

May 3, 2021

Mr. John Muirhead
New King Inc.
874 Silas Deane Highway
Wethersfield, CT 06109

**RE: Proposed Burger King Restaurant
106 & 110 River Road (Route 12)
Lisbon, Connecticut
Our File # 20110**

Dear Mr. Muirhead:

Pursuant to your request our office has prepared this report to document our findings of the potential traffic impact of a proposed 2,877 s.f Burger King Restaurant with a drive through window to be located at 106/110 River Road (Route 12) in the Town of Lisbon, Connecticut. The site location is presented in Figure 1 with respect to the surrounding roadway network. This report is written to present our findings.

Proposed Development

The proposed Burger King is depicted on plans prepared by our office dated May 3, 2021. The site plan shows a single 2,877 s.f. building in the center of the site. The building has a dual drive through window located in the northern portion of the building. A drive through lane circulates the building in a counterclockwise direction. Access to the site is proposed by way of a single driveway to River Road. The proposed site driveway will provide a single, separated, entering and exiting lane and will operate under stop sign control.

Description of Area

The site proposed for development is located on Route 12 (River Road) across from an existing gas station, near the I-395 southbound on and off ramps. Route 12 (River

Road) is a state-maintained highway that originates in Groton and traverses north until it enters Massachusetts. Route 12 enters Lisbon traversing north from Norwich and continues north past a junction with Interstate 395, past the proposed site development, and continues north into Griswold. The roadway provides approximately 40 feet of pavement with a single travel lane and painted shoulder in each direction separated by a painted double yellow centerline. Left-turn lanes are provided along the roadway at commercial driveways. The posted speed limit is 35 miles per hour. Land use along the roadway is commercial uses with single-family residences located north of the junction with interstate 395.

Current Traffic Volumes

The Connecticut DOT maintains a traffic volume count program on all state highways and some local roadways. Included within the DOT database are counts on Route 12, located north of the I-395 southbound on-ramp and another located north of the I-395 northbound off ramp. The count north of the I-395 southbound on-ramp, conducted during October 2017, indicated that Route 12 carries an average daily traffic volume (ADT) of 10,200 vehicles with peak hour volumes of 647 vehicles during the a.m. peak hour (9:00 a.m.) and 967 vehicles during the p.m. peak hour (3:00 p.m.). The count north of the I-395 northbound off-ramp, conducted during October 2017, indicated that Route 12 carries an average daily traffic volume (ADT) of 10,400 vehicles with peak hour volumes of 682 vehicles during the a.m. peak hour (9:00 a.m.) and 1050 vehicles during the p.m. peak hour (4:00 p.m.). The ConnDOT counts are presented in Table 1 and 2.

Manual turning movement counts were conducted during the morning, afternoon and Saturday peak hours at both the I - 395 northbound and southbound on/off-ramps. The counts were conducted during February 2020. The observed traffic volumes are presented in Figures 2, 3 and 4. Copies of the counts are included in the appendix.

A review of the past ConnDOT ADTs revealed that traffic volumes have decreased in the area over the past 6 years. The counts at station 46 indicated traffic volumes have decreased approximately 4% from 2014 to 2017. The count at station 57 indicated traffic volumes have decreased approximately 17% from 2011 to 2017.

In order to be conservative, we have not applied a growth rate factor to the existing 2020 traffic volumes. The resultant volumes represent the 2022 background traffic volumes. These volumes are presented in Figures 5, 6 and 7.

Site Generated Traffic and Traffic Assignment

The proposed development is to consist of a 2,877 s.f. Burger King restaurant with a drive-thru window. The trip generation for the development was calculated utilizing the ITE Trip Generation report. Included in the ITE Trip Generation report is a land use that is directly applicable to the proposed development. The land use utilized for this report is the following: LUC 934 - Fast Food Restaurant with drive thru window.

Using the ITE trip generation report, based on square footage our development is anticipated to have a weekday average daily traffic of 1,356, with 147 peak morning trips made up of 76 entering trips and 71 exiting trips, an afternoon peak of 148 trips made up of 75 entering trips and 73 exiting trips, a Saturday average daily traffic of 1,774 trips, with 158 Saturday peak trips made up of 81 entering trips and 77 exiting trips. The trip generation summary can be found in Table 3.

Capacity Analysis

Capacity analyses were conducted for the morning, afternoon, and Saturday peak hours at the intersection of Route 12 and the I-395 northbound off ramp, the Route 12 and I-395 southbound ramps, the intersection of Route 12 and a gas station entrance, and the intersection of Route 12 with the proposed site entrance drive and exit drive. An

analysis was completed for the background and combined traffic volume conditions. The results of the analysis are presented in Table 4 and discussed below.

Route 12 at I-395 Southbound Ramps – This is an existing signalized T-intersection with Route 12 oriented in the north-south direction and the I-395 southbound ramps approaching from the east. The route 12 approaches each provide three lanes, two through lanes and an exclusive left-turn lane for the southbound approach, and right-turn lane for the northbound approach. The I-395 southbound approach provides three lanes consisting of two left-turn lanes and one right-turn lane. The analysis indicates that the intersection operates at an overall LOS (level of service) A under both the background and combined conditions during the morning peak hour. During the afternoon peak hour, under background conditions the intersection operates at a LOS A, and with the introduction of site traffic, operates at a LOS B. During the Saturday peak hours the intersection operates at a LOS B under background conditions, and at a LOS C under the combined conditions.

Route 12 at I-395 Northbound Ramps – This is an existing signalized four-way intersection with Route 12 oriented in the north-south direction and the I-395 northbound ramps oriented in the east-west direction. The route 12 northbound approach provides a through-lane and dedicated left-turn lane and the southbound approach provides a through-lane and a right -turn permitted through lane. The I-395 northbound ramp approaches from the east and west provide a single right-turn only lane. The analysis indicates the intersection operates at a LOS B under all conditions.

Route 12 at Gas Station Entrance – This is a existing, unsignalized intersection with Route 12 oriented in the north-south direction and the gas station entrance approaching from the east. The route 12 southbound approach provides two through lanes with one permitting left-turns into the gas station, and the northbound approach is a single

through lane which permits right-turns into the gas station. Analysis indicates that the driveway will operate at a LOS A under all conditions.

Route 12 at Site Drive Entrance – This is a proposed, unsignalized intersection, with Route 12 oriented in the north-south direction and the site entrance approaching from the east. Analysis indicates the driveway will operate at a LOS A under all conditions.

Route 12 at Site Drive Exit – This is a proposed, unsignalized intersection, with Route 12 oriented in the north-south direction and the site entrance approaching from the east. The site drive operates under stop-sign control. Analysis indicates the site drive will operate at a LOS C during the morning and afternoon peak hours and at a LOS D during the afternoon peak hours.

Site Driveway Location and Design

The Connecticut Department of Transportation has published its requirements for the application of sight distances at intersections and driveways as adopted in December of 2003. In general, the intersection sight distance (ISD) is the available sight distance allowing a driver approaching an intersection to observe the vehicles on the crossing roadway or opposing direction. Therefore, the ISD varies according to the speed of traffic and distance crossed while performing the maneuver. The clear line of sight is measured from a minimum of 15 feet behind the edge of road or traveled way to a point within the road, while the ISD is the line of sight projected along the length of the roadway. The line should be measured at a height of 3 feet 6 inches from the beginning point (driver's eye level) to the end point (object in roadway.)

The proposed driveways will be located on Route 12 (River Road) across from the existing Mobile driveways. The northern driveway will be a one-way exit, and the southern drive will provide a single entering and exiting travel lane separated by a raised median. The speed limit on Route 12 in the vicinity of the proposed development

is 35 miles per hour. The ConnDOT minimum required ISD for a speed of 35 miles per hour is 390 feet. Our observations at the proposed site driveway locations indicates that the available sight lines are in excess of the required 390 feet.

Drive Thru Queuing

A standard Poisson queue analysis was conducted for the proposed drive through window to determine the required vehicle stacking distance for this site. The results of that analysis are presented in Table 4, 5 and 6. The analysis was conducted based on a service rate of 35 and 45 seconds per vehicle (103 and 80 veh/hr) and a peak hour volume of 81 vehicles. The analysis indicates for a service rate of 35 seconds with 65% of the entering vehicles using the drive-thru queue would be 2 vehicles with an average waiting time of 55 seconds per vehicle. The probability that the queue would exceed fifteen (15) vehicles is approximately 1%. For a service rate of 45 seconds with 65% of the entering vehicles using the drive-thru the queue would be 4 vehicles with an average waiting time of 167 seconds per vehicle. The probability that the queue would exceed fifteen (15) vehicles is approximately 2%. Due to the pandemic, we ran a scenario in which there was no sit-down dining or access into the Burger King, therefore all entering vehicles would utilize the drive-thru window.

The drive-thru was analyzed for a service rate of 35 seconds with 100% of the entering vehicles using the drive-thru. The analysis found the drive-thru queue would be 4 vehicles with an average waiting time of 129 seconds. The probability that the queue would exceed fifteen (15) vehicles is approximately 3%.

The proposed site plan provides approximately 325 ft amount of vehicle storage. The available storage is capable of accommodating thirteen (13) vehicles at an average of 25 feet per vehicle.

Accident Experience

The University of Connecticut gathers and compiles traffic accident data for all state highways and some major local roadways. A list of accidents occurring in the area from January 1st, 2017 through February 5th, 2020 includes the most recent 3 years of available data. Tables relating the accidents to various conditions including date, time, roadway and weather conditions, collision types, and other variables as well as a short description of each accident are included in the appendix.

Accident records were obtained for Route 12 for a distance of 1,000 feet either side of the proposed site driveway. The 3-year accident history indicates a total of twenty-seven (27) accidents. Of those accidents, twelve (23) were front-to-rear accidents, eleven (11) were angled crashes, two (2) were categorized as other, one (1) was a sideswipe same direction crash and one (1) was a sideswipe opposite direction crash. Those crashes resulted in twenty-three (23) property damage only crashes, three (3) crashes involving suspected injuries and one (1) crash resulting in possible injuries. There were no reported fatalities.

Conclusion

Based on our analysis, it is our professional opinion that the traffic volumes associated with the proposed Burger King Restaurant can readily be accommodated by the existing roadway network. The proposed site driveway is properly located with respect to adjacent intersections and with respect to available sight distances and are properly designed to accommodate the anticipated driveway volumes.

We appreciate the opportunity to provide this analysis to you. We will be available to offer testimony in support of your application before local planning agencies upon your request. If you require additional information regarding this application, please do not hesitate to contact our office.

New King Inc.
May 3, 2021
Page 8

Very truly yours,

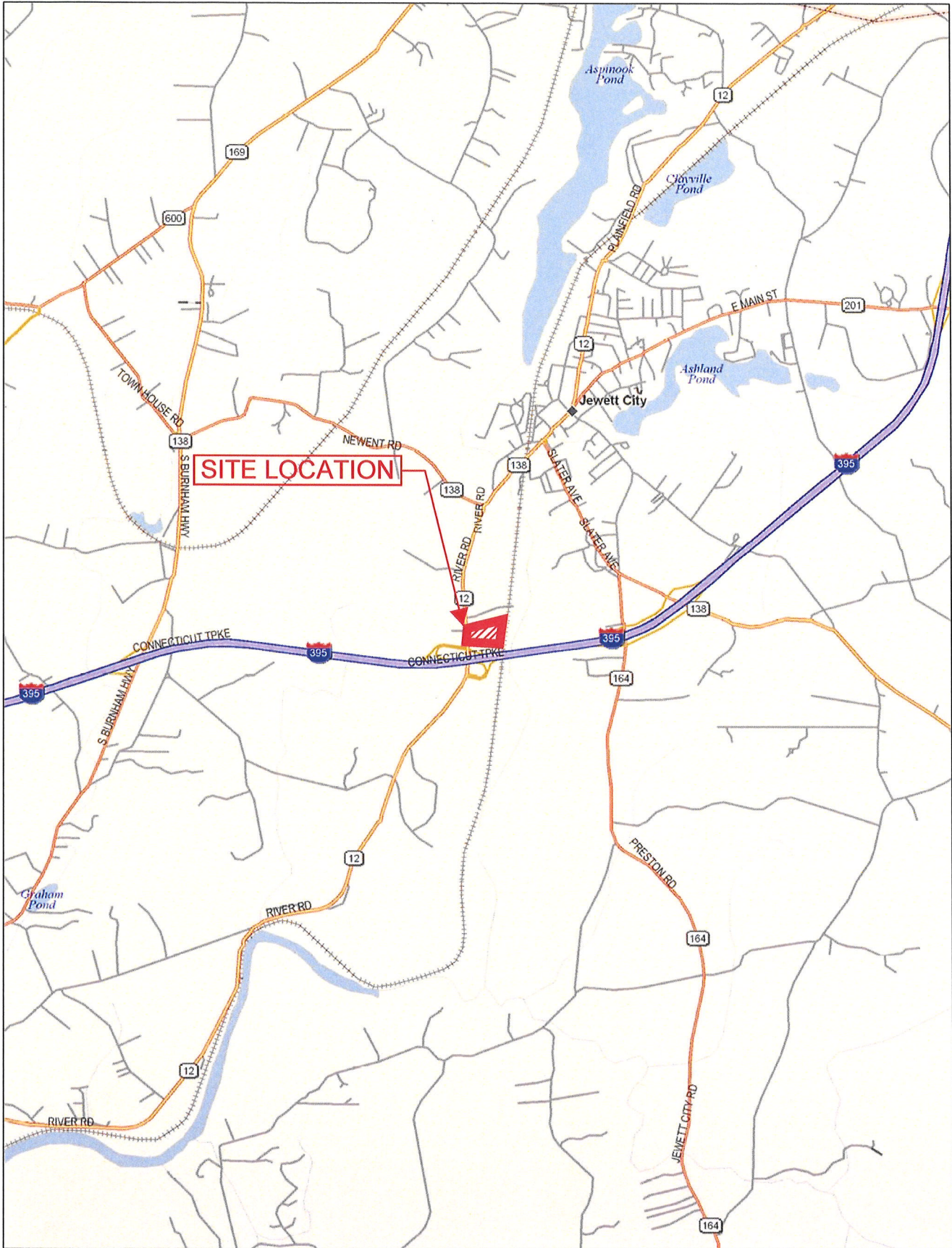
F. A. Hesketh & Associates, Inc.

A handwritten signature in blue ink, appearing to read "Scott F. Hesketh", is written over the company name.

Scott F. Hesketh, P.E.
Manager of Transportation Engineering

Attachments

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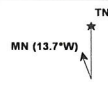


Figure 1

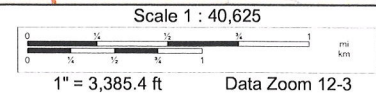


Table 1
 ConnDOT TRAFFIC VOLUMES
 ROUTE 12 NORTH OF I-395 SB ON RAMP
 STATION NO. 057

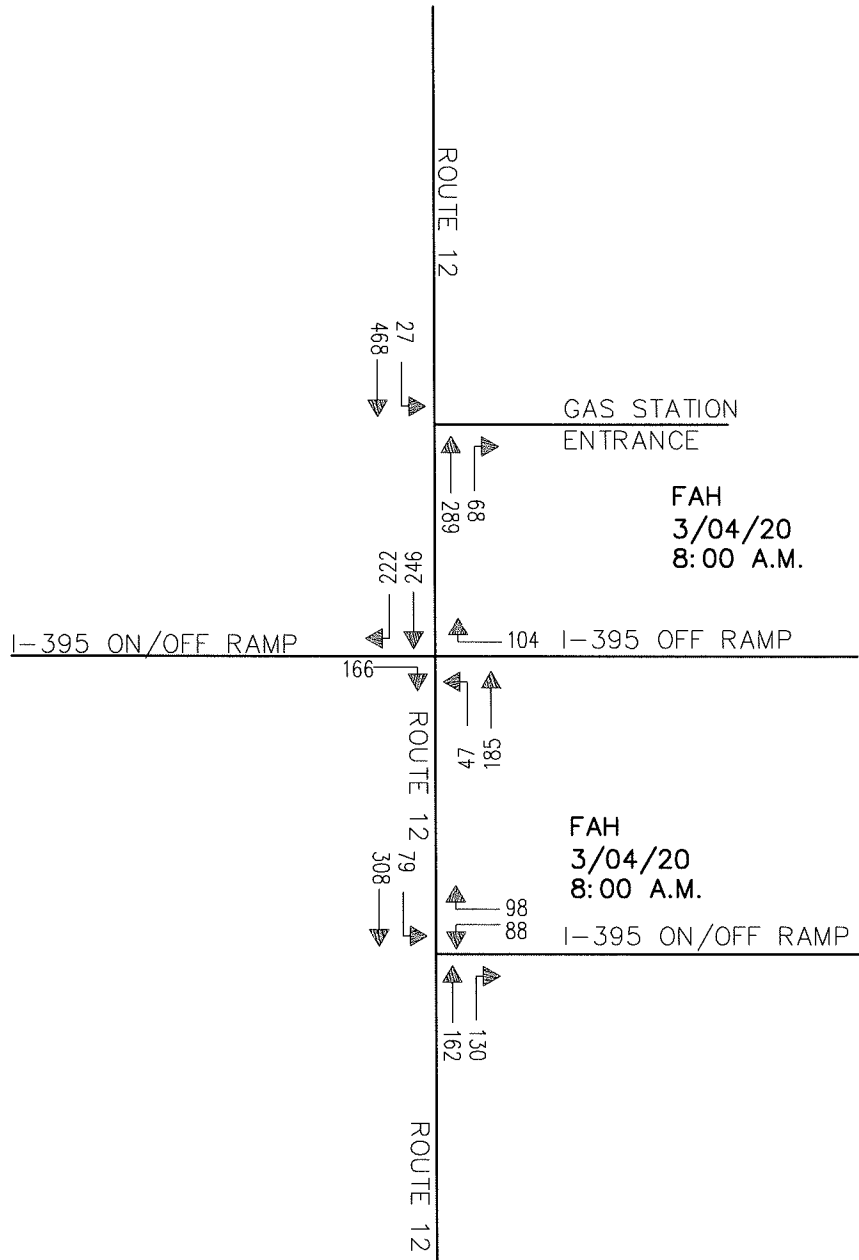
	23-Oct-17 Monday <u>Comb</u>	24-Oct-17 Tuesday <u>Comb</u>
12:00		64
1:00	27	33
2:00	28	29
3:00	49	44
4:00	92	119
5:00	218	220
6:00	378	366
7:00	546	564
8:00	598	593
9:00	624	647
10:00	645	680
11:00	745	720
12:00	861	763
1:00	729	793
2:00	780	849
3:00	906	967
4:00	910	943
5:00	885	848
6:00	681	576
7:00	474	384
8:00	334	286
9:00	224	249
10:00	140	191
11:00	104	107
	10978	11035

2017 ADT = 10,200 for station 57 in Lisbon

Table 2
 ConnDOT TRAFFIC VOLUMES
 ROUTE 12 NORTH OF I-395 NB OFF RAMP
 STATION NO. 046

	24-Oct-17 Tuesday <u>Comb</u>	25-Oct-17 Wednesday <u>Comb</u>
12:00	4	52
1:00	38	45
2:00	31	29
3:00	50	38
4:00	83	93
5:00	153	143
<hr/>		
6:00	275	271
7:00	450	431
8:00	531	534
<hr/>		
9:00	682	587
10:00	740	727
11:00	792	790
12:00	894	880
1:00	912	848
2:00	905	797
<hr/>		
3:00	989	931
4:00	1050	1007
5:00	923	959
<hr/>		
6:00	625	695
7:00	413	485
8:00	290	319
9:00	267	276
10:00	173	169
11:00	104	84
	11374	11190

2017 ADT = 10,400 for station 46 in Lisbon



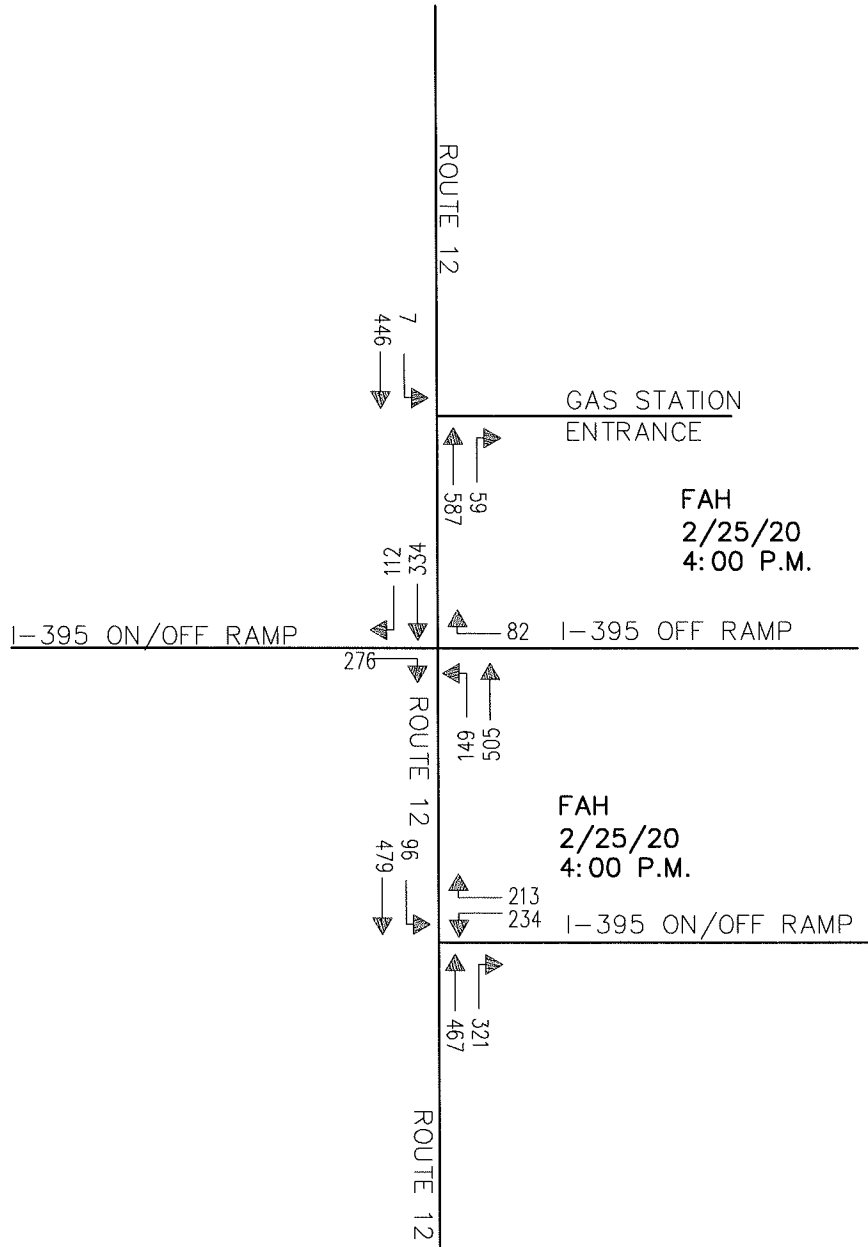
A.M. PEAK HOUR

FIGURE 2

03-05-2020

<p>OBSERVED TRAFFIC VOLUMES A.M. PEAK HOURS</p> <p>PROPOSED BURGER KING RIVER ROAD (RT 12)</p> <p>LISBON, CONNECTICUT</p>	<p>F. A. Hesketh & Associates, Inc. 6 CREAMERY BROOK, EAST GRANBY, CT 06026</p> <p>FAH</p> <p>TRAFFIC PLANNING ENGINEERING DESIGN</p>
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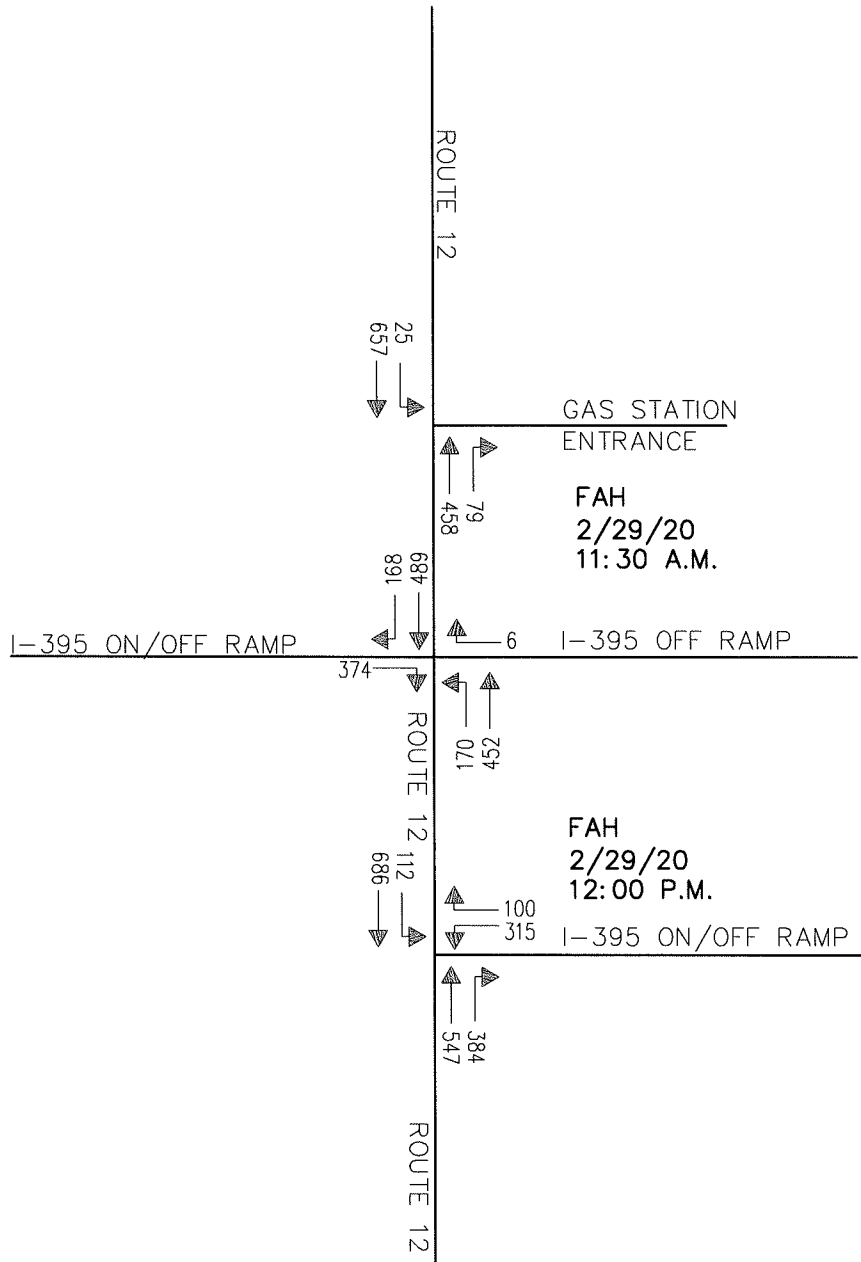
P.M. PEAK HOUR

