

# TRAFFIC IMPACT ANALYSIS

Fulenwider

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## I. INTRODUCTION

Fulenwider is planning to develop approximately 716 acres of property in Aurora, Colorado, with a combination of residential, industrial, and commercial uses as part of a Framework Development Plan (FDP). The proposed land uses analyzed in this study include:

- 1,080 residential multifamily dwelling units
- Approximately 4.1 million square feet of industrial uses/warehousing/data center
- Approximately 154 thousand square feet of commercial/retail space
- Approximately 200 thousand square feet of office space
- Approximately 1,000 hotel rooms

**Figure 1** shows the location of the site. The FDP area is shaped as a backwards “L” bounded on the south by 56<sup>th</sup> Avenue and on the east by the future Harvest Road. The 68<sup>th</sup> Avenue land line marks the northern end of the FDP, and Tibet Street marks the west end. Other boundary roadways include 60<sup>th</sup> Avenue and Denali Street. **Figure 2** shows the proposed FDP. The entire eastern side of the FDP is bisected by Second Creek, a north-south drainageway that affects access for several Planning Areas (PAs). The current proposal is a revision to a previously approved FDP that was necessary due to the emergence of a large single user site in what is now known as PA-4, the area bounded by E-470, 60<sup>th</sup> Avenue, Second Creek, and 56<sup>th</sup> Avenue. The large single user site will be a data center that significantly reduces previous trip generation estimates from the nearly 950,000 square feet of office use and nearly 3.2 million square feet of industrial park that were proposed in the previous FDP. Additionally Denali Street between 56<sup>th</sup> and 60<sup>th</sup> Avenues must be removed due to this large single user data center for security purposes for the facility.

The FDP shown also depicts a hierarchy of roadways that include arterials, collectors, and conceptual alignments for some of the future local streets. Exact alignments will be determined at the time of Contextual Site Plan (CSP), but roadway connection intentions are presented for many of the FDP PAs, consistent with the City’s Roadways Design and Technical Criteria manual per Section 4.04.1.

Exceptions include:

- The mixed-use planning areas (PA-1, and PA-2) northwest of the E-470/56<sup>th</sup> Avenue Interchange. Additional roadway alignment information will be provided at the time of CSP in these areas. It is anticipated that internal circulation roadways, whether public or private, will be incorporated (and will be necessary) to serve these areas.
- The data center in PA-4 needs to maintain a fully secure site. These needs preclude internal roadways for public use. Given the nature of the site user, Denali Street between 56<sup>th</sup> and 60<sup>th</sup> would be discontinuous, which is among the reasons for this traffic study update.

With such a relatively large parcel, the availability of a good roadway network to serve the future home and business owners is crucial to the success of the development. Access onto the existing and planned perimeter street network will be developed in subsequent entitlement steps as each parcel is designed. However, this study makes general access assumptions to begin to assess access/intersections needs and potential signal locations.



#### LEGEND

 = City of Aurora Limits





The purpose of this study is to assess the traffic impacts on the boundary roadways (collectors and arterials) related to the proposed development and to support projected traffic volumes. This report includes information on existing traffic conditions, vehicle-trips associated with the planned development, total traffic volume projections, and recommendations on future roadway needs, including supporting analysis for roadway classifications. This analysis focuses on the long-term timeframe, year 2040, using the recently completed *Aurora Northeast Area Transportation Study (NEATS) Refresh* Transportation Plan as a means to develop background traffic along study area roadways.

While this study considers other nearby master transportation plans (High Point and Porteos), the foundation for which 2040 traffic forecasts (for background traffic) are developed in this report is primarily based on results of the NEATS effort and modeling with some consideration of these other master plans in progress. This version of the study serves as an update to the December 2019 version to assess changes in the roadway network (namely the elimination of Denali Street between 56<sup>th</sup> and 60<sup>th</sup> Avenues) and land use adjustments, most notably the data center use, which represents a significant reduction in trip making as compared to that shown in the December 2019 study.

There is little development in the area, and other master plan developments are currently being planned. Consistent with the December 2019 study, a short-term timeframe was not specifically analyzed in this study because of the many variables associated with all the development (and its timing). The long-term (year 2040) timeframe is the focus of this study realizing that a roadway improvement phasing plan (in conjunction with other development) will be needed to serve this and the adjoining FDPs.

## II. EXISTING CONDITIONS

### II.A. Surrounding Land Use

The area around the Fulenwider site primarily consists of vacant land. The Green Valley Ranch residential development exists about 1 mile west in Denver. In addition, two airport parking lots exist one-half mile to the east along Jackson Gap Street. The Porteos is a planned FDP located across Harvest Road to the east, and High Point is another planned FDP located northwest of Fulenwider. Denver International Airport (DEN) is located immediately north of the FDP.

### II.B. Transportation Network

#### Roadways

The existing transportation system around Fulenwider includes the following facilities:

- **56<sup>th</sup> Avenue.** This east-west facility serves as the southern boundary of the site and consists of a two-lane cross-section with turn lanes located at the E-470 Interchange. The posted speed limit is 45 miles per hour (mph).
- **E-470.** This four-lane tollway facility runs north-south and splits the FDP site. A grade-separated interchange is provided at 56<sup>th</sup> Avenue and at 64<sup>th</sup> Avenue north of the site. A future interchange is planned at 48<sup>th</sup> Avenue, a mile south of the site.
- **64<sup>th</sup> Avenue.** East of E-470, 64<sup>th</sup> Avenue exists as an unimproved roadway. The roadway does not connect to any other roadway to the east, and its use to the east is minimal. This road currently serves as a primary means of access to a lift station site.

Harvest Road, along the FDP's east side, does not yet exist. Ultimately, Harvest Road will serve as the primary entrance north into the DEN, continuing south of the site, possibly winding east to the Powhaton alignment, and connecting to I-70 via an interchange.

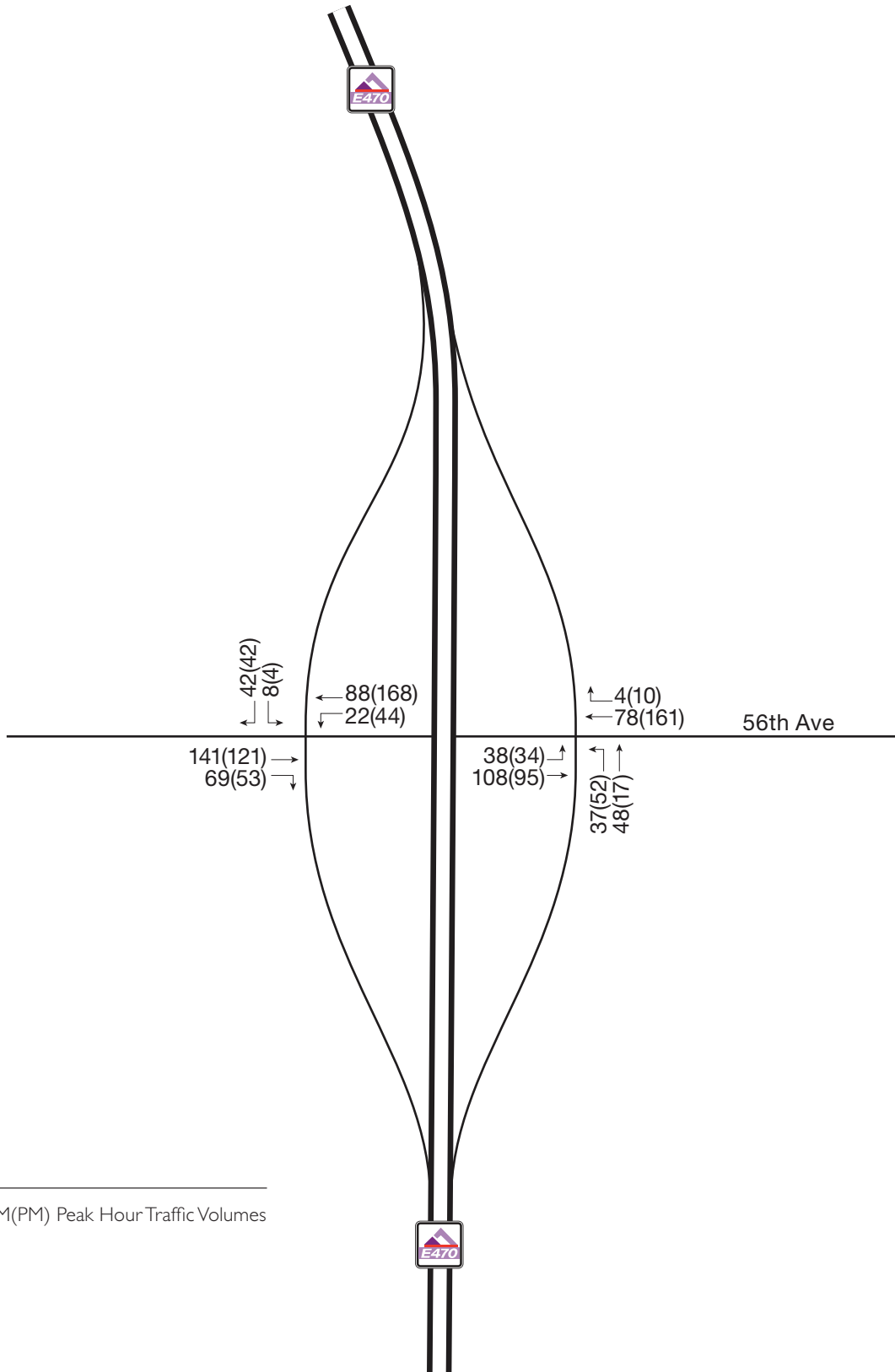
#### Traffic Volumes

Existing traffic volumes near the site are presented on **Figure 3**, and the traffic count data can also be found in **Appendix A**. Specifically, turning movement counts were collected at the E-470/56<sup>th</sup> Avenue Interchange. Current peak hour demands through the interchange are low. Inferences of daily traffic from the peak hour traffic suggest that 56<sup>th</sup> Avenue serves approximately 3,000 vehicles per day (VPD) east of the tollway and 4,000 VPD to the west. Each ramp serves a fraction of this traffic.

#### Traffic Operations

Typically, detailed calculations are carried out to assess operations given current traffic demands. These are often conducted using techniques documented in the *Highway Capacity Manual* (Transportation Research Board, 2016) using the existing traffic volumes and intersection geometry. Level of Service (LOS) is a qualitative measure of traffic operational conditions, based on roadway capacity and vehicle delay. Levels of service are described by a letter designation ranging from A to F, with LOS A representing almost free-flow travel, while LOS F represents congested conditions. For signalized intersections, LOS is calculated for the entire intersection, while LOS for unsignalized intersections is calculated for movements that must yield right-of-way to other traffic movements. **Appendix B** includes the LOS criteria. For the intersections of 56<sup>th</sup> Avenue and the E-470 ramps, 56<sup>th</sup> Avenue provides free-flow movement, and the E-470 ramp approaches are subject to a side-street stop condition. The calculations were not specifically conducted as the demands are so low that LOS issues are not possible.





**LEGEND**

XXX(XXX) = AM(PM) Peak Hour Traffic Volumes

### III. FUTURE ROADWAY NETWORK

In 2018, the City of Aurora completed the *NEATS Refresh* study. This study provides Year 2040 and regional build-out transportation recommendations for the roadways and a multimodal transportation system. The NEATS study area encompassed a regional area extending from approximately between Tower Road east to Schumaker Road, and from Jewell Avenue on the south to 72<sup>nd</sup> Avenue on the north. Recommendations with respect to the Fulenwider FDP include:

- Widening 56<sup>th</sup> Avenue to major arterial standards including six through lanes plus turn lanes
- Constructing Harvest Road to major arterial standards including six through lanes plus turn lanes
- Constructing 64<sup>th</sup> Avenue to major arterial standards including six through lanes plus turn lanes
- Constructing Tibet Street to minor arterial standards including four through lanes plus turn lanes

There have been new developments regarding the ultimate disposition of 64<sup>th</sup> Avenue in light of the traffic projections that have resulted from a number of efforts. City staff have concluded that the ultimate six lane cross-section should not be precluded and that right-of-way to allow for this ultimate construction should be preserved. The City also recognizes that a four-lane cross-section may, indeed, be all that is needed, and they will support the notion of a deferred improvement in widening from four to six lanes at a future date, if it is needed. As such, this study assesses the intersections along 64<sup>th</sup> Avenue assuming four through lanes to better assess this idea.

60<sup>th</sup> Avenue is planned to be a collector street. Annexation agreements for surrounding property (including Fulenwider) reference the potential for a 60<sup>th</sup> Avenue grade-separated crossing of E-470 as a regional improvement serving more than the adjacent properties. The applicant (and the High Point FDP applicant) understands this commitment and has worked with the City in respect to regional triggers in completing this overpass. Traffic forecasts shown in this study include a 60<sup>th</sup> Avenue collector overpass. This overpass will attract some traffic that would otherwise use 56<sup>th</sup> Avenue or 64<sup>th</sup> Avenue to cross the tollway, but its impact on 56<sup>th</sup> and 64<sup>th</sup> Avenues would be relatively minor, and the overpass is not critical to obtaining acceptable operations along 56<sup>th</sup> and 64<sup>th</sup> Avenues.

In addition, 68<sup>th</sup> Avenue in the northern end of the FDP is also included in the analysis. This roadway will intersect Harvest Road at the 68<sup>th</sup> Avenue land line, and its alignment will no longer shift south as one travels west connecting to and through High Point as had previously been studied. High Point has also abandoned the notion of a 66<sup>th</sup> Avenue alignment and is moving forward with plans for a 68<sup>th</sup> alignment providing consistency between the two FDPs.

## IV. FUTURE PROJECTED CONDITIONS

This traffic study assesses the long-term timeframe at the master plan's buildout. The intent is to assess the laneage of the master plan's major roadways adjacent to the FDP and the collector roads planned to be built. This study serves as an update to the previous FDP traffic study in light of an FDP amendment. The buildout scenario assesses year 2040 conditions consistent with NEATS. The long-term analysis assesses the road system given daily traffic projections and incorporates the potential of all Fulenwider being built out to its maximum density (and the remainder of the area is represented from the NEATS study). As individual parcels develop, a more refined traffic impact study may be appropriate to assess access specifics and/or to update information presented in this report.

Traffic projections shown in this study are based on the premise that Fulenwider would be built out to its maximum allowed densities per the FDP proposal. Traffic demands associated with the remainder of the area and region are based on raw travel demand modeling results associated with NEATS. Other master plan traffic studies in the area have been conducted in the same manner; therefore, these other studies, using NEATS data, do not reflect the land use level in Fulenwider that is being analyzed here. This study also does not reflect the full maximum buildout of the other area FDPs in using NEATS as the source for background traffic. As such, final total 2040 projected traffic volumes shown in the varying FDP traffic impact studies will vary, and there will not be full consistency among the various traffic impact studies, just by virtue of this approach. Resulting projections will be greater than those in NEATS since this study considers the maximum buildout potential of Fulenwider, whereas the *NEATS Refresh* considered a less intense 2040 development completion level.

### IV.A. Site Trip Generation

The number of vehicle-trips that will be generated by the proposed development was forecast based on trip rates and procedures documented in *Trip Generation* (Institute of Transportation Engineers, 10<sup>th</sup> Edition, 2017). The categories used in this analysis include industrial, warehousing, retail (shopping center), data center, and residential. Credits were taken for pass-by considerations associated with retail uses of 30 percent. The ITE Trip Generation Handbook provides information on pass-by level for a variety of land uses. Shopping center pass-by percentages can vary depending on the size of the complex. Smaller retail centers (300,000 square feet or less) can range from 17 to 74 percent, whereas larger centers can range from 8 to 55 percent according to the data. For purposes of this study, 30 percent was used as an overall average for the retail use. **Table I** summarizes the trip generation estimates by PA. ITE Equations and rates are included in **Appendix B**.

In total, the entire Fulenwider FDP is estimated to generate 34,500 external vehicle-trips per day. The more intense trip-making portion of the FDP is in the areas near the E-470 Interchange, which are planned to be commercial development. PA-1 and PA-2 will collectively make up nearly 40 percent of the FDP's daily generation, yet these two PAs collectively constitute only 11 percent of the FDP's land area.

A notable change is the data center now planned in PA-4, which is a significant decrease as compared to the previously approved traffic study. PA-4 trip generation is now a custom estimate based on user provided operations data which provided a daily number. The AM and PM volumes as well as directionality of trips utilized ITE data to deduce peak hour numbers from the provided daily value. The same 280 acres were assumed to accommodate significantly more land use per the approved traffic impact study. Specifically, nearly 950,000 square feet of office use and nearly 3.2 million square feet of industrial park use were assumed in the overall FDP traffic impact study. From a trip generation standpoint, this development level had been estimated to generate a total of 17,100 trips per day. The proposed data center represents a reduction in daily trip generation of more than 90 percent or roughly 12,000 daily trips. This reduction in trips is largely seen in a reduction of trips along 56<sup>th</sup> Avenue and to a lesser degree 60<sup>th</sup> Avenue.

**Table 1. Trip Generation Summary**

PA	Description	Type	Quantity	Units	ITE Code	Daily	AM Peak Hour			PM Peak Hour		
							IN	OUT	TOTAL	IN	OUT	TOTAL
1	Residential	Multifamily Housing (Low-Rise)	270	DU	220	1,976	29	96	124	95	56	151
		Multifamily Housing (Mid-Rise)	810	DU	221	4,406	76	216	292	217	139	356
2	Mixed Use	Retail	100	KSF	820	6,012	125	77	202	261	283	543
		Hotel	250	Rooms	310	2,090	69	48	118	76	74	150
4	Ind Dist.	Data Center	1470	KSF	Custom	1,310	80	66	146	36	83	119
6	Ind Dist.	Industrial	634.64	KSF	130	2,454	206	48	254	53	201	254
		Data Center	366.9	KSF	160	363	22	18	40	10	23	33
7	Ind Dist./Retail	Industrial	476	KSF	130	2,113	154	36	190	40	150	190
		Retail	6	KSF	820	887	96	59	155	33	35	68
8	Comm/Ret	Office	80	KSF	710	779	80	13	93	15	77	92
		Retail	5	KSF	820	784	96	59	154	28	31	59
9	Comm/Ret	Office	120	KSF	710	1,169	120	19	139	22	116	138
		Retail	30	KSF	820	2,651	103	63	167	107	116	223
		Hotel	375	Rooms	310	3,135	104	72	176	115	110	225
10	Airport Dist.	Industrial	1127.7	KSF	150	3,309	365	86	451	95	356	451
		Hotel	375	Rooms	310	3,135	104	72	176	115	110	225
		Retail	13	KSF	820	1,501	98	60	158	58	62	120
Totals						38,074	1,927	1,108	3,035	1,376	2,022	3,397
Pass-by Adjustments – 30% of Retail (see text)						3,552	0	0	0	153	153	306
Total External Trip Generation						34,522	1,927	1,108	3,035	1,223	1,869	3,091

ITE Rates used for land uses 130 (AM and PM), 160, 220, 221, and 310. ITE equations used for land uses 130 (Daily), 710, and 820.

## IV.B. Trip Distribution and Traffic Assignment

The site trip distribution assumptions for Fulenwider have been estimated from the NEATS model Transportation Analysis Zones (TAZ) centroid traffic loadings and professional judgment of the directionality of these trips apparent in the 2040 NEATS assignment results. The distribution percentages are varied pending retail versus non-retail uses, recognizing that retail trips are more likely to be destined to the surrounding area, and non-retail traffic can be a bit more regional in nature.

**Figure 4** shows the trip distribution percentages used in the study. Resulting projections will be greater than those in NEATS since this study considers the maximum buildout potential of Fulenwider, whereas the *NEATS Refresh* considered a less-intense 2040 development completion level. In general, trips are anticipated to be oriented most to/from the west and south. DEN will also attract a notable amount of FDP trips.

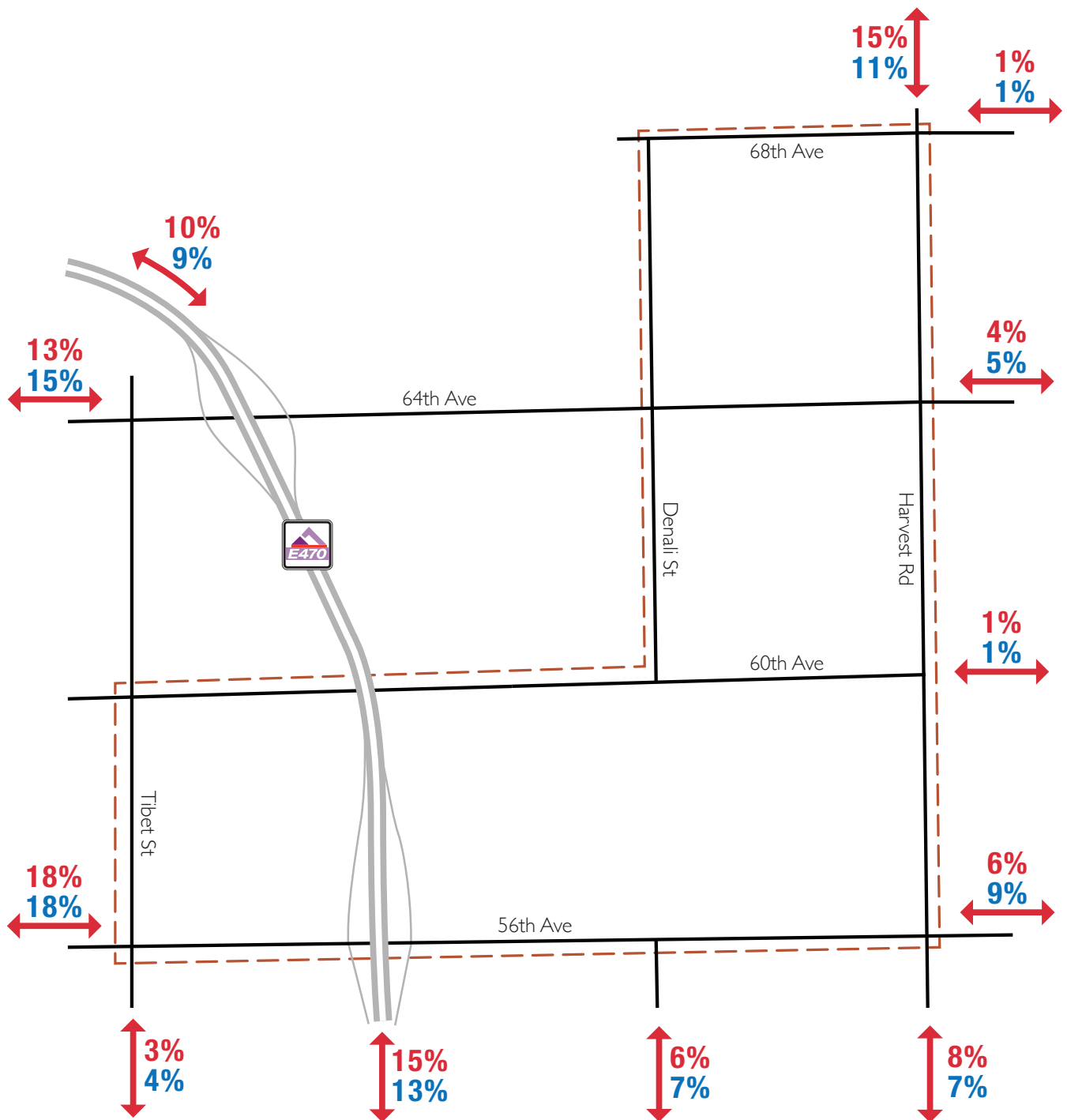
**Figure 5** shows the site-generated traffic that results from applying the distribution percentages of **Figure 4** to the trip generation estimates of **Table I**. Besides the planned roadway intersections around and within the FDP, other site access points were assumed to incorporate three-quarter movement between half-mile signals. Harvest Road and, to a lesser degree, 56<sup>th</sup> Avenue are both anticipated to be the busy roadways once the area is built out. Limiting signals to one-half-mile spacing provides a favorable setting with respect to signal progression. As such, this study does not consider other signals that would violate this more optimal one-half-mile spacing philosophy other than at the E-470/56<sup>th</sup> Avenue Interchange. A cursory assessment of potential mid-block accesses suggests that they would all be challenged in meeting a signal warrant. The trip-making associated with the proposed uses, realizing that many of these areas will be confined by drainage, render them unlikely to generate enough traffic to warrant signalization anyway (intersection 2 might be borderline, but all others will be below warrant criteria). Therefore, this study is testing the idea of partial unsignalized access to help inform future CSPs. The assumption of three-quarter access points in this study by no way implies their approval but a recognition that outbound left turns onto Harvest Road would prove difficult without signalization. Only a single access point was assumed between each signal along Harvest Road as a means of stress testing those locations. Actual number and location of accesses may vary and should be fully vetted by analysis in a site-specific TIS.

Harvest Road north of 56<sup>th</sup> Avenue is anticipated to be the most impacted segment of roadway serving 9,400 VPD of FDP traffic, assuming Fulenwider reaches its maximum densities. The traffic impact to 56<sup>th</sup> Avenue ranges from 8,200 to 9,200 along frontage of the planned development. The daily and peak hour traffic shown on **Figure 6** reflects the effects of pass-by traffic associated with the retail uses, which are not new trips added to the roadways, but rather a diversion of background traffic into and out of retail areas (turning movements capture this component). Denali Street is projected to serve approximately 2,000 to 2,200 VPD, and 60<sup>th</sup> Avenue is projected to serve 1,900 to 3,900 VPD of Fulenwider traffic.

Peak hour traffic from the Fulenwider FDP will be greatest along Harvest Road north of 56<sup>th</sup> Avenue. A significant movement will be the eastbound left turn movement from 56<sup>th</sup> onto Harvest Road during the AM peak hour due primarily to the removal of Denali Street between 56<sup>th</sup> and 60<sup>th</sup> Avenues. The reflection (southbound right turn movement) is equally as heavy in the PM peak hour.

As mentioned previously, the change in land use for PA-4 represents a significant reduction in trip making potential for the area. In comparison with the previous master study, 56<sup>th</sup> Avenue between E-470 and Denali sees a reduction in excess of 8,000 daily trips. 60<sup>th</sup> Avenue also sees a reduction in excess of 2,000 daily trips as a result of this land use change.

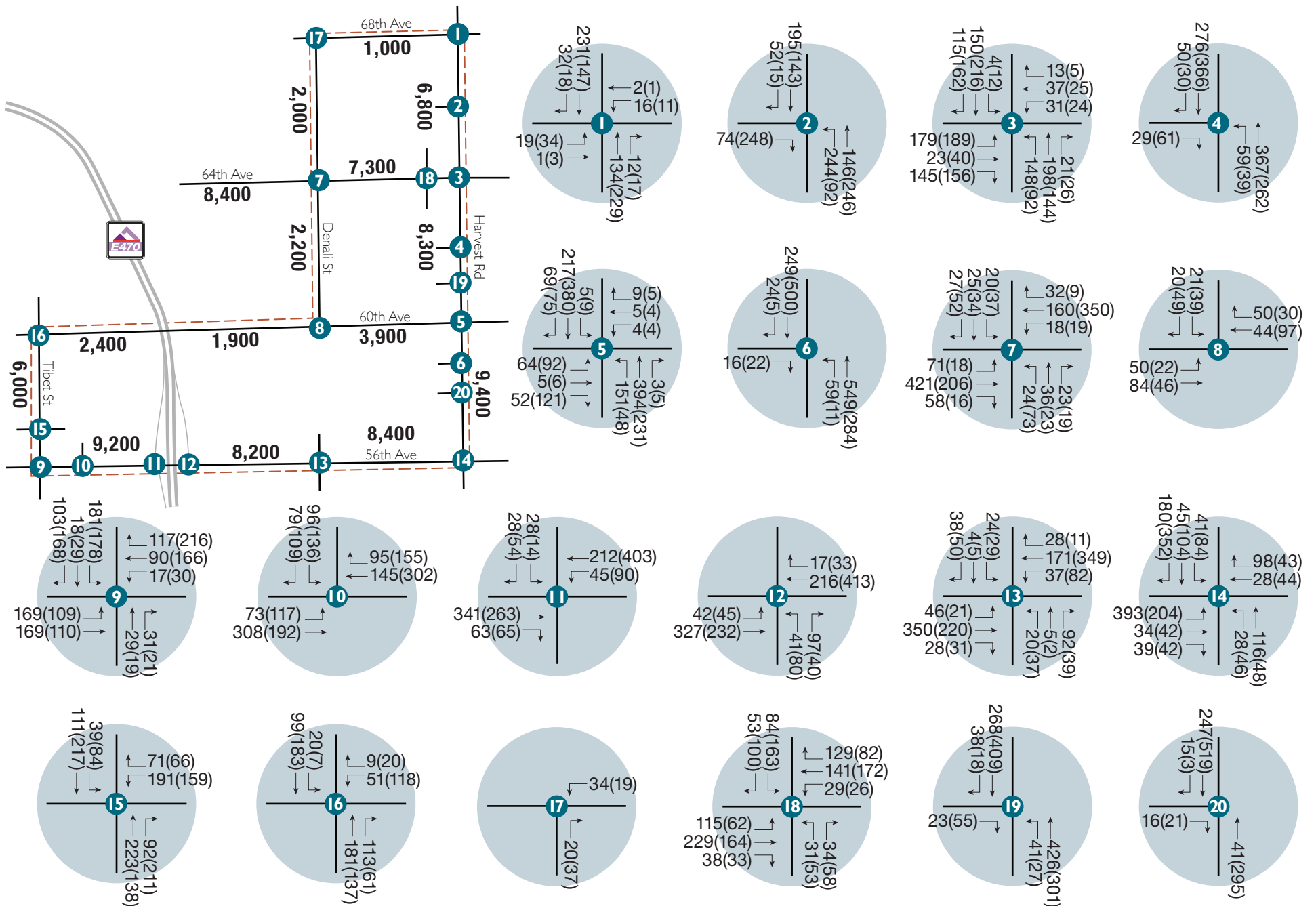




#### LEGEND

XXXX = Non Retail Distribution

XXXX = Retail Distribution



#### LEGEND

XXX(XXX) = AM(PM) Peak Hour Traffic Volumes

XXXX = Daily Traffic Volumes

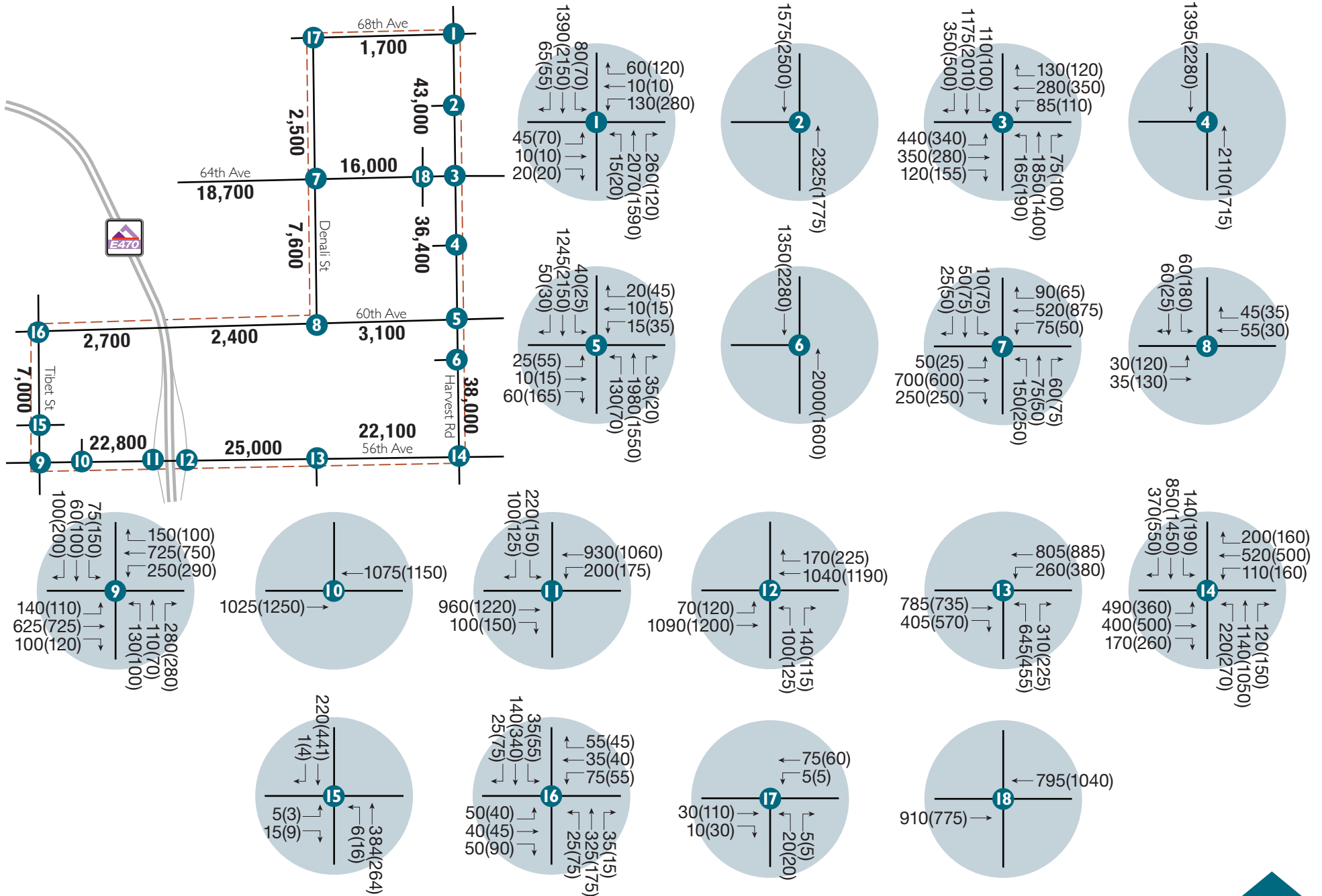
#### IV.C. Background Traffic Volumes

Volumes presented in this section are based on the current version of the *NEATS Refresh*. A current effort to update NEATS is exploring altering how the roadway network in the area. The current proposal would move a diagonal connection south of 56<sup>th</sup> Avenue that was previously proposed between Powhaton Road and Harvest Road to a diagonal connection between Powhaton Road and Jackson Gap Way. The result of such a shift would significantly reduce traffic volumes on Harvest Road as it would make Jackson Gap Way the primary arterial connection into DEN from the south. This change would significantly reduce volumes on Harvest Road and the interaction between 56<sup>th</sup> Avenue and Harvest Road.

The NEATS travel demand modeling was used as the primary means of developing background traffic for the Fulenwider FDP traffic study. Specifically, estimated NEATS trips from the Fulenwider FDP area were removed from the NEATS total 2040 traffic demand estimates in developing 2040 background traffic for this study. The background traffic used in this study, being based on NEATS, does not reflect other FDPs in the area reaching their maximum buildout potential.

Resulting daily traffic was then converted to AM and PM peak hour traffic by applying a 9 percent and 10 percent, peak hour percentage, respectively. Directional split of the peak hour traffic was estimated from the AM and PM peak period assignment results per the NEATS travel demand modeling. Adjustments were made to account for a 60<sup>th</sup> Avenue overpass of E-470 and a 68<sup>th</sup> Avenue connection to Harvest Road (and extending west) as previously identified. These were not represented in the *NEATS Refresh* travel demand modeling as they are not planned arterial roads. Neither of these roadways is considered to be critical to achieving acceptable operations, but both are included at the request of the City. The peak hour intersection turning movement projections were then developed by applying techniques developed by the National Cooperative Highway Research Program, and adjustments were then made to produce reasonable AM and PM peak hour directional reflection patterns and to reasonably balance traffic flows between successive intersections.

Background traffic volume estimates are shown on **Figure 6**. Harvest Road will be the busiest roadway in the study area serving an estimated background traffic demand of 43,000 VPD. 56<sup>th</sup> Avenue could carry a background traffic load of approximately 25,000 VPD near the E-470 Interchange. 60<sup>th</sup> Avenue is estimated to have a background traffic demand of approximately 2,400 to 2,700 VPD near the overpass of E-470. These are based on 2040 modeling results from the *NEATS Refresh* effort (less NEATS trip-making within the Fulenwider area), adjusted to account for a 60<sup>th</sup> Avenue overpass of E-470, for a 68<sup>th</sup> Avenue connection to Harvest Road, and the elimination of Denali Street between 56<sup>th</sup> and 60<sup>th</sup> Avenues.



**LEGEND**

XXX(XXX) = AM(PM) Peak Hour Traffic Volumes

XXXX = Daily Traffic Volumes



## V. YEAR 2040 TOTAL TRAFFIC CONDITIONS

The daily and peak hour traffic volume estimates for Fulenwider (**Figure 5**) were combined with the Year 2040 background traffic volume projections of **Figure 6** to create total long-term traffic forecasts along the study area roads and intersections. These estimates are represented on **Figure 7**.

Harvest Road will be the busiest roadway in the study area serving volumes ranging from 44,700 to 49,800 VPD. 56<sup>th</sup> Avenue will serve traffic volumes ranging from approximately 30,500 VPD to 33,200 VPD. 64<sup>th</sup> Avenue is projected to serve approximately 23,300 VPD just west of Harvest Road, and the collector roadways of Denali Street and 60<sup>th</sup> Avenue are projected to serve up 9,800 and 8,600 VPD, respectively. The 60<sup>th</sup> Avenue overpass of E-470 is projected to serve 4,300 to 5,100 VPD.

