Traffic Impact Study

126 Main Street

Monroe, Connecticut

Prepared for:

Haque LLC

Prepared by:

KWH Enterprise, LLC

June 2025 Updated

Traffic Impact Study
126 Main Street
Monroe, Connecticut

This study examines the traffic impact of a proposed gas station and convenience store development in Monroe, Connecticut. Levels of Service (LOS) for traffic flows under 2022 existing and 2027 no-build and build traffic conditions were analyzed to identify any deficiencies in existing and future traffic operations at area intersections. For the purpose of this traffic study, 2027 was assumed to be the year during which the construction is completed and the facility is in operation.

I. Summary

- Peak-hour traffic counts were collected at the intersection of Main Street (Route 25), Judd Road, and Purdy Hill Road in January 2022. The counts were seasonally adjusted to reflect traffic conditions during the peak summer month of the year. These 2022 existing traffic volumes and projected 2027 volumes were used in the traffic analyses of the study.

- The traffic impact of the development will be limited. Traffic will operate at acceptable LOS D or better at the two site driveways during peak hours. 62 percent of the site trips will likely be pass-by trips made by drivers already using the adjacent roadway who will make a stop at the site.

- At the nearby signalized intersection of Route 25, Judd Road, and Purdy Hill Road, during the weekday morning and afternoon peak hours, relatively heavy through traffic volumes on Route 25 are resulting in delays and LOS E or F for the two Route 25 approaches and for the left-turn approach of Purdy Hill Road. These are existing traffic conditions not associated with the future traffic for the proposed gas station and convenience store development. The intersection is operating at acceptable LOS outside these two weekday peak hours.

II. Project Description

The development site is located on the east side of Main Street (Route 25) in Monroe, Connecticut. North of the site, there is a signalized intersection of Route 25, Judd Road, and Purdy Hill Road. Figure 1 shows the site location in relation to area roadways.

Along Route 25 and between the signalized intersection and the site are a gas station, a coffee shop, a pizza shop, and a fast-food restaurant. Compared with these commercial developments, the site's location away from the traffic signal will ensure that its driveway traffic will have minimal impact on the traffic operation of the intersection.

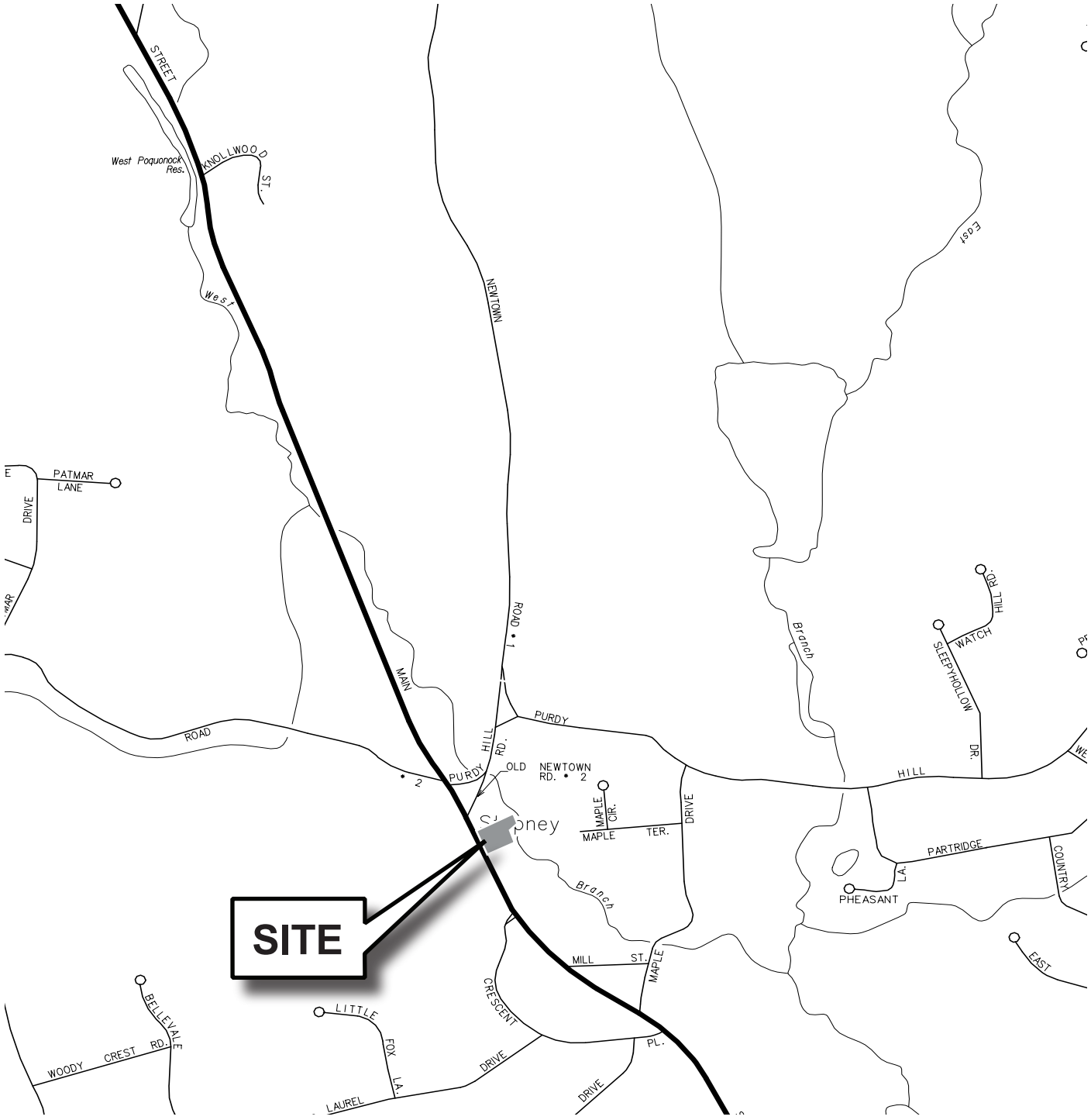


Figure 1 Project Location

III. Existing Traffic Conditions

To evaluate the quality of traffic operation in the vicinity of the redevelopment, the following signalized and unsignalized intersections were analyzed for the study:

- Main Street (Route 25), Judd Road, and Purdy Hill Road; and
- Main Street and the two future site driveway intersections.

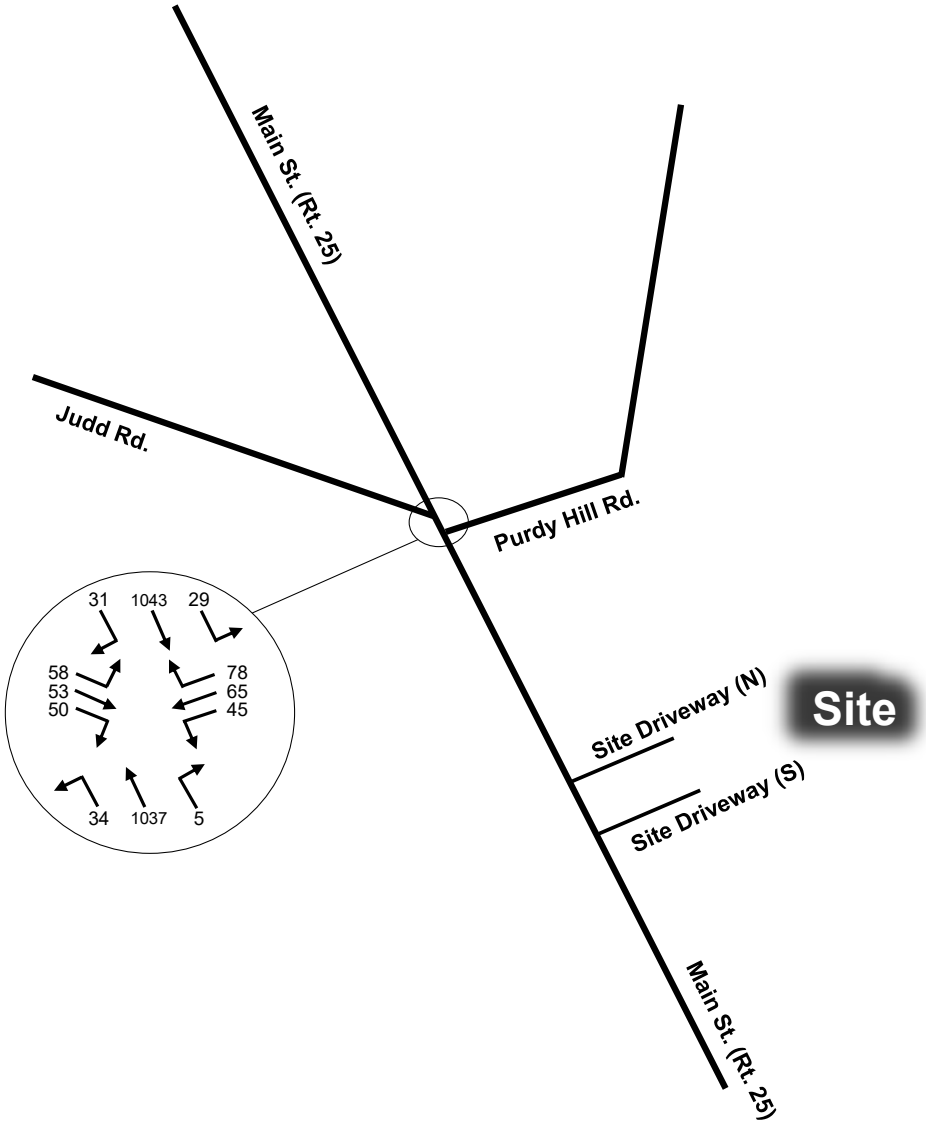
Peak-hour traffic volumes were collected during weekday morning, weekday afternoon, and Saturday midday peak hours in January 2022. CTDOT seasonal adjustment factors of 1.132 for weekdays and 1.168 for Saturdays (see the Appendices) were used to convert the counts to peak summer month traffic volumes. The 2022 volumes based on the field counts and the seasonal adjustments are shown in Figures 2, 3, and 4.

Capacity Analysis

To assess the quality of traffic flow, intersection capacity analysis was conducted for the existing, future no-build and future build traffic conditions. Capacity analysis provides an indication of how well roadway facilities serve the traffic demands placed upon them. *Synchro ver. 10 and 12*, a software package that includes the evaluation criteria of the *Highway Capacity Manual*, was used to analyze the intersections.

Level of service (LOS) is the term used to describe the different operating conditions that occur on a given roadway segment or intersection under various traffic conditions. It is a qualitative measure of the effects of a number of factors including roadway geometry, speed, travel delay, freedom to maneuver, and safety. Six levels of service can be defined for each type of facility. Each level of service (LOS) is given a letter designation from A to F, with LOS A representing the best operating conditions and LOS F representing the worst.

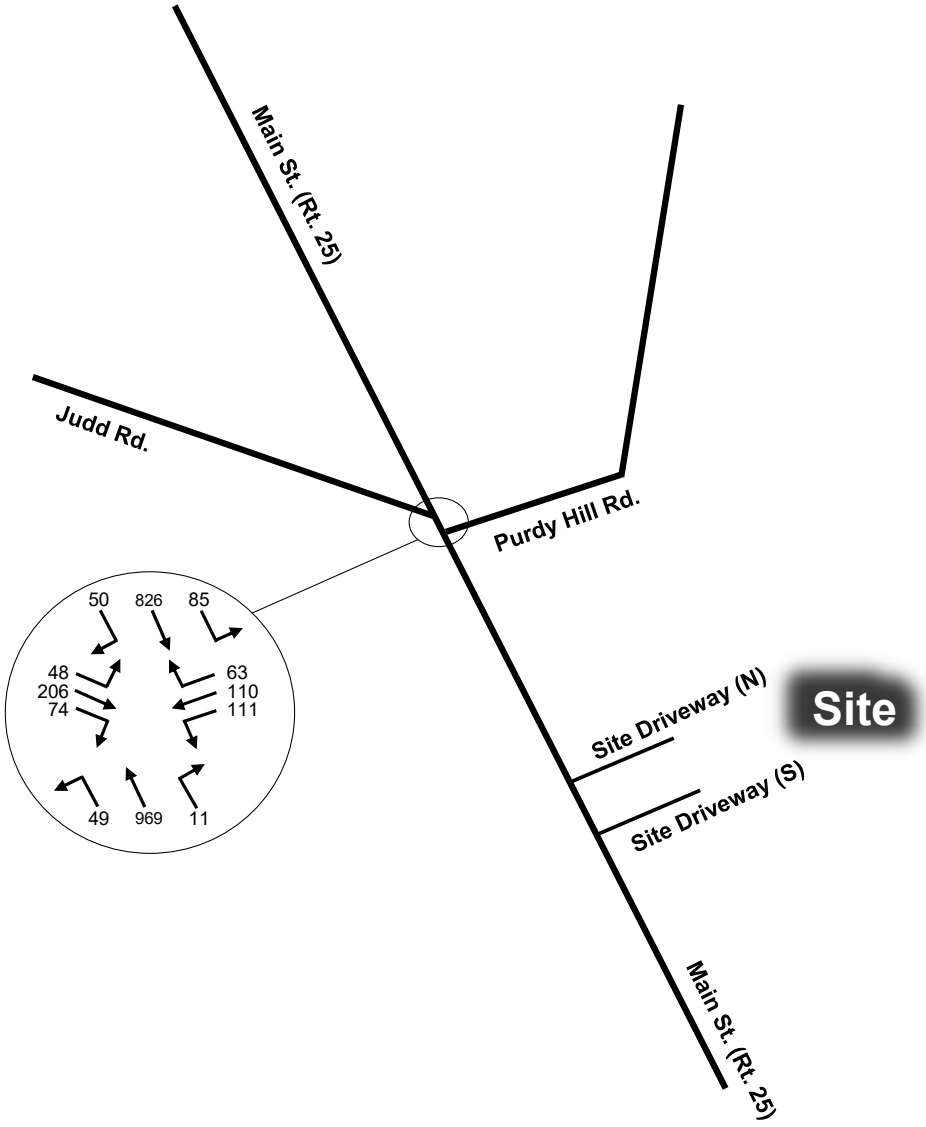
LOS at intersection is measured in terms of average control delay. For signalized intersections and all-way stop-controlled intersections, the analysis considers the operation of all traffic entering the intersection, and an overall condition is reported in addition to individual movements. For two-way stop-controlled (TWSC) intersections where side street traffic has to stop for main street traffic, the analysis assumes that through traffic on the main street is not affected by traffic on side streets. Thus, LOS is calculated for the main street left-turn and side street approaches, and no overall intersection LOS is defined for TWSC intersections. Table 1 presents the LOS criteria for signalized and unsignalized intersections as defined in the HCM 2000.



