

This is the same TIS that was submitted with 1st submittal of MP Amendment 3. Master TIS will be approved with Amendment 3 application prior to approval of F24 site plan. Recommend reviewing MPA3 TIS that will be resubmitted before the end of May and not this one again.

## TRAFFIC IMPACT STUDY

Green Valley Ranch East  
Planning Areas 8 & 9

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## I. INTRODUCTION

### I.A. Summary

Green Valley Ranch East Planning Areas 8 & 9 include a total of 650 single-family dwelling units, a gas station, two fast food restaurants, an automated car wash, a high turnover sit-down restaurant, a grocery store, a medical office building, general commercial, and an automotive parts store. As shown on **Figure 1**, the site is located in the northeast quadrant of the partially constructed 38<sup>th</sup> Avenue/Tibet Road intersection in Aurora, Colorado. Vehicular access would be via connection to Tibet Road at the 39<sup>th</sup>, 42<sup>nd</sup>, and 44<sup>th</sup> Avenue future alignments and onto 28<sup>th</sup> Avenue via the future Ukraine Street alignment. **Figure 2** depicts the current site plan concept.

Previous traffic analyses conducted for Green Valley Ranch East include the following:

- *Transportation Analysis, Green Valley Ranch East, Felsburg Holt & Ullevig, updated May 2020*
- *Traffic Impact Study, Green Valley Ranch East CSP 3, updated May 2020*
- *Traffic Impact Study, Green Valley Ranch East Filing 7, updated May 2020*
- *Traffic Impact Study, Green Valley Ranch East Filing 17, updated May 2020*
- *Traffic Impact Study, Green Valley Ranch East Filing 10, updated October 2024*
- *Traffic Impact Study, 310 West (GVRE Master Plan Amendment 2), updated January 2025*

The proposed development is a departure from the *Transportation Analysis, Green Valley Ranch East* master report, which assumed approximately 620 single family homes within Planning Areas 8 & 9. The current proposal is roughly a 5 percent increase in residential unit count and introduces a previously unanticipated commercial component. This traffic impact study (TIS) identifies the potential impacts specific to the residential and commercial development in Planning Areas 8 & 9 and identifies the required resultant roadway and traffic control improvements. As a result of the proposed changes, the City of Aurora has asked for this to be Master Plan Amendment 3 for Green Valley Ranch East. While a master plan amendment typically requires a full analysis of the development, in recognition of Planning Areas 8 & 9 being the final piece of Green Valley Ranch East, the TIS will be limited to a site-specific scope given that other planning areas have been in conformance. Because the adjacent roadway system is not yet fully constructed and is largely being used for construction access at this time, the study will focus on a short-term (2030) and long-term (2045) scenarios but does not include analysis of existing conditions.

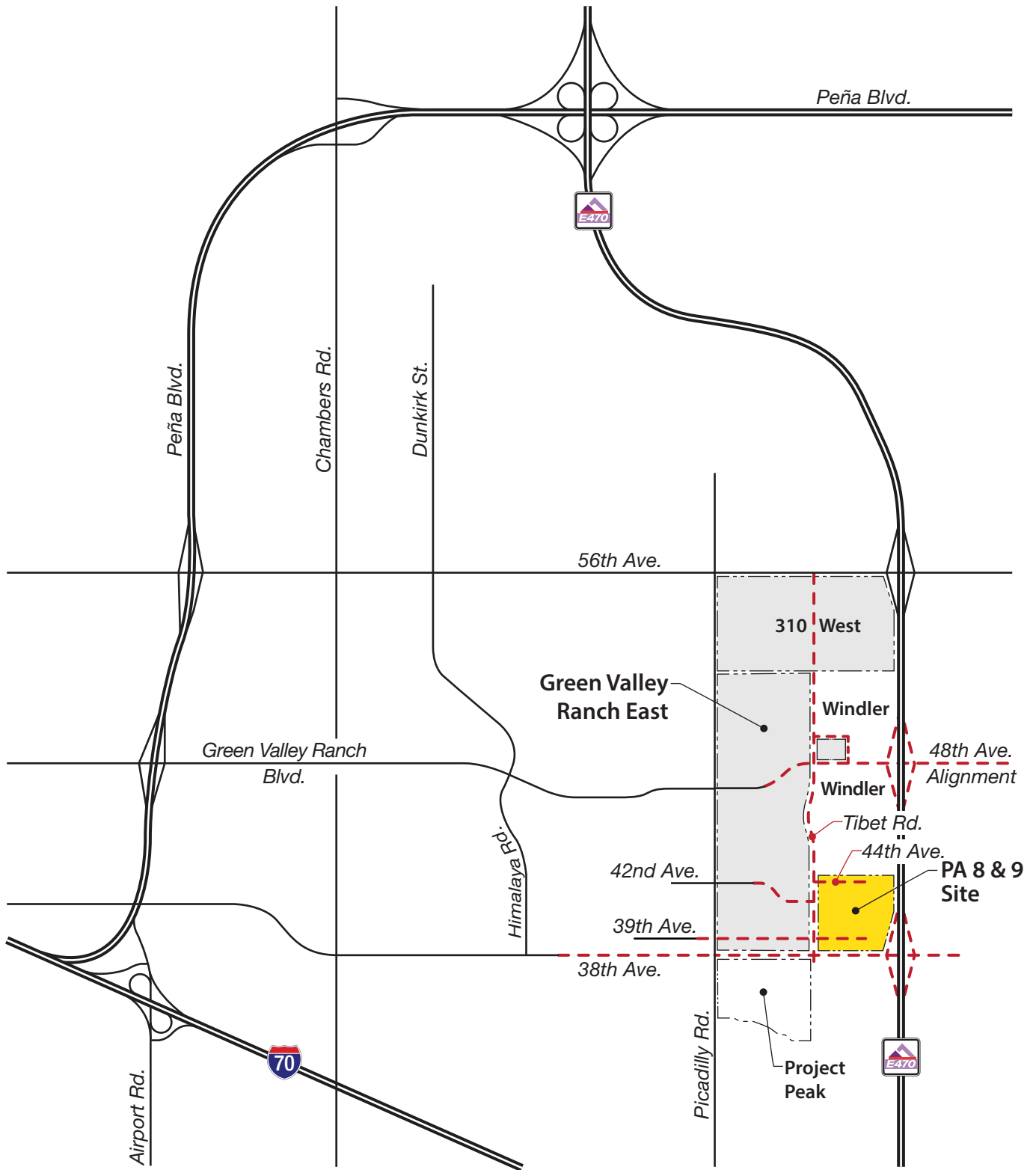
### I.B. Scope of Services

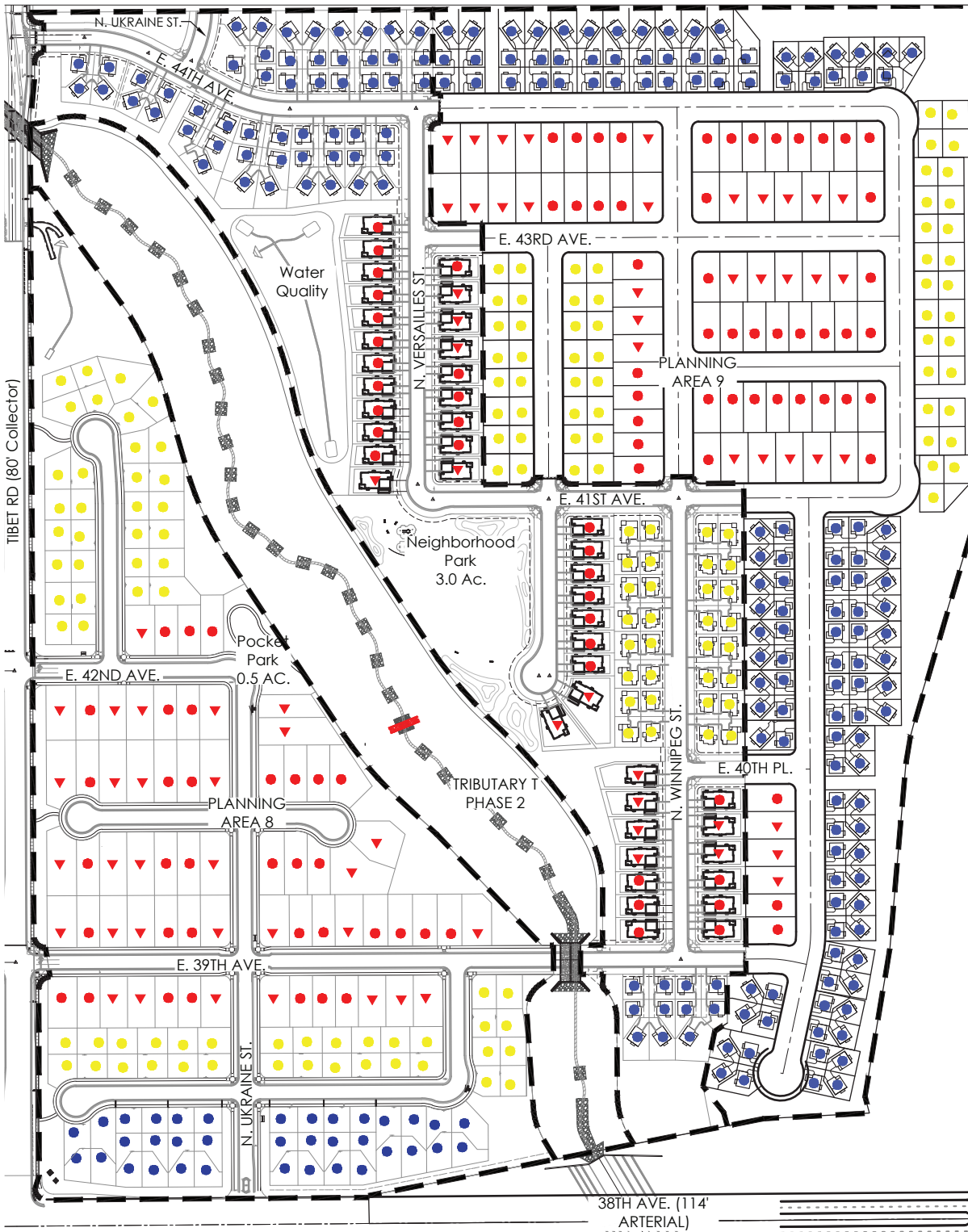
The purpose of this TIS is to estimate the potential impacts specific to the proposed development and to identify any resultant required roadway and/or intersection improvements and traffic control needs. This TIS also includes a queueing analysis for study intersections. The primary focus for traffic operations is at the following intersections:

- |                                        |                                              |
|----------------------------------------|----------------------------------------------|
| ▪ Tibet Road & 44 <sup>th</sup> Avenue | ▪ Tibet Road & 39 <sup>th</sup> Place        |
| ▪ Tibet Road & 43 <sup>rd</sup> Avenue | ▪ Tibet Road & 38 <sup>th</sup> Avenue       |
| ▪ Tibet Road & 42 <sup>nd</sup> Avenue | ▪ 38 <sup>th</sup> Avenue & Ukraine Street   |
| ▪ Tibet Road & 39 <sup>th</sup> Avenue | ▪ 38 <sup>th</sup> Avenue & Wenatchee Street |

The TIS will evaluate the following time periods:

- Buildout (2030) of the development for AM and PM peak hours
- Future (2045) of the development for AM and PM peak hours





## II. EXISTING CONDITIONS

### II.A. Land Use

Green Valley Ranch Planning Areas 8 & 9 are currently vacant. E-470 forms the eastern site boundary. Lands to the west in Green Valley Ranch East are currently under development with residential uses. The Majestic Commercenter development occupies lands to the south, including the recently constructed Shamrock Foods distribution center.

### II.B. Roadway Network

The primary existing study area includes:

- **38<sup>th</sup> Avenue.** This east-west roadway extends east from Tower Road to Himalaya Street as a 4-lane arterial in the City and County of Denver and is posted with a 40 miles per hour (MPH) speed limit. To the west, 38<sup>th</sup> Avenue transitions to 40<sup>th</sup> Avenue and interchanges with Peña Boulevard. 38<sup>th</sup> Avenue transitions to a two-lane cross-section east of Himalaya and has been constructed up to Odessa Street providing access both to Majestic Commercenter and Green Valley Ranch. 38<sup>th</sup> Avenue has a break in connectivity between Odesa Street and Picadilly Road over First Creek before continuing as a four-lane arterial for one-half mile between Picadilly Road and Tibet Road. There is then another break in connectivity over Tributary T between Tibet Road and E-470, where a new interchange has recently been constructed before 38<sup>th</sup> continues east as Aurora Highlands Parkway as a 6-lane arterial entering the Aurora Highlands development.
- **Tibet Road.** This planned north-south roadway will be constructed as adjacent lands develop. Tibet Road between 38<sup>th</sup> Avenue and 48<sup>th</sup> Avenue is planned as a 3-lane collector and a 4-lane arterial north of 48<sup>th</sup> Avenue. The western half of the roadway has been constructed to date but largely serves as a construction access for earlier phases of Green Valley Ranch East to the west and serves as the access to the Shamrock Foods distribution center south of 38<sup>th</sup> Avenue.

### III. PROPOSED FUTURE CONDITIONS

#### III.A. Trip Generation

The standard resource for estimating travel demand is *Trip Generation, 11<sup>th</sup> Edition*, Institute of Transportation Engineers (ITE), 2021. The currently proposed development of Green Valley Ranch East Planning Areas 8 & 9 is anticipated to include 650 single-family dwelling units, a gas station, two fast food restaurants, an automated car wash, a high turnover sit-down restaurant, a grocery store, a medical office building, general commercial, and an automotive parts store. This analysis used a mix of the regression equations and average rates using dwelling units, per thousand square feet of floor area, fueling stations, and car wash tunnels as the independent variables for the corresponding ITE code. **Table 1** outlines the ITE trip generation rates and equations for the applicable land use codes, along with directional distributions and pass-by rates.

National Cooperative Highway Research Program (NCHRP) 684 provides the methodology for internal capture reductions based on the interactions of different land uses within mixed-use developments, including office, retail, restaurant, residential, cinema, and hotel. The methodology considers that mixed-use developments will keep a portion of the trips generated internal to the site, thereby reducing impacts to the adjacent roadway network. This methodology was applied to the site based on the specific land use mix presented in **Table 2**. NCHRP 684 worksheets are included in **Appendix A**.

As previously noted, Planning Areas 8 & 9 contemplate 650 single-family dwelling units, a gas station, two fast food restaurants, an automated car wash, a high turnover sit-down restaurant, a grocery store, a medical office building, general commercial, and an automotive parts store. The trip generation analysis, summarized in **Table 2**, was conducted using the fitted curve equations contained in *Trip Generation, 11<sup>th</sup> Edition*, Institute of Transportation Engineers (ITE), 2021.

#### III.B. Site Trip Distribution and Site-Generated Traffic Assignment

It is projected that the adjacent study area roadway system would be built, including Tibet Road, and 38<sup>th</sup> Avenue by site buildout in 2030. The trip distribution, as depicted on **Figure 3**, is based on the location of the site relative to regional connections and on previous traffic engineering efforts at Green Valley Ranch East.

**Figure 3** also shows the resultant site-generated traffic assignment. As shown, Tibet Road would carry approximately 3,100 vehicles per day (VPD) in site-related volumes. 38<sup>th</sup> Avenue would carry 3,000 to 3,500 VPD generated by the site.

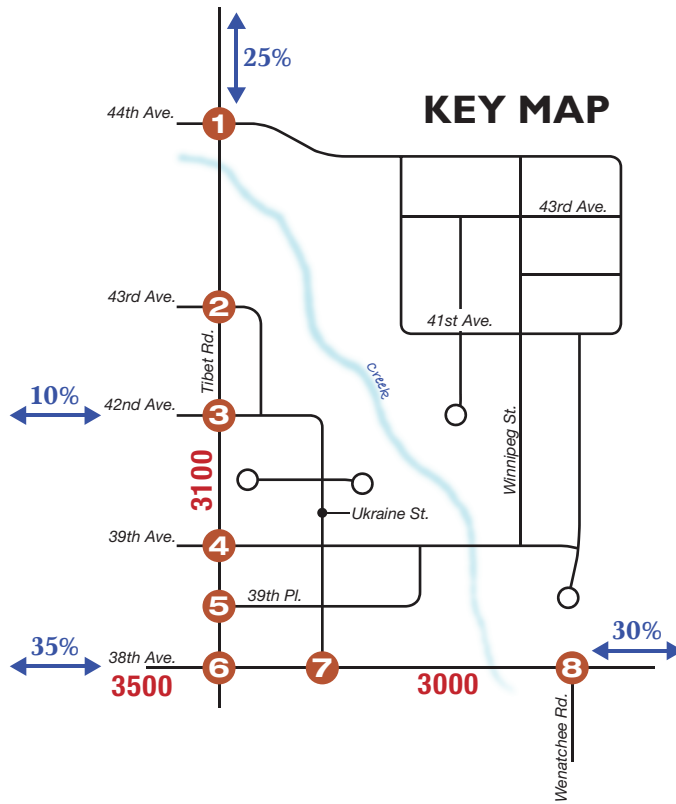
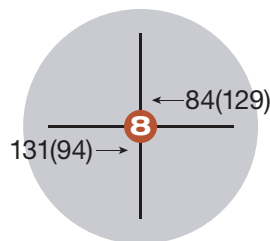
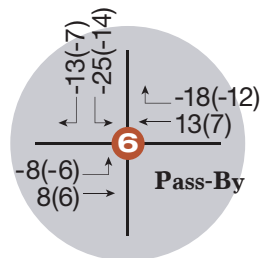
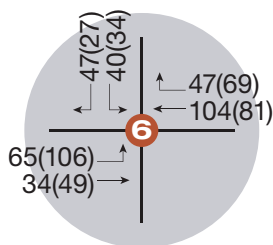
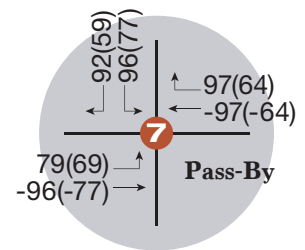
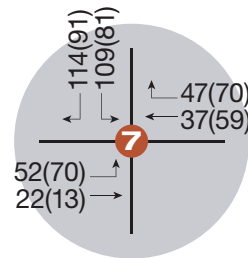
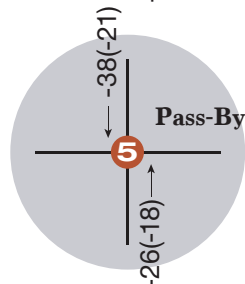
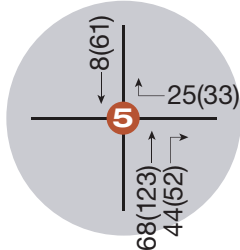
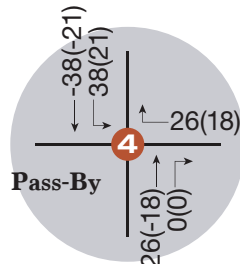
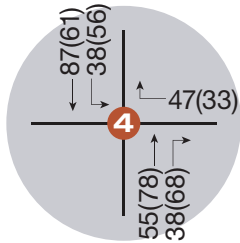
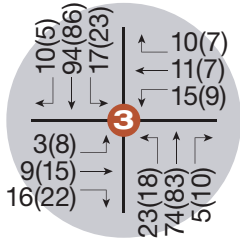
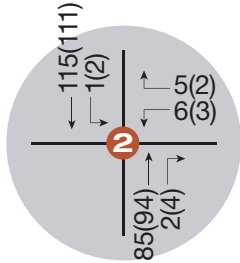
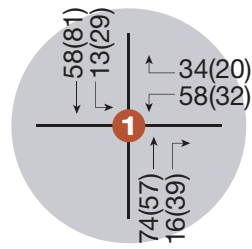


**Table 1. ITE Trip Generation Rates and Equations**

Land Use	ITE Code	Unit	Daily	Peak	Equations & Rates	Distributions		Pass-By
						In	Out	
Single-family Detached	210	DU	$\ln(T)=0.92*\ln(X)+2.68$	AM	$\ln(T)=0.91*\ln(T)+0.12$	25%	75%	n/a
				PM	$\ln(T)=0.94*\ln(X)+0.27$	63%	37%	n/a
Single-family Attached	215	DU	$T=7.62*X+-50.48$	AM	$T=0.52*X+-5.7$	25%	75%	n/a
				PM	$T=0.6*X+-3.93$	59%	41%	n/a
Medical Office Building	720	KSF	$T=T=42.97*X-108.01$	AM	$\ln(T)=0.9*\ln(X)+1.34$	79%	21%	n/a
				PM	$T=4.07*X-3.17$	30%	70%	n/a
Strip Retail Plaza (<40 KSF)	822	KSF	$T=42.2*X+229.68$	AM	$T=2.36*X$	60%	40%	n/a
				PM	$T=6.59*X$	50%	50%	n/a
Automobile Parts Sales	934	KSF	$T=71.05*X-127.72$	AM	$T=2.51*X$	55%	45%	n/a
				PM	$T=4.90*X$	48%	52%	43%
Grocery Store	850	KSF	$T=93.84*X$	AM	$T=2.86*X$	59%	41%	n/a
				PM	$T=8.95*X$	50%	50%	24%
High Turnover (Sit-Down) Restaurant	932	KSF	$T=107.2*X$	AM	$T=9.57*X$	55%	45%	n/a
				PM	$T=9.05*X$	61%	39%	43%
Fast-Food Restaurant with Drive-Thru Window	934	KSF	$T=467.48*X$	AM	$T=44.61*X$	51%	49%	50%
				PM	$T=33.03*X$	52%	48%	55%
Gas Station	945	FP	$T=265.12*X$	AM	$T=16.06*X$	50%	50%	70%
				PM	$T=18.42*X$	50%	50%	70%
Automated Car Wash	948	Tunnels	n/a (assumed 10x PM)	AM	n/a	N/A	N/A	n/a
				PM	$T=77.50*X$	50%	50%	n/a

**Table 2. Trip Generation**

Planning Area	Land Use	ITE Code	Unit	Quantity	Daily	AM Peak			PM Peak		
						In	Out	Total	In	Out	Total
8	Single Family Detached	210	DU	87	888	17	49	66	55	32	87
	Single Family Attached	215	DU	60	407	7	19	26	19	13	32
	Gas Station	945	FP	20	5,143	271	270	541	228	227	455
	Drive-Thru Restaurant	934	KSF	2.6	1,215	59	57	116	45	41	86
	Drive-Thru Restaurant	934	KSF	3.3	1,543	75	72	147	57	52	109
	Car Wash	948	Tunnels	1	780	0	0	0	39	39	78
	High-Turnover Sit-Down Restaurant	932	KSF	5.7	611	30	25	55	32	20	52
	Grocery Store	850	KSF	14.2	1,333	24	17	41	64	63	127
	Strip Retail Plaza	822	KSF	10.0	652	14	10	24	33	33	66
	Medical Office Building	720	KSF	10	322	24	6	30	11	27	38
	Automobile Parts Sales	843	KSF	2.1	21	3	2	5	5	5	10
	Subtotal					12,915	524	527	1,051	588	552
9	Single Family Detached	210	DU	303	2,798	51	153	204	178	104	282
	Single Family Attached	215	DU	200	1,474	25	73	98	68	48	116
	Subtotal					4,272	76	226	302	246	152
Subtotal Trips					17,187	600	753	1,353	834	704	1,538
Total Internal Trips					3,460	104	104	208	242	242	484
Total Passby Trips					3,680	214	214	428	154	154	308
Total New External Trips					10,047	282	435	717	438	308	746



#### LEGEND

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

**XXXX** = Daily Traffic Volumes

**XX%** = Trip Assignment

## IV. BACKGROUND FUTURE TRAFFIC CONDITIONS

As described below, background traffic operations are projected to remain generally acceptable at study area intersections. Background volumes were based on the following:

- Other Green Valley Ranch East development per the Final Development Plan (FDP) and the CSP 1, CSP 2, CSP 3, Filing 7, and Filing 10 Traffic Impact Studies
- Development of Project Peak (Shamrock distribution center), per the TIS for this site dated April 2019, by Kimley-Horn and Associates, Inc.
- Background growth based on the 2018 NEATS Refresh project, including anticipated development in the surrounding area, as follows:
  - The Aurora Highlands 3,500 acres east of E-470
  - 310 West located southeast of Picadilly Road and 56<sup>th</sup> Avenue
  - Windler, which straddles E-470 along 48<sup>th</sup> Avenue
  - Avelon, located in the northeast quadrant of 56<sup>th</sup> Avenue and Picadilly Road, with a mix of residential and commercial uses planned for this site
  - Painted Prairie, 1,628 acres of future mixed-use development located in the northwest quadrant of 56<sup>th</sup> Avenue and Picadilly Road
  - Majestic (southwest of E-470 and 38<sup>th</sup> Avenue), with Project Peak (Shamrock distribution center) as a portion of this overall development

The short-term and long-term peak hour background analyses assume the following improvements:

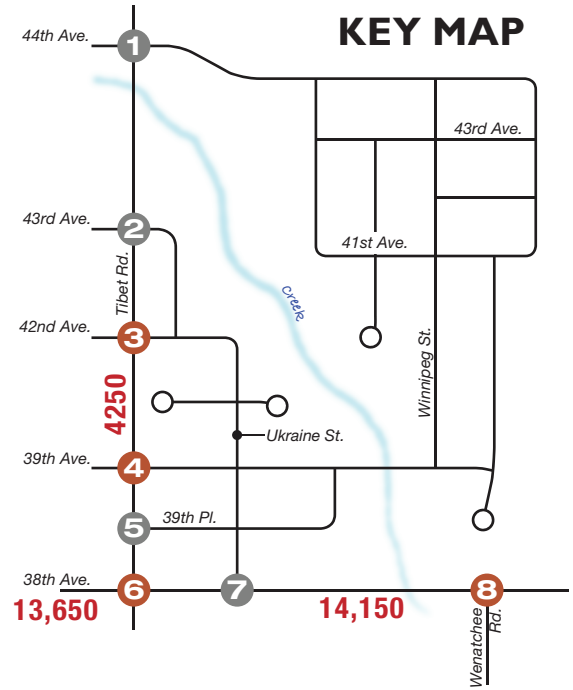
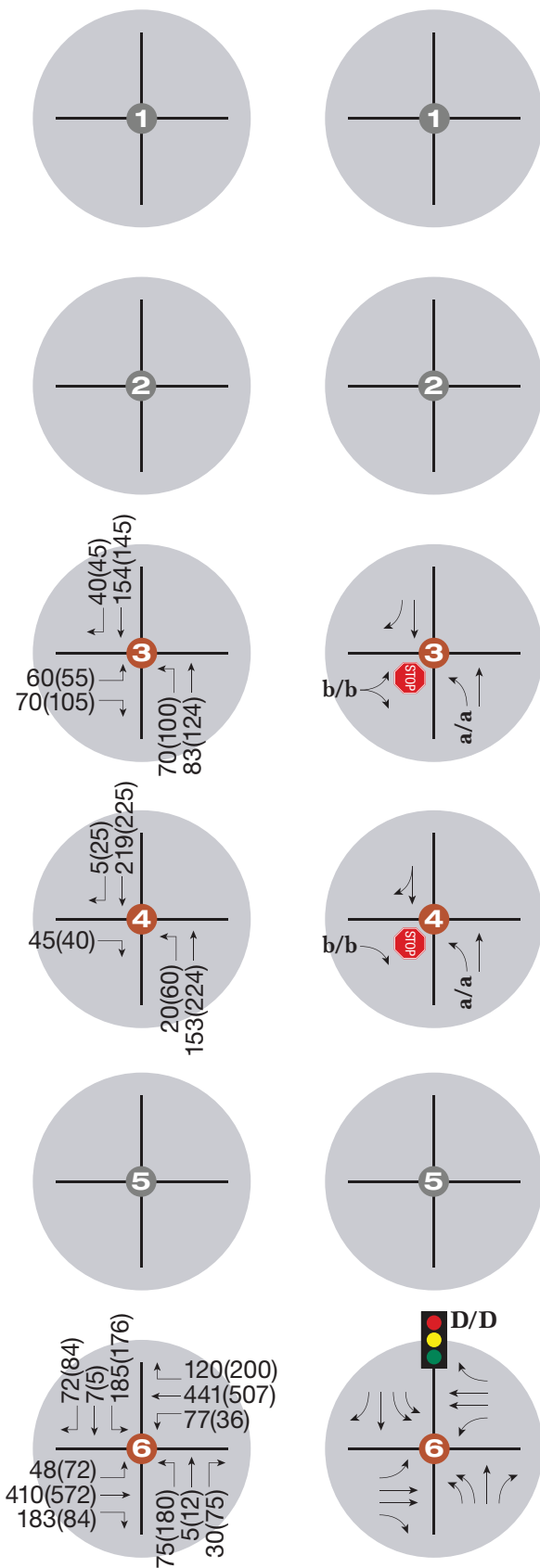
- Tibet Road would be constructed as a 3-lane collector cross section with adjacent development. The projected traffic volumes along Tibet Road would remain within the general capacity of a 3-lane collector roadway.
- 38<sup>th</sup> Avenue would be constructed to 4-lane arterial standards. For this analysis, it is assumed that the planned interchange at E-470/38<sup>th</sup> Avenue would be constructed.
- The intersection at 38<sup>th</sup> Avenue/Tibet Road would require signalization per the Project Peak TIS. Dual left-turn lanes would be needed on the northbound approach at this intersection. Signalization of this intersection should be anticipated following the connection of 38<sup>th</sup> Avenue across E-470.

