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TRAFFIC IMPACT STUDY

To: Mr. Michael Anderson
Haeger Engineering

From: Daniel P. Brinkman, P.E., PTOE
Amanda L. Larson, P.E.I.

Date: March 1, 2013

Subject: Proposed Redevelopment – Double G's Roadhouse
Gilmer Road @ IL Rte 83
Long Grove, Illinois

GEWALT HAMILTON ASSOCIATES, INC. (GHA) has conducted a traffic impact study (TIS) for the above captioned project. Per the January 17, 2013 Haeger Engineering Preliminary Site Plan (*See Exhibit 4*), the proposed restaurant redevelopment is located on the southwest corner or IL Rte 83 and Gilmer Road in Long Grove, IL.

The following summarizes our findings and provides various recommendations for your consideration. *Exhibits* referenced are conveniently located at the end of this document.

PART I. BACKGROUND INFORMATION

Exhibits 1 and 2 – Site Location Map and Photo Inventory

Exhibit 1 provides a location map of the site vicinity and *Exhibit 2* provides a photo inventory of current traffic operations. Pertinent comments include:

- The site is located on the southwest corner of the intersection of IL Rte 83 and Gilmer Rd/Oakwood Rd.
- IL Rte 83 is a major north-south route under the jurisdiction of the Illinois Department of Transportation (IDOT).
- Gilmer Road is under the jurisdiction of the Lake County Division of Transportation.
- At its signal controlled intersection with IL Rte 83, Gilmer Road is 5 lanes, two westbound lanes and 1 left turn, right turn, and through lanes in the eastbound direction. Along the site frontage, Gilmer Road tapers down to two lanes just west of the site. IL Rte 83 provides two travel lanes in each direction and northbound dual left turn lanes onto Gilmer Rd.
- The speed limit on Gilmer Road and IL Rte 83 is 45 miles per hour along the site frontage, and 25 mph on Oakwood Road east of the site.

Exhibit 3 – Existing Traffic

Exhibit 3 summarizes the existing Weekday Morning and Evening Peak Hour traffic volumes in the site vicinity as well as the 24-hour or Average Daily Traffic (ADT) volume. GHA conducted 24-hour turning movement counts at the IL Rte 83 / Gilmer Road intersection on Wednesday February 20, 2013. As can be seen, IL Rte 83 carries approximately 38,800 vehicles per day and Gilmer Road carries approximately 5,900 vehicles per day.

The observed Peak Hours occurred from 7:00-8:00 AM and from 4:45 to 5:45 PM.

No unusual activities (e.g. emergency vehicle activity, roadway construction, etc) or inclement weather were observed during our counts that would be expected to impact traffic volumes or travel patterns in the vicinity.

Summaries of the exiting traffic counts can be found in Appendix I

PART II. TRAFFIC PROJECTIONS

Exhibit 4 – Concept Site Plan

Attached, as *Exhibit 4,* is the preliminary Site Plan for Double G's Roadhouse, prepared by Haeger Engineering dated January 17, 2013. As can be seen, the existing building will be reused and an outdoor seating area will be added. The existing Right-In/Right-Out Only entrance onto Gilmer Road will be closed and a new entrance is proposed approximately 110 feet to the west. The existing Right-In/Right-Out only access along IL Rte 83 will remain as is. A new parking lot with approximately 122 spaces, 25 being land banked, is proposed to the west of the existing building, bringing the site total to 247 spaces.

Exhibit 5 – Project Traffic Characteristics

Exhibit 5 – Part A lists the traffic generation calculations for the proposed redeveloped restaurant. Traffic generations are based on trip rate data published by the Institute of Transportation Engineers (ITE) in most recent, 9th Edition of the manual *Trip Generation.* The trip generations were calculated using both the square footage of the building, as well as the number of proposed seats. The generation based on the square footage was slightly higher; making it a more conservative estimate of trips and as such, will serve as the basis for our analysis.

As can be seen, the development is expected to generate between approximately 15 and 135 trips (combined entering and exiting) during the Morning and Evening Peak Hours respectively, and 1,600 trips on a daily or 24-hour basis.

Exhibit 5 – Part B provides the anticipated trip distribution, which is primarily based on the existing traffic volumes on IL Rte 83 and Gilmer Road. It is expected that 45% of the site traffic will come from and 30% will go to the south, 35% will come from and 40% will go to the north, 15% will come from and 25% will go to the west, and the remaining 5% will come from and go to the east. Ultimately, trip distribution will be primarily a function of where patrons and employees reside.

Exhibits 6 and 7 – Traffic Assignments

Exhibit 6 illustrates the site traffic assignment, which is based on the traffic characteristics summarized in *Exhibit 5* (e.g. traffic generations and trip distribution) and the site access. The anticipated trip distribution is also shown on *Exhibit 6*.

Site traffic and existing volumes (see *Exhibits 6 and 3*) were combined to produce the Total Traffic Assignment, which is illustrated in *Exhibit 7*. Per the LCDOT Highway Access Regulation Ordinance (HARO) guidelines, the background volumes were increased by 3% per year for 1 year which should coincide with the anticipated completion and buildout of the site.

PART III. TRAFFIC EVALUATION

Exhibit 8 - LCDOT HARO Access Requirements

Turn Lane Treatments
Exhibit 8 Part A summarizes the turn lane requirements at the Gilmer Road intersection with the site access. As can be seen...

- Per Figure 11.1, a separate westbound left turn lane is required to accommodate left turning volumes.
- Per Figure 11.2, an increased radius is required to accommodate right turning traffic.

Sight Distance Requirements
Exhibit 8 Part B calculates the sight distance requirements at the Rollins Road intersection with the site access. As can be seen...

- The 45 mph posted speed limit requires a Design Speed of 50 mph.
- Intersection Sight Distance for the right turn out of the site (looking to the left / west) is based on Table 11.1 and is calculated at 555 feet.
- The presence of a second eastbound lane and center median / turn lane requires additional gap time for left turning vehicles (vehicles looking to the right / east) of 1.0 seconds at the design speed for a calculated Intersection Sight Distance of 624 feet.
- The proposed access location will provide adequate Intersection Sight Distance along Gilmer Road to meet the 50 mph Design Speed requirements in both directions.

Exhibit 9 – Sight Distance Analysis

Attached as *Exhibit* 9 is a Sight Distance Analysis prepare by Christopher B. Burke Engineering, April 15, 2004. As can be seen, the required sight distance along Gilmer Road is available in both directions to meet the Intersection Sight Distance required for the design speed of 50 mph.

Exhibit 10 – Intersection Capacity Analyses

Intersection Capacity Analyses were completed at both the signalized IL Rte 83 intersection with Gilmer Road as well as the two site driveways. The analysis parameters are listed in Part A, as published in the Transportation research Board's (TRB) 2000 Highway Capacity Manual (HCM). At signalized intersections, Level of Service (LOS) "reports" traffic operations using the letter designations "A" (best) through "F" (worst) and measures the "control delay" per vehicle in seconds. LOS C is often referred to as intersection "design" guideline and LOS D is usually considered as providing the lower threshold of "acceptable" operations. LOS E and F are usually considered "unacceptable".

At unsignalized intersections, the HCM methodology reports the results differently for Two-Way Stop Controlled (TWSC) or All-Way Stop Controlled (AWSC) intersections. For TWSC intersections, LOS is reported for conflicting movements on the major street (i.e. left turns onto the minor approach) and for each movement on the stopped approach. Approach "control delay" is also reported in seconds per vehicle. Results of AWSC analyses are slightly different. LOS is reported for each stopped approach as well as an average overall intersection "control delay" in seconds per vehicle. LOS C and D continue to be considered "design" and "acceptable" operations respectively.

Exhibit 10 summarizes the intersection capacity analysis results for the weekday morning and evening peak hours. As can be seen, the heavy regional volumes on IL Rte 83 result in longer than desirable delays for northbound left turns during both the morning and evening peak periods. The heavy right turn volumes in the morning from Gilmer Road to IL 83 also experience long delays. The additional traffic generated by the re-use of the restaurant is a fraction of the total traffic utilizing the intersection. The additional delays noted in our findings are primarily a function of the non-project growth considered in the Total Traffic assignment. Turning vehicles entering and exiting the site driveways are expected to operate at or above the "Design" LOS C during both peak hours.

The Highway Capacity Software (HCS) summary printouts are provided as *Appendix II* for reference.

Exhibit 11 - Recommended Traffic Operations Plan

Exhibit 11 schematically illustrates the recommended traffic operations. Key points include:

- A minimum 50-ft radius should be provided for inbound right turn movements.
- Site access should provide two outbound lanes, marked as a separate right turn and left turn lanes..
- Exiting traffic should be under Stop Sign control.

PART IV. CONCLUSION

Based on the standards and criteria in the LCDOT HARO, a separate westbound left turn lane will be required on Gilmer Road at the access. The existing full width median on Gilmer Road can be modified provide storage for left turns. An increased curb radius will be sufficient to accommodate right turns into the site.

PART V. TECHNICAL ADDENDUM

The following *Exhibits* were previously referenced. They provide technical support for our observations, findings, and recommendations discussed in the text.

Exhibits

1. Site Location Map
2. Photo Inventory
3. Existing Traffic
4. Preliminary Site Plan
5. Project Traffic Characteristics
6. Site Traffic
7. Total Traffic
8. LCDOT HARO Access Requirements
9. Sight Distance Analysis prepared by Christopher Burke Engineering (2004)
10. Intersection Capacity Analyses
11. Traffic Operations Plan

Appendices

I. Traffic Count Summaries
II. Capacity Analysis Worksheets
III. HARO Figures 11.1, 11.2

4689.900 Double G's Report DRAFT

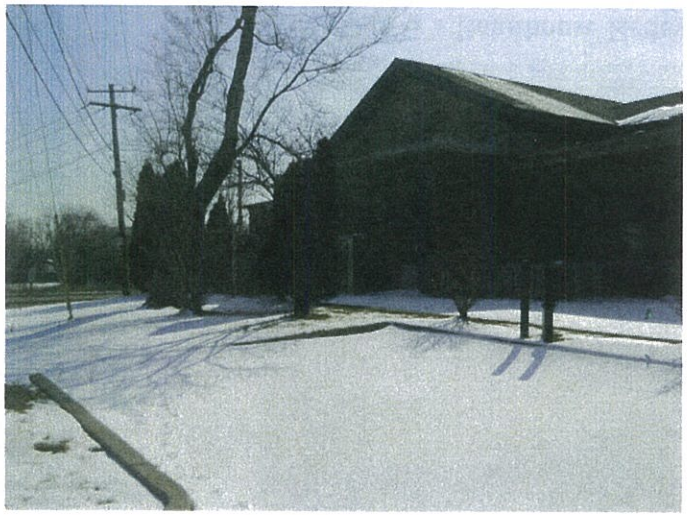
TECHNICAL ADDENDUM

GEWALT HAMILTON
ASSOCIATES, INC.

Double G's Roadhouse Redevelopment– IL Rte 83 @ Gilmer Rd, Long Grove, Illionis

GEWALT HAMILTON ASSOCIATES, INC.

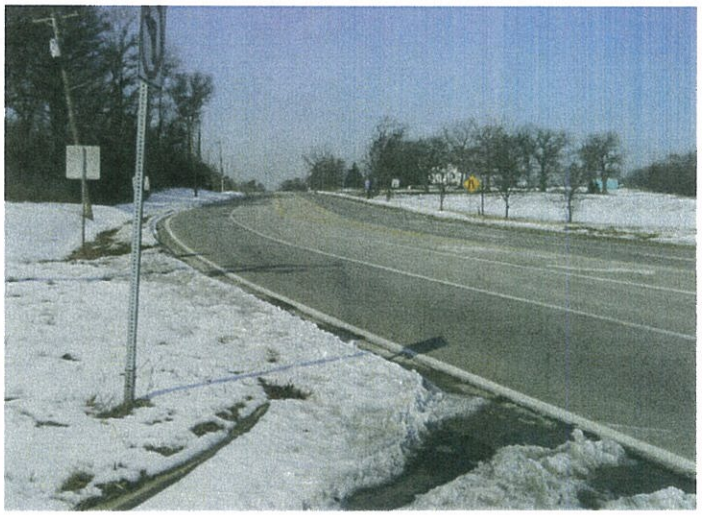
Exhibit 1
Location Map



Existing Building on site

Looking northeast towards Gilmer Rd at IL Rte 83 intersection

Looking east from existing RIRO drive along Gilmer Road



Looking West along Gilmer towards location of proposed entrance

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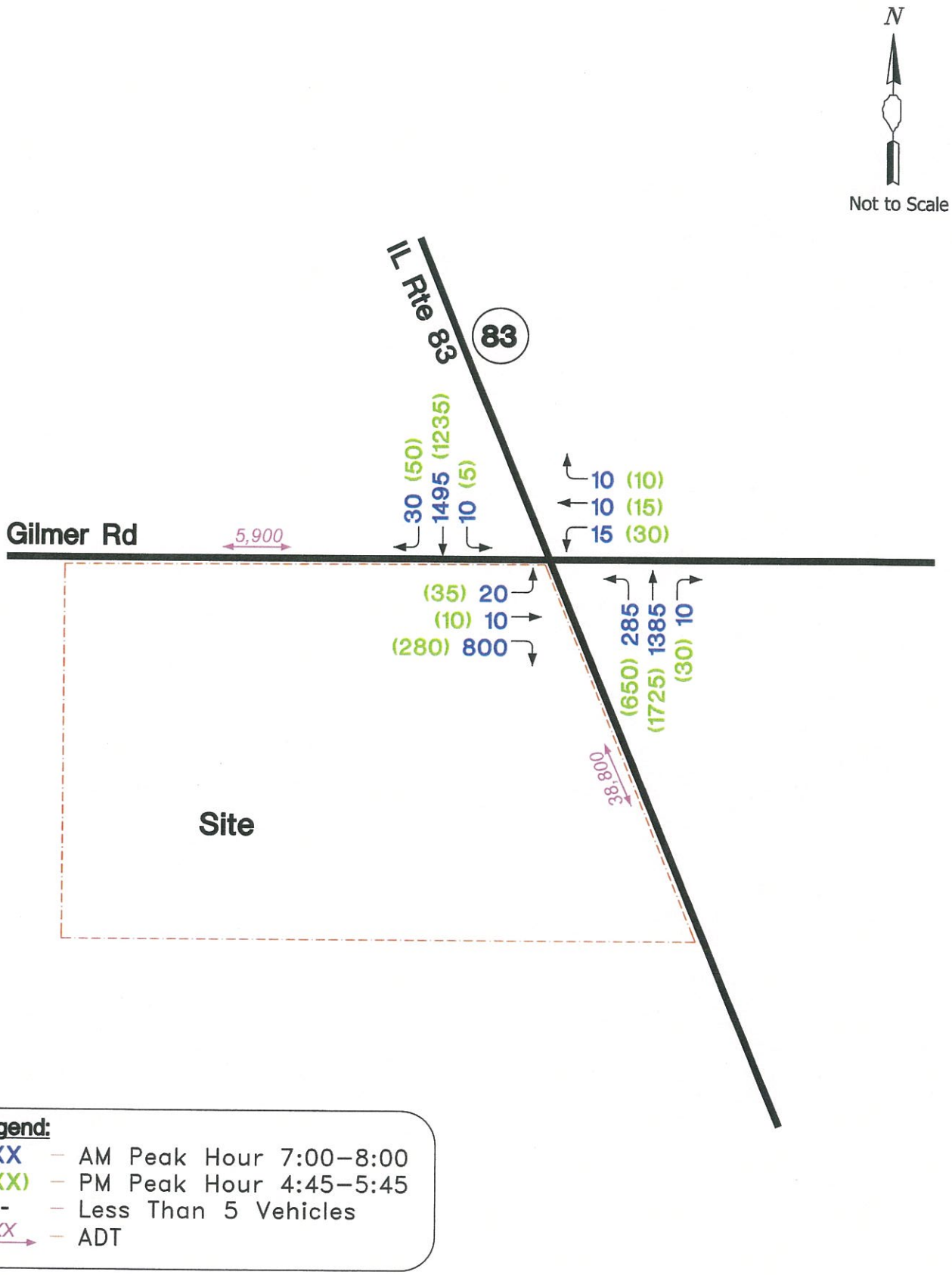
Exhibit 2

Photo Inventory



Legend:

XX	–	AM Peak Hour 7:00–8:00
(XX)	–	PM Peak Hour 4:45–5:45
-	–	Less Than 5 Vehicles
←XX→	–	ADT

