Third Creek West PUD
Master Transportation Study

Revised June 14, 2019

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TRAFFIC IMPACT STUDY

1.0 INTRODUCTION

The Fox Tuttle Hernandez Transportation Group has prepared this master traffic impact study for the Third Creek West Planned Unit Development (PUD) project in the City of Commerce City, Colorado. The project site is located at the northeast quadrant of the E. 104th Avenue and E-470 interchange. The project proposes to develop approximately ±209.8 (developable) acres of mixed-use development to bring residential and commercial uses to northeastern Commerce City in the area between E-470 and Himalaya Road/Parkway.

The purpose of this study is to assist in identifying potential traffic impacts within the study area as a result of this project. The traffic study addresses existing and long-term (Year 2040) daily roadway and peak hour intersection conditions in the study area. The information contained in this study is anticipated to be used by Commerce City in identifying potential improvements to accommodate project traffic increases in the study area through the long-term (2040) scenario. This study focuses on the AM and PM peak hours which represents the periods of highest trip generation for the proposed uses. It also includes an evaluation of roadway laneage needs, auxiliary lane requirements, and intersection traffic controls throughout the study area.

The traffic impact study is consistent with the requirements of the current City of Commerce City Construction Standards and Specifications, Section 5.02.

2.0 PROJECT DESCRIPTION

The project proposes to develop approximately ±237 acres of total land area to include mixed-use residential and commercial uses. With right-of-way dedications and detention areas, the total developable land area is estimated at ±186.6 acres. The PUD concept plan shows single-family detached, single-family-attached, multi-family attached, office, and retail uses, with commercial uses closest to E. 104th Avenue and Himalaya Parkway just north of 104th Avenue. The project is planned with initial development of residential uses and development of commercial uses when feasible based on market conditions. Access to the site is planned as follows, with individual accesses coming online based on phasing of residential and commercial planning areas:

Access with Residential Development:

- Future collector roadway along Himalaya Parkway approximately 1,350' north of 104th Avenue (referred to as "Access #1" in this report)
- Right-in, right-out restricted access along Himalaya Parkway south of 108th Avenue (referred to as "Access #2")
- 108th Avenue (and future collector roadway extension) to Himalaya Parkway
- Future collector roadway along Himalaya Parkway approximately 1,000' south of 112th Avenue (referred to as "Access #3")
- Right-in, right-out restricted access along Himalaya Parkway south of Access #1 (referred to as "Access #4")

Access with Future Commercial Development:

- Future collector roadway along 104th Avenue approximately 950' east of the E-470 east (northbound) ramp intersection (referred to as "Access #5")
- Right-in, right-out restricted access along 104th Avenue between Access 5 and Himalaya Parkway (referred to as "Access #6")

A vicinity map is shown on **Figure 1**. The concept site plan with the proposed access points is provided on **Figure 2**. The site is currently undeveloped within existing residential and agricultural uses north, east and south of the site and existing and proposed residential and commercial uses west of the site. Denver International Airport is located 1-mile to the east.

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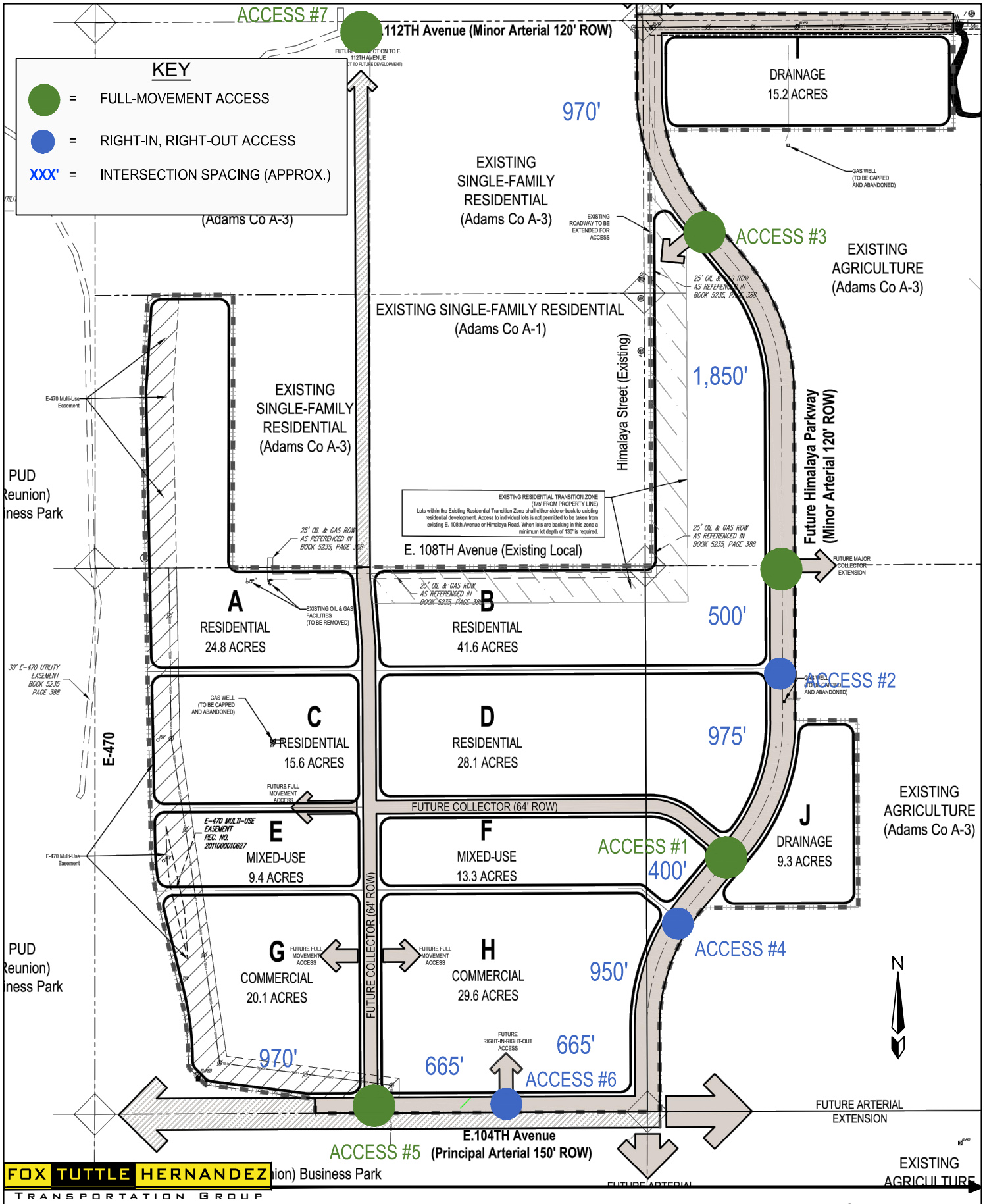
Third Creek West PUD

Vicinity Map

Project #	18041	Original Scale	1"= 4,000'	Date	6/18/18	Drawn by	SGT	Figure #	1



Third Creek West PUD

Concept Site Plan

Project #	18041	Original Scale	1"=600'	Date	6/11/19	Drawn by	SGT	Figure #	2

3.0 EXISTING AND FUTURE BACKGROUND TRAFFIC

3.1 Roadways

The study area boundaries are based on the amount of traffic to be generated by the project and potential impact to the existing roadway network. The existing study area street network consists of two arterials. The primary public roadways that serve the project site are discussed in the following text and within the context of the Commerce City C3 Vision Roadway Classification Plan (Figure 9.1 of the Comprehensive Plan, dated May 1, 2010).

E. 104th Avenue is an east-west, Principal Arterial that extends from US 36 in the City of Westminster to E-470 near the project site. 104th Avenue is planned by Commerce City to ultimately extend east to Picadilly Road near the western boundary of the Denver International Airport. 104th Avenue currently has six lanes (three through lanes in each direction) west of the project site but narrows to a single lane in each direction at E-470. The roadway is shown to extend east as an ultimate six-lane section as a Principal Arterial. The speed limit is posted at 45 miles per hour (mph) within the site vicinity. 104th Avenue serves as the southern boundary of the project site.

Tower Road is a north-south, Principal Arterial that extends from E. 128th Avenue to the north to E. Colfax Avenue in the City of Aurora to the south. Tower Road currently has between two and six lanes within the study area and is proposed as an ultimate six-lane section. Tower Road north of 104th Avenue is planned to be realigned in the future as High Plans Parkway to extend north past E-470 into the City of Brighton as a principal arterial. The speed limit is posted at 45 mph within the site vicinity. The intersection of Tower Road with 104th Avenue is currently signalized.

E-470 is a toll-restricted freeway that provides north-south access in the immediate study area and circulates the eastern half of the Denver metro area. E-470 has four lanes (two in each direction) with a posted speed of 75 mph. There exists a grade-separate interchange at 104th Avenue that is currently side-street, stop-sign controlled.

Himalaya Road is an unpaved two-lane minor arterial that extends from 112th Avenue to 96th Avenue and provides access to existing residential and agricultural uses within the site vicinity. A new Himalaya “Parkway” is planned by Commerce City as an ultimate four-lane cross-section extending from 128th Avenue to 88th Avenue and serving as the east boundary to the project site, with a realignment to the east of the existing Himalaya between 104th Avenue and 112th Avenue.

E. 112th Avenue is an unpaved (within the study area) two-lane minor arterial that extends from State Highway 2 to the west to Gun Club Road and the western boundary of the Denver International Airport to the east. There exists a grade-separate crossing of 112th Avenue over E-470 with no access to E-470 at this crossing. 112th Avenue is planned as an ultimate four-lane cross-section.

E. 108th Avenue is a two-lane, unpaved major collector that provides access to existing residential uses east of Himalaya Road/Pkwy. This roadway is planned to extend east in the future with connectivity to E. 104th Avenue (bending south) and Picadilly Road.

3.2 Existing Traffic Volumes

Existing traffic data was collected in June 2018 for this project, to include: weekday AM and PM peak hour turning movement volumes at the 104th Avenue & Tower Road intersection and daily roadway (3-day) volumes along 104th Avenue and Tower Road to include vehicle classification and breakdown of heavy trucks. Additional traffic data was also compiled from the City of Commerce City for 112th Avenue and Colorado Department of Transportation's (CDOT) online database for E-470. The existing traffic volumes are illustrated on **Figure 3**. The existing intersection geometry and traffic control are also shown on this figure. Count data sheets are provided in the **Appendix**. The vehicular classification data shows heavy truck percentages (double unit or larger) of approximately 3-4% of the daily traffic along Tower Road and 104th Avenue.

3.3 Existing Capacity Analysis

Traffic operations were evaluated for existing conditions utilizing methodology contained in the *Highway Capacity Manual (HCM)*[1]. Study intersections were evaluated using Synchro software. A level of service analysis was conducted to determine the existing performance of the study area intersections.

To measure and describe the operational status of the study intersections, transportation engineers and planners commonly use a grading system referred to as "Level of Service" (LOS)

[1] Highway Capacity Manual, Highway Research Board Special Report 209, Transportation Research Board, National Research Council, 2010.

KEY

XXX/XXX AM/PM PEAK HOUR TRAFFIC VOLUME

XX,XXX AVERAGE DAILY TRAFFIC VOLUME

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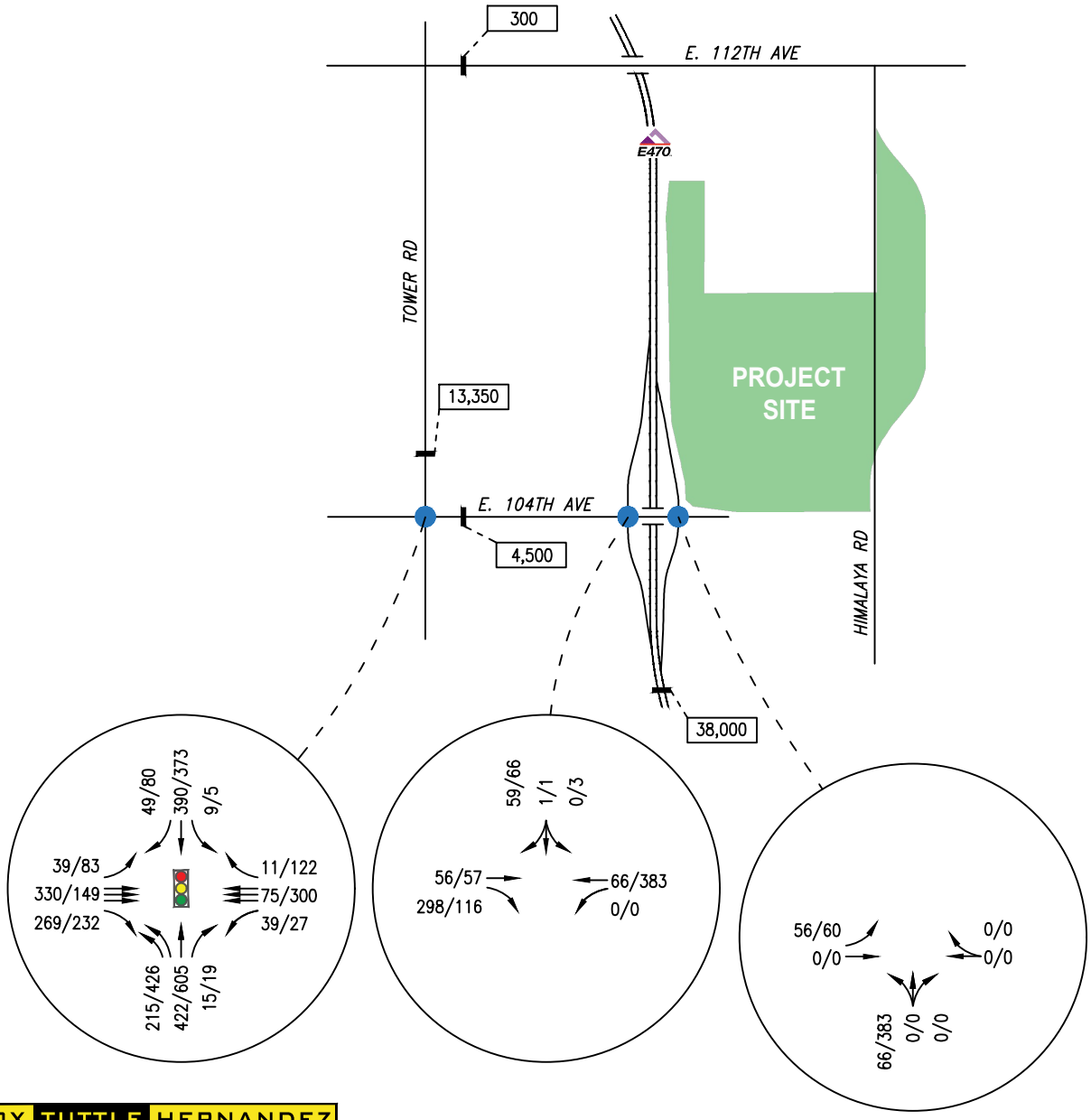

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Existing Traffic Volumes

Project #	18041	Original Scale	NTS	Date	6/18/18	Drawn by	SGT	Figure #	3

that is defined by the *HCM.* LOS characterizes the operational conditions of an intersections traffic flow, ranging from LOS A (indicating very good, free flow operations) and LOS F (indicating congested and sometimes oversaturated conditions). These grades represent the perspective of drivers and are an indication of the comfort and convenience associated with traveling through the intersections. The intersection LOS is represented as a delay in seconds per vehicle for the intersection as a whole and for each turning movement.

Typically, LOS A through C is considered to be good for the overall intersection operations and the City of Commerce City desired standard for overall intersection performance is LOS D, while individual turning movements may be permitted to operate at LOS E or F. Criteria contained in the *HCM* was applied for these analyses in order to determine existing peak hour LOS. A more detailed discussion of LOS methodology is contained in the **Appendix** for reference.

The Level of Service calculations for existing conditions are shown on **Table 1**, for signalized intersections, and **Table 2**, for unsignalized (stop-sign controlled) intersections. As shown on these tables, all intersections are currently operating acceptably at LOS C or better overall.

Some left-turn movements are shown to operate at LOS E in the AM and/or PM peak hour at the Tower Road & 104th Avenue intersection. This is due to the protected-only left-turn operation that provides limited left-turn, green arrow time and does not allow permitted left-turn movements during the opposing through green phase. This phasing is installed to provide safer conditions where left-turn movements cross multiple through lanes or higher speeds and does not require mitigation. There exists pavement width for dual left-turn lanes on all approaches at this intersection and these lanes will be striped in the future to increase left-turn capacity to accommodate future traffic growth.

3.4 Pedestrian and Bicycle Facilities

Currently, the only pedestrian and bicycle facilities in the study area are detached sidewalks and multi-use paths that exist along 104th Avenue west of E-470.

There are currently no on-street bicycle accommodations in the study area.

3.5 Transit

There are two existing transit services in the project vicinity:

- *Route 104X "Commerce City/Denver Express"* that provides weekday-only service from Walden Street & 104th Avenue to Union Station in downtown Denver four times in the morning and return trips in the evening.

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Table 1 - Signalized Intersection Level of Service Summary

Int.	Lane Group	Existing (Year 2018) AM Delay (s)	AM LOS	Existing (Year 2018) PM Delay (s)	PM LOS	2040 w/Project (Total) AM Delay (s)	AM LOS	2040 w/Project (Total) PM Delay (s)	PM LOS
Signalized Control									
104th Ave. & Tower Rd.	**Overall**	**26.0**	**C**	**30.1**	**C**	**34.0**	**C**	**31.9**	**C**
	EBL	33.3	C	33.5	C	57.6	E	71.7	E
	EBT	39.2	D	34.3	C	28.2	C	31.1	C
	EBR	0.0	A	0.0	A	0.0	A	0.0	A
	WBL	33.9	C	33.8	C	7.6	A	7.2	A
	WBT	35.8	D	39.1	D	0.5	A	0.3	A
	WBR	0.0	A	0.0	A	0.0	A	0.0	A
	NBL	45.0	D	52.2	D	70.9	E	67.1	E
	NBT	11.3	B	14.1	B	34.5	C	37.9	D
	NBR	0.0	A	0.0	A	0.0	A	0.0	A
	SBL	58.4	E	64.8	E	53.7	D	55.2	E
	SBT	15.8	B	20.1	C	51.5	D	43.7	D
	SBR	0.0	A	0.0	A	0.0	A	0.0	A
104th Ave. & E-470 West Ramps	**Overall**					**21.7**	**C**	**21.9**	**C**
	EBT	See Stop Sign Control				29.3	C	30.3	C
	EBR					0.0	A	0.0	A
	WBL					40.3	D	49.6	D
	WBT					0.8	A	0.3	A
	SBLT					41.2	D	54.4	D
	SBR					46.3	D	41.5	D
104th Ave. & E-470 East Ramps	**Overall**					**7.1**	**A**	**12.3**	**B**
	EBL	See Stop Sign Control				52.6	D	51.9	D
	EBT					0.1	A	0.2	A
	WBT					0.4	A	1.1	A
	WBR					0.0	A	0.0	A
	NBL					43.2	D	47.8	D
	NBT					38.2	D	29.8	C
	NBR					0.0	A	0.0	A
104th Ave. & Himalaya Pkwy	**Overall**	**-**	**-**	**-**	**-**	**33.0**	**C**	**34.3**	**C**
	EBL	-	-	-	-	48.0	D	57.1	E
	EBT	-	-	-	-	31.6	C	29.0	C
	EBR	-	-	-	-	0.0	A	0.0	A
	WBL	-	-	-	-	27.2	C	27.8	C
	WBT	-	-	-	-	14.1	B	14.1	B
	WBR	-	-	-	-	13.2	B	5.8	A
	NBL	-	-	-	-	50.3	D	49.4	D
	NBT	-	-	-	-	42.3	D	41.7	D
	NBR	-	-	-	-	42.5	D	43.4	D
	SBL	-	-	-	-	36.4	D	41.1	D
	SBT	-	-	-	-	42.1	D	42.7	D
	SBR	-	-	-	-	0.0	A	0.0	A

Int.	Lane Group	Existing (Year 2018) AM Delay (s)	AM LOS	Existing (Year 2018) PM Delay (s)	PM LOS	2040 w/Project (Total) AM Delay (s)	AM LOS	2040 w/Project (Total) PM Delay (s)	PM LOS
Signalized Control									
112th Ave. & Himalaya Pkwy	**Overall**	**-**	**-**	**-**	**-**	**15.0**	**B**	**15.3**	**B**
	EBL	-	-	-	-	16.1	B	14.4	B
	EBT	-	-	-	-	19.4	B	19.1	B
	EBR	-	-	-	-	17.4	B	16.7	B
	WBL	-	-	-	-	15.3	B	14.6	B
	WBT	-	-	-	-	18.3	B	17.6	B
	WBR	-	-	-	-	15.3	B	15.4	B
	NBL	-	-	-	-	9.7	A	10.3	B
	NBT	-	-	-	-	8.6	A	9.9	A
	NBR	-	-	-	-	8.4	A	9.9	A
	SBL	-	-	-	-	9.0	A	10.5	B
	SBT	-	-	-	-	8.6	A	9.6	A
	SBR	-	-	-	-	8.6	A	9.4	A
HE. 104th Ave. & Site Access 5	**Overall**	**-**	**-**	**-**	**-**	**21.7**	**C**	**19.5**	**B**
	EBL	-	-	-	-	21.2	C	17.3	B
	EBT	-	-	-	-	0.2	A	0.3	A
	EBR	-	-	-	-	0.6	A	0.8	A
	WBL	-	-	-	-	52.6	D	55.4	E
	WBT	-	-	-	-	35.7	D	36.6	D
	WBR	-	-	-	-	29.0	C	30.9	C
	NBL	-	-	-	-	35.7	D	37.4	D
	NBT	-	-	-	-	26.1	C	28.8	C
	NBR	-	-	-	-	27.1	C	29.2	C
	SBL	-	-	-	-	27.3	C	33.0	C
	SBT	-	-	-	-	26.1	C	28.8	C
	SBR	-	-	-	-	0.0	A	0.0	A
Himalaya Pkwy & Site Access 1 (w/ Signal)	**Overall**	**-**	**-**	**-**	**-**	**12.8**	**B**	**17.1**	**B**
	EBL	-	-	-	-	33.8	C	29.7	C
	EBT	-	-	-	-	33.3	C	28.3	C
	EBR	-	-	-	-	45.0	D	47.6	D
	WBL	-	-	-	-	34.3	C	28.7	C
	WBT	-	-	-	-	33.3	C	28.3	C
	WBR	-	-	-	-	33.3	C	28.2	C
	NBL	-	-	-	-	4.0	A	6.9	A
	NBT	-	-	-	-	3.0	A	4.9	A
	NBR	-	-	-	-	2.6	A	4.4	A
	SBL	-	-	-	-	5.4	A	9.6	A
	SBT	-	-	-	-	6.2	A	10.8	B
	SBR	-	-	-	-	5.5	A	9.8	A

Note: Average delay shown in seconds per vehicle.

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Table 2 - Unsignalized Intersection Level of Service Summary

Int.	Lane Group	Existing (Year 2018) AM Delay (s)	AM LOS	Existing (Year 2018) PM Delay (s)	PM LOS	2040 w/Project (Total) AM Delay (s)	AM LOS	2040 w/Project (Total) PM Delay (s)	PM LOS
Stop Sign Control									
104th Ave. & E-470 W. Ramps	EBT	0.0	A	0.0	A	See Signalized Control			
	EBR	0.0	A	0.0	A				
	WBL	0.0	A	0.0	A				
	WBT	0.0	A	0.0	A				
	SBLTR	9.0	A	11.8	B				
104th Ave. & E-470 E. Ramps	EBL	7.3	A	7.3	A	See Signalized Control			
	EBT	0.0	A	0.0	A				
	WBTR	0.0	A	0.0	A				
	NBLTR	0.0	A	0.0	A				
Himalaya Pkwy & Site Access 1 *(also analyzed w/ signal Table 1)*	EBL	-	-	-	-	24.0	C	64.3	F
	EBT	-	-	-	-	23.8	C	39.9	E
	EBR	-	-	-	-	10.7	B	11.7	B
	WBL	-	-	-	-	29.6	D	62.8	F
	WBT	-	-	-	-	23.8	C	39.9	E
	WBR	-	-	-	-	9.2	A	9.3	A
	NBL	-	-	-	-	8.6	A	9.0	A
	NBT	-	-	-	-	0.0	A	0.0	A
	NBR	-	-	-	-	0.0	A	0.0	A
	SBL	-	-	-	-	7.9	A	8.0	A
	SBT	-	-	-	-	0.0	A	0.0	A
	SBR	-	-	-	-	0.0	A	0.0	A
108th Ave. & Himalaya Pkwy	EBL	-	-	-	-	15.4	C	18.7	C
	EBT	-	-	-	-	16.7	C	18.7	C
	EBR	-	-	-	-	9.5	A	9.6	A
	WBL	-	-	-	-	18.4	C	21.1	C
	WBT	-	-	-	-	16.1	C	19.7	C
	WBR	-	-	-	-	9.1	A	9.2	A
	NBL	-	-	-	-	8.0	A	8.0	A
	SBL	-	-	-	-	7.7	A	7.8	A

Int.	Lane Group	Existing (Year 2018) AM Delay (s)	AM LOS	Existing (Year 2018) PM Delay (s)	PM LOS	2040 w/Project (Total) AM Delay (s)	AM LOS	2040 w/Project (Total) PM Delay (s)	PM LOS
Stop Sign Control									
Himalaya Pkwy & Site Access 3	EBL	-	-	-	-	12.2	B	12.0	B
	EBTR	-	-	-	-	13.4	B	13.3	B
	WBL	-	-	-	-	12.4	B	12.2	B
	WBTR	-	-	-	-	10.6	B	10.2	B
	NBL	-	-	-	-	0.0	A	0.0	A
	NBTR	-	-	-	-	0.0	A	0.0	A
	SBL	-	-	-	-	7.8	A	7.8	A
	SBT	-	-	-	-	0.0	A	0.0	A
	SBR	-	-	-	-	0.0	A	0.0	A
112th Ave & N-S Collector (Acces 6)	EBT	-	-	-	-	0.0	A	0.0	A
	EBR	-	-	-	-	0.0	A	0.0	A
	WBL	-	-	-	-	8.1	A	8.7	A
	WBT	-	-	-	-	0.0	A	0.0	A
	NBL	-	-	-	-	14.8	B	10.2	B
	NBR	-	-	-	-	9.4	A	18.1	C

Note: Average delay shown in seconds per vehicle.

- *Route AA "Wagon Road / Denver Airport"* that provides 7-day per week service between the Wagon Road Park-n-Ride and DIA Station with stops along 104th Avenue between Walden Street and Grant Street near I-25.

The Walden Street bus stop is located approximately 1-mile west of the project site and 0.25-miles west of Tower Road.

3.6 Crash History

A three-year crash history (June 2016 to June 2018) in the study area was evaluated by obtaining accident reports from the City of Commerce City Police Department. Per discussions with City staff, the evaluation included any crashes within the 104th Avenue & Tower Road intersection and on 104th Avenue from Tower Road to the east of the E-470 east ramps. There were 35 crashes that occurred during this period with 34 of these occurring within the 104th Avenue & Tower Road intersection. The crashes were categorized as follows:

- 21 rear-end crashes
- 6 single-vehicle/fixed-object crashes
- 5 left-turn/right-angle crashes
- 2 sideswipe/same direction crashes
- 1 head-on crash

One crash involved an injury and there were no fatal crashes during this period. Based on the evaluation of the crashes and the conditions involved, there were no critical crash patterns or frequency of crashes that would typically be mitigated based on the data summarized. A tabular summary of the crashes evaluated is provided in the **Appendix**.

3.7 Background Traffic Growth

The study area is largely undeveloped and is anticipated to experience significant traffic growth in the long-term scenario with development. In order to forecast the future daily and peak hour traffic volumes without development of the project, the following resources were reviewed and incorporated, as relevant to this study:

- City of Commerce City C3 Vision Roadway Classification Plan
- DRCOG 2040 Regional Travel Models (Compass and FOCUS models)
- Area CDOT 20-Year Growth Data

- E-470 Traffic and Revenue Forecasts: New Toll Structure, Final Report (2018)
- City of Aurora Northeast Area Transportation Study Update (DRAFT)
- Available data from area development traffic impact studies

Information from these data sources were utilized to estimate Year 2040 average daily traffic volumes within the study area. It should be noted that the DRCOG regional model provides meaningful projections only for Tower Road and is not refined enough in this area for detailed assessment of projected long-range volumes along 104th Avenue, 112th Avenue, or Himalaya Road/Parkway. Revised modeling recently performed by Felsburg Holt & Ullevig as part of the City of Aurora Northeast Area Transportation Study (NEATS) Update was utilized to provide context for traffic growth along E-470 and Picadilly Street to the south of Peňa Blvd. Based on a compilation of this data and backing out the projected site trips for the Third Creek PUD, the following background daily traffic volumes were estimated to utilize as a basis for the long-range analyses:

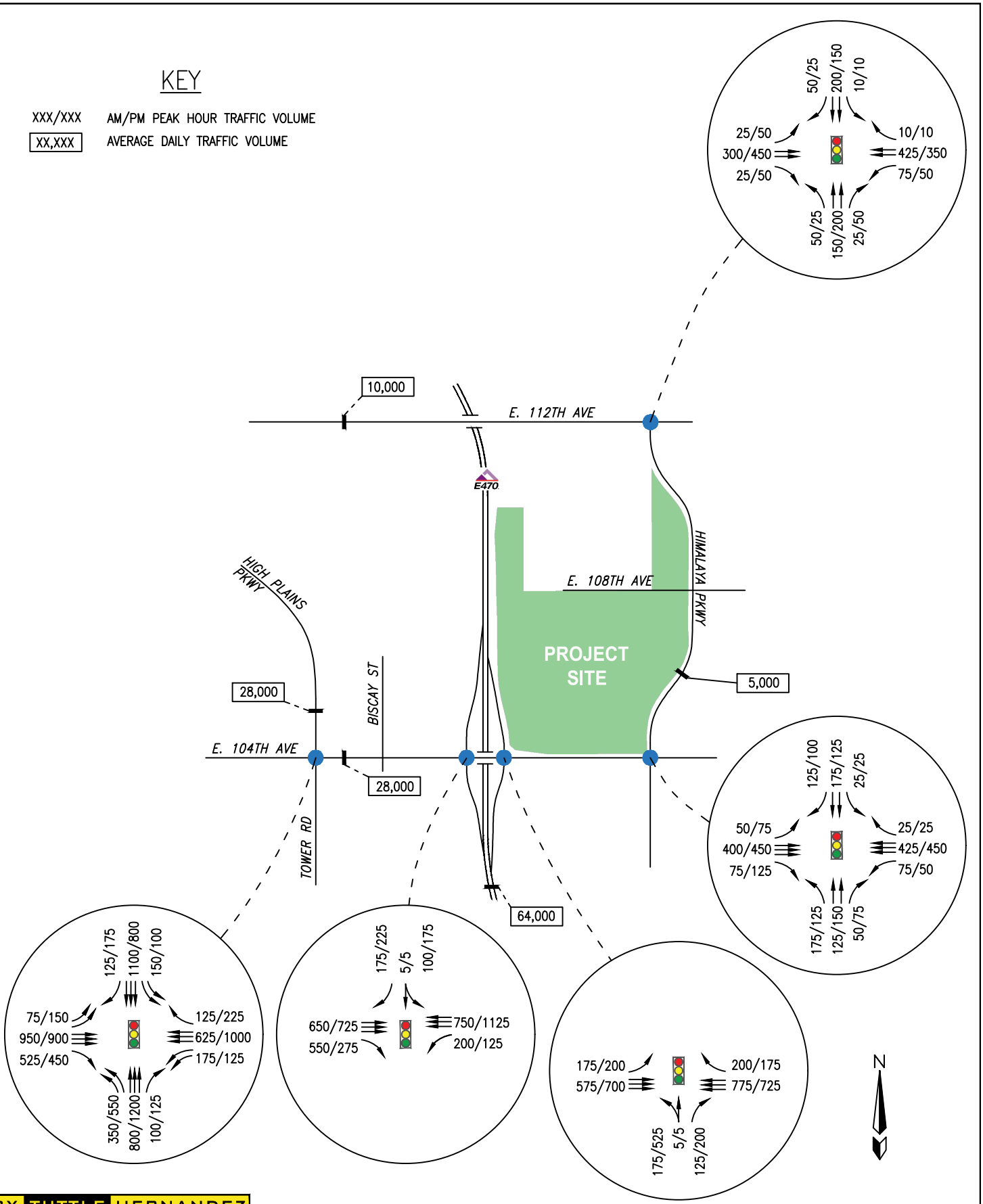
- 104th Avenue east of Tower Road = 22,000 vpd
- 104th Avenue west of Tower Road = 28,000 vpd
- Tower Road north of 104th Avenue = 28,000 vpd
- Tower Road south of 104th Avenue = 32,500 vpd
- 112th Avenue west of E-470 = 10,000 vpd
- Himalaya Parkway north of 104th Avenue = 5,000 vpd

Using these assumptions, the 2040 background traffic is summarized on **Figure 4**. Peak hour turning movement volumes were estimated from existing turning movement volumes and future daily traffic volumes, as well as accounting for development of adjacent parcels per the C3 Vision Future Land Use Plan.