#### **IV.A. Short-Term (2030) Background Traffic Conditions**

Given significant breaks in roadway continuity both along Tibet Road and 38<sup>th</sup> Avenue, it is difficult to gauge short-term background traffic volumes. As such, short-term (year 2030) through traffic volumes along Tibet Road and 38<sup>th</sup> Avenue are assumed to be approximately 45 percent of the long-term (year 2045) traffic volumes described below. Since the developments near the project site along Tibet Road and 38<sup>th</sup> Avenue are assumed to be mostly built out by 2030, side street movements are expected to be the same in the 2030 and 2045 background conditions. These assumptions are consistent with other nearby developments with more established roadway networks. **Figure 4** illustrates the resultant short-term background volume and level of service (LOS) projections. All signalized intersections are expected to operate at LOS D or better, and all unsignalized movements are expected to operate at LOS B or better in the short-term background condition. As shown, short-term background daily volumes on 38<sup>th</sup> Avenue would be approximately 13,650 to 14,150 VPD. Daily volumes on Tibet Road would be approximately 4,250 VPD. Short-term Background LOS worksheets are provided in **Appendix B**.

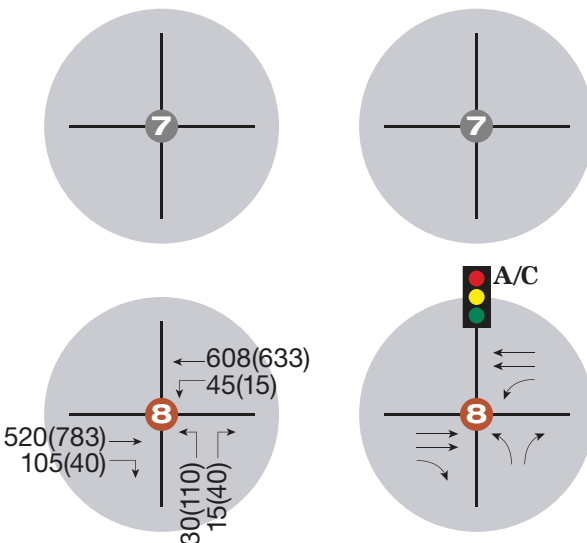
#### **IV.B. Long-Term (2045) Background Traffic Conditions**

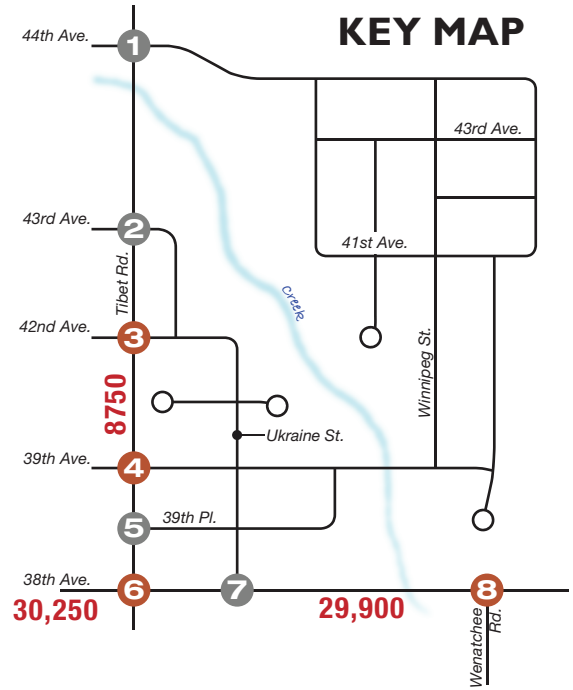
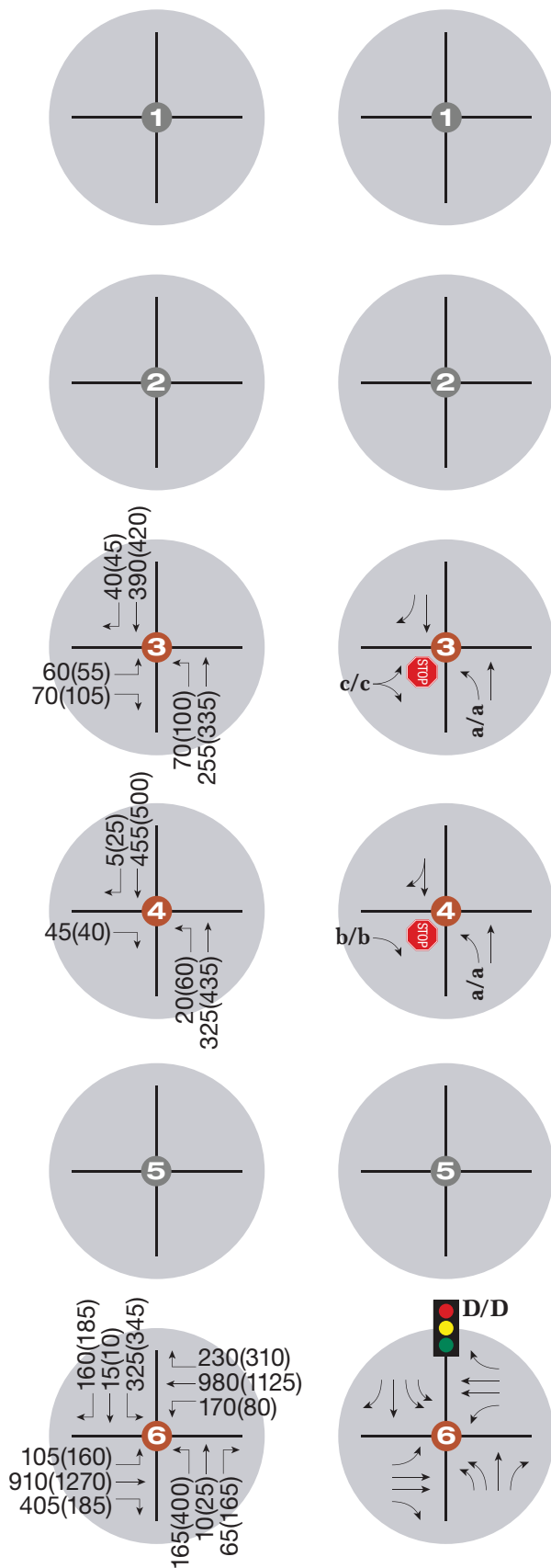
Site generated traffic from the above referenced studies was added along with regional background growth to determine long-term background volumes in the area. **Figure 5** illustrates the resultant long-term background volume and LOS projection. All signalized intersections are expected to operate at LOS D or better, and all unsignalized movements are expected to operate at LOS C or better in the long-term background condition. As shown, long-term background daily volumes on 38<sup>th</sup> Avenue would be approximately 29,900 to 30,250 VPD. Daily volumes on Tibet Road would be approximately 8,750 VPD in the long-term background condition. Long-term Background LOS worksheets are provided in **Appendix C**.



### LEGEND

- XXX(XXX) = AM(PM) Peak Hour Traffic Volumes
- XXXX = Daily Traffic Volumes
- X/X = AM/PM Peak Hour Signalized Intersection Level of Service
- x/x = AM/PM Peak Hour Unsignalized Intersection Level of Service
- STOP = Stop Sign
- Traffic Signal = Traffic Signal
- X = Intersection Not Analyzed in Background Conditions





### LEGEND

- XXX(XXX) = AM(PM) Peak Hour Traffic Volumes
- XXXX = Daily Traffic Volumes
- X/X = AM/PM Peak Hour Signalized Intersection Level of Service
- x/x = AM/PM Peak Hour Unsignalized Intersection Level of Service
- STOP = Stop Sign
- Traffic Signal = Traffic Signal
- X = Intersection Not Analyzed in Background Conditions



FIGURE 5

2045 Background  
Traffic Conditions

## V. TOTAL FUTURE TRAFFIC CONDITIONS

### V.A. Short-Term (2030) Total Traffic Conditions

The site generated traffic volumes previously shown on **Figure 3** were added to the short-term background traffic volumes shown on **Figure 4** to produce the short-term total traffic volumes illustrated on **Figure 6**. In the short-term total condition, all signalized intersections are expected to operate at LOS D or better, and all unsignalized movements are expected to operate at LOS C or better with the exception of the westbound left at 42<sup>nd</sup> Avenue, which will operate at LOS D during the PM peak hour. LOS for the short-term total condition is shown on **Figure 6**, and LOS worksheets are included in **Appendix D**. As shown, total daily volumes on 38<sup>th</sup> Avenue would be approximately 17,150 VPD in the short term, and daily volumes on Tibet Road would be approximately 7,350 VPD.

### V.B. Long-Term (2045) Total Traffic Conditions

The site generated traffic volumes previously shown on **Figure 3** were added to the long-term background traffic volumes shown on **Figure 5** to produce the long-term total traffic volumes illustrated on **Figure 7**. Long-term total volumes at 38<sup>th</sup> Avenue/Tibet Road would include northbound and southbound left-turn movements approaching 300 vehicles per hour (VPH), which is the typical threshold for dual left-turn lanes. Since the northbound dual left turn lane has already been built, the intersection has been analyzed with northbound and southbound dual left turn lanes in all scenarios.

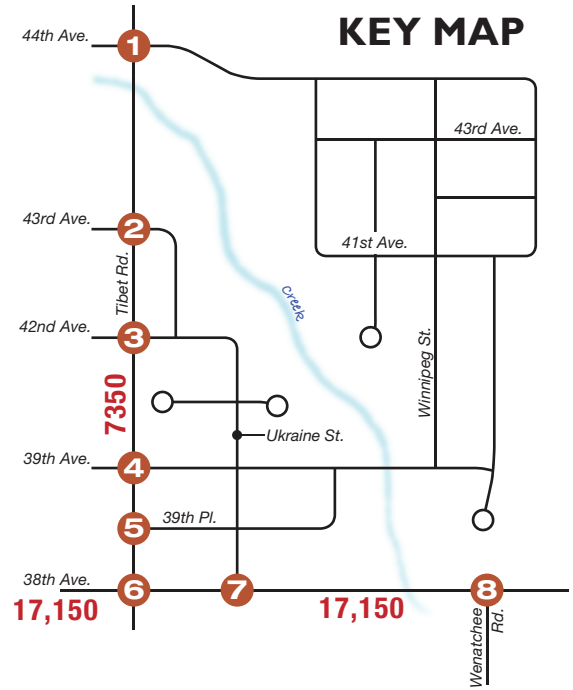
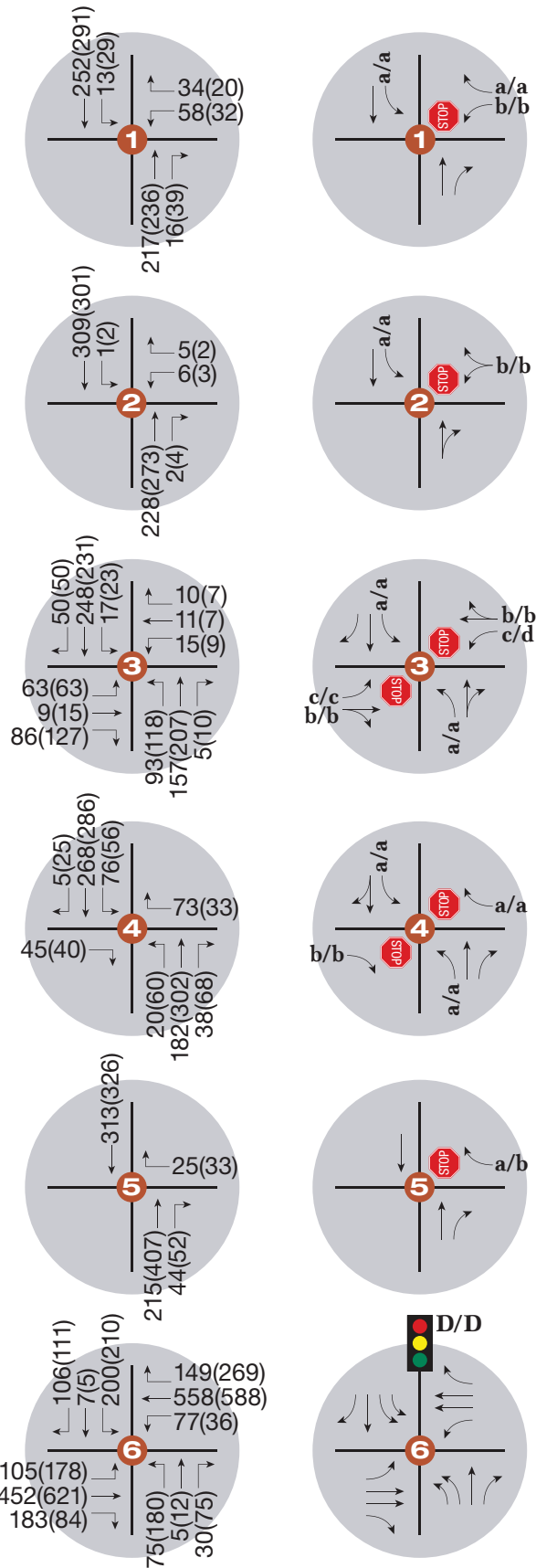
In the long-term total condition, all signalized intersections are expected to operate at LOS C or better. This improvement in 2045 total signalized LOS over 2030 signalized LOS is likely due to the cycle times being a better fit for the 2045 traffic volumes. Pedestrian clearance intervals limit the minimum cycle time. All unsignalized movements are expected to operate at LOS D or better with the exception of the eastbound and westbound lefts at 42<sup>nd</sup> street. These turning movements are expected to operate at LOS E or F during both peak hours. The eastbound and westbound turning movements at the intersection of Tibet Road and 39<sup>th</sup> Avenue also showed poor LOS, so those movements were restricted in this analysis. With 39<sup>th</sup> Avenue operating as a  $\frac{3}{4}$  movement intersection, more left turning traffic is diverted onto 42<sup>nd</sup> Avenue. Although 42<sup>nd</sup> Avenue does not meet volume-based signal warrants, a signal should be considered.

Per previous traffic engineering efforts for CSP 3 and Filing 7, this intersection is adjacent to a future school site and could require a protected pedestrian crossing in the future. Therefore, future traffic and pedestrian conditions should be periodically monitored, and appropriate traffic control measures implemented, when warranted. Particular consideration of Warrant 5, School Crossing, would be anticipated.

If the 42<sup>nd</sup> Avenue intersection were signalized, it would operate at LOS B during both peak hours.

**Appendix E** includes LOS worksheets for the long-term total condition. As shown, total daily volumes on 38<sup>th</sup> Avenue would be approximately 32,900 to 33,750 VPD in the long term, and daily volumes on Tibet Road would be approximately 11,850 VPD in the long term. Short-term and long-term LOS and delay are summarized in **Appendix F**.





#### LEGEND

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

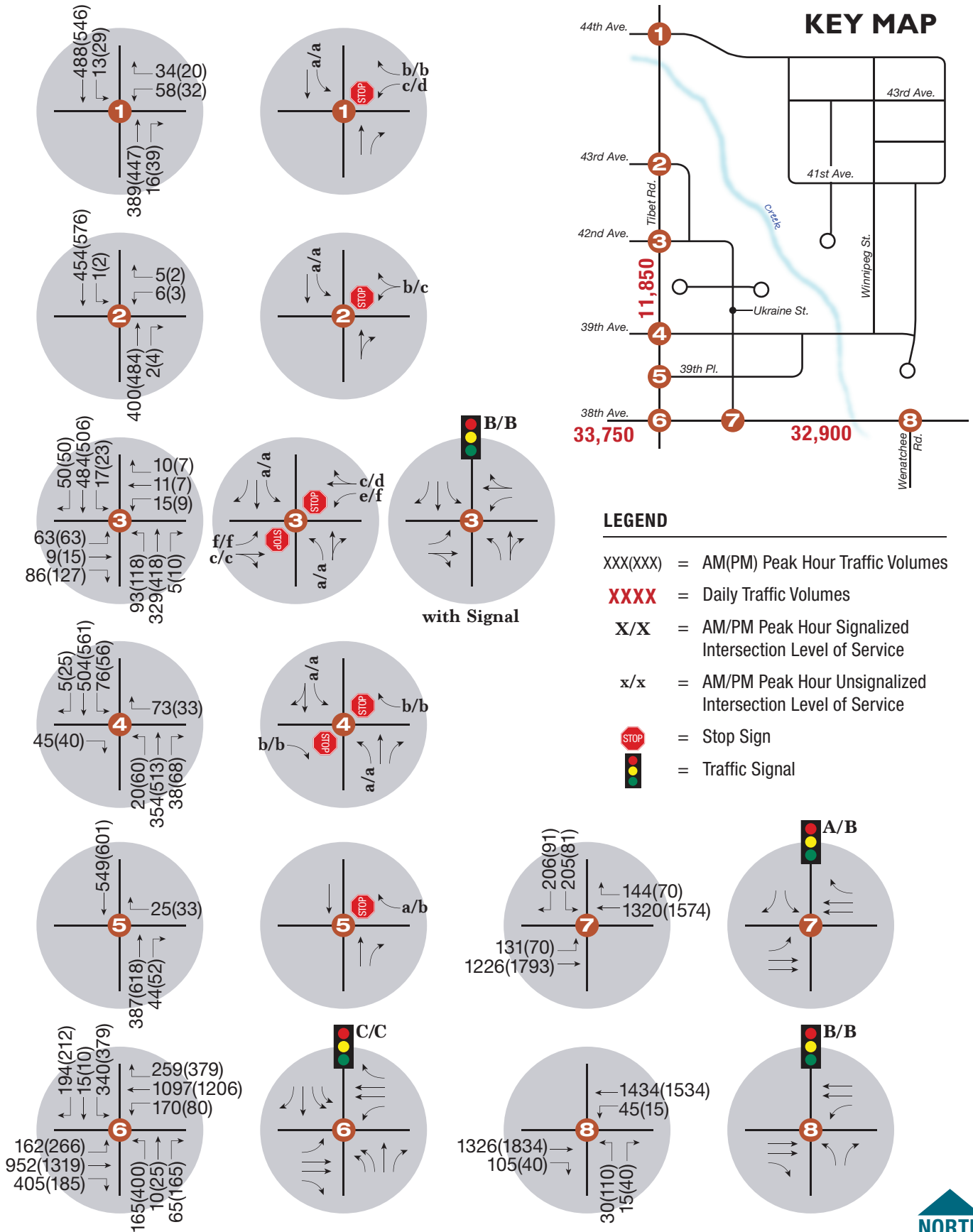
XXXX = Daily Traffic Volumes

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



## VI. EVALUATION

### VI.A. Signal Warrants

The analysis included a review to determine if *Manual on Uniform Traffic Control Devices (MUTCD) for Streets and Highways, 2009 Edition*, traffic signal Warrant 1 (Eight-Hour Vehicular Volume) and/or Warrant 2 (Four-Hour Vehicular Volume) are satisfied for stop-controlled study intersection(s) under short-term and long-term scenarios. Based on reduction criteria used by COA for all intersection configurations, 50 percent right-turn reductions were applied. **Table 3** summarizes the results of the analysis, and **Appendix E** presents graphical results of the MUTCD warrant analysis.

Signal warrants have been performed under the assumption that 10 percent of daily traffic occurs during the highest peak hour. A linear regression was then applied to factor down each additional hour based on historic data of typical arterial roadways in urban environments. The eight highest hour is assumed to be 5.71 percent of daily traffic or 57.1 percent of the highest peak hour. These approximations are useful in areas where roadways are not yet constructed or development remains minimal, as under current conditions. Daily distributions are heavily influenced by construction traffic given relatively low overall volume.

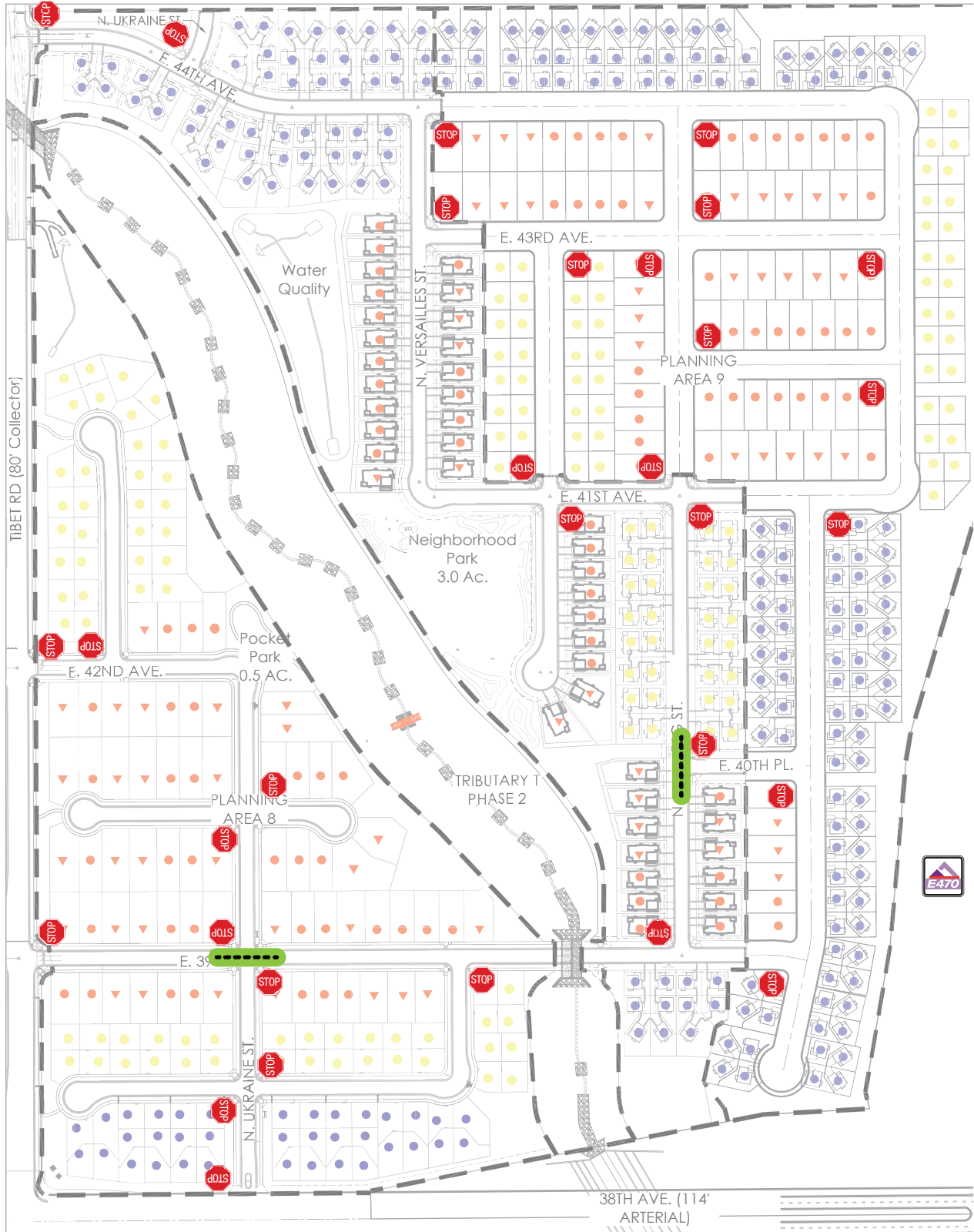
This analysis suggests that the intersection of Tibet Road and 38<sup>th</sup> Avenue would warrant signalization in all scenarios, and the intersection of 38<sup>th</sup> Avenue and Ukraine Street would warrant signalization in both total conditions. 38<sup>th</sup> Avenue and Wenatchee Road is close to meeting warrants and has been analyzed as a signal due to past studies finding that the intersection should be signalized. Although the intersection of Tibet Road and 42<sup>nd</sup> Avenue does not meet Warrants 1 or 2, signalization should be considered due to the nearby school and poor LOS on the side street left turn movements. Current volume projections indicate that four of the required eight hours would be met in Warrant 1 in the long-term total scenario.

**Table 3. MUTCD Signal Warrants**



Intersection	Short-Term Background (2030) Signal Warrant	Long-Term Background (2045) Signal Warrant	Short-Term Total (2030) Signal Warrant	Long-Term Total (2045) Signal Warrant
1. Tibet Rd & 44 <sup>th</sup> Ave	Not Warranted	Not Warranted	Not Warranted	Not Warranted
2. Tibet Rd & 43rd Ave	Not Warranted	Not Warranted	Not Warranted	Not Warranted
3. Tibet Rd & 42nd Ave	Not Warranted	Not Warranted	Not Warranted	Not Warranted
4. Tibet Rd & 39th Ave	Not Warranted	Not Warranted	Not Warranted	Not Warranted
5. Tibet Rd & 39th Pl	Not Warranted	Not Warranted	Not Warranted	Not Warranted
6. Tibet Rd & 38th Ave	<b>Warranted</b>	<b>Warranted</b>	<b>Warranted</b>	<b>Warranted</b>
7. 38th Ave & Ukraine St	Not Warranted	Not Warranted	<b>Warranted</b>	<b>Warranted</b>
8. 38th Ave & Wenatchee Rd	Not Warranted	Not Warranted	Not Warranted	Not Warranted

### VI.B. Internal Traffic Control

Traffic control at the internal intersections within Planning Areas 8 & 9 would be unsignalized, with STOP sign control on the minor approaches. STOP sign locations are shown on **Figure 8**.



#### LEGEND

-  = Stop Sign
-  = Traffic Calming

## VI.C. Street Layout

The proposed street layout for Planning Areas 8 & 9 is generally consistent with Section 4.04.I of the City's Roadway Design and Construction Standards, as follows:

- Arterial spacing (38<sup>th</sup> Avenue, 48<sup>th</sup> Avenue, Picadilly Road, and E-470) is at the approximate one-mile spacing per standards.
- Collector spacing (42<sup>nd</sup> Avenue and Tibet Road) generally meets the one-half-mile spacing requirement and is consistent with previous planning at Green Valley Ranch East.
- Five local street connections to Tibet Road form the western perimeter of the site at 39<sup>th</sup> Drive, 39<sup>th</sup> Avenue, 42<sup>nd</sup> Avenue, 43<sup>rd</sup> Avenue, and 44<sup>th</sup> Avenue. Of note, the northernmost connection to Tibet at 44<sup>th</sup> Avenue would provide for a potential future local connection into the Windler site north of Planning Areas 8 & 9. The site plan also shows one local street connection to 38<sup>th</sup> Avenue at Ukraine Street on the southern site perimeter.
- No cul-de-sacs longer than 500 feet are proposed. No dead ends or hammerheads are proposed.

## VI.D. Traffic Calming

Given the length of several internal streets, some potential traffic calming measures would help provide speed mitigation. Based on the site layout, curb extensions (or neckdowns) on the eastbound and westbound approaches at the first internal intersection on 39<sup>th</sup> Avenue would discourage speeding within Planning Area 8. Midblock curb extensions on the northbound and southbound approaches at the first intersection north of 39<sup>th</sup> Avenue on the primary north-south roadway within Planning Area 9 would also help to maintain low speeds within the site.

## VI.E. Pedestrian Connectivity

A Rectangular Rapid Flashing Beacon (RRFB) is planned just south of the intersection of 44<sup>th</sup> Avenue with Tibet Road. The RRFB will provide safe connectivity of the Highline Canal multiuse trail across Tibet Road between GVRE filings. Further, the trail crossing at 38<sup>th</sup> Avenue near E-470 is planned to be a grade separated under 38<sup>th</sup> Avenue.

## VI.F. Queues

The 95<sup>th</sup> percentile maximum probable queue lengths for long-term total conditions were extracted from the Synchro LOS worksheets contained in the Appendix. The queue lengths are converted into feet (assuming a typical length of 25 feet per vehicle) and are summarized in **Table 4**. The table also provides CDOT storage requirements per the State Highway Access Code (SHAC). 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 were reported. For unsignalized intersections, the HCM 6<sup>th</sup> Edition calculation was reported.
- **Through movements** – For signalized intersections, Synchro methodology queue calculations were reported. Synchro methodology is preferred as it provides more realistic interactions between coordinated signals. No through movement queues are reported for unsignalized intersections as the through movements are free.
- **Right turn movements** – The Synchro queue length was used for signalized intersections. HCM 6<sup>th</sup> Edition information was not used because HCM's signalized intersection methodology does not account for right turns on red and assumes channelized rights to be removed from the intersection resulting in a reported value of zero. For unsignalized intersections, HCM 6<sup>th</sup> Edition calculation was reported.