One major turning pattern shown on **Figure 7** includes trip interactions between the north and west legs of the 56<sup>th</sup> Avenue/Harvest Road intersection. Harvest Road is the sole access to DEN from this area, and 56<sup>th</sup> Avenue's continuity from the west will feed a significant amount of volume to Harvest Road. A similar pattern, albeit to a lesser degree, can be seen at the Harvest Road/64<sup>th</sup> Avenue intersection.

As mentioned previously, these volumes are based on the current version of the *NEATS Refresh*. An effort to update NEATS is currently exploring altering how the roadway network in the area relates to Jackson Gap Road on DEN property. The current proposal would move a diagonal connection south of 56<sup>th</sup> Avenue currently proposed between Powhaton Road. Harvest Road is likely to shift to a diagonal connection between Powhaton Road and Jackson Gap Way. The result of such a shift would significantly reduce traffic volumes on Harvest Road and the interaction between 56<sup>th</sup> Avenue and Harvest Road.

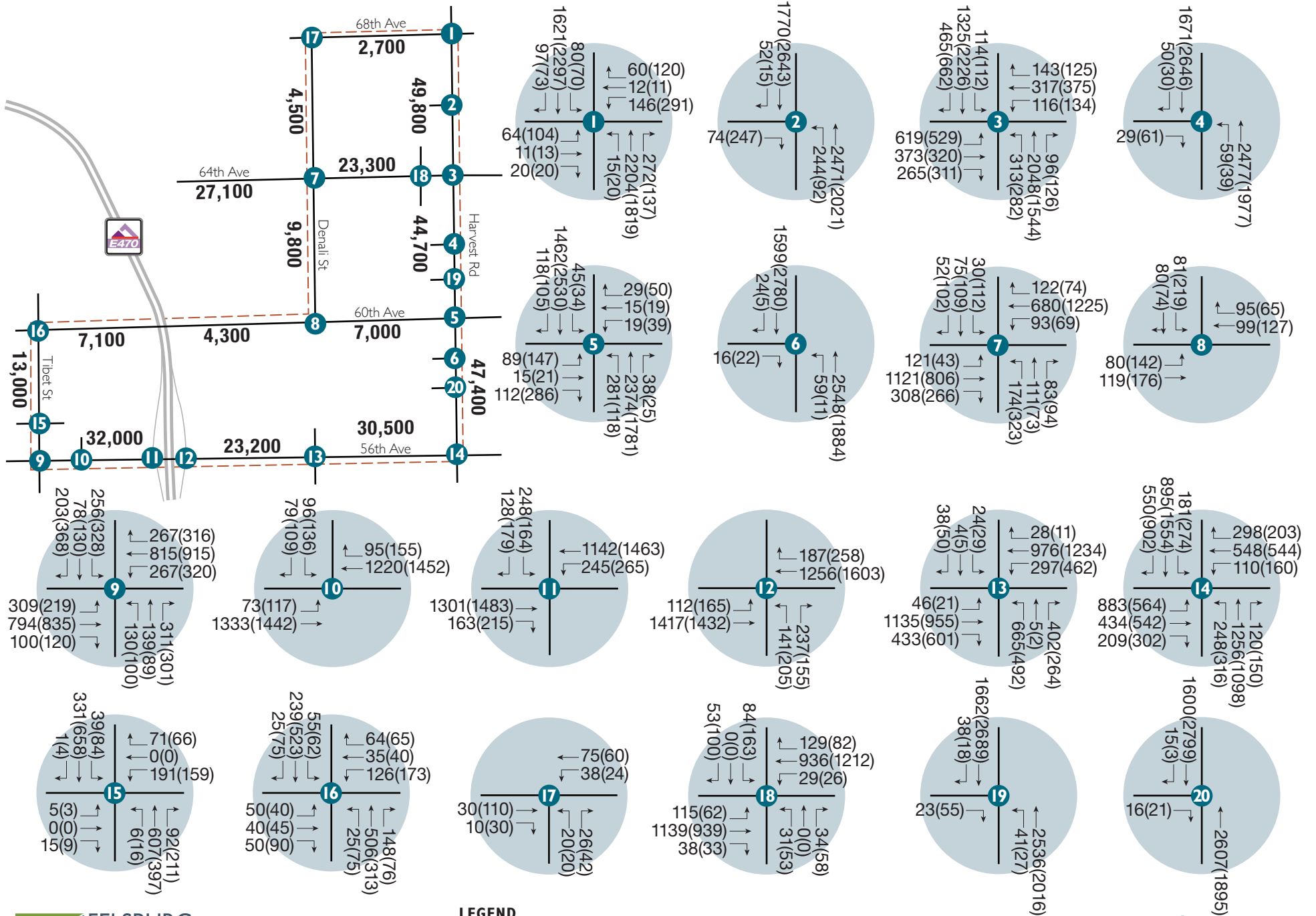
### ***Traffic Signalization Warrant Analyses***

The *Manual on Uniform Traffic Control Devices* (MUTCD) identifies eight warrants that provide guidance to determine whether an installation of a traffic signal is justified. Some of these warrants are based on traffic volume levels, while others are based on the accident history of an intersection or whether the intersection is a designated school crossing. The four-hour warrant has been applied to assess the need. Forecasts for the four highest hours of a typical weekday were developed using a February 2019 24-hour traffic count taken along 64<sup>th</sup> Avenue near the Gaylord site. All full movement intersections were evaluated as shown in **Appendix C**. ITE Trip Generation Equations and Rates



Appendix D, and all were found to warrant signalization given 2040 traffic demands. These include:

- Harvest Road/68<sup>th</sup> Avenue (Intersection #1)
- Harvest Road/64<sup>th</sup> Avenue (Intersection #3)
- Harvest Road/60<sup>th</sup> Avenue (Intersection #5)
- Denali Street/64<sup>th</sup> Avenue (Intersection #7)
- 56<sup>th</sup> Avenue/Tibet Street (Intersection #9)
- 56<sup>th</sup> Avenue/PA-1 and PA-2 Access (Intersection #10)
- 56<sup>th</sup> Avenue/E-470 Interchange Ramps (Intersections #11, #12)
- 56<sup>th</sup> Avenue/Data Center Access (Intersection #13)
- 56<sup>th</sup> Avenue/Harvest Road (Intersection #14)
- Tibet Street/PA-1 Access (Intersection #15)
- Tibet Street/60<sup>th</sup> Avenue (Intersection #16)
- 64<sup>th</sup> Avenue/PA-9/PA-10 (Intersection #18)



**LEGEND**

XXX(XXX) = AM(PM) Peak Hour Traffic Volumes

XXXX = Daily Traffic Volumes

**Year 2040 Total  
Traffic Volumes**

**FIGURE 7**

This study does not specifically analyze the E-470/64<sup>th</sup> Avenue Interchange, but that interchange is assessed in the High Point FDP traffic impact study. In addition, staff had requested that the offsite intersection of Harvest Road and Jackson Gap Street (and possibly 71<sup>st</sup> Avenue) also be analyzed in this study. This had previously been assessed in the *JAG Logistics Center Transportation Impact Study*, where it was found that a realignment of the north-south road and 71<sup>st</sup> Avenue teeing into Harvest Road is needed (in addition to more robust laneage). The Fulenwider traffic impacts documented in this study do not suggest that any other treatment should be considered for that intersection on DEN property. Additional discussions with DEN and Aurora have begun to take place to discuss the proper alignment and merging of Jackson Gap Street and Harvest Road south of DEN property in the far northwest corner of the Porteos development. Given the ongoing discussions of a realignment of the diagonal connection south of 56<sup>th</sup> that may now connect to Jackson Gap Way instead of Harvest Road, such a connection back to Jackson Gap Way from Harvest to the north may be unnecessary given reduced volumes along Harvest Road and the intersection of Harvest Road/68<sup>th</sup> could see a “tee” configuration.

As described previously, the three-quarter movement site accesses onto Harvest Road have been assessed assuming signalization would not occur. Satisfying warrants will be challenging at these locations, and outbound left turns would operate poorly given high through volumes along Harvest Road. The anticipated availability of these gaps is reflected in the Synchro software analyses by implementing the option to “include upstream signal” as outlined in the Highway Capacity Manual (6<sup>th</sup> Edition).

The intersection of 56<sup>th</sup> Avenue/Harvest Road sees increased pressure particularly on the eastbound left turns and southbound right turns due to the elimination of Denali Street between 56<sup>th</sup> and 60<sup>th</sup> Avenue. Such an increase would necessitate the need for triple eastbound lefts. This notion is based on the current version of the *NEATS Refresh*, and as documented that study is currently undergoing updates that have significant impact on the study area, in particular the intersection of 56<sup>th</sup> Avenue/Harvest Road. While the results of those updates are still being finalized at the time of publication of this report, early indications make it unlikely that triple lefts will be needed due to anticipated reductions in background traffic.

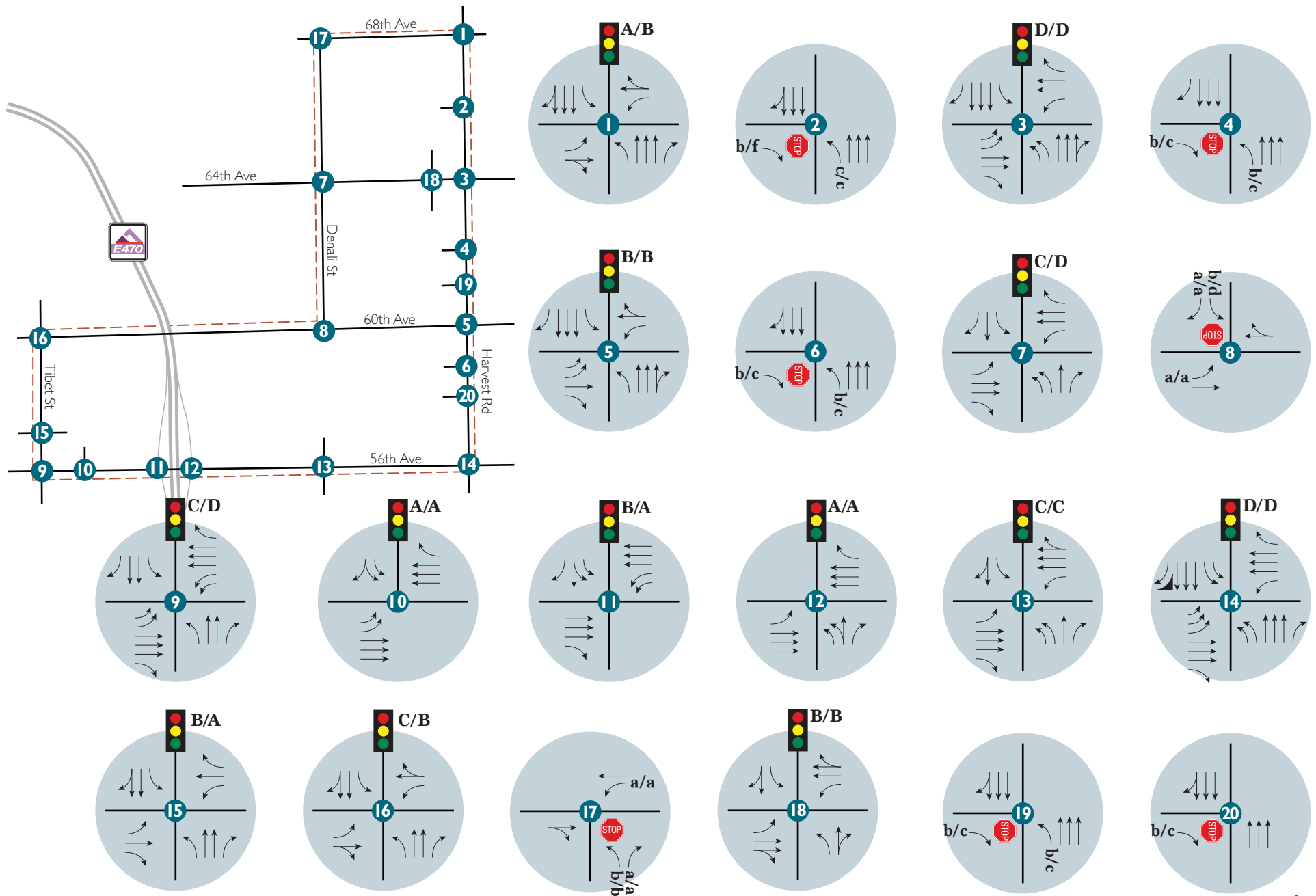
## Capacity Analyses

Capacity analyses were conducted for the surrounding roadway network using the traffic volume estimates of **Figure 7**. The LOS analysis results and intersection laneage requirements can be found on **Figure 8** (worksheets are shown in **Appendix E** and include heavy truck presence reflecting the industrial and distribution uses of 10 percent along 64<sup>th</sup>, 8 percent along Harvest, and 5 percent along 56<sup>th</sup>). With respect to the roadways, the following cross-sections should be planned:

- Harvest Road should ultimately be built to a major arterial classification to include six through lanes of traffic under the assumption the diagonal alignment between Powhatan Road and Harvest Road remains. This cross-section will also be heavily influenced by the current update to NEATS and a four-lane cross-section may be sufficient if the diagonal alignment ties in at Jackson Gap Way as opposed to Harvest Road.
- 56<sup>th</sup> Avenue should ultimately be built to a major arterial classification to include six through lanes of traffic. Turn lanes are needed at the intersections, described below.
- Denali Street should be built to a three-lane collector (including two through lanes) cross-section with widened sections for turn lanes at major intersections, described below.
- 64<sup>th</sup> Avenue will function adequately as a major arterial with four through lanes including the intersections with Denali Street and with Harvest Road.
- 60<sup>th</sup> Avenue should be built to a three-lane collector (including two through lanes) cross-section with widened sections for turn lanes at intersections, described below.
- Tibet Street should be built to a five-lane minor arterial standard with a center left turn lane along the west side of the FDP.

**Figure 9** shows the above in map form.

City of Aurora staff have asked for mitigation strategies for any signalized movement that falls below LOS D. As indicated in the analysis worksheets, the study area signalized intersections have natural cycle lengths ranging from 55 and 120 seconds in the AM and PM peak. City staff have required a minimum of a 120-second cycle to fit with the recent citywide signal retiming project and to ensure that pedestrian crossing times can be accommodated. It is not feasible to alleviate these delays given a cycle length of 120 seconds. FHU recommends the consideration of lower cycle length//hs at these study area intersections to alleviate unnecessary side-street and left-turn delay caused by a cycle length well over the natural cycle length. A detailed table of projected LOS and delays can be found in **Table 2**.

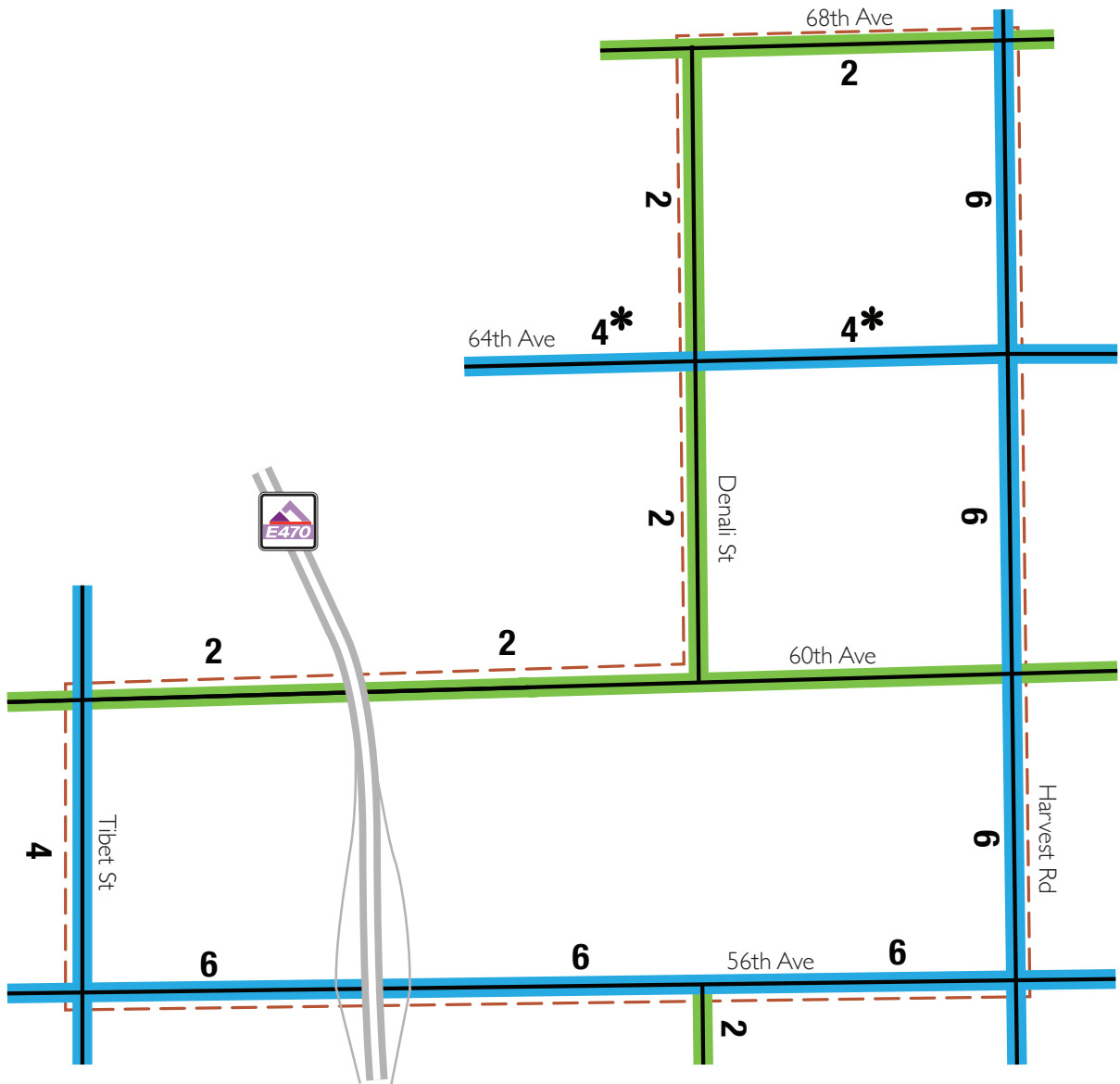


#### LEGEND

**X/X** = AM/PM Peak Hour Signalized Intersection Level of Service  
**x/x** = AM/PM Peak Hour Unsignalized Intersection Level of Service

= Stop Sign  
 = Traffic Signal





#### LEGEND

- = Arterial
- = Collector
- X** = Number of Through Lanes
- \*** = Preserve ROW for 6-Lane Principal Arterial

**Table 2. 2040 Long Term Future Fulenwider Level of Service**

Intersection	Approach	Movement	Level of Service (AM / PM)		Delay (s) (AM / PM)	
Harvest Road & 68 <sup>th</sup> Avenue (Intersection #1)	Eastbound	Signalized	E	D	55.8	54.1
	Westbound		D	E	51.6	62.7
	Northbound		B	A	14.1	1.3
	Southbound		A	B	8.2	15.4
	Total		B	B	14.5	14.9
Harvest Road & PA-10 Access (Intersection #2)	Eastbound	Right	b	f	13.9	75.4
	Northbound	Left	c	c	15.5	18.7
Harvest Road & 64 <sup>th</sup> Avenue (Intersection #3)	Eastbound	Signalized	E	E	55.8	65.2
	Westbound		E	E	57.4	69.1
	Northbound		D	D	53.6	46.2
	Southbound		B	E	13.8	63.7
	Total		D	E	42.1	59.4
Harvest Road & PA-9 Access (Intersection #4)	Eastbound	Right	b	c	12.6	21.1
	Northbound	Left	b	c	11.3	16.3
Harvest Road & 60 <sup>th</sup> Avenue (Intersection #5)	Eastbound	Signalized	E	E	60.4	63.8
	Westbound		E	D	57.7	44.2
	Northbound		A	C	5.4	23.0
	Southbound		B	C	11.5	23.2
	Total		B	C	10.9	27.2
Harvest Road & PA-8 Access (Intersection #6)	Eastbound	Right	b	c	12.1	21.3
	Northbound	Left	b	c	11	17.2
Denali Street & 64 <sup>th</sup> Avenue (Intersection #7)	Eastbound	Signalized	C	C	32.5	26.5
	Westbound		D	C	39.2	27.6
	Northbound		D	D	44.1	52.2
	Southbound		C	C	30.9	35.0
	Total		D	C	35.9	31.6

Intersection	Approach	Movement	Level of Service (AM / PM)		Delay (s) (AM / PM)	
Denali Street & 60 <sup>th</sup> Avenue (Intersection #8)	Eastbound	Left	a	a	7.9	8.1
	Southbound	Left	b	d	13.6	32.5
		Right	a	a	9.6	9.7
Tibet Street & 56 <sup>th</sup> Avenue (Intersection #9)	Eastbound	Signalized	D	D	36.3	40.2
	Westbound		C	D	21.2	49.9
	Northbound		E	E	57.0	61.1
	Southbound		C	D	31.8	43.1
	Total		C	D	33.3	47.0
56 <sup>th</sup> Avenue & PA-I Access (Intersection #10)	Eastbound	Signalized	A	A	3.2	7.3
	Westbound		A	B	0.2	14.7
	Southbound		E	E	61.1	59.4
	Total		A	B	5.4	14.5
56 <sup>th</sup> Avenue & E-470 S Ramp (Intersection #11)	Eastbound	Signalized	A	B	0.4	12.2
	Westbound		A	A	9.3	8.0
	Southbound		E	D	55.2	54.9
	Total		B	B	11.1	14.3
56 <sup>th</sup> Avenue & N-470 S Ramp (Intersection #12)	Eastbound	Signalized	A	A	0.3	3.2
	Westbound		A	C	0.2	23.4
	Northbound		E	E	58.9	57.7
	Total		A	B	2.9	16.5
56 <sup>th</sup> Avenue & Denali Street (Intersection #13)	Eastbound	Signalized	A	B	6.9	15.8
	Westbound		B	C	20.0	20.9
	Northbound		E	E	61.4	58.7
	Southbound		D	E	51.1	60.4
	Total		C	C	26.2	26.7

Intersection	Approach	Movement	Level of Service (AM / PM)		Delay (s) (AM / PM)	
56 <sup>th</sup> Avenue & Harvest Road (Intersection #14)	Eastbound	Signalized	D	D	49.9	53.8
	Westbound		D	D	46.3	53.0
	Northbound		D	D	48.5	37.6
	Southbound		D	D	43.9	40.0
	Total		D	D	47.6	44.8
Tibet Street & PA-I Access B (Intersection #15)	Eastbound	Signalized	E	E	57.5	56.7
	Westbound		D	D	44.9	46.0
	Northbound		B	B	19.6	17.0
	Southbound		A	A	0.5	6.1
	Total		B	B	19.8	16.3
Tibet Street & 60 <sup>th</sup> Avenue (Intersection #16)	Eastbound	Signalized	E	E	58.0	57.8
	Westbound		D	D	47.0	42.1
	Northbound		A	B	0.5	15.8
	Southbound		A	B	7.5	12.8
	Total		B	C	15.7	23.9
Denali Street & 68 <sup>th</sup> Avenue (Intersection #17)	Westbound	Left	a	a	7.4	7.7
	Northbound	Left	b	b	10	10.3
		Right	a	a	8.7	9.3
PA-10 & 64 <sup>th</sup> Avenue (Intersection #18)	Eastbound	Signalized	C	D	22.1	43.9
	Westbound		A	A	4.9	6.7
	Northbound		C	C	21.1	25.7
	Southbound		C	C	30.7	22.5
	Total		B	C	15.1	23.1
Harvest Road & S PA-9 Access (Intersection #19)	Eastbound	Right	b	c	12.1	22.2
	Northbound	Left	b	c	10.8	16.7

The analysis of each intersection also informs turn lane needs, described for each intersection as follows:

- **Harvest/68<sup>th</sup> Avenue.** Lane needs include a single left turn lane along each approach, a northbound right turn lane, and a shared through/right turn lane along the eastbound and westbound approaches.
- **Harvest/64<sup>th</sup> Avenue.** Lane needs include a single left turn lane along the southbound and westbound approaches, dual left turn lanes along the northbound and eastbound approaches, and right turn lanes along the southbound, westbound, and eastbound approaches.
- **Harvest/60<sup>th</sup> Avenue.** Lane needs include a single left turn lane along all approaches, a southbound and eastbound right turn lane, and a shared through/right turn lane along the northbound and westbound approaches.
- **Harvest/56<sup>th</sup> Avenue.** Lane needs include a triple left turn lane along the eastbound approach, a single left turn lane along the westbound approach, dual left turn lanes along the northbound and southbound approaches, and a right turn lane along all four approaches. The southbound right turn movement will be heavy, so incorporating a free-right turn condition southbound to westbound would be extremely beneficial. The reflection of this movement, eastbound left turn, will also be heavy to the point in which triple left turn lanes should be provided. All of the recommendations above are based upon the current *NEATS Refresh* and the current NEATS update regarding the diagonal roadway alignment south of 56<sup>th</sup> has the potential to drastically change recommendations at this location and further study will be needed once that decision is finalized.
- **56<sup>th</sup> Avenue/Data Center Access.** Lane needs include a single left turn lane along the southbound, westbound, and eastbound approaches, dual left turn lanes along the northbound approach, and a right turn lane along the eastbound and northbound approaches.
- **56<sup>th</sup> Avenue/E-470 Interchange.** Lane needs include a single left turn lane along the eastbound approach to northbound E-470, dual left turn lanes along the other three approaches (including both off-ramps), and a right turn lane along all four approaches. This translates into the need to ultimately widen the 56<sup>th</sup> Avenue bridge over E-470 to include nine lanes.
- **56<sup>th</sup> Avenue/Tibet Street.** Lane needs include a single left turn lane along the southbound and northbound approaches, dual left turn lanes along the westbound and eastbound approaches, and a right turn lane along all four approaches. North-south, a two through lanes will be provided.
- **Denali Street/68<sup>th</sup> Avenue.** This tee intersection will function well under side street stop control in which the east-west approaches would be free-flow; a westbound left turn lane should be provided.
- **64<sup>th</sup> Avenue/Denali Street.** Lane needs include a single left turn lane along the southbound, westbound, and eastbound approaches, dual left turn lanes along the northbound approach, and a right turn lane along all four approaches.
- **60<sup>th</sup> Avenue/Denali Street.** Lane needs include a single left turn lane along the southbound and eastbound approaches and a right turn lane along the southbound approach.
- **Tibet Street/60<sup>th</sup> Avenue.** Lane needs include a single left turn lane along all four approaches and a right turn lane along northbound approach. This intersection was studied per the City's request, but the Fulenwider FDP will not rely on 60<sup>th</sup> Avenue and its Tibet Street intersection for access. This intersection's signalization and recommended lane geometry would primarily be a function of the regional 60<sup>th</sup> Avenue overpass improvement, if/when needed, to support robust development throughout the area.



Access intersections as assumed in this study have also been analyzed (results also presented on **Figure 8**) and are summarized as follows:

- All of the three-quarter access points along Harvest Road are shown to operate acceptably and meet City requirements of minor movement at LOS D or better with the exception of the eastbound right turn in the PM Peak hour at intersection #2. This information should be used to help inform CSPs as they develop.
- **PA-1/56<sup>th</sup> Avenue** (Intersection #10). The left-in movement will be relatively heavy, and dual left turn lanes should be provided. Upon more detailed site planning of PA-1, maximizing the spacing between this intersection and Tibet Street should be pursued.
- **PA-1/Tibet Street** (Intersection #15). Lane needs include single left turn lanes along all four approaches, and a right turn lane along the eastbound, westbound, and northbound approaches. Upon more detailed site planning of PA-1, maximizing the spacing between this intersection and 56<sup>th</sup> Avenue should be pursued.
- **PA-9/PA-10/64<sup>th</sup> Avenue** (Intersection #18). The PA-9 access intersection onto 64<sup>th</sup> Avenue will eventually warrant signalization. The location of this access should be located as far west (away from Harvest Road) as possible. A preliminary assessment is that the centerline to centerline distance between Harvest Road and this access intersection would be approximately 650 feet. 64<sup>th</sup> Avenue will provide four through lanes, and eastbound dual left turn lanes are needed at Harvest Road. The 95<sup>th</sup> percentile queue of these dual left turn lanes are projected to reach 300 feet. The 95<sup>th</sup> percentile queue for the westbound left turn movement into PA-9 could reach 75 feet. Lead-in tapers of the opposing left turn lanes could overlap, and a portion of the 75 foot-long westbound left turn lane into PA-9 could overlap with the eastbound lead-in taper (in part) given its length to serve dual lanes. There should be adequate spacing to incorporate the left turn lane needs between the PA-9 access and Harvest Road.

### **64<sup>th</sup> Avenue**

Also as mentioned, agreement has been reached to reduce this roadway's cross-section to include four through lanes provided that adequate right-of-way is provided for an eventual widening to six lanes; the *NEATS Refresh* study shows six. A four-lane cross-section is adequate through the Fulenwider FDP site based on the analysis of the Denali Street intersection and the Harvest Road intersection. The analysis shows that four through lanes within the Fulenwider FDP are appropriate (the *NEATS Refresh* document already shows four through lanes along 64<sup>th</sup> Avenue east of Harvest Road). The City has indicated a desire to preserve the ultimate six lane cross-section with respect to right-of-way. The City recognizes that a four-lane cross-section may suffice, and they have approved plans to move forward with a four-lane cross-section.

### **E-470/56<sup>th</sup> Avenue Interchange**

This study shows that this interchange would need to ultimately be widened to accommodate nine lanes of traffic along the bridge spanning E-470. A lesser cross-section was tested, and it was determined that the ramp terminals could operate well using just two through lanes in each direction as compared to the three through lanes recommended in *NEATS*. Dual left turn lanes onto the southbound on-ramp are ultimately needed, and a single left turn lane onto the northbound on-ramp will be needed. The existing lane interchange configuration could accommodate an estimated 45 to 50 percent of the 2040 peak hour forecasts (assumes signalization of the ramps) before improvement would be needed. The bridge is currently striped for three lanes of travel (one through lane in each direction and a center left turn lane), and its current width could accommodate six lanes.

Ultimately, nine lanes of width along the bridge should be provided. Adding three lanes to the bridge (plus pedestrian accommodation) does not easily lend itself to a phased approach. If done in two separate improvement projects as conditions dictate, one of the projects would simply be widening for one lane of width; this is not a cost-effective improvement. As such, the widening of the bridge to the full nine lanes (plus pedestrian accommodation) would be most cost-effective as a single improvement project in the future. Again, about 45 to 50 percent of the 2040 traffic loadings can be accommodated by the existing interchange prior to the need for improvement, or at least re-striping. More analysis would be needed to inform a phasing plan toward the ultimate interchange.

### **60th Avenue Overpass of E-470**

Being a planned collector, 60<sup>th</sup> Avenue was not addressed or reflected in the *NEATS Refresh* planning effort or its travel demand modeling. Traffic projections are well within the threshold of the planned three-lane collector road between Harvest Road and Tibet Street. A deeper analysis also showed that this overpass will not likely have a major impact on the vehicular LOS at the 56<sup>th</sup> Avenue and 64<sup>th</sup> Avenue interchange intersections, but some relief to these roadways would occur. This roadway may provide other long-term utility as well including:

- Providing an alternative route to 56<sup>th</sup> and 64<sup>th</sup> Avenues given the vision that it will extend from Dunkirk Street to Jackson Gap Street
- Offering utility in serving pedestrian and bicycling activity in the region
- Allowing an alternative means of access for all areas it will serve between Dunkirk Street and Jackson Gap Street

The Fulenwider FDP applicant has indicated that they could develop without the 60<sup>th</sup> Avenue overpass. Its ultimate construction should weigh regional considerations with respect to responsibility and need.

### **Auxiliary Lane Requirements**

Recommendations for vehicle storage lengths at each of the external study area intersections are included in **Table 3**, for use in identifying construction needs for the FDP. These dimensions represent the storage space necessary to meet the 95<sup>th</sup> percentile maximum queue during either the AM or PM peak hour.

Output from the traffic analysis effort was used to recommend these storage lengths, using the following methodology:

- **Left turn lane storage lengths.** At signalized intersections, the greater of the HCM 6<sup>th</sup> Edition or Synchro methodology queue calculations was reported. For unsignalized intersections, the HCM 6<sup>th</sup> Edition calculation was reported.
- **Through movements.** For signalized intersections, Synchro calculation results were reported. No through movement queues are reported for unsignalized intersections as the through movements are free.
- **Right turn movements.** The Synchro queue length was used. HCM 6<sup>th</sup> Edition information was not used because HCM's signalized intersection methodology does not account for right turns on red.