FIGURE 3

03-05-2020

<p>OBSERVED TRAFFIC VOLUMES P.M. PEAK HOURS</p> <p>PROPOSED BURGER KING RIVER ROAD (RT 12)</p> <p>LISBON, CONNECTICUT</p>	<p>F. A. Hesketh & Associates, Inc. 6 CREAMERY BROOK, EAST GRANBY, CT 06026</p> <p>FAH</p> <p>TRAFFIC PLANNING ENGINEERING DESIGN</p>
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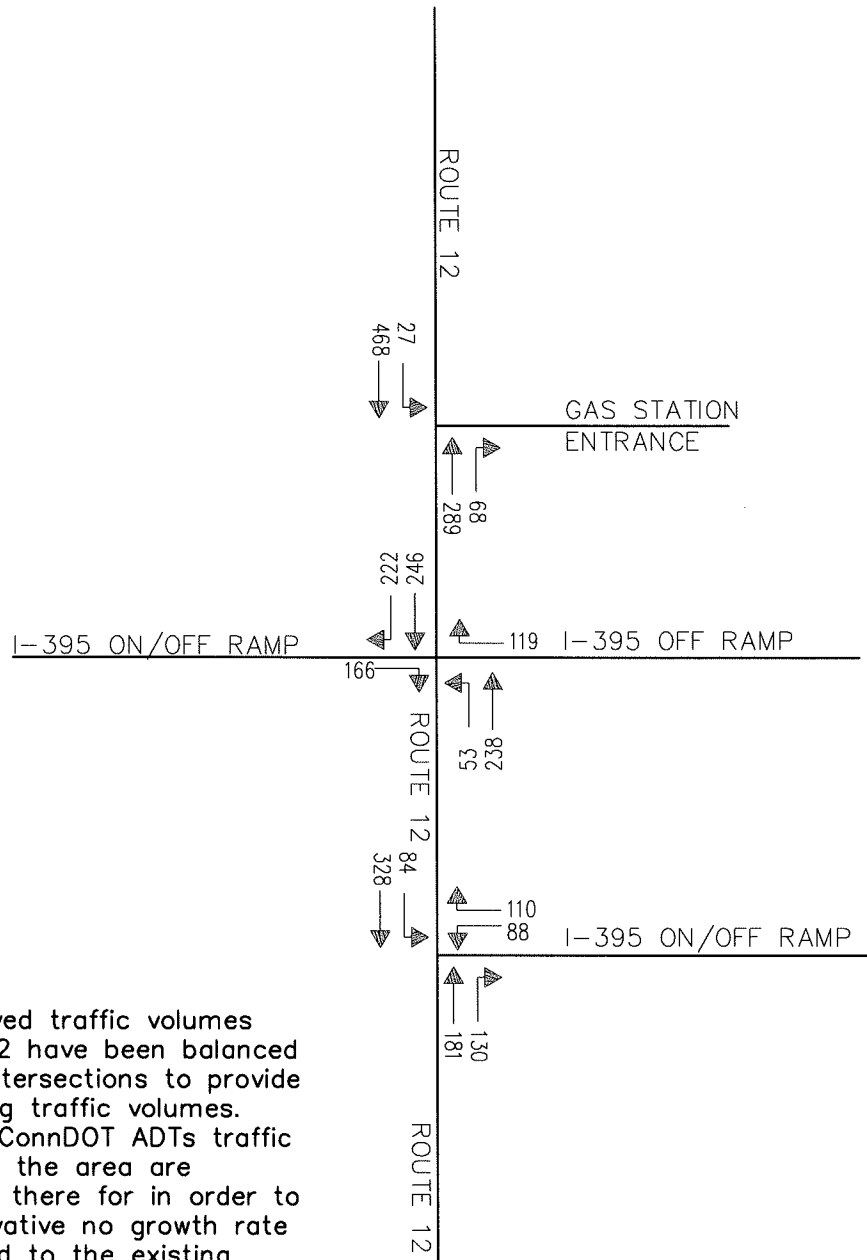
SATURDAY PEAK HOUR

FIGURE 4

03-05-2020

<p>OBSERVED TRAFFIC VOLUMES SAT. PEAK HOURS</p> <p>PROPOSED BURGER KING RIVER ROAD (RT 12) LISBON, CONNECTICUT</p>	<p>F. A. Hesketh & Associates, Inc. 6 CREAMERY BROOK, EAST GRANBY, CT 06026</p> <p>FAH</p> <p>TRAFFIC PLANNING ENGINEERING DESIGN</p>
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The observed traffic volumes from Fig. 2 have been balanced between intersections to provide the existing traffic volumes. Based on ConnDOT ADTs traffic volumes in the area are decreasing there for in order to be conservative no growth rate was applied to the existing traffic volumes.

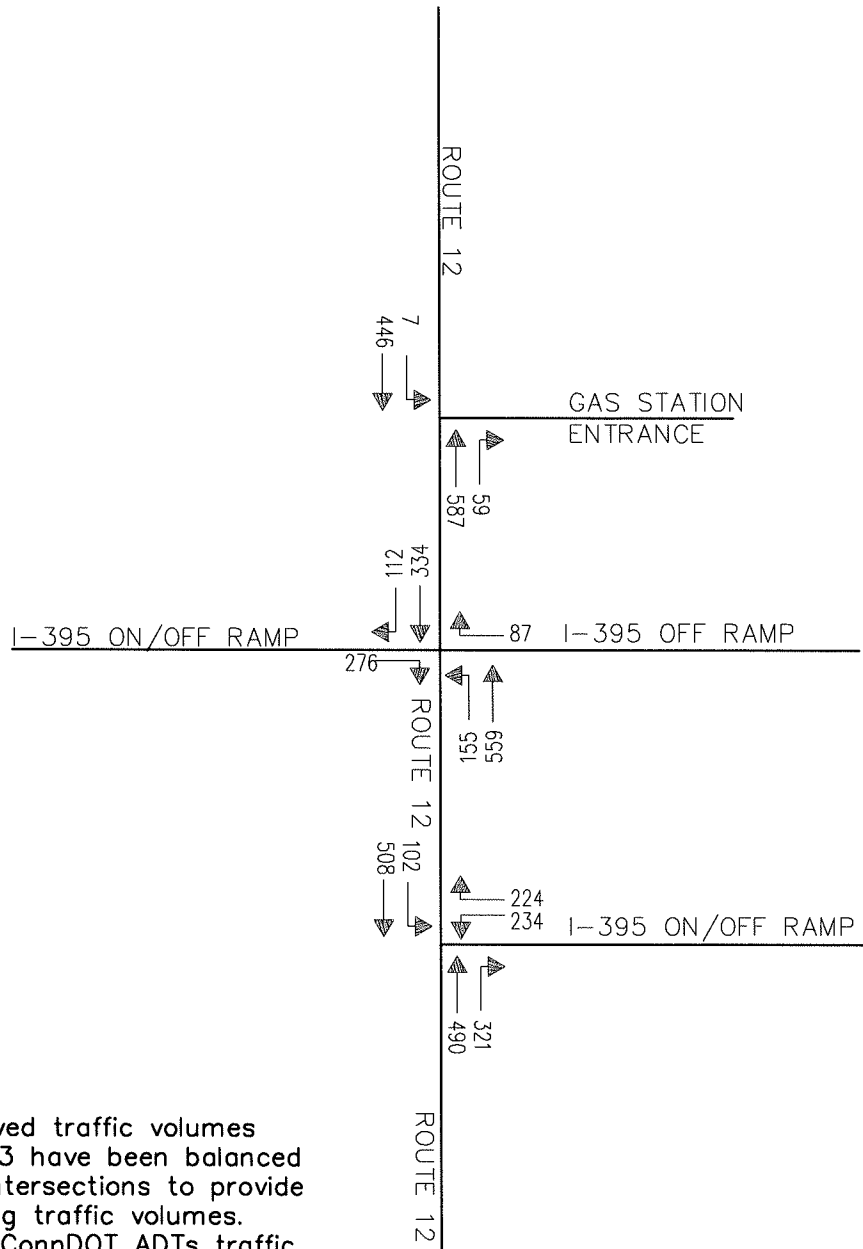
A.M. PEAK HOUR

FIGURE 5

03-05-2020

<p>2022 BACKGROUND TRAFFIC VOLUMES A.M. PEAK HOURS</p> <p>PROPOSED BURGER KING RIVER ROAD (RT 12) LISBON, CONNECTICUT</p>	<p>F. A. Hesketh & Associates, Inc. 6 CREAMERY BROOK, EAST GRANBY, CT 06026</p> <p>FAH</p> <p>TRAFFIC PLANNING ENGINEERING DESIGN</p>
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The observed traffic volumes from Fig. 3 have been balanced between intersections to provide the existing traffic volumes. Based on ConnDOT ADTs traffic volumes in the area are decreasing there for in order to be conservative no growth rate was applied to the existing traffic volumes.

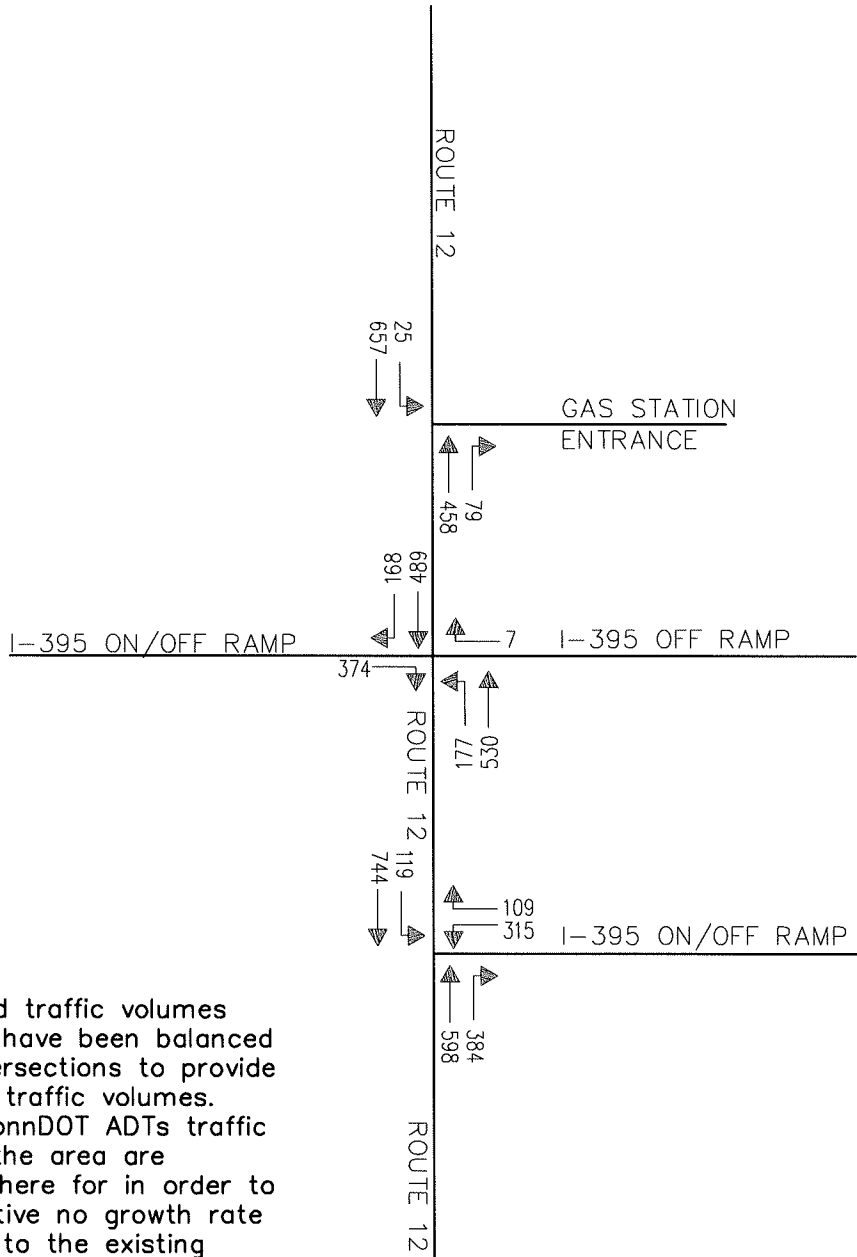
P.M. PEAK HOUR

FIGURE 6

03-05-2020

<p>2022 BACKGROUND TRAFFIC VOLUMES P.M. PEAK HOURS</p> <p>PROPOSED BURGER KING RIVER ROAD (RT 12)</p> <p>LISBON, CONNECTICUT</p>	<p>F. A. Hesketh & Associates, Inc. 6 CREAMERY BROOK, EAST GRANBY, CT 06026</p> <p>FAH</p> <p>TRAFFIC PLANNING ENGINEERING DESIGN</p>
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The observed traffic volumes from Fig. 4 have been balanced between intersections to provide the existing traffic volumes. Based on ConnDOT ADTs traffic volumes in the area are decreasing there for in order to be conservative no growth rate was applied to the existing traffic volumes.

SATURDAY PEAK HOUR

FIGURE 7

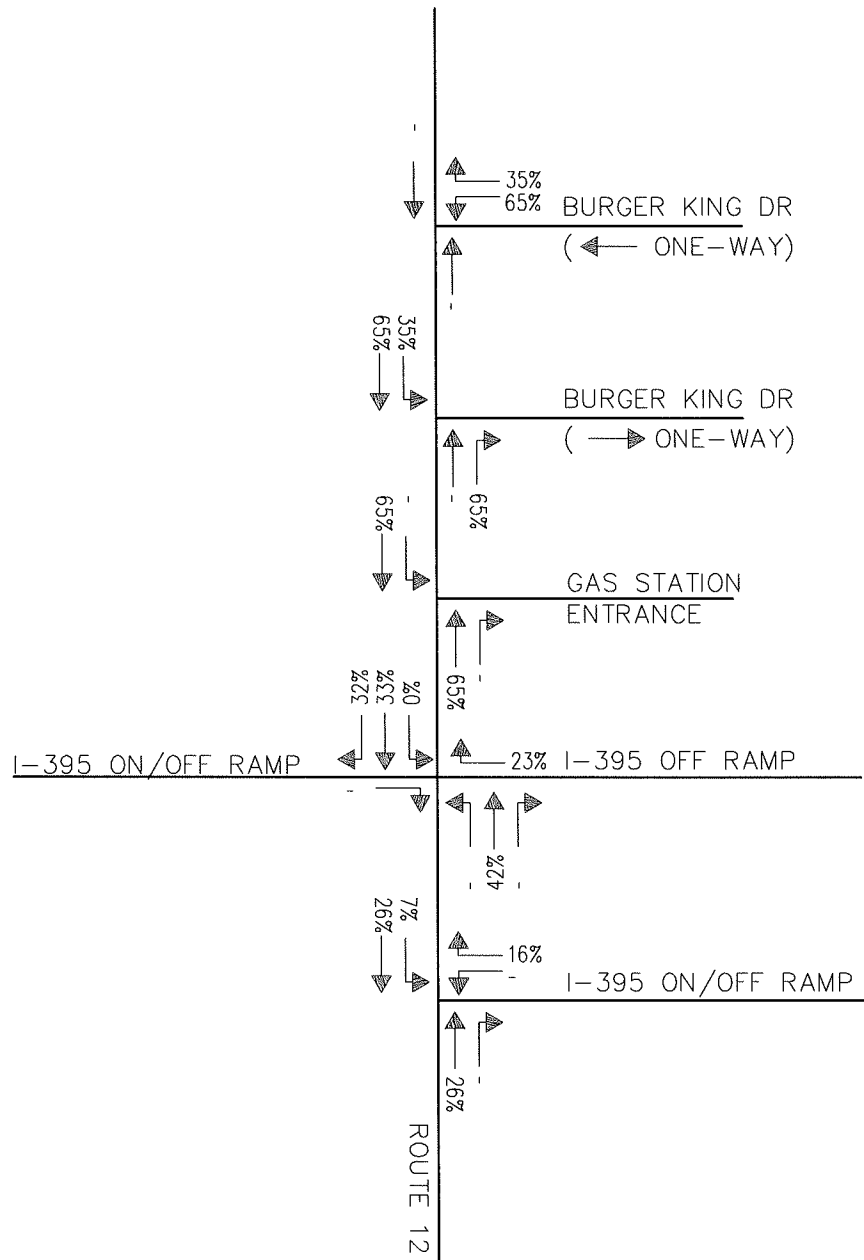
03-05-2020

<p>2022 BACKGROUND TRAFFIC VOLUMES SAT. PEAK HOURS</p> <p>PROPOSED BURGER KING RIVER ROAD (RT 12)</p> <p>LISBON, CONNECTICUT</p>	<p>F. A. Hesketh & Associates, Inc. 6 CREAMERY BROOK, EAST GRANBY, CT 06026</p> <p>FAH</p> <p>TRAFFIC PLANNING ENGINEERING DESIGN</p>
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Table 3
Trip Generation Summary
Proposed Burger King
Lisbon, CT

Land Use	Size	Weekday		A.M. Peak Hour		P.M. Peak Hour		Saturday		Saturday Peak Hour		
		ADT	Enter	Exit	Total	Enter	Exit	Total	ADT	Enter	Exit	Total
Proposed Fast-Food Restaurant with Drive-Through Window	2,877 s.f.	1,356	76	71	147	75	73	148	1,774	81	77	158



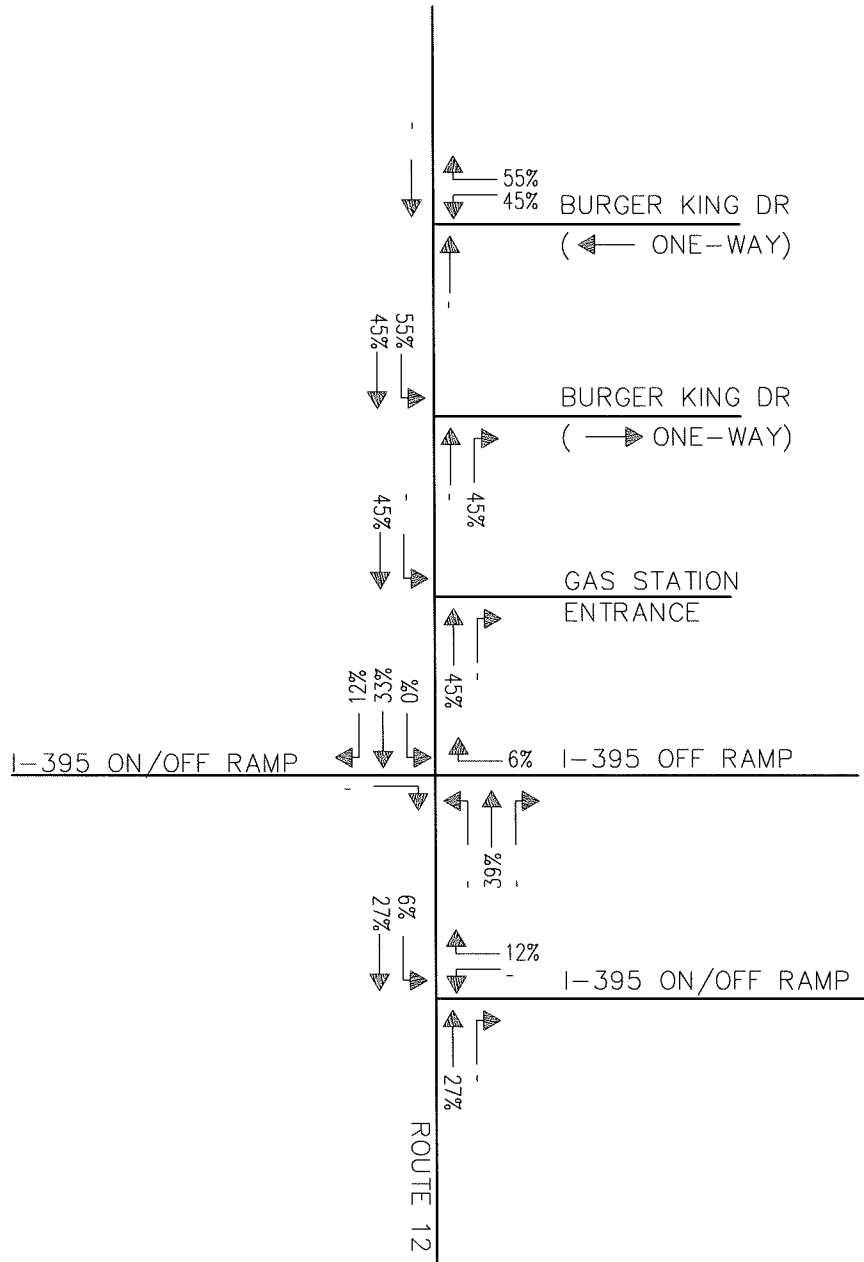
A.M. PEAK HOUR

FIGURE 8

03-05-2020

<p>DIRECTIONAL DISTRIBUTION A.M. PEAK HOURS</p> <p>PROPOSED BURGER KING RIVER ROAD (RT 12)</p> <p>LISBON, CONNECTICUT</p>	<p>F. A. Hesketh & Associates, Inc. 6 CREAMERY BROOK, EAST GRANBY, CT 06026</p> <p>FAH</p> <p>TRAFFIC PLANNING ENGINEERING DESIGN</p>
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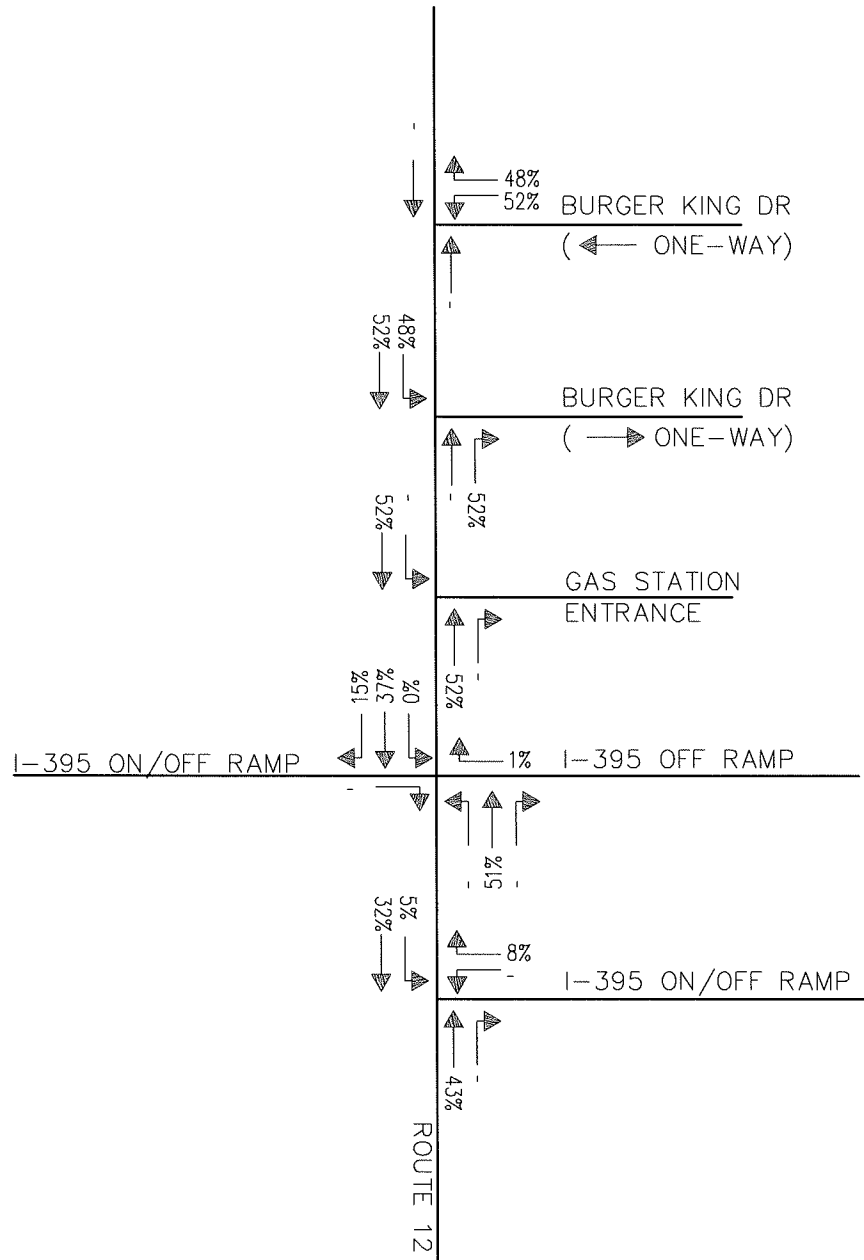
P.M. PEAK HOUR

