay.

Timings

East Highland Ranch (JN 15974)

7: Greenspot Rd. & Alta Vista

12/23/2024



Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Traffic Volume (vph)	173	1308	570	24
Future Volume (vph)	173	1308	570	24
Turn Type	Perm	NA	NA	Prot
Protected Phases		4	8	6
Permitted Phases	4			
Detector Phase	4	4	8	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	5.0
Minimum Split (s)	22.8	22.8	22.8	21.6
Total Split (s)	63.0	63.0	63.0	27.0
Total Split (%)	70.0%	70.0%	70.0%	30.0%
Yellow Time (s)	4.8	4.8	4.8	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	4.6
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	None	Min
Act Effct Green (s)	32.6	32.6	32.6	7.5
Actuated g/C Ratio	0.63	0.63	0.63	0.15
v/c Ratio	0.40	0.58	0.26	0.44
Control Delay (s/veh)	7.9	6.5	4.3	12.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay (s/veh)	7.9	6.5	4.3	12.3
LOS	A	A	A	B
Approach Delay (s/veh)		6.7	4.3	12.3
Approach LOS		A	A	B

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 51.5

Natural Cycle: 55

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.58

Intersection Signal Delay (s/veh): 6.4

Intersection LOS: A

Intersection Capacity Utilization 53.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 7: Greenspot Rd. & Alta Vista

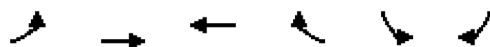


HCM 7th Signalized Intersection Summary

7: Greenspot Rd. & Alta Vista

East Highland Ranch (JN 15974)

12/23/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	173	1308	570	18	24	122
Future Volume (veh/h)	173	1308	570	18	24	122
Initial Q (Qb), veh	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1772	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	182	1377	600	19	25	128
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	583	2390	2304	73	36	186
Arrive On Green	0.64	0.64	0.64	0.64	0.14	0.14
Sat Flow, veh/h	756	3741	3606	114	262	1343
Grp Volume(v), veh/h	182	1377	311	308	154	0
Grp Sat Flow(s),veh/h/ln	756	1870	1870	1850	1616	0
Q Serve(g_s), s	6.4	9.8	3.4	3.4	4.2	0.0
Cycle Q Clear(g_c), s	9.8	9.8	3.4	3.4	4.2	0.0
Prop In Lane	1.00			0.06	0.16	0.83
Lane Grp Cap(c), veh/h	583	2390	1195	1182	223	0
V/C Ratio(X)	0.31	0.58	0.26	0.26	0.69	0.00
Avail Cap(c_a), veh/h	1027	4587	2294	2268	776	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	5.8	4.8	3.6	3.6	19.1	0.0
Incr Delay (d2), s/veh	0.3	0.2	0.1	0.1	1.4	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	2.0	0.7	0.7	1.5	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d), s/veh	6.1	5.0	3.8	3.8	20.6	0.0
LnGrp LOS	A	A	A	A	C	
Approach Vol, veh/h		1559	619		154	
Approach Delay, s/veh		5.2	3.8		20.6	
Approach LOS		A	A		C	
Timer - Assigned Phs				4	6	8
Phs Duration (G+Y+Rc), s				35.6	11.0	35.6
Change Period (Y+Rc), s				5.8	4.6	5.8
Max Green Setting (Gmax), s				57.2	22.4	57.2
Max Q Clear Time (g_c+I1), s				11.8	6.2	5.4
Green Ext Time (p_c), s				18.0	0.2	4.3
Intersection Summary						
HCM 7th Control Delay, s/veh			5.8			
HCM 7th LOS			A			