Deceleration lane and taper lengths should be added to these dimensions per City of Aurora standards to identify the total length of each auxiliary lane. Upon the development of site plans, more detailed traffic impact studies should be prepared to confirm/refine the above queue lengths as well as all of the study area intersection operations

**Table 3. Year 2040 Intersection Queuing Results**

Intersection	Approach	Movement	2040 95th Percentile Queue Length (ft)		Recommended Storage Length (ft)	SHAC Recommendation
			AM	PM		
Harvest Road & 68 <sup>th</sup> Avenue (Intersection #1)	Eastbound	Left	100	150	150	150
		Through/Right <sup>+</sup>	50	50	Continuous	Continuous
	Westbound	Left	225	425	425	400
		Through/Right <sup>+</sup>	75	75	Continuous	Continuous
	Northbound	Left	25	25	50	50
		Through	475	450	Continuous	Continuous
		Right	25	25	50	375
	Southbound	Left	100	75	100	125
		Through	0	0	Continuous	Continuous
		Through/Right <sup>+</sup>	275	600	Continuous	Continuous
Harvest Road & PA-10 Access (Intersection #2)	Eastbound	Right	25	225	Continuous	Continuous
	Northbound	Left	75	50	75	325
		Through	0	0	Continuous	Continuous
	Southbound	Through	0	0	Continuous	Continuous
		Through/Right <sup>+</sup>	0	0	Continuous	Continuous
Harvest Road & 64 <sup>th</sup> Avenue (Intersection #3)	Eastbound	Left*	450	425	450	425
		Through	150	150	Continuous	Continuous
		Right	125	325	Continuous	Continuous
	Westbound	Left	150	175	175	175
		Through	225	275	Continuous	Continuous
		Right	75	75	Continuous	Continuous
	Northbound	Left*	250	300	300	225
		Through	0	0	Continuous	Continuous

Intersection	Approach	Movement	2040 95th Percentile Queue Length (ft)		Recommended Storage Length (ft)	SHAC Recommendation
			AM	PM		
	Southbound	Through/Right <sup>+</sup>	875	500	Continuous	Continuous
		Left	150	100	150	150
		Through	450	900	Continuous	Continuous
		Right	325	400	400	650
Harvest Road & PA-9 Access (Intersection #4)	Eastbound	Right	25	25	Continuous	Continuous
	Northbound	Left	25	25	50	100
		Through	0	0	Continuous	Continuous
	Southbound	Through	0	0	Continuous	Continuous
		Right	0	0	50	75
Harvest Road & 60 <sup>th</sup> Avenue (Intersection #5)	Eastbound	Left	125	175	175	200
		Through	50	50	Continuous	Continuous
		Right	50	200	200	375
	Westbound	Left	50	50	50	75
		Through/Right <sup>+</sup>	50	75	Continuous	Continuous
	Northbound	Left	275	175	275	375
		Through	0	0	Continuous	Continuous
		Through/Right <sup>+</sup>	175	525	Continuous	Continuous
	Southbound	Left	25	25	50	75
		Through	375	775	Continuous	Continuous
		Right	0	0	50	175
Harvest Road & PA-8 Access (Intersection #6)	Eastbound	Right	25	25	Continuous	Continuous
	Northbound	Left	25	25	50	100
		Through	0	0	Continuous	Continuous
	Southbound	Through	0	0	Continuous	Continuous

Intersection	Approach	Movement	2040 95th Percentile Queue Length (ft)		Recommended Storage Length (ft)	SHAC Recommendation
			AM	PM		
		Through/Right <sup>+</sup>	0	0	Continuous	Continuous
Denali Street & 64 <sup>th</sup> Avenue (Intersection #7)	Eastbound	Left	100	50	100	175
		Through	500	325	Continuous	Continuous
		Right	50	50	50	425
	Westbound	Left	100	75	100	125
		Through	275	500	Continuous	Continuous
		Right	100	25	100	175
	Northbound	Left <sup>*</sup>	150	250	250	225
		Through	150	100	Continuous	Continuous
		Right	50	50	50	125
	Southbound	Left	50	125	125	150
		Through	125	150	Continuous	Continuous
		Right	25	50	50	150
Denali Street & 60 <sup>th</sup> Avenue (Intersection #8)	Eastbound	Left	25	25	50	200
		Through	0	0	Continuous	Continuous
	Westbound	Through/Right <sup>+</sup>	0	0	Continuous	Continuous
	Southbound	Left	25	125	125	300
		Right	25	25	Continuous	Continuous
Tibet Street & 56 <sup>th</sup> Avenue (Intersection #9)	Eastbound	Left <sup>*</sup>	225	200	225	225
		Through	250	275	Continuous	Continuous
		Right	25	25	50	175
	Westbound	Left <sup>*</sup>	200	250	250	225
		Through	250	325	Continuous	Continuous
		Right	150	200	200	425

Intersection	Approach	Movement	2040 95th Percentile Queue Length (ft)		Recommended Storage Length (ft)	SHAC Recommendation
			AM	PM		
	Northbound	Left	150	125	150	175
		Through	150	75	Continuous	Continuous
		Right	100	125	125	425
	Southbound	Left	275	350	350	450
		Through	75	50	Continuous	Continuous
		Right	100	50	50	500
56 <sup>th</sup> Avenue & PA-I Access (Intersection #10)	Eastbound	Left*	75	100	100	175
		Through	75	225	Continuous	Continuous
	Westbound	Through	125	200	Continuous	Continuous
		Right	25	50	50	225
	Southbound	Left	150	200	200	200
		Left/Right <sup>+</sup>	0	0	Continuous	Continuous
56 <sup>th</sup> Avenue & E-470 S Ramp (Intersection #11)	Eastbound	Through	225	250	Continuous	Continuous
		Right	25	50	50	300
	Westbound	Left*	175	175	175	350
		Through	75	200	Continuous	Continuous
	Southbound	Left	200	125	200	325
		Through/Left <sup>+</sup>	175	125	Continuous	Continuous
56 <sup>th</sup> Avenue & N-470 S Ramp (Intersection #12)	Eastbound	Left	75	200	200	225
		Through	175	50	Continuous	Continuous
	Westbound	Through	225	275	Continuous	Continuous
		Right	25	25	50	350
	Northbound	Left	125	175	175	275
		Through/Left <sup>+</sup>	100	150	Continuous	Continuous

Intersection	Approach	Movement	2040 95th Percentile Queue Length (ft)		Recommended Storage Length (ft)	SHAC Recommendation
			AM	PM		
		Right	250	150	250	325
56 <sup>th</sup> Avenue & Denali Street (Intersection #13)	Eastbound	Left	75	25	75	75
		Through	375	250	Continuous	Continuous
		Right	100	25	100	800
	Westbound	Left*	200	250	250	325
		Through	0	0	Continuous	Continuous
		Through/Right <sup>+</sup>	125	275	Continuous	Continuous
	Northbound	Left*	450	350	450	450
		Through	25	25	Continuous	Continuous
		Right	150	75	150	525
	Southbound	Left	50	50	50	50
		Through/Right <sup>+</sup>	50	75	Continuous	Continuous
56 <sup>th</sup> Avenue & Harvest Road (Intersection #14)	Eastbound	Left*	400	275	400	400
		Through	100	225	Continuous	Continuous
		Right	75	275	Continuous	400
	Westbound	Left	200	275	275	225
		Through	225	225	Continuous	Continuous
		Right	250	175	250	400
	Northbound	Left*	200	275	275	225
		Through	450	325	Continuous	Continuous
		Right	50	75	75	200
	Southbound	Left*	150	225	225	200
		Through	200	475	Continuous	Continuous
		Right	575	975	575	1175
	Eastbound	Left	25	25	50	50



Intersection	Approach	Movement	2040 95th Percentile Queue Length (ft)		Recommended Storage Length (ft)	SHAC Recommendation
			AM	PM		
Tibet Street & PA-I Access B (Intersection #15)		Through	0	0	Continuous	Continuous
		Right	0	0	50	50
	Westbound	Left	250	225	250	175
		Through	0	0	Continuous	Continuous
		Right	0	0	50	100
	Northbound	Left	25	25	50	50
		Through	75	100	Continuous	Continuous
		Right	25	0	50	275
	Southbound	Left	25	75	75	125
		Through	0	0	Continuous	Continuous
		Through/Right <sup>+</sup>	50	225	Continuous	Continuous
Tibet Street & 60 <sup>th</sup> Avenue (Intersection #16)	Eastbound	Left	75	75	75	75
		Through/Right <sup>+</sup>	100	125	Continuous	Continuous
	Westbound	Left	175	225	225	225
		Through/Right <sup>+</sup>	75	75	Continuous	Continuous
	Northbound	Left	25	50	50	100
		Through	75	100	Continuous	Continuous
		Right	25	25	50	200
	Southbound	Left	25	50	50	100
		Through	100	225	Continuous	Continuous
		Through/Right <sup>+</sup>	100	225	Continuous	Continuous
Denali Street & 68 <sup>th</sup> Avenue (Intersection #17)	Eastbound	Through/Right <sup>+</sup>	0	0	Continuous	Continuous
	Westbound	Left	25	25	50	50
		Through	0	0	Continuous	Continuous
	Northbound	Left	25	25	50	50

Intersection	Approach	Movement	2040 95th Percentile Queue Length (ft)		Recommended Storage Length (ft)	SHAC Recommendation
			AM	PM		
		Right	25	25	Continuous	Continuous
PA-10 & 64 <sup>th</sup> Avenue (Intersection #18)	Eastbound	Left	175	100	175	150
		Through	0	0	Continuous	Continuous
		Through/Right <sup>+</sup>	50	400	Continuous	Continuous
		Through/Right <sup>+</sup>	50	400	Continuous	Continuous
	Westbound	Left	50	25	50	50
		Through	0	0	Continuous	Continuous
		Through/Right <sup>+</sup>	375	400	Continuous	Continuous
	Northbound	Left	50	75	75	75
		Through/Right <sup>+</sup>	0	0	Continuous	Continuous
	Southbound	Left	75	175	175	225
		Through/Right <sup>+</sup>	0	50	Continuous	Continuous
Harvest Road & S PA-9 Access (Intersection #19)	Eastbound	Right	25	25	Continuous	Continuous
	Northbound	Left	25	25	50	75
		Through	0	0	Continuous	Continuous
	Southbound	Through	0	0	Continuous	Continuous
		Through/Right <sup>+</sup>	0	0	Continuous	Continuous
Harvest Road & S PA-8 Access (Intersection #20)	Eastbound	Right	25	25	Continuous	Continuous
	Northbound	Through	0	0	Continuous	Continuous
	Southbound	Through	0	0	Continuous	Continuous
		Through/Right <sup>+</sup>	0	0	Continuous	Continuous

SHAC values based on a HV% of fifteen percent.

\*Dual left-turn queues and storage are per lane

+Shared through and turn lane

## VI. SUMMARY AND RECOMMENDATIONS

Fulenwider is planning to develop an approximate 716-acre site in Aurora, Colorado, referred to as the Fulenwider FDP. The FDP site is located along the north side of 56<sup>th</sup> Avenue and along the west side of Harvest Road. Land use will include a mix of residential, industrial and retail land uses. The proposed land uses include:

- 1,080 residential multifamily dwelling units
- Approximately 4.1 million square feet of industrial uses/warehousing/data center
- Approximately 154 thousand square feet of commercial/retail space
- Approximately 200 thousand square feet of office space
- Approximately 1,000 hotel rooms

The Fulenwider FDP is estimated to generate a total of approximately 36,000 external vehicle-trips per day. The more intense trip-making uses will occur in parcels located immediately west of the E-470/56<sup>th</sup> Avenue interchange.

The recently updated *NEATS Refresh* identifies the appropriate roadway classification and laneage of the surrounding street system. The NEATS study was a key resource in preparing this traffic impact analysis with respect to the major roadways and the traffic demand for the rest of the area outside the Fulenwider FDP.

The overarching roadway recommendations include:

- **Harvest Road.** This roadway will ultimately replace Jackson Gap Way as the area's access into DEN under the current *NEATS Refresh*. Further, this roadway will ultimately serve as a busy north-south major arterial facility through the region. As such, ultimate traffic demands will be significant requiring a six-lane facility and dual left turn lanes along select approaches at the intersections with 64<sup>th</sup> Avenue, 60<sup>th</sup> Avenue, and 56<sup>th</sup> Avenue (a southbound free right turn condition would be beneficial at the Harvest/56<sup>th</sup> intersection). However, current updates to NEATS indicate Jackson Way may be the tie-in location for a diagonal connection with Powhatan south of 56<sup>th</sup> Avenue, which also eliminates the need for Harvest to tie into Jackson Gap to the north as the roadways enter DEN property. These changes in roadway alignment significantly diminish the potential for background traffic along Harvest Road. These reductions in traffic are likely to be significant enough that Harvest Road only needs to be built as a 4-lane arterial roadway.
- **56<sup>th</sup> Avenue.** This roadway provides a significant amount of east-west continuity through the region. Traffic will tend to increase near its interchange with E-470. A six-lane major arterial with dual left turn lanes along select approaches at the intersections of Tibet Street, the E-470 interchange, the major access intersections on either side of the E-470 interchange, Denali Street, and Harvest Road. The E-470 interchange will need to be widened to include three through lanes in each direction, westbound dual left turn lanes, and a single eastbound left turn lane (nine-lane wide bridge).
- **64<sup>th</sup> Avenue.** The *NEATS Refresh* study identifies this roadway to ultimately be a six-lane major arterial road through the FDP site. The City has requested that right-of-way be provided to allow for this, but that a four-lane facility may be appropriate. This study concludes that 64<sup>th</sup> Avenue will function adequately as a four-lane arterial road through the Fulenwider FDP

given appropriate turn lanes at intersections, but the appropriate preservation will be in place to ultimately build a six-lane facility if needed.

- **Denali Street.** This should be planned as a three-lane collector road from 60<sup>th</sup> Avenue to north of 64<sup>th</sup> Avenue. A buyer for the land in this area requires a secure site that prohibits the ability to build the roadway between 56<sup>th</sup> and 60<sup>th</sup> Avenues.
- **60<sup>th</sup> Avenue.** Being a planned collector, this roadway was not addressed or reflected in the *NEATS Refresh* planning effort. Traffic projections are well within the threshold of the planned three-lane collector road between Harvest Road and Tibet Street. A deeper analysis also showed that this overpass will not likely have a major impact on the vehicular levels of service at the 56<sup>th</sup> Avenue and 64<sup>th</sup> Avenue interchange intersections. However, this overpass has the potential to provide some relief to these parallel regional arterial roads and to provide utility with respect to:
  - Offering motorists a regional alternative to 56<sup>th</sup> and 64<sup>th</sup> Avenues given the vision that it will extend from Dunkirk Street to Jackson Gap Street
  - Providing utility in serving pedestrian and bicycling activity in the region
  - Allowing an alternative means of access for all areas it will serve between Dunkirk Street and Jackson Gap Street

The Fulenwider FDP applicant has indicated that they could develop without the need to construct the 60<sup>th</sup> Avenue overpass. Its ultimate construction should heavily consider regional considerations with respect to responsibility and need.

- **E-470/56<sup>th</sup> Avenue Interchange.** This diamond interchange includes striping for three lanes of traffic along the existing bridge crossing E-470. There is enough bridge width that six lanes could be accommodated. Ultimately, nine lanes of bridge width (plus pedestrian accommodation) will be needed to accommodate year 2040 projected peak hour traffic assuming the NEATS recommendation of three through lanes remains. However, there is the possibility of limiting through lanes at the interchange and reducing the cross-section of the bridge to seven lanes. The existing interchange configuration could accommodate approximately 45 to 50 percent of the 2040 peak hour projections, so the existing configuration can accommodate some growth before improvement is needed. Additional analysis and discussion should take place toward a phasing plan to interchange's ultimate configuration.
- **Tibet Street.** This roadway should be planned as a five-lane minor arterial with a center left turn lane and right turn lanes where needed. A potential to signal may be necessary for the site's access onto this roadway as well as at 60<sup>th</sup> Avenue.

Traffic signals are anticipated to be installed at the major intersections, including:

- 56<sup>th</sup> Avenue/Tibet Street
- 56<sup>th</sup> Avenue/E-470 Ramps
- 56<sup>th</sup> Avenue/Accesses intersection on west side of E-470
- 56<sup>th</sup> Avenue/Denali Street
- 56<sup>th</sup> Avenue/ Harvest Road
- Harvest Road/60<sup>th</sup> Avenue
- Harvest Road/64<sup>th</sup> Avenue
- 64<sup>th</sup> Avenue/Denali Street
- Harvest Road/68<sup>th</sup> Avenue

- Tibet Street/60<sup>th</sup> Avenue
- Tibet Street/PA-I Site Access
- 64<sup>th</sup> Avenue/PA-9 and PA-10 Access

All other external and internal street intersections can be controlled by stop signs. Unsignalized access points into and out of the FDP along 56<sup>th</sup> Avenue and Harvest Road should likely be restricted to three-quarter or right-in/right-out only movements, with the final determination being made in conjunction with site CSPs.

## APPENDIX A. EXISTING TRAFFIC COUNTS



(303) 216-2439  
www.alltrafficdata.net

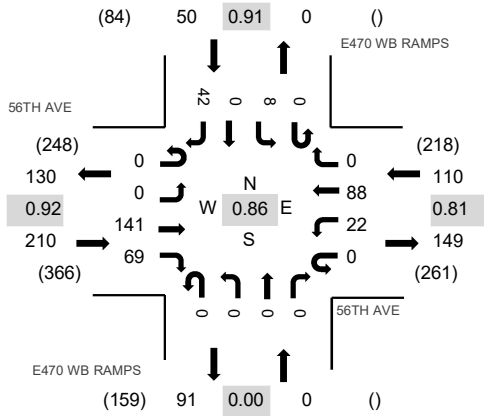
**Location:** 1 E470 WB RAMPS & 56TH AVE AM

**Date:** Tuesday, March 26, 2019

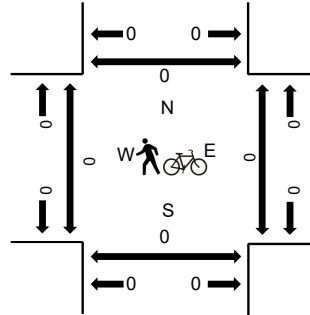
**Peak Hour:** 07:00 AM - 08:00 AM

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

### Peak Hour - All Vehicles



### Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

### Traffic Counts

Interval Start Time	56TH AVE Eastbound				56TH AVE Westbound				E470 WB RAMPS Northbound				E470 WB RAMPS Southbound				Total	Rolling Hour	Pedestrian Crossings				
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North	
7:00 AM	0	0	37	16	0	1	18	0	0	0	0	0	0	0	0	9	81	370	0	0	0	0	
7:15 AM	0	0	33	13	0	7	20	0	0	0	0	0	0	1	0	13	87	365	0	0	0	0	
7:30 AM	0	0	34	23	0	6	31	0	0	0	0	0	0	4	0	9	107	355	0	0	0	0	
7:45 AM	0	0	37	17	0	8	19	0	0	0	0	0	0	3	0	11	95	326	0	0	0	0	
8:00 AM	0	0	29	12	0	3	22	0	0	0	0	0	0	1	0	9	76	298	0	0	0	0	
8:15 AM	0	0	26	14	0	8	23	0	0	0	0	0	0	1	0	5	77		0	0	0	0	
8:30 AM	0	0	33	13	0	5	18	0	0	0	0	0	0	2	0	7	78		0	0	0	0	
8:45 AM	0	0	18	11	0	2	27	0	0	0	0	0	0	2	0	7	67		0	0	0	0	
Count Total	0	0	247	119	0	40	178	0	0	0	0	0	0	14	0	70	668		0	0	0	0	
Peak Hour	0	0	141	69	0	22	88	0	0	0	0	0	0	8	0	42	370		0	0	0	0	





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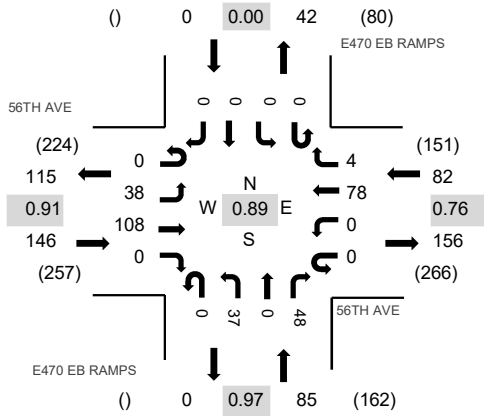
**Location:** 2 E470 EB RAMPS & 56TH AVE AM

**Date:** Tuesday, March 26, 2019

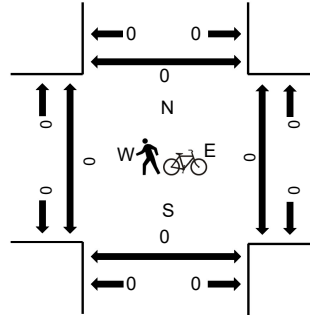
**Peak Hour:** 07:00 AM - 08:00 AM

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

### Peak Hour - All Vehicles



### Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

### Traffic Counts

Interval Start Time	56TH AVE Eastbound				56TH AVE Westbound				E470 EB RAMPS Northbound				E470 EB RAMPS Southbound				Total	Rolling Hour	Pedestrian Crossings				
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North	
7:00 AM	0	10	26	0	0	0	11	0	0	8	0	14	0	0	0	0	69	313	0	0	0	0	
7:15 AM	0	7	27	0	0	0	19	0	0	8	0	13	0	0	0	0	74	310	0	0	0	0	
7:30 AM	0	10	26	0	0	0	28	2	0	11	0	11	0	0	0	0	88	301	0	0	0	0	
7:45 AM	0	11	29	0	0	0	20	2	0	10	0	10	0	0	0	0	82	284	0	0	0	0	
8:00 AM	0	8	23	0	0	0	18	2	0	8	0	7	0	0	0	0	66	257	0	0	0	0	
8:15 AM	0	11	16	0	0	0	16	1	0	15	0	6	0	0	0	0	65		0	0	0	0	
8:30 AM	0	7	27	0	0	0	13	1	0	11	0	12	0	0	0	0	71		0	0	0	0	
8:45 AM	0	6	13	0	0	0	16	2	0	12	0	6	0	0	0	0	55		0	0	0	0	
Count Total	0	70	187	0	0	0	141	10	0	83	0	79	0	0	0	0	570		0	0	0	0	
Peak Hour	0	38	108	0	0	0	78	4	0	37	0	48	0	0	0	0	313		0	0	0	0	



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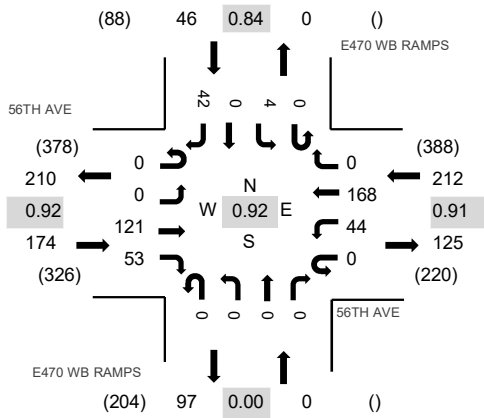
**Location:** 1 E470 WB RAMPS & 56TH AVE PM

**Date:** Tuesday, March 26, 2019

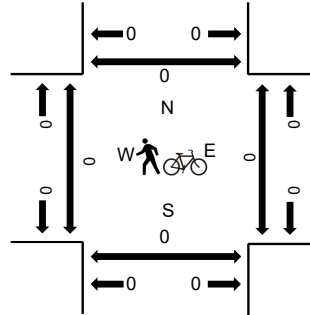
**Peak Hour:** 04:15 PM - 05:15 PM

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

### Peak Hour - All Vehicles



### Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

### Traffic Counts

Interval Start Time	56TH AVE Eastbound				56TH AVE Westbound				E470 WB RAMPS Northbound				E470 WB RAMPS Southbound				Total	Rolling Pedestrian Crossings				
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		Hour	West	East	South	North
4:00 PM	0	0	27	20	0	8	29	0	0	0	0	0	0	1	1	9	95	426	0	0	0	0
4:15 PM	0	0	30	11	0	7	51	0	0	0	0	0	0	0	0	12	111	432	0	0	0	0
4:30 PM	0	0	32	17	0	16	38	0	0	0	0	0	0	2	0	12	117	417	0	0	0	0
4:45 PM	0	0	30	14	0	9	40	0	0	0	0	0	0	1	0	9	103	407	0	0	0	0
5:00 PM	0	0	29	11	0	12	39	0	0	0	0	0	0	1	0	9	101	376	0	0	0	0
5:15 PM	0	0	21	10	0	15	40	0	0	0	0	0	0	2	0	8	96		0	0	0	0
5:30 PM	0	0	20	21	0	11	40	0	0	0	0	0	0	3	0	12	107		0	0	0	0
5:45 PM	0	0	21	12	0	9	24	0	0	0	0	0	0	0	0	6	72		0	0	0	0
Count Total	0	0	210	116	0	87	301	0	0	0	0	0	0	10	1	77	802		0	0	0	0
Peak Hour	0	0	121	53	0	44	168	0	0	0	0	0	0	4	0	42	432		0	0	0	0



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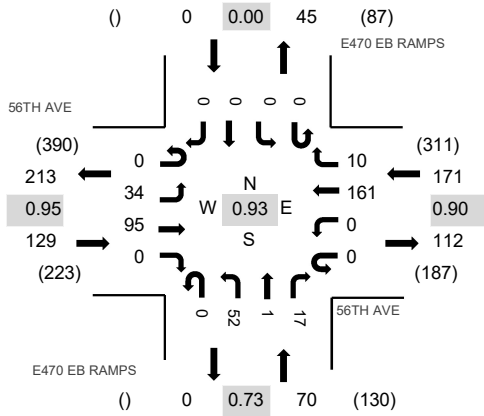
**Location:** 2 E470 EB RAMPS & 56TH AVE PM

**Date:** Tuesday, March 26, 2019

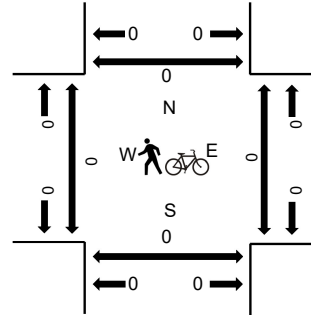
**Peak Hour:** 04:15 PM - 05:15 PM

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

### Peak Hour - All Vehicles



### Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

### Traffic Counts

Interval Start Time	56TH AVE Eastbound				56TH AVE Westbound				E470 EB RAMPS Northbound				E470 EB RAMPS Southbound				Total	Rolling Hour	Pedestrian Crossings				
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North	
4:00 PM	0	12	14	0	0	0	29	1	0	10	0	1	0	0	0	0	67	347	0	0	0	0	
4:15 PM	0	5	29	0	0	0	39	2	0	19	1	4	0	0	0	0	99	370	0	0	0	0	
4:30 PM	0	7	27	0	0	0	42	0	0	13	0	6	0	0	0	0	95	359	0	0	0	0	
4:45 PM	0	11	20	0	0	0	36	3	0	12	0	4	0	0	0	0	86	342	0	0	0	0	
5:00 PM	0	11	19	0	0	0	44	5	0	8	0	3	0	0	0	0	90	317	0	0	0	0	
5:15 PM	0	9	15	0	0	0	44	2	0	11	0	7	0	0	0	0	88		0	0	0	0	
5:30 PM	0	9	14	0	0	0	31	2	0	19	0	3	0	0	0	0	78		0	0	0	0	
5:45 PM	0	4	17	0	0	0	28	3	0	5	0	4	0	0	0	0	61		0	0	0	0	
Count Total	0	68	155	0	0	0	293	18	0	97	1	32	0	0	0	0	664		0	0	0	0	
Peak Hour	0	34	95	0	0	0	161	10	0	52	1	17	0	0	0	0	370		0	0	0	0	

## APPENDIX B. LEVEL OF SERVICE CRITERIA

**TABLE B1**  
**LEVEL OF SERVICE CRITERIA FOR**  
**TWO-WAY STOP CONTROLLED (TWSC) INTERSECTIONS AND ROUNDABOUTS**

Level of Service	Delay Range (sec/veh)
A	0.0 – 10.0
B	>10.0 – 15.0
C	>15.0 – 25.0
D	>25.0 – 35.0
E	>35.0 – 50.0
F	> 50.0

Adapted from *Highway Capacity Manual*, Transportation Research Board, 2016.

**TABLE B2**  
**LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS**

Level of Service	Control Delay (sec/veh)	Qualitative Description
A	$\leq 10.0$	Good progression, short cycles, very few vehicle-stops.
B	>10.0 – 20.0	Good progression, and/or short cycle lengths, more vehicle-stops.
C	>20.0 – 35.0	Fair progression and/or longer cycle lengths, some individual cycle failures, many vehicle-stops
D	>35.0 – 55.0	Noticeable congestion and cycle failures, unfavorable progression, high v/c ratios, several stops.
E	>55.0 – 80.0	Limit of acceptable delay, poor progression, long cycles, high v/c ratios, frequent cycle failures.
F	> 80.0	Delay is unacceptable to most drivers, volume exceeds capacity, breakdown of traffic flow.

Adapted from *Highway Capacity Manual*, Transportation Research Board, 2016.

## APPENDIX C. ITE TRIP GENERATION EQUATIONS AND RATES

PA	Description	Type	Quantity	Units	ITE Code	Rates								Trips									
						Daily	AM Peak Hour			PM Peak Hour			Daily	AM Peak Hour			PM Peak Hour						
							IN	OUT	TOTAL	IN	OUT	TOTAL		IN	OUT	TOTAL	IN	OUT	TOTAL				
1	Mixed Use	Residential	810	DU	221	5.44	0.26	0.74	0.36	0.61	0.39	0.44	=D6*G6	=H6*Q6	=Q6*I6	=J6*D6	=K6*T6	=T6*L6	=M6*D6				
		Residential	270	DU	220	7.32	0.23	0.77	0.46	0.63	0.37	0.56	=D7*G7	=H7*Q7	=Q7*I7	=J7*D7	=K7*T7	=T7*L7	=M7*D7				
2	Mixed Use	Retail	100	KSF	820	EQN	0.62	0.38	EQN	0.48	0.52	EQN	=EXP(0.68*LN(D8))+5.57)	=H8*Q8	=Q8*I8	=0.5*D8+151.78	=K8*T8	=T8*L8	=EXP(0.74*LN(D8))+2.89)				
		Hotel	250	Rooms	310	8.36	0.59	0.41	0.47	0.51	0.49	0.6	=D9*G9	=H9*Q9	=Q9*I9	=J9*D9	=K9*T9	=T9*L9	=M9*D9				
4	Ind Dist.	Data Center	1470	KSF	Custom	-	0.55	0.45	-	0.3	0.7	-	I310	=H10*Q10	=Q10*I10	=N10*0.11/0.99	=K10*T10	=T10*L10	=N10*0.09/0.99				
6	Ind Dist.	Industrial	634.64	KSF	130	EQN	0.81	0.19	0.4	0.21	0.79	0.4	=EXP(0.52*LN(D11))+4.45)	=H11*Q11	=Q11*I11	=N11*0.11/0.99	=K11*T11	=T11*L11	=M11*D11				
		Data Center	366.9	KSF	160	0.99	0.55	0.45	0.11	0.3	0.7	0.09	=D12*G12	=H12*Q12	=Q12*I12	=J12*D12	=K12*T12	=T12*L12	=M12*D12				
7	Comm/Ret	Industrial	476	KSF	130	EQN	0.81	0.19	0.4	0.21	0.79	0.4	=EXP(0.52*LN(D13))+4.45)	=H13*Q13	=Q13*I13	=J13*D13	=K13*T13	=T13*L13	=M13*D13				
		Retail	6	KSF	820	EQN	0.62	0.38	EQN	0.48	0.52	EQN	=EXP(0.68*LN(D14))+5.57)	=H14*Q14	=Q14*I14	=0.5*D14+151.78	=K14*T14	=T14*L14	=EXP(0.74*LN(D14))+2.89)				
8	Comm/Ret	Office	80	KSF	710	9.74	0.86	0.14	1.16	0.16	0.84	1.15	=D15*G15	=H15*Q15	=Q15*I15	=J15*D15	=K15*T15	=T15*L15	=M15*D15				
		Retail	5	KSF	820	EQN	0.62	0.38	EQN	0.48	0.52	EQN	=EXP(0.68*LN(D16))+5.57)	=H16*Q16	=Q16*I16	=0.5*D16+151.78	=K16*T16	=T16*L16	=EXP(0.74*LN(D16))+2.89)				
9	Comm/Ret	Office	120	KSF	710	9.74	0.86	0.14	1.16	0.16	0.84	1.15	=D17*G17	=H17*Q17	=Q17*I17	=J17*D17	=K17*T17	=T17*L17	=M17*D17				
		Retail	30	KSF	820	EQN	0.62	0.38	EQN	0.48	0.52	EQN	=EXP(0.68*LN(D18))+5.57)	=H18*Q18	=Q18*I18	=0.5*D18+151.78	=K18*T18	=T18*L18	=EXP(0.74*LN(D18))+2.89)				
		Hotel	375	Rooms	310	8.36	0.59	0.41	0.47	0.51	0.49	0.6	=D19*G19	=H19*Q19	=Q19*I19	=J19*D19	=K19*T19	=T19*L19	=M19*D19				
10	Apt Dist.	Industrial	1127.7	KSF	130	EQN	0.81	0.19	0.4	0.21	0.79	0.4	=EXP(0.52*LN(D20))+4.45)	=H20*Q20	=Q20*I20	=J20*D20	=K20*T20	=T20*L20	=M20*D20				
		Hotel	375	Rooms	310	8.36	0.59	0.41	0.47	0.51	0.49	0.6	=D21*G21	=H21*Q21	=Q21*I21	=J21*D21	=K21*T21	=T21*L21	=M21*D21				
		Retail	13	KSF	820	EQN	0.62	0.38	EQN	0.48	0.52	EQN	=EXP(0.68*LN(D22))+5.57)	=H22*Q22	=Q22*I22	=0.5*D22+151.78	=K22*T22	=T22*L22	=EXP(0.74*LN(D22))+2.89)				
Totals														=SUM(N6:N22)	=SUM(O6:O22)	=SUM(P6:P22)	=SUM(Q6:Q22)	=SUM(R6:R22)	2022	=SUM(T6:T22)			
Pass-by Adjustments - 30% of Retail														=EVEN(0.3*(SUM(N8,N14,N16,N18,N22)))	0	0	0	=S24	=T24/2	=EVEN(0.3*(SUM(T8,T14,T16,T18,T22)))			
Total External Trip Generation														=N23-N24	=O23-O24	=P23-P24	=Q23-Q24	=R23-R24	=S23-S24	=T23-T24			

## APPENDIX D. YEAR 2040 SIGNAL WARRANT ANALYSIS



**MUTCD Volume-based Warrant Evaluation**  
**Harvest Road and 68th Avenue**  
**Intersection # 1**  
**2040 Total Traffic**



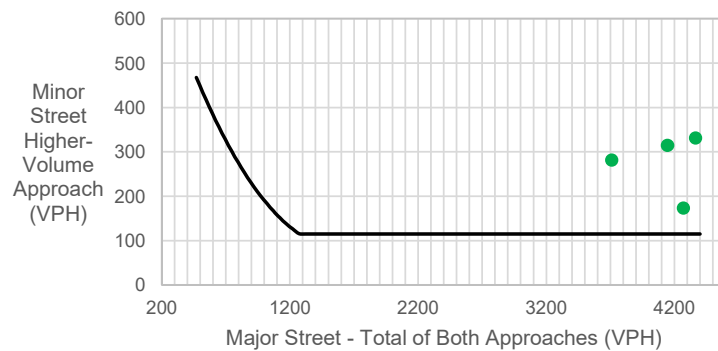
Major Street: Harvest Road  
 Approach Speed: 35 MPH  
 Lanes Moving Traffic: 2 or more  
 Option: Low speed, urban community

Minor Street: 68th Avenue  
 Right Turn Volume Included: 25% EB, 25% WB  
 Lanes Moving Traffic: 2 or more

**WARRANT 2, Four Hour Vehicular Volume**

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
PM Peak Hour	4365	331
AM Peak Hour	4272	173
95% PM Peak Hour	4147	314
85% PM Peak Hour	3710	281

**Satisfied**      **Yes**  
 (100% Factor)



**MUTCD Volume-based Warrant Evaluation**  
**Harvest Road and 64th Avenue**  
**Intersection # 3**  
**2040 Total Traffic**



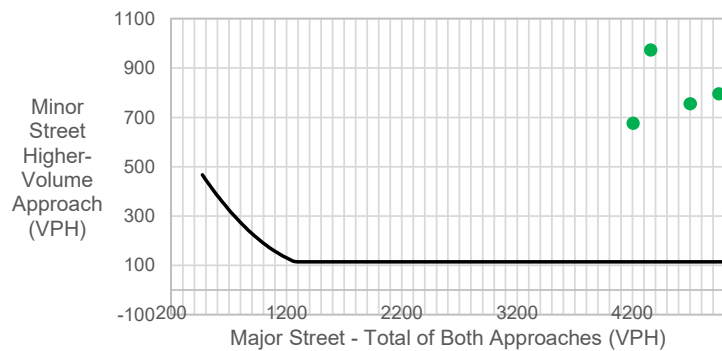
Major Street: Harvest Road  
 Approach Speed: 35 MPH  
 Lanes Moving Traffic: 2 or more  
 Option: Low speed, urban community

Minor Street: 64th Avenue  
 Right Turn Volume Included: 0% EB, 50% WB  
 Lanes Moving Traffic: 2 or more

**WARRANT 2, Four Hour Vehicular Volume**

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
PM Peak Hour	4950	795
95% PM Peak Hour	4703	755
AM Peak Hour	4360	973
85% PM Peak Hour	4208	676

**Satisfied**      **Yes**  
 (100% Factor)



**MUTCD Volume-based Warrant Evaluation**  
**Harvest Road and 60th Avenue**  
**Intersection # 5**  
**2040 Total Traffic**



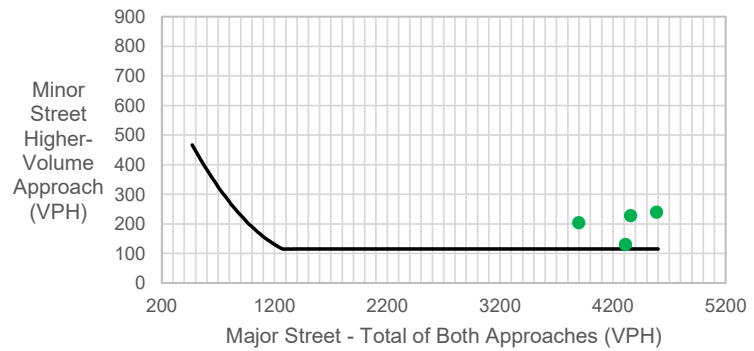
Major Street: Harvest Road  
 Approach Speed: 35 MPH  
 Lanes Moving Traffic: 2 or more  
 Option: Low speed, urban community

Minor Street: 60th Avenue  
 Right Turn Volume Included: 25% EB, 50% WB  
 Lanes Moving Traffic: 2 or more

**WARRANT 2, Four Hour Vehicular Volume**

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
PM Peak Hour	4588	239
95% PM Peak Hour	4359	227
AM Peak Hour	4313	130
85% PM Peak Hour	3900	203

**Satisfied**      **Yes**  
 (100% Factor)



## MUTCD Volume-based Warrant Evaluation

Denali St & 64th Ave

Intersection # 7

2040 Total Traffic



Major Street: 64th Avenue

Approach Speed: 35 MPH

Lanes Moving Traffic: 2 or more

Option: Low speed, urban community

Minor Street: Denali St

Right Turn Volume Included: 0% NB, 0% SB

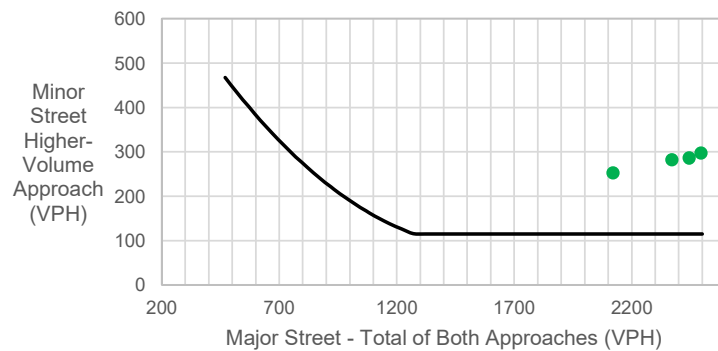
Lanes Moving Traffic: 2 or more

### WARRANT 2, Four Hour Vehicular Volume

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
AM Peak Hour	2445	286
PM Peak Hour	2496	297
95% PM Peak Hour	2371	282
85% AM Peak Hour	2122	252

**Satisfied** Yes

(100% Factor)



## MUTCD Volume-based Warrant Evaluation

Denali St & 60th Ave

Intersection # 8

2040 Total Traffic



Major Street: 60th Avenue

Approach Speed: 35 MPH

Lanes Moving Traffic: 2 or more

Option: Low speed, urban community

Minor Street: Denali St

Right Turn Volume Included: 25% NB, 25% SB

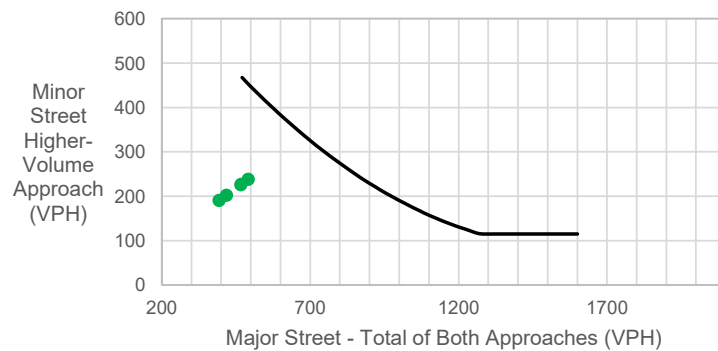
Lanes Moving Traffic: 2 or more

### WARRANT 2, Four Hour Vehicular Volume

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
PM Peak Hour	492	238
95% PM Peak Hour	467	226
85% PM Peak Hour	418	202
80% PM Peak Hour	394	190