FIGURE 9

03-05-2020

<p>DIRECTIONAL DISTRIBUTION P.M. PEAK HOURS</p> <p>PROPOSED BURGER KING RIVER ROAD (RT 12)</p> <p>LISBON, CONNECTICUT</p>	<p>F. A. Hesketh & Associates, Inc. 6 CREAMERY BROOK, EAST GRANBY, CT 06026</p> <p>FAH</p> <p>TRAFFIC PLANNING ENGINEERING DESIGN</p>
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SATURDAY PEAK HOUR

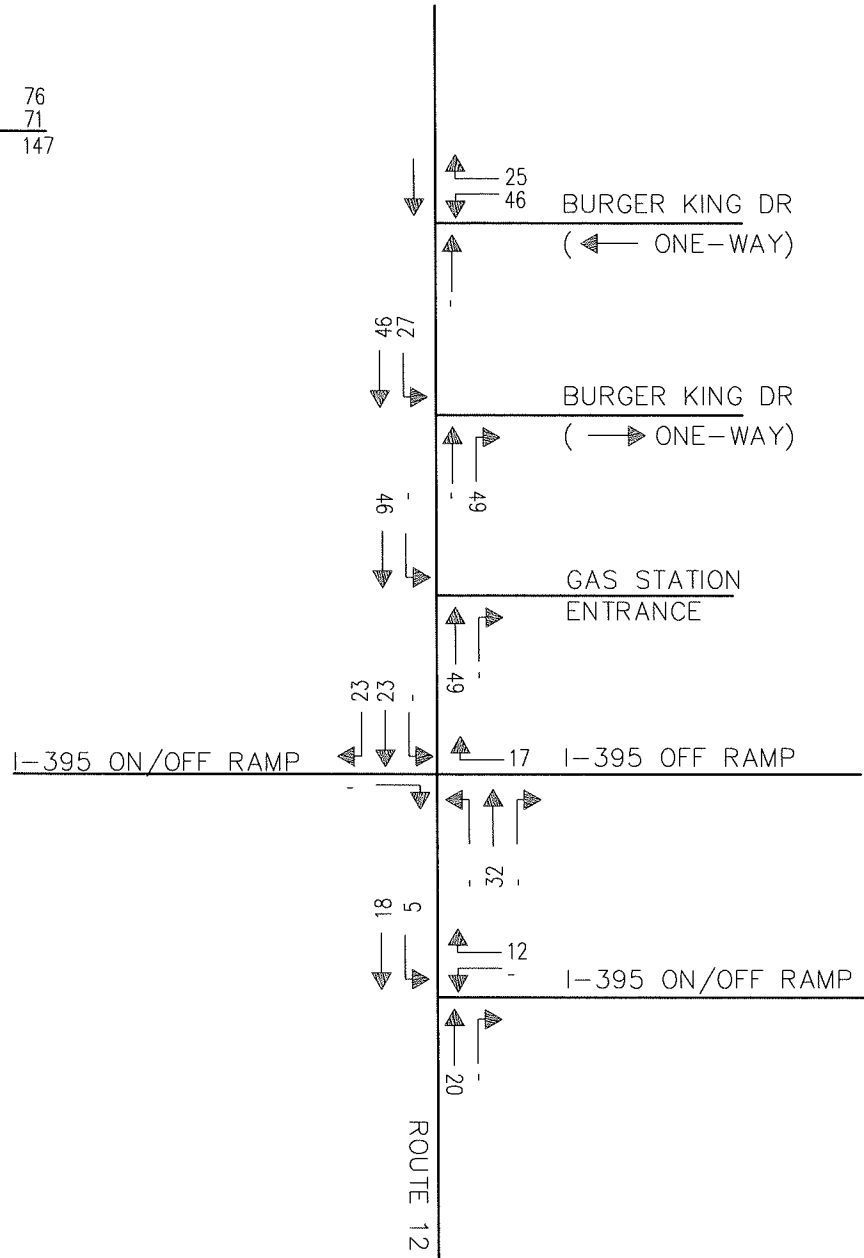
FIGURE 10

03-05-2020

<p>DIRECTIONAL DISTRIBUTION SATURDAY PEAK HOURS</p> <p>PROPOSED BURGER KING RIVER ROAD (RT 12)</p> <p>LISBON, CONNECTICUT</p>	<p>F. A. Hesketh & Associates, Inc. 6 CREAMERY BROOK, EAST GRANBY, CT 06026</p> <p>FAH</p> <p>TRAFFIC PLANNING ENGINEERING DESIGN</p>
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ENTER	76
EXIT	71
TOTAL	147



A.M. PEAK HOUR

FIGURE 11

03-05-2020

SITE GENERATED TRAFFIC VOLUMES
A.M. PEAK HOURS
PROPOSED BURGER KING
RIVER ROAD (RT 12)
LISBON, CONNECTICUT

27

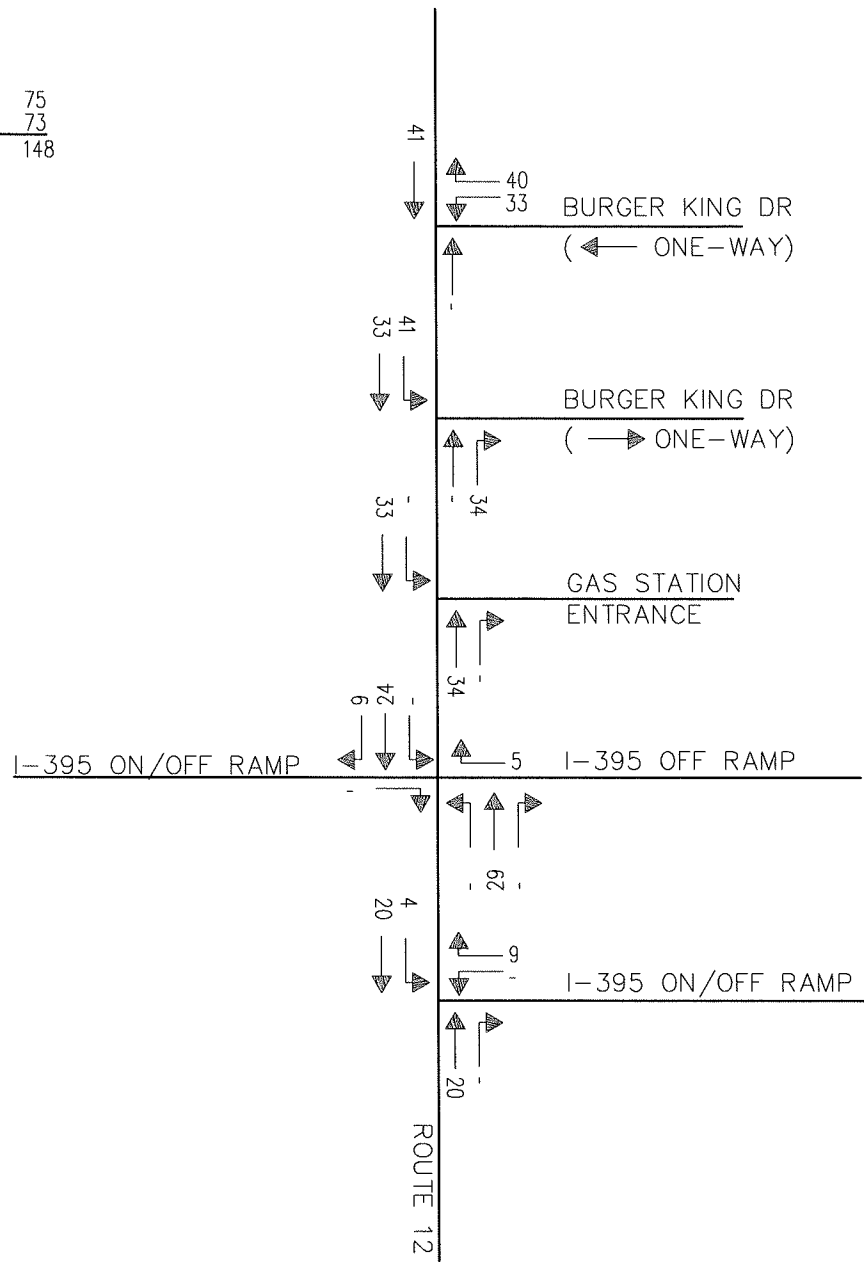
F. A. Hesketh & Associates, Inc.
6 CREAMERY BROOK, EAST GRANBY, CT 06026



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ENTER	75
EXIT	73
TOTAL	148



P.M. PEAK HOUR

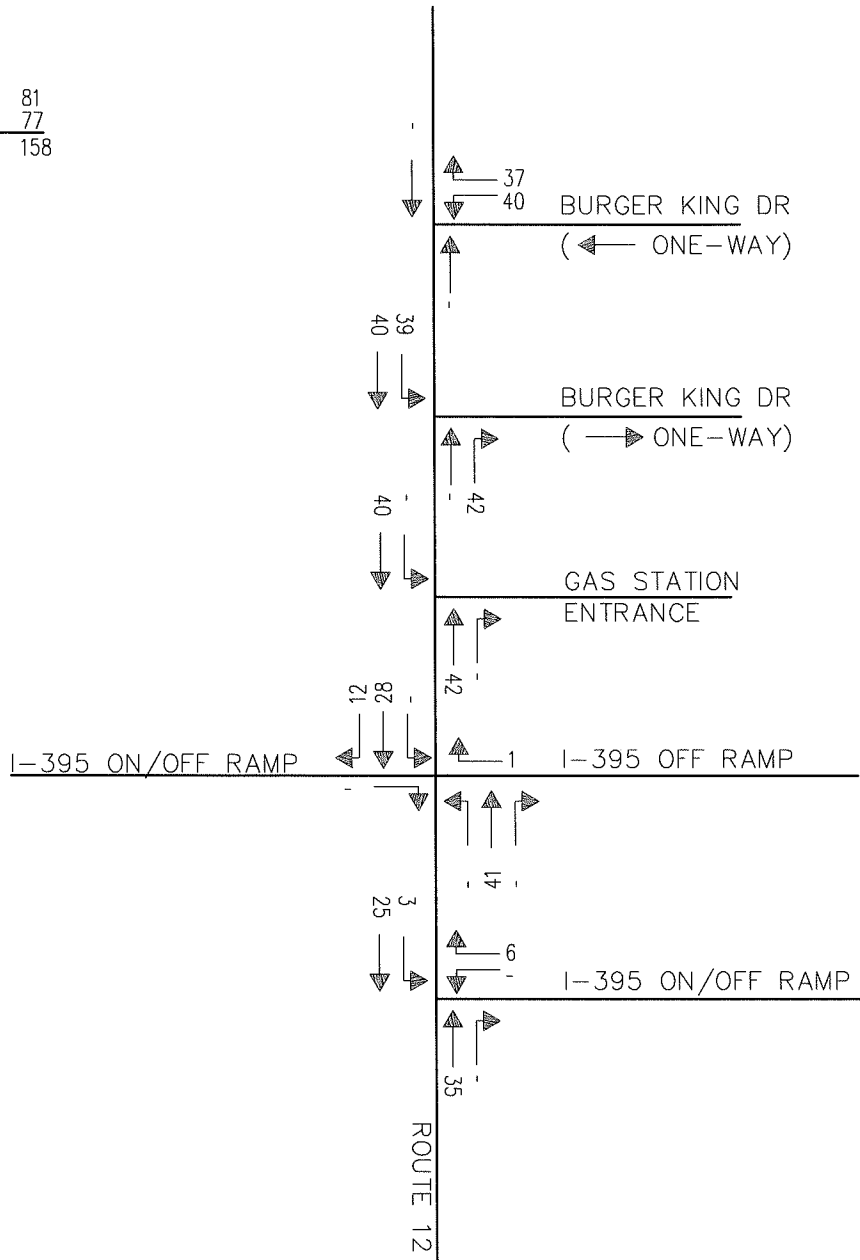
FIGURE 12

03-05-2020

<p>SITE GENERATED TRAFFIC VOLUMES P.M. PEAK HOURS</p> <p>PROPOSED BURGER KING RIVER ROAD (RT 12)</p> <p>LISBON, CONNECTICUT</p>	<p>F. A. Hesketh & Associates, Inc. 6 CREAMERY BROOK, EAST GRANBY, CT 06026</p> <p>FAH</p> <p>TRAFFIC PLANNING ENGINEERING DESIGN</p>
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ENTER	81
EXIT	77
TOTAL	158



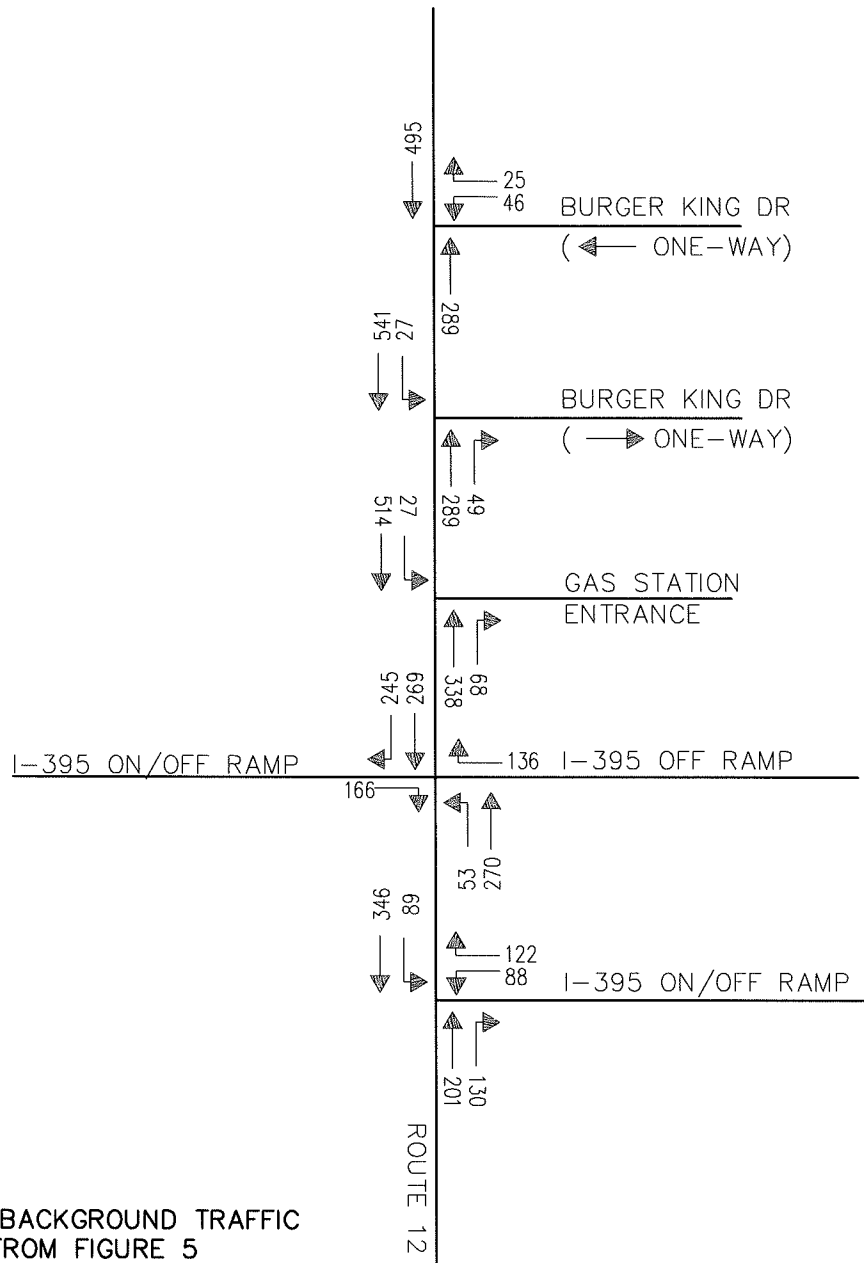
SATURDAY PEAK HOUR

FIGURE 13

03-05-2020

<p>SITE GENERATED TRAFFIC VOLUMES SATURDAY PEAK HOURS</p> <p>PROPOSED BURGER KING RIVER ROAD (RT 12) LISBON, CONNECTICUT</p>	<p>F. A. Hesketh & Associates, Inc. 6 CREAMERY BROOK, EAST GRANBY, CT 06026</p> <p>FAH</p> <p>TRAFFIC PLANNING ENGINEERING DESIGN</p>
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THE 2022 BACKGROUND TRAFFIC VOLUMES FROM FIGURE 5 COMBINED WITH SITE GENERATED TRAFFIC FROM FIGURE 11 PROVIDE THE 2022 COMBINED TRAFFIC VOLUMES.

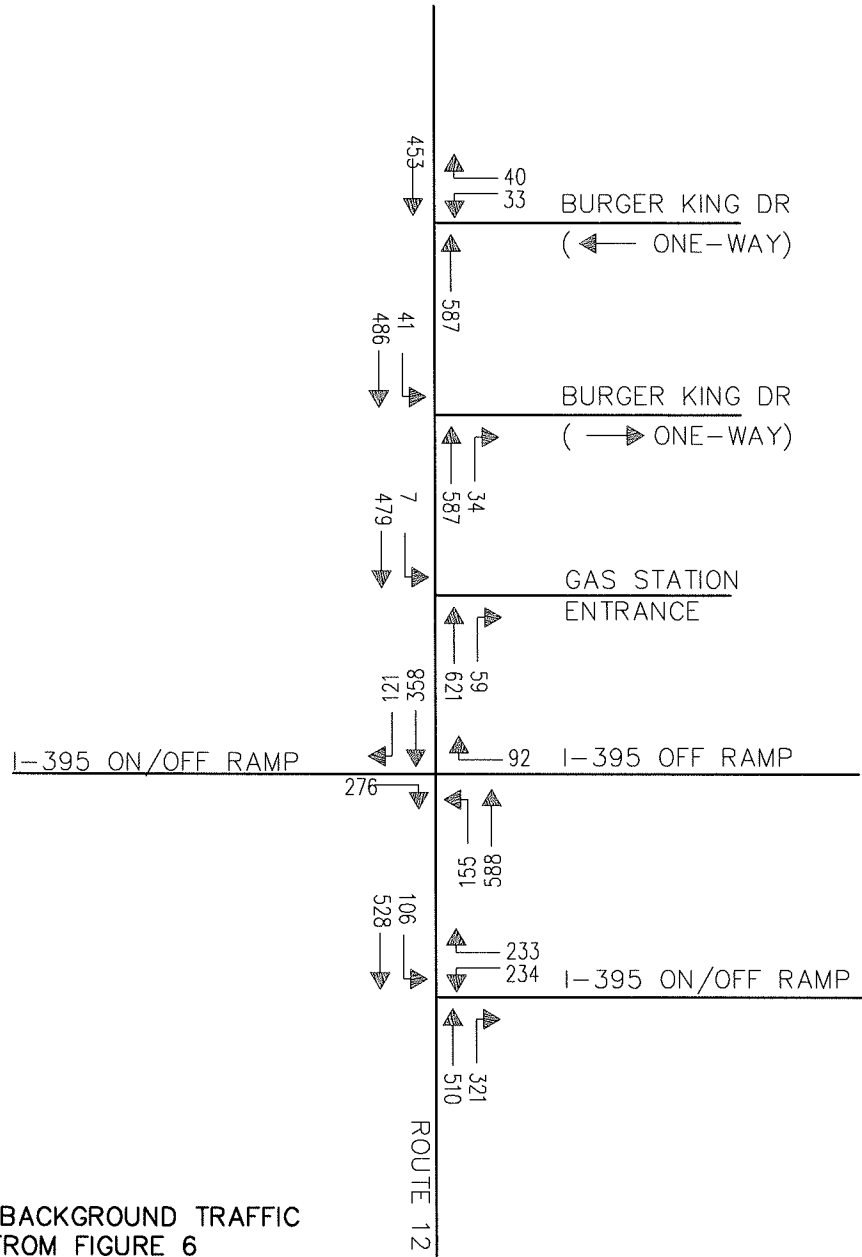
A.M. PEAK HOUR

FIGURE 14

03-05-2020

<p>2022 COMBINED TRAFFIC VOLUMES A.M. PEAK HOURS</p> <p>PROPOSED BURGER KING RIVER ROAD (RT 12)</p> <p>LISBON, CONNECTICUT</p>	<p>F. A. Hesketh & Associates, Inc. 6 CREAMERY BROOK, EAST GRANBY, CT 06026</p> <p>FAH</p> <p>TRAFFIC PLANNING ENGINEERING DESIGN</p>
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THE 2022 BACKGROUND TRAFFIC VOLUMES FROM FIGURE 6 COMBINED WITH SITE GENERATED TRAFFIC FROM FIGURE 12 PROVIDE THE 2022 COMBINED TRAFFIC VOLUMES.

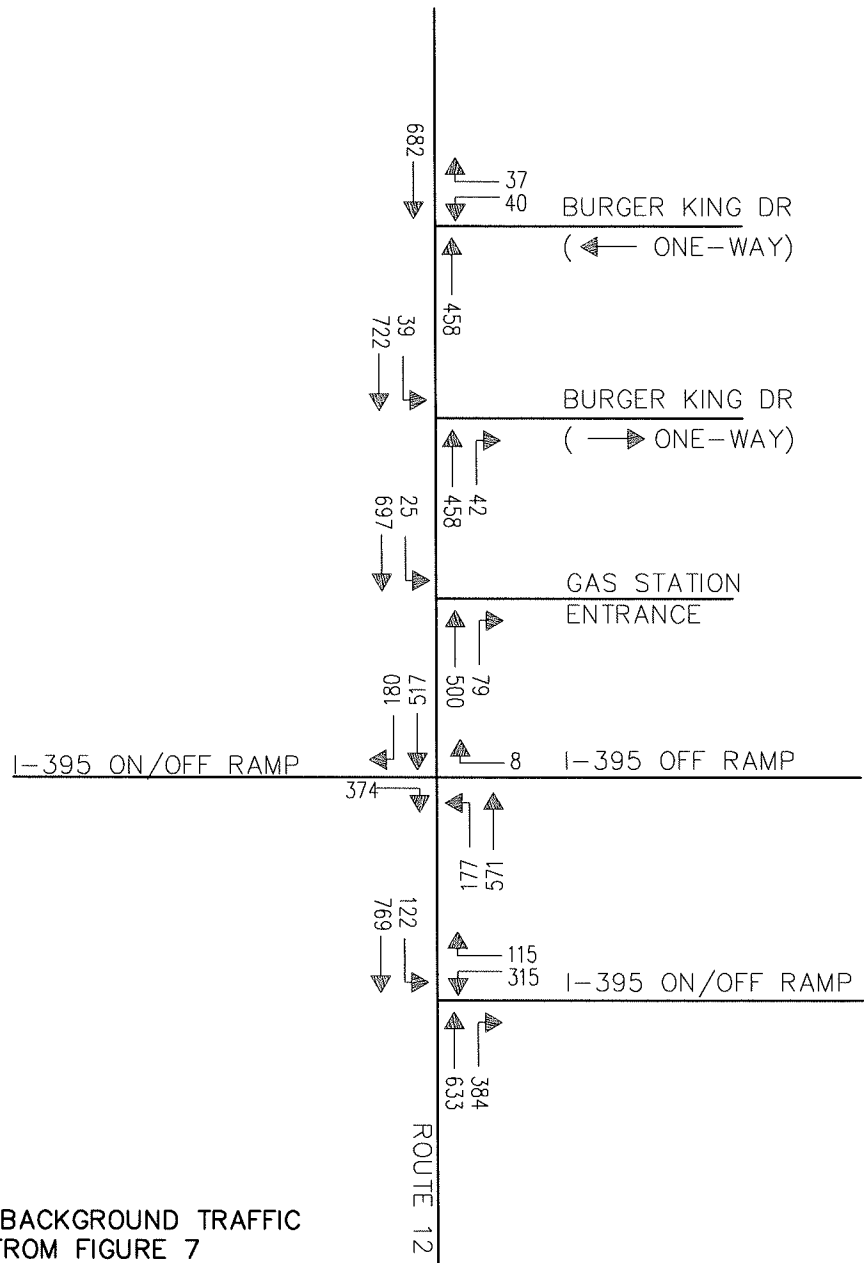
P.M. PEAK HOUR

FIGURE 15

03-05-2020

<p>2022 COMBINED TRAFFIC VOLUMES P.M. PEAK HOURS</p> <p>PROPOSED BURGER KING RIVER ROAD (RT 12)</p> <p>LISBON, CONNECTICUT</p>	<p>F. A. Hesketh & Associates, Inc. 6 CREAMERY BROOK, EAST GRANBY, CT 06026</p> <p>FAH</p> <p>TRAFFIC PLANNING ENGINEERING DESIGN</p>
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THE 2022 BACKGROUND TRAFFIC VOLUMES FROM FIGURE 7 COMBINED WITH SITE GENERATED TRAFFIC FROM FIGURE 13 PROVIDE THE 2022 COMBINED TRAFFIC VOLUMES.