N

Seasonal adjustment factor of 1.132 (1.03/0.91) was used

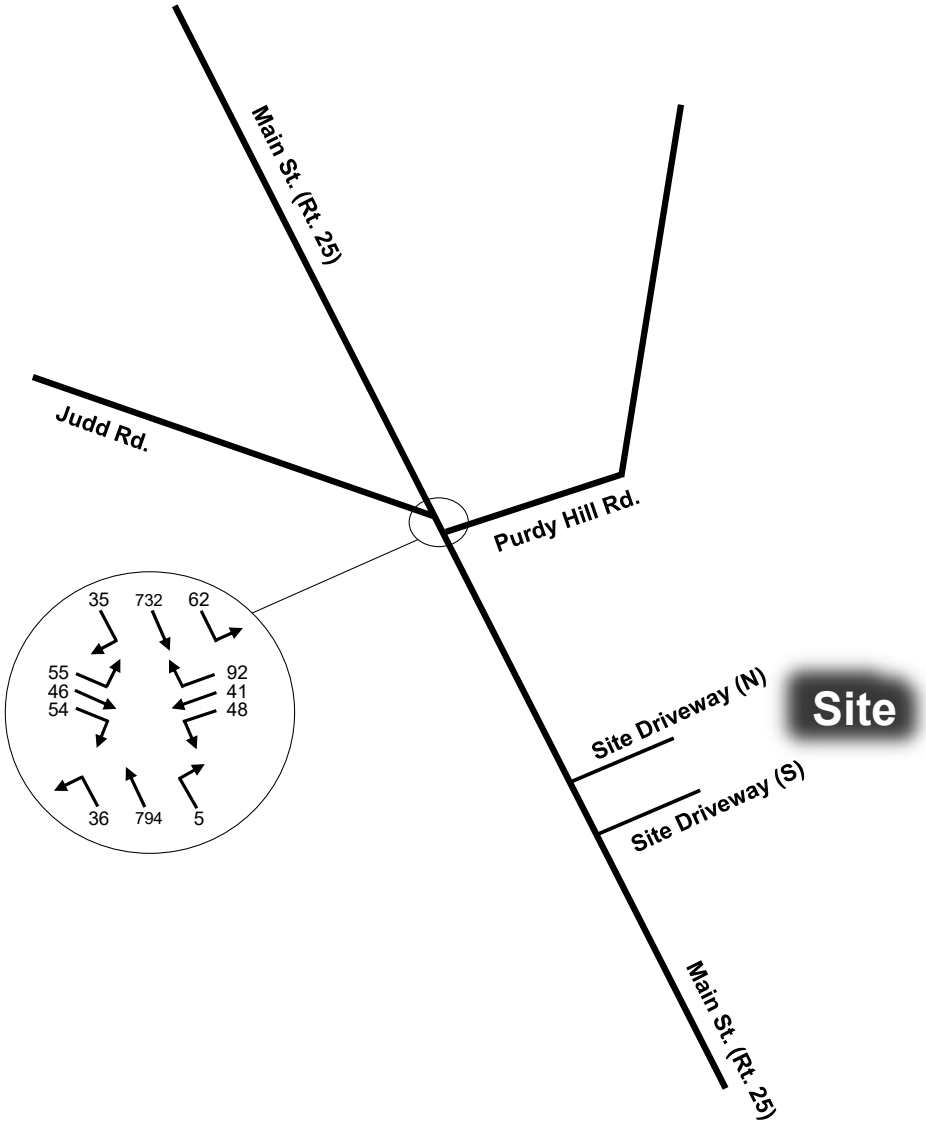
Figure 2 Year 2022 Existing Traffic Volumes
Weekday Morning Peak Hour of Adjacent Streets



N

Seasonal adjustment factor of 1.132 (1.03/0.91) was used

Figure 3 Year 2022 Existing Traffic Volumes
Weekday Afternoon Peak Hour of Adjacent Streets



N

Seasonal adjustment factor of 1.168 (1.18/1.01) was used

Figure 4 Year 2022 Existing Traffic Volumes
Saturday Midday Peak Hour of Adjacent Streets

Table 1 LOS Criteria for Signalized and Unsignalized Intersections

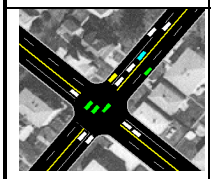
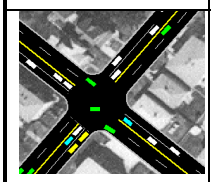
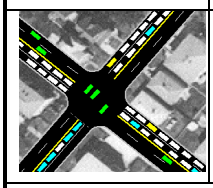
	Level-of-Service (LOS)	Signalized Delay Range (Average Control Delay, in sec/veh)	Unsignalized Delay Range (Average Control Delay in sec/veh)
	**A**	≤ 10	≤ 10
	**B**	> 10 and ≤ 20	> 10 and ≤ 15
	**C**	> 20 and ≤ 35	> 15 and ≤ 25
	**D**	> 35 and ≤ 55	> 25 and ≤ 35
	**E**	> 55 and ≤ 80	> 35 and ≤ 50
	**F**	> 80	> 50
Source: 2000 Highway Capacity Manual (Exhibits 16-2 and 17-2)			

Table 2 that follows shows the capacity analysis results for the analyzed intersection under the 2022 existing traffic conditions. During the weekday morning and afternoon peak hours, relatively heavy through traffic on Route 25 are resulting in delays and LOS E or F for the two Route 25 approaches and for the left-turn approach of Purdy Hill Road. These are existing traffic conditions not associated with the future traffic for the proposed gas station and convenience store development. During the Saturday midday peak hour, and most likely during all other off-peak hours, all traffic approaches of the signalized intersection of Route 25 and Judd Road are operating at acceptable LOS D or better.

Table 2 Capacity Analyses for Existing Conditions

Intersection	2022 Existing Traffic Conditions		
	Weekday Morning Peak Hour of Adjacent Streets	Weekday Afternoon Peak Hour of Adjacent Streets	Saturday Midday Peak Hour of Adjacent Streets
	LOS	LOS	LOS
Rt. 25 (Main St.), Judd Rd., and Purdy Hill Rd. (Signalized)			
EB Left Turn	D	D	C
EB Through and Right Turn	D	D	C
WB Left Turn	D	F	C
WB Through and Right Turn	D	D	C
NB Left Turn	D	E	D
NB Through and Right Turn	E	E	B
SB Left Turn	D	E	D
SB Through and Right Turn	F	D	B
Intersection	E	E	C

EB Eastbound
WB Westbound
NB Northbound
SB Southbound
LOS Level of Service

IV. Future Traffic Conditions

For the purpose of this traffic impact study, it was assumed that the gas station and convenience store will be built and be in operation in 2027.

As a comparison for demonstrating the traffic impact of the project, a 2027 no-build scenario is included in the study. Figures 5, 6, and 7 show the 2027 no-build traffic volumes, which were generated by using an annual background traffic growth rate of 0.5 percent, or 2.5 percent over five years, between 2022 and 2027. The 0.5 percent annual traffic growth rate for Monroe was recommended by CTDOT.

Table 3 details the capacity analysis results for the 2027 no-build traffic conditions. Under the 2014 no-build conditions, traffic will operate at similar LOS as those under the existing conditions. During the weekday morning and afternoon peak hours, Route 25 traffic and left-turn traffic from Purdy Hill Road will continue to experience delays caused by relatively high traffic volumes. Traffic will operate at LOS D or better at the intersection during the Saturday midday peak hour.

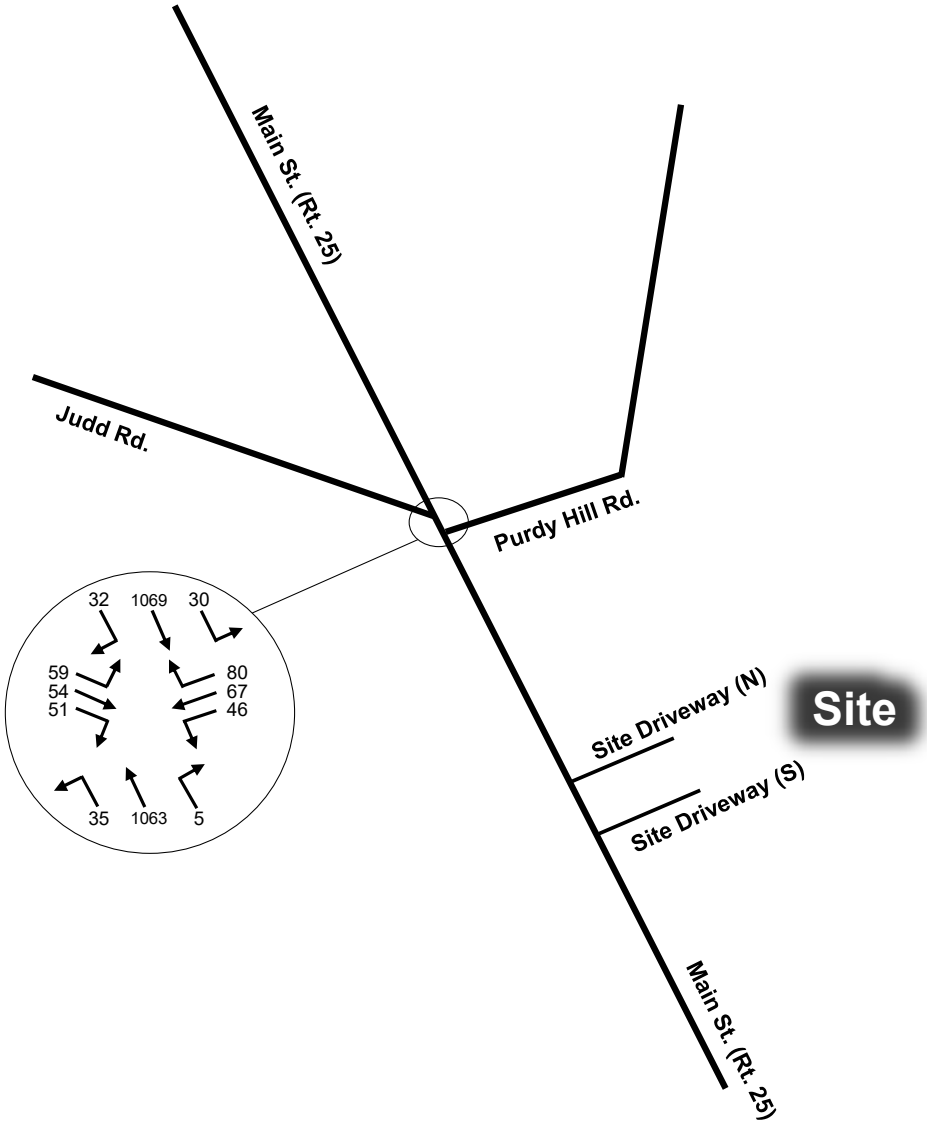


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Figure 5 Year 2027 No-Build Traffic Volumes
Weekday Morning Peak Hour of Adjacent Streets