Satisfied	No
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(100% Factor)



**MUTCD Volume-based Warrant Evaluation**  
**56th Avenue and Tibet Street**  
**Intersection # 9**  
**2040 Total Traffic**



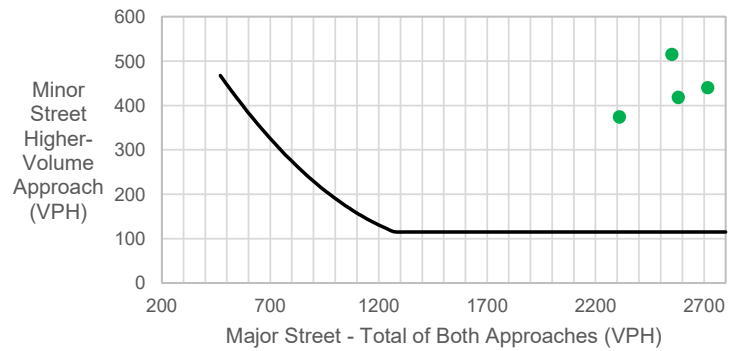
Major Street: 56th Avenue  
 Approach Speed: 35 MPH  
 Lanes Moving Traffic: 2 or more  
 Option: Low speed, urban community

Minor Street: Tibet Street  
 Right Turn Volume Included: 50% NB, 50% SB  
 Lanes Moving Traffic: 2 or more

**WARRANT 2, Four Hour Vehicular Volume**

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
PM Peak Hour	2718	440
95% PM Peak Hour	2582	418
AM Peak Hour	2552	515
85% PM Peak Hour	2310	374

**Satisfied**      **Yes**  
 (100% Factor)



**MUTCD Volume-based Warrant Evaluation**  
**56th Avenue and PA-1 Access A**  
**Intersection # 10**  
**2040 Total Traffic**



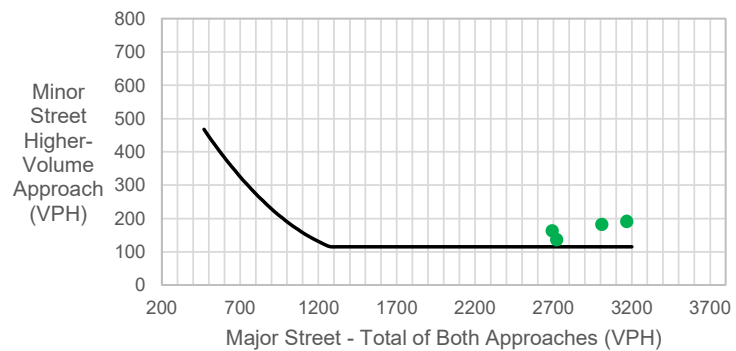
Major Street: 56th Avenue  
 Approach Speed: 35 MPH  
 Lanes Moving Traffic: 2 or more  
 Option: Low speed, urban community

Minor Street: PA-1 Access A  
 Right Turn Volume Included: 50% NB, 50% SB  
 Lanes Moving Traffic: 2 or more

**WARRANT 2, Four Hour Vehicular Volume**

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
PM Peak Hour	3169	191
95% PM Peak Hour	3011	181
AM Peak Hour	2722	136
85% PM Peak Hour	2694	162

**Satisfied**      **Yes**  
 (100% Factor)





**MUTCD Volume-based Warrant Evaluation**  
**56th Avenue and E-470 SB Ramps**  
**Intersection # 11**  
**2040 Total Traffic**



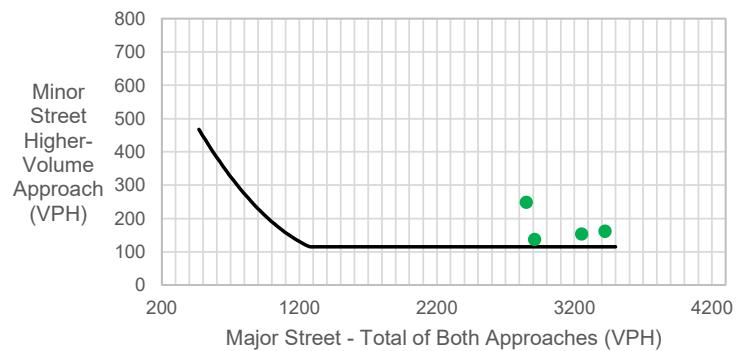
Major Street: 56th Avenue  
 Approach Speed: 35 MPH  
 Lanes Moving Traffic: 2 or more  
 Option: Low speed, urban community

Minor Street: E-470 SB  
 Right Turn Volume Included: 25% NB, 0% SB  
 Lanes Moving Traffic: 2 or more

**WARRANT 2, Four Hour Vehicular Volume**

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
PM Peak Hour	3424	161
95% PM Peak Hour	3253	153
85% PM Peak Hour	2910	137
80% PM Peak Hour	2851	248

**Satisfied**      **Yes**  
 (100% Factor)



**MUTCD Volume-based Warrant Evaluation**  
**56th Avenue and E-470 NB Ramps**  
**Intersection # 12**  
**2040 Total Traffic**



Major Street: 56th Avenue  
 Approach Speed: 35 MPH  
 Lanes Moving Traffic: 2 or more  
 Option: Low speed, urban community

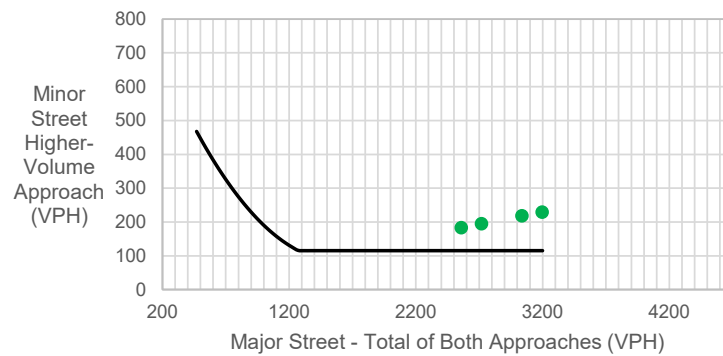
Minor Street: E-470 NB  
 Right Turn Volume Included: 0% NB, 25% SB  
 Lanes Moving Traffic: 2 or more

**WARRANT 2, Four Hour Vehicular Volume**

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
PM Peak Hour	3197	229
95% PM Peak Hour	3037	218
85% PM Peak Hour	2717	195
80% PM Peak Hour	2558	183

<b>Satisfied</b>	<b>Yes</b>
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(100% Factor)



**MUTCD Volume-based Warrant Evaluation**  
**56th Avenue & Denali Street**  
**Intersection # 13**  
**2040 Total Traffic**



Major Street: 56th Avenue  
 Approach Speed: 35 MPH  
 Lanes Moving Traffic: 2 or more  
 Option: Low speed, urban community

Minor Street: Denali Street  
 Right Turn Volume Included: 0% NB, 100% SB  
 Lanes Moving Traffic: 2 or more

**WARRANT 2, Four Hour Vehicular Volume**

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
AM Peak Hour	3369	670
PM Peak Hour	3290	494
95% PM Peak Hour	3126	469
85% PM Peak Hour	2864	570

**Satisfied**      **Yes**  
 (100% Factor)



**MUTCD Volume-based Warrant Evaluation**  
**Harvest Road and 56th Avenue**  
**Intersection # 14**  
**2040 Total Traffic**



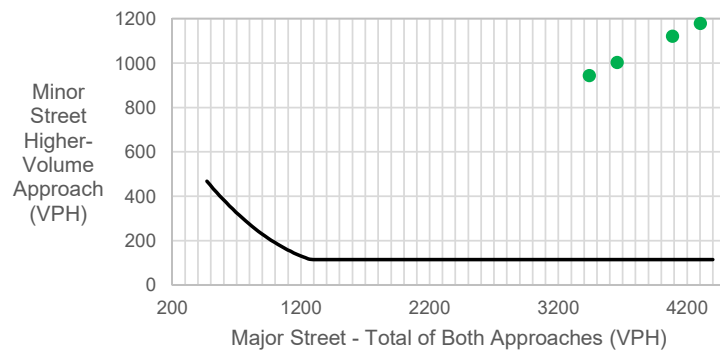
Major Street: Harvest Road  
 Approach Speed: 35 MPH  
 Lanes Moving Traffic: 2 or more  
 Option: Low speed, urban community

Minor Street: 56th Avenue  
 Right Turn Volume Included: 25% EB, 25% WB  
 Lanes Moving Traffic: 2 or more

**WARRANT 2, Four Hour Vehicular Volume**

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
PM Peak Hour	4303	1179
95% PM Peak Hour	4088	1120
85% PM Peak Hour	3658	1002
80% PM Peak Hour	3442	943

**Satisfied**      **Yes**  
 (100% Factor)



**MUTCD Volume-based Warrant Evaluation**  
**Tibet Street and PA-1 Access B**  
**Intersection # 15**  
**2040 Total Traffic**



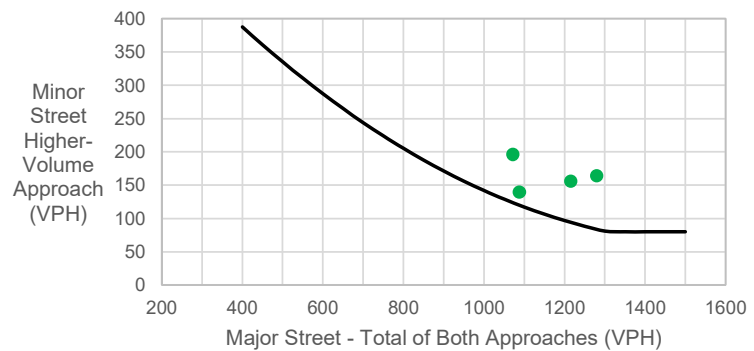
Major Street: Tibet Street  
 Approach Speed: 35 MPH  
 Lanes Moving Traffic: 2 or more  
 Option: Low speed, urban community

Minor Street: PA-1 Access B  
 Right Turn Volume Included: 0% EB, 0% WB  
 Lanes Moving Traffic: 1

**WARRANT 2, Four Hour Vehicular Volume**

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
PM Peak Hour	1280	164
95% PM Peak Hour	1216	156
85% PM Peak Hour	1088	139
AM Peak Hour	1072	196

**Satisfied**      **Yes**  
 (100% Factor)



**MUTCD Volume-based Warrant Evaluation**  
**Tibet Street and 60th Ave**  
**Intersection # 16**  
**2040 Total Traffic**



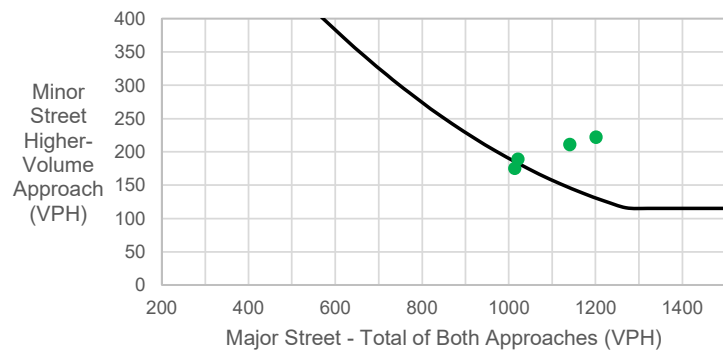
Major Street: Tibet Street  
 Approach Speed: 35 MPH  
 Lanes Moving Traffic: 2 or more  
 Option: Low speed, urban community

Minor Street: 60th Avenue  
 Right Turn Volume Included: 25% EB, 25% WB  
 Lanes Moving Traffic: 2 or more

**WARRANT 2, Four Hour Vehicular Volume**

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
PM Peak Hour	1201	222
95% PM Peak Hour	1141	211
85% PM Peak Hour	1021	189
AM Peak Hour	1014	175

**Satisfied**      **Yes**  
 (100% Factor)



**MUTCD Volume-based Warrant Evaluation**  
**PA 9/10 Access and 64th Avenue**  
**Intersection # 18**  
**2040 Total Traffic**



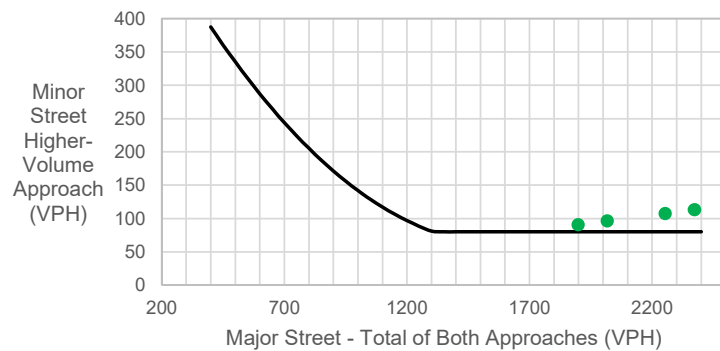
Major Street: 64th Avenue  
 Approach Speed: 35 MPH  
 Lanes Moving Traffic: 2 or more  
 Option: Low speed, urban community

Minor Street: PA 9/10 Access  
 Right Turn Volume Included: 0% NB, 0% SB  
 Lanes Moving Traffic: 1

**WARRANT 2, Four Hour Vehicular Volume**

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
PM Peak Hour	2373	113
95% PM Peak Hour	2254	107
85% PM Peak Hour	2017	96
80% PM Peak Hour	1898	90

**Satisfied**      **Yes**  
 (100% Factor)



## APPENDIX E. YEAR 2040 TOTAL TRAFFIC LEVEL OF SERVICE WORKSHEETS



# Timings

## 1: Harvest Road & 68th Avenue

Fulenwider Harvest Mile TIA  
04/29/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	64	11	146	12	15	2204	272	80	1621
Future Volume (vph)	64	11	146	12	15	2204	272	80	1621
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	pm+pt	NA
Protected Phases	7	4	3	8		2		1	6
Permitted Phases	4		8		2		2	6	
Detector Phase	7	4	3	8	2	2	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	9.5	22.5
Total Split (s)	12.0	23.0	18.0	29.0	67.0	67.0	67.0	12.0	79.0
Total Split (%)	10.0%	19.2%	15.0%	24.2%	55.8%	55.8%	55.8%	10.0%	65.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	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
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	None	C-Max
Act Effect Green (s)	11.9	6.9	21.0	11.4	77.6	77.6	77.6	90.0	90.0
Actuated g/C Ratio	0.10	0.06	0.18	0.10	0.65	0.65	0.65	0.75	0.75
v/c Ratio	0.44	0.31	0.67	0.38	0.13	0.77	0.28	0.51	0.52
Control Delay	50.8	35.3	58.0	20.9	3.4	6.5	0.5	25.5	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.8	35.3	58.0	20.9	3.4	6.5	0.5	25.5	7.4
LOS	D	D	E	C	A	A	A	C	A
Approach Delay		45.7		45.8		5.8			8.2
Approach LOS		D		D		A			A

### Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 116 (97%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.77  
 Intersection Signal Delay: 9.5  
 Intersection Capacity Utilization 73.0%  
 Analysis Period (min) 15

Intersection LOS: A  
 ICU Level of Service D

### Splits and Phases: 1: Harvest Road & 68th Avenue



## Queues

## Fulenwider Harvest Mile TIA

## 1: Harvest Road &amp; 68th Avenue

04/29/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	70	34	159	78	16	2396	296	87	1867
v/c Ratio	0.44	0.31	0.67	0.38	0.13	0.77	0.28	0.51	0.52
Control Delay	50.8	35.3	58.0	20.9	3.4	6.5	0.5	25.5	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.8	35.3	58.0	20.9	3.4	6.5	0.5	25.5	7.4
Queue Length 50th (ft)	46	9	109	9	1	165	0	17	211
Queue Length 95th (ft)	86	42	174	56	m2	m456	m13	72	271
Internal Link Dist (ft)		2360		1029		1126			345
Turn Bay Length (ft)	200				200			200	
Base Capacity (vph)	162	263	245	365	120	3105	1048	178	3575
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.13	0.65	0.21	0.13	0.77	0.28	0.49	0.52

## Intersection Summary


























m Volume for 95th percentile queue is metered by upstream signal.

# HCM 6th Signalized Intersection Summary

## 1: Harvest Road & 68th Avenue

Fulenwider Harvest Mile TIA























04/29/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								  			  	
Traffic Volume (veh/h)	64	11	20	146	12	60	15	2204	272	80	1621	97
Future Volume (veh/h)	64	11	20	146	12	60	15	2204	272	80	1621	97
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781
Adj Flow Rate, veh/h	70	12	22	159	13	65	16	2396	296	87	1762	105
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	8	8	8	8	8	8	8	8	8	8	8	8
Cap, veh/h	198	23	43	262	24	122	197	3238	1005	162	3486	207
Arrive On Green	0.05	0.04	0.04	0.10	0.09	0.09	0.67	0.67	0.67	0.04	0.74	0.74
Sat Flow, veh/h	1697	563	1032	1697	258	1291	234	4863	1510	1697	4694	279
Grp Volume(v), veh/h	70	0	34	159	0	78	16	2396	296	87	1216	651
Grp Sat Flow(s),veh/h/ln	1697	0	1596	1697	0	1549	234	1621	1510	1697	1621	1731
Q Serve(g_s), s	4.7	0.0	2.5	10.4	0.0	5.8	3.6	38.9	9.8	1.8	18.5	18.6
Cycle Q Clear(g_c), s	4.7	0.0	2.5	10.4	0.0	5.8	13.0	38.9	9.8	1.8	18.5	18.6
Prop In Lane	1.00		0.65	1.00		0.83	1.00		1.00	1.00		0.16
Lane Grp Cap(c), veh/h	198	0	66	262	0	146	197	3238	1005	162	2408	1286
V/C Ratio(X)	0.35	0.00	0.51	0.61	0.00	0.53	0.08	0.74	0.29	0.54	0.51	0.51
Avail Cap(c_a), veh/h	218	0	246	278	0	316	197	3238	1005	201	2408	1286
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.6	0.0	56.3	46.6	0.0	51.8	10.9	13.2	8.3	24.6	6.4	6.4
Incr Delay (d2), s/veh	1.1	0.0	6.0	3.4	0.0	3.0	0.8	1.6	0.7	2.7	0.8	1.4
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(95%),veh/ln	3.7	0.0	2.0	8.2	0.0	4.3	0.4	19.5	5.8	3.3	9.7	10.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.7	0.0	62.3	50.1	0.0	54.8	11.8	14.8	9.1	27.3	7.1	7.8
LnGrp LOS	D	A	E	D	A	D	B	B	A	C	A	A
Approach Vol, veh/h	104			237			2708			1954		
Approach Delay, s/veh	55.8			51.6			14.1			8.2		
Approach LOS	E			D			B			A		
Timer - Assigned Phs	1	2	3	4	6		7	8				
Phs Duration (G+Y+Rc), s	9.2	84.4	16.9	9.5	93.6		10.5	15.8				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5		4.5	4.5				
Max Green Setting (Gmax), s	7.5	62.5	13.5	18.5	74.5		7.5	24.5				
Max Q Clear Time (g_c+I1), s	3.8	40.9	12.4	4.5	20.6		6.7	7.8				
Green Ext Time (p_c), s	0.1	18.9	0.0	0.1	23.7		0.0	0.3				
Intersection Summary												
HCM 6th Ctrl Delay	14.5											
HCM 6th LOS	B											

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗	↘	↑↑↑	↑↑↑	↔
Traffic Vol, veh/h	0	74	244	2471	1770	52
Future Vol, veh/h	0	74	244	2471	1770	52
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	8	8	8	8	8	8
Mvmt Flow	0	80	265	2686	1924	57
Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	991	1981	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.26	5.46	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.98	3.18	-	-	-
Pot Cap-1 Maneuver	0	*484	*606	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %		1	1	-	-	-
Mov Cap-1 Maneuver	-	*484	*606	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		NB		SB	
HCM Control Delay, s	13.9		1.4		0	
HCM LOS	B					
Minor Lane/Major Mvmt	NBL		NBT	EBLn1	SBT	SBR
Capacity (veh/h)	* 606		-	484	-	-
HCM Lane V/C Ratio	0.438		-	0.166	-	-
HCM Control Delay (s)	15.5		-	13.9	-	-
HCM Lane LOS	C		-	B	-	-
HCM 95th %tile Q(veh)	2.2		-	0.6	-	-
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

# Timings 3: Harvest Road & 64th Avenue

Fulenwider Harvest Mile TIA  
04/29/2022

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	619	373	265	116	317	143	313	2048	114	1325	465
Future Volume (vph)	619	373	265	116	317	143	313	2048	114	1325	465
Turn Type	Prot	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+pt	NA	pm+ov
Protected Phases	7	4	5	3	8	1	5	2	1	6	7
Permitted Phases			4	8		8			6		6
Detector Phase	7	4	5	3	8	1	5	2	1	6	7
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	24.0	9.5	9.5	24.0	9.5	9.5	24.0	9.5	24.0	9.5
Total Split (s)	29.0	35.0	18.0	15.0	21.0	12.0	18.0	58.0	12.0	52.0	29.0
Total Split (%)	24.2%	29.2%	15.0%	12.5%	17.5%	10.0%	15.0%	48.3%	10.0%	43.3%	24.2%
Yellow Time (s)	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	3.5	4.0	3.5
All-Red Time (s)	1.0	2.0	1.0	1.0	2.0	1.0	1.0	2.0	1.0	2.0	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)	4.5	6.0	4.5	4.5	6.0	4.5	4.5	6.0	4.5	6.0	4.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?											
Recall Mode	None	None	None	None	None	None	None	C-Max	None	C-Max	None
Act Effect Green (s)	24.5	29.4	49.2	26.0	14.7	28.2	13.8	52.3	55.0	46.0	76.5
Actuated g/C Ratio	0.20	0.24	0.41	0.22	0.12	0.24	0.12	0.44	0.46	0.38	0.64
v/c Ratio	1.02	0.50	0.44	0.49	0.84	0.33	0.91	1.12	0.75	0.78	0.51
Control Delay	77.9	20.2	6.3	33.7	70.6	8.5	77.5	79.7	51.5	32.5	11.5
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	77.9	20.2	6.3	33.7	70.6	8.5	77.5	79.7	51.5	32.5	11.5
LOS	E	C	A	C	E	A	E	E	D	C	B
Approach Delay		45.7			47.8			79.4		28.5	
Approach LOS		D			D			E		C	

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 33 (28%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow

Natural Cycle: 120

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.12

Intersection Signal Delay: 54.0

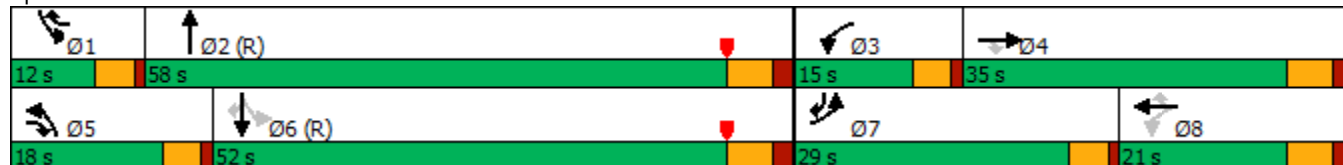
Intersection LOS: D

Intersection Capacity Utilization 91.9%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 3: Harvest Road & 64th Avenue



Queues  
3: Harvest Road & 64th Avenue

Fulenwider Harvest Mile TIA

04/29/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	673	405	288	126	345	155	340	2330	124	1440	505
v/c Ratio	1.02	0.50	0.44	0.49	0.84	0.33	0.91	1.12	0.75	0.78	0.51
Control Delay	77.9	20.2	6.3	33.7	70.6	8.5	77.5	79.7	51.5	32.5	11.5
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	77.9	20.2	6.3	33.7	70.6	8.5	77.5	79.7	51.5	32.5	11.5
Queue Length 50th (ft)	~234	101	82	65	138	3	128	~755	33	364	196
Queue Length 95th (ft)	#393	143	113	111	#213	57	m#212	#851	m#137	426	313
Internal Link Dist (ft)		471			1219			1139		1127	
Turn Bay Length (ft)	200		200	200			200		200		200
Base Capacity (vph)	661	818	659	268	417	466	372	2081	165	1841	992
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.02	0.50	0.44	0.47	0.83	0.33	0.91	1.12	0.75	0.78	0.51

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.
































m Volume for 95th percentile queue is metered by upstream signal.

# HCM 6th Signalized Intersection Summary

## 3: Harvest Road & 64th Avenue

Fulenwider Harvest Mile TIA

04/29/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 			 		 	  			  	
Traffic Volume (veh/h)	619	373	265	116	317	143	313	2048	96	114	1325	465
Future Volume (veh/h)	619	373	265	116	317	143	313	2048	96	114	1325	465
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781
Adj Flow Rate, veh/h	673	405	288	126	345	155	340	2226	104	124	1440	505
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	8	8	8	8	8	8	8	8	8	8	8	8
Cap, veh/h	672	824	537	281	403	270	370	2104	98	162	1893	896
Arrive On Green	0.20	0.24	0.24	0.08	0.12	0.12	0.22	0.88	0.88	0.12	0.78	0.78
Sat Flow, veh/h	3291	3385	1510	1697	3385	1510	3291	4763	221	1697	4863	1510
Grp Volume(v), veh/h	673	405	288	126	345	155	340	1512	818	124	1440	505
Grp Sat Flow(s),veh/h/ln	1646	1692	1510	1697	1692	1510	1646	1621	1742	1697	1621	1510
Q Serve(g_s), s	24.5	12.3	18.2	7.7	12.0	11.3	12.1	53.0	53.0	5.3	19.3	17.9
Cycle Q Clear(g_c), s	24.5	12.3	18.2	7.7	12.0	11.3	12.1	53.0	53.0	5.3	19.3	17.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.13	1.00		1.00
Lane Grp Cap(c), veh/h	672	824	537	281	403	270	370	1432	769	162	1893	896
V/C Ratio(X)	1.00	0.49	0.54	0.45	0.86	0.57	0.92	1.06	1.06	0.77	0.76	0.56
Avail Cap(c_a), veh/h	672	824	537	294	423	279	370	1432	769	166	1893	896
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	0.65	0.65	0.65	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.7	39.0	30.8	41.6	51.8	45.1	46.0	7.0	7.0	26.9	10.3	4.9
Incr Delay (d2), s/veh	28.3	0.3	0.7	1.1	15.2	2.7	27.3	39.9	50.8	18.8	2.9	2.6
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(95%),veh/ln	17.3	8.2	10.1	6.0	9.9	7.9	9.7	16.4	20.5	5.0	7.1	5.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	76.1	39.3	31.4	42.7	67.0	47.7	73.3	46.9	57.8	45.7	13.2	7.5
LnGrp LOS	F	D	C	D	E	D	E	F	F	D	B	A
Approach Vol, veh/h	1366			626			2670			2069		
Approach Delay, s/veh	55.8			57.4			53.6			13.8		
Approach LOS	E			E			D			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.7	59.0	14.1	35.2	18.0	52.7	29.0	20.3				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green Setting (Gmax), s	7.5	52.0	10.5	29.0	13.5	46.0	24.5	15.0				
Max Q Clear Time (g_c+I1), s	7.3	55.0	9.7	20.2	14.1	21.3	26.5	14.0				
Green Ext Time (p_c), s	0.0	0.0	0.0	2.5	0.0	14.6	0.0	0.3				










### Intersection Summary

HCM 6th Ctrl Delay 42.1

HCM 6th LOS D

### Notes





















User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				  	  	
Traffic Vol, veh/h	0	29	59	2477	1671	50
Future Vol, veh/h	0	29	59	2477	1671	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	200	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	8	8	8	8	8	8
Mvmt Flow	0	32	64	2692	1816	54
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	908	1870	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.26	5.46	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.98	3.18	-	-	-
Pot Cap-1 Maneuver	0	*506	*633	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %		1	1	-	-	-
Mov Cap-1 Maneuver	-	*506	*633	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	12.6	0.3		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	* 633	-	506	-	-	
HCM Lane V/C Ratio	0.101	-	0.062	-	-	
HCM Control Delay (s)	11.3	-	12.6	-	-	
HCM Lane LOS	B	-	B	-	-	
HCM 95th %tile Q(veh)	0.3	-	0.2	-	-	
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon



Timings  
5: Harvest Road & 60th Avenue

Fulenwider Harvest Mile TIA  
04/29/2022




										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	89	15	112	19	15	281	2374	45	1462	118
Future Volume (vph)	89	15	112	19	15	281	2374	45	1462	118
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	7	4		3	8	5	2	1	6	
Permitted Phases	4		4	8		2		6		6
Detector Phase	7	4	4	3	8	5	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	10.0	23.0	10.0	23.0	10.0	23.0	23.0
Total Split (s)	12.0	21.0	21.0	12.0	21.0	33.0	75.0	12.0	54.0	54.0
Total Split (%)	10.0%	17.5%	17.5%	10.0%	17.5%	27.5%	62.5%	10.0%	45.0%	45.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	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)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	C-Max
Act Effect Green (s)	15.6	12.6	12.6	12.9	7.4	93.6	84.6	74.6	68.1	68.1
Actuated g/C Ratio	0.13	0.10	0.10	0.11	0.06	0.78	0.70	0.62	0.57	0.57
v/c Ratio	0.61	0.09	0.44	0.13	0.38	0.78	0.78	0.32	0.58	0.14
Control Delay	66.6	56.1	15.3	43.5	33.8	48.9	5.8	20.8	9.2	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.6	56.1	15.3	43.5	33.8	48.9	5.8	20.8	9.2	0.3
LOS	E	E	B	D	C	D	A	C	A	A
Approach Delay		39.3			36.8		10.3		8.9	
Approach LOS		D			D		B		A	

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 98 (82%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow  
 Natural Cycle: 100  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.78  
 Intersection Signal Delay: 11.5  
 Intersection Capacity Utilization 73.7%  
 Analysis Period (min) 15

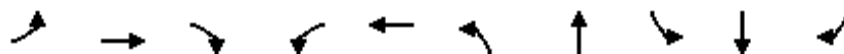
Intersection LOS: B  
 ICU Level of Service D

Splits and Phases: 5: Harvest Road & 60th Avenue

				
Ø1	Ø2 (R)		Ø3	Ø4
12 s	75 s		12 s	21 s
				
Ø5	Ø6 (R)		Ø7	Ø8
33 s	54 s		12 s	21 s

Queues  
5: Harvest Road & 60th Avenue

Fulenwider Harvest Mile TIA  
04/29/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	97	16	122	21	48	305	2621	49	1589	128
v/c Ratio	0.61	0.09	0.44	0.13	0.38	0.78	0.78	0.32	0.58	0.14
Control Delay	66.6	56.1	15.3	43.5	33.8	48.9	5.8	20.8	9.2	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.6	56.1	15.3	43.5	33.8	48.9	5.8	20.8	9.2	0.3
Queue Length 50th (ft)	69	11	5	14	12	171	104	4	95	0
Queue Length 95th (ft)	119	34	47	37	50	m195	160	m18	358	m0
Internal Link Dist (ft)	2372				349		614		409	
Turn Bay Length (ft)	100			100		200		100		100
Base Capacity (vph)	159	251	329	173	245	490	3381	166	2726	907
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.06	0.37	0.12	0.20	0.62	0.78	0.30	0.58	0.14

Intersection Summary























m Volume for 95th percentile queue is metered by upstream signal.






# HCM 6th Signalized Intersection Summary

## 5: Harvest Road & 60th Avenue

Fulenwider Harvest Mile TIA

























04/29/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	89	15	112	19	15	29	281	2374	38	45	1462	118
Future Volume (veh/h)	89	15	112	19	15	29	281	2374	38	45	1462	118
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781
Adj Flow Rate, veh/h	97	16	122	21	16	32	305	2580	41	49	1589	128
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	8	8	8	8	8	8	8	8	8	8	8	8
Cap, veh/h	200	174	147	162	30	59	336	3443	55	188	3131	972
Arrive On Green	0.06	0.10	0.10	0.02	0.06	0.06	0.18	1.00	1.00	0.03	0.64	0.64
Sat Flow, veh/h	1697	1781	1510	1697	530	1060	1697	4931	78	1697	4863	1510
Grp Volume(v), veh/h	97	16	122	21	0	48	305	1693	928	49	1589	128
Grp Sat Flow(s),veh/h/ln	1697	1781	1510	1697	0	1591	1697	1621	1767	1697	1621	1510
Q Serve(g_s), s	6.3	1.0	9.5	1.4	0.0	3.5	7.7	0.0	0.0	1.2	20.7	4.0
Cycle Q Clear(g_c), s	6.3	1.0	9.5	1.4	0.0	3.5	7.7	0.0	0.0	1.2	20.7	4.0
Prop In Lane	1.00		1.00	1.00		0.67	1.00		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	200	174	147	162	0	89	336	2263	1234	188	3131	972
V/C Ratio(X)	0.48	0.09	0.83	0.13	0.00	0.54	0.91	0.75	0.75	0.26	0.51	0.13
Avail Cap(c_a), veh/h	200	245	208	233	0	219	590	2263	1234	237	3131	972
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.7	49.3	53.2	51.8	0.0	55.1	16.2	0.0	0.0	6.4	11.3	8.3
Incr Delay (d2), s/veh	1.8	0.2	17.2	0.4	0.0	5.0	10.2	2.3	4.3	0.7	0.6	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(95%),veh/ln	5.0	0.8	7.7	1.1	0.0	2.8	10.3	1.3	2.6	0.8	11.7	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.6	49.6	70.4	52.1	0.0	60.2	26.4	2.3	4.3	7.2	11.9	8.6
LnGrp LOS	D	D	E	D	A	E	C	A	A	A	B	A
Approach Vol, veh/h	235		69				2926				1766	
Approach Delay, s/veh	60.4		57.7				5.4				11.5	
Approach LOS	E		E				A				B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.5	88.3	7.0	16.2	15.0	81.8	12.0	11.2				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	7.5	70.5	7.5	16.5	28.5	49.5	7.5	16.5				
Max Q Clear Time (g_c+I1), s	3.2	2.0	3.4	11.5	9.7	22.7	8.3	5.5				
Green Ext Time (p_c), s	0.0	47.2	0.0	0.2	0.9	14.9	0.0	0.1				
Intersection Summary												
HCM 6th Ctrl Delay			10.9									
HCM 6th LOS			B									
Notes												

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	16	59	2548	1599	24
Future Vol, veh/h	0	16	59	2548	1599	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	8	8	8	8	8	8
Mvmt Flow	0	17	64	2770	1738	26
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	882	1764	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.26	5.46	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.98	3.18	-	-	-
Pot Cap-1 Maneuver	0	*527	*661	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %		1	1	-	-	-
Mov Cap-1 Maneuver	-	*527	*661	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	12.1	0.2		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	* 661	-	527	-	-	
HCM Lane V/C Ratio	0.097	-	0.033	-	-	
HCM Control Delay (s)	11	-	12.1	-	-	
HCM Lane LOS	B	-	B	-	-	
HCM 95th %tile Q(veh)	0.3	-	0.1	-	-	
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

Timings  
7: Denali Street & 64th Avenue

Fulenwider Harvest Mile TIA  
04/29/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	121	1121	308	93	680	122	174	111	83	30	75	52
Future Volume (vph)	121	1121	308	93	680	122	174	111	83	30	75	52
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	15.0	63.0	63.0	15.0	63.0	63.0	17.0	30.0	30.0	12.0	25.0	25.0
Total Split (%)	12.5%	52.5%	52.5%	12.5%	52.5%	52.5%	14.2%	25.0%	25.0%	10.0%	20.8%	20.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
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	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	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effect Green (s)	64.8	55.4	55.4	63.4	54.7	54.7	11.4	35.3	35.3	33.2	26.5	26.5
Actuated g/C Ratio	0.54	0.46	0.46	0.53	0.46	0.46	0.10	0.29	0.29	0.28	0.22	0.22
v/c Ratio	0.38	0.80	0.39	0.51	0.49	0.18	0.63	0.24	0.18	0.09	0.22	0.13
Control Delay	14.4	32.2	3.2	16.3	23.9	9.6	57.6	37.3	8.8	27.9	41.7	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.4	32.2	3.2	16.3	23.9	9.6	57.6	37.3	8.8	27.9	41.7	0.7
LOS	B	C	A	B	C	A	E	D	A	C	D	A
Approach Delay		25.1			21.2			40.5			25.4	
Approach LOS		C			C			D			C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 84 (70%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 25.8









Intersection LOS: C

Intersection Capacity Utilization 59.0%

ICU Level of Service B

Analysis Period (min) 15













Splits and Phases: 7: Denali Street & 64th Avenue

			
Ø1	Ø2 (R)	Ø3	Ø4
12 s	30 s	15 s	63 s
			
Ø5	Ø6 (R)	Ø7	Ø8
17 s	25 s	15 s	63 s

Queues  
7: Denali Street & 64th Avenue

Fulenwider Harvest Mile TIA

04/29/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	132	1218	335	101	739	133	189	121	90	33	82	57
v/c Ratio	0.38	0.80	0.39	0.51	0.49	0.18	0.63	0.24	0.18	0.09	0.22	0.13
Control Delay	14.4	32.2	3.2	16.3	23.9	9.6	57.6	37.3	8.8	27.9	41.7	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.4	32.2	3.2	16.3	23.9	9.6	57.6	37.3	8.8	27.9	41.7	0.7
Queue Length 50th (ft)	43	399	0	37	236	42	73	81	6	17	54	0
Queue Length 95th (ft)	68	482	48	m57	263	79	112	m143	m44	m40	106	m1
Internal Link Dist (ft)	2407		1779				2359				2362	
Turn Bay Length (ft)	200						200				200	
Base Capacity (vph)	363	1605	889	223	1599	785	331	507	498	361	381	429
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.76	0.38	0.45	0.46	0.17	0.57	0.24	0.18	0.09	0.22	0.13

Intersection Summary

























m Volume for 95th percentile queue is metered by upstream signal.