SATURDAY PEAK HOUR

FIGURE 16

03-05-2020

<p>2022 COMBINED TRAFFIC VOLUMES SATURDAY PEAK HOURS</p> <p>PROPOSED BURGER KING RIVER ROAD (RT 12)</p> <p>LISBON, CONNECTICUT</p>	<p>F. A. Hesketh & Associates, Inc. 6 CREAMERY BROOK, EAST GRANBY, CT 06026</p> <p>FAH</p> <p>TRAFFIC PLANNING ENGINEERING DESIGN</p>
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Table 4

Level of Service Summary

Proposed Burger King

110 River Road (Route 12) - Lisbon, CT

Time Period	A.M. Peak Hour			P.M. Peak Hour			SAT. Peak Hour				
	LOS	Background delay	Combined Traffic delay v/c Queue	LOS	Background delay	Combined Traffic delay v/c Queue	LOS	Background delay	Combined Traffic delay v/c Queue		
Route 12 & I-395 NB Off Ramp											
WB Left	A	7.6	0.26	69	7.5	0.27	71	D	42.9	0.84	#372
NB Thru	B	19.9	0.20	58	20.0	0.22	62	C	24.3	0.50	197
Right	A	5.4	0.26	37	5.3	0.26	37	A	4.4	0.49	57
SB Left	B	19.8	0.18	68	20.0	0.19	71	A	7.4	0.25	m47
Thru	C	24.1	0.36	117	24.3	0.38	122	A	7.7	0.38	134
Overall	B	16.7	0.36		16.9	0.38		B	18.1	0.84	
Route 12 & I-395 SB Ramps											
EB	A	1.7	0.34	0	2.3	0.35	6	A	7.9	0.45	79
WB	A	0.4	0.16	0	0.5	0.18	0	A	0.8	0.18	0
NB Left	A	4.2	0.06	4	4.2	0.07	8	A	2.0	0.19	m13
Thru	B	11.9	0.20	136	12.3	0.23	152	A	4.8	0.40	m86
SB Thru	A	5.4	0.21	76	5.6	0.23	86	B	13.5	0.35	204
Right	A	1.3	0.21	22	1.4	0.23	24	A	3.0	0.13	28
Overall	A	4.8	0.34		5.1	0.35		A	6.6	0.45	
Route 12 & Gas Station Entrance											
NB	A	0.0	0.23	0	0.0	0.26	0	A	0.0	0.41	0
SB Left	A	1.4	0.02	2	1.3	0.03	2	A	0.5	0.01	1
Thru	A	0.0	0.2	0	0.0	0.22	0	A	0.0	0.19	0
Route 12 & Site Entrance											
NB	-	-	-	-	0.0	0.22	0	A	0.0	0.4	0
SB Left	-	-	-	-	1.2	0.02	2	A	2.3	0.05	4
Thru	-	-	-	-	0.0	0.23	0	A	0.0	0.21	0
Route 12 & Site Exit											
WB	-	-	-	-	15.9	0.19	17	C	21.1	0.26	26
NB	-	-	-	-	0.0	0.18	0	A	0.0	0.38	0
SB	-	-	-	-	0.0	0.32	0	A	0.0	0.29	0

TABLE 5
Queue Length Probability
for the Proposed Burger King Drive-thru
Saturday Peak Hour

Service Rate 1

Entering Driveway Volume	81 veh/hr
% Using Drive Through	100 %
Drive Through Volume (q)	81 veh/hr
Average Service Time	35 sec.
Service Rate (Q)	103 veh/hr

P(n) = probability of having n units in the system

$$P(n) = (q/Q)^n (1-(q/Q))$$

$$= 0.7864 \quad ^n \times 0.2136$$

<u>n</u>	<u>P(n)</u>	<u>Sum of P(n)</u>
0	0.2136	0.2136
1	0.1680	0.3816
2	0.1321	0.5137
3	0.1039	0.6175
4	0.0817	0.6992
5	0.0642	0.7635
6	0.0505	0.8140
7	0.0397	0.8537
8	0.0312	0.8850
9	0.0246	0.9095
10	0.0193	0.9289
11	0.0152	0.9441
12	0.0119	0.9560
13	0.0094	0.9654
14	0.0074	0.9728
15	0.0058	0.9786

Expected Queue Length =	3.7 veh.
Average Waiting Time =	129 sec.

TABLE 6
Queue Length Probability
for the Proposed Burger King Drive-thru
Saturday Peak Hour

Service Rate 1

Entering Driveway Volume	81 veh/hr
% Using Drive Through	65 %
Drive Through Volume (q)	63 veh/hr
Average Service Time	35 sec.
Service Rate (Q)	103 veh/hr

P(n) = probability of having n units in the system

$$P(n) = (q/Q)^n (1-(q/Q))$$

$$= 0.6117 \quad ^n \times 0.3883$$

<u>n</u>	<u>P(n)</u>	<u>Sum of P(n)</u>
0	0.3883	0.3883
1	0.2375	0.6259
2	0.1453	0.7712
3	0.0889	0.8600
4	0.0544	0.9144
5	0.0332	0.9476
6	0.0203	0.9680
7	0.0124	0.9804
8	0.0076	0.9880
9	0.0047	0.9927
10	0.0028	0.9955
11	0.0017	0.9973
12	0.0011	0.9983
13	0.0007	0.9990
14	0.0004	0.9994
15	0.0002	0.9996

Expected Queue Length =	1.6 veh.
Average Waiting Time =	55 sec.

TABLE 7
Queue Length Probability
for the Proposed Burger King Drive-thru
Saturday Peak Hour

Service Rate 1

Entering Driveway Volume	81 veh/hr
% Using Drive Through	65 %
Drive Through Volume (q)	63 veh/hr
Average Service Time	45 sec.
Service Rate (Q)	80 veh/hr

P(n) = probability of having n units in the system

$$P(n) = (q/Q)^n (1-(q/Q))$$

$$= 0.7875^n \times 0.2125$$

<u>n</u>	<u>P(n)</u>	<u>Sum of P(n)</u>
0	0.2125	0.2125
1	0.1673	0.3798
2	0.1318	0.5116
3	0.1038	0.6154
4	0.0817	0.6971
5	0.0644	0.7615
6	0.0507	0.8122
7	0.0399	0.8521
8	0.0314	0.8835
9	0.0248	0.9083
10	0.0195	0.9278
11	0.0154	0.9431
12	0.0121	0.9552
13	0.0095	0.9647
14	0.0075	0.9722
15	0.0059	0.9781

Expected Queue Length =	3.7 veh.
Average Waiting Time =	167 sec.

APPENDIX

CONNDOT COUNTS

Status: OK

LISB-057 - North & South

Route 12 - 19.74 mi North of I-395 SB On Ramp

Low ADT		23-Oct	24-Oct
		Mon	Tue
Town.....Lisbon	12:00am	x	64
Station.....57	01:00am	27	33
Location..... 41.590388,-71.99094	02:00am	28	29
2015-Minor Arterial 4.....2015-Urban	03:00am	49	44
Start Report.....23-Oct-2017 01:00AM	04:00am	92	119
End Report.....24-Oct-2017 11:00PM	05:00am	218	220
Axle Correction Factor.....None	06:00am	378	366
Annualized ADT.....10200	07:00am	546	564
24-Hour Count....11042 * G4(0.92) = 10158.6	08:00am	598	593
Day 1.....+11035 * G4(0.92) = 20310.8	09:00am	624	647
UnRounded AADT.....20310.8 / 2 = 10155.4	10:00am	645	680
OK 2017 Mon 23-Oct -this report-...10200	11:00am	745	720
REV 2011 Wed 02-Mar12300	12:00pm	861	763
REV 2008 Wed 06-Feb15100	01:00pm	729	793
	02:00pm	780	849
	03:00pm	906	967
	04:00pm	910	943
	05:00pm	885	848
	06:00pm	681	576
	07:00pm	474	384
	08:00pm	334	286
	09:00pm	224	249
	10:00pm	140	191
	11:00pm	104	107
	Totals	10978	11035

Status: OK

LISB-046 - North & South

Route 12 - 19.61 mi North of I-395 NB Off Ramp (Exit 84)

	24-Oct	25-Oct
Town.....Lisbon		
Station.....46	Tue	Wed
Location..... 41.588715,-71.99098	12:00am	4
2015-Minor Arterial 4.....2015-Urban	01:00am	38
Start Report.....24-Oct-2017 12:00AM	02:00am	31
End Report.....25-Oct-2017 11:00PM	03:00am	50
Axle Correction Factor.....None	04:00am	83
	05:00am	153
24-Hour Count....11374 * G4(0.92) = 10464.1	06:00am	275
Day 1.....+11190 * G4(0.92) = 20758.9	07:00am	450
UnRounded AADT.....20758.9 / 2 = 10379.4	08:00am	531
OK 2017 Tue 24-Oct -this report-...10400	09:00am	682
REV 2014 Mon 28-Apr10800	10:00am	740
REV 2011 Wed 02-Mar13800	11:00am	792
REV 2008 Wed 16-Jan13700	12:00pm	894
	01:00pm	912
	02:00pm	905
	03:00pm	989
	04:00pm	1050
	05:00pm	923
	06:00pm	625
	07:00pm	413
	08:00pm	290
	09:00pm	267
	10:00pm	173
	11:00pm	104
Totals	11374	11190

**F.A. HESKETH & ASSOCIATES
MANUAL COUNTS**

F.A. Hesketh & Associates, Inc.
3 Creamery Brook

Route 12 (River Rd)
at I-395 On/Off Ramps
Lisbon, CT 06351
Job No.20110

East Granby, CT 06026
Phone: (860) 653 - 8000

File Name : AM Rt 12 at I395 1
Site Code : 00000000
Start Date : 3/4/2020
Page No : 1

Groups Printed- Unshifted

Start Time	Route 12 From North					I-395 Off Ramp From East					Route 12 From South					I-395 On/Off Ramp From West					Int. Total
	Rig ht	Thr u	Left	Ped s	App. Total	Rig ht	Thr u	Left	Ped s	App. Total	Rig ht	Thr u	Left	Ped s	App. Total	Rig ht	Thr u	Left	Ped s	App. Total	
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
07:00 AM	68	47	10	0	125	30	0	0	0	30	17	31	13	0	61	25	0	0	0	25	241
07:15 AM	66	63	10	0	139	46	0	0	0	46	23	30	16	0	69	34	0	0	0	34	288
07:30 AM	75	70	6	0	151	26	0	0	0	26	18	39	8	0	65	29	0	0	0	29	271
07:45 AM	56	48	7	0	111	38	0	0	0	38	18	58	4	0	80	34	0	0	0	34	263
Total	265	228	33	0	526	140	0	0	0	140	76	158	41	0	275	122	0	0	0	122	1063
08:00 AM	57	60	8	0	125	21	0	0	0	21	7	38	13	0	58	34	0	0	0	34	238
08:15 AM	54	62	7	0	123	33	0	0	0	33	27	46	8	0	81	35	0	0	0	35	272
08:30 AM	59	60	7	0	126	29	0	0	0	29	18	44	13	0	75	44	0	0	0	44	274
08:45 AM	52	64	5	0	121	21	0	0	0	21	16	57	13	0	86	53	0	0	0	53	281
Total	222	246	27	0	495	104	0	0	0	104	68	185	47	0	300	166	0	0	0	166	1065
Grand Total	487	474	60	0	1021	244	0	0	0	244	144	343	88	0	575	288	0	0	0	288	2128
Apprch %	47.7	46.4	5.9	0.0		100.0	0.0	0.0	0.0		25.0	59.7	15.3	0.0		100.0	0.0	0.0	0.0		
Total %	22.9	22.3	2.8	0.0	48.0	11.5	0.0	0.0	0.0	11.5	6.8	16.1	4.1	0.0	27.0	13.5	0.0	0.0	0.0	13.5	

Start Time	Route 12 From North					I-395 Off Ramp From East					Route 12 From South					I-395 On/Off Ramp From West					Int. Total
	Rig ht	Thr u	Left	Ped s	App. Total	Rig ht	Thr u	Left	Ped s	App. Total	Rig ht	Thr u	Left	Ped s	App. Total	Rig ht	Thr u	Left	Ped s	App. Total	
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Intersect on	08:00 AM																				
Volume	222	246	27	0	495	104	0	0	0	104	68	185	47	0	300	166	0	0	0	166	1065
Percent	44.8	49.7	5.5	0.0		100.0	0.0	0.0	0.0		22.7	61.7	15.7	0.0		100.0	0.0	0.0	0.0		
08:45 Volume	52	64	5	0	121	21	0	0	0	21	16	57	13	0	86	53	0	0	0	53	281
Peak Factor																					0.948
High Int. Volume	08:30 AM					08:15 AM					08:45 AM					08:45 AM					
Peak	59	60	7	0	126	33	0	0	0	33	16	57	13	0	86	53	0	0	0	53	
Factor	0.982					0.788					0.872					0.783					

By Approach	07:00 AM					07:00 AM					08:00 AM					08:00 AM					Int. Total
	Volume	Percent	High Int. Volume	Peak	Factor	Volume	Percent	High Int. Volume	Peak	Factor	Volume	Percent	High Int. Volume	Peak	Factor	Volume	Percent	High Int. Volume	Peak	Factor	
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Volume	265	228	33	0	526	140	0	0	0	140	68	185	47	0	300	166	0	0	0	166	
Percent	50.4	43.3	6.3	0.0		100.0	0.0	0.0	0.0		22.7	61.7	15.7	0.0		100.0	0.0	0.0	0.0		
High Int. Volume	75	70	6	0	151	46	0	0	0	46	16	57	13	0	86	53	0	0	0	53	
Peak Factor	0.871					0.761					0.872					0.783					

F.A. Hesketh & Associates, Inc.

3 Creamery Brook

East Granby, CT 06026

Phone: (860) 653 - 8000

Route 12 (River Rd)
at I-395 On/Off Ramps

Lisbon, CT 06351

Job No.20110

File Name : AM Rt 12 at I395 2

Site Code : 00000000

Start Date : 3/4/2020

Page No : 1

Groups Printed- Group 1

Start Time	Route 12 From North			I-395 On/Off Ramp From East			Route 12 From South			Int. Total
	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	
Factor	1.0	1.0		1.0	1.0		1.0	1.0		
07:00 AM	51	22	73	9	15	24	22	35	57	154
07:15 AM	55	37	92	12	10	22	30	34	64	178
07:30 AM	72	28	100	18	16	34	24	38	62	196
07:45 AM	64	20	84	27	19	46	30	39	69	199
Total	242	107	349	66	60	126	106	146	252	727
08:00 AM	67	20	87	18	12	30	22	36	58	175
08:15 AM	74	24	98	24	15	39	37	44	81	218
08:30 AM	69	24	93	28	27	55	35	40	75	223
08:45 AM	98	11	109	28	34	62	36	42	78	249
Total	308	79	387	98	88	186	130	162	292	865
Grand Total	550	186	736	164	148	312	236	308	544	1592
Apprch %	74.7	25.3		52.6	47.4		43.4	56.6		
Total %	34.5	11.7	46.2	10.3	9.3	19.6	14.8	19.3	34.2	

Start Time	Route 12 From North			I-395 On/Off Ramp From East			Route 12 From South			Int. Total
	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1										
Intersection	08:00 AM									
Volume	308	79	387	98	88	186	130	162	292	865
Percent	79.6	20.4		52.7	47.3		44.5	55.5		
08:45 Volume	98	11	109	28	34	62	36	42	78	249
Peak Factor										0.868
High Int.	08:45 AM			08:45 AM			08:15 AM			
Volume	98	11	109	28	34	62	37	44	81	
Peak Factor	0.888			0.750			0.901			
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1										
By Approach	08:00 AM			08:00 AM			08:00 AM			
Volume	308	79	387	98	88	186	130	162	292	
Percent	79.6	20.4		52.7	47.3		44.5	55.5		
High Int.	08:45 AM			08:45 AM			08:15 AM			
Volume	98	11	109	28	34	62	37	44	81	
Peak Factor	0.888			0.750			0.901			

F.A. Hesketh & Associates, Inc.
3 Creamery Brook

Route 12 (River Rd)
at I-395 On/Off Ramps
Lisbon, CT 06351
Job No.20110

East Granby, CT 06026
Phone: (860) 653 - 8000

File Name : PM Rt 12 at I395 1
Site Code : 00000000
Start Date : 2/25/2020
Page No : 1

Groups Printed- Unshifted

Start Time	Route 12 From North					I-395 Off Ramp From East					Route 12 From South					I-395 On/Off Ramp From West					Int. Total
	Rig ht	Thr u	Left	Ped s	App. Total	Rig ht	Thr u	Left	Ped s	App. Total	Rig ht	Thr u	Left	Ped s	App. Total	Rig ht	Thr u	Left	Ped s	App. Total	
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
03:00 PM	43	77	1	0	121	18	0	0	0	18	13	117	35	0	165	56	0	0	0	56	360
03:15 PM	33	83	3	0	119	30	0	0	0	30	14	119	28	0	161	66	0	0	0	66	376
03:30 PM	30	97	4	0	131	21	0	0	0	21	14	105	31	0	150	50	0	0	0	50	352
03:45 PM	38	86	8	0	132	20	0	0	0	20	13	104	33	0	150	71	0	0	0	71	373
Total	144	343	16	0	503	89	0	0	0	89	54	445	127	0	626	243	0	0	0	243	1461
04:00 PM	30	94	3	0	127	20	0	0	0	20	22	117	43	0	182	69	0	0	0	69	398
04:15 PM	26	71	0	0	97	16	0	0	0	16	12	133	37	0	182	61	0	0	0	61	356
04:30 PM	26	72	1	0	99	25	0	0	0	25	16	129	24	0	169	67	0	0	0	67	360
04:45 PM	30	97	3	0	130	21	0	0	0	21	9	126	45	0	180	79	0	0	0	79	410
Total	112	334	7	0	453	82	0	0	0	82	59	505	149	0	713	276	0	0	0	276	1524
Grand Total	256	677	23	0	956	171	0	0	0	171	113	950	276	0	1339	519	0	0	0	519	2985
Apprch %	26.8	70.8	2.4	0.0		100.0	0.0	0.0	0.0		8.4	70.9	20.6	0.0		100.0	0.0	0.0	0.0		
Total %	8.6	22.7	0.8	0.0	32.0	5.7	0.0	0.0	0.0	5.7	3.8	31.8	9.2	0.0	44.9	17.4	0.0	0.0	0.0	17.4	

Start Time	Route 12 From North					I-395 Off Ramp From East					Route 12 From South					I-395 On/Off Ramp From West					Int. Total
	Rig ht	Thr u	Left	Ped s	App. Total	Rig ht	Thr u	Left	Ped s	App. Total	Rig ht	Thr u	Left	Ped s	App. Total	Rig ht	Thr u	Left	Ped s	App. Total	
Peak Hour From 03:00 PM to 04:45 PM - Peak 1 of 1																					
Intersecti on	04:00 PM																				
Volume	112	334	7	0	453	82	0	0	0	82	59	505	149	0	713	276	0	0	0	276	1524
Percent	24.7	73.7	1.5	0.0		100.0	0.0	0.0	0.0		8.3	70.8	20.9	0.0		100.0	0.0	0.0	0.0		
04:45 Volume	30	97	3	0	130	21	0	0	0	21	9	126	45	0	180	79	0	0	0	79	410
Peak Factor																					0.929
High Int. Volume	04:45 PM					04:30 PM					04:00 PM					04:45 PM					
Peak	30	97	3	0	130	25	0	0	0	25	22	117	43	0	182	79	0	0	0	79	
Factor	0.87					0.82					0.97					0.87					0.87
	1					0					9					3					

Start Time	Route 12 From North					I-395 Off Ramp From East					Route 12 From South					I-395 On/Off Ramp From West					Int. Total
	Rig ht	Thr u	Left	Ped s	App. Total	Rig ht	Thr u	Left	Ped s	App. Total	Rig ht	Thr u	Left	Ped s	App. Total	Rig ht	Thr u	Left	Ped s	App. Total	
Peak Hour From 03:00 PM to 04:45 PM - Peak 1 of 1																					
By Approach	03:15 PM					03:15 PM					04:00 PM					04:00 PM					
Volume	131	360	18	0	509	91	0	0	0	91	59	505	149	0	713	276	0	0	0	276	
Percent	25.7	70.7	3.5	0.0		100.0	0.0	0.0	0.0		8.3	70.8	20.9	0.0		100.0	0.0	0.0	0.0		
High Int. Volume	03:45 PM					03:15 PM					04:00 PM					04:45 PM					
Peak	38	86	8	0	132	30	0	0	0	30	22	117	43	0	182	79	0	0	0	79	
Factor	0.96					0.75					0.97					0.87					0.87
	4					8					9					3					

F.A. Hesketh & Associates, Inc.
3 Creamery Brook

Route 12 (River Rd)
at I-395 On/Off Ramp
Lisbon, CT 06351
Job No.20110

East Granby, CT 06026
Phone: (860) 653 - 8000

File Name : PM Rt 12 at I395 2
Site Code : 00000000
Start Date : 2/25/2020
Page No : 1

Groups Printed- Group 1

Start Time	Route 12 From North			I-395 On/Off Ramp From East			Route 12 From South			Int. Total
	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	
Factor	1.0	1.0		1.0	1.0		1.0	1.0		
03:00 PM	100	26	126	48	43	91	79	102	181	398
03:15 PM	125	20	145	43	48	91	70	111	181	417
03:30 PM	121	26	147	46	70	116	76	104	180	443
03:45 PM	133	21	154	38	63	101	88	100	188	443
Total	479	93	572	175	224	399	313	417	730	1701
04:00 PM	133	21	154	47	55	102	89	118	207	463
04:15 PM	91	25	116	63	64	127	88	114	202	445
04:30 PM	115	27	142	53	57	110	78	110	188	440
04:45 PM	140	23	163	50	58	108	66	125	191	462
Total	479	96	575	213	234	447	321	467	788	1810
Grand Total	958	189	1147	388	458	846	634	884	1518	3511
Apprch %	83.5	16.5		45.9	54.1		41.8	58.2		
Total %	27.3	5.4	32.7	11.1	13.0	24.1	18.1	25.2	43.2	

Start Time	Route 12 From North			I-395 On/Off Ramp From East			Route 12 From South			Int. Total
	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	
Peak Hour From 03:00 PM to 04:45 PM - Peak 1 of 1										
Intersection	04:00 PM									
Volume	479	96	575	213	234	447	321	467	788	1810
Percent	83.3	16.7		47.7	52.3		40.7	59.3		
04:00 Volume	133	21	154	47	55	102	89	118	207	463
Peak Factor										0.977
High Int.	04:45 PM			04:15 PM			04:00 PM			
Volume	140	23	163	63	64	127	89	118	207	
Peak Factor			0.882			0.880			0.952	
Peak Hour From 03:00 PM to 04:45 PM - Peak 1 of 1										
By Approach	03:15 PM			04:00 PM			04:00 PM			
Volume	512	88	600	213	234	447	321	467	788	
Percent	85.3	14.7		47.7	52.3		40.7	59.3		
High Int.	03:45 PM			04:15 PM			04:00 PM			
Volume	133	21	154	63	64	127	89	118	207	
Peak Factor			0.974			0.880			0.952	

F.A. Hesketh & Associates, Inc.
3 Creamery Brook

Route 12 (River Road)
at I-395 On/Off Ramps
Lisbon, CT 06351
Job No.20110

East Granby, CT 06026
Phone: (860) 653 - 8000

File Name : SAT Rt 12 at I395 1
Site Code : 42422424
Start Date : 2/29/2020
Page No : 1

Groups Printed- Unshifted

Start Time	Route 12 From North					I-395 Off Ramp From East					Route 12 From South					I-395 On/Off Ramp From West					Int. Total
	Rig ht	Thr u	Left	Ped s	App. Total	Rig ht	Thr u	Left	Ped s	App. Total	Rig ht	Thr u	Left	Ped s	App. Total	Rig ht	Thr u	Left	Ped s	App. Total	
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
11:00 AM	57	104	5	0	166	1	0	0	24	25	15	109	44	0	168	87	0	0	0	87	446
11:15 AM	62	96	4	0	162	2	0	0	19	21	14	109	35	0	158	89	0	0	0	89	430
11:30 AM	52	125	7	0	184	0	0	0	26	26	16	119	33	0	168	90	0	0	0	90	468
11:45 AM	38	119	12	0	169	3	0	0	30	33	22	104	48	0	174	87	0	0	0	87	463
Total	209	444	28	0	681	6	0	0	99	105	67	441	160	0	668	353	0	0	0	353	1807
12:00 PM	38	104	2	0	144	1	0	0	21	22	27	105	50	0	182	102	0	0	0	102	450
12:15 PM	40	141	4	0	185	2	0	0	16	18	14	124	39	0	177	95	0	0	0	95	475
12:30 PM	41	116	2	0	159	1	0	0	24	25	15	101	60	0	176	90	0	0	0	90	450
12:45 PM	35	115	3	0	153	3	0	0	18	21	12	107	49	0	168	103	0	0	0	103	445
Total	154	476	11	0	641	7	0	0	79	86	68	437	198	0	703	390	0	0	0	390	1820
Grand Total	363	920	39	0	1322	13	0	0	178	191	135	878	358	0	1371	743	0	0	0	743	3627
Aprch %	27.5	69.6	3.0	0.0		6.8	0.0	0.0	93.2		9.8	64.0	26.1	0.0		100.0	0.0	0.0	0.0		
Total %	10.0	25.4	1.1	0.0	36.4	0.4	0.0	0.0	4.9	5.3	3.7	24.2	9.9	0.0	37.8	20.5	0.0	0.0	0.0	20.5	

Start Time	Route 12 From North					I-395 Off Ramp From East					Route 12 From South					I-395 On/Off Ramp From West					Int. Total
	Rig ht	Thr u	Left	Ped s	App. Total	Rig ht	Thr u	Left	Ped s	App. Total	Rig ht	Thr u	Left	Ped s	App. Total	Rig ht	Thr u	Left	Ped s	App. Total	
Peak Hour From 11:00 AM to 12:45 PM - Peak 1 of 1																					
Intersecti on	11:30 AM																				
Volume	168	489	25	0	682	6	0	0	93	99	79	452	170	0	701	374	0	0	0	374	1856
Percent	24.6	71.7	3.7	0.0		6.1	0.0	0.0	93.9		11.3	64.5	24.3	0.0		100.0	0.0	0.0	0.0		
12:15 Peak Factor	40	141	4	0	185	2	0	0	16	18	14	124	39	0	177	95	0	0	0	95	475
High Int. Peak Factor	12:15 PM					11:45 AM					12:00 PM					12:00 PM					
Volume	40	141	4	0	185	3	0	0	30	33	27	105	50	0	182	102	0	0	0	102	
Peak Factor	0.92					0.75					0.96					0.91					
Factor	2					0					3					7					

By Approach	11:30 AM					11:00 AM					11:45 AM					12:00 PM					Int. Total
	Rig ht	Thr u	Left	Ped s	App. Total	Rig ht	Thr u	Left	Ped s	App. Total	Rig ht	Thr u	Left	Ped s	App. Total	Rig ht	Thr u	Left	Ped s	App. Total	
Peak Hour From 11:00 AM to 12:45 PM - Peak 1 of 1																					
Volume	168	489	25	0	682	6	0	0	99	105	78	434	197	0	709	390	0	0	0	390	
Percent	24.6	71.7	3.7	0.0		5.7	0.0	0.0	94.3		11.0	61.2	27.8	0.0		100.0	0.0	0.0	0.0		
High Int. Peak Factor	12:15 PM					11:45 AM					12:00 PM					12:45 PM					
Volume	40	141	4	0	185	3	0	0	30	33	27	105	50	0	182	103	0	0	0	103	
Peak Factor	0.92					0.79					0.97					0.94					
Factor	2					5					4					7					

F.A. Hesketh & Associates, Inc.

3 Creamery Brook

Route 12 (River Rd)
at I-395 On/Off Ramps
Lisbon, CT 06351
Job No.20110

East Granby, CT 06026
Phone: (860) 653 - 8000

File Name : SAT PM Rt 12 at I395 2
Site Code : 00000000
Start Date : 2/29/2020
Page No : 1

Groups Printed- Group 1

Start Time	Route 12 From North			I-395 On/Off Ramp From East			Route 12 From South			Int. Total
	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	
Factor	1.0	1.0		1.0	1.0		1.0	1.0		
11:00 AM	152	20	172	30	60	90	92	125	217	479
11:15 AM	154	18	172	22	66	88	84	112	196	456
11:30 AM	183	23	206	22	69	91	103	115	218	515
11:45 AM	156	23	179	34	74	108	79	122	201	488
Total	645	84	729	108	269	377	358	474	832	1938
12:00 PM	168	28	196	26	75	101	94	140	234	531
12:15 PM	179	38	217	30	88	118	85	137	222	557
12:30 PM	172	22	194	26	87	113	103	122	225	532
12:45 PM	167	24	191	18	65	83	102	148	250	524
Total	686	112	798	100	315	415	384	547	931	2144
Grand Total	1331	196	1527	208	584	792	742	1021	1763	4082
Apprch %	87.2	12.8		26.3	73.7		42.1	57.9		
Total %	32.6	4.8	37.4	5.1	14.3	19.4	18.2	25.0	43.2	

Start Time	Route 12 From North			I-395 On/Off Ramp From East			Route 12 From South			Int. Total
	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	
Peak Hour From 11:00 AM to 12:45 PM - Peak 1 of 1										
Intersection	12:00 PM									
Volume	686	112	798	100	315	415	384	547	931	2144
Percent	86.0	14.0		24.1	75.9		41.2	58.8		
12:15 Volume	179	38	217	30	88	118	85	137	222	557
Peak Factor										0.962
High Int.	12:15 PM			12:15 PM			12:45 PM			
Volume	179	38	217	30	88	118	102	148	250	
Peak Factor			0.919			0.879			0.931	
Peak Hour From 11:00 AM to 12:45 PM - Peak 1 of 1										
By Approach	11:30 AM			11:45 AM			12:00 PM			
Volume	686	112	798	116	324	440	384	547	931	
Percent	86.0	14.0		26.4	73.6		41.2	58.8		
High Int.	12:15 PM			12:15 PM			12:45 PM			
Volume	179	38	217	30	88	118	102	148	250	
Peak Factor			0.919			0.932			0.931	

ITE Trip Generation Calculations

Fast-Food Restaurant with Drive-Through Window (934)

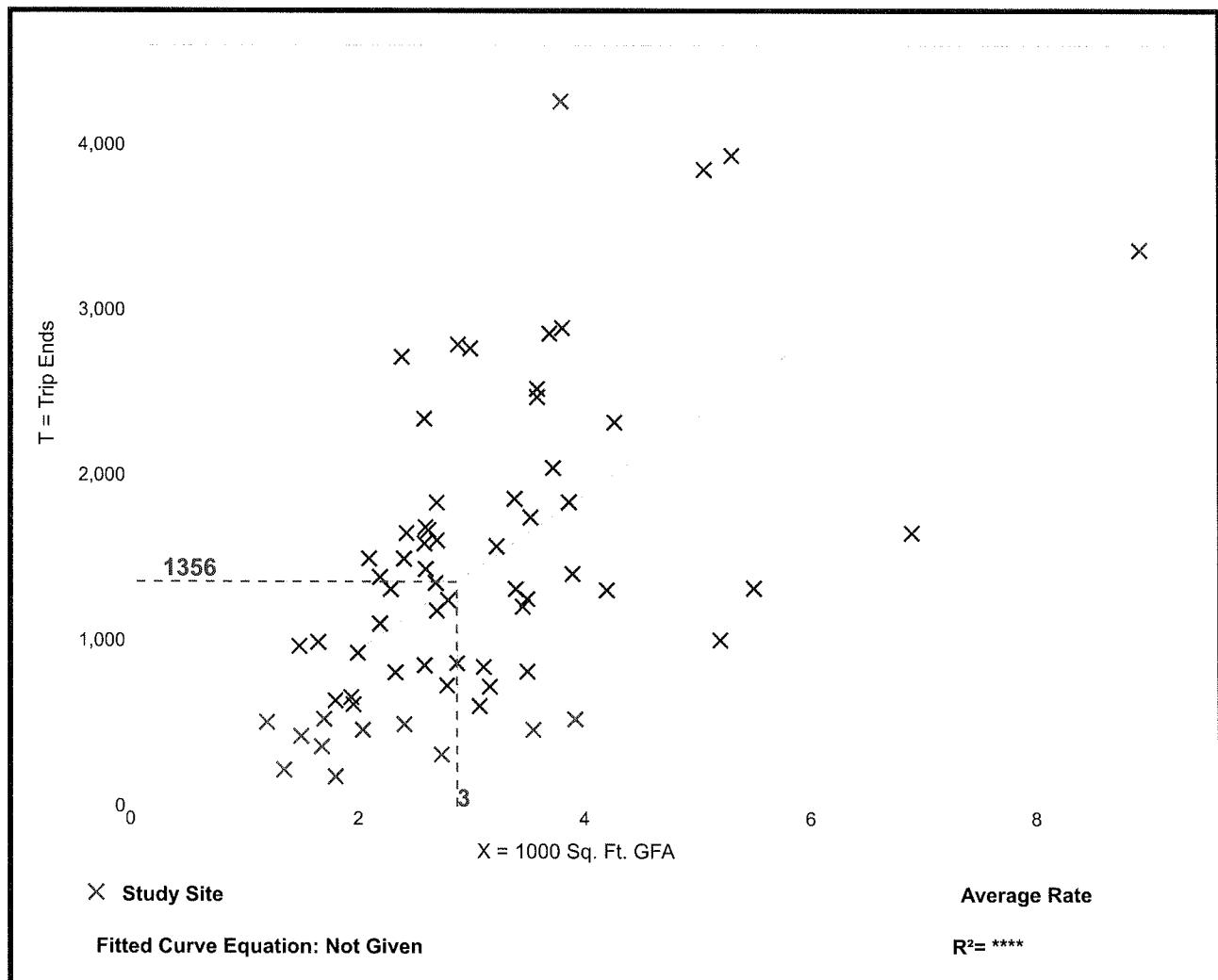
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 67
Avg. 1000 Sq. Ft. GFA: 3
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
470.95	98.89 - 1137.66	244.44

Data Plot and Equation



Fast-Food Restaurant with Drive-Through Window (934)

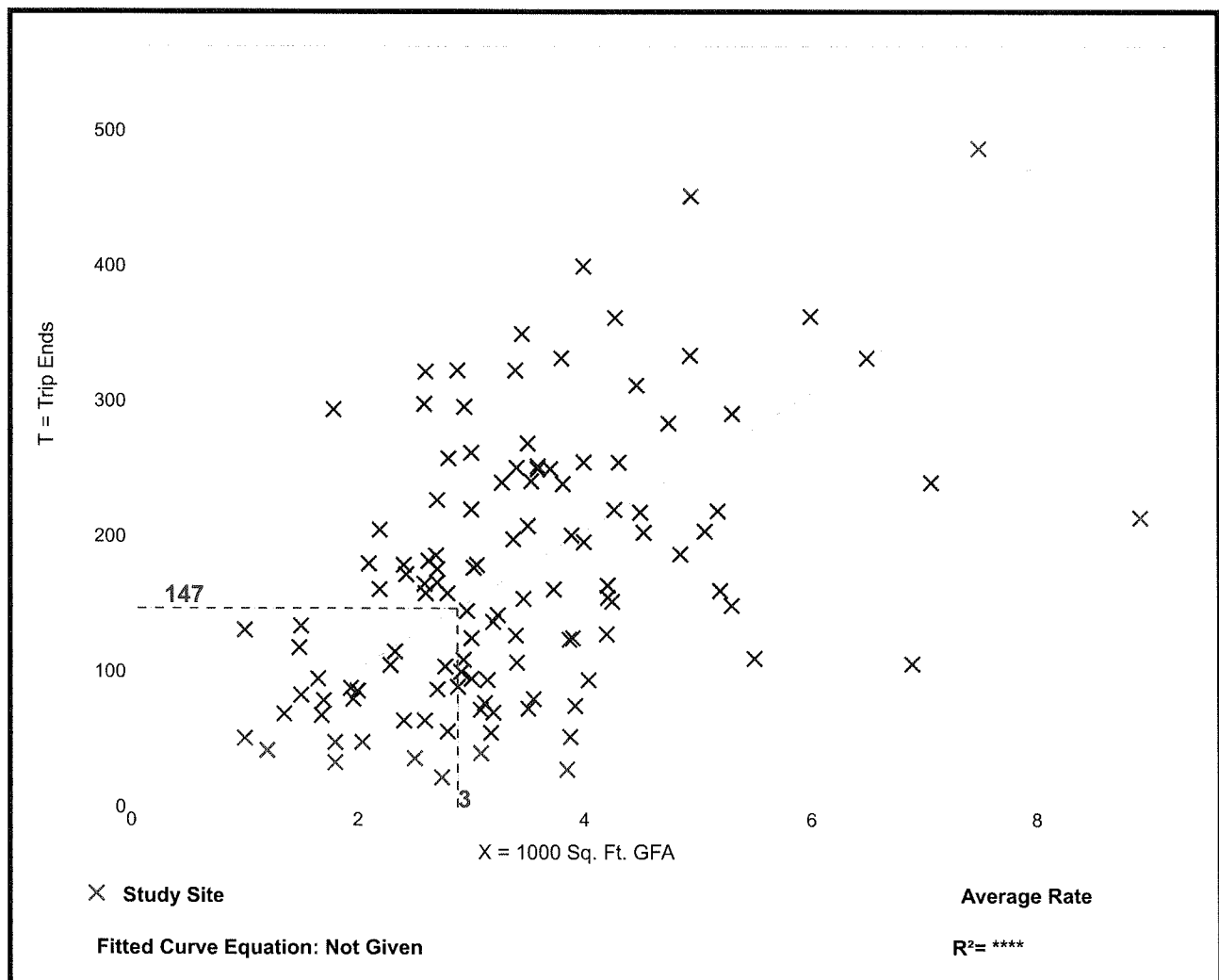
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
AM Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 117
Avg. 1000 Sq. Ft. GFA: 3
Directional Distribution: 52% entering, 48% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
50.97	7.28 - 164.25	26.22

Data Plot and Equation



Fast-Food Restaurant with Drive-Through Window (934)

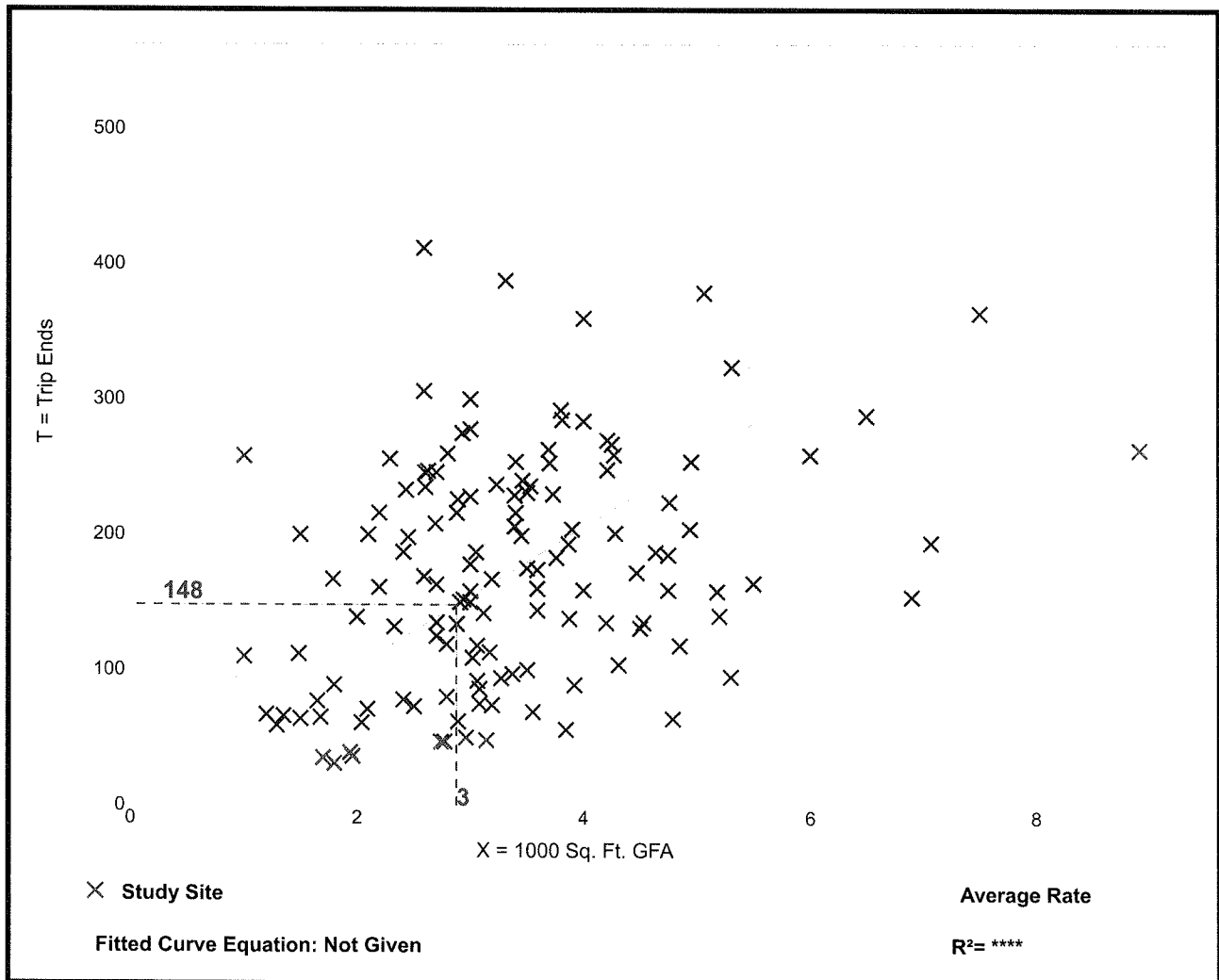
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
PM Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 132
Avg. 1000 Sq. Ft. GFA: 3
Directional Distribution: 51% entering, 49% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
51.36	13.36 - 258.00	27.47

Data Plot and Equation



Fast-Food Restaurant with Drive-Through Window (934)

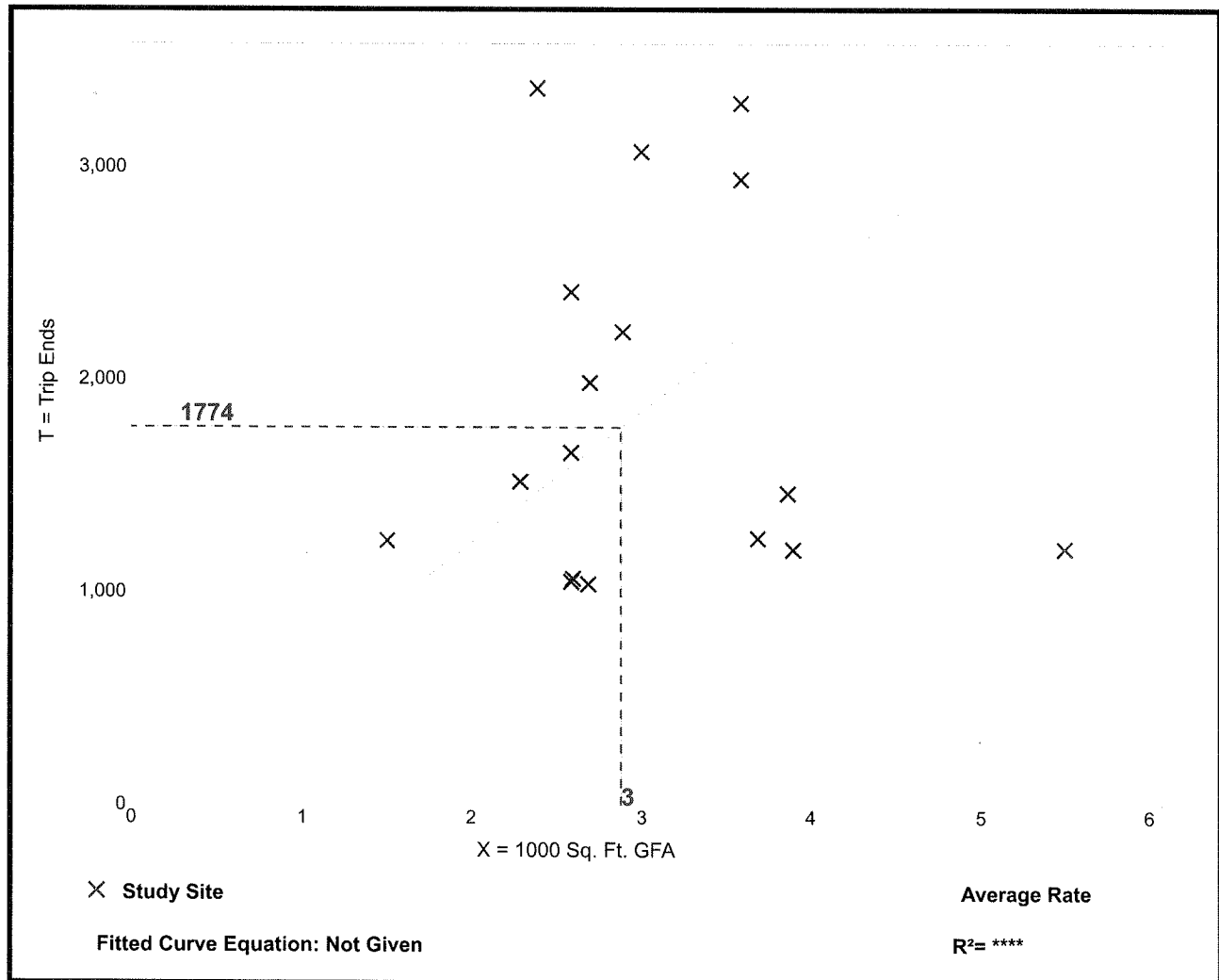
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Saturday

Setting/Location: General Urban/Suburban
Number of Studies: 17
Avg. 1000 Sq. Ft. GFA: 3
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
616.12	218.91 - 1410.88	320.90

Data Plot and Equation



Fast-Food Restaurant with Drive-Through Window (934)

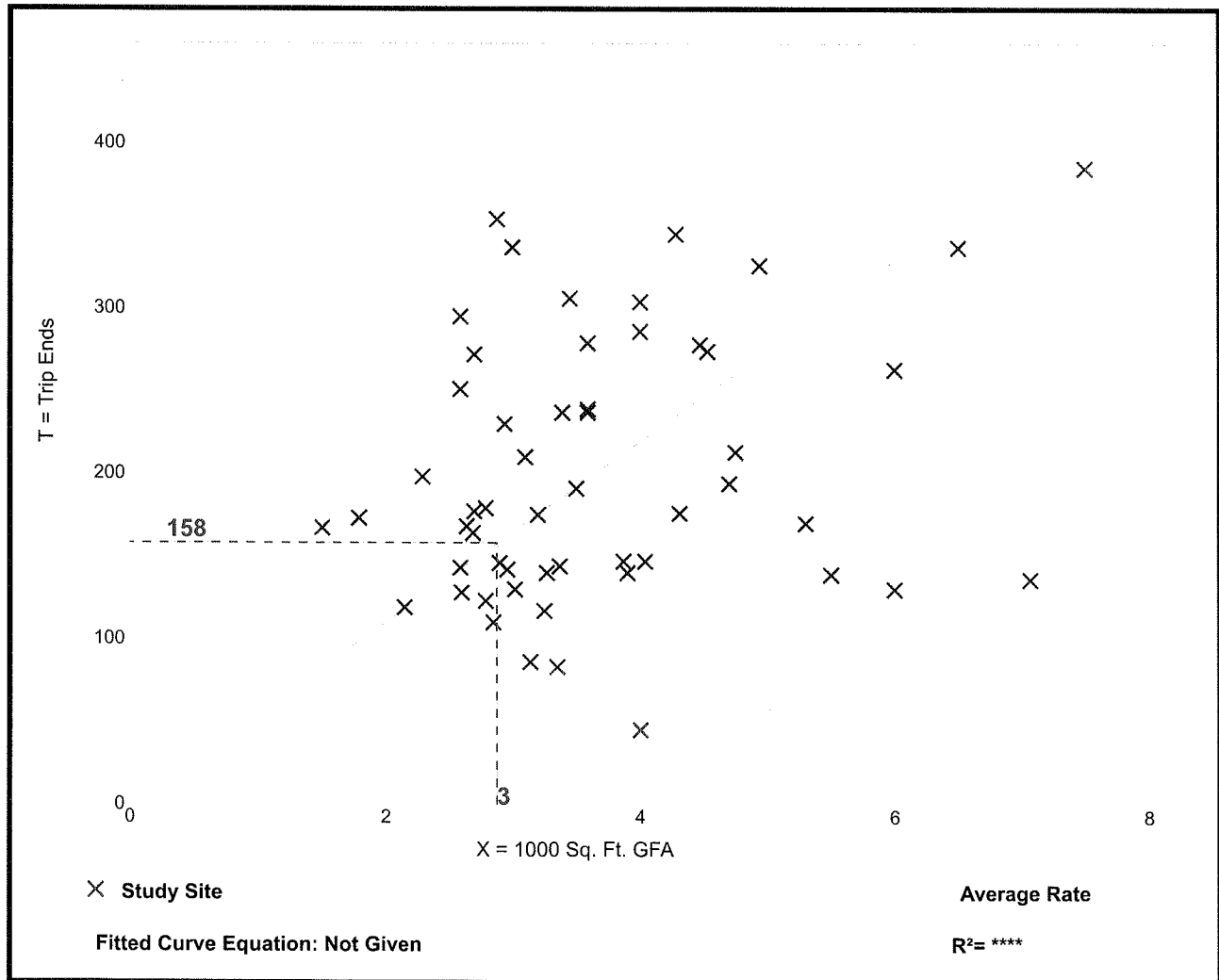
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Saturday, Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 54
Avg. 1000 Sq. Ft. GFA: 4
Directional Distribution: 51% entering, 49% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
54.86	11.25 - 122.92	24.51