**Table 4. Queue Length Summary – Long Range Future**

Intersection	Movement	Per Lane Queue Length (ft) AM/PM	CDOT Storage Length (ft) Requirement AM/PM	Recommended Storage Length
1. Tibet Rd & 44 <sup>th</sup> Avenue	WB Left-turn	25/25	75/50	25-Feet
	WB Right-turn	25/25	50/25	25-Feet
	SB Left-turn	25/25	25/50	25-Feet
2. Tibet Rd & 43 <sup>rd</sup> Avenue	WB Left/Right-turn	25/25	25/25	25-Feet
	SB Left-turn	25/25	25/25	25-Feet
3. Tibet Rd & 42 <sup>nd</sup> Avenue	EB Left-turn	25/25	75/75	25-Feet
	EB Through/Right-turn	75/125	100/150	125-Feet
	WB Left-turn	25/50	25/25	50-Feet
	WB Through/Right-turn	25/25	25/	25-Feet
	NB Left-turn	25/25	100/125	25-Feet
	SB Left-turn	25/25	25/25	25-Feet
4. Tibet Rd & 39 <sup>th</sup> Avenue	EB Right-turn	25/25	50/50	25-Feet
	WB Right-Turn	25/25	75/50	25-Feet
	NB Left-Turn	25/25	25/75	25-Feet
	SB Left-turn	25/25	100/75	25-Feet
5. Tibet Rd & 39 <sup>th</sup> Place	WB Right-Turn	25/25	25/25	25-Feet
6. Tibet Rd & 38 <sup>th</sup> Avenue	EB Left-turn	175/425	175/275	425-Feet
	EB Through	525/600	975/1325	600-Feet
	EB Right-turn	400/100	425/200	400-Feet
	WB Left-turn	200/75	170/100	200-Feet
	WB Through	375/500	1100/1225	500-Feet
	WB Right-turn	100/200	275/400	200-Feet
	NB Left-turn*	125/325	175/400	325-Feet
	NB Through	25/75	25/25	75-Feet
	NB Right-turn	75/250	75/175	250-Feet
	SB Left-turn*	275/300	350/400	300-Feet
	SB Through	50/25	25/25	50-Feet
	SB Right-turn	200/275	200/225	275-Feet
7. 38 <sup>th</sup> Ave & Ukraine Street	EB Left-turn	125/50	150/75	125-Feet
	EB Through	200/525	1250/1800	525-Feet
	WB Through	275/475	1325/1575	475-Feet
	WB Right-turn	25/25	150/75	25-Feet
	SB Left-turn	250/125	225/100	250-Feet
	SB Right-turn	150/50	225/100	150-Feet
8. 38 <sup>th</sup> Ave & Wenatchee Street	EB Through	375/325	1350/1850	375-Feet
	EB Right-turn	50/25	125/50	50-Feet
	WB Left-turn	25/25	50/25	25-Feet
	WB Through	200/300	1450/1550	300-Feet
	NB Left-turn	75/150	50/125	150-Feet
	NB Right-turn	25/50	25/50	50-Feet
*Dual left-turn lane				

## VI.G. Summary of Improvements

The following roadway and intersection improvements should ultimately be implemented within the study area:

- Construct 38<sup>th</sup> Avenue adjacent to the site as a 4-lane Arterial.
- Construct Tibet Road as a 4-lane Collector.
- Construct the intersection of Tibet Road/38<sup>th</sup> Avenue to include separate left-turn and right-turn lanes along each approach. Dual left-turn lanes will be required on the northbound and southbound approaches. Install a traffic signal.
- Construct the intersection of 38<sup>th</sup> Avenue/Ukraine Street as a signal with eastbound and southbound left-turn lanes, as well as westbound and southbound right turn lanes.
- Install STOP-sign control on the westbound approach at Tibet Road/39<sup>th</sup> Place. Provide a northbound right-turn lane.
- Install STOP sign control on the westbound site access approach at the 39<sup>th</sup> Avenue/Tibet Road intersection. Provide a southbound left-turn lane. Restrict the eastbound and westbound left-turns.
- Install STOP sign control on the westbound site access approach at the 42<sup>nd</sup> Avenue/Tibet Road intersection. Provide a southbound left-turn lane. Periodically monitor traffic and pedestrian conditions at this intersection. Ultimately, a signal could be warranted due to its proximity to the future school site and the potential need for a protected school crossing.
- Install STOP sign control on the westbound site access approach at the 43<sup>rd</sup> Avenue/Tibet Road intersection. Provide a southbound left-turn lane.
- Install STOP-sign control on the westbound approach at the Tibet Road/44<sup>th</sup> Avenue site access intersection. Provide a southbound left-turn lane and a northbound right-turn lane.
- Install STOP-sign control at the site-internal intersections as previously depicted.
- Install curb extensions as a traffic calming measure at two internal intersections as previously depicted.



## VII. CONCLUSIONS AND RECOMMENDATIONS

It is currently proposed to develop 650 single-family dwelling units, a gas station, two fast food restaurants, an automated car wash, a high turnover sit-down restaurant, a grocery store, a medical office building, general commercial, and an automotive parts store within Green Valley Ranch East Planning Areas 8 & 9. The site is located along the east side of the future Tibet Road alignment, north of the future 38<sup>th</sup> Avenue alignment. Vehicular access would be via five roadway connections along Tibet Road and one along 38<sup>th</sup> Avenue.

The proposed development at Planning Areas 8 & 9 would have a trip generation potential of about 10,047 trips per day, with 717 AM peak hour trips and 746 PM peak hour trips. Because the adjacent roadway system has yet to be developed, the potential impacts of the site-generated traffic were evaluated under short- and long-term future scenarios. In general, the existing and planned roadway system would have sufficient reserve capacity to accommodate the projected increases. Relative to this, the following findings and recommendations are specific to planning Areas 8 & 9:

- Construct 38<sup>th</sup> Avenue adjacent to the site as a 4-lane Arterial.
- Construct Tibet Road as a 4-lane Collector.
- Construct the intersection of Tibet Road/38<sup>th</sup> Avenue to include separate left-turn and right-turn lanes along each approach. Dual left-turn lanes will be required on the northbound and southbound approaches. Install a traffic signal.
- Construct the intersection of 38<sup>th</sup> Avenue/Ukraine Street as a signal with eastbound and southbound left-turn lanes as well as westbound and southbound right turn lanes.
- Install STOP-sign control on the westbound approach at Tibet Road/39<sup>th</sup> Place. Provide a northbound right-turn lane.
- Install STOP sign control on the westbound site access approach at the 39<sup>th</sup> Avenue/Tibet Road intersection. Provide a southbound left-turn lane. Restrict the eastbound and westbound left-turns.
- Install STOP sign control on the westbound site access approach at the 42<sup>nd</sup> Avenue/Tibet Road intersection. Provide a southbound left-turn lane. Periodically monitor traffic and pedestrian conditions at this intersection. Ultimately, a signal could be warranted due to its proximity to the future school site and the potential need for a protected school crossing.
- Install STOP sign control on the westbound site access approach at the 43<sup>rd</sup> Avenue/Tibet Road intersection. Provide a southbound left-turn lane.
- Install STOP-sign control on the westbound approach at the Tibet Road/44<sup>th</sup> Avenue site access intersection. Provide a southbound left-turn lane and a northbound right-turn lane.
- Install STOP-sign control at the site-internal intersections.
- Install curb extensions as a traffic calming measure at two internal intersections as previously depicted.



## APPENDIX A. TRIP GENERATION

<b>Project Name:</b>	GVRE PA 8 and 9
<b>Analysis Period:</b>	AM Street Peak Hour

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends						
Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	312	312	1.00	299	299
Restaurant	1.00	164	164	1.00	154	154
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	100	100	1.00	294	294
Hotel	1.00	0	0	1.00	0	0

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	87		39	0	42	0
Restaurant	48	22		0	6	5
Cinema/Entertainment	0	0	0		0	0
Residential	6	3	59	0		0
Hotel	0	0	0	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		100	38	0	0	0
Retail	0		82	0	2	0
Restaurant	0	25		0	5	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	53	33	0		0
Hotel	0	12	10	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)						
Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles <sup>1</sup>	Transit <sup>2</sup>	Non-Motorized <sup>2</sup>
Office	0	0	0	0	0	0
Retail	25	287	312	287	0	0
Restaurant	72	92	164	92	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	7	93	100	93	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses <sup>3</sup>	0	24	24	24	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)						
Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles <sup>1</sup>	Transit <sup>2</sup>	Non-Motorized <sup>2</sup>
Office	0	0	0	0	0	0
Retail	41	258	299	258	0	0
Restaurant	27	127	154	127	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	36	258	294	258	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses <sup>3</sup>	0	6	6	6	0	0

<sup>1</sup>Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

<sup>2</sup>Person-Trips

<sup>3</sup>Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

\*Indicates computation that has been rounded to the nearest whole number.

<b>Project Name:</b>	GVRE PA 8 and 9
<b>Analysis Period:</b>	PM Street Peak Hour

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends						
Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	330	330	1.00	328	328
Restaurant	1.00	134	134	1.00	113	113
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	320	320	1.00	197	197
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	7		95	13	85	16
Restaurant	3	46		9	20	8
Cinema/Entertainment	0	0	0		0	0
Residential	8	83	41	0		6
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		26	3	0	13	0
Retail	0		39	0	147	0
Restaurant	0	165		0	51	0
Cinema/Entertainment	0	13	4		13	0
Residential	0	33	19	0		0
Hotel	0	7	7	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)						
Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles <sup>1</sup>	Transit <sup>2</sup>	Non-Motorized <sup>2</sup>
Office	0	0	0	0	0	0
Retail	79	251	330	251	0	0
Restaurant	58	76	134	76	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	105	215	320	215	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses <sup>3</sup>	0	50	50	50	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)						
Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles <sup>1</sup>	Transit <sup>2</sup>	Non-Motorized <sup>2</sup>
Office	0	0	0	0	0	0
Retail	124	204	328	204	0	0
Restaurant	66	47	113	47	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	52	145	197	145	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses <sup>3</sup>	0	66	66	66	0	0

<sup>1</sup>Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

<sup>2</sup>Person-Trips






<sup>3</sup>Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator





\*Indicates computation that has been rounded to the nearest whole number.

## APPENDIX B.      SHORT TERM FUTURE BACKGROUND LEVEL OF SERVICE

HCM 6th TWSC  
3: Tibet Rd & 42nd Ave













2030 Background  
AM Peak

Intersection						
Int Delay, s/veh	4.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	60	70	70	83	154	40
Future Vol, veh/h	60	70	70	83	154	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	-	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	65	76	76	90	167	43
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	409	167	210	0	-	0
Stage 1	167	-	-	-	-	-
Stage 2	242	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	609	877	1361	-	-	-
Stage 1	863	-	-	-	-	-
Stage 2	808	-	-	-	-	-
Platoon blocked, %	1			-	-	-
Mov Cap-1 Maneuver	575	877	1361	-	-	-
Mov Cap-2 Maneuver	575	-	-	-	-	-
Stage 1	815	-	-	-	-	-
Stage 2	808	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	11.4	3.6		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1361	-	706	-	-	
HCM Lane V/C Ratio	0.056	-	0.2	-	-	
HCM Control Delay (s)	7.8	-	11.4	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0.2	-	0.7	-	-	

Intersection						
Int Delay, s/veh	1.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	45	20	153	219	5
Future Vol, veh/h	0	45	20	153	219	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	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	49	22	166	238	5
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	241	243	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	4.12	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	0	798	1323	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	798	1323	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	9.8	0.9		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1323	-	798	-	-	
HCM Lane V/C Ratio	0.016	-	0.061	-	-	
HCM Control Delay (s)	7.8	-	9.8	-	-	
HCM Lane LOS	A	-	A	-	-	
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-	

























Queues  
6: Tibet Rd & 38th Ave

2030 Background  
AM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	52	446	199	84	479	130	82	5	33	201	8	78
v/c Ratio	0.26	0.65	0.31	0.39	0.70	0.20	0.31	0.01	0.03	0.52	0.01	0.08
Control Delay	26.7	41.4	4.4	30.0	42.9	4.1	46.1	18.8	0.1	46.5	16.3	3.0
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	26.7	41.4	4.4	30.0	42.9	4.1	46.1	18.8	0.1	46.5	16.3	3.0
Queue Length 50th (ft)	24	138	0	39	150	0	25	2	0	63	3	0
Queue Length 95th (ft)	48	178	43	70	192	33	48	10	0	96	12	22
Internal Link Dist (ft)	1242			2767			392			425		
Turn Bay Length (ft)	300		300	300		300	300		200	300		200
Base Capacity (vph)	204	937	716	216	937	847	463	877	967	875	940	1003
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	0.25	0.48	0.28	0.39	0.51	0.15	0.18	0.01	0.03	0.23	0.01	0.08
Intersection Summary												

# HCM 6th Signalized Intersection Summary 6: Tibet Rd & 38th Ave

2030 Background  
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	48	410	183	77	441	120	75	5	30	185	7	72
Future Volume (veh/h)	48	410	183	77	441	120	75	5	30	185	7	72
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	52	446	199	84	479	130	82	5	33	201	8	78
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	186	601	339	205	653	422	155	965	901	284	1035	937
Arrive On Green	0.04	0.17	0.17	0.05	0.18	0.18	0.04	0.52	0.52	0.08	0.55	0.55
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	3456	1870	1585	3456	1870	1585
Grp Volume(v), veh/h	52	446	199	84	479	130	82	5	33	201	8	78
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1728	1870	1585	1728	1870	1585
Q Serve(g_s), s	2.4	11.9	11.3	3.9	12.7	6.6	2.3	0.1	0.9	5.7	0.2	2.1
Cycle Q Clear(g_c), s	2.4	11.9	11.3	3.9	12.7	6.6	2.3	0.1	0.9	5.7	0.2	2.1
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	186	601	339	205	653	422	155	965	901	284	1035	937
V/C Ratio(X)	0.28	0.74	0.59	0.41	0.73	0.31	0.53	0.01	0.04	0.71	0.01	0.08
Avail Cap(c_a), veh/h	234	942	491	227	942	551	467	965	901	881	1035	937
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.0	39.5	35.3	32.6	38.5	29.3	46.7	11.8	9.5	44.7	10.0	8.8
Incr Delay (d2), s/veh	0.8	1.8	1.6	1.3	1.7	0.4	2.8	0.0	0.1	3.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.9	9.1	7.9	3.1	9.5	4.5	1.9	0.1	0.6	4.6	0.1	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.9	41.3	37.0	33.9	40.2	29.7	49.5	11.8	9.6	47.9	10.0	9.0
LnGrp LOS	C	D	D	C	D	C	D	B	A	D	B	A
Approach Vol, veh/h	697			693			120			287		
Approach Delay, s/veh	39.5			37.5			36.9			36.3		
Approach LOS	D			D			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.7	56.1	9.8	21.4	9.0	59.8	8.3	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	25.5	23.5	6.5	26.5	13.5	35.5	6.5	26.5				
Max Q Clear Time (g_c+I1), s	7.7	2.9	5.9	13.9	4.3	4.1	4.4	14.7				
Green Ext Time (p_c), s	0.6	0.1	0.0	3.0	0.1	0.3	0.0	2.8				
Intersection Summary												
HCM 6th Ctrl Delay	38.0											
HCM 6th LOS	D											









Queues  
8: Wenatchee Rd & 38th Ave

2030 Background  
AM Peak

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	565	114	49	661	33	16
v/c Ratio	0.18	0.08	0.07	0.21	0.05	0.03
Control Delay	1.7	1.1	2.4	1.8	7.3	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1.7	1.1	2.4	1.8	7.3	5.0
Queue Length 50th (ft)	0	0	0	0	1	0
Queue Length 95th (ft)	40	11	12	47	16	7
Internal Link Dist (ft)	2767			440	342	
Turn Bay Length (ft)		100	100		100	
Base Capacity (vph)	3539	1583	820	3539	1654	1480
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.07	0.06	0.19	0.02	0.01
Intersection Summary						






# HCM 6th Signalized Intersection Summary 8: Wenatchee Rd & 38th Ave





2030 Background  
AM Peak

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↓	↑↑	↓	↑
Traffic Volume (veh/h)	520	105	45	608	30	15
Future Volume (veh/h)	520	105	45	608	30	15
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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	565	114	49	661	33	16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1814	809	662	1814	105	94
Arrive On Green	0.51	0.51	0.51	0.51	0.06	0.06
Sat Flow, veh/h	3647	1585	761	3647	1781	1585
Grp Volume(v), veh/h	565	114	49	661	33	16
Grp Sat Flow(s),veh/h/ln	1777	1585	761	1777	1781	1585
Q Serve(g_s), s	1.9	0.8	0.8	2.3	0.4	0.2
Cycle Q Clear(g_c), s	1.9	0.8	2.8	2.3	0.4	0.2
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1814	809	662	1814	105	94
V/C Ratio(X)	0.31	0.14	0.07	0.36	0.31	0.17
Avail Cap(c_a), veh/h	11809	5267	2802	11809	1831	1629
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	3.0	2.7	3.8	3.1	9.4	9.3
Incr Delay (d2), s/veh	0.1	0.1	0.0	0.1	1.7	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	0.0	0.1	0.1	0.2	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	3.1	2.8	3.8	3.2	11.1	10.2
LnGrp LOS	A	A	A	A	B	B
Approach Vol, veh/h	679			710	49	
Approach Delay, s/veh	3.0			3.2	10.8	
Approach LOS	A			A	B	
Timer - Assigned Phs	2		4		8	
Phs Duration (G+Y+Rc), s	5.7		15.2		15.2	
Change Period (Y+Rc), s	4.5		4.5		4.5	
Max Green Setting (Gmax), s	21.5		69.5		69.5	
Max Q Clear Time (g_c+l1), s	2.4		3.9		4.8	
Green Ext Time (p_c), s	0.1		4.9		5.9	
Intersection Summary						
HCM 6th Ctrl Delay			3.4			
HCM 6th LOS			A			

## Notes













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

Intersection						
Int Delay, s/veh	4.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	55	105	100	124	145	45
Future Vol, veh/h	55	105	100	124	145	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	-	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	60	114	109	135	158	49
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	511	158	207	0	-	0
Stage 1	158	-	-	-	-	-
Stage 2	353	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	523	887	1364	-	-	-
Stage 1	871	-	-	-	-	-
Stage 2	723	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	481	887	1364	-	-	-
Mov Cap-2 Maneuver	481	-	-	-	-	-
Stage 1	801	-	-	-	-	-
Stage 2	723	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	12	3.5		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1364	-	688	-	-	
HCM Lane V/C Ratio	0.08	-	0.253	-	-	
HCM Control Delay (s)	7.9	-	12	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0.3	-	1	-	-	

Intersection						
Int Delay, s/veh	1.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	40	60	224	225	25
Future Vol, veh/h	0	40	60	224	225	25
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, %	2	2	2	2	2	2
Mvmt Flow	0	43	65	243	245	27
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	259	272	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	4.12	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	0	780	1291	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	780	1291	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	9.9	1.7		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1291	-	780	-	-	
HCM Lane V/C Ratio	0.051	-	0.056	-	-	
HCM Control Delay (s)	7.9	-	9.9	-	-	
HCM Lane LOS	A	-	A	-	-	
HCM 95th %tile Q(veh)	0.2	-	0.2	-	-	

























Queues  
6: Tibet Rd & 38th Ave

2030 Background  
PM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	78	622	91	39	551	217	196	13	82	191	5	91
v/c Ratio	0.34	0.68	0.13	0.20	0.72	0.30	0.52	0.02	0.10	0.51	0.01	0.10
Control Delay	25.3	37.5	3.7	10.8	26.9	9.3	46.6	21.1	4.2	46.5	21.4	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.3	37.5	3.7	10.8	26.9	9.3	46.6	21.1	4.2	46.5	21.4	3.6
Queue Length 50th (ft)	34	191	0	4	180	82	61	5	0	60	2	0
Queue Length 95th (ft)	61	233	25	14	231	128	94	19	27	92	10	27
Internal Link Dist (ft)	1242			2767			392			425		
Turn Bay Length (ft)	300		300	300		300	300		200	300		200
Base Capacity (vph)	243	1079	893	199	973	893	806	778	859	806	776	906
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.58	0.10	0.20	0.57	0.24	0.24	0.02	0.10	0.24	0.01	0.10
Intersection Summary												

# HCM 6th Signalized Intersection Summary 6: Tibet Rd & 38th Ave

2030 Background  
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	72	572	84	36	507	200	180	12	75	176	5	84
Future Volume (veh/h)	72	572	84	36	507	200	180	12	75	176	5	84
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	78	622	91	39	551	217	196	13	82	191	5	91
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	196	786	478	172	732	451	278	911	824	273	908	846
Arrive On Green	0.05	0.22	0.22	0.01	0.07	0.07	0.08	0.49	0.49	0.08	0.49	0.49
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	3456	1870	1585	3456	1870	1585
Grp Volume(v), veh/h	78	622	91	39	551	217	196	13	82	191	5	91
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1728	1870	1585	1728	1870	1585
Q Serve(g_s), s	3.4	16.5	4.3	1.7	15.2	12.0	5.5	0.4	2.6	5.4	0.1	2.8
Cycle Q Clear(g_c), s	3.4	16.5	4.3	1.7	15.2	12.0	5.5	0.4	2.6	5.4	0.1	2.8
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	196	786	478	172	732	451	278	911	824	273	908	846
V/C Ratio(X)	0.40	0.79	0.19	0.23	0.75	0.48	0.70	0.01	0.10	0.70	0.01	0.11
Avail Cap(c_a), veh/h	261	1084	611	211	977	561	812	911	824	812	908	846
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	0.86	0.86	0.86	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.4	36.8	25.9	31.5	44.1	35.1	44.8	13.3	12.1	44.9	13.3	11.5
Incr Delay (d2), s/veh	1.3	2.8	0.2	0.6	2.0	0.7	3.3	0.0	0.2	3.3	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.7	11.8	2.9	1.4	11.6	8.6	4.5	0.3	1.7	4.4	0.1	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.7	39.6	26.1	32.1	46.1	35.8	48.1	13.3	12.4	48.2	13.3	11.8
LnGrp LOS	C	D	C	C	D	D	D	B	B	D	B	B
Approach Vol, veh/h	791			807			291			287		
Approach Delay, s/veh	37.2			42.6			36.5			36.0		
Approach LOS	D			D			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.4	53.2	7.8	26.6	12.5	53.0	9.3	25.1				
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	23.5	22.5	5.5	30.5	23.5	22.5	8.5	27.5				
Max Q Clear Time (g_c+l1), s	7.4	4.6	3.7	18.5	7.5	4.8	5.4	17.2				
Green Ext Time (p_c), s	0.5	0.2	0.0	3.6	0.6	0.2	0.0	3.3				
Intersection Summary												
HCM 6th Ctrl Delay	39.0											
HCM 6th LOS	D											







Queues  
8: Wenatchee Rd & 38th Ave

2030 Background  
PM Peak

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	851	43	16	688	120	43
v/c Ratio	0.69	0.07	0.15	0.56	0.12	0.05
Control Delay	52.9	25.1	23.0	27.6	12.4	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.9	25.1	23.0	27.6	12.4	4.4
Queue Length 50th (ft)	306	10	7	184	34	0
Queue Length 95th (ft)	368	m31	21	206	75	18
Internal Link Dist (ft)	2767			440	342	
Turn Bay Length (ft)		100	100		100	
Base Capacity (vph)	2211	1005	195	2211	996	909
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.04	0.08	0.31	0.12	0.05
<b>Intersection Summary</b>						
m Volume for 95th percentile queue is metered by upstream signal.						

# HCM 6th Signalized Intersection Summary 8: Wenatchee Rd & 38th Ave

2030 Background  
PM Peak






						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↓	↑↑	↓	↑
Traffic Volume (veh/h)	783	40	15	633	110	40
Future Volume (veh/h)	783	40	15	633	110	40
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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	851	43	16	688	120	43
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1176	524	136	1176	1032	918
Arrive On Green	0.11	0.11	0.33	0.33	0.58	0.58
Sat Flow, veh/h	3647	1585	648	3647	1781	1585
Grp Volume(v), veh/h	851	43	16	688	120	43
Grp Sat Flow(s),veh/h/ln	1777	1585	648	1777	1781	1585
Q Serve(g_s), s	23.2	2.4	2.3	16.1	3.0	1.2
Cycle Q Clear(g_c), s	23.2	2.4	25.4	16.1	3.0	1.2
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1176	524	136	1176	1032	918
V/C Ratio(X)	0.72	0.08	0.12	0.59	0.12	0.05
Avail Cap(c_a), veh/h	2221	991	327	2221	1032	918
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.78	0.78	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.1	30.9	41.6	27.8	9.5	9.1
Incr Delay (d2), s/veh	0.7	0.1	0.4	0.5	0.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	15.9	1.7	0.7	11.0	2.2	0.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	40.8	30.9	42.0	28.2	9.7	9.2
LnGrp LOS	D	C	D	C	A	A
Approach Vol, veh/h	894			704	163	
Approach Delay, s/veh	40.3			28.5	9.6	
Approach LOS	D			C	A	
Timer - Assigned Phs	2		4		8	
Phs Duration (G+Y+Rc), s	62.4		37.6		37.6	
Change Period (Y+Rc), s	4.5		4.5		4.5	
Max Green Setting (Gmax), s	28.5		62.5		62.5	
Max Q Clear Time (g_c+l1), s	5.0		25.2		27.4	
Green Ext Time (p_c), s	0.4		7.4		5.6	
Intersection Summary						
HCM 6th Ctrl Delay			32.8			
HCM 6th LOS			C			







## APPENDIX C. LONG RANGE FUTURE BACKGROUND LEVEL OF SERVICE

HCM 6th TWSC  
3: Tibet Rd & 42nd Ave













2045 Background  
AM Peak

Intersection						
Int Delay, s/veh	3.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	60	70	70	255	390	40
Future Vol, veh/h	60	70	70	255	390	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	-	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	65	76	76	277	424	43
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	853	424	467	0	-	0
Stage 1	424	-	-	-	-	-
Stage 2	429	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	328	630	1094	-	-	-
Stage 1	660	-	-	-	-	-
Stage 2	694	-	-	-	-	-
Platoon blocked, %	1			-	-	-
Mov Cap-1 Maneuver	306	630	1094	-	-	-
Mov Cap-2 Maneuver	306	-	-	-	-	-
Stage 1	614	-	-	-	-	-
Stage 2	694	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	17.7	1.8		0		
HCM LOS	C					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1094	-	423	-	-	
HCM Lane V/C Ratio	0.07	-	0.334	-	-	
HCM Control Delay (s)	8.5	-	17.7	-	-	
HCM Lane LOS	A	-	C	-	-	
HCM 95th %tile Q(veh)	0.2	-	1.4	-	-	

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	45	20	325	455	5
Future Vol, veh/h	0	45	20	325	455	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	100	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	49	22	353	495	5
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	498	500	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	4.12	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	0	572	1064	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	572	1064	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	11.9	0.5		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1064	-	572	-	-	
HCM Lane V/C Ratio	0.02	-	0.086	-	-	
HCM Control Delay (s)	8.5	-	11.9	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-	

Queues  
6: Tibet Rd & 38th Ave

2045 Background  
AM Peak

























												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	114	989	440	185	1065	250	179	11	71	353	16	174
v/c Ratio	0.56	0.81	0.45	0.73	0.81	0.26	0.53	0.02	0.11	0.74	0.03	0.25
Control Delay	29.6	41.7	2.8	48.8	59.6	3.9	56.6	39.5	9.9	45.4	28.7	17.0
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	29.6	41.7	2.8	48.8	59.6	3.9	56.6	39.5	9.9	45.4	28.7	17.0
Queue Length 50th (ft)	47	363	0	134	463	2	69	6	8	95	9	76
Queue Length 95th (ft)	84	417	45	165	457	28	103	25	41	m140	m25	m130
Internal Link Dist (ft)	1242		2767				392		425			
Turn Bay Length (ft)	300	300		300	300		300	200		300	200	
Base Capacity (vph)	290	1371	1022	302	1420	1000	443	483	718	534	559	774
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.72	0.43	0.61	0.75	0.25	0.40	0.02	0.10	0.66	0.03	0.22

Intersection Summary

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

# HCM 6th Signalized Intersection Summary 6: Tibet Rd & 38th Ave

2045 Background  
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	105	910	405	170	980	230	165	10	65	325	15	160
Future Volume (veh/h)	105	910	405	170	980	230	165	10	65	325	15	160
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	114	989	440	185	1065	250	179	11	71	353	16	174
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	196	1187	640	240	1282	764	242	580	626	419	676	665
Arrive On Green	0.06	0.33	0.33	0.06	0.24	0.24	0.07	0.31	0.31	0.12	0.36	0.36
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	3456	1870	1585	3456	1870	1585
Grp Volume(v), veh/h	114	989	440	185	1065	250	179	11	71	353	16	174
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1728	1870	1585	1728	1870	1585
Q Serve(g_s), s	5.0	30.8	27.5	7.9	34.1	13.0	6.1	0.5	3.4	12.0	0.7	8.6
Cycle Q Clear(g_c), s	5.0	30.8	27.5	7.9	34.1	13.0	6.1	0.5	3.4	12.0	0.7	8.6
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	196	1187	640	240	1282	764	242	580	626	419	676	665
V/C Ratio(X)	0.58	0.83	0.69	0.77	0.83	0.33	0.74	0.02	0.11	0.84	0.02	0.26
Avail Cap(c_a), veh/h	322	1377	725	334	1407	819	446	580	626	533	676	665
HCM Platoon Ratio	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.75	0.75	0.75	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.1	36.9	29.5	29.2	42.0	23.1	54.7	28.7	23.0	51.6	24.7	22.7
Incr Delay (d2), s/veh	2.7	4.0	2.3	5.4	3.1	0.2	4.4	0.1	0.4	9.6	0.1	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.1	20.0	16.1	6.6	21.8	8.5	5.0	0.4	2.4	9.7	0.6	6.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.8	40.9	31.8	34.6	45.1	23.3	59.2	28.8	23.4	61.2	24.8	23.7
LnGrp LOS	C	D	C	C	D	C	E	C	C	E	C	C
Approach Vol, veh/h		1543			1500			261			543	
Approach Delay, s/veh		37.6			40.2			48.2			48.1	
Approach LOS		D			D			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	41.7	14.7	44.6	12.9	47.8	11.5	47.8				
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	18.5	20.5	16.5	46.5	15.5	23.5	15.5	47.5				
Max Q Clear Time (g_c+l1), s	14.0	5.4	9.9	32.8	8.1	10.6	7.0	36.1				
Green Ext Time (p_c), s	0.5	0.2	0.3	7.3	0.3	0.5	0.2	6.3				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay			40.8									
HCM 6th LOS			D									
<b>Notes</b>												
User approved pedestrian interval to be less than phase max green.												