# HCM 6th Signalized Intersection Summary

## 7: Denali Street & 64th Avenue

Fulenwider Harvest Mile TIA

04/29/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	121	1121	308	93	680	122	174	111	83	30	75	52
Future Volume (veh/h)	121	1121	308	93	680	122	174	111	83	30	75	52
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	132	1218	335	101	739	133	189	121	90	33	82	57
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	287	1421	634	173	1382	616	244	605	513	432	522	442
Arrive On Green	0.06	0.43	0.43	0.02	0.14	0.14	0.08	0.35	0.35	0.03	0.30	0.30
Sat Flow, veh/h	1668	3328	1485	1668	3328	1485	3237	1752	1485	1668	1752	1485
Grp Volume(v), veh/h	132	1218	335	101	739	133	189	121	90	33	82	57
Grp Sat Flow(s),veh/h/ln	1668	1664	1485	1668	1664	1485	1618	1752	1485	1668	1752	1485
Q Serve(g_s), s	5.4	39.7	20.0	4.1	24.8	9.6	6.9	5.8	5.1	1.6	4.1	3.4
Cycle Q Clear(g_c), s	5.4	39.7	20.0	4.1	24.8	9.6	6.9	5.8	5.1	1.6	4.1	3.4
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	287	1421	634	173	1382	616	244	605	513	432	522	442
V/C Ratio(X)	0.46	0.86	0.53	0.58	0.53	0.22	0.77	0.20	0.18	0.08	0.16	0.13
Avail Cap(c_a), veh/h	330	1623	724	236	1623	724	337	605	513	490	522	442
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.72	0.72	0.72	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.1	31.1	25.4	27.9	41.0	34.4	54.5	27.6	27.4	27.8	31.0	30.8
Incr Delay (d2), s/veh	1.2	4.3	0.7	2.2	0.2	0.1	7.3	0.7	0.7	0.1	0.6	0.6
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(95%),veh/ln	3.9	23.1	11.5	3.2	15.8	6.5	5.5	4.7	3.4	1.2	3.3	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.3	35.4	26.1	30.2	41.2	34.5	61.8	28.3	28.1	27.9	31.7	31.4
LnGrp LOS	C	D	C	C	D	C	E	C	C	C	C	C
Approach Vol, veh/h	1685				973				400			
Approach Delay, s/veh	32.5				39.2				44.1			
Approach LOS	C				D				D			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.8	46.0	10.5	55.7	13.6	40.2	11.9	54.3				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	7.5	25.5	10.5	58.5	12.5	20.5	10.5	58.5				
Max Q Clear Time (g_c+I1), s	3.6	7.8	6.1	41.7	8.9	6.1	7.4	26.8				
Green Ext Time (p_c), s	0.0	0.8	0.1	9.5	0.2	0.4	0.1	6.5				
Intersection Summary												
HCM 6th Ctrl Delay	35.9											
HCM 6th LOS	D											

Intersection						
Int Delay, s/veh	4.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	80	119	99	95	81	80
Future Vol, veh/h	80	119	99	95	81	80
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	87	129	108	103	88	87

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	211	0	0	463	160
Stage 1	-	-	-	160	-
Stage 2	-	-	-	303	-
Critical Hdwy	4.2	-	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	5.5	-
Follow-up Hdwy	2.29	-	-	3.59	3.39
Pot Cap-1 Maneuver	1313	-	-	543	865
Stage 1	-	-	-	850	-
Stage 2	-	-	-	731	-
Platoon blocked, %		-	-		
Mov Cap-1 Maneuver	1313	-	-	507	865
Mov Cap-2 Maneuver	-	-	-	507	-
Stage 1	-	-	-	794	-
Stage 2	-	-	-	731	-

























Approach	EB	WB	SB
HCM Control Delay, s	3.2	0	11.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1313	-	-	-	507	865
HCM Lane V/C Ratio	0.066	-	-	-	0.174	0.101
HCM Control Delay (s)	7.9	-	-	-	13.6	9.6
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0.2	-	-	-	0.6	0.3



Timings  
9: Tibet Street & 56th Avenue

Fulenwider Harvest Mile TIA  
04/29/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	309	794	100	267	815	267	130	139	311	256	78	203
Future Volume (vph)	309	794	100	267	815	267	130	139	311	256	78	203
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	25.0	41.0	41.0	23.0	39.0	39.0	14.0	33.0	33.0	23.0	42.0	42.0
Total Split (%)	20.8%	34.2%	34.2%	19.2%	32.5%	32.5%	11.7%	27.5%	27.5%	19.2%	35.0%	35.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
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	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	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effect Green (s)	17.2	56.2	56.2	15.6	54.6	54.6	21.6	12.3	12.3	34.6	20.8	20.8
Actuated g/C Ratio	0.14	0.47	0.47	0.13	0.46	0.46	0.18	0.10	0.10	0.29	0.17	0.17
v/c Ratio	0.70	0.37	0.14	0.67	0.39	0.34	0.54	0.43	0.73	0.75	0.14	0.49
Control Delay	56.9	22.4	2.6	60.0	21.5	6.2	41.2	53.3	15.1	40.0	32.6	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.9	22.4	2.6	60.0	21.5	6.2	41.2	53.3	15.1	40.0	32.6	9.2
LOS	E	C	A	E	C	A	D	D	B	D	C	A
Approach Delay		29.6			26.1			30.1			27.2	
Approach LOS		C			C			C			C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 8 (7%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 28.0

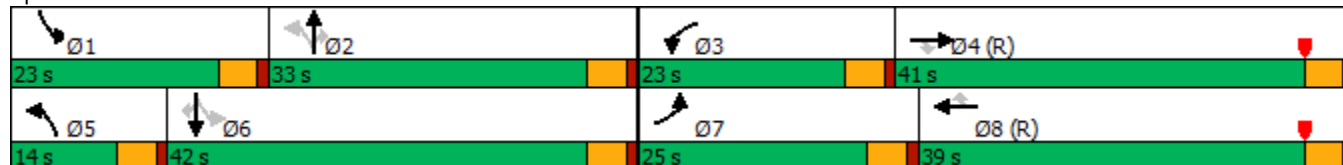
Intersection LOS: C

Intersection Capacity Utilization 60.0%

ICU Level of Service B













Analysis Period (min) 15

Splits and Phases: 9: Tibet Street & 56th Avenue



Queues  
9: Tibet Street & 56th Avenue

Fulenwider Harvest Mile TIA  
04/29/2022

























												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	336	863	109	290	886	290	141	151	338	278	85	221
v/c Ratio	0.70	0.37	0.14	0.67	0.39	0.34	0.54	0.43	0.73	0.75	0.14	0.49
Control Delay	56.9	22.4	2.6	60.0	21.5	6.2	41.2	53.3	15.1	40.0	32.6	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.9	22.4	2.6	60.0	21.5	6.2	41.2	53.3	15.1	40.0	32.6	9.2
Queue Length 50th (ft)	129	153	0	120	109	21	85	58	0	144	23	3
Queue Length 95th (ft)	172	228	24	170	249	80	127	87	88	156	37	33
Internal Link Dist (ft)	810			681			1021			674		
Turn Bay Length (ft)	200		200	200		200	200		200	200		200
Base Capacity (vph)	576	2314	792	521	2248	857	265	816	623	377	1074	632
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.37	0.14	0.56	0.39	0.34	0.53	0.19	0.54	0.74	0.08	0.35
Intersection Summary												

# HCM 6th Signalized Intersection Summary

## 9: Tibet Street & 56th Avenue

Fulenwider Harvest Mile TIA

04/29/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	309	794	100	267	815	267	130	139	311	256	78	203
Future Volume (veh/h)	309	794	100	267	815	267	130	139	311	256	78	203
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	336	863	109	290	886	290	141	151	338	278	85	221
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5	5	5	5	5	5	5
Cap, veh/h	403	1886	585	349	1806	561	438	807	360	471	1011	451
Arrive On Green	0.12	0.38	0.38	0.21	0.72	0.72	0.08	0.23	0.23	0.14	0.29	0.29
Sat Flow, veh/h	3374	4985	1547	3374	4985	1547	1739	3469	1547	1739	3469	1547
Grp Volume(v), veh/h	336	863	109	290	886	290	141	151	338	278	85	221
Grp Sat Flow(s),veh/h/ln	1687	1662	1547	1687	1662	1547	1739	1735	1547	1739	1735	1547
Q Serve(g_s), s	11.7	15.6	5.7	9.9	9.1	9.9	7.3	4.2	25.7	14.0	2.1	14.2
Cycle Q Clear(g_c), s	11.7	15.6	5.7	9.9	9.1	9.9	7.3	4.2	25.7	14.0	2.1	14.2
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	403	1886	585	349	1806	561	438	807	360	471	1011	451
V/C Ratio(X)	0.83	0.46	0.19	0.83	0.49	0.52	0.32	0.19	0.94	0.59	0.08	0.49
Avail Cap(c_a), veh/h	576	1886	585	520	1806	561	442	824	368	503	1084	484
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.94	0.94	0.94	1.00	1.00	1.00	0.95	0.95	0.95
Uniform Delay (d), s/veh	51.7	28.0	24.9	46.6	11.8	11.9	31.1	36.9	45.2	27.3	30.9	35.2
Incr Delay (d2), s/veh	7.1	0.8	0.7	6.7	0.9	3.2	0.4	0.1	31.3	1.5	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(95%),veh/ln	8.9	10.2	3.8	7.1	4.7	5.2	5.6	3.2	18.5	9.9	1.6	8.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.7	28.8	25.6	53.3	12.7	15.1	31.5	37.0	76.5	28.8	30.9	35.9
LnGrp LOS	E	C	C	D	B	B	C	D	E	C	C	D
Approach Vol, veh/h	1308			1466			630			584		
Approach Delay, s/veh	36.3			21.2			57.0			31.8		
Approach LOS	D			C			E			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	20.8	32.4	16.9	49.9	13.7	39.5	18.8	48.0				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	18.5	28.5	18.5	36.5	9.5	37.5	20.5	34.5				
Max Q Clear Time (g_c+I1), s	16.0	27.7	11.9	17.6	9.3	16.2	13.7	11.9				
Green Ext Time (p_c), s	0.2	0.2	0.5	5.7	0.0	1.2	0.7	7.0				
Intersection Summary												
HCM 6th Ctrl Delay	33.3											
HCM 6th LOS	C											

Timings  
10: 56th Avenue & PA-1 Access A

Fulenwider Harvest Mile TIA  
04/29/2022



Lane Group	EBL	EBT	WBT	WBR	SBL
Lane Configurations	↖↗	↑↑↑	↑↑↑	↖	↖↗
Traffic Volume (vph)	73	1333	1220	95	96
Future Volume (vph)	73	1333	1220	95	96
Turn Type	Prot	NA	NA	Perm	Prot
Protected Phases	7	4	8		6
Permitted Phases				8	
Detector Phase	7	4	8	8	6
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	22.5	22.5
Total Split (s)	17.0	91.0	74.0	74.0	29.0
Total Split (%)	14.2%	75.8%	61.7%	61.7%	24.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
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)	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead		Lag	Lag	
Lead-Lag Optimize?					
Recall Mode	None	C-Max	C-Max	C-Max	None
Act Effect Green (s)	8.2	101.6	91.0	91.0	9.4
Actuated g/C Ratio	0.07	0.85	0.76	0.76	0.08
v/c Ratio	0.35	0.35	0.35	0.09	0.58
Control Delay	64.5	1.7	2.9	0.4	35.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	64.5	1.7	2.9	0.4	35.7
LOS	E	A	A	A	D
Approach Delay		4.9	2.7		35.7
Approach LOS		A	A		D

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 40 (33%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.58

Intersection Signal Delay: 5.8

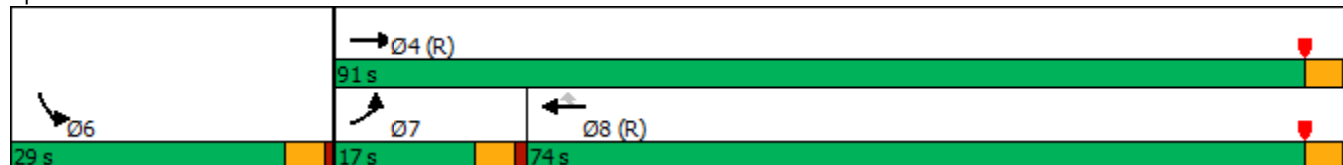
Intersection LOS: A

Intersection Capacity Utilization 44.0%

ICU Level of Service A

Analysis Period (min) 15

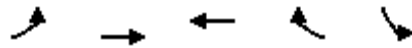
Splits and Phases: 10: 56th Avenue & PA-1 Access A



Queues  
10: 56th Avenue & PA-1 Access A

Fulenwider Harvest Mile TIA

04/29/2022



Lane Group	EBL	EBT	WBT	WBR	SBL
Lane Group Flow (vph)	79	1449	1326	103	190
v/c Ratio	0.35	0.35	0.35	0.09	0.58
Control Delay	64.5	1.7	2.9	0.4	35.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	64.5	1.7	2.9	0.4	35.7
Queue Length 50th (ft)	32	36	77	0	40
Queue Length 95th (ft)	m57	83	119	1	76
Internal Link Dist (ft)		681	1214		618
Turn Bay Length (ft)	200				
Base Capacity (vph)	347	4182	3745	1191	718
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.23	0.35	0.35	0.09	0.26

Intersection Summary

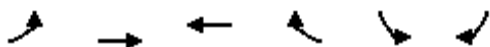
m Volume for 95th percentile queue is metered by upstream signal.

# HCM 6th Signalized Intersection Summary

## 10: 56th Avenue & PA-1 Access A

Fulenwider Harvest Mile TIA

04/29/2022



Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations	↰↰	↑↑↑	↑↑↑	↱	↰↰		
Traffic Volume (veh/h)	73	1333	1220	95	96	79	
Future Volume (veh/h)	73	1333	1220	95	96	79	
Initial Q (Qb), veh	0	0	0	0	0	0	
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	1826	1826	1826	1826	1826	1826	
Adj Flow Rate, veh/h	79	1449	1326	103	95	96	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Percent Heavy Veh, %	5	5	5	5	5	5	
Cap, veh/h	130	4206	3826	1188	141	126	
Arrive On Green	0.08	1.00	1.00	1.00	0.08	0.08	
Sat Flow, veh/h	3374	5149	5149	1547	1739	1547	
Grp Volume(v), veh/h	79	1449	1326	103	95	96	
Grp Sat Flow(s),veh/h/ln	1687	1662	1662	1547	1739	1547	
Q Serve(g_s), s	2.7	0.0	0.0	0.0	6.4	7.3	
Cycle Q Clear(g_c), s	2.7	0.0	0.0	0.0	6.4	7.3	
Prop In Lane	1.00			1.00	1.00	1.00	
Lane Grp Cap(c), veh/h	130	4206	3826	1188	141	126	
V/C Ratio(X)	0.61	0.34	0.35	0.09	0.67	0.76	
Avail Cap(c_a), veh/h	351	4206	3826	1188	355	316	
HCM Platoon Ratio	2.00	2.00	2.00	2.00	1.00	1.00	
Upstream Filter(I)	0.84	0.84	0.95	0.95	1.00	1.00	
Uniform Delay (d), s/veh	54.5	0.0	0.0	0.0	53.6	54.0	
Incr Delay (d2), s/veh	3.8	0.2	0.2	0.1	5.5	9.2	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(95%),veh/ln	2.1	0.1	0.2	0.1	5.4	10.6	
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	58.2	0.2	0.2	0.1	59.0	63.2	
LnGrp LOS	E	A	A	A	E	E	
Approach Vol, veh/h		1528	1429		191		
Approach Delay, s/veh		3.2	0.2		61.1		
Approach LOS		A	A		E		
Timer - Assigned Phs				4	6	7	8
Phs Duration (G+Y+Rc), s				105.8	14.2	9.1	96.6
Change Period (Y+Rc), s				4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s				86.5	24.5	12.5	69.5
Max Q Clear Time (g_c+I1), s				2.0	9.3	4.7	2.0
Green Ext Time (p_c), s				14.6	0.5	0.1	13.0
Intersection Summary							
HCM 6th Ctrl Delay			5.4				
HCM 6th LOS			A				
Notes							

# Timings 11: 56th Avenue & E-470 SB Ramps

Fulenwider Harvest Mile TIA  
04/29/2022

	→	↘	↙	←	↘	↓	↙
Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Lane Configurations	↑↑↑	↗	↘↘	↑↑↑	↘	↖	↗
Traffic Volume (vph)	1301	163	245	1142	248	0	128
Future Volume (vph)	1301	163	245	1142	248	0	128
Turn Type	NA	Perm	Prot	NA	Perm	NA	Perm
Protected Phases	4		3	8		6	
Permitted Phases		4			6		6
Detector Phase	4	4	3	8	6	6	6
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	9.5	22.5	22.5	22.5	22.5
Total Split (s)	64.0	64.0	26.0	90.0	30.0	30.0	30.0
Total Split (%)	53.3%	53.3%	21.7%	75.0%	25.0%	25.0%	25.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	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
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lead				
Lead-Lag Optimize?							
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None
Act Effect Green (s)	75.9	75.9	14.8	95.3	15.7	15.7	15.7
Actuated g/C Ratio	0.63	0.63	0.12	0.79	0.13	0.13	0.13
v/c Ratio	0.45	0.17	0.65	0.32	0.63	0.63	0.47
Control Delay	9.1	1.5	69.9	2.6	61.8	61.8	18.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.1	1.5	69.9	2.6	61.8	61.8	18.4
LOS	A	A	E	A	E	E	B
Approach Delay	8.3			14.5		47.0	
Approach LOS	A			B		D	

## Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 23 (19%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 15.5

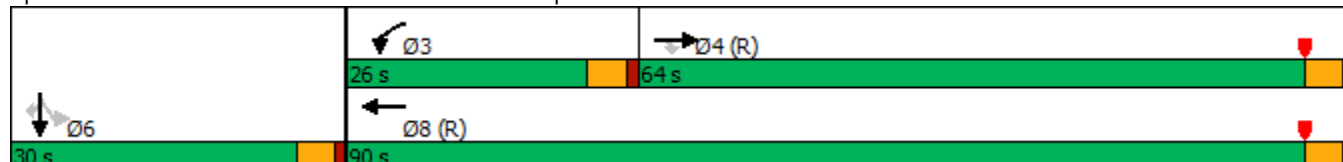
Intersection LOS: B

Intersection Capacity Utilization 50.2%

ICU Level of Service A

Analysis Period (min) 15

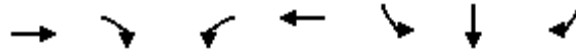
Splits and Phases: 11: 56th Avenue & E-470 SB Ramps



Queues  
11: 56th Avenue & E-470 SB Ramps

Fulenwider Harvest Mile TIA

04/29/2022



Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Lane Group Flow (vph)	1414	177	266	1241	135	135	139
v/c Ratio	0.45	0.17	0.65	0.32	0.63	0.63	0.47
Control Delay	9.1	1.5	69.9	2.6	61.8	61.8	18.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.1	1.5	69.9	2.6	61.8	61.8	18.4
Queue Length 50th (ft)	131	4	113	45	106	106	21
Queue Length 95th (ft)	220	11	159	73	166	166	78
Internal Link Dist (ft)	1214			486		861	
Turn Bay Length (ft)		150	200		300		300
Base Capacity (vph)	3126	1025	597	3922	347	347	412
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.17	0.45	0.32	0.39	0.39	0.34
Intersection Summary							




# HCM 6th Signalized Intersection Summary

## 11: 56th Avenue & E-470 SB Ramps















Fulenwider Harvest Mile TIA

04/29/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑	↑↑	↑↑↑					↑	↑	↑
Traffic Volume (veh/h)	0	1301	163	245	1142	0	0	0	0	248	0	128
Future Volume (veh/h)	0	1301	163	245	1142	0	0	0	0	248	0	128
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	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
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1826	1826	1826	1826	0				1826	1826	1826
Adj Flow Rate, veh/h	0	1414	0	266	1241	0				270	0	139
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	5	5	5	5	0				5	5	5
Cap, veh/h	0	3370		328	4042	0				397	0	177
Arrive On Green	0.00	1.00	0.00	0.19	1.00	0.00				0.11	0.00	0.11
Sat Flow, veh/h	0	5149	1547	3374	5149	0				3478	0	1547
Grp Volume(v), veh/h	0	1414	0	266	1241	0				270	0	139
Grp Sat Flow(s),veh/h/ln	0	1662	1547	1687	1662	0				1739	0	1547
Q Serve(g_s), s	0.0	0.0	0.0	9.0	0.0	0.0				8.9	0.0	10.5
Cycle Q Clear(g_c), s	0.0	0.0	0.0	9.0	0.0	0.0				8.9	0.0	10.5
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	3370		328	4042	0				397	0	177
V/C Ratio(X)	0.00	0.42		0.81	0.31	0.00				0.68	0.00	0.79
Avail Cap(c_a), veh/h	0	3370		604	4042	0				739	0	329
HCM Platoon Ratio	1.00	2.00	2.00	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.94	0.00	0.91	0.91	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	47.3	0.0	0.0				51.1	0.0	51.7
Incr Delay (d2), s/veh	0.0	0.4	0.0	4.4	0.2	0.0				2.1	0.0	7.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	0.2	0.0	6.5	0.1	0.0				7.2	0.0	7.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.4	0.0	51.7	0.2	0.0				53.1	0.0	59.3
LnGrp LOS	A	A		D	A	A				D	A	E
Approach Vol, veh/h		1414	A		1507						409	
Approach Delay, s/veh		0.4			9.3						55.2	
Approach LOS		A			A						E	
Timer - Assigned Phs			3	4		6		8				
Phs Duration (G+Y+Rc), s			16.2	85.6		18.2		101.8				
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s			21.5	59.5		25.5		85.5				
Max Q Clear Time (g_c+I1), s			11.0	2.0		12.5		2.0				
Green Ext Time (p_c), s			0.6	13.5		1.2		11.2				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay			11.1									
HCM 6th LOS			B									
<b>Notes</b>												
User approved volume balancing among the lanes for turning movement.												
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.												

Timings  
12: E-470 NB Ramps & 56th Avenue

Fulenwider Harvest Mile TIA  
04/29/2022

							
Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Configurations							
Traffic Volume (vph)	112	1417	1256	187	141	0	237
Future Volume (vph)	112	1417	1256	187	141	0	237
Turn Type	pm+pt	NA	NA	Perm	Perm	NA	Perm
Protected Phases	7	4	8			2	
Permitted Phases	4			8	2		2
Detector Phase	7	4	8	8	2	2	2
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	20.0	79.0	59.0	59.0	41.0	41.0	41.0
Total Split (%)	16.7%	65.8%	49.2%	49.2%	34.2%	34.2%	34.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	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
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead		Lag	Lag			
Lead-Lag Optimize?							
Recall Mode	None	C-Max	C-Max	C-Max	None	None	None
Act Effect Green (s)	88.7	88.7	76.1	76.1	22.3	22.3	22.3
Actuated g/C Ratio	0.74	0.74	0.63	0.63	0.19	0.19	0.19
v/c Ratio	0.41	0.42	0.44	0.19	0.25	0.25	0.78
Control Delay	13.0	5.2	6.8	0.7	41.2	41.3	52.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.0	5.3	6.8	0.7	41.2	41.3	52.0
LOS	B	A	A	A	D	D	D
Approach Delay		5.8	6.0			48.0	
Approach LOS		A	A			D	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 21 (18%), Referenced to phase 4:EBTL and 8:WBT, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 10.7

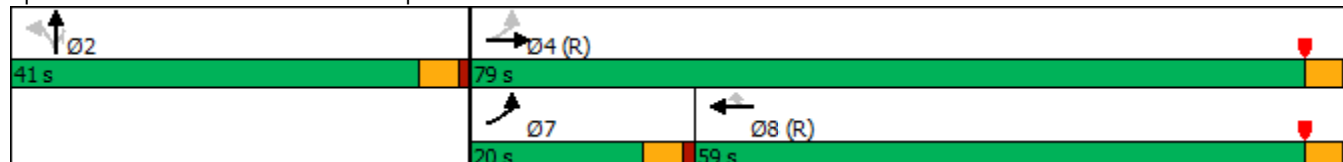
Intersection LOS: B

Intersection Capacity Utilization 50.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 12: E-470 NB Ramps & 56th Avenue



Queues  
12: E-470 NB Ramps & 56th Avenue

Fulenwider Harvest Mile TIA

04/29/2022



Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	122	1540	1365	203	76	77	258
v/c Ratio	0.41	0.42	0.44	0.19	0.25	0.25	0.78
Control Delay	13.0	5.2	6.8	0.7	41.2	41.3	52.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.0	5.3	6.8	0.7	41.2	41.3	52.0
Queue Length 50th (ft)	22	103	83	2	53	54	153
Queue Length 95th (ft)	66	138	208	m9	91	91	226
Internal Link Dist (ft)		486	2097			702	
Turn Bay Length (ft)				200	200		200
Base Capacity (vph)	385	3653	3132	1048	496	496	506
Starvation Cap Reductn	0	280	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.46	0.44	0.19	0.15	0.16	0.51

Intersection Summary
























m Volume for 95th percentile queue is metered by upstream signal.

# HCM 6th Signalized Intersection Summary

## 12: E-470 NB Ramps & 56th Avenue



























Fulenwider Harvest Mile TIA

04/29/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  							
Traffic Volume (veh/h)	112	1417	0	0	1256	187	141	0	237	0	0	0
Future Volume (veh/h)	112	1417	0	0	1256	187	141	0	237	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	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			
Work Zone On Approach	No			No			No					
Adj Sat Flow, veh/h/ln	1826	1826	0	0	1826	1826	1826	1826	1826			
Adj Flow Rate, veh/h	122	1540	0	0	1365	203	153	0	0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	5	5	0	0	5	5	5	5	5			
Cap, veh/h	382	4294	0	0	3903	1212	221	0				
Arrive On Green	0.08	1.00	0.00	0.00	1.00	1.00	0.06	0.00	0.00			
Sat Flow, veh/h	1739	5149	0	0	5149	1547	3478	0	1547			
Grp Volume(v), veh/h	122	1540	0	0	1365	203	153	0	0			
Grp Sat Flow(s),veh/h/ln	1739	1662	0	0	1662	1547	1739	0	1547			
Q Serve(g_s), s	1.5	0.0	0.0	0.0	0.0	0.0	5.2	0.0	0.0			
Cycle Q Clear(g_c), s	1.5	0.0	0.0	0.0	0.0	0.0	5.2	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	382	4294	0	0	3903	1212	221	0				
V/C Ratio(X)	0.32	0.36	0.00	0.00	0.35	0.17	0.69	0.00				
Avail Cap(c_a), veh/h	535	4294	0	0	3903	1212	1058	0				
HCM Platoon Ratio	2.00	2.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00			
Upstream Filter(I)	0.88	0.88	0.00	0.00	0.80	0.80	1.00	0.00	0.00			
Uniform Delay (d), s/veh	1.6	0.0	0.0	0.0	0.0	0.0	55.0	0.0	0.0			
Incr Delay (d2), s/veh	0.4	0.2	0.0	0.0	0.2	0.2	3.8	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	0.5	0.1	0.0	0.0	0.1	0.1	4.3	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	2.0	0.2	0.0	0.0	0.2	0.2	58.9	0.0	0.0			
LnGrp LOS	A	A	A	A	A	A	E	A				
Approach Vol, veh/h	1662			1568			153			A		
Approach Delay, s/veh	0.3			0.2			58.9					
Approach LOS	A			A			E					
Timer - Assigned Phs	2			4			7			8		
Phs Duration (G+Y+Rc), s	12.1			107.9			9.4			98.5		
Change Period (Y+Rc), s	4.5			4.5			4.5			4.5		
Max Green Setting (Gmax), s	36.5			74.5			15.5			54.5		
Max Q Clear Time (g_c+I1), s	7.2			2.0			3.5			2.0		
Green Ext Time (p_c), s	0.5			16.1			0.2			14.0		
Intersection Summary												
HCM 6th Ctrl Delay	2.9											
HCM 6th LOS	A											
Notes												
User approved volume balancing among the lanes for turning movement.												
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.												

Timings  
13: Denali Street & 56th Avenue

Fulenwider Harvest Mile TIA  
04/29/2022

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations		  		 	  	 				
Traffic Volume (vph)	46	1135	433	297	976	665	5	402	24	4
Future Volume (vph)	46	1135	433	297	976	665	5	402	24	4
Turn Type	Perm	NA	pm+ov	Prot	NA	Prot	NA	Perm	pm+pt	NA
Protected Phases		4	5	3	8	5	2		1	6
Permitted Phases	4		4					2	6	
Detector Phase	4	4	5	3	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	9.5	9.5	22.5	9.5	22.5	22.5	9.5	22.5
Total Split (s)	44.0	44.0	35.0	20.0	64.0	35.0	44.0	44.0	12.0	21.0
Total Split (%)	36.7%	36.7%	29.2%	16.7%	53.3%	29.2%	36.7%	36.7%	10.0%	17.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	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)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lead	Lead		Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	None	None	C-Max	None	None	None	None	None
Act Effect Green (s)	50.9	50.9	85.0	16.9	72.3	29.5	31.7	31.7	12.2	6.7
Actuated g/C Ratio	0.42	0.42	0.71	0.14	0.60	0.25	0.26	0.26	0.10	0.06
v/c Ratio	0.26	0.59	0.38	0.69	0.37	0.88	0.01	0.64	0.16	0.36
Control Delay	30.4	27.8	2.1	58.1	9.4	56.8	33.0	10.9	31.1	26.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.4	27.8	2.1	58.1	9.4	56.8	33.0	10.9	31.1	26.1
LOS	C	C	A	E	A	E	C	B	C	C
Approach Delay		21.0			20.5		39.5			27.9
Approach LOS		C			C		D			C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 30 (25%), Referenced to phase 4:EBTL and 8:WBT, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 25.9

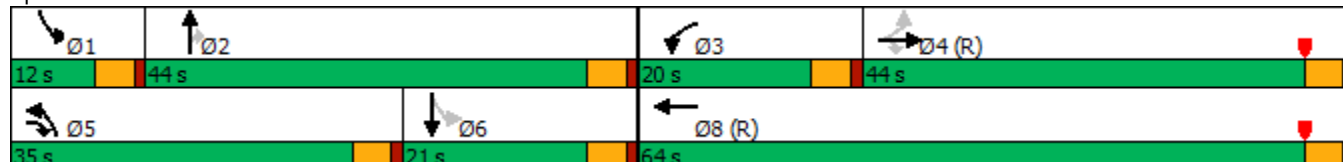
Intersection LOS: C

Intersection Capacity Utilization 67.3%

ICU Level of Service C

Analysis Period (min) 15

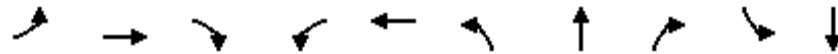
Splits and Phases: 13: Denali Street & 56th Avenue



Queues  
13: Denali Street & 56th Avenue

Fulenwider Harvest Mile TIA

04/29/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	50	1234	471	323	1091	723	5	437	26	45
v/c Ratio	0.26	0.59	0.38	0.69	0.37	0.88	0.01	0.64	0.16	0.36
Control Delay	30.4	27.8	2.1	58.1	9.4	56.8	33.0	10.9	31.1	26.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.4	27.8	2.1	58.1	9.4	56.8	33.0	10.9	31.1	26.1
Queue Length 50th (ft)	23	290	29	107	85	276	3	33	13	3
Queue Length 95th (ft)	m56	368	77	123	115	#370	13	137	33	41
Internal Link Dist (ft)		2097			2361		437			220
Turn Bay Length (ft)	200		200	200		200		200		
Base Capacity (vph)	191	2096	1235	487	2966	847	597	764	170	250
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.59	0.38	0.66	0.37	0.85	0.01	0.57	0.15	0.18

Intersection Summary

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

Queue shown is maximum after two cycles.





























m Volume for 95th percentile queue is metered by upstream signal.

# HCM 6th Signalized Intersection Summary

## 13: Denali Street & 56th Avenue

Fulenwider Harvest Mile TIA

04/29/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  		 	  		 					
Traffic Volume (veh/h)	46	1135	433	297	976	28	665	5	402	24	4	38
Future Volume (veh/h)	46	1135	433	297	976	28	665	5	402	24	4	38
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	50	1234	471	323	1061	30	723	5	437	26	4	41
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5	5	5	5	5	5	5
Cap, veh/h	269	2068	1005	379	2814	80	791	545	462	184	12	127
Arrive On Green	0.83	0.83	0.83	0.15	0.75	0.75	0.23	0.30	0.30	0.02	0.09	0.09
Sat Flow, veh/h	505	4985	1547	3374	4983	141	3374	1826	1547	1739	139	1429
Grp Volume(v), veh/h	50	1234	471	323	707	384	723	5	437	26	0	45
Grp Sat Flow(s),veh/h/ln	505	1662	1547	1687	1662	1801	1687	1826	1547	1739	0	1569
Q Serve(g_s), s	2.5	10.0	9.5	11.2	8.9	8.9	25.1	0.2	33.1	1.6	0.0	3.2
Cycle Q Clear(g_c), s	2.5	10.0	9.5	11.2	8.9	8.9	25.1	0.2	33.1	1.6	0.0	3.2
Prop In Lane	1.00		1.00	1.00		0.08	1.00		1.00	1.00		0.91
Lane Grp Cap(c), veh/h	269	2068	1005	379	1876	1017	791	545	462	184	0	139
V/C Ratio(X)	0.19	0.60	0.47	0.85	0.38	0.38	0.91	0.01	0.95	0.14	0.00	0.32
Avail Cap(c_a), veh/h	269	2068	1005	436	1876	1017	857	601	509	251	0	216
HCM Platoon Ratio	2.00	2.00	2.00	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.88	0.88	0.88	0.70	0.70	0.70	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	6.2	6.8	2.6	50.1	7.6	7.6	44.8	29.6	41.1	48.0	0.0	51.3
Incr Delay (d2), s/veh	1.3	1.1	1.4	10.0	0.4	0.7	13.6	0.0	25.7	0.3	0.0	1.3
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(95%),veh/ln	0.6	4.1	2.9	8.0	4.7	5.3	17.6	0.2	21.8	1.3	0.0	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.5	7.9	4.0	60.1	8.0	8.4	58.4	29.6	66.8	48.3	0.0	52.7
LnGrp LOS	A	A	A	E	A	A	E	C	E	D	A	D
Approach Vol, veh/h	1755			1414			1165			71		
Approach Delay, s/veh	6.9			20.0			61.4			51.1		
Approach LOS	A			B			E			D		
Timer - Assigned Phs	1	2	3	4	5	6	8					
Phs Duration (G+Y+Rc), s	7.4	40.3	18.0	54.3	32.6	15.1	72.3					
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5					
Max Green Setting (Gmax), s	7.5	39.5	15.5	39.5	30.5	16.5	59.5					
Max Q Clear Time (g_c+I1), s	3.6	35.1	13.2	12.0	27.1	5.2	10.9					
Green Ext Time (p_c), s	0.0	0.7	0.3	12.6	1.1	0.1	8.2					

### Intersection Summary

























HCM 6th Ctrl Delay	26.2
HCM 6th LOS	C

### Notes

User approved pedestrian interval to be less than phase max green.