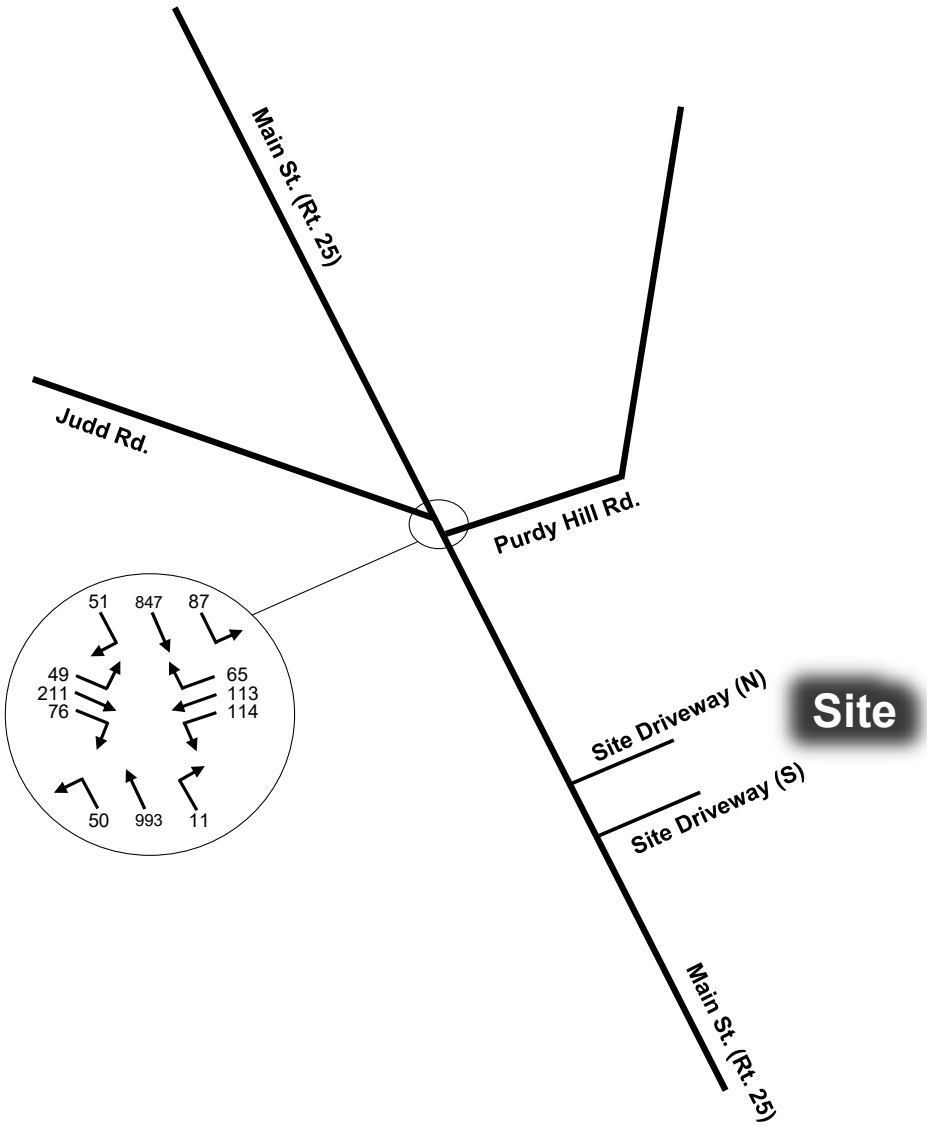

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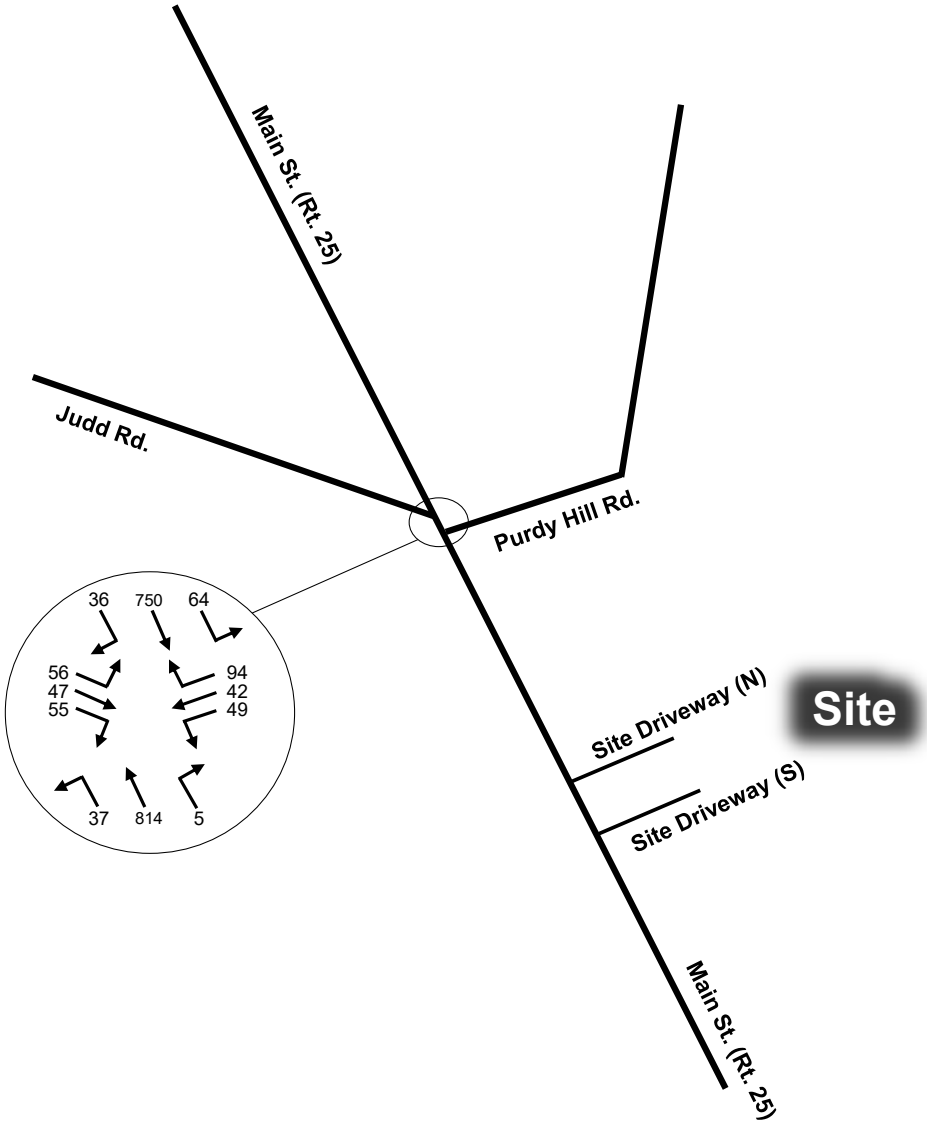
Figure 6 Year 2027 No-Build Traffic Volumes
Weekday Afternoon Peak Hour of Adjacent Streets



N

Figure 7 Year 2027 No-Build Traffic Volumes
Saturday Midday Peak Hour of Adjacent Streets

Table 3 Capacity Analyses for No-Build Conditions

Intersection	2027 No-Build Traffic Conditions		
	Weekday Morning Peak Hour of Adjacent Streets	Weekday Afternoon Peak Hour of Adjacent Streets	Saturday Midday Peak Hour of Adjacent Streets
	LOS	LOS	LOS
Rt. 25 (Main St.), Judd Rd., and Purdy Hill Rd. (Signalized)			
EB Left Turn	D	D	C
EB Through and Right Turn	D	D	C
WB Left Turn	D	F	C
WB Through and Right Turn	D	D	C
NB Left Turn	D	E	D
NB Through and Right Turn	F	F	C
SB Left Turn	D	E	D
SB Through and Right Turn	F	D	B
Intersection	F	E	C

EB Eastbound
WB Westbound
NB Northbound
SB Southbound
LOS Level of Service

Trip Generation

The peak-hour vehicular trips generated by the development (Table 4) were estimated based on data from ITE (Institute of Transportation Engineers) *Trip Generation Manual, 11th Edition*.

Table 4 Trip Generation (vph)

	Total Trips			Pass-By Trips (62 Percent)			Primary/New Trips, Excluding Pass-By Trips		
	Entry	Exit	Entry & Exit	Entry	Exit	Entry & Exit	Entry	Exit	Entry & Exit
Weekday AM peak hour of adjacent street	81	81	162	50	50	100	31	31	62
Weekday PM peak hour of adjacent street	69	68	137	43	42	85	26	26	52
Saturday Midday Peak Hour	63	60	123	39	37	76	24	23	47

vph Vehicles per hour

Surveys conducted by ITE (see the Appendices) indicate that for convenience markets/gas stations, average rate for pass-by trips, trips made by people already traveling on adjacent streets who make a stop at the site, are 62 percent. When these pass-by trips are excluded, the site is expected to generate 62, 52, and 47 new trips during the respective weekday morning, weekday afternoon, and Saturday midday peak hours.