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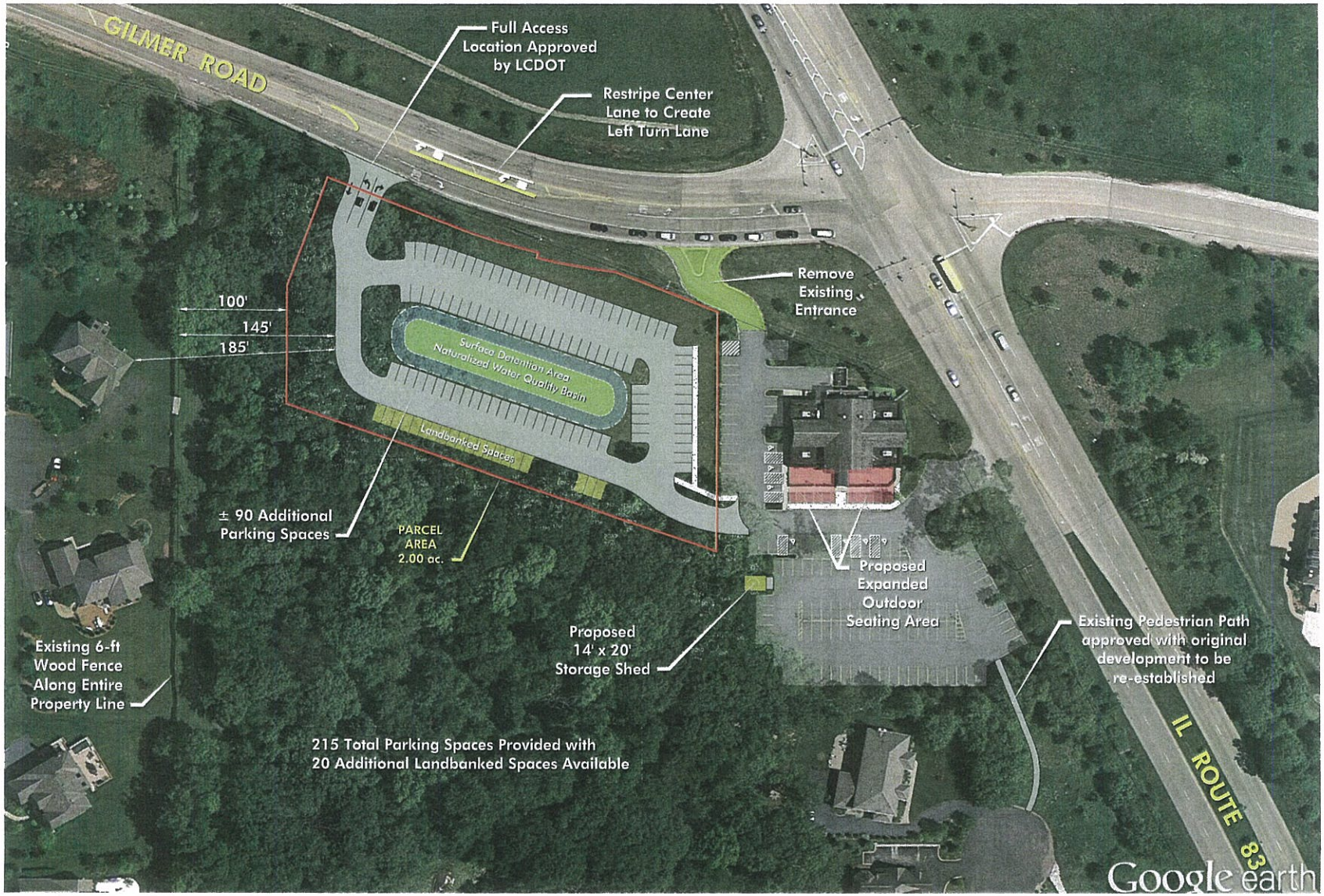
Exhibit 3
Existing Traffic



NORTH

Scale: 1" = 40'

HAEGER ENGINEERING
consulting engineers • land surveyors

SITE PLAN EXHIBIT

DOUBLE G'S ROADHOUSE
LONG GROVE, IL

Project Manager	MLA
Engineer:	
Date:	2-28-13
Project No.	13-001
Sheet	1

Exhibit 5
Project Traffic Characteristics
Double G's Roadhouse - Long Grove, Illinois

Part A. Traffic Generation Calculations

	ITE Code	Morning Peak Hour In	Morning Peak Hour Out	Morning Peak Hour Sum	Evening Peak Hour In	Evening Peak Hour Out	Evening Peak Hour Sum	Daily Sum
Quality Restaurant • 17,790 SF	#931	10	5	15	90	45	135	1600
Quality Restaurant • 484 Seats	#931	10	5	15	85	40	125	1365
Increments =		*0*	*0*	*0*	*+5*	*+5*	*+10*	*+235*

Discussion: Use square feet as variable, because traffic generations are higher.

Source: ITE Trip Generation Manual; 9th Edition

Part B. Trip Distribution

Route & Direction	Percent Use by Route: Approach Site From	Percent Use by Route: Depart Site To
IL Rte 83		
- North of Gilmer Road	35%	40%
- South of Site	45%	30%
Gilmer Road		
- East of IL Rte 83	5%	5%
- Northwest of Site	15%	25%
Totals =	100%	100%

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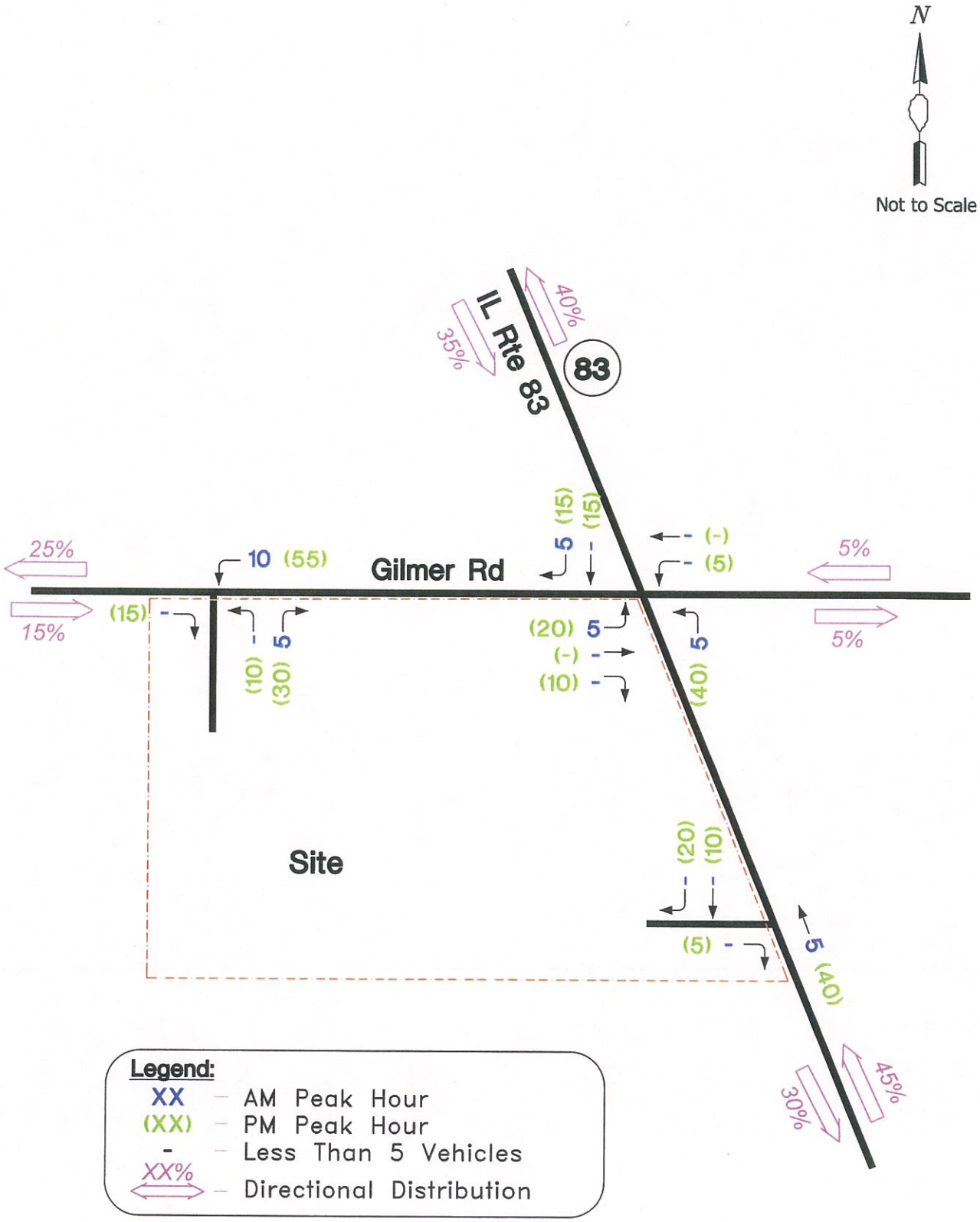

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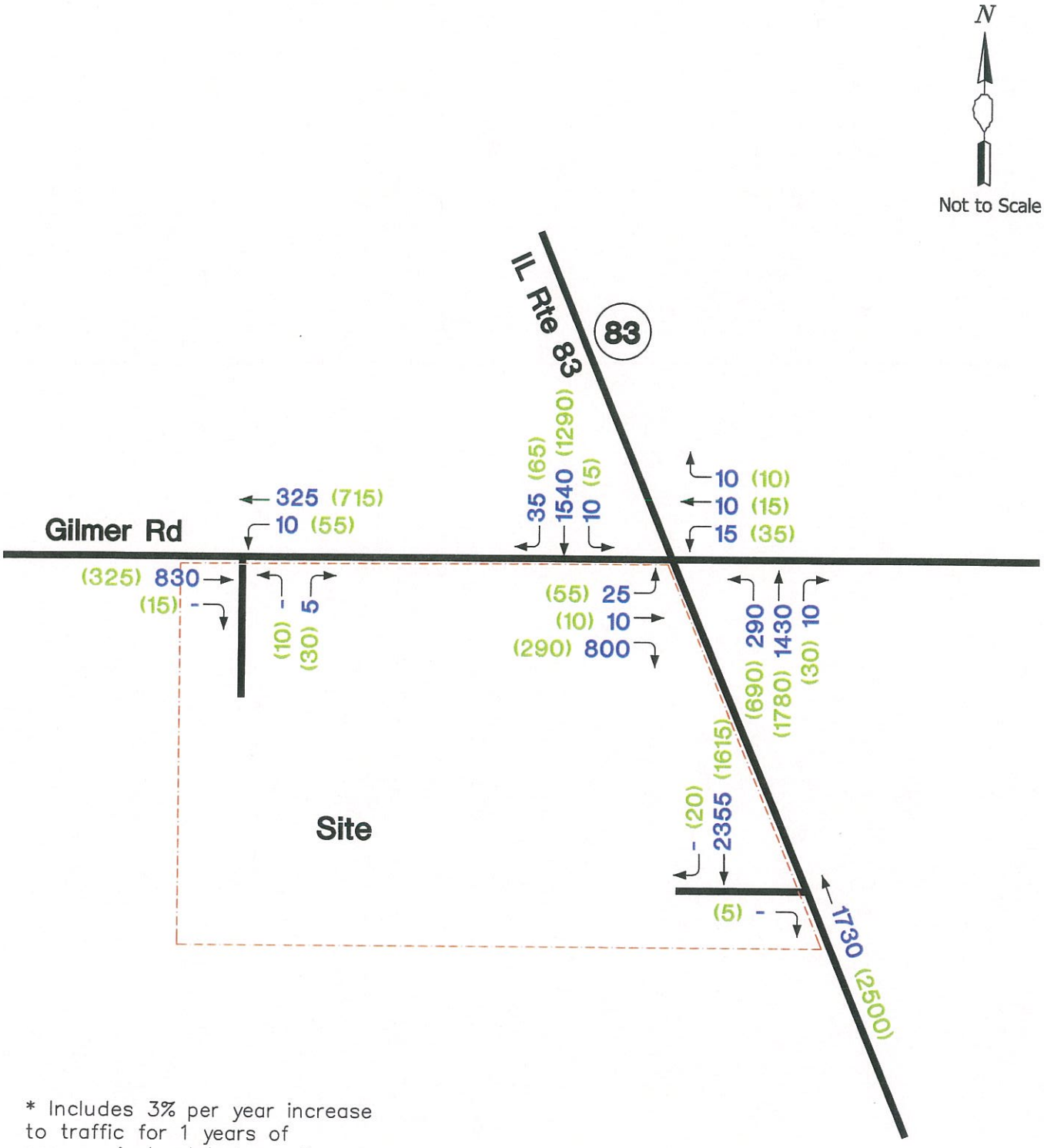
Exhibit 6
Site Traffic



* Includes 3% per year increase to traffic for 1 years of non-project related growth after buildout (2013).

Legend:

XX – AM Peak Hour
(XX) – PM Peak Hour
\- – Less Than 5 Vehicles

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Exhibit 7
Total Traffic

Exhibit 8
Access Requirements

Double G's Roadhouse - Gilmer Rd @ IL Rte 83

Long Grove, Illinois

Per Lake County Highway Access Regulation Ordinance

Gilmer Road @ Site Access

Part A. Turn Lane Requirements

1. Left Turn Lane Treatment (HARO Figure 11.1)

	Morning Peak Hour	Evening Peak Hour
Eastbound Opposing	830 vehicles	325 vehicles
Westbound Left & Through	335 vehicles	770 vehicles

Result: An eastbound left turn lane is required.

2. Right Turn Lane Treatment (HARO Figure 11.2)

	Morning Peak Hour	Evening Peak Hour
Eastbound Right Turns	0 vehicles	15 vehicles
Total Eastbound	830 vehicles	340 vehicles

Result: Increased corner radius is required.

Part B. Sight Distance Requirement

Posted Speed Limit = 45

Design Speed = 50 (2)

Center Turn Lane = YES

		Intersection Sight Distance (3)	Stopping Sight Distance (4)	Result
To/From West	660 feet	555 feet	425 feet	OK
To/From East	660 feet	624 feet	425 feet	OK

Notes: 1) Section 11.4.2b indicates that turn lane may not be needed if turning volume is less than 20 vehicles.

2) Design Speed is equal to Posted Speed limit plus 5 mph

3) Intersection Sight Distance calculated for actual roadway conditions

4) Stopping Sight Distance from HARO Table 11.2

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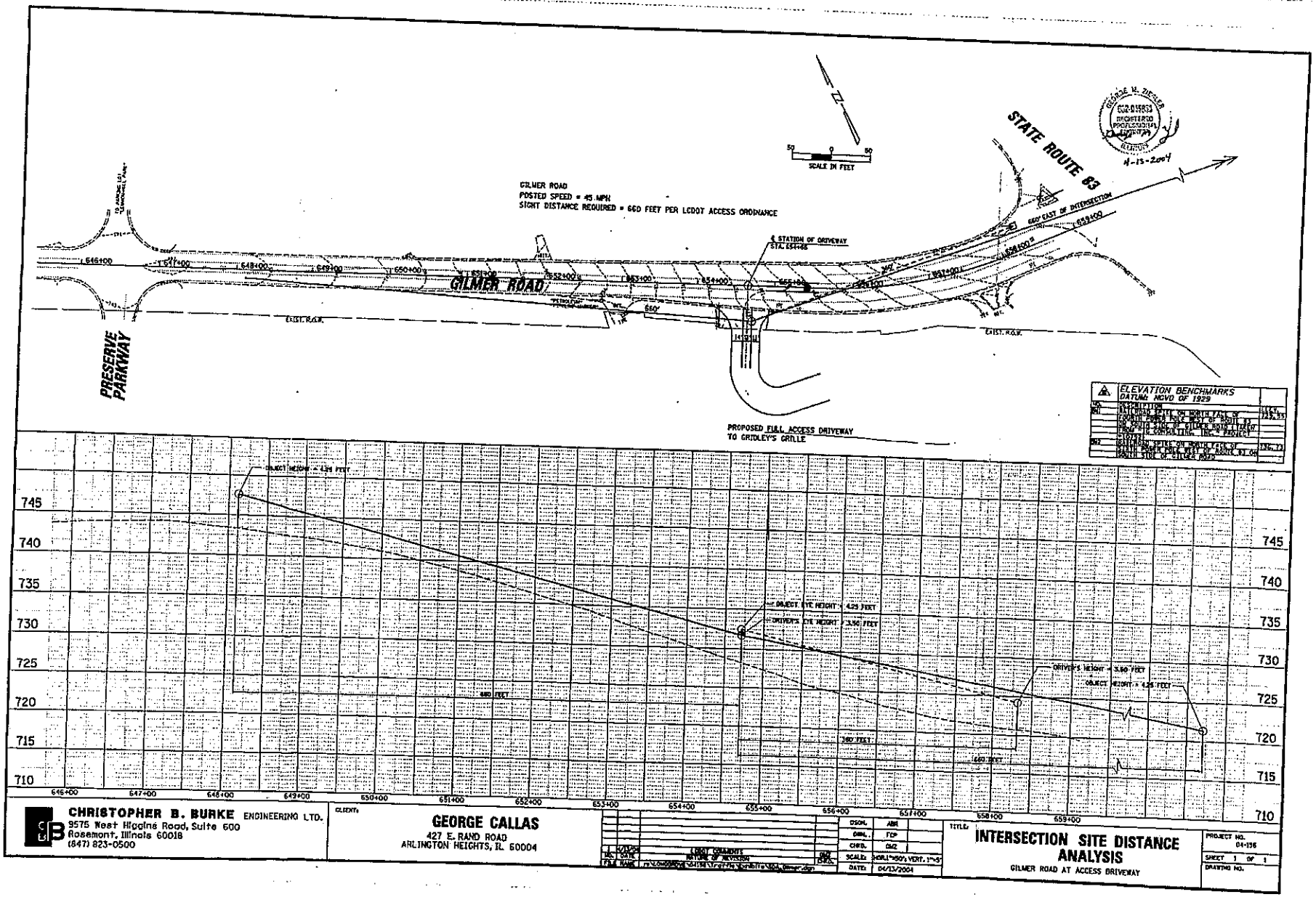

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CLIENT:
GEORGE CALLAS
427 E. RAND ROAD
ARLINGTON HEIGHTS, IL 60004

DSGN.	ABR	
DWN.	FCP	
CHKD.	DMZ	
SCALE:	HOR.1"=50'; VERT. 1"=5'	
DATE:	04/13/2004	

TITLE:
INTERSECTION SITE DISTANCE ANALYSIS
GILMER ROAD AT ACCESS DRIVEWAY

PROJECT NO. 04-156
SHEET 1 OF 1
DRAWING NO.