Queues  
8: Wenatchee Rd & 38th Ave

2045 Background  
AM Peak

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1299	114	49	1467	33	16
v/c Ratio	0.56	0.11	0.25	0.63	0.07	0.04
Control Delay	25.4	5.9	9.2	12.9	40.8	19.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.4	5.9	9.2	12.9	40.8	19.3
Queue Length 50th (ft)	560	34	14	318	19	0
Queue Length 95th (ft)	518	m33	19	201	55	22
Internal Link Dist (ft)	2767			440	342	
Turn Bay Length (ft)		100	100		100	
Base Capacity (vph)	2875	1307	238	2875	468	431
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.09	0.21	0.51	0.07	0.04
<b>Intersection Summary</b>						
m Volume for 95th percentile queue is metered by upstream signal.						






# HCM 6th Signalized Intersection Summary 8: Wenatchee Rd & 38th Ave

2045 Background  
AM Peak





						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Volume (veh/h)	1195	105	45	1350	30	15
Future Volume (veh/h)	1195	105	45	1350	30	15
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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1299	114	49	1467	33	16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2159	963	165	2159	565	503
Arrive On Green	0.20	0.20	0.61	0.61	0.32	0.32
Sat Flow, veh/h	3647	1585	380	3647	1781	1585
Grp Volume(v), veh/h	1299	114	49	1467	33	16
Grp Sat Flow(s),veh/h/ln	1777	1585	380	1777	1781	1585
Q Serve(g_s), s	39.9	7.1	12.9	33.1	1.5	0.8
Cycle Q Clear(g_c), s	39.9	7.1	52.7	33.1	1.5	0.8
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2159	963	165	2159	565	503
V/C Ratio(X)	0.60	0.12	0.30	0.68	0.06	0.03
Avail Cap(c_a), veh/h	2887	1288	243	2887	565	503
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.57	0.57	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.8	21.6	36.2	15.7	28.5	28.2
Incr Delay (d2), s/veh	0.2	0.0	1.0	0.4	0.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	24.4	4.8	2.2	18.7	1.3	0.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	34.9	21.7	37.2	16.1	28.7	28.4
LnGrp LOS	C	C	D	B	C	C
Approach Vol, veh/h	1413			1516	49	
Approach Delay, s/veh	33.8			16.8	28.6	
Approach LOS	C			B	C	
Timer - Assigned Phs	2		4		8	
Phs Duration (G+Y+Rc), s	42.6		77.4		77.4	
Change Period (Y+Rc), s	4.5		4.5		4.5	
Max Green Setting (Gmax), s	13.5		97.5		97.5	
Max Q Clear Time (g_c+I1), s	3.5		41.9		54.7	
Green Ext Time (p_c), s	0.1		15.2		18.2	
Intersection Summary						
HCM 6th Ctrl Delay			25.1			
HCM 6th LOS			C			

HCM 6th TWSC  
3: Tibet Rd & 42nd Ave

2045 Background  
PM Peak













Intersection						
Int Delay, s/veh	4.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	55	105	100	335	420	45
Future Vol, veh/h	55	105	100	335	420	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	-	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	60	114	109	364	457	49
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1039	457	506	0	-	0
Stage 1	457	-	-	-	-	-
Stage 2	582	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	236	604	1059	-	-	-
Stage 1	638	-	-	-	-	-
Stage 2	577	-	-	-	-	-
Platoon blocked, %	1			-	-	-
Mov Cap-1 Maneuver	212	604	1059	-	-	-
Mov Cap-2 Maneuver	212	-	-	-	-	-
Stage 1	572	-	-	-	-	-
Stage 2	577	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	23.2	2		0		
HCM LOS	C					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1059	-	369	-	-	
HCM Lane V/C Ratio	0.103	-	0.471	-	-	
HCM Control Delay (s)	8.8	-	23.2	-	-	
HCM Lane LOS	A	-	C	-	-	
HCM 95th %tile Q(veh)	0.3	-	2.4	-	-	



Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	40	60	435	500	25
Future Vol, veh/h	0	40	60	435	500	25
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, %	2	2	2	2	2	2
Mvmt Flow	0	43	65	473	543	27
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	557	570	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	4.12	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	0	530	1002	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	530	1002	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	12.4	1.1		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1002	-	530	-	-	
HCM Lane V/C Ratio	0.065	-	0.082	-	-	
HCM Control Delay (s)	8.8	-	12.4	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0.2	-	0.3	-	-	

Queues  
6: Tibet Rd & 38th Ave

2045 Background  
PM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	174	1380	201	87	1223	337	435	27	179	375	11	201
v/c Ratio	0.76	0.88	0.19	0.55	0.86	0.32	0.82	0.07	0.32	0.79	0.03	0.36
Control Delay	45.6	38.3	1.5	36.5	56.0	2.4	62.7	40.0	17.5	62.0	30.6	20.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.6	38.3	1.5	36.5	56.0	2.4	62.7	40.0	17.5	62.0	30.6	20.3
Queue Length 50th (ft)	78	492	0	45	526	0	168	17	49	144	6	107
Queue Length 95th (ft)	#175	595	25	m83	598	46	#228	44	112	m192	m14	m165
Internal Link Dist (ft)	1242				2767				392			
Turn Bay Length (ft)	300		300	300		300	300		200	300		200
Base Capacity (vph)	245	1607	1088	158	1435	1066	557	402	552	500	371	576
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	0.71	0.86	0.18	0.55	0.85	0.32	0.78	0.07	0.32	0.75	0.03	0.35

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 6: Tibet Rd & 38th Ave

2045 Background  
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	1270	185	80	1125	310	400	25	165	345	10	185
Future Volume (veh/h)	160	1270	185	80	1125	310	400	25	165	345	10	185
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	174	1380	201	87	1223	337	435	27	179	375	11	201
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	215	1533	912	159	1424	835	497	466	463	436	434	484
Arrive On Green	0.07	0.43	0.43	0.03	0.27	0.27	0.14	0.25	0.25	0.13	0.23	0.23
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	3456	1870	1585	3456	1870	1585
Grp Volume(v), veh/h	174	1380	201	87	1223	337	435	27	179	375	11	201
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1728	1870	1585	1728	1870	1585
Q Serve(g_s), s	6.7	43.3	7.4	3.4	39.3	17.2	14.8	1.3	10.8	12.8	0.5	12.1
Cycle Q Clear(g_c), s	6.7	43.3	7.4	3.4	39.3	17.2	14.8	1.3	10.8	12.8	0.5	12.1
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	215	1533	912	159	1424	835	497	466	463	436	434	484
V/C Ratio(X)	0.81	0.90	0.22	0.55	0.86	0.40	0.87	0.06	0.39	0.86	0.03	0.42
Avail Cap(c_a), veh/h	270	1614	948	179	1436	841	562	466	463	504	434	484
HCM Platoon Ratio	1.00	1.00	1.00	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.80	0.80	0.80	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.2	31.7	12.4	28.5	40.7	21.3	50.3	34.3	33.9	51.4	35.6	33.2
Incr Delay (d2), s/veh	13.5	7.1	0.1	2.3	4.4	0.3	13.3	0.2	2.4	12.6	0.1	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	6.4	26.9	4.7	2.8	25.1	10.7	11.7	1.1	8.0	10.4	0.5	8.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.7	38.8	12.5	30.8	45.1	21.6	63.6	34.5	36.3	64.0	35.7	35.8
LnGrp LOS	D	D	B	C	D	C	E	C	D	E	D	D
Approach Vol, veh/h	1755			1647			641			587		
Approach Delay, s/veh	35.9			39.5			54.7			53.8		
Approach LOS	D			D			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.7	34.4	9.6	56.3	21.8	32.3	13.3	52.6				
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	17.5	23.5	6.5	54.5	19.5	21.5	12.5	48.5				
Max Q Clear Time (g_c+I1), s	14.8	12.8	5.4	45.3	16.8	14.1	8.7	41.3				
Green Ext Time (p_c), s	0.4	0.5	0.0	6.5	0.5	0.4	0.2	5.1				
Intersection Summary												
HCM 6th Ctrl Delay	42.1											
HCM 6th LOS	D											







Queues  
8: Wenatchee Rd & 38th Ave

2045 Background  
PM Peak

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1891	43	16	1527	120	43
v/c Ratio	0.71	0.04	0.16	0.58	0.38	0.14
Control Delay	21.0	4.5	7.8	7.6	48.8	16.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.0	4.5	7.8	7.6	48.8	16.2
Queue Length 50th (ft)	595	9	3	221	85	3
Queue Length 95th (ft)	690	m10	11	266	146	36
Internal Link Dist (ft)	2767			440	342	
Turn Bay Length (ft)		100	100		100	
Base Capacity (vph)	2698	1213	103	2698	313	312
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.04	0.16	0.57	0.38	0.14
<b>Intersection Summary</b>						
m Volume for 95th percentile queue is metered by upstream signal.						

# HCM 6th Signalized Intersection Summary 8: Wenatchee Rd & 38th Ave







2045 Background  
PM Peak

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↖	↑↑	↖	↗
Traffic Volume (veh/h)	1740	40	15	1405	110	40
Future Volume (veh/h)	1740	40	15	1405	110	40
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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1891	43	16	1527	120	43
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2345	1046	108	2345	472	420
Arrive On Green	0.44	0.44	0.66	0.66	0.27	0.27
Sat Flow, veh/h	3647	1585	240	3647	1781	1585
Grp Volume(v), veh/h	1891	43	16	1527	120	43
Grp Sat Flow(s),veh/h/ln	1777	1585	240	1777	1781	1585
Q Serve(g_s), s	55.4	1.8	6.9	30.8	6.4	2.5
Cycle Q Clear(g_c), s	55.4	1.8	62.2	30.8	6.4	2.5
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2345	1046	108	2345	472	420
V/C Ratio(X)	0.81	0.04	0.15	0.65	0.25	0.10
Avail Cap(c_a), veh/h	2710	1209	132	2710	472	420
HCM Platoon Ratio	0.67	0.67	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.48	0.48	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.8	11.9	41.3	12.2	34.7	33.3
Incr Delay (d2), s/veh	0.8	0.0	0.6	0.5	1.3	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	30.4	1.1	0.8	17.0	5.3	1.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	27.6	11.9	41.9	12.6	36.0	33.8
LnGrp LOS	C	B	D	B	D	C
Approach Vol, veh/h	1934			1543	163	
Approach Delay, s/veh	27.3			12.9	35.4	
Approach LOS	C			B	D	
Timer - Assigned Phs	2		4		8	
Phs Duration (G+Y+Rc), s	36.3		83.7		83.7	
Change Period (Y+Rc), s	4.5		4.5		4.5	
Max Green Setting (Gmax), s	19.5		91.5		91.5	
Max Q Clear Time (g_c+l1), s	8.4		57.4		64.2	
Green Ext Time (p_c), s	0.3		21.8		14.9	
Intersection Summary						
HCM 6th Ctrl Delay			21.6			
HCM 6th LOS			C			

## APPENDIX D.      SHORT TERM FUTURE TOTAL TRAFFIC LEVEL OF SERVICE





HCM 6th TWSC  
1: Tibet Rd & 44th Ave

2030 Total  
AM Peak

Intersection						
Int Delay, s/veh	2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	58	34	217	16	13	252
Future Vol, veh/h	58	34	217	16	13	252
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	-	100	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	63	37	236	17	14	274
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	538	236	0	0	253	0
Stage 1	236	-	-	-	-	-
Stage 2	302	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	504	910	-	-	1343	-
Stage 1	860	-	-	-	-	-
Stage 2	804	-	-	-	-	-
Platoon blocked, %		1	-	-	1	-
Mov Cap-1 Maneuver	499	910	-	-	1343	-
Mov Cap-2 Maneuver	499	-	-	-	-	-
Stage 1	860	-	-	-	-	-
Stage 2	796	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	11.7	0		0.4		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	499	910	1343	-
HCM Lane V/C Ratio	-	-	0.126	0.041	0.011	-
HCM Control Delay (s)	-	-	13.3	9.1	7.7	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.4	0.1	0	-

HCM 6th TWSC  
2: Tibet Rd & 43rd Ave

2030 Total  
AM Peak

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	6	5	228	2	1	309
Future Vol, veh/h	6	5	228	2	1	309
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	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	5	248	2	1	336

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	587	249	0	0	250
Stage 1	249	-	-	-	-
Stage 2	338	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	472	892	-	-	1347
Stage 1	846	-	-	-	-
Stage 2	792	-	-	-	-
Platoon blocked, %		1	-	-	1
Mov Cap-1 Maneuver	472	892	-	-	1347
Mov Cap-2 Maneuver	472	-	-	-	-
Stage 1	846	-	-	-	-
Stage 2	791	-	-	-	-










Approach	WB	NB	SB
HCM Control Delay, s	11.1	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	601	1347
HCM Lane V/C Ratio	-	-	0.02	0.001
HCM Control Delay (s)	-	-	11.1	7.7
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0



HCM 6th TWSC  
3: Tibet Rd & 42nd Ave

2030 Total  
AM Peak

Intersection												
Int Delay, s/veh	4.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	63	9	86	15	11	10	93	157	5	17	248	50
Future Vol, veh/h	63	9	86	15	11	10	93	157	5	17	248	50
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	100	-	-	100	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	68	10	93	16	12	11	101	171	5	18	270	54

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	693	684	270	761	736	174	324	0	0	176	0	0
Stage 1	306	306	-	376	376	-	-	-	-	-	-	-
Stage 2	387	378	-	385	360	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	358	371	769	322	346	939	1236	-	-	1424	-	-
Stage 1	704	662	-	676	628	-	-	-	-	-	-	-
Stage 2	665	627	-	638	626	-	-	-	-	-	-	-
Platoon blocked, %						1		-	-	1	-	-
Mov Cap-1 Maneuver	319	336	769	257	313	939	1236	-	-	1424	-	-
Mov Cap-2 Maneuver	319	336	-	257	313	-	-	-	-	-	-	-
Stage 1	646	653	-	621	577	-	-	-	-	-	-	-
Stage 2	591	576	-	545	618	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	14.4		16.1		3		0.4	
HCM LOS	B		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1236	-	-	319	685	257	459	1424	-	-
HCM Lane V/C Ratio	0.082	-	-	0.215	0.151	0.063	0.05	0.013	-	-
HCM Control Delay (s)	8.2	-	-	19.3	11.2	20	13.3	7.6	-	-
HCM Lane LOS	A	-	-	C	B	C	B	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.8	0.5	0.2	0.2	0	-	-





HCM 6th TWSC  
4: Tibet Rd & 39th Ave

2030 Total  
AM Peak

Intersection												
Int Delay, s/veh	2.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗	↗	↗	↗	↗	↗	
Traffic Vol, veh/h	0	0	45	0	0	73	20	182	38	76	268	5
Future Vol, veh/h	0	0	45	0	0	73	20	182	38	76	268	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	100	-	100	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	49	0	0	79	22	198	41	83	291	5
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	-	-	294	-	-	198	296	0	0	239	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.22	-	-	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.318	-	-	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	0	745	0	0	934	1265	-	-	1351	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-
Platoon blocked, %						1		-	-	1	-	-
Mov Cap-1 Maneuver	-	-	745	-	-	934	1265	-	-	1351	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	10.2		9.2		0.7		1.7					
HCM LOS	B		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1265	-	-	745	934	1351	-	-				
HCM Lane V/C Ratio	0.017	-	-	0.066	0.085	0.061	-	-				
HCM Control Delay (s)	7.9	-	-	10.2	9.2	7.8	-	-				
HCM Lane LOS	A	-	-	B	A	A	-	-				
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.3	0.2	-	-				













HCM 6th TWSC  
5: Tibet Rd

2030 Total  
AM Peak

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	25	215	44	0	313
Future Vol, veh/h	0	25	215	44	0	313
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	27	234	48	0	340
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	-	234	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	913	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		1	-	-		-
Mov Cap-1 Maneuver	-	913	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	9.1	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBT		
Capacity (veh/h)	-	- 913		-		
HCM Lane V/C Ratio	-	- 0.03		-		
HCM Control Delay (s)	-	- 9.1		-		
HCM Lane LOS	-	- A		-		
HCM 95th %tile Q(veh)	-	- 0.1		-		

























Queues  
6: Tibet Rd & 38th Ave

2030 Total  
AM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	114	491	199	84	607	162	82	5	33	217	8	115
v/c Ratio	0.42	0.50	0.26	0.27	0.73	0.22	0.31	0.01	0.04	0.55	0.01	0.12
Control Delay	23.7	31.9	3.2	16.0	39.8	16.6	46.2	26.0	1.4	46.6	22.6	3.1
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	23.7	31.9	3.2	16.0	39.8	16.6	46.2	26.0	1.4	46.6	22.6	3.1
Queue Length 50th (ft)	47	143	0	50	214	62	25	2	0	68	3	0
Queue Length 95th (ft)	73	171	36	74	268	109	48	12	6	102	14	29
Internal Link Dist (ft)	1242			790			392			189		
Turn Bay Length (ft)	300		300	300		300	300		200	300		200
Base Capacity (vph)	311	1256	791	321	1114	767	360	686	822	499	758	962
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.39	0.25	0.26	0.54	0.21	0.23	0.01	0.04	0.43	0.01	0.12
Intersection Summary												

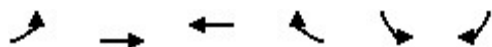
# HCM 6th Signalized Intersection Summary 6: Tibet Rd & 38th Ave

2030 Total  
AM Peak

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	105	452	183	77	558	149	75	5	30	200	7	106	
Future Volume (veh/h)	105	452	183	77	558	149	75	5	30	200	7	106	
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	
Adj Flow Rate, veh/h	114	491	199	84	607	162	82	5	33	217	8	115	
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, %	2	2	2	2	2	2	2	2	2	2	2	2	
Cap, veh/h	231	859	454	253	803	492	155	828	782	293	903	871	
Arrive On Green	0.07	0.24	0.24	0.02	0.07	0.07	0.04	0.44	0.44	0.08	0.48	0.48	
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	3456	1870	1585	3456	1870	1585	
Grp Volume(v), veh/h	114	491	199	84	607	162	82	5	33	217	8	115	
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1728	1870	1585	1728	1870	1585	
Q Serve(g_s), s	4.8	12.2	10.2	3.6	16.8	8.7	2.3	0.1	1.1	6.1	0.2	3.5	
Cycle Q Clear(g_c), s	4.8	12.2	10.2	3.6	16.8	8.7	2.3	0.1	1.1	6.1	0.2	3.5	
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00	
Lane Grp Cap(c), veh/h	231	859	454	253	803	492	155	828	782	293	903	871	
V/C Ratio(X)	0.49	0.57	0.44	0.33	0.76	0.33	0.53	0.01	0.04	0.74	0.01	0.13	
Avail Cap(c_a), veh/h	335	1262	634	314	1119	634	363	828	782	501	903	871	
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	0.77	0.77	0.77	1.00	1.00	1.00	1.00	1.00	1.00	
Uniform Delay (d), s/veh	28.4	33.4	29.1	29.1	43.6	32.0	46.7	15.6	13.1	44.7	13.4	11.0	
Incr Delay (d2), s/veh	1.6	0.6	0.7	0.6	1.5	0.3	2.8	0.0	0.1	3.7	0.0	0.3	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(95%),veh/ln	3.9	9.0	7.1	2.9	12.2	6.4	1.9	0.1	0.7	5.0	0.2	2.3	
Unsig. Movement Delay, s/veh													
LnGrp Delay(d),s/veh	30.0	34.0	29.8	29.7	45.1	32.3	49.5	15.6	13.2	48.4	13.5	11.3	
LnGrp LOS	C	C	C	C	D	C	D	B	B	D	B	B	
Approach Vol, veh/h	804				853				120				340
Approach Delay, s/veh	32.4				41.1				38.1				35.0
Approach LOS	C				D				D				C
Timer - Assigned Phs	1	2	3	4	5	6	7	8					
Phs Duration (G+Y+Rc), s	13.0	48.8	9.6	28.7	9.0	52.8	11.2	27.1					
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	14.5	23.5	8.5	35.5	10.5	27.5	12.5	31.5					
Max Q Clear Time (g_c+I1), s	8.1	3.1	5.6	14.2	4.3	5.5	6.8	18.8					
Green Ext Time (p_c), s	0.4	0.1	0.0	4.0	0.1	0.4	0.1	3.8					
Intersection Summary													
HCM 6th Ctrl Delay	36.6												
HCM 6th LOS	D												
Notes													

Queues  
7: 38th Ave & Ukraine St

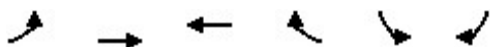
2030 Total  
AM Peak









Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	142	599	628	157	223	224
v/c Ratio	0.47	0.41	0.73	0.12	0.25	0.25
Control Delay	10.7	7.7	12.8	1.7	17.2	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.7	7.7	12.8	1.7	17.2	3.3
Queue Length 50th (ft)	29	134	69	0	78	0
Queue Length 95th (ft)	45	156	211	30	153	45
Internal Link Dist (ft)		790	1897		419	
Turn Bay Length (ft)	150			150		
Base Capacity (vph)	355	2034	1327	1282	885	904
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.29	0.47	0.12	0.25	0.25
Intersection Summary						

# HCM 6th Signalized Intersection Summary 7: 38th Ave & Ukraine St







2030 Total  
AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Volume (veh/h)	131	551	578	144	205	206	
Future Volume (veh/h)	131	551	578	144	205	206	
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	1870	1870	1870	1870	1870	1870	
Adj Flow Rate, veh/h	142	599	628	157	223	224	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Percent Heavy Veh, %	2	2	2	2	2	2	
Cap, veh/h	259	1252	812	1246	994	884	
Arrive On Green	0.16	0.70	0.30	0.30	0.56	0.56	
Sat Flow, veh/h	1781	3647	3647	1585	1781	1585	
Grp Volume(v), veh/h	142	599	628	157	223	224	
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1585	1781	1585	
Q Serve(g_s), s	5.8	7.5	16.1	2.2	6.3	7.3	
Cycle Q Clear(g_c), s	5.8	7.5	16.1	2.2	6.3	7.3	
Prop In Lane	1.00			1.00	1.00	1.00	
Lane Grp Cap(c), veh/h	259	1252	812	1246	994	884	
V/C Ratio(X)	0.55	0.48	0.77	0.13	0.22	0.25	
Avail Cap(c_a), veh/h	395	2043	1333	1479	994	884	
HCM Platoon Ratio	2.00	2.00	1.33	1.33	1.00	1.00	
Upstream Filter(I)	0.86	0.86	0.72	0.72	1.00	1.00	
Uniform Delay (d), s/veh	24.3	10.7	32.5	2.3	11.2	11.4	
Incr Delay (d2), s/veh	1.6	0.2	1.2	0.0	0.5	0.7	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(95%),veh/ln	4.2	4.1	10.0	5.2	4.6	14.1	
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	25.9	10.9	33.6	2.3	11.7	12.1	
LnGrp LOS	C	B	C	A	B	B	
Approach Vol, veh/h		741	785	447			
Approach Delay, s/veh		13.8	27.4	11.9			
Approach LOS		B	C	B			
Timer - Assigned Phs				4	6	7	8
Phs Duration (G+Y+Rc), s				39.7	60.3	12.4	27.3
Change Period (Y+Rc), s				4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s				57.5	33.5	15.5	37.5
Max Q Clear Time (g_c+I1), s				9.5	9.3	7.8	18.1
Green Ext Time (p_c), s				4.7	1.4	0.2	4.8
Intersection Summary							
HCM 6th Ctrl Delay			18.8				
HCM 6th LOS			B				

Queues  
8: Wenatchee Rd & 38th Ave

2030 Total  
AM Peak

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	708	114	49	752	33	16
v/c Ratio	0.63	0.20	0.38	0.67	0.03	0.02
Control Delay	24.7	7.0	33.3	32.3	10.7	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.7	7.0	33.3	32.3	10.7	5.5
Queue Length 50th (ft)	218	18	24	217	8	0
Queue Length 95th (ft)	270	43	53	243	26	11
Internal Link Dist (ft)	1897			440	342	
Turn Bay Length (ft)		100	100		100	
Base Capacity (vph)	2530	1164	294	2530	1051	946
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.10	0.17	0.30	0.03	0.02
Intersection Summary						









# HCM 6th Signalized Intersection Summary 8: Wenatchee Rd & 38th Ave

2030 Total  
AM Peak

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↙	↑↑	↙	↗
Traffic Volume (veh/h)	651	105	45	692	30	15
Future Volume (veh/h)	651	105	45	692	30	15
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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	708	114	49	752	33	16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1116	498	176	1116	1062	945
Arrive On Green	0.42	0.42	0.31	0.31	0.60	0.60
Sat Flow, veh/h	3647	1585	666	3647	1781	1585
Grp Volume(v), veh/h	708	114	49	752	33	16
Grp Sat Flow(s),veh/h/ln	1777	1585	666	1777	1781	1585
Q Serve(g_s), s	15.8	4.6	6.7	18.4	0.8	0.4
Cycle Q Clear(g_c), s	15.8	4.6	22.5	18.4	0.8	0.4
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1116	498	176	1116	1062	945
V/C Ratio(X)	0.63	0.23	0.28	0.67	0.03	0.02
Avail Cap(c_a), veh/h	2541	1133	443	2541	1062	945
HCM Platoon Ratio	1.33	1.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.94	0.94	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.6	21.3	38.4	29.8	8.3	8.2
Incr Delay (d2), s/veh	0.6	0.2	0.9	0.7	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.9	3.0	2.0	12.4	0.5	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	25.1	21.5	39.3	30.6	8.4	8.3
LnGrp LOS	C	C	D	C	A	A
Approach Vol, veh/h	822			801	49	
Approach Delay, s/veh	24.6			31.1	8.3	
Approach LOS	C			C	A	
Timer - Assigned Phs	2		4		8	
Phs Duration (G+Y+Rc), s	64.1		35.9		35.9	
Change Period (Y+Rc), s	4.5		4.5		4.5	
Max Green Setting (Gmax), s	19.5		71.5		71.5	
Max Q Clear Time (g_c+l1), s	2.8		17.8		24.5	
Green Ext Time (p_c), s	0.1		6.3		6.9	
Intersection Summary						
HCM 6th Ctrl Delay			27.3			
HCM 6th LOS			C			





HCM 6th TWSC  
1: Tibet Rd & 44th Ave

2030 Total  
PM Peak

Intersection						
Int Delay, s/veh	1.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	32	20	236	39	29	271
Future Vol, veh/h	32	20	236	39	29	271
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	-	100	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	35	22	257	42	32	295
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	616	257	0	0	299	0
Stage 1	257	-	-	-	-	-
Stage 2	359	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	*454	*887	-	-	1292	-
Stage 1	*836	-	-	-	-	-
Stage 2	*759	-	-	-	-	-
Platoon blocked, %		1	-	-	1	-
Mov Cap-1 Maneuver	*443	*887	-	-	1292	-
Mov Cap-2 Maneuver	*443	-	-	-	-	-
Stage 1	*836	-	-	-	-	-
Stage 2	*740	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	12	0		0.8		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	443	887	1292	-
HCM Lane V/C Ratio	-	-	0.079	0.025	0.024	-
HCM Control Delay (s)	-	-	13.8	9.2	7.9	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0.1	0.1	-
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

HCM 6th TWSC  
2: Tibet Rd & 43rd Ave

2030 Total  
PM Peak

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	2	273	4	2	301
Future Vol, veh/h	3	2	273	4	2	301
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	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	2	297	4	2	327

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	630	299	0
Stage 1	299	-	-
Stage 2	331	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	*446	*856	-
Stage 1	*807	-	-
Stage 2	*794	-	-
Platoon blocked, %		1	-
Mov Cap-1 Maneuver	*445	*856	-
Mov Cap-2 Maneuver	*445	-	-
Stage 1	*807	-	-
Stage 2	*792	-	-










Approach	WB	NB	SB
HCM Control Delay, s	11.6	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	551	* 1281
HCM Lane V/C Ratio	-	-	0.01	0.002
HCM Control Delay (s)	-	-	11.6	7.8
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0	0