Timings  
14: Harvest Road & 56th Avenue

Fulenwider Harvest Mile TIA  
04/29/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	883	434	209	110	548	298	248	1256	120	181	895	550
Future Volume (vph)	883	434	209	110	548	298	248	1256	120	181	895	550
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	5	3	8	1	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	24.0	9.5	9.5	24.0	9.5	9.5	24.0	9.5	9.5	24.0	9.5
Total Split (s)	33.0	40.0	21.0	20.0	27.0	17.0	21.0	43.0	20.0	17.0	39.0	33.0
Total Split (%)	27.5%	33.3%	17.5%	16.7%	22.5%	14.2%	17.5%	35.8%	16.7%	14.2%	32.5%	27.5%
Yellow Time (s)	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	3.5
All-Red Time (s)	1.0	2.0	1.0	1.0	2.0	1.0	1.0	2.0	1.0	1.0	2.0	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	0.0
Total Lost Time (s)	4.5	6.0	4.5	4.5	6.0	4.5	4.5	6.0	4.5	4.5	6.0	4.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?												
Recall Mode	None	C-Max	None	None	C-Max	None	None	None	None	None	None	None
Act Effct Green (s)	27.9	37.3	57.8	12.9	22.4	39.8	14.4	37.3	56.2	11.5	34.3	68.2
Actuated g/C Ratio	0.23	0.31	0.48	0.11	0.19	0.33	0.12	0.31	0.47	0.10	0.29	0.57
v/c Ratio	0.85	0.31	0.28	0.65	0.65	0.56	0.68	0.89	0.17	0.62	0.69	0.66
Control Delay	35.4	17.0	6.4	67.5	49.3	25.6	59.1	47.8	4.8	83.0	21.3	10.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.4	17.0	6.4	67.5	49.3	25.6	59.1	47.8	4.8	83.0	21.3	10.0
LOS	D	B	A	E	D	C	E	D	A	F	C	B
Approach Delay		26.2			44.0			46.4			24.4	
Approach LOS		C			D			D			C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 73 (61%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 34.4

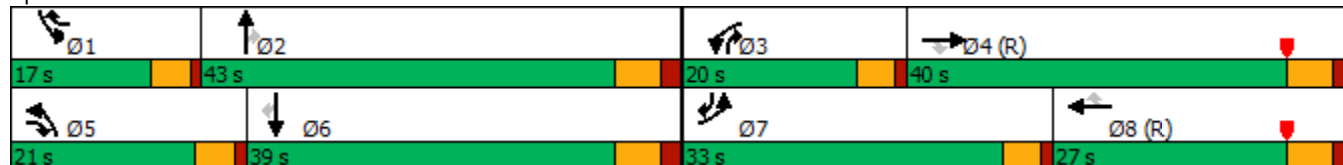
Intersection LOS: C

Intersection Capacity Utilization 74.3%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 14: Harvest Road & 56th Avenue

















Queues  
14: Harvest Road & 56th Avenue

Fulenwider Harvest Mile TIA

04/29/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	960	472	227	120	596	324	270	1365	130	197	973	598
v/c Ratio	0.85	0.31	0.28	0.65	0.65	0.56	0.68	0.89	0.17	0.62	0.69	0.66
Control Delay	35.4	17.0	6.4	67.5	49.3	25.6	59.1	47.8	4.8	83.0	21.3	10.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.4	17.0	6.4	67.5	49.3	25.6	59.1	47.8	4.8	83.0	21.3	10.0
Queue Length 50th (ft)	127	102	92	90	160	135	104	368	8	74	134	388
Queue Length 95th (ft)	209	94	70	152	204	231	147	#435	41	124	176	563
Internal Link Dist (ft)	2361			1323			477			1125		
Turn Bay Length (ft)	250		250	250		250	250		250	250		250
Base Capacity (vph)	1151	1537	821	222	921	595	458	1536	810	347	1413	911
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.83	0.31	0.28	0.54	0.65	0.54	0.59	0.89	0.16	0.57	0.69	0.66

Intersection Summary

























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

# HCM 6th Signalized Intersection Summary

## 14: Harvest Road & 56th Avenue

Fulenwider Harvest Mile TIA

04/29/2022

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	883	434	209	110	548	298	248	1256	120	181	895	550	
Future Volume (veh/h)	883	434	209	110	548	298	248	1256	120	181	895	550	
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0	
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	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	
Adj Flow Rate, veh/h	960	472	227	120	596	324	270	1365	130	197	973	0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Percent Heavy Veh, %	5	5	5	5	5	5	5	5	5	5	5	5	
Cap, veh/h	1087	1813	715	146	1126	467	333	1504	597	255	1390		
Arrive On Green	0.07	0.12	0.12	0.08	0.23	0.23	0.10	0.30	0.30	0.08	0.28	0.00	
Sat Flow, veh/h	4904	4985	1547	1739	4985	1547	3374	4985	1547	3374	4985	1547	
Grp Volume(v), veh/h	960	472	227	120	596	324	270	1365	130	197	973	0	
Grp Sat Flow(s),veh/h/ln	1635	1662	1547	1739	1662	1547	1687	1662	1547	1687	1662	1547	
Q Serve(g_s), s	23.3	10.3	13.8	8.1	12.6	22.2	9.4	31.6	6.8	6.9	21.0	0.0	
Cycle Q Clear(g_c), s	23.3	10.3	13.8	8.1	12.6	22.2	9.4	31.6	6.8	6.9	21.0	0.0	
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	1087	1813	715	146	1126	467	333	1504	597	255	1390		
V/C Ratio(X)	0.88	0.26	0.32	0.82	0.53	0.69	0.81	0.91	0.22	0.77	0.70		
Avail Cap(c_a), veh/h	1165	1813	715	225	1126	467	464	1537	607	351	1390		
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	0.77	0.77	0.77	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	
Uniform Delay (d), s/veh	54.1	38.1	29.1	54.1	40.8	37.0	53.0	40.3	24.7	54.4	38.8	0.0	
Incr Delay (d2), s/veh	6.2	0.3	0.9	13.2	1.8	8.3	7.4	8.1	0.2	7.0	1.6	0.0	
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(95%),veh/ln	15.5	7.5	9.3	7.2	8.9	14.1	7.7	20.0	4.4	5.7	13.6	0.0	
Unsig. Movement Delay, s/veh													
LnGrp Delay(d),s/veh	60.3	38.4	30.0	67.3	42.6	45.3	60.4	48.4	24.9	61.4	40.4	0.0	
LnGrp LOS	E	D	C	E	D	D	E	D	C	E	D		
Approach Vol, veh/h	1659			1040			1765			1170			A
Approach Delay, s/veh	49.9			46.3			48.5			43.9			
Approach LOS	D			D			D			D			
Timer - Assigned Phs	1	2	3	4	5	6	7	8					
Phs Duration (G+Y+Rc), s	13.6	42.2	14.6	49.6	16.3	39.5	31.1	33.1					
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0					
Max Green Setting (Gmax), s	12.5	37.0	15.5	34.0	16.5	33.0	28.5	21.0					
Max Q Clear Time (g_c+I1), s	8.9	33.6	10.1	15.8	11.4	23.0	25.3	24.2					
Green Ext Time (p_c), s	0.2	2.6	0.1	3.5	0.4	4.7	1.3	0.0					

### Intersection Summary

HCM 6th Ctrl Delay 47.6

HCM 6th LOS D



















### Notes

User approved pedestrian interval to be less than phase max green.

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

Timings  
15: Tibet Street & PA-1 Access B

Fulenwider Harvest Mile TIA  
04/29/2022

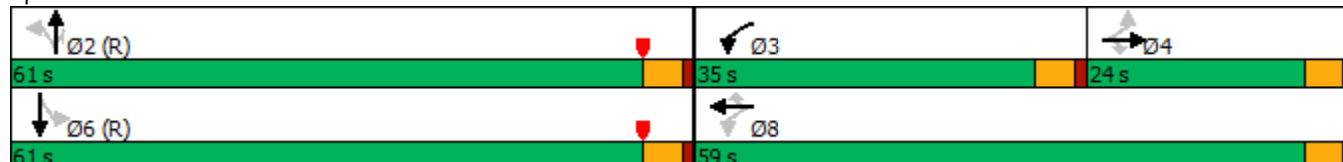
									
Lane Group	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	5	15	191	71	6	607	92	39	331
Future Volume (vph)	5	15	191	71	6	607	92	39	331
Turn Type	Perm	Perm	pm+pt	Perm	Perm	NA	Perm	Perm	NA
Protected Phases			3			2			6
Permitted Phases	4	4	8	8	2		2	6	
Detector Phase	4	4	3	8	2	2	2	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	24.0	24.0	35.0	59.0	61.0	61.0	61.0	61.0	61.0
Total Split (%)	20.0%	20.0%	29.2%	49.2%	50.8%	50.8%	50.8%	50.8%	50.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	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
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lead						
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effect Green (s)	6.1	6.1	23.7	23.7	87.3	87.3	87.3	87.3	87.3
Actuated g/C Ratio	0.05	0.05	0.20	0.20	0.73	0.73	0.73	0.73	0.73
v/c Ratio	0.05	0.03	0.67	0.17	0.01	0.26	0.09	0.08	0.14
Control Delay	55.0	0.1	52.8	0.9	4.2	3.7	0.3	4.7	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.0	0.1	52.8	0.9	4.2	3.7	0.3	4.7	3.8
LOS	D	A	D	A	A	A	A	A	A
Approach Delay						3.3			3.9
Approach LOS						A			A

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 11 (9%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow  
 Natural Cycle: 70  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.67  
 Intersection Signal Delay: 10.4  
 Intersection Capacity Utilization 49.4%  
 Analysis Period (min) 15

Intersection LOS: B  
 ICU Level of Service A

Splits and Phases: 15: Tibet Street & PA-1 Access B



## Queues

## Fulenwider Harvest Mile TIA

## 15: Tibet Street &amp; PA-1 Access B

04/29/2022



























Lane Group	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	5	16	208	77	7	660	100	42	361
v/c Ratio	0.05	0.03	0.67	0.17	0.01	0.26	0.09	0.08	0.14
Control Delay	55.0	0.1	52.8	0.9	4.2	3.7	0.3	4.7	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.0	0.1	52.8	0.9	4.2	3.7	0.3	4.7	3.8
Queue Length 50th (ft)	4	0	155	0	1	30	0	5	21
Queue Length 95th (ft)	17	0	199	0	m2	106	1	16	46
Internal Link Dist (ft)						674			1580
Turn Bay Length (ft)									
Base Capacity (vph)	294	626	449	792	705	2501	1146	502	2501
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.03	0.46	0.10	0.01	0.26	0.09	0.08	0.14

## Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



















# HCM 6th Signalized Intersection Summary 15: Tibet Street & PA-1 Access B

Fulenwider Harvest Mile TIA  
04/29/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	15	191	0	71	6	607	92	39	331	1
Future Volume (veh/h)	5	0	15	191	0	71	6	607	92	39	331	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	5	0	16	208	0	77	7	660	100	42	360	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5	5	5	5	5	5	5
Cap, veh/h	112	73	62	343	381	323	774	2485	1108	447	2542	7
Arrive On Green	0.04	0.00	0.04	0.13	0.00	0.21	0.24	0.24	0.24	1.00	1.00	1.00
Sat Flow, veh/h	1291	1826	1547	1739	1826	1547	996	3469	1547	689	3549	10
Grp Volume(v), veh/h	5	0	16	208	0	77	7	660	100	42	176	185
Grp Sat Flow(s),veh/h/ln	1291	1826	1547	1739	1826	1547	996	1735	1547	689	1735	1824
Q Serve(g_s), s	0.4	0.0	1.2	13.2	0.0	5.0	0.6	18.6	6.1	1.7	0.0	0.0
Cycle Q Clear(g_c), s	0.4	0.0	1.2	13.2	0.0	5.0	0.6	18.6	6.1	20.3	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	112	73	62	343	381	323	774	2485	1108	447	1242	1307
V/C Ratio(X)	0.04	0.00	0.26	0.61	0.00	0.24	0.01	0.27	0.09	0.09	0.14	0.14
Avail Cap(c_a), veh/h	270	297	251	557	829	703	774	2485	1108	447	1242	1307
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.85	0.85	0.85	0.98	0.98	0.98
Uniform Delay (d), s/veh	55.5	0.0	55.9	45.0	0.0	39.5	13.2	20.1	15.3	2.2	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	2.2	1.7	0.0	0.4	0.0	0.2	0.1	0.4	0.2	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(95%),veh/ln	0.3	0.0	0.9	9.8	0.0	3.5	0.2	13.2	3.9	0.4	0.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.7	0.0	58.0	46.7	0.0	39.9	13.3	20.3	15.4	2.6	0.2	0.2
LnGrp LOS	E	A	E	D	A	D	B	C	B	A	A	A
Approach Vol, veh/h	21			285			767			403		
Approach Delay, s/veh	57.5			44.9			19.6			0.5		
Approach LOS	E			D			B			A		
Timer - Assigned Phs	2		3	4		6		8				
Phs Duration (G+Y+Rc), s	90.5		20.2	9.3		90.5		29.5				
Change Period (Y+Rc), s	4.5		4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s	56.5		30.5	19.5		56.5		54.5				
Max Q Clear Time (g_c+I1), s	20.6		15.2	3.2		22.3		7.0				
Green Ext Time (p_c), s	5.6		0.5	0.0		2.6		0.2				
Intersection Summary												
HCM 6th Ctrl Delay	19.8											
HCM 6th LOS	B											

Timings  
16: Tibet Street & 60th Avenue

Fulenwider Harvest Mile TIA  
04/29/2022

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	50	40	126	35	25	506	148	55	239
Future Volume (vph)	50	40	126	35	25	506	148	55	239
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA
Protected Phases	7	4	3	8	5	2		1	6
Permitted Phases	4		8		2		2	6	
Detector Phase	7	4	3	8	5	2	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5
Total Split (s)	14.0	31.0	25.0	42.0	12.0	49.0	49.0	15.0	52.0
Total Split (%)	11.7%	25.8%	20.8%	35.0%	10.0%	40.8%	40.8%	12.5%	43.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	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
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max
Act Effect Green (s)	17.4	9.3	27.5	16.9	79.2	74.1	74.1	81.5	76.9
Actuated g/C Ratio	0.14	0.08	0.23	0.14	0.66	0.62	0.62	0.68	0.64
v/c Ratio	0.25	0.56	0.49	0.37	0.04	0.26	0.16	0.11	0.13
Control Delay	37.6	40.8	43.2	21.6	4.4	5.2	0.6	7.7	10.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.6	40.8	43.2	21.6	4.4	5.2	0.6	7.7	10.2
LOS	D	D	D	C	A	A	A	A	B
Approach Delay		39.6		33.7		4.2			9.7
Approach LOS		D		C		A			A

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 28 (23%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.56

Intersection Signal Delay: 14.0

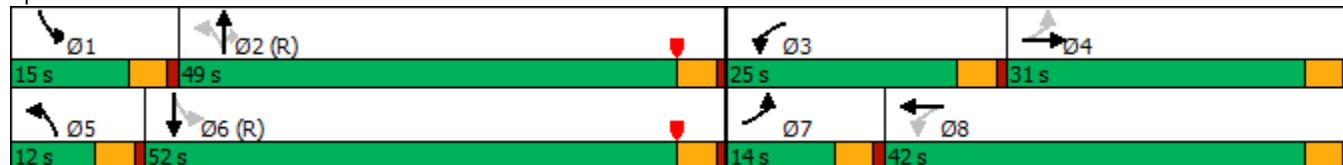
Intersection LOS: B

Intersection Capacity Utilization 43.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 16: Tibet Street & 60th Avenue



Queues  
16: Tibet Street & 60th Avenue

Fulenwider Harvest Mile TIA

04/29/2022

























Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	54	97	137	108	27	550	161	60	287
v/c Ratio	0.25	0.56	0.49	0.37	0.04	0.26	0.16	0.11	0.13
Control Delay	37.6	40.8	43.2	21.6	4.4	5.2	0.6	7.7	10.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.6	40.8	43.2	21.6	4.4	5.2	0.6	7.7	10.2
Queue Length 50th (ft)	34	37	82	18	2	25	0	13	44
Queue Length 95th (ft)	62	90	121	m62	9	54	6	35	81
Internal Link Dist (ft)		281		3347		1580			525
Turn Bay Length (ft)			100		200			200	
Base Capacity (vph)	233	403	337	558	737	2123	1011	596	2176
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.24	0.41	0.19	0.04	0.26	0.16	0.10	0.13

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

# HCM 6th Signalized Intersection Summary 16: Tibet Street & 60th Avenue






Fulenwider Harvest Mile TIA  
04/29/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	40	50	126	35	64	25	506	148	55	239	25
Future Volume (veh/h)	50	40	50	126	35	64	25	506	148	55	239	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	54	43	54	137	38	70	27	550	161	60	260	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5	5	5	5	5	5	5
Cap, veh/h	209	57	71	239	74	136	773	2249	1003	590	2094	216
Arrive On Green	0.04	0.08	0.08	0.09	0.13	0.13	0.05	1.00	1.00	0.04	0.66	0.66
Sat Flow, veh/h	1739	736	924	1739	575	1060	1739	3469	1547	1739	3175	327
Grp Volume(v), veh/h	54	0	97	137	0	108	27	550	161	60	141	146
Grp Sat Flow(s),veh/h/ln	1739	0	1660	1739	0	1635	1739	1735	1547	1739	1735	1767
Q Serve(g_s), s	3.4	0.0	6.9	8.4	0.0	7.4	0.6	0.0	0.0	1.4	3.6	3.7
Cycle Q Clear(g_c), s	3.4	0.0	6.9	8.4	0.0	7.4	0.6	0.0	0.0	1.4	3.6	3.7
Prop In Lane	1.00		0.56	1.00		0.65	1.00		1.00	1.00		0.18
Lane Grp Cap(c), veh/h	209	0	128	239	0	209	773	2249	1003	590	1144	1165
V/C Ratio(X)	0.26	0.00	0.76	0.57	0.00	0.52	0.03	0.24	0.16	0.10	0.12	0.13
Avail Cap(c_a), veh/h	281	0	366	383	0	511	839	2249	1003	679	1144	1165
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.98	0.98	0.98	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.5	0.0	54.2	43.9	0.0	48.8	6.4	0.0	0.0	6.2	7.6	7.6
Incr Delay (d2), s/veh	0.6	0.0	8.7	2.2	0.0	2.0	0.0	0.3	0.3	0.1	0.2	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(95%),veh/ln	2.7	0.0	5.7	6.8	0.0	5.7	0.4	0.1	0.2	0.9	2.5	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.1	0.0	62.9	46.0	0.0	50.8	6.4	0.3	0.3	6.3	7.8	7.8
LnGrp LOS	D	A	E	D	A	D	A	A	A	A	A	A
Approach Vol, veh/h	151			245			738			347		
Approach Delay, s/veh	58.0			48.1			0.5			7.5		
Approach LOS	E			D			A			A		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.8	82.3	15.1	13.8	7.5	83.6	9.0	19.9				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	10.5	44.5	20.5	26.5	7.5	47.5	9.5	37.5				
Max Q Clear Time (g_c+I1), s	3.4	2.0	10.4	8.9	2.6	5.7	5.4	9.4				
Green Ext Time (p_c), s	0.1	4.9	0.2	0.4	0.0	1.8	0.0	0.6				
Intersection Summary												
HCM 6th Ctrl Delay	15.9											
HCM 6th LOS	B											



Intersection

Int Delay, s/veh 3.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	30	10	38	75	20	26
Future Vol, veh/h	30	10	38	75	20	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	0	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	33	11	41	82	22	28

















Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	44
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.2
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.29
Pot Cap-1 Maneuver	-	-	1514
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1514
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.5	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	747	1010	-	-	1514	-
HCM Lane V/C Ratio	0.029	0.028	-	-	0.027	-
HCM Control Delay (s)	10	8.7	-	-	7.4	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0.1	-

Timings  
18: PA 9/10 Access & 64th Avenue

Fulenwider Harvest Mile TIA  
04/29/2022

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	115	1139	29	936	31	0	59	0
Future Volume (vph)	115	1139	29	936	31	0	59	0
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	pm+pt	NA
Protected Phases		4		8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	9.5	22.5
Total Split (s)	76.0	76.0	76.0	76.0	22.0	32.0	12.0	22.0
Total Split (%)	63.3%	63.3%	63.3%	63.3%	18.3%	26.7%	10.0%	18.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
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)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Max	C-Max	None	Max
Act Effect Green (s)	63.4	63.4	63.4	63.4	47.6	37.9	24.7	17.5
Actuated g/C Ratio	0.53	0.53	0.53	0.53	0.40	0.32	0.21	0.15
v/c Ratio	0.89	0.73	0.30	0.66	0.06	0.07	0.22	0.14
Control Delay	54.2	5.6	26.0	32.0	26.6	0.2	29.6	0.7
Queue Delay	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0
Total Delay	54.2	5.6	26.0	32.4	26.6	0.2	29.6	0.7
LOS	D	A	C	C	C	A	C	A
Approach Delay		9.9		32.2		12.9		15.9
Approach LOS		A		C		B		B



Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 20 (17%), Referenced to phase 2:NBTL, Start of Yellow  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.89  
 Intersection Signal Delay: 19.8  
 Intersection Capacity Utilization 58.0%  
 Analysis Period (min) 15

Intersection LOS: B

ICU Level of Service B

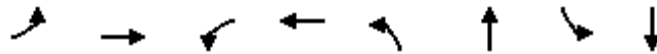
Splits and Phases: 18: PA 9/10 Access & 64th Avenue

		
Ø1	Ø2 (R)	Ø4
12 s	32 s	76 s
		
Ø5	Ø6	Ø8
22 s	22 s	76 s

Queues  
18: PA 9/10 Access & 64th Avenue

Fulenwider Harvest Mile TIA

04/29/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	125	1279	32	1157	34	37	64	58
v/c Ratio	0.89	0.73	0.30	0.66	0.06	0.07	0.22	0.14
Control Delay	54.2	5.6	26.0	32.0	26.6	0.2	29.6	0.7
Queue Delay	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0
Total Delay	54.2	5.6	26.0	32.4	26.6	0.2	29.6	0.7
Queue Length 50th (ft)	22	28	17	342	17	0	32	0
Queue Length 95th (ft)	m#152	39	m23	m357	42	0	68	0
Internal Link Dist (ft)		1779		471		407		332
Turn Bay Length (ft)								
Base Capacity (vph)	158	1983	122	1964	541	558	295	421
Starvation Cap Reductn	0	0	0	324	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.64	0.26	0.71	0.06	0.07	0.22	0.14

Intersection Summary

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

Queue shown is maximum after two cycles.





















m Volume for 95th percentile queue is metered by upstream signal.

# HCM 6th Signalized Intersection Summary

## 18: PA 9/10 Access & 64th Avenue

Fulenwider Harvest Mile TIA

04/29/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	115	1139	38	29	936	129	31	0	34	59	0	53
Future Volume (veh/h)	115	1139	38	29	936	129	31	0	34	59	0	53
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781
Adj Flow Rate, veh/h	125	1238	41	32	1017	140	34	0	37	64	0	58
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	8	8	8	8	8	8	8	8	8	8	8	8
Cap, veh/h	222	1533	51	127	1370	188	638	0	590	494	0	427
Arrive On Green	0.61	0.61	0.61	0.92	0.92	0.92	0.15	0.00	0.39	0.04	0.00	0.28
Sat Flow, veh/h	463	3343	111	412	2989	411	1697	0	1510	1697	0	1510
Grp Volume(v), veh/h	125	626	653	32	576	581	34	0	37	64	0	58
Grp Sat Flow(s),veh/h/ln	463	1692	1762	412	1692	1707	1697	0	1510	1697	0	1510
Q Serve(g_s), s	27.0	34.1	34.2	7.4	10.6	10.6	1.4	0.0	1.8	3.2	0.0	3.4
Cycle Q Clear(g_c), s	39.9	34.1	34.2	42.9	10.6	10.6	1.4	0.0	1.8	3.2	0.0	3.4
Prop In Lane	1.00		0.06	1.00		0.24	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	222	776	808	127	776	783	638	0	590	494	0	427
V/C Ratio(X)	0.56	0.81	0.81	0.25	0.74	0.74	0.05	0.00	0.06	0.13	0.00	0.14
Avail Cap(c_a), veh/h	286	1008	1050	184	1008	1017	638	0	590	536	0	427
HCM Platoon Ratio	1.33	1.33	1.33	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.59	0.59	0.59	0.62	0.62	0.62	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.8	19.3	19.3	18.6	3.1	3.1	18.9	0.0	22.8	28.7	0.0	32.1
Incr Delay (d2), s/veh	1.3	2.3	2.2	0.6	1.3	1.3	0.2	0.0	0.2	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(95%),veh/ln	4.9	16.1	16.7	1.2	3.1	3.1	1.0	0.0	1.2	2.4	0.0	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.2	21.6	21.5	19.3	4.5	4.5	19.1	0.0	23.0	28.8	0.0	32.7
LnGrp LOS	C	C	C	B	A	A	B	A	C	C	A	C
Approach Vol, veh/h	1404			1189			71			122		
Approach Delay, s/veh	22.1			4.9			21.1			30.7		
Approach LOS	C			A			C			C		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.1	51.3		59.6	22.0	38.4		59.6				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	7.5	27.5		71.5	17.5	17.5		71.5				
Max Q Clear Time (g_c+I1), s	5.2	3.8		41.9	3.4	5.4		44.9				
Green Ext Time (p_c), s	0.0	0.1		13.3	0.0	0.2		9.8				

### Intersection Summary

HCM 6th Ctrl Delay 15.1

HCM 6th LOS B

### Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗	↘	↑↑↑	↑↑↑	
Traffic Vol, veh/h	0	23	41	2536	1662	38
Future Vol, veh/h	0	23	41	2536	1662	38
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	0	25	45	2757	1807	41

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	-	924	1848
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	7.2	5.4
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	3.95	3.15
Pot Cap-1 Maneuver	0	*532	*667
Stage 1	0	-	-
Stage 2	0	-	-
Platoon blocked, %		1	1
Mov Cap-1 Maneuver	-	*532	*667
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.1	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	* 667	-	532	-	-
HCM Lane V/C Ratio	0.067	-	0.047	-	-
HCM Control Delay (s)	10.8	-	12.1	-	-
HCM Lane LOS	B	-	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.1	-	-



















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

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑↑	↑↑↑	↘
Traffic Vol, veh/h	0	16	0	2607	1600	15
Future Vol, veh/h	0	16	0	2607	1600	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	0	17	0	2834	1739	16
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	878	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.2	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.95	-	-	-	-
Pot Cap-1 Maneuver	0	*532	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %		1		-	-	-
Mov Cap-1 Maneuver	-	*532	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	12	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT EBLn1		SBT	SBR		
Capacity (veh/h)	- 532		-	-		
HCM Lane V/C Ratio	- 0.033		-	-		
HCM Control Delay (s)	- 12		-	-		
HCM Lane LOS	- B		-	-		
HCM 95th %tile Q(veh)	- 0.1		-	-		
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

# Timings

## 1: Harvest Road & 68th Avenue

Fulenwider Harvest Mile TIA  
04/29/2022





									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	104	13	291	11	20	1819	137	70	2297
Future Volume (vph)	104	13	291	11	20	1819	137	70	2297
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	pm+pt	NA
Protected Phases	7	4	3	8		2		1	6
Permitted Phases	4		8		2		2	6	
Detector Phase	7	4	3	8	2	2	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	9.5	22.5
Total Split (s)	15.0	21.0	24.0	30.0	63.0	63.0	63.0	12.0	75.0
Total Split (%)	12.5%	17.5%	20.0%	25.0%	52.5%	52.5%	52.5%	10.0%	62.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	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
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	None	C-Max
Act Effect Green (s)	14.8	7.0	27.0	12.5	73.9	73.9	73.9	84.0	84.0
Actuated g/C Ratio	0.12	0.06	0.22	0.10	0.62	0.62	0.62	0.70	0.70
v/c Ratio	0.57	0.32	0.99	0.52	0.37	0.67	0.15	0.46	0.77
Control Delay	51.4	36.1	92.6	16.8	18.0	6.5	0.9	20.9	14.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.4	36.1	92.6	16.8	18.0	6.5	0.9	20.9	14.8
LOS	D	D	F	B	B	A	A	C	B
Approach Delay		47.7		69.1		6.2			15.0
Approach LOS		D		E		A			B

### Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 22 (18%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.99  
 Intersection Signal Delay: 17.0  
 Intersection Capacity Utilization 85.5%  
 Analysis Period (min) 15

Intersection LOS: B  
 ICU Level of Service E

### Splits and Phases: 1: Harvest Road & 68th Avenue

							
Ø1	Ø2 (R)				Ø3		Ø4
12 s	63 s				24 s		21 s
							
Ø5 (R)					Ø7	Ø8	
75 s					15 s	30 s	

## Queues

## Fulenwider Harvest Mile TIA

## 1: Harvest Road &amp; 68th Avenue

04/29/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	113	36	316	142	22	1977	149	76	2576
v/c Ratio	0.57	0.32	0.99	0.52	0.37	0.67	0.15	0.46	0.77
Control Delay	51.4	36.1	92.6	16.8	18.0	6.5	0.9	20.9	14.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.4	36.1	92.6	16.8	18.0	6.5	0.9	20.9	14.8
Queue Length 50th (ft)	70	11	226	8	3	307	6	19	475
Queue Length 95th (ft)	118	44	#326	67	m7	m434	m12	61	591
Internal Link Dist (ft)		2323		1029		1126			345
Turn Bay Length (ft)	200				200			200	
Base Capacity (vph)	204	238	321	424	60	2959	973	175	3346
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.15	0.98	0.33	0.37	0.67	0.15	0.43	0.77

## Intersection Summary

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.






























# HCM 6th Signalized Intersection Summary

## 1: Harvest Road & 68th Avenue

Fulenwider Harvest Mile TIA























04/29/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	104	13	20	291	11	120	20	1819	137	70	2297	73
Future Volume (veh/h)	104	13	20	291	11	120	20	1819	137	70	2297	73
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781
Adj Flow Rate, veh/h	113	14	22	316	12	130	22	1977	149	76	2497	79
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	8	8	8	8	8	8	8	8	8	8	8	8
Cap, veh/h	236	26	41	361	16	177	100	2954	917	235	3310	104
Arrive On Green	0.08	0.04	0.04	0.16	0.13	0.13	1.00	1.00	1.00	0.04	0.68	0.68
Sat Flow, veh/h	1697	624	981	1697	129	1400	116	4863	1510	1697	4844	152
Grp Volume(v), veh/h	113	0	36	316	0	142	22	1977	149	76	1666	910
Grp Sat Flow(s),veh/h/ln	1697	0	1605	1697	0	1529	116	1621	1510	1697	1621	1754
Q Serve(g_s), s	7.5	0.0	2.6	19.5	0.0	10.7	14.5	0.0	0.0	1.9	40.2	40.9
Cycle Q Clear(g_c), s	7.5	0.0	2.6	19.5	0.0	10.7	46.3	0.0	0.0	1.9	40.2	40.9
Prop In Lane	1.00		0.61	1.00		0.92	1.00		1.00	1.00		0.09
Lane Grp Cap(c), veh/h	236	0	67	361	0	193	100	2954	917	235	2216	1199
V/C Ratio(X)	0.48	0.00	0.54	0.87	0.00	0.73	0.22	0.67	0.16	0.32	0.75	0.76
Avail Cap(c_a), veh/h	252	0	221	361	0	325	100	2954	917	276	2216	1199
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.8	0.0	56.4	45.3	0.0	50.5	10.1	0.0	0.0	7.2	12.4	12.5
Incr Delay (d2), s/veh	1.5	0.0	6.6	20.4	0.0	5.3	5.0	1.2	0.4	0.8	2.4	4.5
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(95%),veh/ln	5.9	0.0	2.1	16.4	0.0	7.8	0.8	0.6	0.2	1.3	20.0	22.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.3	0.0	62.9	65.7	0.0	55.8	15.2	1.2	0.4	8.0	14.8	17.0
LnGrp LOS	D	A	E	E	A	E	B	A	A	A	B	B
Approach Vol, veh/h	149		458				2148		2652			
Approach Delay, s/veh	54.1		62.7				1.3		15.4			
Approach LOS	D		E				A		B			
Timer - Assigned Phs	1	2	3	4	6		7	8				
Phs Duration (G+Y+Rc), s	9.1	77.4	24.0	9.5	86.5		13.8	19.7				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5		4.5	4.5				
Max Green Setting (Gmax), s	7.5	58.5	19.5	16.5	70.5		10.5	25.5				
Max Q Clear Time (g_c+I1), s	3.9	48.3	21.5	4.6	42.9		9.5	12.7				
Green Ext Time (p_c), s	0.0	8.8	0.0	0.1	23.0		0.0	0.6				
Intersection Summary												
HCM 6th Ctrl Delay			14.9									
HCM 6th LOS			B									
Notes												

Intersection						
Int Delay, s/veh	4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	247	92	2021	2643	15
Future Vol, veh/h	0	247	92	2021	2643	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	8	8	8	8	8	8
Mvmt Flow	0	268	100	2197	2873	16
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	1445	2889	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.26	5.46	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.98	3.18	-	-	-
Pot Cap-1 Maneuver	0	*289	*361	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %		1	1	-	-	-
Mov Cap-1 Maneuver	-	*289	*361	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	75.4	0.8		0		
HCM LOS	F					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	* 361	-	289	-	-	
HCM Lane V/C Ratio	0.277	-	0.929	-	-	
HCM Control Delay (s)	18.7	-	75.4	-	-	
HCM Lane LOS	C	-	F	-	-	
HCM 95th %tile Q(veh)	1.1	-	8.8	-	-	
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

Timings  
3: Harvest Road & 64th Avenue

Fulenwider Harvest Mile TIA  
04/29/2022











											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	529	320	311	134	375	125	282	1544	112	2226	662
Future Volume (vph)	529	320	311	134	375	125	282	1544	112	2226	662
Turn Type	Prot	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+pt	NA	pm+ov
Protected Phases	7	4	5	3	8	1	5	2	1	6	7
Permitted Phases			4	8		8			6		6
Detector Phase	7	4	5	3	8	1	5	2	1	6	7
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	24.0	9.5	9.5	24.0	9.5	9.5	24.0	9.5	24.0	9.5
Total Split (s)	26.0	31.0	15.0	16.0	21.0	15.0	15.0	58.0	15.0	58.0	26.0
Total Split (%)	21.7%	25.8%	12.5%	13.3%	17.5%	12.5%	12.5%	48.3%	12.5%	48.3%	21.7%
Yellow Time (s)	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	3.5	4.0	3.5
All-Red Time (s)	1.0	2.0	1.0	1.0	2.0	1.0	1.0	2.0	1.0	2.0	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)	4.5	6.0	4.5	4.5	6.0	4.5	4.5	6.0	4.5	6.0	4.5
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	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	None	C-Max	None	C-Max	None
Act Effect Green (s)	21.5	25.7	42.2	27.3	15.0	30.2	10.5	53.3	62.7	52.0	79.5
Actuated g/C Ratio	0.18	0.21	0.35	0.23	0.12	0.25	0.09	0.44	0.52	0.43	0.66
v/c Ratio	0.99	0.49	0.59	0.52	0.98	0.30	1.08	0.86	0.65	1.16	0.71
Control Delay	73.9	26.1	19.1	36.0	91.6	11.7	129.1	25.6	41.7	105.3	13.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay	73.9	26.1	19.1	36.0	91.6	11.7	129.1	25.6	41.7	105.3	13.3
LOS	E	C	B	D	F	B	F	C	D	F	B
Approach Delay		46.0			64.1			40.6		82.6	
Approach LOS		D			E			D		F	

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 60 (50%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow  
 Natural Cycle: 120  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.16  
 Intersection Signal Delay: 62.4  
 Intersection Capacity Utilization 94.0%  
 Analysis Period (min) 15

Intersection LOS: E  
 ICU Level of Service F

Splits and Phases: 3: Harvest Road & 64th Avenue

				
Ø1	Ø2 (R)		Ø3	Ø4
15 s	58 s		16 s	31 s
				
Ø5	Ø6 (R)		Ø7	Ø8
15 s	58 s		26 s	21 s

Queues  
3: Harvest Road & 64th Avenue

Fulenwider Harvest Mile TIA

04/29/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	575	348	338	146	408	136	307	1815	122	2420	720
v/c Ratio	0.99	0.49	0.59	0.52	0.98	0.30	1.08	0.86	0.65	1.16	0.71
Control Delay	73.9	26.1	19.1	36.0	91.6	11.7	129.1	25.6	41.7	105.3	13.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay	73.9	26.1	19.1	36.0	91.6	11.7	129.1	25.6	41.7	105.3	13.3
Queue Length 50th (ft)	186	107	207	79	167	16	~132	477	42	~820	354
Queue Length 95th (ft)	#342	147	314	133	#273	67	#226	481	m77	m#895	m386
Internal Link Dist (ft)		472			1219			1139		1127	
Turn Bay Length (ft)	200		200	200			200		200		200
Base Capacity (vph)	580	716	570	291	417	472	283	2118	206	2081	1013
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	17
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.99	0.49	0.59	0.50	0.98	0.29	1.08	0.86	0.59	1.16	0.72

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.
























m Volume for 95th percentile queue is metered by upstream signal.