Exhibit 10
Intersection Capacity Analyses
Double G's Roadhouse - Long Grove, Illinois

Part A. Parameters - Type of Traffic Control *(Source: 2000 Highway Capacity Manual)*

I. Traffic Signals

LOS	Delay (sec / veh)	Description
A	≤ 10	All signal phases clear waiting vehicles without delay
B	>10 and ≤ 20	Minimal delay experienced on select signal phases
C	>20 and ≤ 35	Some delay experienced on several phases; often used as design criteria
D	>35 and ≤ 55	Usually considered as the acceptable delay standard
E	>55 and ≤ 80	Very long delays experienced during the peak hours
F	>80	Unacceptable delays experienced throughout the peak hours

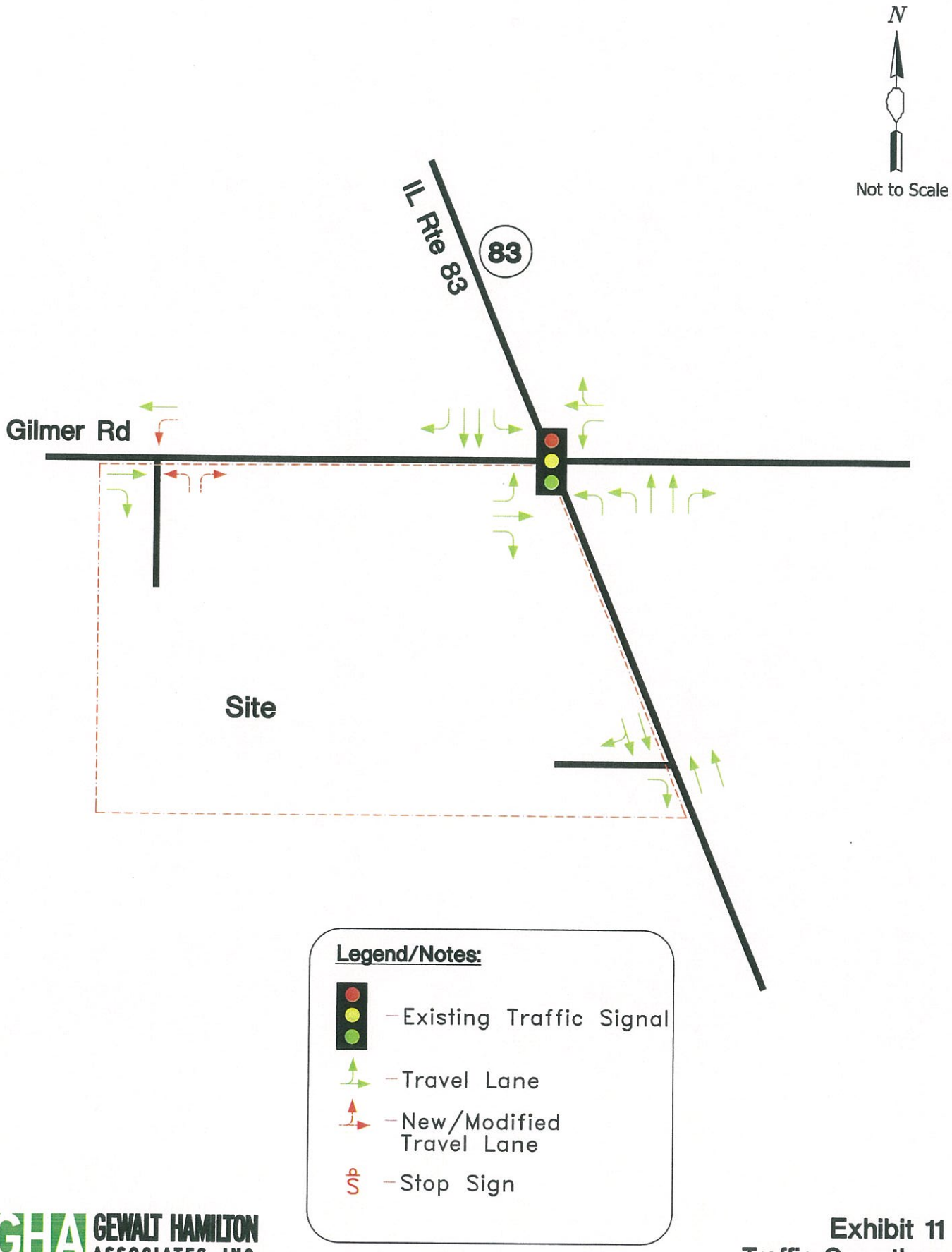
II. Stop Sign

LOS	Delay (sec / veh)
A	≤ 10
B	>10 and ≤ 15
C	>15 and ≤ 25
D	>25 and ≤ 35
E	>35 and ≤ 50
F	>50

Part B. Results

	Roadway Conditions	LOS Per Movement By Approach (> = Shared Lane; - = Non Critical or not Allowed Movement)												Intersection / Approach	
		Eastbound			Westbound			Northbound			Southbound			Delay	
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	(sec / veh)	LOS
1. IL RTE 83 @ Gilmer Rd	**Traffic Signal**													**Intersection Delay**	
A. Weekday Morning Peak Hour															
Existing Traffic (See *Exhibit 3*)	• Current	D	D	F	D	D	<	F	C	B	E	D	B	84.7	F
Total Traffic (*See Exhibit 7*)	• Current	D	D	F	D	D	<	F	C	B	E	D	B	86.0	F
B. Weekday Evening Peak Hour															
Existing Traffic (See *Exhibit 3*)	• Current	E	E	D	E	E	<	F	B	B	E	C	B	81.2	F
Total Traffic (*See Exhibit 7*)	• Current	E	E	D	E	E	<	F	B	B	E	C	B	90.0	F
2. Gilmer Rd @ Site Access	**TWSC - NB Stops**													**NB Approach Delay**	
A. Weekday Morning Peak Hour															
Total Traffic (*See Exhibit 7*)	• As Planned	-	-	-	A	-	-	C	-	B	-	-	-	15.0	B
B. Weekday Evening Peak Hour															
Total Traffic (*See Exhibit 7*)	• As Planned	-	-	-	A	-	-	C	-	B	-	-	-	11.7	B
3. IL Rte 83 @ Site Access	**TWSC - EB Stops**													**EB Approach Delay**	
A. Weekday Morning Peak Hour															
Total Traffic (*See Exhibit 7*)	• As Planned	-	-	C	-	-	-	-	-	-	-	-	-	20.4	C
B. Weekday Evening Peak Hour															
Total Traffic (*See Exhibit 7*)	• As Planned	-	-	B	-	-	-	-	-	-	-	-	-	14.6	B

GHA GEWALT HAMILTON ASSOCIATES, INC.



GEWALT HAMILTON ASSOCIATES, INC.

Exhibit 11
Traffic Operations

APPENDICES

I. Traffic Count Summaries
II. Capacity Analysis Summary Worksheets
III. HARO Figure 11.1, 11.2
IV. Parking Generation Table

Gewalt Hamilton Associates

850 Forest Edge Dr
Vernon Hills, IL
Vernon Hills - Gurnee - Chicago

4689.900 DOUBLE G'S ROADHOUSE
GILMER RD @ IL RTE 83
24 HR
GHA MIO

File Name : IL_83_@_Gilmer_and_O_96329_02-20-2013
Site Code :
Start Date : 2/20/2013
Page No : 1

Groups Printed- Car - Truck

	IL Rte 83 Southbound					Oakwood Rd Westbound					IL Rte 83 Northbound					Gilmer Rd Eastbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
12:00 AM	0	25	0	0	25	2	0	0	0	2	8	33	0	0	41	1	0	0	0	1	69
12:15 AM	0	19	0	0	19	0	0	0	0	0	9	28	0	0	37	0	0	1	0	1	57
12:30 AM	0	16	0	0	16	0	0	0	0	0	5	21	0	0	26	0	0	3	0	3	45
12:45 AM	0	13	0	0	13	0	0	0	0	0	8	16	0	0	24	0	0	3	0	3	40
Total	0	73	0	0	73	2	0	0	0	2	30	98	0	0	128	1	0	7	0	8	211
01:00 AM	0	12	1	0	13	0	0	1	0	1	1	13	1	0	15	0	0	2	0	2	31
01:15 AM	0	16	0	0	16	0	0	0	0	0	5	18	0	0	23	0	0	1	0	1	40
01:30 AM	0	8	0	0	8	0	0	0	0	0	3	17	1	0	21	0	0	3	0	3	32
01:45 AM	0	7	0	0	7	0	0	0	0	0	1	14	0	0	15	0	0	0	0	0	22
Total	0	43	1	0	44	0	0	1	0	1	10	62	2	0	74	0	0	6	0	6	125
02:00 AM	0	5	0	0	5	0	0	0	0	0	7	10	0	0	17	0	0	1	0	1	23
02:15 AM	0	14	0	1	15	0	0	0	0	0	5	9	0	0	14	1	0	4	0	5	34
02:30 AM	0	11	0	0	11	0	0	0	0	0	3	10	0	0	13	0	0	3	0	3	27
02:45 AM	0	5	0	0	5	0	0	0	0	0	4	12	0	0	16	1	0	4	0	5	26
Total	0	35	0	1	36	0	0	0	0	0	19	41	0	0	60	2	0	12	0	14	110
03:00 AM	0	14	0	0	14	0	0	0	0	0	2	10	0	0	12	0	0	4	0	4	30
03:15 AM	0	13	1	0	14	0	0	0	0	0	0	11	0	0	11	0	0	9	0	9	34
03:30 AM	0	24	0	0	24	0	0	0	0	0	2	16	0	0	18	0	0	8	0	8	50
03:45 AM	0	14	0	0	14	0	0	0	0	0	3	17	0	0	20	0	0	9	0	9	43
Total	0	65	1	0	66	0	0	0	0	0	7	54	0	0	61	0	0	30	0	30	157
04:00 AM	0	29	0	0	29	0	0	0	0	0	0	12	0	0	12	0	0	8	0	8	49
04:15 AM	0	36	1	0	37	1	0	0	0	1	3	20	0	0	23	0	0	19	0	19	80
04:30 AM	0	51	0	0	51	1	0	1	0	2	2	21	0	0	23	0	0	35	0	35	111
04:45 AM	0	55	0	0	55	0	0	0	0	0	3	34	1	0	38	1	1	22	0	24	117
Total	0	171	1	0	172	2	0	1	0	3	8	87	1	0	96	1	1	84	0	86	357
05:00 AM	0	97	2	0	99	1	0	2	0	3	4	31	1	0	36	0	0	56	0	56	194
05:15 AM	0	128	1	0	129	1	0	0	0	1	6	44	0	0	50	1	0	61	0	62	242
05:30 AM	0	179	1	0	180	0	0	0	0	0	9	106	1	0	116	0	0	161	0	161	457
05:45 AM	0	158	1	0	159	1	0	0	0	1	9	109	0	0	118	0	1	114	0	115	393
Total	0	562	5	0	567	3	0	2	0	5	28	290	2	0	320	1	1	392	0	394	1286
06:00 AM	0	259	1	0	260	2	0	0	0	2	13	119	2	0	134	0	0	128	0	128	524
06:15 AM	1	368	0	0	369	6	0	0	0	6	20	181	0	0	201	0	0	164	0	164	740
06:30 AM	0	349	3	0	352	1	0	0	0	1	34	230	0	0	264	3	1	217	0	221	838

Gewalt Hamilton Associates

850 Forest Edge Dr
Vernon Hills, IL
Vernon Hills - Gurnee - Chicago

4689.900 DOUBLE G'S ROADHOUSE
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06:45 AM	0	333	6	1	340	4	0	1	0	5	35	276	0	0	311	4	0	195	0	199	855
Total	1	1309	10	1	1321	13	0	1	0	14	102	806	2	0	910	7	1	704	0	712	2957
07:00 AM	3	389	4	0	396	6	0	3	0	9	47	291	1	0	339	4	1	186	0	191	935
07:15 AM	3	460	12	0	475	3	1	1	0	5	82	385	2	0	469	2	3	197	0	202	1151
07:30 AM	0	334	8	0	342	3	3	1	0	7	76	391	2	0	469	2	0	206	0	208	1026
07:45 AM	1	312	4	0	317	2	2	4	0	8	76	318	5	0	399	9	3	210	0	222	946
Total	7	1495	28	0	1530	14	6	9	0	29	281	1385	10	0	1676	17	7	799	0	823	4058
08:00 AM	0	324	14	0	338	4	4	2	0	10	68	272	2	0	342	3	2	218	0	223	913
08:15 AM	3	323	11	0	337	5	1	3	0	9	53	284	9	0	346	8	4	192	0	204	896
08:30 AM	3	290	2	0	295	4	3	6	0	13	39	298	5	0	342	6	3	151	0	160	810
08:45 AM	0	280	6	0	286	2	0	2	0	4	46	303	1	0	350	3	0	120	0	123	763
Total	6	1217	33	0	1256	15	8	13	0	36	206	1157	17	0	1380	20	9	681	0	710	3382
09:00 AM	2	224	3	1	230	2	0	0	0	2	27	277	2	0	306	4	0	97	0	101	639
09:15 AM	2	220	6	1	229	2	0	1	0	3	37	260	1	1	299	2	1	82	0	85	616
09:30 AM	1	211	3	0	215	3	1	1	0	5	30	224	2	1	257	1	1	79	0	81	558
09:45 AM	2	206	1	0	209	1	0	0	0	1	23	190	0	0	213	2	0	81	0	83	506
Total	7	861	13	2	883	8	1	2	0	11	117	951	5	2	1075	9	2	339	0	350	2319
10:00 AM	2	161	3	0	166	0	1	0	0	1	28	173	2	1	204	2	0	55	0	57	428
10:15 AM	3	162	3	0	168	0	0	2	0	2	33	152	0	1	186	3	1	74	0	78	434
10:30 AM	0	141	4	0	145	3	1	4	0	8	40	193	0	0	233	3	0	67	0	70	456
10:45 AM	0	184	1	0	185	0	0	0	0	0	28	159	2	0	189	3	2	55	0	60	434
Total	5	648	11	0	664	3	2	6	0	11	129	677	4	2	812	11	3	251	0	265	1752
11:00 AM	6	229	5	0	240	4	0	2	0	6	36	168	3	1	208	6	1	66	0	73	527
11:15 AM	8	177	3	1	189	2	0	2	0	4	34	184	5	0	223	2	0	46	0	48	464
11:30 AM	2	208	3	0	213	4	1	1	0	6	35	191	1	0	227	5	0	52	0	57	503
11:45 AM	2	195	6	0	203	7	0	3	0	10	44	175	1	2	222	7	0	53	0	60	495
Total	18	809	17	1	845	17	1	8	0	26	149	718	10	3	880	20	1	217	0	238	1989
12:00 PM	1	165	5	0	171	1	1	1	0	3	39	170	1	0	210	5	0	57	0	62	446
12:15 PM	1	178	4	0	183	1	0	3	0	4	40	188	1	0	229	2	1	49	0	52	468
12:30 PM	0	172	4	1	177	3	1	2	0	6	35	179	3	0	217	2	0	49	0	51	451
12:45 PM	2	176	4	0	182	3	0	1	0	4	50	175	1	0	226	6	0	48	0	54	466
Total	4	691	17	1	713	8	2	7	0	17	164	712	6	0	882	15	1	203	0	219	1831

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850 Forest Edge Dr
Vernon Hills, IL
Vernon Hills - Gurnee - Chicago

4689.900 DOUBLE G'S ROADHOUSE
GILMER RD @ IL RTE 83
24 HR
GHA MIO

File Name : IL_83_@_Gilmer_and_O_96329_02-20-2013
Site Code :
Start Date : 2/20/2013
Page No : 3