4.0 ESTIMATED SITE TRAFFIC

4.1 Trip Generation

A trip generation estimate was performed to determine the traffic characteristics of the proposed residential and commercial development of the Third Creek West PUD. The trip rates contained



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Year 2040 Background Traffic Volumes

Project #	18041	Original Scale	NTS	Date	6/14/19	Drawn by	SGT	Figure #	4

in the *Institute of Transportation Engineers (ITE) Trip Generation Manual*[2] were applied to estimate the traffic for the site for each of these proposed land uses:

- #210 “Single-Family Detached Housing”
- #220 “Multifamily Housing (Low-Rise)”
- #221 “Multifamily Housing (Mid-Rise)”
- #710 “General Office Building”
- #820 “Shopping Center”

The project includes ±182.5 acres of developable land in eight (8) Planning Areas, labeled “A” through “H”. Planning areas “I” and “J” are not included in this analysis as they are planned as detention ponds; any future development of these parcels is subject to future PUD Permit applications, including the requirement for update traffic analysis. The Planning Areas propose a mix of permitted uses and densities that provide options for land use refinement with the development subareas. In order to conservatively estimate potential site trips at buildout, the maximum residential development scenario of 1,050 dwelling units was assumed with floor-area ratios (FAR) of 0.25 FAR for commercial (retail and office) uses to calculate gross-floor area. For mixed-use planning areas “E” and “F”, where residential use may be vertically mixed with commercial uses, the gross-floor area for commercial use was calculated in addition to the multifamily residential uses that would be located above it.

The assumptions made to estimate dwelling units and commercial gross-floor area square footage is provided in the **Appendix**. Based on these assumptions, the following land use calculations were utilized as a basis for trip generation calculations:

- Single-Family Detached Housing = 445 units
- Multifamily Housing (Low-Rise) = 305 units
- Multifamily Housing (Mid-Rise) = 300 units
- General Office = 259,000 square feet
- Shopping Center = 280,000 square feet

The project is expected to experience mostly new trips, also known as ‘primary trips’, as well as pass-by trips (for retail) and multi-use trips. Each trip type is discussed below:

[2] Trip Generation 10th Edition, Institute of Transportation Engineers, 2017.

Primary Trips. These trips are made specifically to visit the site and are considered "new" trips and are unique to the area transportation system. Primary trips would not have been made if the proposed project did not exist. Therefore, this is the only trip type that increases the total number of trips made on a regional basis.

Pass-By Trips. Pass-by trips do not create any increase in the traffic volumes within the context of the larger transportation impact area. These are trips that are already occurring or are anticipated to occur in the future on the area roadways but would divert into the project site to visit retail uses once developed. The only impact of the pass-by trips is at the site driveways and adjacent intersections where through movements become turning movements into and out of the site. An example would be a driver diverting into the site on their way to work to stop at a coffee shop within the development.

Pass-by was only applied to the potential retail portions of the project site for AM & PM peak hour scenarios. These land uses historically have shown to have pass-by trips as indicated by the national data in the *ITE Trip Generation Handbook*, which are those vehicles that utilize one of the adjacent roadways to travel between their origin and destination and choose to make a stop within the development site before they continue on route. This is not a reduction of trips, but a redirect of existing/background trips that will become a customer of the new businesses. The *ITE Trip Generation Handbook* defines pass-by as "trips made as intermediate stops on the way from an origin to primary trip destination without a route diversion". It was assumed that there will be an average of 30 percent AM peak hour and 34 percent PM peak hour pass-by trips for the retail uses, based on ITE data.

Multi-Use (Internal) Trips. These are non-auto internal trips that occur from one land use or building to another within the site boundaries for mixed-use developments. For example, a person that shops in the new retail center may visit several stores but only park once, or a person that lives above or nearby a coffee shop or restaurant may walk from home to that use without using a vehicle. Multi-use or multi-purpose trips typically do not affect the exterior site access points, nor add any additional traffic volumes to the exterior street network. Utilizing the ITE methodology and based on currently industry best practices for mixed-use development trip generation, it was estimated that the mix of uses within Third Creek West would have a 15% "MXD" reduction for retail trips and a 5% MXD reduction for office and multifamily residential. No MXD reduction was applied to the single-family detached use given that these units are anticipated to be located further away from the site office and retail uses.

Utilizing these assumptions, the trip generation estimates are summarized in **Table 3**. The breakdown of pass-by and primary trips is provided on **Table 4**.

Estimated Trips:

Third Creek West PUD is estimated to generate the following total trips at full buildout:

- Daily: 19,062
- AM Peak Hour: 1,086, including 68 pass-by trips
- PM Peak Hour: 1,943, including 313 pass-by trips

4.2 Trip Distribution and Assignment

The estimated automobile trip volumes were distributed onto the study area street network based on existing traffic characteristics of the area, land uses, and projected future traffic patterns in the area based on the C3 Vision roadway network plan and long-range land use plan. The overall assumed site trip distributions are provided on **Figure 5**.

Using these distribution assumptions, the projected site traffic was assigned to the study area roadway network for weekday daily and weekday AM and PM peak hour periods. The site-generated volumes are shown on **Figure 6**. The Year 2040 total traffic volumes, with project traffic, is shown on **Figure 7**.

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Table 3. Trip Generation Estimate

Land Use	Size	Unit	MXD Factor*	Average Daily Trips				A.M. Peak Hour Trips				P.M. Peak Hour Trips			
				Rate	Total	In	Out	Rate	Total	In	Out	Rate	Total	In	Out
Residential															
ITE 210 - Single-Family Detached Housing	565	Dwelling Units	1.00	9.44	5,333	2,667	2,666	0.75	424	106	318	0.99	559	352	207
ITE 220 - Multifamily Housing (Low-Rise)	87	Dwelling Units	0.95	7.32	605	303	302	0.46	38	9	29	0.56	46	29	17
ITE 221 - Multifamily Housing (Mid-Rise)	289	Dwelling Units	0.95	5.44	1,493	746	747	0.36	99	26	73	0.44	121	74	47
Residential Subtotal	***941***	***Dwelling Units***			***7,432***	***3,716***	***3,715***		***561***	***141***	***420***		***726***	***455***	***271***
Commercial Subtotal															
ITE 710 - General Office Building	271	1,000 SF	0.95	9.74	2,505	1,253	1,252	1.16	298	257	41	1.15	296	47	249
ITE 820 - Shopping Center	284	1,000 SF	0.85	37.75	9,125	4,562	4,563	0.94	227	141	86	3.81	921	442	479
Commercial Subtotal	***555***	***1,000 SF***			***11,630***	***5,815***	***5,815***		***526***	***398***	***127***		***1,217***	***489***	***728***
Totals:					**19,062**	**9,531**	**9,530**		**1,086**	**539**	**547**		**1,943**	**944**	**999**

Source: ITE Trip Generation 10th Edition. 2017.

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Table 4. Pass-By and Primary Trip Summary

Land Use	*PASS-BY* Trip Generation Estimates							
	Pass-By %		A.M. Peak			P.M. Peak		
	AM	PM	Total	In	Out	Total	In	Out
ITE 210 - Single-Family Detached Housing	0.00	0.00	0	0	0	0	0	0
ITE 220 - Multifamily Housing (Low-Rise)	0.00	0.00	0	0	0	0	0	0
ITE 221 - Multifamily Housing (Mid-Rise)	0.00	0.00	0	0	0	0	0	0
ITE 710 - General Office Building	0.00	0.00	0	0	0	0	0	0
ITE 820 - Shopping Center	0.30	0.34	68	42	26	313	150	163
Totals:			**68**	**42**	**26**	**313**	**150**	**163**

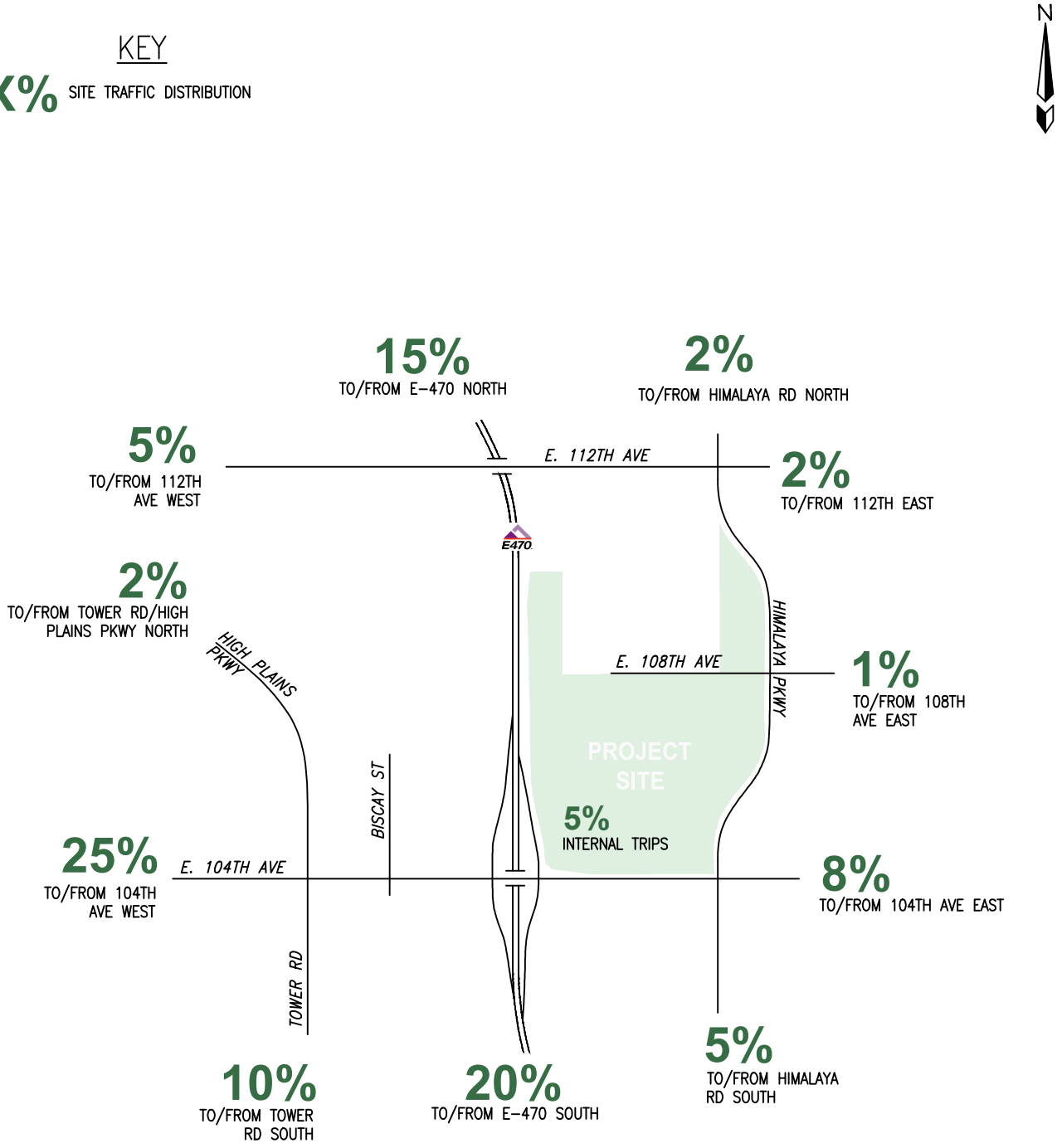
Land Use	*PRIMARY* Trip Generation Estimates							
	Primary %		A.M. Peak			P.M. Peak		
	AM	PM	Total	In	Out	Total	In	Out
ITE 210 - Single-Family Detached Housing	1.00	1.00	424	106	318	559	352	207
ITE 220 - Multifamily Housing (Low-Rise)	1.00	1.00	38	9	29	46	29	17
ITE 221 - Multifamily Housing (Mid-Rise)	1.00	1.00	99	26	73	121	74	47
ITE 710 - General Office Building	1.00	1.00	298	257	41	296	47	249
ITE 820 - Shopping Center	0.70	0.66	159	99	60	608	292	316
Totals:			**1018**	**497**	**521**	**1630**	**794**	**836**

TOTAL SITE DRIVEWAY TRIPS:		**1086**	**539**	**547**	**1943**	**944**	**999**

Note: Shopping Center pass-by based on ITE Trip Generation Handbook, 3rd Edition (2017).

KEY

XX% SITE TRAFFIC DISTRIBUTION



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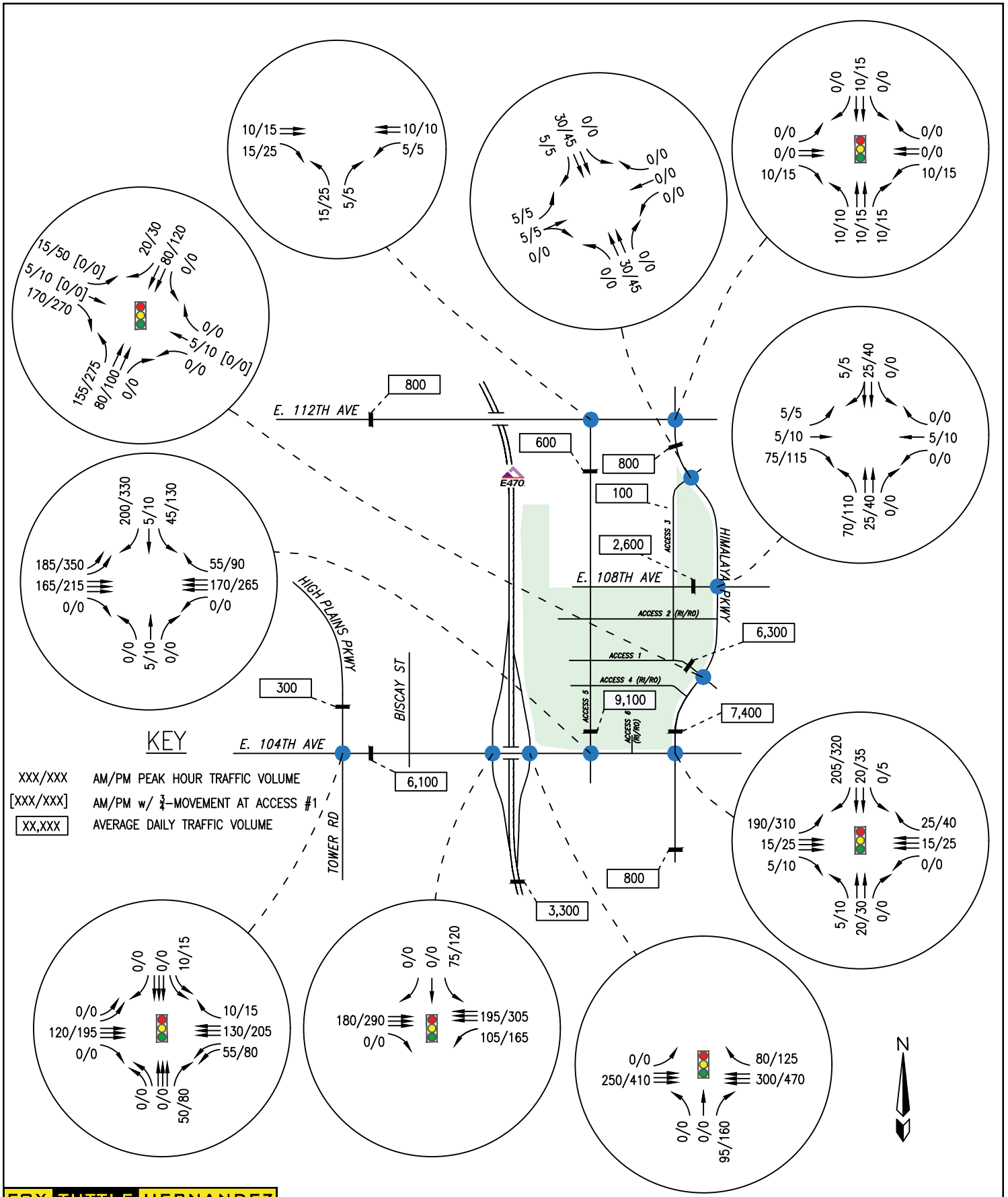
Third Creek West PUD

Trip Distribution

Project #	18041	Original Scale	NTS	Date	6/14/19	Drawn by	SGT	Figure #	5



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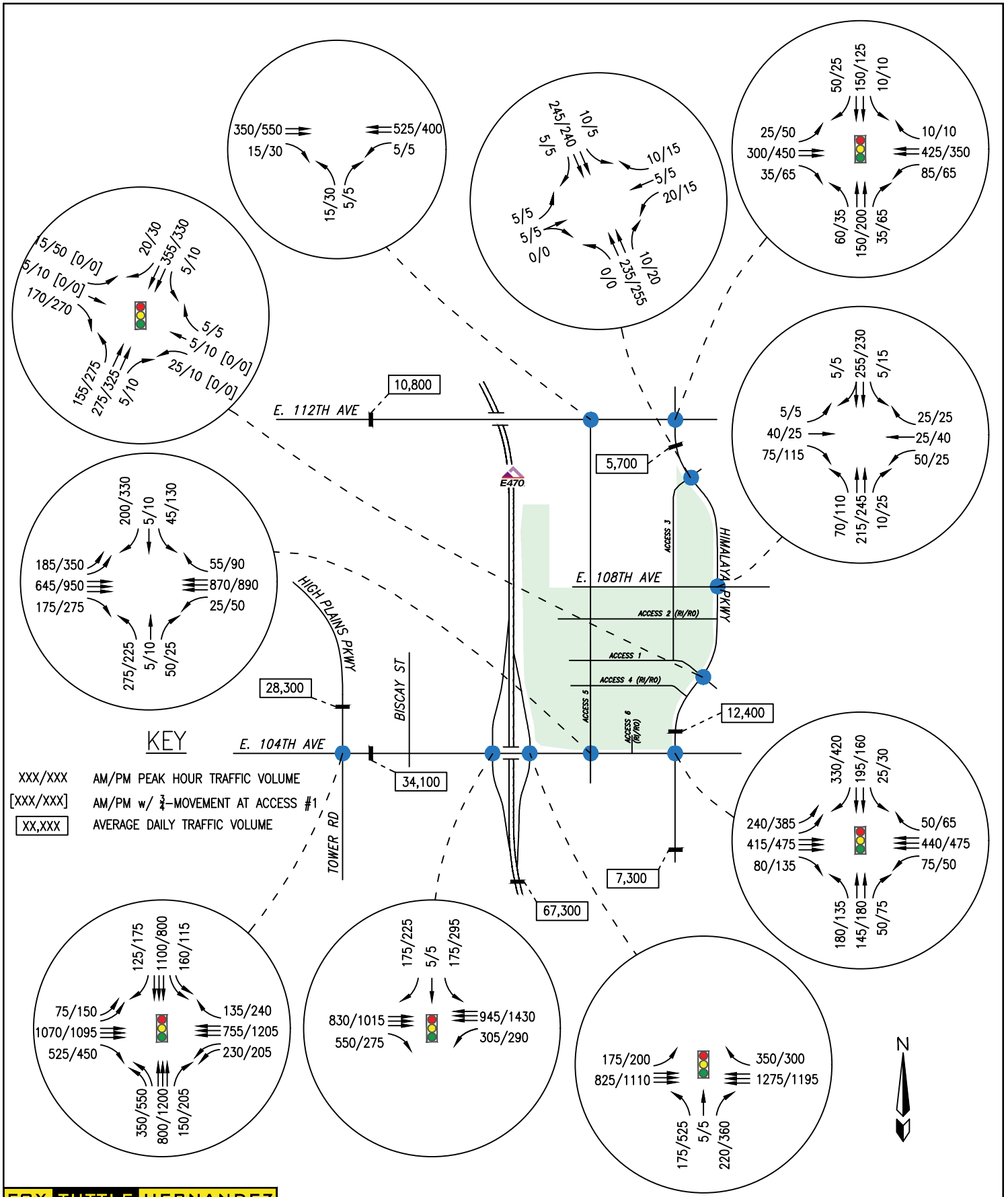
Third Creek West PUD

Site-Generated Traffic Volumes

Project #	18041	Original Scale	NTS	Date	6/14/19	Drawn by	SGT	Figure #	6



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Third Creek West PUD

Year 2040 Total Traffic Volumes

Project #	18041	Original Scale	NTS	Date	6/14/19	Drawn by	SGT	Figure #	7

5.0 FUTURE TRAFFIC CONDITIONS WITH PROJECT

5.1 Level of Service Capacity Analysis

The HCM methodology and level of service criteria discussed in Section 3.3 was applied to the study area intersections to determine impacts with the addition of site-build out traffic volumes in the long-term, buildout scenario. The results of the LOS calculations for the intersections are summarized in **Table 1** for signalized intersections and **Table 2** for unsignalized (stop-sign controlled) intersections.

The data contained in **Table 1** and **Table 2** illustrates that the study intersections are anticipated to operate acceptably overall (LOS D or better) with the addition of site traffic ***at build out in the long-term scenario***. A summary of the overall intersection LOS (for signalized intersections) and worst movement/approach LOS (for stop-controlled intersections) is as follows:

With Signalized Control (Overall LOS):

- 104th Avenue & Tower Road = LOS C (AM), LOS C (PM)
- 104th Avenue & E-470 West Ramp = LOS C (AM), LOS C (PM)
- 104th Avenue & E-470 East Ramp = LOS A (AM), LOS B (PM)
- 104th Avenue & Himalaya Parkway = LOS C (AM), LOS C (PM)
- 112th Avenue & Himalaya Parkway = LOS B (AM), LOS B (AM)
- 104th Avenue & Site Access 5 = LOS C (AM), LOS B (PM)
- Himalaya Parkway & Site Access 1 (w/ signal) = LOS B (AM), LOS B (AM)

With Stop-Sign Control (Worst Movement/Approach):

- Himalaya Parkway & Access 1 (as full-movement, unsignalized) = LOS D *(WBLT)* (AM), LOS F *(EBLT)* (PM)
- Himalaya Parkway & 108th Avenue = LOS C (AM), LOS C (PM)
- Himalaya Parkway & Access 3 = LOS C (AM), LOS C (PM)
- 112th Avenue & North-South Collector (Access 6) = LOS B (AM), LOS C (PM)

This analysis assumes that roadway laneage consistent with the C3 Vision Roadway Classification Plan and Commerce City Typical Street Sections for the study area Principal

Arterial, Minor Arterial, and Collector Roadways are in place as well as traffic controls projected to be warranted for the long-range area buildout scenario. These are described as follows:

- 104th Avenue = planned by Commerce City as a Principal Arterial with a continuous six-lane cross-section with right and left-turn auxiliary lanes at full-movement intersections. To implement a six-lane cross-section consistent with the City's long-range plan, this would require widening of the E-470 overpass. This need is projected to complete the City's long-range plan but is not necessary or anticipated as a project-related improvement

- Tower Road = planned by Commerce City as a continuous six-lane cross-section with right and left-turn auxiliary lanes at full-movement intersections. This need is projected to complete the City's long-range plan but is not necessary or anticipated as a project-related improvement

- 112th Avenue = planned by Commerce City as a continuous four-lane cross-section with right and left-turn auxiliary lanes at full-movement intersections. To implement a four-lane cross-section consistent with the City's long-range plan, this would require widening of the E-470 overpass. This need is projected to complete the City's long-range plan but is not necessary or anticipated as a project-related improvement

- Himalaya Parkway = planned by Commerce City as a continuous four-lane cross-section with right and left-turn auxiliary lanes at full-movement intersections. This need is projected to complete the City's long-range plan but is not necessary or anticipated as a project-related improvement

As shown on **Table 1** and **Table 2**, no individual movements are projected to operate at worse than LOS D, with the following exceptions:

- Some signalized left-turn movements are shown to operate at LOS E in the AM and/or PM peak hour due to the protected-only left-turn operation that provides limited left-turn, green arrow time and does not allow permitted left-turn movements during the opposing through green phase. This phasing is installed to provide safer conditions where left-turn movements cross multiple through lanes or higher speeds and does not require mitigation.

- The sidestreet movements at the Himalaya Parkway & Site Access 1 (collector) are anticipated to operate at LOS F in the PM peak hours. These delays are typical of a sidestreet approach to an arterial roadway. With the discounting of right-turn volumes per MUTCD criteria, this intersection is not anticipated to meet either four-hour or eight-hour signal warrant volumes as projected with site buildout (see Section 5.2). If a traffic

signal is warranted by field volumes and installed, the intersection is anticipated to operate at LOS B overall.

5.2 Traffic Control Devices

MUTCD traffic signal peak hour warrant analysis was performed as a planning tool for when Four Hour or Eight Hour field volume warrants may be met in the future. See **Figure 8**. The following intersections that are currently unsignalized or do not yet exist are anticipated to require signalization to operate safely and efficiently in the long-term buildout scenario:

- *104th Avenue & E-470 Ramps.* Both ramp terminals will need to be signalized in the future to accommodate projected long-term traffic growth. This need is projected based primarily on background (non-project) traffic growth projections and is not anticipated as a project-related improvement

- *104th Avenue & Himalaya Parkway.* This intersection will need to be signalized in the future to accommodate projected long-term traffic growth and as it provides connectivity to Picadilly Road to the east. This need is projected based primarily on background (non-project) traffic growth projections and is not anticipated as a project-related improvement.

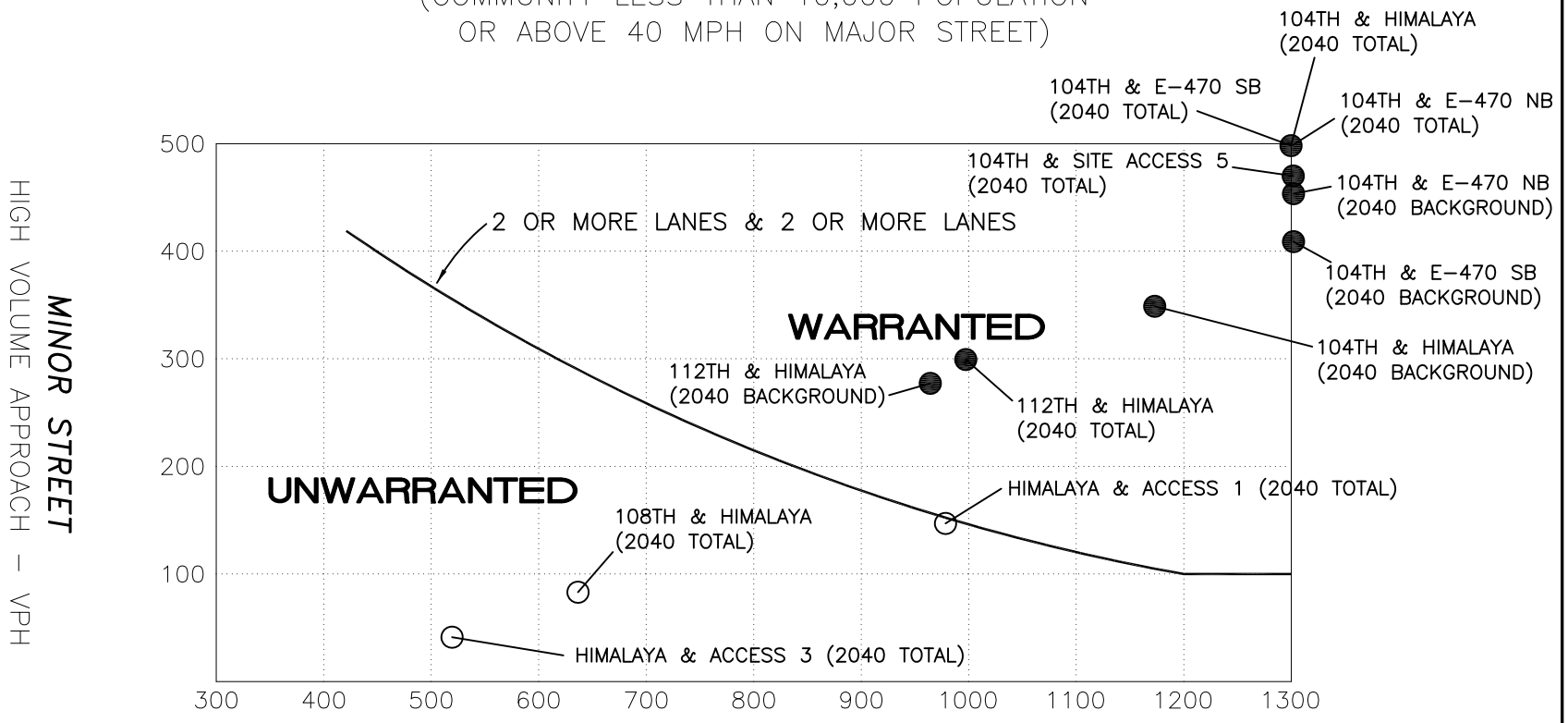
- *112th Avenue & Himalaya Parkway*. This intersection will need to be signalized in the future to accommodate projected long-term traffic growth. This need is projected based primarily on background (non-project) traffic growth projections and is not anticipated as a project-related improvement.

- *104th Avenue & Site Access 5*. Signalization of this intersection is projected to be needed with development of the commercial uses along 104th Avenue in the long-term future, but not with initial residential development. The timing/need for a signal at this access is also dependent upon area development and background traffic growth (non-project), connectivity of 104th Avenue to Picadilly Road to the east, and upon development of the Reunion property on the south side of 104th Avenue which would be anticipated to take access at this location.

Per **Figure 8**, the Himalaya Parkway & Site Access 1 is not anticipated to meet signal warrant volumes with Year 2040 buildout, but it projected to be just below signal warrant thresholds. Based on this assessment and the LOS results previously discussed as a stop-controlled, full-movement intersection, a signal may need to be installed in the long-term future if these volumes are met or exceeded. The developer would be responsible for a portion of this cost. This location meets the City's minor arterial spacing for a signal at ¼-mile north of the 104th Avenue & Himalaya Parkway signal location.

PEAK HOUR VOLUME WARRANT

(COMMUNITY LESS THAN 10,000 POPULATION
OR ABOVE 40 MPH ON MAJOR STREET)



KEY

○ NOT WARRANTED

● MEETS WARRANTS

NOTE: HIGHEST VOLUME PEAK HOUR USED (AM OR PM) FOR WARRANT ANALYSIS

NOTE: 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

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Third Creek West PUD

Signal Warrant Analysis

FT Project # 18041	Original Scale NTS	Date 6/11/19	Drawn by SGT	Figure # 8

5.3 Corridor Signal Progression

Corridor signal progression was analyzed for the Year 2040 planning scenario for the 104th Avenue corridor from Tower Road to Himalaya Parkway. Per the discussion in the previous section, it was assumed that signals would be added at the E-470 ramps, the site access on 104th Avenue, and at Himalaya. In addition, signalization is assumed for the long-term scenario at the Biscay Street intersection along 104th Avenue. In total, this analysis assumes six (6) traffic signals along 104th Avenue from Tower Road to Himalaya Parkway and including these intersections for the Year 2040 scenario.

Signal timing assumptions included a 90-second cycle length in the AM and PM peak hours and offsets per the Synchro capacity analysis to achieve optimal operations and levels of service. Time-space diagrams were produced using Synchro software and are attached in the **Appendix**.

As shown on the time-space diagrams, in the AM peak hour, link bandwidths range between 31 seconds and 54 seconds, with eastbound and westbound arterial bandwidths of 26 seconds (29 percent efficiency). In the PM peak hour, link bandwidths range between 31 seconds and 54 seconds, with eastbound and westbound arterial bandwidths of 28 seconds (31 percent efficiency). The average of the peak hour efficiencies is just at the City target minimum of 30 percent. It is important to note that these bandwidths and efficiency calculations are based on numerous assumptions for long-term traffic volume growth and how the signals will be timed and operate.