Data Plot and Equation



SYNCHRO Capacity Analyses







Lanes, Volumes, Timings
3: Route 12 & I-395 NB Off Ramp

2022 Background Traffic Volumes
AM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	 		 			 
Traffic Volume (vph)	88	113	181	130	84	328
Future Volume (vph)	88	113	181	130	84	328
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	225	
Storage Lanes	1	0		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	0.924			0.850		
Flt Protected	0.979				0.950	
Satd. Flow (prot)	1685	0	3539	1583	1770	3539
Flt Permitted	0.979				0.628	
Satd. Flow (perm)	1685	0	3539	1583	1170	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	105			141		
Link Speed (mph)	35		35			35
Link Distance (ft)	248		597			373
Travel Time (s)	4.8		11.6			7.3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	96	123	197	141	91	357
Shared Lane Traffic (%)						
Lane Group Flow (vph)	219	0	197	141	91	357
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Number of Detectors	1		2	1	1	2
Detector Template	Left		Thru	Right	Left	Thru
Leading Detector (ft)	20		100	20	20	100
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	20		6	20	20	6
Detector 1 Type	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)			94			94
Detector 2 Size(ft)			6			6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot		NA	custom	custom	NA
Protected Phases	5				1	
Permitted Phases			3	3	3	3

Lanes, Volumes, Timings
3: Route 12 & I-395 NB Off Ramp

2022 Background Traffic Volumes
AM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	5		3	3	1	3
Switch Phase						
Minimum Initial (s)	7.0		19.5	19.5	4.5	19.5
Minimum Split (s)	20.0		25.6	25.6	9.0	25.6
Total Split (s)	30.0		27.0	27.0	13.0	27.0
Total Split (%)	42.9%		38.6%	38.6%	18.6%	38.6%
Maximum Green (s)	26.0		20.9	20.9	9.0	20.9
Yellow Time (s)	3.0		4.0	4.0	3.0	4.0
All-Red Time (s)	1.0		2.1	2.1	1.0	2.1
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0		6.1	6.1	4.0	6.1
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		Min	Min	None	Min
Walk Time (s)	7.0		7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0		0	0	0	0
Act Effct Green (s)	32.5		19.6	19.6	27.4	19.6
Actuated g/C Ratio	0.46		0.28	0.28	0.39	0.28
v/c Ratio	0.26		0.20	0.26	0.18	0.36
Control Delay	7.6		19.9	5.4	19.8	24.1
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	7.6		19.9	5.4	19.8	24.1
LOS	A		B	A	B	C
Approach Delay	7.6		13.8			23.2
Approach LOS	A		B			C
90th %ile Green (s)	30.2		19.8	19.8	5.9	19.8
90th %ile Term Code	Coord		Gap	Gap	Gap	Gap
70th %ile Green (s)	30.6		19.5	19.5	5.8	19.5
70th %ile Term Code	Coord		Min	Min	Gap	Min
50th %ile Green (s)	30.7		19.5	19.5	5.7	19.5
50th %ile Term Code	Coord		Min	Min	Gap	Min
30th %ile Green (s)	30.8		19.5	19.5	5.6	19.5
30th %ile Term Code	Coord		Min	Min	Gap	Min
10th %ile Green (s)	40.4		19.5	19.5	0.0	19.5
10th %ile Term Code	Coord		Min	Min	Skip	Min
Stops (vph)	65		130	20	62	283
Fuel Used(gal)	1		2	1	1	5
CO Emissions (g/hr)	81		174	60	72	323
NOx Emissions (g/hr)	16		34	12	14	63
VOC Emissions (g/hr)	19		40	14	17	75
Dilemma Vehicles (#)	0		9	0	0	7
Queue Length 50th (ft)	28		34	0	30	72
Queue Length 95th (ft)	69		58	37	68	117
Internal Link Dist (ft)	168		517			293
Turn Bay Length (ft)					225	
Base Capacity (vph)	839		1056	571	589	1056
Starvation Cap Reductn	0		0	0	0	0

Lanes, Volumes, Timings
 3: Route 12 & I-395 NB Off Ramp

2022 Background Traffic Volumes
 AM

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.26		0.19	0.25	0.15	0.34

Intersection Summary



















Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 0 (0%), Referenced to phase 6:, Start of Yellow
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.36
 Intersection Signal Delay: 16.7
 Intersection LOS: B
 Intersection Capacity Utilization 44.5%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 3: Route 12 & I-395 NB Off Ramp















Lanes, Volumes, Timings
5: Route 12 & I-395 SB Ramps

2022 Background Traffic Volumes
AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	166	0	0	119	53	238	0	0	246	222
Future Volume (vph)	0	0	166	0	0	119	53	238	0	0	246	222
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr t			0.865			0.865						0.850
Flt Protected							0.950					
Satd. Flow (prot)	0	0	1611	0	0	1611	1770	1863	0	0	1863	1583
Flt Permitted							0.595					
Satd. Flow (perm)	0	0	1611	0	0	1611	1108	1863	0	0	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			322			763						241
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		228			226			373			241	
Travel Time (s)		5.2			5.1			8.5			5.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	180	0	0	129	58	259	0	0	267	241
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	180	0	0	129	58	259	0	0	267	241
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors			1			1	1	2			2	1
Detector Template			Right			Right	Left	Thru			Thru	Right
Leading Detector (ft)			20			20	20	100			100	20
Trailing Detector (ft)			0			0	0	0			0	0
Detector 1 Position(ft)			0			0	0	0			0	0
Detector 1 Size(ft)			20			20	20	6			6	20
Detector 1 Type			Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)			0.0			0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)			0.0			0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)			0.0			0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type			custom			Prot	custom	NA			NA	custom
Protected Phases			4			4	1					
Permitted Phases			14				2	2			2	2
Detector Phase			4			4	1	2			2	2
Switch Phase												
Minimum Initial (s)			5.5			5.5	5.0	13.5			13.5	13.5

Lanes, Volumes, Timings
5: Route 12 & I-395 SB Ramps

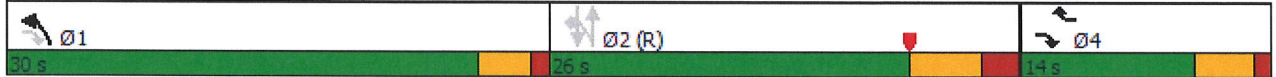
2022 Background Traffic Volumes
AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)			10.0			10.0	28.0	19.6			19.6	19.6
Total Split (s)			14.0			14.0	30.0	26.0			26.0	26.0
Total Split (%)			20.0%			20.0%	42.9%	37.1%			37.1%	37.1%
Maximum Green (s)			9.7			9.7	26.0	19.9			19.9	19.9
Yellow Time (s)			3.3			3.3	3.0	4.0			4.0	4.0
All-Red Time (s)			1.0			1.0	1.0	2.1			2.1	2.1
Lost Time Adjust (s)			0.0			0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)			4.3			4.3	4.0	6.1			6.1	6.1
Lead/Lag							Lead	Lag			Lag	Lag
Lead-Lag Optimize?							Yes	Yes			Yes	Yes
Vehicle Extension (s)			3.0			3.0	3.0	3.0			3.0	3.0
Recall Mode			None			None	None	C-Max			C-Max	C-Max
Walk Time (s)			7.0			7.0	7.0	7.0			7.0	7.0
Flash Dont Walk (s)			11.0			11.0	11.0	11.0			11.0	11.0
Pedestrian Calls (#/hr)			0			0	0	0			0	0
Act Effct Green (s)			11.6			5.5	53.8	48.0			48.0	48.0
Actuated g/C Ratio			0.17			0.08	0.77	0.69			0.69	0.69
v/c Ratio			0.34			0.16	0.06	0.20			0.21	0.21
Control Delay			1.7			0.4	4.2	11.9			5.4	1.3
Queue Delay			0.0			0.0	0.0	0.0			0.0	0.0
Total Delay			1.7			0.4	4.2	11.9			5.4	1.3
LOS			A			A	A	B			A	A
Approach Delay		1.7			0.4			10.5			3.5	
Approach LOS		A			A			B			A	
90th %ile Green (s)			5.5			5.5	6.5	43.6			43.6	43.6
90th %ile Term Code			Min			Min	Gap	Coord			Coord	Coord
70th %ile Green (s)			5.5			5.5	6.2	43.9			43.9	43.9
70th %ile Term Code			Min			Min	Gap	Coord			Coord	Coord
50th %ile Green (s)			5.5			5.5	5.9	44.2			44.2	44.2
50th %ile Term Code			Min			Min	Gap	Coord			Coord	Coord
30th %ile Green (s)			5.5			5.5	0.0	54.1			54.1	54.1
30th %ile Term Code			Min			Min	Skip	Coord			Coord	Coord
10th %ile Green (s)			5.5			5.5	0.0	54.1			54.1	54.1
10th %ile Term Code			Min			Min	Skip	Coord			Coord	Coord
Stops (vph)			0			0	28	162			88	14
Fuel Used(gal)			0			0	0	2			1	1
CO Emissions (g/hr)			25			15	25	151			85	39
NOx Emissions (g/hr)			5			3	5	29			17	8
VOC Emissions (g/hr)			6			4	6	35			20	9
Dilemma Vehicles (#)			0			0	0	0			0	0
Queue Length 50th (ft)			0			0	15	87			43	0
Queue Length 95th (ft)			0			0	4	136			76	22
Internal Link Dist (ft)		148			146			293			161	
Turn Bay Length (ft)												
Base Capacity (vph)			565			880	1135	1276			1276	1160
Starvation Cap Reductn			0			0	0	0			0	0
Spillback Cap Reductn			0			0	0	0			0	0
Storage Cap Reductn			0			0	0	0			0	0
Reduced v/c Ratio			0.32			0.15	0.05	0.20			0.21	0.21

Intersection Summary










Area Type:	Other
Cycle Length:	70
Actuated Cycle Length:	70
Offset:	19.9 (28%), Referenced to phase 2:NBSB and 6:, Start of Yellow
Natural Cycle:	60
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.34
Intersection Signal Delay:	4.8
Intersection LOS:	A
Intersection Capacity Utilization	31.9%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 5: Route 12 & I-395 SB Ramps



















HCM Unsignalized Intersection Capacity Analysis
10: Route 12 & Gas Station Entrance

2022 Background Traffic Volumes
AM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						 
Traffic Volume (veh/h)	0	0	289	68	27	468
Future Volume (Veh/h)	0	0	289	68	27	468
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	314	74	29	509
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			241			
pX, platoon unblocked	0.95	0.95			0.95	
vC, conflicting volume	664	351			388	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	619	290			329	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			98	
cM capacity (veh/h)	389	671			1165	
Direction, Lane #	NB 1	SB 1	SB 2			
Volume Total	388	199	339			
Volume Left	0	29	0			
Volume Right	74	0	0			
cSH	1700	1165	1700			
Volume to Capacity	0.23	0.02	0.20			
Queue Length 95th (ft)	0	2	0			
Control Delay (s)	0.0	1.4	0.0			
Lane LOS		A				
Approach Delay (s)	0.0	0.5				
Approach LOS						
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			36.4%	ICU Level of Service		A
Analysis Period (min)			15			







Lanes, Volumes, Timings
3: Route 12 & I-395 NB Off Ramp

2022 Background Traffic Volumes
PM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	 		 	 	 	 
Traffic Volume (vph)	234	224	490	321	102	508
Future Volume (vph)	234	224	490	321	102	508
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	225	
Storage Lanes	1	0		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	0.934			0.850		
Flt Protected	0.975				0.950	
Satd. Flow (prot)	1696	0	3539	1583	1770	3539
Flt Permitted	0.975				0.395	
Satd. Flow (perm)	1696	0	3539	1583	736	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	55			349		
Link Speed (mph)	35		35			35
Link Distance (ft)	248		586			373
Travel Time (s)	4.8		11.4			7.3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	254	243	533	349	111	552
Shared Lane Traffic (%)						
Lane Group Flow (vph)	497	0	533	349	111	552
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Number of Detectors	1		2	1	1	2
Detector Template	Left		Thru	Right	Left	Thru
Leading Detector (ft)	20		100	20	20	100
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	20		6	20	20	6
Detector 1 Type	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)			94			94
Detector 2 Size(ft)			6			6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot		NA	custom	custom	NA
Protected Phases	4				1	1
Permitted Phases			2	2	2	2

Lanes, Volumes, Timings
3: Route 12 & I-395 NB Off Ramp

2022 Background Traffic Volumes
PM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	4		2	2	1	1
Switch Phase						
Minimum Initial (s)	7.0		20.0	20.0	5.0	5.0
Minimum Split (s)	27.0		36.0	36.0	12.0	12.0
Total Split (s)	31.0		43.0	43.0	16.0	16.0
Total Split (%)	34.4%		47.8%	47.8%	17.8%	17.8%
Maximum Green (s)	27.0		36.9	36.9	12.0	12.0
Yellow Time (s)	3.0		4.0	4.0	3.0	3.0
All-Red Time (s)	1.0		2.1	2.1	1.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0		6.1	6.1	4.0	4.0
Lead/Lag			Lag	Lag	Lead	Lead
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		Min	Min	None	None
Walk Time (s)	7.0		7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0		0	0	0	0
Act Effct Green (s)	29.9		33.4	33.4	48.1	52.1
Actuated g/C Ratio	0.33		0.37	0.37	0.53	0.58
v/c Ratio	0.83		0.41	0.43	0.21	0.27
Control Delay	36.6		23.6	4.6	9.1	8.7
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	36.6		23.6	4.6	9.1	8.7
LOS	D		C	A	A	A
Approach Delay	36.6		16.1			8.8
Approach LOS	D		B			A
90th %ile Green (s)	35.4		28.5	28.5	12.0	12.0
90th %ile Term Code	Max		Coord	Coord	Max	Max
70th %ile Green (s)	33.0		26.6	26.6	16.3	16.3
70th %ile Term Code	Gap		Coord	Coord	Gap	Gap
50th %ile Green (s)	31.1		31.1	31.1	13.7	13.7
50th %ile Term Code	Gap		Coord	Coord	Gap	Gap
30th %ile Green (s)	27.8		36.1	36.1	12.0	12.0
30th %ile Term Code	Gap		Coord	Coord	Gap	Gap
10th %ile Green (s)	22.3		44.7	44.7	8.9	8.9
10th %ile Term Code	Gap		Coord	Coord	Gap	Gap
Stops (vph)	370		359	32	37	190
Fuel Used(gal)	7		7	2	1	4
CO Emissions (g/hr)	490		498	133	52	259
NOx Emissions (g/hr)	95		97	26	10	50
VOC Emissions (g/hr)	113		115	31	12	60
Dilemma Vehicles (#)	0		27	0	0	24
Queue Length 50th (ft)	227		121	0	24	67
Queue Length 95th (ft)	327		175	59	46	91
Internal Link Dist (ft)	168		506			293
Turn Bay Length (ft)					225	
Base Capacity (vph)	617		1511	875	549	2040
Starvation Cap Reductn	0		0	0	0	0

Lanes, Volumes, Timings
 3: Route 12 & I-395 NB Off Ramp

2022 Background Traffic Volumes
 PM

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.81		0.35	0.40	0.20	0.27

Intersection Summary



















Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 6:, Start of Yellow
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 18.7
 Intersection LOS: B
 Intersection Capacity Utilization 60.8%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 3: Route 12 & I-395 NB Off Ramp















Lanes, Volumes, Timings
5: Route 12 & I-395 SB Ramps

2022 Background Traffic Volumes
PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	276	0	0	87	155	559	0	0	334	112
Future Volume (vph)	0	0	276	0	0	87	155	559	0	0	334	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr't			0.865			0.865						0.850
Flt Protected							0.950					
Satd. Flow (prot)	0	0	1611	0	0	1611	1770	1863	0	0	1863	1583
Flt Permitted							0.503					
Satd. Flow (perm)	0	0	1611	0	0	1611	937	1863	0	0	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			223			409						122
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		228			226			373			241	
Travel Time (s)		5.2			5.1			8.5			5.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	300	0	0	95	168	608	0	0	363	122
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	300	0	0	95	168	608	0	0	363	122
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors			1			1	1	2			2	1
Detector Template			Right			Right	Left	Thru			Thru	Right
Leading Detector (ft)			20			20	20	100			100	20
Trailing Detector (ft)			0			0	0	0			0	0
Detector 1 Position(ft)			0			0	0	0			0	0
Detector 1 Size(ft)			20			20	20	6			6	20
Detector 1 Type			Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)			0.0			0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)			0.0			0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)			0.0			0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type			custom			Prot	D.P+P	NA			NA	Perm
Protected Phases			4			4	1	1			2	
Permitted Phases			14				2	2				2
Detector Phase			4			4	1	1			2	2
Switch Phase												
Minimum Initial (s)			5.5			5.5	5.0	5.0			15.0	15.0

Lanes, Volumes, Timings
5: Route 12 & I-395 SB Ramps

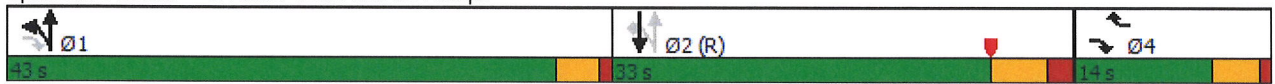
2022 Background Traffic Volumes
PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)			10.0			10.0	39.0	39.0			25.0	25.0
Total Split (s)			14.0			14.0	43.0	43.0			33.0	33.0
Total Split (%)			15.6%			15.6%	47.8%	47.8%			36.7%	36.7%
Maximum Green (s)			9.7			9.7	39.0	39.0			26.9	26.9
Yellow Time (s)			3.3			3.3	3.0	3.0			4.0	4.0
All-Red Time (s)			1.0			1.0	1.0	1.0			2.1	2.1
Lost Time Adjust (s)			0.0			0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)			4.3			4.3	4.0	4.0			6.1	6.1
Lead/Lag							Lead	Lead			Lag	Lag
Lead-Lag Optimize?							Yes	Yes			Yes	Yes
Vehicle Extension (s)			3.0			3.0	3.0	3.0			3.0	3.0
Recall Mode			None			None	None	None			C-Max	C-Max
Walk Time (s)			7.0			7.0	7.0	7.0			7.0	7.0
Flash Dont Walk (s)			11.0			11.0	11.0	11.0			11.0	11.0
Pedestrian Calls (#/hr)			0			0	0	0			0	0
Act Effct Green (s)			29.0			8.1	69.6	73.6			50.6	50.6
Actuated g/C Ratio			0.32			0.09	0.77	0.82			0.56	0.56
v/c Ratio			0.45			0.18	0.19	0.40			0.35	0.13
Control Delay			7.9			0.8	2.0	4.4			13.5	3.0
Queue Delay			0.0			0.0	0.0	0.3			0.0	0.0
Total Delay			7.9			0.8	2.0	4.8			13.5	3.0
LOS			A			A	A	A			B	A
Approach Delay		7.9			0.8			4.2			10.8	
Approach LOS		A			A			A			B	
90th %ile Green (s)			9.7			9.7	24.2	24.2			41.7	41.7
90th %ile Term Code			Max			Max	Gap	Gap			Coord	Coord
70th %ile Green (s)			9.7			9.7	20.0	20.0			45.9	45.9
70th %ile Term Code			Max			Max	Gap	Gap			Coord	Coord
50th %ile Green (s)			9.1			9.1	16.9	16.9			49.6	49.6
50th %ile Term Code			Gap			Gap	Gap	Gap			Coord	Coord
30th %ile Green (s)			6.4			6.4	13.2	13.2			56.0	56.0
30th %ile Term Code			Gap			Gap	Gap	Gap			Coord	Coord
10th %ile Green (s)			5.5			5.5	10.3	10.3			59.8	59.8
10th %ile Term Code			Min			Min	Gap	Gap			Coord	Coord
Stops (vph)			59			0	23	219			184	12
Fuel Used(gal)			1			0	1	3			3	0
CO Emissions (g/hr)			88			12	45	234			179	24
NOx Emissions (g/hr)			17			2	9	45			35	5
VOC Emissions (g/hr)			20			3	10	54			41	6
Dilemma Vehicles (#)			0			0	0	0			0	0
Queue Length 50th (ft)			30			0	16	78			108	0
Queue Length 95th (ft)			79			0	m13	m86			204	28
Internal Link Dist (ft)		148			146			293			161	
Turn Bay Length (ft)												
Base Capacity (vph)			655			538	1127	1523			1047	943
Starvation Cap Reductn			0			0	0	406			0	0
Spillback Cap Reductn			0			0	0	0			0	0
Storage Cap Reductn			0			0	0	0			0	0
Reduced v/c Ratio			0.46			0.18	0.15	0.54			0.35	0.13

Intersection Summary










Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 41 (46%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.45
 Intersection Signal Delay: 6.6
 Intersection LOS: A
 Intersection Capacity Utilization 43.3%
 ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Route 12 & I-395 SB Ramps














HCM Unsignalized Intersection Capacity Analysis
10: Route 12 & Gas Station Entrance

2022 Background Traffic Volumes
PM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						 
Traffic Volume (veh/h)	0	0	587	59	7	446
Future Volume (Veh/h)	0	0	587	59	7	446
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	638	64	8	485
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
			None			None
Median storage veh						
Upstream signal (ft)						
			241			
pX, platoon unblocked	0.87	0.87			0.87	
vC, conflicting volume	928	670			702	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	844	547			584	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			99	
cM capacity (veh/h)	261	419			859	
Direction, Lane #						
	NB 1	SB 1	SB 2			
Volume Total	702	170	323			
Volume Left	0	8	0			
Volume Right	64	0	0			
cSH	1700	859	1700			
Volume to Capacity	0.41	0.01	0.19			
Queue Length 95th (ft)	0	1	0			
Control Delay (s)	0.0	0.5	0.0			
Lane LOS						
		A				
Approach Delay (s)	0.0	0.2				
Approach LOS						
Intersection Summary						
Average Delay						
			0.1			
Intersection Capacity Utilization						
			37.8%	ICU Level of Service		A
Analysis Period (min)						
			15			







Lanes, Volumes, Timings
3: Route 12 & I-395 NB Off Ramp

2022 Background Traffic Volumes
SAT

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	315	109	598	384	119	744
Future Volume (vph)	315	109	598	384	119	744
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	225	
Storage Lanes	1	0		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	0.965			0.850		
Flt Protected	0.964				0.950	
Satd. Flow (prot)	1733	0	3539	1583	1770	3539
Flt Permitted	0.964				0.317	
Satd. Flow (perm)	1733	0	3539	1583	590	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	20			417		
Link Speed (mph)	35		35			35
Link Distance (ft)	248		586			373
Travel Time (s)	4.8		11.4			7.3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	342	118	650	417	129	809
Shared Lane Traffic (%)						
Lane Group Flow (vph)	460	0	650	417	129	809
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Number of Detectors	1		2	1	1	2
Detector Template	Left		Thru	Right	Left	Thru
Leading Detector (ft)	20		100	20	20	100
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	20		6	20	20	6
Detector 1 Type	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)			94			94
Detector 2 Size(ft)			6			6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot		NA	custom	custom	NA
Protected Phases	4				1	1
Permitted Phases			2	2	2	2

Lanes, Volumes, Timings
3: Route 12 & I-395 NB Off Ramp

2022 Background Traffic Volumes
SAT

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	4		2	2	1	1
Switch Phase						
Minimum Initial (s)	7.0		20.0	20.0	5.0	5.0
Minimum Split (s)	27.0		36.0	36.0	12.0	12.0
Total Split (s)	31.0		43.0	43.0	16.0	16.0
Total Split (%)	34.4%		47.8%	47.8%	17.8%	17.8%
Maximum Green (s)	27.0		36.9	36.9	12.0	12.0
Yellow Time (s)	3.0		4.0	4.0	3.0	3.0
All-Red Time (s)	1.0		2.1	2.1	1.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0		6.1	6.1	4.0	4.0
Lead/Lag			Lag	Lag	Lead	Lead
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		Min	Min	None	None
Walk Time (s)	7.0		7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0		0	0	0	0
Act Effct Green (s)	27.6		33.3	33.3	50.4	54.4
Actuated g/C Ratio	0.31		0.37	0.37	0.56	0.60
v/c Ratio	0.84		0.50	0.49	0.25	0.38
Control Delay	42.9		24.3	4.4	7.4	7.7
Queue Delay	0.0		0.0	0.0	0.0	0.3
Total Delay	42.9		24.3	4.4	7.4	7.9
LOS	D		C	A	A	A
Approach Delay	42.9		16.5			7.8
Approach LOS	D		B			A
90th %ile Green (s)	30.2		33.7	33.7	12.0	12.0
90th %ile Term Code	Max		Coord	Coord	Max	Max
70th %ile Green (s)	31.7		28.9	28.9	15.3	15.3
70th %ile Term Code	Gap		Coord	Coord	Max	Max
50th %ile Green (s)	29.2		27.2	27.2	19.5	19.5
50th %ile Term Code	Gap		Coord	Coord	Gap	Gap
30th %ile Green (s)	26.0		33.8	33.8	16.1	16.1
30th %ile Term Code	Gap		Coord	Coord	Gap	Gap
10th %ile Green (s)	20.9		42.9	42.9	12.1	12.1
10th %ile Term Code	Gap		Coord	Coord	Gap	Gap
Stops (vph)	360		451	34	45	308
Fuel Used(gal)	7		9	2	1	5
CO Emissions (g/hr)	500		621	155	59	383
NOx Emissions (g/hr)	97		121	30	11	75
VOC Emissions (g/hr)	116		144	36	14	89
Dilemma Vehicles (#)	0		33	0	0	28
Queue Length 50th (ft)	227		165	0	25	117
Queue Length 95th (ft)	#372		197	57	m47	134
Internal Link Dist (ft)	168		506			293
Turn Bay Length (ft)					225	
Base Capacity (vph)	572		1497	910	526	2139
Starvation Cap Reductn	0		0	0	0	625