Groups Printed- Car - Truck

	IL Rte 83 Southbound					Oakwood Rd Westbound					IL Rte 83 Northbound					Gilmer Rd Eastbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
01:00 PM	1	151	7	0	159	0	0	0	0	0	45	160	4	0	209	5	0	44	0	49	417
01:15 PM	4	184	7	0	195	0	0	2	0	2	47	190	2	3	242	5	0	38	0	43	482
01:30 PM	1	193	3	0	197	0	0	1	0	1	55	203	5	0	263	5	0	41	0	46	507
01:45 PM	1	178	10	0	189	0	1	0	0	1	55	186	2	0	243	4	1	54	0	59	492
Total	7	706	27	0	740	0	1	3	0	4	202	739	13	3	957	19	1	177	0	197	1898
02:00 PM	0	204	5	0	209	1	1	2	0	4	60	197	1	1	259	1	0	38	0	39	511
02:15 PM	3	208	8	1	220	0	2	3	0	5	95	207	6	0	308	4	0	50	0	54	587
02:30 PM	1	252	12	0	265	1	0	5	0	6	96	242	1	0	339	11	0	80	0	91	701
02:45 PM	1	232	14	1	248	2	2	1	0	5	123	260	2	0	385	8	0	47	0	55	693
Total	5	896	39	2	942	4	5	11	0	20	374	906	10	1	1291	24	0	215	0	239	2492
03:00 PM	1	213	4	0	218	2	1	3	0	6	103	277	1	0	381	10	4	65	0	79	684
03:15 PM	1	231	9	0	241	2	5	0	0	7	112	257	6	0	375	6	2	77	0	85	708
03:30 PM	1	266	4	0	271	2	2	2	0	6	110	333	4	0	447	6	2	58	0	66	790
03:45 PM	3	301	8	0	312	4	3	4	0	11	183	317	4	0	504	5	1	76	0	82	909
Total	6	1011	25	0	1042	10	11	9	0	30	508	1184	15	0	1707	27	9	276	0	312	3091
04:00 PM	6	294	14	1	315	4	5	4	0	13	155	327	4	0	486	12	4	68	0	84	898
04:15 PM	0	354	13	0	367	1	2	1	0	4	144	353	5	0	502	4	0	69	0	73	946
04:30 PM	1	341	9	0	351	4	1	2	0	7	182	398	1	1	582	7	0	91	0	98	1038
04:45 PM	0	291	11	0	302	6	5	2	0	13	165	373	8	0	546	9	3	71	0	83	944
Total	7	1280	47	1	1335	15	13	9	0	37	646	1451	18	1	2116	32	7	299	0	338	3826
05:00 PM	2	270	16	0	288	13	3	0	0	16	157	465	8	1	631	13	3	77	0	93	1028
05:15 PM	0	311	7	1	319	4	2	1	0	7	180	426	6	0	612	5	1	73	0	79	1017
05:30 PM	3	359	14	1	377	4	3	3	0	10	144	463	6	0	613	5	2	58	0	65	1065
05:45 PM	6	256	11	0	273	3	0	4	0	7	153	380	6	3	542	10	1	55	0	66	888
Total	11	1196	48	2	1257	24	8	8	0	40	634	1734	26	4	2398	33	7	263	0	303	3998
06:00 PM	2	241	7	0	250	7	0	2	0	9	121	368	2	2	493	5	0	85	0	90	842
06:15 PM	2	312	11	0	325	3	1	2	0	6	161	388	11	1	561	3	2	52	0	57	949
06:30 PM	0	250	6	0	256	6	3	3	0	12	125	328	6	0	459	7	1	49	0	57	784
06:45 PM	2	232	8	0	242	2	3	1	0	6	81	239	6	0	326	8	0	31	0	39	613
Total	6	1035	32	0	1073	18	7	8	0	33	488	1323	25	3	1839	23	3	217	0	243	3188
07:00 PM	3	175	8	0	186	2	1	2	0	5	104	220	2	0	326	2	1	39	0	42	559
07:15 PM	1	163	3	1	168	0	2	4	0	6	81	233	7	0	321	3	0	40	0	43	538
07:30 PM	1	155	5	1	162	2	1	1	0	4	82	176	2	0	260	1	0	26	0	27	453

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4689.900 DOUBLE G'S ROADHOUSE
GILMER RD @ IL RTE 83
24 HR
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File Name : IL_83_@_Gilmer_and_O_96329_02-20-2013
Site Code :
Start Date : 2/20/2013
Page No : 4

Groups Printed- Car - Truck

	IL Rte 83 Southbound					Oakwood Rd Westbound					IL Rte 83 Northbound					Gilmer Rd Eastbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
07:45 PM	0	142	5	0	147	2	0	0	0	2	74	196	2	1	273	8	3	31	0	42	464
Total	5	635	21	2	663	6	4	7	0	17	341	825	13	1	1180	14	4	136	0	154	2014
08:00 PM	0	137	0	0	137	2	0	2	0	4	70	149	5	0	224	3	0	39	0	42	407
08:15 PM	0	94	2	0	96	1	0	0	0	1	58	189	2	0	249	3	0	28	0	31	377
08:30 PM	1	103	3	0	107	0	0	0	0	0	75	149	5	0	229	2	0	20	0	22	358
08:45 PM	3	91	3	0	97	0	1	0	0	1	61	137	3	0	201	3	0	23	0	26	325
Total	4	425	8	0	437	3	1	2	0	6	264	624	15	0	903	11	0	110	0	121	1467
09:00 PM	0	103	0	0	103	0	0	0	0	0	49	123	0	1	173	1	1	16	0	18	294
09:15 PM	0	118	4	0	122	0	0	0	0	0	37	127	1	0	165	0	1	15	0	16	303
09:30 PM	0	114	3	0	117	0	0	0	0	0	33	144	0	0	177	3	1	19	0	23	317
09:45 PM	0	90	0	0	90	1	0	0	0	1	39	132	4	1	176	2	1	14	0	17	284
Total	0	425	7	0	432	1	0	0	0	1	158	526	5	2	691	6	4	64	0	74	1198
10:00 PM	0	102	3	1	106	1	0	1	0	2	29	119	0	0	148	2	0	11	0	13	269
10:15 PM	0	92	4	0	96	1	0	1	0	2	29	105	1	0	135	2	0	10	0	12	245
10:30 PM	0	61	2	0	63	0	0	1	0	1	27	83	0	0	110	1	0	8	0	9	183
10:45 PM	0	46	0	0	46	0	0	0	0	0	25	73	0	0	98	0	0	4	0	4	148
Total	0	301	9	1	311	2	0	3	0	5	110	380	1	0	491	5	0	33	0	38	845
11:00 PM	1	44	0	1	46	3	1	0	0	4	25	50	2	0	77	1	0	7	0	8	135
11:15 PM	0	35	0	0	35	0	1	0	0	1	23	56	0	0	79	0	0	9	0	9	124
11:30 PM	0	30	0	0	30	0	0	0	0	0	9	56	0	0	65	1	0	0	0	1	96
11:45 PM	0	20	1	0	21	0	0	0	0	0	9	34	1	0	44	0	0	1	0	1	66
Total	1	129	1	1	132	3	2	0	0	5	66	196	3	0	265	2	0	17	0	19	421
Grand Total	100	16018	401	15	16534	171	72	110	0	353	5041	16926	203	22	22192	300	61	5532	0	5893	44972
Apprch %	0.6	96.9	2.4	0.1		48.4	20.4	31.2	0		22.7	76.3	0.9	0.1		5.1	1	93.9	0		
Total %	0.2	35.6	0.9	0	36.8	0.4	0.2	0.2	0	0.8	11.2	37.6	0.5	0	49.3	0.7	0.1	12.3	0	13.1	
Car	95	15399	377	15	15886	169	68	108	0	345	4860	16283	197	22	21362	288	57	5385	0	5730	43323
% Car	95	96.1	94	100	96.1	98.8	94.4	98.2	0	97.7	96.4	96.2	97	100	96.3	96	93.4	97.3	0	97.2	96.3
Truck	5	619	24	0	648	2	4	2	0	8	181	643	6	0	830	12	4	147	0	163	1649
% Truck	5	3.9	6	0	3.9	1.2	5.6	1.8	0	2.3	3.6	3.8	3	0	3.7	4	6.6	2.7	0	2.8	3.7

Gewalt Hamilton Associates

850 Forest Edge Dr
Vernon Hills, IL
Vernon Hills - Gurnee - Chicago

4689.900 DOUBLE G'S ROADHOUSE
GILMER RD @ IL RTE 83
24 HR
GHA MIO

File Name : IL_83_@_Gilmer_and_O_96329_02-20-2013
Site Code :
Start Date : 2/20/2013
Page No : 5

	IL Rte 83 Southbound					Oakwood Rd Westbound					IL Rte 83 Northbound					Gilmer Rd Eastbound					
Start Time	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 12:00 AM to 09:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	**3**	389	4	0	396	**6**	0	3	0	**9**	47	291	1	0	339	4	1	186	0	191	935
07:15 AM	3	**460**	**12**	0	**475**	3	1	1	0	5	**82**	385	2	0	**469**	2	**3**	197	0	202	**1151**
07:30 AM	0	334	8	0	342	3	**3**	1	0	7	76	**391**	2	0	469	2	0	206	0	208	1026
07:45 AM	1	312	4	0	317	2	2	**4**	0	8	76	318	**5**	0	399	**9**	3	**210**	0	**222**	946
Total Volume	7	1495	28	0	1530	14	6	9	0	29	281	1385	10	0	1676	17	7	799	0	823	4058
% App. Total	0.5	97.7	1.8	0		48.3	20.7	31	0		16.8	82.6	0.6	0		2.1	0.9	97.1	0		
PHF	.583	.813	.583	.000	.805	.583	.500	.563	.000	.806	.857	.886	.500	.000	.893	.472	.583	.951	.000	.927	.881
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:00 AM																					
11:00 AM	6	**229**	5	0	**240**	4	0	2	0	6	36	168	3	1	208	6	**1**	**66**	0	**73**	**527**
11:15 AM	**8**	177	3	**1**	189	2	0	2	0	4	34	184	**5**	0	223	2	0	46	0	48	464
11:30 AM	2	208	3	0	213	4	**1**	1	0	6	35	**191**	1	0	**227**	5	0	52	0	57	503
11:45 AM	2	195	**6**	0	203	**7**	0	**3**	0	**10**	**44**	175	1	**2**	222	**7**	0	53	0	60	495
Total Volume	18	809	17	1	845	17	1	8	0	26	149	718	10	3	880	20	1	217	0	238	1989
% App. Total	2.1	95.7	2	0.1		65.4	3.8	30.8	0		16.9	81.6	1.1	0.3		8.4	0.4	91.2	0		
PHF	.563	.883	.708	.250	.880	.607	.250	.667	.000	.650	.847	.940	.500	.375	.969	.714	.250	.822	.000	.815	.944
Peak Hour Analysis From 02:00 PM to 11:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	0	291	11	0	302	6	**5**	2	0	13	165	373	**8**	0	546	9	**3**	71	0	83	944
05:00 PM	2	270	**16**	0	288	**13**	3	0	0	**16**	157	**465**	8	**1**	**631**	**13**	3	**77**	0	**93**	1028
05:15 PM	0	311	7	**1**	319	4	2	1	0	7	**180**	426	6	0	612	5	1	73	0	79	1017
05:30 PM	**3**	**359**	14	1	**377**	4	3	**3**	0	10	144	463	6	0	613	5	2	58	0	65	**1065**
Total Volume	5	1231	48	2	1286	27	13	6	0	46	646	1727	28	1	2402	32	9	279	0	320	4054
% App. Total	0.4	95.7	3.7	0.2		58.7	28.3	13	0		26.9	71.9	1.2	0		10	2.8	87.2	0		
PHF	.417	.857	.750	.500	.853	.519	.650	.500	.000	.719	.897	.928	.875	.250	.952	.615	.750	.906	.000	.860	.952

HCS+: Signalized Intersections Release 5.5

Analyst: ALL
Agency: GHA
Date: 2/25/2013
Period: AM PEAK HOUR
Project ID: AM EXISTING - GILMER AT 83 DOUBLE G'S ROADHOUSE
E/W St: GILMER RD/OAKWOOD RD

Inter.: GILMER @ 83
Area Type: All other areas
Jurisd: IDOT
Year : 2013
N/S St: IL RTE 83

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	1	1	1	0	1	2	1	1	2	1
LGConfig	L	T	R	L	TR		L	T	R	L	T	R
Volume	20	10	800	15	10	10	285	1385	10	10	1495	30
Lane Width	11.0	13.0	12.0	11.0	12.0		12.0	13.0	12.0	13.0	13.0	12.0
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	A	A			NB Left	A	A		
Thru		A			Thru		A	A	
Right		A			Right			A	
Peds					Peds				
WB Left	A	A			SB Left	A			
Thru		A			Thru			A	
Right		A			Right			A	
Peds					Peds				
NB Right	A				EB Right	A	A		
SB Right	A				WB Right				
Green	10.0	37.0				11.0	11.0	82.0	
Yellow	3.0	4.5				3.0	0.0	4.5	
All Red	0.0	1.5				1.0	0.0	1.5	

Cycle Length: 170.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
L	427	1711	0.05	0.31	40.8	D		
T	419	1925	0.03	0.22	52.4	D	213.1	F
R	643	1583	1.35	0.41	219.5	F		
Westbound								
L	436	1711	0.04	0.31	40.7	D		
TR	375	1723	0.06	0.22	52.8	D	47.7	D
Northbound								
L	271	1770	1.14	0.15	171.2	F		
T	2005	3665	0.75	0.55	31.2	C	54.9	D
R	913	1583	0.01	0.58	15.4	B		
Southbound								
L	118	1829	0.09	0.06	75.2	E		
T	1768	3665	0.92	0.48	49.2	D	48.7	D
R	913	1583	0.04	0.58	15.6	B		

Intersection Delay = 84.7 (sec/veh) Intersection LOS = F

HCS+: Signalized Intersections Release 5.5

Phone: Fax:
E-Mail:

OPERATIONAL ANALYSIS

Analyst: ALL
Agency/Co.: GHA
Date Performed: 2/25/2013
Analysis Time Period: AM PEAK HOUR
Intersection: GILMER @ 83
Area Type: All other areas
Jurisdiction: IDOT
Analysis Year: 2013
Project ID: AM EXISTING - GILMER AT 83 DOUBLE G'S ROADHOUSE
E/W St: GILMER RD/OAKWOOD RD N/S St: IL RTE 83

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	20	10	800	15	10	10	285	1385	10	10	1495	30
% Heavy Veh	2	2	2	2	2	2	2	2	2	2	2	2
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
PK 15 Vol	5	3	217	4	3	3	77	376	3	3	406	8
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat	1900	1900	1900	1900	1900		1900	1900	1900	1900	1900	1900
ParkExist												
NumPark												
No. Lanes	1	1	1	1	1	0	1	2	1	1	2	1
LGConfig	L	T	R	L	TR		L	T	R	L	T	R
Lane Width	11.0	13.0	12.0	11.0	12.0		12.0	13.0	12.0	13.0	13.0	12.0
RTOR Vol			0			0			0			0
Adj Flow	22	11	870	16	22		310	1505	11	11	1625	33
%InSharedLn												
Prop LTs	1.000	0.000		1.000	0.000			0.000			0.000	
Prop RTs		0.000	1.000		0.500			0.000	1.000		0.000	1.000
Peds Bikes	0			0			0			0		
Buses	0	0	0	0	0		0	0	0	0	0	0
%InProtPhase	0.0			0.0								

Duration 0.25 Area Type: All other areas

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Arriv. Type	3	3	3	3	3		3	3	3	3	3	3
Unit Ext.	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
I Factor		1.000			1.000			1.000			1.000	
Lost Time	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Ext of g	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Ped Min g		3.2			3.2			3.2			3.2	

PHASE DATA

Phase Combination		1	2	3	4			5	6	7	8
EB	Left	A	A			NB	Left	A	A		
	Thru		A				Thru		A	A	
	Right		A				Right			A	
	Peds						Peds				
WB	Left	A	A			SB	Left	A			
	Thru		A				Thru			A	
	Right		A				Right			A	
	Peds						Peds				
NB	Right	A				EB	Right	A	A		
SB	Right	A				WB	Right				
Green		10.0	37.0					11.0	11.0	82.0	
Yellow		3.0	4.5					3.0	0.0	4.5	
All Red		0.0	1.5					1.0	0.0	1.5	

Cycle Length: 170.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	20	10	800	15	10	10	285	1385	10	10	1495	30
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	22	11	870	16	11	11	310	1505	11	11	1625	33
No. Lanes	1	1	1	1	1	0	1	2	1	1	2	1
Lane group	L	T	R	L	TR		L	T	R	L	T	R
Adj flow	22	11	870	16	22		310	1505	11	11	1625	33
Prop LTs	1.000	0.000		1.000	0.000			0.000			0.000	
Prop RTs		0.000	1.000		0.500			0.000	1.000		0.000	1.000

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	L	T	R	L	TR		L	T	R	L	T	R
So	1900	1900	1900	1900	1900		1900	1900	1900	1900	1900	1900
Lanes	1	1	1	1	1	0	1	2	1	1	2	1
fW	0.967	1.033	1.000	0.967	1.000		1.000	1.033	1.000	1.033	1.033	1.000
fHV	0.980	0.980	0.980	0.980	0.980		0.980	0.980	0.980	0.980	0.980	0.980
fG	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000
fP	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000
fBB	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000*
fA	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000
fLU	1.000	1.000	1.000	1.000	1.000		1.000	0.952	1.000	1.000	0.952	1.000
fRT		1.000	0.850		0.925			1.000	0.850		1.000	0.850
fLT	0.950	1.000		0.950	1.000		0.950	1.000		0.950	1.000	
Sec.	0.715			0.736								
fLpb	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fRpb		1.000	1.000		1.000			1.000	1.000		1.000	1.000
S	1711	1925	1583	1711	1723		1770	3665	1583	1829	3665	1583
Sec.	1287			1326								

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)	Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound							
Prot		22	1711	# 0.01	0.059	101	0.22
Perm		0	1287	0.00	0.253	326	0.00
Left	L	22			0.31	427	0.05
Prot							
Perm							
Thru	T	11	1925	0.01	0.22	419	0.03
Right	R	870	1583	# 0.55	0.41	643	1.35
Westbound							
Prot		16	1711	0.01	0.059	101	0.16
Perm		0	1326	0.00	0.253	335	0.00
Left	L	16			0.31	436	0.04
Prot							
Perm							
Thru	TR	22	1723	0.01	0.22	375	0.06
Right							
Northbound							
Prot							
Perm							
Left	L	310	1770	0.18	0.15	271	1.14
Prot							
Perm							
Thru	T	1505	3665	0.41	0.55	2005	0.75
Right	R	11	1583	0.01	0.58	913	0.01
Southbound							
Prot							
Perm							
Left	L	11	1829	0.01	0.06	118	0.09
Prot							
Perm							
Thru	T	1625	3665	# 0.44	0.48	1768	0.92
Right	R	33	1583	0.02	0.58	913	0.04

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 1.01
Total lost time per cycle, L = 12.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.08

