



LSC TRANSPORTATION CONSULTANTS, INC.

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

September 2, 2016

Mr. Daniel P. Onifer
Crown Enterprises, Inc.
12225 Stephens
Warren, MI 48089

Re: Aberdeen Cross-Dock
Logistics Facility
Commerce City, CO
LSC #151440

Dear Mr. Onifer:

In response to your request, LSC Transportation Consultants, Inc. has prepared this traffic impact analysis for the proposed Aberdeen Cross-Dock Logistics Facility. As shown on Figure 1, the site is located west of Stage Highway (SH) 2, south of E. 104th Avenue, and east of Lima Street in Commerce City, 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 short-term and long-term background and resulting total traffic volumes on the area roadways; the site's projected traffic impacts; and any recommended roadway improvements to mitigate the site's traffic impacts.

LAND USE AND ACCESS

The site is proposed to include a cross-dock logistics facility. Access is proposed from a full movement access to E. 104th Avenue via Peoria Parkway and an emergency-only access to E. 104th Avenue via Lima Street. Figure 2 shows the conceptual site plan.

ROADWAY AND TRAFFIC CONDITIONS

Area Roadways

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

- **E. 104th Avenue** is an east-west, four-lane, principal arterial roadway north of the site. The intersection with Peoria Parkway is stop-sign controlled. The speed limit in the vicinity of the site is 45 mph. It is shown as a six-lane principal arterial at buildout per the *Commerce City C3 Vision Transportation Plan*.
- **SH 2** is a north-south, two-lane state highway east of the site. It is classified by CDOT as NR-A (Non-Rural Principal Highway). The intersection with E. 104th Avenue is signalized with auxiliary turn lanes. The speed limit in the vicinity of the site is 55 mph. It is shown as a four-lane state highway by 2035 per the *Commerce City C3 Vision Transportation Plan*.
- **Peoria Parkway** is a north-south, four-lane major collector roadway north of the site. The intersection with E. 104th Avenue is stop-sign controlled with auxiliary turn lanes but is planned for future signalization. The posted speed limit in the vicinity of the site is 35 mph.

Existing Traffic Conditions

Figure 3 shows the existing lane geometries, traffic controls, and traffic volumes in the site's vicinity on a typical weekday. The weekday peak-hour traffic volumes and daily traffic counts are from the attached traffic counts conducted by Counter Measures in January, 2016.

2017 and 2035 Background Traffic

Figure 4 shows the estimated 2017 background traffic and Figure 5 shows the estimated 2035 background traffic. The 2017 background traffic assumes an annual growth rate of about three percent from 2016 to 2017. The projected 2035 background traffic volumes on 104th Avenue and SH 2 are consistent with projections from the *C3 Vision Transportation Plan*. Peoria Parkway north of E. 104th Avenue was assumed to grow at an annual rate of about three percent for movements to/from the west and at two percent for movements to/from the east. The future land use between the site and E. 104th Avenue was assumed to develop primarily as retail space between 2017 and 2035. Specific uses assumed include a gas station with 16 fueling positions, 6,000 square feet of fast-food restaurant with drive-through, 8,000 square feet of sit-down restaurant, a bank with three drive-in lanes, and about 112,500 square feet of general retail space.

Existing, 2017, and 2035 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 Figures 3, 4, and 5 were analyzed to determine the existing, 2017, and 2035 background levels of service. Table 1 shows the level of service analysis results. The level of service reports are attached.

- **SH 2/E. 104th Avenue:** This signalized intersection currently operates at an overall LOS "C" during both morning and afternoon peak-hours. By 2035, the intersection is expected to operate at an overall LOS "D" during both morning and afternoon peak-hours.

- **E. 104th Avenue/Peoria Parkway:** The southbound left-turn movement currently operates at LOS “F” during the morning peak-hour and LOS “E” during the afternoon peak-hour and is expected to operate poorly until the intersection is signalized. Without signalized control, the side road left-turn movement onto E. 104th Avenue is expected to operate at LOS “E” or “F”. As a signalized intersection it is expected to operate at an overall LOS “C” during both morning and afternoon peak-hours through 2035.
- **E. 104th Avenue/Lima Street:** All movements at this unsignalized three-quarter movement intersection currently operate at LOS “B” or better during both morning and afternoon peak-hours and are expected to operate at LOS “C” or better through 2035.

TRIP GENERATION

Table 2 shows the estimated average weekday, morning peak-hour, and afternoon peak-hour trip generation for the proposed site for two scenarios based on information from the applicant.

In 2017, the site is projected to generate about 330 vehicle-trips on the average weekday, with about half entering and half exiting the site 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 30 vehicles would enter and about 50 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 40 vehicles would enter and about 30 vehicles would exit the site.

In 2035, the site is projected to generate about 500 vehicle-trips on the average weekday, with about half entering and half exiting the site 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 45 vehicles would enter and about 75 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 60 vehicles would enter and about 45 vehicles would exit the site.

TRIP DISTRIBUTION AND ASSIGNMENT

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.

SITE-GENERATED TRAFFIC

Figure 7a shows the estimated 2017 site-generated traffic volumes which are the directional distribution percentages (from Figure 6) applied to the appropriate trip generation estimate (from Table 2).

Figure 7b shows the estimated 2035 site-generated traffic volumes which are the directional distribution percentages (from Figure 6) applied to the appropriate trip generation estimate (from Table 2).

2017 AND 2035 TOTAL TRAFFIC

Figure 8 shows the 2017 total traffic which is the sum of the 2017 background traffic volumes (from Figure 4) and the 2017 site-generated traffic volumes (from Figure 7a). Figure 8 also shows the 2017 lane geometry and traffic control.

Figure 9 shows the 2035 total traffic which is the sum of 2035 background traffic volumes (from Figure 5) and the 2035 site-generated traffic volumes (from Figure 7b). Figure 9 also shows the 2035 lane geometry and traffic control.

PROJECTED LEVELS OF SERVICE

The intersections in Figures 8 and 9 were analyzed to determine the 2016 and 2035 total levels of service. Table 1 shows the level of service analysis results. The level of service reports are attached.

- **SH 2/E. 104th Avenue:** This signalized intersection is expected to operate at an overall LOS “D” during both peak-hours through 2035 with or without the addition of site traffic.
- **E. 104th Avenue/Peoria Parkway:** This intersection is expected to operate at an overall LOS “C” in 2035 with traffic signal control. The side road approaches are expected to have significant delay until traffic signal control is implemented as shown in the 2017 analyses.
- **E. 104th Avenue/Lima Street:** All movements at this unsignalized three-quarter movement intersection are expected to operate at LOS “C” or better during both morning and afternoon peak-hours through 2035.

CONCLUSIONS AND RECOMMENDATIONS

Trip Generation

1. In 2017, the site is projected to generate about 330 vehicle-trips on the average weekday, with about half entering and half exiting the site during a 24-hour period. During the morning peak-hour, about 30 vehicles would enter and about 50 vehicles would exit the site. During the afternoon peak-hour, about 40 vehicles would enter and about 30 vehicles would exit the site.
2. In 2035, the site is projected to generate about 500 vehicle-trips on the average weekday, with about half entering and half exiting the site during a 24-hour period. During the morning peak-hour, about 45 vehicles would enter and about 75 vehicles would exit the site. During the afternoon peak-hour, about 60 vehicles would enter and about 45 vehicles would exit the site.

Projected Levels of Service

3. The southbound left-turn movement at the intersection of E. 104th Avenue/Peoria Parkway currently operates at LOS “F” and is expected to do so until traffic signal control is implemented.

4. All movements at the intersections analyzed are expected to operate at LOS "D" or better during both morning and afternoon peak-hours through 2035, with or without the addition of site traffic assuming the E. 104th Avenue/Peoria Parkway intersection is signalized and State Highway 2 is widened to four through lanes by 2035. The Peoria Parkway side road left-turn movements onto 104th Avenue are expected to operate at LOS "E" or "F" until traffic signal control is implemented.

Recommendations

5. The City should consider implementing traffic signal control at the intersection of E. 104th Avenue and Peoria Parkway based on the existing traffic volumes. The southbound left-turn movement currently operates at LOS "F" and is a high enough volume to likely warrant traffic signal control. A traffic signal warrant will likely not be met based on the northbound approach traffic volumes until additional development occurs beyond the proposed site. Both side road approaches are expected to experience significant delay until traffic signal control is implemented. The applicant has been asked to contribute 4.69 percent of the future traffic signal cost or \$17,780 of the estimated \$379,300 total cost.

* * * * *

We trust our findings will assist you in gaining approval of the proposed Aberdeen Cross-Dock Logistics Facility development. Please contact me if you have any questions or need further assistance.

Sincerely,

LSC TRANSPORTATION CONSULTANTS, INC.

By

Christopher S. McGranahan, PE, PTOI
Principal



9-2-16

CSM/wc

Enclosures: Tables 1 and 2
Figures 1 - 9
Traffic Count Reports
Level of Service Definitions
Level of Service Reports

Table 1
Intersection Levels of Service Analysis
Aberdeen Cross-Dock Logistics Facility
Commerce City, CO
LSC #151440; September, 2016

Intersection Location	Traffic Control	Existing Traffic		2017 Background Traffic		2017 Total Traffic		2035 Background Traffic		2035 Total Traffic	
		Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service	Level of Service
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
<u>SH 2/E. 104th Avenue</u>	Signalized										
EB Left		D	C	D	C	D	C	D	C	D	C
EB Through		D	D	D	D	D	D	D	D	D	D
EB Right		D	C	D	C	D	C	D	C	D	C
WB Left		D	D	D	C	D	C	C	D	C	D
WB Through		D	D	D	D	D	D	D	D	D	D
WB Right		C	C	C	C	C	C	C	C	C	C
NWB Left		B	B	B	B	B	B	C	C	C	C
NBW Through		B	C	B	C	B	C	C	D	C	D
NWB Right		B	B	B	B	B	B	B	D	C	D
SEB Left		B	B	B	C	B	C	C	D	C	D
SEB Through		C	C	C	C	C	C	D	C	D	C
SEB Right		B	B	B	B	B	B	C	C	C	C
Entire Intersection Delay (sec /veh)		34.4	32.6	32.7	31.2	32.9	31.3	37.1	43.1	37.6	43.4
Entire Intersection LOS		C	C	C	C	C	C	D	D	D	D
<u>E. 104th Avenue/Peoria Parkway/Site Access</u>	TWSC										
NB Left		-	-	-	-	D	E	-	-	-	-
NB Through		-	-	-	-	D	E	-	-	-	-
NB Right		-	-	-	-	A	B	-	-	-	-
EB Left		A	A	A	A	A	A	-	-	-	-
WB Left		-	-	-	-	A	A	-	-	-	-
SB Left		F	E	F	F	F	F	-	-	-	-
SB Through		-	-	-	-	D	E	-	-	-	-
SB Right		B	B	B	B	-	-	-	-	-	-
Critical Movement Delay		184.0	45.0	246.2	54.4	460.7	111.2	-	-	-	-
	Signalized										
EB Left		-	-	-	-	-	-	B	B	B	B
EB Through		-	-	-	-	-	-	C	C	C	C
EB Right		-	-	-	-	-	-	B	B	C	B
WB Left		-	-	-	-	-	-	B	C	B	C
WB Through		-	-	-	-	-	-	C	B	C	B
WB Right		-	-	-	-	-	-	B	B	B	B
NB Left		-	-	-	-	-	-	C	C	C	C
NB Through		-	-	-	-	-	-	D	D	D	D
NB Right		-	-	-	-	-	-	D	C	D	C
SB Left		-	-	-	-	-	-	D	C	D	C
SB Through		-	-	-	-	-	-	C	D	C	D
SB Right		-	-	-	-	-	-	D	C	D	C
Entire Intersection Delay (sec /veh)		-	-	-	-	-	-	25.3	23.5	26.2	24.4
Entire Intersection LOS		-	-	-	-	-	-	C	C	C	C
<u>E. 104th Avenue/Paris Street</u>	TWSC										
SB Approach		B	B	-	-	-	-	-	-	-	-
Critical Movement Delay		11.4	10.0	-	-	-	-	-	-	-	-
<u>E. 104th Avenue/Lima Street</u>	TWSC										
NB Left		A	B	A	B	A	B	B	C	B	C
WB Left		A	A	A	A	A	A	A	B	B	B
Critical Movement Delay		9.7	11.1	9.7	11.3	9.8	11.4	11.4	15.6	11.5	15.9

Table 2
ESTIMATED TRAFFIC GENERATION
Aberdeen Cross-Dock Logistics Facility
Commerce City, CO
LSC #151440; September, 2016

Land Use	Average Daily Traffic	Vehicle-Trips			
		Morning Peak-Hour		Afternoon Peak-Hour	
		AM In	AM Out	PM In	PM Out
Proposed Land Use - 2017 - 103 Loading Doors					
Tractor-Trailers ⁽¹⁾	130	0	20	10	0
Passenger Vehicles ⁽¹⁾	186	30	30	30	30
Deliveries ⁽²⁾	14	0	0	0	0
Total =	330	30	50	40	30
Proposed Land Use Potential - 2035 - 157 Loading Doors					
Tractor-Trailers	198	0	30	15	0
Passenger Vehicles	282	45	45	45	45
Deliveries	20	0	0	0	0
Total =	500	45	75	60	45

(1) Projected trip generation is based on the August 7, 2015 Traffic Impact Letter (TIL) for a similar facility (same tenant) located in Blaine, Minnesota.

(2) A small number of off-peak delivery trips was added to the estimate included in the TIL.



Approximate Scale
Scale: 1"=600'



Figure 1

Vicinity Map

Aberdeen Cross-Dock Logistics Facility (LSC #151440)

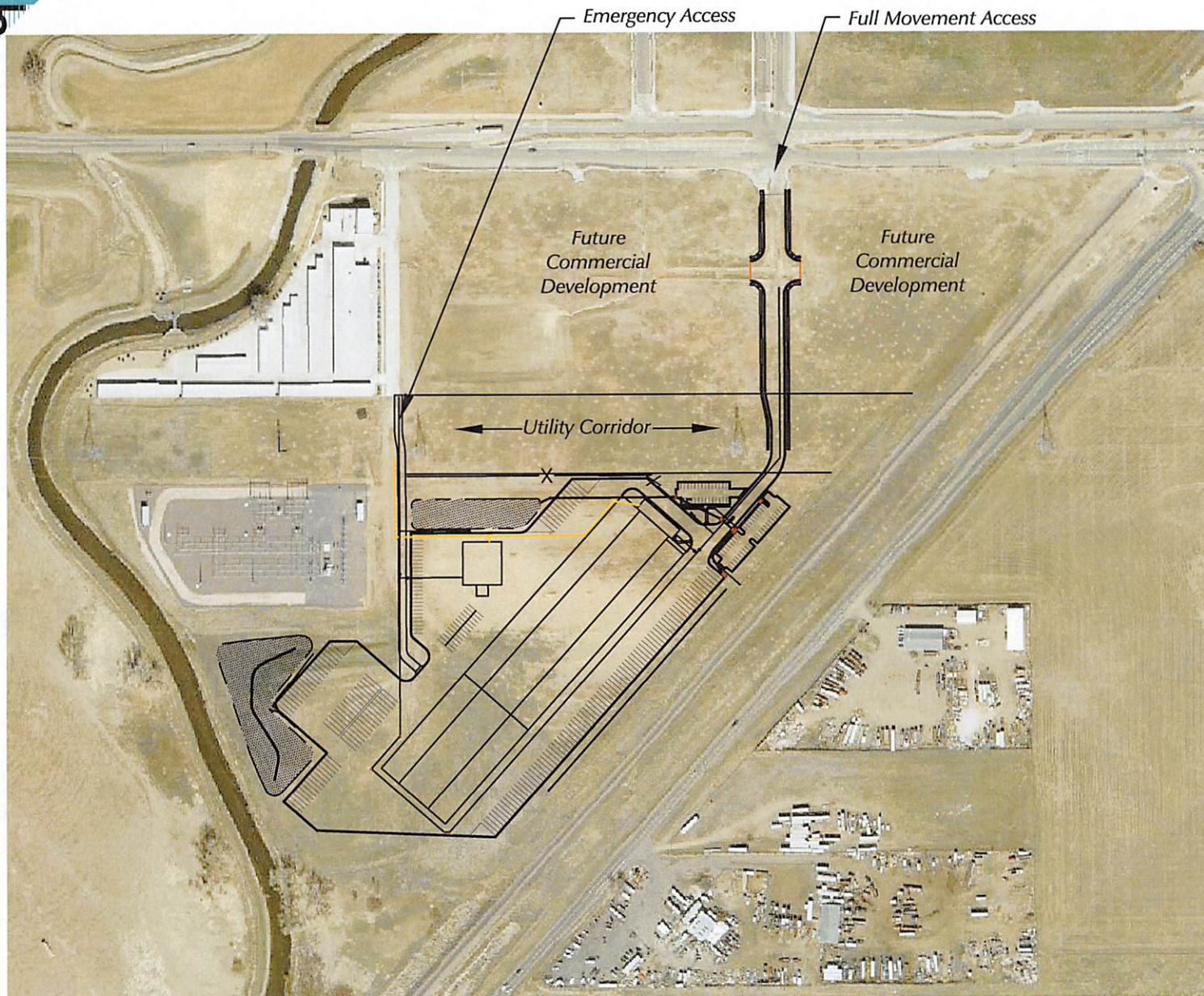


Figure 2
Site Plan

Aberdeen Cross-Dock Logistics Facility (LSC #151440)

