

Traffic Analysis For Oakland Pointe Apartments

JAMES CITY COUNTY, VIRGINIA

For:
Connelly Development, LLC

By:
**DRW Consultants, LLC
Midlothian, VA**

January 12, 2018

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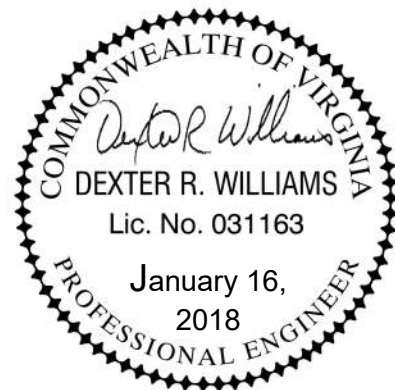


TABLE OF CONTENTS

FOREWORD

REPORT TEXT	Page
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Introduction And Scope	1
Rt. 60 Richmond Road Access	1
Existing Traffic Conditions.....	2
2025 Background Traffic	4
Site Trip Generation, Distribution And Assignment.....	6
2025 Traffic With Site	6
Summary & Conclusions	8

REPORT EXHIBITS	Number
-----------------	--------

Region And Area Maps	1
Oakland Pointe Apartments Conceptual Plan	2a
Oakland Pointe Apartments Road Improvements Plan.....	2b
2017 Peak Hour Traffic Counts	3
Rt. 60 Richmond Road Traffic Counts and Trends	4
2025 Peak Hour Background Traffic – Growth Factor Only.....	5
Remaining Candle Factory & Oakland Pointe Site Trip Generation And Distribution.....	6
Remaining Candle Factory Assignment	7
2025 Background Traffic Traffic.....	8
Site Trip Assignment	9
2025 Traffic With Site	10

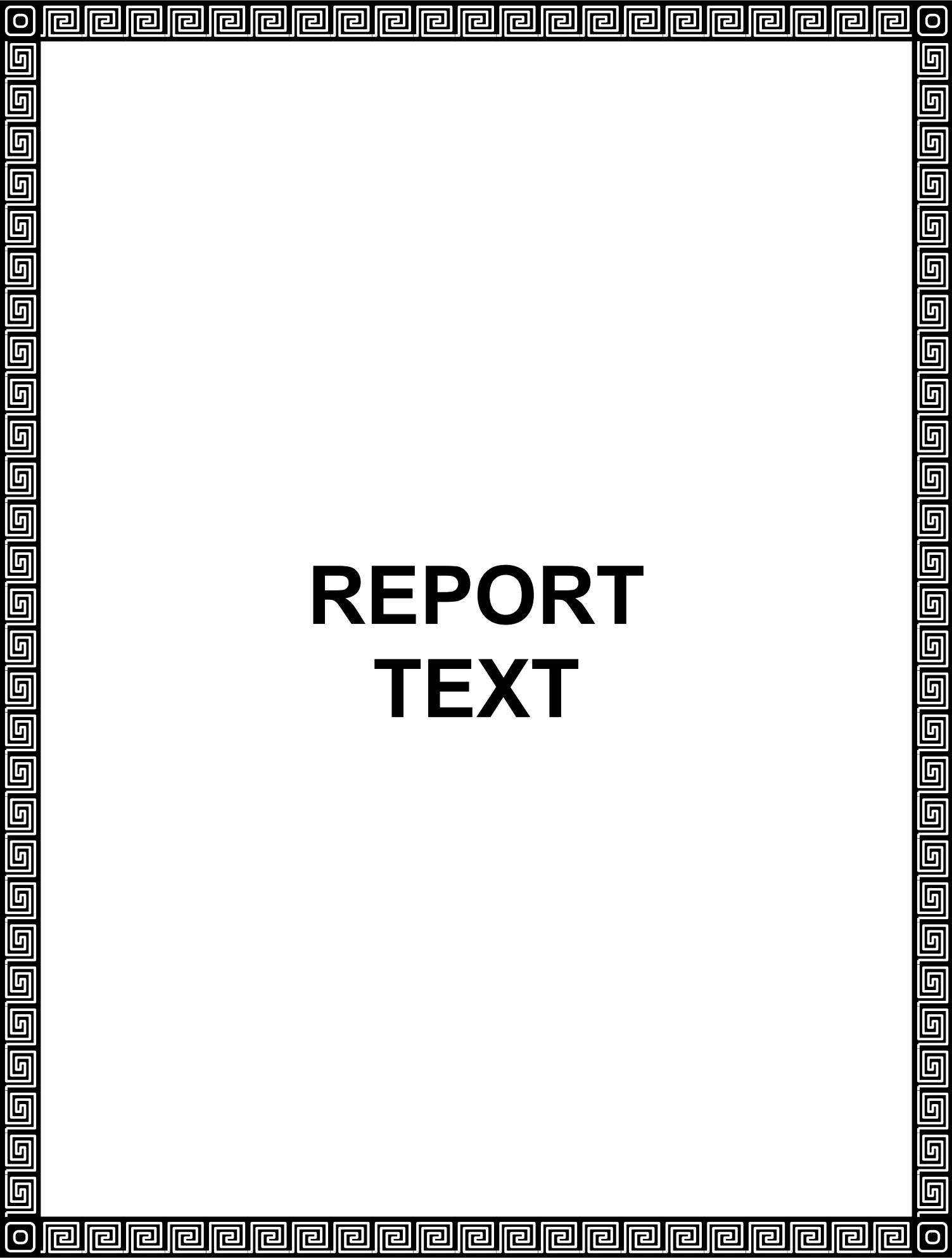
FOREWORD

This traffic study is an update of the November 20, 2017 study for Oakland Pointe Apartments.

Following are the revisions incorporated in this traffic study:

- 1. The eastbound left turn lane on Rt. 60 at Croaker Road has 400 feet of storage/100 foot taper. The previous study had 300 feet storage/100 foot taper.*
- 2. The unsignalized traffic level of service at Rt. 60/Oakland Drive has been modified to allow one vehicle in the median for the northbound left turn from Oakland Drive to westbound Rt. 60. The previous study did not include this adjustment. The existing width of the median is 52 feet which can actually accommodate two vehicles (25 storage per vehicle) and is more than enough for a single vehicle. This change more accurately reflect traffic operations.*
- 3. Traffic signal timing at Rt. 60/Croaker Road uses the coordinated split values. The previous traffic study used the default values. This change more accurately reflects signal timing.*
- 4. The most current conceptual plan for Oakland Pointe Apartments is included.*

All traffic counts and forecasts in this study are the same as the previous study. All traffic analysis procedures follow the conventions of the previous study.



REPORT TEXT

INTRODUCTION AND SCOPE

Connelly Development, LLC proposes to develop an apartment project in James City County, Oakland Pointe Apartments. The site fronts on Rt. 60 Richmond Road between Croaker Road to the east and Oakland Drive to the west. The upper section of Exhibit 1 shows the site location in the VDOT Hampton Roads District. The lower section of Exhibit 1 shows the location of the site and adjacent areas on the County's parcel map.

Access to Oakland Pointe Apartments is proposed via a right turn in/out only entrance on Richmond Road. This traffic study has been prepared to document existing and future traffic conditions with and without site development. In addition to traffic analysis at the Richmond Road/Oakland Pointe Apartments entrance, the following intersections are included in the study for counts and analysis:

1. Rt. 60 Richmond Road/Croaker Road/Pricket Road - signalized
2. Rt. 60 Richmond Road/Oakland Drive - unsignalized

A preliminary development plan by AES is shown on Exhibit 2 and includes 126 apartments.