# HCM 6th Signalized Intersection Summary

## 3: Harvest Road & 64th Avenue

Fulenwider Harvest Mile TIA





















04/29/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	529	320	311	134	375	125	282	1544	126	112	2226	662
Future Volume (veh/h)	529	320	311	134	375	125	282	1544	126	112	2226	662
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781
Adj Flow Rate, veh/h	575	348	338	146	408	136	307	1678	137	122	2420	720
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	8	8	8	8	8	8	8	8	8	8	8	8
Cap, veh/h	590	725	455	296	423	274	288	2127	173	194	2107	925
Arrive On Green	0.06	0.07	0.07	0.09	0.13	0.13	0.09	0.46	0.46	0.11	0.87	0.87
Sat Flow, veh/h	3291	3385	1510	1697	3385	1510	3291	4583	374	1697	4863	1510
Grp Volume(v), veh/h	575	348	338	146	408	136	307	1186	629	122	2420	720
Grp Sat Flow(s),veh/h/ln	1646	1692	1510	1697	1692	1510	1646	1621	1714	1697	1621	1510
Q Serve(g_s), s	20.9	11.9	24.0	8.9	14.4	9.7	10.5	37.1	37.2	4.8	52.0	52.0
Cycle Q Clear(g_c), s	20.9	11.9	24.0	8.9	14.4	9.7	10.5	37.1	37.2	4.8	52.0	52.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.22	1.00		1.00
Lane Grp Cap(c), veh/h	590	725	455	296	423	274	288	1505	796	194	2107	925
V/C Ratio(X)	0.98	0.48	0.74	0.49	0.96	0.50	1.07	0.79	0.79	0.63	1.15	0.78
Avail Cap(c_a), veh/h	590	725	455	306	423	274	288	1505	796	246	2107	925
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	0.82	0.82	0.82	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.2	49.3	44.5	40.5	52.2	44.2	54.8	27.2	27.2	23.6	8.0	5.8
Incr Delay (d2), s/veh	27.4	0.4	5.3	1.3	34.5	1.4	71.6	4.3	7.9	3.3	72.8	6.4
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(95%),veh/ln	16.6	8.9	15.2	6.9	12.8	6.7	11.9	21.2	23.3	3.4	26.2	6.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	83.5	49.7	49.8	41.7	86.7	45.5	126.3	31.4	35.1	26.9	80.8	12.3
LnGrp LOS	F	D	D	D	F	D	F	C	D	C	F	B
Approach Vol, veh/h	1261			690			2122			3262		
Approach Delay, s/veh	65.2			69.1			46.2			63.7		
Approach LOS	E			E			D			E		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.3	61.7	15.3	31.7	15.0	58.0	26.0	21.0				
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0				
Max Green Setting (Gmax), s	10.5	52.0	11.5	25.0	10.5	52.0	21.5	15.0				
Max Q Clear Time (g_c+I1), s	6.8	39.2	10.9	26.0	12.5	54.0	22.9	16.4				
Green Ext Time (p_c), s	0.1	9.4	0.0	0.0	0.0	0.0	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay	59.4											
HCM 6th LOS	E											
Notes												

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗	↘	↑↑↑	↑↑↑	↗
Traffic Vol, veh/h	0	61	39	1977	2646	30
Future Vol, veh/h	0	61	39	1977	2646	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	200	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	8	8	8	8	8	8
Mvmt Flow	0	66	42	2149	2876	33
Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	1438	2909		0	- 0
Stage 1	-	-	-		-	-
Stage 2	-	-	-		-	-
Critical Hdwy	-	7.26	5.46		-	-
Critical Hdwy Stg 1	-	-	-		-	-
Critical Hdwy Stg 2	-	-	-		-	-
Follow-up Hdwy	-	3.98	3.18		-	-
Pot Cap-1 Maneuver	0	*289	*361		-	-
Stage 1	0	-	-		-	-
Stage 2	0	-	-		-	-
Platoon blocked, %		1	1		-	-
Mov Cap-1 Maneuver	-	*289	*361		-	-
Mov Cap-2 Maneuver	-	-	-		-	-
Stage 1	-	-	-		-	-
Stage 2	-	-	-		-	-
Approach	EB		NB		SB	
HCM Control Delay, s	21.1		0.3		0	
HCM LOS	C					
Minor Lane/Major Mvmt	NBL		NBT EBLn1		SBT SBR	
Capacity (veh/h)	* 361		- 289		- -	
HCM Lane V/C Ratio	0.117		- 0.229		- -	
HCM Control Delay (s)	16.3		- 21.1		- -	
HCM Lane LOS	C		- C		- -	
HCM 95th %tile Q(veh)	0.4		- 0.9		- -	
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

Timings  
5: Harvest Road & 60th Avenue

Fulenwider Harvest Mile TIA  
04/29/2022

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	147	21	286	39	19	118	1781	34	2530	105
Future Volume (vph)	147	21	286	39	19	118	1781	34	2530	105
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm
Protected Phases	7	4		3	8	5	2	1	6	
Permitted Phases	4		4	8		2		6		6
Detector Phase	7	4	4	3	8	5	2	1	6	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	2.0	5.0	5.0	5.0	4.5	5.0	5.0
Minimum Split (s)	10.0	23.0	23.0	7.0	23.0	10.0	23.0	9.0	23.0	23.0
Total Split (s)	20.0	31.0	31.0	12.0	23.0	12.0	65.0	12.0	65.0	65.0
Total Split (%)	16.7%	25.8%	25.8%	10.0%	19.2%	10.0%	54.2%	10.0%	54.2%	54.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	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)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max	C-Max
Act Effect Green (s)	26.7	17.3	17.3	16.1	10.3	83.3	77.4	76.9	70.5	70.5
Actuated g/C Ratio	0.22	0.14	0.14	0.13	0.09	0.69	0.64	0.64	0.59	0.59
v/c Ratio	0.57	0.09	0.82	0.21	0.41	0.68	0.63	0.23	0.97	0.12
Control Delay	45.8	42.7	36.8	35.8	25.5	42.0	17.0	7.3	14.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.8	42.7	36.8	35.8	25.5	42.0	17.0	7.3	14.8	0.0
LOS	D	D	D	D	C	D	B	A	B	A
Approach Delay		40.0			29.2		18.5		14.2	
Approach LOS		D			C		B		B	

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 2 (2%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow  
 Natural Cycle: 100  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.97  
 Intersection Signal Delay: 18.4  
 Intersection Capacity Utilization 81.5%  
 Analysis Period (min) 15

Intersection LOS: B  
 ICU Level of Service D

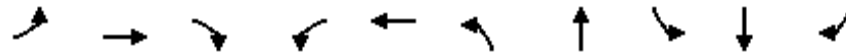
Splits and Phases: 5: Harvest Road & 60th Avenue



Queues  
5: Harvest Road & 60th Avenue

Fulenwider Harvest Mile TIA

04/29/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	160	23	311	42	75	128	1963	37	2750	114
v/c Ratio	0.57	0.09	0.82	0.21	0.41	0.68	0.63	0.23	0.97	0.12
Control Delay	45.8	42.7	36.8	35.8	25.5	42.0	17.0	7.3	14.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.8	42.7	36.8	35.8	25.5	42.0	17.0	7.3	14.8	0.0
Queue Length 50th (ft)	106	16	97	26	16	48	356	0	~851	0
Queue Length 95th (ft)	157	37	198	50	59	#173	519	m0	m#770	m0
Internal Link Dist (ft)	2372				349	614		549		
Turn Bay Length (ft)	100	100		100	200		100		100	
Base Capacity (vph)	297	388	478	204	287	188	3093	176	2822	934
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.06	0.65	0.21	0.26	0.68	0.63	0.21	0.97	0.12

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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
























Queue shown is maximum after two cycles.






m Volume for 95th percentile queue is metered by upstream signal.



# HCM 6th Signalized Intersection Summary 5: Harvest Road & 60th Avenue

























Fulenwider Harvest Mile TIA  
04/29/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	147	21	286	39	19	50	118	1781	25	34	2530	105
Future Volume (veh/h)	147	21	286	39	19	50	118	1781	25	34	2530	105
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781
Adj Flow Rate, veh/h	160	23	311	42	21	54	128	1936	27	37	2750	114
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	8	8	8	8	8	8	8	8	8	8	8	8
Cap, veh/h	360	391	331	261	68	174	149	2845	40	169	2681	832
Arrive On Green	0.09	0.22	0.22	0.03	0.15	0.15	0.05	0.58	0.58	0.05	1.00	1.00
Sat Flow, veh/h	1697	1781	1510	1697	442	1135	1697	4942	69	1697	4863	1510
Grp Volume(v), veh/h	160	23	311	42	0	75	128	1270	693	37	2750	114
Grp Sat Flow(s),veh/h/ln	1697	1781	1510	1697	0	1577	1697	1621	1769	1697	1621	1510
Q Serve(g_s), s	9.2	1.2	24.3	2.5	0.0	5.1	4.5	32.8	32.8	1.1	66.2	0.0
Cycle Q Clear(g_c), s	9.2	1.2	24.3	2.5	0.0	5.1	4.5	32.8	32.8	1.1	66.2	0.0
Prop In Lane	1.00		1.00	1.00		0.72	1.00		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	360	391	331	261	0	242	149	1867	1018	169	2681	832
V/C Ratio(X)	0.44	0.06	0.94	0.16	0.00	0.31	0.86	0.68	0.68	0.22	1.03	0.14
Avail Cap(c_a), veh/h	420	393	333	319	0	243	168	1867	1018	230	2681	832
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.1	37.0	46.0	41.2	0.0	45.1	32.0	17.8	17.8	15.0	0.0	0.0
Incr Delay (d2), s/veh	0.9	0.1	33.6	0.3	0.0	0.7	31.1	2.0	3.7	0.6	24.3	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(95%),veh/ln	7.0	1.0	17.9	1.9	0.0	3.7	5.9	18.0	20.0	0.8	10.2	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.9	37.1	79.6	41.5	0.0	45.8	63.2	19.8	21.4	15.6	24.3	0.3
LnGrp LOS	D	D	E	D	A	D	E	B	C	B	F	A
Approach Vol, veh/h	494				117				2091			
Approach Delay, s/veh	63.8				44.3				23.0			
Approach LOS	E				D				C			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.7	73.6	7.9	30.8	10.8	70.5	15.8	22.9				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	7.5	60.5	7.5	26.5	7.5	60.5	15.5	18.5				
Max Q Clear Time (g_c+I1), s	3.1	34.8	4.5	26.3	6.5	68.2	11.2	7.1				
Green Ext Time (p_c), s	0.0	16.9	0.0	0.0	0.0	0.0	0.2	0.2				
Intersection Summary												
HCM 6th Ctrl Delay			27.2									
HCM 6th LOS			C									
Notes												

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	22	11	1884	2780	5
Future Vol, veh/h	0	22	11	1884	2780	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	8	8	8	8	8	8
Mvmt Flow	0	24	12	2048	3022	5
Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	1514	3027	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.26	5.46	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.98	3.18	-	-	-
Pot Cap-1 Maneuver	0	*245	*307	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %		1	1	-	-	-
Mov Cap-1 Maneuver	-	*245	*307	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		NB		SB	
HCM Control Delay, s	21.3		0.1		0	
HCM LOS	C					
Minor Lane/Major Mvmt	NBL		NBT	EBLn1	SBT	SBR
Capacity (veh/h)	* 307		-	245	-	-
HCM Lane V/C Ratio	0.039		-	0.098	-	-
HCM Control Delay (s)	17.2		-	21.3	-	-
HCM Lane LOS	C		-	C	-	-
HCM 95th %tile Q(veh)	0.1		-	0.3	-	-
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

Timings  
7: Denali Street & 64th Avenue

Fulenwider Harvest Mile TIA  
04/29/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	806	266	69	1225	74	323	73	94	112	109	102
Future Volume (vph)	43	806	266	69	1225	74	323	73	94	112	109	102
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	12.0	61.0	61.0	12.0	61.0	61.0	23.0	33.0	33.0	14.0	24.0	24.0
Total Split (%)	10.0%	50.8%	50.8%	10.0%	50.8%	50.8%	19.2%	27.5%	27.5%	11.7%	20.0%	20.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
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	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	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effect Green (s)	60.7	54.9	54.9	60.9	55.0	55.0	17.1	33.0	33.0	34.1	25.0	25.0
Actuated g/C Ratio	0.51	0.46	0.46	0.51	0.46	0.46	0.14	0.28	0.28	0.28	0.21	0.21
v/c Ratio	0.31	0.58	0.35	0.28	0.89	0.11	0.78	0.17	0.21	0.32	0.33	0.27
Control Delay	17.2	25.8	3.3	5.4	22.7	1.3	62.0	36.1	7.4	29.8	46.1	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.2	25.8	3.3	5.4	22.7	1.3	62.0	36.1	7.4	29.8	46.1	5.7
LOS	B	C	A	A	C	A	E	D	A	C	D	A
Approach Delay		20.1			20.7			47.7			27.7	
Approach LOS		C			C			D			C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 97 (81%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 25.2









Intersection LOS: C

Intersection Capacity Utilization 65.2%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 7: Denali Street & 64th Avenue













 Ø1	 Ø2 (R)	 Ø3	 Ø4
14 s	33 s	12 s	61 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
23 s	24 s	12 s	61 s

## Queues

## Fulenwider Harvest Mile TIA

## 7: Denali Street &amp; 64th Avenue

04/29/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	47	876	289	75	1332	80	351	79	102	122	118	111
v/c Ratio	0.31	0.58	0.35	0.28	0.89	0.11	0.78	0.17	0.21	0.32	0.33	0.27
Control Delay	17.2	25.8	3.3	5.4	22.7	1.3	62.0	36.1	7.4	29.8	46.1	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.2	25.8	3.3	5.4	22.7	1.3	62.0	36.1	7.4	29.8	46.1	5.7
Queue Length 50th (ft)	15	251	0	5	406	4	132	49	1	63	82	0
Queue Length 95th (ft)	33	315	47	m12	497	m8	185	m89	m40	m110	m140	m30
Internal Link Dist (ft)	2407			1779			2359			2391		
Turn Bay Length (ft)	200						200			200		
Base Capacity (vph)	158	1545	844	270	1545	763	490	474	477	384	359	413
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.57	0.34	0.28	0.86	0.10	0.72	0.17	0.21	0.32	0.33	0.27

## Intersection Summary

























m Volume for 95th percentile queue is metered by upstream signal.






# HCM 6th Signalized Intersection Summary

## 7: Denali Street & 64th Avenue

Fulenwider Harvest Mile TIA

04/29/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	43	806	266	69	1225	74	323	73	94	112	109	102
Future Volume (veh/h)	43	806	266	69	1225	74	323	73	94	112	109	102
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	47	876	289	75	1332	80	351	79	102	122	118	111
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	142	1434	639	227	1452	648	410	546	463	461	445	377
Arrive On Green	0.03	0.43	0.43	0.05	0.58	0.58	0.13	0.31	0.31	0.07	0.25	0.25
Sat Flow, veh/h	1668	3328	1485	1668	3328	1485	3237	1752	1485	1668	1752	1485
Grp Volume(v), veh/h	47	876	289	75	1332	80	351	79	102	122	118	111
Grp Sat Flow(s),veh/h/ln	1668	1664	1485	1668	1664	1485	1618	1752	1485	1668	1752	1485
Q Serve(g_s), s	1.9	24.4	16.5	3.0	43.1	2.9	12.7	3.9	6.1	6.4	6.5	7.2
Cycle Q Clear(g_c), s	1.9	24.4	16.5	3.0	43.1	2.9	12.7	3.9	6.1	6.4	6.5	7.2
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	142	1434	639	227	1452	648	410	546	463	461	445	377
V/C Ratio(X)	0.33	0.61	0.45	0.33	0.92	0.12	0.86	0.14	0.22	0.26	0.27	0.29
Avail Cap(c_a), veh/h	192	1567	699	267	1567	699	499	546	463	478	445	377
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.60	0.60	0.60	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.4	26.4	24.1	20.4	23.2	14.8	51.3	29.8	30.5	29.7	35.8	36.1
Incr Delay (d2), s/veh	1.3	0.6	0.5	0.5	5.5	0.1	11.7	0.6	1.1	0.3	1.5	2.0
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(95%),veh/ln	1.4	14.8	9.8	2.1	20.6	1.8	9.8	3.1	4.2	4.7	5.3	5.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.7	27.0	24.6	20.9	28.7	14.9	63.0	30.3	31.6	30.0	37.3	38.1
LnGrp LOS	C	C	C	C	C	B	E	C	C	C	D	D
Approach Vol, veh/h	1212			1487			532			351		
Approach Delay, s/veh	26.5			27.6			52.2			35.0		
Approach LOS	C			C			D			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.8	41.9	9.1	56.2	19.7	35.0	8.5	56.8				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	9.5	28.5	7.5	56.5	18.5	19.5	7.5	56.5				
Max Q Clear Time (g_c+I1), s	8.4	8.1	5.0	26.4	14.7	9.2	3.9	45.1				
Green Ext Time (p_c), s	0.0	0.7	0.0	8.6	0.5	0.7	0.0	7.2				
Intersection Summary												
HCM 6th Ctrl Delay	31.6											
HCM 6th LOS	C											

Intersection						
Int Delay, s/veh	11.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	142	176	127	65	219	74
Future Vol, veh/h	142	176	127	65	219	74
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	154	191	138	71	238	80

























Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	209	0	0	673	174
Stage 1	-	-	-	174	-
Stage 2	-	-	-	499	-
Critical Hdwy	4.2	-	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	5.5	-
Follow-up Hdwy	2.29	-	-	3.59	3.39
Pot Cap-1 Maneuver	1316	-	-	408	849
Stage 1	-	-	-	837	-
Stage 2	-	-	-	594	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	1316	-	-	360	849
Mov Cap-2 Maneuver	-	-	-	360	-
Stage 1	-	-	-	739	-
Stage 2	-	-	-	594	-

Approach	EB	WB	SB
HCM Control Delay, s	3.6	0	26.7
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1316	-	-	-	360	849
HCM Lane V/C Ratio	0.117	-	-	-	0.661	0.095
HCM Control Delay (s)	8.1	-	-	-	32.5	9.7
HCM Lane LOS	A	-	-	-	D	A
HCM 95th %tile Q(veh)	0.4	-	-	-	4.5	0.3

Timings  
9: Tibet Street & 56th Avenue

Fulenwider Harvest Mile TIA  
04/29/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	219	835	120	320	915	316	100	89	301	328	130	368
Future Volume (vph)	219	835	120	320	915	316	100	89	301	328	130	368
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	15.0	38.0	38.0	21.0	44.0	44.0	12.0	32.0	32.0	29.0	49.0	49.0
Total Split (%)	12.5%	31.7%	31.7%	17.5%	36.7%	36.7%	10.0%	26.7%	26.7%	24.2%	40.8%	40.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
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	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	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effect Green (s)	14.1	49.2	49.2	17.8	52.8	52.8	19.0	11.5	11.5	39.5	27.6	27.6
Actuated g/C Ratio	0.12	0.41	0.41	0.15	0.44	0.44	0.16	0.10	0.10	0.33	0.23	0.23
v/c Ratio	0.61	0.45	0.18	0.70	0.46	0.39	0.49	0.29	0.79	0.78	0.18	0.68
Control Delay	56.8	28.3	2.1	43.6	20.4	10.0	37.4	50.9	22.9	41.8	25.7	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.8	28.3	2.1	43.6	20.4	10.0	37.4	50.9	22.9	41.8	25.7	10.1
LOS	E	C	A	D	C	B	D	D	C	D	C	B
Approach Delay		31.0			23.1			31.0			25.1	
Approach LOS		C			C			C			C	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 92 (77%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 26.7

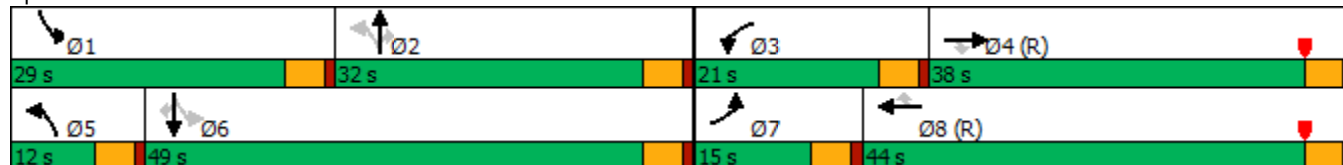
Intersection LOS: C

Intersection Capacity Utilization 64.2%

ICU Level of Service C

Analysis Period (min) 15













Splits and Phases: 9: Tibet Street & 56th Avenue



Queues  
9: Tibet Street & 56th Avenue

Fulenwider Harvest Mile TIA

































04/29/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	238	908	130	348	995	343	109	97	327	357	141	400
v/c Ratio	0.61	0.45	0.18	0.70	0.46	0.39	0.49	0.29	0.79	0.78	0.18	0.68
Control Delay	56.8	28.3	2.1	43.6	20.4	10.0	37.4	50.9	22.9	41.8	25.7	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.8	28.3	2.1	43.6	20.4	10.0	37.4	50.9	22.9	41.8	25.7	10.1
Queue Length 50th (ft)	91	178	0	110	190	90	62	38	25	172	35	25
Queue Length 95th (ft)	130	273	19	155	319	200	91	60	117	251	46	47
Internal Link Dist (ft)	810		681				1021				674	
Turn Bay Length (ft)	200	200		200	200		200	200		200	200	
Base Capacity (vph)	392	2024	735	514	2175	869	222	787	578	463	1274	765
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.45	0.18	0.68	0.46	0.39	0.49	0.12	0.57	0.77	0.11	0.52
Intersection Summary												



# HCM 6th Signalized Intersection Summary 9: Tibet Street & 56th Avenue

Fulenwider Harvest Mile TIA  
04/29/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		 	  			 			 	
Traffic Volume (veh/h)	219	835	120	320	915	316	100	89	301	328	130	368
Future Volume (veh/h)	219	835	120	320	915	316	100	89	301	328	130	368
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	238	908	130	348	995	343	109	97	327	357	141	400
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5	5	5	5	5	5	5
Cap, veh/h	291	1669	518	410	1845	573	359	782	349	544	1149	513
Arrive On Green	0.09	0.33	0.33	0.04	0.12	0.12	0.06	0.23	0.23	0.06	0.11	0.11
Sat Flow, veh/h	3374	4985	1547	3374	4985	1547	1739	3469	1547	1739	3469	1547
Grp Volume(v), veh/h	238	908	130	348	995	343	109	97	327	357	141	400
Grp Sat Flow(s),veh/h/ln	1687	1662	1547	1687	1662	1547	1739	1735	1547	1739	1735	1547
Q Serve(g_s), s	8.3	17.8	7.3	12.3	22.5	25.2	5.7	2.7	24.9	17.7	4.4	30.2
Cycle Q Clear(g_c), s	8.3	17.8	7.3	12.3	22.5	25.2	5.7	2.7	24.9	17.7	4.4	30.2
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	291	1669	518	410	1845	573	359	782	349	544	1149	513
V/C Ratio(X)	0.82	0.54	0.25	0.85	0.54	0.60	0.30	0.12	0.94	0.66	0.12	0.78
Avail Cap(c_a), veh/h	295	1669	518	464	1845	573	359	795	355	606	1286	574
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	1.00	1.00	0.89	0.89	0.89	1.00	1.00	1.00	0.95	0.95	0.95
Uniform Delay (d), s/veh	53.9	32.5	29.0	56.5	43.1	44.2	32.5	37.0	45.7	29.8	37.7	49.2
Incr Delay (d2), s/veh	16.3	1.3	1.2	11.4	1.0	4.1	0.5	0.1	32.0	2.1	0.0	5.9
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(95%),veh/ln	7.4	11.5	5.1	10.0	15.1	16.2	4.4	2.1	18.1	13.1	3.5	19.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.2	33.7	30.2	67.9	44.1	48.3	32.9	37.1	77.6	31.9	37.7	55.1
LnGrp LOS	E	C	C	E	D	D	C	D	E	C	D	E
Approach Vol, veh/h	1276		1686				533		898			
Approach Delay, s/veh	40.2		49.9				61.1		43.1			
Approach LOS	D		D				E		D			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	24.7	31.5	19.1	44.7	12.0	44.2	14.8	48.9				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	24.5	27.5	16.5	33.5	7.5	44.5	10.5	39.5				
Max Q Clear Time (g_c+I1), s	19.7	26.9	14.3	19.8	7.7	32.2	10.3	27.2				
Green Ext Time (p_c), s	0.5	0.1	0.3	5.2	0.0	1.9	0.0	6.0				
Intersection Summary												
HCM 6th Ctrl Delay			47.0									
HCM 6th LOS			D									

Timings  
10: 56th Avenue & PA-1 Access A

Fulenwider Harvest Mile TIA  
04/29/2022



Lane Group	EBL	EBT	WBT	WBR	SBL
Lane Configurations	↔↔	↑↑↑	↑↑↑	↔	↔↔
Traffic Volume (vph)	117	1442	1452	155	136
Future Volume (vph)	117	1442	1452	155	136
Turn Type	Prot	NA	NA	Perm	Prot
Protected Phases	7	4	8		6
Permitted Phases				8	
Detector Phase	7	4	8	8	6
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	22.5	22.5
Total Split (s)	18.0	92.0	74.0	74.0	28.0
Total Split (%)	15.0%	76.7%	61.7%	61.7%	23.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
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)	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes		Yes	Yes	
Recall Mode	None	C-Max	C-Max	C-Max	None
Act Effect Green (s)	9.9	99.9	85.5	85.5	11.1
Actuated g/C Ratio	0.08	0.83	0.71	0.71	0.09
v/c Ratio	0.46	0.38	0.45	0.15	0.66
Control Delay	53.6	3.6	7.3	2.8	36.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	53.6	3.6	7.3	2.8	36.8
LOS	D	A	A	A	D
Approach Delay		7.3	6.8		36.8
Approach LOS		A	A		D

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 81 (68%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 9.2

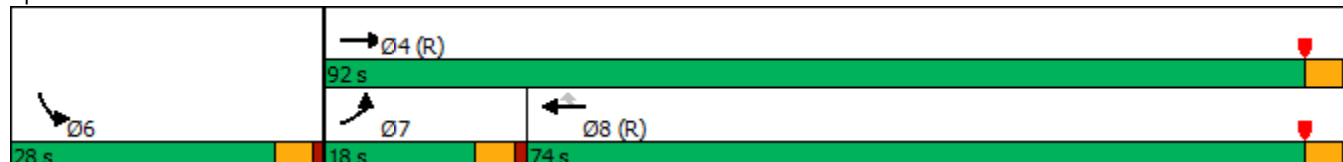
Intersection LOS: A

Intersection Capacity Utilization 50.8%

ICU Level of Service A

Analysis Period (min) 15

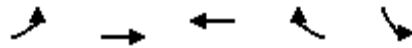
Splits and Phases: 10: 56th Avenue & PA-1 Access A



Queues  
10: 56th Avenue & PA-1 Access A

Fulenwider Harvest Mile TIA

04/29/2022



Lane Group	EBL	EBT	WBT	WBR	SBL
Lane Group Flow (vph)	127	1567	1578	168	266
v/c Ratio	0.46	0.38	0.45	0.15	0.66
Control Delay	53.6	3.6	7.3	2.8	36.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	53.6	3.6	7.3	2.8	36.8
Queue Length 50th (ft)	51	57	113	14	57
Queue Length 95th (ft)	m77	216	182	42	98
Internal Link Dist (ft)		681	1214		618
Turn Bay Length (ft)	200				
Base Capacity (vph)	375	4111	3519	1144	719
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.34	0.38	0.45	0.15	0.37

Intersection Summary

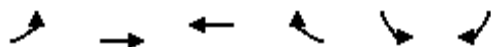
m Volume for 95th percentile queue is metered by upstream signal.

# HCM 6th Signalized Intersection Summary

## 10: 56th Avenue & PA-1 Access A

Fulenwider Harvest Mile TIA

04/29/2022



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰↰	↑↑↑	↑↑↑	↱	↰↰	
Traffic Volume (veh/h)	117	1442	1452	155	136	109
Future Volume (veh/h)	117	1442	1452	155	136	109
Initial Q (Qb), veh	0	0	0	0	0	0
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	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	127	1567	1578	168	133	134
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	183	4080	3622	1124	185	165
Arrive On Green	0.05	0.82	0.49	0.49	0.11	0.11
Sat Flow, veh/h	3374	5149	5149	1547	1739	1547
Grp Volume(v), veh/h	127	1567	1578	168	133	134
Grp Sat Flow(s),veh/h/ln	1687	1662	1662	1547	1739	1547
Q Serve(g_s), s	4.4	10.0	24.7	7.2	8.9	10.2
Cycle Q Clear(g_c), s	4.4	10.0	24.7	7.2	8.9	10.2
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	183	4080	3622	1124	185	165
V/C Ratio(X)	0.69	0.38	0.44	0.15	0.72	0.81
Avail Cap(c_a), veh/h	380	4080	3622	1124	341	303
HCM Platoon Ratio	1.00	1.00	0.67	0.67	1.00	1.00
Upstream Filter(I)	0.77	0.77	0.90	0.90	1.00	1.00
Uniform Delay (d), s/veh	55.8	2.9	14.8	10.3	51.9	52.4
Incr Delay (d2), s/veh	3.6	0.2	0.3	0.3	5.1	9.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.5	3.5	14.9	4.1	7.5	13.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	59.3	3.1	15.1	10.5	57.0	61.7
LnGrp LOS	E	A	B	B	E	E
Approach Vol, veh/h		1694	1746		267	
Approach Delay, s/veh		7.3	14.7		59.4	
Approach LOS		A	B		E	
Timer - Assigned Phs			4		6	7
Phs Duration (G+Y+Rc), s			102.7		17.3	11.0
Change Period (Y+Rc), s			4.5		4.5	4.5
Max Green Setting (Gmax), s			87.5		23.5	13.5
Max Q Clear Time (g_c+I1), s			12.0		12.2	6.4
Green Ext Time (p_c), s			16.7		0.6	0.2
Intersection Summary						
HCM 6th Ctrl Delay			14.5			
HCM 6th LOS			B			
Notes						

User approved volume balancing among the lanes for turning movement.

# Timings 11: 56th Avenue & E-470 SB Ramps

Fulenwider Harvest Mile TIA  
04/29/2022

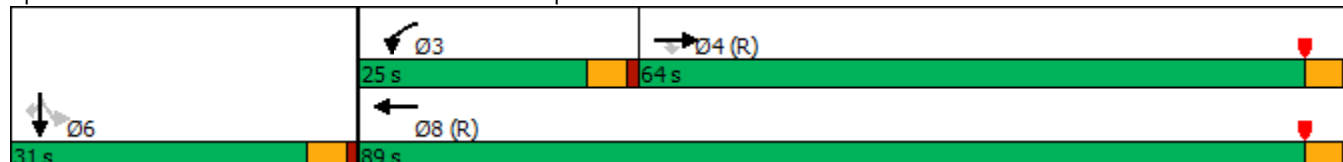
	→	↘	↙	←	↘	↓	↙
Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Lane Configurations	↑↑↑	↑	↘↙	↑↑↑	↘	↕	↘
Traffic Volume (vph)	1483	215	265	1463	164	0	179
Future Volume (vph)	1483	215	265	1463	164	0	179
Turn Type	NA	Perm	Prot	NA	Perm	NA	Perm
Protected Phases	4		3	8		6	
Permitted Phases		4			6		6
Detector Phase	4	4	3	8	6	6	6
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	9.5	22.5	22.5	22.5	22.5
Total Split (s)	64.0	64.0	25.0	89.0	31.0	31.0	31.0
Total Split (%)	53.3%	53.3%	20.8%	74.2%	25.8%	25.8%	25.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	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
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes				
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None
Act Effect Green (s)	74.2	74.2	15.6	94.3	16.7	16.7	16.7
Actuated g/C Ratio	0.62	0.62	0.13	0.79	0.14	0.14	0.14
v/c Ratio	0.53	0.23	0.67	0.41	0.39	0.39	0.75
Control Delay	11.5	3.2	57.3	4.0	50.1	50.1	51.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.5	3.2	57.3	4.0	50.1	50.1	51.8
LOS	B	A	E	A	D	D	D
Approach Delay	10.4			12.2		51.0	
Approach LOS	B			B		D	

## Intersection Summary

Cycle Length: 120  
Actuated Cycle Length: 120  
Offset: 43 (36%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow  
Natural Cycle: 60  
Control Type: Actuated-Coordinated  
Maximum v/c Ratio: 0.75  
Intersection Signal Delay: 14.9  
Intersection Capacity Utilization 57.0%  
Analysis Period (min) 15

Intersection LOS: B  
ICU Level of Service B

## Splits and Phases: 11: 56th Avenue & E-470 SB Ramps



Queues  
11: 56th Avenue & E-470 SB Ramps

Fulenwider Harvest Mile TIA

04/29/2022

	→	↘	↙	←	↘	↓	↙
Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Lane Group Flow (vph)	1612	234	288	1590	89	89	195
v/c Ratio	0.53	0.23	0.67	0.41	0.39	0.39	0.75
Control Delay	11.5	3.2	57.3	4.0	50.1	50.1	51.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.5	3.2	57.3	4.0	50.1	50.1	51.8
Queue Length 50th (ft)	256	52	110	64	67	67	106
Queue Length 95th (ft)	250	40	168	182	112	112	175
Internal Link Dist (ft)	1214			486		861	
Turn Bay Length (ft)		150	200		300		300
Base Capacity (vph)	3052	1013	569	3880	360	360	382
Starvation Cap Reductn	0	0	0	389	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.23	0.51	0.46	0.25	0.25	0.51
Intersection Summary							

# HCM 6th Signalized Intersection Summary

## 11: 56th Avenue & E-470 SB Ramps




















Fulenwider Harvest Mile TIA

04/29/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑	↑↑	↑↑↑					↑	↑	↑
Traffic Volume (veh/h)	0	1483	215	265	1463	0	0	0	0	164	0	179
Future Volume (veh/h)	0	1483	215	265	1463	0	0	0	0	164	0	179
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	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
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1826	1826	1826	1826	0				1826	1826	1826
Adj Flow Rate, veh/h	0	1612	0	288	1590	0				178	0	195
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	5	5	5	5	0				5	5	5
Cap, veh/h	0	3173		349	3876	0				513	0	228
Arrive On Green	0.00	0.64	0.00	0.21	1.00	0.00				0.15	0.00	0.15
Sat Flow, veh/h	0	5149	1547	3374	5149	0				3478	0	1547
Grp Volume(v), veh/h	0	1612	0	288	1590	0				178	0	195
Grp Sat Flow(s),veh/h/ln	0	1662	1547	1687	1662	0				1739	0	1547
Q Serve(g_s), s	0.0	20.8	0.0	9.8	0.0	0.0				5.5	0.0	14.8
Cycle Q Clear(g_c), s	0.0	20.8	0.0	9.8	0.0	0.0				5.5	0.0	14.8
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	3173		349	3876	0				513	0	228
V/C Ratio(X)	0.00	0.51		0.82	0.41	0.00				0.35	0.00	0.86
Avail Cap(c_a), veh/h	0	3173		576	3876	0				768	0	342
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	0.91	0.00	0.84	0.84	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	11.7	0.0	46.5	0.0	0.0				46.0	0.0	49.9
Incr Delay (d2), s/veh	0.0	0.5	0.0	4.2	0.3	0.0				0.4	0.0	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
%ile BackOfQ(95%),veh/ln	0.0	11.1	0.0	6.8	0.2	0.0				4.4	0.0	10.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	12.2	0.0	50.7	0.3	0.0				46.4	0.0	62.6
LnGrp LOS	A	B		D	A	A				D	A	E
Approach Vol, veh/h		1612	A		1878						373	
Approach Delay, s/veh		12.2			8.0						54.9	
Approach LOS		B			A						D	
Timer - Assigned Phs			3	4		6		8				
Phs Duration (G+Y+Rc), s			16.9	80.9		22.2		97.8				
Change Period (Y+Rc), s			4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s			20.5	59.5		26.5		84.5				
Max Q Clear Time (g_c+I1), s			11.8	22.8		16.8		2.0				
Green Ext Time (p_c), s			0.6	14.9		0.9		17.3				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay			14.3									
HCM 6th LOS			B									
<b>Notes</b>												
User approved volume balancing among the lanes for turning movement.												
Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.												

Timings  
12: E-470 NB Ramps & 56th Avenue

Fulenwider Harvest Mile TIA  
04/29/2022

							
Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Configurations		  	  			 	
Traffic Volume (vph)	165	1432	1603	258	205	0	155
Future Volume (vph)	165	1432	1603	258	205	0	155
Turn Type	pm+pt	NA	NA	Perm	Perm	NA	Perm
Protected Phases	7	4	8			2	
Permitted Phases	4			8	2		2
Detector Phase	7	4	8	8	2	2	2
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	15.0	90.0	75.0	75.0	30.0	30.0	30.0
Total Split (%)	12.5%	75.0%	62.5%	62.5%	25.0%	25.0%	25.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	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
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead		Lag	Lag			
Lead-Lag Optimize?	Yes		Yes	Yes			
Recall Mode	None	C-Max	C-Max	C-Max	None	None	None
Act Effect Green (s)	96.2	96.2	81.1	81.1	14.8	14.8	14.8
Actuated g/C Ratio	0.80	0.80	0.68	0.68	0.12	0.12	0.12
v/c Ratio	0.66	0.39	0.52	0.25	0.55	0.56	0.70
Control Delay	45.8	1.2	8.5	0.9	58.7	58.9	46.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.8	1.2	8.5	0.9	58.7	58.9	46.9
LOS	D	A	A	A	E	E	D
Approach Delay		5.8	7.5			53.7	
Approach LOS		A	A			D	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 60 (50%), Referenced to phase 4:EBTL and 8:WBT, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 11.1

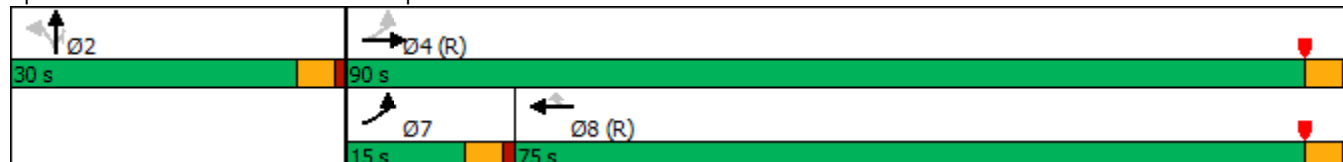
Intersection LOS: B

Intersection Capacity Utilization 57.0%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 12: E-470 NB Ramps & 56th Avenue





Queues  
12: E-470 NB Ramps & 56th Avenue

Fulenwider Harvest Mile TIA

04/29/2022



Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	179	1557	1742	280	111	112	168
v/c Ratio	0.66	0.39	0.52	0.25	0.55	0.56	0.70
Control Delay	45.8	1.2	8.5	0.9	58.7	58.9	46.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.8	1.2	8.5	0.9	58.7	58.9	46.9
Queue Length 50th (ft)	53	18	227	0	87	87	82
Queue Length 95th (ft)	141	34	263	m21	140	141	149
Internal Link Dist (ft)		486	2097			702	
Turn Bay Length (ft)				200	200		200
Base Capacity (vph)	289	3961	3337	1130	347	347	373
Starvation Cap Reductn	0	522	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.45	0.52	0.25	0.32	0.32	0.45

Intersection Summary
























m Volume for 95th percentile queue is metered by upstream signal.