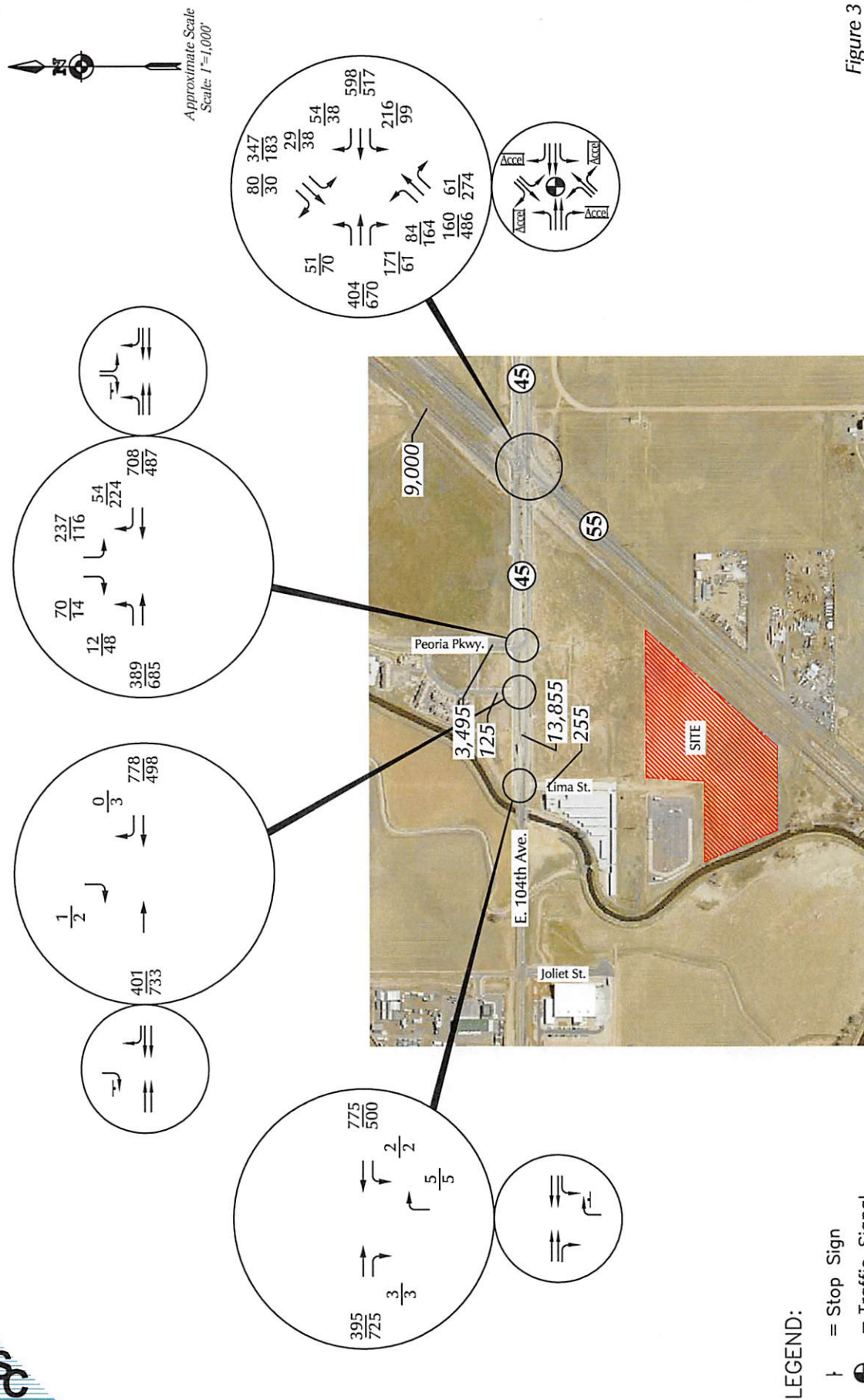
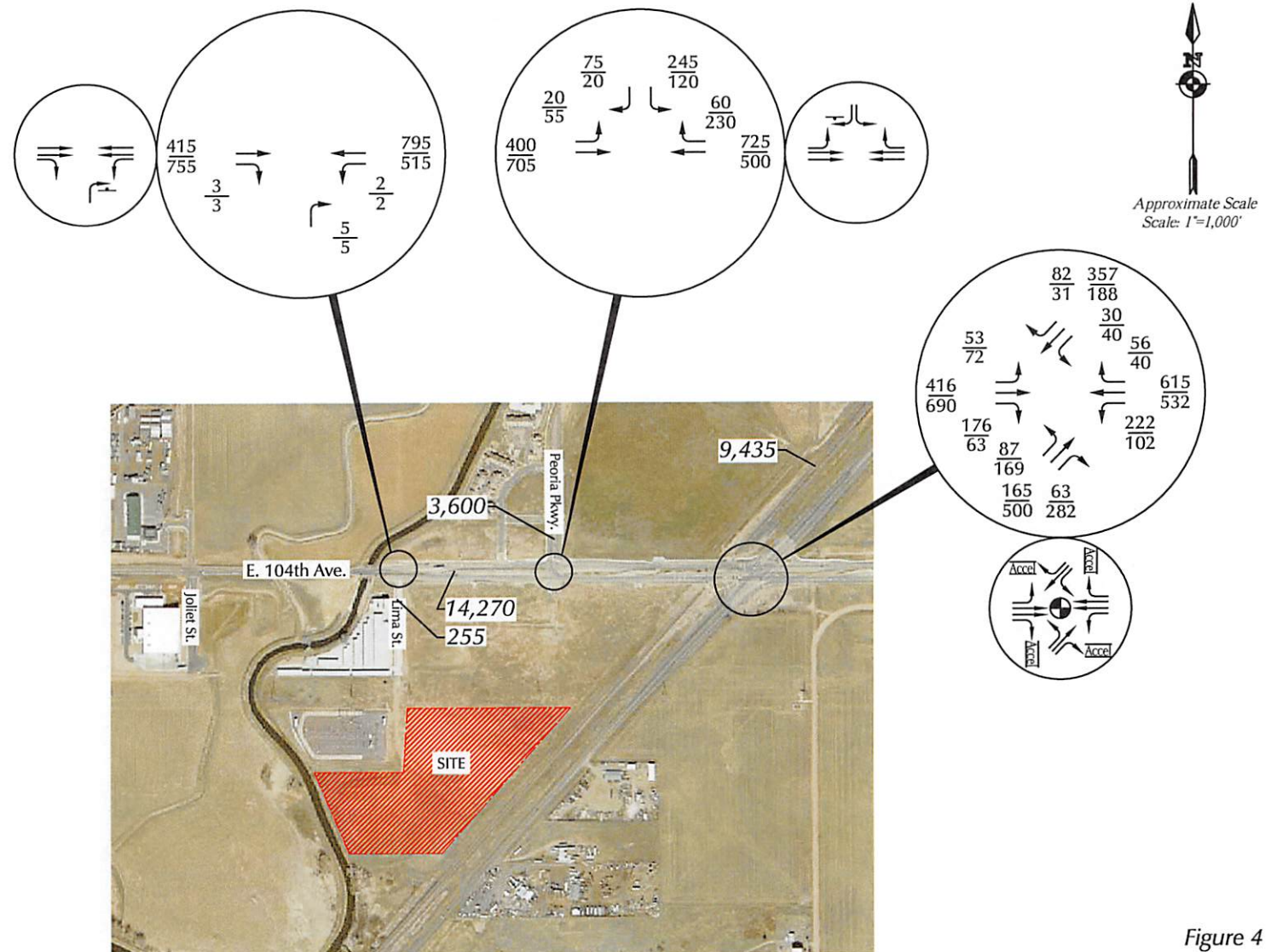


Figure 3

Existing Traffic, Lane Geometry and Traffic Control

Aberdeen Cross-Dock Logistics Facility (LSC #151440)



LEGEND:

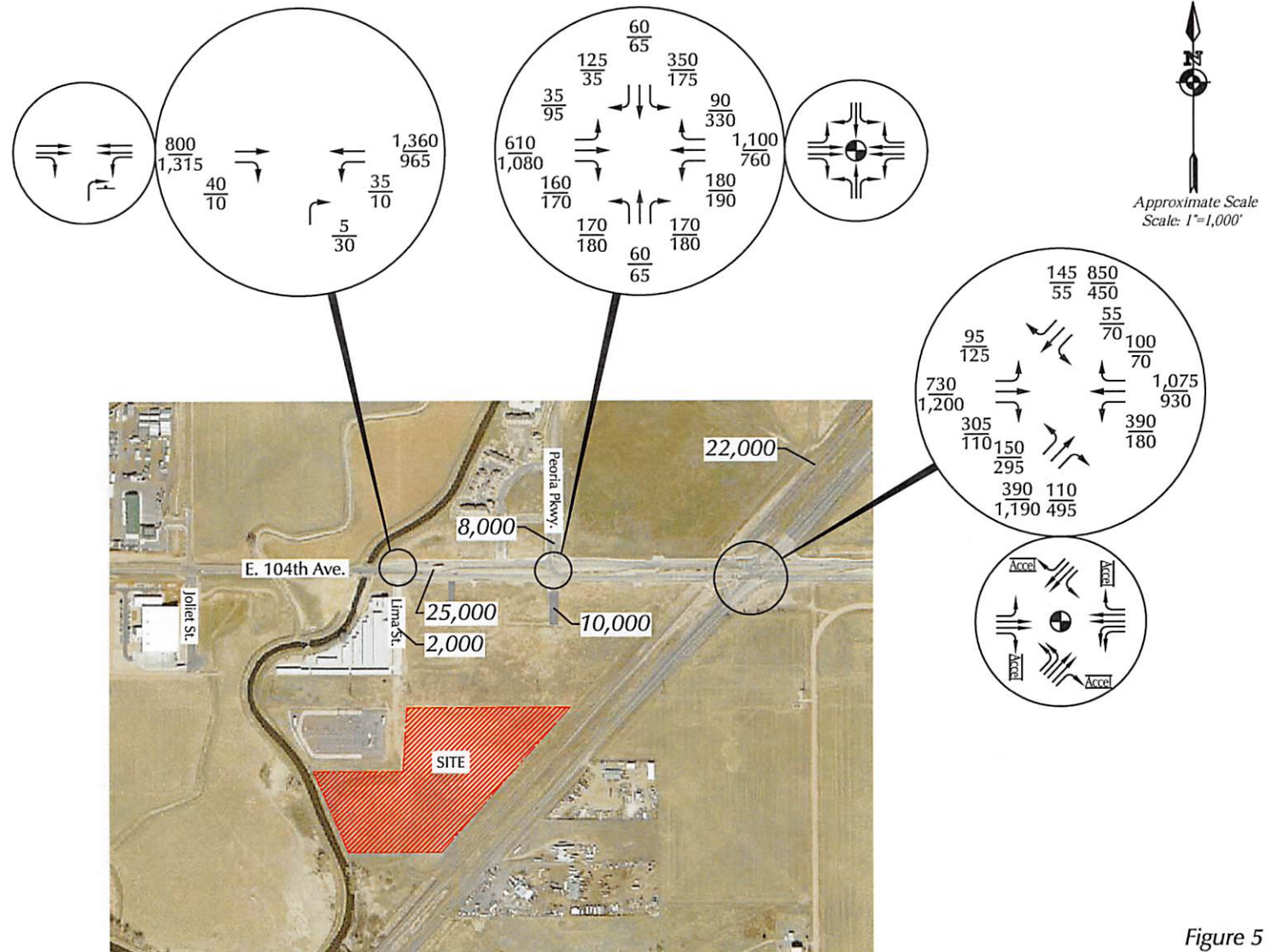
- ⌋ = Stop Sign
- ⊕ = Traffic Signal
- $\frac{26}{35}$ = $\frac{\text{AM Peak Hour Traffic}}{\text{PM Peak Hour Traffic}}$
- 2,500 = Average Daily Traffic

Note: Assumes an annual growth rate of about three percent from 2016 to 2017.

Year 2017 Background Traffic, Lane Geometry and Traffic Control

Aberdeen Cross-Dock Logistics Facility (LSC #151440)

Figure 4



LEGEND:

⌋ = Stop Sign

⊕ = Traffic Signal

$\frac{26}{35}$ = $\frac{\text{AM Peak Hour Traffic}}{\text{PM Peak Hour Traffic}}$

2,500 = Average Daily Traffic

Note: Projected volumes on 104th Avenue and SH 2 are consistent with projections from the C3 Transportation Plan. Peoria Parkway north of E. 104th Avenue was assumed to grow at an annual rate of about three percent for movements to/from the west and at two percent for movements to/from the east. The future land use between the site and E. 104th Avenue was assumed to develop primarily as retail space.

Year 2035 Background Traffic, Lane Geometry and Traffic Control

Aberdeen Cross-Dock Logistics Facility (LSC #151440)

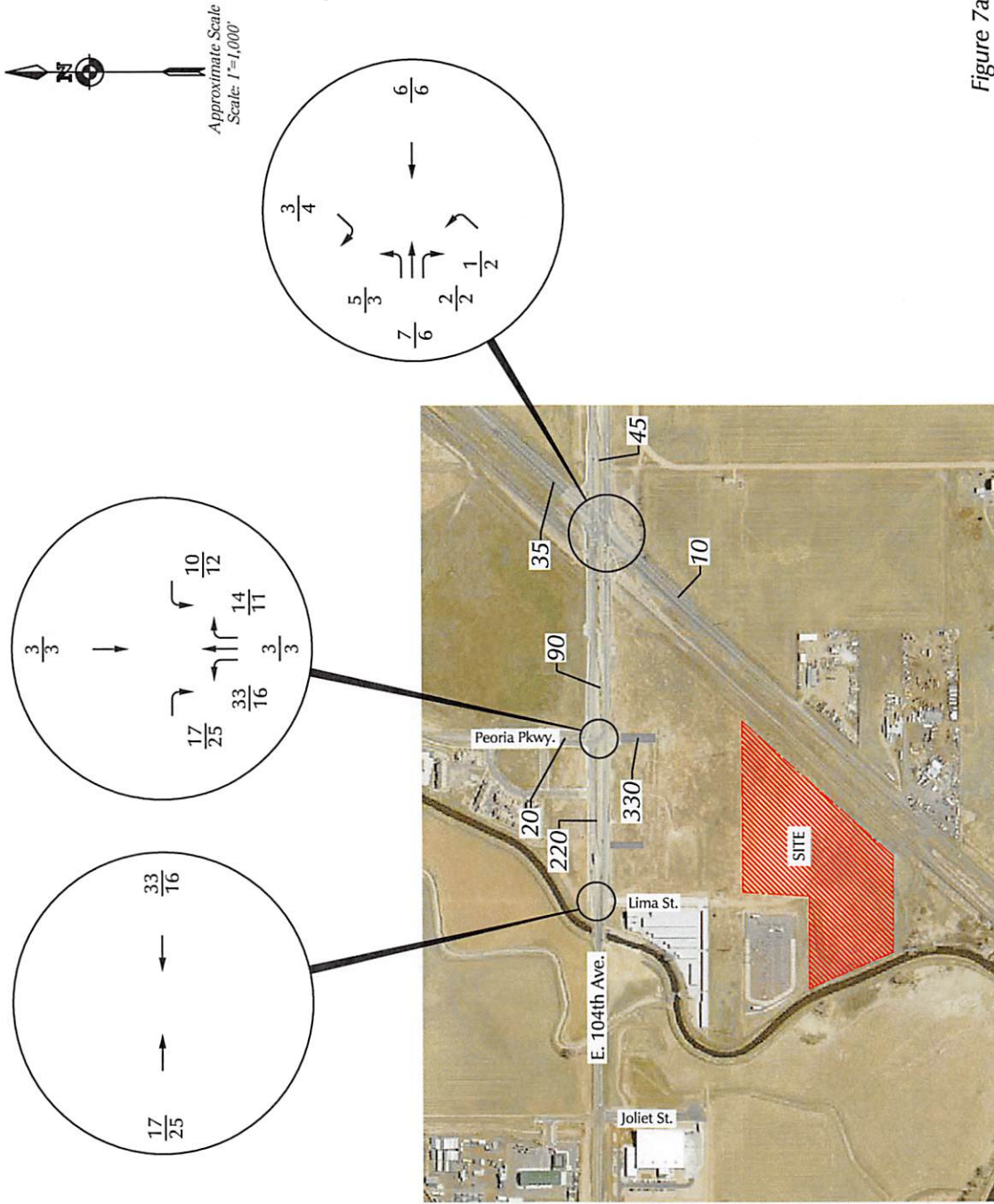
Figure 5

Approximate Scale
Scale: 1"=1,000'



LEGEND:
 $\frac{25\%}{25\%}$ = $\frac{\text{Tractor-Trailers}}{\text{Non-Tractor-Trailers}}$ Percent Directional Distribution

Figure 6
**Directional Distribution
of Site-Generated Traffic**
Aberdeen Cross-Dock Logistics Facility (LSC #151440)



LEGEND:
 $\frac{26}{35}$ = AM Peak Hour Traffic
 $\frac{35}{35}$ = PM Peak Hour Traffic
 2,500 = Average Daily Traffic

Figure 7a
**Year 2017 Assignment
 of Site-Generated Traffic**
 Aberdeen Cross-Dock Logistics Facility (LSC #151440)

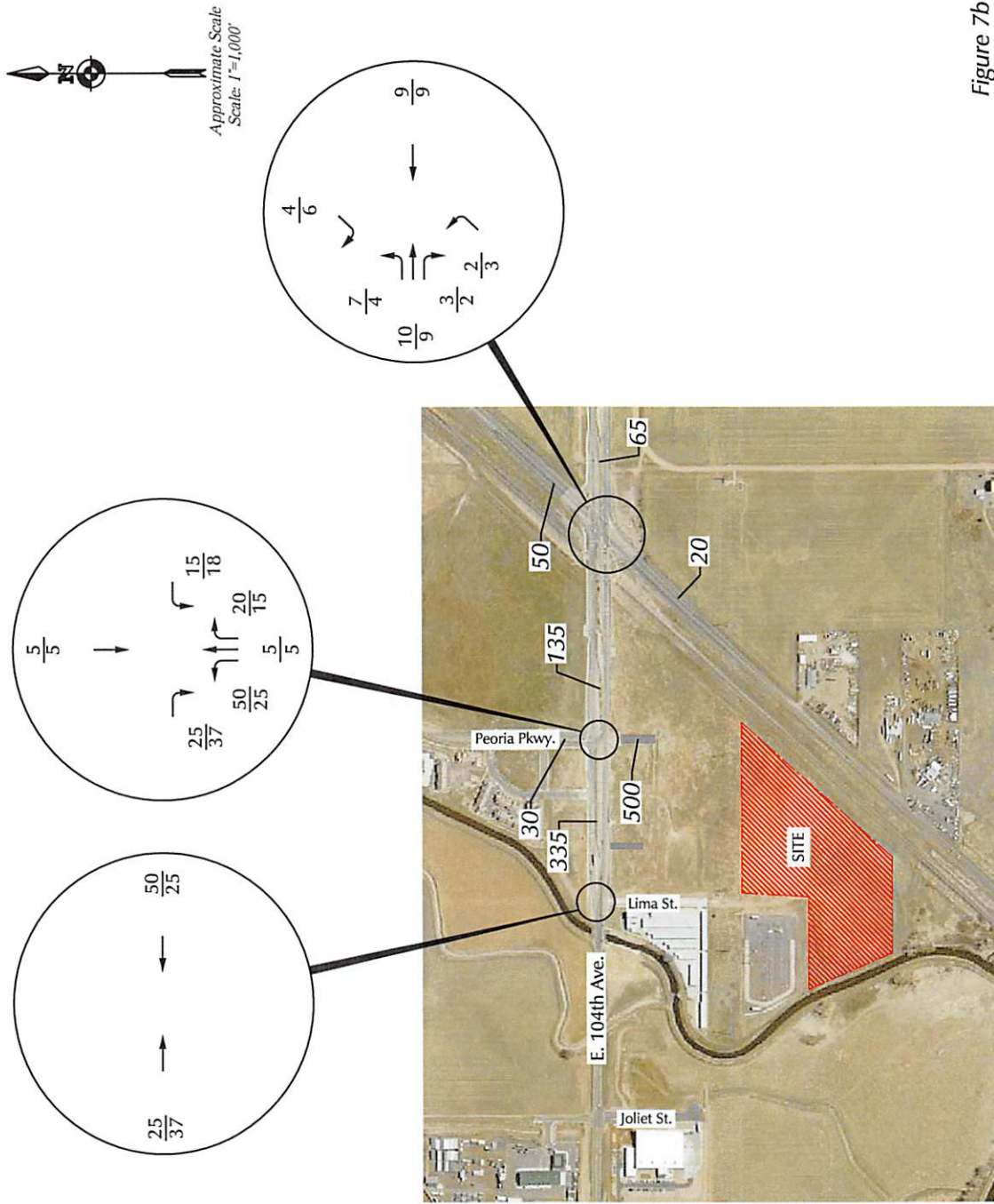


Figure 7b

Year 2035 Assignment of Site-Generated Traffic

Aberdeen Cross-Dock Logistics Facility (LSC #151440)

LEGEND:

$\frac{26}{35}$ = AM Peak Hour Traffic
 $\frac{26}{35}$ = PM Peak Hour Traffic
 2,500 = Average Daily Traffic

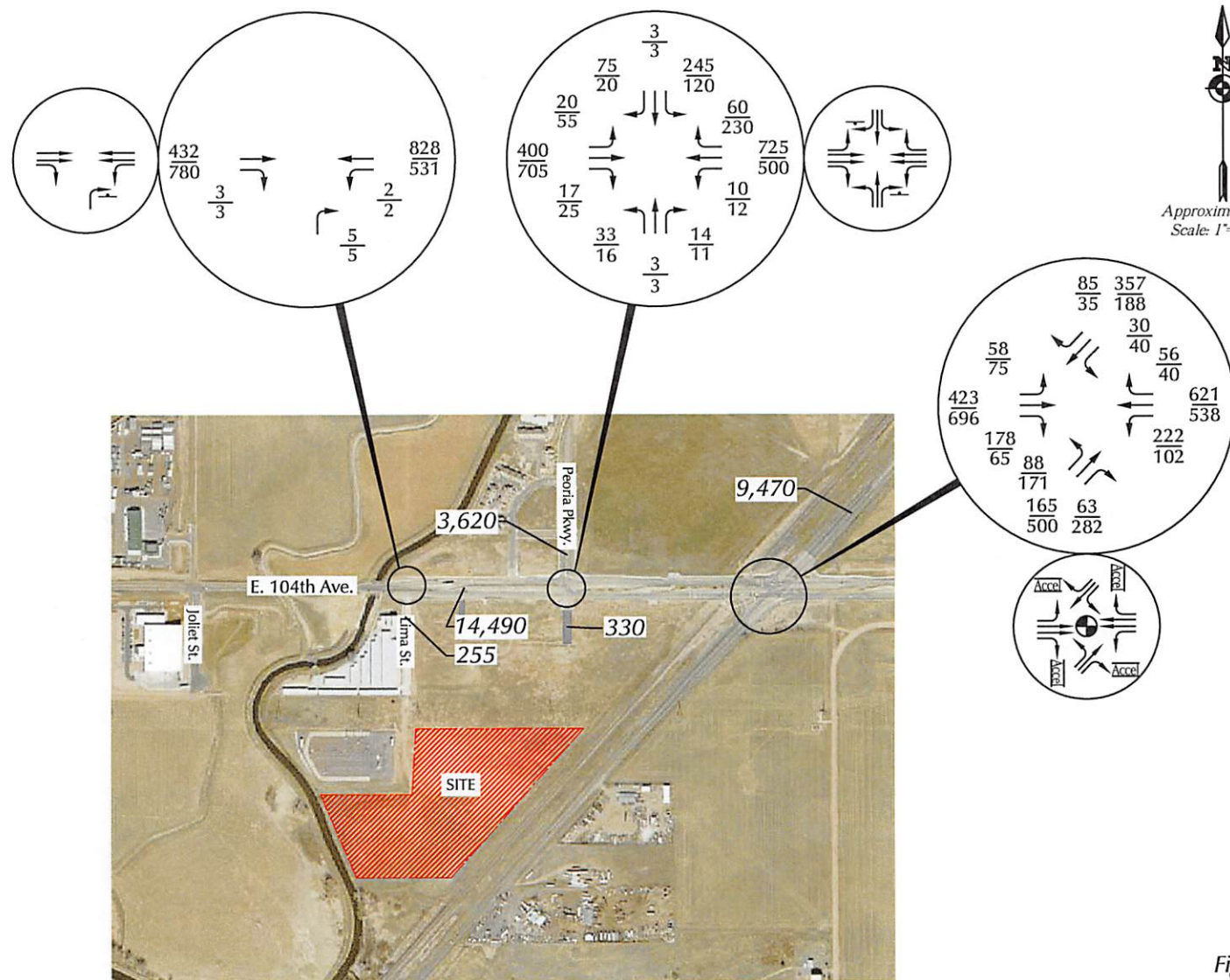


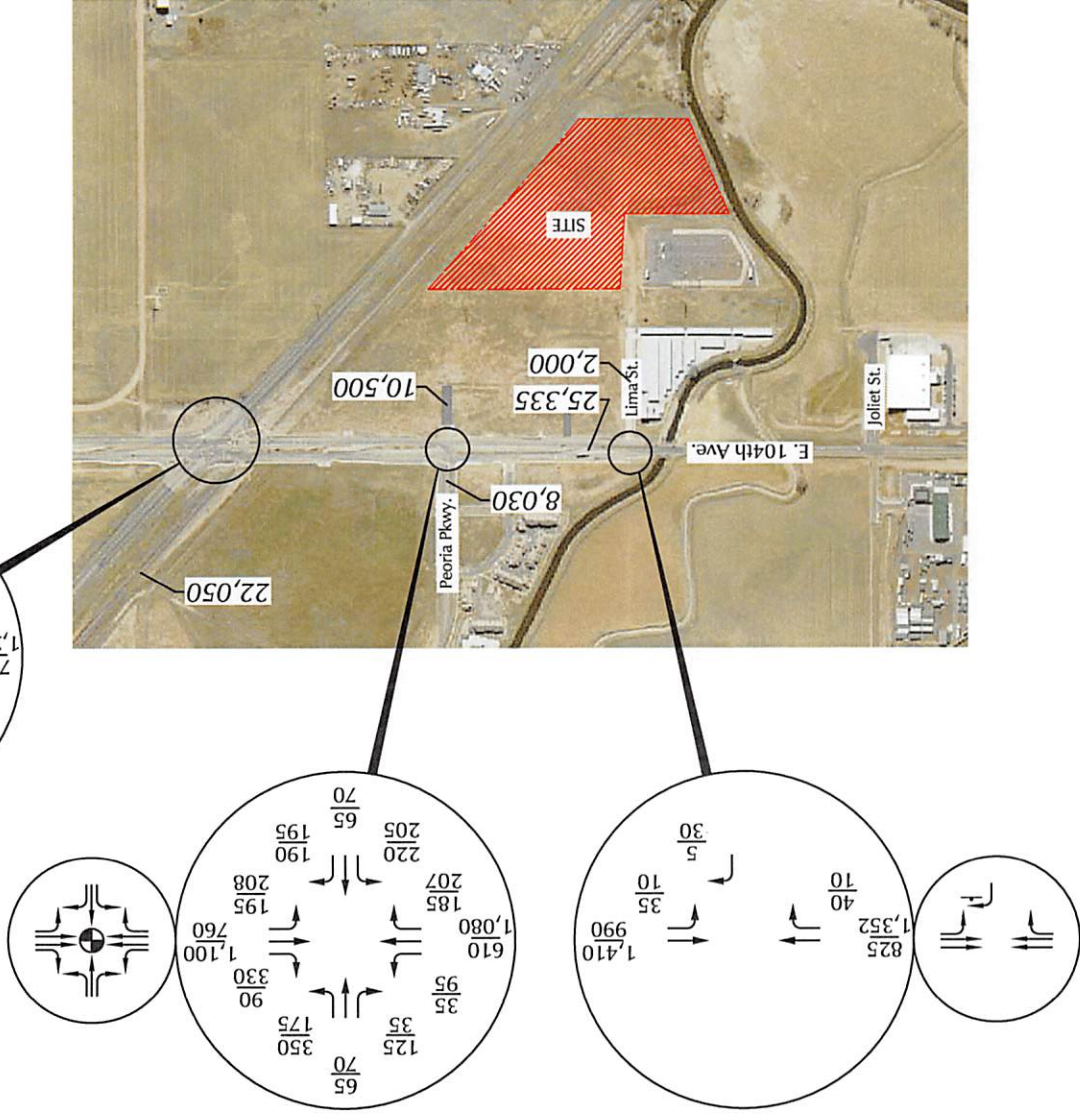
Figure 8

Year 2017 Total Traffic, Lane Geometry and Traffic Control

Aberdeen Cross-Dock Logistics Facility (LSC #151440)

LEGEND:

- ⊥ = Stop Sign
- ⊙ = Traffic Signal
- $\frac{26}{35}$ = AM Peak Hour Traffic
- $\frac{35}{26}$ = PM Peak Hour Traffic
- 2,500 = Average Daily Traffic



Year 2035 Total Traffic, Lane Geometry and Traffic Control,

Figure 9

Aberdeen Cross-Dock Logistics Facility (LSC #151440)

Approximate Scale
Scale: 1"=1,000'

COUNTER MEASURES INC.

1889 YORK STREET
DENVER, COLORADO
303-333-7409

N/S STREET: HWY-2
EW STREET: 104TH AVE
CITY: COMMERCE CITY
COUNTY: ADAMS

File Name : HWY2104T
Site Code : 00000013
Start Date : 1/5/2016
Page No : 1

Groups Printed- 1 - VEHICLES

	HWY-2 Southbound				104TH AVE Westbound				HWY-2 Northbound				104TH AVE Eastbound				Int. Total
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
06:30 AM	4	78	14	0	48	116	23	0	32	64	7	0	12	78	27	4	507
06:45 AM	7	94	14	0	51	161	5	0	36	33	13	0	26	102	37	0	579
Total	11	172	28	0	99	277	28	0	68	97	20	0	38	180	64	4	1086
07:00 AM	10	79	13	0	38	82	8	0	23	36	15	0	9	104	54	0	471
07:15 AM	6	101	32	0	65	199	28	0	14	43	14	0	7	96	48	0	653
07:30 AM	6	73	21	0	62	156	13	0	11	48	19	0	9	102	32	0	552
07:45 AM	2	80	19	0	46	158	10	0	15	48	23	0	11	109	17	0	538
Total	24	333	85	0	211	595	59	0	63	175	71	0	36	411	151	0	2214
08:00 AM	7	79	13	0	62	152	8	0	10	45	11	0	15	79	27	0	508
08:15 AM	12	64	15	0	55	124	6	0	8	39	24	0	9	91	26	0	473
Total	19	143	28	0	117	276	14	0	18	84	35	0	24	170	53	0	981
04:00 PM	9	38	9	0	35	128	14	0	29	102	52	0	22	135	17	0	590
04:15 PM	7	56	5	0	29	128	7	1	36	97	55	0	7	140	16	0	584
04:30 PM	8	38	7	0	24	120	6	0	50	134	68	0	18	186	12	0	671
04:45 PM	11	46	3	0	21	126	10	0	46	117	61	0	23	172	18	0	654
Total	35	178	24	0	109	502	37	1	161	450	236	0	70	633	63	0	2499
05:00 PM	6	50	14	0	24	150	11	0	43	118	75	0	22	183	17	0	713
05:15 PM	12	41	8	0	27	111	9	0	39	119	72	0	11	125	13	0	587
05:30 PM	9	46	5	0	27	130	8	0	36	132	66	1	14	190	13	0	677
05:45 PM	6	27	10	0	29	125	10	0	40	93	72	0	9	139	16	0	576
Total	33	164	37	0	107	516	38	0	158	462	285	1	56	637	59	0	2553
Grand Total	122	990	202	0	643	2166	176	1	468	1268	647	1	224	2031	390	4	9333
Apprch %	9.3	75.3	15.4	0.0	21.5	72.5	5.9	0.0	19.6	53.2	27.1	0.0	8.5	76.7	14.7	0.2	
Total %	1.3	10.6	2.2	0.0	6.9	23.2	1.9	0.0	5.0	13.6	6.9	0.0	2.4	21.8	4.2	0.0	

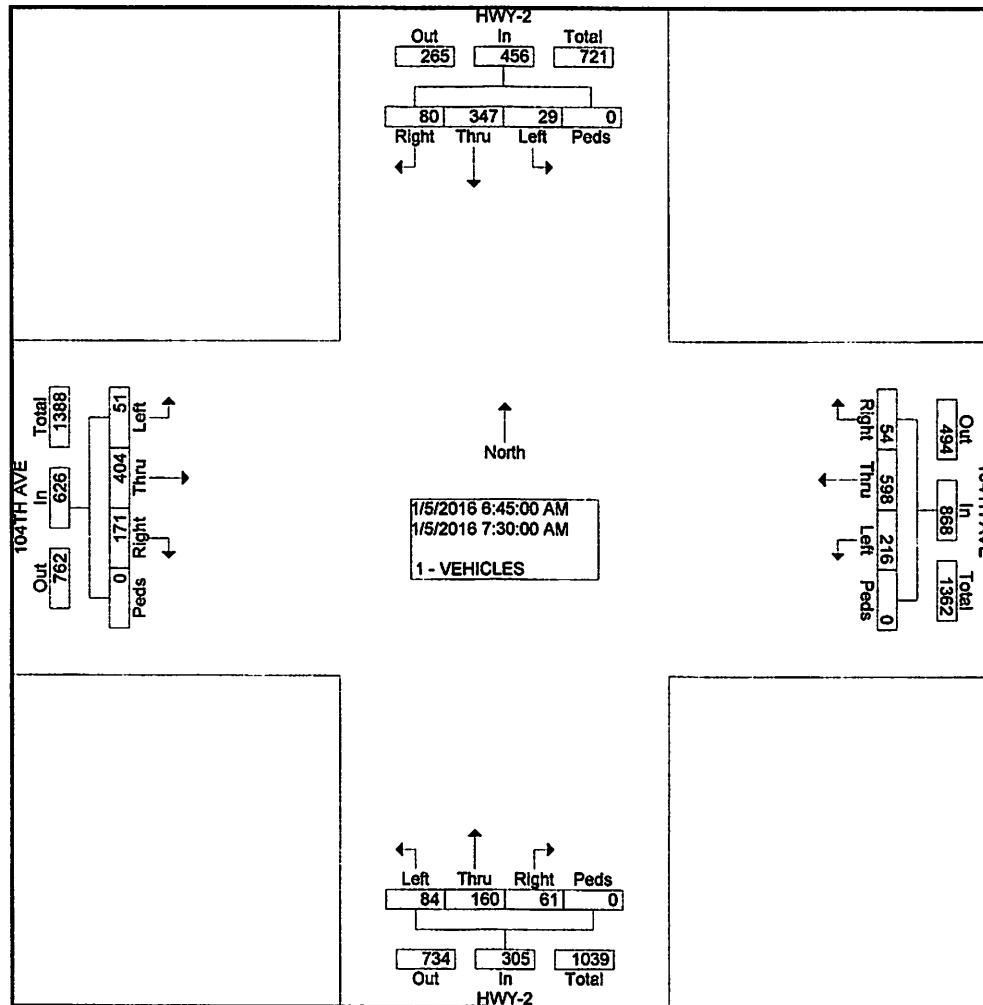
COUNTER MEASURES INC.

1889 YORK STREET
DENVER, COLORADO
303-333-7409

N/S STREET: HWY-2
E/W STREET: 104TH AVE
CITY: COMMERCE CITY
COUNTY: ADAMS

File Name : HWY2104T
Site Code : 00000013
Start Date : 1/5/2016
Page No : 2

	HWY-2 Southbound					104TH AVE Westbound					HWY-2 Northbound					104TH AVE Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 06:30 AM to 08:30 AM - Peak 1 of 1																					
Intersection	06:45 AM																				
Volume	29	347	80	0	456	216	598	54	0	868	84	160	61	0	305	51	404	171	0	626	2255
Percent	6.4	76.1	17.5	0.0		24.9	68.9	6.2	0.0		27.5	52.5	20.0	0.0		8.1	64.5	27.3	0.0		
07:15																					
Volume	6	101	32	0	139	65	199	28	0	292	14	43	14	0	71	7	96	48	0	151	653
Peak Factor																					0.863
High Int.	07:15 AM					07:15 AM					06:45 AM					07:00 AM					
Volume	6	101	32	0	139	65	199	28	0	292	36	33	13	0	82	9	104	54	0	167	
Peak Factor	0.82					0.74					0.93					0.93					7
	0					3					0					7					



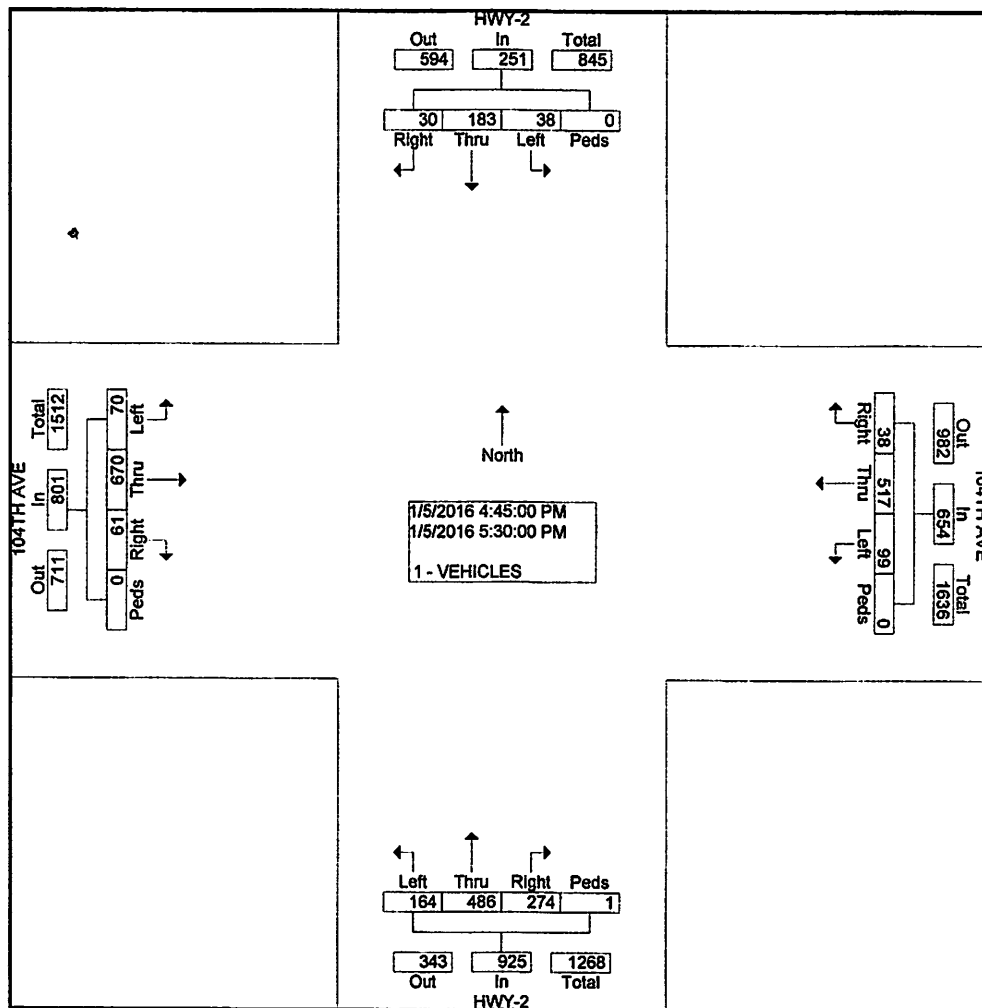
COUNTER MEASURES INC.

1889 YORK STREET
DENVER, COLORADO
303-333-7409

N/S STREET: HWY-2
E/W STREET: 104TH AVE
CITY: COMMERCE CITY
COUNTY: ADAMS

File Name : HWY2104T
Site Code : 00000013
Start Date : 1/5/2016
Page No : 2

	HWY-2 Southbound					104TH AVE Westbound					HWY-2 Northbound					104TH AVE Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Intersection	04:45 PM																				
Volume	38	183	30	0	251	99	517	38	0	654	164	486	274	1	925	70	670	61	0	801	2631
Percent	15.	72.	12.	0.0		15.	79.	5.8	0.0		17.	52.	29.	0.1		8.7	83.	7.6	0.0		
	1	9	0			1	1				7	5	6				6				
05:00																					
Volume	6	50	14	0	70	24	150	11	0	185	43	118	75	0	236	22	183	17	0	222	713
Peak Factor																					0.92
High Int.	05:00 PM					05:00 PM					05:00 PM					05:00 PM					
Volume	6	50	14	0	70	24	150	11	0	185	43	118	75	0	236	22	183	17	0	222	
Peak Factor	0.89					0.88					0.98					0.90					
	6					4					0					2					



COUNTER MEASURES INC.

1889 YORK STREET
DENVER, COLORADO
303-333-7409

N/S STREET: PEORIA PKWY
E/W STREET: 104TH AVE
CITY: COMMERCE CITY
COUNTY: ADAMS

File Name : PEOR104T
Site Code : 00000002
Start Date : 1/5/2016
Page No : 1

Groups Printed- VEHICLES

Start Time	PEORIA PKWY Southbound				104TH AVE Westbound				Northbound				104TH AVE Eastbound				Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
06:30 AM	33	0	10	0	0	136	26	1	0	0	0	0	1	84	0	0	291
06:45 AM	63	0	18	0	0	198	13	0	0	0	0	0	4	102	0	0	398
Total	96	0	28	0	0	334	39	1	0	0	0	0	5	186	0	0	689
07:00 AM	62	0	18	0	0	105	13	0	0	0	0	0	4	105	0	0	307
07:15 AM	58	0	20	0	0	232	13	0	0	0	0	0	1	93	0	0	417
07:30 AM	54	0	14	0	0	173	15	0	0	0	0	0	3	89	0	0	348
07:45 AM	42	0	9	0	0	177	15	0	0	0	0	0	0	95	0	0	338
Total	216	0	61	0	0	687	56	0	0	0	0	0	8	382	0	0	1410
08:00 AM	48	0	4	0	0	153	22	0	0	0	0	0	1	73	0	0	301
08:15 AM	35	0	12	0	0	126	21	0	0	0	0	0	4	91	0	0	289
Total	83	0	16	0	0	279	43	0	0	0	0	0	5	164	0	0	590
04:00 PM	32	0	2	0	0	130	36	0	0	0	0	0	5	142	0	0	347
04:15 PM	22	0	0	0	0	129	40	0	0	0	0	0	6	141	0	0	338
04:30 PM	31	0	5	0	0	123	54	0	0	0	0	0	8	185	0	0	406
04:45 PM	33	0	4	0	0	120	55	0	0	0	0	0	7	180	0	0	399
Total	118	0	11	0	0	502	185	0	0	0	0	0	26	648	0	0	1490
05:00 PM	34	0	1	0	0	149	58	0	0	0	0	0	11	188	0	0	441
05:15 PM	24	0	5	0	0	116	42	0	0	0	0	0	17	125	0	0	329
05:30 PM	25	0	4	0	0	102	69	0	0	0	0	0	13	192	0	0	405
05:45 PM	33	0	2	0	0	118	57	0	0	0	0	0	6	131	0	0	347
Total	116	0	12	0	0	485	226	0	0	0	0	0	47	636	0	0	1522
Grand Total	629	0	128	0	0	2287	549	1	0	0	0	0	91	2016	0	0	5701
Apprch %	83.1	0.0	16.9	0.0	0.0	80.6	19.4	0.0	0.0	0.0	0.0	0.0	4.3	95.7	0.0	0.0	
Total %	11.0	0.0	2.2	0.0	0.0	40.1	9.6	0.0	0.0	0.0	0.0	0.0	1.6	35.4	0.0	0.0	

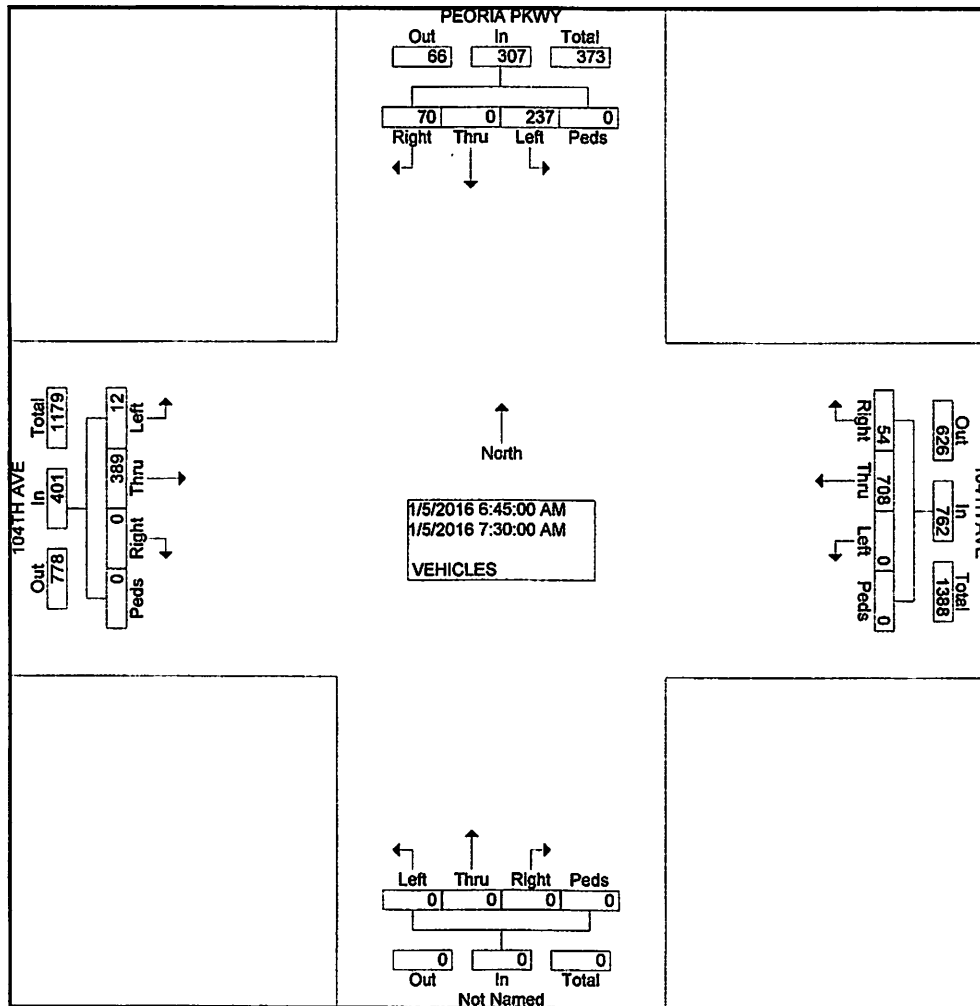
COUNTER MEASURES INC.

1889 YORK STREET
DENVER, COLORADO
303-333-7409

N/S STREET: PEORIA PKWY
E/W STREET: 104TH AVE
CITY: COMMERCE CITY
COUNTY: ADAMS

File Name : PEOR104T
Site Code : 00000002
Start Date : 1/5/2016
Page No : 2

	PEORIA PKWY Southbound					104TH AVE Westbound					Northbound					104TH AVE Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 06:30 AM to 08:30 AM - Peak 1 of 1																					
Intersecti on	06:45 AM																				
Volume	237	0	70	0	307	0	708	54	0	762	0	0	0	0	0	12	389	0	0	401	1470
Percent	77.2	0.0	22.8	0.0		0.0	92.9	7.1	0.0		0.0	0.0	0.0	0.0		3.0	97.0	0.0	0.0		
07:15 Volume	58	0	20	0	78	0	232	13	0	245	0	0	0	0	0	1	93	0	0	94	417
Peak Factor																					0.881
High Int.	06:45 AM					07:15 AM					6:15:00 AM					07:00 AM					
Volume	63	0	18	0	81	0	232	13	0	245	0	0	0	0	0	4	105	0	0	109	
Peak Factor	0.948					0.778										0.920					



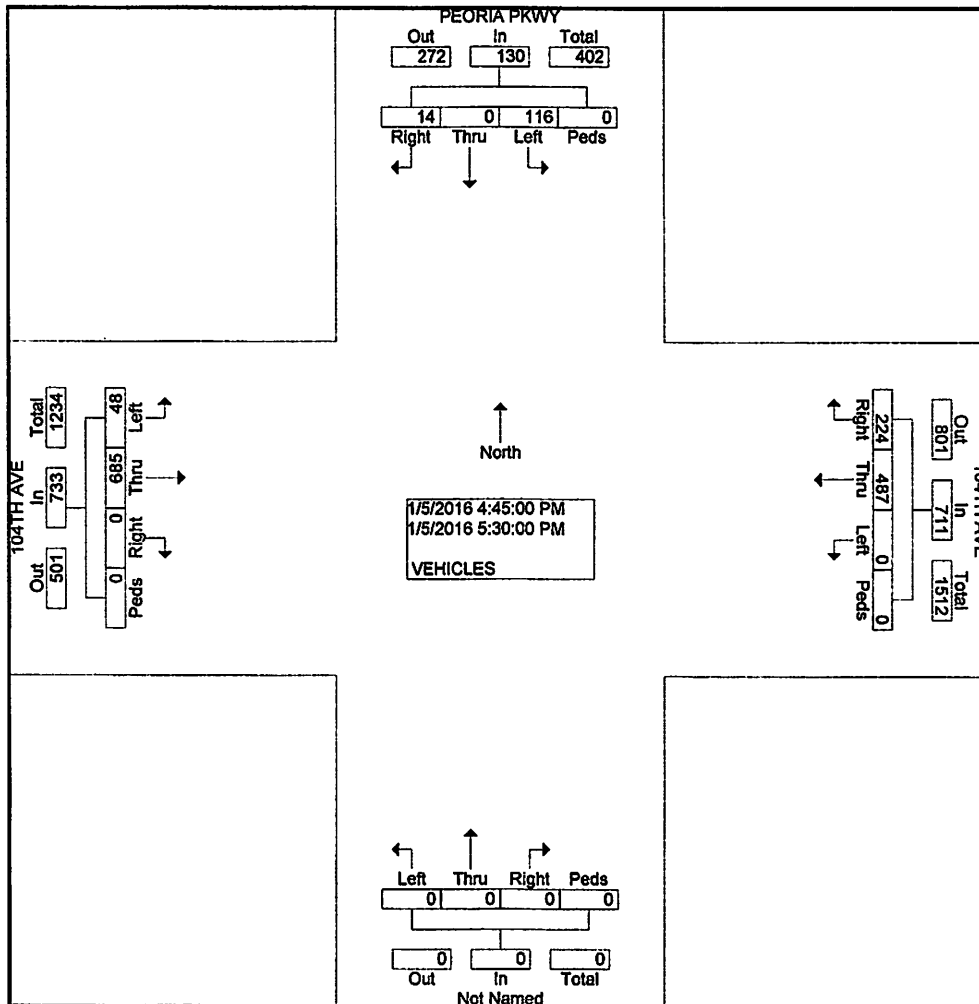
COUNTER MEASURES INC.

1889 YORK STREET
DENVER, COLORADO
303-333-7409

N/S STREET: PEORIA PKWY
E/W STREET: 104TH AVE
CITY: COMMERCE CITY
COUNTY: ADAMS

File Name : PEOR104T
Site Code : 00000002
Start Date : 1/5/2016
Page No : 2

	PEORIA PKWY Southbound					104TH AVE Westbound					Northbound					104TH AVE Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 04:45 PM to 05:30 PM - Peak 1 of 1																					
Intersect on	04:45 PM																				
Volume	116	0	14	0	130	0	487	224	0	711	0	0	0	0	0	48	685	0	0	733	1574
Percent	89.2	0.0	10.8	0.0		0.0	68.5	31.5	0.0		0.0	0.0	0.0	0.0		6.5	93.5	0.0	0.0		
05:00																					
Volume	34	0	1	0	35	0	149	58	0	207	0	0	0	0	0	11	188	0	0	199	441
Peak Factor																					0.892
High Int.	04:45 PM					05:00 PM										05:30 PM					
Volume	33	0	4	0	37	0	149	58	0	207	0	0	0	0	0	13	192	0	0	205	
Peak Factor	0.878					0.859					0.894										



COUNTER MEASURES INC.

1889 YORK STREET
DENVER, COLORADO
303-333-7409

N/S STREET: JOLIET ST
E/W STREET: 104TH AVE
CITY: COMMERCE CITY
COUNTY: ADAMS

File Name : JOIL104T
Site Code : 00000014
Start Date : 1/5/2016
Page No : 1

Groups Printed- VEHICLES

	JOIET ST Southbound				104TH AVE Westbound				JOIET ST Northbound				104TH AVE Eastbound				Int. Total
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
06:30 AM	0	0	1	0	23	125	0	0	13	0	5	0	3	82	65	0	317
06:45 AM	2	0	0	0	41	171	6	0	7	0	6	0	8	98	101	0	440
Total	2	0	1	0	64	296	6	0	20	0	11	0	11	180	166	0	757
07:00 AM	0	0	0	0	23	102	3	0	13	0	2	0	4	112	74	0	333
07:15 AM	0	0	1	0	35	140	3	0	5	2	6	0	3	108	43	0	346
07:30 AM	0	1	0	0	30	145	3	0	7	0	6	0	2	83	18	0	295
07:45 AM	0	1	1	0	31	135	2	0	3	0	3	0	1	97	14	0	288
Total	0	2	2	0	119	522	11	0	28	2	17	0	10	400	149	0	1262
08:00 AM	0	0	3	0	18	131	0	0	4	0	4	0	1	70	11	0	242
08:15 AM	0	0	0	0	15	119	3	0	7	0	3	0	3	92	19	0	261
Total	0	0	3	0	33	250	3	0	11	0	7	0	4	162	30	0	503
04:00 PM	4	0	0	0	7	120	0	0	9	0	23	0	0	124	5	0	292
04:15 PM	0	1	1	0	5	125	1	0	13	0	14	0	0	128	1	0	289
04:30 PM	6	3	20	0	5	120	2	0	26	2	35	0	4	174	11	0	408
04:45 PM	1	0	7	0	1	121	0	0	13	0	24	0	0	154	6	0	327
Total	11	4	28	0	18	486	3	0	61	2	96	0	4	580	23	0	1316
05:00 PM	1	0	1	0	3	149	0	0	15	1	32	0	0	174	5	0	381
05:15 PM	0	0	0	0	6	100	0	0	11	0	29	0	0	125	4	0	275
05:30 PM	0	0	3	0	5	123	0	0	12	0	20	0	0	179	4	0	346
05:45 PM	0	0	1	0	11	104	0	0	10	0	13	0	0	134	4	0	277
Total	1	0	5	0	25	476	0	0	48	1	94	0	0	612	17	0	1279
Grand Total	14	6	39	0	259	2030	23	0	168	5	225	0	29	1934	385	0	5117
Apprch %	23.7	10.2	66.1	0.0	11.2	87.8	1.0	0.0	42.2	1.3	56.5	0.0	1.2	82.4	16.4	0.0	
Total %	0.3	0.1	0.8	0.0	5.1	39.7	0.4	0.0	3.3	0.1	4.4	0.0	0.6	37.8	7.5	0.0	

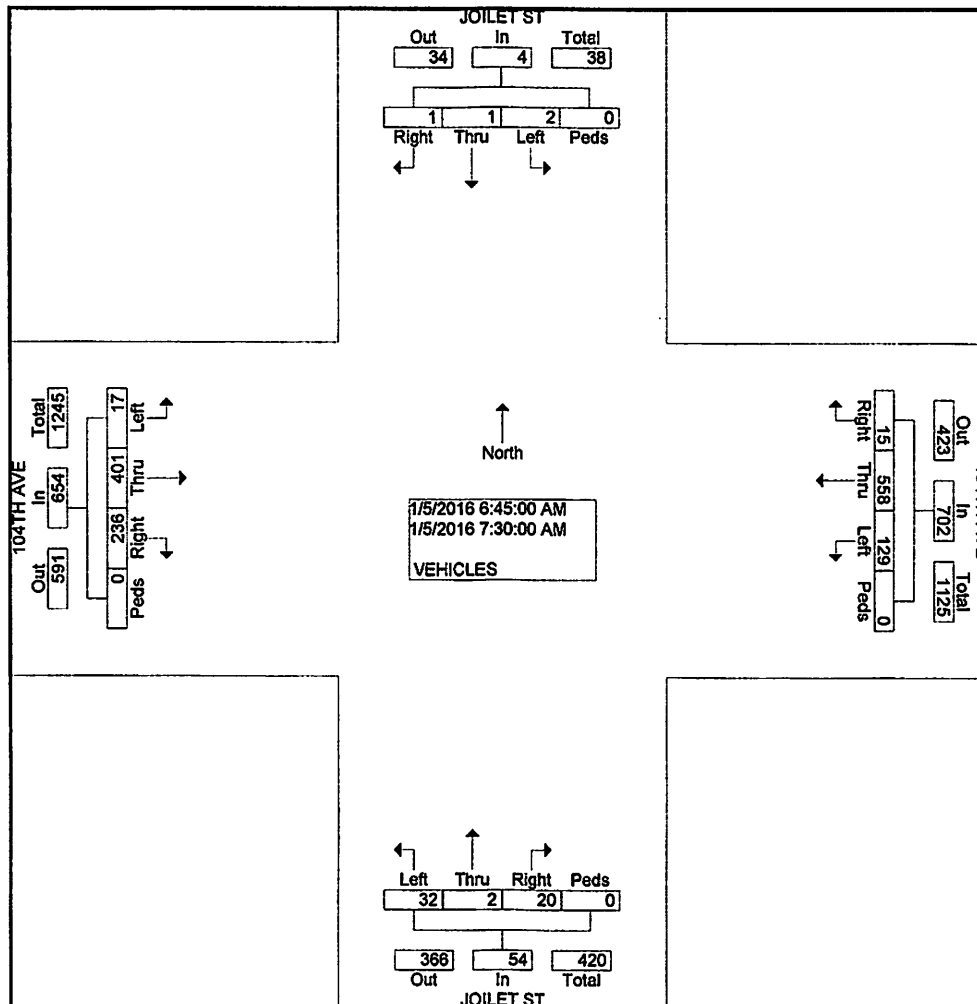
COUNTER MEASURES INC.

1889 YORK STREET
DENVER, COLORADO
303-333-7409

N/S STREET: JOLIET ST
E/W STREET: 104TH AVE
CITY: COMMERCE CITY
COUNTY: ADAMS

File Name : JOIL104T
Site Code : 00000014
Start Date : 1/5/2016
Page No : 2

	JOILET ST Southbound					104TH AVE Westbound					JOILET ST Northbound					104TH AVE Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 06:45 AM to 07:30 AM - Peak 1 of 1																					
Intersect on	06:45 AM																				
Volume	2	1	1	0	4	129	558	15	0	702	32	2	20	0	54	17	401	236	0	654	1414
Percent	50.	25.	25.	0.0		18.	79.	2.1	0.0		59.	3.7	37.	0.0		2.6	61.	36.	0.0		
	0	0	0			4	5				3		0				3	1			
06:45 Volume	2	0	0	0	2	41	171	6	0	218	7	0	6	0	13	8	98	101	0	207	440
Peak Factor																					0.803
High Int. Volume	06:45 AM					06:45 AM					07:00 AM					06:45 AM					
Peak Factor	2	0	0	0	2	41	171	6	0	218	13	0	2	0	15	8	98	101	0	207	
					0.50					0.80					0.90					0.79	
					0					5					0					0	



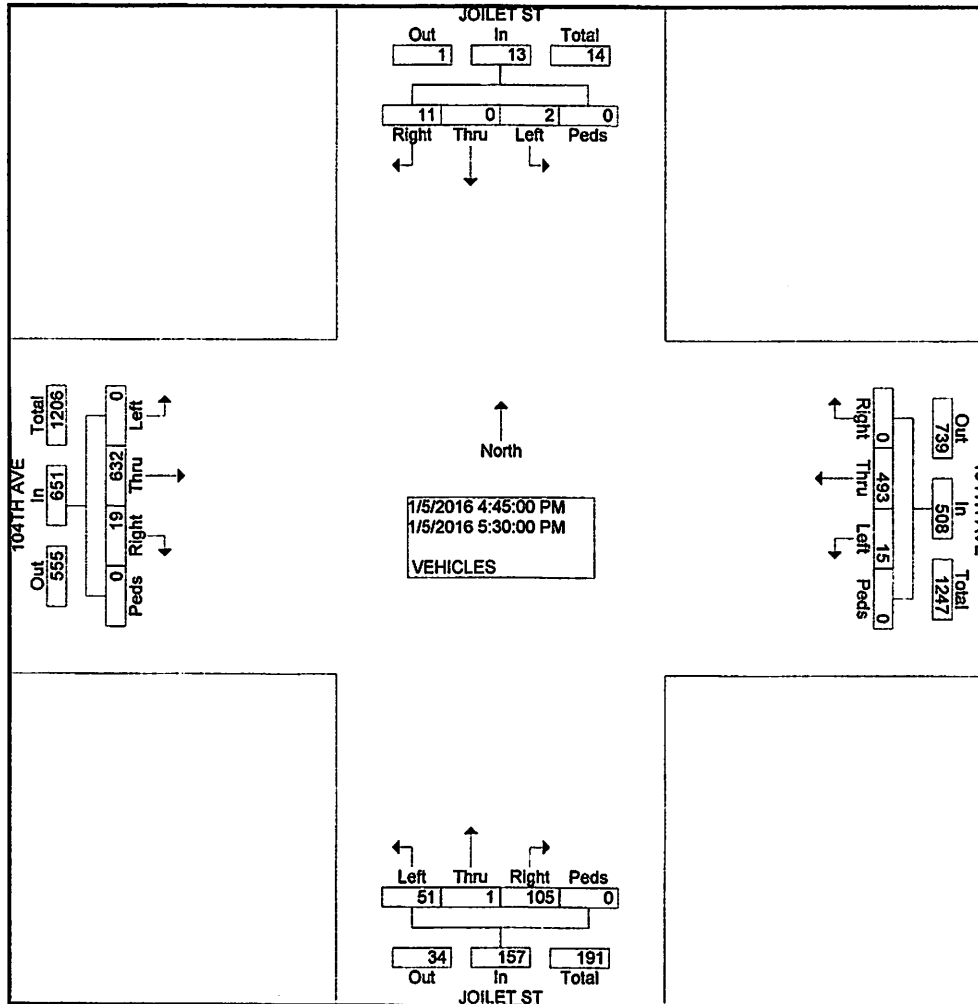
COUNTER MEASURES INC.

1889 YORK STREET
DENVER, COLORADO
303-333-7409

N/S STREET: JOLIET ST
E/W STREET: 104TH AVE
CITY: COMMERCE CITY
COUNTY: ADAMS

File Name : JOIL104T
Site Code : 00000014
Start Date : 1/5/2016
Page No : 2

	JOILET ST Southbound					104TH AVE Westbound					JOILET ST Northbound					104TH AVE Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 04:45 PM to 05:30 PM - Peak 1 of 1																					
Intersect on	04:45 PM																				
Volume	2	0	11	0	13	15	493	0	0	508	51	1	105	0	157	0	632	19	0	651	1329
Percent	15.4	0.0	84.6	0.0		3.0	97.0	0.0	0.0		32.5	0.6	66.9	0.0		0.0	97.1	2.9	0.0		
05:00 Volume	1	0	1	0	2	3	149	0	0	152	15	1	32	0	48	0	174	5	0	179	381
Peak Factor																					0.872
High Int. Volume	04:45 PM					05:00 PM					05:00 PM					05:30 PM					
Peak Factor	1	0	7	0	8	3	149	0	0	152	15	1	32	0	48	0	179	4	0	183	
	0.40					0.83					0.81					0.88					9
	6					6					8					9					



**1889 YORK STREET
DENVER.COLORADO
303-333-7409**

File Name : PARI104T
Site Code : 00000022
Start Date : 1/5/2016
Page No : 1

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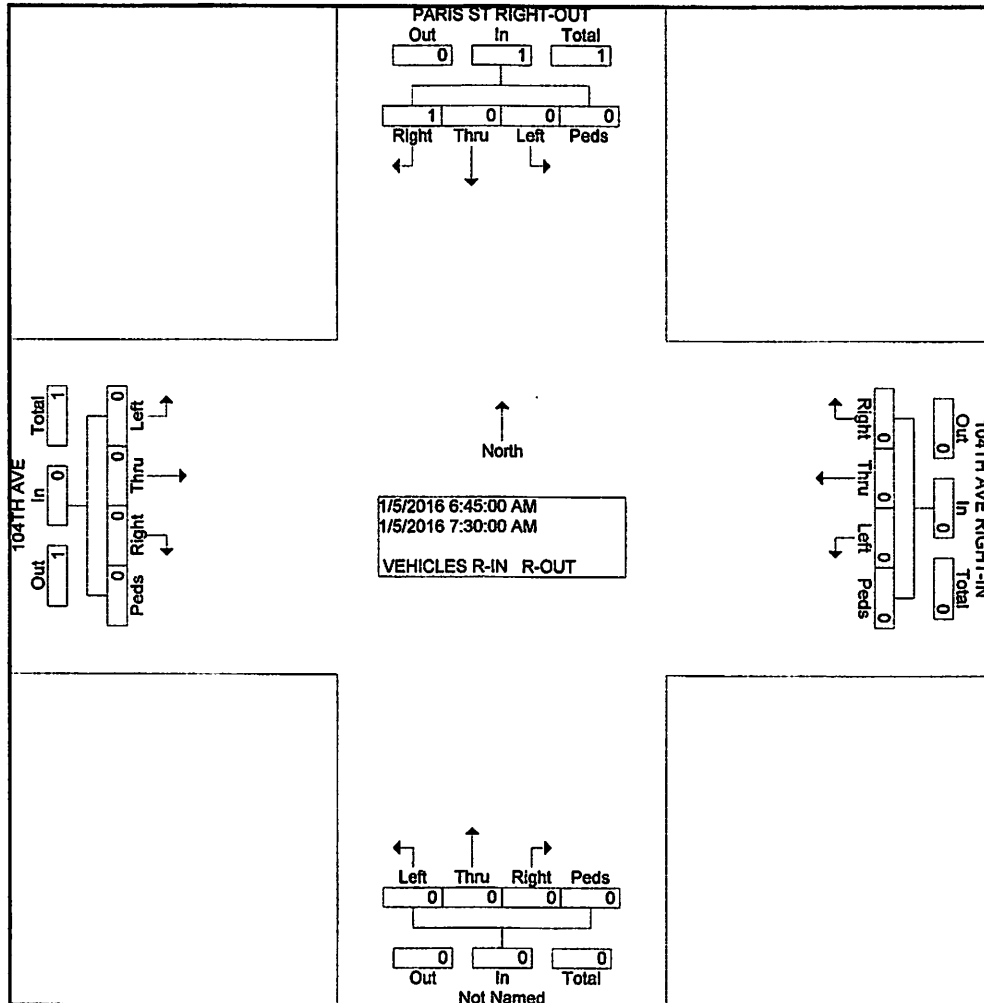
COUNTER MEASURES INC.

1889 YORK STREET
DENVER, COLORADO
303-333-7409

N/S STREET: PARIS ST
E/W STREET: 104TH AVE
CITY: COMMERCE CITY
COUNTY: ADAMS

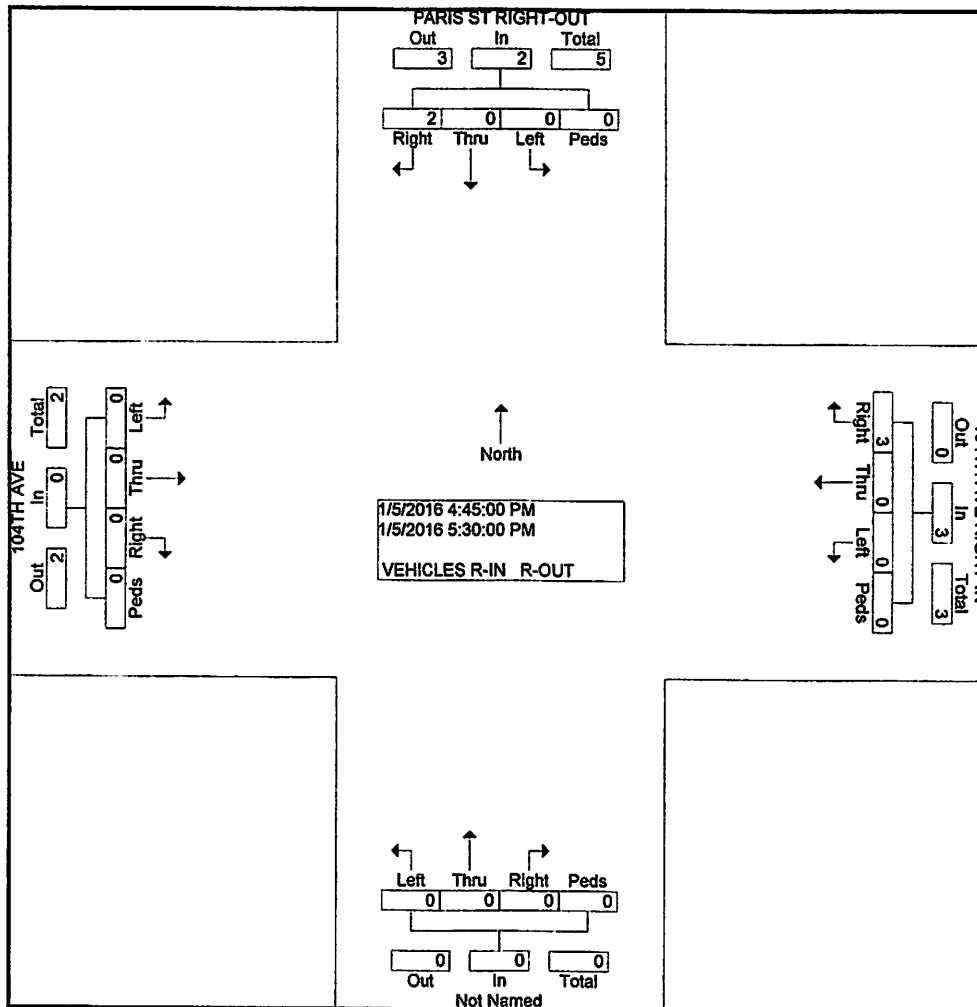
File Name : PARI104T
Site Code : 00000022
Start Date : 1/5/2016
Page No : 2

	PARIS ST RIGHT-OUT Southbound					104TH AVE RIGHT-IN Westbound					Northbound					104TH AVE Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 06:45 AM to 07:30 AM - Peak 1 of 1																					
Intersection	06:45 AM																				
Volume	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Percent	0.0	0.0	100.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0		
07:00																					
Volume	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Peak Factor																					0.250
High Int.	07:00 AM																				
Volume	0	0	1	0	1																
Peak Factor	0.250																				
Factor	0																				



File Name : PARI104T
Site Code : 00000022
Start Date : 1/5/2016
Page No : 2

File Name : PARI104T
Site Code : 00000022
Start Date : 1/5/2016
Page No : 2

Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1

COUNTER MEASURES INC.

Location: JOILET ST S/O 104TH AVE
City: COMMERCE CITY
County: ADAMS
Direction: NORTHBOUND-SOUTHBOUND

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

Site Code: 010512
Station ID: 010512

Start Time	06-Jan-16 Wed	NB	SB	Total
12:00 AM		10	3	13
01:00		7	6	13
02:00		9	18	27
03:00		5	13	18
04:00		6	27	33
05:00		18	98	116
06:00		32	256	288
07:00		26	210	236
08:00		56	110	166
09:00		62	76	138
10:00		68	87	155
11:00		76	70	146
12:00 PM		100	103	203
01:00		82	90	172
02:00		84	70	154
03:00		82	69	151
04:00		148	55	203
05:00		136	50	186
06:00		60	32	92
07:00		30	40	70
08:00		26	13	39
09:00		20	12	32
10:00		9	6	15
11:00		8	1	9
Total		1160	1515	2675
Percent		43.4%	56.6%	
AM Peak	-	11:00	06:00	06:00
Vol.	-	76	256	288
PM Peak	-	16:00	12:00	12:00
Vol.	-	148	103	203
Grand Total		1160	1515	2675
Percent		43.4%	56.6%	
ADT		ADT 2,675	AADT 2,675	

COUNTER MEASURES INC.

Location: LIMA ST S/O 104TH AVE
City: COMMERCE CITY
County: ADAMS
Direction: NORTHBOUND-SOUTHBOUND

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

Site Code: 010516
Station ID: 010516

Start Time	06-Jan-16 Wed	NB	SB	Total
12:00 AM		0	0	0
01:00		0	0	0
02:00		0	0	0
03:00		0	0	0
04:00		0	0	0
05:00		0	0	0
06:00		1	3	4
07:00		6	4	10
08:00		11	11	22
09:00		15	12	27
10:00		6	4	10
11:00		10	9	19
12:00 PM		11	10	21
01:00		9	7	16
02:00		16	16	32
03:00		12	13	25
04:00		12	11	23
05:00		7	6	13
06:00		8	8	16
07:00		2	0	2
08:00		4	3	7
09:00		4	3	7
10:00		0	0	0
11:00		0	0	0
Total		134	120	254
Percent		52.8%	47.2%	
AM Peak	-	09:00	09:00	09:00
Vol.	-	15	12	27
PM Peak	-	14:00	14:00	14:00
Vol.	-	16	16	32
Grand Total		134	120	254
Percent		52.8%	47.2%	
ADT		ADT 254	AADT 254	

COUNTER MEASURES INC.

Location: 104TH AVE W/O PARIS ST
City: COMMERCE CITY
County: ADAMS
Direction: EASTBOUND-WESTBOUND

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

Site Code: 010515
Station ID: 010515

Start Time	05-Jan-16 Tue	EB	WB	Total
12:00 AM		39	36	75
01:00		26	26	52
02:00		22	20	42
03:00		45	32	77
04:00		64	86	150
05:00		162	261	423
06:00		318	551	869
07:00		344	662	1006
08:00		370	520	890
09:00		282	356	638
10:00		288	308	596
11:00		342	373	715
12:00 PM		364	365	729
01:00		391	387	778
02:00		410	420	830
03:00		572	496	1068
04:00		684	525	1209
05:00		696	516	1212
06:00		517	342	859
07:00		294	246	540
08:00		262	171	433
09:00		178	128	306
10:00		147	90	237
11:00		62	58	120
Total		6879	6975	13854
Percent		49.7%	50.3%	
AM Peak	-	08:00	07:00	07:00
Vol.	-	370	662	1006
PM Peak	-	17:00	16:00	17:00
Vol.	-	696	525	1212
Grand Total		6879	6975	13854
Percent		49.7%	50.3%	
ADT	ADT 13,854		AADT 13,854	

COUNTER MEASURES INC.

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

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

Site Code: 010518
 Station ID: 010518

Start Time	06-Jan-16	NB	SB							Total
12:00 AM		0	0							0
01:00		0	0							0
02:00		0	0							0
03:00		0	1							1
04:00		1	1							2
05:00		2	2							4
06:00		3	4							7
07:00		7	6							13
08:00		6	7							13
09:00		3	4							7
10:00		2	2							4
11:00		4	3							7
12:00 PM		7	6							13
01:00		6	6							12
02:00		5	6							11
03:00		2	2							4
04:00		2	2							4
05:00		2	1							3
06:00		3	1							4
07:00		1	1							2
08:00		5	4							9
09:00		2	1							3
10:00		1	0							1
11:00		1	0							1
Total		65	60							125
Percent		52.0%	48.0%							
AM Peak	-	07:00	08:00	-	-	-	-	-	-	07:00
Vol.	-	7	7	-	-	-	-	-	-	13
PM Peak	-	12:00	12:00	-	-	-	-	-	-	12:00
Vol.	-	7	6	-	-	-	-	-	-	13
Grand Total		65	60							125
Total										
Percent		52.0%	48.0%							
ADT		ADT 125	AADT 125							

COUNTER MEASURES INC.

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

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

Site Code: 010517
 Station ID: 010517

Start Time	06-Jan-16 Wed	NB	SB	Total
12:00 AM		8	3	11
01:00		3	4	7
02:00		3	7	10
03:00		6	6	12
04:00		4	33	37
05:00		13	91	104
06:00		48	164	212
07:00		74	234	308
08:00		68	146	214
09:00		43	72	115
10:00		58	72	130
11:00		65	94	159
12:00 PM		82	85	167
01:00		101	82	183
02:00		96	88	184
03:00		182	149	331
04:00		211	118	329
05:00		264	125	389
06:00		156	92	248
07:00		82	52	134
08:00		67	24	91
09:00		33	28	61
10:00		17	14	31
11:00		18	8	26
Total		1702	1791	3493
Percent		48.7%	51.3%	
AM Peak	-	07:00	07:00	07:00
Vol.	-	74	234	308
PM Peak	-	17:00	15:00	17:00
Vol.	-	264	149	389
Grand Total		1702	1791	3493
Percent		48.7%	51.3%	
ADT		ADT 3,493	AADT 3,493	

LEVEL OF SERVICE DEFINITIONS

From *Highway Capacity Manual*, Transportation Research Board, 2010

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, 2010

UNSIGNALIZED INTERSECTION LEVEL OF SERVICE (LOS)

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

LOS	Average Vehicle Control Delay	<u>Operational Characteristics</u>
A	<10 seconds	<u>Normally, vehicles on the stop-controlled approach only have to wait up to 10 seconds before being able to clear the intersection.</u> 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 2010 Signalized Intersection Summary

3: State Highway 2 & E. 104th Avenue

Existing
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	51	404	171	216	598	54	84	160	61	29	347	80
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3
Lanes	1	2	1	1	2	1	1	1	1	1	1	1
Cap, veh/h	204	753	387	326	1039	477	427	919	961	586	881	808
Arrive On Green	0.04	0.20	0.20	0.11	0.28	0.28	0.04	0.49	0.49	0.02	0.47	0.47
Sat Flow, veh/h	1774	3725	1583	1774	3725	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	59	470	199	251	695	63	98	186	71	34	403	93
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	3.3	14.4	13.5	12.1	20.6	3.6	3.4	7.0	2.3	1.2	18.1	3.8
Cycle Q Clear(g_c), s	3.3	14.4	13.5	12.1	20.6	3.6	3.4	7.0	2.3	1.2	18.1	3.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	204	753	387	326	1039	477	427	919	961	586	881	808
V/C Ratio(X)	0.29	0.62	0.51	0.77	0.67	0.13	0.23	0.20	0.07	0.06	0.46	0.12
Avail Cap(c_a), veh/h	351	1195	575	338	1195	543	494	919	961	689	881	808
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.8	45.4	40.7	29.4	39.8	31.7	16.2	17.8	10.1	16.3	22.1	15.9
Incr Delay (d2), s/veh	0.8	0.9	1.1	10.0	1.2	0.1	0.3	0.5	0.1	0.0	1.7	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 Back of Q (50%), veh/ln	1.5	6.9	5.5	6.4	9.7	1.4	1.4	3.1	0.8	0.5	8.3	1.5
Lane Grp Delay (d), s/veh	38.6	46.3	41.8	39.4	41.0	31.8	16.4	18.3	10.2	16.3	23.8	16.2
Lane Grp LOS	D	D	D	D	D	C	B	B	B	B	C	B
Approach Vol, veh/h		728			1009			355			530	
Approach Delay, s/veh		44.4			40.0			16.2			22.0	
Approach LOS		D			D			B			C	
Timer												
Assigned Phs	7	4		3	8		5	2		1	6	
Phs Duration (G+Y+Rc), s	9.6	30.2		19.2	39.8		10.3	67.5		7.8	65.0	
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0		5.0	6.0		5.0	6.0	
Max Green Setting (Gmax), s	15.0	40.0		15.0	40.0		10.0	59.0		10.0	59.0	
Max Q Clear Time (g_c+l1), s	5.3	16.4		14.1	22.6		5.4	9.0		3.2	20.1	
Green Ext Time (p_c), s	0.1	8.9		0.1	7.7		0.1	3.8		0.0	3.8	
Intersection Summary												
HCM 2010 Ctrl Delay			34.4									
HCM 2010 LOS			C									
Notes												

HCM 2010 TWSC
6: E. 104th Avenue & Peoria Parkway

Existing
AM Peak

Intersection

Intersection Delay, s/veh 30.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	12	389	708	54	237	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	630	-	-	300	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	442	805	61	269	80

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	805	0	1053
Stage 1	-	-	805
Stage 2	-	-	248
Follow-up Headway	2.22	-	3.52
Pot Capacity-1 Maneuver	815	-	# 222
Stage 1	-	-	400
Stage 2	-	-	770
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	815	-	# 218
Mov Capacity-2 Maneuver	-	-	# 218
Stage 1	-	-	400
Stage 2	-	-	757

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	144.8
HCM LOS			F

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	815	-	-	-	218	598
HCM Lane V/C Ratio	0.017	-	-	-	1.235	0.133
HCM Control Delay (s)	9.492	-	-	-	184	11.9
HCM Lane LOS	A				F	B
HCM 95th %tile Q(veh)	0.051	-	-	-	13.756	0.457

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 TWSC
7: E. 104th Avenue & Paris Street

Existing
AM Peak

Intersection

Intersection Delay, s/veh 0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	0	401	778	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	0	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	456	884	0	0	1

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	884	0	1112
Stage 1	-	-	884
Stage 2	-	-	228
Follow-up Headway	2.22	-	3.52
Pot Capacity-1 Maneuver	761	-	203
Stage 1	-	-	364
Stage 2	-	-	788
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	761	-	203
Mov Capacity-2 Maneuver	-	-	203
Stage 1	-	-	364
Stage 2	-	-	788

Approach	EB	WB	SB
HCM Control Delay, s	0	0	11.4
HCM LOS			B

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	761	-	-	-	563
HCM Lane V/C Ratio	-	-	-	-	0.002
HCM Control Delay (s)	0	-	-	-	11.4
HCM Lane LOS	A				B
HCM 95th %tile Q(veh)	0	-	-	-	0.006

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 TWSC
9: Lima Street & E. 104th Avenue

Existing
AM Peak

Intersection

Intersection Delay, s/veh 0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	395	3	2	775	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	300	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	449	3	2	881	0	6

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	894
Stage 1	-	-	449
Stage 2	-	-	445
Follow-up Headway	-	2.22	3.52
Pot Capacity-1 Maneuver	-	1108	281
Stage 1	-	-	610
Stage 2	-	-	613
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	-	1108	280
Mov Capacity-2 Maneuver	-	-	280
Stage 1	-	-	610
Stage 2	-	-	612

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.7
HCM LOS			A

Minor Lane / Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	779	-	-	1108	-
HCM Lane V/C Ratio	0.007	-	-	0.002	-
HCM Control Delay (s)	9.7	-	-	8.256	-
HCM Lane LOS	A			A	
HCM 95th %tile Q(veh)	0.022	-	-	0.006	-

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 Signalized Intersection Summary

3: State Highway 2 & E. 104th Avenue

Existing
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	70	670	61	99	517	38	164	486	274	38	183	30
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3
Lanes	1	2	1	1	2	1	1	1	1	1	1	1
Cap, veh/h	247	945	502	210	998	462	621	931	884	298	858	799
Arrive On Green	0.04	0.25	0.25	0.06	0.27	0.27	0.06	0.50	0.50	0.02	0.46	0.46
Sat Flow, veh/h	1774	3725	1583	1774	3725	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	76	728	66	108	562	41	178	528	298	41	199	33
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	4.0	23.2	3.8	5.6	16.7	2.4	6.0	25.4	13.1	1.6	8.3	1.4
Cycle Q Clear(g_c), s	4.0	23.2	3.8	5.6	16.7	2.4	6.0	25.4	13.1	1.6	8.3	1.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	247	945	502	210	998	462	621	931	884	298	858	799
V/C Ratio(X)	0.31	0.77	0.13	0.51	0.56	0.09	0.29	0.57	0.34	0.14	0.23	0.04
Avail Cap(c_a), veh/h	376	1163	594	313	1163	532	647	931	884	394	858	799
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.9	44.4	31.2	33.8	40.4	33.0	13.7	22.4	15.4	19.2	20.9	16.0
Incr Delay (d2), s/veh	0.7	2.6	0.1	1.9	0.5	0.1	0.3	2.5	1.0	0.2	0.6	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	1.8	11.3	1.5	2.5	7.9	1.0	2.4	11.6	5.1	0.7	3.8	0.5
Lane Grp Delay (d), s/veh	34.6	46.9	31.3	35.8	40.9	33.1	14.0	24.9	16.4	19.4	21.5	16.1
Lane Grp LOS	C	D	C	D	D	C	B	C	B	B	C	B
Approach Vol, veh/h		870			711			1004			273	
Approach Delay, s/veh		44.7			39.7			20.4			20.5	
Approach LOS		D			D			C			C	
Timer												
Assigned Phs	7	4		3	8		5	2		1	6	
Phs Duration (G+Y+Rc), s	10.7	37.5		12.5	39.3		13.1	70.0		8.1	65.0	
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0		5.0	6.0		5.0	6.0	
Max Green Setting (Gmax), s	15.0	40.0		15.0	40.0		10.0	59.0		10.0	59.0	
Max Q Clear Time (g_c+I1), s	6.0	25.2		7.6	18.7		8.0	27.4		3.6	10.3	
Green Ext Time (p_c), s	0.1	7.3		0.1	8.8		0.1	5.4		0.0	5.6	
Intersection Summary												
HCM 2010 Ctrl Delay			32.6									
HCM 2010 LOS			C									
Notes												

HCM 2010 TWSC
6: E. 104th Avenue & Peoria Parkway

Existing
PM Peak

Intersection

Intersection Delay, s/veh 3.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	48	685	487	224	116	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	630	-	-	300	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	54	770	547	252	130	16

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	547	0	274
Stage 1	-	-	-
Stage 2	-	-	-
Follow-up Headway	2.22	-	3.32
Pot Capacity-1 Maneuver	1018	-	724
Stage 1	-	-	-
Stage 2	-	-	-
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	1018	-	724
Mov Capacity-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	41.2
HCM LOS			E

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1018	-	-	-	214	724
HCM Lane V/C Ratio	0.053	-	-	-	0.609	0.022
HCM Control Delay (s)	8.734	-	-	-	45	10.1
HCM Lane LOS	A	-	-	-	E	B
HCM 95th %tile Q(veh)	0.168	-	-	-	3.501	0.067

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 TWSC
7: E. 104th Avenue & Paris Street

Existing
PM Peak

Intersection

Intersection Delay, s/veh 0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	0	733	498	3	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	0	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	824	560	3	0	2

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	560	0	972
Stage 1	-	-	560
Stage 2	-	-	412
Follow-up Headway	2.22	-	3.52
Pot Capacity-1 Maneuver	1007	-	250
Stage 1	-	-	535
Stage 2	-	-	637
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	1007	-	250
Mov Capacity-2 Maneuver	-	-	250
Stage 1	-	-	535
Stage 2	-	-	637

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10
HCM LOS			B

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1007	-	-	-	717
HCM Lane V/C Ratio	-	-	-	-	0.003
HCM Control Delay (s)	0	-	-	-	10
HCM Lane LOS	A				B
HCM 95th %tile Q(veh)	0	-	-	-	0.009

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 TWSC
9: Lima Street & E. 104th Avenue

Existing
PM Peak

Intersection

Intersection Delay, s/veh 0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	725	3	2	500	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	300	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	815	3	2	562	0	6

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	815
Stage 1	-	-	-
Stage 2	-	-	-
Follow-up Headway	-	2.22	-
Pot Capacity-1 Maneuver	-	808	-
Stage 1	-	-	-
Stage 2	-	-	-
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	-	808	-
Mov Capacity-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

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

Minor Lane / Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	593	-	-	808	-
HCM Lane V/C Ratio	0.009	-	-	0.003	-
HCM Control Delay (s)	11.1	-	-	9.468	-
HCM Lane LOS	B			A	
HCM 95th %tile Q(veh)	0.029	-	-	0.008	-

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 Signalized Intersection Summary

3: State Highway 2 & E. 104th Avenue

2017 Background
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	53	416	176	222	615	56	87	165	63	30	357	82
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3
Lanes	1	2	1	1	2	1	1	1	1	1	1	1
Cap, veh/h	215	811	415	340	1097	503	396	875	926	554	835	770
Arrive On Green	0.04	0.22	0.22	0.12	0.29	0.29	0.04	0.47	0.47	0.02	0.45	0.45
Sat Flow, veh/h	1774	3725	1583	1774	3725	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	62	484	205	258	715	65	101	192	73	35	415	95
Grp Sat Flow(s), veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	3.2	14.1	13.2	11.8	20.2	3.5	3.5	7.3	2.4	1.3	19.1	3.9
Cycle Q Clear(g_c), s	3.2	14.1	13.2	11.8	20.2	3.5	3.5	7.3	2.4	1.3	19.1	3.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	215	811	415	340	1097	503	396	875	926	554	835	770
V/C Ratio(X)	0.29	0.60	0.49	0.76	0.65	0.13	0.26	0.22	0.08	0.06	0.50	0.12
Avail Cap(c_a), veh/h	295	1484	701	357	1639	733	420	875	926	617	835	770
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.1	42.4	37.6	27.3	37.1	29.3	17.3	18.9	10.9	17.3	23.6	16.9
Incr Delay (d2), s/veh	0.7	0.7	0.9	8.8	0.7	0.1	0.3	0.6	0.2	0.0	2.1	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 Back of Q (50%), veh/ln	1.5	6.7	5.3	6.1	9.4	1.4	1.4	3.3	0.9	0.5	8.8	1.5
Lane Grp Delay (d), s/veh	35.8	43.1	38.6	36.0	37.8	29.4	17.6	19.4	11.0	17.3	25.7	17.2
Lane Grp LOS	D	D	D	D	D	C	B	B	B	B	C	B
Approach Vol, veh/h		751			1038			366			545	
Approach Delay, s/veh		41.2			36.8			17.3			23.7	
Approach LOS		D			D			B			C	
Timer												
Assigned Phs	7	4		3	8		5	2		1	6	
Phs Duration (G+Y+Rc), s	9.6	31.2		18.9	40.5		10.4	62.6		7.8	60.0	
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0		5.0	6.0		5.0	6.0	
Max Green Setting (Gmax), s	10.0	48.0		15.0	53.0		7.0	54.0		7.0	54.0	
Max Q Clear Time (g_c+I1), s	5.2	16.1		13.8	22.2		5.5	9.3		3.3	21.1	
Green Ext Time (p_c), s	0.0	10.2		0.1	10.1		0.0	3.9		0.0	3.8	
Intersection Summary												
HCM 2010 Ctrl Delay				32.7								
HCM 2010 LOS				C								
Notes												

Intersection

Intersection Delay, s/veh 40.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	20	400	725	60	245	75
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	630	-	-	300	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	455	824	68	278	85

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	824	0	412
Stage 1	-	-	824
Stage 2	-	-	273
Follow-up Headway	2.22	-	3.32
Pot Capacity-1 Maneuver	802	-	# 207
Stage 1	-	-	391
Stage 2	-	-	748
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	802	-	# 201
Mov Capacity-2 Maneuver	-	-	# 201
Stage 1	-	-	391
Stage 2	-	-	727

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	191.3
HCM LOS			F

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	802	-	-	-	201	589
HCM Lane V/C Ratio	0.028	-	-	-	1.385	0.145
HCM Control Delay (s)	9.62	-	-	-	246.2	12.1
HCM Lane LOS	A				F	B
HCM 95th %tile Q(veh)	0.087	-	-	-	16.143	0.504

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection

Intersection Delay, s/veh 0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	415	3	2	795	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	300	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	472	3	2	903	0	6

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	472	928
Stage 1	-	-	472
Stage 2	-	-	456
Follow-up Headway	-	2.22	3.52
Pot Capacity-1 Maneuver	-	1086	267
Stage 1	-	-	594
Stage 2	-	-	605
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	-	1086	267
Mov Capacity-2 Maneuver	-	-	267
Stage 1	-	-	594
Stage 2	-	-	604

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.7
HCM LOS			A

Minor Lane / Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	766	-	-	1086	-
HCM Lane V/C Ratio	0.007	-	-	0.002	-
HCM Control Delay (s)	9.7	-	-	8.322	-
HCM Lane LOS	A			A	
HCM 95th %tile Q(veh)	0.022	-	-	0.006	-

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 Signalized Intersection Summary

3: State Highway 2 & E. 104th Avenue

2017 Background
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	72	690	63	102	532	40	169	500	282	40	188	31
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3
Lanes	1	2	1	1	2	1	1	1	1	1	1	1
Cap, veh/h	270	1049	535	228	1099	507	574	869	830	262	810	759
Arrive On Green	0.04	0.28	0.28	0.06	0.30	0.30	0.06	0.47	0.47	0.02	0.43	0.43
Sat Flow, veh/h	1774	3725	1583	1774	3725	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	78	750	68	111	578	43	184	543	307	43	204	34
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	3.8	22.5	3.7	5.4	16.1	2.4	6.8	27.3	14.2	1.7	8.6	1.4
Cycle Q Clear(g_c), s	3.8	22.5	3.7	5.4	16.1	2.4	6.8	27.3	14.2	1.7	8.6	1.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	270	1049	535	228	1099	507	574	869	830	262	810	759
V/C Ratio(X)	0.29	0.71	0.13	0.49	0.53	0.08	0.32	0.63	0.37	0.16	0.25	0.04
Avail Cap(c_a), veh/h	447	1650	790	239	1350	613	574	869	830	317	810	759
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.4	40.1	28.4	30.5	36.5	29.5	16.2	25.0	17.4	20.9	22.3	17.2
Incr Delay (d2), s/veh	0.6	0.9	0.1	1.6	0.4	0.1	0.3	3.4	1.3	0.3	0.7	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	1.7	10.7	1.5	2.4	7.5	0.9	2.8	12.7	5.6	0.7	4.0	0.6
Lane Grp Delay (d), s/veh	31.0	41.0	28.5	32.1	36.9	29.6	16.5	28.4	18.7	21.2	23.0	17.3
Lane Grp LOS	C	D	C	C	D	C	B	C	B	C	C	B
Approach Vol, veh/h	896				732		1034				281	
Approach Delay, s/veh	39.2				35.8		23.4				22.1	
Approach LOS	D				D		C				C	
Timer												
Assigned Phs	7	4		3	8		5	2		1	6	
Phs Duration (G+Y+Rc), s	10.6	40.0		12.2	41.6		12.0	63.9		8.1	60.0	
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0		5.0	6.0		5.0	6.0	
Max Green Setting (Gmax), s	18.0	55.0		8.0	45.0		7.0	54.0		7.0	54.0	
Max Q Clear Time (g_c+I1), s	5.8	24.5		7.4	18.1		8.8	29.3		3.7	10.6	
Green Ext Time (p_c), s	0.1	10.5		0.0	10.0		0.0	5.4		0.0	5.8	
Intersection Summary												
HCM 2010 Ctrl Delay	31.2											
HCM 2010 LOS	C											
Notes												

HCM 2010 TWSC
6: E. 104th Avenue & Peoria Parkway

2017 Background
PM Peak

Intersection

Intersection Delay, s/veh 4.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	55	705	500	230	120	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	630	-	-	300	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	62	792	562	258	135	22

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	562	0	1082
Stage 1	-	-	562
Stage 2	-	-	520
Follow-up Headway	2.22	-	3.52
Pot Capacity-1 Maneuver	1005	-	212
Stage 1	-	-	534
Stage 2	-	-	561
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	1005	-	199
Mov Capacity-2 Maneuver	-	-	199
Stage 1	-	-	534
Stage 2	-	-	526

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	48.1
HCM LOS			E

Minor Lane / Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1005	-	-	-	199	716
HCM Lane V/C Ratio	0.061	-	-	-	0.678	0.031
HCM Control Delay (s)	8.817	-	-	-	54.4	10.2
HCM Lane LOS	A				F	B
HCM 95th %tile Q(veh)	0.196	-	-	-	4.153	0.097

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection

Intersection Delay, s/veh 0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	755	3	2	515	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	300	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	848	3	2	579	0	6

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	0	0	848	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Follow-up Headway	-	-	2.22	-
Pot Capacity-1 Maneuver	-	-	785	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Time blocked-Platoon, %	-	-	-	-
Mov Capacity-1 Maneuver	-	-	785	-
Mov Capacity-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	11.3
HCM LOS			B

Minor Lane / Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	579	-	-	785	-
HCM Lane V/C Ratio	0.01	-	-	0.003	-
HCM Control Delay (s)	11.3	-	-	9.599	-
HCM Lane LOS	B			A	
HCM 95th %tile Q(veh)	0.029	-	-	0.009	-

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 Signalized Intersection Summary

3: State Highway 2 & E. 104th Avenue

2017 Total
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	58	423	178	222	621	56	88	165	63	30	357	85
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3
Lanes	1	2	1	1	2	1	1	1	1	1	1	1
Cap, veh/h	218	821	420	339	1096	502	393	872	924	552	831	771
Arrive On Green	0.04	0.22	0.22	0.11	0.29	0.29	0.04	0.47	0.47	0.02	0.45	0.45
Sat Flow, veh/h	1774	3725	1583	1774	3725	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	67	492	207	258	722	65	102	192	73	35	415	99
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	3.5	14.4	13.4	11.8	20.5	3.5	3.6	7.4	2.4	1.3	19.2	4.1
Cycle Q Clear(g_c), s	3.5	14.4	13.4	11.8	20.5	3.5	3.6	7.4	2.4	1.3	19.2	4.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	218	821	420	339	1096	502	393	872	924	552	831	771
V/C Ratio(X)	0.31	0.60	0.49	0.76	0.66	0.13	0.26	0.22	0.08	0.06	0.50	0.13
Avail Cap(c_a), veh/h	291	1478	699	355	1632	730	416	872	924	614	831	771
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.9	42.4	37.6	27.4	37.4	29.4	17.4	19.1	11.0	17.5	23.9	17.0
Incr Delay (d2), s/veh	0.8	0.7	0.9	8.9	0.7	0.1	0.3	0.6	0.2	0.0	2.1	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 Back of Q (50%), veh/ln	1.6	6.8	5.4	6.1	9.6	1.4	1.5	3.3	0.9	0.5	8.9	1.6
Lane Grp Delay (d), s/veh	35.7	43.1	38.5	36.3	38.1	29.5	17.8	19.7	11.2	17.5	26.0	17.3
Lane Grp LOS	D	D	D	D	D	C	B	B	B	B	C	B
Approach Vol, veh/h		766			1045			367			549	
Approach Delay, s/veh		41.2			37.1			17.5			23.9	
Approach LOS		D			D			B			C	
Timer												
Assigned Phs	7	4		3	8		5	2		1	6	
Phs Duration (G+Y+Rc), s	10.0	31.7		18.9	40.6		10.4	62.7		7.8	60.0	
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0		5.0	6.0		5.0	6.0	
Max Green Setting (Gmax), s	10.0	48.0		15.0	53.0		7.0	54.0		7.0	54.0	
Max Q Clear Time (g_c+I1), s	5.5	16.4		13.8	22.5		5.6	9.4		3.3	21.2	
Green Ext Time (p_c), s	0.0	10.3		0.1	10.2		0.0	3.9		0.0	3.9	
Intersection Summary												
HCM 2010 Ctrl Delay			32.9									
HCM 2010 LOS			C									
Notes												

HCM 2010 TWSC
6: East Site Access/Peoria Parkway & E. 104th Avenue

2017 Total
AM Peak

Intersection

Intersection Delay, s/veh 71.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	20	400	17	10	725	60	33	3	14	245	3	75
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	630	-	150	300	-	300	150	-	150	0	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	23	455	19	11	824	68	38	3	16	278	3	85

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	824	0	0	455	0	0	936	1347	227	1121	1347	412
Stage 1	-	-	-	-	-	-	500	500	-	847	847	-
Stage 2	-	-	-	-	-	-	436	847	-	274	500	-
Follow-up Headway	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Capacity-1 Maneuver	802	-	-	1102	-	-	220	150	776	# 161	150	589
Stage 1	-	-	-	-	-	-	521	541	-	323	376	-
Stage 2	-	-	-	-	-	-	569	376	-	709	541	-
Time blocked-Platoon, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Capacity-1 Maneuver	802	-	-	1102	-	-	179	144	776	# 150	144	589
Mov Capacity-2 Maneuver	-	-	-	-	-	-	179	144	-	# 150	144	-
Stage 1	-	-	-	-	-	-	506	525	-	314	372	-
Stage 2	-	-	-	-	-	-	477	372	-	670	525	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.1	24.6	\$ 352.5
HCM LOS			C	F

Minor Lane / Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	179	144	776	802	-	-	1102	-	-	150	144
HCM Lane V/C Ratio	0.209	0.024	0.021	0.028	-	-	0.01	-	-	1.856	0.024
HCM Control Delay (s)	30.4	30.6	9.7	9.62	-	-	8.301	-	-	\$ 460.7	30.6
HCM Lane LOS	D	D	A	A			A			F	D
HCM 95th %tile Q(veh)	0.762	0.072	0.063	0.087	-	-	0.031	-	-	21.018	0.072

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 TWSC
9: Lima Street & E. 104th Avenue

2017 Total
AM Peak

Intersection

Intersection Delay, s/veh 0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	432	3	2	828	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	300	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	491	3	2	941	0	6

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	966
Stage 1	-	-	491
Stage 2	-	-	475
Follow-up Headway	-	2.22	3.52
Pot Capacity-1 Maneuver	-	1069	252
Stage 1	-	-	581
Stage 2	-	-	592
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	-	1069	252
Mov Capacity-2 Maneuver	-	-	252
Stage 1	-	-	581
Stage 2	-	-	591

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.8
HCM LOS			A

Minor Lane / Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	755	-	-	1069	-
HCM Lane V/C Ratio	0.008	-	-	0.002	-
HCM Control Delay (s)	9.8	-	-	8.375	-
HCM Lane LOS	A			A	
HCM 95th %tile Q(veh)	0.023	-	-	0.006	-

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 Signalized Intersection Summary
3: State Highway 2 & E. 104th Avenue

2017 Total
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	75	696	65	102	538	40	171	500	282	40	188	35
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3
Lanes	1	2	1	1	2	1	1	1	1	1	1	1
Cap, veh/h	271	1057	538	227	1100	507	570	866	828	260	807	760
Arrive On Green	0.05	0.28	0.28	0.06	0.30	0.30	0.06	0.46	0.46	0.02	0.43	0.43
Sat Flow, veh/h	1774	3725	1583	1774	3725	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	82	757	71	111	585	43	186	543	307	43	204	38
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	4.0	22.8	3.9	5.4	16.4	2.4	6.9	27.4	14.3	1.7	8.7	1.6
Cycle Q Clear(g_c), s	4.0	22.8	3.9	5.4	16.4	2.4	6.9	27.4	14.3	1.7	8.7	1.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	271	1057	538	227	1100	507	570	866	828	260	807	760
V/C Ratio(X)	0.30	0.72	0.13	0.49	0.53	0.08	0.33	0.63	0.37	0.17	0.25	0.05
Avail Cap(c_a), veh/h	444	1645	788	238	1346	611	570	866	828	315	807	760
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.3	40.1	28.4	30.6	36.7	29.6	16.4	25.2	17.6	21.1	22.5	17.3
Incr Delay (d2), s/veh	0.6	0.9	0.1	1.6	0.4	0.1	0.3	3.4	1.3	0.3	0.8	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	1.8	10.8	1.5	2.4	7.6	0.9	2.8	12.7	5.6	0.7	4.0	0.6
Lane Grp Delay (d), s/veh	30.9	41.0	28.5	32.2	37.1	29.7	16.7	28.6	18.9	21.4	23.2	17.4
Lane Grp LOS	C	D	C	C	D	C	B	C	B	C	C	B
Approach Vol, veh/h		910			739			1036			285	
Approach Delay, s/veh		39.1			35.9			23.6			22.2	
Approach LOS		D			D			C			C	
Timer												
Assigned Phs	7	4		3	8		5	2		1	6	
Phs Duration (G+Y+Rc), s	10.8	40.4		12.2	41.8		12.0	63.9		8.1	60.0	
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0		5.0	6.0		5.0	6.0	
Max Green Setting (Gmax), s	18.0	55.0		8.0	45.0		7.0	54.0		7.0	54.0	
Max Q Clear Time (g_c+I1), s	6.0	24.8		7.4	18.4		8.9	29.4		3.7	10.7	
Green Ext Time (p_c), s	0.1	10.6		0.0	10.1		0.0	5.4		0.0	5.8	
Intersection Summary												
HCM 2010 Ctrl Delay			31.3									
HCM 2010 LOS			C									
Notes												

HCM 2010 TWSC
6: East Site Access/Peoria Parkway & E. 104th Avenue

2017 Total
PM Peak

Intersection

Intersection Delay, s/veh 8.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	55	705	25	12	500	230	16	3	11	120	3	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	630	-	150	300	-	300	150	-	150	0	-	150
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	62	792	28	13	562	258	18	3	12	135	3	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	562	0	0	792	0	0	1226	1505	396	1110	1505	281
Stage 1	-	-	-	-	-	-	916	916	-	589	589	-
Stage 2	-	-	-	-	-	-	310	589	-	521	916	-
Follow-up Headway	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Capacity-1 Maneuver	1005	-	-	824	-	-	135	120	603	164	120	716
Stage 1	-	-	-	-	-	-	293	349	-	461	494	-
Stage 2	-	-	-	-	-	-	675	494	-	507	349	-
Time blocked-Platoon, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Capacity-1 Maneuver	1005	-	-	824	-	-	120	111	603	148	111	716
Mov Capacity-2 Maneuver	-	-	-	-	-	-	120	111	-	148	111	-
Stage 1	-	-	-	-	-	-	275	327	-	433	486	-
Stage 2	-	-	-	-	-	-	639	486	-	461	327	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.2	29.4	95.5
HCM LOS			D	F

Minor Lane / Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	120	111	603	1005	-	-	824	-	-	148	111
HCM Lane V/C Ratio	0.15	0.03	0.02	0.061	-	-	0.016	-	-	0.911	0.03
HCM Control Delay (s)	40.2	38.4	11.1	8.817	-	-	9.442	-	-	111.2	38.4
HCM Lane LOS	E	E	B	A			A			F	E
HCM 95th %ile Q(veh)	0.508	0.093	0.063	0.196	-	-	0.05	-	-	6.335	0.093

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

Intersection

Intersection Delay, s/veh 0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	780	3	2	531	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	300	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	876	3	2	597	0	6

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	876	1179
Stage 1	-	-	876
Stage 2	-	-	303
Follow-up Headway	-	2.22	3.52
Pot Capacity-1 Maneuver	-	766	183
Stage 1	-	-	368
Stage 2	-	-	723
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	-	766	183
Mov Capacity-2 Maneuver	-	-	183
Stage 1	-	-	368
Stage 2	-	-	721

Approach	EB	WB	NB
HCM Control Delay, s	0	0	11.4
HCM LOS			B

Minor Lane / Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	567	-	-	766	-
HCM Lane V/C Ratio	0.01	-	-	0.003	-
HCM Control Delay (s)	11.4	-	-	9.714	-
HCM Lane LOS	B			A	
HCM 95th %tile Q(veh)	0.03	-	-	0.009	-

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 Signalized Intersection Summary
3: State Highway 2 & E. 104th Avenue

2035 Background
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	95	730	305	390	1075	100	150	390	110	55	850	145
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3
Lanes	1	2	1	2	2	1	2	2	1	1	2	1
Cap, veh/h	177	1217	584	559	1364	629	438	1488	777	384	1447	697
Arrive On Green	0.05	0.33	0.33	0.09	0.37	0.37	0.04	0.40	0.40	0.03	0.39	0.39
Sat Flow, veh/h	1774	3725	1583	3442	3725	1583	3442	3725	1583	1774	3725	1583
Grp Volume(v), veh/h	103	793	332	424	1168	109	163	424	120	60	924	158
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1721	1863	1583	1721	1863	1583	1774	1863	1583
Q Serve(g_s), s	5.3	25.3	23.3	10.3	40.3	6.2	3.9	10.7	5.8	2.8	28.1	8.6
Cycle Q Clear(g_c), s	5.3	25.3	23.3	10.3	40.3	6.2	3.9	10.7	5.8	2.8	28.1	8.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	177	1217	584	559	1364	629	438	1488	777	384	1447	697
V/C Ratio(X)	0.58	0.65	0.57	0.76	0.86	0.17	0.37	0.28	0.15	0.16	0.64	0.23
Avail Cap(c_a), veh/h	212	1286	614	615	1420	653	465	1488	777	418	1447	697
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.78	0.78	0.78	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.2	40.1	35.0	28.8	40.7	27.1	26.5	28.3	19.5	24.6	34.6	24.2
Incr Delay (d2), s/veh	2.3	0.9	0.9	5.0	5.2	0.1	0.5	0.5	0.4	0.2	2.2	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	2.4	11.9	9.2	4.6	19.8	2.4	1.6	4.9	2.3	1.2	13.1	3.5
Lane Grp Delay (d), s/veh	36.6	40.9	35.9	33.8	45.9	27.2	27.0	28.8	19.9	24.7	36.8	24.9
Lane Grp LOS	D	D	D	C	D	C	C	C	B	C	D	C
Approach Vol, veh/h	1228			1701			707			1142		
Approach Delay, s/veh	39.2			41.7			26.9			34.5		
Approach LOS	D			D			C			C		
Timer												
Assigned Phs	7	4		3	8		5	2		1	6	
Phs Duration (G+Y+Rc), s	12.2	50.4		17.7	55.9		10.9	61.5		9.4	60.0	
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0		5.0	6.0		5.0	6.0	
Max Green Setting (Gmax), s	10.0	48.0		15.0	53.0		7.0	54.0		7.0	54.0	
Max Q Clear Time (g_c+I1), s	7.3	27.3		12.3	42.3		5.9	12.7		4.8	30.1	
Green Ext Time (p_c), s	0.0	14.6		0.4	8.7		0.1	11.8		0.0	10.0	
Intersection Summary												
HCM 2010 Ctrl Delay	37.1											
HCM 2010 LOS	D											
Notes												

HCM 2010 Signalized Intersection Summary
6: East Site Access/Peoria Parkway & E. 104th Avenue

2035 Background

AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	35	610	160	180	1100	90	170	60	170	350	60	125
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3
Lanes	1	2	1	1	2	1	1	1	1	1	1	1
Cap, veh/h	208	1516	644	394	1704	724	413	242	328	464	339	288
Arrive On Green	0.03	0.41	0.41	0.08	0.46	0.46	0.10	0.13	0.13	0.16	0.18	0.18
Sat Flow, veh/h	1774	3725	1583	1774	3725	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	38	663	174	196	1196	98	185	65	185	380	65	136
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	1.2	12.3	7.0	5.3	24.6	3.4	8.5	3.0	10.1	15.0	2.8	7.4
Cycle Q Clear(g_c), s	1.2	12.3	7.0	5.3	24.6	3.4	8.5	3.0	10.1	15.0	2.8	7.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	208	1516	644	394	1704	724	413	242	328	464	339	288
V/C Ratio(X)	0.18	0.44	0.27	0.50	0.70	0.14	0.45	0.27	0.56	0.82	0.19	0.47
Avail Cap(c_a), veh/h	346	1516	644	442	1704	724	413	272	353	464	369	314
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.51	0.51	0.51	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.0	20.5	18.9	13.4	20.8	15.0	31.4	37.6	34.1	26.9	33.2	35.1
Incr Delay (d2), s/veh	0.4	0.9	1.0	0.5	1.3	0.2	0.8	0.6	1.8	11.1	0.3	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	0.5	5.5	2.7	2.1	10.8	1.3	3.8	1.5	4.0	8.6	1.4	3.0
Lane Grp Delay (d), s/veh	18.4	21.4	20.0	13.9	22.0	15.2	32.1	38.2	35.9	38.0	33.5	36.3
Lane Grp LOS	B	C	B	B	C	B	C	D	D	D	C	D
Approach Vol, veh/h		875			1490			435			581	
Approach Delay, s/veh		21.0			20.5			34.6			37.1	
Approach LOS		C			C			C			D	
Timer												
Assigned Phs	7	4		3	8		5	2		1	6	
Phs Duration (G+Y+Rc), s	7.5	45.0		12.4	49.9		15.0	18.5		20.0	23.5	
Change Period (Y+Rc), s	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Max Green Setting (Gmax), s	10.0	39.0		10.0	39.0		10.0	14.0		15.0	19.0	
Max Q Clear Time (g_c+I1), s	3.2	14.3		7.3	26.6		10.5	12.1		17.0	9.4	
Green Ext Time (p_c), s	0.0	15.1		0.1	9.2		0.0	0.4		0.0	1.3	
Intersection Summary												
HCM 2010 Ctrl Delay				25.3								
HCM 2010 LOS				C								
Notes												

Intersection

Intersection Delay, s/veh 0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	800	40	35	1360	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	300	-	-	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	870	43	38	1478	0	5

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	1685
Stage 1	-	-	870
Stage 2	-	-	815
Follow-up Headway	-	2.22	3.52
Pot Capacity-1 Maneuver	-	770	85
Stage 1	-	-	370
Stage 2	-	-	396
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	-	770	81
Mov Capacity-2 Maneuver	-	-	81
Stage 1	-	-	370
Stage 2	-	-	376

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	11.4
HCM LOS			B

Minor Lane / Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	569	-	-	770	-
HCM Lane V/C Ratio	0.01	-	-	0.049	-
HCM Control Delay (s)	11.4	-	-	9.918	-
HCM Lane LOS	B			A	
HCM 95th %tile Q(veh)	0.029	-	-	0.156	-

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 Signalized Intersection Summary

3: State Highway 2 & E. 104th Avenue

2035 Background
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	125	1200	110	180	930	70	295	1190	495	70	450	55
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3
Lanes	1	2	1	2	2	1	2	2	1	1	2	1
Cap, veh/h	223	1383	666	298	1337	629	749	1462	701	136	1420	702
Arrive On Green	0.06	0.37	0.37	0.05	0.36	0.36	0.05	0.39	0.39	0.04	0.38	0.38
Sat Flow, veh/h	1774	3725	1583	3442	3725	1583	3442	3725	1583	1774	3725	1583
Grp Volume(v), veh/h	136	1304	120	196	1011	76	321	1293	538	76	489	60
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1721	1863	1583	1721	1863	1583	1774	1863	1583
Q Serve(g_s), s	6.7	48.0	6.7	5.1	33.8	4.3	7.0	45.8	40.7	3.7	13.2	3.1
Cycle Q Clear(g_c), s	6.7	48.0	6.7	5.1	33.8	4.3	7.0	45.8	40.7	3.7	13.2	3.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	223	1383	666	298	1337	629	749	1462	701	136	1420	702
V/C Ratio(X)	0.61	0.94	0.18	0.66	0.76	0.12	0.43	0.88	0.77	0.56	0.34	0.09
Avail Cap(c_a), veh/h	338	1446	693	320	1337	629	749	1462	701	156	1420	702
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.72	0.72	0.72	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.7	43.1	25.7	35.1	40.0	27.0	26.8	40.1	33.4	34.1	31.2	22.8
Incr Delay (d2), s/veh	1.9	9.5	0.1	4.4	2.5	0.1	0.4	8.2	7.9	3.6	0.7	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	3.0	24.3	2.6	3.8	16.2	1.7	0.8	22.5	17.4	1.7	6.1	1.2
Lane Grp Delay (d), s/veh	32.6	52.6	25.8	39.5	42.5	27.1	27.2	48.2	41.3	37.7	31.9	23.1
Lane Grp LOS	C	D	C	D	D	C	C	D	D	D	C	C
Approach Vol, veh/h	1560			1283			2152			625		
Approach Delay, s/veh	48.8			41.1			43.3			31.8		
Approach LOS	D			D			D			C		
Timer												
Assigned Phs	7	4		3	8		5	2		1	6	
Phs Duration (G+Y+Rc), s	13.8	57.6		12.1	55.9		12.0	61.6		10.4	60.0	
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0		5.0	6.0		5.0	6.0	
Max Green Setting (Gmax), s	18.0	55.0		8.0	45.0		7.0	54.0		7.0	54.0	
Max Q Clear Time (g_c+I1), s	8.7	50.0		7.1	35.8		9.0	47.8		5.7	15.2	
Green Ext Time (p_c), s	0.2	2.6		0.1	7.9		0.0	5.2		0.0	20.1	
Intersection Summary												
HCM 2010 Ctrl Delay	43.1											
HCM 2010 LOS	D											
Notes												

HCM 2010 Signalized Intersection Summary
6: East Site Access/Peoria Parkway & E. 104th Avenue

2035 Background
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Volume (veh/h)	95	1080	170	190	760	330	180	65	180	175	65	35
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3
Lanes	1	2	1	1	2	1	1	1	1	1	1	1
Cap, veh/h	312	1587	674	291	1707	726	410	263	356	391	263	224
Arrive On Green	0.05	0.43	0.43	0.08	0.46	0.46	0.11	0.14	0.14	0.11	0.14	0.14
Sat Flow, veh/h	1774	3725	1583	1774	3725	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	103	1174	185	207	826	359	196	71	196	190	71	38
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	3.0	24.2	7.0	5.5	14.1	14.5	8.5	3.1	10.0	8.2	3.1	1.9
Cycle Q Clear(g_c), s	3.0	24.2	7.0	5.5	14.1	14.5	8.5	3.1	10.0	8.2	3.1	1.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	312	1587	674	291	1707	726	410	263	356	391	263	224
V/C Ratio(X)	0.33	0.74	0.27	0.71	0.48	0.49	0.48	0.27	0.55	0.49	0.27	0.17
Avail Cap(c_a), veh/h	415	1587	674	337	1707	726	410	386	461	391	386	329
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.64	0.64	0.64	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.2	22.0	17.1	18.2	17.3	17.4	29.0	35.1	31.4	28.9	35.1	34.6
Incr Delay (d2), s/veh	0.6	3.1	1.0	3.8	0.6	1.6	0.9	0.5	1.3	0.9	0.5	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 Back of Q (50%), veh/ln	1.2	11.1	2.7	2.4	6.1	5.5	3.8	1.5	3.9	3.7	1.5	0.8
Lane Grp Delay (d), s/veh	14.8	25.2	18.1	22.0	17.9	18.9	29.8	35.6	32.7	29.8	35.6	34.9
Lane Grp LOS	B	C	B	C	B	B	C	D	C	C	D	C
Approach Vol, veh/h	1462				1392		463				299	
Approach Delay, s/veh	23.6				18.8		32.0				31.8	
Approach LOS	C				B		C				C	
Timer												
Assigned Phs	7	4		3	8		5	2		1	6	
Phs Duration (G+Y+Rc), s	9.7	45.0		12.6	48.0		15.0	18.9		15.0	18.9	
Change Period (Y+Rc), s	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Max Green Setting (Gmax), s	10.0	39.0		10.0	39.0		10.0	19.0		10.0	19.0	
Max Q Clear Time (g_c+I1), s	5.0	26.2		7.5	16.5		10.5	12.0		10.2	5.1	
Green Ext Time (p_c), s	0.1	10.3		0.1	16.1		0.0	0.9		0.0	1.3	
Intersection Summary												
HCM 2010 Ctrl Delay			23.5									
HCM 2010 LOS			C									
Notes												

Intersection

Intersection Delay, s/veh 0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	1315	10	10	965	0	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	300	-	-	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	1429	11	11	1049	0	33

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	1429
Stage 1	-	-	-
Stage 2	-	-	-
Follow-up Headway	-	2.22	-
Pot Capacity-1 Maneuver	-	472	-
Stage 1	-	-	-
Stage 2	-	-	-
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	-	472	-
Mov Capacity-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	15.6
HCM LOS			C

Minor Lane / Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	373	-	-	472	-
HCM Lane V/C Ratio	0.087	-	-	0.023	-
HCM Control Delay (s)	15.6	-	-	12.807	-
HCM Lane LOS	C			B	
HCM 95th %tile Q(veh)	0.285	-	-	0.071	-

Notes

- : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 Signalized Intersection Summary

3: State Highway 2 & E. 104th Avenue

2035 Total
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	102	740	308	390	1084	100	152	390	110	55	850	149
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3
Lanes	1	2	1	2	2	1	2	2	1	1	2	1
Cap, veh/h	180	1227	589	556	1364	629	434	1481	774	382	1438	698
Arrive On Green	0.05	0.33	0.33	0.09	0.37	0.37	0.04	0.40	0.40	0.03	0.39	0.39
Sat Flow, veh/h	1774	3725	1583	3442	3725	1583	3442	3725	1583	1774	3725	1583
Grp Volume(v), veh/h	111	804	335	424	1178	109	165	424	120	60	924	162
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1721	1863	1583	1721	1863	1583	1774	1863	1583
Q Serve(g_s), s	5.7	25.8	23.6	10.4	41.0	6.2	3.9	10.8	5.9	2.9	28.3	8.9
Cycle Q Clear(g_c), s	5.7	25.8	23.6	10.4	41.0	6.2	3.9	10.8	5.9	2.9	28.3	8.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	180	1227	589	556	1364	629	434	1481	774	382	1438	698
V/C Ratio(X)	0.62	0.66	0.57	0.76	0.86	0.17	0.38	0.29	0.15	0.16	0.64	0.23
Avail Cap(c_a), veh/h	209	1279	611	610	1412	650	459	1481	774	415	1438	698
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.78	0.78	0.78	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.4	40.1	35.0	29.1	41.1	27.3	26.8	28.7	19.8	24.9	35.0	24.3
Incr Delay (d2), s/veh	3.2	0.9	0.9	5.2	5.7	0.1	0.5	0.5	0.4	0.2	2.2	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	2.8	12.2	9.4	5.2	20.1	2.5	1.6	5.0	2.3	1.2	13.1	3.6
Lane Grp Delay (d), s/veh	37.6	41.0	35.9	34.2	46.8	27.4	27.4	29.1	20.2	25.1	37.3	25.1
Lane Grp LOS	D	D	D	C	D	C	C	C	C	C	D	C
Approach Vol, veh/h	1250				1711		709				1146	
Approach Delay, s/veh	39.3				42.4		27.2				34.9	
Approach LOS	D				D		C				C	
Timer												
Assigned Phs	7	4	3		8		5	2	1		6	
Phs Duration (G+Y+Rc), s	12.7	51.1	17.8		56.2		11.0	61.6	9.4		60.0	
Change Period (Y+Rc), s	5.0	5.0	5.0		5.0		5.0	6.0	5.0		6.0	
Max Green Setting (Gmax), s	10.0	48.0	15.0		53.0		7.0	54.0	7.0		54.0	
Max Q Clear Time (g_c+I1), s	7.7	27.8	12.4		43.0		5.9	12.8	4.9		30.3	
Green Ext Time (p_c), s	0.0	14.5	0.4		8.2		0.0	11.9	0.0		9.9	
Intersection Summary												
HCM 2010 Ctrl Delay			37.6									
HCM 2010 LOS			D									
Notes												

HCM 2010 Signalized Intersection Summary
6: East Site Access/Peoria Parkway & E. 104th Avenue

2035 Total
AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	35	610	185	195	1100	90	220	65	190	350	65	125
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3
Lanes	1	2	1	1	2	1	1	1	1	1	1	1
Cap, veh/h	204	1490	633	391	1696	721	419	259	349	462	355	301
Arrive On Green	0.03	0.40	0.40	0.08	0.46	0.46	0.10	0.14	0.14	0.15	0.19	0.19
Sat Flow, veh/h	1774	3725	1583	1774	3725	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	38	663	201	212	1196	98	239	71	207	380	71	136
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	1.2	12.7	8.5	5.9	25.1	3.5	10.0	3.3	11.4	15.0	3.1	7.4
Cycle Q Clear(g_c), s	1.2	12.7	8.5	5.9	25.1	3.5	10.0	3.3	11.4	15.0	3.1	7.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	204	1490	633	391	1696	721	419	259	349	462	355	301
V/C Ratio(X)	0.19	0.45	0.32	0.54	0.71	0.14	0.57	0.27	0.59	0.82	0.20	0.45
Avail Cap(c_a), veh/h	340	1490	633	428	1696	721	419	267	356	462	363	308
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.51	0.51	0.51	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.6	21.4	20.1	13.9	21.3	15.4	32.5	37.6	34.1	27.1	33.2	35.0
Incr Delay (d2), s/veh	0.4	1.0	1.3	0.6	1.3	0.2	1.9	0.6	2.5	11.4	0.3	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q (50%), veh/ln	0.5	5.7	3.4	2.3	11.3	1.3	5.3	1.6	4.7	8.6	1.5	2.9
Lane Grp Delay (d), s/veh	19.0	22.3	21.4	14.5	22.6	15.6	34.3	38.1	36.6	38.5	33.5	36.0
Lane Grp LOS	B	C	C	B	C	B	C	D	D	D	C	D
Approach Vol, veh/h		902			1506			517			587	
Approach Delay, s/veh		22.0			21.0			35.8			37.3	
Approach LOS		C			C			D			D	
Timer												
Assigned Phs	7	4		3	8		5	2		1	6	
Phs Duration (G+Y+Rc), s	7.6	45.0		13.0	50.4		15.0	19.6		20.0	24.6	
Change Period (Y+Rc), s	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Max Green Setting (Gmax), s	10.0	39.0		10.0	39.0		10.0	14.0		15.0	19.0	
Max Q Clear Time (g_c+I1), s	3.2	14.7		7.9	27.1		12.0	13.4		17.0	9.4	
Green Ext Time (p_c), s	0.0	15.1		0.1	8.9		0.0	0.1		0.0	1.4	
Intersection Summary												
HCM 2010 Ctrl Delay			26.2									
HCM 2010 LOS			C									
Notes												

HCM 2010 TWSC
9: Lima Street & E. 104th Avenue

2035 Total
AM Peak

Intersection

Intersection Delay, s/veh 0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	825	40	35	1410	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	300	-	-	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	897	43	38	1533	0	5

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	897	1739
Stage 1	-	-	897
Stage 2	-	-	842
Follow-up Headway	-	2.22	3.52
Pot Capacity-1 Maneuver	-	753	78
Stage 1	-	-	358
Stage 2	-	-	383
Time blocked-Platoon, %	-	-	-
Mov Capacity-1 Maneuver	-	753	74
Mov Capacity-2 Maneuver	-	-	74
Stage 1	-	-	358
Stage 2	-	-	364

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	11.5
HCM LOS			B

Minor Lane / Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	558	-	-	753	-
HCM Lane V/C Ratio	0.01	-	-	0.051	-
HCM Control Delay (s)	11.5	-	-	10.035	-
HCM Lane LOS	B			B	
HCM 95th %tile Q(veh)	0.029	-	-	0.159	-

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined

HCM 2010 Signalized Intersection Summary

3: State Highway 2 & E. 104th Avenue

2035 Total
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	129	1209	112	180	939	70	298	1190	495	70	450	61
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3
Lanes	1	2	1	2	2	1	2	2	1	1	2	1
Cap, veh/h	223	1387	668	296	1337	629	744	1458	699	136	1417	703
Arrive On Green	0.06	0.37	0.37	0.05	0.36	0.36	0.05	0.39	0.39	0.04	0.38	0.38
Sat Flow, veh/h	1774	3725	1583	3442	3725	1583	3442	3725	1583	1774	3725	1583
Grp Volume(v), veh/h	140	1314	122	196	1021	76	324	1293	538	76	489	66
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1721	1863	1583	1721	1863	1583	1774	1863	1583
Q Serve(g_s), s	6.9	48.6	6.9	5.1	34.4	4.3	7.0	45.9	40.8	3.7	13.3	3.4
Cycle Q Clear(g_c), s	6.9	48.6	6.9	5.1	34.4	4.3	7.0	45.9	40.8	3.7	13.3	3.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	223	1387	668	296	1337	629	744	1458	699	136	1417	703
V/C Ratio(X)	0.63	0.95	0.18	0.66	0.76	0.12	0.44	0.89	0.77	0.56	0.35	0.09
Avail Cap(c_a), veh/h	335	1443	691	317	1337	629	744	1458	699	155	1417	703
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.70	0.70	0.70	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.9	43.2	25.7	35.2	40.2	27.1	27.1	40.3	33.5	34.3	31.4	22.9
Incr Delay (d2), s/veh	2.0	9.9	0.1	4.6	2.7	0.1	0.4	8.3	8.0	3.6	0.7	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 Back of Q (50%), veh/ln	3.1	24.7	2.7	2.3	16.7	1.7	0.9	22.5	17.4	1.7	6.1	1.4
Lane Grp Delay (d), s/veh	32.9	53.1	25.8	39.8	42.9	27.2	27.5	48.6	41.5	37.9	32.1	23.2
Lane Grp LOS	C	D	C	D	D	C	C	D	D	D	C	C
Approach Vol, veh/h	1576				1293				2155		631	
Approach Delay, s/veh	49.2				41.5				43.7		31.8	
Approach LOS	D				D				D		C	
Timer												
Assigned Phs	7	4		3	8		5	2		1	6	
Phs Duration (G+Y+Rc), s	14.0	57.9		12.1	56.0		12.0	61.6		10.4	60.0	
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0		5.0	6.0		5.0	6.0	
Max Green Setting (Gmax), s	18.0	55.0		8.0	45.0		7.0	54.0		7.0	54.0	
Max Q Clear Time (g_c+l1), s	8.9	50.6		7.1	36.4		9.0	47.9		5.7	15.3	
Green Ext Time (p_c), s	0.2	2.3		0.1	7.5		0.0	5.1		0.0	20.1	
Intersection Summary												
HCM 2010 Ctrl Delay			43.4									
HCM 2010 LOS			D									
Notes												

HCM 2010 Signalized Intersection Summary
6: East Site Access/Peoria Parkway & E. 104th Avenue

2035 Total
PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	95	1080	207	208	760	330	205	70	195	175	70	35
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow veh/h/ln	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3	186.3
Lanes	1	2	1	1	2	1	1	1	1	1	1	1
Cap, veh/h	310	1561	663	292	1699	722	412	278	376	390	278	236
Arrive On Green	0.05	0.42	0.42	0.09	0.46	0.46	0.11	0.15	0.15	0.11	0.15	0.15
Sat Flow, veh/h	1774	3725	1583	1774	3725	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	103	1174	225	226	826	359	223	76	212	190	76	38
Grp Sat Flow(s),veh/h/ln	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	3.0	24.9	9.0	6.1	14.4	14.8	10.0	3.4	11.0	8.3	3.4	1.9
Cycle Q Clear(g_c), s	3.0	24.9	9.0	6.1	14.4	14.8	10.0	3.4	11.0	8.3	3.4	1.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	310	1561	663	292	1699	722	412	278	376	390	278	236
V/C Ratio(X)	0.33	0.75	0.34	0.77	0.49	0.50	0.54	0.27	0.56	0.49	0.27	0.16
Avail Cap(c_a), veh/h	410	1561	663	326	1699	722	412	380	463	390	380	323
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.63	0.63	0.63	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.7	22.9	18.3	18.9	17.7	17.8	29.5	35.1	31.3	28.9	35.1	34.5
Incr Delay (d2), s/veh	0.6	3.4	1.4	6.5	0.6	1.6	1.4	0.5	1.3	0.9	0.5	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 Back of Q (50%), veh/ln	1.3	11.7	3.5	2.8	6.2	5.7	4.6	1.6	4.3	3.8	1.6	0.8
Lane Grp Delay (d), s/veh	15.3	26.3	19.7	25.4	18.3	19.4	31.0	35.7	32.6	29.8	35.7	34.9
Lane Grp LOS	B	C	B	C	B	B	C	D	C	C	D	C
Approach Vol, veh/h	1502				1411		511				304	
Approach Delay, s/veh	24.6				19.7		32.3				31.9	
Approach LOS	C				B		C				C	
Timer												
Assigned Phs	7	4	3		8	5		2	1		6	
Phs Duration (G+Y+Rc), s	9.8	45.0	13.2		48.5	15.0		19.9	15.0		19.9	
Change Period (Y+Rc), s	5.0	6.0	5.0		6.0	5.0		6.0	5.0		6.0	
Max Green Setting (Gmax), s	10.0	39.0	10.0		39.0	10.0		19.0	10.0		19.0	
Max Q Clear Time (g_c+I1), s	5.0	26.9	8.1		16.8	12.0		13.0	10.3		5.4	
Green Ext Time (p_c), s	0.1	9.9	0.1		16.1	0.0		0.9	0.0		1.4	
Intersection Summary												
HCM 2010 Ctrl Delay			24.4									
HCM 2010 LOS			C									
Notes												

HCM 2010 TWSC
9: Lima Street & E. 104th Avenue

2035 Total
PM Peak

Intersection

Intersection Delay, s/veh 0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	1352	10	10	990	0	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	250	300	-	-	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	1470	11	11	1076	0	33

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	1470	0	2030	735
Stage 1	-	-	-	-	1470	-
Stage 2	-	-	-	-	560	-
Follow-up Headway	-	-	2.22	-	3.52	3.32
Pot Capacity-1 Maneuver	-	-	455	-	50	362
Stage 1	-	-	-	-	178	-
Stage 2	-	-	-	-	535	-
Time blocked-Platoon, %	-	-	-	-	-	-
Mov Capacity-1 Maneuver	-	-	455	-	49	362
Mov Capacity-2 Maneuver	-	-	-	-	49	-
Stage 1	-	-	-	-	178	-
Stage 2	-	-	-	-	522	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	15.9
HCM LOS			C

Minor Lane / Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	362	-	-	455	-
HCM Lane V/C Ratio	0.09	-	-	0.024	-
HCM Control Delay (s)	15.9	-	-	13.106	-
HCM Lane LOS	C			B	
HCM 95th %tile Q(veh)	0.295	-	-	0.073	-

Notes

~ : Volume Exceeds Capacity; \$: Delay Exceeds 300 Seconds; Error : Computation Not Defined