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

HCM 6th TWSC  
3: Tibet Rd & 42nd Ave

2030 Total  
PM Peak

Intersection												
Int Delay, s/veh	5.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	63	15	127	9	7	7	118	207	10	23	231	50
Future Vol, veh/h	63	15	127	9	7	7	118	207	10	23	231	50
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	100	-	-	100	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	68	16	138	10	8	8	128	225	11	25	251	54

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	796	793	251	892	842	231	305	0	0	236	0	0
Stage 1	301	301	-	487	487	-	-	-	-	-	-	-
Stage 2	495	492	-	405	355	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	305	321	788	263	301	917	1256	-	-	1366	-	-
Stage 1	708	665	-	597	562	-	-	-	-	-	-	-
Stage 2	591	558	-	622	630	-	-	-	-	-	-	-
Platoon blocked, %						1		-	-	1	-	-
Mov Cap-1 Maneuver	269	283	788	189	265	917	1256	-	-	1366	-	-
Mov Cap-2 Maneuver	269	283	-	189	265	-	-	-	-	-	-	-
Stage 1	636	653	-	536	504	-	-	-	-	-	-	-
Stage 2	518	501	-	491	619	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	15.4		18.4		2.9		0.6	
HCM LOS	C		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1256	-	-	269	663	189	411	1366	-	-
HCM Lane V/C Ratio	0.102	-	-	0.255	0.233	0.052	0.037	0.018	-	-
HCM Control Delay (s)	8.2	-	-	22.9	12.1	25.1	14.1	7.7	-	-
HCM Lane LOS	A	-	-	C	B	D	B	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	1	0.9	0.2	0.1	0.1	-	-





HCM 6th TWSC  
4: Tibet Rd & 39th Ave

2030 Total  
PM Peak

Intersection												
Int Delay, s/veh	1.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↰			↰	↰	↱	↰	↰	↱	
Traffic Vol, veh/h	0	0	40	0	0	33	60	302	68	56	286	25
Future Vol, veh/h	0	0	40	0	0	33	60	302	68	56	286	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	100	-	100	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	43	0	0	36	65	328	74	61	311	27
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	-	-	325	-	-	328	338	0	0	402	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.22	-	-	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.318	-	-	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	0	716	0	0	840	1221	-	-	1169	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-
Platoon blocked, %						1		-	-	1	-	-
Mov Cap-1 Maneuver	-	-	716	-	-	840	1221	-	-	1169	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	10.4		9.5		1.1		1.3					
HCM LOS	B		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1221	-	-	716	840	1169	-	-				
HCM Lane V/C Ratio	0.053	-	-	0.061	0.043	0.052	-	-				
HCM Control Delay (s)	8.1	-	-	10.4	9.5	8.2	-	-				
HCM Lane LOS	A	-	-	B	A	A	-	-				
HCM 95th %tile Q(veh)	0.2	-	-	0.2	0.1	0.2	-	-				













HCM 6th TWSC  
5: Tibet Rd

2030 Total  
PM Peak

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	23	407	52	0	326
Future Vol, veh/h	0	23	407	52	0	326
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	25	442	57	0	354
Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	442	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	*762	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		1	-	-		-
Mov Cap-1 Maneuver	-	*762	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	WB		NB		SB	
HCM Control Delay, s	9.9		0		0	
HCM LOS	A					
Minor Lane/Major Mvmt	NBT		NBRWBLn1		SBT	
Capacity (veh/h)	-		762		-	
HCM Lane V/C Ratio	-		0.033		-	
HCM Control Delay (s)	-		9.9		-	
HCM Lane LOS	-		A		-	
HCM 95th %tile Q(veh)	-		0.1		-	
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

Queues  
6: Tibet Rd & 38th Ave

2030 Total  
PM Peak

























												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	193	675	91	39	639	292	196	13	82	228	5	121
v/c Ratio	0.59	0.56	0.11	0.15	0.75	0.36	0.55	0.02	0.11	0.58	0.01	0.14
Control Delay	25.3	28.5	2.6	10.5	40.2	20.6	48.2	28.2	2.4	47.6	27.4	7.0
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	25.3	28.5	2.6	10.5	40.2	20.6	48.2	28.2	2.4	47.6	27.4	7.0
Queue Length 50th (ft)	77	186	0	16	230	139	61	6	0	71	2	14
Queue Length 95th (ft)	108	214	21	m23	288	197	97	22	17	108	12	49
Internal Link Dist (ft)	1242				790				392			
Turn Bay Length (ft)	300		300	300		300	300		200	300		200
Base Capacity (vph)	373	1433	839	255	1044	837	399	613	745	463	633	904
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	0.52	0.47	0.11	0.15	0.61	0.35	0.49	0.02	0.11	0.49	0.01	0.13

Intersection Summary

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

# HCM 6th Signalized Intersection Summary 6: Tibet Rd & 38th Ave

2030 Total  
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	178	621	84	36	588	269	180	12	75	210	5	111
Future Volume (veh/h)	178	621	84	36	588	269	180	12	75	210	5	111
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	193	675	91	39	639	292	196	13	82	228	5	121
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	286	1074	602	228	834	511	267	743	682	303	762	805
Arrive On Green	0.10	0.30	0.30	0.01	0.08	0.08	0.08	0.40	0.40	0.09	0.41	0.41
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	3456	1870	1585	3456	1870	1585
Grp Volume(v), veh/h	193	675	91	39	639	292	196	13	82	228	5	121
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1728	1870	1585	1728	1870	1585
Q Serve(g_s), s	7.8	16.4	3.8	1.7	17.6	16.0	5.5	0.4	3.1	6.4	0.2	4.1
Cycle Q Clear(g_c), s	7.8	16.4	3.8	1.7	17.6	16.0	5.5	0.4	3.1	6.4	0.2	4.1
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	286	1074	602	228	834	511	267	743	682	303	762	805
V/C Ratio(X)	0.67	0.63	0.15	0.17	0.77	0.57	0.73	0.02	0.12	0.75	0.01	0.15
Avail Cap(c_a), veh/h	401	1439	765	267	1048	606	397	743	682	467	762	805
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	0.70	0.70	0.70	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.0	30.0	20.4	28.5	43.4	34.2	45.1	18.3	17.1	44.6	17.6	13.1
Incr Delay (d2), s/veh	2.8	0.6	0.1	0.2	1.9	0.7	3.9	0.0	0.4	3.8	0.0	0.4
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	6.2	11.3	2.5	1.3	12.6	10.5	4.5	0.3	2.1	5.2	0.1	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.8	30.7	20.5	28.8	45.3	34.9	49.0	18.4	17.5	48.4	17.6	13.5
LnGrp LOS	C	C	C	C	D	C	D	B	B	D	B	B
Approach Vol, veh/h	959			970			291			354		
Approach Delay, s/veh	29.3			41.5			38.8			36.0		
Approach LOS	C			D			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.3	44.2	7.8	34.7	12.2	45.2	14.6	28.0				
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	13.5	22.5	5.5	40.5	11.5	24.5	16.5	29.5				
Max Q Clear Time (g_c+I1), s	8.4	5.1	3.7	18.4	7.5	6.1	9.8	19.6				
Green Ext Time (p_c), s	0.3	0.2	0.0	5.1	0.2	0.3	0.3	3.8				
Intersection Summary												
HCM 6th Ctrl Delay	35.9											
HCM 6th LOS	D											



Queues  
7: 38th Ave & Ukraine St

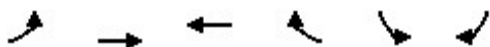
2030 Total  
PM Peak









Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	76	909	872	76	88	99
v/c Ratio	0.32	0.57	0.72	0.06	0.11	0.13
Control Delay	11.0	15.8	24.5	4.5	19.4	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.0	15.8	24.5	4.5	19.4	5.0
Queue Length 50th (ft)	30	242	294	10	32	0
Queue Length 95th (ft)	49	267	339	37	75	34
Internal Link Dist (ft)		790	1897		419	
Turn Bay Length (ft)	150			150		
Base Capacity (vph)	272	2318	1787	1366	815	782
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.39	0.49	0.06	0.11	0.13
Intersection Summary						

# HCM 6th Signalized Intersection Summary 7: 38th Ave & Ukraine St

2030 Total  
PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Volume (veh/h)	70	836	802	70	81	91	
Future Volume (veh/h)	70	836	802	70	81	91	
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	1870	1870	1870	1870	1870	1870	
Adj Flow Rate, veh/h	76	909	872	76	88	99	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Percent Heavy Veh, %	2	2	2	2	2	2	
Cap, veh/h	204	1483	1167	1301	878	781	
Arrive On Green	0.09	0.83	0.11	0.11	0.49	0.49	
Sat Flow, veh/h	1781	3647	3647	1585	1781	1585	
Grp Volume(v), veh/h	76	909	872	76	88	99	
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1585	1781	1585	
Q Serve(g_s), s	2.7	8.7	23.8	1.2	2.6	3.4	
Cycle Q Clear(g_c), s	2.7	8.7	23.8	1.2	2.6	3.4	
Prop In Lane	1.00			1.00	1.00	1.00	
Lane Grp Cap(c), veh/h	204	1483	1167	1301	878	781	
V/C Ratio(X)	0.37	0.61	0.75	0.06	0.10	0.13	
Avail Cap(c_a), veh/h	312	2328	1795	1581	878	781	
HCM Platoon Ratio	2.00	2.00	0.33	0.33	1.00	1.00	
Upstream Filter(I)	0.84	0.84	0.82	0.82	1.00	1.00	
Uniform Delay (d), s/veh	22.0	5.5	40.6	2.3	13.5	13.7	
Incr Delay (d2), s/veh	1.0	0.3	0.8	0.0	0.2	0.3	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(95%),veh/ln	2.0	3.5	16.5	3.1	2.0	7.6	
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	23.0	5.9	41.4	2.3	13.8	14.1	
LnGrp LOS	C	A	D	A	B	B	
Approach Vol, veh/h		985	948	187			
Approach Delay, s/veh		7.2	38.2	13.9			
Approach LOS		A	D	B			
Timer - Assigned Phs				4	6	7	8
Phs Duration (G+Y+Rc), s				46.2	53.8	8.9	37.3
Change Period (Y+Rc), s				4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s				65.5	25.5	10.5	50.5
Max Q Clear Time (g_c+l1), s				10.7	5.4	4.7	25.8
Green Ext Time (p_c), s				8.2	0.5	0.1	7.0
Intersection Summary							
HCM 6th Ctrl Delay			21.7				
HCM 6th LOS			C				

Queues  
8: Wenatchee Rd & 38th Ave

2030 Total  
PM Peak

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	953	43	16	828	120	43
v/c Ratio	0.69	0.07	0.15	0.60	0.13	0.05
Control Delay	7.4	0.3	20.1	25.7	14.8	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.4	0.3	20.1	25.7	14.8	5.3
Queue Length 50th (ft)	33	1	7	218	37	0
Queue Length 95th (ft)	39	0	19	230	83	20
Internal Link Dist (ft)	1897			440	342	
Turn Bay Length (ft)		100	100		100	
Base Capacity (vph)	2282	1036	182	2282	923	846
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.04	0.09	0.36	0.13	0.05
Intersection Summary						

# HCM 6th Signalized Intersection Summary 8: Wenatchee Rd & 38th Ave







2030 Total  
PM Peak

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↙	↑↑	↙	↗
Traffic Volume (veh/h)	877	40	15	762	110	40
Future Volume (veh/h)	877	40	15	762	110	40
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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	953	43	16	828	120	43
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1146	511	141	1146	1046	931
Arrive On Green	0.65	0.65	0.32	0.32	0.59	0.59
Sat Flow, veh/h	3647	1585	589	3647	1781	1585
Grp Volume(v), veh/h	953	43	16	828	120	43
Grp Sat Flow(s),veh/h/ln	1777	1585	589	1777	1781	1585
Q Serve(g_s), s	20.5	1.0	2.5	20.6	3.0	1.2
Cycle Q Clear(g_c), s	20.5	1.0	23.0	20.6	3.0	1.2
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1146	511	141	1146	1046	931
V/C Ratio(X)	0.83	0.08	0.11	0.72	0.11	0.05
Avail Cap(c_a), veh/h	2292	1022	331	2292	1046	931
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.83	0.83	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.7	12.2	40.1	29.9	9.1	8.7
Incr Delay (d2), s/veh	1.4	0.1	0.4	0.9	0.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.1	0.7	0.7	13.6	2.1	0.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.0	12.3	40.4	30.8	9.3	8.8
LnGrp LOS	B	B	D	C	A	A
Approach Vol, veh/h	996			844	163	
Approach Delay, s/veh	16.8			31.0	9.2	
Approach LOS	B			C	A	
Timer - Assigned Phs	2		4		8	
Phs Duration (G+Y+Rc), s	63.2		36.8		36.8	
Change Period (Y+Rc), s	4.5		4.5		4.5	
Max Green Setting (Gmax), s	26.5		64.5		64.5	
Max Q Clear Time (g_c+l1), s	5.0		22.5		25.0	
Green Ext Time (p_c), s	0.4		8.8		7.3	
Intersection Summary						
HCM 6th Ctrl Delay			22.2			
HCM 6th LOS			C			

## APPENDIX E.      LONG TERM FUTURE TOTAL TRAFFIC LEVEL OF SERVICE





HCM 6th TWSC  
1: Tibet Rd & 44th Ave

2045 Total  
AM Peak

Intersection						
Int Delay, s/veh	1.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	58	34	389	16	13	488
Future Vol, veh/h	58	34	389	16	13	488
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	-	100	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	63	37	423	17	14	530
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	981	423	0	0	440	0
Stage 1	423	-	-	-	-	-
Stage 2	558	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	*344	*764	-	-	*1143	-
Stage 1	*720	-	-	-	-	-
Stage 2	*640	-	-	-	-	-
Platoon blocked, %	1	1	-	-	1	-
Mov Cap-1 Maneuver	*340	*764	-	-	*1143	-
Mov Cap-2 Maneuver	*340	-	-	-	-	-
Stage 1	*720	-	-	-	-	-
Stage 2	*633	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	15	0		0.2		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	340	764	* 1143	-
HCM Lane V/C Ratio	-	-	0.185	0.048	0.012	-
HCM Control Delay (s)	-	-	18	10	8.2	-
HCM Lane LOS	-	-	C	B	A	-
HCM 95th %tile Q(veh)	-	-	0.7	0.2	0	-
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

HCM 6th TWSC  
2: Tibet Rd & 43rd Ave

2045 Total  
AM Peak

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	6	5	400	2	1	545
Future Vol, veh/h	6	5	400	2	1	545
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	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	5	435	2	1	592

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1030	436	0	0	437
Stage 1	436	-	-	-	-
Stage 2	594	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	*295	*764	-	-	*1143
Stage 1	*720	-	-	-	-
Stage 2	*597	-	-	-	-
Platoon blocked, %	1	1	-	-	1
Mov Cap-1 Maneuver	*295	*764	-	-	*1143
Mov Cap-2 Maneuver	*295	-	-	-	-
Stage 1	*720	-	-	-	-
Stage 2	*596	-	-	-	-










Approach	WB	NB	SB
HCM Control Delay, s	14.1	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	409	* 1143
HCM Lane V/C Ratio	-	-	0.029	0.001
HCM Control Delay (s)	-	-	14.1	8.2
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0

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

HCM 6th TWSC  
3: Tibet Rd & 42nd Ave

2045 Total  
AM Peak

Intersection												
Int Delay, s/veh	6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	63	9	86	15	11	10	93	329	5	17	484	50
Future Vol, veh/h	63	9	86	15	11	10	93	329	5	17	484	50
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	100	-	-	100	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	68	10	93	16	12	11	101	358	5	18	526	54

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1136	1127	526	1204	1179	361	580	0	0	363	0	0
Stage 1	562	562	-	563	563	-	-	-	-	-	-	-
Stage 2	574	565	-	641	616	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	163	182	552	141	166	*816	994	-	-	*1221	-	-
Stage 1	512	510	-	564	524	-	-	-	-	-	-	-
Stage 2	554	523	-	463	482	-	-	-	-	-	-	-
Platoon blocked, %	1	1		1	1	1		-	-	1	-	-
Mov Cap-1 Maneuver	137	161	552	102	147	*816	994	-	-	*1221	-	-
Mov Cap-2 Maneuver	137	161	-	102	147	-	-	-	-	-	-	-
Stage 1	460	502	-	507	470	-	-	-	-	-	-	-
Stage 2	478	470	-	372	475	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	31.2		32.1		2		0.2	
HCM LOS	D		D					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	994	-	-	137	449	102	241	* 1221	-	-
HCM Lane V/C Ratio	0.102	-	-	0.5	0.23	0.16	0.095	0.015	-	-
HCM Control Delay (s)	9	-	-	55	15.4	46.9	21.5	8	-	-
HCM Lane LOS	A	-	-	F	C	E	C	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	2.4	0.9	0.5	0.3	0	-	-

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



HCM 6th TWSC  
4: Tibet Rd & 39th Ave

2045 Total  
AM Peak

Intersection												
Int Delay, s/veh	1.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱	↱	↱	↱	↱	↱	
Traffic Vol, veh/h	0	0	45	0	0	73	20	354	38	76	504	5
Future Vol, veh/h	0	0	45	0	0	73	20	354	38	76	504	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	100	-	100	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	49	0	0	79	22	385	41	83	548	5

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	-	-	551	-	-	385	553	0	0	426	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.22	-	-	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.318	-	-	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	0	534	0	0	*790	1017	-	-	1157	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-
Platoon blocked, %						1		-	-	1	-	-
Mov Cap-1 Maneuver	-	-	534	-	-	*790	1017	-	-	1157	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	12.4		10.1		0.4		1.1	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1017	-	-	534 790	1157	-	-
HCM Lane V/C Ratio	0.021	-	-	0.092 0.1	0.071	-	-
HCM Control Delay (s)	8.6	-	-	12.4 10.1	8.4	-	-
HCM Lane LOS	A	-	-	B B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3 0.3	0.2	-	-

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













HCM 6th TWSC  
5: Tibet Rd

2045 Total  
AM Peak

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↗	↗		↗
Traffic Vol, veh/h	0	25	387	44	0	549
Future Vol, veh/h	0	25	387	44	0	549
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	27	421	48	0	597
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	-	421	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	*764	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		1	-	-		-
Mov Cap-1 Maneuver	-	*764	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	9.9	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBT		
Capacity (veh/h)	-	-	764	-		
HCM Lane V/C Ratio	-	-	0.036	-		
HCM Control Delay (s)	-	-	9.9	-		
HCM Lane LOS	-	-	A	-		
HCM 95th %tile Q(veh)	-	-	0.1	-		
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

Queues  
6: Tibet Rd & 38th Ave

2045 Total  
AM Peak

























												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	176	1035	440	185	1192	282	179	11	71	370	16	211
v/c Ratio	0.70	0.75	0.42	0.69	0.87	0.28	0.53	0.03	0.12	0.76	0.03	0.31
Control Delay	39.1	35.6	2.5	45.9	42.9	0.9	56.6	41.8	10.5	44.6	33.3	22.0
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	39.1	35.6	2.5	45.9	42.9	0.9	56.6	41.8	10.5	44.6	33.3	22.0
Queue Length 50th (ft)	74	336	0	104	272	0	69	7	9	124	11	115
Queue Length 95th (ft)	154	444	45	180	353	8	103	25	41	m161	m27	m163
Internal Link Dist (ft)		1242			790			392			189	
Turn Bay Length (ft)	300		300	300		300	300		200	300		200
Base Capacity (vph)	289	1410	1075	326	1412	1034	443	399	649	529	477	702
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	0.73	0.41	0.57	0.84	0.27	0.40	0.03	0.11	0.70	0.03	0.30

Intersection Summary

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

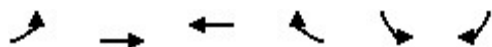
# HCM 6th Signalized Intersection Summary 6: Tibet Rd & 38th Ave

2045 Total  
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	162	952	405	170	1097	259	165	10	65	340	15	194
Future Volume (veh/h)	162	952	405	170	1097	259	165	10	65	340	15	194
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	176	1035	440	185	1192	282	179	11	71	370	16	211
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	230	1261	673	244	1279	770	242	531	585	435	636	666
Arrive On Green	0.08	0.35	0.35	0.17	0.72	0.72	0.07	0.28	0.28	0.13	0.34	0.34
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	3456	1870	1585	3456	1870	1585
Grp Volume(v), veh/h	176	1035	440	185	1192	282	179	11	71	370	16	211
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1728	1870	1585	1728	1870	1585
Q Serve(g_s), s	7.4	31.8	26.5	8.0	34.3	7.5	6.1	0.5	3.5	12.6	0.7	10.7
Cycle Q Clear(g_c), s	7.4	31.8	26.5	8.0	34.3	7.5	6.1	0.5	3.5	12.6	0.7	10.7
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	230	1261	673	244	1279	770	242	531	585	435	636	666
V/C Ratio(X)	0.77	0.82	0.65	0.76	0.93	0.37	0.74	0.02	0.12	0.85	0.03	0.32
Avail Cap(c_a), veh/h	317	1377	725	337	1407	827	446	531	585	533	636	666
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	0.65	0.65	0.65	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.1	35.2	27.5	25.0	15.6	7.8	54.7	30.9	25.0	51.4	26.4	23.3
Incr Delay (d2), s/veh	7.3	3.8	1.9	4.2	7.6	0.2	4.4	0.1	0.4	10.6	0.1	1.2
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	6.4	20.5	15.5	5.6	11.5	3.5	5.0	0.4	2.5	10.1	0.6	7.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.4	39.0	29.4	29.2	23.2	8.0	59.2	31.0	25.4	62.0	26.4	24.5
LnGrp LOS	D	D	C	C	C	A	E	C	C	E	C	C
Approach Vol, veh/h	1651			1659			261			597		
Approach Delay, s/veh	36.1			21.3			48.8			47.8		
Approach LOS	D			C			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.6	38.6	14.7	47.1	12.9	45.3	14.1	47.7				
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	20.5	16.5	46.5	15.5	23.5	15.5	47.5				
Max Q Clear Time (g_c+l1), s	14.6	5.5	10.0	33.8	8.1	12.7	9.4	36.3				
Green Ext Time (p_c), s	0.5	0.2	0.3	7.2	0.3	0.6	0.2	6.9				
Intersection Summary												
HCM 6th Ctrl Delay	32.7											
HCM 6th LOS	C											

Queues  
7: 38th Ave & Ukraine St

2045 Total  
AM Peak



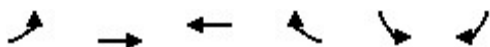
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	142	1333	1435	157	223	224
v/c Ratio	0.73	0.59	0.75	0.11	0.44	0.41
Control Delay	49.5	11.0	16.6	0.3	40.7	16.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.5	11.0	16.6	0.3	40.7	16.6
Queue Length 50th (ft)	68	172	216	0	144	47
Queue Length 95th (ft)	m112	184	274	5	241	130
Internal Link Dist (ft)		790	1897		420	
Turn Bay Length (ft)	150			150		
Base Capacity (vph)	195	2521	2167	1386	502	552
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.53	0.66	0.11	0.44	0.41







Intersection Summary

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

# HCM 6th Signalized Intersection Summary 7: 38th Ave & Ukraine St

2045 Total  
AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Volume (veh/h)	131	1226	1320	144	205	206	
Future Volume (veh/h)	131	1226	1320	144	205	206	
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	1870	1870	1870	1870	1870	1870	
Adj Flow Rate, veh/h	142	1333	1435	157	223	224	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Percent Heavy Veh, %	2	2	2	2	2	2	
Cap, veh/h	207	1965	1616	1311	663	590	
Arrive On Green	0.12	1.00	0.91	0.91	0.37	0.37	
Sat Flow, veh/h	1781	3647	3647	1585	1781	1585	
Grp Volume(v), veh/h	142	1333	1435	157	223	224	
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1585	1781	1585	
Q Serve(g_s), s	5.0	0.0	22.8	0.4	10.8	12.4	
Cycle Q Clear(g_c), s	5.0	0.0	22.8	0.4	10.8	12.4	
Prop In Lane	1.00			1.00	1.00	1.00	
Lane Grp Cap(c), veh/h	207	1965	1616	1311	663	590	
V/C Ratio(X)	0.69	0.68	0.89	0.12	0.34	0.38	
Avail Cap(c_a), veh/h	210	2532	2177	1561	663	590	
HCM Platoon Ratio	2.00	2.00	2.00	2.00	1.00	1.00	
Upstream Filter(I)	0.62	0.62	0.75	0.75	1.00	1.00	
Uniform Delay (d), s/veh	23.9	0.0	4.0	0.3	27.0	27.6	
Incr Delay (d2), s/veh	5.6	0.3	2.9	0.0	1.4	1.9	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(95%),veh/ln	3.9	0.2	4.7	0.7	8.5	18.2	
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	29.5	0.3	6.9	0.3	28.4	29.4	
LnGrp LOS	C	A	A	A	C	C	
Approach Vol, veh/h		1475	1592	447			
Approach Delay, s/veh		3.1	6.3	28.9			
Approach LOS		A	A	C			
Timer - Assigned Phs				4	6	7	8
Phs Duration (G+Y+Rc), s				64.7	55.3	11.6	53.1
Change Period (Y+Rc), s				4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s				85.5	25.5	7.5	73.5
Max Q Clear Time (g_c+I1), s				2.0	14.4	7.0	24.8
Green Ext Time (p_c), s				15.8	1.1	0.0	17.8
Intersection Summary							
HCM 6th Ctrl Delay			7.8				
HCM 6th LOS			A				

Queues  
8: Wenatchee Rd & 38th Ave

2045 Total  
AM Peak

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1441	114	49	1559	33	16
v/c Ratio	0.58	0.10	0.27	0.63	0.08	0.04
Control Delay	16.9	3.5	8.3	10.4	44.9	20.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.9	3.5	8.3	10.4	44.9	20.8
Queue Length 50th (ft)	409	21	12	288	21	0
Queue Length 95th (ft)	370	26	18	191	57	22
Internal Link Dist (ft)	1897			440	342	
Turn Bay Length (ft)		100	100		100	
Base Capacity (vph)	2904	1319	210	2904	389	361
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.09	0.23	0.54	0.08	0.04
Intersection Summary						

# HCM 6th Signalized Intersection Summary 8: Wenatchee Rd & 38th Ave







2045 Total  
AM Peak

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↙	↑↑	↙	↗
Traffic Volume (veh/h)	1326	105	45	1434	30	15
Future Volume (veh/h)	1326	105	45	1434	30	15
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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1441	114	49	1559	33	16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1964	876	166	1964	663	590
Arrive On Green	0.73	0.73	0.55	0.55	0.37	0.37
Sat Flow, veh/h	3647	1585	332	3647	1781	1585
Grp Volume(v), veh/h	1441	114	49	1559	33	16
Grp Sat Flow(s),veh/h/ln	1777	1585	332	1777	1781	1585
Q Serve(g_s), s	28.0	2.5	14.2	42.0	1.4	0.8
Cycle Q Clear(g_c), s	28.0	2.5	42.2	42.0	1.4	0.8
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1964	876	166	1964	663	590
V/C Ratio(X)	0.73	0.13	0.30	0.79	0.05	0.03
Avail Cap(c_a), veh/h	2917	1301	255	2917	663	590
HCM Platoon Ratio	1.33	1.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.80	0.80	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.8	7.5	32.6	21.4	24.1	23.9
Incr Delay (d2), s/veh	0.4	0.1	1.0	0.9	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	12.1	1.5	2.1	23.7	1.1	0.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	11.3	7.5	33.6	22.3	24.2	24.0
LnGrp LOS	B	A	C	C	C	C
Approach Vol, veh/h	1555			1608	49	
Approach Delay, s/veh	11.0			22.7	24.1	
Approach LOS	B			C	C	
Timer - Assigned Phs	2		4		8	
Phs Duration (G+Y+Rc), s	49.2		70.8		70.8	
Change Period (Y+Rc), s	4.5		4.5		4.5	
Max Green Setting (Gmax), s	12.5		98.5		98.5	
Max Q Clear Time (g_c+I1), s	3.4		30.0		44.2	
Green Ext Time (p_c), s	0.0		19.0		22.2	
Intersection Summary						
HCM 6th Ctrl Delay			17.0			
HCM 6th LOS			B			







HCM 6th TWSC  
1: Tibet Rd & 44th Ave

2045 Total  
PM Peak

Intersection						
Int Delay, s/veh	1.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	32	20	447	39	29	546
Future Vol, veh/h	32	20	447	39	29	546
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	100	0	-	100	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	35	22	486	42	32	593
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1143	486	0	0	528	0
Stage 1	486	-	-	-	-	-
Stage 2	657	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	*195	*711	-	-	1049	-
Stage 1	*671	-	-	-	-	-
Stage 2	*564	-	-	-	-	-
Platoon blocked, %	1	1	-	-	1	-
Mov Cap-1 Maneuver	*189	*711	-	-	1049	-
Mov Cap-2 Maneuver	*189	-	-	-	-	-
Stage 1	*671	-	-	-	-	-
Stage 2	*547	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	21.3	0		0.4		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	189	711	1049	-
HCM Lane V/C Ratio	-	-	0.184	0.031	0.03	-
HCM Control Delay (s)	-	-	28.3	10.2	8.5	-
HCM Lane LOS	-	-	D	B	A	-
HCM 95th %tile Q(veh)	-	-	0.7	0.1	0.1	-
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