This study includes AM and PM peak hour traffic analysis at the existing two intersections and the site access cited above for the following scenarios:

- Existing traffic
- 2025 without the project (with build out of Candle Factory rezoning/Village At Candle Station with access on Pricket Road)
- 2025 with the project and related improvements as shown on Exhibit 2b

RT. 60 RICHMOND ROAD ACCESS

Oakland Pointe Apartments has public road access on Rt. 60 Richmond Road. Rt. 60 is a four lane divided median road with substantial grade separation between eastbound and westbound through lanes. With right turn in and out access only, traffic entering from the east and exiting to the west must make U-turns at Croaker Road and at Oakland Drive intersections. These adjacent crossover U-turning movements are addressed in this study.

EXISTING TRAFFIC CONDITIONS

Intersection turning movement traffic counts were conducted by Peggy Malone & Associates from 7 to 9 AM and from 4 to 6 PM on Tuesday, October 10, 2017. Total volumes are tabulated on Appendix Exhibit A and B series and peak hour counts without balance are shown on Appendix Exhibit D.

Exhibit 3 shows AM and PM peak hour traffic on the study area road network diagram. Rt. 60 Richmond Road (posted speed limit 45 mph, east-west orientation) is a four lane divided roadway. Lane configurations at the Richmond Road intersections with Croaker Road/Pricket Road and Oakland Drive are shown on Exhibit 3.

Synchro 10 has been used to calculate intersection levels of service. VDOT signal timing was obtained for the Richmond Road/Croaker Road/Pricket Road intersection.

The following reports are included in the technical appendix:

1. For signalized Richmond Road/Croaker Road/Pricket Road, 2000 Highway Capacity Manual (HCM2000) report is used. See Appendix Exhibits J1 and J2 for the HCM2000 report AM and PM peak hours, respectively. HCM2010 HCM 6th Edition produce NEMA custom phasing violations and are not used.
2. Unsignalized intersection (Richmond Road/Oakland Drive) LOS results are shown in Appendix Exhibits K1 and K2 for the AM and PM peak hours, respectively.
3. Synchro Queues results are shown in Appendix Exhibits L1 and L2 for the AM and PM peak hours, respectively.
4. SimTraffic Queuing & Blocking results are shown in Appendix Exhibits M1, M1A and M2 series for the AM and PM peak hours, respectively.

The following table shows existing peak hour intersection levels of service and queuing results at Richmond Road/Croaker Road/Pricket Road:

2017 COUNTS - TABLE 1-1 Richmond Road/ Croaker Road/Pricket Road									
Traffic LOS And Seconds Delay					95th Percentile Queues By Lane Group				
	AM		PM		Storage Length	Synchro		SimTraffic Q&B	
Overall	C	31.3	D	36.1		AM	PM	AM 60 min	PM
EBL	D	52.1	D	52.5	200	286	150	221	133
EBT	B	18.4	C	27.7		208	220	139	147
EBR	B	15.0	C	23.4	10	0	0	32	58
WBL	D	42.8	D	45.1	200	7	85	9	109
WBT	C	26.4	C	33.3		76	323	68	205
WBR	C	24.4	C	26.3	200	0	66	1147	101
NBL	D	38.0	D	49.9	165	9	157	90	131
NBL/T	D	39.0	D	42.4		20	132	14	193
NBR	D	37.1	D	38.8	150	0	0	67	73
SBL/T	D	52.7	D	53.5		189	422	176	980
SBR	C	29.9	C	30.6	200	36	59	57	1117

SimTraffic queue shown is maximum report value for multi-lane groups

There is overall LOS C at the Richmond Road/Croaker Road intersection in the AM peak hour and overall LOS D in the PM peak hour. There is LOS D or better for all turning movements.

Queuing on the eastbound left turn on Richmond Road at Croaker Road is of particular importance because site traffic will use this turn lane for left turns and U-turns. Queuing for this left turn was recorded at the time of counts and is tabulated on Appendix Exhibits C1 and C2. The following table shows the recorded queues and calculated values in Table 1-1.

TABLE 1-2 EASTBOUND LEFT QUEUING		
SOURCE	AM	PM
Field	250	161
Synchro	286	150
SimTraffic	221	133

A 10-minute SimTraffic interval was used for AM peak hour traffic and a 60-minute interval was used for PM peak hour traffic as was done in the previous study.

In Table 1-1, the other notable queues are on the southbound approach in the PM peak hour.

The following table shows existing peak hour intersection levels of service and queuing results at Rt. 60 Richmond Road/Oakland Drive:

2017 COUNTS - TABLE 1-3 Richmond Road/Oakland Drive									
Traffic LOS And Seconds Delay					95th Percentile Queues By Lane Group				
	AM		PM		Storage Length	HCM 6th		SimTraffic Q&B	
						AM	PM	AM	PM
NBL	C	19.4	C	21.4		3	3	28	36
NBT	B	11.7	B	11.2		3	3	32	40
WBL	A	9.8	A	9.5		0	3	14	45

The northbound left turn on Oakland Drive has LOS C in the AM peak hour and PM peak hour. All other movements have LOS A and B.

2025 BACKGROUND TRAFFIC

Exhibit 4 shows VDOT daily traffic counts (2012 through 2016) and linear regression analysis trend for Rt. 60 Richmond Road west and east of Croaker Road. For the 2025 design year, the traffic counts show 1.0 growth factor west of Croaker Road and a 1.08 growth factor east of Croaker Road.

A 1.08 growth factor is applied to 2017 counts to produce 2025 background traffic (growth factor only) as shown on Exhibit 5.

Build out of the Candle Factory development on Pricket Road (including Village at Candle Station) is also included in this traffic study. Table 1 on Exhibit 6 shows trip generation for the remaining development on Pricket Road. Table 2 shows trip distribution for the remaining development (see Appendix Exhibit E for trip assignment percentages for Pricket Road and for Oakland Drive). Trip assignments for the remaining development are shown on Exhibit 7 and 2025 background traffic without Oakland Pointe Apartments.

For analysis reports, see Technical Appendix as follows:

- HCM2000 signalized intersections LOS: Exhibit J3 and J4
- Unsignalized intersection: Exhibit K3 and K4
- Synchro Queues: Exhibits L3 and L4.
- SimTraffic Queuing & Blocking: Exhibits M3 and M4.

The following table shows 2025 background traffic peak hour intersection levels of service and queuing results at Rt. 60 Richmond Road/Croaker Road/Pricket Road:

2025 Background - TABLE 2-1 Richmond Road/ Croaker Road/Pricket Road									
Traffic LOS And Seconds Delay By Lane					95th Percentile Queues By Lane Group				
	AM		PM		Storage Length	Synchro		SimTraffic Q&B	
Overall	C	31.5	D	41.4		AM	PM	AM	PM
EBL	D	51.3	E	60.1	200	324	162	356	150
EBT	B	19.6	C	30.2		228	244	266	171
EBR	B	15.9	C	25.2	10	0	0	50	86
WBL	D	40.4	D	50.4	200	29	102	7	129
WBT	C	27.0	D	36.9		136	353	70	219
WBR	C	24.9	C	28.1	200	46	79	143	126
NBL	D	38.4	E	60.1	165	58	190	83	207
NBL/T	D	39.4	D	46.7		73	149	120	254
NBR	D	36.5	D	40.9	150	0	0	33	133
SBL/T	D	50.1	E	64.9		216	499	381	931
SBR	C	29.4	D	41.4	200	45	67	253	1169

SimTraffic queue shown is maximum report value for multi-lane groups

Overall intersection LOS for both peak hours is the same as existing conditions with not much change for turning movement LOS in the AM peak hour. For the eastbound left, northbound left and the southbound left/through in the PM peak hour, LOS changed from LOS D to LOS

E.

The following table shows existing peak hour intersection levels of service and queuing results at Rt. 60 Richmond Road/Oakland Drive:

2025 Background - TABLE 2-2 Richmond Road/Oakland Drive									
Traffic LOS And Seconds Delay By Lane					95th Percentile Queues By Lane Group				
	AM		PM		Storage Length	HCM 6th		SimTraffic Q&B	
						AM	PM	AM	PM
NBL	C	19.4	C	24.2	180	3	5	26	33
NBT	B	11.6	B	11.6	180	3	3	40	47
WBL	A	9.8	A	9.8		0	3	18	54

The northbound left turn on Oakland Drive has LOS C in the AM peak hour AND PM peak hours. All other movements have LOS A and B.