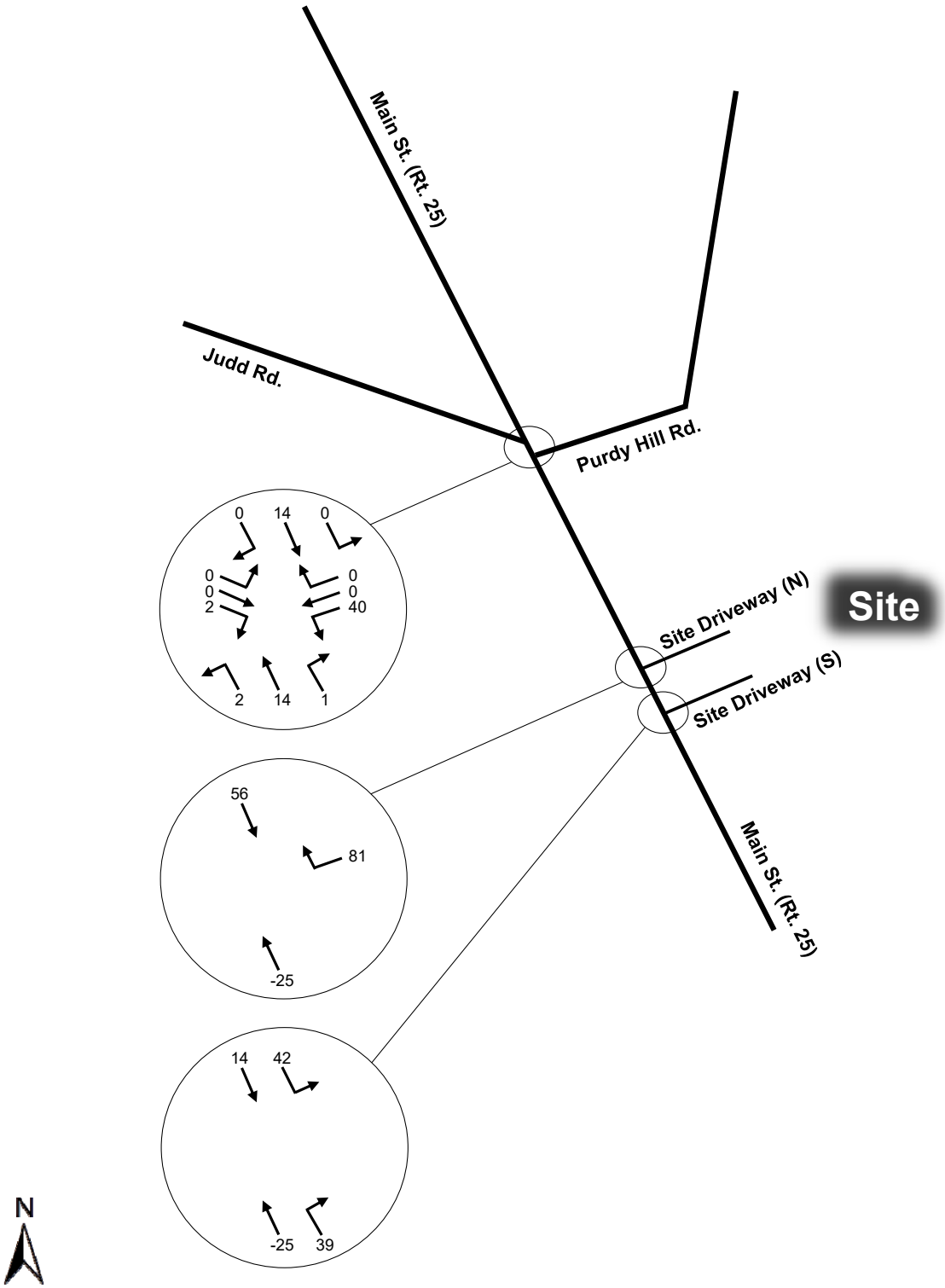


Figure 8 Trip Generation
Weekday Morning Peak Hour of Adjacent Streets

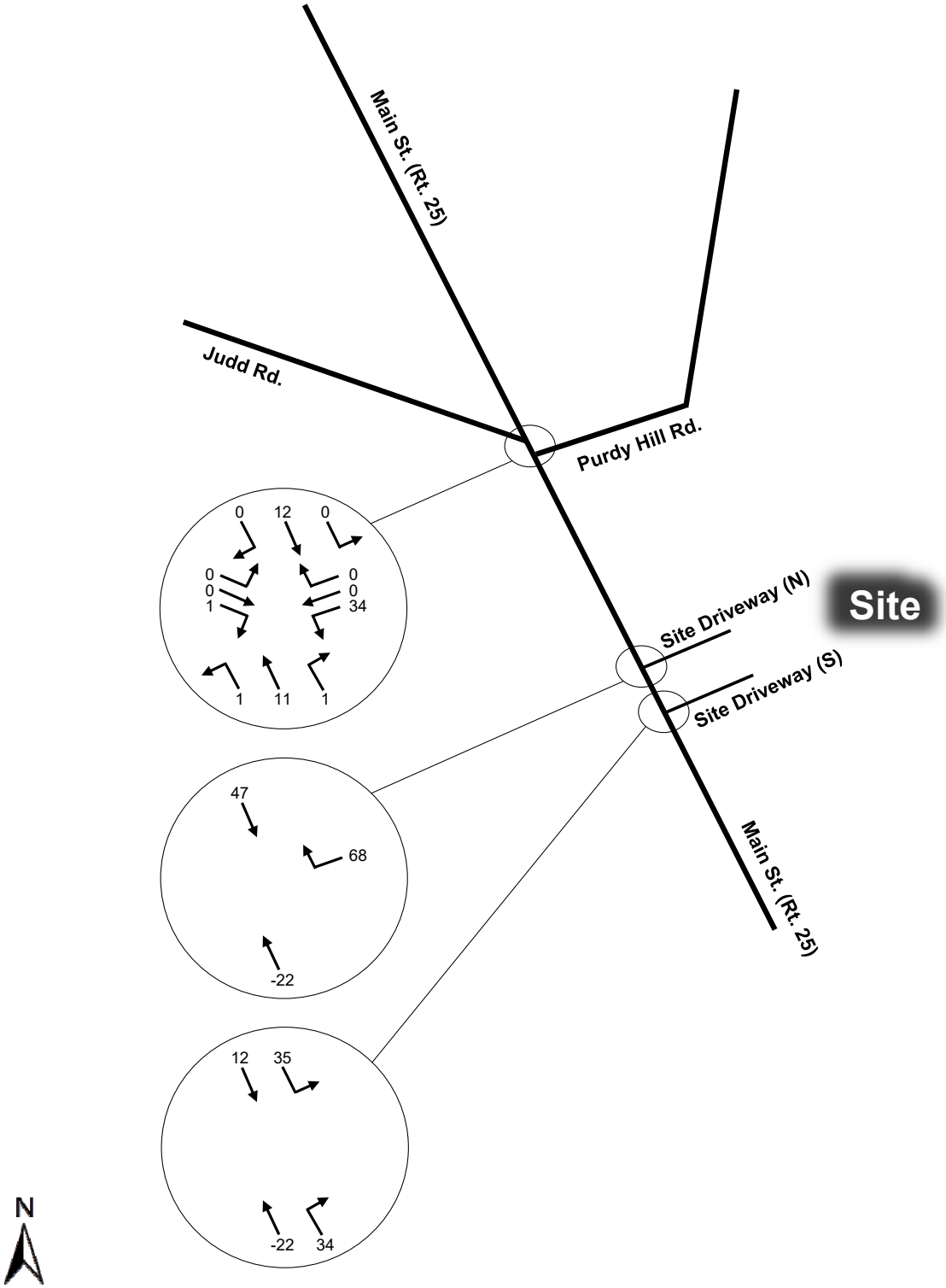


Figure 9 Trip Generation
Weekday Afternoon Peak Hour of Adjacent Streets

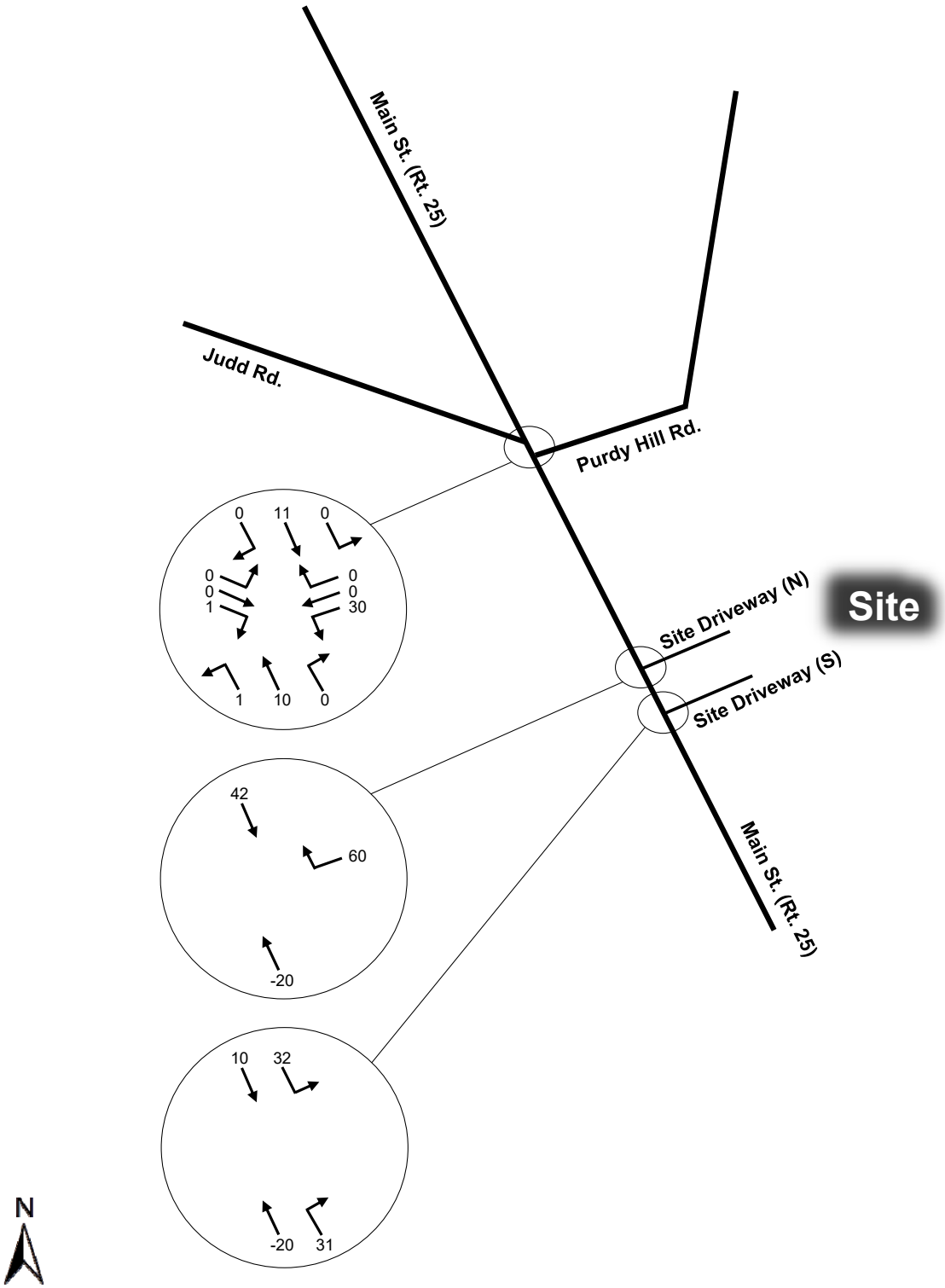


Figure 10 Trip Generation
Saturday Midday Peak Hour of Adjacent Streets

Table 5 depicts the distribution of the site-generated trips along area routes. The distribution takes into account the relative traffic volumes of area roadways and the development patterns in this part of Monroe.

Table 5 Trip Distribution

To / From Route	Entry and Exit
North: Route 25 (Main Street)	45%
South: Route 25 (Main Street)	45%
West: Judd Road	5%
East: Purdy Hill Road	5%
Total	100%

Traffic volumes for the 2027 build conditions, which combine the no-build volumes and the site trips, are presented in Figures 11, 12, and 13.

Capacity Analysis

Table 6 shows the capacity analysis results for the 2027 build traffic conditions. Similar to the no-build conditions, traffic for the two Route 25 approaches and for the left-turn approach of Purdy Hill Road will experience delays and LOS E or F during the two weekday peak hours. Traffic will operate at acceptable LOS D or better during the Saturday midday peak hour. All vehicles using the two site driveways will operate at acceptable LOS D or better during the peak hours.

Overall, the traffic impact of the development will be limited. Traffic will operate at acceptable LOS D or better at the two site driveways during peak hours. 62 percent of the site trips will likely be pass-by trips made by drivers already using the adjacent roadway who will make a stop at the site.

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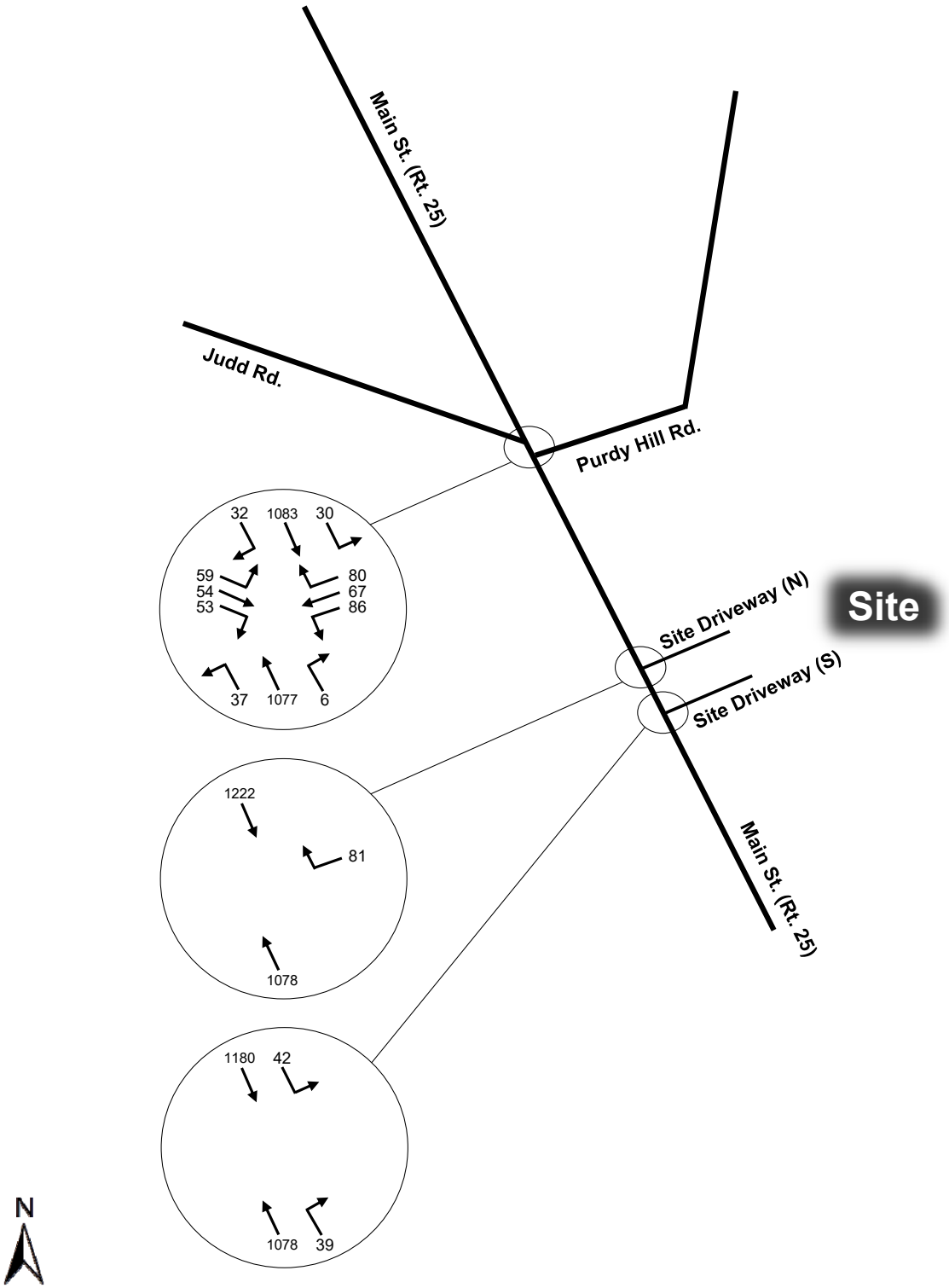


Figure 11 Year 2027 Build Traffic Volumes
Weekday Morning Peak Hour of Adjacent Streets

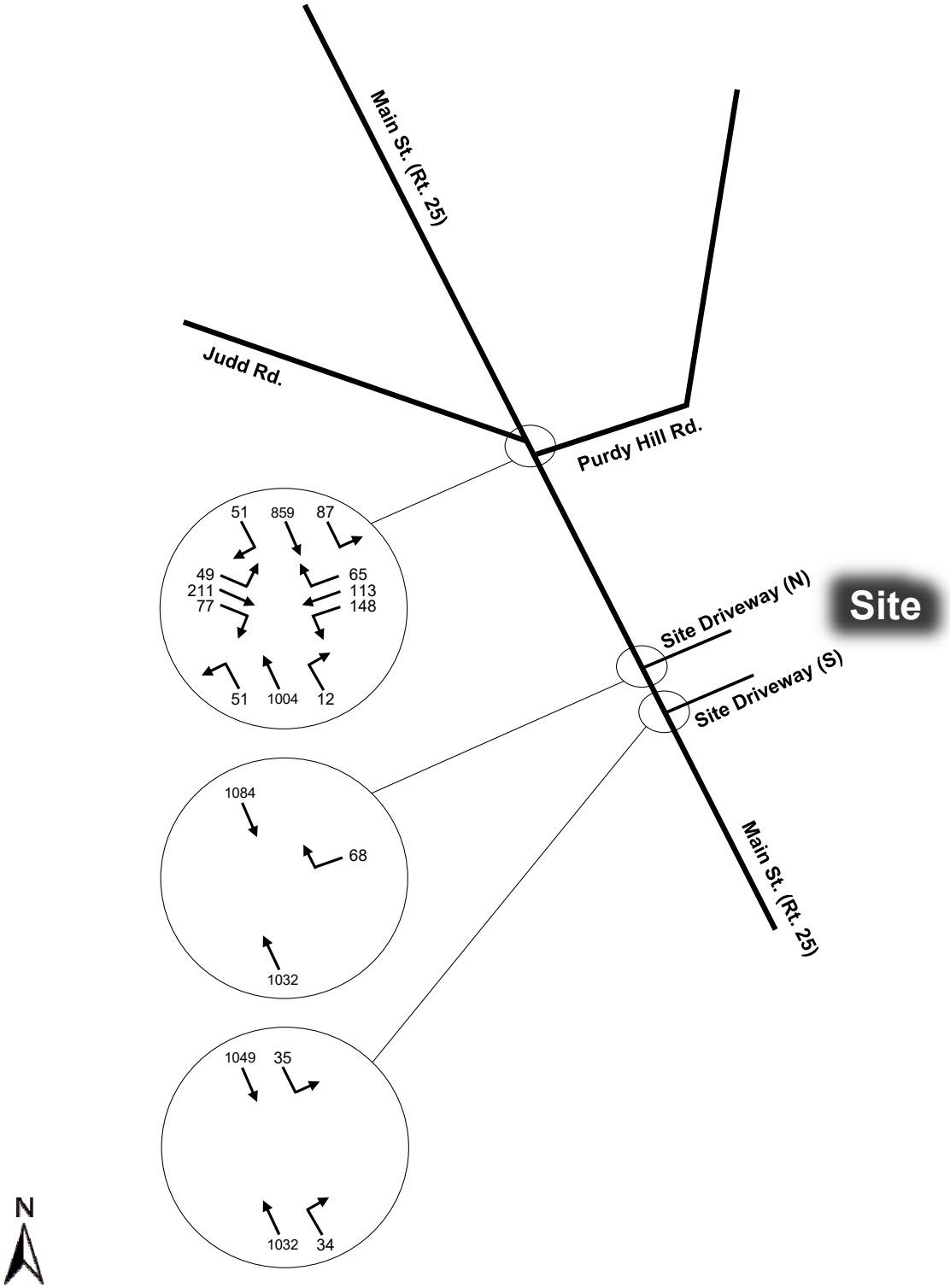


Figure 12 Year 2027 Build Traffic Volumes
Weekday Afternoon Peak Hour of Adjacent Streets

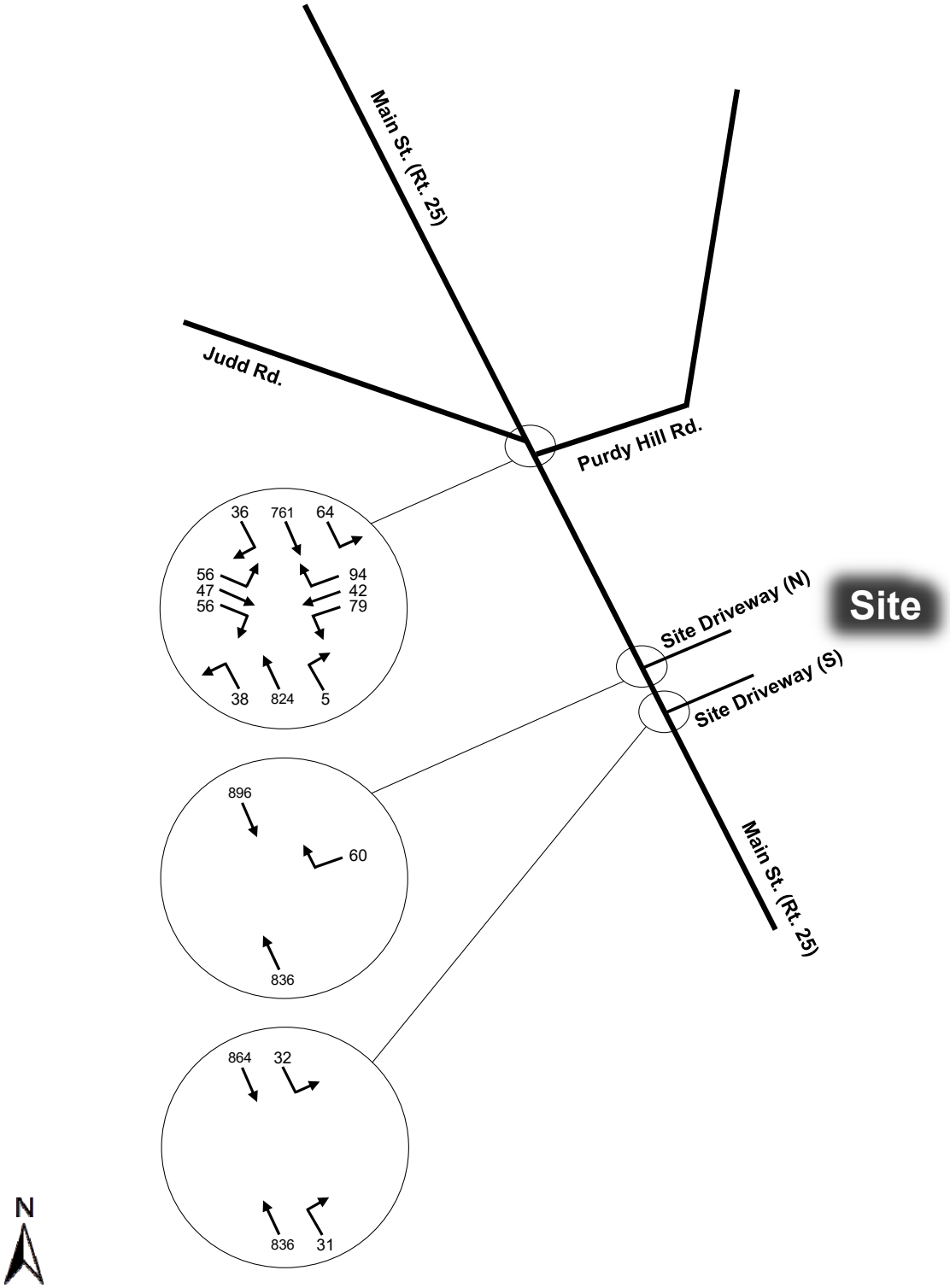


Figure 13 Year 2027 Build Traffic Volumes
Saturday Midday Peak Hour of Adjacent Streets