Control Delay and LOS Determination

Appr/ Lane Grp	Ratios v/c	g/C	Unf Del d1	Prog Adj Fact	Lane Grp Cap	Incremental Factor Del k	d2	Res Del d3	Lane Group Delay	LOS	Approach Delay	LOS
Eastbound												
L	0.05	0.31	40.8	1.000	427	0.11	0.1	0.0	40.8	D		
T	0.03	0.22	52.3	1.000	419	0.11	0.0	0.0	52.4	D	213.1	F
R	1.35	0.41	50.5	1.000	643	0.50	169.0	0.0	219.5	F		
Westbound												
L	0.04	0.31	40.6	1.000	436	0.11	0.0	0.0	40.7	D		
TR	0.06	0.22	52.7	1.000	375	0.11	0.1	0.0	52.8	D	47.7	D
Northbound												
L	1.14	0.15	72.0	1.000	271	0.50	99.2	0.0	171.2	F		
T	0.75	0.55	29.6	1.000	2005	0.31	1.6	0.0	31.2	C	54.9	D
R	0.01	0.58	15.4	1.000	913	0.11	0.0	0.0	15.4	B		
Southbound												
L	0.09	0.06	74.8	1.000	118	0.11	0.3	0.0	75.2	E		
T	0.92	0.48	40.9	1.000	1768	0.44	8.2	0.0	49.2	D	48.7	D

R	0.04	0.58	15.6	1.000	913	0.11	0.0	0.0	15.6	B

Intersection delay = 84.7 (sec/veh) Intersection LOS = F

SUPPLEMENTAL PERMITTED LT WORKSHEET
for exclusive lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach				
Cycle length, C 170.0 sec				
Total actual green time for LT lane group, G (s)	50.0	50.0		
Effective permitted green time for LT lane group, g(s)	43.0	43.0		
Opposing effective green time, go (s)	37.0	37.0		
Number of lanes in LT lane group, N	1	1		
Number of lanes in opposing approach, No	1	1		
Adjusted LT flow rate, VLT (veh/h)	22	16		
Proportion of LT in LT lane group, PLT	1.000	1.000		
Proportion of LT in opposing flow, PLTo	0.00	0.00		
Adjusted opposing flow rate, Vo (veh/h)	22	11		
Lost time for LT lane group, tL	6.00	6.00		
Computation				
LT volume per cycle, LTC=VLTC/3600	1.04	0.76		
Opposing lane util. factor, fLUo	1.000	1.000	0.952	0.952
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)	1.04	0.52		
gf=G[exp(- a * (LTC ** b)]-tl, gf<=g	0.0	0.0		
Opposing platoon ratio, Rpo (refer Exhibit 16-11)	1.00	1.00		
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]	0.78	0.78		
gq, (see Exhibit C16-4,5,6,7,8)	1.65	0.82		
gu=g-gq if gq>=gf, or = g-gf if gq<gf	41.35	42.18		
n=Max(gq-gf)/2,0)	0.82	0.41		
PTHo=1-PLTo	1.00	1.00		
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]	1.00	1.00		
EL1 (refer to Exhibit C16-3)	1.35	1.33		
EL2=Max((1-Ptho**n)/Plto, 1.0)				
fmin=2(1+PL)/g or fmin=2(1+Pl)/g	0.09	0.09		
gdiff=max(gq-gf,0)	0.00	0.00		
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)	0.71	0.74		
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)				
or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT	0.715	0.736		

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET
for shared lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach				
Cycle length, C 170.0 sec				
Total actual green time for LT lane group, G (s)				
Effective permitted green time for LT lane group, g(s)				
Opposing effective green time, go (s)				
Number of lanes in LT lane group, N				
Number of lanes in opposing approach, No				
Adjusted LT flow rate, VLT (veh/h)				
Proportion of LT in LT lane group, PLT	0.000	0.000	0.000	0.000
Proportion of LT in opposing flow, PLTo				
Adjusted opposing flow rate, Vo (veh/h)				
Lost time for LT lane group, tL				
Computation				
LT volume per cycle, LTC=VLTC/3600				
Opposing lane util. factor, fLUo	1.000	1.000	0.952	0.952
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)				
gf=G[exp(- a * (LTC ** b)]-tl, gf<=g				
Opposing platoon ratio, Rpo (refer Exhibit 16-11)				
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]				
gq, (see Exhibit C16-4,5,6,7,8)				
gu=g-gq if gq>=gf, or = g-gf if gq<gf				
n=Max(gq-gf)/2,0)				
PTHo=1-PLTo				
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]				
EL1 (refer to Exhibit C16-3)				
EL2=Max((1-Ptho**n)/Plto, 1.0)				
fmin=2(1+PL)/g or fmin=2(1+Pl)/g				
gdiff=max(gq-gf,0)				
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)				
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)				
or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT				

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

Permitted Left Turns	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				
Permitted Right Turns				
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				

OCCbicg
OCCr
Number of cross-street receiving lanes, Nrec
Number of turning lanes, Nturn
ApbT
Proportion right-turns, PRT
Proportion right-turns using protected phase, PRTA
Right turn adjustment, fRpb

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

	EBLT	WBLT	NBLT	SBLT
Cycle length, C 170.0 sec				
Adj. LT vol from Vol Adjustment Worksheet, v	22	16		
v/c ratio from Capacity Worksheet, X	0.05	0.04		
Protected phase effective green interval, g (s)	10.0	10.0		
Opposing queue effective green interval, gq	1.65	0.82		
Unopposed green interval, gu	41.35	42.18		
Red time r=(C-g-gq-gu)	117.0	117.0		
Arrival rate, qa=v/(3600(max[X,1.0]))	0.01	0.00		
Protected ph. departure rate, Sp=s/3600	0.475	0.475		
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)	0.37	0.38		
XPerm	0.02	0.01		
XProt	0.16	0.12		
Case	1	1		
Queue at beginning of green arrow, Qa	0.72	0.52		
Queue at beginning of unsaturated green, Qu	0.01	0.00		
Residual queue, Qr	0.00	0.00		
Uniform Delay, d1	40.8	40.6		

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
L	0.0	0.00		40.8	0.00	0.0	0.0	40.8
T	0.0	0.00	66.5	52.3	0.00	0.0	0.0	52.4
R	0.0	0.00	50.5	50.5	0.00	56.8	0.0	219.5
Westbound								
L	0.0	0.00		40.6	0.00	0.0	0.0	40.7
TR	0.0	0.00	66.5	52.7	0.00	0.0	0.0	52.8
	0.0						0.0	
Northbound								
L	0.0	0.00	72.0	72.0	0.00	9.8	0.0	171.2
T	0.0	0.00	38.5	29.6	0.00	0.0	0.0	31.2
R	0.0	0.00	36.0	15.4	0.00	0.0	0.0	15.4
Southbound								
L	0.0	0.00	79.5	74.8	0.00	0.0	0.0	75.2
T	0.0	0.00	44.0	40.9	0.00	0.0	0.0	49.2
R	0.0	0.00	36.0	15.6	0.00	0.0	0.0	15.6

Intersection Delay 84.7 sec/veh Intersection LOS F

BACK OF QUEUE WORKSHEET

	Eastbound			Westbound			Northbound			Southbound		
LaneGroup	L	T	R	L	TR		L	T	R	L	T	R
Init Queue	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Flow Rate	22	11	870	16	22		310	790	11	11	853	33
So	1900	1900	1900	1900	1900		1900	1900	1900	1900	1900	1900
No.Lanes	1	1	1	1	1	0	1	2	1	1	2	1
SL	1367	1925	1583	1399	1723		1770	1924	1583	1829	1924	1583
LnCapacity	427	419	643	436	375		271	1053	913	118	928	913
Flow Ratio	0.0	0.0	0.5	0.0	0.0		0.2	0.4	0.0	0.0	0.4	0.0
v/c Ratio	0.05	0.03	1.35	0.04	0.06		1.14	0.75	0.01	0.09	0.92	0.04
Grn Ratio	0.31	0.22	0.41	0.31	0.22		0.15	0.55	0.58	0.06	0.48	0.58
I Factor		1.000			1.000			1.000			1.000	
AT or PVG	3	3	3	3	3		3	3	3	3	3	3
Pltn Ratio	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
PF2	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Q1	0.7	0.4	41.1	0.5	0.8		14.6	28.7	0.2	0.5	37.5	0.7
kB	0.6	0.6	0.8	0.6	0.6		0.5	1.0	1.0	0.3	1.0	1.0
Q2	0.0	0.0	31.1	0.0	0.0		7.3	2.9	0.0	0.0	6.5	0.0
Q Average	0.7	0.4	72.2	0.5	0.9		22.0	31.5	0.2	0.5	44.0	0.7
Q Spacing	25.0	25.0	25.0	25.0	25.0		25.0	25.0	25.0	25.0	25.0	25.0
Q Storage	135	0	400	130	0		205	0	50	200	0	50
Q S Ratio	0.1		4.5	0.1			2.7		0.1	0.1		0.4
70th Percentile Output:												
fB%	1.2	1.2	1.1	1.2	1.2		1.2	1.1	1.2	1.2	1.1	1.2
BOQ	0.9	0.5	80.6	0.7	1.0		25.4	36.1	0.3	0.6	49.8	0.9
QSRatio	0.2		5.0	0.1			3.1		0.1	0.1		0.4
85th Percentile Output:												
fB%	1.6	1.6	1.3	1.6	1.6		1.4	1.4	1.6	1.6	1.4	1.6
BOQ	1.2	0.7	95.8	0.9	1.4		31.7	44.3	0.4	0.8	60.2	1.1
QSRatio	0.2		6.0	0.2			3.9		0.2	0.1		0.6
90th Percentile Output:												
fB%	1.8	1.8	1.4	1.8	1.8		1.5	1.5	1.8	1.8	1.4	1.8
BOQ	1.3	0.8	102	1.0	1.5		33.7	46.8	0.4	0.9	63.5	1.3
QSRatio	0.2		6.4	0.2			4.1		0.2	0.1		0.6
95th Percentile Output:												
fB%	2.1	2.1	1.5	2.1	2.1		1.7	1.6	2.1	2.1	1.6	2.1
BOQ	1.6	0.9	109	1.1	1.8		36.8	50.6	0.5	1.1	68.2	1.5
QSRatio	0.3		6.8	0.2			4.5		0.2	0.1		0.7
98th Percentile Output:												
fB%	2.6	2.7	1.7	2.7	2.6		1.9	1.8	2.7	2.7	1.7	2.6
BOQ	2.0	1.1	123	1.4	2.3		41.4	56.4	0.6	1.4	76.2	1.9
QSRatio	0.4		7.7	0.3			5.0		0.3	0.2		0.9

ERROR MESSAGES

No errors to report.

HCS+: Signalized Intersections Release 5.5

Analyst: ALL
Agency: GHA
Date: 2/25/2013
Period: PM PEAK HOUR
Project ID: PM EXISTING - GILMER AT 83 DOUBLE G'S ROADHOUSE
E/W St: GILMER RD/OAKWOOD RD

Inter.: GILMER @ 83
Area Type: All other areas
Jurisd: IDOT
Year : 2013
N/S St: IL RTE 83

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	1	1	1	0	1	2	1	1	2	1
LGConfig	L	T	R	L	TR		L	T	R	L	T	R
Volume	35	10	280	30	15	10	650	1725	30	5	1235	50
Lane Width	11.0	13.0	12.0	11.0	12.0		12.0	13.0	12.0	13.0	13.0	12.0
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	A	A			NB Left	A	A		
Thru		A			Thru		A	A	
Right		A			Right			A	
Peds					Peds				
WB Left	A	A			SB Left	A			
Thru		A			Thru			A	
Right		A			Right			A	
Peds					Peds				
NB Right	A				EB Right	A	A		
SB Right	A				WB Right				
Green	10.0	10.0				12.0	22.0	87.0	
Yellow	3.0	4.5				3.0	0.0	4.5	
All Red	0.0	1.5				1.0	0.0	1.5	

Cycle Length: 160.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
L	221	1711	0.17	0.16	57.8	E		
T	120	1925	0.09	0.06	71.1	E	47.1	D
R	534	1583	0.57	0.34	44.9	D		
Westbound								
L	234	1711	0.14	0.16	57.5	E		
TR	109	1749	0.25	0.06	72.6	E	64.3	E
Northbound								
L	420	1770	1.68	0.24	378.7	F		
T	2497	3665	0.75	0.68	18.0	B	115.4	F
R	1019	1583	0.03	0.64	10.4	B		
Southbound								
L	137	1829	0.04	0.08	68.7	E		
T	1993	3665	0.67	0.54	27.2	C	26.7	C
R	1019	1583	0.05	0.64	10.5	B		

Intersection Delay = 81.2 (sec/veh) Intersection LOS = F

HCS+: Signalized Intersections Release 5.5

Phone: Fax:
E-Mail:

OPERATIONAL ANALYSIS

Analyst: ALL
Agency/Co.: GHA
Date Performed: 2/25/2013
Analysis Time Period: PM PEAK HOUR
Intersection: GILMER @ 83
Area Type: All other areas
Jurisdiction: IDOT
Analysis Year: 2013
Project ID: PM EXISTING - GILMER AT 83 DOUBLE G'S ROADHOUSE
E/W St: GILMER RD/OAKWOOD RD N/S St: IL RTE 83

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	35	10	280	30	15	10	650	1725	30	5	1235	50
% Heavy Veh	2	2	2	2	2	2	2	2	2	2	2	2
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
PK 15 Vol	10	3	76	8	4	3	177	469	8	2	336	14
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat	1900	1900	1900	1900	1900		1900	1900	1900	1900	1900	1900
ParkExist												
NumPark												
No. Lanes	1	1	1	1	1	0	1	2	1	1	2	1
LGConfig	L	T	R	L	TR		L	T	R	L	T	R
Lane Width	11.0	13.0	12.0	11.0	12.0		12.0	13.0	12.0	13.0	13.0	12.0
RTOR Vol			0			0			0			0
Adj Flow	38	11	304	33	27		707	1875	33	5	1342	54
%InSharedLn												
Prop LTs	1.000	0.000		1.000	0.000			0.000			0.000	
Prop RTs		0.000	1.000		0.407			0.000	1.000		0.000	1.000
Peds Bikes		0			0			0			0	
Buses	0	0	0	0	0		0	0	0	0	0	0
%InProtPhase	0.0			0.0								

Duration 0.25 Area Type: All other areas

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Arriv. Type	3	3	3	3	3		3	3	3	3	3	3
Unit Ext.	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
I Factor		1.000			1.000			1.000			1.000	
Lost Time	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Ext of g	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Ped Min g		3.2			3.2			3.2			3.2	

PHASE DATA

Phase Combination		1	2	3	4			5	6	7	8
EB	Left	A	A			NB	Left	A	A		
	Thru		A				Thru		A	A	
	Right		A				Right			A	
	Peds						Peds				
WB	Left	A	A			SB	Left	A			
	Thru		A				Thru			A	
	Right		A				Right			A	
	Peds						Peds				
NB	Right	A				EB	Right	A	A		
SB	Right	A				WB	Right				
Green		10.0	10.0					12.0	22.0	87.0	
Yellow		3.0	4.5					3.0	0.0	4.5	
All Red		0.0	1.5					1.0	0.0	1.5	

Cycle Length: 160.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	35	10	280	30	15	10	650	1725	30	5	1235	50
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	38	11	304	33	16	11	707	1875	33	5	1342	54
No. Lanes	1	1	1	1	1	0	1	2	1	1	2	1
Lane group	L	T	R	L	TR		L	T	R	L	T	R
Adj flow	38	11	304	33	27		707	1875	33	5	1342	54
Prop LTs	1.000	0.000		1.000	0.000			0.000			0.000	
Prop RTs		0.000	1.000		0.407			0.000	1.000		0.000	1.000

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	L	T	R	L	TR		L	T	R	L	T	R
So	1900	1900	1900	1900	1900		1900	1900	1900	1900	1900	1900
Lanes	1	1	1	1	1	0	1	2	1	1	2	1
fW	0.967	1.033	1.000	0.967	1.000		1.000	1.033	1.000	1.033	1.033	1.000
fHV	0.980	0.980	0.980	0.980	0.980		0.980	0.980	0.980	0.980	0.980	0.980
fG	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000
fP	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000
fBB	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000
fA	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000
fLU	1.000	1.000	1.000	1.000	1.000		1.000	0.952	1.000	1.000	0.952	1.000
fRT		1.000	0.850		0.939			1.000	0.850		1.000	0.850
fLT	0.950	1.000		0.950	1.000		0.950	1.000		0.950	1.000	
Sec.	0.634			0.707								
fLpb	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fRpb		1.000	1.000		1.000			1.000	1.000		1.000	1.000
S	1711	1925	1583	1711	1749		1770	3665	1583	1829	3665	1583
Sec.	1142			1273								

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)	Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound							
Prot		38	1711	# 0.02	0.063	107	0.36
Perm		0	1142	0.00	0.100	114	0.00
Left	L	38			0.16	221	0.17
Prot							
Perm							
Thru	T	11	1925	0.01	0.06	120	0.09
Right	R	304	1583	0.19	0.34	534	0.57
Westbound							
Prot		33	1711	0.02	0.063	107	0.31
Perm		0	1273	0.00	0.100	127	0.00
Left	L	33			0.16	234	0.14
Prot							
Perm							
Thru	TR	27	1749	# 0.02	0.06	109	0.25
Right							
Northbound							
Prot							
Perm							
Left	L	707	1770	# 0.40	0.24	420	1.68
Prot							
Perm							
Thru	T	1875	3665	0.51	0.68	2497	0.75
Right	R	33	1583	0.02	0.64	1019	0.03
Southbound							
Prot							
Perm							
Left	L	5	1829	0.00	0.08	137	0.04
Prot							
Perm							
Thru	T	1342	3665	# 0.37	0.54	1993	0.67
Right	R	54	1583	0.03	0.64	1019	0.05

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 0.80
Total lost time per cycle, L = 18.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 0.91