SITE TRIP GENERATION, DISTRIBUTION AND ASSIGNMENT

Table 3 on Exhibit 6 shows trip generation for the site using Trip Generation Manual, 9th Edition (TGM9), published by the Institute of Transportation Engineers (ITE). Site trip distribution is shown in Table 4 on Exhibit 6.

Site trip assignment is shown on Exhibit 9.

2025 TRAFFIC WITH SITE

Exhibit 10 respectively shows 2025 AM and PM peak hour traffic with site traffic.

The westbound left turn/U-turn movement on Richmond Road at Oakland Drive warrants a left turn lane (see Appendix Exhibit F) of 100 foot full width lane with 100 foot taper. The right turn into the site on eastbound Rt. 60 warrants a right turn taper (see Appendix Exhibit F1) with 100 foot length. These improvements are included on Exhibit 10. Also included for analysis is an additional 200 feet of storage on the eastbound left turn on Richmond Road at Croaker Road.

For analysis reports, see Technical Appendix as follows:

- HCM2000 signalized intersections LOS: Exhibit J5 and J6 series
- Unsignalized intersection LOS: Exhibits K5 and K6 series
- Synchro Queues: Exhibits L5 and L6 series
- SimTraffic Queuing & Blocking: Exhibits M5 and M6 series.

The following table shows 2025 total traffic peak hour intersection levels of service and queuing results at Rt. 60 Richmond Road/Croaker Road/Pricket Road:

2025 Total - TABLE 3-1 Richmond Road/ Croaker Road/Pricket Road									
Existing Signal Timing									
Traffic LOS And Seconds Delay					95th Percentile Queues By Lane Group				
	AM		PM		Storage Length	Synchro		SimTraffic Q&B	
Overall	C	34.5	D	42.5		AM	PM	AM	PM
EBL	E	70.9	E	64.4	400	376	191	418	169
EBT	B	19.8	C	30.8		237	252	329	163
EBR	B	15.9	C	24.8	10	0	0	43	71
WBL	D	40.7	D	51.7	200	29	102	59	132
WBT	C	27.0	D	38.2		138	367	132	230
WBR	C	24.9	C	28.7	200	46	88	82	139
NBL	D	38.5	E	62.4	165	58	190	46	190
NBL/T	D	39.2	D	47.8		73	149	114	247
NBR	D	36.6	D	41.8	150	0	0	29	96
SBL/T	D	50.3	E	70.3		117	499	283	1038
SBR	C	29.6	C	33.0	200	48	75	154	509

SimTraffic queue shown is maximum report value for multi-lane groups

Overall intersection LOS for both peak hours is the same as existing conditions. The AM peak hour eastbound left turn has LOS E the AM and the eastbound left, northbound left and the southbound left/through have LOS E in the PM peak hour like the background traffic.

As a sensitivity test for LOS and queuing results, the signal timing at the intersection has been optimized using Synchro with the following results:

2025 Total - TABLE 3-2 Richmond Road/ Croaker Road/Pricket Road Optimized Signal Timing									
Traffic LOS And Seconds Delay					95th Percentile Queues By Lane Group				
	AM		PM		Storage Length	Synchro		SimTraffic Q&B	
						AM	PM	AM	PM
Overall	C	32.5	D	42.0					
EBL	D	52.0	E	68.7	400	293	153	337	202
EBT	B	19.2	C	31.5		654	604	155	160
EBR	B	15.6	C	25.3	10	35	93	41	51
WBL	D	43.4	D	51.1	200	40	178	44	136
WBT	C	28.5	D	39.6		339	817	140	242
WBR	C	26.2	C	29.1	200	174	355	88	137
NBL	D	40.8	E	63.3	165	3.9	143	31	197
NBL/T	D	42.3	D	47.8		54	116	85	247
NBR	D	38.7	D	41.5	150	51	64	40	97
SBL/T	D	51.3	E	60.7		244	381	276	1023
SBR	C	31.0	C	31.6	200	162	205	63	504

SimTraffic queue shown is maximum report value for multi-lane groups

In the AM peak hour, the eastbound left turn LOS reduces to D and related queues are reduced. There was less degree of change in the PM peak hour.

The following table shows existing peak hour intersection levels of service and queuing results at Rt. 60 Richmond Road/Oakland Drive:

2025 Total - TABLE 3-3 Richmond Road/Oakland Drive									
Traffic LOS And Seconds Delay					95th Percentile Queues By Lane Group				
	AM		PM		Storage Length	HCM 6th		SimTraffic Q&B	
						AM	PM	AM	PM
NBL	C	20.0	D	28.0	180	3	3	24	34
NBT	B	11.7	B	11.7	180	3	3	40	40
WBL	B	13.6	B	13.8		3	13	22	60

The northbound left turn on Oakland Drive has LOS C in the AM peak hour and LOS D in the PM peak hour. All other movements have LOS B.

The following table shows existing peak hour intersection levels of service and queuing results at the site entrance:

2025 Total - TABLE 3-4 Richmond Road/Oakland Pointe Apartments								
Traffic LOS And Seconds Delay					95th Percentile Queues By Lane Group			
	AM		PM		Storage Length	HCM 6th		SimTraffic Q&B
						AM	PM	AM PM
NBR	B	12.4	B	11.4		8	5	35 36

There is LOS B in the AM peak hour and PM peak hour.