Lanes, Volumes, Timings
 3: Route 12 & I-395 NB Off Ramp

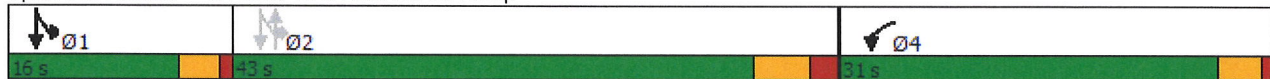


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.80		0.43	0.46	0.25	0.53

Intersection Summary



















Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 6:, Start of Yellow
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 18.1
 Intersection LOS: B
 Intersection Capacity Utilization 59.1%
 ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Route 12 & I-395 NB Off Ramp



Lanes, Volumes, Timings
5: Route 12 & I-395 SB Ramps













2022 Background Traffic Volumes
SAT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	374	0	0	7	177	530	0	0	489	168
Future Volume (vph)	0	0	374	0	0	7	177	530	0	0	489	168
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr't			0.865			0.865						0.850
Flt Protected							0.950					
Satd. Flow (prot)	0	0	1611	0	0	1611	1770	1863	0	0	1863	1583
Flt Permitted							0.364					
Satd. Flow (perm)	0	0	1611	0	0	1611	678	1863	0	0	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			103			431						183
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		228			226			373			241	
Travel Time (s)		5.2			5.1			8.5			5.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	407	0	0	8	192	576	0	0	532	183
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	407	0	0	8	192	576	0	0	532	183
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors			1			1	1	2			2	1
Detector Template			Right			Right	Left	Thru			Thru	Right
Leading Detector (ft)			20			20	20	100			100	20
Trailing Detector (ft)			0			0	0	0			0	0
Detector 1 Position(ft)			0			0	0	0			0	0
Detector 1 Size(ft)			20			20	20	6			6	20
Detector 1 Type			Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)			0.0			0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)			0.0			0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)			0.0			0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type			custom			Prot	D.P+P	NA			NA	Perm
Protected Phases			4			4	1	1			2	
Permitted Phases			14				2	2				2
Detector Phase			4			4	1	1			2	2
Switch Phase												
Minimum Initial (s)			5.5			5.5	5.0	5.0			15.0	15.0

Lanes, Volumes, Timings
5: Route 12 & I-395 SB Ramps

2022 Background Traffic Volumes

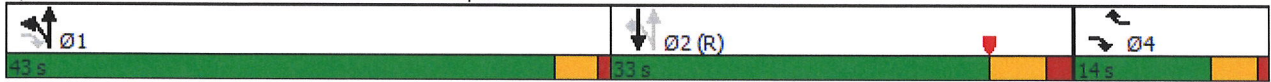
SAT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)			10.0			10.0	39.0	39.0			25.0	25.0
Total Split (s)			14.0			14.0	43.0	43.0			33.0	33.0
Total Split (%)			15.6%			15.6%	47.8%	47.8%			36.7%	36.7%
Maximum Green (s)			9.7			9.7	39.0	39.0			26.9	26.9
Yellow Time (s)			3.3			3.3	3.0	3.0			4.0	4.0
All-Red Time (s)			1.0			1.0	1.0	1.0			2.1	2.1
Lost Time Adjust (s)			0.0			0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)			4.3			4.3	4.0	4.0			6.1	6.1
Lead/Lag							Lead	Lead			Lag	Lag
Lead-Lag Optimize?							Yes	Yes			Yes	Yes
Vehicle Extension (s)			3.0			3.0	3.0	3.0			3.0	3.0
Recall Mode			None			None	None	None			C-Max	C-Max
Walk Time (s)			7.0			7.0	7.0	7.0			7.0	7.0
Flash Dont Walk (s)			11.0			11.0	11.0	11.0			11.0	11.0
Pedestrian Calls (#/hr)			0			0	0	0			0	0
Act Effct Green (s)			30.1			9.7	68.0	72.0			49.5	49.5
Actuated g/C Ratio			0.33			0.11	0.76	0.80			0.55	0.55
v/c Ratio			0.67			0.01	0.27	0.39			0.52	0.19
Control Delay			24.1			0.0	4.6	4.1			16.2	2.6
Queue Delay			0.0			0.0	0.0	0.4			0.0	0.0
Total Delay			24.1			0.0	4.6	4.5			16.2	2.6
LOS			C			A	A	A			B	A
Approach Delay		24.1						4.5			12.7	
Approach LOS		C						A			B	
90th %ile Green (s)			9.7			9.7	23.2	23.2			42.7	42.7
90th %ile Term Code			Max			Max	Gap	Gap			Coord	Coord
70th %ile Green (s)			9.7			9.7	19.2	19.2			46.7	46.7
70th %ile Term Code			Max			Max	Gap	Gap			Coord	Coord
50th %ile Green (s)			9.7			9.7	15.5	15.5			50.4	50.4
50th %ile Term Code			Max			Max	Gap	Gap			Coord	Coord
30th %ile Green (s)			9.7			9.7	14.0	14.0			51.9	51.9
30th %ile Term Code			Max			Max	Gap	Gap			Coord	Coord
10th %ile Green (s)			9.7			9.7	10.1	10.1			55.8	55.8
10th %ile Term Code			Max			Max	Gap	Gap			Coord	Coord
Stops (vph)			234			0	50	177			308	15
Fuel Used(gal)			4			0	1	3			4	0
CO Emissions (g/hr)			265			1	67	207			296	34
NOx Emissions (g/hr)			52			0	13	40			58	7
VOC Emissions (g/hr)			61			0	15	48			69	8
Dilemma Vehicles (#)			0			0	0	0			0	0
Queue Length 50th (ft)			149			0	13	79			174	0
Queue Length 95th (ft)			219			0	m36	m98			318	34
Internal Link Dist (ft)		148			146			293			161	
Turn Bay Length (ft)												
Base Capacity (vph)			607			558	1015	1490			1024	953
Starvation Cap Reductn			0			0	0	459			0	0
Spillback Cap Reductn			0			0	0	0			0	0
Storage Cap Reductn			0			0	0	0			0	0
Reduced v/c Ratio			0.67			0.01	0.19	0.56			0.52	0.19

Intersection Summary









Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 41 (46%), Referenced to phase 2:NBSB, Start of Yellow
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay: 11.8 Intersection LOS: B
 Intersection Capacity Utilization 57.6% ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Route 12 & I-395 SB Ramps














HCM Unsignalized Intersection Capacity Analysis
10: Route 12 & Gas Station Entrance

2022 Background Traffic Volumes
SAT

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	458	79	25	657
Future Volume (Veh/h)	0	0	458	79	25	657
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	498	86	27	714
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (ft)			241			
pX, platoon unblocked	0.87	0.87			0.87	
vC, conflicting volume	952	541			584	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	872	402			451	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			97	
cM capacity (veh/h)	246	522			966	
Direction, Lane #	NB 1	SB 1	SB 2			
Volume Total	584	265	476			
Volume Left	0	27	0			
Volume Right	86	0	0			
cSH	1700	966	1700			
Volume to Capacity	0.34	0.03	0.28			
Queue Length 95th (ft)	0	2	0			
Control Delay (s)	0.0	1.2	0.0			
Lane LOS		A				
Approach Delay (s)	0.0	0.4				
Approach LOS						
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			39.7%		ICU Level of Service	A
Analysis Period (min)			15			







Lanes, Volumes, Timings
3: Route 12 & I-395 NB Off Ramp

2022 Combined Traffic Volumes
AM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	88	122	201	130	89	346
Future Volume (vph)	88	122	201	130	89	346
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	225	
Storage Lanes	1	0		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	0.922			0.850		
Flt Protected	0.979				0.950	
Satd. Flow (prot)	1681	0	3539	1583	1770	3539
Flt Permitted	0.979				0.615	
Satd. Flow (perm)	1681	0	3539	1583	1146	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	113			141		
Link Speed (mph)	35		35			35
Link Distance (ft)	248		597			373
Travel Time (s)	4.8		11.6			7.3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	96	133	218	141	97	376
Shared Lane Traffic (%)						
Lane Group Flow (vph)	229	0	218	141	97	376
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Number of Detectors	1		2	1	1	2
Detector Template	Left		Thru	Right	Left	Thru
Leading Detector (ft)	20		100	20	20	100
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	20		6	20	20	6
Detector 1 Type	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)			94			94
Detector 2 Size(ft)			6			6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot		NA	custom	custom	NA
Protected Phases	5				1	
Permitted Phases			3	3	3	3

Lanes, Volumes, Timings
3: Route 12 & I-395 NB Off Ramp

2022 Combined Traffic Volumes
AM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	5		3	3	1	3
Switch Phase						
Minimum Initial (s)	7.0		19.5	19.5	4.5	19.5
Minimum Split (s)	20.0		25.6	25.6	9.0	25.6
Total Split (s)	30.0		27.0	27.0	13.0	27.0
Total Split (%)	42.9%		38.6%	38.6%	18.6%	38.6%
Maximum Green (s)	26.0		20.9	20.9	9.0	20.9
Yellow Time (s)	3.0		4.0	4.0	3.0	4.0
All-Red Time (s)	1.0		2.1	2.1	1.0	2.1
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0		6.1	6.1	4.0	6.1
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		Min	Min	None	Min
Walk Time (s)	7.0		7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0		0	0	0	0
Act Effct Green (s)	32.5		19.6	19.6	27.4	19.6
Actuated g/C Ratio	0.46		0.28	0.28	0.39	0.28
v/c Ratio	0.27		0.22	0.26	0.19	0.38
Control Delay	7.5		20.0	5.3	20.0	24.3
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	7.5		20.0	5.3	20.0	24.3
LOS	A		B	A	B	C
Approach Delay	7.5		14.2			23.4
Approach LOS	A		B			C
90th %ile Green (s)	29.8		20.2	20.2	5.9	20.2
90th %ile Term Code	Coord		Gap	Gap	Gap	Gap
70th %ile Green (s)	30.6		19.5	19.5	5.8	19.5
70th %ile Term Code	Coord		Min	Min	Gap	Min
50th %ile Green (s)	30.7		19.5	19.5	5.7	19.5
50th %ile Term Code	Coord		Min	Min	Gap	Min
30th %ile Green (s)	30.8		19.5	19.5	5.6	19.5
30th %ile Term Code	Coord		Min	Min	Gap	Min
10th %ile Green (s)	40.4		19.5	19.5	0.0	19.5
10th %ile Term Code	Coord		Min	Min	Skip	Min
Stops (vph)	68		147	20	67	299
Fuel Used(gal)	1		3	1	1	5
CO Emissions (g/hr)	85		195	59	77	342
NOx Emissions (g/hr)	17		38	12	15	66
VOC Emissions (g/hr)	20		45	14	18	79
Dilemma Vehicles (#)	0		10	0	0	7
Queue Length 50th (ft)	29		37	0	32	77
Queue Length 95th (ft)	71		62	37	71	122
Internal Link Dist (ft)	168		517			293
Turn Bay Length (ft)					225	
Base Capacity (vph)	839		1056	571	583	1056
Starvation Cap Reductn	0		0	0	0	0

Lanes, Volumes, Timings
3: Route 12 & I-395 NB Off Ramp

2022 Combined Traffic Volumes
AM



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.27		0.21	0.25	0.17	0.36

Intersection Summary

Area Type:	Other
Cycle Length:	70
Actuated Cycle Length:	70
Offset:	0 (0%), Referenced to phase 6:, Start of Yellow
Natural Cycle:	55
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.38
Intersection Signal Delay:	16.9
Intersection LOS:	B
Intersection Capacity Utilization	45.3%
ICU Level of Service	A
Analysis Period (min)	15



















Splits and Phases: 3: Route 12 & I-395 NB Off Ramp



Lanes, Volumes, Timings
5: Route 12 & I-395 SB Ramps













2022 Combined Traffic Volumes

AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	166	0	0	136	53	270	0	0	269	245
Future Volume (vph)	0	0	166	0	0	136	53	270	0	0	269	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr't			0.865			0.865						0.850
Flt Protected							0.950					
Satd. Flow (prot)	0	0	1611	0	0	1611	1770	1863	0	0	1863	1583
Flt Permitted							0.581					
Satd. Flow (perm)	0	0	1611	0	0	1611	1082	1863	0	0	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			287			742						266
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		228			226			373			241	
Travel Time (s)		5.2			5.1			8.5			5.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	180	0	0	148	58	293	0	0	292	266
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	180	0	0	148	58	293	0	0	292	266
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors			1			1	1	2			2	1
Detector Template			Right			Right	Left	Thru			Thru	Right
Leading Detector (ft)			20			20	20	100			100	20
Trailing Detector (ft)			0			0	0	0			0	0
Detector 1 Position(ft)			0			0	0	0			0	0
Detector 1 Size(ft)			20			20	20	6			6	20
Detector 1 Type			Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)			0.0			0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)			0.0			0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)			0.0			0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type			custom			Prot	custom	NA			NA	custom
Protected Phases			4			4	1					
Permitted Phases			14				2	2			2	2
Detector Phase			4			4	1	2			2	2
Switch Phase												
Minimum Initial (s)			5.5			5.5	5.0	13.5			13.5	13.5

Lanes, Volumes, Timings
5: Route 12 & I-395 SB Ramps

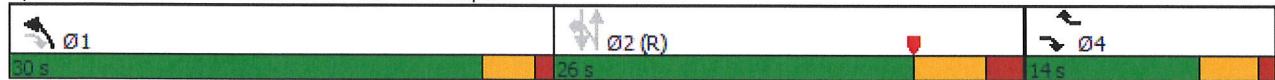
2022 Combined Traffic Volumes
AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)			10.0			10.0	28.0	19.6			19.6	19.6
Total Split (s)			14.0			14.0	30.0	26.0			26.0	26.0
Total Split (%)			20.0%			20.0%	42.9%	37.1%			37.1%	37.1%
Maximum Green (s)			9.7			9.7	26.0	19.9			19.9	19.9
Yellow Time (s)			3.3			3.3	3.0	4.0			4.0	4.0
All-Red Time (s)			1.0			1.0	1.0	2.1			2.1	2.1
Lost Time Adjust (s)			0.0			0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)			4.3			4.3	4.0	6.1			6.1	6.1
Lead/Lag							Lead	Lag			Lag	Lag
Lead-Lag Optimize?							Yes	Yes			Yes	Yes
Vehicle Extension (s)			3.0			3.0	3.0	3.0			3.0	3.0
Recall Mode			None			None	None	C-Max			C-Max	C-Max
Walk Time (s)			7.0			7.0	7.0	7.0			7.0	7.0
Flash Dont Walk (s)			11.0			11.0	11.0	11.0			11.0	11.0
Pedestrian Calls (#/hr)			0			0	0	0			0	0
Act Effct Green (s)			11.8			5.6	53.7	47.8			47.8	47.8
Actuated g/C Ratio			0.17			0.08	0.77	0.68			0.68	0.68
v/c Ratio			0.35			0.18	0.07	0.23			0.23	0.23
Control Delay			2.3			0.5	4.2	12.3			5.6	1.4
Queue Delay			0.0			0.0	0.0	0.0			0.0	0.0
Total Delay			2.3			0.5	4.2	12.3			5.6	1.4
LOS			A			A	A	B			A	A
Approach Delay		2.3			0.5			11.0			3.6	
Approach LOS		A			A			B			A	
90th %ile Green (s)			6.1			6.1	6.6	42.9			42.9	42.9
90th %ile Term Code			Gap			Gap	Gap	Coord			Coord	Coord
70th %ile Green (s)			5.5			5.5	6.2	43.9			43.9	43.9
70th %ile Term Code			Min			Min	Gap	Coord			Coord	Coord
50th %ile Green (s)			5.5			5.5	5.9	44.2			44.2	44.2
50th %ile Term Code			Min			Min	Gap	Coord			Coord	Coord
30th %ile Green (s)			5.5			5.5	0.0	54.1			54.1	54.1
30th %ile Term Code			Min			Min	Skip	Coord			Coord	Coord
10th %ile Green (s)			5.5			5.5	0.0	54.1			54.1	54.1
10th %ile Term Code			Min			Min	Skip	Coord			Coord	Coord
Stops (vph)			2			0	28	186			99	15
Fuel Used(gal)			0			0	0	2			1	1
CO Emissions (g/hr)			27			18	25	174			95	43
NOx Emissions (g/hr)			5			3	5	34			19	8
VOC Emissions (g/hr)			6			4	6	40			22	10
Dilemma Vehicles (#)			0			0	0	0			0	0
Queue Length 50th (ft)			0			0	15	100			48	0
Queue Length 95th (ft)			6			0	8	152			86	24
Internal Link Dist (ft)		148			146			293			161	
Turn Bay Length (ft)												
Base Capacity (vph)			537			862	1122	1273			1273	1165
Starvation Cap Reductn			0			0	0	0			0	0
Spillback Cap Reductn			0			0	0	0			0	0
Storage Cap Reductn			0			0	0	0			0	0
Reduced v/c Ratio			0.34			0.17	0.05	0.23			0.23	0.23

Intersection Summary









Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 19.9 (28%), Referenced to phase 2:NBSB and 6:, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.35
 Intersection Signal Delay: 5.1
 Intersection LOS: A
 Intersection Capacity Utilization 33.1%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 5: Route 12 & I-395 SB Ramps












HCM Unsignalized Intersection Capacity Analysis
8: Route 12 & Site Entrance

2022 Combined Traffic Volumes
AM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	289	49	27	541
Future Volume (Veh/h)	0	0	289	49	27	541
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	314	53	29	588
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			387			
pX, platoon unblocked	0.97	0.97			0.97	
vC, conflicting volume	692	340			367	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	665	301			328	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			98	
cM capacity (veh/h)	371	672			1187	
Direction, Lane #	NB 1	SB 1	SB 2			
Volume Total	367	225	392			
Volume Left	0	29	0			
Volume Right	53	0	0			
cSH	1700	1187	1700			
Volume to Capacity	0.22	0.02	0.23			
Queue Length 95th (ft)	0	2	0			
Control Delay (s)	0.0	1.2	0.0			
Lane LOS		A				
Approach Delay (s)	0.0	0.5				
Approach LOS						
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			38.3%		ICU Level of Service	A
Analysis Period (min)			15			












HCM Unsignalized Intersection Capacity Analysis
12: Route 12 & Site Exit

2022 Combined Traffic Volumes
AM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	46	25	289	0	0	495
Future Volume (Veh/h)	46	25	289	0	0	495
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	50	27	314	0	0	538
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (ft)			508			
pX, platoon unblocked						
vC, conflicting volume	852	314			314	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	852	314			314	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	85	96			100	
cM capacity (veh/h)	330	726			1246	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	77	314	538			
Volume Left	50	0	0			
Volume Right	27	0	0			
cSH	408	1700	1700			
Volume to Capacity	0.19	0.18	0.32			
Queue Length 95th (ft)	17	0	0			
Control Delay (s)	15.9	0.0	0.0			
Lane LOS	C					
Approach Delay (s)	15.9	0.0	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			36.8%		ICU Level of Service	A
Analysis Period (min)			15			







Lanes, Volumes, Timings
3: Route 12 & I-395 NB Off Ramp

2022 Combined Traffic Volumes
PM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	234	233	510	321	106	528
Future Volume (vph)	234	233	510	321	106	528
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	225	
Storage Lanes	1	0		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	0.933			0.850		
Flt Protected	0.976				0.950	
Satd. Flow (prot)	1696	0	3539	1583	1770	3539
Flt Permitted	0.976				0.373	
Satd. Flow (perm)	1696	0	3539	1583	695	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	81			349		
Link Speed (mph)	35		35			35
Link Distance (ft)	248		597			373
Travel Time (s)	4.8		11.6			7.3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	254	253	554	349	115	574
Shared Lane Traffic (%)						
Lane Group Flow (vph)	507	0	554	349	115	574
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Number of Detectors	1		2	1	1	2
Detector Template	Left		Thru	Right	Left	Thru
Leading Detector (ft)	20		100	20	20	100
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	20		6	20	20	6
Detector 1 Type	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)			94			94
Detector 2 Size(ft)			6			6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot		NA	custom	custom	NA
Protected Phases	5				1	
Permitted Phases			3	3	3	3

Lanes, Volumes, Timings
3: Route 12 & I-395 NB Off Ramp

2022 Combined Traffic Volumes
PM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	5		3	3	1	3
Switch Phase						
Minimum Initial (s)	7.0		19.5	19.5	4.5	19.5
Minimum Split (s)	20.0		25.6	25.6	9.0	25.6
Total Split (s)	30.0		27.0	27.0	13.0	27.0
Total Split (%)	42.9%		38.6%	38.6%	18.6%	38.6%
Maximum Green (s)	26.0		20.9	20.9	9.0	20.9
Yellow Time (s)	3.0		4.0	4.0	3.0	4.0
All-Red Time (s)	1.0		2.1	2.1	1.0	2.1
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0		6.1	6.1	4.0	6.1
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		Min	Min	None	Min
Walk Time (s)	7.0		7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0		0	0	0	0
Act Effct Green (s)	31.1		21.0	21.0	28.8	21.0
Actuated g/C Ratio	0.44		0.30	0.30	0.41	0.30
v/c Ratio	0.64		0.52	0.49	0.31	0.54
Control Delay	17.9		22.4	5.0	16.2	27.1
Queue Delay	0.0		0.2	0.0	0.0	0.0
Total Delay	17.9		22.5	5.0	16.2	27.1
LOS	B		C	A	B	C
Approach Delay	17.9		15.8			25.3
Approach LOS	B		B			C
90th %ile Green (s)	29.0		20.9	20.9	6.0	20.9
90th %ile Term Code	Coord		Max	Max	Gap	Max
70th %ile Green (s)	29.2		20.9	20.9	5.8	20.9
70th %ile Term Code	Coord		Max	Max	Gap	Max
50th %ile Green (s)	26.4		23.8	23.8	5.7	23.8
50th %ile Term Code	Coord		Gap	Gap	Gap	Gap
30th %ile Green (s)	30.5		19.8	19.8	5.6	19.8
30th %ile Term Code	Coord		Gap	Gap	Gap	Gap
10th %ile Green (s)	40.4		19.5	19.5	0.0	19.5
10th %ile Term Code	Coord		Min	Min	Skip	Min
Stops (vph)	313		404	38	54	472
Fuel Used(gal)	5		8	2	1	8
CO Emissions (g/hr)	342		528	140	73	551
NOx Emissions (g/hr)	66		103	27	14	107
VOC Emissions (g/hr)	79		122	32	17	128
Dilemma Vehicles (#)	0		31	0	0	11
Queue Length 50th (ft)	154		96	0	21	110
Queue Length 95th (ft)	248		149	54	50	168
Internal Link Dist (ft)	168		517			293
Turn Bay Length (ft)					225	
Base Capacity (vph)	798		1085	727	456	1085
Starvation Cap Reductn	0		0	0	0	0



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Spillback Cap Reductn	4		90	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.64		0.56	0.48	0.25	0.53

Intersection Summary



















Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 0 (0%), Referenced to phase 6:, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.64
 Intersection Signal Delay: 19.4
 Intersection LOS: B
 Intersection Capacity Utilization 61.1%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 3: Route 12 & I-395 NB Off Ramp















Lanes, Volumes, Timings
5: Route 12 & I-395 SB Ramps

2022 Combined Traffic Volumes
PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	276	0	0	92	155	588	0	0	358	121
Future Volume (vph)	0	0	276	0	0	92	155	588	0	0	358	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr't			0.865			0.865						0.850
Flt Protected							0.950					
Satd. Flow (prot)	0	0	1611	0	0	1611	1770	1863	0	0	1863	1583
Flt Permitted							0.503					
Satd. Flow (perm)	0	0	1611	0	0	1611	937	1863	0	0	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			181			641						132
Link Speed (mph)		30			30			30				30
Link Distance (ft)		228			226			373				241
Travel Time (s)		5.2			5.1			8.5				5.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	300	0	0	100	168	639	0	0	389	132
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	300	0	0	100	168	639	0	0	389	132
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors			1			1	1	2			2	1
Detector Template			Right			Right	Left	Thru			Thru	Right
Leading Detector (ft)			20			20	20	100			100	20
Trailing Detector (ft)			0			0	0	0			0	0
Detector 1 Position(ft)			0			0	0	0			0	0
Detector 1 Size(ft)			20			20	20	6			6	20
Detector 1 Type			Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)			0.0			0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)			0.0			0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)			0.0			0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type			custom			Prot	custom	NA			NA	custom
Protected Phases			4			4	1					
Permitted Phases			14				2	2			2	2
Detector Phase			4			4	1	2			2	2
Switch Phase												
Minimum Initial (s)			5.5			5.5	5.0	13.5			13.5	13.5