5.4 Auxiliary Lanes

The City of Commerce City details requirements for right and left-turn auxiliary lanes in Section 3.04.1 of the Engineering Construction Standards and Specifications. A summary of what auxiliary lanes would be required by the City based on these criteria, roadway classifications, and project volumes is detailed in this section.

It should be noted that the City's requirements for auxiliary lanes are more conservative than typical standards applied, with respect to the minimum turning volume and geometric conditions for which auxiliary lanes become warranted. Application of both the Colorado Department of Transportation (CDOT) criteria for auxiliary lanes and National Cooperative Highway Research Program (NCHRP) Report 780 Design Guidance for Intersection Auxiliary Lanes (2014) criteria would suggest that not all of the auxiliary lanes discussed in this section would be warranted based on volume, geometry and speed. For example, CDOT access code criteria states that right-turn deceleration and acceleration lanes are generally not required on roadways with three or more travel lanes in the direction. CDOT criteria also would not prescribe a right-turn acceleration lane until >50 vph when above 40 mph, where the City's criteria is only 10 vph when turning from a major collector.

As such, auxiliary lane requirements should be analyzed with each filing or planning area development submittal to address what lanes are warranted when more detailed volume and roadway phasing criteria are known. The auxiliary lanes discussed in this report should serve only as a direct application of the City's criteria and framework for long-term, total area and roadway buildout. It is more likely that an interim roadway condition will exist for many years prior to full buildout and completion of the City's planned long-range roadway network in the C3 Vision Roadway Classification Plan. Each filing traffic report should assess auxiliary lane needs based on updated trip generation and more refined information relative to background traffic growth.

Table 5 on the following page summarizes auxiliary lanes that would be required with application of the City's Section 3.04.1 criteria for the full-movement project access points.

In addition to the City-prescribed auxiliary lanes on **Table 5**, right-in, right-out accesses on 104th Avenue and Himalaya Parkway may also be required to include right-turn acceleration and deceleration lanes, as follows using the City's Section 3.04.1 criteria:

- Southbound RI/RO acceleration lanes on Himalaya Parkway
- Southbound RI/RO deceleration lanes on Himalaya Parkway
- With development of the commercial uses in Planning Areas G & H, westbound RI/RO acceleration lane on 104th Avenue
- With development of the commercial uses in Planning Areas G & HG, westbound RI/RO deceleration lane on 104th Avenue

Per the Commerce City Construction Standards and Specifications, a right-in, right-out access is allowed with 660' spacing on a Principal Arterial (E. 104th Ave) and 250' spacing on a Minor Arterial (Himalaya Parkway). The right-in, right-out access shown on **Figure 2** meet these minimums.

While the access spacing for these right-in, right-out accesses meets City intersection/access spacing criteria, the spacing would not allow for full (separate) acceleration and deceleration lengths. Variances would be required to allow a combined acceleration-deceleration lane extending continuous between the accesses. The locations where combined acceleration-deceleration lanes would be required to meeting City auxiliary lane standards are as follows:

- On Himalaya Parkway, a southbound acceleration lane from Access 1 to be combined with a right-turn deceleration lane at Access 4 (400' spacing available, per Figure 2)

- On Himalaya Parkway, a southbound acceleration lane from E. 108th Avenue to be combined with a right-turn deceleration lane at Access 2 (500' spacing available, per Figure 2)

- On E. 104th Avenue, a westbound acceleration lane from the right-in, right-out access to be combined with the right-turn deceleration lane at Access 5 (665' spacing available per Figure 2)

- On E. 104th Avenue, a westbound acceleration lane from Access 5 to be combined with the right-turn deceleration lane for the E-470 northbound ramp (970' spacing available per Figure 2)

All other auxiliary lanes shown on **Table 5** can be accommodated to the City auxiliary lane requirements within the proposed access and intersection spacing.

Table 5 Aux Lanes

6.0 CONCLUSIONS

The Third Creek West PUD project proposes to develop ±209.8 (developable) acres of mixed-use development located at the northeast corner of the E-470 and E. 104th Avenue interchange. Access to the site is proposed via new collector connections and right-in, right-out accesses along E. 104th Avenue and Himalaya Parkway.

The project is estimated to generate approximately 19,062 daily trips with 1,086 trips occurring in the AM peak hour and 1,943 trips occurring in the PM peak hour at build-out, including pass-by trips. **It was determined that the proposed roadway system can adequately accommodate the projected traffic volumes for buildout conditions.** The following improvement measures are anticipated to meet long-term project demands or area planning, with discussion related to project contribution to the need for these improvements:

- **E. 104th Avenue Widening**: E. 104th Avenue is projected as a six-lane Principal Arterial in the long-term future, per the C3 Vision Roadway Network Plan. To implement the City's long-range plan, widening of the E-470 overpass would be required. This widening is assumed as a background-related project in this report consistent with City long-range planning, though the need for the ultimate cross-section on 104th Avenue may be further out than the Year 2040 scenario if area land uses are slower to build out and if the C3 Vision roadway connectivity is not yet in place.

  Project Responsibility: The project should accommodate the right-of-way for the ultimate roadway cross-section, to include right-turn lanes (in addition to the three westbound lanes) along the project frontage. The project proposes to construct the north half of the ultimate roadway along the project frontage, which with the auxiliary lanes discussed, would be more than adequate to service project-added traffic prior to the larger area buildout and connectivity. Construction of through lanes on 104th Avenue along the project frontage should phased to only construct what is needed to support each phase of development.

- **Himalaya Parkway Widening and Realignment**: Himalaya Parkway is anticipated to be improved to four-lanes, per the C3 Vision Roadway Network Plan.

  Project Responsibility: The project should accommodate the right-of-way for the ultimate roadway cross-section, to include right-turn lanes (in addition to the two southbound lanes) along the project frontage. Per the concept site plan, Himalaya Parkway is

proposed to be realigned to the east between 104th Avenue & 112th Avenue. Prior to area buildout (non-project growth) and connectivity, Himalaya Parkway can operate as a two-lane roadway with the full left-turn and right-turn auxiliary lane improvements discussed in this report in place.

- **Minor Collector Roadways**: Project Responsibility: The project proposes to construct new minor collectors at Access 1, Access 3 (with residential development) and Access 5 (with commercial development as market conditions dictate) within the project site, as well as extend 108th Avenue to the new Himalaya Parkway alignment. Construction of these roadways will be phased to provide access to residential land use areas as needed to service these development areas.

- **Auxiliary Lanes**: Project Responsibility: Auxiliary lane requirements for long-range buildout per City of Commerce City criteria are summarized on **Table 5**. This should only be utilized as a conservative framework for long-range auxiliary lane provisions, as dictated by Section 3.04.1 of the City's Engineering Construction Standards and Specifications. The need for auxiliary lanes should be analyzed with each filing or planning area development plan traffic study to determine which lanes for each access are needed and when, as more detailed access phasing and site generated traffic volumes are known. As discussed previously, Access 5 along 104th Avenue is projected to be constructed to support commercial development along 104th Avenue as market conditions dictate (Planning Areas G & H). Subsequent development plans will need to confirm the timing and necessity of these accesses for the various interim scenarios.

- **Traffic Signalization**: Signalization of the E-470 ramps, 104th Avenue & Himalaya Street, and 112th Avenue & Himalaya Street are anticipated to be needed in the long-term future to accommodate long-term background (non-project) traffic growth. These are not anticipated as project-related improvements as the project would represent only a portion to the traffic demand at these locations and they would not be warranted based on project-added traffic alone.

  Signalization of the 104th Avenue & Access 5 intersection is projected to be needed with development of the commercial uses along 104th Avenue as market conditions dictate, but not with initial residential development. The timing/need for a signal at this access is also dependent upon area development and background traffic growth (non-project), connectivity of 104th Avenue to Picadilly Road to the east, and upon development of the Reunion property on the south side of 104th Avenue which would be anticipated to take access at this location.

- **Himalaya Parkway & Access 1**. This access is analyzed in this report as a both a full movement, unsignalized and signalized intersection. As a full-movement, unsignalized access, the side-street left and through movements are projected to operate at LOS E and F (up to 64.3 seconds average delay) in the worst peak hour (PM) but LOS C/D otherwise. This level of delay is common at an unsignalized approach to an arterial roadway and the projected buildout volumes are just below MUTCD signal warrant thresholds. The longest side-street queues estimated for the LOS E and F condition is one-half of a vehicle and 2.2 vehicles, per the Synchro modeling provided in the Appendix, indicating there is not a capacity issue and the delays are experienced by very few vehicles. Per subsequent discussions with the design team and City staff, the developer should anticipate contributing a portion of the cost of this traffic signal should signal warrant volumes be met at this location in the future.

Appendix:

Level of Service Definitions
Land Use Assumptions for Trip Generation Estimates
Three-Year Crash History
Traffic Count Data
Intersection Capacity Worksheets
Time-Space Diagrams

Level of Service Definitions

LEVEL OF SERVICE DEFINITIONS

In rating roadway and intersection operating conditions with existing or future traffic volumes, "Levels of Service" (LOS) A through F are used, with LOS A indicating very good operation and LOS F indicating poor operation. Levels of service at signalized and unsignalized intersections are closely associated with vehicle delays experienced in seconds per vehicle. More complete level of service definitions and delay data for signal and stop sign controlled intersections are contained in the following table for reference.

Level of Service Rating	Delay in seconds per vehicle *(a)*		Definition
	Signalized	Unsignalized	
A	0.0 to 10.0	0.0 to 10.0	Low vehicular traffic volumes; primarily free flow operations. Density is low and vehicles can freely maneuver within the traffic stream. Drivers are able to maintain their desired speeds with little or no delay.
B	10.1 to 20.0	10.1 to 15.0	Stable vehicular traffic volume flow with potential for some restriction of operating speeds due to traffic conditions. Vehicle maneuvering is only slightly restricted. The stopped delays are not bothersome and drivers are not subject to appreciable tension.
C	20.1 to 35.0	15.1 to 25.0	Stable traffic operations, however the ability for vehicles to maneuver is more restricted by the increase in traffic volumes. Relatively satisfactory operating speeds prevail, but adverse signal coordination or longer vehicle queues cause delays along the corridor.
D	35.1 to 55.0	25.1 to 35.0	Approaching unstable vehicular traffic flow where small increases in volume could cause substantial delays. Most drivers are restricted in ability to maneuver and selection of travel speeds due to congestion. Driver comfort and convenience are low, but tolerable.
E	55.1 to 80.0	35.1 to 50.0	Traffic operations characterized by significant approach delays and average travel speeds of one-half to one-third the free flow speed. Vehicular flow is unstable and there is potential for stoppages of brief duration. High signal density, extensive vehicle queuing, or corridor signal progression/timing are the typical causes of vehicle delays at signalized corridors.
F	> 80.0	> 50.0	Forced vehicular traffic flow and operations with high approach delays at critical intersections. Vehicle speeds are reduced substantially and stoppages may occur for short or long periods of time because of downstream congestion.

(a) Delay ranges based on 2010 Highway Capacity Manual criteria.

Land Use Assumptions for Trip Generation Estimates

Land Use Assumptions for Trip Generation Estimates

Planning Areas	Use	Developable Acreage*	Residential									Office			Retail		
			SFD =	4.50	DU/AC	MFA(L)=	10.85	DU/AC	MFA(H) =	23.25	DU/AC	FAR =	0.25	GFA/AC	FAR =	0.25	GFA/AC
			%	Acreage	DU	%	Acreage	DU	%	Acreage	DU	%	Acreage	GFA (SF)	%	Acreage	GFA (SF)
A & B	Res.	70.5	100%	70.5	317	0%	0.0	0	0%	0.0	0	0%	0.0	0	0%	0	0
C & D	Res.	43.7	100%	43.7	197	0%	0.0	0	0%	0.0	0	0%	0.0	0	0%	0.0	0
E	Det	0.0	100%	0.0	0	0%	0.0	0	0%	0.0	0	0%	0.0	0	0%	0.0	0
F	Det	0.0	100%	0.0	0	0%	0.0	0	0%	0.0	0	0%	0.0	0	0%	0.0	0
G	MXD	9.4	50%	4.7	21	50%	4.7	51	0%	0.0	0	15.0%	6.2	67790	10.0%	4.2	45194
H	MXD	13.3	50%	6.7	30	25%	3.3	36	0%	0.0	0	0%	0.0	0	25%	3.3	36209
I	MXD	20.1	0%	0.0	0	0%	0.0	0	25%	5.0	117	37.5%	7.5	82083	37.5%	7.5	82083
J	MXD	29.6	0%	0.0	0	0%	0.0	0	25%	7.4	172	37.5%	11.1	120879	37.5%	11.1	120879
Total		**186.6**		**125.6**	**565**		**8.0**	**87**		**12.4**	**289**		**24.9**	**270,753**		**26.1**	**284,365**

* Reduced by 24.1 acres for Arterial ROW dedication, spread across all parcels

Three-Year Crash History

3-Year Crash History

Date	Location	Type	Direction	Injury	Fatality	Other
12/17/15	Tower Rd & 104th Ave	Head-On	n/a	0	0	
6/2/18	Tower Rd & 104th Ave	Rear-End	n/a	0	0	
2/2/18	Tower Rd & 104th Ave	Rear-End	Both veh SB	0	0	Icy
2/10/18	Tower Rd & 104th Ave	Rear-End	Both veh NB	0	0	Icy
1/15/18	Tower Rd & 104th Ave	Rear-End	Both veh EB	0	0	Icy
12/20/17	Tower Rd & 104th Ave	Rear-End	Both veh EB	0	0	
9/1/17	Tower Rd & 104th Ave	Rear-End	Both veh NB	0	0	
3/3/17	Tower Rd & 104th Ave	Rear-End	Both veh NB	0	0	
9/25/16	Tower Rd & 104th Ave	Rear-End	Both veh NB	0	0	
8/13/16	Tower Rd & 104th Ave	Rear-End	Both veh NB	0	0	
8/4/16	Tower Rd & 104th Ave	Rear-End	Both veh NB	0	0	
6/22/16	Tower Rd & 104th Ave	Rear-End	Both veh NB	0	0	
6/22/16	Tower Rd & 104th Ave	Rear-End	Both veh NB	0	0	
6/19/16	Tower Rd & 104th Ave	Rear-End	Both veh NB	0	0	
5/30/16	Tower Rd & 104th Ave	Rear-End	Both veh NB	0	0	
5/16/16	Tower Rd & 104th Ave	Rear-End	Both veh NB	0	0	
1/4/16	Tower Rd & 104th Ave	Rear-End	Both veh SB	0	0	
7/29/15	Tower Rd & 104th Ave	Rear-End	Both veh SB	0	0	
7/12/15	Tower Rd & 104th Ave	Rear-End	Both veh NB	0	0	
6/26/15	Tower Rd & 104th Ave	Rear-End	n/a	0	0	
6/26/15	Tower Rd & 104th Ave	Rear-End	Both veh NB	0	0	
6/5/15	Tower Rd & 104th Ave	Rear-End	Both veh SB	0	0	
1/19/17	Tower Rd & 104th Ave	Right-Angle	EB Through vs. WB Left	0	0	
1/12/17	Tower Rd & 104th Ave	Right-Angle	EB Left vs. WB Through	0	0	
12/17/15	Tower Rd & 104th Ave	Right-Angle	EB Through vs. NB Through	0	0	Icy
8/22/15	Tower Rd & 104th Ave	Right-Angle	NB Left vs. SB Through	0	0	
7/21/15	Tower Rd & 104th Ave	Right-Angle	WB Left vs. EB Through	0	0	
2/14/18	Tower Rd & 104th Ave	Sideswipe	Both veh SB	0	0	
7/1/16	Tower Rd & 104th Ave	Sideswipe	Both veh NB	0	0	
1/15/18	Tower Rd & 104th Ave	Single-Car/Fixed Object	EB	0	0	Icy
2/10/18	Tower Rd & 104th Ave	Single-Car/Fixed Object	SB	0	1	
4/8/17	Tower Rd & 104th Ave	Single-Car/Fixed Object	NB	0	0	
12/17/16	Tower Rd & Biscay St	Single-Car/Fixed Object	SB	0	0	
12/3/16	Tower Rd & 104th Ave	Single-Car/Fixed Object	EB	0	0	
1/14/16	Tower Rd & 104th Ave	Single-Car/Fixed Object	SB	0	0	

Existing Traffic Data

COUNTER MEASURES INC.
1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: TOWER RD
E/W STREET: 104TH AVE
CITY: COMMERCE CITY
COUNTY: ADAMS

File Name : TOWE104T
Site Code : 00000013
Start Date : 6/5/2018
Page No : 1

Groups Printed- VEHICLES

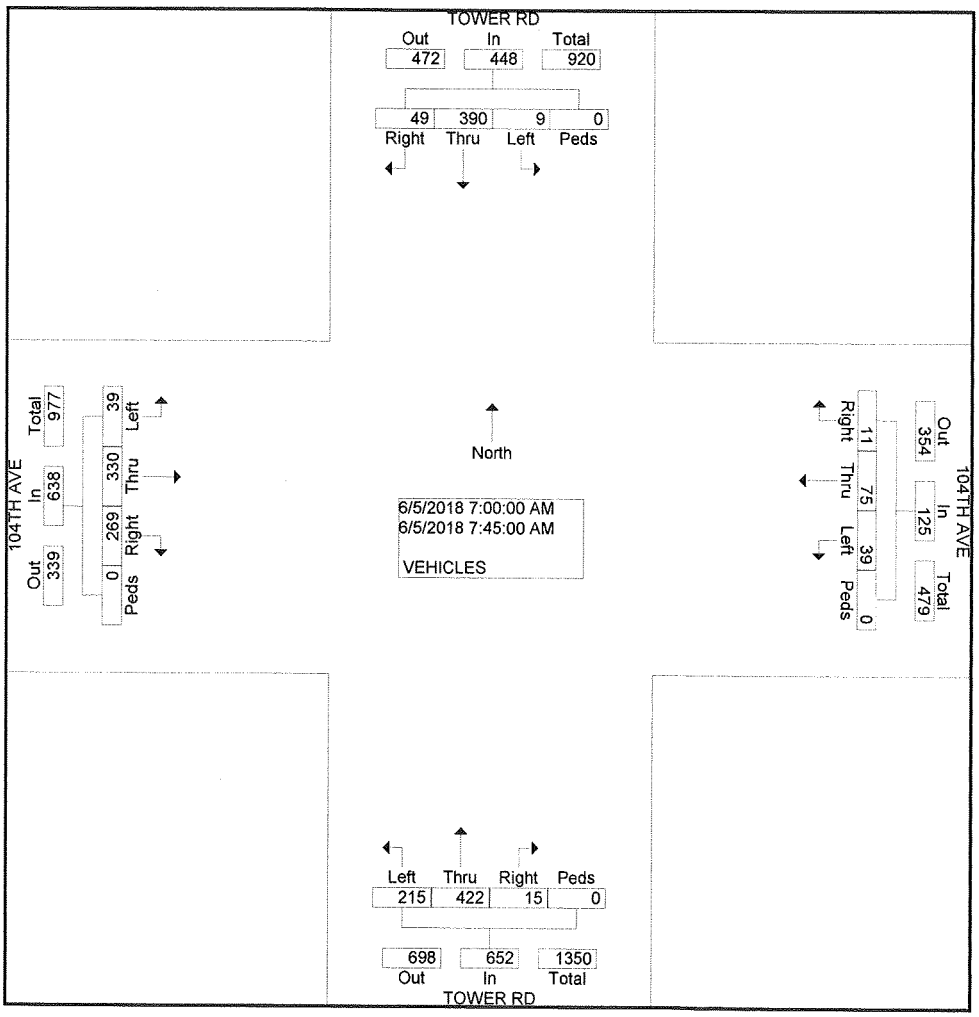
	TOWER RD Southbound				104TH AVE Westbound				TOWER RD Northbound				104TH AVE Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
07:00 AM	1	87	10	0	5	14	2	0	49	101	2	0	8	85	65	0	429
07:15 AM	3	95	9	0	10	20	2	0	45	100	7	0	5	91	53	0	440
07:30 AM	4	99	10	0	14	23	2	0	53	100	2	0	13	74	57	0	451
07:45 AM	1	109	20	0	10	18	5	0	68	121	4	0	13	80	94	0	543
Total	9	390	49	0	39	75	11	0	215	422	15	0	39	330	269	0	1863
08:00 AM	1	59	10	0	8	10	1	0	51	90	3	0	14	72	106	0	425
08:15 AM	2	71	11	0	10	19	4	0	40	83	1	0	15	73	111	0	440
08:30 AM	3	83	5	1	5	11	0	1	51	78	4	0	14	35	51	0	342
08:45 AM	2	65	9	0	10	19	1	0	49	61	0	0	16	27	81	0	340
Total	8	278	35	1	33	59	6	1	191	312	8	0	59	207	349	0	1547
04:00 PM	0	65	19	0	4	51	1	0	89	163	3	0	11	37	62	0	505
04:15 PM	1	85	16	0	6	59	11	0	106	155	4	0	26	33	49	0	551
04:30 PM	4	81	14	0	4	73	5	0	96	137	4	0	20	55	57	0	550
04:45 PM	1	92	20	0	7	54	7	0	119	153	3	0	15	43	70	0	584
Total	6	323	69	0	21	237	24	0	410	608	14	0	72	168	238	0	2190
05:00 PM	2	106	19	0	7	64	6	0	91	166	6	0	23	37	54	0	581
05:15 PM	1	94	21	0	9	76	11	0	109	153	4	1	19	36	41	1	576
05:30 PM	1	81	20	0	4	106	98	0	107	133	6	0	26	33	67	0	682
05:45 PM	4	89	19	0	2	62	16	0	119	152	6	0	21	33	54	0	577
Total	8	370	79	0	22	308	131	0	426	604	22	1	89	139	216	1	2416
Grand Total	31	1361	232	1	115	679	172	1	1242	1946	59	1	259	844	1072	1	8016
Apprch %	1.9	83.8	14.3	0.1	11.9	70.2	17.8	0.1	38.2	59.9	1.8	0.0	11.9	38.8	49.3	0.0	
Total %	0.4	17.0	2.9	0.0	1.4	8.5	2.1	0.0	15.5	24.3	0.7	0.0	3.2	10.5	13.4	0.0	

COUNTER MEASURES INC.
1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: TOWER RD
E/W STREET: 104TH AVE
CITY: COMMERCE CITY
COUNTY: ADAMS

File Name : TOWE104T
Site Code : 00000013
Start Date : 6/5/2018
Page No : 2

	TOWER RD Southbound					104TH AVE Westbound					TOWER RD Northbound					104TH AVE Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 07:00 AM to 09:00 AM - Peak 1 of 1																					
Intersection	07:00 AM																				
Volume	9	390	49	0	448	39	75	11	0	125	215	422	15	0	652	39	330	269	0	638	1863
Percent	2.0	87.1	10.9	0.0		31.2	60.0	8.8	0.0		33.0	64.7	2.3	0.0		6.1	51.7	42.2	0.0		
07:45 Volume	1	109	20	0	130	10	18	5	0	33	68	121	4	0	193	13	80	94	0	187	543
Peak Factor																					0.858
High Int.	07:45 AM					07:30 AM					07:45 AM					07:45 AM					
Volume	1	109	20	0	130	14	23	2	0	39	68	121	4	0	193	13	80	94	0	187	
Peak Factor					0.862					0.801					0.845					0.853	

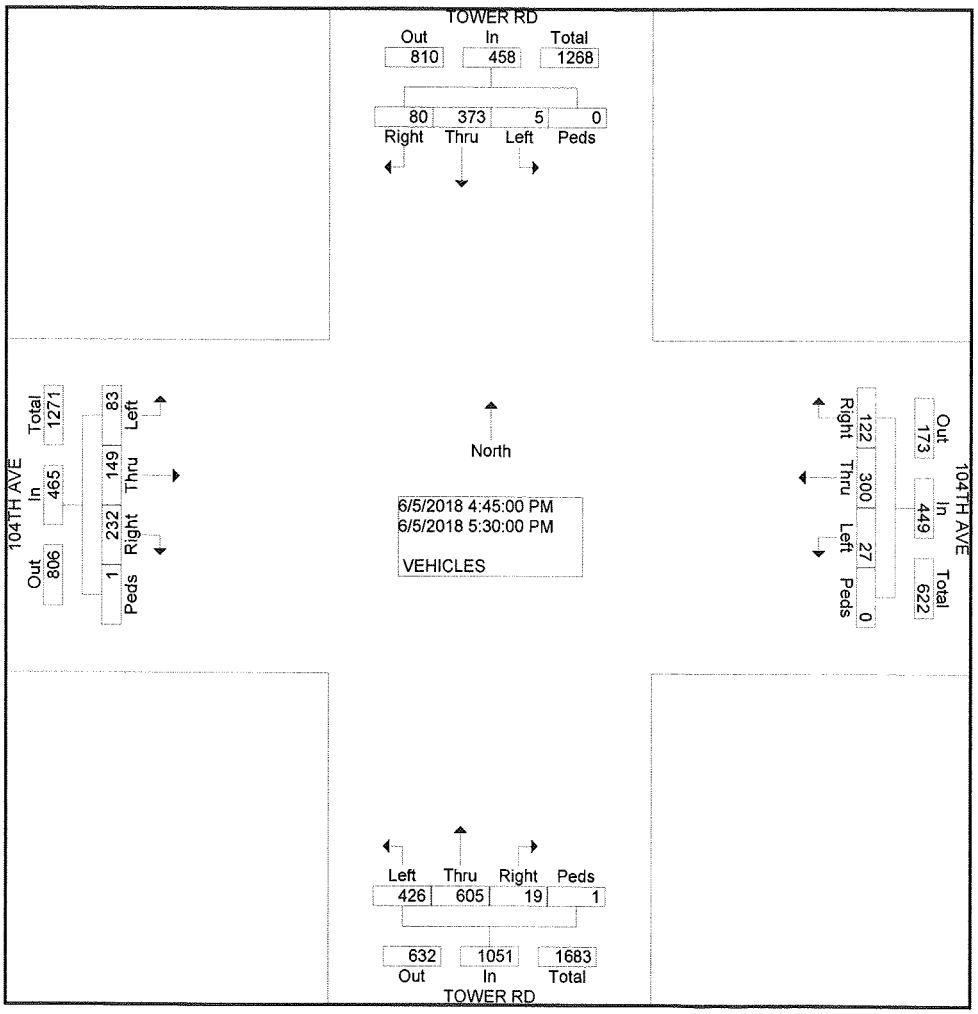


COUNTER MEASURES INC.
1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: TOWER RD
E/W STREET: 104TH AVE
CITY: COMMERCE CITY
COUNTY: ADAMS

File Name : TOWE104T
Site Code : 00000013
Start Date : 6/5/2018
Page No : 2

	TOWER RD Southbound					104TH AVE Westbound					TOWER RD Northbound					104TH AVE Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Intersection	04:45 PM																				
Volume	5	373	80	0	458	27	300	122	0	449	426	605	19	1	1051	83	149	232	1	465	2423
Percent	1.1	81.4	17.5	0.0		6.0	66.8	27.2	0.0		40.5	57.6	1.8	0.1		17.8	32.0	49.9	0.2		
05:30 Volume	1	81	20	0	102	4	106	98	0	208	107	133	6	0	246	26	33	67	0	126	682
Peak Factor																					0.888
High Int.	05:00 PM					05:30 PM					04:45 PM					04:45 PM					
Volume	2	106	19	0	127	4	106	98	0	208	119	153	3	0	275	15	43	70	0	128	
Peak Factor					0.902					0.540					0.955					0.908	



COUNTER MEASURES INC.
1889 YORK STREET
DENVER.COLORADO
303-333-7409

N/S STREET: E-470 WEST RAMPS
E/W STREET: 104TH AVE
CITY: COMMERCE CITY
COUNTY: ADAMS

File Name : E470104T
Site Code : 00000014
Start Date : 6/5/2018
Page No : 1

Groups Printed- VEHICLES

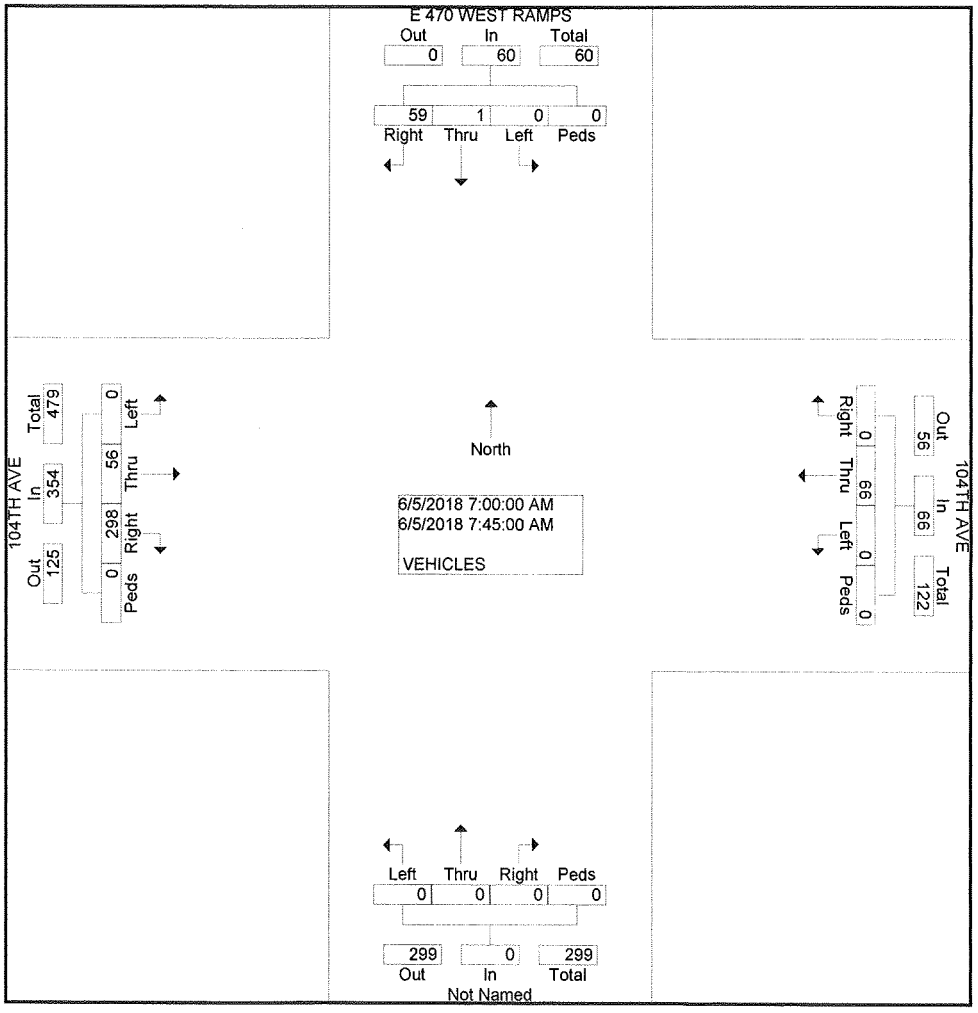
	E 470 WEST RAMPS Southbound				104TH AVE Westbound				Northbound				104TH AVE Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
07:00 AM	0	1	8	0	0	13	0	0	0	0	0	0	0	9	79	0	110
07:15 AM	0	0	16	0	0	16	0	0	0	0	0	0	0	19	82	0	133
07:30 AM	0	0	19	0	0	20	0	0	0	0	0	0	0	16	64	0	119
07:45 AM	0	0	16	0	0	17	0	0	0	0	0	0	0	12	73	0	118
Total	0	1	59	0	0	66	0	0	0	0	0	0	0	56	298	0	480
08:00 AM	0	0	11	0	0	8	0	0	0	0	0	0	0	14	62	0	95
08:15 AM	1	0	11	0	0	22	0	1	0	0	0	0	0	7	69	0	111
08:30 AM	0	0	6	0	0	10	0	0	0	0	0	0	0	12	30	0	58
08:45 AM	0	0	16	0	0	14	0	0	0	0	0	0	0	4	25	0	59
Total	1	0	44	0	0	54	0	1	0	0	0	0	0	37	186	0	323
04:00 PM	0	0	16	0	0	40	0	0	0	0	0	0	0	13	27	0	96
04:15 PM	1	0	15	0	0	61	0	0	0	0	0	0	0	13	25	0	115
04:30 PM	0	0	16	0	0	66	0	0	0	0	0	0	0	20	43	0	145
04:45 PM	1	1	12	0	0	56	0	0	0	0	0	0	0	17	30	0	117
Total	2	1	59	0	0	223	0	0	0	0	0	0	0	63	125	0	473
05:00 PM	1	0	15	0	0	62	0	0	0	0	0	0	0	15	30	0	123
05:15 PM	0	0	20	0	0	76	0	0	0	0	0	0	0	13	28	0	137
05:30 PM	1	0	19	0	0	189	0	0	0	0	0	0	0	12	28	0	249
05:45 PM	0	0	17	0	0	63	0	0	0	0	0	0	0	11	32	0	123
Total	2	0	71	0	0	390	0	0	0	0	0	0	0	51	118	0	632
Grand Total	5	2	233	0	0	733	0	1	0	0	0	0	0	207	727	0	1908
Apprch %	2.1	0.8	97.1	0.0	0.0	99.9	0.0	0.1	0.0	0.0	0.0	0.0	0.0	22.2	77.8	0.0	
Total %	0.3	0.1	12.2	0.0	0.0	38.4	0.0	0.1	0.0	0.0	0.0	0.0	0.0	10.8	38.1	0.0	