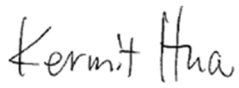
Table 6 Capacity Analyses for Build Conditions

Intersection	2027 Build Traffic Conditions		
	Weekday Morning Peak Hour of Adjacent Streets	Weekday Afternoon Peak Hour of Adjacent Streets	Saturday Midday Peak Hour of Adjacent Streets
	LOS	LOS	LOS
Rt. 25 (Main St.), Judd Rd., and Purdy Hill Rd. (Signalized)			
EB Left Turn	D	D	C
EB Through and Right Turn	D	D	C
WB Left Turn	D	F	C
WB Through and Right Turn	D	D	C
NB Left Turn	D	E	D
NB Through and Right Turn	F	F	C
SB Left Turn	D	E	D
SB Through and Right Turn	F	D	B
Intersection	F	E	C
Rt. 25 and Site Driveway (S) (Unsignalized)			
WB Site Driveway (S)	A	A	A
Rt. 25 and Site Driveway (N) (Unsignalized)			
WB Site Driveway (N)	D	D	C

EB Eastbound
WB Westbound
NB Northbound
SB Southbound
LOS Level of Service

V. Conclusions

Area traffic operation was analyzed for the construction of a gas station with a convenience store under 2022 existing and 2027 no-build and build traffic conditions. Traffic will operate at acceptable LOS D or better at the two site driveways during peak hours. This development will not produce significant traffic impact on area roadways.



Kermit Hua, PE, PTOE
Principal
KWH Enterprise, LLC
(203) 606-3525
kermit.hua@kwhenterprise.com

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF POLICY & PLANNING - ROADWAY INFORMATION SYSTEMS
TRAFFIC DATA COLLECTION & VERIFICATION SECTION

FACTORS FOR EXPANDING 24-HOUR COUNTS TO
ANNUAL AVERAGE DAILY TRAFFIC VOLUMES
(BASED ON 2018 CONTINUOUS COUNT STATION DATA)

GROUP - 1 * * INTERSTATE * *

STATION(S): 7, 12, 24, 30, 31, 32, 53, 54

AVG.	WEEKDAY	FRIDAY	SATURDAY	SUNDAY
JANUARY	1.08	1.03	1.21	1.41
FEBRUARY	1.04	0.96	1.13	1.45
MARCH	1.05	0.93	1.05	1.21
APRIL	0.99	0.91	1.03	1.17
MAY	0.94	0.83	0.98	1.10
JUNE	0.95	0.90	0.99	1.08
JULY	0.95	0.91	0.97	1.08
AUGUST	0.94	0.86	0.99	1.06
SEPTEMBER	0.99	0.89	0.99	1.08
OCTOBER	0.98	0.90	1.00	1.12
NOVEMBER	0.98	0.98	1.03	1.13
DECEMBER	1.00	0.96	1.04	1.22

GROUP - 2 * * RURAL * *

STATION(S): 4, 10, 16, 20, 50, 51

AVG.	WEEKDAY	FRIDAY	SATURDAY	SUNDAY
JANUARY	1.12	1.08	1.17	1.48
FEBRUARY	1.12	1.05	1.16	1.55
MARCH	1.08	1.04	1.06	1.32
APRIL	1.05	0.95	0.94	1.29
MAY	0.95	0.89	0.95	1.04
JUNE	0.91	0.80	0.87	0.95
JULY	0.93	0.84	0.87	0.98
AUGUST	0.89	0.83	0.90	0.93
SEPTEMBER	0.97	0.88	0.91	1.02
OCTOBER	0.98	0.88	0.97	1.08
NOVEMBER	1.00	1.02	1.09	1.21
DECEMBER	1.08	1.09	1.11	1.29

GROUP - 3 * * INTERSTATE * *

STATION(S): 27 (I-84 FROM ROUTE 195 TO MASS. STATE LINE)

AVG.	WEEKDAY	FRIDAY	SATURDAY	SUNDAY
JANUARY	1.02	1.10	1.25	0.99
FEBRUARY	0.86	0.81	1.02	1.22
MARCH	1.46	0.91	0.94	0.93
APRIL	1.22	0.96	1.00	1.00
MAY	1.07	0.73	0.99	0.90
JUNE	1.04	0.84	0.96	0.71
JULY	0.98	0.84	0.80	0.74
AUGUST	0.81	0.75	0.89	0.79
SEPTEMBER	1.11	1.09	1.13	0.81
OCTOBER	1.04	1.06	1.30	0.99
NOVEMBER	1.26	1.24	1.15	0.64
DECEMBER	1.14	0.33	0.43	0.79

CONNECTICUT DEPARTMENT OF TRANSPORTATION
BUREAU OF POLICY & PLANNING - ROADWAY INFORMATION SYSTEMS
TRAFFIC MONITORING & DATA ANALYSIS SECTION

FACTORS FOR EXPANDING 24-HOUR COUNTS TO
ANNUAL AVERAGE DAILY TRAFFIC VOLUMES
(BASED ON 2018 CONTINUOUS COUNT STATION DATA)

GROUP - 4 * * URBAN * *

STATION(S): 8, 9, 11, 15, 17, 22, 23, 28, 47, 48, 52

AVG.	WEEKDAY	FRIDAY	SATURDAY	SUNDAY
JANUARY	1.03	1.00	1.18	1.46
FEBRUARY	1.03	0.95	1.14	1.49
MARCH	0.97	0.94	1.07	1.30
APRIL	0.98	0.90	1.03	1.26
MAY	0.92	0.83	1.01	1.21
JUNE	0.91	0.85	1.01	1.15
JULY	0.95	0.89	1.06	1.22
AUGUST	0.95	0.89	1.09	1.23
SEPTEMBER	0.96	0.88	1.03	1.20
OCTOBER	0.95	0.86	1.05	1.16
NOVEMBER	0.97	0.97	1.08	1.27
DECEMBER	0.99	0.96	1.06	1.24

GROUP - 5 * *NORTHWEST RECREATIONAL * *

STATION(S): 1 (Station 18 not available on 2018)

AVG.	WEEKDAY	FRIDAY	SATURDAY	SUNDAY
JANUARY	1.29	1.18	1.05	1.21
FEBRUARY	1.24	1.10	1.02	1.34
MARCH	1.28	1.06	1.14	1.24
APRIL	1.04	0.88	0.96	0.85
MAY	1.00	0.83	0.78	0.80
JUNE	0.96	0.80	0.79	0.77
JULY	0.91	0.80	0.71	0.61
AUGUST	0.94	0.75	0.76	0.71
SEPTEMBER	0.99	0.85	0.69	0.73
OCTOBER	0.95	0.71	0.69	0.68
NOVEMBER	1.15	1.05	1.08	1.06
DECEMBER	1.13	1.11	1.09	1.25

GROUP - 6 * * SOUTHEAST RECREATIONAL * *

STATION(S): 5, 33, 44, 46

AVG.	WEEKDAY	FRIDAY	SATURDAY	SUNDAY
JANUARY	1.24	1.08	1.05	1.22
FEBRUARY	1.17	1.00	0.98	1.21
MARCH	1.19	0.98	0.93	1.06
APRIL	1.13	0.91	0.86	1.00
MAY	1.04	0.85	0.84	0.92
JUNE	1.00	0.80	0.81	0.88
JULY	0.91	0.77	0.75	0.79
AUGUST	0.92	0.75	0.77	0.80
SEPTEMBER	1.07	0.89	0.84	0.92
OCTOBER	1.10	0.89	0.93	0.98
NOVEMBER	1.17	0.97	0.93	1.04
DECEMBER	1.16	1.00	0.97	1.15

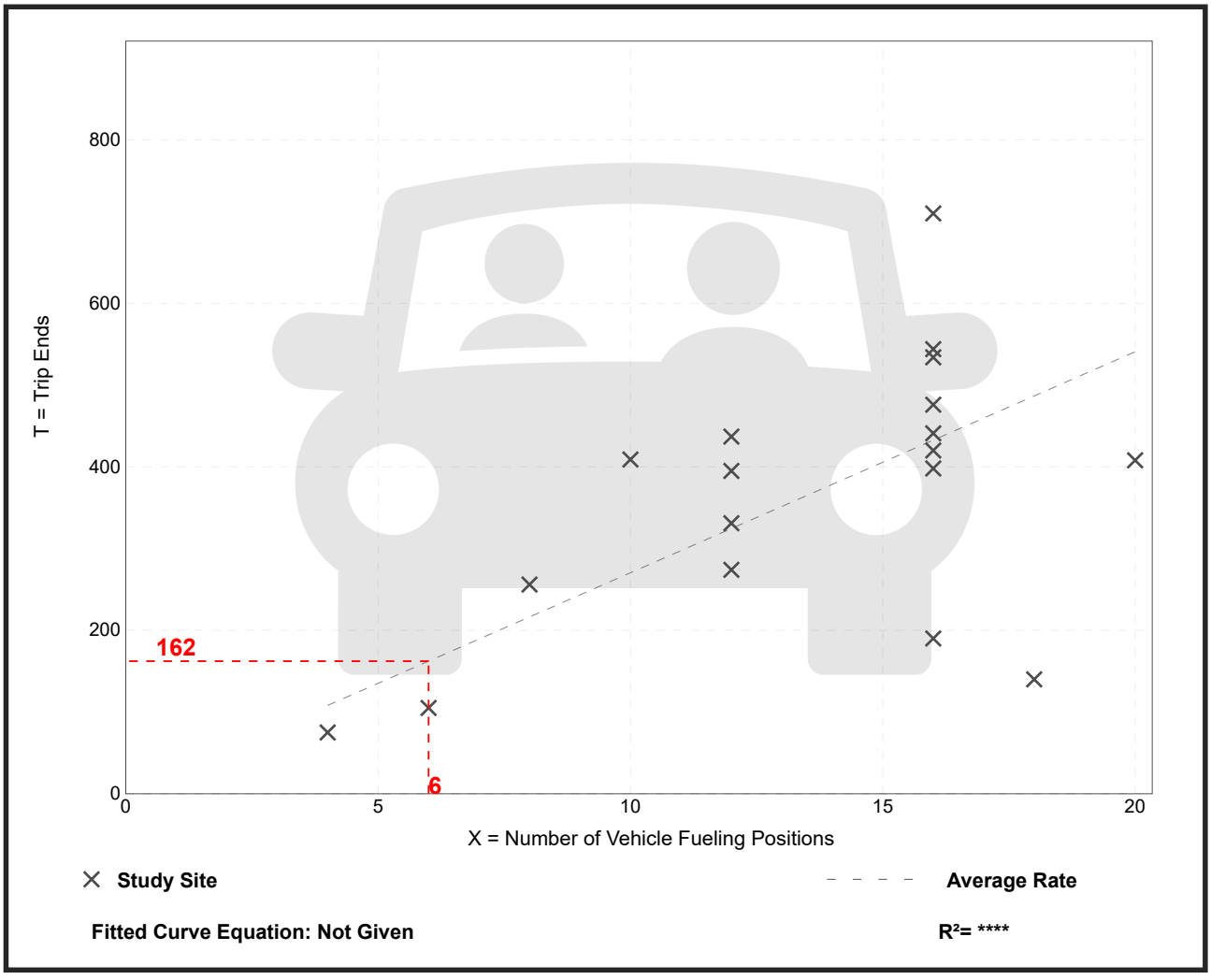
Convenience Store/Gas Station - GFA (4-5.5k)
(945)

Vehicle Trip Ends vs: **Vehicle Fueling Positions**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 18
Avg. Num. of Vehicle Fueling Positions: 13
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
27.04	7.78 - 44.38	9.88

Data Plot and Equation



Trip Gen Manual, 11th Edition ● Institute of Transportation Engineers

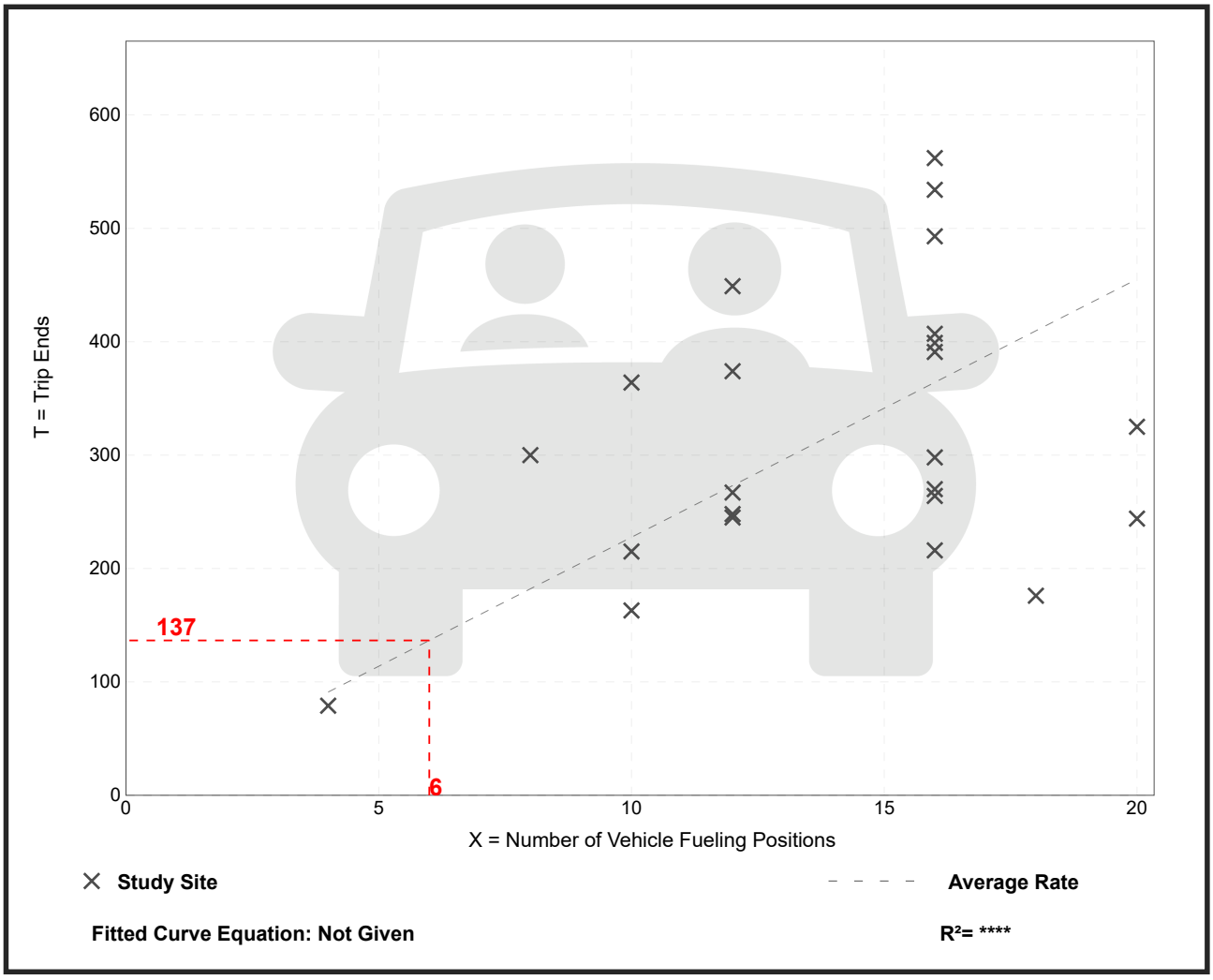
Convenience Store/Gas Station - GFA (4-5.5k)
(945)

Vehicle Trip Ends vs: **Vehicle Fueling Positions**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 23
Avg. Num. of Vehicle Fueling Positions: 14
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
22.76	9.78 - 37.50	8.49

Data Plot and Equation



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Convenience Store/Gas Station - GFA (4-5.5k)
(945)

Vehicle Trip Ends vs: **Vehicle Fueling Positions**
On a: **Saturday, Peak Hour of Generator**

Setting/Location: **General Urban/Suburban**
Number of Studies: 7
Avg. Num. of Vehicle Fueling Positions: 14
Directional Distribution: 51% entering, 49% exiting

Vehicle Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
20.44	10.94 - 33.17	8.08

Data Plot and Equation

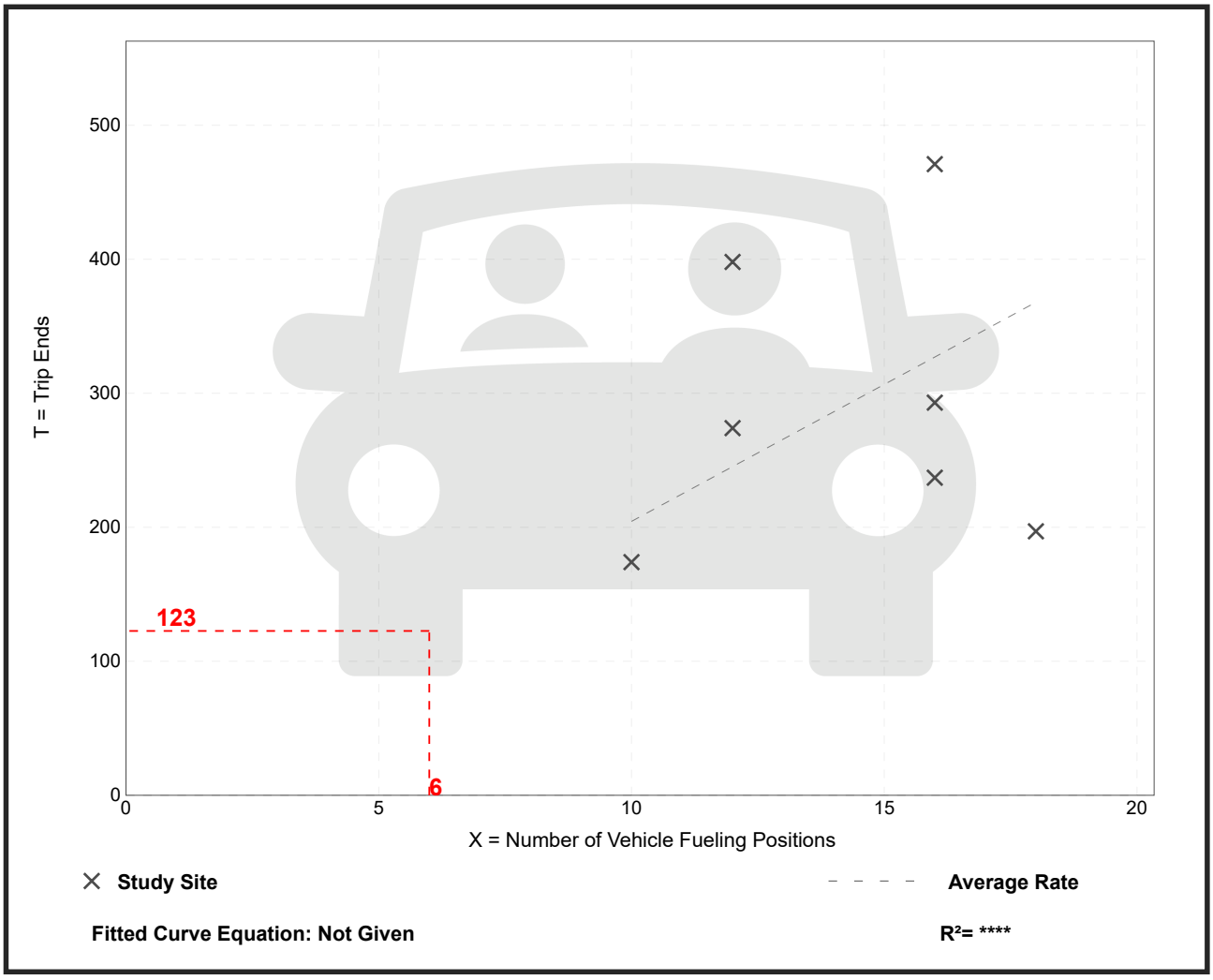

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Table E.36 Pass-By and Non-Pass-By Trips Weekday, PM Peak Period Land Use Code 944—Gasoline/Service Station

SIZE (1,000 SQ. FT. GFA)	VEHICLE FUELING POSITIONS	LOCATION	WEEKDAY SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PASS-BY TRIP (%)	NON-PASS-BY TRIPS (%)			ADJ. STREET PEAK HOUR VOLUME	SOURCE
							PRIMARY	DIVERTED	TOTAL		
—	—	Chicago suburbs, IL	1987	48	3:00–7:00 p.m.	21	—	—	79	—	Kenig, O'Hara, Humes, Flock
—	—	Chicago suburbs, IL	1987	34	3:00–6:00 p.m.	25	—	—	75	—	Kenig, O'Hara, Humes, Flock
—	—	Chicago suburbs, IL	1987	42	3:00–6:00 p.m.	20	—	—	80	—	Kenig, O'Hara, Humes, Flock
2.3	6	Gaithersburg, MD	1992	55	4:00–6:00 p.m.	40	11	49	60	2,760	RBA
2.1	6	Bethesda, MD	1992	30	4:00–6:00 p.m.	53	20	27	47	1,060	RBA
1.7	6	Wheaton, MD	1992	18	4:00–6:00 p.m.	61	6	33	39	2,510	RBA
2.0	8	Gaithersburg, MD	1992	47	4:00–6:00 p.m.	62	23	15	38	2,635	RBA
1.2	6	Damascus, MD	1992	26	4:00–6:00 p.m.	58	11	31	42	1,020	RBA
0.3	12	Wheaton, MD	1992	52	4:00–6:00 p.m.	38	10	52	62	3,835	RBA

Average Pass-By Trip Percentage: 42
"—" means no data were provided

Table E.37 Pass-By and Non-Pass-By Trips Weekday, AM Peak Period Land Use Code 945—Gasoline/Service Station with Convenience Market

SIZE (1,000 SQ. FT. GFA)	VEHICLE FUELING POSITIONS	LOCATION	WEEKDAY SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PASS-BY TRIP (%)	NON-PASS-BY TRIPS (%)			ADJ. STREET PEAK HOUR VOLUME	SOURCE
							PRIMARY	DIVERTED	TOTAL		
0.8	8	Louisville area, KY	1993	61	7:00–9:00 a.m.	60	15	25	40	4,000	Barton-Aschman Assoc.
0.6	8	Louisville, KY	1993	48	7:00–9:00 a.m.	68	13	19	32	1,307	Barton-Aschman Assoc.
0.7	10	Louisville, KY	1993	47	7:00–9:00 a.m.	67	11	22	33	1,105	Barton-Aschman Assoc.
0.7	8	Louisville area, KY	1993	—	7:00–9:00 a.m.	56	22	22	44	1,211	Barton-Aschman Assoc.
0.7	10	Louisville area, KY	1993	—	7:00–9:00 a.m.	46	42	12	54	1,211	Barton-Aschman Assoc.
0.3	—	Louisville area, KY	1993	75	7:00–9:00 a.m.	72	15	13	28	—	Barton-Aschman Assoc.
0.8	8	Silver Spring, MD	1992	36	7:00–9:00 a.m.	47	14	39	53	3,095	RBA
0.4	8	Derwood, MD	1992	46	7:00–9:00 a.m.	75	0	25	25	3,770	RBA
2.2	8	Kensington, MD	1992	31	7:00–9:00 a.m.	47	34	19	53	1,785	RBA
1	8	Silver Spring, MD	1992	35	7:00–9:00 a.m.	78	9	13	22	7,080	RBA

Average Pass-By Trip Percentage: 62
"—" means no data were provided

Figure E.18 Gasoline/Service Station with Convenience Market (945)

Average Pass-By Trip Percentage vs: **1,000 Sq. Ft. Gross Floor Area**
On a: **Weekday, AM Peak Period**
Number of Studies: 10
Average 1,000 Sq. Ft. GFA: 0.8

Data Plot

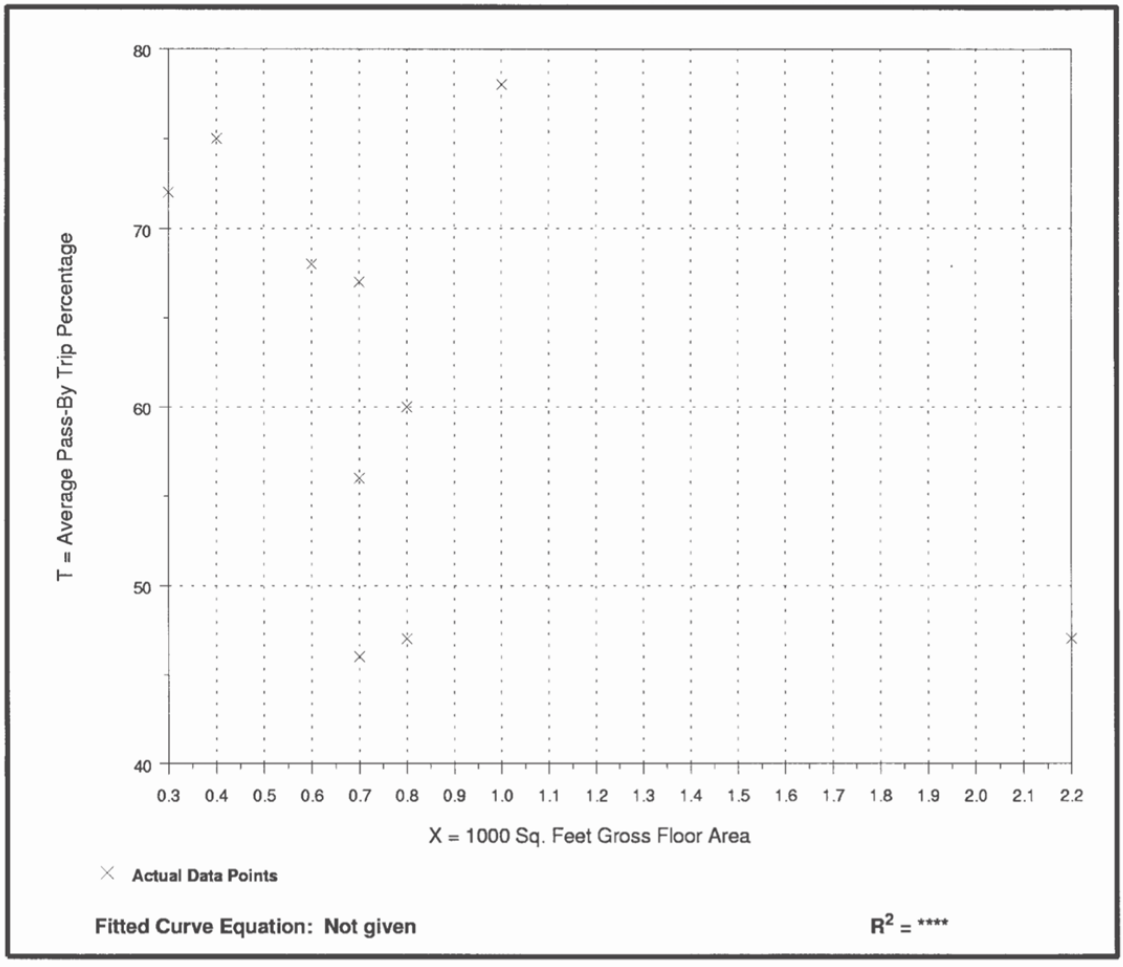


Table E.38 Pass-By and Non-Pass-By Trips Weekday, PM Peak Period
Land Use Code 945—Gasoline/Service Station with Convenience Market

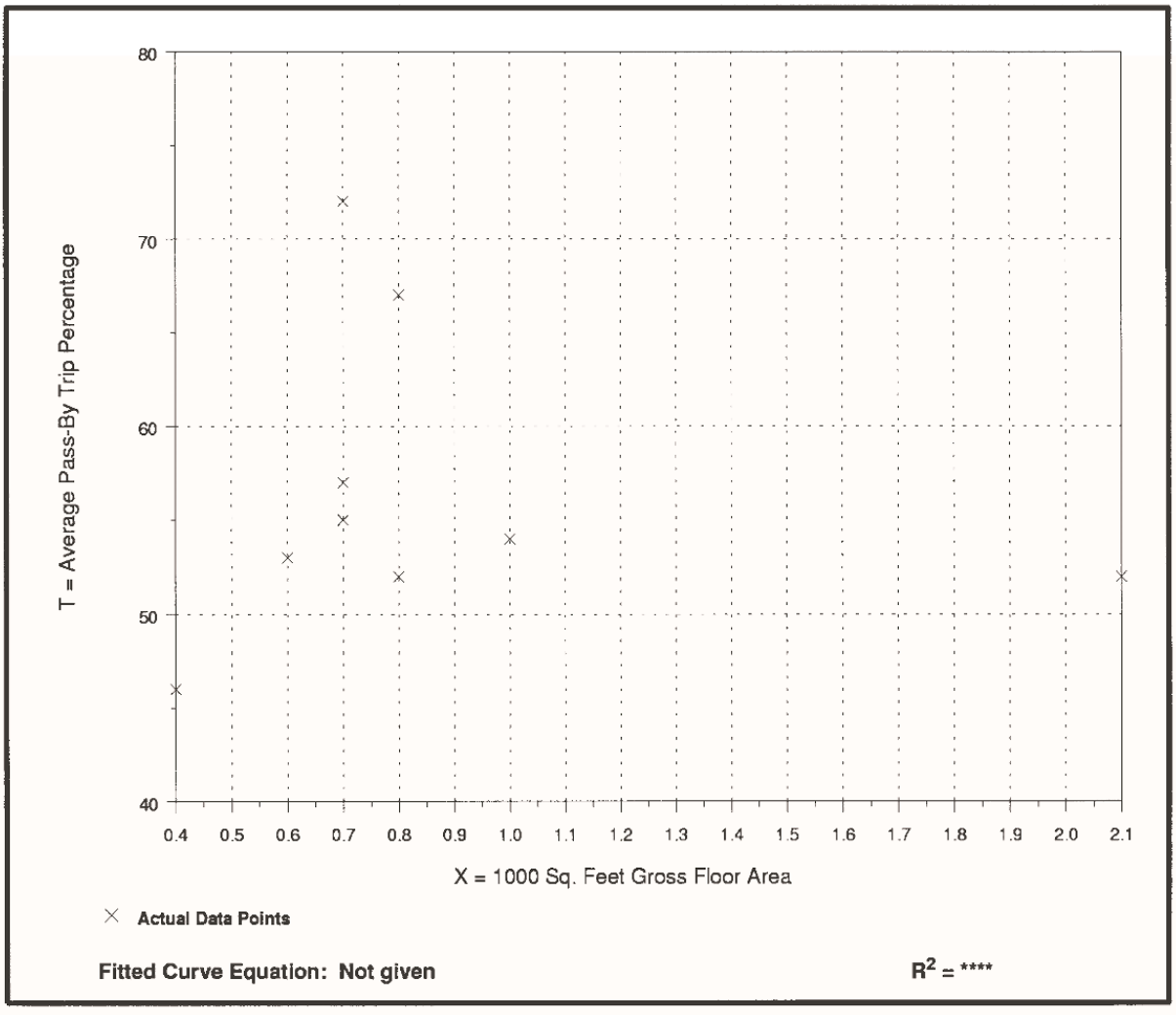
SIZE (1,000 SQ. FT. GFA)	VEHICLE FUELING POSITIONS	LOCATION	WEEKDAY SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PASS-BY TRIP (%)	NON-PASS-BY TRIPS (%)			ADJ. STREET PEAK HOUR VOLUME	SOURCE
							PRIMARY	DIVERTED	TOTAL		
0.8	8	Louisville area, KY	1993	83	4:00–6:00 p.m.	52	8	40	48	4,965	Barton-Aschman Assoc.
0.6	8	Louisville, KY	1993	60	4:00–6:00 p.m.	53	20	27	47	1,491	Barton-Aschman Assoc.
0.7	10	Louisville, KY	1993	—	4:00–6:00 p.m.	57	19	24	43	1,812	Barton-Aschman Assoc.
0.7	8	Louisville area, KY	1993	—	4:00–6:00 p.m.	72	7	21	28	2,657	Barton-Aschman Assoc.
0.7	10	Louisville area, KY	1993	—	4:00–6:00 p.m.	55	16	29	45	2,657	Barton-Aschman Assoc.
0.8	8	Silver Spring, MD	1992	36	4:00–6:00 p.m.	67	14	19	33	3,095	RBA
0.4	8	Derwood, MD	1992	46	4:00–6:00 p.m.	46	11	43	54	3,770	RBA
2.1	8	Kensington, MD	1992	31	4:00–6:00 p.m.	52	13	35	48	1,785	RBA
1	8	Silver Spring, MD	1992	35	4:00–6:00 p.m.	54	3	43	46	7,080	RBA

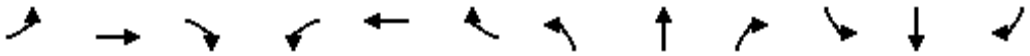
Average Pass-By Trip Percentage: 56
"—" means no data were provided

Figure E.19 Gasoline/Service Station with Convenience Market (945)

Average Pass-By Trip Percentage vs: **1,000 Sq. Ft. Gross Floor Area**
On a: **Weekday, PM Peak Period**
Number of Studies: 9
Average 1,000 Sq. Ft. GFA: 0.9

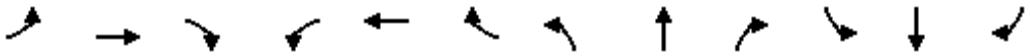
Data Plot





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	53	50	45	65	78	34	1037	5	29	1043	31
Future Volume (vph)	58	53	50	45	65	78	34	1037	5	29	1043	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.4	6.4		6.4	6.4		6.8	6.0		6.8	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.92		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	1678		1719	1662		1719	1808		1719	1802	
Flt Permitted	0.55	1.00		0.68	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	992	1678		1230	1662		1719	1808		1719	1802	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	67	62	58	52	76	91	40	1206	6	34	1213	36
RTOR Reduction (vph)	0	32	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	67	88	0	52	167	0	40	1212	0	34	1249	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			4		1	6		5	2	
Permitted Phases	4			4								
Actuated Green, G (s)	14.1	14.1		14.1	14.1		4.2	61.3		3.9	61.0	
Effective Green, g (s)	14.1	14.1		14.1	14.1		4.2	61.3		3.9	61.0	
Actuated g/C Ratio	0.14	0.14		0.14	0.14		0.04	0.62		0.04	0.62	
Clearance Time (s)	6.4	6.4		6.4	6.4		6.8	6.0		6.8	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		1.5	2.5		1.5	2.5	
Lane Grp Cap (vph)	142	240		176	237		73	1125		68	1115	
v/s Ratio Prot		0.05			c0.10		c0.02	0.67		0.02	c0.69	
v/s Ratio Perm	0.07			0.04								
v/c Ratio	0.47	0.37		0.30	0.70		0.55	1.08		0.50	1.12	
Uniform Delay, d1	38.8	38.2		37.8	40.2		46.2	18.6		46.3	18.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.3		0.3	7.5		4.4	50.2		2.1	66.3	
Delay (s)	39.7	38.5		38.1	47.8		50.7	68.8		48.4	85.1	
Level of Service	D	D		D	D		D	E		D	F	
Approach Delay (s)		38.9			45.5			68.3			84.1	
Approach LOS		D			D			E			F	

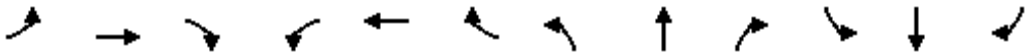
Intersection Summary			
HCM 2000 Control Delay	71.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	98.5	Sum of lost time (s)	19.2
Intersection Capacity Utilization	84.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	48	206	74	111	110	63	49	969	11	85	826	50
Future Volume (vph)	48	206	74	111	110	63	49	969	11	85	826	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.4	6.4		6.4	6.4		6.8	6.0		6.8	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.95		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1789		1770	1762		1770	1860		1770	1847	
Flt Permitted	0.53	1.00		0.30	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	995	1789		562	1762		1770	1860		1770	1847	
Peak-hour factor, PHF	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)	52	224	80	121	120	68	53	1053	12	92	898	54
RTOR Reduction (vph)	0	11	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	52	293	0	121	188	0	53	1065	0	92	952	0
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			4		1	6		5	2	
Permitted Phases	4			4								
Actuated Green, G (s)	25.0	25.0		25.0	25.0		6.5	61.5		9.3	64.3	
Effective Green, g (s)	25.0	25.0		25.0	25.0		6.5	61.5		9.3	64.3	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.06	0.53		0.08	0.56	
Clearance Time (s)	6.4	6.4		6.4	6.4		6.8	6.0		6.8	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		1.5	2.5		1.5	2.5	
Lane Grp Cap (vph)	216	388		122	383		100	994		143	1032	
v/s Ratio Prot		0.16			0.11		0.03	c0.57		c0.05	c0.52	
v/s Ratio Perm	0.05			c0.22								
v/c Ratio	0.24	0.76		0.99	0.49		0.53	1.07		0.64	0.92	
Uniform Delay, d1	37.2	42.1		44.9	39.4		52.8	26.8		51.2	23.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	7.3		78.6	0.4		2.7	49.5		7.2	13.1	
Delay (s)	37.4	49.4		123.5	39.8		55.5	76.3		58.5	36.2	
Level of Service	D	D		F	D		E	E		E	D	
Approach Delay (s)		47.6			72.6			75.3			38.2	
Approach LOS		D			E			E			D	

Intersection Summary			
HCM 2000 Control Delay	57.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	19.2
Intersection Capacity Utilization	99.2%	ICU Level of Service	F
Analysis Period (min)	15		

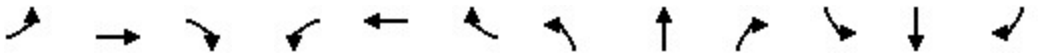
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	46	54	48	41	92	36	794	5	62	732	35
Future Volume (vph)	55	46	54	48	41	92	36	794	5	62	732	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.4	6.4		6.4	6.4		6.8	6.0		6.8	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	0.90		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1711		1770	1669		1770	1861		1770	1850	
Flt Permitted	0.67	1.00		0.69	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1247	1711		1286	1669		1770	1861		1770	1850	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	57	47	56	49	42	95	37	819	5	64	755	36
RTOR Reduction (vph)	0	48	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	57	55	0	49	137	0	37	824	0	64	791	0
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			4		1	6		5	2	
Permitted Phases	4			4								
Actuated Green, G (s)	10.7	10.7		10.7	10.7		3.7	41.6		5.3	43.2	
Effective Green, g (s)	10.7	10.7		10.7	10.7		3.7	41.6		5.3	43.2	
Actuated g/C Ratio	0.14	0.14		0.14	0.14		0.05	0.54		0.07	0.56	
Clearance Time (s)	6.4	6.4		6.4	6.4		6.8	6.0		6.8	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		1.5	2.5		1.5	2.5	
Lane Grp Cap (vph)	173	238		179	232		85	1008		122	1040	
v/s Ratio Prot		0.03			c0.08		0.02	c0.44		c0.04	0.43	
v/s Ratio Perm	0.05			0.04								
v/c Ratio	0.33	0.23		0.27	0.59		0.44	0.82		0.52	0.76	
Uniform Delay, d1	29.8	29.4		29.6	31.0		35.5	14.5		34.5	12.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.2		0.3	2.7		1.3	5.1		1.9	3.2	
Delay (s)	30.2	29.6		29.9	33.7		36.8	19.6		36.4	16.0	
Level of Service	C	C		C	C		D	B		D	B	
Approach Delay (s)		29.8			32.7			20.3			17.6	
Approach LOS		C			C			C			B	

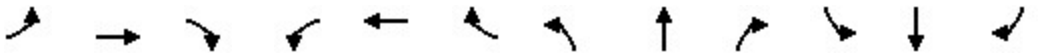
Intersection Summary			
HCM 2000 Control Delay	21.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	76.8	Sum of lost time (s)	19.2
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	54	51	46	67	80	35	1063	5	30	1069	32
Future Volume (vph)	59	54	51	46	67	80	35	1063	5	30	1069	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.4	6.4		6.4	6.4		6.8	6.0		6.8	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.92		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	1678		1719	1662		1719	1808		1719	1802	
Flt Permitted	0.54	1.00		0.68	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	974	1678		1228	1662		1719	1808		1719	1802	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	69	63	59	53	78	93	41	1236	6	35	1243	37
RTOR Reduction (vph)	0	32	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	69	90	0	53	171	0	41	1242	0	35	1280	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			4		1	6		5	2	
Permitted Phases	4			4								
Actuated Green, G (s)	14.4	14.4		14.4	14.4		4.2	61.2		4.0	61.0	
Effective Green, g (s)	14.4	14.4		14.4	14.4		4.2	61.2		4.0	61.0	
Actuated g/C Ratio	0.15	0.15		0.15	0.15		0.04	0.62		0.04	0.62	
Clearance Time (s)	6.4	6.4		6.4	6.4		6.8	6.0		6.8	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		1.5	2.5		1.5	2.5	
Lane Grp Cap (vph)	141	244		178	242		73	1119		69	1112	
v/s Ratio Prot		0.05			c0.10		c0.02	0.69		0.02	c0.71	
v/s Ratio Perm	0.07			0.04								
v/c Ratio	0.49	0.37		0.30	0.71		0.56	1.11		0.51	1.15	
Uniform Delay, d1	38.8	38.1		37.7	40.2		46.4	18.8		46.4	18.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.3		0.3	7.5		5.8	62.3		2.1	78.6	
Delay (s)	39.8	38.5		38.0	47.6		52.2	81.1		48.6	97.5	
Level of Service	D	D		D	D		D	F		D	F	
Approach Delay (s/veh)		38.9			45.4			80.2			96.2	
Approach LOS		D			D			F			F	

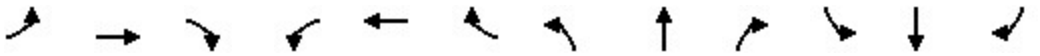
Intersection Summary			
HCM 2000 Control Delay (s/veh)	82.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	98.8	Sum of lost time (s)	19.2
Intersection Capacity Utilization	86.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	211	76	114	113	65	50	993	11	87	847	51
Future Volume (vph)	49	211	76	114	113	65	50	993	11	87	847	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.4	6.4		6.4	6.4		6.8	6.0		6.8	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.95		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1788		1770	1760		1770	1860		1770	1847	
Flt Permitted	0.52	1.00		0.29	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	972	1788		532	1760		1770	1860		1770	1847	
Peak-hour factor, PHF	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)	53	229	83	124	123	71	54	1079	12	95	921	55
RTOR Reduction (vph)	0	11	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	53	301	0	124	194	0	54	1091	0	95	976	0
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			4		1	6		5	2	
Permitted Phases	4			4								
Actuated Green, G (s)	25.0	25.0		25.0	25.0		6.5	61.4		9.5	64.4	
Effective Green, g (s)	25.0	25.0		25.0	25.0		6.5	61.4		9.5	64.4	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.06	0.53		0.08	0.56	
Clearance Time (s)	6.4	6.4		6.4	6.4		6.8	6.0		6.8	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		1.5	2.5		1.5	2.5	
Lane Grp Cap (vph)	211	388		115	382		99	992		146	1033	
v/s Ratio Prot		0.17			0.11		0.03	c0.59		c0.05	c0.53	
v/s Ratio Perm	0.05			c0.23								
v/c Ratio	0.25	0.78		1.08	0.51		0.55	1.10		0.65	0.94	
Uniform Delay, d1	37.3	42.4		45.1	39.6		52.9	26.8		51.2	23.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	8.6		106.5	0.4		3.3	59.7		7.7	16.3	
Delay (s)	37.5	51.0		151.6	40.0		56.1	86.6		58.9	40.0	
Level of Service	D	D		F	D		E	F		E	D	
Approach Delay (s/veh)		49.0			83.5			85.1			41.7	
Approach LOS		D			F			F			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	64.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	115.1	Sum of lost time (s)	19.2
Intersection Capacity Utilization	101.1%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	47	55	49	42	94	37	814	5	64	750	36
Future Volume (vph)	56	47	55	49	42	94	37	814	5	64	750	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.4	6.4		6.4	6.4		6.8	6.0		6.8	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	0.90		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1711		1770	1669		1770	1861		1770	1850	
Flt Permitted	0.67	1.00		0.69	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1244	1711		1284	1669		1770	1861		1770	1850	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	58	48	57	51	43	97	38	839	5	66	773	37
RTOR Reduction (vph)	0	49	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	58	56	0	51	140	0	38	844	0	66	810	0
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			4		1	6		5	2	
Permitted Phases	4			4								
Actuated Green, G (s)	10.8	10.8		10.8	10.8		3.7	42.5		5.4	44.2	
Effective Green, g (s)	10.8	10.8		10.8	10.8		3.7	42.5		5.4	44.2	
Actuated g/C Ratio	0.14	0.14		0.14	0.14		0.05	0.55		0.07	0.57	
Clearance Time (s)	6.4	6.4		6.4	6.4		6.8	6.0		6.8	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		1.5	2.5		1.5	2.5	
Lane Grp Cap (vph)	172	237		178	231		84	1015		122	1049	
v/s Ratio Prot		0.03			c0.08		0.02	c0.45		c0.04	0.44	
v/s Ratio Perm	0.05			0.04								
v/c Ratio	0.34	0.24		0.29	0.61		0.45	0.83		0.54	0.77	
Uniform Delay, d1	30.3	29.9		30.1	31.5		36.1	14.7		35.1	13.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.2		0.3	3.1		1.4	5.8		2.6	3.4	
Delay (s)	30.7	30.1		30.4	34.6		37.5	20.5		37.7	16.4	
Level of Service	C	C		C	C		D	C		D	B	
Approach Delay (s/veh)		30.3			33.5			21.3			18.0	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	21.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	77.9	Sum of lost time (s)	19.2
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	1078	39	42	1180
Future Volume (Veh/h)	0	0	1078	39	42	1180
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	1172	42	46	1283
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						534
pX, platoon unblocked	0.37					
vC, conflicting volume	2568	1193			1214	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	4361	1193			1214	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			92	
cM capacity (veh/h)	1	228			575	

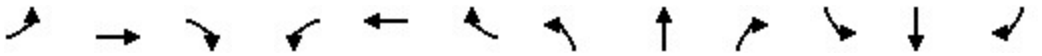
Direction, Lane #	NB 1	SB 1
Volume Total	1214	1329
Volume Left	0	46
Volume Right	42	0
cSH	1700	575
Volume to Capacity	0.71	0.08
Queue Length 95th (ft)	0	7
Control Delay (s/veh)	0.0	4.1
Lane LOS		A
Approach Delay (s/veh)	0.0	4.1
Approach LOS		

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	99.4%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	81	1078	0	0	1222
Future Volume (Veh/h)	0	81	1078	0	0	1222
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	88	1172	0	0	1328
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						449
pX, platoon unblocked	0.37					
vC, conflicting volume	2500	1172			1172	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	4238	1172			1172	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	62			100	
cM capacity (veh/h)	1	234			596	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	88	1172	1328
Volume Left	0	0	0
Volume Right	88	0	0
cSH	234	1700	1700
Volume to Capacity	0.38	0.69	0.78
Queue Length 95th (ft)	41	0	0
Control Delay (s/veh)	29.3	0.0	0.0
Lane LOS	D		
Approach Delay (s/veh)	29.3	0.0	0.0
Approach LOS	D		

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	68.4%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	54	53	86	67	80	37	1077	6	30	1083	32
Future Volume (vph)	59	54	53	86	67	80	37	1077	6	30	1083	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.4	6.4		6.4	6.4		6.8	6.0		6.8	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.92		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	1675		1719	1662		1719	1808		1719	1802	
Flt Permitted	0.54	1.00		0.68	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	979	1675		1225	1662		1719	1808		1719	1802	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	69	63	62	100	78	93	43	1252	7	35	1259	37
RTOR Reduction (vph)	0	33	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	69	92	0	100	171	0	43	1259	0	35	1296	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			4		1	6		5	2	
Permitted Phases	4			4								
Actuated Green, G (s)	14.8	14.8		14.8	14.8		4.3	61.3		4.0	61.0	
Effective Green, g (s)	14.8	14.8		14.8	14.8		4.3	61.3		4.0	61.0	
Actuated g/C Ratio	0.15	0.15		0.15	0.15		0.04	0.62		0.04	0.61	
Clearance Time (s)	6.4	6.4		6.4	6.4		6.8	6.0		6.8	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		1.5	2.5		1.5	2.5	
Lane Grp Cap (vph)	145	249		182	247		74	1116		69	1106	
v/s Ratio Prot		0.05			c0.10		c0.03	0.70		0.02	c0.72	
v/s Ratio Perm	0.07			0.08								
v/c Ratio	0.48	0.37		0.55	0.69		0.58	1.13		0.51	1.17	
Uniform Delay, d1	38.7	38.0		39.2	40.1		46.6	19.0		46.7	19.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.3		1.8	6.6		7.3	69.5		2.1	87.2	
Delay (s)	39.6	38.4		41.0	46.7		53.9	88.5		48.8	106.3	
Level of Service	D	D		D	D		D	F		D	F	
Approach Delay (s/veh)		38.8			44.6			87.3			104.8	
Approach LOS		D			D			F			F	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	88.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	99.3	Sum of lost time (s)	19.2
Intersection Capacity Utilization	87.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	1032	34	35	1049
Future Volume (Veh/h)	0	0	1032	34	35	1049
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	1122	37	38	1140
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						534
pX, platoon unblocked	0.40					
vC, conflicting volume	2357	1141			1159	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3649	1141			1159	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			94	
cM capacity (veh/h)	2	244			603	

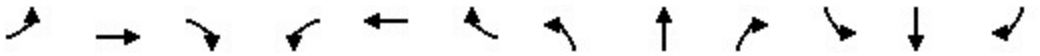
Direction, Lane #	NB 1	SB 1
Volume Total	1159	1178
Volume Left	0	38
Volume Right	37	0
cSH	1700	603
Volume to Capacity	0.68	0.06
Queue Length 95th (ft)	0	5
Control Delay (s/veh)	0.0	2.5
Lane LOS		A
Approach Delay (s/veh)	0.0	2.5
Approach LOS		

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	68	1032	0	0	1084
Future Volume (Veh/h)	0	68	1032	0	0	1084
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	74	1122	0	0	1178
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						449
pX, platoon unblocked	0.39					
vC, conflicting volume	2300	1122			1122	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3532	1122			1122	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	70			100	
cM capacity (veh/h)	3	251			623	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	74	1122	1178
Volume Left	0	0	0
Volume Right	74	0	0
cSH	251	1700	1700
Volume to Capacity	0.30	0.66	0.69
Queue Length 95th (ft)	30	0	0
Control Delay (s/veh)	25.3	0.0	0.0
Lane LOS	D		
Approach Delay (s/veh)	25.3	0.0	0.0
Approach LOS	D		

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	211	77	148	113	65	51	1004	12	87	859	51
Future Volume (vph)	49	211	77	148	113	65	51	1004	12	87	859	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.4	6.4		6.4	6.4		6.8	6.0		6.8	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.95		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1788		1770	1760		1770	1859		1770	1847	
Flt Permitted	0.52	1.00		0.28	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	972	1788		528	1760		1770	1859		1770	1847	
Peak-hour factor, PHF	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)	53	229	84	161	123	71	55	1091	13	95	934	55
RTOR Reduction (vph)	0	11	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	53	302	0	161	194	0	55	1104	0	95	989	0
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			4		1	6		5	2	
Permitted Phases	4			4								
Actuated Green, G (s)	25.0	25.0		25.0	25.0		6.6	61.4		9.5	64.3	
Effective Green, g (s)	25.0	25.0		25.0	25.0		6.6	61.4		9.5	64.3	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.06	0.53		0.08	0.56	
Clearance Time (s)	6.4	6.4		6.4	6.4		6.8	6.0		6.8	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		1.5	2.5		1.5	2.5	
Lane Grp Cap (vph)	211	388		114	382		101	991		146	1031	
v/s Ratio Prot		0.17			0.11		0.03	c0.59		c0.05	c0.54	
v/s Ratio Perm	0.05			c0.30								
v/c Ratio	0.25	0.78		1.41	0.51		0.54	1.11		0.65	0.96	
Uniform Delay, d1	37.3	42.4		45.1	39.6		52.8	26.8		51.2	24.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	8.7		229.3	0.4		3.2	65.1		7.7	18.7	
Delay (s)	37.5	51.1		274.3	40.0		56.0	91.9		58.9	42.9	
Level of Service	D	D		F	D		E	F		E	D	
Approach Delay (s/veh)		49.2			146.3			90.2			44.3	
Approach LOS		D			F			F			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	75.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	115.1	Sum of lost time (s)	19.2
Intersection Capacity Utilization	103.7%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	836	31	32	864
Future Volume (Veh/h)	0	0	836	31	32	864
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	909	34	35	939
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						534
pX, platoon unblocked	0.62					
vC, conflicting volume	1935	926			943	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2205	926			943	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			95	
cM capacity (veh/h)	29	326			727	

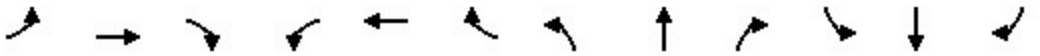
Direction, Lane #	NB 1	SB 1
Volume Total	943	974
Volume Left	0	35
Volume Right	34	0
cSH	1700	727
Volume to Capacity	0.55	0.05
Queue Length 95th (ft)	0	4
Control Delay (s/veh)	0.0	1.4
Lane LOS		A
Approach Delay (s/veh)	0.0	1.4
Approach LOS		

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	74.7%	ICU Level of Service	D	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	60	836	0	0	896
Future Volume (Veh/h)	0	60	836	0	0	896
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	65	909	0	0	974
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						449
pX, platoon unblocked	0.61					
vC, conflicting volume	1883	909			909	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2125	909			909	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	80			100	
cM capacity (veh/h)	34	333			749	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	65	909	974
Volume Left	0	0	0
Volume Right	65	0	0
cSH	333	1700	1700
Volume to Capacity	0.20	0.53	0.57
Queue Length 95th (ft)	18	0	0
Control Delay (s/veh)	18.4	0.0	0.0
Lane LOS	C		
Approach Delay (s/veh)	18.4	0.0	0.0
Approach LOS	C		

Intersection Summary			
Average Delay		0.6	
Intersection Capacity Utilization		54.4%	ICU Level of Service A
Analysis Period (min)		15	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	47	56	79	42	94	38	824	5	64	761	36
Future Volume (vph)	56	47	56	79	42	94	38	824	5	64	761	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.4	6.4		6.4	6.4		6.8	6.0		6.8	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	0.90		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1710		1770	1669		1770	1861		1770	1850	
Flt Permitted	0.67	1.00		0.69	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1244	1710		1283	1669		1770	1861		1770	1850	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	58	48	58	81	43	97	39	849	5	66	785	37
RTOR Reduction (vph)	0	50	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	58	56	0	81	140	0	39	854	0	66	822	0
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			4		1	6		5	2	
Permitted Phases	4			4								
Actuated Green, G (s)	10.8	10.8		10.8	10.8		3.7	42.0		5.3	43.6	
Effective Green, g (s)	10.8	10.8		10.8	10.8		3.7	42.0		5.3	43.6	
Actuated g/C Ratio	0.14	0.14		0.14	0.14		0.05	0.54		0.07	0.56	
Clearance Time (s)	6.4	6.4		6.4	6.4		6.8	6.0		6.8	6.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		1.5	2.5		1.5	2.5	
Lane Grp Cap (vph)	173	238		179	233		84	1011		121	1043	
v/s Ratio Prot		0.03			c0.08		0.02	c0.46		c0.04	0.44	
v/s Ratio Perm	0.05			0.06								
v/c Ratio	0.34	0.24		0.45	0.60		0.46	0.84		0.55	0.79	
Uniform Delay, d1	30.0	29.6		30.5	31.2		35.8	14.9		34.8	13.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.2		0.7	3.0		1.5	6.5		2.7	3.9	
Delay (s)	30.4	29.8		31.2	34.2		37.3	21.4		37.5	17.1	
Level of Service	C	C		C	C		D	C		D	B	
Approach Delay (s/veh)		30.0			33.1			22.1			18.6	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	22.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	77.3	Sum of lost time (s)	19.2
Intersection Capacity Utilization	81.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group