HCM 6th TWSC  
2: Tibet Rd & 43rd Ave

2045 Total  
PM Peak

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	2	484	4	2	576
Future Vol, veh/h	3	2	484	4	2	576
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	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	2	526	4	2	626

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1158	528	0	0	530
Stage 1	528	-	-	-	-
Stage 2	630	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	*174	*685	-	-	*1025
Stage 1	*646	-	-	-	-
Stage 2	*572	-	-	-	-
Platoon blocked, %	1	1	-	-	1
Mov Cap-1 Maneuver	*174	*685	-	-	*1025
Mov Cap-2 Maneuver	*174	-	-	-	-
Stage 1	*646	-	-	-	-
Stage 2	*571	-	-	-	-










Approach	WB	NB	SB
HCM Control Delay, s	19.8	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	248 * 1025	-
HCM Lane V/C Ratio	-	-	0.022	0.002
HCM Control Delay (s)	-	-	19.8	8.5
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	0.1	0

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

HCM 6th TWSC  
3: Tibet Rd & 42nd Ave

2045 Total  
PM Peak

Intersection												
Int Delay, s/veh	10.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	63	15	127	9	7	7	118	418	10	23	506	50
Future Vol, veh/h	63	15	127	9	7	7	118	418	10	23	506	50
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	100	-	-	100	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	68	16	138	10	8	8	128	454	11	25	550	54

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1324	1321	550	1420	1370	460	604	0	0	465	0	0
Stage 1	600	600	-	716	716	-	-	-	-	-	-	-
Stage 2	724	721	-	704	654	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	103	120	535	82	108	*737	974	-	-	*1104	-	-
Stage 1	488	490	-	454	431	-	-	-	-	-	-	-
Stage 2	448	429	-	428	463	-	-	-	-	-	-	-
Platoon blocked, %	1	1		1	1	1		-	-	1	-	-
Mov Cap-1 Maneuver	85	102	535	47	92	*737	974	-	-	*1104	-	-
Mov Cap-2 Maneuver	85	102	-	47	92	-	-	-	-	-	-	-
Stage 1	424	479	-	395	375	-	-	-	-	-	-	-
Stage 2	378	372	-	300	452	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	56.4		57.2		2		0.3	
HCM LOS	F		F					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	974	-	-	85	369	47	164	*1104	-	-
HCM Lane V/C Ratio	0.132	-	-	0.806	0.418	0.208	0.093	0.023	-	-
HCM Control Delay (s)	9.3	-	-	135	21.6	100.7	29.2	8.3	-	-
HCM Lane LOS	A	-	-	F	C	F	D	A	-	-
HCM 95th %tile Q(veh)	0.5	-	-	4.1	2	0.7	0.3	0.1	-	-

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





HCM 6th TWSC  
4: Tibet Rd & 39th Ave

2045 Total  
PM Peak

Intersection												
Int Delay, s/veh	1.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↗			↗	↗	↗	↗	↗	↗	
Traffic Vol, veh/h	0	0	40	0	0	33	60	513	68	56	561	25
Future Vol, veh/h	0	0	40	0	0	33	60	513	68	56	561	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	100	-	100	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	43	0	0	36	65	558	74	61	610	27
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	-	-	624	-	-	558	637	0	0	632	0	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.22	-	-	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.318	-	-	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	0	485	0	0	*659	947	-	-	929	-	-
Stage 1	0	0	-	0	0	-	-	-	-	-	-	-
Stage 2	0	0	-	0	0	-	-	-	-	-	-	-
Platoon blocked, %						1		-	-	1	-	-
Mov Cap-1 Maneuver	-	-	485	-	-	*659	947	-	-	929	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	13.2		10.8		0.9		0.8					
HCM LOS	B		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	947	-	-	485	659	929	-	-				
HCM Lane V/C Ratio	0.069	-	-	0.09	0.054	0.066	-	-				
HCM Control Delay (s)	9.1	-	-	13.2	10.8	9.1	-	-				
HCM Lane LOS	A	-	-	B	B	A	-	-				
HCM 95th %tile Q(veh)	0.2	-	-	0.3	0.2	0.2	-	-				
Notes												
~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    *: All major volume in platoon												

HCM 6th TWSC  
5: Tibet Rd

2045 Total  
PM Peak

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	23	618	52	0	601
Future Vol, veh/h	0	23	618	52	0	601
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	-	0	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	25	672	57	0	653

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	-	672	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	6.22	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	3.318	-
Pot Cap-1 Maneuver	0	*555	-
Stage 1	0	-	-
Stage 2	0	-	-
Platoon blocked, %	-	1	-
Mov Cap-1 Maneuver	-	*555	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-













Approach	WB	NB	SB
HCM Control Delay, s	11.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	- 555	-
HCM Lane V/C Ratio	-	- 0.045	-
HCM Control Delay (s)	-	- 11.8	-
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

Queues  
6: Tibet Rd & 38th Ave

2045 Total  
PM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	289	1434	201	87	1311	412	435	27	179	412	11	230
v/c Ratio	0.94	0.78	0.17	0.43	0.81	0.37	0.83	0.13	0.46	0.82	0.06	0.48
Control Delay	71.5	26.7	1.0	27.2	25.6	1.7	63.2	54.1	33.0	51.7	44.6	31.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.5	26.7	1.0	27.2	25.6	1.7	63.2	54.1	33.0	51.7	44.6	31.3
Queue Length 50th (ft)	167	424	0	14	434	24	165	20	88	138	8	135
Queue Length 95th (ft)	#326	541	20	m33	442	20	#258	51	154	m#233	m20	m206
Internal Link Dist (ft)		1242			790			392			189	
Turn Bay Length (ft)	300		300	300		300	300		200	300		200
Base Capacity (vph)	319	1873	1186	331	1754	1120	535	203	502	508	190	490
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	0.91	0.77	0.17	0.26	0.75	0.37	0.81	0.13	0.36	0.81	0.06	0.47

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

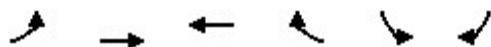
## 6: Tibet Rd & 38th Ave

2045 Total  
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	266	1319	185	80	1206	379	400	25	165	379	10	212
Future Volume (veh/h)	266	1319	185	80	1206	379	400	25	165	379	10	212
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	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	289	1434	201	87	1311	412	435	27	179	412	11	230
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	317	1813	1033	191	1516	889	489	304	325	465	291	447
Arrive On Green	0.13	0.51	0.51	0.06	0.57	0.57	0.14	0.16	0.16	0.13	0.16	0.16
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	3456	1870	1585	3456	1870	1585
Grp Volume(v), veh/h	289	1434	201	87	1311	412	435	27	179	412	11	230
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1728	1870	1585	1728	1870	1585
Q Serve(g_s), s	12.9	39.8	6.1	3.3	37.6	15.8	14.8	1.5	12.1	14.1	0.6	14.6
Cycle Q Clear(g_c), s	12.9	39.8	6.1	3.3	37.6	15.8	14.8	1.5	12.1	14.1	0.6	14.6
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	317	1813	1033	191	1516	889	489	304	325	465	291	447
V/C Ratio(X)	0.91	0.79	0.19	0.46	0.86	0.46	0.89	0.09	0.55	0.89	0.04	0.51
Avail Cap(c_a), veh/h	352	1813	1033	375	1762	999	504	304	325	475	291	447
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	0.63	0.63	0.63	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.2	24.1	8.3	22.5	23.0	11.3	50.6	42.7	42.7	51.0	43.0	36.2
Incr Delay (d2), s/veh	25.8	2.5	0.1	1.1	2.7	0.2	17.4	0.6	6.5	17.8	0.2	4.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	16.1	23.5	3.7	2.5	19.1	7.4	12.1	1.3	9.1	11.6	0.5	10.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.0	26.6	8.4	23.6	25.8	11.6	68.0	43.3	49.3	68.8	43.3	40.4
LnGrp LOS	E	C	A	C	C	B	E	D	D	E	D	D
Approach Vol, veh/h	1924			1810			641			653		
Approach Delay, s/veh	29.4			22.4			61.7			58.3		
Approach LOS	C			C			E			E		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	20.6	24.0	9.6	65.7	21.5	23.2	19.6	55.7				
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	16.5	8.5	17.5	59.5	17.5	7.5	17.5	59.5				
Max Q Clear Time (g_c+l1), s	16.1	14.1	5.3	41.8	16.8	16.6	14.9	39.6				
Green Ext Time (p_c), s	0.1	0.0	0.1	10.9	0.1	0.0	0.2	11.6				
Intersection Summary												
HCM 6th Ctrl Delay	34.8											
HCM 6th LOS	C											

Queues  
7: 38th Ave & Ukraine St

2045 Total  
PM Peak



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	76	1949	1711	76	88	99
v/c Ratio	0.40	0.75	0.74	0.05	0.26	0.26
Control Delay	13.3	10.1	15.3	0.3	44.3	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.3	10.2	15.3	0.3	44.3	10.1
Queue Length 50th (ft)	12	335	396	0	59	0
Queue Length 95th (ft)	m29	504	464	m3	111	48
Internal Link Dist (ft)		790	1897		420	
Turn Bay Length (ft)	150			150		
Base Capacity (vph)	210	2668	2328	1419	345	388
Starvation Cap Reductn	0	24	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.74	0.73	0.05	0.26	0.26

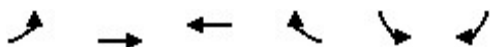
Intersection Summary







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



# HCM 6th Signalized Intersection Summary 7: 38th Ave & Ukraine St

2045 Total  
PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Volume (veh/h)	70	1793	1574	70	81	91	
Future Volume (veh/h)	70	1793	1574	70	81	91	
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	1870	1870	1870	1870	1870	1870	
Adj Flow Rate, veh/h	76	1949	1711	76	88	99	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Percent Heavy Veh, %	2	2	2	2	2	2	
Cap, veh/h	173	2195	1925	1346	548	487	
Arrive On Green	0.05	0.82	0.72	0.72	0.31	0.31	
Sat Flow, veh/h	1781	3647	3647	1585	1781	1585	
Grp Volume(v), veh/h	76	1949	1711	76	88	99	
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1585	1781	1585	
Q Serve(g_s), s	2.2	43.4	44.9	0.6	4.3	5.5	
Cycle Q Clear(g_c), s	2.2	43.4	44.9	0.6	4.3	5.5	
Prop In Lane	1.00			1.00	1.00	1.00	
Lane Grp Cap(c), veh/h	173	2195	1925	1346	548	487	
V/C Ratio(X)	0.44	0.89	0.89	0.06	0.16	0.20	
Avail Cap(c_a), veh/h	231	2680	2295	1511	548	487	
HCM Platoon Ratio	1.33	1.33	1.33	1.33	1.00	1.00	
Upstream Filter(l)	0.57	0.57	0.76	0.76	1.00	1.00	
Uniform Delay (d), s/veh	22.7	8.0	14.0	0.9	30.3	30.7	
Incr Delay (d2), s/veh	1.0	2.0	3.2	0.0	0.6	0.9	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(95%),veh/ln	2.0	11.8	19.2	1.1	3.5	9.6	
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	23.7	10.0	17.2	0.9	30.9	31.6	
LnGrp LOS	C	B	B	A	C	C	
Approach Vol, veh/h		2025	1787		187		
Approach Delay, s/veh		10.5	16.5		31.3		
Approach LOS		B	B		C		
Timer - Assigned Phs				4	6	7	8
Phs Duration (G+Y+Rc), s				78.6	41.4	9.1	69.5
Change Period (Y+Rc), s				4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s				90.5	20.5	8.5	77.5
Max Q Clear Time (g_c+l1), s				45.4	7.5	4.2	46.9
Green Ext Time (p_c), s				26.7	0.4	0.0	18.1
Intersection Summary							
HCM 6th Ctrl Delay			14.2				
HCM 6th LOS			B				

Queues  
8: Wenatchee Rd & 38th Ave

2045 Total  
PM Peak

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1993	43	16	1667	120	43
v/c Ratio	0.74	0.04	0.18	0.62	0.42	0.15
Control Delay	10.9	3.4	8.7	7.4	51.0	20.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.9	3.4	8.7	7.4	51.0	20.4
Queue Length 50th (ft)	307	5	3	248	85	7
Queue Length 95th (ft)	314	m8	12	298	147	41
Internal Link Dist (ft)	1897			440	342	
Turn Bay Length (ft)		100	100		100	
Base Capacity (vph)	2727	1226	91	2727	285	282
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.04	0.18	0.61	0.42	0.15
Intersection Summary						
m Volume for 95th percentile queue is metered by upstream signal.						

# HCM 6th Signalized Intersection Summary 8: Wenatchee Rd & 38th Ave

2045 Total  
PM Peak

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↙	↑↑	↙	↗
Traffic Volume (veh/h)	1834	40	15	1534	110	40
Future Volume (veh/h)	1834	40	15	1534	110	40
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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1993	43	16	1667	120	43
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2043	911	185	2043	624	555
Arrive On Green	1.00	1.00	0.57	0.57	0.35	0.35
Sat Flow, veh/h	3647	1585	217	3647	1781	1585
Grp Volume(v), veh/h	1993	43	16	1667	120	43
Grp Sat Flow(s),veh/h/ln	1777	1585	217	1777	1781	1585
Q Serve(g_s), s	0.0	0.0	4.1	45.1	5.6	2.2
Cycle Q Clear(g_c), s	0.0	0.0	4.1	45.1	5.6	2.2
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2043	911	185	2043	624	555
V/C Ratio(X)	0.98	0.05	0.09	0.82	0.19	0.08
Avail Cap(c_a), veh/h	2739	1222	227	2739	624	555
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.60	0.60	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	11.7	20.4	27.2	26.0
Incr Delay (d2), s/veh	7.3	0.0	0.2	1.5	0.7	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.7	0.0	0.4	25.1	4.6	1.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	7.3	0.0	11.9	21.9	27.9	26.3
LnGrp LOS	A	A	B	C	C	C
Approach Vol, veh/h	2036			1683	163	
Approach Delay, s/veh	7.1			21.8	27.5	
Approach LOS	A			C	C	
Timer - Assigned Phs	2		4		8	
Phs Duration (G+Y+Rc), s	46.5		73.5		73.5	
Change Period (Y+Rc), s	4.5		4.5		4.5	
Max Green Setting (Gmax), s	18.5		92.5		92.5	
Max Q Clear Time (g_c+I1), s	7.6		2.0		47.1	
Green Ext Time (p_c), s	0.3		39.1		21.9	
Intersection Summary						
HCM 6th Ctrl Delay			14.3			
HCM 6th LOS			B			

## APPENDIX F. LOS AND DELAY TABLE

Intersection	Movement	Short Term Total		Long Term Total	
		AM	PM	AM	PM
		LOS(Delay)	LOS(Delay)	LOS(Delay)	LOS(Delay)
1.Tibet Rd & 44 <sup>th</sup> Ave	WB Left-turn	B(13.3)	B(13.8)	C (18)	D (28.3)
	WB Right-turn	A(9.1)	A(9.2)	B (10)	B (10.2)
	SB Left-turn	A(7.7)	A(7.9)	A (8.2)	A (8.5)
2.Tibet Rd & 43 <sup>rd</sup> Ave	WB Left/Right-turn	B(11.1)	B(11.6)	B (14.1)	C (19.8)
	SB Left-turn	A(7.7)	A(7.8)	A (8.2)	A (8.5)
3.Tibet Rd & 42 <sup>nd</sup> Ave (Unsignalized)	EB Left-turn	C(19.3)	C(22.9)	F(55)	F(135)
	EB Through/Right-turn	B(11.2)	B(12.1)	C(15.4)	C(21.6)
	WB Left-turn	C(20)	D(25.1)	E(46.9)	F(100.37)
	WB Through/Right-turn	B(13.3)	B(14.1)	C(21.5)	D(29.2)
	NB Left-turn	A(8.2)	A(8.2)	A(9)	A(9.3)
	SB Left-turn	A(7.6)	A(7.7)	A(8)	A(8.3)
3.Tibet Rd & 42 <sup>nd</sup> Ave (Siganlized)	EB Left-turn	N/A	N/A	D (55)	D (50.8)
	EB Through/Right-turn	N/A	N/A	E (58.8)	E (59.5)
	WB Left-turn	N/A	N/A	E (58)	E (58)
	WB Through/Right-turn	N/A	N/A	D (50.6)	D (47.3)
	NB Left-turn	N/A	N/A	A (0.8)	A (1.3)
	NB Through/Right-turn	N/A	N/A	A (0.4)	A (0.5)
	SB Left-turn	N/A	N/A	A (1.7)	A (2.4)
	SB Through	N/A	N/A	A (2.9)	A (3.9)
	SB Right-turn	N/A	N/A	A (1.8)	A (2.4)
	<b>Overall</b>	N/A	N/A	B (10.8)	B (11.3)
4.Tibet Rd & 39 <sup>th</sup> Ave	EB Right-turn	B(10.2)	B(10.4)	B(12.4)	B(13.2)
	WB Right-Turn	A(9.2)	A(9.5)	B(10.1)	B(10.8)
	NB Left-Turn	A(7.9)	A(8.1)	A(8.6)	A(9.1)
	SB Left-turn	A(7.8)	A(8.2)	A(8.4)	A(9.1)
5.Tibet Rd & 39 <sup>th</sup> Pl	WB Right-Turn	A(9.1)	A(9.9)	A(9.9)	b(11.8)
6.Tibet Rd & 38 <sup>th</sup> Ave	EB Left-turn	C (30)	C (28.8)	D (35.4)	E (58)
	EB Through	C (34)	C (30.7)	D (39)	C (26.6)
	EB Right-turn	C (29.8)	C (20.5)	C (29.4)	A (8.4)
	WB Left-turn	C (29.7)	C (28.8)	C (29.2)	C (23.6)
	WB Through	D (45.1)	D (45.3)	C (23.2)	C (25.8)
	WB Right-turn	C (32.3)	C (34.9)	A (8)	B (11.6)
	NB Left-turn*	D (49.5)	D (49)	E (59.2)	E (68)
	NB Through	B (15.6)	B (18.4)	C (31)	D (43.3)
	NB Right-turn	B (13.2)	B (17.5)	C (25.4)	D (49.3)
	SB Left-turn*	D (48.4)	D (48.4)	E (62)	E (68.8)
	SB Through	B (13.5)	B (17.6)	C (26.4)	D (43.3)
	SB Right-turn	B(10.1)	B(10.8)	B(10.7)	B(12)
	<b>Overall</b>	<b>B(10.1)</b>	<b>B(10.8)</b>	<b>B(10.7)</b>	<b>B(12)</b>
7.38 <sup>th</sup> Ave & Ukraine St	EB Left-turn	A(9.9)	B(10.4)	B(11.3)	B(11.9)
	EB Through	B (10.9)	A (5.9)	A (0.3)	B (10)
	WB Through	C (33.6)	D (41.4)	A (6.9)	B (17.2)
	WB Right-turn	A (2.3)	A (2.3)	A (0.3)	A (0.9)
	SB Left-turn	B (11.7)	B (13.8)	C (28.4)	C (30.9)
	SB Right-turn	B (12.1)	B (14.1)	C (29.4)	C (31.6)
	<b>Overall</b>	<b>B (18.8)</b>	<b>C (21.7)</b>	<b>A (7.8)</b>	<b>B (14.2)</b>
8.38 <sup>th</sup> Ave & Wenatchee St	EB Through	C (25.1)	B (17)	B (11.3)	A (7.3)
	EB Right-turn	C (21.5)	B (12.3)	A (7.5)	A (0)
	WB Left-turn	D (39.3)	D (40.4)	C (33.6)	B (11.9)
	WB Through	C (30.6)	C (30.8)	C (22.3)	C (21.9)
	NB Left-turn	A (8.4)	A (9.3)	C (24.2)	C (27.9)
	NB Right-turn	A (8.3)	A (8.8)	C (24)	C (26.3)
	<b>Overall</b>	<b>C (27.3)</b>	<b>C (22.2)</b>	<b>B (17)</b>	<b>B (14.3)</b>

## APPENDIX G. SIGNAL WARRANTS

**MUTCD Volume-based Warrant Evaluation**  
**Tibet Rd & 44th Ave**  
**Short-term (2027) Total**



Major Street: Tibet Rd  
 Lanes Moving Traffic: 2 or more  
 Approach Speed: 30 MPH

Minor Street: 44th Ave  
 Lanes Moving Traffic: 2 or more  
 Right Turn Volume Included: 50% WB

Option: Low speed, urban community

**WARRANT 1, Condition A - Minimum Vehicular Volume**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Aprchs. Major Street	600 (480)	575	540	505	469	434	399	364	328
Highest Aprch. Minor Street	200 (160)	75	70	66	61	57	52	47	43

**WARRANT 1, Condition B - Interruption of Continuous Traffic**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Aprchs. Major Street	900 (720)	575	540	505	469	434	399	364	328
Highest Aprch. Minor Street	100 (80)	75	70	66	61	57	52	47	43

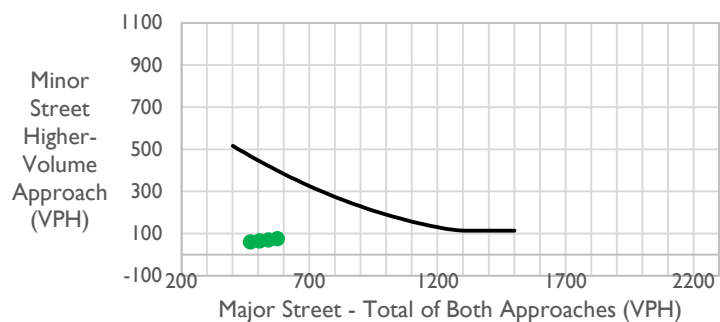
**WARRANT 1, Condition A and Condition B**

**80% Satisfied** No

**WARRANT 2, Four Hour Volume**

**100% Satisfied** No

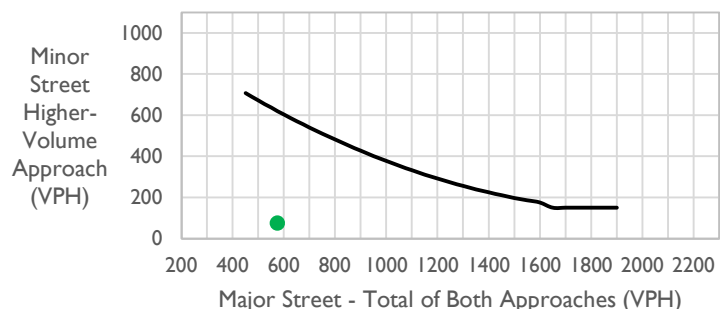
	Both Aprchs. Major Street	Higher Vol. Aprch. Minor Street
Peak Hour	575	75
2nd Highest	540	70
3rd Highest	505	66
4th Highest	469	61



**WARRANT 3, Peak Hour Volume**

**100% Satisfied** No

	Both Aprchs. Major Street	Higher Vol. Aprch. Minor Street
Peak Hour	575	75



**MUTCD Volume-based Warrant Evaluation**  
**Tibet Rd & 44th Ave**  
**Long-term (2050) Total**



Major Street: Tibet Rd  
 Lanes Moving Traffic: 2 or more  
 Approach Speed: 30 MPH

Minor Street: 44th Ave  
 Lanes Moving Traffic: 2 or more  
 Right Turn Volume Included: 50% WB

Option: Low speed, urban community

**WARRANT 1, Condition A - Minimum Vehicular Volume**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	600 (480)	1061	996	931	866	801	736	671	606
Highest Apprch. Minor Street	200 (160)	75	70	66	61	57	52	47	43

**WARRANT 1, Condition B - Interruption of Continuous Traffic**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	900 (720)	1061	996	931	866	801	736	671	606
Highest Apprch. Minor Street	100 (80)	75	70	66	61	57	52	47	43

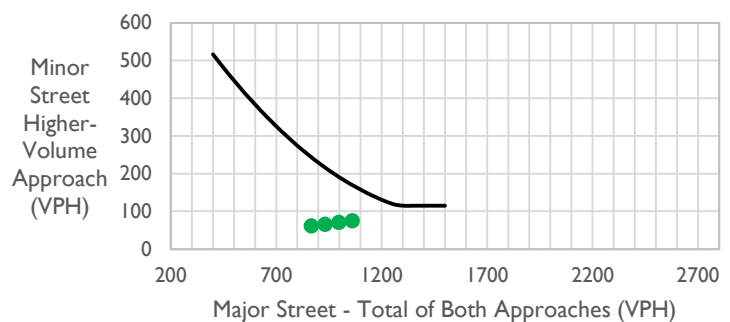
**WARRANT 1, Condition A and Condition B**

**80% Satisfied** No

**WARRANT 2, Four Hour Volume**

**100% Satisfied** No

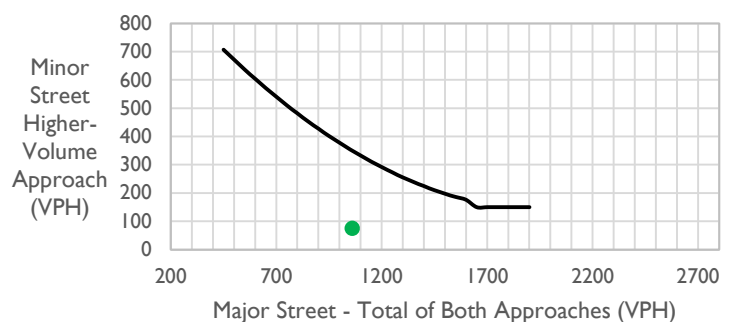
	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	1061	75
2nd Highest	996	70
3rd Highest	931	66
4th Highest	866	61



**WARRANT 3, Peak Hour Volume**

**100% Satisfied** No

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	1061	75





**MUTCD Volume-based Warrant Evaluation**  
**Tibet Rd & 43rd Ave**  
**Short-term (2027) Total**



Major Street: Tibet Rd  
 Lanes Moving Traffic: 2 or more  
 Approach Speed: 30 MPH

Minor Street: 43rd Ave  
 Lanes Moving Traffic: 2 or more  
 Right Turn Volume Included: 50% WB

Option: Low speed, urban community

**WARRANT 1, Condition A - Minimum Vehicular Volume**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Aprchs. Major Street	600 (480)	580	544	509	473	438	402	367	331
Highest Aprch. Minor Street	200 (160)	9	8	8	7	7	6	6	5

**WARRANT 1, Condition B - Interruption of Continuous Traffic**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Aprchs. Major Street	900 (720)	580	544	509	473	438	402	367	331
Highest Aprch. Minor Street	100 (80)	9	8	8	7	7	6	6	5

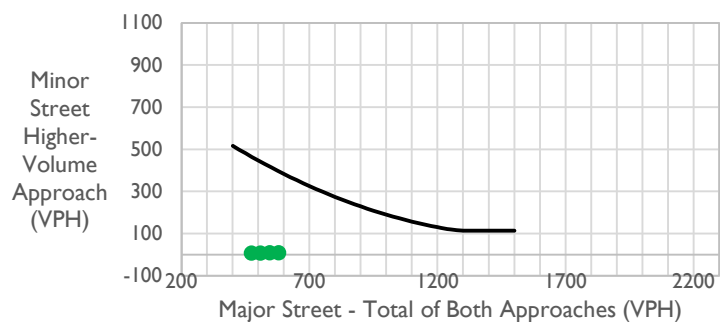
**WARRANT 1, Condition A and Condition B**

**80% Satisfied** No

**WARRANT 2, Four Hour Volume**

**100% Satisfied** No

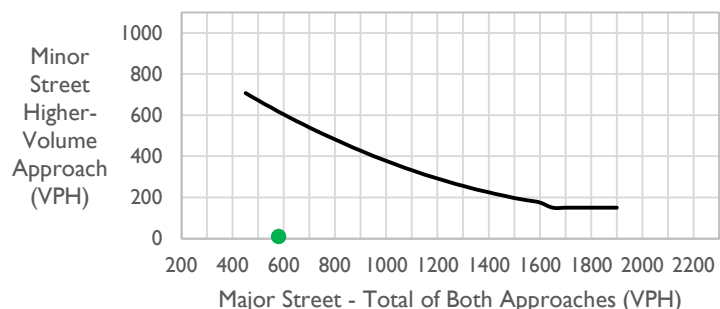
	Both Aprchs. Major Street	Higher Vol. Aprch. Minor Street
Peak Hour	580	9
2nd Highest	544	8
3rd Highest	509	8
4th Highest	473	7



**WARRANT 3, Peak Hour Volume**

**100% Satisfied** No

	Both Aprchs. Major Street	Higher Vol. Aprch. Minor Street
Peak Hour	580	9



**MUTCD Volume-based Warrant Evaluation**  
**Tibet Rd & 43rd Ave**  
**Long-term (2050) Total**



Major Street: Tibet Rd  
 Lanes Moving Traffic: 2 or more  
 Approach Speed: 30 MPH

Minor Street: 43rd Ave  
 Lanes Moving Traffic: 2 or more  
 Right Turn Volume Included: 50% WB

Option: Low speed, urban community

**WARRANT 1, Condition A - Minimum Vehicular Volume**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Aprchs. Major Street	600 (480)	1066	1001	935	870	805	739	674	609
Highest Aprch. Minor Street	200 (160)	9	8	8	7	7	6	6	5

**WARRANT 1, Condition B - Interruption of Continuous Traffic**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Aprchs. Major Street	900 (720)	1066	1001	935	870	805	739	674	609
Highest Aprch. Minor Street	100 (80)	9	8	8	7	7	6	6	5

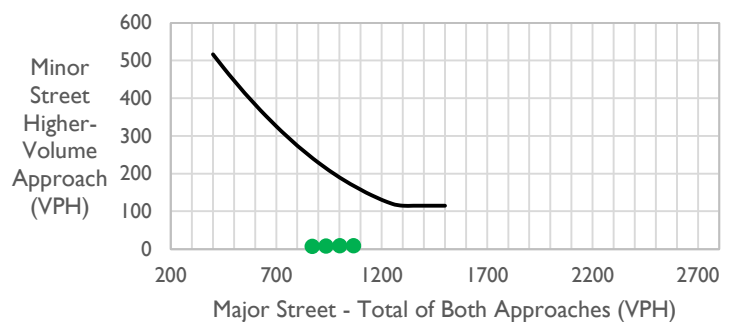
**WARRANT 1, Condition A and Condition B**

**80% Satisfied** No

**WARRANT 2, Four Hour Volume**

**100% Satisfied** No

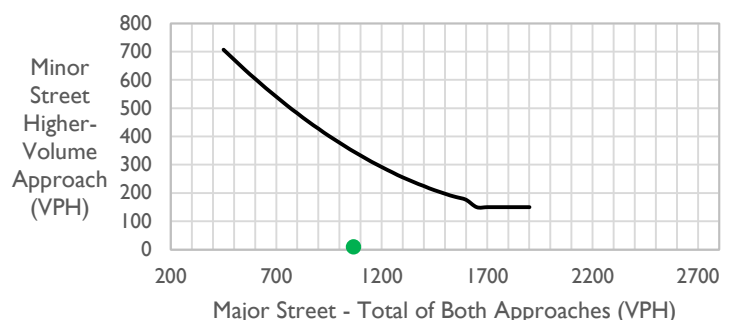
	Both Aprchs. Major Street	Higher Vol. Aprch. Minor Street
Peak Hour	1066	9
2nd Highest	1001	8
3rd Highest	935	8
4th Highest	870	7



**WARRANT 3, Peak Hour Volume**

**100% Satisfied** No

	Both Aprchs. Major Street	Higher Vol. Aprch. Minor Street
Peak Hour	1066	9



**MUTCD Volume-based Warrant Evaluation**  
**Tibet Rd & 42nd Ave**  
**Short-term (2027) Background**



Major Street: Tibet Rd  
 Lanes Moving Traffic: 2 or more  
 Approach Speed: 30 MPH

Minor Street: 42nd Ave  
 Lanes Moving Traffic: 2 or more  
 Right Turn Volume Included: 50% EB

Option: Low speed, urban community

**WARRANT 1, Condition A - Minimum Vehicular Volume**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	600 (480)	414	389	363	338	313	287	262	236
Highest Apprch. Minor Street	200 (160)	108	101	95	88	82	75	68	62

**WARRANT 1, Condition B - Interruption of Continuous Traffic**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	900 (720)	414	389	363	338	313	287	262	236
Highest Apprch. Minor Street	100 (80)	108	101	95	88	82	75	68	62

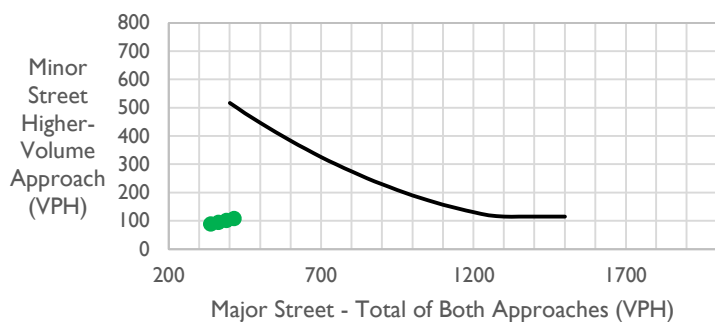
**WARRANT 1, Condition A and Condition B**

**80% Satisfied** No

**WARRANT 2, Four Hour Volume**

**100% Satisfied** No

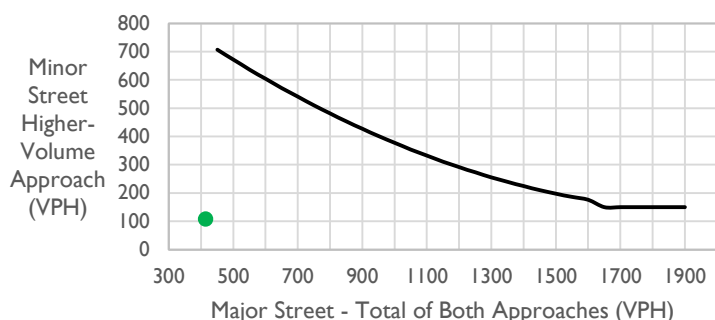
	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	414	108
2nd Highest	389	101
3rd Highest	363	95
4th Highest	338	88



**WARRANT 3, Peak Hour Volume**

**100% Satisfied** No

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	414	108



**MUTCD Volume-based Warrant Evaluation**  
**Tibet Rd & 42nd Ave**  
**Long-term (2050) Background**



Major Street: Tibet Rd  
 Lanes Moving Traffic: 2 or more  
 Approach Speed: 30 MPH

Minor Street: 42nd Ave  
 Lanes Moving Traffic: 2 or more  
 Right Turn Volume Included: 50% EB

Option: Low speed, urban community

**WARRANT 1, Condition A - Minimum Vehicular Volume**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Aprchs. Major Street	600 (480)	900	845	790	735	679	624	569	514
Highest Aprch. Minor Street	200 (160)	108	101	95	88	82	75	68	62

**WARRANT 1, Condition B - Interruption of Continuous Traffic**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Aprchs. Major Street	900 (720)	900	845	790	735	679	624	569	514
Highest Aprch. Minor Street	100 (80)	108	101	95	88	82	75	68	62

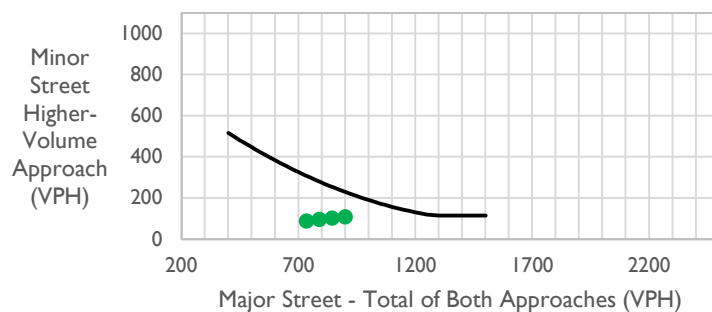
**WARRANT 1, Condition A and Condition B**

**80% Satisfied** No

**WARRANT 2, Four Hour Volume**

**100% Satisfied** No

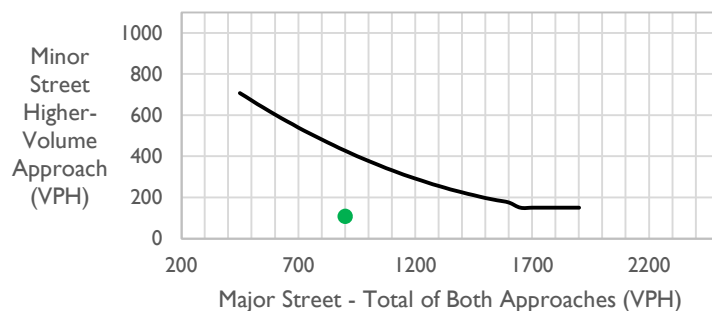
	Both Aprchs. Major Street	Higher Vol. Aprch. Minor Street
Peak Hour	900	108
2nd Highest	845	101
3rd Highest	790	95
4th Highest	735	88



**WARRANT 3, Peak Hour Volume**

**100% Satisfied** No

	Both Aprchs. Major Street	Higher Vol. Aprch. Minor Street
Peak Hour	900	108



**MUTCD Volume-based Warrant Evaluation**  
**Tibet Rd & 42nd Ave**  
**Short-term (2027) Total**



Major Street: Tibet Rd  
 Lanes Moving Traffic: 2 or more  
 Approach Speed: 30 MPH

Minor Street: 42nd Ave  
 Lanes Moving Traffic: 2 or more  
 Right Turn Volume Included: 50% EB, 50% WB

Option: Low speed, urban community

**WARRANT 1, Condition A - Minimum Vehicular Volume**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Aprchs. Major Street	600 (480)	639	600	561	522	482	443	404	365
Highest Aprch. Minor Street	200 (160)	142	133	125	116	107	98	90	81

**WARRANT 1, Condition B - Interruption of Continuous Traffic**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Aprchs. Major Street	900 (720)	639	600	561	522	482	443	404	365
Highest Aprch. Minor Street	100 (80)	142	133	125	116	107	98	90	81

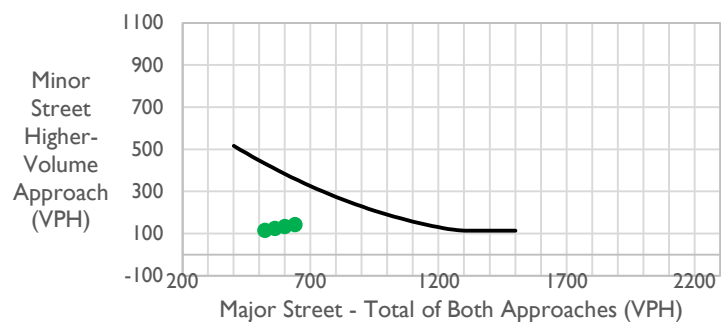
**WARRANT 1, Condition A and Condition B**

**80% Satisfied** No

**WARRANT 2, Four Hour Volume**

**100% Satisfied** No

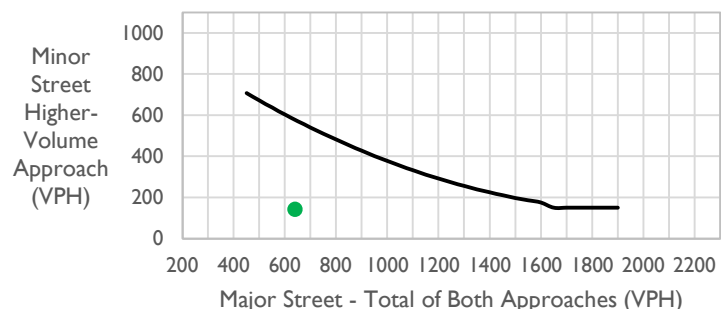
	Both Aprchs. Major Street	Higher Vol. Aprch. Minor Street
Peak Hour	639	142
2nd Highest	600	133
3rd Highest	561	125
4th Highest	522	116



**WARRANT 3, Peak Hour Volume**

**100% Satisfied** No

	Both Aprchs. Major Street	Higher Vol. Aprch. Minor Street
Peak Hour	639	142



**MUTCD Volume-based Warrant Evaluation**  
**Tibet Rd & 42nd Ave**  
**Long-term (2050) Total**



Major Street: Tibet Rd  
 Lanes Moving Traffic: 2 or more  
 Approach Speed: 30 MPH

Minor Street: 42nd Ave  
 Lanes Moving Traffic: 2 or more  
 Right Turn Volume Included: 50% EB, 50% WB

Option: Low speed, urban community

**WARRANT 1, Condition A - Minimum Vehicular Volume**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	600 (480)	1125	1056	987	918	849	780	711	642
Highest Apprch. Minor Street	200 (160)	142	133	125	116	107	98	90	81

**WARRANT 1, Condition B - Interruption of Continuous Traffic**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	900 (720)	1125	1056	987	918	849	780	711	642
Highest Apprch. Minor Street	100 (80)	142	133	125	116	107	98	90	81

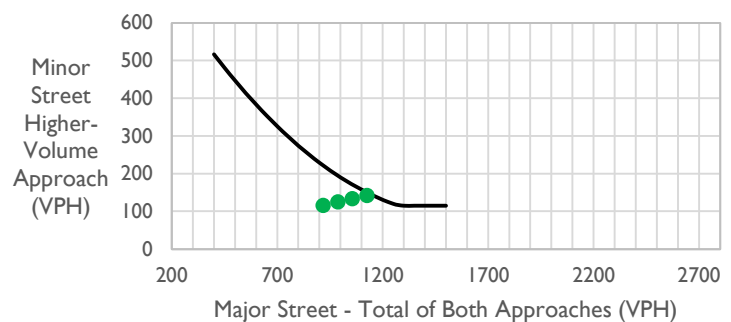
**WARRANT 1, Condition A and Condition B**

**80% Satisfied** No

**WARRANT 2, Four Hour Volume**

**100% Satisfied** No

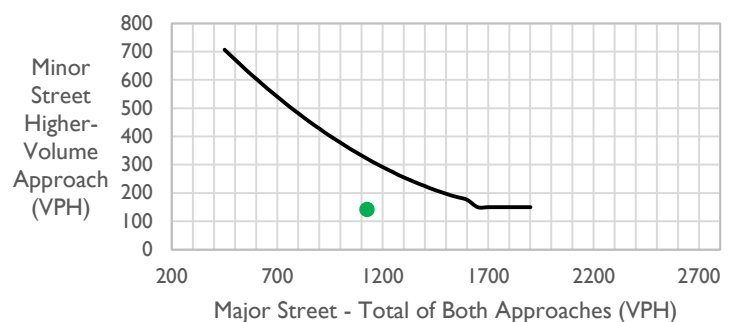
	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	1125	142
2nd Highest	1056	133
3rd Highest	987	125
4th Highest	918	116



**WARRANT 3, Peak Hour Volume**

**100% Satisfied** No

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	1125	142



**MUTCD Volume-based Warrant Evaluation**  
**Tibet Rd & 39th Ave**  
**Short-term (2027) Background**



Major Street: Tibet Rd  
 Lanes Moving Traffic: 2 or more  
 Approach Speed: 30 MPH

Minor Street: 39th Ave  
 Lanes Moving Traffic: 2 or more  
 Right Turn Volume Included: 0% EB

Option: Low speed, urban community

**WARRANT 1, Condition A - Minimum Vehicular Volume**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	600 (480)	534	501	469	436	403	370	338	305
Highest Apprch. Minor Street	200 (160)	45	42	39	37	34	31	28	26

**WARRANT 1, Condition B - Interruption of Continuous Traffic**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	900 (720)	534	501	469	436	403	370	338	305
Highest Apprch. Minor Street	100 (80)	45	42	39	37	34	31	28	26

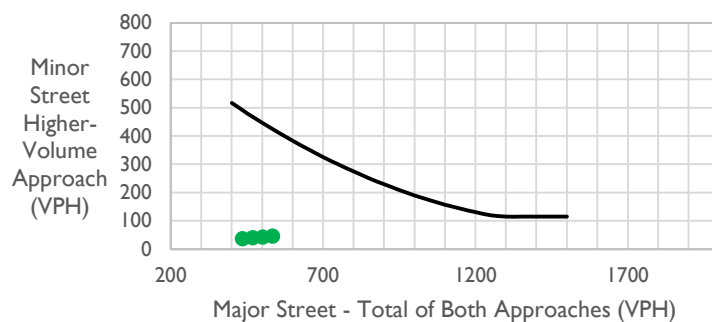
**WARRANT 1, Condition A and Condition B**

**80% Satisfied** No

**WARRANT 2, Four Hour Volume**

**100% Satisfied** No

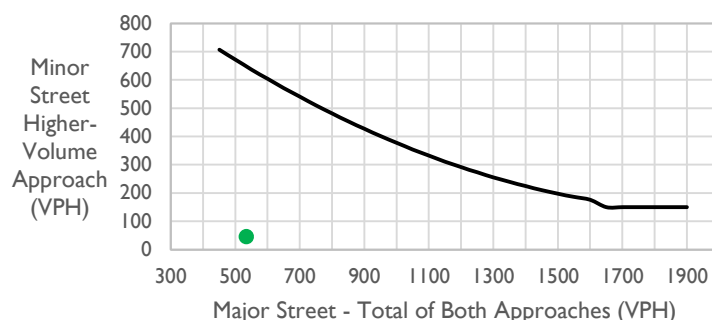
	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	534	45
2nd Highest	501	42
3rd Highest	469	39
4th Highest	436	37



**WARRANT 3, Peak Hour Volume**

**100% Satisfied** No

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	534	45



**MUTCD Volume-based Warrant Evaluation**  
**Tibet Rd & 39th Ave**  
**Long-term (2050) Background**



Major Street: Tibet Rd  
 Lanes Moving Traffic: 2 or more  
 Approach Speed: 30 MPH

Minor Street: 39th Ave  
 Lanes Moving Traffic: 2 or more  
 Right Turn Volume Included: 0% EB

Option: Low speed, urban community

**WARRANT 1, Condition A - Minimum Vehicular Volume**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	600 (480)	1020	957	895	832	770	707	645	582
Highest Apprch. Minor Street	200 (160)	45	42	39	37	34	31	28	26

**WARRANT 1, Condition B - Interruption of Continuous Traffic**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	900 (720)	1020	957	895	832	770	707	645	582
Highest Apprch. Minor Street	100 (80)	45	42	39	37	34	31	28	26

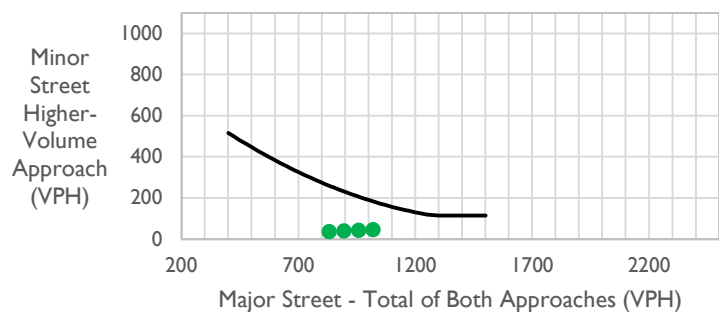
**WARRANT 1, Condition A and Condition B**

**80% Satisfied** No

**WARRANT 2, Four Hour Volume**

**100% Satisfied** No

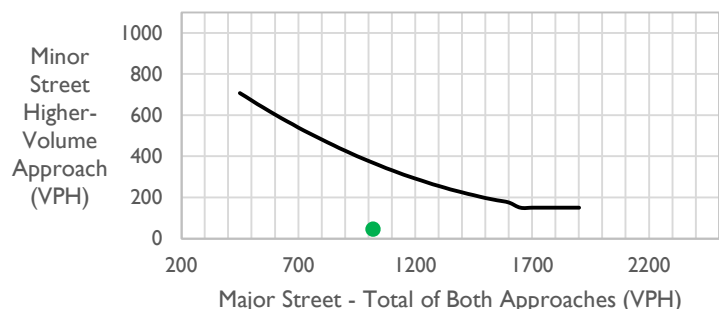
	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	1020	45
2nd Highest	957	42
3rd Highest	895	39
4th Highest	832	37



**WARRANT 3, Peak Hour Volume**

**100% Satisfied** No

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	1020	45





**MUTCD Volume-based Warrant Evaluation**  
**Tibet Rd & 39th Ave**  
**Short-term (2027) Total**



Major Street: Tibet Rd  
 Lanes Moving Traffic: 2 or more  
 Approach Speed: 30 MPH

Minor Street: 39th Ave  
 Lanes Moving Traffic: 2 or more  
 Right Turn Volume Included: 0% EB, 0% WB

Option: Low speed, urban community

**WARRANT 1, Condition A - Minimum Vehicular Volume**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Aprchs. Major Street	600 (480)	797	748	699	650	602	553	504	455
Highest Aprch. Minor Street	200 (160)	73	69	64	60	55	51	46	42

**WARRANT 1, Condition B - Interruption of Continuous Traffic**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Aprchs. Major Street	900 (720)	797	748	699	650	602	553	504	455
Highest Aprch. Minor Street	100 (80)	73	69	64	60	55	51	46	42

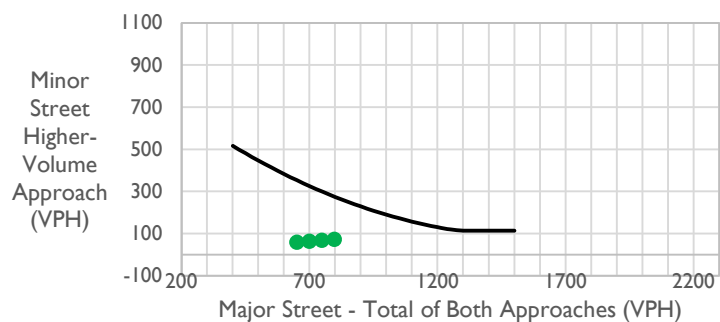
**WARRANT 1, Condition A and Condition B**

**80% Satisfied** No

**WARRANT 2, Four Hour Volume**

**100% Satisfied** No

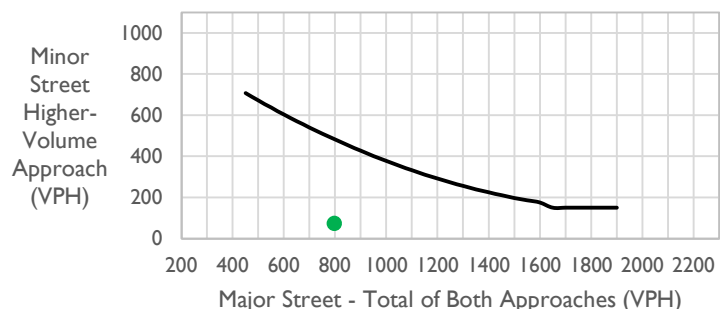
	Both Aprchs. Major Street	Higher Vol. Aprch. Minor Street
Peak Hour	797	73
2nd Highest	748	69
3rd Highest	699	64
4th Highest	650	60



**WARRANT 3, Peak Hour Volume**

**100% Satisfied** No

	Both Aprchs. Major Street	Higher Vol. Aprch. Minor Street
Peak Hour	797	73



**MUTCD Volume-based Warrant Evaluation**  
**Tibet Rd & 39th Ave**  
**Long-term (2050) Total**



Major Street: Tibet Rd  
 Lanes Moving Traffic: 2 or more  
 Approach Speed: 30 MPH

Minor Street: 39th Ave  
 Lanes Moving Traffic: 2 or more  
 Right Turn Volume Included: 0% EB, 0% WB

Option: Low speed, urban community

**WARRANT 1, Condition A - Minimum Vehicular Volume**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	600 (480)	1283	1204	1126	1047	968	890	811	733
Highest Apprch. Minor Street	200 (160)	73	69	64	60	55	51	46	42

**WARRANT 1, Condition B - Interruption of Continuous Traffic**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	900 (720)	1283	1204	1126	1047	968	890	811	733
Highest Apprch. Minor Street	100 (80)	73	69	64	60	55	51	46	42

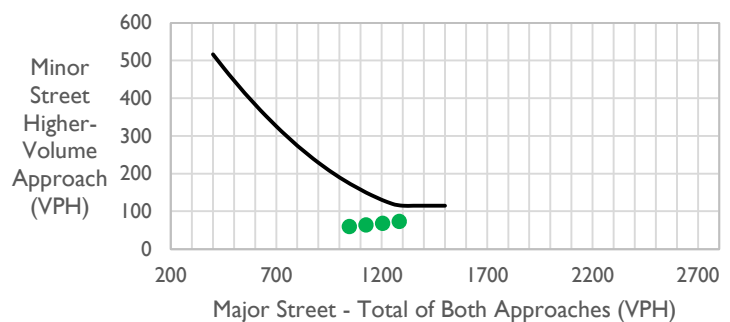
**WARRANT 1, Condition A and Condition B**

**80% Satisfied** No

**WARRANT 2, Four Hour Volume**

**100% Satisfied** No

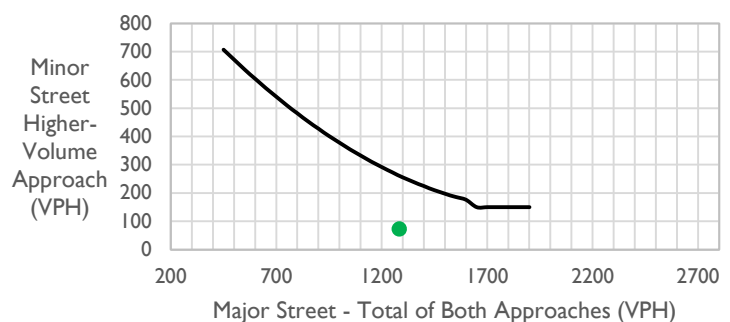
	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	1283	73
2nd Highest	1204	69
3rd Highest	1126	64
4th Highest	1047	60



**WARRANT 3, Peak Hour Volume**

**100% Satisfied** No

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	1283	73



**MUTCD Volume-based Warrant Evaluation**  
**Tibet Rd & 39th PI**  
**Short-term (2027) Total**



Major Street: Tibet Rd  
 Lanes Moving Traffic: 2 or more  
 Approach Speed: 30 MPH

Minor Street: 39th PI  
 Lanes Moving Traffic: 2 or more  
 Right Turn Volume Included: 50% WB

Option: Low speed, urban community

**WARRANT 1, Condition A - Minimum Vehicular Volume**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	600 (480)	785	737	689	641	593	544	496	448
Highest Apprch. Minor Street	200 (160)	13	12	11	11	10	9	8	7

**WARRANT 1, Condition B - Interruption of Continuous Traffic**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	900 (720)	785	737	689	641	593	544	496	448
Highest Apprch. Minor Street	100 (80)	13	12	11	11	10	9	8	7

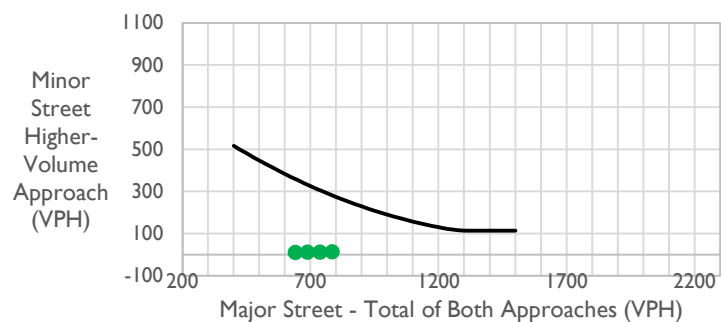
**WARRANT 1, Condition A and Condition B**

**80% Satisfied** No

**WARRANT 2, Four Hour Volume**

**100% Satisfied** No

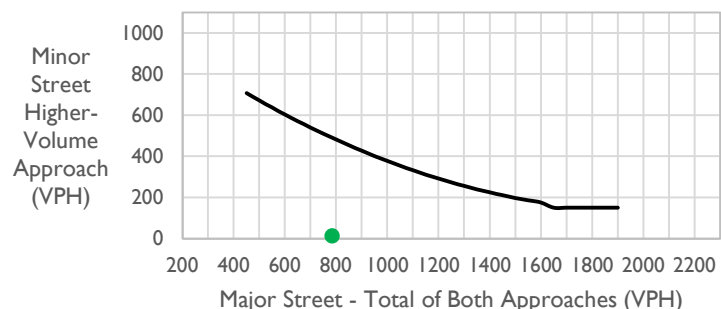
	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	785	13
2nd Highest	737	12
3rd Highest	689	11
4th Highest	641	11



**WARRANT 3, Peak Hour Volume**

**100% Satisfied** No

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	785	13



**MUTCD Volume-based Warrant Evaluation**  
**Tibet Rd & 39th PI**  
**Long-term (2050) Total**



Major Street: Tibet Rd  
 Lanes Moving Traffic: 2 or more  
 Approach Speed: 30 MPH

Minor Street: 39th PI  
 Lanes Moving Traffic: 2 or more  
 Right Turn Volume Included: 50% WB

Option: Low speed, urban community

**WARRANT 1, Condition A - Minimum Vehicular Volume**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	600 (480)	1271	1193	1115	1037	959	882	804	726
Highest Apprch. Minor Street	200 (160)	13	12	11	11	10	9	8	7

**WARRANT 1, Condition B - Interruption of Continuous Traffic**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	900 (720)	1271	1193	1115	1037	959	882	804	726
Highest Apprch. Minor Street	100 (80)	13	12	11	11	10	9	8	7

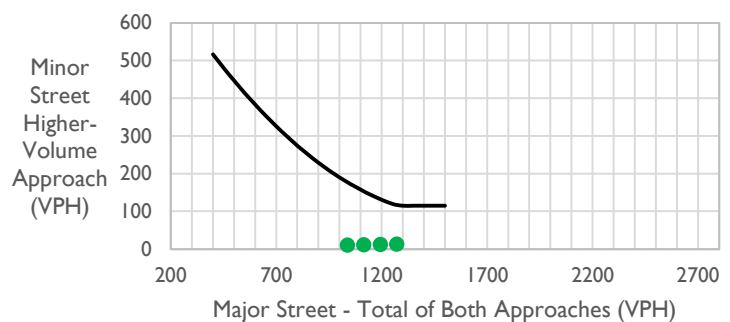
**WARRANT 1, Condition A and Condition B**

**80% Satisfied** No

**WARRANT 2, Four Hour Volume**

**100% Satisfied** No

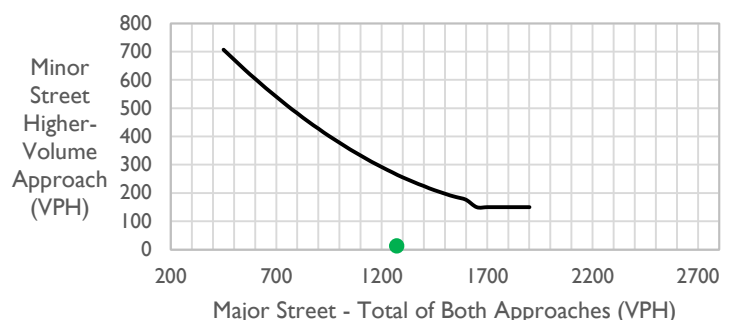
	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	1271	13
2nd Highest	1193	12
3rd Highest	1115	11
4th Highest	1037	11



**WARRANT 3, Peak Hour Volume**

**100% Satisfied** No

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	1271	13



**MUTCD Volume-based Warrant Evaluation**  
**Tibet Rd & 38th Ave**  
**Short-term (2027) Background**



Major Street: 38th Ave  
 Lanes Moving Traffic: 2 or more  
 Approach Speed: 30 MPH

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

Option: Low speed, urban community

**WARRANT 1, Condition A - Minimum Vehicular Volume**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	600 (480)	1471	1381	1291	1201	1110	1020	930	840
Highest Apprch. Minor Street	200 (160)	230	216	202	188	174	160	145	131

**WARRANT 1, Condition B - Interruption of Continuous Traffic**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	900 (720)	1471	1381	1291	1201	1110	1020	930	840
Highest Apprch. Minor Street	100 (80)	230	216	202	188	174	160	145	131

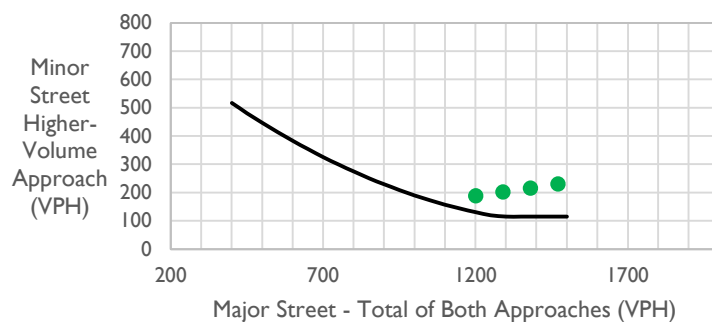
**WARRANT 1, Condition A and Condition B**

**80% Satisfied** No

**WARRANT 2, Four Hour Volume**

**100% Satisfied** Yes

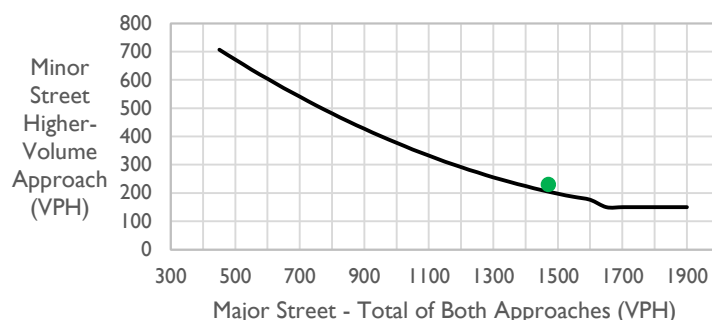
	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	1471	230
2nd Highest	1381	216
3rd Highest	1291	202
4th Highest	1201	188



**WARRANT 3, Peak Hour Volume**

**100% Satisfied** Yes

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	1471	230



**MUTCD Volume-based Warrant Evaluation**  
**Tibet Rd & 38th Ave**  
**Long-term (2050) Background**



Major Street: 38th Ave  
 Lanes Moving Traffic: 2 or more  
 Approach Speed: 30 MPH

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

Option: Low speed, urban community

**WARRANT 1, Condition A - Minimum Vehicular Volume**

**100% Satisfied** **Yes**

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	600 (480)	3130	2938	2746	2555	2363	2171	1979	1787
Highest Apprch. Minor Street	200 (160)	508	477	446	415	383	352	321	290

**WARRANT 1, Condition B - Interruption of Continuous Traffic**

**100% Satisfied** **Yes**

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	900 (720)	3130	2938	2746	2555	2363	2171	1979	1787
Highest Apprch. Minor Street	100 (80)	508	477	446	415	383	352	321	290

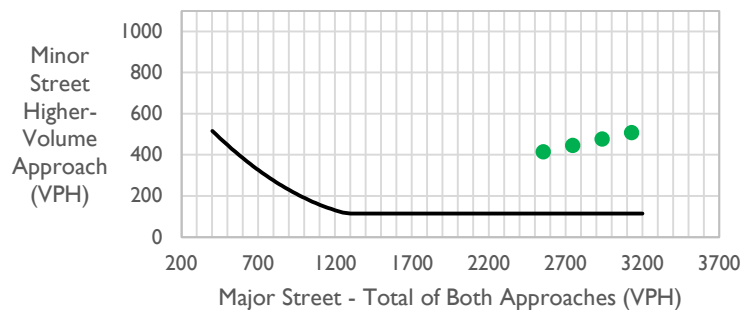
**WARRANT 1, Condition A and Condition B**

**80% Satisfied** **Yes**

**WARRANT 2, Four Hour Volume**

**100% Satisfied** **Yes**

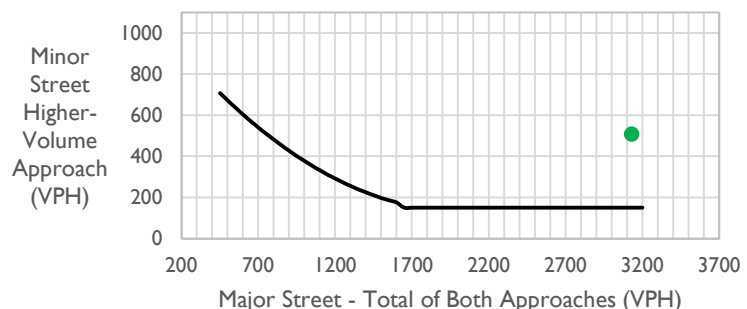
	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	3130	508
2nd Highest	2938	477
3rd Highest	2746	446
4th Highest	2555	415



**WARRANT 3, Peak Hour Volume**

**100% Satisfied** **Yes**

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	3130	508



**MUTCD Volume-based Warrant Evaluation**  
**Tibet Rd & 38th Ave**  
**Short-term (2027) Total**



Major Street: 38th Ave  
 Lanes Moving Traffic: 2 or more  
 Approach Speed: 30 MPH

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

Option: Low speed, urban community

**WARRANT 1, Condition A - Minimum Vehicular Volume**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Aprchs. Major Street	600 (480)	1776	1667	1558	1449	1341	1232	1123	1014
Highest Aprch. Minor Street	200 (160)	271	254	238	221	205	188	171	155

**WARRANT 1, Condition B - Interruption of Continuous Traffic**

**100% Satisfied** Yes

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Aprchs. Major Street	900 (720)	1776	1667	1558	1449	1341	1232	1123	1014
Highest Aprch. Minor Street	100 (80)	271	254	238	221	205	188	171	155

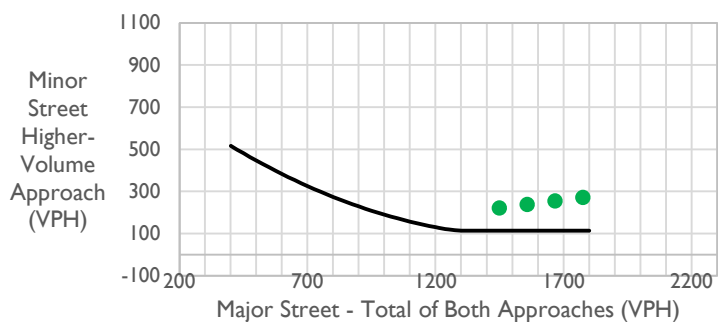
**WARRANT 1, Condition A and Condition B**

**80% Satisfied** No

**WARRANT 2, Four Hour Volume**

**100% Satisfied** Yes

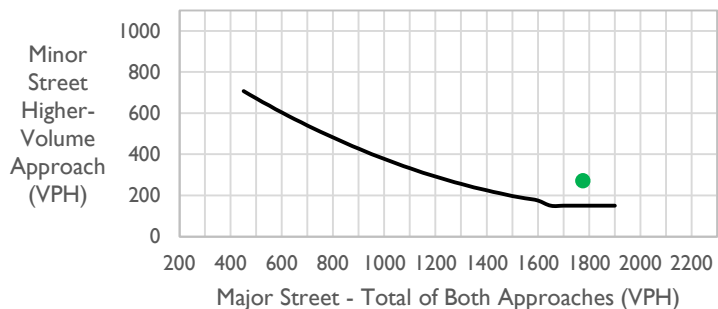
	Both Aprchs. Major Street	Higher Vol. Aprch. Minor Street
Peak Hour	1776	271
2nd Highest	1667	254
3rd Highest	1558	238
4th Highest	1449	221



**WARRANT 3, Peak Hour Volume**

**100% Satisfied** Yes

	Both Aprchs. Major Street	Higher Vol. Aprch. Minor Street
Peak Hour	1776	271



**MUTCD Volume-based Warrant Evaluation**  
**Tibet Rd & 38th Ave**  
**Long-term (2050) Total**



Major Street: 38th Ave  
 Lanes Moving Traffic: 2 or more  
 Approach Speed: 30 MPH

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

Option: Low speed, urban community

**WARRANT 1, Condition A - Minimum Vehicular Volume**

**100% Satisfied** **Yes**

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	600 (480)	3435	3224	3014	2803	2593	2382	2172	1961
Highest Apprch. Minor Street	200 (160)	508	477	446	415	383	352	321	290

**WARRANT 1, Condition B - Interruption of Continuous Traffic**

**100% Satisfied** **Yes**

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	900 (720)	3435	3224	3014	2803	2593	2382	2172	1961
Highest Apprch. Minor Street	100 (80)	508	477	446	415	383	352	321	290

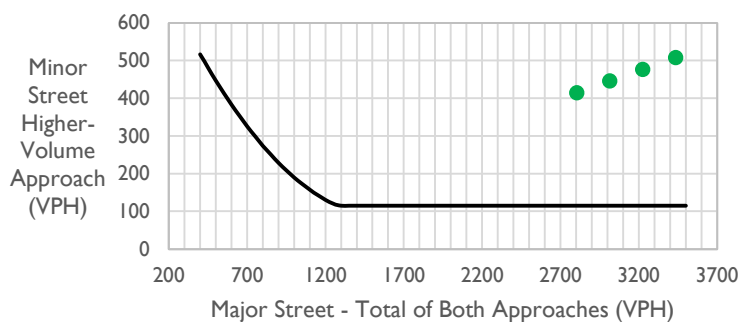
**WARRANT 1, Condition A and Condition B**

**80% Satisfied** **Yes**

**WARRANT 2, Four Hour Volume**

**100% Satisfied** **Yes**

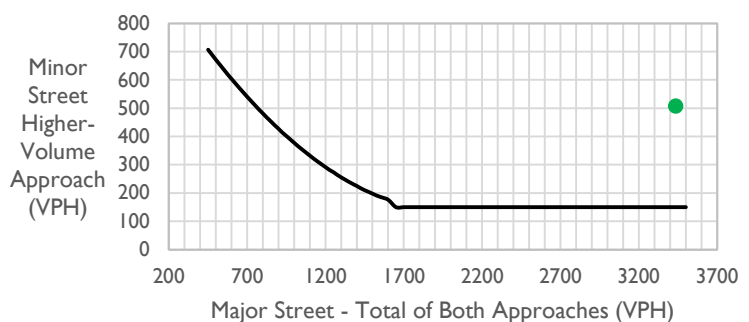
	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	3435	508
2nd Highest	3224	477
3rd Highest	3014	446
4th Highest	2803	415



**WARRANT 3, Peak Hour Volume**

**100% Satisfied** **Yes**

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	3435	508





**MUTCD Volume-based Warrant Evaluation**  
**Ukraine St & 38th Ave**  
**Short-term (2027) Total**



Major Street: 38th Ave  
 Lanes Moving Traffic: 2 or more  
 Approach Speed: 30 MPH

Minor Street: Ukraine St  
 Lanes Moving Traffic: 2 or more  
 Right Turn Volume Included: 50% SB

Option: Low speed, urban community

**WARRANT 1, Condition A - Minimum Vehicular Volume**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Aprchs. Major Street	600 (480)	1778	1669	1560	1451	1342	1233	1124	1015
Highest Aprch. Minor Street	200 (160)	308	289	270	251	232	214	195	176

**WARRANT 1, Condition B - Interruption of Continuous Traffic**

**100% Satisfied** Yes

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Aprchs. Major Street	900 (720)	1778	1669	1560	1451	1342	1233	1124	1015
Highest Aprch. Minor Street	100 (80)	308	289	270	251	232	214	195	176

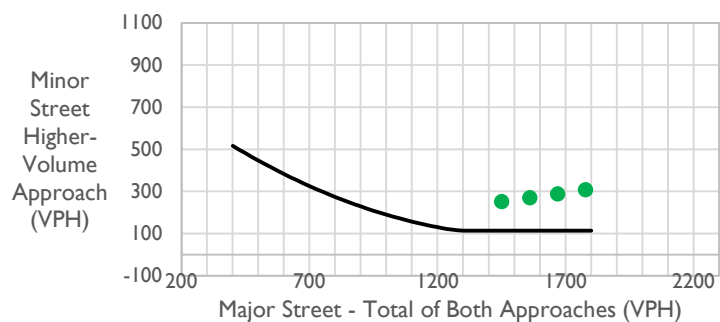
**WARRANT 1, Condition A and Condition B**

**80% Satisfied** Yes

**WARRANT 2, Four Hour Volume**

**100% Satisfied** Yes

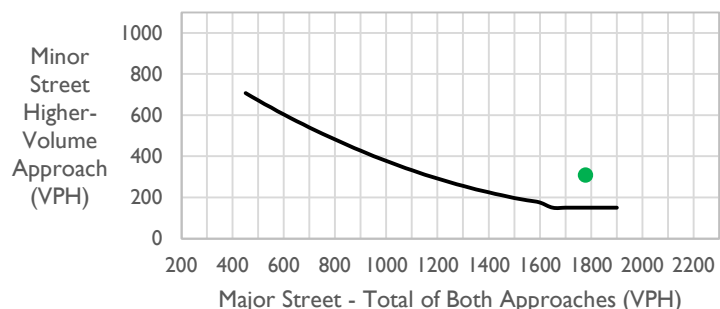
	Both Aprchs. Major Street	Higher Vol. Aprch. Minor Street
Peak Hour	1778	308
2nd Highest	1669	289
3rd Highest	1560	270
4th Highest	1451	251



**WARRANT 3, Peak Hour Volume**

**100% Satisfied** Yes

	Both Aprchs. Major Street	Higher Vol. Aprch. Minor Street
Peak Hour	1778	308



**MUTCD Volume-based Warrant Evaluation**  
**Ukraine St & 38th Ave**  
**Long-term (2050) Total**



Major Street: 38th Ave  
 Lanes Moving Traffic: 2 or more  
 Approach Speed: 30 MPH

Minor Street: Ukraine St  
 Lanes Moving Traffic: 2 or more  
 Right Turn Volume Included: 50% SB

Option: Low speed, urban community

**WARRANT 1, Condition A - Minimum Vehicular Volume**

**100% Satisfied** **No**

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	600 (480)	3507	3292	3077	2862	2647	2432	2217	2002
Highest Apprch. Minor Street	200 (160)	308	289	270	251	232	214	195	176

**WARRANT 1, Condition B - Interruption of Continuous Traffic**

**100% Satisfied** **Yes**

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	900 (720)	3507	3292	3077	2862	2647	2432	2217	2002
Highest Apprch. Minor Street	100 (80)	308	289	270	251	232	214	195	176

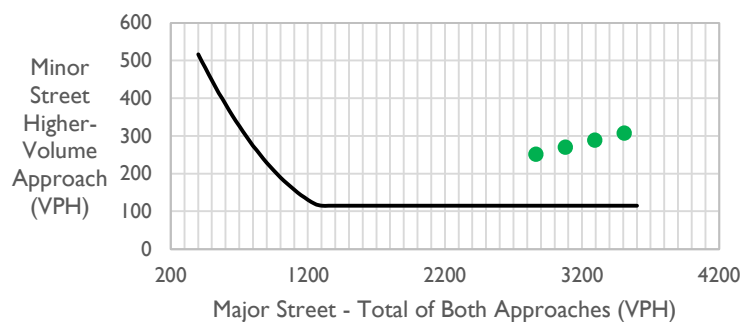
**WARRANT 1, Condition A and Condition B**

**80% Satisfied** **Yes**

**WARRANT 2, Four Hour Volume**

**100% Satisfied** **Yes**

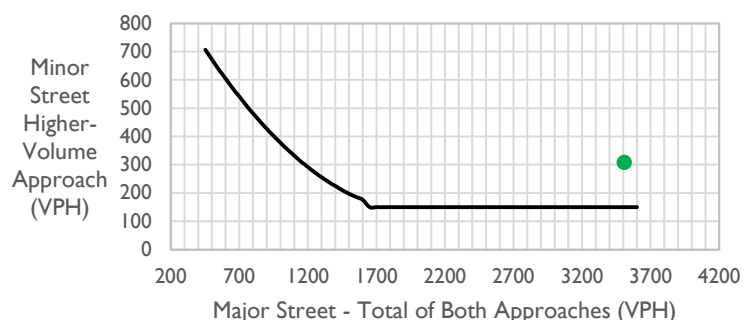
	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	3507	308
2nd Highest	3292	289
3rd Highest	3077	270
4th Highest	2862	251



**WARRANT 3, Peak Hour Volume**

**100% Satisfied** **Yes**

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	3507	308



**MUTCD Volume-based Warrant Evaluation**  
**Wenatchee Rd & 38th Ave**  
**Short-term (2027) Background**



Major Street: 38th Ave  
 Lanes Moving Traffic: 2 or more  
 Approach Speed: 30 MPH

Minor Street: Wenatchee Rd  
 Lanes Moving Traffic: 2 or more  
 Right Turn Volume Included: 50% NB

Option: Low speed, urban community

**WARRANT 1, Condition A - Minimum Vehicular Volume**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	600 (480)	1471	1381	1291	1201	1110	1020	930	840
Highest Apprch. Minor Street	200 (160)	130	122	114	106	98	90	82	74

**WARRANT 1, Condition B - Interruption of Continuous Traffic**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	900 (720)	1471	1381	1291	1201	1110	1020	930	840
Highest Apprch. Minor Street	100 (80)	130	122	114	106	98	90	82	74

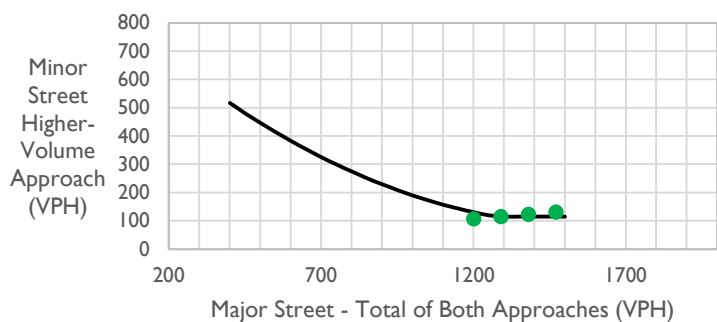
**WARRANT 1, Condition A and Condition B**

**80% Satisfied** No

**WARRANT 2, Four Hour Volume**

**100% Satisfied** No

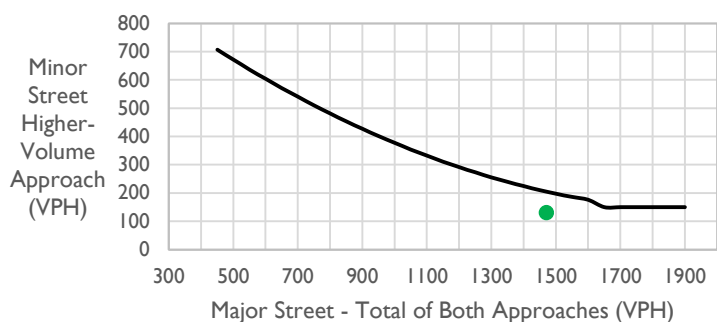
	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	1471	130
2nd Highest	1381	122
3rd Highest	1291	114
4th Highest	1201	106



**WARRANT 3, Peak Hour Volume**

**100% Satisfied** No

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	1471	130



**MUTCD Volume-based Warrant Evaluation**  
**Wenatchee Rd & 38th Ave**  
**Long-term (2050) Background**



Major Street: 38th Ave  
 Lanes Moving Traffic: 2 or more  
 Approach Speed: 30 MPH

Minor Street: Wenatchee Rd  
 Lanes Moving Traffic: 2 or more  
 Right Turn Volume Included: 50% NB

Option: Low speed, urban community

**WARRANT 1, Condition A - Minimum Vehicular Volume**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	600 (480)	3200	3004	2808	2612	2416	2219	2023	1827
Highest Apprch. Minor Street	200 (160)	130	122	114	106	98	90	82	74

**WARRANT 1, Condition B - Interruption of Continuous Traffic**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	900 (720)	3200	3004	2808	2612	2416	2219	2023	1827
Highest Apprch. Minor Street	100 (80)	130	122	114	106	98	90	82	74

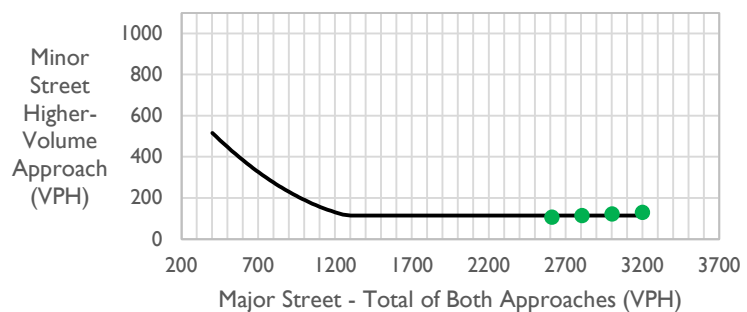
**WARRANT 1, Condition A and Condition B**

**80% Satisfied** No

**WARRANT 2, Four Hour Volume**

**100% Satisfied** No

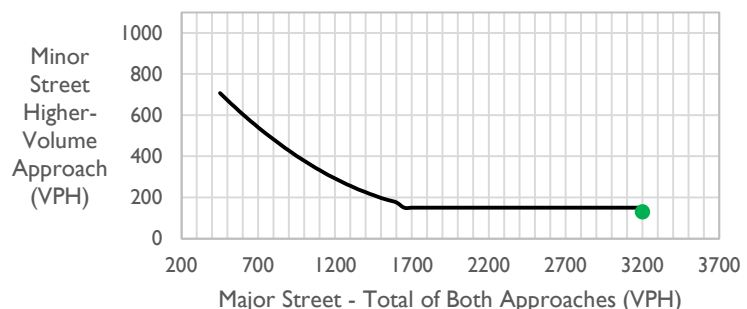
	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	3200	130
2nd Highest	3004	122
3rd Highest	2808	114
4th Highest	2612	106



**WARRANT 3, Peak Hour Volume**

**100% Satisfied** No

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	3200	130



**MUTCD Volume-based Warrant Evaluation**  
**Wenatchee Rd & 38th Ave**  
**Short-term (2027) Total**



Major Street: 38th Ave  
 Lanes Moving Traffic: 2 or more  
 Approach Speed: 30 MPH

Minor Street: Wenatchee Rd  
 Lanes Moving Traffic: 2 or more  
 Right Turn Volume Included: 50% NB

Option: Low speed, urban community

**WARRANT 1, Condition A - Minimum Vehicular Volume**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Aprchs. Major Street	600 (480)	1694	1590	1486	1383	1279	1175	1071	967
Highest Aprch. Minor Street	200 (160)	130	122	114	106	98	90	82	74

**WARRANT 1, Condition B - Interruption of Continuous Traffic**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Aprchs. Major Street	900 (720)	1694	1590	1486	1383	1279	1175	1071	967
Highest Aprch. Minor Street	100 (80)	130	122	114	106	98	90	82	74

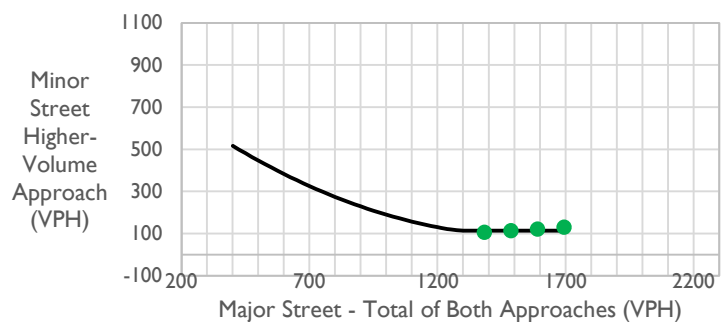
**WARRANT 1, Condition A and Condition B**

**80% Satisfied** No

**WARRANT 2, Four Hour Volume**

**100% Satisfied** No

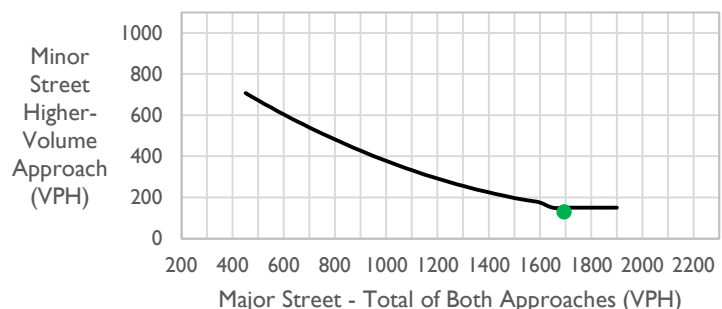
	Both Aprchs. Major Street	Higher Vol. Aprch. Minor Street
Peak Hour	1694	130
2nd Highest	1590	122
3rd Highest	1486	114
4th Highest	1383	106



**WARRANT 3, Peak Hour Volume**

**100% Satisfied** No

	Both Aprchs. Major Street	Higher Vol. Aprch. Minor Street
Peak Hour	1694	130



**MUTCD Volume-based Warrant Evaluation**  
**Wenatchee Rd & 38th Ave**  
**Long-term (2050) Total**



Major Street: 38th Ave  
 Lanes Moving Traffic: 2 or more  
 Approach Speed: 30 MPH

Minor Street: Wenatchee Rd  
 Lanes Moving Traffic: 2 or more  
 Right Turn Volume Included: 50% NB

Option: Low speed, urban community

**WARRANT 1, Condition A - Minimum Vehicular Volume**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	600 (480)	3423	3213	3003	2794	2584	2374	2164	1955
Highest Apprch. Minor Street	200 (160)	130	122	114	106	98	90	82	74

**WARRANT 1, Condition B - Interruption of Continuous Traffic**

**100% Satisfied** No

	Vehicles per hour 100% (80%)	Peak Hour	2nd Highest	3rd Highest	4th Highest	5th Highest	6th Highest	7th Highest	8th Highest
Both Apprchs. Major Street	900 (720)	3423	3213	3003	2794	2584	2374	2164	1955
Highest Apprch. Minor Street	100 (80)	130	122	114	106	98	90	82	74

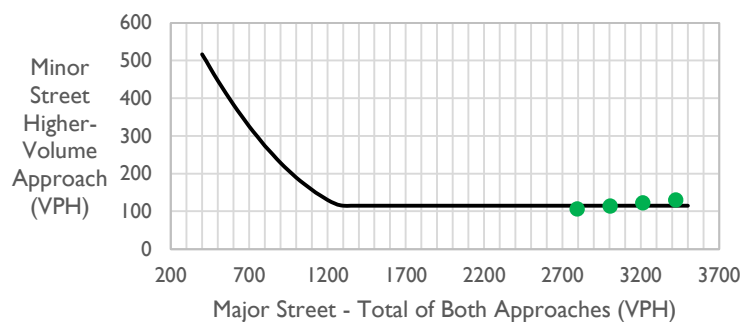
**WARRANT 1, Condition A and Condition B**

**80% Satisfied** No

**WARRANT 2, Four Hour Volume**

**100% Satisfied** No

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	3423	130
2nd Highest	3213	122
3rd Highest	3003	114
4th Highest	2794	106



**WARRANT 3, Peak Hour Volume**

**100% Satisfied** No

	Both Apprchs. Major Street	Higher Vol. Apprch. Minor Street
Peak Hour	3423	130