COUNTER MEASURES INC.
1889 YORK STREET
DENVER,COLORADO
303-333-7409

N/S STREET: E-470 WEST RAMPS
E/W STREET: 104TH AVE
CITY: COMMERCE CITY
COUNTY: ADAMS

File Name : E470104T
Site Code : 00000014
Start Date : 6/5/2018
Page No : 2

	E 470 WEST RAMPS Southbound					104TH AVE Westbound					Northbound					104TH AVE Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 07:00 AM to 09:00 AM - Peak 1 of 1																					
Intersection	07:00 AM																				
Volume	0	1	59	0	60	0	66	0	0	66	0	0	0	0	0	0	56	298	0	354	480
Percent	0.0	1.7	98.3	0.0		0.0	100.0	0.0	0.0		0.0	0.0	0.0	0.0		0.0	15.8	84.2	0.0		
07:15 Volume	0	0	16	0	16	0	16	0	0	16	0	0	0	0	0	0	19	82	0	101	133
Peak Factor																					0.902
High Int.	07:30 AM					07:30 AM					6:45:00 AM					07:15 AM					
Volume	0	0	19	0	19	0	20	0	0	20	0	0	0	0	0	0	19	82	0	101	
Peak Factor					0.789					0.825										0.876	

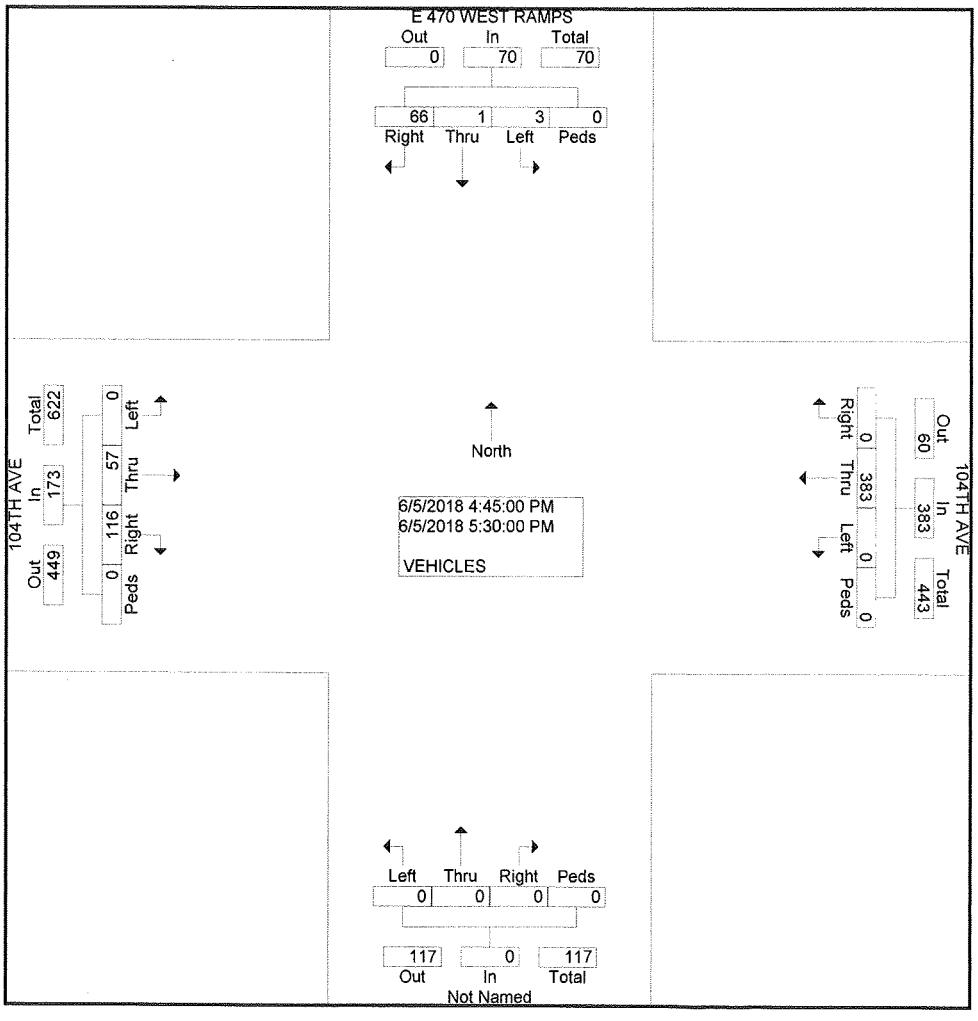


COUNTER MEASURES INC.
1889 YORK STREET
DENVER,COLORADO
303-333-7409

N/S STREET: E-470 WEST RAMPS
E/W STREET: 104TH AVE
CITY: COMMERCE CITY
COUNTY: ADAMS

File Name : E470104T
Site Code : 00000014
Start Date : 6/5/2018
Page No : 2

	E 470 WEST RAMPS Southbound					104TH AVE Westbound					Northbound					104TH AVE Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 04:45 PM to 05:30 PM - Peak 1 of 1																					
Intersection	04:45 PM																				
Volume	3	1	66	0	70	0	383	0	0	383	0	0	0	0	0	0	57	116	0	173	626
Percent	4.3	1.4	94.3	0.0		0.0	100.0	0.0	0.0		0.0	0.0	0.0	0.0		0.0	32.9	67.1	0.0		
05:30 Volume	1	0	19	0	20	0	189	0	0	189	0	0	0	0	0	0	12	28	0	40	249
Peak Factor																					0.629
High Int.	05:15 PM					05:30 PM										04:45 PM					
Volume	0	0	20	0	20	0	189	0	0	189	0	0	0	0	0	0	17	30	0	47	
Peak Factor					0.875					0.507										0.920	



COUNTER MEASURES INC.

1889 YORK STREET
DENVER,COLORADO 80206
303-333-7409

Location: TOWER RD N/O 104TH AVE
City: COMMERCE CITY
County: ADAMS
Direction: NORTHBOUND-SOUTHBOUND

Site Code: 060418
Station ID: 060418

NB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
06/05/18	1	58	8	0	5	0	0	0	2	0	0	0	0	74
01:00	0	51	8	1	3	0	0	0	2	0	0	0	0	65
02:00	1	41	5	1	3	0	0	1	0	0	0	0	0	52
03:00	0	19	6	0	1	0	0	0	0	0	0	0	0	26
04:00	0	52	22	0	2	0	0	1	0	0	0	0	0	77
05:00	2	139	40	1	16	1	0	5	2	0	0	0	0	206
06:00	3	249	70	0	25	**6**	0	2	7	0	0	0	0	362
07:00	3	**320**	**81**	**8**	**32**	4	**1**	**7**	12	0	0	0	0	**468**
08:00	**7**	260	51	0	28	2	0	6	10	0	0	0	0	364
09:00	2	169	42	3	20	4	0	2	**15**	0	0	0	0	257
10:00	0	187	55	2	17	4	1	7	10	0	0	0	0	283
11:00	1	199	47	2	19	6	0	7	8	0	0	0	0	289
12 PM	0	235	52	**5**	22	2	0	**7**	10	0	0	0	0	333
13:00	2	270	55	5	26	6	0	7	**15**	0	0	0	0	386
14:00	2	339	77	2	33	**11**	0	6	14	0	0	0	0	484
15:00	1	473	**120**	1	28	4	0	6	8	**1**	0	0	0	642
16:00	**5**	466	106	1	37	5	0	2	4	0	0	0	0	626
17:00	5	**571**	111	2	**48**	3	0	5	6	0	0	0	0	**751**
18:00	2	412	95	2	27	1	**1**	5	3	0	0	0	0	548
19:00	5	223	61	3	15	1	0	5	0	0	0	0	0	313
20:00	3	174	45	0	5	0	0	3	2	0	0	0	0	232
21:00	1	148	30	0	6	0	0	2	0	0	0	0	0	187
22:00	0	160	17	0	9	1	0	1	0	0	0	0	0	188
23:00	0	114	18	0	7	0	0	0	2	0	0	0	0	141
Day Total	46	5329	1222	39	434	61	3	87	132	1	0	0	0	7354
Percent	0.6%	72.5%	16.6%	0.5%	5.9%	0.8%	0.0%	1.2%	1.8%	0.0%	0.0%	0.0%	0.0%	
AM Peak	08:00	07:00	07:00	07:00	07:00	06:00	07:00	07:00	09:00					07:00
Vol.	7	320	81	8	32	6	1	7	15					468
PM Peak	16:00	17:00	15:00	12:00	17:00	14:00	18:00	12:00	13:00	15:00				17:00
Vol.	5	571	120	5	48	11	1	7	15	1				751

Location: TOWER RD N/O 104TH AVE
City: COMMERCE CITY
County: ADAMS
Direction: NORTHBOUND-SOUTHBOUND

COUNTER MEASURES INC.
1889 YORK STREET
DENVER,COLORADO 80206
303-333-7409

Site Code: 060418
Station ID: 060418

NB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
06/06/18	3	57	8	1	5	0	0	0	0	0	0	0	0	74
01:00	1	53	10	0	2	1	0	0	1	0	0	0	0	68
02:00	0	29	7	1	2	0	0	0	2	0	0	0	0	41
03:00	0	24	10	0	1	0	0	0	0	0	0	0	0	35
04:00	1	64	20	0	4	0	0	0	1	0	0	0	0	90
05:00	2	114	38	0	16	0	**1**	0	3	0	0	0	0	174
06:00	3	218	76	0	**31**	5	0	2	2	0	0	0	0	337
07:00	4	**302**	**80**	2	23	4	0	2	10	0	0	0	0	**427**
08:00	**6**	261	64	3	26	4	0	5	9	0	0	0	0	378
09:00	2	167	57	4	17	4	0	**7**	9	0	0	0	0	267
10:00	1	195	53	5	29	**9**	1	3	**13**	0	0	0	0	309
11:00	2	214	65	**6**	21	5	0	3	9	0	0	0	0	325
12 PM	0	250	68	4	28	6	0	4	**12**	0	0	0	0	372
13:00	3	240	78	3	35	5	0	**7**	8	0	0	0	0	379
14:00	3	323	80	3	32	5	0	3	8	**1**	0	0	0	458
15:00	4	480	103	**5**	**42**	**10**	0	5	9	1	0	0	0	659
16:00	**9**	456	113	4	38	5	0	4	7	0	0	0	0	636
17:00	0	**502**	**122**	1	32	3	0	6	9	0	0	0	0	**675**
18:00	4	370	99	3	28	1	0	3	2	0	0	0	0	510
19:00	1	273	44	1	15	0	0	2	3	0	0	0	0	339
20:00	1	190	47	1	9	0	0	6	1	0	0	0	0	255
21:00	1	142	22	0	12	0	0	1	2	0	0	0	0	180
22:00	0	108	12	0	1	0	0	1	1	0	0	0	0	123
23:00	0	106	27	0	6	0	0	1	2	0	0	0	0	142
Day Total	51	5138	1303	47	455	67	2	65	123	2	0	0	0	7253
Percent	0.7%	70.8%	18.0%	0.6%	6.3%	0.9%	0.0%	0.9%	1.7%	0.0%	0.0%	0.0%	0.0%	
AM Peak	08:00	07:00	07:00	11:00	06:00	10:00	05:00	09:00	10:00					07:00
Vol.	6	302	80	6	31	9	1	7	13					427
PM Peak	16:00	17:00	17:00	15:00	15:00	15:00		13:00	12:00	14:00				17:00
Vol.	9	502	122	5	42	10		7	12	1				675

COUNTER MEASURES INC.

1889 YORK STREET
DENVER,COLORADO 80206
303-333-7409

Location: TOWER RD N/O 104TH AVE
City: COMMERCE CITY
County: ADAMS
Direction: NORTHBOUND-SOUTHBOUND

Site Code: 060418
Station ID: 060418

NB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
06/07/18	2	88	13	1	4	0	0	0	1	0	0	0	0	109
01:00	1	50	7	0	1	0	0	0	0	0	0	0	0	59
02:00	0	45	5	0	4	2	0	0	1	0	0	0	0	57
03:00	0	17	11	1	3	0	0	0	2	0	0	0	0	34
04:00	0	54	18	0	4	0	0	0	2	0	0	0	0	78
05:00	0	137	40	0	14	1	0	0	0	0	0	0	0	192
06:00	2	221	**93**	3	26	2	0	2	7	0	0	0	0	356
07:00	2	**274**	73	4	25	6	0	4	10	0	0	0	0	**398**
08:00	**4**	227	59	2	**28**	4	0	5	14	0	0	0	0	343
09:00	2	208	48	**6**	19	4	0	**10**	7	0	0	0	0	304
10:00	0	181	55	3	18	**11**	0	5	12	0	0	0	0	285
11:00	4	167	55	3	25	8	0	2	**22**	0	0	0	0	286
12 PM	2	248	73	**7**	21	1	0	3	7	0	0	0	0	362
13:00	0	243	70	4	36	5	0	5	**17**	0	0	0	0	380
14:00	4	340	75	3	20	7	**1**	6	11	**1**	0	0	0	468
15:00	5	418	107	4	27	**8**	0	**11**	6	0	0	0	0	586
16:00	**6**	**487**	**118**	3	**41**	3	0	7	8	1	0	0	0	**674**
17:00	1	474	91	3	27	2	0	7	5	0	0	0	0	610
18:00	4	382	86	2	16	0	1	8	4	0	0	0	0	503
19:00	2	257	61	1	15	0	0	4	2	0	0	0	0	342
20:00	2	209	44	0	7	0	0	1	3	0	0	0	0	266
21:00	0	168	27	0	3	0	0	1	0	0	0	0	0	199
22:00	0	152	28	0	5	0	0	0	1	0	0	0	0	186
23:00	1	114	19	0	5	0	0	0	0	0	0	0	0	139
Day Total	44	5161	1276	50	394	64	2	81	142	2	0	0	0	7216
Percent	0.6%	71.5%	17.7%	0.7%	5.5%	0.9%	0.0%	1.1%	2.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	08:00	07:00	06:00	09:00	08:00	10:00		09:00	11:00					07:00
Vol.	4	274	93	6	28	11		10	22					398
PM Peak	16:00	16:00	16:00	12:00	16:00	15:00	14:00	15:00	13:00	14:00				16:00
Vol.	6	487	118	7	41	8	1	11	17	1				674
Grand Total	141	15628	3801	136	1283	192	7	233	397	5	0	0	0	21823
Percent	0.6%	71.6%	17.4%	0.6%	5.9%	0.9%	0.0%	1.1%	1.8%	0.0%	0.0%	0.0%	0.0%	

COUNTER MEASURES INC.

1889 YORK STREET
DENVER,COLORADO 80206
303-333-7409

Location: TOWER RD N/O 104TH AVE
City: COMMERCE CITY
County: ADAMS
Direction: NORTHBOUND-SOUTHBOUND

Site Code: 060418
Station ID: 060418

SB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
06/05/18	0	21	5	0	1	0	0	0	0	0	0	0	0	27
01:00	1	27	5	0	1	0	0	0	2	0	0	0	0	36
02:00	0	27	6	0	0	0	0	0	0	0	0	0	0	33
03:00	1	70	18	**1**	1	1	0	0	3	0	0	0	0	95
04:00	2	136	31	1	5	0	0	1	1	0	0	0	0	177
05:00	4	345	86	0	17	4	0	1	0	0	0	0	0	457
06:00	3	**388**	**100**	0	16	2	0	1	**9**	0	0	0	0	**519**
07:00	5	359	88	1	**19**	**8**	0	6	7	0	0	0	0	493
08:00	**7**	280	61	0	13	1	0	2	6	0	0	0	0	370
09:00	1	205	55	0	10	2	0	**9**	9	0	0	0	0	291
10:00	2	148	48	0	12	4	0	6	7	0	0	0	0	227
11:00	0	207	47	1	14	4	0	6	5	0	0	0	0	284
12 PM	2	191	42	1	8	2	0	5	**7**	0	0	0	0	258
13:00	3	216	47	0	11	7	0	**7**	2	0	0	0	0	293
14:00	2	208	58	1	16	5	0	5	6	0	0	0	0	301
15:00	**4**	218	48	1	16	**10**	0	3	3	0	0	0	0	303
16:00	1	295	**80**	**2**	19	5	0	3	1	0	0	0	0	406
17:00	1	**346**	76	2	**23**	9	0	4	0	0	0	0	0	**461**
18:00	2	213	65	1	17	1	**3**	1	2	0	0	0	0	305
19:00	1	179	43	1	10	1	0	3	0	0	0	0	0	238
20:00	1	162	29	0	10	1	0	2	0	0	0	0	0	205
21:00	1	115	27	0	3	0	0	1	0	0	0	0	0	147
22:00	1	68	17	0	2	2	0	1	0	0	0	0	0	91
23:00	0	22	4	0	0	0	0	0	2	0	0	0	0	28
Day Total	45	4446	1086	13	244	69	3	67	72	0	0	0	0	6045
Percent	0.7%	73.5%	18.0%	0.2%	4.0%	1.1%	0.0%	1.1%	1.2%	0.0%	0.0%	0.0%	0.0%	
AM Peak	08:00	06:00	06:00	03:00	07:00	07:00		09:00	06:00					06:00
Vol.	7	388	100	1	19	8		9	9					519
PM Peak	15:00	17:00	16:00	16:00	17:00	15:00	18:00	13:00	12:00					17:00
Vol.	4	346	80	2	23	10	3	7	7					461

COUNTER MEASURES INC.

1889 YORK STREET
DENVER,COLORADO 80206
303-333-7409

Location: TOWER RD N/O 104TH AVE
City: COMMERCE CITY
County: ADAMS
Direction: NORTHBOUND-SOUTHBOUND

Site Code: 060418
Station ID: 060418

SB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
06/06/18	1	26	5	0	1	1	0	2	1	0	0	0	0	37
01:00	1	29	5	0	0	0	0	0	1	0	0	0	0	36
02:00	2	28	7	0	0	1	0	0	1	0	0	0	0	39
03:00	0	80	16	1	2	0	0	0	0	0	0	0	0	99
04:00	3	157	33	0	6	2	0	1	0	0	0	0	0	202
05:00	4	310	83	0	11	1	0	1	2	0	0	0	0	412
06:00	1	**406**	**110**	1	18	**5**	1	2	**11**	0	0	0	0	**555**
07:00	4	298	84	0	17	3	0	5	6	0	0	0	0	417
08:00	**5**	254	54	1	**22**	3	0	**8**	6	0	0	0	0	353
09:00	0	220	47	2	7	5	0	7	3	0	0	0	0	291
10:00	1	197	39	2	9	5	**2**	7	5	0	0	0	0	267
11:00	0	190	38	**4**	9	2	1	3	8	0	0	0	0	255
12 PM	1	184	44	0	17	2	0	4	4	0	0	0	0	256
13:00	**6**	214	42	3	15	**10**	0	4	**8**	**1**	0	0	0	303
14:00	2	231	60	1	18	2	**1**	**11**	3	0	0	0	0	329
15:00	1	234	53	2	**23**	5	1	6	7	0	0	0	0	332
16:00	2	279	**77**	**4**	16	3	1	3	2	0	0	0	0	387
17:00	1	**315**	75	0	21	5	0	1	1	0	0	0	0	**419**
18:00	0	235	67	0	20	3	0	4	0	0	0	0	0	329
19:00	1	209	49	0	11	0	0	1	0	0	0	0	0	271
20:00	1	155	32	0	4	0	0	4	0	0	0	0	0	196
21:00	0	131	30	0	1	0	0	0	0	0	0	0	0	162
22:00	0	69	10	0	4	0	0	1	0	0	0	0	0	84
23:00	0	31	6	0	1	0	0	0	0	0	0	0	0	38
Day Total	37	4482	1066	21	253	58	7	75	69	1	0	0	0	6069
Percent	0.6%	73.9%	17.6%	0.3%	4.2%	1.0%	0.1%	1.2%	1.1%	0.0%	0.0%	0.0%	0.0%	
AM Peak	08:00	06:00	06:00	11:00	08:00	06:00	10:00	08:00	06:00					06:00
Vol.	5	406	110	4	22	5	2	8	11					555
PM Peak	13:00	17:00	16:00	16:00	15:00	13:00	14:00	14:00	13:00	13:00				17:00
Vol.	6	315	77	4	23	10	1	11	8	1				419

COUNTER MEASURES INC.

1889 YORK STREET
DENVER,COLORADO 80206
303-333-7409

Location: TOWER RD N/O 104TH AVE
City: COMMERCE CITY
County: ADAMS
Direction: NORTHBOUND-SOUTHBOUND

Site Code: 060418
Station ID: 060418

SB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
06/07/18	1	19	5	0	0	0	0	0	0	0	0	0	0	25
01:00	0	25	1	0	1	0	0	0	0	0	0	0	0	27
02:00	1	28	5	0	0	0	0	1	0	0	0	0	0	35
03:00	0	73	19	1	1	0	0	1	0	0	0	0	0	95
04:00	3	162	27	0	6	0	0	0	2	0	0	0	0	200
05:00	**8**	330	93	0	9	1	0	0	2	0	0	0	0	443
06:00	2	**352**	**105**	0	10	3	0	5	7	0	0	0	0	**484**
07:00	7	342	57	0	13	4	1	6	**12**	0	0	0	0	442
08:00	2	267	58	**2**	16	**7**	0	6	9	0	0	0	0	367
09:00	4	211	54	0	11	4	**3**	**9**	8	0	0	0	0	304
10:00	3	178	40	2	**18**	4	1	6	4	0	0	0	0	256
11:00	1	174	51	1	12	7	1	8	3	0	0	0	0	258
12 PM	1	200	50	1	15	**8**	**1**	4	5	0	0	0	0	285
13:00	1	234	55	**3**	18	2	0	**8**	4	0	0	0	0	325
14:00	0	208	46	2	**22**	4	0	5	**9**	0	0	0	0	296
15:00	1	241	54	2	15	4	0	7	3	0	0	0	0	327
16:00	**4**	**317**	83	1	18	0	1	7	1	0	0	0	0	**432**
17:00	0	289	**87**	0	15	2	0	0	3	0	0	0	0	396
18:00	1	253	57	0	13	2	0	5	0	0	0	0	0	331
19:00	0	212	41	0	8	0	0	3	1	0	0	0	0	265
20:00	1	153	25	0	7	0	0	1	1	0	0	0	0	188
21:00	0	123	28	0	2	1	0	2	0	0	0	0	0	156
22:00	0	89	11	0	3	1	0	0	0	0	0	0	0	104
23:00	0	40	5	0	3	0	0	0	0	0	0	0	0	48
Day Total	41	4520	1057	15	236	54	8	84	74	0	0	0	0	6089
Percent	0.7%	74.2%	17.4%	0.2%	3.9%	0.9%	0.1%	1.4%	1.2%	0.0%	0.0%	0.0%	0.0%	
AM Peak	05:00	06:00	06:00	08:00	10:00	08:00	09:00	09:00	07:00					06:00
Vol.	8	352	105	2	18	7	3	9	12					484
PM Peak	16:00	16:00	17:00	13:00	14:00	12:00	12:00	13:00	14:00					16:00
Vol.	4	317	87	3	22	8	1	8	9					432
Grand Total	123	13448	3209	49	733	181	18	226	215	1	0	0	0	18203
Percent	0.7%	73.9%	17.6%	0.3%	4.0%	1.0%	0.1%	1.2%	1.2%	0.0%	0.0%	0.0%	0.0%	

COUNTER MEASURES INC.

1889 YORK STREET
DENVER,COLORADO 80206
303-333-7409

Location: 104TH AVE E/O TOWER RD
City: COMMERCE CITY
County: ADAMS
Direction: EASTBOUND

Site Code: 060415
Station ID: 060415

EB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
06/05/18	0	6	2	0	0	0	0	0	0	0	0	0	0	8
01:00	0	0	1	0	1	0	0	0	1	0	0	0	0	3
02:00	0	5	1	1	0	0	0	0	0	0	0	0	0	7
03:00	0	9	0	1	1	0	0	1	0	0	0	0	0	12
04:00	0	18	2	1	1	0	0	0	2	0	0	0	0	24
05:00	1	84	26	1	3	0	0	1	2	**1**	0	0	0	119
06:00	**3**	174	**51**	1	4	3	0	2	**4**	0	0	**1**	0	243
07:00	3	**260**	44	**2**	**12**	**6**	**2**	2	3	0	0	0	0	**334**
08:00	2	162	41	1	6	2	0	**3**	1	0	**4**	0	0	222
09:00	1	84	26	2	5	1	0	2	3	0	0	0	0	124
10:00	0	72	22	2	8	1	1	2	3	0	4	1	0	116
11:00	2	65	15	2	3	3	1	2	3	0	0	0	0	96
12 PM	0	81	15	0	6	1	0	3	**5**	0	0	0	0	111
13:00	0	74	19	3	7	1	0	0	1	0	0	0	0	105
14:00	0	64	19	2	6	0	0	2	0	0	0	0	**1**	94
15:00	**2**	89	22	1	7	**3**	0	2	4	0	0	0	0	130
16:00	0	103	**30**	1	7	1	0	**8**	2	**1**	0	0	0	153
17:00	0	**107**	26	**5**	**8**	2	0	3	2	0	0	**1**	0	**154**
18:00	0	75	20	2	5	1	0	1	0	0	0	0	0	104
19:00	0	41	17	2	6	0	0	0	1	0	0	0	0	67
20:00	0	31	9	0	0	0	0	0	0	0	0	0	0	40
21:00	1	38	1	1	1	0	0	0	0	0	0	0	0	42
22:00	0	19	6	2	1	0	0	0	0	0	0	0	0	28
23:00	0	13	1	0	0	0	0	0	1	0	0	0	0	15
Day Total	15	1674	416	33	98	25	4	34	38	2	8	3	1	2351
Percent	0.6%	71.2%	17.7%	1.4%	4.2%	1.1%	0.2%	1.4%	1.6%	0.1%	0.3%	0.1%	0.0%	
AM Peak	06:00	07:00	06:00	07:00	07:00	07:00	07:00	08:00	06:00	05:00	08:00	06:00		07:00
Vol.	3	260	51	2	12	6	2	3	4	1	4	1		334
PM Peak	15:00	17:00	16:00	17:00	17:00	15:00		16:00	12:00	16:00		17:00	14:00	17:00
Vol.	2	107	30	5	8	3		8	5	1		1	1	154

Location: 104TH AVE E/O TOWER RD
City: COMMERCE CITY
County: ADAMS
Direction: EASTBOUND

COUNTER MEASURES INC.
1889 YORK STREET
DENVER,COLORADO 80206
303-333-7409

Site Code: 060415
Station ID: 060415

EB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
06/06/18	0	11	3	0	0	0	0	0	0	0	0	0	0	14
01:00	0	7	1	0	0	0	0	0	0	0	0	0	0	8
02:00	0	8	0	1	0	0	0	0	0	0	0	0	0	9
03:00	0	10	1	1	1	0	0	0	0	0	0	0	0	13
04:00	0	16	5	1	5	0	0	0	0	0	0	0	0	27
05:00	0	89	34	1	2	1	0	1	1	0	0	0	0	129
06:00	1	222	**49**	2	**6**	**5**	0	**8**	4	0	0	1	0	298
07:00	**4**	**266**	45	1	3	1	0	6	**9**	0	**1**	0	0	**336**
08:00	1	167	23	**3**	5	2	0	4	2	0	1	**2**	**1**	211
09:00	0	92	25	2	3	2	0	3	7	**1**	1	0	0	136
10:00	1	82	17	2	4	0	0	2	0	0	0	0	0	108
11:00	0	69	17	3	4	1	0	2	4	0	0	0	0	100
12 PM	**3**	69	22	0	9	**4**	0	3	3	0	0	0	0	113
13:00	0	69	18	2	6	2	0	2	**6**	0	0	0	0	105
14:00	0	79	23	2	4	1	0	**6**	4	0	0	0	0	119
15:00	1	95	28	0	**10**	1	**1**	2	1	0	0	0	0	139
16:00	1	98	**31**	**5**	7	1	0	1	1	0	0	0	0	145
17:00	2	**108**	26	2	5	1	0	3	1	0	0	0	0	**148**
18:00	0	78	29	2	3	0	0	3	0	0	0	0	0	115
19:00	0	53	9	2	3	0	0	0	0	0	0	0	0	67
20:00	0	33	6	1	1	0	0	1	0	0	0	0	0	42
21:00	0	32	2	0	1	0	0	0	0	0	0	0	0	35
22:00	0	12	1	2	0	0	0	0	0	0	0	0	0	15
23:00	0	10	3	0	1	0	0	0	1	0	0	0	0	15
Day Total	14	1775	418	35	83	22	1	47	44	1	3	3	1	2447
Percent	0.6%	72.5%	17.1%	1.4%	3.4%	0.9%	0.0%	1.9%	1.8%	0.0%	0.1%	0.1%	0.0%	
AM Peak	07:00	07:00	06:00	08:00	06:00	06:00		06:00	07:00	09:00	07:00	08:00	08:00	07:00
Vol.	4	266	49	3	6	5		8	9	1	1	2	1	336
PM Peak	12:00	17:00	16:00	16:00	15:00	12:00	15:00	14:00	13:00					17:00
Vol.	3	108	31	5	10	4	1	6	6					148

COUNTER MEASURES INC.

1889 YORK STREET
DENVER,COLORADO 80206
303-333-7409

Location: 104TH AVE E/O TOWER RD
City: COMMERCE CITY
County: ADAMS
Direction: EASTBOUND

Site Code: 060415
Station ID: 060415

EB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
06/07/18	0	22	1	0	0	0	0	0	0	0	0	0	0	23
01:00	0	9	2	0	0	0	0	0	1	0	0	0	0	12
02:00	0	3	2	1	0	0	0	0	0	0	0	0	0	6
03:00	0	11	2	1	0	0	0	0	0	0	0	0	0	14
04:00	0	20	3	1	1	0	0	0	0	0	**1**	0	0	26
05:00	1	76	32	1	4	1	0	0	1	0	0	0	0	116
06:00	**4**	215	**63**	2	6	**6**	**2**	4	**5**	0	0	**1**	0	308
07:00	2	**250**	49	1	4	4	0	**7**	5	**3**	0	0	**1**	**326**
08:00	1	174	33	1	6	4	0	4	2	0	0	1	0	226
09:00	0	96	25	2	**9**	2	0	1	4	0	1	0	0	140
10:00	1	72	19	2	9	1	0	2	0	0	0	0	0	106
11:00	2	60	14	**4**	4	5	0	2	4	0	1	0	1	97
12 PM	**2**	78	31	0	5	1	0	1	**5**	0	0	0	0	123
13:00	0	87	27	2	7	1	0	3	4	0	**1**	0	0	132
14:00	0	90	25	1	**10**	**2**	**2**	2	3	0	0	0	0	135
15:00	1	94	30	1	7	1	0	3	2	0	0	0	0	139
16:00	1	**138**	**34**	2	4	2	0	**4**	3	**1**	0	**2**	0	**191**
17:00	0	115	30	**5**	5	0	0	2	3	0	0	0	0	160
18:00	0	94	25	3	1	0	0	0	0	0	0	0	0	123
19:00	0	57	8	2	4	0	0	0	1	0	0	0	0	72
20:00	0	49	5	1	0	1	0	2	0	0	0	0	0	58
21:00	0	35	3	0	0	0	0	0	0	0	0	0	0	38
22:00	0	30	2	2	0	0	0	0	2	0	0	0	0	36
23:00	0	13	7	0	0	0	0	0	0	0	0	0	0	20
Day Total	15	1888	472	35	86	31	4	37	45	4	4	4	2	2627
Percent	0.6%	71.9%	18.0%	1.3%	3.3%	1.2%	0.2%	1.4%	1.7%	0.2%	0.2%	0.2%	0.1%	
AM Peak	06:00	07:00	06:00	11:00	09:00	06:00	06:00	07:00	06:00	07:00	04:00	06:00	07:00	07:00
Vol.	4	250	63	4	9	6	2	7	5	3	1	1	1	326
PM Peak	12:00	16:00	16:00	17:00	14:00	14:00	14:00	16:00	12:00	16:00	13:00	16:00		16:00
Vol.	2	138	34	5	10	2	2	4	5	1	1	2		191
Grand Total	44	5337	1306	103	267	78	9	118	127	7	15	10	4	7425
Percent	0.6%	71.9%	17.6%	1.4%	3.6%	1.1%	0.1%	1.6%	1.7%	0.1%	0.2%	0.1%	0.1%	

COUNTER MEASURES INC.