Control Delay and LOS Determination

Appr/ Lane Grp	Ratios v/c	g/C	Unf Del d1	Prog Adj Fact	Lane Grp Cap	Incremental Factor k	Del d2	Res Del d3	Lane Group Delay	LOS	Approach Delay	LOS
Eastbound												
L	0.17	0.16	57.4	1.000	221	0.11	0.4	0.0	57.8	E		
T	0.09	0.06	70.7	1.000	120	0.11	0.3	0.0	71.1	E	47.1	D
R	0.57	0.34	43.5	1.000	534	0.16	1.5	0.0	44.9	D		
Westbound												
L	0.14	0.16	57.2	1.000	234	0.11	0.3	0.0	57.5	E		
TR	0.25	0.06	71.4	1.000	109	0.11	1.2	0.0	72.6	E	64.3	E
Northbound												
L	1.68	0.24	61.0	1.000	420	0.50	317.7	0.0	378.7	F		
T	0.75	0.68	16.6	1.000	2497	0.31	1.3	0.0	18.0	B	115.4	F
R	0.03	0.64	10.4	1.000	1019	0.11	0.0	0.0	10.4	B		
Southbound												
L	0.04	0.08	68.6	1.000	137	0.11	0.1	0.0	68.7	E		
T	0.67	0.54	26.3	1.000	1993	0.25	0.9	0.0	27.2	C	26.7	C

R	0.05	0.64	10.5	1.000	1019	0.11	0.0	0.0	10.5	B

Intersection delay = 81.2 (sec/veh) Intersection LOS = F

SUPPLEMENTAL PERMITTED LT WORKSHEET
for exclusive lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach				
Cycle length, C 160.0 sec				
Total actual green time for LT lane group, G (s)	23.0	23.0		
Effective permitted green time for LT lane group, g(s)	16.0	16.0		
Opposing effective green time, go (s)	10.0	10.0		
Number of lanes in LT lane group, N	1	1		
Number of lanes in opposing approach, No	1	1		
Adjusted LT flow rate, VLT (veh/h)	38	33		
Proportion of LT in LT lane group, PLT	1.000	1.000		
Proportion of LT in opposing flow, PLTo	0.00	0.00		
Adjusted opposing flow rate, Vo (veh/h)	27	11		
Lost time for LT lane group, tL	6.00	6.00		
Computation				
LT volume per cycle, LTC=VLTC/3600	1.69	1.47		
Opposing lane util. factor, fLUo	1.000	1.000	0.952	0.952
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)	1.20	0.49		
gf=G[exp(- a * (LTC ** b)]-tl, gf<=g	0.0	0.0		
Opposing platoon ratio, Rpo (refer Exhibit 16-11)	1.00	1.00		
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]	0.94	0.94		
gq, (see Exhibit C16-4,5,6,7,8)	2.28	0.92		
gu=g-gq if gq>=gf, or = g-gf if gq<gf	13.72	15.08		
n=Max(gq-gf)/2,0)	1.14	0.46		
PTHo=1-PLTo	1.00	1.00		
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]	1.00	1.00		
EL1 (refer to Exhibit C16-3)	1.35	1.33		
EL2=Max((1-Ptho**n)/Plto, 1.0)				
fmin=2(1+PL)/g or fmin=2(1+Pl)/g	0.25	0.25		
gdiff=max(gq-gf,0)	0.00	0.00		
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)	0.63	0.71		
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)				
or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT	0.634	0.707		

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET
for shared lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach				
Cycle length, C 160.0 sec				
Total actual green time for LT lane group, G (s)				
Effective permitted green time for LT lane group, g(s)				
Opposing effective green time, go (s)				
Number of lanes in LT lane group, N				
Number of lanes in opposing approach, No				
Adjusted LT flow rate, VLT (veh/h)				
Proportion of LT in LT lane group, PLT	0.000	0.000	0.000	0.000
Proportion of LT in opposing flow, PLTo				
Adjusted opposing flow rate, Vo (veh/h)				
Lost time for LT lane group, tL				
Computation				
LT volume per cycle, LTC=VLTC/3600				
Opposing lane util. factor, fLUo	1.000	1.000	0.952	0.952
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)				
gf=G[exp(- a * (LTC ** b)]-tl, gf<=g				
Opposing platoon ratio, Rpo (refer Exhibit 16-11)				
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]				
gq, (see Exhibit C16-4,5,6,7,8)				
gu=g-gq if gq>=gf, or = g-gf if gq<gf				
n=Max(gq-gf)/2,0)				
PTHo=1-PLTo				
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]				
EL1 (refer to Exhibit C16-3)				
EL2=Max((1-Ptho**n)/Plto, 1.0)				
fmin=2(1+PL)/g or fmin=2(1+Pl)/g				
gdiff=max(gq-gf,0)				
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)				
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)				
or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT				

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

	EB	WB	NB	SB
Permitted Left Turns				
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				
Permitted Right Turns				
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				

OCCbicg
OCCr
Number of cross-street receiving lanes, Nrec
Number of turning lanes, Nturn
ApbT
Proportion right-turns, PRT
Proportion right-turns using protected phase, PRTA
Right turn adjustment, fRpb

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

	EBLT	WBLT	NBLT	SBLT
Cycle length, C 160.0 sec				
Adj. LT vol from Vol Adjustment Worksheet, v	38	33		
v/c ratio from Capacity Worksheet, X	0.17	0.14		
Protected phase effective green interval, g (s)	10.0	10.0		
Opposing queue effective green interval, gq	2.28	0.92		
Unopposed green interval, gu	13.72	15.08		
Red time r=(C-g-gq-gu)	134.0	134.0		
Arrival rate, qa=v/(3600(max[X,1.0]))	0.01	0.01		
Protected ph. departure rate, Sp=s/3600	0.475	0.475		
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)	0.37	0.38		
XPerm	0.03	0.03		
XProt	0.32	0.28		
Case	1	1		
Queue at beginning of green arrow, Qa	1.41	1.23		
Queue at beginning of unsaturated green, Qu	0.02	0.01		
Residual queue, Qr	0.00	0.00		
Uniform Delay, d1	57.4	57.2		

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
L	0.0	0.00		57.4	0.00	0.0	0.0	57.8
T	0.0	0.00	75.0	70.7	0.00	0.0	0.0	71.1
R	0.0	0.00	53.0	43.5	0.00	0.0	0.0	44.9
Westbound								
L	0.0	0.00		57.2	0.00	0.0	0.0	57.5
TR	0.0	0.00	75.0	71.4	0.00	0.0	0.0	72.6
	0.0						0.0	
Northbound								
L	0.0	0.00	61.0	61.0	0.00	71.7	0.0	378.7
T	0.0	0.00	25.5	16.6	0.00	0.0	0.0	18.0
R	0.0	0.00	28.5	10.4	0.00	0.0	0.0	10.4
Southbound								
L	0.0	0.00	74.0	68.6	0.00	0.0	0.0	68.7
T	0.0	0.00	36.5	26.3	0.00	0.0	0.0	27.2
R	0.0	0.00	28.5	10.5	0.00	0.0	0.0	10.5

Intersection Delay 81.2 sec/veh Intersection LOS F

BACK OF QUEUE WORKSHEET

	Eastbound			Westbound		Northbound			Southbound		
LaneGroup	L	T	R	L	TR	L	T	R	L	T	R
Init Queue	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Flow Rate	38	11	304	33	27	707	984	33	5	704	54
So	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
No.Lanes	1	1	1	1	1 0	1	2	1	1	2	1
SL	1361	1925	1583	1441	1749	1770	1924	1583	1829	1924	1583
LnCapacity	221	120	534	234	109	420	1311	1019	137	1046	1019
Flow Ratio	0.0	0.0	0.2	0.0	0.0	0.4	0.5	0.0	0.0	0.4	0.0
v/c Ratio	0.17	0.09	0.57	0.14	0.25	1.68	0.75	0.03	0.04	0.67	0.05
Grn Ratio	0.16	0.06	0.34	0.16	0.06	0.24	0.68	0.64	0.08	0.54	0.64
I Factor		1.000			1.000		1.000			1.000	
AT or PVG	3	3	3	3	3	3	3	3	3	3	3
Pltn Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Q1	1.4	0.5	11.1	1.2	1.1	31.4	28.5	0.5	0.2	22.5	0.9
kB	0.4	0.3	0.7	0.4	0.3	0.6	1.1	1.0	0.3	1.0	1.0
Q2	0.1	0.0	0.9	0.1	0.1	37.2	3.2	0.0	0.0	2.0	0.1
Q Average	1.5	0.5	11.9	1.3	1.2	68.7	31.7	0.6	0.2	24.5	0.9
Q Spacing	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Q Storage	135	0	400	130	0	205	0	50	200	0	50
Q S Ratio	0.3		0.7	0.3		8.4		0.3	0.0		0.5
70th Percentile Output:											
fB%	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.2	1.2	1.2	1.2
BOQ	1.8	0.6	14.0	1.6	1.5	76.8	36.3	0.7	0.3	28.3	1.1
QSRatio	0.3		0.9	0.3		9.4		0.3	0.0		0.6
85th Percentile Output:											
fB%	1.6	1.6	1.5	1.6	1.6	1.3	1.4	1.6	1.6	1.4	1.6
BOQ	2.4	0.8	17.9	2.1	1.9	91.4	44.5	0.9	0.3	35.1	1.5
QSRatio	0.4		1.1	0.4		11.1		0.5	0.0		0.7
90th Percentile Output:											
fB%	1.8	1.8	1.6	1.8	1.8	1.4	1.5	1.8	1.8	1.5	1.8
BOQ	2.7	0.9	19.3	2.3	2.2	97.0	47.0	1.0	0.4	37.2	1.7
QSRatio	0.5		1.2	0.4		11.8		0.5	0.0		0.8
95th Percentile Output:											
fB%	2.1	2.1	1.8	2.1	2.1	1.5	1.6	2.1	2.1	1.7	2.1
BOQ	3.1	1.0	21.6	2.7	2.5	104	50.9	1.2	0.5	40.5	1.9
QSRatio	0.6		1.3	0.5		12.7		0.6	0.1		1.0
98th Percentile Output:											
fB%	2.6	2.7	2.1	2.6	2.6	1.7	1.8	2.7	2.7	1.9	2.6
BOQ	3.9	1.3	25.1	3.4	3.2	117	56.7	1.5	0.6	45.3	2.5
QSRatio	0.7		1.6	0.7		14.3		0.8	0.1		1.2

ERROR MESSAGES

No errors to report.

HCS+: Signalized Intersections Release 5.5

Analyst: ALL
Agency: GHA
Date: 2/25/2013
Period: AM PEAK HOUR
Project ID: AM TOTAL - GILMER AT 83 DOUBLE G'S ROADHOUSE
E/W St: GILMER RD/OAKWOOD RD

Inter.: GILMER @ 83
Area Type: All other areas
Jurisd: IDOT
Year : 2013
N/S St: IL RTE 83

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	1	1	1	0	1	2	1	1	2	1
LGConfig	L	T	R	L	TR		L	T	R	L	T	R
Volume	25	10	800	15	10	10	290	1430	10	10	1540	35
Lane Width	11.0	13.0	12.0	11.0	12.0		12.0	13.0	12.0	13.0	13.0	12.0
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	A	A			NB Left	A	A		
Thru		A			Thru		A	A	
Right		A			Right			A	
Peds					Peds				
WB Left	A	A			SB Left	A			
Thru		A			Thru			A	
Right		A			Right			A	
Peds					Peds				
NB Right	A				EB Right	A	A		
SB Right	A				WB Right				
Green	10.0	37.0				11.0	11.0	82.0	
Yellow	3.0	4.5				3.0	0.0	4.5	
All Red	0.0	1.5				1.0	0.0	1.5	

Cycle Length: 170.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
L	427	1711	0.06	0.31	41.0	D		
T	419	1925	0.03	0.22	52.4	D	212.1	F
R	643	1583	1.35	0.41	219.5	F		
Westbound								
L	436	1711	0.04	0.31	40.7	D		
TR	375	1723	0.06	0.22	52.8	D	47.7	D
Northbound								
L	271	1770	1.16	0.15	177.9	F		
T	2005	3665	0.78	0.55	32.2	C	56.5	E
R	913	1583	0.01	0.58	15.4	B		
Southbound								
L	118	1829	0.09	0.06	75.2	E		
T	1768	3665	0.95	0.48	53.2	D	52.5	D
R	913	1583	0.04	0.58	15.6	B		

Intersection Delay = 86.0 (sec/veh) Intersection LOS = F

HCS+: Signalized Intersections Release 5.5

Phone:
E-Mail:
Fax:

OPERATIONAL ANALYSIS

Analyst: ALL
Agency/Co.: GHA
Date Performed: 2/25/2013
Analysis Time Period: AM PEAK HOUR
Intersection: GILMER @ 83
Area Type: All other areas
Jurisdiction: IDOT
Analysis Year: 2013
Project ID: AM TOTAL - GILMER AT 83 DOUBLE G'S ROADHOUSE
E/W St: GILMER RD/OAKWOOD RD N/S St: IL RTE 83

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	25	10	800	15	10	10	290	1430	10	10	1540	35
% Heavy Veh	2	2	2	2	2	2	2	2	2	2	2	2
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
PK 15 Vol	7	3	217	4	3	3	79	389	3	3	418	10
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat	1900	1900	1900	1900	1900		1900	1900	1900	1900	1900	1900
ParkExist												
NumPark												
No. Lanes	1	1	1	1	1	0	1	2	1	1	2	1
LGConfig	L	T	R	L	TR		L	T	R	L	T	R
Lane Width	11.0	13.0	12.0	11.0	12.0		12.0	13.0	12.0	13.0	13.0	12.0
RTOR Vol			0			0			0			0
Adj Flow	27	11	870	16	22		315	1554	11	11	1674	38
%InSharedLn												
Prop LTs	1.000	0.000		1.000	0.000			0.000			0.000	
Prop RTs		0.000	1.000		0.500			0.000	1.000		0.000	1.000
Peds Bikes	0			0			0			0		
Buses	0	0	0	0	0		0	0	0	0	0	0
%InProtPhase	0.0			0.0								

Duration 0.25 Area Type: All other areas

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Arriv. Type	3	3	3	3	3		3	3	3	3	3	3
Unit Ext.	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
I Factor		1.000			1.000			1.000			1.000	
Lost Time	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Ext of g	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Ped Min g		3.2			3.2			3.2			3.2	

PHASE DATA

Phase Combination		1	2	3	4			5	6	7	8
EB	Left	A	A			NB	Left	A	A		
	Thru		A				Thru		A	A	
	Right		A				Right			A	
	Peds						Peds				
WB	Left	A	A			SB	Left	A			
	Thru		A				Thru			A	
	Right		A				Right			A	
	Peds						Peds				
NB	Right	A				EB	Right	A	A		
SB	Right	A				WB	Right				
Green		10.0	37.0					11.0	11.0	82.0	
Yellow		3.0	4.5					3.0	0.0	4.5	
All Red		0.0	1.5					1.0	0.0	1.5	

Cycle Length: 170.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	25	10	800	15	10	10	290	1430	10	10	1540	35
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	27	11	870	16	11	11	315	1554	11	11	1674	38
No. Lanes	1	1	1	1	1	0	1	2	1	1	2	1
Lane group	L	T	R	L	TR		L	T	R	L	T	R
Adj flow	27	11	870	16	22		315	1554	11	11	1674	38
Prop LTs	1.000	0.000		1.000	0.000			0.000			0.000	
Prop RTs		0.000	1.000		0.500			0.000	1.000		0.000	1.000

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	L	T	R	L	TR		L	T	R	L	T	R
So	1900	1900	1900	1900	1900		1900	1900	1900	1900	1900	1900
Lanes	1	1	1	1	1	0	1	2	1	1	2	1
fW	0.967	1.033	1.000	0.967	1.000		1.000	1.033	1.000	1.033	1.033	1.000
fHV	0.980	0.980	0.980	0.980	0.980		0.980	0.980	0.980	0.980	0.980	0.980
fG	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000
fP	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000
fBB	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000*
fA	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000
fLU	1.000	1.000	1.000	1.000	1.000		1.000	0.952	1.000	1.000	0.952	1.000
fRT		1.000	0.850		0.925			1.000	0.850		1.000	0.850
fLT	0.950	1.000		0.950	1.000		0.950	1.000		0.950	1.000	
Sec.	0.715			0.736								
fLpb	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fRpb		1.000	1.000		1.000			1.000	1.000		1.000	1.000
S	1711	1925	1583	1711	1723		1770	3665	1583	1829	3665	1583
Sec.	1287			1326								

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)	Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound							
Prot		27	1711	# 0.02	0.059	101	0.27
Perm		0	1287	0.00	0.253	326	0.00
Left	L	27			0.31	427	0.06
Prot							
Perm							
Thru	T	11	1925	0.01	0.22	419	0.03
Right	R	870	1583	# 0.55	0.41	643	1.35
Westbound							
Prot		16	1711	0.01	0.059	101	0.16
Perm		0	1326	0.00	0.253	335	0.00
Left	L	16			0.31	436	0.04
Prot							
Perm							
Thru	TR	22	1723	0.01	0.22	375	0.06
Right							
Northbound							
Prot							
Perm							
Left	L	315	1770	0.18	0.15	271	1.16
Prot							
Perm							
Thru	T	1554	3665	0.42	0.55	2005	0.78
Right	R	11	1583	0.01	0.58	913	0.01
Southbound							
Prot							
Perm							
Left	L	11	1829	0.01	0.06	118	0.09
Prot							
Perm							
Thru	T	1674	3665	# 0.46	0.48	1768	0.95
Right	R	38	1583	0.02	0.58	913	0.04

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 1.02
Total lost time per cycle, L = 12.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.10