SUMMARY AND CONCLUSIONS

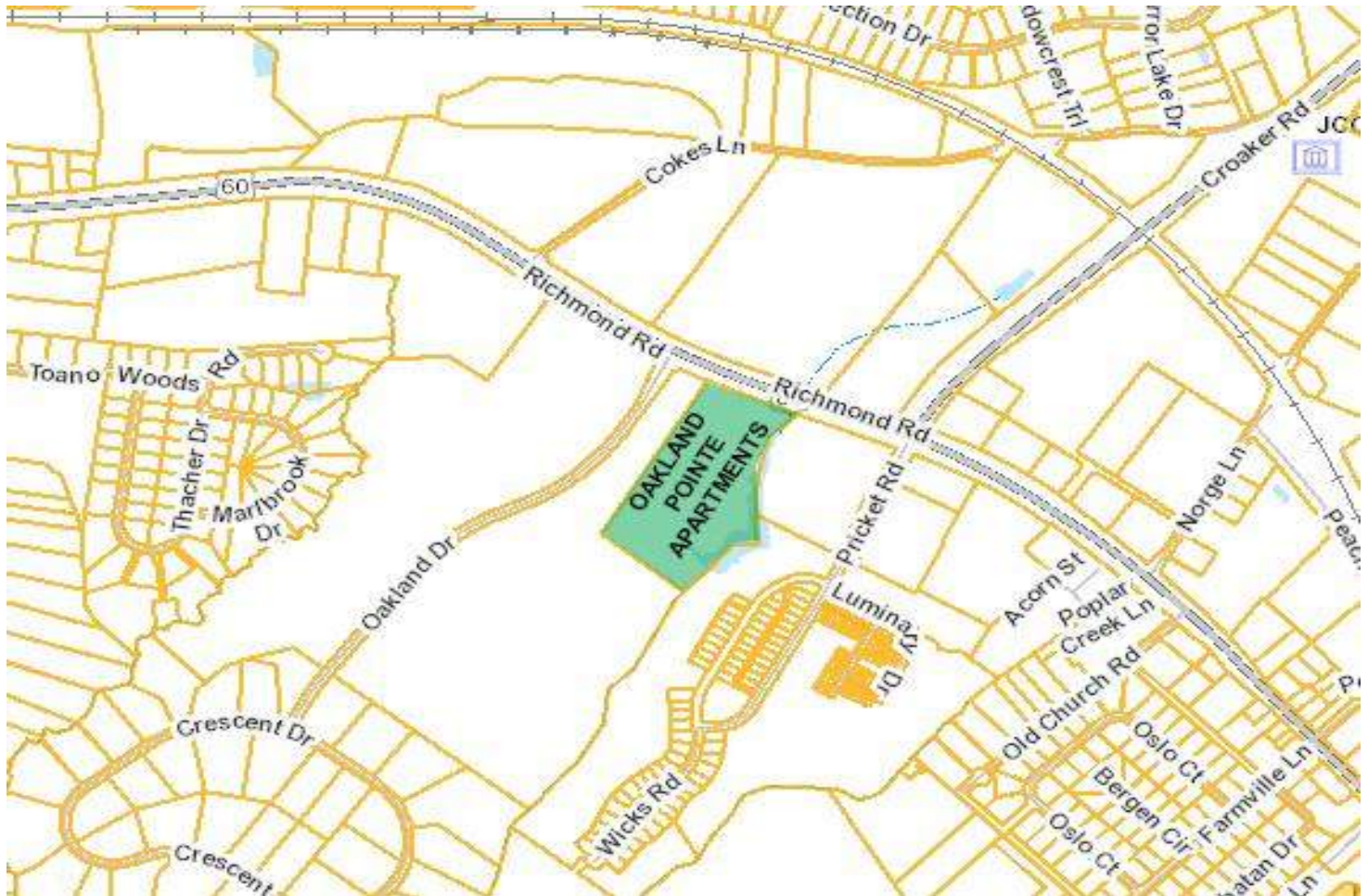
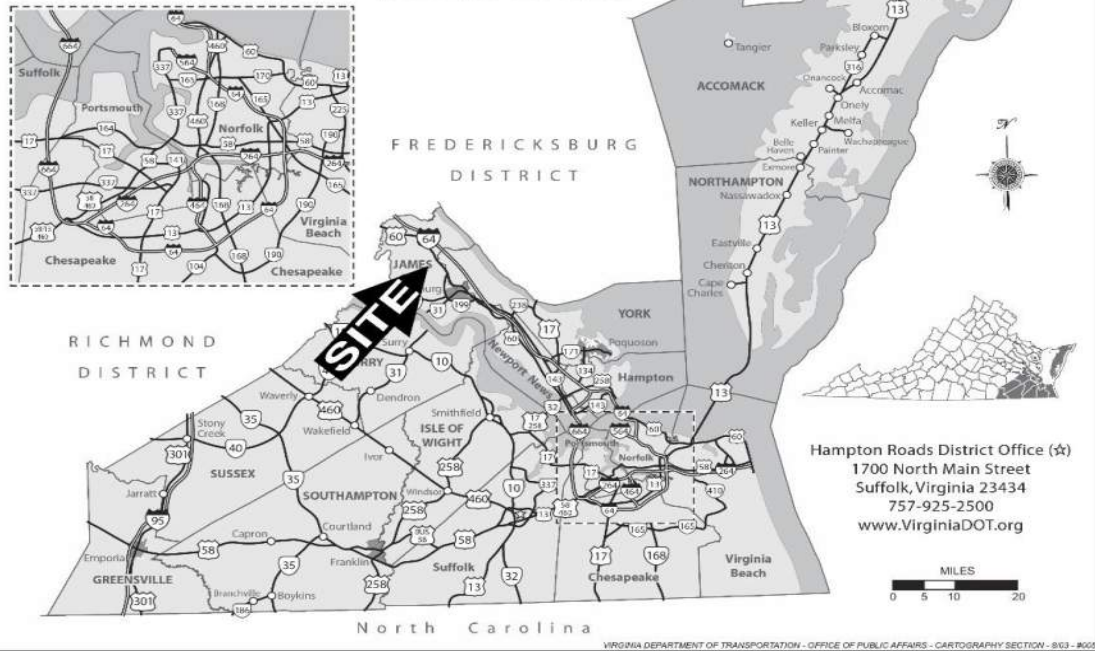
Traffic levels of service are not much affected by the project with the greatest effect being the increase in the queue on the eastbound left turn lane on Rt. 60 at Croaker Road. Improvements to the Rt. 60 corridor by the development to compensate for impacts as shown on Exhibit 2b include:

1. 100 foot left turn lane with 100-foot taper on westbound Rt. 60 at Oakland Drive.
2. 100 foot right turn taper at site entrance.
3. Extend 200 foot left turn on eastbound Rt. 60 at Croaker Road to 400 feet with 100-foot taper.



REPORT EXHIBITS

Virginia Department of Transportation HAMPTON ROADS DISTRICT



OAKLAND POINTE APARTMENTS
REGION AND AREA MAPS

DRW Consultants, LLC
804-794-7312

Exhibit 1



RENDERED CONCEPTUAL PLAN

OAKLAND POINTE

JAMES CITY COUNTY, VIRGINIA

(AES PROJECT #: W10503-00 - AES PROJECT CONTACT: T. RYAN STEPHENSON, P.E.)

Revised: 1/02/2018
DATE: 12/06/2017
SCALE: 1"=50'

SHEET 1 of 1

DRW Consultants, LLC
804-794-7312

Exhibit 2a

No.	Date	Description

A/E/S
CONSULTING ENGINEERS
1400 Oak Ridge Road
Richmond, VA 23220
Tel: (804) 794-7312
Fax: (804) 794-7313
www.aes-engineers.com

Transportation | Civil | Surveying | Geotechnical | Environmental | Construction Management

OAKLAND FARM APARTMENTS

STONEMAN DISTRICT
JAMES CITY COUNTY
VIRGINIA

Project Number: 0001-0001
Project Name: OAKLAND FARM APARTMENTS
Scale: AS SHOWN
Sheet Size: 11x17
Sheet No.: 1 of 1