1889 YORK STREET
DENVER,COLORADO 80206
303-333-7409

Location: 104TH AVE E/O TOWER RD
City: COMMERCE CITY
County: ADAMS
Direction: WESTBOUND

Site Code: 060416
Station ID: 060416

WB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
06/05/18	0	6	2	0	1	0	0	1	0	0	0	0	0	10
01:00	0	2	5	0	1	0	0	0	0	0	0	0	0	8
02:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2
03:00	0	1	3	0	1	0	0	0	0	0	0	0	0	5
04:00	0	1	4	0	1	0	0	1	0	0	0	0	0	7
05:00	**2**	12	15	1	7	**1**	0	0	0	0	0	0	0	38
06:00	1	22	23	**3**	17	0	0	1	0	0	0	0	0	67
07:00	1	67	**24**	0	**21**	1	0	0	1	0	0	0	0	**115**
08:00	0	50	20	1	11	1	0	**2**	0	0	0	0	0	85
09:00	1	67	17	1	4	0	0	1	0	0	0	**1**	0	92
10:00	0	64	8	1	4	1	**1**	1	**2**	0	0	0	0	82
11:00	0	**75**	4	0	2	0	0	0	0	0	0	0	0	81
12 PM	0	82	1	0	1	0	0	0	0	0	0	0	0	84
13:00	0	87	2	0	1	0	0	0	0	0	0	0	0	90
14:00	0	126	0	0	0	0	0	0	0	0	0	0	0	126
15:00	0	162	18	2	9	**2**	0	**2**	0	0	0	0	0	195
16:00	**1**	194	**31**	1	5	2	0	1	**1**	0	0	0	0	236
17:00	0	**297**	29	2	**13**	0	0	1	1	0	0	0	0	**343**
18:00	0	112	16	0	7	1	0	0	0	0	0	0	0	136
19:00	0	45	11	**3**	7	0	0	0	0	0	0	0	0	66
20:00	0	21	15	1	4	0	0	0	0	0	0	0	0	41
21:00	0	10	11	0	1	0	0	1	0	0	0	0	0	23
22:00	0	12	11	0	5	0	0	0	0	0	0	0	0	28
23:00	0	7	5	0	0	0	0	0	0	0	0	0	0	12
Day Total	6	1523	276	16	123	9	1	12	5	0	0	1	0	1972
Percent	0.3%	77.2%	14.0%	0.8%	6.2%	0.5%	0.1%	0.6%	0.3%	0.0%	0.0%	0.1%	0.0%	
AM Peak	05:00	11:00	07:00	06:00	07:00	05:00	10:00	08:00	10:00			09:00		07:00
Vol.	2	75	24	3	21	1	1	2	2			1		115
PM Peak	16:00	17:00	16:00	19:00	17:00	15:00		15:00	16:00					17:00
Vol.	1	297	31	3	13	2		2	1					343

Location: 104TH AVE E/O TOWER RD
City: COMMERCE CITY
County: ADAMS
Direction: WESTBOUND

COUNTER MEASURES INC.
1889 YORK STREET
DENVER,COLORADO 80206
303-333-7409

Site Code: 060416
Station ID: 060416

WB

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
06/06/18	0	6	4	0	0	0	0	0	0	0	0	0	0	10
01:00	0	4	2	0	1	0	0	0	0	0	0	0	0	7
02:00	0	0	2	0	1	0	0	0	0	0	0	0	0	3
03:00	0	4	3	0	0	0	0	0	0	0	0	0	0	7
04:00	0	6	7	0	2	0	0	0	0	0	0	0	0	15
05:00	0	16	14	0	7	0	0	0	0	0	0	0	0	37
06:00	**2**	18	22	**2**	**22**	**2**	0	0	1	0	0	0	0	69
07:00	0	**70**	26	0	21	0	0	1	0	0	0	0	0	**118**
08:00	0	46	**31**	2	19	0	0	1	1	0	0	0	0	100
09:00	0	66	16	2	17	0	0	**3**	1	0	0	0	0	105
10:00	0	63	20	1	7	0	0	1	**2**	0	0	**1**	0	95
11:00	0	63	18	2	8	0	0	1	0	0	0	0	0	92
12 PM	2	91	19	**2**	5	**1**	0	**2**	**1**	0	0	0	0	123
13:00	0	67	6	2	9	0	0	2	0	0	0	0	0	86
14:00	0	93	15	2	6	1	0	0	0	0	0	0	0	117
15:00	**3**	152	14	0	5	0	0	0	1	0	0	0	0	175
16:00	0	**250**	19	0	**13**	0	0	1	0	0	0	0	0	**283**
17:00	0	199	**38**	0	11	0	0	2	1	0	0	0	0	251
18:00	1	93	31	0	9	0	0	2	1	0	**1**	0	0	138
19:00	0	35	19	1	6	0	0	1	0	0	0	0	0	62
20:00	0	21	8	0	7	0	0	1	0	0	0	0	0	37
21:00	0	32	1	0	0	0	0	0	0	0	0	0	0	33
22:00	0	25	4	0	0	0	0	0	0	0	0	0	0	29
23:00	0	14	0	0	0	0	0	0	0	0	0	0	0	14
Day Total	8	1434	339	16	176	4	0	18	9	0	1	1	0	2006
Percent	0.4%	71.5%	16.9%	0.8%	8.8%	0.2%	0.0%	0.9%	0.4%	0.0%	0.0%	0.0%	0.0%	
AM Peak	06:00	07:00	08:00	06:00	06:00	06:00		09:00	10:00			10:00		07:00
Vol.	2	70	31	2	22	2		3	2			1		118
PM Peak	15:00	16:00	17:00	12:00	16:00	12:00		12:00	12:00		18:00			16:00
Vol.	3	250	38	2	13	1		2	1		1			283

Location: 104TH AVE E/O TOWER RD
City: COMMERCE CITY
County: ADAMS
Direction: WESTBOUND

COUNTER MEASURES INC.
1889 YORK STREET
DENVER,COLORADO 80206
303-333-7409

Site Code: 060416
Station ID: 060416

WB

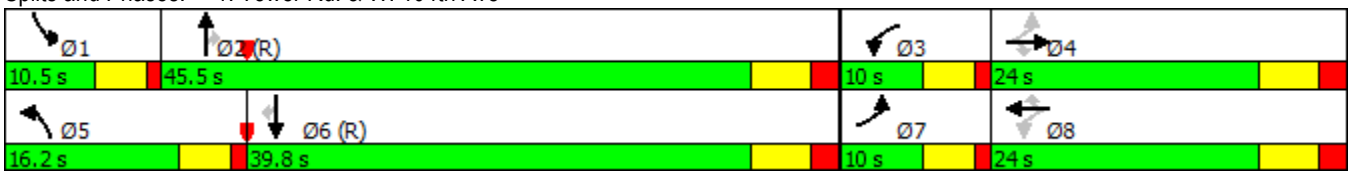
Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
06/07/18	**1**	12	0	0	0	**1**	0	0	0	0	0	0	0	14
01:00	0	5	1	0	0	0	0	0	0	0	0	0	0	6
02:00	0	2	2	0	0	0	0	0	0	0	0	0	0	4
03:00	0	3	1	0	0	0	0	0	0	0	0	0	0	4
04:00	0	11	3	0	2	0	0	0	0	0	0	0	0	16
05:00	0	20	9	1	5	0	0	0	0	0	0	0	0	35
06:00	1	28	20	1	17	0	0	0	0	0	0	0	0	67
07:00	1	58	47	2	**22**	1	0	0	**1**	0	0	0	0	**132**
08:00	0	46	**52**	**3**	17	1	0	**1**	1	0	0	0	0	121
09:00	0	57	24	1	11	1	0	1	0	0	0	0	0	95
10:00	0	49	19	2	8	1	0	0	0	**1**	0	0	0	80
11:00	0	**62**	10	1	8	1	0	0	0	0	0	0	0	82
12 PM	0	78	15	**1**	5	0	0	1	0	0	0	0	0	100
13:00	0	83	11	1	8	0	0	**3**	0	**1**	0	0	0	107
14:00	0	87	15	1	13	**2**	0	0	0	0	0	0	0	118
15:00	**2**	137	23	1	**18**	1	0	1	0	0	0	0	0	183
16:00	0	**217**	16	0	6	1	0	1	0	0	0	0	0	241
17:00	0	197	**37**	0	17	0	0	0	**1**	0	0	0	0	**252**
18:00	0	128	19	0	15	0	0	0	0	0	0	0	0	162
19:00	0	61	7	0	9	0	0	0	0	0	0	0	0	77
20:00	0	46	14	0	5	1	0	0	0	0	0	0	0	66
21:00	0	27	12	0	1	0	0	0	0	0	0	0	0	40
22:00	0	18	8	0	1	0	0	0	0	0	0	0	0	27
23:00	1	14	2	0	1	0	0	0	0	0	0	0	0	18
Day Total	6	1446	367	15	189	11	0	8	3	2	0	0	0	2047
Percent	0.3%	70.6%	17.9%	0.7%	9.2%	0.5%	0.0%	0.4%	0.1%	0.1%	0.0%	0.0%	0.0%	
AM Peak	00:00	11:00	08:00	08:00	07:00	00:00		08:00	07:00	10:00				07:00
Vol.	1	62	52	3	22	1		1	1	1				132
PM Peak	15:00	16:00	17:00	12:00	15:00	14:00		13:00	17:00	13:00				17:00
Vol.	2	217	37	1	18	2		3	1	1				252
Grand Total	20	4403	982	47	488	24	1	38	17	2	1	2	0	6025
Percent	0.3%	73.1%	16.3%	0.8%	8.1%	0.4%	0.0%	0.6%	0.3%	0.0%	0.0%	0.0%	0.0%	

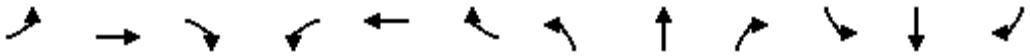
Intersection Capacity Worksheets

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	330	269	39	75	11	215	422	15	9	390	49
Future Volume (vph)	39	330	269	39	75	11	215	422	15	9	390	49
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	24.0	10.0	24.0	24.0	10.5	24.0	24.0	10.5	24.0	24.0
Total Split (s)	10.0	24.0	24.0	10.0	24.0	24.0	16.2	45.5	45.5	10.5	39.8	39.8
Total Split (%)	11.1%	26.7%	26.7%	11.1%	26.7%	26.7%	18.0%	50.6%	50.6%	11.7%	44.2%	44.2%
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	18.3	13.5	13.5	18.3	13.5	13.5	11.2	56.4	56.4	5.9	42.8	42.8
Actuated g/C Ratio	0.20	0.15	0.15	0.20	0.15	0.15	0.12	0.63	0.63	0.07	0.48	0.48
v/c Ratio	0.16	0.51	0.62	0.21	0.12	0.03	0.60	0.43	0.02	0.09	0.51	0.07
Control Delay	24.9	37.1	9.9	25.8	32.2	0.2	43.2	12.8	0.0	41.2	21.4	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.9	37.1	9.9	25.8	32.2	0.2	43.2	12.8	0.0	41.2	21.4	0.1
LOS	C	D	A	C	C	A	D	B	A	D	C	A
Approach Delay		24.9			27.4			22.5			19.5	
Approach LOS		C			C			C			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.62	
Intersection Signal Delay: 23.0	Intersection LOS: C
Intersection Capacity Utilization 55.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 1: Tower Rd. & W. 104th Ave





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	46	388	316	49	94	14	256	502	18	10	453	57
v/c Ratio	0.16	0.51	0.62	0.21	0.12	0.03	0.60	0.43	0.02	0.09	0.51	0.07
Control Delay	24.9	37.1	9.9	25.8	32.2	0.2	43.2	12.8	0.0	41.2	21.4	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.9	37.1	9.9	25.8	32.2	0.2	43.2	12.8	0.0	41.2	21.4	0.1
Queue Length 50th (ft)	19	75	0	21	17	0	71	139	0	6	189	0
Queue Length 95th (ft)	40	93	54	39	27	0	102	285	0	20	294	0
Internal Link Dist (ft)		988			982			791			622	
Turn Bay Length (ft)	320		425	300		415	310		375	260		320
Base Capacity (vph)	290	1017	569	238	1017	476	460	1167	1046	119	884	857
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	0.16	0.38	0.56	0.21	0.09	0.03	0.56	0.43	0.02	0.08	0.51	0.07

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	330	269	39	75	11	215	422	15	9	390	49
Future Volume (veh/h)	39	330	269	39	75	11	215	422	15	9	390	49
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	46	388	0	49	94	0	256	502	0	10	453	0
Adj No. of Lanes	1	3	1	1	3	1	2	1	1	1	1	1
Peak Hour Factor	0.85	0.85	0.85	0.80	0.80	0.80	0.84	0.84	0.84	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	279	596	185	193	602	187	335	1114	947	22	955	812
Arrive On Green	0.04	0.12	0.00	0.04	0.12	0.00	0.10	0.60	0.00	0.01	0.51	0.00
Sat Flow, veh/h	1774	5085	1583	1774	5085	1583	3442	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	46	388	0	49	94	0	256	502	0	10	453	0
Grp Sat Flow(s),veh/h/ln	1774	1695	1583	1774	1695	1583	1721	1863	1583	1774	1863	1583
Q Serve(g_s), s	2.0	6.6	0.0	2.2	1.5	0.0	6.5	13.3	0.0	0.5	14.1	0.0
Cycle Q Clear(g_c), s	2.0	6.6	0.0	2.2	1.5	0.0	6.5	13.3	0.0	0.5	14.1	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	279	596	185	193	602	187	335	1114	947	22	955	812
V/C Ratio(X)	0.16	0.65	0.00	0.25	0.16	0.00	0.76	0.45	0.00	0.46	0.47	0.00
Avail Cap(c_a), veh/h	320	1017	317	232	1017	317	447	1114	947	118	955	812
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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	33.0	38.0	0.0	33.2	35.6	0.0	39.6	10.0	0.0	44.1	14.1	0.0
Incr Delay (d2), s/veh	0.3	1.2	0.0	0.7	0.1	0.0	5.4	1.3	0.0	14.3	1.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	3.1	0.0	1.1	0.7	0.0	3.3	7.2	0.0	0.3	7.6	0.0
LnGrp Delay(d),s/veh	33.3	39.2	0.0	33.9	35.8	0.0	45.0	11.3	0.0	58.4	15.8	0.0
LnGrp LOS	C	D		C	D		D	B		E	B	
Approach Vol, veh/h		434			143			758			463	
Approach Delay, s/veh		38.6			35.1			22.7			16.7	
Approach LOS		D			D			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.6	59.8	8.0	16.5	13.3	52.2	7.9	16.7
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0
Max Green Setting (Gmax), s	6.0	39.5	5.5	18.0	11.7	33.8	5.5	18.0
Max Q Clear Time (g_c+I1), s	2.5	15.3	4.2	8.6	8.5	16.1	4.0	3.5
Green Ext Time (p_c), s	0.0	5.8	0.0	2.0	0.3	5.3	0.0	2.5

Intersection Summary	
HCM 2010 Ctrl Delay	26.0
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑						↕	
Traffic Vol, veh/h	0	56	298	0	66	0	0	0	0	0	1	59
Future Vol, veh/h	0	56	298	0	66	0	0	0	0	0	1	59
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	160	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	82	82	82	92	92	92	78	78	78
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	64	343	0	80	0	0	0	0	0	1	76

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	64	0	0	144	144	80
Stage 1	-	-	-	-	-	-	80	80	-
Stage 2	-	-	-	-	-	-	64	64	-
Critical Hdwy	-	-	-	4.12	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	-	-	-	2.218	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	0	-	-	1538	-	0	849	747	980
Stage 1	0	-	-	-	-	0	943	828	-
Stage 2	0	-	-	-	-	0	959	842	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1538	-	-	849	0	980
Mov Cap-2 Maneuver	-	-	-	-	-	-	849	0	-
Stage 1	-	-	-	-	-	-	943	0	-
Stage 2	-	-	-	-	-	-	959	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	9
HCM LOS			A

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	1538	-	980
HCM Lane V/C Ratio	-	-	-	-	0.078
HCM Control Delay (s)	-	-	0	-	9
HCM Lane LOS	-	-	A	-	A
HCM 95th %tile Q(veh)	-	-	0	-	0.3

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	56	0	0	0	0	0	66	0	0	0	0	0
Future Vol, veh/h	56	0	0	0	0	0	66	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	92	92	92	88	88	88	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	64	0	0	0	0	0	75	0	0	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	1	0	-	-	-	0	128	128	0
Stage 1	-	-	-	-	-	-	127	127	-
Stage 2	-	-	-	-	-	-	1	1	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1622	-	0	0	-	-	866	763	-
Stage 1	-	-	0	0	-	-	899	791	-
Stage 2	-	-	0	0	-	-	1022	895	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1622	-	-	-	-	-	832	0	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	832	0	-
Stage 1	-	-	-	-	-	-	864	0	-
Stage 2	-	-	-	-	-	-	1022	0	-

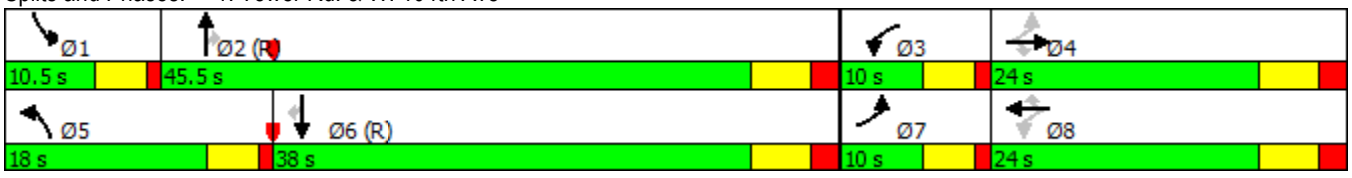
Approach	EB	WB	NB
HCM Control Delay, s	7.3	0	
HCM LOS			-

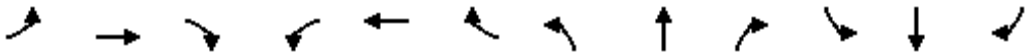
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR
Capacity (veh/h)	-	1622	-	-	-
HCM Lane V/C Ratio	-	0.039	-	-	-
HCM Control Delay (s)	-	7.3	-	-	-
HCM Lane LOS	-	A	-	-	-
HCM 95th %tile Q(veh)	-	0.1	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	149	232	27	300	122	426	605	19	5	373	80
Future Volume (vph)	83	149	232	27	300	122	426	605	19	5	373	80
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	24.0	10.0	24.0	24.0	10.5	24.0	24.0	10.5	24.0	24.0
Total Split (s)	10.0	24.0	24.0	10.0	24.0	24.0	18.0	45.5	45.5	10.5	38.0	38.0
Total Split (%)	11.1%	26.7%	26.7%	11.1%	26.7%	26.7%	20.0%	50.6%	50.6%	11.7%	42.2%	42.2%
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	18.7	13.9	13.9	17.8	11.9	11.9	16.3	55.9	55.9	5.9	37.3	37.3
Actuated g/C Ratio	0.21	0.15	0.15	0.20	0.13	0.13	0.18	0.62	0.62	0.07	0.41	0.41
v/c Ratio	0.38	0.21	0.56	0.12	0.53	0.38	0.72	0.55	0.02	0.05	0.54	0.12
Control Delay	30.7	33.8	9.7	25.2	39.0	4.7	41.8	14.5	0.1	40.0	24.9	0.3
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	30.7	33.8	9.7	25.2	39.0	4.7	41.8	14.5	0.1	40.0	24.9	0.3
LOS	C	C	A	C	D	A	D	B	A	D	C	A
Approach Delay		21.2			28.8			25.3			20.8	
Approach LOS		C			C			C			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 24.3	Intersection LOS: C
Intersection Capacity Utilization 63.9%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 1: Tower Rd. & W. 104th Ave





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	92	166	258	32	353	144	448	637	20	6	414	89
v/c Ratio	0.38	0.21	0.56	0.12	0.53	0.38	0.72	0.55	0.02	0.05	0.54	0.12
Control Delay	30.7	33.8	9.7	25.2	39.0	4.7	41.8	14.5	0.1	40.0	24.9	0.3
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	30.7	33.8	9.7	25.2	39.0	4.7	41.8	14.5	0.1	40.0	24.9	0.3
Queue Length 50th (ft)	41	31	0	14	69	0	122	185	0	3	184	0
Queue Length 95th (ft)	77	50	65	32	90	14	176	420	0	15	291	0
Internal Link Dist (ft)		988			982			791			622	
Turn Bay Length (ft)	320		425	300		415	310		375	260		320
Base Capacity (vph)	241	1045	530	271	1017	476	623	1156	1037	121	772	773
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	0.38	0.16	0.49	0.12	0.35	0.30	0.72	0.55	0.02	0.05	0.54	0.12

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	83	149	232	27	300	122	426	605	19	5	373	80
Future Volume (veh/h)	83	149	232	27	300	122	426	605	19	5	373	80
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	92	166	0	32	353	0	448	637	0	6	414	0
Adj No. of Lanes	1	3	1	1	3	1	2	1	1	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.85	0.85	0.85	0.95	0.95	0.95	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	235	727	226	272	575	179	515	1090	927	14	826	702
Arrive On Green	0.06	0.14	0.00	0.03	0.11	0.00	0.15	0.59	0.00	0.01	0.44	0.00
Sat Flow, veh/h	1774	5085	1583	1774	5085	1583	3442	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	92	166	0	32	353	0	448	637	0	6	414	0
Grp Sat Flow(s),veh/h/ln	1774	1695	1583	1774	1695	1583	1721	1863	1583	1774	1863	1583
Q Serve(g_s), s	4.1	2.6	0.0	1.4	6.0	0.0	11.5	19.4	0.0	0.3	14.3	0.0
Cycle Q Clear(g_c), s	4.1	2.6	0.0	1.4	6.0	0.0	11.5	19.4	0.0	0.3	14.3	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	235	727	226	272	575	179	515	1090	927	14	826	702
V/C Ratio(X)	0.39	0.23	0.00	0.12	0.61	0.00	0.87	0.58	0.00	0.44	0.50	0.00
Avail Cap(c_a), veh/h	236	1017	317	326	1017	317	516	1090	927	118	826	702
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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	32.5	34.2	0.0	33.6	38.0	0.0	37.4	11.8	0.0	44.5	17.9	0.0
Incr Delay (d2), s/veh	1.1	0.2	0.0	0.2	1.1	0.0	14.8	2.3	0.0	20.4	2.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	1.2	0.0	0.7	2.8	0.0	6.5	10.6	0.0	0.2	7.9	0.0
LnGrp Delay(d),s/veh	33.5	34.3	0.0	33.8	39.1	0.0	52.2	14.1	0.0	64.8	20.1	0.0
LnGrp LOS	C	C		C	D		D	B		E	C	
Approach Vol, veh/h		258			385			1085			420	
Approach Delay, s/veh		34.0			38.7			29.8			20.7	
Approach LOS		C			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.2	58.7	7.3	18.9	18.0	45.9	9.9	16.2
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	4.5	6.0
Max Green Setting (Gmax), s	6.0	39.5	5.5	18.0	13.5	32.0	5.5	18.0
Max Q Clear Time (g_c+I1), s	2.3	21.4	3.4	4.6	13.5	16.3	6.1	8.0
Green Ext Time (p_c), s	0.0	6.0	0.0	2.6	0.0	5.7	0.0	2.2

Intersection Summary	
HCM 2010 Ctrl Delay	30.1
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱	↰	↑						✣	
Traffic Vol, veh/h	0	57	116	0	383	0	0	0	0	0	1	66
Future Vol, veh/h	0	57	116	0	383	0	0	0	0	0	1	66
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	160	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	85	85	85	92	92	92	87	87	87
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	62	126	0	451	0	0	0	0	0	1	76

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	62	0	0	513	513	451
Stage 1	-	-	-	-	-	-	451	451	-
Stage 2	-	-	-	-	-	-	62	62	-
Critical Hdwy	-	-	-	4.12	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	-	-	-	2.218	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	0	-	-	1541	-	0	521	465	608
Stage 1	0	-	-	-	-	0	642	571	-
Stage 2	0	-	-	-	-	0	961	843	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1541	-	-	521	0	608
Mov Cap-2 Maneuver	-	-	-	-	-	-	521	0	-
Stage 1	-	-	-	-	-	-	642	0	-
Stage 2	-	-	-	-	-	-	961	0	-

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

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	1541	-	608
HCM Lane V/C Ratio	-	-	-	-	0.127
HCM Control Delay (s)	-	-	0	-	11.8
HCM Lane LOS	-	-	A	-	B
HCM 95th %tile Q(veh)	-	-	0	-	0.4

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	0	0	0	0	0	383	0	0	0	0	0
Future Vol, veh/h	60	0	0	0	0	0	383	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	92	92	92	88	88	88	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	68	0	0	0	0	0	435	0	0	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	1	0	-	-	-	0	137	137	0
Stage 1	-	-	-	-	-	-	136	136	-
Stage 2	-	-	-	-	-	-	1	1	-
Critical Hdwy	4.12	-	-	-	-	-	6.42	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	5.42	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.42	5.52	-
Follow-up Hdwy	2.218	-	-	-	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1622	-	0	0	-	-	856	754	-
Stage 1	-	-	0	0	-	-	890	784	-
Stage 2	-	-	0	0	-	-	1022	895	-
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1622	-	-	-	-	-	820	0	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	820	0	-
Stage 1	-	-	-	-	-	-	853	0	-
Stage 2	-	-	-	-	-	-	1022	0	-

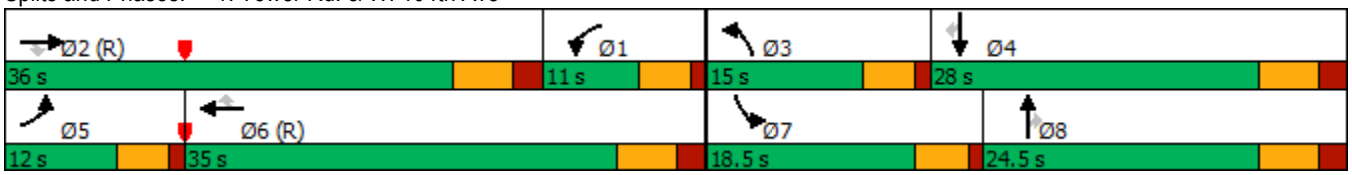
Approach	EB	WB	NB
HCM Control Delay, s	7.3	0	
HCM LOS			-

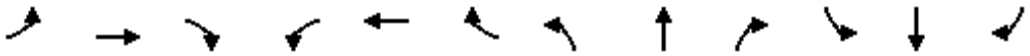
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR
Capacity (veh/h)	-	1622	-	-	-
HCM Lane V/C Ratio	-	0.042	-	-	-
HCM Control Delay (s)	-	7.3	-	-	-
HCM Lane LOS	-	A	-	-	-
HCM 95th %tile Q(veh)	-	0.1	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	1070	525	230	755	135	350	800	150	160	1100	125
Future Volume (vph)	75	1070	525	230	755	135	350	800	150	160	1100	125
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	24.0	10.0	24.0	24.0	10.5	24.0	24.0	10.5	24.0	24.0
Total Split (s)	12.0	36.0	36.0	11.0	35.0	35.0	15.0	24.5	24.5	18.5	28.0	28.0
Total Split (%)	13.3%	40.0%	40.0%	12.2%	38.9%	38.9%	16.7%	27.2%	27.2%	20.6%	31.1%	31.1%
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	6.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Max	Max	None	Max	Max
Act Effct Green (s)	7.2	30.0	30.0	6.5	31.4	31.4	10.5	20.0	20.0	12.5	22.0	22.0
Actuated g/C Ratio	0.08	0.33	0.33	0.07	0.35	0.35	0.12	0.22	0.22	0.14	0.24	0.24
v/c Ratio	0.58	0.69	0.76	1.97	0.46	0.23	0.95	0.77	0.31	0.71	0.96	0.25
Control Delay	56.9	28.5	18.0	488.7	24.5	4.9	75.2	38.9	3.3	52.8	52.5	1.6
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	56.9	28.5	18.0	488.7	24.5	4.9	75.2	38.9	3.3	52.8	52.5	1.6
LOS	E	C	B	F	C	A	E	D	A	D	D	A
Approach Delay		26.5			117.4			44.6			47.9	
Approach LOS		C			F			D			D	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green, Master Intersection	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.97	
Intersection Signal Delay: 54.8	Intersection LOS: D
Intersection Capacity Utilization 82.2%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 1: Tower Rd. & W. 104th Ave





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	82	1163	571	250	821	147	380	870	163	174	1196	136
v/c Ratio	0.58	0.69	0.76	1.97	0.46	0.23	0.95	0.77	0.31	0.71	0.96	0.25
Control Delay	56.9	28.5	18.0	488.7	24.5	4.9	75.2	38.9	3.3	52.8	52.5	1.6
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	56.9	28.5	18.0	488.7	24.5	4.9	75.2	38.9	3.3	52.8	52.5	1.6
Queue Length 50th (ft)	46	206	114	~222	136	0	112	175	0	94	246	0
Queue Length 95th (ft)	#101	256	254	#369	175	40	#200	#226	23	#165	#340	6
Internal Link Dist (ft)		988			982			791			622	
Turn Bay Length (ft)	320		425	300		415	310		375	260		320
Base Capacity (vph)	147	1695	753	127	1774	647	400	1127	520	275	1243	551
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	0.56	0.69	0.76	1.97	0.46	0.23	0.95	0.77	0.31	0.63	0.96	0.25

Intersection Summary

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

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	1070	525	230	755	135	350	800	150	160	1100	125
Future Volume (veh/h)	75	1070	525	230	755	135	350	800	150	160	1100	125
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	82	1163	0	250	821	0	380	870	0	174	1196	0
Adj No. of Lanes	1	3	1	1	3	1	2	3	1	1	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	105	1695	528	1104	4643	1446	402	1236	385	209	1243	387
Arrive On Green	0.06	0.33	0.00	0.62	0.91	0.00	0.12	0.24	0.00	0.12	0.24	0.00
Sat Flow, veh/h	1774	5085	1583	1774	5085	1583	3442	5085	1583	1774	5085	1583
Grp Volume(v), veh/h	82	1163	0	250	821	0	380	870	0	174	1196	0
Grp Sat Flow(s),veh/h/ln	1774	1695	1583	1774	1695	1583	1721	1695	1583	1774	1695	1583
Q Serve(g_s), s	4.1	17.8	0.0	5.6	1.5	0.0	9.9	14.1	0.0	8.6	20.9	0.0
Cycle Q Clear(g_c), s	4.1	17.8	0.0	5.6	1.5	0.0	9.9	14.1	0.0	8.6	20.9	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	105	1695	528	1104	4643	1446	402	1236	385	209	1243	387
V/C Ratio(X)	0.78	0.69	0.00	0.23	0.18	0.00	0.95	0.70	0.00	0.83	0.96	0.00
Avail Cap(c_a), veh/h	148	1695	528	1104	4643	1446	402	1236	385	276	1243	387
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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	41.8	25.9	0.0	7.5	0.4	0.0	39.5	31.1	0.0	38.8	33.6	0.0
Incr Delay (d2), s/veh	15.8	2.3	0.0	0.1	0.1	0.0	31.5	3.4	0.0	14.9	17.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	8.7	0.0	2.7	0.7	0.0	6.5	7.0	0.0	5.1	11.8	0.0
LnGrp Delay(d),s/veh	57.6	28.2	0.0	7.6	0.5	0.0	70.9	34.5	0.0	53.7	51.5	0.0
LnGrp LOS	E	C		A	A		E	C		D	D	
Approach Vol, veh/h		1245			1071			1250			1370	
Approach Delay, s/veh		30.1			2.1			45.6			51.8	
Approach LOS		C			A			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	63.5	36.0	15.0	28.0	9.8	89.7	15.1	27.9
Change Period (Y+Rc), s	6.0	* 6	4.5	6.0	4.5	6.0	4.5	6.0
Max Green Setting (Gmax), s	6.5	* 30	10.5	22.0	7.5	29.0	14.0	18.5
Max Q Clear Time (g_c+I1), s	7.6	19.8	11.9	22.9	6.1	3.5	10.6	16.1
Green Ext Time (p_c), s	0.0	5.2	0.0	0.0	0.0	5.5	0.1	1.3

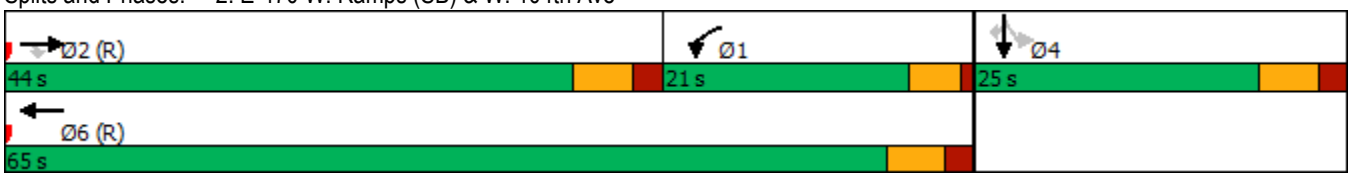
Intersection Summary	
HCM 2010 Ctrl Delay	34.0
HCM 2010 LOS	C

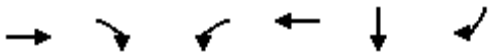
Notes

Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	830	550	305	945	5	175
Future Volume (vph)	830	550	305	945	5	175
Turn Type	NA	Perm	Prot	NA	NA	Perm
Protected Phases	2		1	6	4	
Permitted Phases		2				4
Detector Phase	2	2	1	6	4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.0	24.0	9.5	24.0	24.0	24.0
Total Split (s)	44.0	44.0	21.0	65.0	25.0	25.0
Total Split (%)	48.9%	48.9%	23.3%	72.2%	27.8%	27.8%
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.5	6.0	6.0	6.0
Lead/Lag	Lead	Lead	Lag			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	Min	Min
Act Effct Green (s)	42.3	42.3	16.5	63.3	14.7	14.7
Actuated g/C Ratio	0.47	0.47	0.18	0.70	0.16	0.16
v/c Ratio	0.38	0.56	1.02	0.29	0.67	0.51
Control Delay	16.5	3.8	85.4	2.4	46.5	15.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.5	3.8	85.4	2.4	46.5	15.5
LOS	B	A	F	A	D	B
Approach Delay	11.5			22.7	31.2	
Approach LOS	B			C	C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 24 (27%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.02	
Intersection Signal Delay: 18.5	Intersection LOS: B
Intersection Capacity Utilization 74.7%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 2: E-470 W. Ramps (SB) & W. 104th Ave



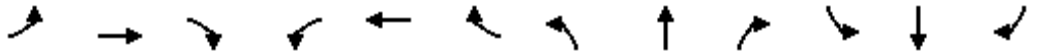


Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	902	598	332	1027	195	190
v/c Ratio	0.38	0.56	1.02	0.29	0.67	0.51
Control Delay	16.5	3.8	85.4	2.4	46.5	15.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.5	3.8	85.4	2.4	46.5	15.5
Queue Length 50th (ft)	117	0	~208	30	105	26
Queue Length 95th (ft)	163	61	#379	35	167	83
Internal Link Dist (ft)	1302			508	229	
Turn Bay Length (ft)		400	250			
Base Capacity (vph)	2387	1060	324	3574	375	443
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	0.56	1.02	0.29	0.52	0.43

Intersection Summary

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

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↱	↰	↑↑↑						↲	↱
Traffic Volume (veh/h)	0	830	550	305	945	0	0	0	0	175	5	175
Future Volume (veh/h)	0	830	550	305	945	0	0	0	0	175	5	175
Number	5	2	12	1	6	16				7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	0	1863	1863	1863	1863	0				1900	1863	1863
Adj Flow Rate, veh/h	0	902	0	332	1027	0				190	5	190
Adj No. of Lanes	0	3	1	1	3	0				0	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	2	2	0				2	2	2
Cap, veh/h	0	2147	669	406	3650	0				258	7	236
Arrive On Green	0.00	0.14	0.00	0.30	0.95	0.00				0.15	0.15	0.15
Sat Flow, veh/h	0	5253	1583	1774	5253	0				1731	46	1583
Grp Volume(v), veh/h	0	902	0	332	1027	0				195	0	190
Grp Sat Flow(s),veh/h/ln	0	1695	1583	1774	1695	0				1776	0	1583
Q Serve(g_s), s	0.0	14.6	0.0	15.6	1.1	0.0				9.4	0.0	10.4
Cycle Q Clear(g_c), s	0.0	14.6	0.0	15.6	1.1	0.0				9.4	0.0	10.4
Prop In Lane	0.00		1.00	1.00		0.00				0.97		1.00
Lane Grp Cap(c), veh/h	0	2147	669	406	3650	0				264	0	236
V/C Ratio(X)	0.00	0.42	0.00	0.82	0.28	0.00				0.74	0.00	0.81
Avail Cap(c_a), veh/h	0	2147	669	406	3650	0				375	0	334
HCM Platoon Ratio	1.00	0.33	0.33	1.33	1.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.86	0.86	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	28.7	0.0	29.6	0.6	0.0				36.6	0.0	37.0
Incr Delay (d2), s/veh	0.0	0.6	0.0	10.8	0.2	0.0				4.6	0.0	9.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	7.0	0.0	8.8	0.5	0.0				5.0	0.0	5.2
LnGrp Delay(d),s/veh	0.0	29.3	0.0	40.3	0.8	0.0				41.2	0.0	46.3
LnGrp LOS		C		D	A					D		D
Approach Vol, veh/h		902			1359						385	
Approach Delay, s/veh		29.3			10.4						43.7	
Approach LOS		C			B						D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4		6		
Phs Duration (G+Y+Rc), s	26.6	44.0		19.4		70.6		
Change Period (Y+Rc), s	6.0	* 6		6.0		6.0		
Max Green Setting (Gmax), s	16.5	* 38		19.0		59.0		
Max Q Clear Time (g_c+I1), s	17.6	16.6		12.4		3.1		
Green Ext Time (p_c), s	0.0	5.9		1.0		8.3		

Intersection Summary	
HCM 2010 Ctrl Delay	21.7
HCM 2010 LOS	C

Notes

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Configurations							
Traffic Volume (vph)	175	825	1275	350	175	5	220
Future Volume (vph)	175	825	1275	350	175	5	220
Turn Type	Prot	NA	NA	Perm	Perm	NA	Perm
Protected Phases	5	2	6			8	
Permitted Phases				6	8		8
Detector Phase	5	2	6	6	8	8	8
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	18.0	66.0	48.0	48.0	24.0	24.0	24.0
Total Split (%)	20.0%	73.3%	53.3%	53.3%	26.7%	26.7%	26.7%
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag			
Lead-Lag Optimize?	Yes		Yes	Yes			
Recall Mode	None	C-Max	C-Max	C-Max	Min	Min	Min
Act Effct Green (s)	13.8	66.5	48.2	48.2	11.5	11.5	11.5
Actuated g/C Ratio	0.15	0.74	0.54	0.54	0.13	0.13	0.13
v/c Ratio	0.70	0.24	0.51	0.37	0.43	0.02	0.65
Control Delay	67.6	0.3	8.3	1.6	38.3	31.4	18.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.6	0.3	8.3	1.6	38.3	31.4	18.4
LOS	E	A	A	A	D	C	B
Approach Delay		12.1	6.8			27.3	
Approach LOS		B	A			C	

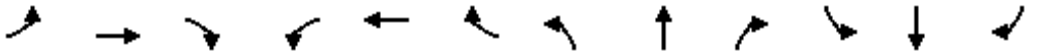
Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 35 (39%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 11.3	Intersection LOS: B
Intersection Capacity Utilization 74.7%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 3: E-470 E. Ramps (NB) & W. 104th Ave

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	190	897	1386	380	190	5	239
v/c Ratio	0.70	0.24	0.51	0.37	0.43	0.02	0.65
Control Delay	67.6	0.3	8.3	1.6	38.3	31.4	18.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.6	0.3	8.3	1.6	38.3	31.4	18.4
Queue Length 50th (ft)	107	0	99	3	53	3	28
Queue Length 95th (ft)	#209	11	131	18	77	12	93
Internal Link Dist (ft)		508	888			254	
Turn Bay Length (ft)	250			400			500
Base Capacity (vph)	287	3756	2723	1024	686	372	466
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.24	0.51	0.37	0.28	0.01	0.51

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	175	825	0	0	1275	350	175	5	220	0	0	0
Future Volume (veh/h)	175	825	0	0	1275	350	175	5	220	0	0	0
Number	5	2	12	1	6	16	3	8	18			
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/h/ln	1863	1863	0	0	1863	1863	1863	1863	1863			
Adj Flow Rate, veh/h	190	897	0	0	1386	0	190	5	0			
Adj No. of Lanes	1	3	0	0	3	1	2	1	1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	221	3995	0	0	3107	967	279	151	128			
Arrive On Green	0.25	1.00	0.00	0.00	1.00	0.00	0.08	0.08	0.00			
Sat Flow, veh/h	1774	5253	0	0	5253	1583	3442	1863	1583			
Grp Volume(v), veh/h	190	897	0	0	1386	0	190	5	0			
Grp Sat Flow(s),veh/h/ln	1774	1695	0	0	1695	1583	1721	1863	1583			
Q Serve(g_s), s	9.2	0.0	0.0	0.0	0.0	0.0	4.8	0.2	0.0			
Cycle Q Clear(g_c), s	9.2	0.0	0.0	0.0	0.0	0.0	4.8	0.2	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	221	3995	0	0	3107	967	279	151	128			
V/C Ratio(X)	0.86	0.22	0.00	0.00	0.45	0.00	0.68	0.03	0.00			
Avail Cap(c_a), veh/h	266	3995	0	0	3107	967	688	373	317			
HCM Platoon Ratio	2.00	2.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00			
Upstream Filter(I)	0.93	0.93	0.00	0.00	0.86	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	33.0	0.0	0.0	0.0	0.0	0.0	40.2	38.1	0.0			
Incr Delay (d2), s/veh	19.5	0.1	0.0	0.0	0.4	0.0	2.9	0.1	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	5.6	0.0	0.0	0.0	0.1	0.0	2.4	0.1	0.0			
LnGrp Delay(d),s/veh	52.6	0.1	0.0	0.0	0.4	0.0	43.2	38.2	0.0			
LnGrp LOS	D	A			A		D	D				
Approach Vol, veh/h		1087			1386			195				
Approach Delay, s/veh		9.3			0.4			43.0				
Approach LOS		A			A			D				

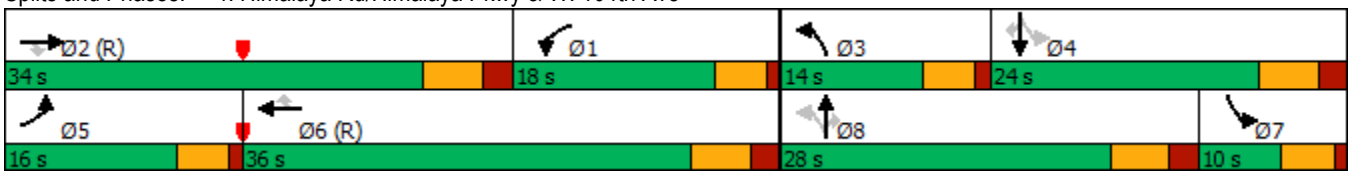
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		76.7			15.7	61.0		13.3
Change Period (Y+Rc), s		6.0			4.5	6.0		6.0
Max Green Setting (Gmax), s		60.0			13.5	42.0		18.0
Max Q Clear Time (g_c+I1), s		2.0			11.2	2.0		6.8
Green Ext Time (p_c), s		6.9			0.1	12.2		0.5

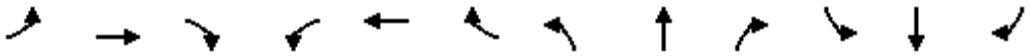
Intersection Summary	
HCM 2010 Ctrl Delay	7.1
HCM 2010 LOS	A

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	240	415	80	75	440	50	180	145	50	25	195	330
Future Volume (vph)	240	415	80	75	440	50	180	145	50	25	195	330
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	24.0	24.0	9.5	24.0	24.0	9.5	24.0	24.0	9.5	24.0	24.0
Total Split (s)	16.0	34.0	34.0	18.0	36.0	36.0	14.0	28.0	28.0	10.0	24.0	24.0
Total Split (%)	17.8%	37.8%	37.8%	20.0%	40.0%	40.0%	15.6%	31.1%	31.1%	11.1%	26.7%	26.7%
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	6.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Min	Min	None	Min	Min
Act Effct Green (s)	11.3	37.8	37.8	12.0	36.4	36.4	20.0	18.5	18.5	13.6	11.9	11.9
Actuated g/C Ratio	0.13	0.42	0.42	0.13	0.40	0.40	0.22	0.21	0.21	0.15	0.13	0.13
v/c Ratio	0.61	0.21	0.11	0.35	0.23	0.07	0.70	0.22	0.11	0.11	0.45	0.69
Control Delay	26.9	10.8	2.0	38.9	19.0	0.2	48.6	32.6	0.4	32.4	38.3	11.3
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	26.9	10.8	2.0	38.9	19.0	0.2	48.6	32.6	0.4	32.4	38.3	11.3
LOS	C	B	A	D	B	A	D	C	A	C	D	B
Approach Delay		15.1			20.0			36.0			21.8	
Approach LOS		B			B			D			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 89 (99%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 21.5	Intersection LOS: C
Intersection Capacity Utilization 52.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 4: Himalaya Rd/Himalaya Pkwy & W. 104th Ave

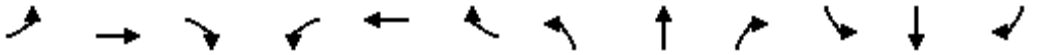




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	261	451	87	82	478	54	196	158	54	27	212	359
v/c Ratio	0.61	0.21	0.11	0.35	0.23	0.07	0.70	0.22	0.11	0.11	0.45	0.69
Control Delay	26.9	10.8	2.0	38.9	19.0	0.2	48.6	32.6	0.4	32.4	38.3	11.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.9	10.8	2.0	38.9	19.0	0.2	48.6	32.6	0.4	32.4	38.3	11.3
Queue Length 50th (ft)	49	43	0	42	64	0	87	35	0	14	59	0
Queue Length 95th (ft)	90	86	3	85	99	0	#214	73	0	34	86	73
Internal Link Dist (ft)		1265			1719			469			386	
Turn Bay Length (ft)	300		300	300		300	300		300	300		300
Base Capacity (vph)	457	2134	801	265	2055	769	282	905	580	239	707	603
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	0.57	0.21	0.11	0.31	0.23	0.07	0.70	0.17	0.09	0.11	0.30	0.60

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	240	415	80	75	440	50	180	145	50	25	195	330
Future Volume (veh/h)	240	415	80	75	440	50	180	145	50	25	195	330
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	261	451	0	82	478	54	196	158	54	27	212	0
Adj No. of Lanes	2	3	1	1	3	1	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	344	1582	493	432	2399	747	267	267	120	263	317	142
Arrive On Green	0.03	0.10	0.00	0.24	0.47	0.47	0.11	0.08	0.08	0.10	0.09	0.00
Sat Flow, veh/h	3442	5085	1583	1774	5085	1583	1774	3539	1583	1774	3539	1583
Grp Volume(v), veh/h	261	451	0	82	478	54	196	158	54	27	212	0
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1774	1695	1583	1774	1770	1583	1774	1770	1583
Q Serve(g_s), s	6.8	7.4	0.0	3.3	4.9	1.7	9.5	3.9	2.9	0.0	5.2	0.0
Cycle Q Clear(g_c), s	6.8	7.4	0.0	3.3	4.9	1.7	9.5	3.9	2.9	0.0	5.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	344	1582	493	432	2399	747	267	267	120	263	317	142
V/C Ratio(X)	0.76	0.29	0.00	0.19	0.20	0.07	0.73	0.59	0.45	0.10	0.67	0.00
Avail Cap(c_a), veh/h	440	1582	493	432	2399	747	267	865	387	263	708	317
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.98	0.98	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	42.4	31.1	0.0	27.0	13.9	13.0	40.4	40.3	39.8	36.2	39.7	0.0
Incr Delay (d2), s/veh	5.6	0.4	0.0	0.2	0.2	0.2	10.0	2.1	2.6	0.2	2.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	3.5	0.0	1.6	2.3	0.8	5.5	2.0	1.4	0.6	2.7	0.0
LnGrp Delay(d),s/veh	48.0	31.6	0.0	27.2	14.1	13.2	50.3	42.3	42.5	36.4	42.1	0.0
LnGrp LOS	D	C		C	B	B	D	D	D	D	D	
Approach Vol, veh/h		712			614			408			239	
Approach Delay, s/veh		37.6			15.7			46.2			41.5	
Approach LOS		D			B			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	27.9	34.0	14.0	14.1	13.5	48.5	15.3	12.8
Change Period (Y+Rc), s	6.0	* 6	4.5	6.0	4.5	6.0	6.0	* 6
Max Green Setting (Gmax), s	13.5	* 28	9.5	18.0	11.5	30.0	5.5	* 22
Max Q Clear Time (g_c+I1), s	5.3	9.4	11.5	7.2	8.8	6.9	2.0	5.9
Green Ext Time (p_c), s	0.1	2.6	0.0	0.8	0.2	3.1	0.0	0.9

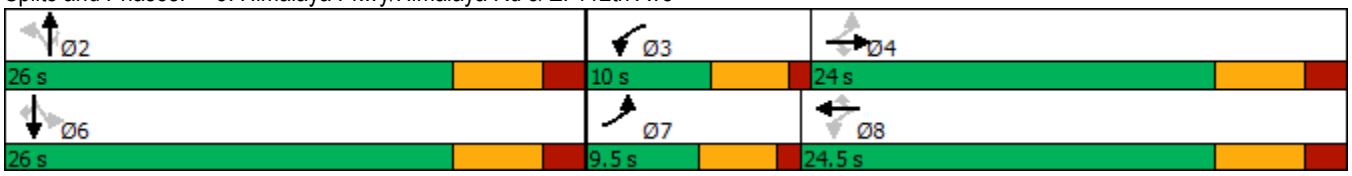
Intersection Summary	
HCM 2010 Ctrl Delay	33.0
HCM 2010 LOS	C

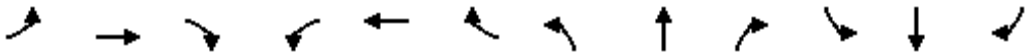
Notes

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	300	35	85	425	10	60	150	35	10	150	50
Future Volume (vph)	25	300	35	85	425	10	60	150	35	10	150	50
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	24.0	24.0	9.5	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	9.5	24.0	24.0	10.0	24.5	24.5	26.0	26.0	26.0	26.0	26.0	26.0
Total Split (%)	15.8%	40.0%	40.0%	16.7%	40.8%	40.8%	43.3%	43.3%	43.3%	43.3%	43.3%	43.3%
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	15.1	10.9	10.9	17.2	14.7	14.7	20.4	20.4	20.4	20.4	20.4	20.4
Actuated g/C Ratio	0.31	0.22	0.22	0.35	0.30	0.30	0.42	0.42	0.42	0.42	0.42	0.42
v/c Ratio	0.07	0.41	0.08	0.22	0.44	0.02	0.13	0.11	0.05	0.02	0.11	0.07
Control Delay	9.3	18.8	0.3	10.8	15.3	0.1	12.5	11.3	0.1	11.9	11.3	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.3	18.8	0.3	10.8	15.3	0.1	12.5	11.3	0.1	11.9	11.3	0.2
LOS	A	B	A	B	B	A	B	B	A	B	B	A
Approach Delay		16.3			14.3			10.0			8.7	
Approach LOS		B			B			A			A	

Intersection Summary		
Cycle Length: 60		
Actuated Cycle Length: 49		
Natural Cycle: 60		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.44		
Intersection Signal Delay: 13.2	Intersection LOS: B	
Intersection Capacity Utilization 43.0%	ICU Level of Service A	
Analysis Period (min) 15		

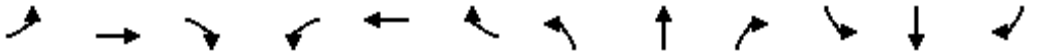
Splits and Phases: 5: Himalaya Pkwy/Himalaya Rd & E. 112th Ave





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	27	326	38	92	462	11	65	163	38	11	163	54
v/c Ratio	0.07	0.41	0.08	0.22	0.44	0.02	0.13	0.11	0.05	0.02	0.11	0.07
Control Delay	9.3	18.8	0.3	10.8	15.3	0.1	12.5	11.3	0.1	11.9	11.3	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.3	18.8	0.3	10.8	15.3	0.1	12.5	11.3	0.1	11.9	11.3	0.2
Queue Length 50th (ft)	5	47	0	17	50	0	12	16	0	2	16	0
Queue Length 95th (ft)	15	77	0	37	106	0	39	37	0	11	37	0
Internal Link Dist (ft)		1349			1902			467			313	
Turn Bay Length (ft)	300		300	300		300	300		300	300		300
Base Capacity (vph)	369	1328	678	410	1420	716	504	1475	739	504	1475	739
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	0.07	0.25	0.06	0.22	0.33	0.02	0.13	0.11	0.05	0.02	0.11	0.07

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	300	35	85	425	10	60	150	35	10	150	50
Future Volume (veh/h)	25	300	35	85	425	10	60	150	35	10	150	50
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	27	326	38	92	462	11	65	163	38	11	163	54
Adj No. of Lanes	1	2	1	1	2	1	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	284	573	256	360	723	323	604	1482	663	610	1482	663
Arrive On Green	0.03	0.16	0.16	0.07	0.20	0.20	0.42	0.42	0.42	0.42	0.42	0.42
Sat Flow, veh/h	1774	3539	1583	1774	3539	1583	1160	3539	1583	1177	3539	1583
Grp Volume(v), veh/h	27	326	38	92	462	11	65	163	38	11	163	54
Grp Sat Flow(s),veh/h/ln	1774	1770	1583	1774	1770	1583	1160	1770	1583	1177	1770	1583
Q Serve(g_s), s	0.6	4.1	1.0	2.0	5.7	0.3	1.7	1.3	0.7	0.3	1.3	1.0
Cycle Q Clear(g_c), s	0.6	4.1	1.0	2.0	5.7	0.3	3.1	1.3	0.7	1.6	1.3	1.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	284	573	256	360	723	323	604	1482	663	610	1482	663
V/C Ratio(X)	0.09	0.57	0.15	0.26	0.64	0.03	0.11	0.11	0.06	0.02	0.11	0.08
Avail Cap(c_a), veh/h	414	1334	597	433	1371	613	604	1482	663	610	1482	663
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.9	18.5	17.2	14.9	17.4	15.2	9.4	8.5	8.3	8.9	8.5	8.4
Incr Delay (d2), s/veh	0.1	0.9	0.3	0.4	0.9	0.0	0.4	0.2	0.2	0.1	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	2.1	0.5	1.0	2.9	0.1	0.6	0.7	0.3	0.1	0.7	0.5
LnGrp Delay(d),s/veh	16.1	19.4	17.4	15.3	18.3	15.3	9.7	8.6	8.4	9.0	8.6	8.6
LnGrp LOS	B	B	B	B	B	B	A	A	A	A	A	A
Approach Vol, veh/h		391			565			266			228	
Approach Delay, s/veh		19.0			17.8			8.9			8.6	
Approach LOS		B			B			A			A	

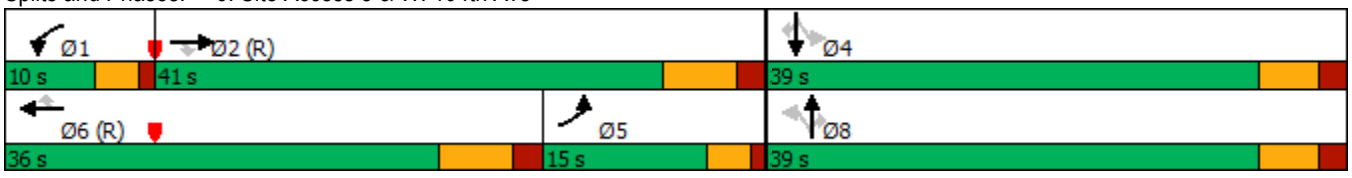
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		26.0	8.0	13.7		26.0	6.0	15.8
Change Period (Y+Rc), s		6.0	4.5	6.0		6.0	4.5	6.0
Max Green Setting (Gmax), s		20.0	5.5	18.0		20.0	5.0	18.5
Max Q Clear Time (g_c+I1), s		5.1	4.0	6.1		3.6	2.6	7.7
Green Ext Time (p_c), s		1.1	0.0	1.5		1.0	0.0	2.0

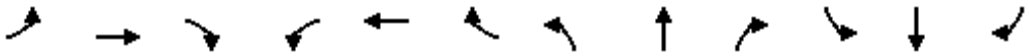
Intersection Summary	
HCM 2010 Ctrl Delay	15.0
HCM 2010 LOS	B

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	185	645	175	25	870	55	275	5	50	45	5	200
Future Volume (vph)	185	645	175	25	870	55	275	5	50	45	5	200
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	25.0	25.0	9.5	25.0	25.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	15.0	41.0	41.0	10.0	36.0	36.0	39.0	39.0	39.0	39.0	39.0	39.0
Total Split (%)	16.7%	45.6%	45.6%	11.1%	40.0%	40.0%	43.3%	43.3%	43.3%	43.3%	43.3%	43.3%
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	Min	Min	Min	Min	Min	Min
Act Effct Green (s)	11.0	48.2	48.2	6.4	37.5	37.5	24.5	24.5	24.5	24.5	24.5	24.5
Actuated g/C Ratio	0.12	0.54	0.54	0.07	0.42	0.42	0.27	0.27	0.27	0.27	0.27	0.27
v/c Ratio	0.48	0.26	0.20	0.22	0.45	0.08	0.78	0.01	0.10	0.13	0.01	0.37
Control Delay	31.4	7.5	1.0	37.5	19.8	2.1	44.1	20.0	0.3	22.8	20.0	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.4	7.5	1.0	37.5	19.8	2.1	44.1	20.0	0.3	22.8	20.0	4.9
LOS	C	A	A	D	B	A	D	B	A	C	B	A
Approach Delay		10.8			19.2			37.2			8.4	
Approach LOS		B			B			D			A	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 39 (43%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 17.1	Intersection LOS: B
Intersection Capacity Utilization 60.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 6: Site Access 5 & W. 104th Ave

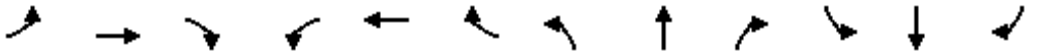




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	201	701	190	27	946	60	299	5	54	49	5	217
v/c Ratio	0.48	0.26	0.20	0.22	0.45	0.08	0.78	0.01	0.10	0.13	0.01	0.37
Control Delay	31.4	7.5	1.0	37.5	19.8	2.1	44.1	20.0	0.3	22.8	20.0	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.4	7.5	1.0	37.5	19.8	2.1	44.1	20.0	0.3	22.8	20.0	4.9
Queue Length 50th (ft)	57	31	0	12	153	0	157	2	0	21	2	0
Queue Length 95th (ft)	93	79	3	m30	225	m8	220	9	0	42	9	44
Internal Link Dist (ft)		888			1265			280			1390	
Turn Bay Length (ft)	350		250	150		250	200		200	200		
Base Capacity (vph)	419	2723	936	127	2119	730	515	683	695	515	683	717
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	0.48	0.26	0.20	0.21	0.45	0.08	0.58	0.01	0.08	0.10	0.01	0.30

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	185	645	175	25	870	55	275	5	50	45	5	200
Future Volume (veh/h)	185	645	175	25	870	55	275	5	50	45	5	200
Number	5	2	12	1	6	16	3	8	18	7	4	14
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	201	701	190	27	946	60	299	5	54	49	5	0
Adj No. of Lanes	2	3	1	1	3	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	742	2765	861	48	1639	510	414	447	380	399	447	380
Arrive On Green	0.43	1.00	1.00	0.01	0.11	0.11	0.24	0.24	0.24	0.24	0.24	0.00
Sat Flow, veh/h	3442	5085	1583	1774	5085	1583	1405	1863	1583	1338	1863	1583
Grp Volume(v), veh/h	201	701	190	27	946	60	299	5	54	49	5	0
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1774	1695	1583	1405	1863	1583	1338	1863	1583
Q Serve(g_s), s	3.4	0.0	0.0	1.4	15.9	3.1	18.5	0.2	2.4	2.6	0.2	0.0
Cycle Q Clear(g_c), s	3.4	0.0	0.0	1.4	15.9	3.1	18.7	0.2	2.4	2.8	0.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	742	2765	861	48	1639	510	414	447	380	399	447	380
V/C Ratio(X)	0.27	0.25	0.22	0.56	0.58	0.12	0.72	0.01	0.14	0.12	0.01	0.00
Avail Cap(c_a), veh/h	742	2765	861	118	1639	510	592	683	581	568	683	581
HCM Platoon Ratio	2.00	2.00	2.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.95	0.95	0.95	0.87	0.87	0.87	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	21.0	0.0	0.0	44.1	34.4	28.6	33.2	26.1	26.9	27.1	26.1	0.0
Incr Delay (d2), s/veh	0.2	0.2	0.6	8.5	1.3	0.4	2.5	0.0	0.2	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.1	0.1	0.8	7.7	1.4	7.4	0.1	1.1	1.0	0.1	0.0
LnGrp Delay(d),s/veh	21.2	0.2	0.6	52.6	35.7	29.0	35.7	26.1	27.1	27.3	26.1	0.0
LnGrp LOS	C	A	A	D	D	C	D	C	C	C	C	
Approach Vol, veh/h		1092			1033			358			54	
Approach Delay, s/veh		4.1			35.7			34.2			27.1	
Approach LOS		A			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.5	55.9		27.6	26.4	36.0		27.6
Change Period (Y+Rc), s	4.0	7.0		6.0	7.0	* 7		6.0
Max Green Setting (Gmax), s	6.0	34.0		33.0	11.0	* 29		33.0
Max Q Clear Time (g_c+I1), s	3.4	2.0		4.8	5.4	17.9		20.7
Green Ext Time (p_c), s	0.0	5.5		0.1	0.3	4.6		0.9

Intersection Summary	
HCM 2010 Ctrl Delay	21.7
HCM 2010 LOS	C

Notes

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	5	170	25	5	5	155	275	5	5	355	20
Future Vol, veh/h	15	5	170	25	5	5	155	275	5	5	355	20
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	250	-	250	250	-	250	300	-	300	300	-	300
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	16	5	185	27	5	5	168	299	5	5	386	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	884	1036	193	841	1053	150	408	0	0	304	0	0
Stage 1	396	396	-	635	635	-	-	-	-	-	-	-
Stage 2	488	640	-	206	418	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	240	230	816	258	225	870	1147	-	-	1254	-	-
Stage 1	601	602	-	433	471	-	-	-	-	-	-	-
Stage 2	530	468	-	777	589	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	207	196	816	173	191	870	1147	-	-	1254	-	-
Mov Cap-2 Maneuver	207	196	-	173	191	-	-	-	-	-	-	-
Stage 1	513	600	-	370	402	-	-	-	-	-	-	-
Stage 2	443	400	-	593	587	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.1	25.9	3.1	0.1
HCM LOS	B	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBL	SBT	SBR
Capacity (veh/h)	1147	-	-	207	196	816	173	191	870	1254	-	-
HCM Lane V/C Ratio	0.147	-	-	0.079	0.028	0.226	0.157	0.028	0.006	0.004	-	-
HCM Control Delay (s)	8.7	-	-	23.9	23.9	10.7	29.6	24.4	9.2	7.9	-	-
HCM Lane LOS	A	-	-	C	C	B	D	C	A	A	-	-
HCM 95th %tile Q(veh)	0.5	-	-	0.3	0.1	0.9	0.5	0.1	0	0	-	-

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	40	75	50	25	25	70	215	10	5	255	5
Future Vol, veh/h	5	40	75	50	25	25	70	215	10	5	255	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	200	-	200	200	-	200	300	-	300	300	-	300
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	5	43	82	54	27	27	76	234	11	5	277	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	570	684	139	556	678	117	282	0	0	245	0	0
Stage 1	287	287	-	386	386	-	-	-	-	-	-	-
Stage 2	283	397	-	170	292	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	404	370	884	414	373	913	1277	-	-	1318	-	-
Stage 1	696	673	-	609	609	-	-	-	-	-	-	-
Stage 2	700	602	-	815	670	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	351	346	884	324	349	913	1277	-	-	1318	-	-
Mov Cap-2 Maneuver	351	346	-	324	349	-	-	-	-	-	-	-
Stage 1	654	670	-	572	572	-	-	-	-	-	-	-
Stage 2	608	566	-	689	667	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.2	15.5	1.9	0.1
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBL	SBT	SBR
Capacity (veh/h)	1277	-	-	351	346	884	324	349	913	1318	-	-
HCM Lane V/C Ratio	0.06	-	-	0.015	0.126	0.092	0.168	0.078	0.03	0.004	-	-
HCM Control Delay (s)	8	-	-	15.4	16.9	9.5	18.3	16.2	9.1	7.7	-	-
HCM Lane LOS	A	-	-	C	C	A	C	C	A	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0	0.4	0.3	0.6	0.3	0.1	0	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	5	0	20	5	10	0	235	10	10	245	5
Future Vol, veh/h	5	5	0	20	5	10	0	235	10	10	245	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	150	-	-	150	-	-	250	-	-	250	-	250
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	5	5	0	22	5	11	0	255	11	11	266	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	418	554	133	419	554	133	271	0	0	266	0	0
Stage 1	288	288	-	261	261	-	-	-	-	-	-	-
Stage 2	130	266	-	158	293	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	519	439	892	518	439	892	1289	-	-	1295	-	-
Stage 1	695	672	-	721	691	-	-	-	-	-	-	-
Stage 2	860	687	-	828	669	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	504	435	892	510	435	892	1289	-	-	1295	-	-
Mov Cap-2 Maneuver	504	435	-	510	435	-	-	-	-	-	-	-
Stage 1	695	667	-	721	691	-	-	-	-	-	-	-
Stage 2	843	687	-	814	664	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.8	11.6	0	0.3
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1289	-	-	504	435	510	661	1295	-	-
HCM Lane V/C Ratio	-	-	-	0.011	0.012	0.043	0.025	0.008	-	-
HCM Control Delay (s)	0	-	-	12.2	13.4	12.4	10.6	7.8	-	-
HCM Lane LOS	A	-	-	B	B	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0.1	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	350	15	5	525	15	5
Future Vol, veh/h	350	15	5	525	15	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	300	300	-	0	200
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	380	16	5	571	16	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	396	0	676	190
Stage 1	-	-	-	-	380	-
Stage 2	-	-	-	-	296	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1159	-	387	820
Stage 1	-	-	-	-	661	-
Stage 2	-	-	-	-	729	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1159	-	385	820
Mov Cap-2 Maneuver	-	-	-	-	385	-
Stage 1	-	-	-	-	661	-
Stage 2	-	-	-	-	726	-

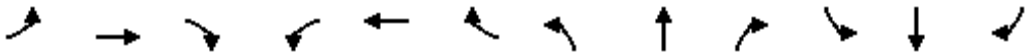
Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	13.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	385	820	-	-	1159	-
HCM Lane V/C Ratio	0.042	0.007	-	-	0.005	-
HCM Control Delay (s)	14.8	9.4	-	-	8.1	-
HCM Lane LOS	B	A	-	-	A	-
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	5	170	25	5	5	155	275	5	5	355	20
Future Volume (vph)	15	5	170	25	5	5	155	275	5	5	355	20
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	4	4	4	8	8	8	5	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	32.0	32.0	32.0	32.0	32.0	32.0	22.0	58.0	58.0	36.0	36.0	36.0
Total Split (%)	35.6%	35.6%	35.6%	35.6%	35.6%	35.6%	24.4%	64.4%	64.4%	40.0%	40.0%	40.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	7.9	7.9	7.9	7.9	7.9	7.9	73.1	73.1	73.1	61.2	61.2	61.2
Actuated g/C Ratio	0.09	0.09	0.09	0.09	0.09	0.09	0.81	0.81	0.81	0.68	0.68	0.68
v/c Ratio	0.13	0.03	0.60	0.22	0.03	0.02	0.21	0.10	0.00	0.01	0.16	0.02
Control Delay	38.6	35.8	14.7	41.2	35.8	0.2	2.6	2.0	0.4	6.0	5.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.6	35.8	14.7	41.2	35.8	0.2	2.6	2.0	0.4	6.0	5.8	0.1
LOS	D	D	B	D	D	A	A	A	A	A	A	A
Approach Delay		17.1			34.9			2.2			5.5	
Approach LOS		B			C			A			A	

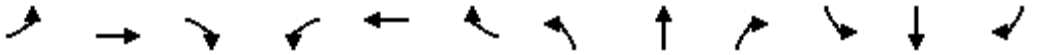
Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.60	
Intersection Signal Delay: 7.2	Intersection LOS: A
Intersection Capacity Utilization 37.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 7: Himalaya Pkwy & Site Access 1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	16	5	185	27	5	5	168	299	5	5	386	22
v/c Ratio	0.13	0.03	0.60	0.22	0.03	0.02	0.21	0.10	0.00	0.01	0.16	0.02
Control Delay	38.6	35.8	14.7	41.2	35.8	0.2	2.6	2.0	0.4	6.0	5.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.6	35.8	14.7	41.2	35.8	0.2	2.6	2.0	0.4	6.0	5.8	0.1
Queue Length 50th (ft)	9	3	0	15	3	0	13	12	0	1	34	0
Queue Length 95th (ft)	27	13	58	38	13	0	35	27	1	5	66	0
Internal Link Dist (ft)		291			267			310			260	
Turn Bay Length (ft)	250		250	250		250	300		300	300		300
Base Capacity (vph)	429	569	612	429	569	534	905	2875	1289	721	2407	1100
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	0.04	0.01	0.30	0.06	0.01	0.01	0.19	0.10	0.00	0.01	0.16	0.02

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	5	170	25	5	5	155	275	5	5	355	20
Future Volume (veh/h)	15	5	170	25	5	5	155	275	5	5	355	20
Number	7	4	14	3	8	18	5	2	12	1	6	16
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	16	5	185	27	5	5	168	299	5	5	386	22
Adj No. of Lanes	1	1	1	1	1	1	1	2	1	1	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	275	264	224	246	264	224	772	2684	1201	780	2313	1035
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.05	0.76	0.76	0.65	0.65	0.65
Sat Flow, veh/h	1399	1863	1583	1188	1863	1583	1774	3539	1583	1071	3539	1583
Grp Volume(v), veh/h	16	5	185	27	5	5	168	299	5	5	386	22
Grp Sat Flow(s),veh/h/ln	1399	1863	1583	1188	1863	1583	1774	1770	1583	1071	1770	1583
Q Serve(g_s), s	0.9	0.2	10.2	1.8	0.2	0.2	2.5	2.0	0.1	0.1	3.8	0.4
Cycle Q Clear(g_c), s	1.1	0.2	10.2	2.0	0.2	0.2	2.5	2.0	0.1	0.1	3.8	0.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	275	264	224	246	264	224	772	2684	1201	780	2313	1035
V/C Ratio(X)	0.06	0.02	0.82	0.11	0.02	0.02	0.22	0.11	0.00	0.01	0.17	0.02
Avail Cap(c_a), veh/h	504	569	484	440	569	484	1020	2684	1201	780	2313	1035
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.7	33.2	37.5	34.1	33.2	33.3	3.8	2.9	2.6	5.4	6.1	5.5
Incr Delay (d2), s/veh	0.1	0.0	7.5	0.2	0.0	0.0	0.1	0.1	0.0	0.0	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.1	4.9	0.6	0.1	0.1	1.2	1.0	0.0	0.0	1.9	0.2
LnGrp Delay(d),s/veh	33.8	33.3	45.0	34.3	33.3	33.3	4.0	3.0	2.6	5.4	6.2	5.5
LnGrp LOS	C	C	D	C	C	C	A	A	A	A	A	A
Approach Vol, veh/h		206			37			472			413	
Approach Delay, s/veh		43.9			34.0			3.3			6.2	
Approach LOS		D			C			A			A	

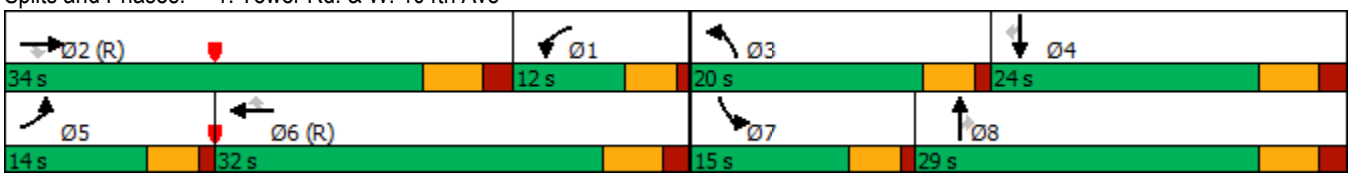
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		72.8		17.2	9.4	63.3		17.2
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5		4.5
Max Green Setting (Gmax), s		53.5		27.5	17.5	31.5		27.5
Max Q Clear Time (g_c+I1), s		4.0		12.2	4.5	5.8		4.0
Green Ext Time (p_c), s		2.1		0.6	0.3	2.6		0.1

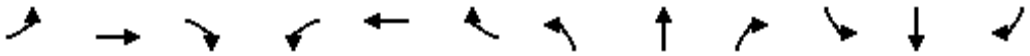
Intersection Summary	
HCM 2010 Ctrl Delay	12.8
HCM 2010 LOS	B

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	1095	450	205	1205	240	550	1200	205	115	800	175
Future Volume (vph)	150	1095	450	205	1205	240	550	1200	205	115	800	175
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	24.0	10.0	24.0	24.0	10.5	24.0	24.0	10.5	24.0	24.0
Total Split (s)	14.0	34.0	34.0	12.0	32.0	32.0	20.0	29.0	29.0	15.0	24.0	24.0
Total Split (%)	15.6%	37.8%	37.8%	13.3%	35.6%	35.6%	22.2%	32.2%	32.2%	16.7%	26.7%	26.7%
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	6.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Max	Max	None	Max	Max
Act Effct Green (s)	9.5	28.0	28.0	7.5	26.0	26.0	15.5	23.8	23.8	9.7	18.0	18.0
Actuated g/C Ratio	0.11	0.31	0.31	0.08	0.29	0.29	0.17	0.26	0.26	0.11	0.20	0.20
v/c Ratio	0.88	0.75	0.67	1.52	0.89	0.41	0.98	0.94	0.37	0.65	0.86	0.36
Control Delay	82.0	31.5	12.8	296.1	39.8	5.4	71.0	47.6	5.9	55.2	44.5	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.0	31.5	12.8	296.1	39.8	5.4	71.0	47.6	5.9	55.2	44.5	2.7
LOS	F	C	B	F	D	A	E	D	A	E	D	A
Approach Delay		31.0			66.7			49.8			38.9	
Approach LOS		C			E			D			D	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green, Master Intersection	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.52	
Intersection Signal Delay: 47.3	Intersection LOS: D
Intersection Capacity Utilization 81.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 1: Tower Rd. & W. 104th Ave



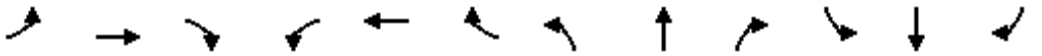


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	163	1190	489	223	1310	261	579	1263	216	125	870	190
v/c Ratio	0.88	0.75	0.67	1.52	0.89	0.41	0.98	0.94	0.37	0.65	0.86	0.36
Control Delay	82.0	31.5	12.8	296.1	39.8	5.4	71.0	47.6	5.9	55.2	44.5	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.0	31.5	12.8	296.1	39.8	5.4	71.0	47.6	5.9	55.2	44.5	2.7
Queue Length 50th (ft)	93	221	60	~178	260	0	171	260	0	69	176	0
Queue Length 95th (ft)	#206	273	172	#318	#342	55	#277	#358	52	#136	#241	13
Internal Link Dist (ft)		988			982			791			622	
Turn Bay Length (ft)	320		425	300		415	310		375	260		320
Base Capacity (vph)	186	1582	732	147	1469	642	591	1342	578	206	1017	535
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	0.88	0.75	0.67	1.52	0.89	0.41	0.98	0.94	0.37	0.61	0.86	0.36

Intersection Summary

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

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	1095	450	205	1205	240	550	1200	205	115	800	175
Future Volume (veh/h)	150	1095	450	205	1205	240	550	1200	205	115	800	175
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	163	1190	0	223	1310	0	579	1263	0	125	870	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.95	0.95	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	188	1589		935	3815		595	1453		156	1021	
Arrive On Green	0.11	0.31	0.00	0.70	0.99	0.00	0.17	0.28	0.00	0.09	0.20	0.00
Sat Flow, veh/h	1781	5106	1585	1781	5106	1585	3456	5106	1585	1781	5106	1585
Grp Volume(v), veh/h	163	1190	0	223	1310	0	579	1263	0	125	870	0
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1781	1702	1585	1728	1702	1585	1781	1702	1585
Q Serve(g_s), s	8.1	18.8	0.0	4.1	0.2	0.0	15.0	21.2	0.0	6.2	14.8	0.0
Cycle Q Clear(g_c), s	8.1	18.8	0.0	4.1	0.2	0.0	15.0	21.2	0.0	6.2	14.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	188	1589		935	3815		595	1453		156	1021	
V/C Ratio(X)	0.87	0.75		0.24	0.34		0.97	0.87		0.80	0.85	
Avail Cap(c_a), veh/h	188	1589		935	3815		595	1453		208	1021	
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	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	39.6	27.8	0.0	7.1	0.1	0.0	37.0	30.6	0.0	40.3	34.7	0.0
Incr Delay (d2), s/veh	32.1	3.3	0.0	0.1	0.2	0.0	30.0	7.3	0.0	14.9	8.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	7.5	0.0	1.3	0.1	0.0	8.4	9.0	0.0	3.2	6.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	71.7	31.1	0.0	7.2	0.3	0.0	67.1	37.9	0.0	55.2	43.7	0.0
LnGrp LOS	E	C		A	A		E	D		E	D	
Approach Vol, veh/h		1353	A		1533	A		1842	A		995	A
Approach Delay, s/veh		36.0			1.3			47.1			45.1	
Approach LOS		D			A			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	53.4	34.0	20.0	24.0	14.0	73.4	12.4	31.6
Change Period (Y+Rc), s	6.0	* 6	4.5	6.0	4.5	6.0	4.5	6.0
Max Green Setting (Gmax), s	7.5	* 28	15.5	18.0	9.5	26.0	10.5	23.0
Max Q Clear Time (g_c+I1), s	6.1	20.8	17.0	16.8	10.1	2.2	8.2	23.2
Green Ext Time (p_c), s	0.1	4.1	0.0	0.7	0.0	9.5	0.1	0.0

Intersection Summary	
HCM 6th Ctrl Delay	31.9
HCM 6th LOS	C

Notes

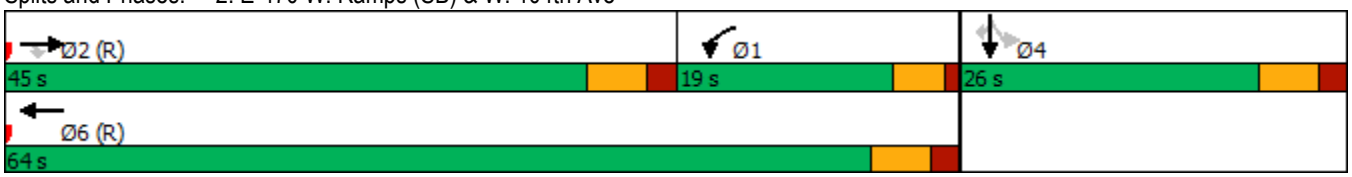
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

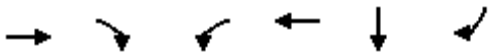
Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1015	275	290	1430	5	225
Future Volume (vph)	1015	275	290	1430	5	225
Turn Type	NA	Perm	Prot	NA	NA	Perm
Protected Phases	2		1	6	4	
Permitted Phases		2				4
Detector Phase	2	2	1	6	4	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.0	24.0	9.5	24.0	24.0	24.0
Total Split (s)	45.0	45.0	19.0	64.0	26.0	26.0
Total Split (%)	50.0%	50.0%	21.1%	71.1%	28.9%	28.9%
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.5	6.0	6.0	6.0
Lead/Lag	Lead	Lead	Lag			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	C-Max	C-Max	None	C-Max	Min	Min
Act Effct Green (s)	40.0	40.0	14.5	59.0	19.0	19.0
Actuated g/C Ratio	0.44	0.44	0.16	0.66	0.21	0.21
v/c Ratio	0.49	0.34	1.11	0.47	0.87	0.58
Control Delay	18.9	3.2	117.4	8.6	58.2	23.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.9	3.2	117.4	8.6	58.2	23.3
LOS	B	A	F	A	E	C
Approach Delay	15.6			27.0	43.2	
Approach LOS	B			C	D	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 26 (29%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.11	
Intersection Signal Delay: 25.2	Intersection LOS: C
Intersection Capacity Utilization 66.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: E-470 W. Ramps (SB) & W. 104th Ave





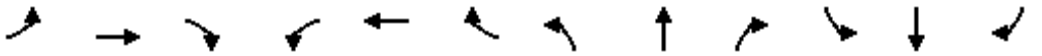
Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Group Flow (vph)	1103	299	315	1554	326	245
v/c Ratio	0.49	0.34	1.11	0.47	0.87	0.58
Control Delay	18.9	3.2	117.4	8.6	58.2	23.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.9	3.2	117.4	8.6	58.2	23.3
Queue Length 50th (ft)	161	0	~213	108	178	66
Queue Length 95th (ft)	200	45	m#355	123	#318	143
Internal Link Dist (ft)	1302			508	229	
Turn Bay Length (ft)		400	250			
Base Capacity (vph)	2257	869	285	3331	394	436
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	0.49	0.34	1.11	0.47	0.83	0.56

Intersection Summary

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

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

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↱	↰	↑↑↑						↲	↱
Traffic Volume (veh/h)	0	1015	275	290	1430	0	0	0	0	295	5	225
Future Volume (veh/h)	0	1015	275	290	1430	0	0	0	0	295	5	225
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1870	1870	1870	1870	0				1870	1870	1870
Adj Flow Rate, veh/h	0	1103	0	315	1554	0				321	5	245
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92				0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	2	2	0				2	2	2
Cap, veh/h	0	2213		344	3538	0				363	6	327
Arrive On Green	0.00	0.14	0.00	0.39	1.00	0.00				0.21	0.21	0.21
Sat Flow, veh/h	0	5274	1585	1781	5274	0				1755	27	1585
Grp Volume(v), veh/h	0	1103	0	315	1554	0				326	0	245
Grp Sat Flow(s),veh/h/ln	0	1702	1585	1781	1702	0				1783	0	1585
Q Serve(g_s), s	0.0	17.9	0.0	15.1	0.0	0.0				16.0	0.0	13.1
Cycle Q Clear(g_c), s	0.0	17.9	0.0	15.1	0.0	0.0				16.0	0.0	13.1
Prop In Lane	0.00		1.00	1.00		0.00				0.98		1.00
Lane Grp Cap(c), veh/h	0	2213		344	3538	0				368	0	327
V/C Ratio(X)	0.00	0.50		0.92	0.44	0.00				0.89	0.00	0.75
Avail Cap(c_a), veh/h	0	2213		344	3538	0				396	0	352
HCM Platoon Ratio	1.00	0.33	0.33	2.00	2.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	0.00	0.73	0.73	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	29.5	0.0	26.9	0.0	0.0				34.7	0.0	33.5
Incr Delay (d2), s/veh	0.0	0.8	0.0	22.7	0.3	0.0				19.7	0.0	8.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	8.2	0.0	6.8	0.1	0.0				8.7	0.0	5.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	30.3	0.0	49.6	0.3	0.0				54.4	0.0	41.5
LnGrp LOS	A	C		D	A	A				D	A	D
Approach Vol, veh/h		1103	A		1869						571	
Approach Delay, s/veh		30.3			8.6						48.8	
Approach LOS		C			A						D	

Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	23.5	45.0		24.6		68.5						
Change Period (Y+Rc), s	6.0	* 6		6.0		6.0						
Max Green Setting (Gmax), s	14.5	* 39		20.0		58.0						
Max Q Clear Time (g_c+I1), s	17.1	19.9		18.0		2.0						
Green Ext Time (p_c), s	0.0	7.0		0.6		15.8						

Intersection Summary		
HCM 6th Ctrl Delay		21.9
HCM 6th LOS		C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

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

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Configurations							
Traffic Volume (vph)	200	1110	1195	300	525	5	360
Future Volume (vph)	200	1110	1195	300	525	5	360
Turn Type	Prot	NA	NA	Perm	Perm	NA	Perm
Protected Phases	5	2	6			8	
Permitted Phases				6	8		8
Detector Phase	5	2	6	6	8	8	8
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	19.0	66.0	47.0	47.0	24.0	24.0	24.0
Total Split (%)	21.1%	73.3%	52.2%	52.2%	26.7%	26.7%	26.7%
Yellow Time (s)	3.5	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag			
Lead-Lag Optimize?	Yes		Yes	Yes			
Recall Mode	None	C-Max	C-Max	C-Max	Min	Min	Min
Act Effct Green (s)	13.8	60.0	41.7	41.7	18.0	18.0	18.0
Actuated g/C Ratio	0.15	0.67	0.46	0.46	0.20	0.20	0.20
v/c Ratio	0.80	0.36	0.55	0.36	0.83	0.01	0.99
Control Delay	66.9	1.2	6.9	1.5	46.7	29.2	71.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.9	1.2	6.9	1.5	46.7	29.2	71.8
LOS	E	A	A	A	D	C	E
Approach Delay		11.2	5.8			56.8	
Approach LOS		B	A			E	

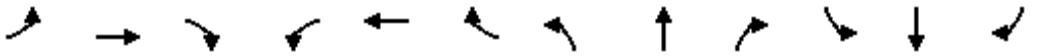
Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 29 (32%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.99	
Intersection Signal Delay: 20.0	Intersection LOS: C
Intersection Capacity Utilization 66.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 3: E-470 E. Ramps (NB) & W. 104th Ave

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	217	1207	1299	326	571	5	391
v/c Ratio	0.80	0.36	0.55	0.36	0.83	0.01	0.99
Control Delay	66.9	1.2	6.9	1.5	46.7	29.2	71.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.9	1.2	6.9	1.5	46.7	29.2	71.8
Queue Length 50th (ft)	115	9	86	2	161	2	172
Queue Length 95th (ft)	m#209	10	103	19	#243	12	#360
Internal Link Dist (ft)		508	888			254	
Turn Bay Length (ft)	250			400			500
Base Capacity (vph)	285	3390	2358	908	686	372	395
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.76	0.36	0.55	0.36	0.83	0.01	0.99

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.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	200	1110	0	0	1195	300	525	5	360	0	0	0
Future Volume (veh/h)	200	1110	0	0	1195	300	525	5	360	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	217	1207	0	0	1299	0	571	5	0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	248	3468	0	0	2502		648	351				
Arrive On Green	0.28	1.00	0.00	0.00	0.98	0.00	0.19	0.19	0.00			
Sat Flow, veh/h	1781	5274	0	0	5274	1585	3456	1870	1585			
Grp Volume(v), veh/h	217	1207	0	0	1299	0	571	5	0			
Grp Sat Flow(s),veh/h/ln	1781	1702	0	0	1702	1585	1728	1870	1585			
Q Serve(g_s), s	10.5	0.0	0.0	0.0	0.9	0.0	14.5	0.2	0.0			
Cycle Q Clear(g_c), s	10.5	0.0	0.0	0.0	0.9	0.0	14.5	0.2	0.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	248	3468	0	0	2502		648	351				
V/C Ratio(X)	0.88	0.35	0.00	0.00	0.52		0.88	0.01				
Avail Cap(c_a), veh/h	287	3468	0	0	2502		691	374				
HCM Platoon Ratio	2.00	2.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00			
Upstream Filter(I)	0.87	0.87	0.00	0.00	0.81	0.00	1.00	1.00	0.00			
Uniform Delay (d), s/veh	31.7	0.0	0.0	0.0	0.5	0.0	35.6	29.8	0.0			
Incr Delay (d2), s/veh	20.2	0.2	0.0	0.0	0.6	0.0	12.2	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	5.0	0.1	0.0	0.0	0.3	0.0	7.0	0.1	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.9	0.2	0.0	0.0	1.1	0.0	47.8	29.8	0.0			
LnGrp LOS	D	A	A	A	A		D	C				
Approach Vol, veh/h		1424			1299	A		576	A			
Approach Delay, s/veh		8.1			1.1			47.6				
Approach LOS		A			A			D				

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		67.1			17.0	50.1		22.9				
Change Period (Y+Rc), s		6.0			4.5	6.0		6.0				
Max Green Setting (Gmax), s		60.0			14.5	41.0		18.0				
Max Q Clear Time (g_c+I1), s		2.0			12.5	2.9		16.5				
Green Ext Time (p_c), s		10.5			0.1	11.0		0.4				

Intersection Summary												
HCM 6th Ctrl Delay			12.3									
HCM 6th LOS			B									

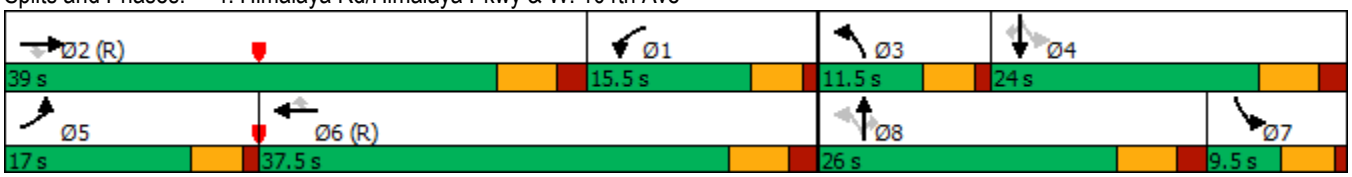
Notes

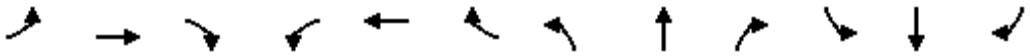
Unsignalized Delay for [NBR, WBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	385	475	135	50	475	65	135	180	75	30	160	420
Future Volume (vph)	385	475	135	50	475	65	135	180	75	30	160	420
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	24.0	24.0	9.5	24.0	24.0	9.5	24.0	24.0	9.5	24.0	24.0
Total Split (s)	17.0	39.0	39.0	15.5	37.5	37.5	11.5	26.0	26.0	9.5	24.0	24.0
Total Split (%)	18.9%	43.3%	43.3%	17.2%	41.7%	41.7%	12.8%	28.9%	28.9%	10.6%	26.7%	26.7%
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0	3.5	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	6.0	4.5	6.0	6.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	Min	Min	None	Min	Min
Act Effct Green (s)	14.8	42.2	42.2	9.9	35.3	35.3	16.4	14.9	14.9	13.4	11.9	11.9
Actuated g/C Ratio	0.16	0.47	0.47	0.11	0.39	0.39	0.18	0.17	0.17	0.15	0.13	0.13
v/c Ratio	0.74	0.22	0.17	0.28	0.26	0.09	0.62	0.33	0.18	0.15	0.37	0.77
Control Delay	31.6	10.1	2.4	39.9	19.7	0.2	47.6	36.1	0.9	33.0	36.8	13.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.6	10.1	2.4	39.9	19.7	0.2	47.6	36.1	0.9	33.0	36.8	13.4
LOS	C	B	A	D	B	A	D	D	A	C	D	B
Approach Delay		17.4			19.3			33.3			20.5	
Approach LOS		B			B			C			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 20.9	Intersection LOS: C
Intersection Capacity Utilization 56.4%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: Himalaya Rd/Himalaya Pkwy & W. 104th Ave

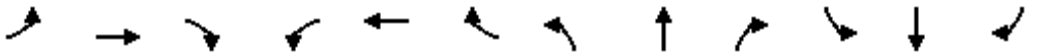




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	418	516	147	54	516	71	147	196	82	33	174	457
v/c Ratio	0.74	0.22	0.17	0.28	0.26	0.09	0.62	0.33	0.18	0.15	0.37	0.77
Control Delay	31.6	10.1	2.4	39.9	19.7	0.2	47.6	36.1	0.9	33.0	36.8	13.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.6	10.1	2.4	39.9	19.7	0.2	47.6	36.1	0.9	33.0	36.8	13.4
Queue Length 50th (ft)	90	62	9	28	72	0	80	55	0	17	48	6
Queue Length 95th (ft)	#197	97	39	64	104	0	#157	87	0	40	73	94
Internal Link Dist (ft)		1265			1719			469			386	
Turn Bay Length (ft)	300		300	300		300	300		300	300		300
Base Capacity (vph)	565	2384	867	216	1993	753	236	795	538	227	707	672
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	0.74	0.22	0.17	0.25	0.26	0.09	0.62	0.25	0.15	0.15	0.25	0.68

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	385	475	135	50	475	65	135	180	75	30	160	420
Future Volume (veh/h)	385	475	135	50	475	65	135	180	75	30	160	420
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	418	516	0	54	516	71	147	196	82	33	174	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	480	1872		406	2413	749	219	313	139	170	275	
Arrive On Green	0.05	0.12	0.00	0.23	0.47	0.47	0.08	0.09	0.09	0.05	0.08	0.00
Sat Flow, veh/h	3456	5106	1585	1781	5106	1585	1781	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	418	516	0	54	516	71	147	196	82	33	174	0
Grp Sat Flow(s),veh/h/ln	1728	1702	1585	1781	1702	1585	1781	1777	1585	1781	1777	1585
Q Serve(g_s), s	10.8	8.3	0.0	2.2	5.3	1.4	7.0	4.8	4.5	0.0	4.3	0.0
Cycle Q Clear(g_c), s	10.8	8.3	0.0	2.2	5.3	1.4	7.0	4.8	4.5	0.0	4.3	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	480	1872		406	2413	749	219	313	139	170	275	
V/C Ratio(X)	0.87	0.28		0.13	0.21	0.09	0.67	0.63	0.59	0.19	0.63	
Avail Cap(c_a), veh/h	480	1872		406	2413	749	219	790	352	179	711	
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.93	0.93	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	42.1	28.7	0.0	27.6	13.9	5.6	41.6	39.6	39.5	40.6	40.3	0.0
Incr Delay (d2), s/veh	14.9	0.3	0.0	0.1	0.2	0.3	7.8	2.1	3.9	0.6	2.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.8	3.5	0.0	0.9	1.9	0.8	3.7	2.1	1.9	0.7	1.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.1	29.0	0.0	27.8	14.1	5.8	49.4	41.7	43.4	41.1	42.7	0.0
LnGrp LOS	E	C		C	B	A	D	D	D	D	D	
Approach Vol, veh/h		934	A		641			425			207	A
Approach Delay, s/veh		41.6			14.4			44.7			42.4	
Approach LOS		D			B			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	26.5	39.0	11.5	13.0	17.0	48.5	10.5	13.9
Change Period (Y+Rc), s	6.0	* 6	4.5	6.0	4.5	6.0	6.0	* 6
Max Green Setting (Gmax), s	11.0	* 33	7.0	18.0	12.5	31.5	5.0	* 20
Max Q Clear Time (g_c+I1), s	4.2	10.3	9.0	6.3	12.8	7.3	2.0	6.8
Green Ext Time (p_c), s	0.0	3.2	0.0	0.7	0.0	3.5	0.0	1.1

Intersection Summary	
HCM 6th Ctrl Delay	34.3
HCM 6th LOS	C

Notes

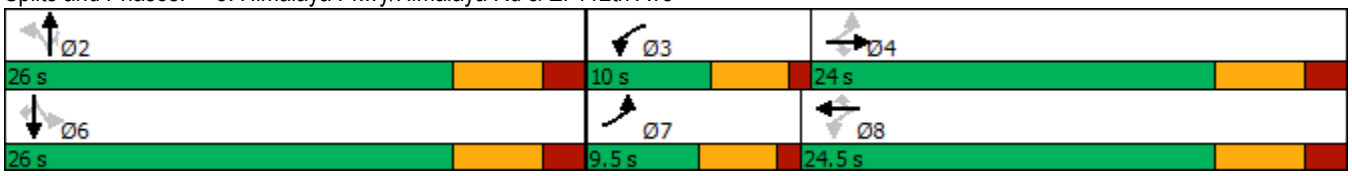
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