Control Delay and LOS Determination

Appr/ Lane Grp	Ratios v/c	Ratios g/C	Unf Del d1	Prog Adj Fact	Lane Grp Cap	Incremental Factor k	Incremental Del d2	Res Del d3	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound												
L	0.06	0.31	40.9	1.000	427	0.11	0.1	0.0	41.0	D		
T	0.03	0.22	52.3	1.000	419	0.11	0.0	0.0	52.4	D	212.1	F
R	1.35	0.41	50.5	1.000	643	0.50	169.0	0.0	219.5	F		
Westbound												
L	0.04	0.31	40.6	1.000	436	0.11	0.0	0.0	40.7	D		
TR	0.06	0.22	52.7	1.000	375	0.11	0.1	0.0	52.8	D	47.7	D
Northbound												
L	1.16	0.15	72.0	1.000	271	0.50	105.9	0.0	177.9	F		
T	0.78	0.55	30.3	1.000	2005	0.32	2.0	0.0	32.2	C	56.5	E
R	0.01	0.58	15.4	1.000	913	0.11	0.0	0.0	15.4	B		
Southbound												
L	0.09	0.06	74.8	1.000	118	0.11	0.3	0.0	75.2	E		
T	0.95	0.48	41.9	1.000	1768	0.46	11.3	0.0	53.2	D	52.5	D

R	0.04	0.58	15.6	1.000	913	0.11	0.0	0.0	15.6	B

Intersection delay = 86.0 (sec/veh) Intersection LOS = F

SUPPLEMENTAL PERMITTED LT WORKSHEET
for exclusive lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach				
Cycle length, C 170.0 sec				
Total actual green time for LT lane group, G (s)	50.0	50.0		
Effective permitted green time for LT lane group, g(s)	43.0	43.0		
Opposing effective green time, go (s)	37.0	37.0		
Number of lanes in LT lane group, N	1	1		
Number of lanes in opposing approach, No	1	1		
Adjusted LT flow rate, VLT (veh/h)	27	16		
Proportion of LT in LT lane group, PLT	1.000	1.000		
Proportion of LT in opposing flow, PLTo	0.00	0.00		
Adjusted opposing flow rate, Vo (veh/h)	22	11		
Lost time for LT lane group, tL	6.00	6.00		
Computation				
LT volume per cycle, LTC=VLTC/3600	1.27	0.76		
Opposing lane util. factor, fLUo	1.000	1.000	0.952	0.952
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)	1.04	0.52		
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g	0.0	0.0		
Opposing platoon ratio, Rpo (refer Exhibit 16-11)	1.00	1.00		
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]	0.78	0.78		
gq, (see Exhibit C16-4,5,6,7,8)	1.65	0.82		
gu=g-gq if gq>=gf, or = g-gf if gq<gf	41.35	42.18		
n=Max(gq-gf)/2,0)	0.82	0.41		
PTHo=1-PLTo	1.00	1.00		
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]	1.00	1.00		
EL1 (refer to Exhibit C16-3)	1.35	1.33		
EL2=Max((1-Ptho**n)/Plto, 1.0)				
fmin=2(1+PL)/g or fmin=2(1+Pl)/g	0.09	0.09		
gdiff=max(gq-gf,0)	0.00	0.00		
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)	0.71	0.74		
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)				
or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT	0.715	0.736		

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET
for shared lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach				
Cycle length, C 170.0 sec				
Total actual green time for LT lane group, G (s)				
Effective permitted green time for LT lane group, g(s)				
Opposing effective green time, go (s)				
Number of lanes in LT lane group, N				
Number of lanes in opposing approach, No				
Adjusted LT flow rate, VLT (veh/h)				
Proportion of LT in LT lane group, PLT	0.000	0.000	0.000	0.000
Proportion of LT in opposing flow, PLTo				
Adjusted opposing flow rate, Vo (veh/h)				
Lost time for LT lane group, tL				
Computation				
LT volume per cycle, LTC=VLTC/3600				
Opposing lane util. factor, fLUo	1.000	1.000	0.952	0.952
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)				
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g				
Opposing platoon ratio, Rpo (refer Exhibit 16-11)				
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]				
gq, (see Exhibit C16-4,5,6,7,8)				
gu=g-gq if gq>=gf, or = g-gf if gq<gf				
n=Max(gq-gf)/2,0)				
PTHo=1-PLTo				
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]				
EL1 (refer to Exhibit C16-3)				
EL2=Max((1-Ptho**n)/Plto, 1.0)				
fmin=2(1+PL)/g or fmin=2(1+Pl)/g				
gdiff=max(gq-gf,0)				
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)				
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)				
or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT				

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

Permitted Left Turns

	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				
Permitted Right Turns				
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				

OCCbicg
OCCr
Number of cross-street receiving lanes, Nrec
Number of turning lanes, Nturn
ApbT
Proportion right-turns, PRT
Proportion right-turns using protected phase, PRTA
Right turn adjustment, fRpb

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

	EBLT	WBLT	NBLT	SBLT
Cycle length, C 170.0 sec				
Adj. LT vol from Vol Adjustment Worksheet, v	27	16		
v/c ratio from Capacity Worksheet, X	0.06	0.04		
Protected phase effective green interval, g (s)	10.0	10.0		
Opposing queue effective green interval, gq	1.65	0.82		
Unopposed green interval, gu	41.35	42.18		
Red time r=(C-g-gq-gu)	117.0	117.0		
Arrival rate, qa=v/(3600(max[X,1.0]))	0.01	0.00		
Protected ph. departure rate, Sp=s/3600	0.475	0.475		
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)	0.37	0.38		
XPerm	0.02	0.01		
XProt	0.20	0.12		
Case	1	1		
Queue at beginning of green arrow, Qa	0.88	0.52		
Queue at beginning of unsaturated green, Qu	0.01	0.00		
Residual queue, Qr	0.00	0.00		
Uniform Delay, d1	40.9	40.6		

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
L	0.0	0.00		40.9	0.00	0.0	0.0	41.0
T	0.0	0.00	66.5	52.3	0.00	0.0	0.0	52.4
R	0.0	0.00	50.5	50.5	0.00	56.8	0.0	219.5
Westbound								
L	0.0	0.00		40.6	0.00	0.0	0.0	40.7
TR	0.0	0.00	66.5	52.7	0.00	0.0	0.0	52.8
	0.0						0.0	
Northbound								
L	0.0	0.00	72.0	72.0	0.00	11.0	0.0	177.9
T	0.0	0.00	38.5	30.3	0.00	0.0	0.0	32.2
R	0.0	0.00	36.0	15.4	0.00	0.0	0.0	15.4
Southbound								
L	0.0	0.00	79.5	74.8	0.00	0.0	0.0	75.2
T	0.0	0.00	44.0	41.9	0.00	0.0	0.0	53.2
R	0.0	0.00	36.0	15.6	0.00	0.0	0.0	15.6

Intersection Delay 86.0 sec/veh Intersection LOS F

BACK OF QUEUE WORKSHEET

	Eastbound			Westbound			Northbound			Southbound		
LaneGroup	L	T	R	L	TR		L	T	R	L	T	R
Init Queue	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Flow Rate	27	11	870	16	22		315	816	11	11	879	38
So	1900	1900	1900	1900	1900		1900	1900	1900	1900	1900	1900
No.Lanes	1	1	1	1	1	0	1	2	1	1	2	1
SL	1367	1925	1583	1399	1723		1770	1924	1583	1829	1924	1583
LnCapacity	427	419	643	436	375		271	1053	913	118	928	913
Flow Ratio	0.0	0.0	0.5	0.0	0.0		0.2	0.4	0.0	0.0	0.5	0.0
v/c Ratio	0.06	0.03	1.35	0.04	0.06		1.16	0.77	0.01	0.09	0.95	0.04
Grn Ratio	0.31	0.22	0.41	0.31	0.22		0.15	0.55	0.58	0.06	0.48	0.58
I Factor		1.000			1.000			1.000			1.000	
AT or PVG	3	3	3	3	3		3	3	3	3	3	3
Pltn Ratio	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
PF2	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Q1	0.9	0.4	41.1	0.5	0.8		14.9	30.3	0.2	0.5	39.6	0.8
kB	0.6	0.6	0.8	0.6	0.6		0.5	1.0	1.0	0.3	1.0	1.0
Q2	0.0	0.0	31.1	0.0	0.0		7.8	3.2	0.0	0.0	7.7	0.0
Q Average	0.9	0.4	72.2	0.5	0.9		22.7	33.5	0.2	0.5	47.2	0.8
Q Spacing	25.0	25.0	25.0	25.0	25.0		25.0	25.0	25.0	25.0	25.0	25.0
Q Storage	135	0	400	130	0		205	0	50	200	0	50
Q S Ratio	0.2		4.5	0.1			2.8		0.1	0.1		0.4
70th Percentile Output:												
fB%	1.2	1.2	1.1	1.2	1.2		1.2	1.1	1.2	1.2	1.1	1.2
BOQ	1.1	0.5	80.6	0.7	1.0		26.3	38.3	0.3	0.6	53.4	1.0
QSRatio	0.2		5.0	0.1			3.2		0.1	0.1		0.5
85th Percentile Output:												
fB%	1.6	1.6	1.3	1.6	1.6		1.4	1.4	1.6	1.6	1.4	1.6
BOQ	1.5	0.7	95.8	0.9	1.4		32.7	46.9	0.4	0.8	64.4	1.3
QSRatio	0.3		6.0	0.2			4.0		0.2	0.1		0.7
90th Percentile Output:												
fB%	1.8	1.8	1.4	1.8	1.8		1.5	1.5	1.8	1.8	1.4	1.8
BOQ	1.6	0.8	102	1.0	1.5		34.7	49.5	0.4	0.9	67.9	1.5
QSRatio	0.3		6.4	0.2			4.2		0.2	0.1		0.7
95th Percentile Output:												
fB%	2.1	2.1	1.5	2.1	2.1		1.7	1.6	2.1	2.1	1.5	2.1
BOQ	1.9	0.9	109	1.1	1.8		37.9	53.4	0.5	1.1	72.9	1.7
QSRatio	0.4		6.8	0.2			4.6		0.2	0.1		0.9
98th Percentile Output:												
fB%	2.6	2.7	1.7	2.7	2.6		1.9	1.8	2.7	2.7	1.7	2.6
BOQ	2.4	1.1	123	1.4	2.3		42.5	59.5	0.6	1.4	81.6	2.2
QSRatio	0.4		7.7	0.3			5.2		0.3	0.2		1.1

ERROR MESSAGES

No errors to report.

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	ALL	Intersection	GILMER @ SITE ACCESS
Agency/Co.	GHA	Jurisdiction	LCDOT
Date Performed	2/26/2013	Analysis Year	2013
Analysis Time Period	AM PEAK HOUR		

Project Description: AM TOTAL - GILMER AT SITE DOUBLE G'S ROADHOUSE

East/West Street: GILMER RD — North/South Street: SITE ACCESS

Intersection Orientation: East-West — Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		830	1	10	325	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	830	1	10	325	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Two Way Left Turn Lane					
RT Channelized			0			0
Lanes	0	1	1	1	1	0
Configuration		T	R	L	T	
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	1		5			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	1	0	5	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L	L		R			
v (veh/h)		10	1		5			
C (m) (veh/h)		810	333		373			
v/c		0.01	0.00		0.01			
95% queue length		0.04	0.01		0.04			
Control Delay (s/veh)		9.5	15.8		14.8			
LOS		A	C		B			
Approach Delay (s/veh)	--	--	15.0					
Approach LOS	--	--	B					

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	ALL	Intersection	SITE ACCESS @ IL RTE 83
Agency/Co.	GHA	Jurisdiction	IDOT
Date Performed	2/26/2013	Analysis Year	2013
Analysis Time Period	AM PEAK HOUR		

Project Description: AM TOTAL - SITE @ 83 DOUBLE G'S ROADHOUSE

East/West Street: SITE ACCESS — North/South Street: IL RTE 83

Intersection Orientation: North-South — Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		1730			2355	1
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	1730	0	0	2355	1
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	2	0	0	2	0
Configuration		T			T	TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)			1			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	0	1	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	1	0	0	0
Configuration			R			

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								R
v (veh/h)								1
C (m) (veh/h)								235
v/c								0.00
95% queue length								0.01
Control Delay (s/veh)								20.4
LOS								C
Approach Delay (s/veh)	--	--				20.4		
Approach LOS	--	--				C		

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0.07 0.64 10.6 1.000 1019 0.11 0.0 0.0 10.7 B

Intersection delay = 90.0 (sec/veh) Intersection LOS = F

SUPPLEMENTAL PERMITTED LT WORKSHEET
for exclusive lefts

	EB	WB	NB	SB
t				
sed by Single(S) or Multiple(M) lane approach				
e length, C 160.0 sec				
l actual green time for LT lane group, G (s)	23.0	23.0		
ctive permitted green time for LT lane group, g(s)	16.0	16.0		
sing effective green time, go (s)	10.0	10.0		
er of lanes in LT lane group, N	1	1		
er of lanes in opposing approach, No	1	1		
sted LT flow rate, VLT (veh/h)	60	38		
ortion of LT in LT lane group, PLT	1.000	1.000		
ortion of LT in opposing flow, PLTo	0.00	0.00		
sted opposing flow rate, Vo (veh/h)	27	11		
time for LT lane group, tL	6.00	6.00		
utation				
olume per cycle, LTC=VLTC/3600	2.67	1.69		
sing lane util. factor, fLUo	1.000	1.000	0.952	0.952
sing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)	1.20	0.49		
[exp(- a * (LTC ** b)]-tl, gf<=g	0.0	0.0		
sing platoon ratio, Rpo (refer Exhibit 16-11)	1.00	1.00		
sing Queue Ratio, qro=Max[1-Rpo(go/C),0]	0.94	0.94		
(see Exhibit C16-4,5,6,7,8)	2.28	0.92		
-gq if gq>=gf, or = g-gf if gq<gf	13.72	15.08		
x(gq-gf)/2,0)	1.14	0.46		
=1-PLTo	1.00	1.00		
PLT[1+(N-1)g/(gf+gu/EL1+4.24)]	1.00	1.00		
(refer to Exhibit C16-3)	1.35	1.33		
Max((1-Ptho**n)/Plto, 1.0)				
=2(1+PL)/g or fmin=2(1+Pl)/g	0.25	0.25		
f=max(gq-gf,0)	0.00	0.00		
gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)	0.63	0.71		
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)				
lt=[fm+0.91(N-1)]/N**				
-turn adjustment, fLT	0.634	0.707		

special case of single-lane approach opposed by multilane approach,
text.
Pl>=1 for shared left-turn lanes with N>1, then assume de-facto
ft-turn lane and redo calculations.
or permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
special case of multilane approach opposed by single-lane approach
ien gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET
for shared lefts

	EB	WB	NB	SB
:				
sed by Single(S) or Multiple(M) lane approach				
e length, C 160.0 sec				
l actual green time for LT lane group, G (s)				
ctive permitted green time for LT lane group, g(s)				
sing effective green time, go (s)				
er of lanes in LT lane group, N				
Number of lanes in opposing approach, No				
Adjusted LT flow rate, VLT (veh/h)				
Proportion of LT in LT lane group, PLT	0.000	0.000	0.000	0.000
Proportion of LT in opposing flow, PLTo				
Adjusted opposing flow rate, Vo (veh/h)				
Lost time for LT lane group, tL				
Computation				
LT volume per cycle, LTC=VLTC/3600				
Opposing lane util. factor, fLUo	1.000	1.000	0.952	0.952
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)				
gf=G[exp(- a * (LTC ** b)]-tl, gf<=g				
Opposing platoon ratio, Rpo (refer Exhibit 16-11)				
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]				
gq, (see Exhibit C16-4,5,6,7,8)				
gu=g-gq if gq>=gf, or = g-gf if gq<gf				
n=Max(gq-gf)/2,0)				
PTHo=1-PLTo				
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]				
EL1 (refer to Exhibit C16-3)				
EL2=Max((1-Ptho**n)/Plto, 1.0)				
fmin=2(1+PL)/g or fmin=2(1+Pl)/g				
gdiff=max(gq-gf,0)				
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)				
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)				
or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT				

For special case of single-lane approach opposed by multilane approach,
see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto
left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach
or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

Permitted Left Turns	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				
Permitted Right Turns				
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				

PHASE DATA

se Combination	1	2	3	4			5	6	7	8
Left	A	A			NB	Left	A	A		
Thru		A				Thru		A	A	
Right		A				Right			A	
Peds						Peds				
Left	A	A			SB	Left	A			
Thru		A				Thru			A	
Right		A				Right			A	
Peds						Peds				
Right	A				EB	Right	A	A		
Right	A				WB	Right				
:n	10.0	10.0					12.0	22.0	87.0	
.ow	3.0	4.5					3.0	0.0	4.5	
Red	0.0	1.5					1.0	0.0	1.5	

Cycle Length: 160.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

ıme Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
ıme, V	55	10	290	35	15	10	690	1780	30	5	1290	65
	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
flow	60	11	315	38	16	11	750	1935	33	5	1402	71
Lanes	1	1	1	1	1	0	1	2	1	1	2	1
group	L	T	R	L	TR		L	T	R	L	T	R
flow	60	11	315	38	27		750	1935	33	5	1402	71
LTs	1.000	0.000		1.000	0.000			0.000			0.000	
RTs		0.000	1.000		0.407			0.000	1.000		0.000	1.000