RENDERED
PROPOSED ROAD
IMPROVEMENTS
PLAN

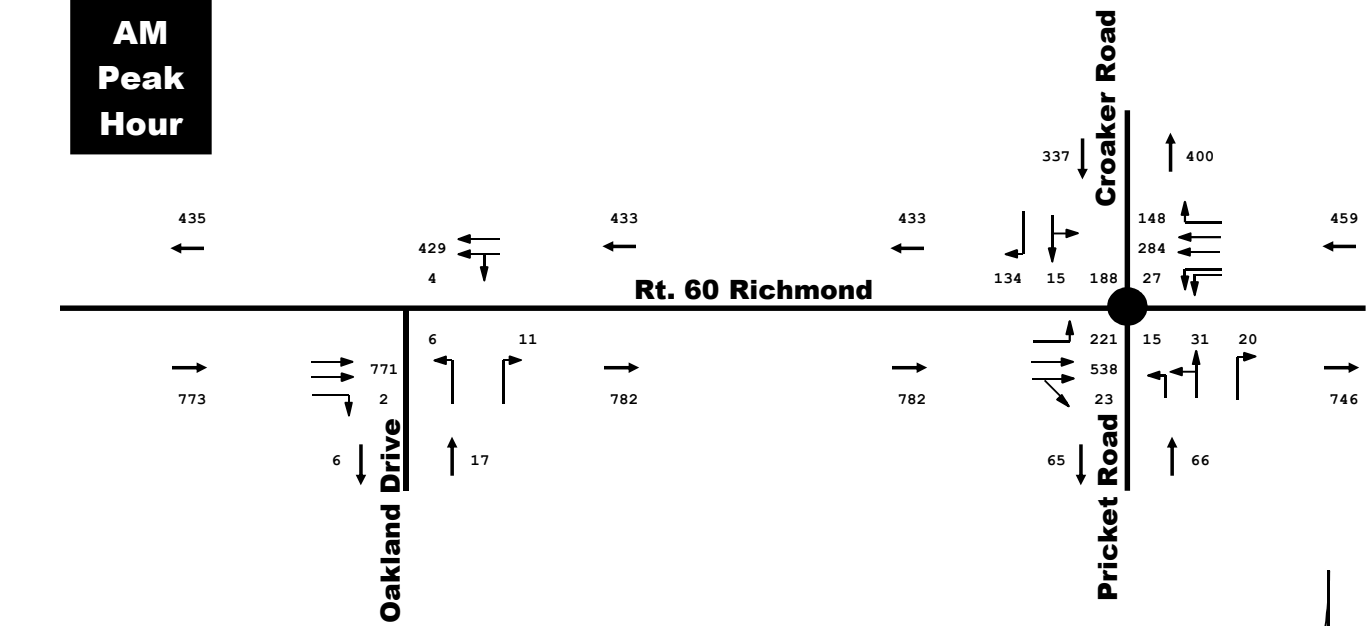


OAKLAND POINTE APARTMENTS
ROAD IMPROVEMENTS PLAN

DRW Consultants, LLC
804-794-7312

Exhibit 2b

**AM
Peak
Hour**



**PM
Peak
Hour**

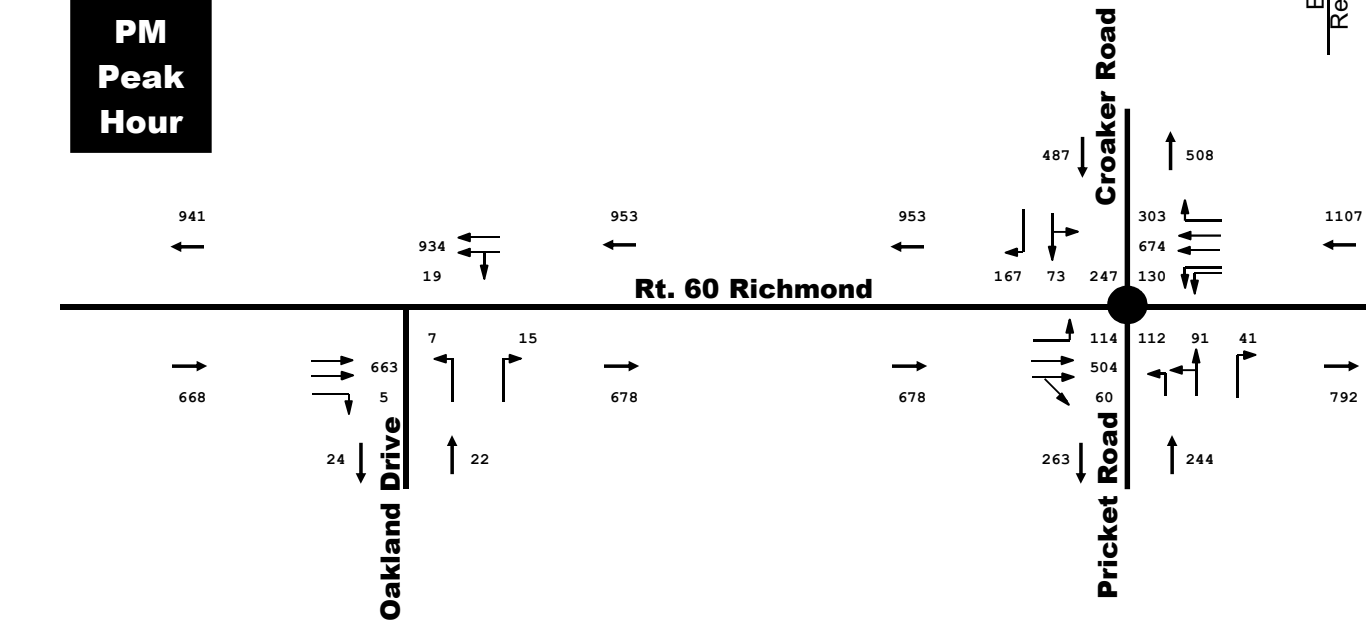


Exhibit
Reference

2017 PEAK HOUR COUNTS
WITH BALANCE

DRW Consultants, LLC
804-794-7312

Exhibit 3

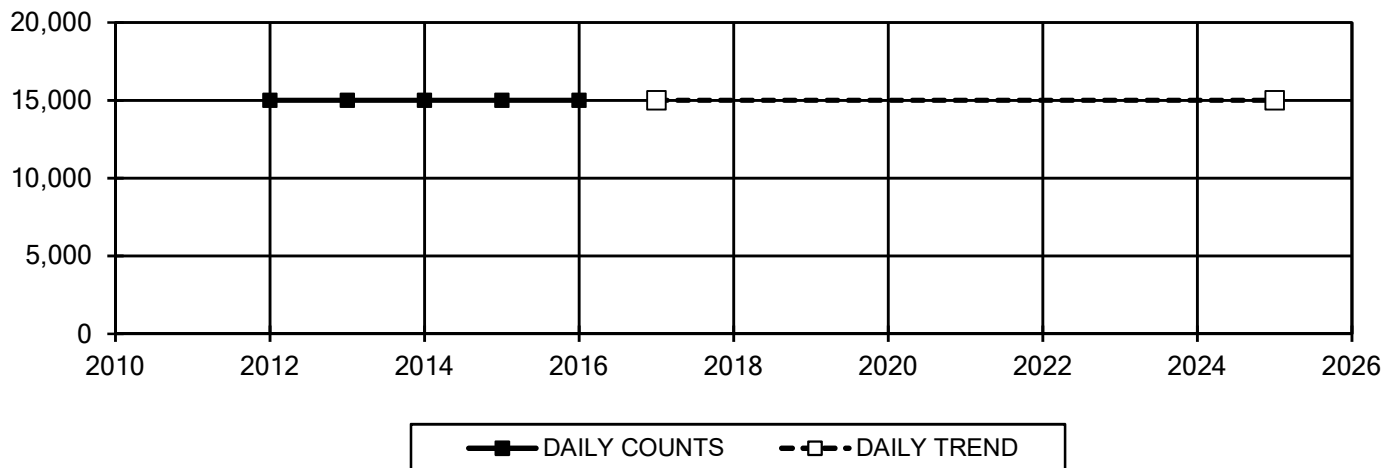
Street: Richmond Road, Rt. 60
 From: Rt. 30
 To: Croaker Road

Street: Richmond Road, Rt. 60
 From: Croaker Road
 To: Centerville Road

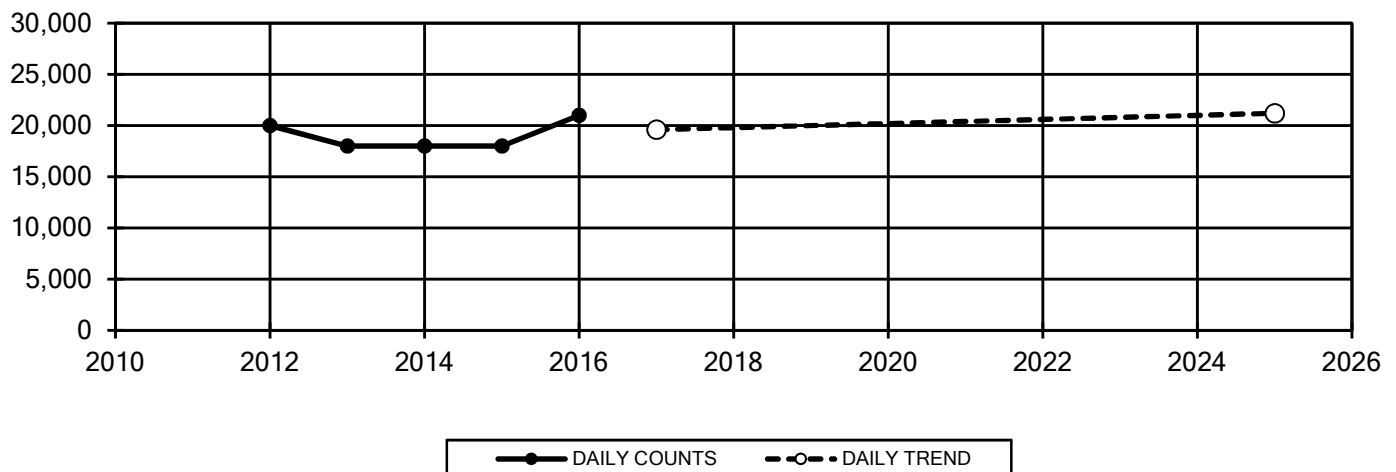
Year	DAILY COUNTS	
2012	15,000	
2013	15,000	
2014	15,000	
2015	15,000	
2016	15,000	
Year	DAILY TREND	
2017	15,000	$\Delta 17$
2025	15,000	1.00

Year	DAILY COUNTS	
2012	20,000	
2013	18,000	
2014	18,000	
2015	18,000	
2016	21,000	
Year	DAILY TREND	
2017	19,600	$\Delta 17$
2025	21,200	1.08

From Rt. 30 To Croaker Road



From Croaker Road To Centerville Road



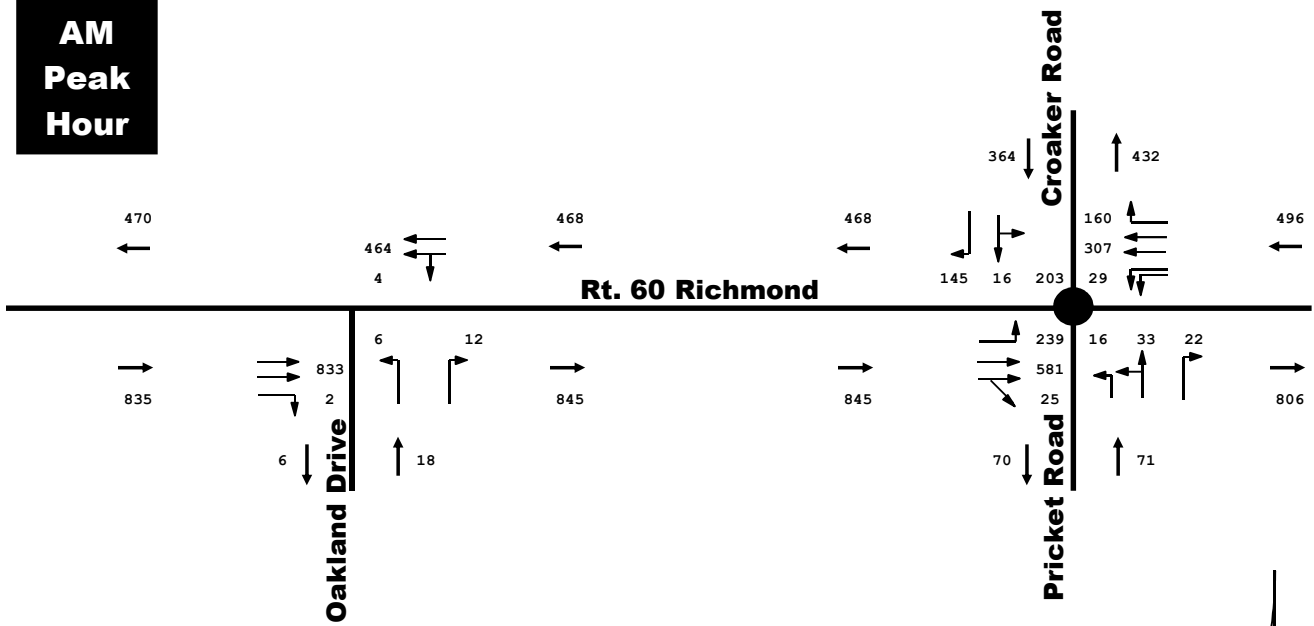
VDOT Average Annual Daily Traffic (AADT) Volume Estimates

RT. 60 RICHMOND ROAD
 DAILY TRAFFIC COUNTS AND TRENDS

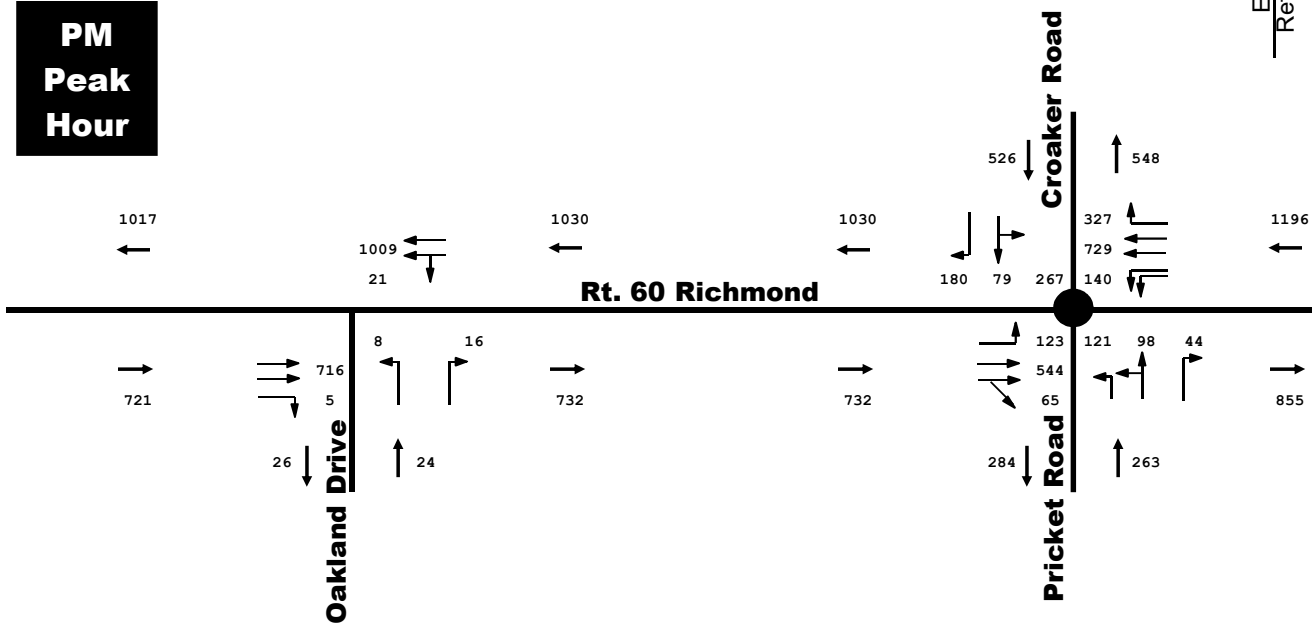
DRW Consultants, LLC
 804-794-7312

Exhibit 4

**AM
Peak
Hour**



**PM
Peak
Hour**



2025 PEAK HOUR BACKGROUND TRAFFIC
GROWTH FACTOR ONLY

DRW Consultants, LLC
804-794-7312

Exhibit 5

		LAND USE CODE		WEEKDAY TRIP GENERATION						
			SQ.FT., OTHER UNITS	AM PEAK HOUR			PM PEAK HOUR			
VALUE	LAND USE			Enter	Exit	Total	Enter	Exit	Total	
DAILY										

TABLE 1 - Trip Generation - Candle Factory Remaining Development

eq.-adj. st.	Single-Family	210	33 units	8	25	33	25	14	39	379
eq.-adj. st.	Condo/Townhouse	230	78 units	7	35	42	33	16	49	518
rate-adj. st.	Mini-Warehouse	151	355 units	5	2	7	3	4	7	88
TOTAL:				20	62	82	61	34	95	985

TABLE 2 - Candle Factory Trip Distribution

		20				62		82		61		34		95	
		AM Peak Hour								PM Peak Hour					
		Entering Traffic		Exiting Traffic						Entering Traffic		Exiting Traffic			
Direction		% Dist.	Trips	% Dist.	Trips					% Dist.	Trips	% Dist.	Trips	% Dist.	Trips
	Rt. 60 West	33%	7	33%	20			33%	21	33%	11				
	Rt. 60 East	40%	8	40%	25			40%	24	40%	14				
	Croaker North	27%	5	27%	17			27%	16	27%	9				
		100%	20	100%	62			100%	61	100%	34				

TABLE 3 - Trip Generation - Oakland Farm Apartments

eq.-adj. st.	Apartment	220	126 units	13	52	65	57	30	87	887
TOTAL:				13	52	65	57	30	87	887

TABLE 4 - Oakland Farm Trip Distribution

		13				52		65		57		30		87	
		AM Peak Hour								PM Peak Hour					
		Entering Traffic		Exiting Traffic						Entering Traffic		Exiting Traffic			
Direction		% Dist.	Trips	% Dist.	Trips					% Dist.	Trips	% Dist.	Trips	% Dist.	Trips
	Rt. 60 West	33%	4	33%	17			33%	19	33%	10				
	Rt. 60 East	40%	5	40%	21			40%	23	40%	12				
	Croaker North	27%	4	27%	14			27%	15	27%	8				
		100%	13	100%	52			100%	57	100%	30				

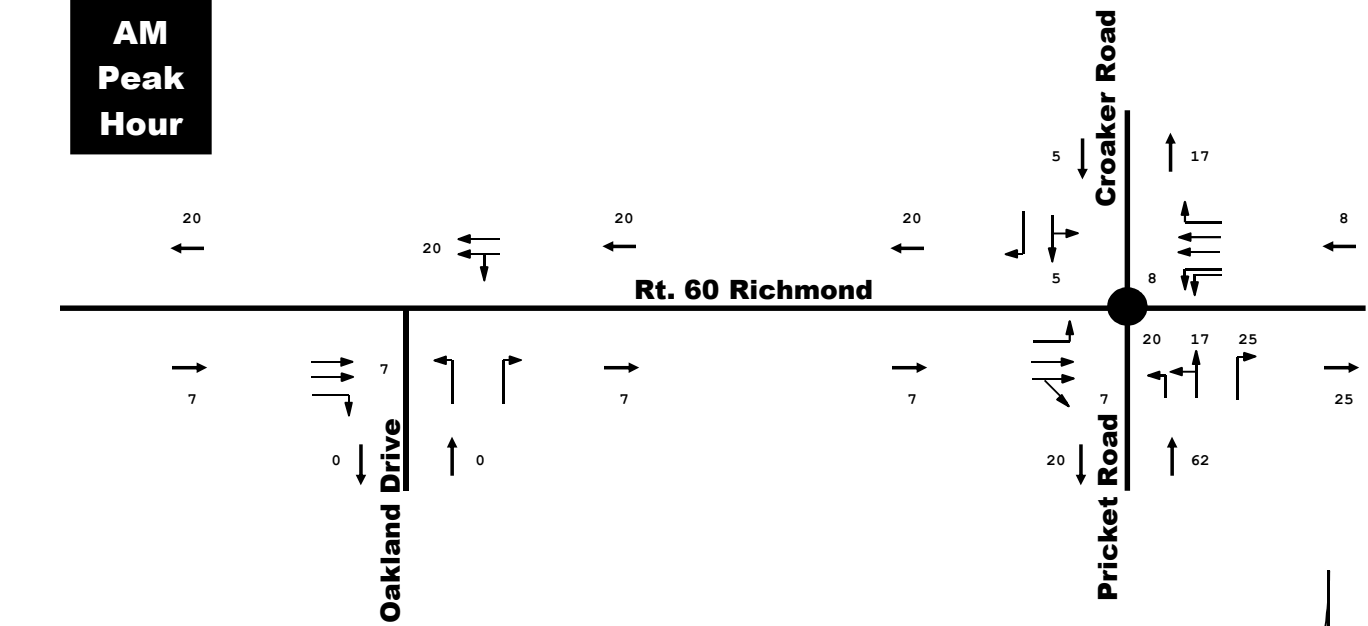
Trip generation rates from Trip Generation Manual, 9th Edition (TGM9)
by the Institute of Transportation Engineers (ITE)