Lanes, Volumes, Timings
5: Route 12 & I-395 SB Ramps

2022 Combined Traffic Volumes
PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)			10.0			10.0	28.0	19.6			19.6	19.6
Total Split (s)			14.0			14.0	30.0	26.0			26.0	26.0
Total Split (%)			20.0%			20.0%	42.9%	37.1%			37.1%	37.1%
Maximum Green (s)			9.7			9.7	26.0	19.9			19.9	19.9
Yellow Time (s)			3.3			3.3	3.0	4.0			4.0	4.0
All-Red Time (s)			1.0			1.0	1.0	2.1			2.1	2.1
Lost Time Adjust (s)			0.0			0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)			4.3			4.3	4.0	6.1			6.1	6.1
Lead/Lag							Lead	Lag			Lag	Lag
Lead-Lag Optimize?							Yes	Yes			Yes	Yes
Vehicle Extension (s)			3.0			3.0	3.0	3.0			3.0	3.0
Recall Mode			None			None	None	C-Max			C-Max	C-Max
Walk Time (s)			7.0			7.0	7.0	7.0			7.0	7.0
Flash Dont Walk (s)			11.0			11.0	11.0	11.0			11.0	11.0
Pedestrian Calls (#/hr)			0			0	0	0			0	0
Act Effct Green (s)			19.7			8.4	49.3	39.9			39.9	39.9
Actuated g/C Ratio			0.28			0.12	0.70	0.57			0.57	0.57
v/c Ratio			0.51			0.13	0.23	0.60			0.37	0.14
Control Delay			11.4			0.4	3.1	18.0			10.1	2.1
Queue Delay			0.0			0.0	0.0	4.6			0.0	0.0
Total Delay			11.4			0.4	3.1	22.6			10.1	2.1
LOS			B			A	A	C			B	A
Approach Delay		11.4			0.4			18.6			8.1	
Approach LOS		B			A			B			A	
90th %ile Green (s)			9.7			9.7	8.9	37.0			37.0	37.0
90th %ile Term Code			Max			Max	Gap	Coord			Coord	Coord
70th %ile Green (s)			9.7			9.7	8.0	37.9			37.9	37.9
70th %ile Term Code			Max			Max	Gap	Coord			Coord	Coord
50th %ile Green (s)			9.7			9.7	7.3	38.6			38.6	38.6
50th %ile Term Code			Max			Max	Gap	Coord			Coord	Coord
30th %ile Green (s)			7.5			7.5	6.6	41.5			41.5	41.5
30th %ile Term Code			Gap			Gap	Gap	Coord			Coord	Coord
10th %ile Green (s)			5.5			5.5	5.8	44.3			44.3	44.3
10th %ile Term Code			Min			Min	Gap	Coord			Coord	Coord
Stops (vph)			95			0	42	494			189	13
Fuel Used(gal)			2			0	1	7			2	0
CO Emissions (g/hr)			116			12	55	461			171	25
NOx Emissions (g/hr)			23			2	11	90			33	5
VOC Emissions (g/hr)			27			3	13	107			40	6
Dilemma Vehicles (#)			0			0	0	0			0	0
Queue Length 50th (ft)			38			0	7	256			87	0
Queue Length 95th (ft)			99			0	m20	364			150	22
Internal Link Dist (ft)		148			146			293			161	
Turn Bay Length (ft)												
Base Capacity (vph)			575			775	1022	1060			1060	958
Starvation Cap Reductn			0			0	0	340			0	0
Spillback Cap Reductn			0			0	0	0			0	0
Storage Cap Reductn			0			0	0	0			0	0
Reduced v/c Ratio			0.52			0.13	0.16	0.89			0.37	0.14

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 19.9 (28%), Referenced to phase 2:NBSB and 6:, Start of Yellow

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.60

Intersection Signal Delay: 13.1

Intersection LOS: B

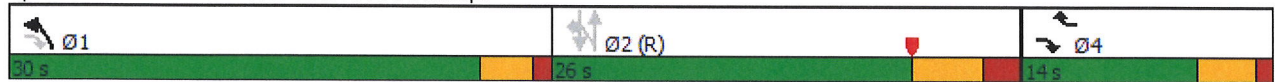
Intersection Capacity Utilization 45.3%

ICU Level of Service A

Analysis Period (min) 15










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

Splits and Phases: 5: Route 12 & I-395 SB Ramps












HCM Unsignalized Intersection Capacity Analysis
10: Route 12 & Gas Station Entrance

2022 Combined Traffic Volumes
PM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						 
Traffic Volume (veh/h)	0	0	621	59	7	479
Future Volume (Veh/h)	0	0	621	59	7	479
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	675	64	8	521
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			241			
pX, platoon unblocked	0.76	0.76			0.76	
vC, conflicting volume	984	707			739	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	823	461			503	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			99	
cM capacity (veh/h)	235	418			807	
Direction, Lane #	NB 1	SB 1	SB 2			
Volume Total	739	182	347			
Volume Left	0	8	0			
Volume Right	64	0	0			
cSH	1700	807	1700			
Volume to Capacity	0.43	0.01	0.20			
Queue Length 95th (ft)	0	1	0			
Control Delay (s)	0.0	0.5	0.0			
Lane LOS		A				
Approach Delay (s)	0.0	0.2				
Approach LOS						
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			39.6%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
8: Route 12 & Site Entrance

2022 Combined Traffic Volumes
PM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						 
Traffic Volume (veh/h)	0	0	587	34	41	486
Future Volume (Veh/h)	0	0	587	34	41	486
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	638	37	45	528
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (ft)			387			
pX, platoon unblocked	0.77	0.77			0.77	
vC, conflicting volume	1010	656			675	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	866	407			431	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			95	
cM capacity (veh/h)	214	458			868	
Direction, Lane #	NB 1	SB 1	SB 2			
Volume Total	675	221	352			
Volume Left	0	45	0			
Volume Right	37	0	0			
cSH	1700	868	1700			
Volume to Capacity	0.40	0.05	0.21			
Queue Length 95th (ft)	0	4	0			
Control Delay (s)	0.0	2.3	0.0			
Lane LOS		A				
Approach Delay (s)	0.0	0.9				
Approach LOS						
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			48.2%	ICU Level of Service		A
Analysis Period (min)			15			












HCM Unsignalized Intersection Capacity Analysis
12: Route 12 & Site Exit

2022 Combined Traffic Volumes
PM

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	33	40	587	0	0	453
Future Volume (Veh/h)	33	40	587	0	0	453
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	36	43	638	0	0	492
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage veh)						
Upstream signal (ft)			508			
pX, platoon unblocked	0.78	0.78			0.78	
vC, conflicting volume	1130	638			638	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1027	399			399	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	82	92			100	
cM capacity (veh/h)	203	509			908	
Direction, Lane #						
	WB 1	NB 1	SB 1			
Volume Total	79	638	492			
Volume Left	36	0	0			
Volume Right	43	0	0			
cSH	302	1700	1700			
Volume to Capacity	0.26	0.38	0.29			
Queue Length 95th (ft)	26	0	0			
Control Delay (s)	21.1	0.0	0.0			
Lane LOS	C					
Approach Delay (s)	21.1	0.0	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization		41.8%		ICU Level of Service		A
Analysis Period (min)			15			







Lanes, Volumes, Timings
3: Route 12 & I-395 NB Off Ramp

2022 Combined Traffic Volumes
SAT

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	315	115	633	384	122	769
Future Volume (vph)	315	115	633	384	122	769
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	225	
Storage Lanes	1	0		1	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	0.964			0.850		
Flt Protected	0.965				0.950	
Satd. Flow (prot)	1733	0	3539	1583	1770	3539
Flt Permitted	0.965				0.297	
Satd. Flow (perm)	1733	0	3539	1583	553	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	30			417		
Link Speed (mph)	35		35			35
Link Distance (ft)	248		597			373
Travel Time (s)	4.8		11.6			7.3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	342	125	688	417	133	836
Shared Lane Traffic (%)						
Lane Group Flow (vph)	467	0	688	417	133	836
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Number of Detectors	1		2	1	1	2
Detector Template	Left		Thru	Right	Left	Thru
Leading Detector (ft)	20		100	20	20	100
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	20		6	20	20	6
Detector 1 Type	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)			94			94
Detector 2 Size(ft)			6			6
Detector 2 Type			CI+Ex			CI+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot		NA	custom	custom	NA
Protected Phases	5				1	
Permitted Phases			3	3	3	3

Lanes, Volumes, Timings
3: Route 12 & I-395 NB Off Ramp

2022 Combined Traffic Volumes
SAT

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	5		3	3	1	3
Switch Phase						
Minimum Initial (s)	7.0		19.5	19.5	4.5	19.5
Minimum Split (s)	20.0		25.6	25.6	9.0	25.6
Total Split (s)	30.0		27.0	27.0	13.0	27.0
Total Split (%)	42.9%		38.6%	38.6%	18.6%	38.6%
Maximum Green (s)	26.0		20.9	20.9	9.0	20.9
Yellow Time (s)	3.0		4.0	4.0	3.0	4.0
All-Red Time (s)	1.0		2.1	2.1	1.0	2.1
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0		6.1	6.1	4.0	6.1
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		Min	Min	None	Min
Walk Time (s)	7.0		7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0		0	0	0	0
Act Effct Green (s)	28.2		23.5	23.5	31.7	23.5
Actuated g/C Ratio	0.40		0.34	0.34	0.45	0.34
v/c Ratio	0.65		0.58	0.52	0.37	0.70
Control Delay	22.0		21.9	4.8	17.5	24.8
Queue Delay	0.0		0.2	0.0	0.0	0.2
Total Delay	22.0		22.0	4.8	17.5	25.0
LOS	C		C	A	B	C
Approach Delay	22.0		15.5			24.0
Approach LOS	C		B			C
90th %ile Green (s)	27.1		20.9	20.9	7.9	20.9
90th %ile Term Code	Coord		Max	Max	Gap	Max
70th %ile Green (s)	27.7		22.3	22.3	5.9	22.3
70th %ile Term Code	Coord		Max	Max	Gap	Max
50th %ile Green (s)	25.2		24.9	24.9	5.8	24.9
50th %ile Term Code	Coord		Max	Max	Gap	Max
30th %ile Green (s)	22.4		27.8	27.8	5.7	27.8
30th %ile Term Code	Coord		Max	Max	Gap	Max
10th %ile Green (s)	38.4		21.5	21.5	0.0	21.5
10th %ile Term Code	Coord		Gap	Gap	Skip	Gap
Stops (vph)	328		501	43	64	632
Fuel Used(gal)	5		9	2	1	11
CO Emissions (g/hr)	361		651	165	87	748
NOx Emissions (g/hr)	70		127	32	17	146
VOC Emissions (g/hr)	84		151	38	20	173
Dilemma Vehicles (#)	0		43	0	0	21
Queue Length 50th (ft)	160		122	0	26	147
Queue Length 95th (ft)	252		189	59	m55	#233
Internal Link Dist (ft)	168		517			293
Turn Bay Length (ft)					225	
Base Capacity (vph)	736		1186	808	429	1186
Starvation Cap Reductn	0		0	0	0	51

Lanes, Volumes, Timings
 3: Route 12 & I-395 NB Off Ramp

2022 Combined Traffic Volumes
 SAT

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Spillback Cap Reductn	3		74	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.64		0.62	0.52	0.31	0.74

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 0 (0%), Referenced to phase 6:, Start of Yellow
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 19.9 Intersection LOS: B
 Intersection Capacity Utilization 60.5% ICU Level of Service B
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Route 12 & I-395 NB Off Ramp















Lanes, Volumes, Timings
5: Route 12 & I-395 SB Ramps

2022 Combined Traffic Volumes
SAT

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	374	0	0	8	177	571	0	0	517	180
Future Volume (vph)	0	0	374	0	0	8	177	571	0	0	517	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.865			0.865						0.850
Flt Protected							0.950					
Satd. Flow (prot)	0	0	1611	0	0	1611	1770	1863	0	0	1863	1583
Flt Permitted							0.344					
Satd. Flow (perm)	0	0	1611	0	0	1611	641	1863	0	0	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			78			643						196
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		228			226			373			241	
Travel Time (s)		5.2			5.1			8.5			5.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	407	0	0	9	192	621	0	0	562	196
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	407	0	0	9	192	621	0	0	562	196
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors			1			1	1	2			2	1
Detector Template			Right			Right	Left	Thru			Thru	Right
Leading Detector (ft)			20			20	20	100			100	20
Trailing Detector (ft)			0			0	0	0			0	0
Detector 1 Position(ft)			0			0	0	0			0	0
Detector 1 Size(ft)			20			20	20	6			6	20
Detector 1 Type			Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)			0.0			0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)			0.0			0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)			0.0			0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)								94			94	
Detector 2 Size(ft)								6			6	
Detector 2 Type								Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)								0.0			0.0	
Turn Type			custom			Prot	custom	NA			NA	custom
Protected Phases			4			4	1					
Permitted Phases			14				2	2			2	2
Detector Phase			4			4	1	2			2	2
Switch Phase												
Minimum Initial (s)			5.5			5.5	5.0	13.5			13.5	13.5

Lanes, Volumes, Timings
5: Route 12 & I-395 SB Ramps

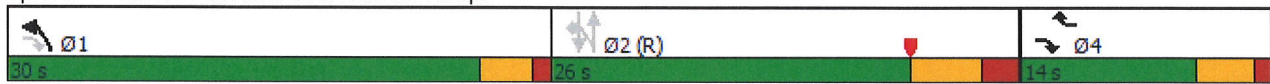
2022 Combined Traffic Volumes
SAT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)			10.0			10.0	28.0	19.6			19.6	19.6
Total Split (s)			14.0			14.0	30.0	26.0			26.0	26.0
Total Split (%)			20.0%			20.0%	42.9%	37.1%			37.1%	37.1%
Maximum Green (s)			9.7			9.7	26.0	19.9			19.9	19.9
Yellow Time (s)			3.3			3.3	3.0	4.0			4.0	4.0
All-Red Time (s)			1.0			1.0	1.0	2.1			2.1	2.1
Lost Time Adjust (s)			0.0			0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)			4.3			4.3	4.0	6.1			6.1	6.1
Lead/Lag							Lead	Lag			Lag	Lag
Lead-Lag Optimize?							Yes	Yes			Yes	Yes
Vehicle Extension (s)			3.0			3.0	3.0	3.0			3.0	3.0
Recall Mode			None			None	None	C-Max			C-Max	C-Max
Walk Time (s)			7.0			7.0	7.0	7.0			7.0	7.0
Flash Dont Walk (s)			11.0			11.0	11.0	11.0			11.0	11.0
Pedestrian Calls (#/hr)			0			0	0	0			0	0
Act Effct Green (s)			22.7			9.7	48.0	36.9			36.9	36.9
Actuated g/C Ratio			0.32			0.14	0.69	0.53			0.53	0.53
v/c Ratio			0.71			0.01	0.33	0.63			0.57	0.21
Control Delay			23.7			0.0	3.8	21.2			14.9	2.5
Queue Delay			0.0			0.0	0.0	12.4			0.0	0.0
Total Delay			23.7			0.0	3.8	33.6			14.9	2.5
LOS			C			A	A	C			B	A
Approach Delay		23.7						26.6			11.7	
Approach LOS		C						C			B	
90th %ile Green (s)			9.7			9.7	13.5	32.4			32.4	32.4
90th %ile Term Code			Max			Max	Gap	Coord			Coord	Coord
70th %ile Green (s)			9.7			9.7	10.3	35.6			35.6	35.6
70th %ile Term Code			Max			Max	Gap	Coord			Coord	Coord
50th %ile Green (s)			9.7			9.7	8.1	37.8			37.8	37.8
50th %ile Term Code			Max			Max	Gap	Coord			Coord	Coord
30th %ile Green (s)			9.7			9.7	7.0	38.9			38.9	38.9
30th %ile Term Code			Max			Max	Gap	Coord			Coord	Coord
10th %ile Green (s)			9.7			9.7	6.1	39.8			39.8	39.8
10th %ile Term Code			Max			Max	Gap	Coord			Coord	Coord
Stops (vph)			259			0	49	533			345	18
Fuel Used(gal)			4			0	1	7			4	1
CO Emissions (g/hr)			272			1	64	494			311	37
NOx Emissions (g/hr)			53			0	13	96			60	7
VOC Emissions (g/hr)			63			0	15	114			72	9
Dilemma Vehicles (#)			0			0	0	0			0	0
Queue Length 50th (ft)			125			0	4	276			147	0
Queue Length 95th (ft)			196			0	m12	381			280	31
Internal Link Dist (ft)		148			146			293			161	
Turn Bay Length (ft)												
Base Capacity (vph)			575			777	895	982			982	926
Starvation Cap Reductn			0			0	0	341			0	0
Spillback Cap Reductn			0			0	0	0			0	0
Storage Cap Reductn			0			0	0	0			0	0
Reduced v/c Ratio			0.71			0.01	0.21	0.97			0.57	0.21

Intersection Summary










Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 19.9 (28%), Referenced to phase 2:NBSB and 6:, Start of Yellow
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.71
 Intersection Signal Delay: 20.2
 Intersection LOS: C
 Intersection Capacity Utilization 59.0%
 ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Route 12 & I-395 SB Ramps












HCM Unsignalized Intersection Capacity Analysis
10: Route 12 & Gas Station Entrance

2022 Combined Traffic Volumes
SAT

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						 
Traffic Volume (veh/h)	0	0	500	79	25	697
Future Volume (Veh/h)	0	0	500	79	25	697
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	543	86	27	758
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			241			
pX, platoon unblocked	0.75	0.75			0.75	
vC, conflicting volume	1019	586			629	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	861	285			343	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			97	
cM capacity (veh/h)	215	535			913	
Direction, Lane #	NB 1	SB 1	SB 2			
Volume Total	629	280	505			
Volume Left	0	27	0			
Volume Right	86	0	0			
cSH	1700	913	1700			
Volume to Capacity	0.37	0.03	0.30			
Queue Length 95th (ft)	0	2	0			
Control Delay (s)	0.0	1.2	0.0			
Lane LOS		A				
Approach Delay (s)	0.0	0.4				
Approach LOS						
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			40.8%	ICU Level of Service		A
Analysis Period (min)			15			










HCM Unsignalized Intersection Capacity Analysis
8: Route 12 & Site Entrance

2022 Combined Traffic Volumes
SAT

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						 
Traffic Volume (veh/h)	0	0	458	42	39	722
Future Volume (Veh/h)	0	0	458	42	39	722
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	498	46	42	785
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (ft)			387			
pX, platoon unblocked	0.77	0.77			0.77	
vC, conflicting volume	998	521			544	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	847	227			257	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			96	
cM capacity (veh/h)	222	597			1004	
Direction, Lane #						
	NB 1	SB 1	SB 2			
Volume Total	544	304	523			
Volume Left	0	42	0			
Volume Right	46	0	0			
cSH	1700	1004	1700			
Volume to Capacity	0.32	0.04	0.31			
Queue Length 95th (ft)	0	3	0			
Control Delay (s)	0.0	1.6	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.6				
Approach LOS						
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			52.3%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
12: Route 12 & Site Exit

2022 Combined Traffic Volumes
SAT

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	40	37	458	0	0	682
Future Volume (Veh/h)	40	37	458	0	0	682
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	40	498	0	0	741
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			508			
pX, platoon unblocked	0.79	0.79			0.79	
vC, conflicting volume	1239	498			498	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1170	233			233	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	74	94			100	
cM capacity (veh/h)	169	637			1055	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	83	498	741			
Volume Left	43	0	0			
Volume Right	40	0	0			
cSH	261	1700	1700			
Volume to Capacity	0.32	0.29	0.44			
Queue Length 95th (ft)	33	0	0			
Control Delay (s)	25.1	0.0	0.0			
Lane LOS	D					
Approach Delay (s)	25.1	0.0	0.0			
Approach LOS	D					
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization			47.0%	ICU Level of Service		A
Analysis Period (min)			15			

UConn CRASH HISTORY

https://ctrash.uconn.edu/QueryTool2.action?qid=93110

Route 12 (River Road)

CrashID	Date Of Crash	Week	Time of Cras	Crash Severity	# of Veh.	Milemarker	Roadway	Intersecting Roadway	Dist.	Unit	Dir.	Manner of Crash	Weather	Lighting	Road Surface
371355	2/21/2017	Tuesday	6:49:00	PDO	2	19.57	River Rd	ACC TO NB I-395(029)	100	Feet	N	Front to rear	Clear	Daylight	Dry
382799	4/5/2017	Wednesday	18:15:00	PDO	2	19.55	Rt 12	ACC TO NB I-395(029)			N	Angle	Clear	Daylight	Dry
382550	5/10/2017	Wednesday	20:07:00	PDO	2	19.7	RIVER RD	ACC TO NB I-395(029)	2	Tenths of Mile	N	Angle	Clear	Dark-Lighte	Dry
398576	6/3/2017	Saturday	16:00:00	PDO	2	19.88	River Rd	DONALD'S RESTAURANT(307	Feet	N	Angle	Clear	Daylight	Dry
401468	6/6/2017	Tuesday	16:38:00	PDO	2	19.59	RTE 12	ACC TO NB I-395(029)	200	Feet	N	Front to rear	Rain	Daylight	Wet
401578	6/14/2017	Wednesday	18:58:00	PDO	2	19.69	Route 12	ACC TO SB I-395(025)			N	Angle	Clear	Daylight	Dry
461340	11/13/2017	Monday	12:12:00	PDO	2	19.72	River Rd (RT 12)	DR TO MOBIL GAS STA			N	Angle	ain or Freez	Daylight	Wet
463854	12/5/2017	Tuesday	17:46:00	PDO	2	19.55	RT. 12	ACC TO NB I-395(025)			N	Other	Rain	Dark-Lighte	Wet
467551	12/11/2017	Monday	11:31:00	Susp Injury	2	19.8	Rt 12 E/B	ACC TO SB I-395(025)	85	Feet	N	Front to rear	Clear	Daylight	Dry
474940	12/16/2017	Saturday	10:05:00	PDO	2	19.71	River Rd	EXIT FR SB I-395(028)	700	Feet	N	Angle	Clear	Daylight	Dry
490674	2/5/2018	Monday	7:10:00	PDO	2	19.71	River Rd	EXIT FR SHELL GAS STA	50	Feet	S	Front to rear	Clear	Daylight	Wet
499692	3/14/2018	Wednesday	16:05:00	PDO	2	19.57	12-N	395 on ramp	50	Feet	N	Angle	Clear	Daylight	Wet
555157	9/22/2018	Saturday	19:17:00	Poss Injury	2	19.76	12-N	I-395 North Ramps	200	Feet	N	Angle	Clear	Daylight	Dry
563861	10/21/2018	Sunday	17:23:00	PDO	2	19.66	12-N	Lee Road	3	Tenths of Mile	S	Front to rear	Cloudy	Dark-Lighte	Dry
580437	11/19/2018	Monday	17:31:00	Susp Injury	2	19.87	12-N	I395	50	Feet	S	SSSD	Clear	Daylight	Dry
613636	2/23/2019	Saturday	14:16:00	PDO	2	19.67	12-N	lee rd	2	Tenths of Mile	S	Front to rear	Clear	Dark-Not Lighi	Dry
622185	3/25/2019	Monday	10:32:00	PDO	2	19.7	12-N	21A Off Ramp	15	Feet	N	Front to rear	Clear	Daylight	Dry
641479	5/31/2019	Friday	17:35:00	PDO	2	19.75	12-N	Exit 21 I-395S	300	Feet	N	Front to rear	Clear	Daylight	Dry
655002	6/25/2019	Tuesday	14:28:00	PDO	2	19.67	12-N	Exit 21 on ramp			N	Angle	Clear	Daylight	Dry
656221	6/28/2019	Friday	15:51:00	PDO	2	19.57	12-N	I395 S/B off Ramp	73	Feet	N	Other	Rain	Daylight	Wet
656230	6/28/2019	Friday	15:51:00	PDO	2	19.56	12-N	EXIT 21			N	Front to rear	Clear	Daylight	Dry
684503	9/8/2019	Sunday	12:06:00	Susp Injury	2	19.89	12-N	Lee road	1	Feet	S	Angle	Clear	Daylight	Dry
700769	10/17/2019	Thursday	15:38:00	PDO	2	19.88	12-N	I-395 South Ramps	2	Tenths of Mile	N	Front to rear	Rain	Other	Wet
704317	10/27/2019	Sunday	17:17:00	PDO	2	19.72	12-N	I-395 Ramps	100	Feet	N	Front to rear	Rain	Other	Wet
715187	11/23/2019	Saturday	10:33:00	PDO	2	19.74	12-N	Lee Rd	1717	Feet	S	Angle	Clear	Daylight	Dry
726140	12/7/2019	Saturday	14:47:00	PDO	2	19.82	12-N	395 S Exit 21A	780	Feet	N	SSOD	Clear	Daylight	Dry