.ration Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	TR		L	T	R	L	T	R
	1900	1900	1900	1900	1900		1900	1900	1900	1900	1900	1900
s	1	1	1	1	1	0	1	2	1	1	2	1
	0.967	1.033	1.000	0.967	1.000		1.000	1.033	1.000	1.033	1.033	1.000
	0.980	0.980	0.980	0.980	0.980		0.980	0.980	0.980	0.980	0.980	0.980
	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000
	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000
	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000
	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000
	1.000	1.000	1.000	1.000	1.000		1.000	0.952	1.000	1.000	0.952	1.000
		1.000	0.850		0.939			1.000	0.850		1.000	0.850
	0.950	1.000		0.950	1.000		0.950	1.000		0.950	1.000	
	0.634			0.707								
	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
		1.000	1.000		1.000			1.000	1.000		1.000	1.000
	1711	1925	1583	1711	1749		1770	3665	1583	1829	3665	1583
	1142			1273								

CAPACITY AND LOS WORKSHEET

city Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)	Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound							
Prot		60	1711	# 0.04	0.063	107	0.56
Perm		0	1142	0.00	0.100	114	0.00
Left	L	60			0.16	221	0.27
Prot							
Perm							
Thru	T	11	1925	0.01	0.06	120	0.09
Right	R	315	1583	0.20	0.34	534	0.59
Westbound							
Prot		38	1711	0.02	0.063	107	0.36
Perm		0	1273	0.00	0.100	127	0.00
Left	L	38			0.16	234	0.16
Prot							
Perm							
Thru	TR	27	1749	# 0.02	0.06	109	0.25
Right							
Northbound							
Prot							
Perm							
Left	L	750	1770	# 0.42	0.24	420	1.79
Prot							
Perm							
Thru	T	1935	3665	0.53	0.68	2497	0.77
Right	R	33	1583	0.02	0.64	1019	0.03
Southbound							
Prot							
Perm							
Left	L	5	1829	0.00	0.08	137	0.04
Prot							
Perm							
Thru	T	1402	3665	# 0.38	0.54	1993	0.70
Right	R	71	1583	0.04	0.64	1019	0.07

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 0.86
Total lost time per cycle, L = 18.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 0.97

Control Delay and LOS Determination

Appr/ Lane Grp	Ratios v/c	Ratios g/C	Unf Del d1	Prog Adj Fact	Lane Grp Cap	Incremental Factor k	Incremental Del d2	Res Del d3	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound												
L	0.27	0.16	58.2	1.000	221	0.11	0.7	0.0	58.8	E		
T	0.09	0.06	70.7	1.000	120	0.11	0.3	0.0	71.1	E	48.4	D
R	0.59	0.34	43.8	1.000	534	0.18	1.7	0.0	45.6	D		
Westbound												
L	0.16	0.16	57.4	1.000	234	0.11	0.3	0.0	57.7	E		
TR	0.25	0.06	71.4	1.000	109	0.11	1.2	0.0	72.6	E	63.9	E
Northbound												
L	1.79	0.24	61.0	1.000	420	0.50	363.1	0.0	424.1	F		
T	0.77	0.68	17.2	1.000	2497	0.32	1.6	0.0	18.8	B	130.5	F
R	0.03	0.64	10.4	1.000	1019	0.11	0.0	0.0	10.4	B		
Southbound												
L	0.04	0.08	68.6	1.000	137	0.11	0.1	0.0	68.7	E		
T	0.70	0.54	27.0	1.000	1993	0.27	1.1	0.0	28.1	C	27.4	C

icg

er of cross-street receiving lanes, Nrec
er of turning lanes, Nturn

ortion right-turns, PRT
ortion right-turns using protected phase, PRTA
t turn adjustment, fRpb

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

		EBLT	WBLT	NBLT	SBLT
e length, C	160.0 sec				
LT vol from Vol Adjustment Worksheet, v		60	38		
ratio from Capacity Worksheet, X		0.27	0.16		
ected phase effective green interval, g (s)		10.0	10.0		
sing queue effective green interval, gq		2.28	0.92		
posed green interval, gu		13.72	15.08		
time r=(C-g-gq-gu)		134.0	134.0		
val rate, qa=v/(3600(max[X,1.0]))		0.02	0.01		
ected ph. departure rate, Sp=s/3600		0.475	0.475		
itted ph. departure rate, Ss=s(gq+gu)/(gu*3600)		0.37	0.38		
m		0.05	0.03		
t		0.50	0.32		
		1	1		
e at beginning of green arrow, Qa		2.23	1.41		
e at beginning of unsaturated green, Qu		0.04	0.01		
dual queue, Qr		0.00	0.00		
orm Delay, d1		58.2	57.4		

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

/ p	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
bound								
	0.0	0.00		58.2	0.00	0.0	0.0	58.8
	0.0	0.00	75.0	70.7	0.00	0.0	0.0	71.1
	0.0	0.00	53.0	43.8	0.00	0.0	0.0	45.6
ound								
	0.0	0.00		57.4	0.00	0.0	0.0	57.7
	0.0	0.00	75.0	71.4	0.00	0.0	0.0	72.6
	0.0						0.0	
hbound								
	0.0	0.00	61.0	61.0	0.00	82.5	0.0	424.1
	0.0	0.00	25.5	17.2	0.00	0.0	0.0	18.8
	0.0	0.00	28.5	10.4	0.00	0.0	0.0	10.4
bound								
	0.0	0.00	74.0	68.6	0.00	0.0	0.0	68.7
	0.0	0.00	36.5	27.0	0.00	0.0	0.0	28.1
	0.0	0.00	28.5	10.6	0.00	0.0	0.0	10.7

Intersection Delay 90.0 sec/veh Intersection LOS F

BACK OF QUEUE WORKSHEET

	Eastbound			Westbound		Northbound			Southbound		
LaneGroup	L	T	R	L	TR	L	T	R	L	T	R
Init Queue	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Flow Rate	60	11	315	38	27	750	1016	33	5	736	71
So	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
No.Lanes	1	1	1	1	1 0	1	2	1	1	2	1
SL	1361	1925	1583	1441	1749	1770	1924	1583	1829	1924	1583
LnCapacity	221	120	534	234	109	420	1311	1019	137	1046	1019
Flow Ratio	0.0	0.0	0.2	0.0	0.0	0.4	0.5	0.0	0.0	0.4	0.0
v/c Ratio	0.27	0.09	0.59	0.16	0.25	1.79	0.77	0.03	0.04	0.70	0.07
Grn Ratio	0.16	0.06	0.34	0.16	0.06	0.24	0.68	0.64	0.08	0.54	0.64
I Factor		1.000			1.000		1.000			1.000	
AT or PVG	3	3	3	3	3	3	3	3	3	3	3
Pltn Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Q1	2.3	0.5	11.6	1.4	1.1	33.3	30.5	0.5	0.2	24.2	1.2
kB	0.4	0.3	0.7	0.4	0.3	0.6	1.1	1.0	0.3	1.0	1.0
Q2	0.1	0.0	0.9	0.1	0.1	42.5	3.6	0.0	0.0	2.2	0.1
Q Average	2.4	0.5	12.5	1.5	1.2	75.9	34.1	0.6	0.2	26.4	1.3
Q Spacing	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Q Storage	135	0	400	130	0	205	0	50	200	0	50
Q S Ratio	0.4		0.8	0.3		9.3		0.3	0.0		0.6
70th Percentile Output:											
fB%	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.2	1.2	1.2	1.2
BOQ	2.9	0.6	14.7	1.8	1.5	84.6	39.0	0.7	0.3	30.4	1.5
QSRatio	0.5		0.9	0.3		10.3		0.3	0.0		0.7
85th Percentile Output:											
fB%	1.6	1.6	1.5	1.6	1.6	1.3	1.4	1.6	1.6	1.4	1.6
BOQ	3.8	0.8	18.7	2.4	1.9	100	47.6	0.9	0.3	37.6	2.0
QSRatio	0.7		1.2	0.5		12.2		0.5	0.0		1.0
90th Percentile Output:											
fB%	1.8	1.8	1.6	1.8	1.8	1.4	1.5	1.8	1.8	1.5	1.8
BOQ	4.2	0.9	20.2	2.7	2.2	107	50.2	1.0	0.4	39.8	2.2
QSRatio	0.8		1.3	0.5		13.0		0.5	0.0		1.1
95th Percentile Output:											
fB%	2.0	2.1	1.8	2.1	2.1	1.5	1.6	2.1	2.1	1.6	2.1
BOQ	4.9	1.0	22.5	3.1	2.5	114	54.2	1.2	0.5	43.3	2.6
QSRatio	0.9		1.4	0.6		14.0		0.6	0.1		1.3
98th Percentile Output:											
fB%	2.5	2.7	2.1	2.6	2.6	1.7	1.8	2.7	2.7	1.8	2.6
BOQ	6.1	1.3	26.0	3.9	3.2	129	60.4	1.5	0.6	48.4	3.3
QSRatio	1.1		1.6	0.7		15.8		0.8	0.1		1.6

ERROR MESSAGES

No errors to report.

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	ALL	Intersection	GILMER @ SITE ACCESS
Agency/Co.	GHA	Jurisdiction	LCDOT
Date Performed	2/26/2013	Analysis Year	2013
Analysis Time Period	PM PEAK HOUR		

Project Description: PM TOTAL - GILMER AT SITE DOUBLE G'S ROADHOUSE

East/West Street: GILMER RD | North/South Street: SITE ACCESS

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		325	15	55	715	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	325	15	55	715	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Two Way Left Turn Lane					
RT Channelized			0			0
Lanes	0	1	1	1	1	0
Configuration		T	R	L	T	
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	10		30			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	10	0	30	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L	L		R			
v (veh/h)		55	10		30			
C (m) (veh/h)		1230	327		721			
v/c		0.04	0.03		0.04			
95% queue length		0.14	0.09		0.13			
Control Delay (s/veh)		8.1	16.4		10.2			
LOS		A	C		B			
Approach Delay (s/veh)	--	--	11.7					
Approach LOS	--	--	B					

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	ALL	Intersection	SITE ACCESS @ IL RTE 83
Agency/Co.	GHA	Jurisdiction	IDOT
Date Performed	2/26/2013	Analysis Year	2013
Analysis Time Period	PM PEAK HOUR		

Project Description: PM TOTAL - SITE @ 83 DOUBLE G'S ROADHOUSE

East/West Street: SITE ACCESS | North/South Street: IL RTE 83

Intersection Orientation: North-South | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		2500			1615	20
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	2500	0	0	1615	20
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	2	0	0	2	0
Configuration		T			T	TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)			5			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	0	5	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	1	0	0	0
Configuration			R			

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								R
v (veh/h)								5
C (m) (veh/h)								379
v/c								0.01
95% queue length								0.04
Control Delay (s/veh)								14.6
LOS								B
Approach Delay (s/veh)	--	--				14.6		
Approach LOS	--	--				B		

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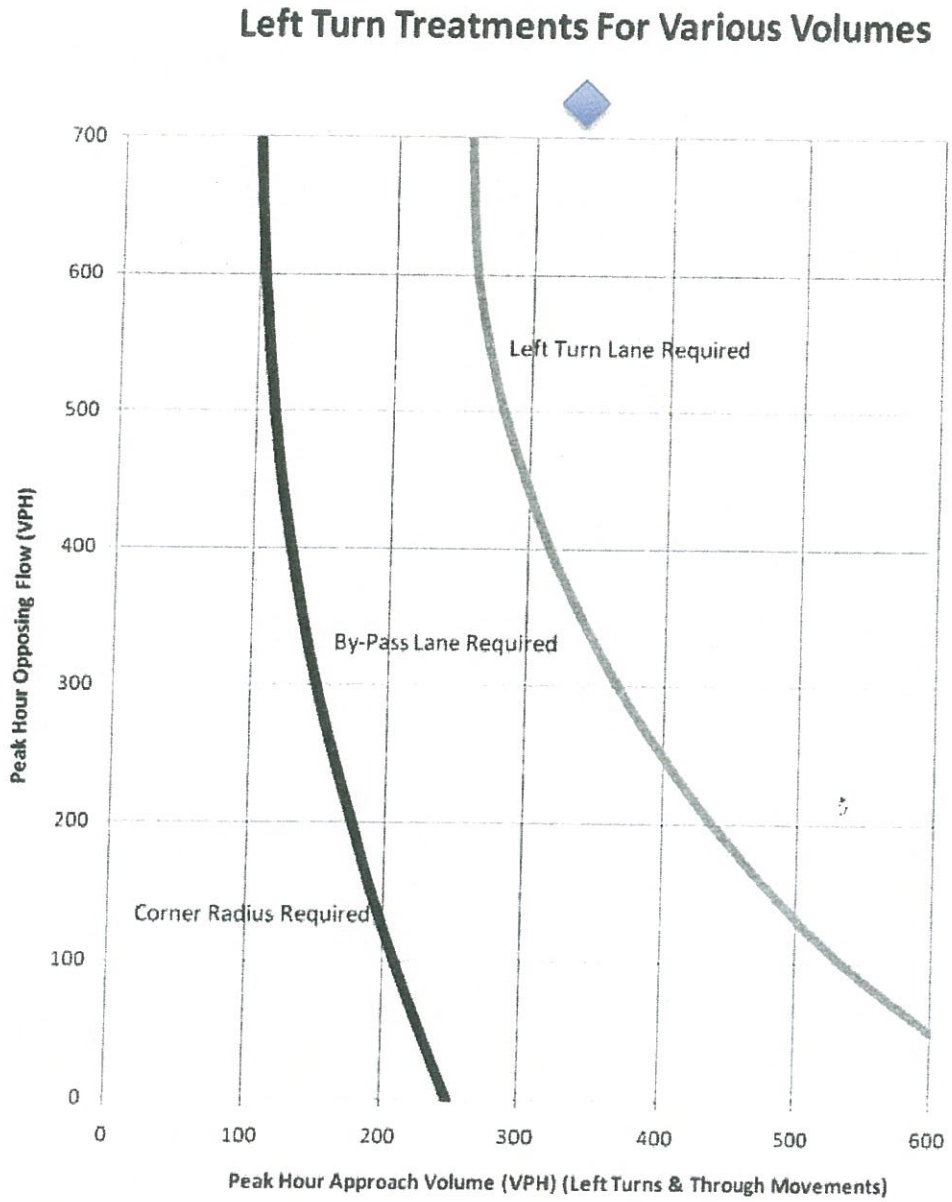
Figure 11.1

11.4.3



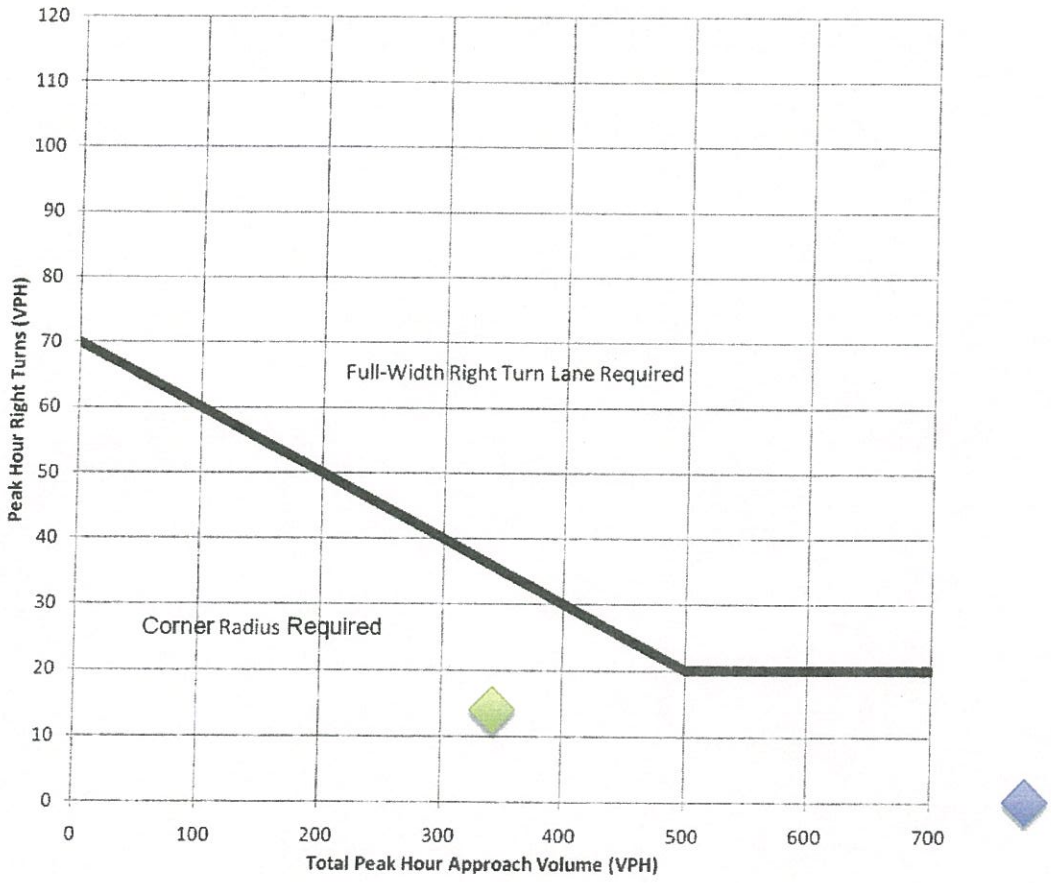
AM Peak Hour

PM Peak Hour

Figure 11.2

11.4.4

Right Turn Treatments For Various Volumes: Two-Lane Highway



AM Peak Hour

PM Peak Hour

Appendix IV: Parking Generations Double G's Roadhouse Long Grove, IL				
Period	**ITE Land Use**	**# of Seats**	**Rate**	**Parking Required**
Weekday	931	484	0.5	**242**
Saturday	931	484	0.43	208

Source: Institute of Transportation Engineers Parking Generation; 3rd Edition