# HCM 6th Signalized Intersection Summary

## 12: E-470 NB Ramps & 56th Avenue

Fulenwider Harvest Mile TIA

04/29/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  							
Traffic Volume (veh/h)	165	1432	0	0	1603	258	205	0	155	0	0	0
Future Volume (veh/h)	165	1432	0	0	1603	258	205	0	155	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	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			
Work Zone On Approach	No			No			No					
Adj Sat Flow, veh/h/ln	1826	1826	0	0	1826	1826	1826	1826	1826			
Adj Flow Rate, veh/h	179	1557	0	0	1742	280	223	0	0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	5	5	0	0	5	5	5	5	5			
Cap, veh/h	228	4188	0	0	3794	1178	295	0				
Arrive On Green	0.08	1.00	0.00	0.00	0.25	0.25	0.08	0.00	0.00			
Sat Flow, veh/h	1739	5149	0	0	5149	1547	3478	0	1547			
Grp Volume(v), veh/h	179	1557	0	0	1742	280	223	0	0			
Grp Sat Flow(s),veh/h/ln	1739	1662	0	0	1662	1547	1739	0	1547			
Q Serve(g_s), s	2.7	0.0	0.0	0.0	35.5	17.3	7.5	0.0	0.0			
Cycle Q Clear(g_c), s	2.7	0.0	0.0	0.0	35.5	17.3	7.5	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	228	4188	0	0	3794	1178	295	0				
V/C Ratio(X)	0.79	0.37	0.00	0.00	0.46	0.24	0.76	0.00				
Avail Cap(c_a), veh/h	308	4188	0	0	3794	1178	739	0				
HCM Platoon Ratio	2.00	2.00	1.00	1.00	0.33	0.33	1.00	1.00	1.00			
Upstream Filter(I)	0.84	0.84	0.00	0.00	0.83	0.83	1.00	0.00	0.00			
Uniform Delay (d), s/veh	21.9	0.0	0.0	0.0	24.0	17.2	53.7	0.0	0.0			
Incr Delay (d2), s/veh	7.7	0.2	0.0	0.0	0.3	0.4	4.0	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	7.4	0.1	0.0	0.0	21.7	11.2	6.2	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.6	0.2	0.0	0.0	24.4	17.6	57.7	0.0	0.0			
LnGrp LOS	C	A	A	A	C	B	E	A				
Approach Vol, veh/h	1736			2022			223			A		
Approach Delay, s/veh	3.2			23.4			57.7					
Approach LOS	A			C			E					
Timer - Assigned Phs	2			4			7			8		
Phs Duration (G+Y+Rc), s	14.7			105.3			9.5			95.8		
Change Period (Y+Rc), s	4.5			4.5			4.5			4.5		
Max Green Setting (Gmax), s	25.5			85.5			10.5			70.5		
Max Q Clear Time (g_c+I1), s	9.5			2.0			4.7			37.5		
Green Ext Time (p_c), s	0.6			16.7			0.2			17.6		

### Intersection Summary

HCM 6th Ctrl Delay 16.5

HCM 6th LOS B



























### Notes

User approved volume balancing among the lanes for turning movement.

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

Timings  
13: Denali Street & 56th Avenue

Fulenwider Harvest Mile TIA  
04/29/2022

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations		  		 	  	 				
Traffic Volume (vph)	21	955	601	462	1234	492	2	264	29	5
Future Volume (vph)	21	955	601	462	1234	492	2	264	29	5
Turn Type	Perm	NA	pm+ov	Prot	NA	Prot	NA	Perm	pm+pt	NA
Protected Phases		4	5	3	8	5	2		1	6
Permitted Phases	4		4					2	6	
Detector Phase	4	4	5	3	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	9.5	9.5	22.5	9.5	22.5	22.5	9.5	22.5
Total Split (s)	39.0	39.0	31.0	28.0	67.0	31.0	41.0	41.0	12.0	22.0
Total Split (%)	32.5%	32.5%	25.8%	23.3%	55.8%	25.8%	34.2%	34.2%	10.0%	18.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	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)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lead	Lead		Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Max	C-Max	None	None	C-Max	None	None	None	None	None
Act Effect Green (s)	48.8	48.8	77.7	23.1	76.4	24.4	27.5	27.5	13.4	7.7
Actuated g/C Ratio	0.41	0.41	0.65	0.19	0.64	0.20	0.23	0.23	0.11	0.06
v/c Ratio	0.17	0.52	0.56	0.78	0.43	0.79	0.00	0.50	0.19	0.44
Control Delay	26.4	22.1	2.7	55.0	12.4	54.3	34.5	7.4	32.3	36.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.4	22.1	2.7	55.0	12.4	54.3	34.5	7.4	32.3	36.3
LOS	C	C	A	E	B	D	C	A	C	D
Approach Delay		14.8			23.9		37.9			34.9
Approach LOS		B			C		D			C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 55 (46%), Referenced to phase 4:EBTL and 8:WBT, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 23.2

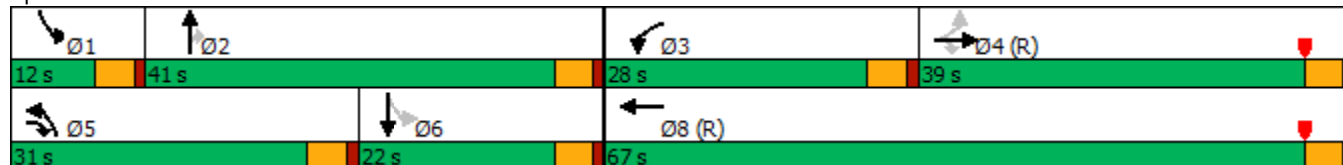
Intersection LOS: C

Intersection Capacity Utilization 65.8%

ICU Level of Service C

Analysis Period (min) 15

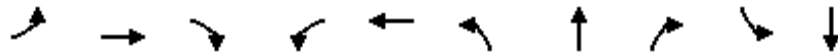
Splits and Phases: 13: Denali Street & 56th Avenue



Queues  
13: Denali Street & 56th Avenue

Fulenwider Harvest Mile TIA

04/29/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	23	1038	653	502	1353	535	2	287	32	59
v/c Ratio	0.17	0.52	0.56	0.78	0.43	0.79	0.00	0.50	0.19	0.44
Control Delay	26.4	22.1	2.7	55.0	12.4	54.3	34.5	7.4	32.3	36.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.4	22.1	2.7	55.0	12.4	54.3	34.5	7.4	32.3	36.3
Queue Length 50th (ft)	7	139	14	192	192	201	1	0	17	17
Queue Length 95th (ft)	m24	242	19	240	252	262	8	69	39	59
Internal Link Dist (ft)		2097			2361		437			197
Turn Bay Length (ft)	200		200	200		200		200		
Base Capacity (vph)	139	2009	1179	690	3141	736	550	667	182	258
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.52	0.55	0.73	0.43	0.73	0.00	0.43	0.18	0.23

Intersection Summary





























m Volume for 95th percentile queue is metered by upstream signal.

# HCM 6th Signalized Intersection Summary

## 13: Denali Street & 56th Avenue

Fulenwider Harvest Mile TIA

04/29/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  		 	  		 					
Traffic Volume (veh/h)	21	955	601	462	1234	11	492	2	264	29	5	50
Future Volume (veh/h)	21	955	601	462	1234	11	492	2	264	29	5	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	23	1038	653	502	1341	12	535	2	287	32	5	54
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5	5	5	5	5	5	5
Cap, veh/h	236	2225	970	568	3323	30	609	380	322	166	7	79
Arrive On Green	0.59	0.59	0.59	0.17	0.65	0.65	0.18	0.21	0.21	0.03	0.05	0.05
Sat Flow, veh/h	393	4985	1547	3374	5095	46	3374	1826	1547	1739	133	1435
Grp Volume(v), veh/h	23	1038	653	502	875	478	535	2	287	32	0	59
Grp Sat Flow(s),veh/h/ln	393	1662	1547	1687	1662	1818	1687	1826	1547	1739	0	1568
Q Serve(g_s), s	3.1	14.0	31.6	17.4	14.9	14.9	18.5	0.1	21.6	2.1	0.0	4.4
Cycle Q Clear(g_c), s	3.1	14.0	31.6	17.4	14.9	14.9	18.5	0.1	21.6	2.1	0.0	4.4
Prop In Lane	1.00		1.00	1.00		0.03	1.00		1.00	1.00		0.92
Lane Grp Cap(c), veh/h	236	2225	970	568	2167	1185	609	380	322	166	0	86
V/C Ratio(X)	0.10	0.47	0.67	0.88	0.40	0.40	0.88	0.01	0.89	0.19	0.00	0.69
Avail Cap(c_a), veh/h	236	2225	970	661	2167	1185	745	555	471	227	0	229
HCM Platoon Ratio	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.91	0.91	0.91	0.11	0.11	0.11	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.1	16.4	10.5	48.8	9.9	9.9	47.9	37.7	46.2	51.5	0.0	55.7
Incr Delay (d2), s/veh	0.8	0.6	3.4	1.6	0.1	0.1	10.1	0.0	13.9	0.6	0.0	9.3
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(95%),veh/ln	0.6	7.9	11.7	8.7	6.0	6.5	13.4	0.1	14.3	1.7	0.0	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.9	17.0	13.9	50.4	9.9	10.0	58.0	37.7	60.1	52.0	0.0	64.9
LnGrp LOS	B	B	B	D	A	A	E	D	E	D	A	E
Approach Vol, veh/h		1714			1855			824			91	
Approach Delay, s/veh		15.8			20.9			58.7			60.4	
Approach LOS		B			C			E			E	
Timer - Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	7.8	29.5	24.7	58.1	26.2	11.1		82.8				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	7.5	36.5	23.5	34.5	26.5	17.5		62.5				
Max Q Clear Time (g_c+I1), s	4.1	23.6	19.4	33.6	20.5	6.4		16.9				
Green Ext Time (p_c), s	0.0	0.8	0.7	0.7	1.1	0.2		11.1				

### Intersection Summary

HCM 6th Ctrl Delay	26.7
HCM 6th LOS	C






































### Notes

User approved pedestrian interval to be less than phase max green.

# Timings

## 14: Harvest Road & 56th Avenue

Fulenwider Harvest Mile TIA  
04/29/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	  	  			  		 	  		  	  	
Traffic Volume (vph)	564	542	302	160	544	203	316	1098	150	274	1554	902
Future Volume (vph)	564	542	302	160	544	203	316	1098	150	274	1554	902
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	Perm
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	5	3	8	1	5	2	3	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	24.0	9.5	9.5	24.0	9.5	9.5	24.0	9.5	9.5	24.0	24.0
Total Split (s)	21.0	24.0	18.0	20.0	24.0	22.0	18.0	54.0	20.0	22.0	58.0	58.0
Total Split (%)	17.4%	19.8%	14.9%	16.5%	19.8%	18.2%	14.9%	44.6%	16.5%	18.2%	47.9%	47.9%
Yellow Time (s)	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	3.5	3.5	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	1.0	2.0	1.0	1.0	2.0	1.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	6.0	4.5	4.5	6.0	4.5	4.5	6.0	4.5	4.5	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	None	C-Max	None	None	None	None	None	None	None
Act Effect Green (s)	16.5	19.7	39.2	14.8	18.0	39.4	13.5	50.1	70.9	15.4	52.0	52.0
Actuated g/C Ratio	0.14	0.16	0.32	0.12	0.15	0.33	0.11	0.41	0.59	0.13	0.43	0.43
v/c Ratio	0.93	0.73	0.60	0.83	0.81	0.40	0.92	0.58	0.18	0.70	0.80	1.13
Control Delay	73.0	54.5	32.6	82.0	59.2	23.5	84.1	29.1	7.3	59.8	33.4	93.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.0	54.5	32.6	82.0	59.2	23.5	84.1	29.1	7.3	59.8	33.4	93.9
LOS	E	D	C	F	E	C	F	C	A	E	C	F
Approach Delay		57.2			55.3			38.1			56.0	
Approach LOS		E			E			D			E	

### Intersection Summary

Cycle Length: 121

Actuated Cycle Length: 121

Offset: 90.5 (75%), Referenced to phase 4:EBT and 8:WBT, Start of Yellow

Natural Cycle: 120

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.13

Intersection Signal Delay: 51.9

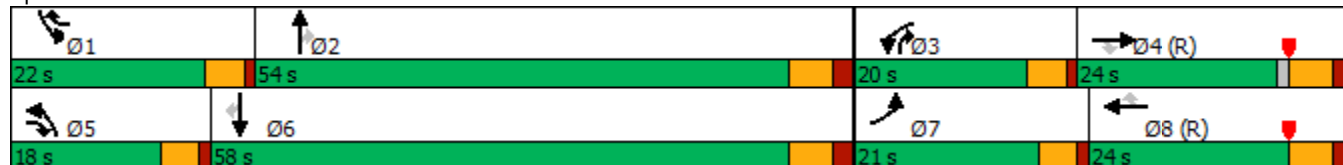
Intersection LOS: D

Intersection Capacity Utilization 89.1%

ICU Level of Service E













Analysis Period (min) 15

Splits and Phases: 14: Harvest Road & 56th Avenue



Queues  
14: Harvest Road & 56th Avenue

Fulenwider Harvest Mile TIA  
04/29/2022

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	613	589	328	174	591	221	343	1193	163	298	1689	980
v/c Ratio	0.93	0.73	0.60	0.83	0.81	0.40	0.92	0.58	0.18	0.70	0.80	1.13
Control Delay	73.0	54.5	32.6	82.0	59.2	23.5	84.1	29.1	7.3	59.8	33.4	93.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.0	54.5	32.6	82.0	59.2	23.5	84.1	29.1	7.3	59.8	33.4	93.9
Queue Length 50th (ft)	170	163	172	134	165	90	139	261	31	115	411	~714
Queue Length 95th (ft)	#242	207	275	#249	210	158	#227	317	65	162	474	#970
Internal Link Dist (ft)	2361			1323			477			955		
Turn Bay Length (ft)	250		250	250		250	250		250	250		250
Base Capacity (vph)	661	804	544	220	734	572	372	2045	937	482	2122	869
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.93	0.73	0.60	0.79	0.81	0.39	0.92	0.58	0.17	0.62	0.80	1.13

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

























Queue shown is maximum after two cycles.

# HCM 6th Signalized Intersection Summary

## 14: Harvest Road & 56th Avenue

Fulenwider Harvest Mile TIA

04/29/2022

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	564	542	302	160	544	203	316	1098	150	274	1554	902	
Future Volume (veh/h)	564	542	302	160	544	203	316	1098	150	274	1554	902	
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0	
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	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	
Adj Flow Rate, veh/h	613	589	328	174	591	221	343	1193	163	298	1689	0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Percent Heavy Veh, %	5	5	5	5	5	5	5	5	5	5	5	5	
Cap, veh/h	669	998	482	200	892	442	376	2014	804	361	1992		
Arrive On Green	0.14	0.20	0.20	0.12	0.18	0.18	0.11	0.40	0.40	0.11	0.40	0.00	
Sat Flow, veh/h	4904	4985	1547	1739	4985	1547	3374	4985	1547	3374	4985	1547	
Grp Volume(v), veh/h	613	589	328	174	591	221	343	1193	163	298	1689	0	
Grp Sat Flow(s),veh/h/ln	1635	1662	1547	1739	1662	1547	1687	1662	1547	1687	1662	1547	
Q Serve(g_s), s	14.9	13.0	22.4	11.9	13.4	14.4	12.2	22.7	6.8	10.5	37.2	0.0	
Cycle Q Clear(g_c), s	14.9	13.0	22.4	11.9	13.4	14.4	12.2	22.7	6.8	10.5	37.2	0.0	
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	669	998	482	200	892	442	376	2014	804	361	1992		
V/C Ratio(X)	0.92	0.59	0.68	0.87	0.66	0.50	0.91	0.59	0.20	0.83	0.85		
Avail Cap(c_a), veh/h	669	998	482	223	892	442	376	2014	804	488	2142		
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)	0.85	0.85	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	
Uniform Delay (d), s/veh	51.6	43.9	36.4	52.6	46.3	36.0	53.2	28.2	15.6	52.9	33.0	0.0	
Incr Delay (d2), s/veh	15.5	2.2	6.4	26.9	3.9	4.0	25.7	0.5	0.1	8.3	3.2	0.0	
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(95%),veh/ln	10.9	8.9	13.5	10.7	9.6	9.7	10.7	14.0	4.2	8.5	21.7	0.0	
Unsig. Movement Delay, s/veh													
LnGrp Delay(d),s/veh	67.1	46.1	42.8	79.5	50.1	40.0	78.9	28.7	15.8	61.3	36.2	0.0	
LnGrp LOS	E	D	D	E	D	D	E	C	B	E	D		
Approach Vol, veh/h	1530			986			1699			1987			A
Approach Delay, s/veh	53.8			53.0			37.6			40.0			
Approach LOS	D			D			D			D			
Timer - Assigned Phs	1	2	3	4	5	6	7	8					
Phs Duration (G+Y+Rc), s	17.4	54.9	18.4	30.2	18.0	54.3	21.0	27.7					
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0					
Max Green Setting (Gmax), s	17.5	48.0	15.5	18.0	13.5	52.0	16.5	18.0					
Max Q Clear Time (g_c+I1), s	12.5	24.7	13.9	24.4	14.2	39.2	16.9	16.4					
Green Ext Time (p_c), s	0.5	10.1	0.1	0.0	0.0	9.1	0.0	0.7					

### Intersection Summary

HCM 6th Ctrl Delay 44.8

HCM 6th LOS D

### Notes



















User approved pedestrian interval to be less than phase max green.

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



Timings  
15: Tibet Street & PA-1 Access B

Fulenwider Harvest Mile TIA  
04/29/2022

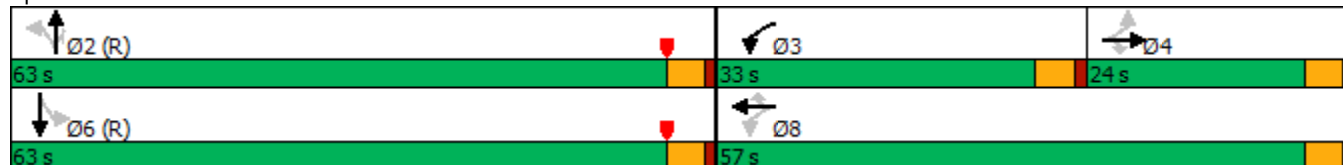
									
Lane Group	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	3	9	159	66	16	397	211	84	658
Future Volume (vph)	3	9	159	66	16	397	211	84	658
Turn Type	Perm	Perm	pm+pt	Perm	Perm	NA	Perm	Perm	NA
Protected Phases			3			2			6
Permitted Phases	4	4	8	8	2		2	6	
Detector Phase	4	4	3	8	2	2	2	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	24.0	24.0	33.0	57.0	63.0	63.0	63.0	63.0	63.0
Total Split (%)	20.0%	20.0%	27.5%	47.5%	52.5%	52.5%	52.5%	52.5%	52.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	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
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lead						
Lead-Lag Optimize?	Yes	Yes	Yes						
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effect Green (s)	5.9	5.9	21.1	21.1	89.9	89.9	89.9	89.9	89.9
Actuated g/C Ratio	0.05	0.05	0.18	0.18	0.75	0.75	0.75	0.75	0.75
v/c Ratio	0.03	0.03	0.62	0.13	0.03	0.17	0.19	0.13	0.28
Control Delay	54.7	0.1	53.5	0.5	7.6	5.5	2.3	5.9	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.7	0.1	53.5	0.5	7.6	5.5	2.3	5.9	6.4
LOS	D	A	D	A	A	A	A	A	A
Approach Delay						4.5			6.3
Approach LOS						A			A

Intersection Summary

Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 65 (54%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow  
 Natural Cycle: 70  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.62  
 Intersection Signal Delay: 10.1  
 Intersection Capacity Utilization 49.2%  
 Analysis Period (min) 15

Intersection LOS: B  
 ICU Level of Service A

Splits and Phases: 15: Tibet Street & PA-1 Access B



Queues  
15: Tibet Street & PA-1 Access B

Fulenwider Harvest Mile TIA

04/29/2022



























Lane Group	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	3	10	173	72	17	432	229	91	719
v/c Ratio	0.03	0.03	0.62	0.13	0.03	0.17	0.19	0.13	0.28
Control Delay	54.7	0.1	53.5	0.5	7.6	5.5	2.3	5.9	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.7	0.1	53.5	0.5	7.6	5.5	2.3	5.9	6.4
Queue Length 50th (ft)	2	0	129	0	1	19	0	24	124
Queue Length 95th (ft)	13	0	174	0	m12	91	0	64	212
Internal Link Dist (ft)						674			1615
Turn Bay Length (ft)									
Base Capacity (vph)	294	499	418	867	487	2574	1209	676	2572
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.02	0.41	0.08	0.03	0.17	0.19	0.13	0.28

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



















HCM 6th Signalized Intersection Summary  
15: Tibet Street & PA-1 Access B

Fulenwider Harvest Mile TIA  
04/29/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	0	9	159	0	66	16	397	211	84	658	4
Future Volume (veh/h)	3	0	9	159	0	66	16	397	211	84	658	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	3	0	10	173	0	72	17	432	229	91	715	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5	5	5	5	5	5	5
Cap, veh/h	111	72	61	308	344	292	539	2555	1139	542	2605	15
Arrive On Green	0.04	0.00	0.04	0.11	0.00	0.19	0.24	0.24	0.24	0.74	0.74	0.74
Sat Flow, veh/h	1297	1826	1547	1739	1826	1547	716	3469	1547	755	3537	20
Grp Volume(v), veh/h	3	0	10	173	0	72	17	432	229	91	351	368
Grp Sat Flow(s),veh/h/ln	1297	1826	1547	1739	1826	1547	716	1735	1547	755	1735	1822
Q Serve(g_s), s	0.3	0.0	0.7	11.0	0.0	4.8	2.2	11.8	14.1	5.9	8.0	8.0
Cycle Q Clear(g_c), s	0.3	0.0	0.7	11.0	0.0	4.8	10.3	11.8	14.1	17.7	8.0	8.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	111	72	61	308	344	292	539	2555	1139	542	1277	1342
V/C Ratio(X)	0.03	0.00	0.16	0.56	0.00	0.25	0.03	0.17	0.20	0.17	0.27	0.27
Avail Cap(c_a), veh/h	271	297	251	527	799	677	539	2555	1139	542	1277	1342
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.89	0.89	0.89	0.92	0.92	0.92
Uniform Delay (d), s/veh	55.5	0.0	55.7	46.2	0.0	41.4	19.0	16.4	17.3	8.9	5.2	5.2
Incr Delay (d2), s/veh	0.1	0.0	1.3	1.6	0.0	0.4	0.1	0.1	0.4	0.6	0.5	0.5
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(95%),veh/ln	0.2	0.0	0.6	8.5	0.0	3.3	0.8	9.2	9.7	1.9	5.0	5.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.6	0.0	57.0	47.8	0.0	41.9	19.1	16.6	17.7	9.6	5.7	5.7
LnGrp LOS	E	A	E	D	A	D	B	B	B	A	A	A
Approach Vol, veh/h		13		245		678		810				
Approach Delay, s/veh		56.7		46.0		17.0		6.1				
Approach LOS		E		D		B		A				
Timer - Assigned Phs		2		3		4		6		8		
Phs Duration (G+Y+Rc), s		92.9		17.9		9.2		92.9		27.1		
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		58.5		28.5		19.5		58.5		52.5		
Max Q Clear Time (g_c+I1), s		16.1		13.0		2.7		19.7		6.8		
Green Ext Time (p_c), s		4.3		0.4		0.0		6.0		0.2		
Intersection Summary												
HCM 6th Ctrl Delay			16.3									
HCM 6th LOS			B									

Timings  
16: Tibet Street & 60th Avenue

Fulenwider Harvest Mile TIA  
04/29/2022

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	40	45	173	40	75	313	76	62	523
Future Volume (vph)	40	45	173	40	75	313	76	62	523
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA
Protected Phases	7	4	3	8	5	2		1	6
Permitted Phases	4		8		2		2	6	
Detector Phase	7	4	3	8	5	2	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	9.5	22.5	22.5	9.5	22.5
Total Split (s)	12.0	29.0	26.0	43.0	15.0	52.0	52.0	13.0	50.0
Total Split (%)	10.0%	24.2%	21.7%	35.8%	12.5%	43.3%	43.3%	10.8%	41.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	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
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	C-Max
Act Effect Green (s)	18.1	11.1	32.1	22.6	75.7	69.1	69.1	74.9	68.7
Actuated g/C Ratio	0.15	0.09	0.27	0.19	0.63	0.58	0.58	0.62	0.57
v/c Ratio	0.20	0.67	0.62	0.31	0.17	0.17	0.09	0.10	0.34
Control Delay	32.9	40.8	40.9	15.7	4.8	7.5	3.0	9.7	16.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.9	40.8	40.9	15.7	4.8	7.5	3.0	9.7	16.0
LOS	C	D	D	B	A	A	A	A	B
Approach Delay		39.0		31.4		6.3			15.4
Approach LOS		D		C		A			B

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 107 (89%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 18.2

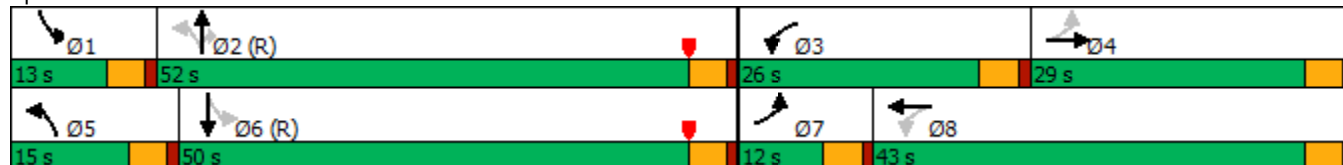
Intersection LOS: B

Intersection Capacity Utilization 53.5%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 16: Tibet Street & 60th Avenue



Queues  
16: Tibet Street & 60th Avenue

Fulenwider Harvest Mile TIA

04/29/2022



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	43	147	188	114	82	340	83	67	650
v/c Ratio	0.20	0.67	0.62	0.31	0.17	0.17	0.09	0.10	0.34
Control Delay	32.9	40.8	40.9	15.7	4.8	7.5	3.0	9.7	16.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.9	40.8	40.9	15.7	4.8	7.5	3.0	9.7	16.0
Queue Length 50th (ft)	25	54	115	27	11	30	0	17	135
Queue Length 95th (ft)	48	117	m159	m67	48	84	13	44	225
Internal Link Dist (ft)		308		3340		1615			515
Turn Bay Length (ft)			100						
Base Capacity (vph)	222	392	352	574	509	1980	943	670	1938
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.38	0.53	0.20	0.16	0.17	0.09	0.10	0.34

Intersection Summary























m Volume for 95th percentile queue is metered by upstream signal.

# HCM 6th Signalized Intersection Summary

## 16: Tibet Street & 60th Avenue






Fulenwider Harvest Mile TIA

04/29/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	45	90	173	40	65	75	313	76	62	523	75
Future Volume (veh/h)	40	45	90	173	40	65	75	313	76	62	523	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826	1826
Adj Flow Rate, veh/h	43	49	98	188	43	71	82	340	83	67	568	82
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	5	5	5	5	5	5	5	5	5	5	5
Cap, veh/h	252	60	119	280	117	194	506	2053	916	622	1795	258
Arrive On Green	0.03	0.11	0.11	0.11	0.19	0.19	0.03	0.40	0.40	0.04	0.59	0.59
Sat Flow, veh/h	1739	543	1087	1739	619	1023	1739	3469	1547	1739	3043	438
Grp Volume(v), veh/h	43	0	147	188	0	114	82	340	83	67	323	327
Grp Sat Flow(s),veh/h/ln	1739	0	1630	1739	0	1642	1739	1735	1547	1739	1735	1747
Q Serve(g_s), s	2.6	0.0	10.6	11.1	0.0	7.3	2.2	7.6	4.0	1.8	11.3	11.3
Cycle Q Clear(g_c), s	2.6	0.0	10.6	11.1	0.0	7.3	2.2	7.6	4.0	1.8	11.3	11.3
Prop In Lane	1.00		0.67	1.00		0.62	1.00		1.00	1.00		0.25
Lane Grp Cap(c), veh/h	252	0	179	280	0	311	506	2053	916	622	1023	1031
V/C Ratio(X)	0.17	0.00	0.82	0.67	0.00	0.37	0.16	0.17	0.09	0.11	0.32	0.32
Avail Cap(c_a), veh/h	306	0	333	398	0	527	590	2053	916	680	1023	1031
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.99	0.99	0.99	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.4	0.0	52.3	39.9	0.0	42.4	9.4	17.1	16.0	8.9	12.4	12.4
Incr Delay (d2), s/veh	0.3	0.0	9.0	2.8	0.0	0.7	0.1	0.2	0.2	0.1	0.8	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(95%),veh/ln	2.1	0.0	8.4	8.6	0.0	5.4	1.5	5.8	2.7	1.2	8.0	8.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.7	0.0	61.3	42.7	0.0	43.1	9.5	17.3	16.2	9.0	13.2	13.2
LnGrp LOS	D	A	E	D	A	D	A	B	B	A	B	B
Approach Vol, veh/h	190			302			505			717		
Approach Delay, s/veh	57.8			42.8			15.8			12.8		
Approach LOS	E			D			B			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.0	75.5	17.9	17.7	9.2	75.3	8.3	27.2				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	8.5	47.5	21.5	24.5	10.5	45.5	7.5	38.5				
Max Q Clear Time (g_c+I1), s	3.8	9.6	13.1	12.6	4.2	13.3	4.6	9.3				
Green Ext Time (p_c), s	0.0	2.7	0.3	0.6	0.1	4.5	0.0	0.6				
Intersection Summary												
HCM 6th Ctrl Delay	24.0											
HCM 6th LOS	C											

Intersection

Int Delay, s/veh 2.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	110	30	24	60	20	42
Future Vol, veh/h	110	30	24	60	20	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	200	-	0	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	120	33	26	65	22	46

















Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	153
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.2
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.29
Pot Cap-1 Maneuver	-	-	1380
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1380
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.2	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	704	891	-	-	1380	-
HCM Lane V/C Ratio	0.031	0.051	-	-	0.019	-
HCM Control Delay (s)	10.3	9.3	-	-	7.7	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	0.2	-	-	0.1	-

Timings  
18: 64th Avenue

Fulenwider Harvest Mile TIA  
04/29/2022

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	62	939	26	1212	53	0	163	0
Future Volume (vph)	62	939	26	1212	53	0	163	0
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	pm+pt	NA
Protected Phases		4		8	5	2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	9.5	22.5	9.5	22.5
Total Split (s)	79.0	79.0	79.0	79.0	12.0	24.0	17.0	29.0
Total Split (%)	65.8%	65.8%	65.8%	65.8%	10.0%	20.0%	14.2%	24.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
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)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effect Green (s)	67.0	67.0	67.0	67.0	34.5	26.9	44.0	34.0
Actuated g/C Ratio	0.56	0.56	0.56	0.56	0.29	0.22	0.37	0.28
v/c Ratio	0.71	0.57	0.15	0.76	0.15	0.14	0.39	0.21
Control Delay	55.0	16.5	15.5	27.4	29.4	0.6	31.8	6.2
Queue Delay	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0
Total Delay	55.0	16.5	15.5	28.3	29.4	0.6	31.8	6.2
LOS	D	B	B	C	C	A	C	A
Approach Delay		18.8		28.0		14.4		22.1
Approach LOS		B		C		B		C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 47 (39%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 23.4

Intersection LOS: C

Intersection Capacity Utilization 67.2%

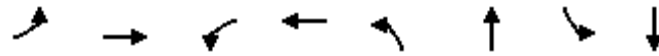
ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 18: 64th Avenue







Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	67	1057	28	1406	58	63	177	109
v/c Ratio	0.71	0.57	0.15	0.76	0.15	0.14	0.39	0.21
Control Delay	55.0	16.5	15.5	27.4	29.4	0.6	31.8	6.2
Queue Delay	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0
Total Delay	55.0	16.5	15.5	28.3	29.4	0.6	31.8	6.2
Queue Length 50th (ft)	38	354	11	397	30	0	98	0
Queue Length 95th (ft)	m#94	400	m12	m387	66	0	171	38
Internal Link Dist (ft)		1779		472		284		409
Turn Bay Length (ft)								
Base Capacity (vph)	106	2066	211	2060	382	453	462	511
Starvation Cap Reductn	0	0	0	344	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.51	0.13	0.82	0.15	0.14	0.38	0.21

#### Intersection Summary

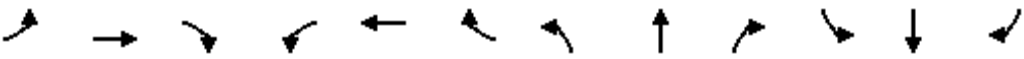








# 95th percentile volume exceeds capacity, queue may be longer.






Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

# HCM 6th Signalized Intersection Summary 18: 64th Avenue

Fulenwider Harvest Mile TIA  
04/29/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	62	939	33	26	1212	82	53	0	58	163	0	100
Future Volume (veh/h)	62	939	33	26	1212	82	53	0	58	163	0	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
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	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781
Adj Flow Rate, veh/h	67	1021	36	28	1317	89	58	0	63	177	0	109
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	8	8	8	8	8	8	8	8	8	8	8	8
Cap, veh/h	162	1535	54	147	1481	100	542	0	521	603	0	591
Arrive On Green	0.15	0.15	0.15	0.92	0.92	0.92	0.04	0.00	0.35	0.08	0.00	0.39
Sat Flow, veh/h	365	3335	118	508	3218	217	1697	0	1510	1697	0	1510
Grp Volume(v), veh/h	67	518	539	28	691	715	58	0	63	177	0	109
Grp Sat Flow(s),veh/h/ln	365	1692	1760	508	1692	1742	1697	0	1510	1697	0	1510
Q Serve(g_s), s	21.3	34.7	34.7	4.9	21.3	21.8	2.6	0.0	3.4	7.8	0.0	5.7
Cycle Q Clear(g_c), s	43.1	34.7	34.7	39.5	21.3	21.8	2.6	0.0	3.4	7.8	0.0	5.7
Prop In Lane	1.00		0.07	1.00		0.12	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	162	779	810	147	779	802	542	0	521	603	0	591
V/C Ratio(X)	0.41	0.67	0.67	0.19	0.89	0.89	0.11	0.00	0.12	0.29	0.00	0.18
Avail Cap(c_a), veh/h	220	1051	1093	229	1051	1082	587	0	521	640	0	591
HCM Platoon Ratio	0.33	0.33	0.33	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.84	0.84	0.84	0.38	0.38	0.38	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	56.3	42.2	42.2	16.9	3.4	3.4	23.8	0.0	26.9	20.9	0.0	23.9
Incr Delay (d2), s/veh	1.4	0.8	0.8	0.2	3.0	3.1	0.1	0.0	0.5	0.3	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(95%),veh/ln	3.9	21.9	22.7	0.9	3.8	3.9	1.9	0.0	2.4	5.6	0.0	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.7	43.0	43.0	17.2	6.4	6.5	23.9	0.0	27.3	21.1	0.0	24.6
LnGrp LOS	E	D	D	B	A	A	C	A	C	C	A	C
Approach Vol, veh/h	1124			1434			121			286		
Approach Delay, s/veh	43.9			6.7			25.7			22.5		
Approach LOS	D			A			C			C		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	14.4	45.9		59.7	8.8	51.5		59.7				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	12.5	19.5		74.5	7.5	24.5		74.5				
Max Q Clear Time (g_c+I1), s	9.8	5.4		45.1	4.6	7.7		41.5				
Green Ext Time (p_c), s	0.1	0.2		9.9	0.0	0.5		13.7				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay				23.1								
HCM 6th LOS				C								

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	55	27	2016	2689	18
Future Vol, veh/h	0	55	27	2016	2689	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	0	60	29	2191	2923	20
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	1472	2943	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.2	5.4	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.95	3.15	-	-	-
Pot Cap-1 Maneuver	0	*269	*337	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %		1	1	-	-	-
Mov Cap-1 Maneuver	-	*269	*337	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	22.2	0.2		0		
HCM LOS	C					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	* 337	-	269	-	-	
HCM Lane V/C Ratio	0.087	-	0.222	-	-	
HCM Control Delay (s)	16.7	-	22.2	-	-	
HCM Lane LOS	C	-	C	-	-	
HCM 95th %tile Q(veh)	0.3	-	0.8	-	-	
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑↑	↑↑↑	↘
Traffic Vol, veh/h	0	21	0	1895	2799	3
Future Vol, veh/h	0	21	0	1895	2799	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	0	23	0	2060	3042	3
Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	1523	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.2	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.95	-	-	-	-
Pot Cap-1 Maneuver	0	*247	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %		1		-	-	-
Mov Cap-1 Maneuver	-	*247	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		NB		SB	
HCM Control Delay, s	21.1		0		0	
HCM LOS	C					
Minor Lane/Major Mvmt	NBT		EBLn1		SBT	SBR
Capacity (veh/h)	-		247		-	-
HCM Lane V/C Ratio	-		0.092		-	-
HCM Control Delay (s)	-		21.1		-	-
HCM Lane LOS	-		C		-	-
HCM 95th %tile Q(veh)	-		0.3		-	-
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon