



LSC TRANSPORTATION CONSULTANTS, INC.

1889 York Street
Denver, CO 80206
(303) 333-1105
FAX (303) 333-1107
E-mail: lsc@lscdenver.com

July 30, 2021

Mr. Chris Phipps
Mountain Classic Real Estate
461 E 200 S., Suite 102
Salt Lake City, UT 84111

Re: Knights Inn Conversion
Aurora, CO
LSC #200770

Dear Mr. Phipps:

In response to your request, LSC Transportation Consultants, Inc. has prepared this updated traffic impact analysis for the proposed Knights Inn Conversion to respond to City comments. As shown on Figure 1, the site is located west of Billings Street and south of E. 6th Avenue in Aurora, Colorado.

REPORT CONTENTS

The report contains the following: the existing roadway and traffic conditions in the vicinity of the site including the lane geometries, traffic controls, posted speed limits, etc.; the existing weekday peak-hour traffic volumes; the existing daily traffic volumes in the area; the typical weekday site-generated traffic volume projections for the site; the assignment of the projected traffic volumes to the area roadways; the projected long-term background and resulting total traffic volumes on the area roadways; and the site's projected traffic impacts.

LAND USE AND ACCESS

The site currently includes a 153-room hotel and is proposed to be converted to 150 apartment dwelling units. Access exists to Billings Street from two locations as shown in the conceptual site plan in Figure 2. The northern access is right-in/right-out and the southern access is full movement. The applicant plans to update the ADA ramps at both site access intersections and install a raised porkchop island at the right-in/right-out access.

ROADWAY AND TRAFFIC CONDITIONS

Area Roadways

The major roadways in the site's vicinity are shown on Figure 1 and are described below.

- **E. 6th Avenue (SH 30)** is an east-west, six-lane major arterial roadway north of the site. It is classified as R-A (Regional Highway) by CDOT. The CDOT Straight Line Diagram (SLD)

is attached for reference. The intersection with Billings Street is signalized with auxiliary turn lanes. The posted speed limit in the vicinity of the site is 40 mph.

- **Billings Street** is a north-south, two-lane local roadway east of the site. The intersection with E. 6th Avenue is signalized with auxiliary turn lanes. No speed limit is posted.

Existing Traffic Conditions

Figure 3a shows the 2018 existing traffic volumes and posted speed limits in the site's vicinity on a typical weekday based on traffic counts provided by the City. Figure 3b shows the estimated existing 2020 traffic volumes, lane geometry, and traffic control. The 2020 volumes in Figure 3b were estimated by LSC based on the 2018 volumes in Figure 3a, the CDOT 20-year growth factor of 1.13, and the trip generation potential for the existing hotel.

2022 and 2040 Background Traffic

Figure 4 shows the estimated 2022 background traffic and Figure 5 shows the estimated 2040 background traffic less existing hotel traffic. The 2022 and 2040 background traffic volumes are based on an annual growth rate of just over 0.6 percent from the 2020 traffic volumes in Figure 3b based on the CDOT 20-year growth factor of 1.13.

Existing, 2022, and 2040 Background Levels of Service

Level of service (LOS) is a quantitative measure of the level of congestion or delay at an intersection. Level of service is indicated on a scale from "A" to "F." LOS A is indicative of little congestion or delay and LOS F is indicative of a high level of congestion or delay. Attached are specific level of service definitions for signalized and unsignalized intersections.

The intersections in the study area were analyzed to determine the existing, 2022 and 2040 background levels of service using Synchro. Table 1 shows the level of service analysis results. The level of service reports are attached.

- **E. 6th Avenue (SH 30)/Billings Street:** This signalized intersection currently operates at an overall LOS "E" during the morning peak-hour and LOS "F" during the afternoon peak-hours and is expected to operate at LOS "F" in both peak-hours by 2040.
- **Billings Street/Knights Inn Access/Retail Access:** All movements at this unsignalized intersection currently operate at LOS "B" or better during both morning and afternoon peak-hours and are expected to do so through 2040.
- **Billings Street/RIRO Access:** All movements at this unsignalized intersection currently operate at LOS "A" during both morning and afternoon peak-hours and are expected to do so through 2040.
- **Billings Street/Denny's Access:** All movements at this unsignalized intersection currently operate at LOS "B" or better during both morning and afternoon peak-hours and are expected to do so through 2040.

The 2022 background level of service at the E. 6th Avenue (SH 30)/Billings Street intersection is better than the existing scenarios because the 2022 background level of service assumes the existing hotel traffic has been removed from the roadway network.

The first submittal traffic study reported the signalized level of service in the Synchro format to show the assumed phasing plan. The City commented that the *Highway Capacity Manual* (HCM) should be used instead of the Synchro format. Typically, these formats report different but similar results due to the different methodologies involved. In this case, the HCM format reports similar results for the east-west movements but considerably worse for the side road approaches which considerably dropped the overall intersection level of service for the second version of the traffic study.

TRIP GENERATION

Table 2 shows the estimated average weekday, morning peak-hour, and afternoon peak-hour trip generation for the existing and proposed land uses on the site based on the rates from *Trip Generation, 10th Edition, 2017* by the Institute of Transportation Engineers (ITE).

The site is projected to generate about 1,098 vehicle-trips on the average weekday, with about half entering and half exiting during a 24-hour period. During the morning peak-hour, which generally occurs for one hour between 6:30 and 8:30 a.m., about 17 vehicles would enter and about 53 vehicles would exit the site. During the afternoon peak-hour, which generally occurs for one hour between 4:00 and 6:00 p.m., about 53 vehicles would enter and about 31 vehicles would exit. These estimates are expected to be reduced by about 15 percent because bus transit with more than 15-minute headings is walkable from the site. In addition, the 2nd Avenue/Abilene RTD passenger rail station is about a half-mile walk to the south.

It is important to note the proposed land use has a similar trip generation potential as the previous hotel land use.

TRIP DISTRIBUTION

Figure 6 shows the estimated directional distribution of the site-generated traffic volumes on the area roadways. The estimates were based on the location of the site with respect to the regional population, employment, and activity centers; and the site's proposed land use.

TRIP ASSIGNMENT

Figure 7 shows the estimated site-generated traffic volumes based on the directional distribution percentages (from Figure 6) and the trip generation estimate (from Table 2).

2022 and 2040 TOTAL TRAFFIC

Figure 8 shows the 2022 total traffic which is the sum of the background traffic volumes (from Figure 4) and the site-generated traffic volumes (from Figure 7). Figure 8 also shows the assumed 2022 lane geometry and traffic control which is the same as existing conditions.

Figure 9 shows the 2040 total traffic which is the sum of 2040 background traffic volumes (from Figure 5) and the site-generated traffic volumes (from Figure 7). Figure 9 also shows the assumed 2040 lane geometry and traffic control which is the same as existing conditions.

PROJECTED LEVELS OF SERVICE

The intersections in the study area were analyzed to determine the 2022 and 2040 total levels of service. Table 1 shows the level of service analysis results. The level of service reports are attached.

- **E. 6th Avenue (SH 30)/Billings Street:** This signalized intersection is expected to operate at an overall LOS “F” during both morning and afternoon peak-hours through 2040 with or without the addition of site traffic.
- **Billings Street/Knights Inn Access/Retail Access:** All movements at this unsignalized intersection are expected to operate at LOS “C” or better during both morning and afternoon peak-hours through 2040.
- **Billings Street/RIRO Access:** All movements at this unsignalized intersection are expected to operate at LOS “A” during both morning and afternoon peak-hours through 2040.
- **Billings Street/Denny’s Access:** All movements at this unsignalized intersection are expected to operate at LOS “B” or better during both morning and afternoon peak-hours through 2040.

It is worth noting the difference in the 2040 background and total traffic overall delay at the E. 6th Avenue (SH 30)/Billings Street is partially due to the existing hotel trips being removed from the background scenarios and the proposed use trips added in the total scenarios. The overall delay would be more similar if the existing hotel trips were included in the background traffic scenario. The traffic impact of the site redevelopment is expected to be minimal.

PEDESTRIAN CONNECTIVITY AND LEVEL OF SERVICE

Residents will be able to cross both E. 6th Avenue (SH 30) and Billings Street at the existing pedestrian crossings located at the signalized E. 6th Avenue (SH 30)/Billings Street intersection. There are existing sidewalks connecting the site south to the 2nd Avenue/Abilene RTD passenger rail station. The applicant will improve the ADA ramps at both site access intersections to improve pedestrian flow and install a raised right-in/right-out porkchop island to help enforce the right-in/right-out configuration of the northern site access.

CONCLUSIONS AND RECOMMENDATIONS

Trip Generation

1. The site is projected to generate about 1,098 vehicle-trips on the average weekday, with about half entering and half exiting during a 24-hour period. During the morning peak-hour, about 17 vehicles would enter and about 53 vehicles would exit the site. During the afternoon peak-hour, about 53 vehicles would enter and about 31 vehicles would exit. These estimates are expected to be reduced by about 15 percent because bus transit with more than 15-minute headings is walkable from the site. In addition, the 2nd Avenue/Abilene RTD passenger rail station is about a half-mile walk to the south.

It is important to note the proposed land use has a similar trip generation potential as the previous hotel land use.

Projected Levels of Service

2. The signalized E. 6th Avenue (SH 30)/Billings Street intersection is expected to continue to operate poorly through 2040 with or without redevelopment of the site.
3. All movements at the unsignalized intersections analyzed are expected to operate at LOS "C" or better during both morning and afternoon peak-hours through 2040.

Conclusions

4. The impact of the Knights Inn Conversion can be accommodated by the existing roadway network with implementation of the recommendations below.

Recommendations

5. The northern site access should be right-in/right-out-only enforced by a raised pork-chop style median.
6. The applicant should reconstruct the ADA ramps at both site access intersections.

* * * * *

We trust our findings will assist you in gaining approval of the proposed Knights Inn Conversion. Please contact me if you have any questions or need further assistance.

Sincerely,

LSC TRANSPORTATION CONSULTANTS, INC.

By 
Christopher S. McGranahan, PE, PTOE
Principal

CSM/wc

7-30-21

Enclosures: Tables 1 and 2
Figures 1 - 9
CDOT Straight Line Diagram (SLD) for SH 30
Traffic Count Reports
Level of Service Definitions
Level of Service Reports

Table 1
Intersection Levels of Service Analysis
Knights Inn Conversion
Aurora, CO
LSC #200770; July, 2021

Intersection Location	Traffic Control	Existing Traffic		2022 Background		2022 Total		2040 Background		2040 Total	
		Level of Service AM	Level of Service PM	Level of Service AM	Level of Service PM	Level of Service AM	Level of Service PM	Level of Service AM	Level of Service PM	Level of Service AM	Level of Service PM
<u>E. 6th Avenue (SH 30)/Billings Street</u>	Signalized										
EB Left		C	B	C	B	C	B	C	B	C	B
EB Through or Through/Right		C	B	C	B	C	B	C	B	C	B
WB Left		B	B	B	B	B	B	C	B	C	B
WB Through or Through/Right		C	B	C	B	C	B	C	B	C	B
NB Left/Through		F	F	F	F	F	F	F	F	F	F
NB Right		C	D	C	D	C	D	C	D	C	D
SB Left/Through		F	F	F	F	F	F	F	F	F	F
SB Right		D	D	D	D	D	D	D	D	D	D
Entire Intersection Delay (sec /veh)		75.2	95.1	68.9	85.8	90.2	99.1	84.0	103.4	105.8	116.6
Entire Intersection LOS		E	F	E	F	F	F	F	F	F	F
<u>Billings Street/Knights Inn Access/Retail Access</u>	TWSC										
NB Approach		A	A	--	--	A	A	--	--	A	A
EB Approach		B	B	--	--	B	B	--	--	B	C
WB Approach		A	B	A	B	A	B	A	B	B	B
SB Approach		A	A	A	A	A	A	A	A	A	A
Critical Movement Delay		10.9	13.0	9.6	10.5	11.3	13.5	9.9	11.1	12.2	15.0
<u>Billings Street/RIRO Access</u>	TWSC										
EB Right		A	A	--	--	A	A	--	--	A	A
Critical Movement Delay		8.8	8.9	--	--	8.7	8.9	--	--	8.8	9.0
<u>Billings Street/Denny's Access</u>	TWSC										
WB Approach		A	B	A	B	B	B	B	B	B	B
SB Left/Through		A	A	A	A	A	A	A	A	A	A
Critical Movement Delay		9.8	10.1	9.7	10.0	10.1	10.3	10.2	10.6	10.5	10.9

Table 2
ESTIMATED TRAFFIC GENERATION
Knights Inn Conversion
Aurora, CO
LSC #200770; July, 2021

Trip Generating Category	Quantity	Trip Generation Rates ⁽¹⁾					Vehicle-Trips Generated				
		Average Weekday	AM Peak-Hour		PM Peak-Hour		Average Weekday	AM Peak-Hour		PM Peak-Hour	
			In	Out	In	Out		In	Out	In	Out
TRIP GENERATION COMPARISON											
EXISTING LAND USE											
Hotel ⁽²⁾	153 Rooms	8.36	0.277	0.193	0.306	0.294	1,279	43	29	47	45
CURRENTLY PROPOSED LAND USE											
Apartments ⁽³⁾	150 DU ⁽⁴⁾	7.32	0.115	0.354	0.353	0.207	1,098	17	53	53	31
ATM Reduction ⁽⁵⁾ =							165	3	8	8	5
Net External Trips =							933	14	45	45	26

Notes:

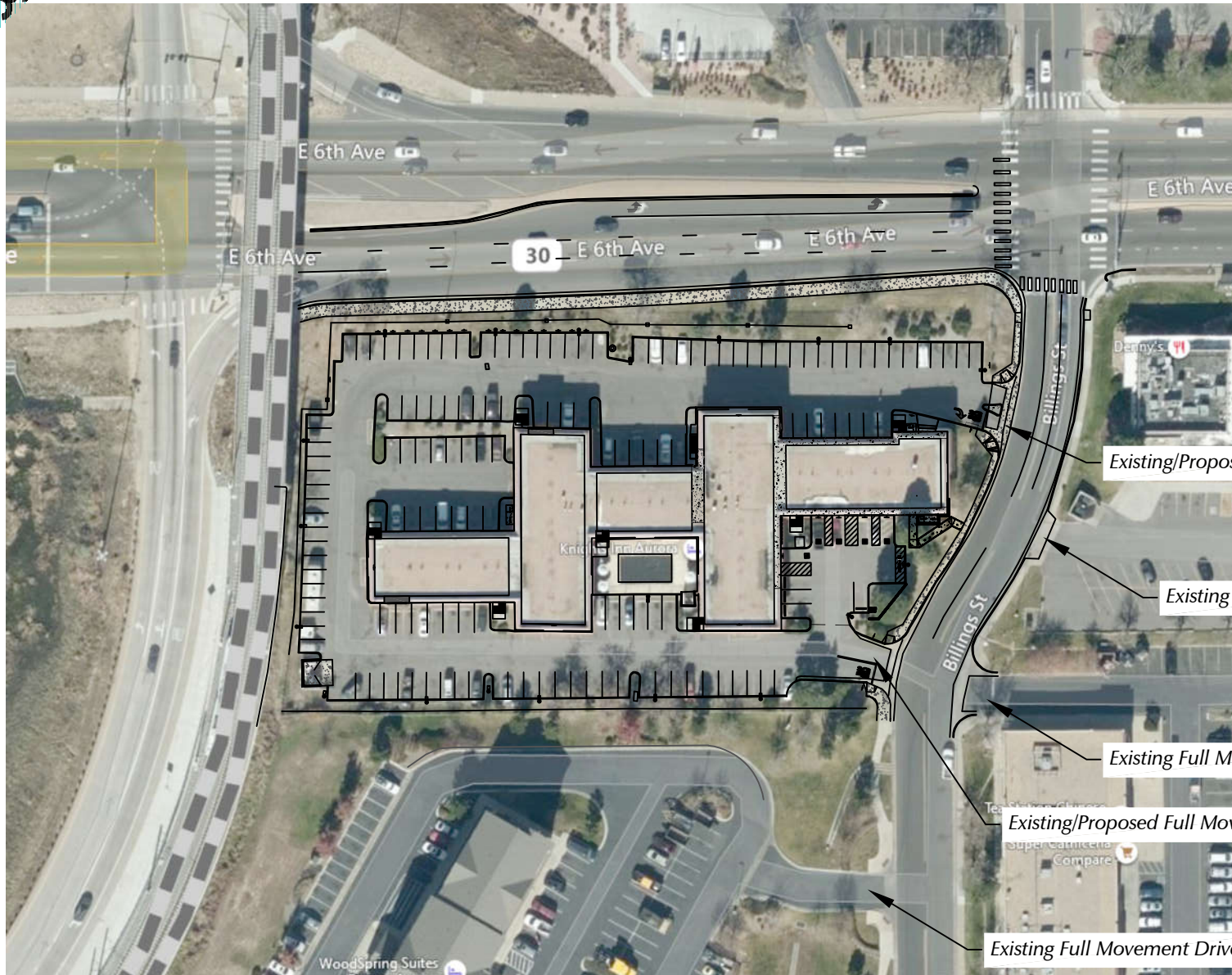
- (1) Source: *Trip Generation*, Institute of Transportation Engineers, 10th Edition, 2017.
- (2) ITE Land Use No. 310 - Hotel
- (3) ITE Land Use No. 220 - Multifamily Housing (Low Rise)
- (4) DU = Dwelling Units
- (5) A reduction of 15 percent is assumed due to bus transit with >15 minute headings is walkable from the site



Figure 1

Vicinity Map

Knights Inn Conversion (LSC #200770)

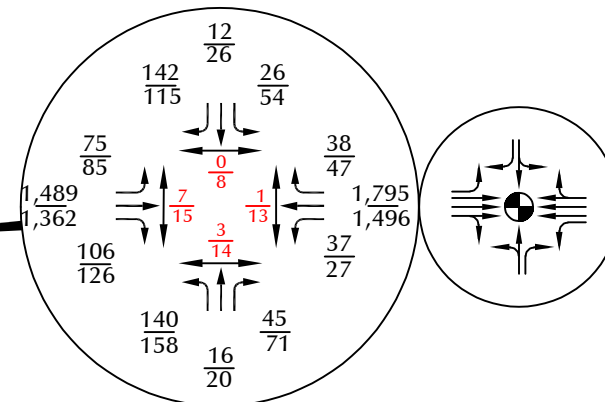
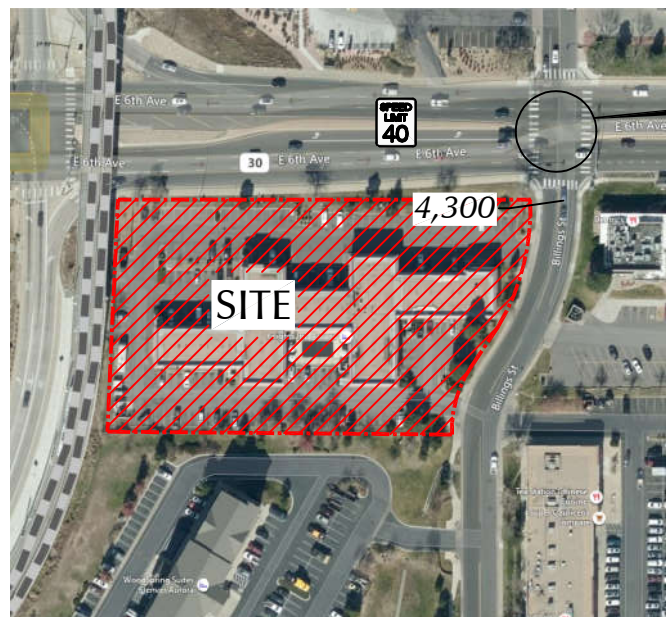
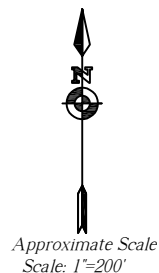


Approximate Scale
Scale: 1"=100'

Figure 2

Site Plan

Knights Inn Conversion (LSC #200770)



Note: ADT based on 10x afternoon peak hour volume.

LEGEND:




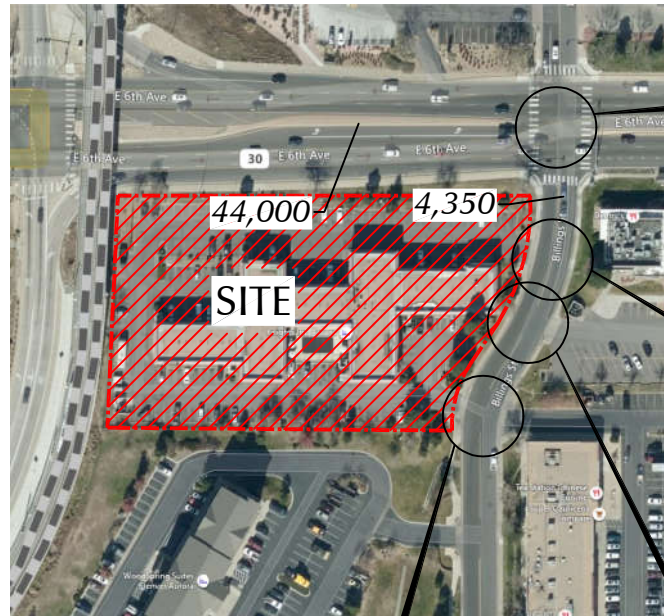
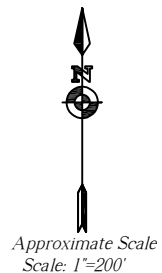
-  = Stop Sign
-  = Traffic Signal
-  = Speed Limit
- $\frac{26}{35}$ = $\frac{\text{AM Peak Hour Pedestrian Traffic}}{\text{PM Peak Hour Pedestrian Traffic}}$
- $\frac{26}{35}$ = $\frac{\text{AM Peak Hour Traffic}}{\text{PM Peak Hour Traffic}}$
- 1,000 = Average Daily Traffic

Figure 3a



2018 Existing Traffic, Lane Geometry and Traffic Control

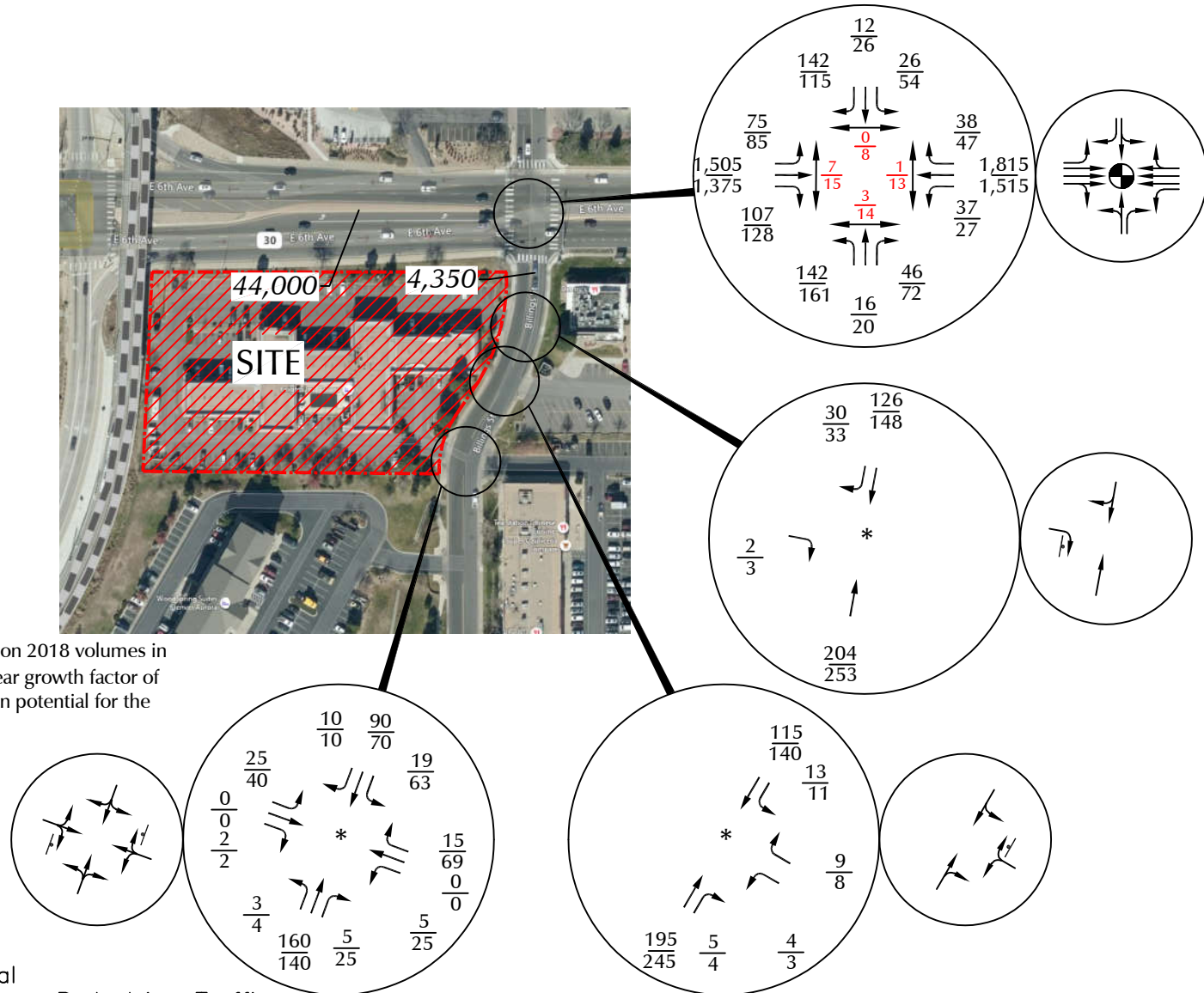
Knights Inn Conversion (LSC #200770)



* Estimated by LSC based on 2018 volumes in Figure 3a, the CDOT 20-year growth factor of 1.13 and the trip generation potential for the existing hotel.

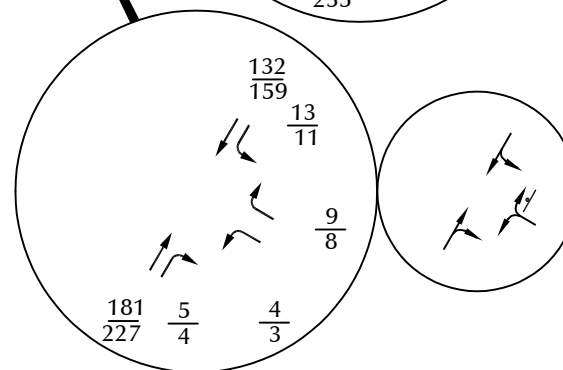
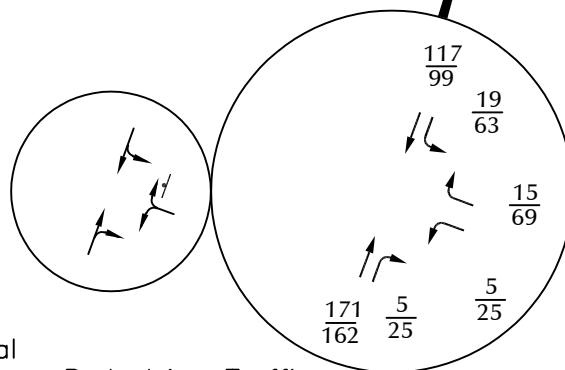
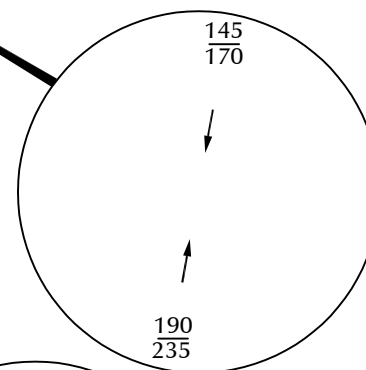
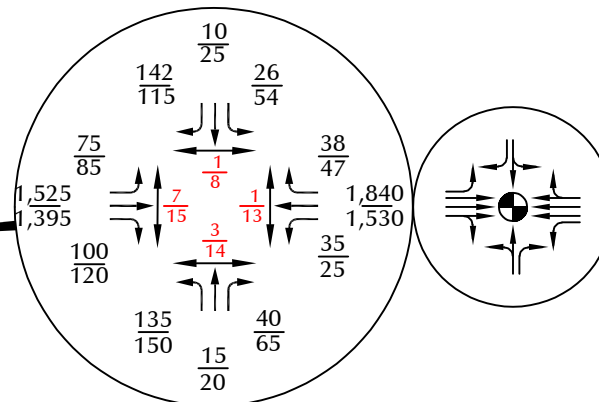
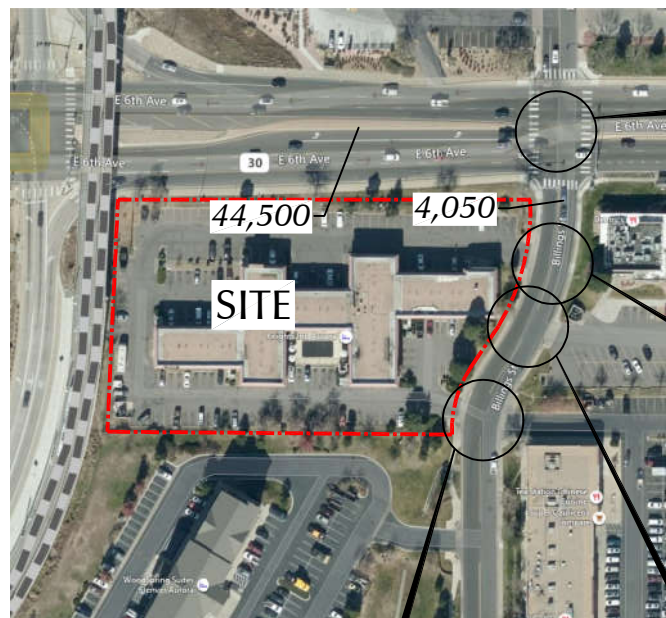
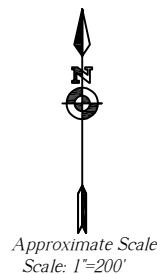
LEGEND:

-  = Stop Sign
-  = Traffic Signal
- $\frac{26}{35}$ = $\frac{\text{AM Peak Hour Pedestrian Traffic}}{\text{PM Peak Hour Pedestrian Traffic}}$
- $\frac{26}{35}$ = $\frac{\text{AM Peak Hour Traffic}}{\text{PM Peak Hour Traffic}}$
- 1,000 = Average Daily Traffic



*Estimated Existing 2020 Traffic Volumes,
Lane Geometry and Traffic Control*

Knights Inn Conversion (LSC #200770)



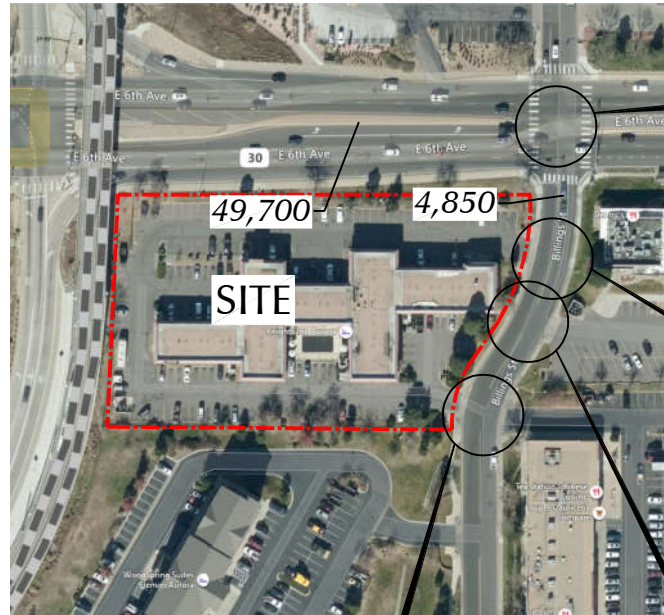
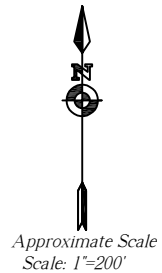
LEGEND:

- = Stop Sign
- = Traffic Signal
- $\frac{26}{35}$ = AM Peak Hour Pedestrian Traffic
- $\frac{26}{35}$ = PM Peak Hour Pedestrian Traffic
- $\frac{26}{35}$ = AM Peak Hour Traffic
- $\frac{26}{35}$ = PM Peak Hour Traffic
- 1,000 = Average Daily Traffic

Figure 4

Year 2022 Background Traffic, Lane Geometry and Traffic Control

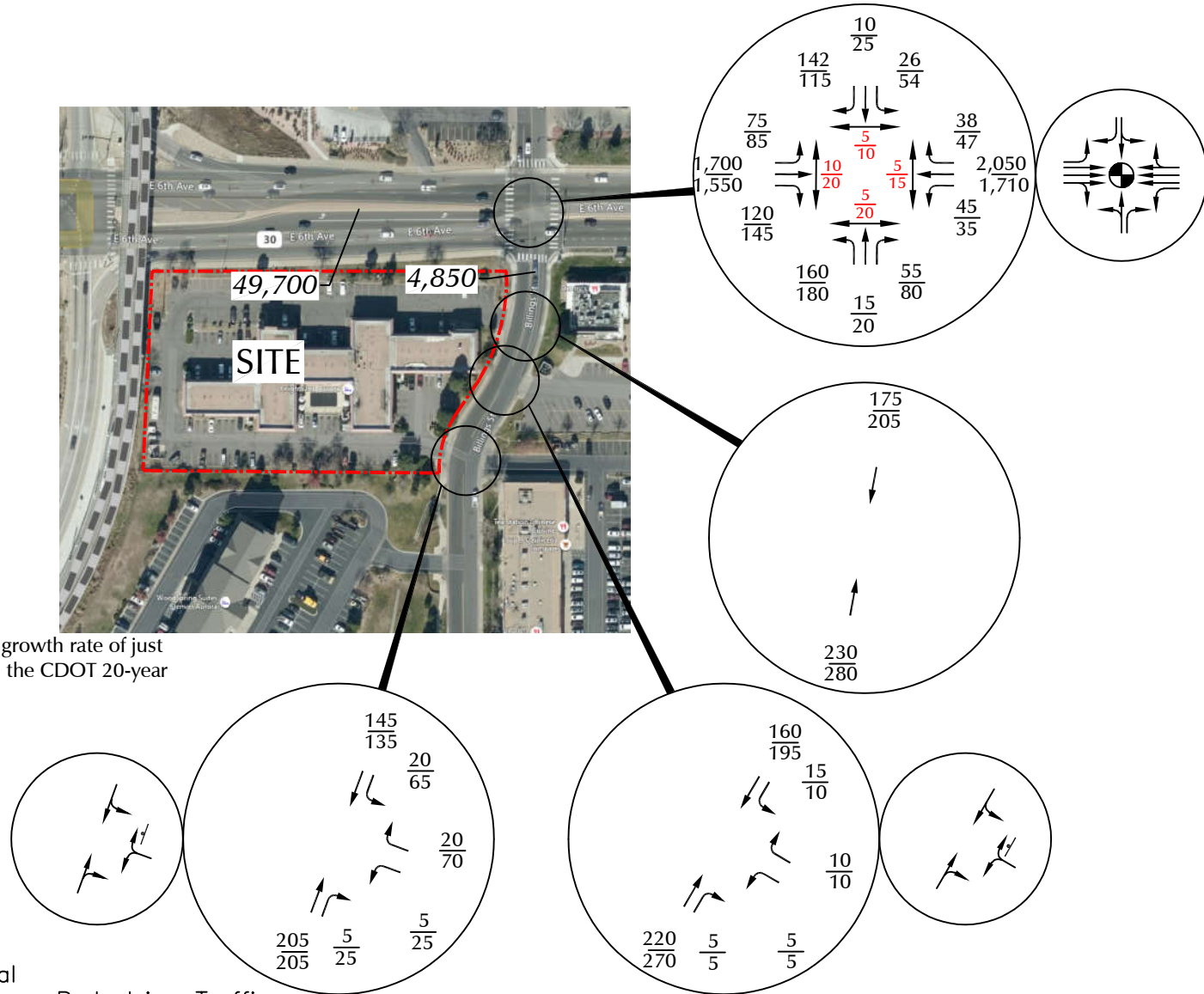
Knights Inn Conversion (LSC #200770)



Note: Based on an annual growth rate of just over 0.6 percent based on the CDOT 20-year growth factor of 1.13.

LEGEND:

- = Stop Sign
- = Traffic Signal
- $\frac{26}{35}$ = AM Peak Hour Pedestrian Traffic
PM Peak Hour Pedestrian Traffic
- $\frac{26}{35}$ = AM Peak Hour Traffic
PM Peak Hour Traffic
- 1,000 = Average Daily Traffic



Year 2040 Background Traffic, Lane Geometry and Traffic Control

Knights Inn Conversion (LSC #200770)

Figure 5

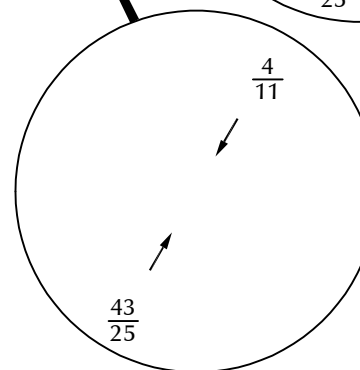
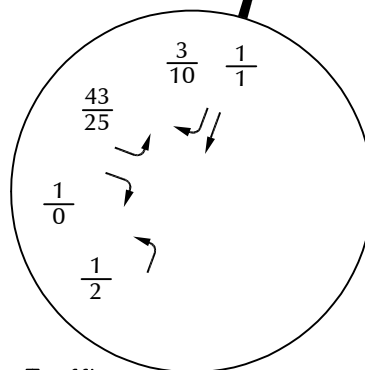
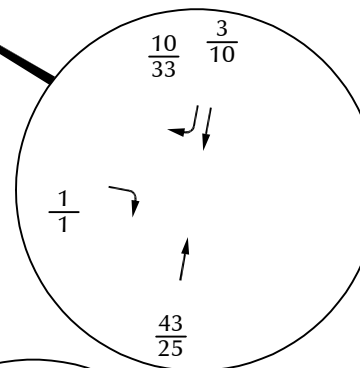
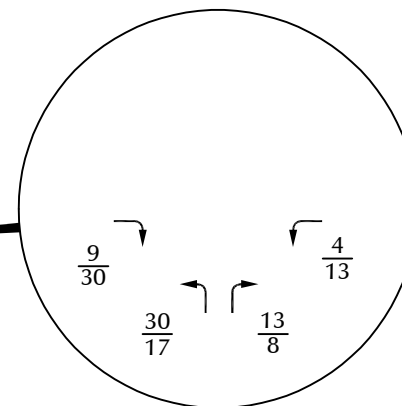
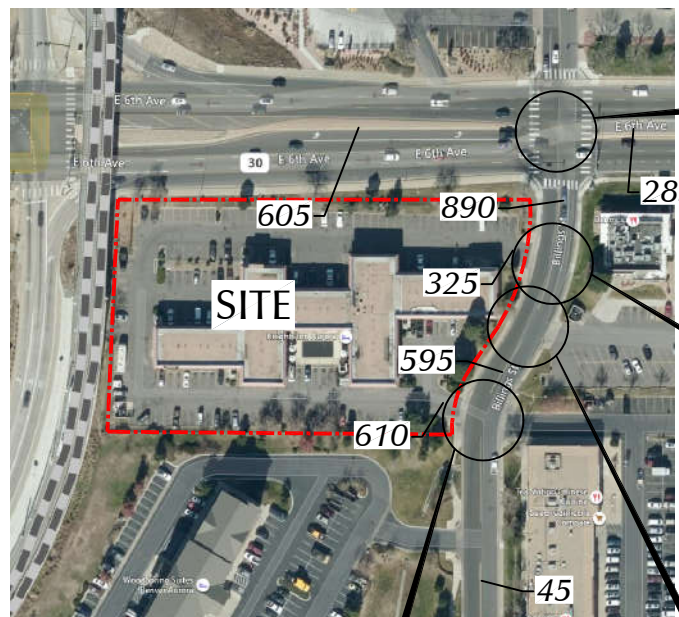
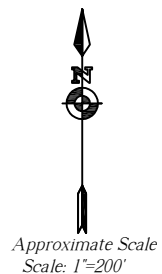


Approximate Scale
Scale: 1"=400'

LEGEND:

↔ 65% = Percent Directional
Distribution

Figure 6
*Directional Distribution
of Site-Generated Traffic*
Knights Inn Conversion (LSC #200770)



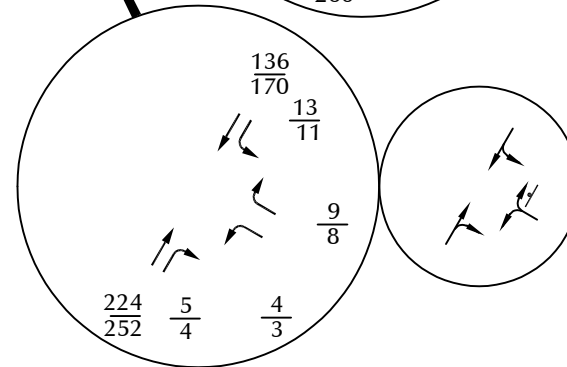
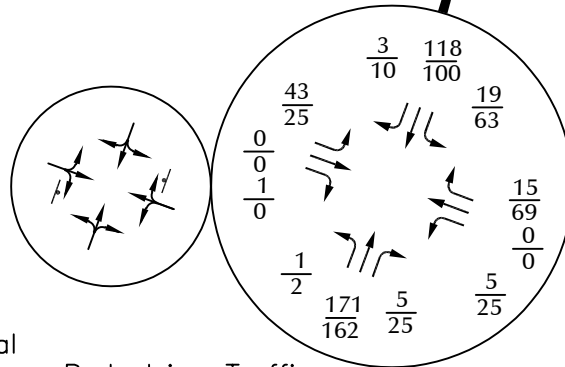
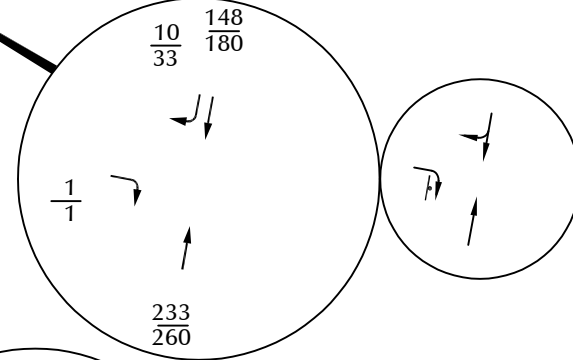
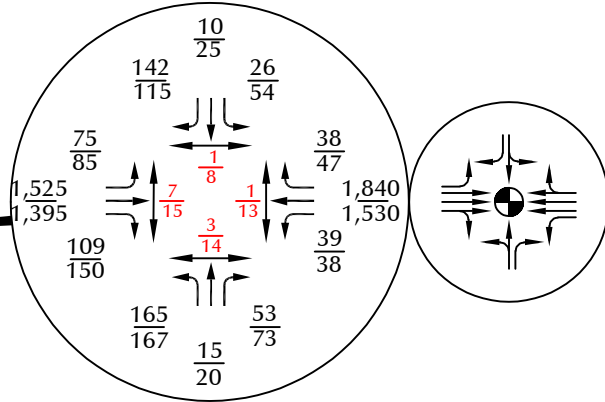
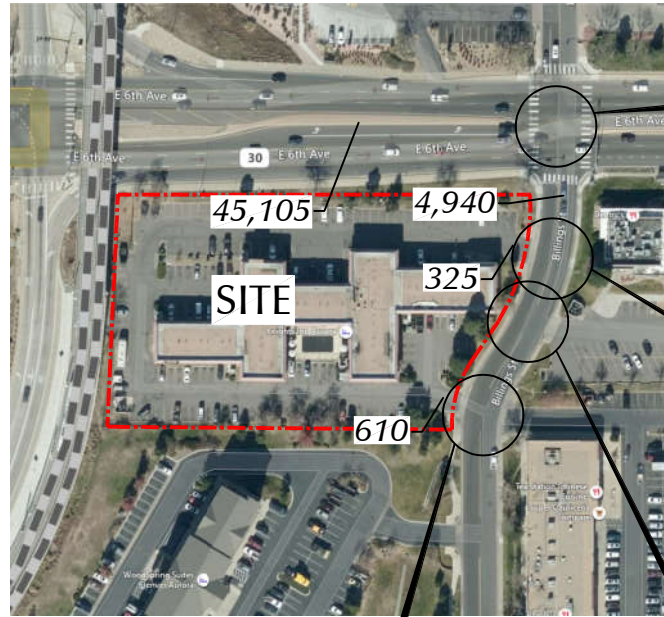
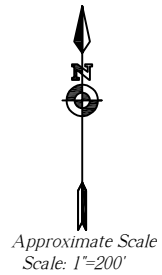
LEGEND:

$\frac{26}{35}$ = AM Peak Hour Pedestrian Traffic
 $\frac{26}{35}$ = PM Peak Hour Pedestrian Traffic
 $\frac{26}{35}$ = AM Peak Hour Traffic
 $\frac{26}{35}$ = PM Peak Hour Traffic
 1,000 = Average Daily Traffic

Figure 7

Assignment of Site-Generated Traffic

Knights Inn Conversion (LSC #200770)



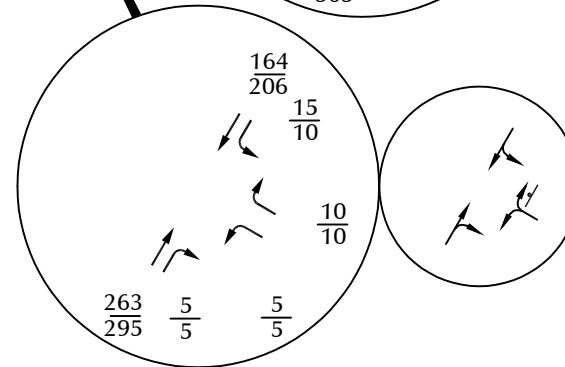
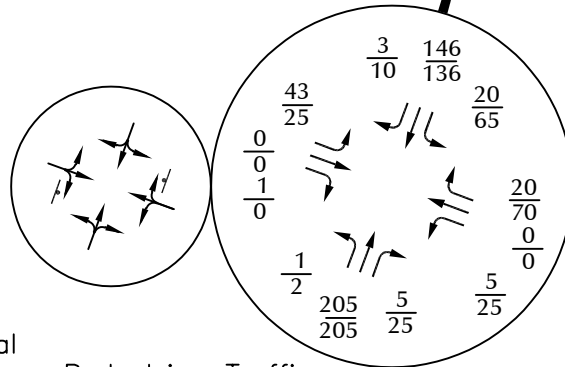
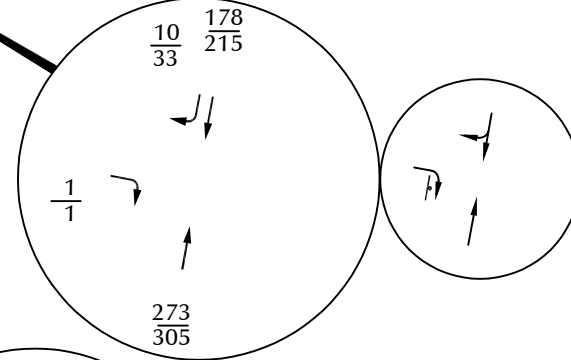
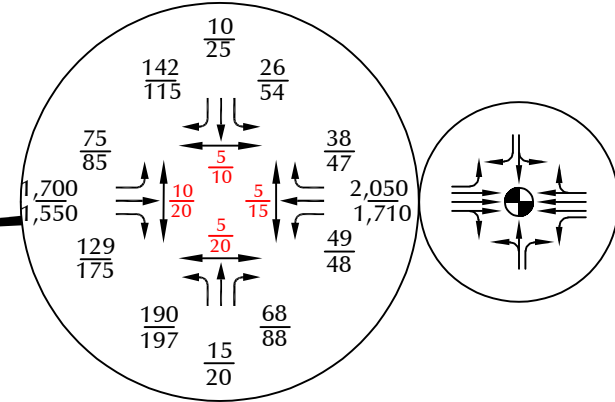
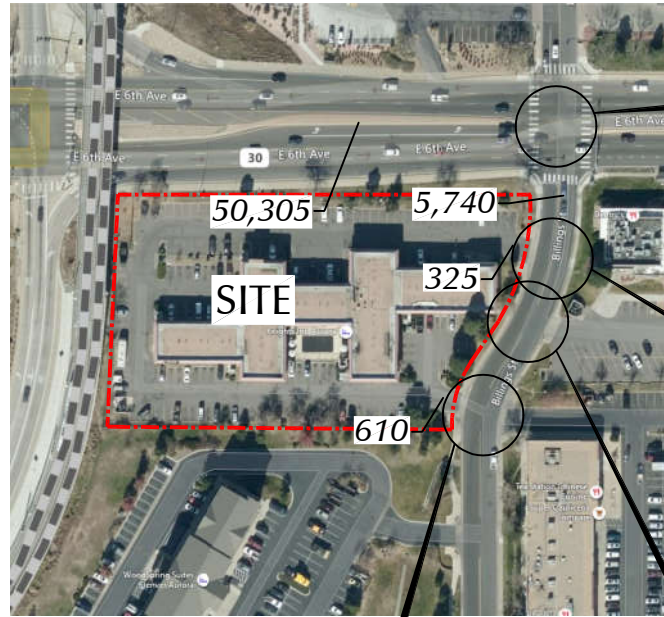
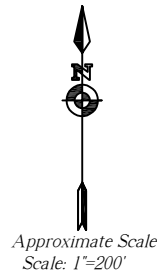
LEGEND:

- = Stop Sign
- = Traffic Signal
- $\frac{26}{35}$ = AM Peak Hour Pedestrian Traffic / PM Peak Hour Pedestrian Traffic
- $\frac{26}{35}$ = AM Peak Hour Traffic / PM Peak Hour Traffic
- 1,000 = Average Daily Traffic

Figure 8

Year 2022 Total Traffic, Lane Geometry and Traffic Control

Knights Inn Conversion (LSC #200770)



LEGEND:

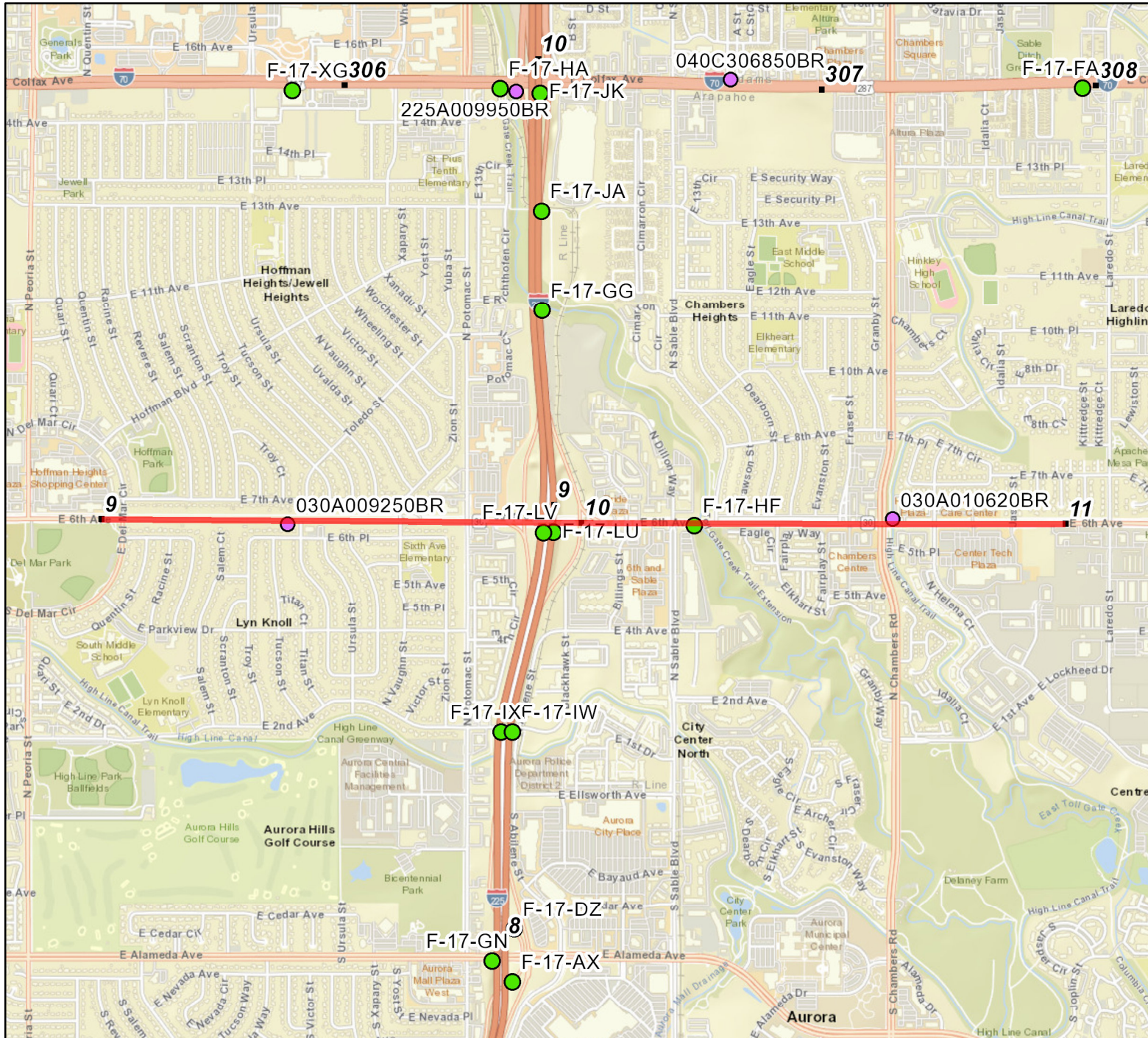
- = Stop Sign
- = Traffic Signal
- $\frac{26}{35}$ = AM Peak Hour Pedestrian Traffic
- $\frac{26}{35}$ = PM Peak Hour Pedestrian Traffic
- $\frac{26}{35}$ = AM Peak Hour Traffic
- $\frac{26}{35}$ = PM Peak Hour Traffic
- 1,000 = Average Daily Traffic

Figure 9

Year 2040 Total Traffic, Lane Geometry and Traffic Control

Knights Inn Conversion (LSC #200770)

Route 030A From 9 to 11



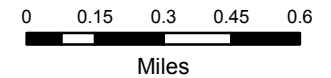
Legend

- Route
- Milepoint
- Structures
 - Major Structure
 - Minor Structure

Created:

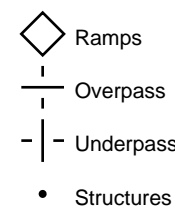
Date: 12/2/2020

Time: 1:53:30 PM



The information contained in this map is based on the most currently available data and has been checked for accuracy. CDOT does not guarantee the accuracy of any information presented, is not liable in any respect for any errors or omissions, and is not responsible for determining "fitness for use".

Route 030A
From 10 To 11



CLASSIFICATION

Access Control	R-A: Regional Highway
----------------	-----------------------

SAFETY

Primary Speed Limit	40
---------------------	----

TRAFFIC

AADT	44000	35000	31000
V/C Ratio	0.91	0.96	0.82
VMT	9284	16695	16182
Year 20 Factor	1.13		1.20

It may appear that information is missing from the straight line diagram. If so, reduce the number of miles/page and re-submit the request.



(303) 216-2439
www.alltrafficdata.net

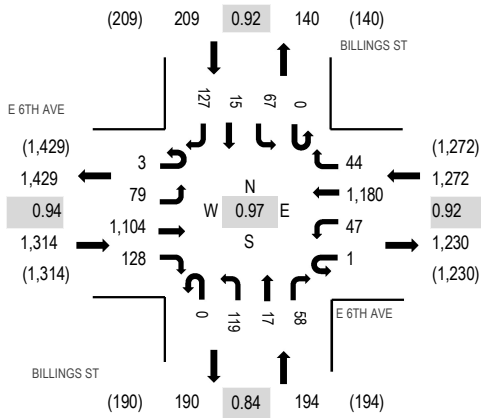
Location: 15 BILLINGS ST & E 6TH AVE PM

Date: Saturday, April 7, 2018

Peak Hour: 02:30 PM - 03:30 PM

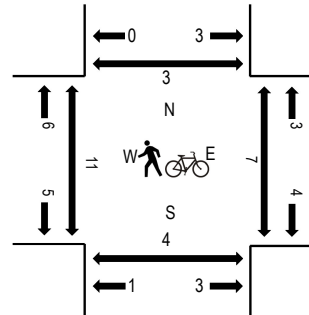
Peak 15-Minutes: 03:15 PM - 03:30 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	E 6TH AVE Eastbound				E 6TH AVE Westbound				BILLINGS ST Northbound				BILLINGS ST Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
2:30 PM	1	17	264	32	0	11	295	8	0	34	8	16	0	23	4	30	743	2,989	3	3	1	2
2:45 PM	1	24	269	39	0	13	265	13	0	24	2	19	0	11	6	31	717		5	0	1	0
3:00 PM	1	18	270	28	1	10	323	11	0	30	2	9	0	20	2	30	755		1	1	2	1
3:15 PM	0	20	301	29	0	13	297	12	0	31	5	14	0	13	3	36	774		2	3	0	0
Count Total	3	79	1,104	128	1	47	1,180	44	0	119	17	58	0	67	15	127	2,989		11	7	4	3
Peak Hour	3	79	1,104	128	1	47	1,180	44	0	119	17	58	0	67	15	127	2,989		11	7	4	3



(303) 216-2439
www.alltrafficdata.net

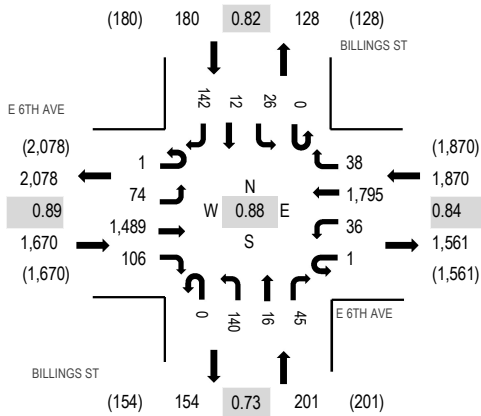
Location: 15 BILLINGS ST & E 6TH AVE AM

Date: Thursday, April 5, 2018

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

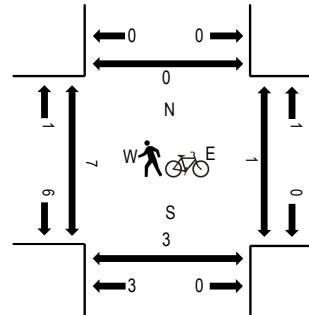
Peak 15-Minutes: 07:15 AM - 07:30 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	E 6TH AVE Eastbound				E 6TH AVE Westbound				BILLINGS ST Northbound				BILLINGS ST Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	1	15	350	24	1	7	382	12	0	16	1	4	0	7	4	35	859	3,921	2	0	0	0
7:15 AM	0	12	438	19	0	3	543	10	0	33	5	12	0	3	2	36	1,116		4	0	0	0
7:30 AM	0	17	344	30	0	12	450	11	0	39	6	16	0	5	4	29	963		0	0	0	0
7:45 AM	0	30	357	33	0	14	420	5	0	52	4	13	0	11	2	42	983		1	1	3	0
Count Total	1	74	1,489	106	1	36	1,795	38	0	140	16	45	0	26	12	142	3,921		7	1	3	0
Peak Hour	1	74	1,489	106	1	36	1,795	38	0	140	16	45	0	26	12	142	3,921		7	1	3	0



(303) 216-2439
www.alltrafficdata.net

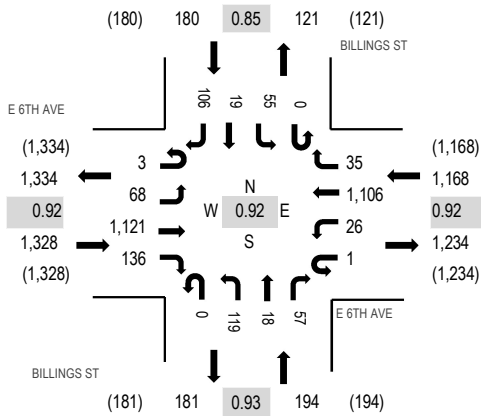
Location: 15 BILLINGS ST & E 6TH AVE Noon

Date: Thursday, April 5, 2018

Peak Hour: 12:45 PM - 01:45 PM

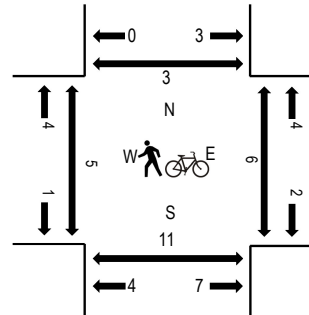
Peak 15-Minutes: 12:45 PM - 01:00 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	E 6TH AVE Eastbound				E 6TH AVE Westbound				BILLINGS ST Northbound				BILLINGS ST Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
12:45 PM	0	16	311	35	0	9	291	9	0	28	7	17	0	15	5	33	776	2,870	4	2	5	0
1:00 PM	0	11	265	36	1	2	259	8	0	32	3	15	0	13	7	26	678		1	0	0	0
1:15 PM	3	19	276	30	0	10	296	12	0	29	8	12	0	11	2	27	735		0	0	1	0
1:30 PM	0	22	269	35	0	5	260	6	0	30	0	13	0	16	5	20	681		0	4	4	2
Count Total	3	68	1,121	136	1	26	1,106	35	0	119	18	57	0	55	19	106	2,870		5	6	10	2
Peak Hour	3	68	1,121	136	1	26	1,106	35	0	119	18	57	0	55	19	106	2,870		5	6	10	2



(303) 216-2439
www.alltrafficdata.net

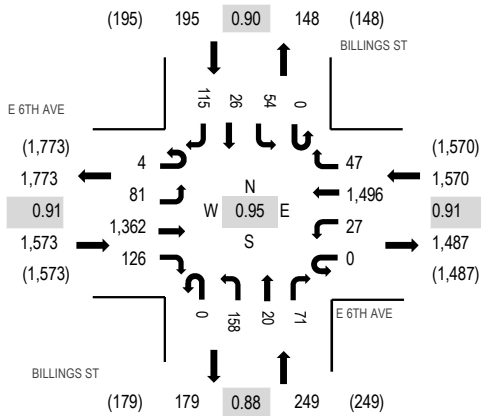
Location: 15 BILLINGS ST & E 6TH AVE PM

Date: Thursday, April 5, 2018

Peak Hour: 03:45 PM - 04:45 PM

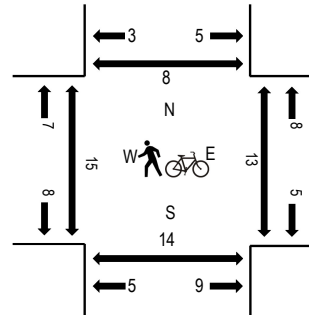
Peak 15-Minutes: 04:00 PM - 04:15 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	E 6TH AVE Eastbound				E 6TH AVE Westbound				BILLINGS ST Northbound				BILLINGS ST Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
3:45 PM	2	16	313	34	0	9	350	8	0	37	8	17	0	10	7	31	842	3,587	7	3	2	1
4:00 PM	0	22	382	27	0	10	386	16	0	40	1	17	0	8	6	31	946		4	3	3	1
4:15 PM	0	23	337	36	0	6	343	10	0	46	5	20	0	19	5	30	880		1	3	4	4
4:30 PM	2	20	330	29	0	2	417	13	0	35	6	17	0	17	8	23	919		2	4	5	1
Count Total	4	81	1,362	126	0	27	1,496	47	0	158	20	71	0	54	26	115	3,587		14	13	14	7
Peak Hour	4	81	1,362	126	0	27	1,496	47	0	158	20	71	0	54	26	115	3,587		14	13	14	7

LEVEL OF SERVICE DEFINITIONS

From *Highway Capacity Manual*, Transportation Research Board, 2016, 6th Edition

SIGNALIZED INTERSECTION LEVEL OF SERVICE (LOS)

LOS	<u>Average Vehicle Delay</u> sec/vehicle	<u>Operational Characteristics</u>
A	<10 seconds	Describes operations with low control delay, up to 10 sec/veh. This LOS occurs when progression is extremely favorable and most vehicles arrive during the green phase. Many vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay values.
B	10 to 20 seconds	Describes operations with control delay greater than 10 seconds and up to 20 sec/veh. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of delay.
C	20 to 35 seconds	Describes operations with control delay greater than 20 and up to 35 sec/veh. These higher delays may result from only fair progression, longer cycle length, or both. Individual cycle failures may begin to appear at this level. Cycle failure occurs when a given green phase does not serve queued vehicles, and overflows occur. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.
D	35 to 55 seconds	Describes operations with control delay greater than 35 and up to 55 sec/veh. At LOS D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, and high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	55 to 80 seconds	Describes operations with control delay greater than 55 and up to 80 sec/veh. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent.
F	>80 seconds	Describes operations with control delay in excess of 80 sec/veh. This level, considered unacceptable to most drivers, often occurs with over-saturation, that is, when arrival flow rates exceed the capacity of lane groups. It may also occur at high v/c ratios with many individual cycle failures. Poor progression and long cycle lengths may also contribute significantly to high delay levels.

LEVEL OF SERVICE DEFINITIONS

From *Highway Capacity Manual*, Transportation Research Board, 2016, 6th Edition










UNSIGNALIZED INTERSECTION LEVEL OF SERVICE (LOS)

Applicable to Two-Way Stop Control, All-Way Stop Control, and Roundabouts

LOS	Average Vehicle Control Delay	Operational Characteristics
A	<10 seconds	Normally, vehicles on the stop-controlled approach only have to wait up to 10 seconds before being able to clear the intersection. Left-turning vehicles on the uncontrolled street do not have to wait to make their turn.
B	10 to 15 seconds	Vehicles on the stop-controlled approach will experience delays before being able to clear the intersection. <u>The delay could be up to 15 seconds.</u> Left-turning vehicles on the uncontrolled street may have to wait to make their turn.
C	15 to 25 seconds	Vehicles on the stop-controlled approach can expect delays in the range of 15 to 25 seconds before clearing the intersection. Motorists may begin to take chances due to the long delays, thereby posing a safety risk to through traffic. <u>Left-turning vehicles on the uncontrolled street will now be required to wait to make their turn causing a queue to be created in the turn lane.</u>
D	25 to 35 seconds	<u>This is the point at which a traffic signal may be warranted for this intersection.</u> The delays for the stop-controlled intersection are not considered to be excessive. The length of the queue may begin to block other public and private access points.
E	35 to 50 seconds	The delays for all critical traffic movements are considered to be unacceptable. The length of the queues for the stop-controlled approaches as well as the left-turn movements are extremely long. <u>There is a high probability that this intersection will meet traffic signal warrants.</u> The ability to install a traffic signal is affected by the location of other existing traffic signals. Consideration may be given to restricting the accesses by eliminating the left-turn movements from and to the stop-controlled approach.
F	>50 seconds	The delay for the critical traffic movements are probably in excess of 100 seconds. The length of the queues are extremely long. Motorists are selecting alternative routes due to the long delays. <u>The only remedy for these long delays is installing a traffic signal or restricting the accesses.</u> The potential for accidents at this intersection are extremely high due to motorist taking more risky chances. If the median permits, motorists begin making two-stage left-turns.





HCM 6th Signalized Intersection Summary 3: Billings Street & E. 6th Avenue

Existing
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	1505	107	37	1815	38	142	16	46	26	12	142
Future Volume (veh/h)	75	1505	107	37	1815	38	142	16	46	26	12	142
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	82	1636	116	40	1973	41	154	17	50	28	13	154
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	178	2644	187	200	2766	57	49	0	521	43	13	521
Arrive On Green	0.04	0.54	0.54	0.04	0.54	0.53	0.32	0.33	0.33	0.32	0.33	0.33
Sat Flow, veh/h	1781	4868	345	1781	5148	107	0	0	1585	0	39	1585
Grp Volume(v), veh/h	82	1144	608	40	1304	710	171	0	50	41	0	154
Grp Sat Flow(s),veh/h/ln	1781	1702	1808	1781	1702	1851	0	0	1585	39	0	1585
Q Serve(g_s), s	2.8	32.4	32.5	1.4	40.2	40.3	0.0	0.0	3.1	0.0	0.0	10.1
Cycle Q Clear(g_c), s	2.8	32.4	32.5	1.4	40.2	40.3	45.0	0.0	3.1	45.0	0.0	10.1
Prop In Lane	1.00		0.19	1.00		0.06	0.90		1.00	0.68		1.00
Lane Grp Cap(c), veh/h	178	1849	982	200	1829	994	49	0	521	56	0	521
V/C Ratio(X)	0.46	0.62	0.62	0.20	0.71	0.71	3.50	0.00	0.10	0.74	0.00	0.30
Avail Cap(c_a), veh/h	321	1849	982	264	1829	994	49	0	521	56	0	521
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.5	22.0	22.1	17.3	24.3	24.4	69.6	0.0	32.6	56.0	0.0	35.0
Incr Delay (d2), s/veh	1.9	1.6	2.9	0.5	2.4	4.4	1173.9	0.0	0.1	39.7	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	12.8	14.1	0.6	16.1	18.1	17.7	0.0	1.2	2.1	0.0	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.4	23.6	25.0	17.8	26.7	28.7	1243.5	0.0	32.7	95.7	0.0	35.3
LnGrp LOS	C	C	C	B	C	C	F	A	C	F	A	D
Approach Vol, veh/h	1834			2054			221			195		
Approach Delay, s/veh	24.1			27.2			969.6			48.0		
Approach LOS	C			C			F			D		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.9	81.1		51.0	8.8	80.2		51.0				
Change Period (Y+Rc), s	4.0	6.0		6.0	4.0	6.0		6.0				
Max Green Setting (Gmax), s	9.0	70.0		45.0	16.0	63.0		45.0				
Max Q Clear Time (g_c+I1), s	3.4	34.5		47.0	4.8	42.3		47.0				
Green Ext Time (p_c), s	0.0	16.2		0.0	0.1	14.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	75.2											
HCM 6th LOS	E											




HCM 6th TWSC
6: Billings Street & Knights Inn Access/Retail Access

Existing
AM Peak

Intersection												
Int Delay, s/veh	1.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	0	2	5	0	15	3	160	5	19	90	10
Future Vol, veh/h	25	0	2	5	0	15	3	160	5	19	90	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	27	0	2	5	0	16	3	174	5	21	98	11
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	337	331	104	330	334	177	109	0	0	179	0	0
Stage 1	146	146	-	183	183	-	-	-	-	-	-	-
Stage 2	191	185	-	147	151	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	641	604	989	648	601	866	1496	-	-	1397	-	-
Stage 1	886	790	-	819	748	-	-	-	-	-	-	-
Stage 2	811	747	-	885	786	-	-	-	-	-	-	-
Platoon blocked, %	1	1	1	1	1		1	-	-		-	-
Mov Cap-1 Maneuver	621	593	989	638	590	866	1496	-	-	1397	-	-
Mov Cap-2 Maneuver	621	593	-	638	590	-	-	-	-	-	-	-
Stage 1	884	777	-	817	747	-	-	-	-	-	-	-
Stage 2	794	746	-	869	773	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	10.9		9.7			0.1			1.2			
HCM LOS	B		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1496	-	-	639	795	1397	-	-				
HCM Lane V/C Ratio	0.002	-	-	0.046	0.027	0.015	-	-				
HCM Control Delay (s)	7.4	0	-	10.9	9.7	7.6	0	-				
HCM Lane LOS	A	A	-	B	A	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-				




HCM 6th TWSC
9: Billings Street & RIRO Access

Existing
AM Peak

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	2	0	204	126	30
Future Vol, veh/h	0	2	0	204	126	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	2	0	222	137	33
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	154	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	960	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %		1		-	-	-
Mov Cap-1 Maneuver	-	960	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	8.8	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT EBLn1		SBT	SBR		
Capacity (veh/h)	- 960		-	-		
HCM Lane V/C Ratio	- 0.002		-	-		
HCM Control Delay (s)	- 8.8		-	-		
HCM Lane LOS	- A		-	-		
HCM 95th %tile Q(veh)	- 0		-	-		

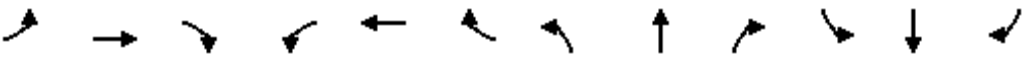








HCM 6th TWSC
12: Billings Street & Denny's Access

Existing
AM Peak

Intersection						
Int Delay, s/veh	0.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	9	195	5	13	115
Future Vol, veh/h	4	9	195	5	13	115
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	10	212	5	14	125
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	368	215	0	0	217	0
Stage 1	215	-	-	-	-	-
Stage 2	153	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	657	825	-	-	1353	-
Stage 1	821	-	-	-	-	-
Stage 2	902	-	-	-	-	-
Platoon blocked, %	1	-	-	-	-	-
Mov Cap-1 Maneuver	650	825	-	-	1353	-
Mov Cap-2 Maneuver	650	-	-	-	-	-
Stage 1	821	-	-	-	-	-
Stage 2	892	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	9.8	0		0.8		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	762		1353	-	
HCM Lane V/C Ratio	-	0.019		0.01	-	
HCM Control Delay (s)	-	9.8		7.7	0	
HCM Lane LOS	-	A		A	A	
HCM 95th %tile Q(veh)	-	0.1		0	-	

HCM 6th Signalized Intersection Summary 3: Billings Street & E. 6th Avenue

Existing
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	1375	128	27	1515	47	161	20	72	54	26	115
Future Volume (veh/h)	85	1375	128	27	1515	47	161	20	72	54	26	115
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	92	1495	139	29	1647	51	175	22	78	59	28	125
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	252	2946	274	247	3097	96	50	0	399	45	14	399
Arrive On Green	0.04	0.62	0.61	0.03	0.61	0.60	0.24	0.25	0.25	0.24	0.25	0.25
Sat Flow, veh/h	1781	4753	442	1781	5089	158	0	0	1585	0	54	1585
Grp Volume(v), veh/h	92	1070	564	29	1102	596	197	0	78	87	0	125
Grp Sat Flow(s),veh/h/ln	1781	1702	1791	1781	1702	1842	0	0	1585	54	0	1585
Q Serve(g_s), s	2.5	23.5	23.6	0.8	25.3	25.3	0.0	0.0	5.2	0.0	0.0	8.6
Cycle Q Clear(g_c), s	2.5	23.5	23.6	0.8	25.3	25.3	33.0	0.0	5.2	33.0	0.0	8.6
Prop In Lane	1.00		0.25	1.00		0.09	0.89		1.00	0.68		1.00
Lane Grp Cap(c), veh/h	252	2110	1110	247	2072	1121	50	0	399	58	0	399
V/C Ratio(X)	0.36	0.51	0.51	0.12	0.53	0.53	3.91	0.00	0.20	1.50	0.00	0.31
Avail Cap(c_a), veh/h	281	2110	1110	296	2072	1121	50	0	399	58	0	399
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(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.1	14.2	14.3	10.9	15.3	15.3	67.1	0.0	39.7	59.6	0.0	41.0
Incr Delay (d2), s/veh	0.9	0.9	1.7	0.2	1.0	1.8	1356.9	0.0	0.2	296.9	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	8.8	9.5	0.3	9.5	10.6	20.7	0.0	2.1	6.8	0.0	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.0	15.1	16.0	11.1	16.3	17.1	1423.9	0.0	40.0	356.5	0.0	41.5
LnGrp LOS	B	B	B	B	B	B	F	A	D	F	A	D
Approach Vol, veh/h	1726			1727			275			212		
Approach Delay, s/veh	15.3			16.5			1031.4			170.8		
Approach LOS	B			B			F			F		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.3	88.7		39.0	8.8	87.2		39.0				
Change Period (Y+Rc), s	4.0	6.0		6.0	4.0	6.0		6.0				
Max Green Setting (Gmax), s	7.0	79.0		33.0	7.0	79.0		33.0				
Max Q Clear Time (g_c+I1), s	2.8	25.6		35.0	4.5	27.3		35.0				
Green Ext Time (p_c), s	0.0	16.6		0.0	0.0	17.5		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	95.1											
HCM 6th LOS	F											




HCM 6th TWSC
6: Billings Street & Knights Inn Access/Retail Access

Existing
PM Peak

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	40	0	2	25	0	69	4	140	25	63	70	10
Future Vol, veh/h	40	0	2	25	0	69	4	140	25	63	70	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	43	0	2	27	0	75	4	152	27	68	76	11
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	429	405	82	393	397	166	87	0	0	179	0	0
Stage 1	218	218	-	174	174	-	-	-	-	-	-	-
Stage 2	211	187	-	219	223	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	554	547	1020	588	553	878	1526	-	-	1397	-	-
Stage 1	808	734	-	828	755	-	-	-	-	-	-	-
Stage 2	791	745	-	807	730	-	-	-	-	-	-	-
Platoon blocked, %	1	1	1	1	1		1	-	-		-	-
Mov Cap-1 Maneuver	486	517	1020	562	523	878	1526	-	-	1397	-	-
Mov Cap-2 Maneuver	486	517	-	562	523	-	-	-	-	-	-	-
Stage 1	806	697	-	826	753	-	-	-	-	-	-	-
Stage 2	721	743	-	765	693	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	13		10.4			0.2			3.4			
HCM LOS	B		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1526	-	-	498	764	1397	-	-				
HCM Lane V/C Ratio	0.003	-	-	0.092	0.134	0.049	-	-				
HCM Control Delay (s)	7.4	0	-	13	10.4	7.7	0	-				
HCM Lane LOS	A	A	-	B	B	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.3	0.5	0.2	-	-				




HCM 6th TWSC
9: Billings Street & RIRO Access

Existing
PM Peak

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	3	0	253	148	33
Future Vol, veh/h	0	3	0	253	148	33
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	3	0	275	161	36
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	179	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	930	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %		1		-	-	-
Mov Cap-1 Maneuver	-	930	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	8.9	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT EBLn1		SBT	SBR		
Capacity (veh/h)	- 930		-	-		
HCM Lane V/C Ratio	- 0.004		-	-		
HCM Control Delay (s)	- 8.9		-	-		
HCM Lane LOS	- A		-	-		
HCM 95th %tile Q(veh)	- 0		-	-		

HCM 6th TWSC
12: Billings Street & Denny's Access

Existing
PM Peak

























Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	8	245	4	11	140
Future Vol, veh/h	3	8	245	4	11	140
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	9	266	4	12	152
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	444	268	0	0	270	0
Stage 1	268	-	-	-	-	-
Stage 2	176	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	598	771	-	-	1293	-
Stage 1	777	-	-	-	-	-
Stage 2	890	-	-	-	-	-
Platoon blocked, %	1	-	-	-	-	-
Mov Cap-1 Maneuver	592	771	-	-	1293	-
Mov Cap-2 Maneuver	592	-	-	-	-	-
Stage 1	777	-	-	-	-	-
Stage 2	881	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	10.1	0		0.6		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	- 712		1293	-	
HCM Lane V/C Ratio	-	- 0.017		0.009	-	
HCM Control Delay (s)	-	- 10.1		7.8	0	
HCM Lane LOS	-	- B		A	A	
HCM 95th %tile Q(veh)	-	- 0.1		0	-	

HCM 6th Signalized Intersection Summary

3: Billings Street & E. 6th Avenue




2022 Background

AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  							
Traffic Volume (veh/h)	75	1525	100	35	1840	38	135	15	40	26	10	142
Future Volume (veh/h)	75	1525	100	35	1840	38	135	15	40	26	10	142
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	82	1658	109	38	2000	41	147	16	43	28	11	154
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	175	2662	175	197	2766	57	49	1	521	44	11	521
Arrive On Green	0.04	0.54	0.54	0.03	0.54	0.53	0.32	0.33	0.33	0.32	0.33	0.33
Sat Flow, veh/h	1781	4895	322	1781	5150	105	0	3	1585	0	33	1585
Grp Volume(v), veh/h	82	1153	614	38	1321	720	163	0	43	39	0	154
Grp Sat Flow(s),veh/h/ln	1781	1702	1812	1781	1702	1851	3	0	1585	33	0	1585
Q Serve(g_s), s	2.8	32.7	32.8	1.3	41.1	41.2	0.0	0.0	2.6	0.0	0.0	10.1
Cycle Q Clear(g_c), s	2.8	32.7	32.8	1.3	41.1	41.2	45.0	0.0	2.6	45.0	0.0	10.1
Prop In Lane	1.00		0.18	1.00		0.06	0.90		1.00	0.72		1.00
Lane Grp Cap(c), veh/h	175	1851	986	197	1829	995	50	0	521	55	0	521
V/C Ratio(X)	0.47	0.62	0.62	0.19	0.72	0.72	3.27	0.00	0.08	0.71	0.00	0.30
Avail Cap(c_a), veh/h	318	1851	986	262	1829	995	50	0	521	55	0	521
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.1	22.0	22.1	17.3	24.5	24.6	68.8	0.0	32.4	57.5	0.0	35.0
Incr Delay (d2), s/veh	1.9	1.6	3.0	0.5	2.5	4.6	1070.8	0.0	0.1	35.4	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	12.9	14.2	0.5	16.4	18.5	16.6	0.0	1.0	2.0	0.0	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.0	23.6	25.1	17.8	27.0	29.1	1139.6	0.0	32.5	92.9	0.0	35.3
LnGrp LOS	C	C	C	B	C	C	F	A	C	F	A	D
Approach Vol, veh/h	1849				2079				206		193	
Approach Delay, s/veh	24.2				27.6				908.5		46.9	
Approach LOS	C				C				F		D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.9	81.1		51.0	8.8	80.2		51.0				
Change Period (Y+Rc), s	4.0	6.0		6.0	4.0	6.0		6.0				
Max Green Setting (Gmax), s	9.0	70.0		45.0	16.0	63.0		45.0				
Max Q Clear Time (g_c+I1), s	3.3	34.8		47.0	4.8	43.2		47.0				
Green Ext Time (p_c), s	0.0	16.4		0.0	0.1	13.7		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	68.9											
HCM 6th LOS	E											




HCM 6th TWSC
6: Billings Street & Retail Access

2022 Background
AM Peak

Intersection						
Int Delay, s/veh	1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	15	171	5	19	117
Future Vol, veh/h	5	15	171	5	19	117
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	16	186	5	21	127
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	358	189	0	0	191	0
Stage 1	189	-	-	-	-	-
Stage 2	169	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	675	853	-	-	1383	-
Stage 1	843	-	-	-	-	-
Stage 2	896	-	-	-	-	-
Platoon blocked, %	1	-	-	-	-	-
Mov Cap-1 Maneuver	665	853	-	-	1383	-
Mov Cap-2 Maneuver	665	-	-	-	-	-
Stage 1	843	-	-	-	-	-
Stage 2	882	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	9.6	0		1.1		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	797		1383	-	
HCM Lane V/C Ratio	-	0.027		0.015	-	
HCM Control Delay (s)	-	9.6		7.6	0	
HCM Lane LOS	-	A		A	A	
HCM 95th %tile Q(veh)	-	0.1		0	-	

HCM 6th TWSC
12: Billings Street & Denny's Access

2022 Background
AM Peak

























Intersection						
Int Delay, s/veh	0.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	9	181	5	13	132
Future Vol, veh/h	4	9	181	5	13	132
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	10	197	5	14	143
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	371	200	0	0	202	0
Stage 1	200	-	-	-	-	-
Stage 2	171	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	663	841	-	-	1370	-
Stage 1	834	-	-	-	-	-
Stage 2	893	-	-	-	-	-
Platoon blocked, %	1	-	-	-	-	-
Mov Cap-1 Maneuver	655	841	-	-	1370	-
Mov Cap-2 Maneuver	655	-	-	-	-	-
Stage 1	834	-	-	-	-	-
Stage 2	884	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	9.7	0		0.7		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	773		1370	-	
HCM Lane V/C Ratio	-	0.018		0.01	-	
HCM Control Delay (s)	-	9.7		7.7	0	
HCM Lane LOS	-	A		A	A	
HCM 95th %tile Q(veh)	-	0.1		0	-	

HCM 6th Signalized Intersection Summary

3: Billings Street & E. 6th Avenue




2022 Background

PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  							
Traffic Volume (veh/h)	85	1395	120	25	1530	47	150	20	65	54	25	115
Future Volume (veh/h)	85	1395	120	25	1530	47	150	20	65	54	25	115
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	92	1516	130	27	1663	51	163	22	71	59	27	125
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	249	2974	255	244	3098	95	50	0	399	45	13	399
Arrive On Green	0.04	0.62	0.61	0.03	0.61	0.60	0.24	0.25	0.25	0.24	0.26	0.25
Sat Flow, veh/h	1781	4790	411	1781	5090	156	0	0	1585	0	52	1585
Grp Volume(v), veh/h	92	1077	569	27	1112	602	185	0	71	86	0	125
Grp Sat Flow(s),veh/h/ln	1781	1702	1796	1781	1702	1842	0	0	1585	52	0	1585
Q Serve(g_s), s	2.5	23.7	23.8	0.7	25.6	25.7	0.0	0.0	4.7	0.0	0.0	8.6
Cycle Q Clear(g_c), s	2.5	23.7	23.8	0.7	25.6	25.7	33.0	0.0	4.7	33.0	0.0	8.6
Prop In Lane	1.00		0.23	1.00		0.08	0.88		1.00	0.69		1.00
Lane Grp Cap(c), veh/h	249	2113	1115	244	2072	1121	50	0	399	58	0	399
V/C Ratio(X)	0.37	0.51	0.51	0.11	0.54	0.54	3.69	0.00	0.18	1.49	0.00	0.31
Avail Cap(c_a), veh/h	278	2113	1115	294	2072	1121	50	0	399	58	0	399
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(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.2	14.2	14.3	10.9	15.4	15.4	67.1	0.0	39.6	59.5	0.0	41.0
Incr Delay (d2), s/veh	0.9	0.9	1.7	0.2	1.0	1.8	1257.0	0.0	0.2	293.0	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	8.8	9.6	0.3	9.7	10.7	19.3	0.0	1.9	6.7	0.0	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.1	15.1	15.9	11.1	16.4	17.2	1324.1	0.0	39.8	352.5	0.0	41.5
LnGrp LOS	B	B	B	B	B	B	F	A	D	F	A	D
Approach Vol, veh/h		1738			1741			256			211	
Approach Delay, s/veh		15.3			16.6			967.9			168.2	
Approach LOS		B			B			F			F	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.2	88.8		39.0	8.8	87.2		39.0				
Change Period (Y+Rc), s	4.0	6.0		6.0	4.0	6.0		6.0				
Max Green Setting (Gmax), s	7.0	79.0		33.0	7.0	79.0		33.0				
Max Q Clear Time (g_c+I1), s	2.7	25.8		35.0	4.5	27.7		35.0				
Green Ext Time (p_c), s	0.0	16.8		0.0	0.0	17.7		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			85.8									
HCM 6th LOS			F									




HCM 6th TWSC
6: Billings Street & Retail Access

2022 Background
PM Peak

Intersection						
Int Delay, s/veh	3.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	25	69	162	25	63	99
Future Vol, veh/h	25	69	162	25	63	99
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	75	176	27	68	108
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	434	190	0	0	203	0
Stage 1	190	-	-	-	-	-
Stage 2	244	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	599	852	-	-	1369	-
Stage 1	842	-	-	-	-	-
Stage 2	817	-	-	-	-	-
Platoon blocked, %	1	-	-	-	-	-
Mov Cap-1 Maneuver	567	852	-	-	1369	-
Mov Cap-2 Maneuver	567	-	-	-	-	-
Stage 1	842	-	-	-	-	-
Stage 2	774	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	10.5	0		3		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	752		1369	-	
HCM Lane V/C Ratio	-	0.136		0.05	-	
HCM Control Delay (s)	-	10.5		7.8	0	
HCM Lane LOS	-	B		A	A	
HCM 95th %tile Q(veh)	-	0.5		0.2	-	

HCM 6th TWSC
12: Billings Street & Denny's Access

























2022 Background
PM Peak

Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	8	227	4	11	159
Future Vol, veh/h	3	8	227	4	11	159
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	9	247	4	12	173
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	446	249	0	0	251	0
Stage 1	249	-	-	-	-	-
Stage 2	197	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	604	790	-	-	1314	-
Stage 1	792	-	-	-	-	-
Stage 2	880	-	-	-	-	-
Platoon blocked, %	1	-	-	-	-	-
Mov Cap-1 Maneuver	598	790	-	-	1314	-
Mov Cap-2 Maneuver	598	-	-	-	-	-
Stage 1	792	-	-	-	-	-
Stage 2	871	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	10	0		0.5		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	726		1314	-	
HCM Lane V/C Ratio	-	0.016		0.009	-	
HCM Control Delay (s)	-	10		7.8	0	
HCM Lane LOS	-	B		A	A	
HCM 95th %tile Q(veh)	-	0.1		0	-	

HCM 6th Signalized Intersection Summary





3: Billings Street & E. 6th Avenue

2022 Total
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  							
Traffic Volume (veh/h)	75	1525	109	39	1840	38	165	15	53	26	10	142
Future Volume (veh/h)	75	1525	109	39	1840	38	165	15	53	26	10	142
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	82	1658	118	42	2000	41	179	16	58	28	11	154
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	175	2641	188	197	2766	57	49	0	521	44	11	521
Arrive On Green	0.04	0.54	0.54	0.04	0.54	0.53	0.32	0.33	0.33	0.32	0.33	0.33
Sat Flow, veh/h	1781	4866	346	1781	5150	105	0	0	1585	0	33	1585
Grp Volume(v), veh/h	82	1159	617	42	1321	720	195	0	58	39	0	154
Grp Sat Flow(s),veh/h/ln	1781	1702	1808	1781	1702	1851	0	0	1585	33	0	1585
Q Serve(g_s), s	2.8	33.1	33.2	1.4	41.1	41.2	0.0	0.0	3.6	0.0	0.0	10.1
Cycle Q Clear(g_c), s	2.8	33.1	33.2	1.4	41.1	41.2	45.0	0.0	3.6	45.0	0.0	10.1
Prop In Lane	1.00		0.19	1.00		0.06	0.92		1.00	0.72		1.00
Lane Grp Cap(c), veh/h	175	1847	981	197	1829	995	49	0	521	55	0	521
V/C Ratio(X)	0.47	0.63	0.63	0.21	0.72	0.72	3.95	0.00	0.11	0.71	0.00	0.30
Avail Cap(c_a), veh/h	318	1847	981	261	1829	995	49	0	521	55	0	521
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.1	22.2	22.3	17.5	24.5	24.6	69.6	0.0	32.8	57.5	0.0	35.0
Incr Delay (d2), s/veh	1.9	1.6	3.0	0.5	2.5	4.6	1376.4	0.0	0.1	35.4	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	13.1	14.4	0.6	16.4	18.5	20.6	0.0	1.4	2.0	0.0	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.0	23.8	25.3	18.1	27.0	29.1	1446.0	0.0	32.8	92.9	0.0	35.3
LnGrp LOS	C	C	C	B	C	C	F	A	C	F	A	D
Approach Vol, veh/h	1858				2083				253		193	
Approach Delay, s/veh	24.4				27.6				1122.1		46.9	
Approach LOS	C				C				F		D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.0	81.0		51.0	8.8	80.2		51.0				
Change Period (Y+Rc), s	4.0	6.0		6.0	4.0	6.0		6.0				
Max Green Setting (Gmax), s	9.0	70.0		45.0	16.0	63.0		45.0				
Max Q Clear Time (g_c+I1), s	3.4	35.2		47.0	4.8	43.2		47.0				
Green Ext Time (p_c), s	0.0	16.4		0.0	0.1	13.7		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	90.2											
HCM 6th LOS	F											

HCM 6th TWSC
6: Billings Street & Knights Inn Access/Retail Access

2022 Total
AM Peak

Intersection												
Int Delay, s/veh	2.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	43	0	1	5	0	15	1	171	5	19	118	3
Future Vol, veh/h	43	0	1	5	0	15	1	171	5	19	118	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	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	47	0	1	5	0	16	1	186	5	21	128	3
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	371	365	130	363	364	189	131	0	0	191	0	0
Stage 1	172	172	-	191	191	-	-	-	-	-	-	-
Stage 2	199	193	-	172	173	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	630	592	*988	639	593	853	*1479	-	-	1383	-	-
Stage 1	885	783	-	811	742	-	-	-	-	-	-	-
Stage 2	803	741	-	885	782	-	-	-	-	-	-	-
Platoon blocked, %	1	1	1	1	1		1	-	-	-	-	-
Mov Cap-1 Maneuver	610	582	*988	630	582	853	*1479	-	-	1383	-	-
Mov Cap-2 Maneuver	610	582	-	630	582	-	-	-	-	-	-	-
Stage 1	884	771	-	810	741	-	-	-	-	-	-	-
Stage 2	787	740	-	870	770	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	11.3		9.7			0			1			
HCM LOS	B		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	* 1479	-	-	615	784	1383	-	-				
HCM Lane V/C Ratio	0.001	-	-	0.078	0.028	0.015	-	-				
HCM Control Delay (s)	7.4	0	-	11.3	9.7	7.6	0	-				
HCM Lane LOS	A	A	-	B	A	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.3	0.1	0	-	-				
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s			+: Computation Not Defined				*: All major volume in platoon			




HCM 6th TWSC
9: Billings Street & RIRO Access

2022 Total
AM Peak

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑	↘	
Traffic Vol, veh/h	0	1	0	233	148	10
Future Vol, veh/h	0	1	0	233	148	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1	0	253	161	11
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	167	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	962	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %		1		-	-	-
Mov Cap-1 Maneuver	-	962	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	8.7	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT EBLn1		SBT	SBR		
Capacity (veh/h)	- 962		-	-		
HCM Lane V/C Ratio	- 0.001		-	-		
HCM Control Delay (s)	- 8.7		-	-		
HCM Lane LOS	- A		-	-		
HCM 95th %tile Q(veh)	- 0		-	-		

HCM 6th TWSC
12: Billings Street & Denny's Access

2022 Total
AM Peak

Intersection						
Int Delay, s/veh	0.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	9	224	5	13	136
Future Vol, veh/h	4	9	224	5	13	136
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	10	243	5	14	148

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	422	246	0
Stage 1	246	-	-
Stage 2	176	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	616	793	-
Stage 1	795	-	-
Stage 2	889	-	-
Platoon blocked, %	1	-	-
Mov Cap-1 Maneuver	609	793	-
Mov Cap-2 Maneuver	609	-	-
Stage 1	795	-	-
Stage 2	878	-	-

























Approach	WB	NB	SB
HCM Control Delay, s	10.1	0	0.7
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	726	1318
HCM Lane V/C Ratio	-	-	0.019	0.011
HCM Control Delay (s)	-	-	10.1	7.8
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0

HCM 6th Signalized Intersection Summary

3: Billings Street & E. 6th Avenue

2022 Total
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  							
Traffic Volume (veh/h)	85	1395	150	38	1530	47	167	20	73	54	25	115
Future Volume (veh/h)	85	1395	150	38	1530	47	167	20	73	54	25	115
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	92	1516	163	41	1663	51	182	22	79	59	27	125
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	249	2881	309	245	3098	95	50	0	399	45	13	399
Arrive On Green	0.04	0.62	0.61	0.04	0.61	0.60	0.24	0.25	0.25	0.24	0.25	0.25
Sat Flow, veh/h	1781	4681	503	1781	5090	156	0	0	1585	0	52	1585
Grp Volume(v), veh/h	92	1102	577	41	1112	602	204	0	79	86	0	125
Grp Sat Flow(s),veh/h/ln	1781	1702	1780	1781	1702	1842	0	0	1585	52	0	1585
Q Serve(g_s), s	2.6	24.9	25.0	1.1	25.6	25.7	0.0	0.0	5.3	0.0	0.0	8.6
Cycle Q Clear(g_c), s	2.6	24.9	25.0	1.1	25.6	25.7	33.0	0.0	5.3	33.0	0.0	8.6
Prop In Lane	1.00		0.28	1.00		0.08	0.89		1.00	0.69		1.00
Lane Grp Cap(c), veh/h	249	2095	1095	245	2072	1121	50	0	399	58	0	399
V/C Ratio(X)	0.37	0.53	0.53	0.17	0.54	0.54	4.04	0.00	0.20	1.49	0.00	0.31
Avail Cap(c_a), veh/h	278	2095	1095	286	2072	1121	50	0	399	58	0	399
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(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.2	14.8	14.9	11.2	15.4	15.4	67.1	0.0	39.8	59.8	0.0	41.0
Incr Delay (d2), s/veh	0.9	0.9	1.8	0.3	1.0	1.8	1415.2	0.0	0.2	293.0	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	9.3	10.1	0.4	9.7	10.7	21.6	0.0	2.1	6.7	0.0	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.1	15.7	16.7	11.5	16.4	17.2	1482.3	0.0	40.0	352.8	0.0	41.5
LnGrp LOS	B	B	B	B	B	B	F	A	D	F	A	D
Approach Vol, veh/h	1771				1755				283		211	
Approach Delay, s/veh	15.9				16.5				1079.7		168.3	
Approach LOS	B				B				F		F	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.9	88.1		39.0	8.8	87.2		39.0				
Change Period (Y+Rc), s	4.0	6.0		6.0	4.0	6.0		6.0				
Max Green Setting (Gmax), s	7.0	79.0		33.0	7.0	79.0		33.0				
Max Q Clear Time (g_c+I1), s	3.1	27.0		35.0	4.6	27.7		35.0				
Green Ext Time (p_c), s	0.0	17.4		0.0	0.0	17.7		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	99.1											
HCM 6th LOS	F											




HCM 6th TWSC
6: Billings Street & Knights Inn Access/Retail Access

2022 Total
PM Peak

Intersection												
Int Delay, s/veh	3.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	25	0	0	25	0	69	2	162	25	63	100	10
Future Vol, veh/h	25	0	0	25	0	69	2	162	25	63	100	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	27	0	0	27	0	75	2	176	27	68	109	11
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	482	458	115	445	450	190	120	0	0	203	0	0
Stage 1	251	251	-	194	194	-	-	-	-	-	-	-
Stage 2	231	207	-	251	256	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	517	514	996	549	520	852	1489	-	-	1369	-	-
Stage 1	787	714	-	808	740	-	-	-	-	-	-	-
Stage 2	772	731	-	787	710	-	-	-	-	-	-	-
Platoon blocked, %	1	1	1	1	1		1	-	-		-	-
Mov Cap-1 Maneuver	452	486	996	526	491	852	1489	-	-	1369	-	-
Mov Cap-2 Maneuver	452	486	-	526	491	-	-	-	-	-	-	-
Stage 1	785	676	-	806	739	-	-	-	-	-	-	-
Stage 2	703	730	-	745	673	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	13.5		10.7		0.1		2.8					
HCM LOS	B		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1489	-	-	452	731	1369	-	-				
HCM Lane V/C Ratio	0.001	-	-	0.06	0.14	0.05	-	-				
HCM Control Delay (s)	7.4	0	-	13.5	10.7	7.8	0	-				
HCM Lane LOS	A	A	-	B	B	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.2	0.5	0.2	-	-				




HCM 6th TWSC
9: Billings Street & RIRO Access

2022 Total
PM Peak

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1	0	260	180	33
Future Vol, veh/h	0	1	0	260	180	33
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1	0	283	196	36
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	214	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	923	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %		1		-	-	-
Mov Cap-1 Maneuver	-	923	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	8.9	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT EBLn1		SBT	SBR		
Capacity (veh/h)	- 923		-	-		
HCM Lane V/C Ratio	- 0.001		-	-		
HCM Control Delay (s)	- 8.9		-	-		
HCM Lane LOS	- A		-	-		
HCM 95th %tile Q(veh)	- 0		-	-		

HCM 6th TWSC
12: Billings Street & Denny's Access

2022 Total
PM Peak

Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	8	252	4	11	170
Future Vol, veh/h	3	8	252	4	11	170
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	9	274	4	12	185
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	485	276	0	0	278	0
Stage 1	276	-	-	-	-	-
Stage 2	209	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	570	763	-	-	1285	-
Stage 1	771	-	-	-	-	-
Stage 2	867	-	-	-	-	-
Platoon blocked, %	1		-	-		-
Mov Cap-1 Maneuver	565	763	-	-	1285	-
Mov Cap-2 Maneuver	565	-	-	-	-	-
Stage 1	771	-	-	-	-	-
Stage 2	859	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	10.3	0		0.5		
HCM LOS	B					
Minor Lane/Major Mvmt		NBT	NBRWBLn1	SBL	SBT	
Capacity (veh/h)		-	-	696	1285	-
HCM Lane V/C Ratio		-	-	0.017	0.009	-
HCM Control Delay (s)		-	-	10.3	7.8	0
HCM Lane LOS		-	-	B	A	A
HCM 95th %tile Q(veh)		-	-	0.1	0	-

HCM 6th Signalized Intersection Summary

3: Billings Street & E. 6th Avenue




2040 Background

AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	1700	120	45	2050	38	160	15	55	26	10	142
Future Volume (veh/h)	75	1700	120	45	2050	38	160	15	55	26	10	142
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	82	1848	130	49	2228	41	174	16	60	28	11	154
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	156	2635	185	175	2773	51	49	0	521	44	11	521
Arrive On Green	0.04	0.54	0.53	0.04	0.54	0.53	0.32	0.33	0.33	0.32	0.33	0.33
Sat Flow, veh/h	1781	4871	342	1781	5163	95	0	0	1585	0	33	1585
Grp Volume(v), veh/h	82	1290	688	49	1468	801	190	0	60	39	0	154
Grp Sat Flow(s),veh/h/ln	1781	1702	1809	1781	1702	1853	0	0	1585	33	0	1585
Q Serve(g_s), s	2.8	39.2	39.5	1.7	49.1	49.4	0.0	0.0	3.7	0.0	0.0	10.1
Cycle Q Clear(g_c), s	2.8	39.2	39.5	1.7	49.1	49.4	45.0	0.0	3.7	45.0	0.0	10.1
Prop In Lane	1.00		0.19	1.00		0.05	0.92		1.00	0.72		1.00
Lane Grp Cap(c), veh/h	156	1842	979	175	1829	996	49	0	521	55	0	521
V/C Ratio(X)	0.53	0.70	0.70	0.28	0.80	0.80	3.86	0.00	0.12	0.71	0.00	0.30
Avail Cap(c_a), veh/h	298	1842	979	236	1829	996	49	0	521	55	0	521
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.4	23.7	23.9	20.0	26.4	26.4	69.6	0.0	32.8	57.5	0.0	35.0
Incr Delay (d2), s/veh	2.7	2.2	4.2	0.9	3.8	6.9	1333.1	0.0	0.1	35.4	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	15.7	17.3	0.7	19.9	22.6	20.0	0.0	1.5	2.0	0.0	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.2	26.0	28.1	20.9	30.2	33.4	1402.8	0.0	32.9	92.9	0.0	35.3
LnGrp LOS	C	C	C	C	C	C	F	A	C	F	A	D
Approach Vol, veh/h	2060			2318			250			193		
Approach Delay, s/veh	26.9			31.1			1074.0			46.9		
Approach LOS	C			C			F			D		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.3	80.7		51.0	8.8	80.2		51.0				
Change Period (Y+Rc), s	4.0	6.0		6.0	4.0	6.0		6.0				
Max Green Setting (Gmax), s	9.0	70.0		45.0	16.0	63.0		45.0				
Max Q Clear Time (g_c+I1), s	3.7	41.5		47.0	4.8	51.4		47.0				
Green Ext Time (p_c), s	0.0	17.1		0.0	0.1	9.7		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	84.0											
HCM 6th LOS	F											




HCM 6th TWSC
6: Billings Street & Retail Access

2040 Background
AM Peak

Intersection						
Int Delay, s/veh	1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	20	205	5	20	145
Future Vol, veh/h	5	20	205	5	20	145
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	22	223	5	22	158
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	428	226	0	0	228	0
Stage 1	226	-	-	-	-	-
Stage 2	202	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	618	813	-	-	1340	-
Stage 1	812	-	-	-	-	-
Stage 2	872	-	-	-	-	-
Platoon blocked, %	1	-	-	-	-	-
Mov Cap-1 Maneuver	607	813	-	-	1340	-
Mov Cap-2 Maneuver	607	-	-	-	-	-
Stage 1	812	-	-	-	-	-
Stage 2	857	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	9.9	0		0.9		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	- 761		1340	-	
HCM Lane V/C Ratio	-	- 0.036		0.016	-	
HCM Control Delay (s)	-	- 9.9		7.7	0	
HCM Lane LOS	-	- A		A	A	
HCM 95th %tile Q(veh)	-	- 0.1		0	-	

HCM 6th TWSC
12: Billings Street & Denny's Access

2040 Background
AM Peak





















Intersection						
Int Delay, s/veh	0.7					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	10	220	5	15	160
Future Vol, veh/h	5	10	220	5	15	160
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	11	239	5	16	174
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	448	242	0	0	244	0
Stage 1	242	-	-	-	-	-
Stage 2	206	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	601	797	-	-	1322	-
Stage 1	798	-	-	-	-	-
Stage 2	869	-	-	-	-	-
Platoon blocked, %	1	-	-	-	-	-
Mov Cap-1 Maneuver	593	797	-	-	1322	-
Mov Cap-2 Maneuver	593	-	-	-	-	-
Stage 1	798	-	-	-	-	-
Stage 2	857	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	10.2	0		0.7		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	715		1322	-	
HCM Lane V/C Ratio	-	0.023		0.012	-	
HCM Control Delay (s)	-	10.2		7.8	0	
HCM Lane LOS	-	B		A	A	
HCM 95th %tile Q(veh)	-	0.1		0	-	

HCM 6th Signalized Intersection Summary

3: Billings Street & E. 6th Avenue




2040 Background

PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	1550	145	35	1710	47	180	20	80	54	25	115
Future Volume (veh/h)	85	1550	145	35	1710	47	180	20	80	54	25	115
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	92	1685	158	38	1859	51	196	22	87	59	27	125
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	221	2927	274	218	3109	85	51	0	399	45	13	399
Arrive On Green	0.04	0.62	0.61	0.04	0.61	0.60	0.24	0.25	0.25	0.24	0.25	0.25
Sat Flow, veh/h	1781	4750	444	1781	5109	140	0	0	1585	0	52	1585
Grp Volume(v), veh/h	92	1207	636	38	1238	672	218	0	87	86	0	125
Grp Sat Flow(s),veh/h/ln	1781	1702	1790	1781	1702	1845	0	0	1585	52	0	1585
Q Serve(g_s), s	2.6	28.4	28.7	1.0	30.2	30.3	0.0	0.0	5.9	0.0	0.0	8.6
Cycle Q Clear(g_c), s	2.6	28.4	28.7	1.0	30.2	30.3	33.0	0.0	5.9	33.0	0.0	8.6
Prop In Lane	1.00		0.25	1.00		0.08	0.90		1.00	0.69		1.00
Lane Grp Cap(c), veh/h	221	2098	1103	218	2072	1123	51	0	399	58	0	399
V/C Ratio(X)	0.42	0.58	0.58	0.17	0.60	0.60	4.30	0.00	0.22	1.49	0.00	0.31
Avail Cap(c_a), veh/h	249	2098	1103	260	2072	1123	51	0	399	58	0	399
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.2	15.4	15.5	12.1	16.3	16.3	67.1	0.0	40.0	59.8	0.0	41.0
Incr Delay (d2), s/veh	1.3	1.2	2.2	0.4	1.3	2.4	1532.1	0.0	0.3	293.0	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	10.7	11.6	0.4	11.4	12.7	23.3	0.0	0.0	6.7	0.0	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.5	16.5	17.7	12.4	17.5	18.7	1599.1	0.0	40.2	352.8	0.0	41.5
LnGrp LOS	B	B	B	B	B	B	F	A	D	F	A	D
Approach Vol, veh/h		1935			1948			305			211	
Approach Delay, s/veh		16.9			17.8			1154.5			168.3	
Approach LOS		B			B			F			F	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.8	88.2		39.0	8.8	87.2		39.0				
Change Period (Y+Rc), s	4.0	6.0		6.0	4.0	6.0		6.0				
Max Green Setting (Gmax), s	7.0	79.0		33.0	7.0	79.0		33.0				
Max Q Clear Time (g_c+I1), s	3.0	30.7		35.0	4.6	32.3		35.0				
Green Ext Time (p_c), s	0.0	19.9		0.0	0.0	20.7		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			103.4									
HCM 6th LOS			F									

HCM 6th TWSC
6: Billings Street & Retail Access

2040 Background
PM Peak




Intersection						
Int Delay, s/veh	3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	25	70	205	25	65	135
Future Vol, veh/h	25	70	205	25	65	135
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	76	223	27	71	147
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	526	237	0	0	250	0
Stage 1	237	-	-	-	-	-
Stage 2	289	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	530	802	-	-	1316	-
Stage 1	802	-	-	-	-	-
Stage 2	784	-	-	-	-	-
Platoon blocked, %	1		-	-		-
Mov Cap-1 Maneuver	499	802	-	-	1316	-
Mov Cap-2 Maneuver	499	-	-	-	-	-
Stage 1	802	-	-	-	-	-
Stage 2	738	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	11.1	0		2.6		
HCM LOS	B					
Minor Lane/Major Mvmt		NBT	NBRWBLn1	SBL	SBT	
Capacity (veh/h)		-	-	692	1316	-
HCM Lane V/C Ratio		-	-	0.149	0.054	-
HCM Control Delay (s)		-	-	11.1	7.9	0
HCM Lane LOS		-	-	B	A	A
HCM 95th %tile Q(veh)		-	-	0.5	0.2	-

HCM 6th TWSC
12: Billings Street & Denny's Access

2040 Background
PM Peak

Intersection

Int Delay, s/veh 0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	10	270	5	10	195
Future Vol, veh/h	5	10	270	5	10	195
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	11	293	5	11	212


Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	530	296	0
Stage 1	296	-	-
Stage 2	234	-	-
Critical Hdwy	6.42	6.22	-
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	-
Pot Cap-1 Maneuver	539	743	-
Stage 1	755	-	-
Stage 2	853	-	-
Platoon blocked, %	1	-	-
Mov Cap-1 Maneuver	534	743	-
Mov Cap-2 Maneuver	534	-	-
Stage 1	755	-	-
Stage 2	844	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.6	0	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	657	1263
HCM Lane V/C Ratio	-	-	0.025	0.009
HCM Control Delay (s)	-	-	10.6	7.9
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0

HCM 6th Signalized Intersection Summary 3: Billings Street & E. 6th Avenue

2040 Total
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	1700	129	49	2050	38	190	15	68	26	10	142
Future Volume (veh/h)	75	1700	129	49	2050	38	190	15	68	26	10	142
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	82	1848	140	53	2228	41	207	16	74	28	11	154
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	156	2616	198	175	2773	51	50	0	521	44	11	521
Arrive On Green	0.04	0.54	0.53	0.04	0.54	0.53	0.32	0.33	0.33	0.32	0.33	0.33
Sat Flow, veh/h	1781	4843	366	1781	5163	95	0	0	1585	0	33	1585
Grp Volume(v), veh/h	82	1297	691	53	1468	801	223	0	74	39	0	154
Grp Sat Flow(s),veh/h/ln	1781	1702	1805	1781	1702	1853	0	0	1585	33	0	1585
Q Serve(g_s), s	2.8	39.6	40.0	1.8	49.1	49.4	0.0	0.0	4.6	0.0	0.0	10.1
Cycle Q Clear(g_c), s	2.8	39.6	40.0	1.8	49.1	49.4	45.0	0.0	4.6	45.0	0.0	10.1
Prop In Lane	1.00		0.20	1.00		0.05	0.93		1.00	0.72		1.00
Lane Grp Cap(c), veh/h	156	1839	975	175	1829	996	50	0	521	55	0	521
V/C Ratio(X)	0.53	0.71	0.71	0.30	0.80	0.80	4.50	0.00	0.14	0.71	0.00	0.30
Avail Cap(c_a), veh/h	298	1839	975	234	1829	996	50	0	521	55	0	521
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.4	23.9	24.1	20.4	26.4	26.4	69.6	0.0	33.1	57.5	0.0	35.0
Incr Delay (d2), s/veh	2.7	2.3	4.3	1.0	3.8	6.9	1619.2	0.0	0.1	35.4	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	15.8	17.5	0.8	19.9	22.6	24.1	0.0	1.8	2.0	0.0	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.2	26.2	28.4	21.3	30.2	33.4	1688.8	0.0	33.2	92.9	0.0	35.3
LnGrp LOS	C	C	C	C	C	C	F	A	C	F	A	D
Approach Vol, veh/h	2070				2322				297		193	
Approach Delay, s/veh	27.1				31.1				1276.3		46.9	
Approach LOS	C				C				F		D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.4	80.6		51.0	8.8	80.2		51.0				
Change Period (Y+Rc), s	4.0	6.0		6.0	4.0	6.0		6.0				
Max Green Setting (Gmax), s	9.0	70.0		45.0	16.0	63.0		45.0				
Max Q Clear Time (g_c+I1), s	3.8	42.0		47.0	4.8	51.4		47.0				
Green Ext Time (p_c), s	0.0	17.0		0.0	0.1	9.7		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	105.8											
HCM 6th LOS	F											




HCM 6th TWSC
6: Billings Street & Knights Inn Access/Retail Access

2040 Total
AM Peak

Intersection												
Int Delay, s/veh	2.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	43	0	1	5	0	20	1	205	5	20	146	3
Future Vol, veh/h	43	0	1	5	0	20	1	205	5	20	146	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	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	47	0	1	5	0	22	1	223	5	22	159	3
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	444	435	161	433	434	226	162	0	0	228	0	0
Stage 1	205	205	-	228	228	-	-	-	-	-	-	-
Stage 2	239	230	-	205	206	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	568	543	*966	579	543	813	*1445	-	-	1340	-	-
Stage 1	862	763	-	775	715	-	-	-	-	-	-	-
Stage 2	764	714	-	862	762	-	-	-	-	-	-	-
Platoon blocked, %	1	1	1	1	1	1	-	-	-	-	-	-
Mov Cap-1 Maneuver	545	532	*966	570	533	813	*1445	-	-	1340	-	-
Mov Cap-2 Maneuver	545	532	-	570	533	-	-	-	-	-	-	-
Stage 1	861	749	-	774	714	-	-	-	-	-	-	-
Stage 2	743	713	-	845	748	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	12.2		10		0		0.9					
HCM LOS	B		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	* 1445		-	-	550	749	1340	-	-			
HCM Lane V/C Ratio	0.001		-	-	0.087	0.036	0.016	-	-			
HCM Control Delay (s)	7.5		0	-	12.2	10	7.7	0	-			
HCM Lane LOS	A		A	-	B	B	A	A	-			
HCM 95th %tile Q(veh)	0		-	-	0.3	0.1	0	-	-			
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s			+: Computation Not Defined			*: All major volume in platoon				




HCM 6th TWSC
9: Billings Street & RIRO Access

2040 Total
AM Peak

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1	0	273	178	10
Future Vol, veh/h	0	1	0	273	178	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1	0	297	193	11
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	199	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	938	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %		1		-	-	-
Mov Cap-1 Maneuver	-	938	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	8.8	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT EBLn1		SBT	SBR		
Capacity (veh/h)	- 938		-	-		
HCM Lane V/C Ratio	- 0.001		-	-		
HCM Control Delay (s)	- 8.8		-	-		
HCM Lane LOS	- A		-	-		
HCM 95th %tile Q(veh)	- 0		-	-		

HCM 6th TWSC
12: Billings Street & Denny's Access

2040 Total
AM Peak

Intersection						
Int Delay, s/veh	0.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	10	263	5	15	164
Future Vol, veh/h	5	10	263	5	15	164
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	11	286	5	16	178
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	499	289	0	0	291	0
Stage 1	289	-	-	-	-	-
Stage 2	210	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	557	750	-	-	1271	-
Stage 1	760	-	-	-	-	-
Stage 2	864	-	-	-	-	-
Platoon blocked, %	1	-	-	-	-	-
Mov Cap-1 Maneuver	549	750	-	-	1271	-
Mov Cap-2 Maneuver	549	-	-	-	-	-
Stage 1	760	-	-	-	-	-
Stage 2	852	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	10.5	0	0.7			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	668	1271	-	
HCM Lane V/C Ratio	-	-	0.024	0.013	-	
HCM Control Delay (s)	-	-	10.5	7.9	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.1	0	-	

HCM 6th Signalized Intersection Summary

3: Billings Street & E. 6th Avenue

2040 Total
PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	1550	175	48	1710	47	197	20	88	54	25	115
Future Volume (veh/h)	85	1550	175	48	1710	47	197	20	88	54	25	115
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	92	1685	190	52	1859	51	214	22	96	59	27	125
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	221	2853	321	218	3109	85	51	0	399	45	13	399
Arrive On Green	0.04	0.61	0.61	0.04	0.61	0.60	0.24	0.25	0.25	0.24	0.25	0.25
Sat Flow, veh/h	1781	4657	524	1781	5109	140	0	0	1585	0	52	1585
Grp Volume(v), veh/h	92	1230	645	52	1238	672	236	0	96	86	0	125
Grp Sat Flow(s),veh/h/ln	1781	1702	1776	1781	1702	1845	0	0	1585	52	0	1585
Q Serve(g_s), s	2.6	29.6	29.9	1.4	30.2	30.3	0.0	0.0	6.5	0.0	0.0	8.6
Cycle Q Clear(g_c), s	2.6	29.6	29.9	1.4	30.2	30.3	33.0	0.0	6.5	33.0	0.0	8.6
Prop In Lane	1.00		0.29	1.00		0.08	0.91		1.00	0.69		1.00
Lane Grp Cap(c), veh/h	221	2086	1088	218	2072	1123	51	0	399	58	0	399
V/C Ratio(X)	0.42	0.59	0.59	0.24	0.60	0.60	4.64	0.00	0.24	1.49	0.00	0.31
Avail Cap(c_a), veh/h	249	2086	1088	254	2072	1123	51	0	399	58	0	399
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(l)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.2	15.9	16.0	12.7	16.3	16.3	67.1	0.0	40.2	59.8	0.0	41.0
Incr Delay (d2), s/veh	1.3	1.2	2.4	0.6	1.3	2.4	1682.5	0.0	0.3	293.0	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	11.1	12.1	0.6	11.4	12.7	25.5	0.0	2.6	6.7	0.0	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.5	17.1	18.4	13.2	17.5	18.7	1749.6	0.0	40.5	352.8	0.0	41.5
LnGrp LOS	B	B	B	B	B	B	F	A	D	F	A	D
Approach Vol, veh/h	1967			1962			332			211		
Approach Delay, s/veh	17.4			17.8			1255.4			168.3		
Approach LOS	B			B			F			F		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.3	87.7		39.0	8.8	87.2		39.0				
Change Period (Y+Rc), s	4.0	6.0		6.0	4.0	6.0		6.0				
Max Green Setting (Gmax), s	7.0	79.0		33.0	7.0	79.0		33.0				
Max Q Clear Time (g_c+I1), s	3.4	31.9		35.0	4.6	32.3		35.0				
Green Ext Time (p_c), s	0.0	20.4		0.0	0.0	20.7		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	116.6											
HCM 6th LOS	F											

HCM 6th TWSC
6: Billings Street & Knights Inn Access/Retail Access

2040 Total
PM Peak

Intersection												
Int Delay, s/veh	3.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	25	0	0	25	0	70	2	205	25	65	136	10
Future Vol, veh/h	25	0	0	25	0	70	2	205	25	65	136	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	27	0	0	27	0	76	2	223	27	71	148	11




Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	575	550	154	537	542	237	159	0	0	250	0	0
Stage 1	296	296	-	241	241	-	-	-	-	-	-	-
Stage 2	279	254	-	296	301	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	450	456	963	480	461	802	1445	-	-	1316	-	-
Stage 1	751	686	-	762	706	-	-	-	-	-	-	-
Stage 2	728	697	-	751	681	-	-	-	-	-	-	-
Platoon blocked, %	1	1	1	1	1	1	-	-	-	-	-	-
Mov Cap-1 Maneuver	388	428	963	457	433	802	1445	-	-	1316	-	-
Mov Cap-2 Maneuver	388	428	-	457	433	-	-	-	-	-	-	-
Stage 1	750	645	-	760	705	-	-	-	-	-	-	-
Stage 2	658	696	-	707	641	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15	11.4	0.1	2.4
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1445	-	-	388 669	1316	-	-
HCM Lane V/C Ratio	0.002	-	-	0.07 0.154	0.054	-	-
HCM Control Delay (s)	7.5	0	-	15 11.4	7.9	0	-
HCM Lane LOS	A	A	-	C B	A A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2 0.5	0.2	-	-




HCM 6th TWSC
9: Billings Street & RIRO Access

2040 Total
PM Peak

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1	0	305	215	33
Future Vol, veh/h	0	1	0	305	215	33
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1	0	332	234	36
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	252	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	891	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %		1		-	-	-
Mov Cap-1 Maneuver	-	891	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	9	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT EBLn1		SBT	SBR		
Capacity (veh/h)	- 891		-	-		
HCM Lane V/C Ratio	- 0.001		-	-		
HCM Control Delay (s)	- 9		-	-		
HCM Lane LOS	- A		-	-		
HCM 95th %tile Q(veh)	- 0		-	-		

HCM 6th TWSC
12: Billings Street & Denny's Access

2040 Total
PM Peak

Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	10	295	5	10	206
Future Vol, veh/h	5	10	295	5	10	206
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	11	321	5	11	224
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	570	324	0	0	326	0
Stage 1	324	-	-	-	-	-
Stage 2	246	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	512	717	-	-	1234	-
Stage 1	733	-	-	-	-	-
Stage 2	851	-	-	-	-	-
Platoon blocked, %	1	-	-	-	-	-
Mov Cap-1 Maneuver	507	717	-	-	1234	-
Mov Cap-2 Maneuver	507	-	-	-	-	-
Stage 1	733	-	-	-	-	-
Stage 2	842	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	10.9	0		0.4		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	-		630	1234	
HCM Lane V/C Ratio	-	-		0.026	0.009	
HCM Control Delay (s)	-	-		10.9	7.9	
HCM Lane LOS	-	-		B	A	
HCM 95th %tile Q(veh)	-	-		0.1	0	