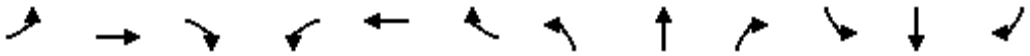
Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	450	65	65	350	10	35	200	65	10	125	25
Future Volume (vph)	50	450	65	65	350	10	35	200	65	10	125	25
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	24.0	24.0	9.5	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	9.5	24.0	24.0	10.0	24.5	24.5	26.0	26.0	26.0	26.0	26.0	26.0
Total Split (%)	15.8%	40.0%	40.0%	16.7%	40.8%	40.8%	43.3%	43.3%	43.3%	43.3%	43.3%	43.3%
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	6.0	6.0	4.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	17.0	12.8	12.8	17.5	13.0	13.0	20.6	20.6	20.6	20.6	20.6	20.6
Actuated g/C Ratio	0.33	0.25	0.25	0.34	0.25	0.25	0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.13	0.55	0.14	0.18	0.42	0.02	0.08	0.15	0.10	0.02	0.10	0.04
Control Delay	9.5	19.7	1.4	10.0	17.8	0.1	13.4	12.4	1.0	13.1	12.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.5	19.7	1.4	10.0	17.8	0.1	13.4	12.4	1.0	13.1	12.5	0.1
LOS	A	B	A	A	B	A	B	B	A	B	B	A
Approach Delay		16.7			16.1			10.1			10.6	
Approach LOS		B			B			B			B	

Intersection Summary		
Cycle Length: 60		
Actuated Cycle Length: 51		
Natural Cycle: 60		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.55		
Intersection Signal Delay: 14.5	Intersection LOS: B	
Intersection Capacity Utilization 45.1%	ICU Level of Service A	
Analysis Period (min) 15		

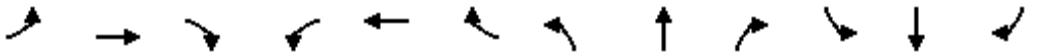
Splits and Phases: 5: Himalaya Pkwy/Himalaya Rd & E. 112th Ave





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	54	489	71	71	380	11	38	217	71	11	136	27
v/c Ratio	0.13	0.55	0.14	0.18	0.42	0.02	0.08	0.15	0.10	0.02	0.10	0.04
Control Delay	9.5	19.7	1.4	10.0	17.8	0.1	13.4	12.4	1.0	13.1	12.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.5	19.7	1.4	10.0	17.8	0.1	13.4	12.4	1.0	13.1	12.5	0.1
Queue Length 50th (ft)	9	74	0	13	55	0	8	25	0	2	15	0
Queue Length 95th (ft)	24	113	6	30	87	0	27	50	6	12	34	0
Internal Link Dist (ft)		1349			1902			467			313	
Turn Bay Length (ft)	300		300	300		300	300		300	300		300
Base Capacity (vph)	405	1284	661	387	1320	676	500	1428	719	462	1428	719
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	0.13	0.38	0.11	0.18	0.29	0.02	0.08	0.15	0.10	0.02	0.10	0.04

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	450	65	65	350	10	35	200	65	10	125	25
Future Volume (veh/h)	50	450	65	65	350	10	35	200	65	10	125	25
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	489	71	71	380	11	38	217	71	11	136	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	363	746	333	326	781	348	602	1417	632	536	1417	632
Arrive On Green	0.05	0.21	0.21	0.06	0.22	0.22	0.40	0.40	0.40	0.40	0.40	0.40
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1223	3554	1585	1091	3554	1585
Grp Volume(v), veh/h	54	489	71	71	380	11	38	217	71	11	136	27
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1223	1777	1585	1091	1777	1585
Q Serve(g_s), s	1.2	6.3	1.9	1.5	4.7	0.3	1.0	2.0	1.4	0.3	1.2	0.5
Cycle Q Clear(g_c), s	1.2	6.3	1.9	1.5	4.7	0.3	2.2	2.0	1.4	2.3	1.2	0.5
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	363	746	333	326	781	348	602	1417	632	536	1417	632
V/C Ratio(X)	0.15	0.66	0.21	0.22	0.49	0.03	0.06	0.15	0.11	0.02	0.10	0.04
Avail Cap(c_a), veh/h	447	1275	569	410	1310	584	602	1417	632	536	1417	632
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.3	18.2	16.4	14.3	17.1	15.4	10.1	9.7	9.5	10.4	9.4	9.2
Incr Delay (d2), s/veh	0.2	1.0	0.3	0.3	0.5	0.0	0.2	0.2	0.4	0.1	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	2.2	0.6	0.5	1.6	0.1	0.3	0.7	0.4	0.1	0.4	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.4	19.1	16.7	14.6	17.6	15.4	10.3	9.9	9.9	10.5	9.6	9.4
LnGrp LOS	B	B	B	B	B	B	B	A	A	B	A	A
Approach Vol, veh/h		614			462			326			174	
Approach Delay, s/veh		18.4			17.1			9.9			9.6	
Approach LOS		B			B			A			A	

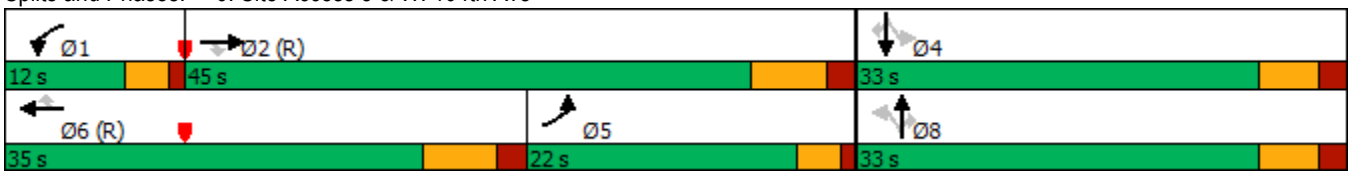
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		26.0	7.6	16.5		26.0	7.1	17.0				
Change Period (Y+Rc), s		6.0	4.5	6.0		6.0	4.5	6.0				
Max Green Setting (Gmax), s		20.0	5.5	18.0		20.0	5.0	18.5				
Max Q Clear Time (g_c+I1), s		4.2	3.5	8.3		4.3	3.2	6.7				
Green Ext Time (p_c), s		1.4	0.0	2.2		0.7	0.0	1.7				

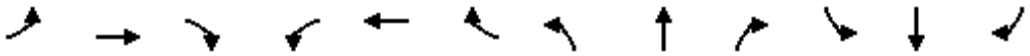
Intersection Summary												
HCM 6th Ctrl Delay			15.3									
HCM 6th LOS			B									

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	350	950	275	50	890	90	225	10	25	130	10	330
Future Volume (vph)	350	950	275	50	890	90	225	10	25	130	10	330
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	25.0	25.0	9.5	25.0	25.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	22.0	45.0	45.0	12.0	35.0	35.0	33.0	33.0	33.0	33.0	33.0	33.0
Total Split (%)	24.4%	50.0%	50.0%	13.3%	38.9%	38.9%	36.7%	36.7%	36.7%	36.7%	36.7%	36.7%
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	Min	Min	Min	Min	Min	Min
Act Effct Green (s)	18.0	46.8	46.8	7.6	34.4	34.4	20.6	20.6	20.6	20.6	20.6	20.6
Actuated g/C Ratio	0.20	0.52	0.52	0.08	0.38	0.38	0.23	0.23	0.23	0.23	0.23	0.23
v/c Ratio	0.55	0.39	0.31	0.36	0.50	0.14	0.77	0.03	0.05	0.44	0.03	0.56
Control Delay	30.2	10.2	1.6	38.2	22.3	3.6	48.0	23.8	0.2	33.0	23.8	6.6
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	30.2	10.2	1.6	38.2	22.3	3.6	48.0	23.8	0.2	33.0	23.8	6.6
LOS	C	B	A	D	C	A	D	C	A	C	C	A
Approach Delay		13.1			21.4			42.5			14.3	
Approach LOS		B			C			D			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 41 (46%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 18.1	Intersection LOS: B
Intersection Capacity Utilization 65.9%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 6: Site Access 5 & W. 104th Ave

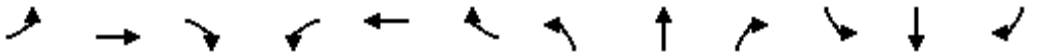




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	380	1033	299	54	967	98	245	11	27	141	11	359
v/c Ratio	0.55	0.39	0.31	0.36	0.50	0.14	0.77	0.03	0.05	0.44	0.03	0.56
Control Delay	30.2	10.2	1.6	38.2	22.3	3.6	48.0	23.8	0.2	33.0	23.8	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.2	10.2	1.6	38.2	22.3	3.6	48.0	23.8	0.2	33.0	23.8	6.6
Queue Length 50th (ft)	108	99	0	22	170	1	130	5	0	69	5	0
Queue Length 95th (ft)	m144	m126	m13	m51	238	m12	197	17	0	114	17	61
Internal Link Dist (ft)		888			1265			280			1390	
Turn Bay Length (ft)	350		250	150		250	200		200	200		
Base Capacity (vph)	686	2643	966	162	1946	680	419	558	602	419	558	726
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	0.55	0.39	0.31	0.33	0.50	0.14	0.58	0.02	0.04	0.34	0.02	0.49

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	350	950	275	50	890	90	225	10	25	130	10	330
Future Volume (veh/h)	350	950	275	50	890	90	225	10	25	130	10	330
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	380	1033	299	54	967	98	245	11	27	141	11	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	911	2895	899	73	1589	493	358	380	322	352	380	
Arrive On Green	0.53	1.00	1.00	0.01	0.10	0.10	0.20	0.20	0.20	0.20	0.20	0.00
Sat Flow, veh/h	3456	5106	1585	1781	5106	1585	1404	1870	1585	1370	1870	1585
Grp Volume(v), veh/h	380	1033	299	54	967	98	245	11	27	141	11	0
Grp Sat Flow(s),veh/h/ln	1728	1702	1585	1781	1702	1585	1404	1870	1585	1370	1870	1585
Q Serve(g_s), s	6.0	0.0	0.0	2.7	16.3	5.1	15.3	0.4	1.2	8.3	0.4	0.0
Cycle Q Clear(g_c), s	6.0	0.0	0.0	2.7	16.3	5.1	15.7	0.4	1.2	8.7	0.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	911	2895	899	73	1589	493	358	380	322	352	380	
V/C Ratio(X)	0.42	0.36	0.33	0.74	0.61	0.20	0.68	0.03	0.08	0.40	0.03	
Avail Cap(c_a), veh/h	911	2895	899	158	1589	493	494	561	476	484	561	
HCM Platoon Ratio	2.00	2.00	2.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.85	0.85	0.85	0.85	0.85	0.85	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	17.1	0.0	0.0	43.9	35.1	30.1	35.0	28.8	29.1	32.2	28.8	0.0
Incr Delay (d2), s/veh	0.3	0.3	0.8	11.5	1.5	0.8	2.3	0.0	0.1	0.7	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.1	0.2	1.4	7.5	2.0	5.3	0.2	0.5	2.8	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.3	0.3	0.8	55.4	36.6	30.9	37.4	28.8	29.2	33.0	28.8	0.0
LnGrp LOS	B	A	A	E	D	C	D	C	C	C	C	
Approach Vol, veh/h		1712			1119			283			152	A
Approach Delay, s/veh		4.2			37.0			36.2			32.7	
Approach LOS		A			D			D			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.7	58.0		24.3	30.7	35.0		24.3				
Change Period (Y+Rc), s	4.0	7.0		6.0	7.0	* 7		6.0				
Max Green Setting (Gmax), s	8.0	38.0		27.0	18.0	* 28		27.0				
Max Q Clear Time (g_c+I1), s	4.7	2.0		10.7	8.0	18.3		17.7				
Green Ext Time (p_c), s	0.0	9.4		0.4	0.9	4.4		0.6				

Intersection Summary		
HCM 6th Ctrl Delay		19.5
HCM 6th LOS		B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

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

Intersection	
Int Delay, s/veh	7.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	10	270	10	10	5	275	325	10	10	330	30
Future Vol, veh/h	50	10	270	10	10	5	275	325	10	10	330	30
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	250	-	250	250	-	250	300	-	300	300	-	300
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	54	11	293	11	11	5	299	353	11	11	359	33

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1161	1343	180	1158	1365	177	392	0	0	364	0	0
Stage 1	381	381	-	951	951	-	-	-	-	-	-	-
Stage 2	780	962	-	207	414	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	150	151	832	151	146	835	1163	-	-	1191	-	-
Stage 1	613	612	-	279	336	-	-	-	-	-	-	-
Stage 2	354	332	-	776	591	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	110	111	832	72	107	835	1163	-	-	1191	-	-
Mov Cap-2 Maneuver	110	111	-	72	107	-	-	-	-	-	-	-
Stage 1	455	606	-	207	250	-	-	-	-	-	-	-
Stage 2	250	247	-	489	586	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	20.8	44.3	4.1	0.2
HCM LOS	C	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBL	SBT	SBR
Capacity (veh/h)	1163	-	-	110	111	832	72	107	835	1191	-	-
HCM Lane V/C Ratio	0.257	-	-	0.494	0.098	0.353	0.151	0.102	0.007	0.009	-	-
HCM Control Delay (s)	9.2	-	-	66.1	40.9	11.7	63.7	42.4	9.3	8.1	-	-
HCM Lane LOS	A	-	-	F	E	B	F	E	A	A	-	-
HCM 95th %tile Q(veh)	1	-	-	2.2	0.3	1.6	0.5	0.3	0	0	-	-

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	25	115	25	40	25	110	245	25	15	230	5
Future Vol, veh/h	5	25	115	25	40	25	110	245	25	15	230	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	200	-	200	200	-	200	300	-	300	300	-	300
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	5	27	125	27	43	27	120	266	27	16	250	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	677	815	125	677	793	133	255	0	0	293	0	0
Stage 1	282	282	-	506	506	-	-	-	-	-	-	-
Stage 2	395	533	-	171	287	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	339	310	902	339	320	892	1307	-	-	1265	-	-
Stage 1	701	676	-	517	538	-	-	-	-	-	-	-
Stage 2	602	523	-	814	673	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	268	278	902	249	287	892	1307	-	-	1265	-	-
Mov Cap-2 Maneuver	268	278	-	249	287	-	-	-	-	-	-	-
Stage 1	637	667	-	469	489	-	-	-	-	-	-	-
Stage 2	483	475	-	664	664	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.6	17.2	2.3	0.5
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBL	SBT	SBR
Capacity (veh/h)	1307	-	-	268	278	902	249	287	892	1265	-	-
HCM Lane V/C Ratio	0.091	-	-	0.02	0.098	0.139	0.109	0.151	0.03	0.013	-	-
HCM Control Delay (s)	8	-	-	18.7	19.3	9.6	21.2	19.8	9.2	7.9	-	-
HCM Lane LOS	A	-	-	C	C	A	C	C	A	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.1	0.3	0.5	0.4	0.5	0.1	0	-	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	5	0	15	5	15	0	235	20	5	240	5
Future Vol, veh/h	5	5	0	15	5	15	0	235	20	5	240	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	150	-	-	150	-	-	250	-	-	250	-	250
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	5	5	0	16	5	16	0	255	22	5	261	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	401	548	131	409	542	139	266	0	0	277	0	0
Stage 1	271	271	-	266	266	-	-	-	-	-	-	-
Stage 2	130	277	-	143	276	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	534	442	894	527	446	884	1295	-	-	1283	-	-
Stage 1	712	684	-	716	687	-	-	-	-	-	-	-
Stage 2	860	680	-	845	680	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	518	440	894	521	444	884	1295	-	-	1283	-	-
Mov Cap-2 Maneuver	518	440	-	521	444	-	-	-	-	-	-	-
Stage 1	712	681	-	716	687	-	-	-	-	-	-	-
Stage 2	837	680	-	835	677	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.7	11	0	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1295	-	-	518	440	521	708	1283	-	-
HCM Lane V/C Ratio	-	-	-	0.01	0.012	0.031	0.031	0.004	-	-
HCM Control Delay (s)	0	-	-	12	13.3	12.1	10.2	7.8	-	-
HCM Lane LOS	A	-	-	B	B	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0.1	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	550	30	5	400	30	5
Future Vol, veh/h	550	30	5	400	30	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	300	300	-	0	200
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	598	33	5	435	33	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	631	0	826	299
Stage 1	-	-	-	-	598	-
Stage 2	-	-	-	-	228	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	947	-	310	697
Stage 1	-	-	-	-	512	-
Stage 2	-	-	-	-	788	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	947	-	308	697
Mov Cap-2 Maneuver	-	-	-	-	308	-
Stage 1	-	-	-	-	512	-
Stage 2	-	-	-	-	784	-

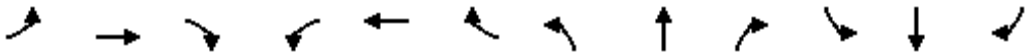
Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	17
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	308	697	-	-	947	-
HCM Lane V/C Ratio	0.106	0.008	-	-	0.006	-
HCM Control Delay (s)	18.1	10.2	-	-	8.8	-
HCM Lane LOS	C	B	-	-	A	-
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	10	270	10	10	5	275	325	10	10	330	30
Future Volume (vph)	50	10	270	10	10	5	275	325	10	10	330	30
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	4	4	4	8	8	8	5	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	31.0	31.0	31.0	31.0	31.0	31.0	28.0	59.0	59.0	31.0	31.0	31.0
Total Split (%)	34.4%	34.4%	34.4%	34.4%	34.4%	34.4%	31.1%	65.6%	65.6%	34.4%	34.4%	34.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	9.6	9.6	9.6	9.6	9.6	9.6	71.4	71.4	71.4	57.3	57.3	57.3
Actuated g/C Ratio	0.11	0.11	0.11	0.11	0.11	0.11	0.79	0.79	0.79	0.64	0.64	0.64
v/c Ratio	0.36	0.06	0.68	0.07	0.06	0.02	0.36	0.13	0.01	0.02	0.16	0.03
Control Delay	42.7	33.9	13.1	34.5	33.9	0.2	4.0	2.6	1.1	8.7	7.8	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.7	33.9	13.1	34.5	33.9	0.2	4.0	2.6	1.1	8.7	7.8	0.5
LOS	D	C	B	C	C	A	A	A	A	A	A	A
Approach Delay		18.2			27.9			3.2			7.3	
Approach LOS		B			C			A			A	

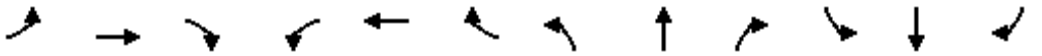
Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 8.5	Intersection LOS: A
Intersection Capacity Utilization 45.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 7: Himalaya Pkwy & Site Access 1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	54	11	293	11	11	5	299	353	11	11	359	33
v/c Ratio	0.36	0.06	0.68	0.07	0.06	0.02	0.36	0.13	0.01	0.02	0.16	0.03
Control Delay	42.7	33.9	13.1	34.5	33.9	0.2	4.0	2.6	1.1	8.7	7.8	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.7	33.9	13.1	34.5	33.9	0.2	4.0	2.6	1.1	8.7	7.8	0.5
Queue Length 50th (ft)	29	6	0	6	6	0	30	16	0	2	36	0
Queue Length 95th (ft)	60	20	68	20	20	0	75	39	3	11	78	3
Internal Link Dist (ft)		291			267			310			260	
Turn Bay Length (ft)	250		250	250		250	300		300	300		300
Base Capacity (vph)	411	548	672	411	548	517	956	2808	1259	640	2254	1034
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	0.13	0.02	0.44	0.03	0.02	0.01	0.31	0.13	0.01	0.02	0.16	0.03

Intersection Summary

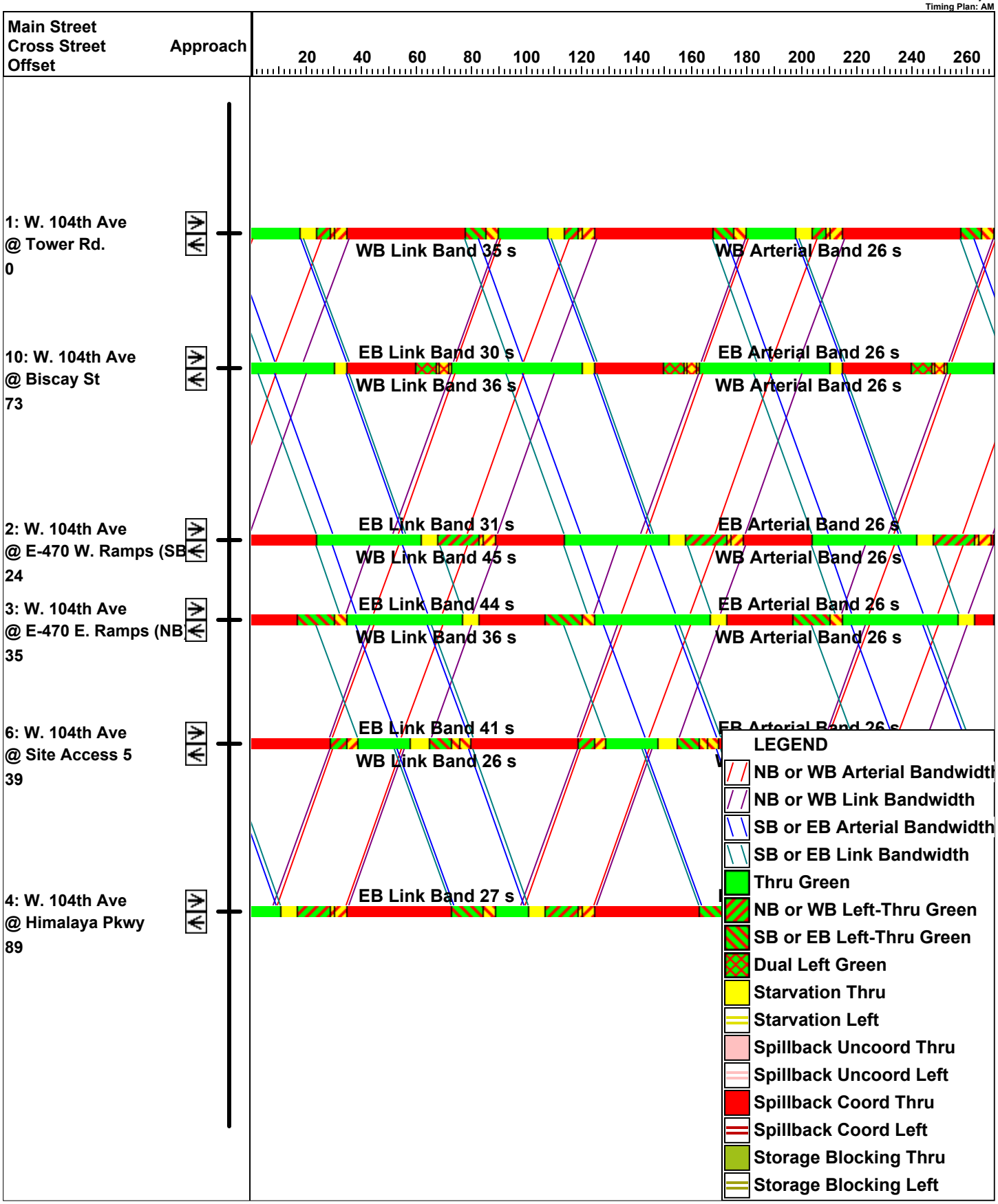


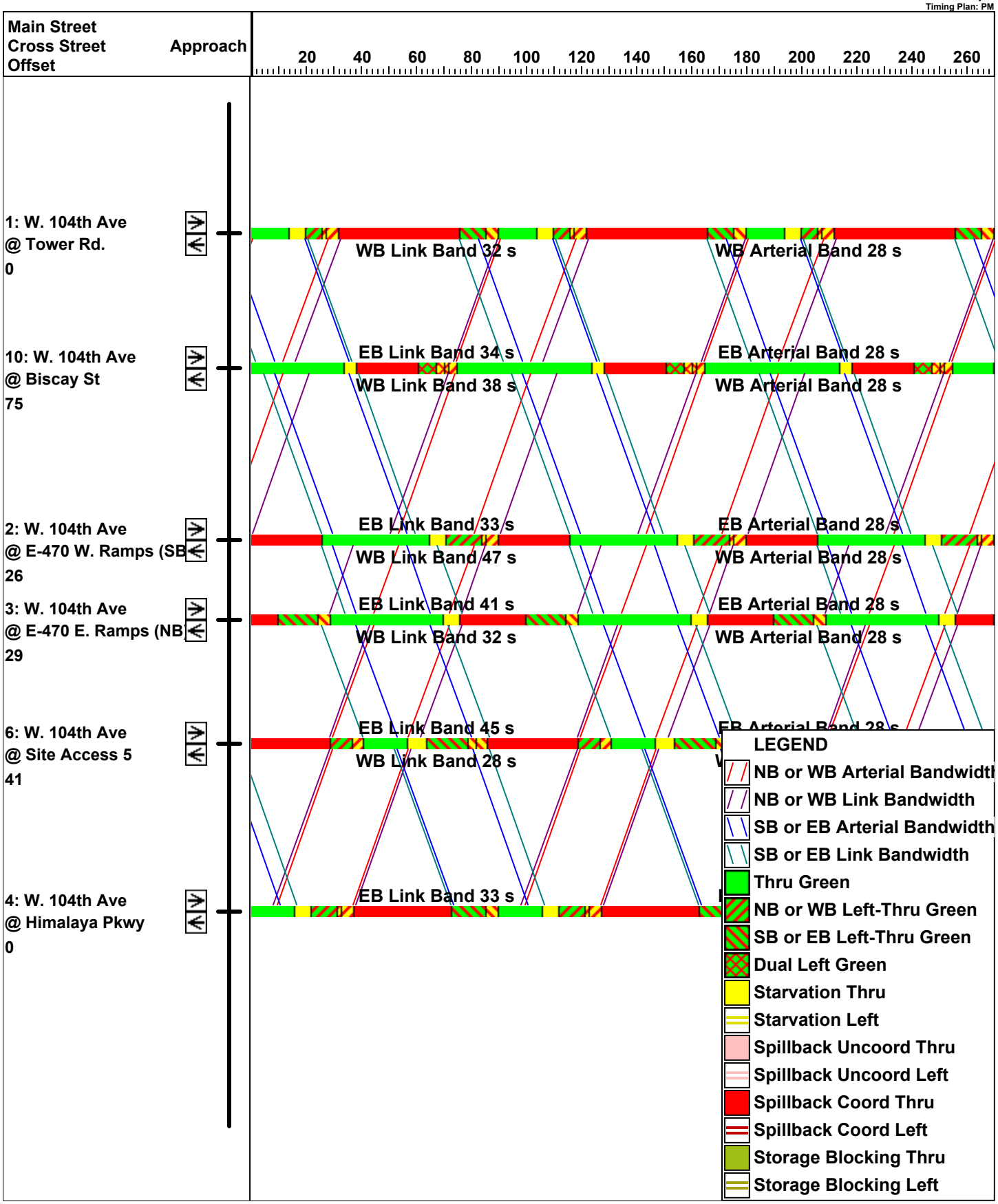
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	10	270	10	10	5	275	325	10	10	330	30
Future Volume (veh/h)	50	10	270	10	10	5	275	325	10	10	330	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		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	54	11	293	11	11	5	299	353	11	11	359	33
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	367	393	333	301	393	333	741	2451	1093	630	1922	857
Arrive On Green	0.21	0.21	0.21	0.21	0.21	0.21	0.10	0.69	0.69	0.54	0.54	0.54
Sat Flow, veh/h	1397	1870	1585	1075	1870	1585	1781	3554	1585	1018	3554	1585
Grp Volume(v), veh/h	54	11	293	11	11	5	299	353	11	11	359	33
Grp Sat Flow(s),veh/h/ln	1397	1870	1585	1075	1870	1585	1781	1777	1585	1018	1777	1585
Q Serve(g_s), s	2.9	0.4	16.1	0.7	0.4	0.2	6.1	3.1	0.2	0.5	4.6	0.9
Cycle Q Clear(g_c), s	3.3	0.4	16.1	1.2	0.4	0.2	6.1	3.1	0.2	0.5	4.6	0.9
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	367	393	333	301	393	333	741	2451	1093	630	1922	857
V/C Ratio(X)	0.15	0.03	0.88	0.04	0.03	0.01	0.40	0.14	0.01	0.02	0.19	0.04
Avail Cap(c_a), veh/h	485	551	467	392	551	467	1030	2451	1093	630	1922	857
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.5	28.2	34.4	28.7	28.2	28.1	6.5	4.8	4.4	9.6	10.6	9.7
Incr Delay (d2), s/veh	0.2	0.0	13.1	0.0	0.0	0.0	0.4	0.1	0.0	0.1	0.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.2	7.3	0.2	0.2	0.1	2.0	1.0	0.1	0.1	1.7	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.7	28.3	47.6	28.7	28.3	28.2	6.9	4.9	4.4	9.6	10.8	9.8
LnGrp LOS	C	C	D	C	C	C	A	A	A	A	B	A
Approach Vol, veh/h		358			27			663			403	
Approach Delay, s/veh		44.3			28.4			5.8			10.7	
Approach LOS		D			C			A			B	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		66.6		23.4	13.4	53.2		23.4				
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s		54.5		26.5	23.5	26.5		26.5				
Max Q Clear Time (g_c+I1), s		5.1		18.1	8.1	6.6		3.2				
Green Ext Time (p_c), s		2.5		0.8	0.8	2.3		0.1				

Intersection Summary												
HCM 6th Ctrl Delay			17.1									
HCM 6th LOS			B									

Time-Space Diagrams


Main Street
Cross Street
Offset
Approach
20
40
60
80
100
120
140
160
180
200
220
240
260
1: W. 104th Ave
@ Tower Rd.
0
WB Link Band 35 s
WB Arterial Band 26 s
10: W. 104th Ave
@ Biscay St
73
EB Link Band 30 s
WB Link Band 36 s
EB Arterial Band 26 s
WB Arterial Band 26 s
2: W. 104th Ave
@ E-470 W. Ramps (SB
24
EB Link Band 31 s
WB Link Band 45 s
EB Arterial Band 26 s
WB Arterial Band 26 s
3: W. 104th Ave
@ E-470 E. Ramps (NB
35
EB Link Band 44 s
WB Link Band 36 s
EB Arterial Band 26 s
WB Arterial Band 26 s
6: W. 104th Ave
@ Site Access 5
39
EB Link Band 41 s
WB Link Band 26 s
4: W. 104th Ave
@ Himalaya Pkwy
89
EB Link Band 27 s
LEGEND
NB or WB Arterial Bandwidth
NB or WB Link Bandwidth
SB or EB Arterial Bandwidth
SB or EB Link Bandwidth
Thru Green
NB or WB Left-Thru Green
SB or EB Left-Thru Green
Dual Left Green
Starvation Thru
Starvation Left
Spillback Uncoord Thru
Spillback Uncoord Left
Spillback Coord Thru
Spillback Coord Left
Storage Blocking Thru
Storage Blocking Left


Main Street
Cross Street
Offset
Approach
20
40
60
80
100
120
140
160
180
200
220
240
260
1: W. 104th Ave
@ Tower Rd.
0
WB Link Band 32 s
WB Arterial Band 28 s
10: W. 104th Ave
@ Biscay St
75
EB Link Band 34 s
EB Arterial Band 28 s
WB Link Band 38 s
WB Arterial Band 28 s
2: W. 104th Ave
@ E-470 W. Ramps (SB
26
EB Link Band 33 s
EB Arterial Band 28 s
WB Link Band 47 s
WB Arterial Band 28 s
3: W. 104th Ave
@ E-470 E. Ramps (NB
29
EB Link Band 41 s
EB Arterial Band 28 s
WB Link Band 32 s
WB Arterial Band 28 s
6: W. 104th Ave
@ Site Access 5
41
EB Link Band 45 s
WB Link Band 28 s
4: W. 104th Ave
@ Himalaya Pkwy
0
EB Link Band 33 s
LEGEND
NB or WB Arterial Bandwidth
NB or WB Link Bandwidth
SB or EB Arterial Bandwidth
SB or EB Link Bandwidth
Thru Green
NB or WB Left-Thru Green
SB or EB Left-Thru Green
Dual Left Green
Starvation Thru
Starvation Left
Spillback Uncoord Thru
Spillback Uncoord Left
Spillback Coord Thru
Spillback Coord Left
Storage Blocking Thru
Storage Blocking Left