REMAINING CANDLE FACTORY DEVELOPMENT
AND OAKLAND FARM APARTMENTS
TRIP GENERATION AND DISTRIBUTION

DRW Consultants, LLC
804-794-7312

Exhibit 6

**AM
Peak
Hour**



**PM
Peak
Hour**

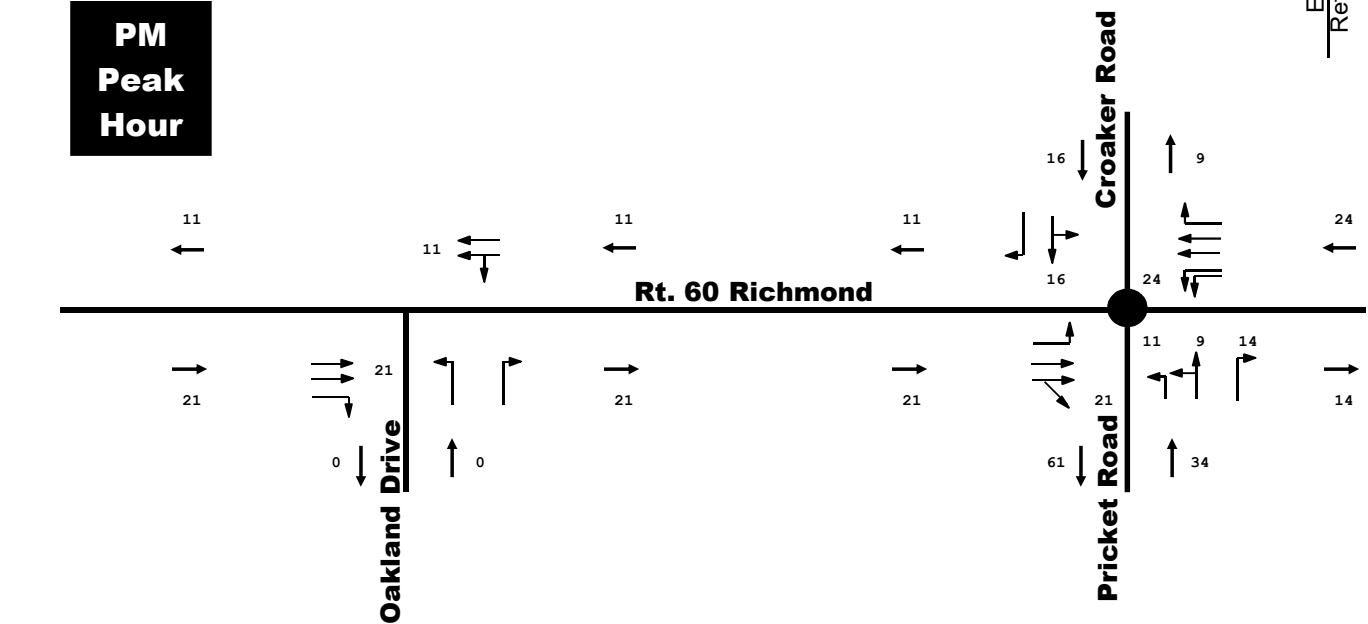


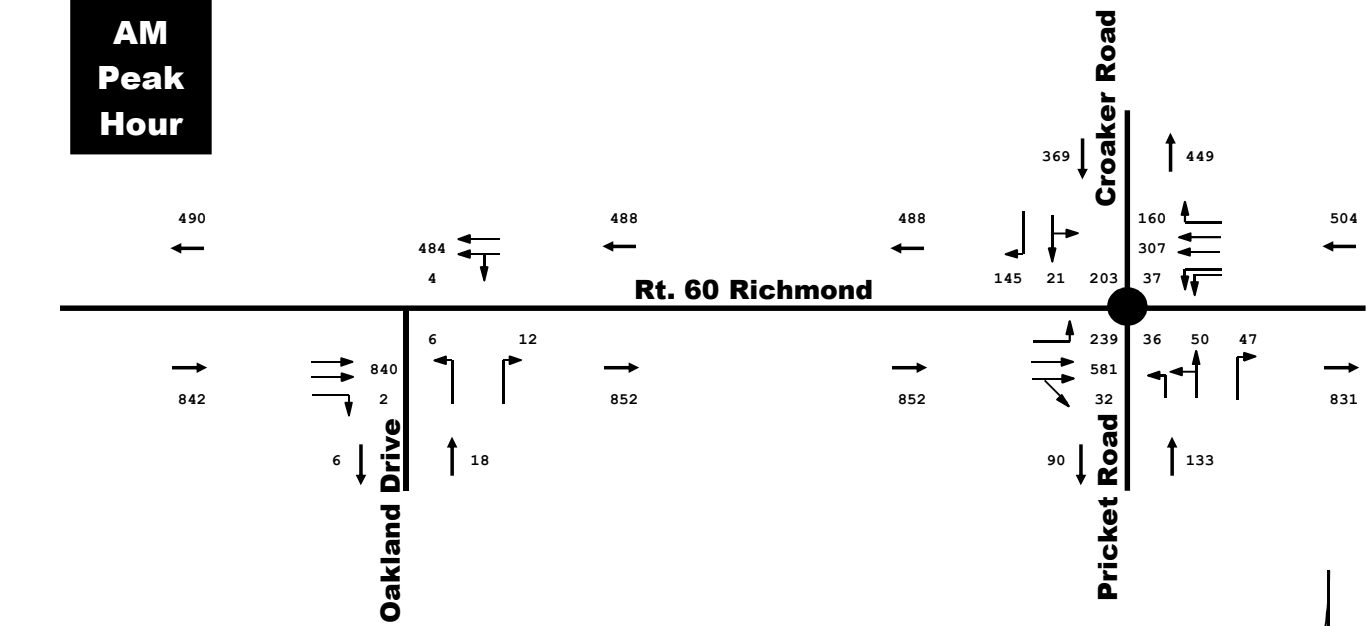
Exhibit
Reference

REMAINING CANDLE FACTORY TRIP ASSIGNMENT

DRW Consultants, LLC
804-794-7312

Exhibit 7

**AM
Peak
Hour**



**PM
Peak
Hour**

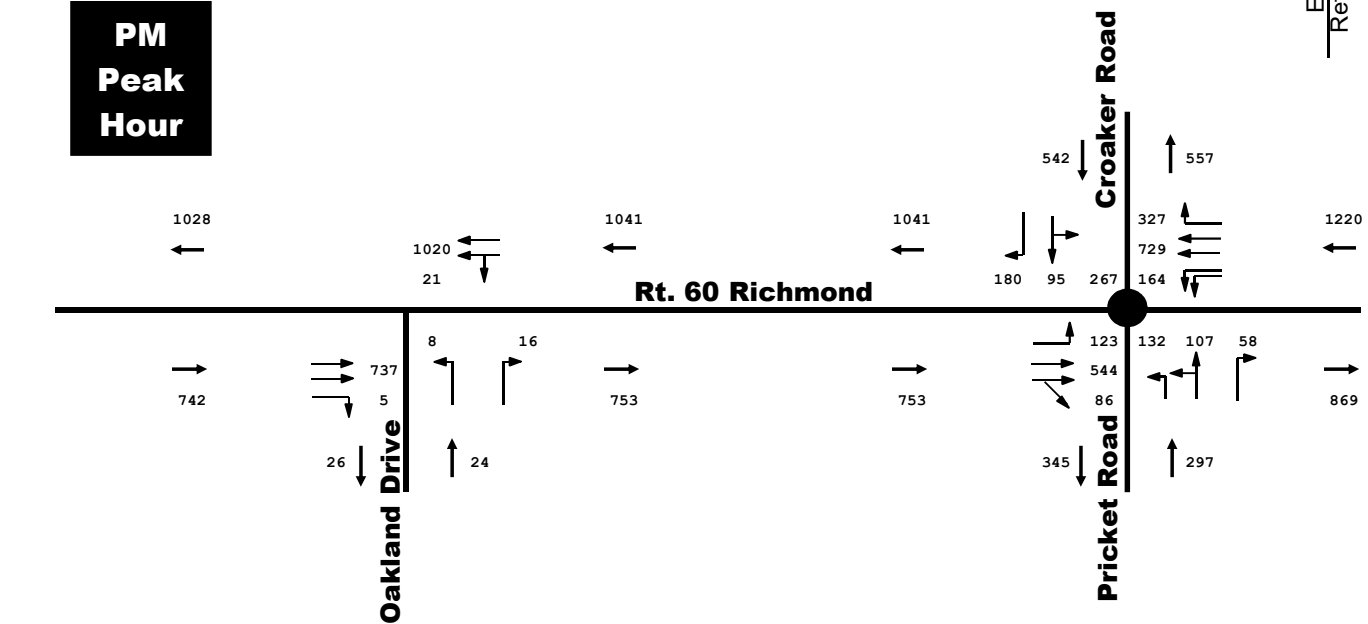


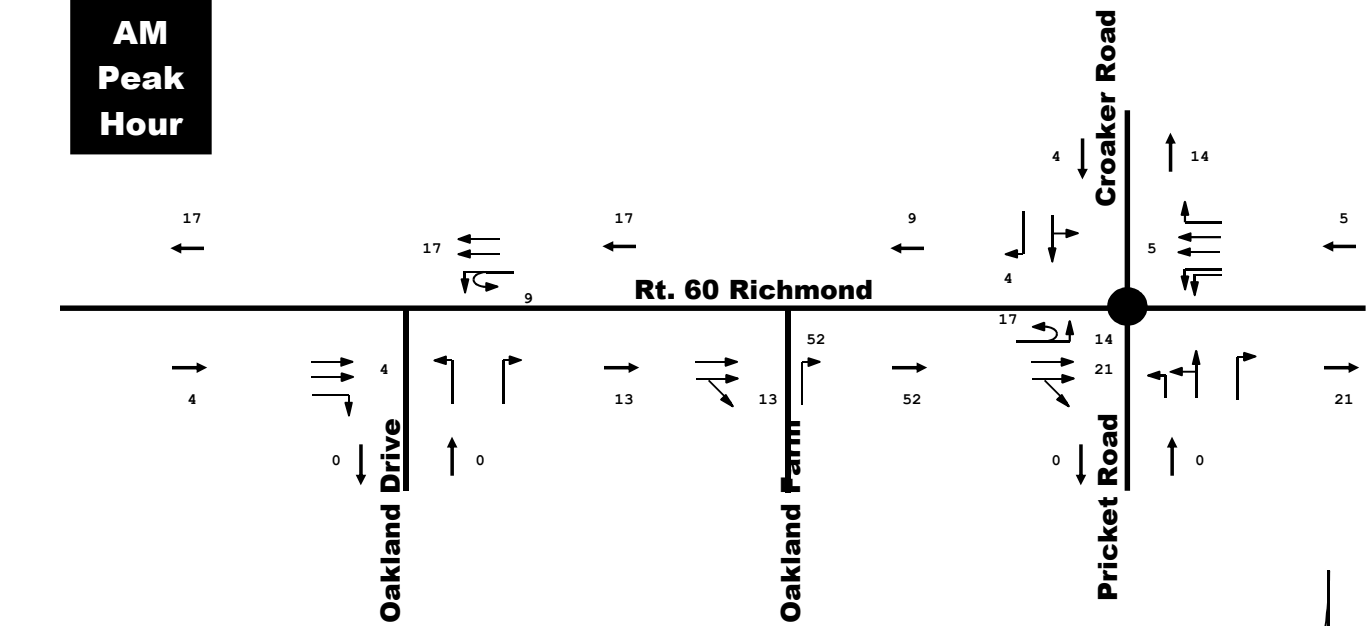
Exhibit
Reference

2025 PEAK HOUR BACKGROUND TRAFFIC
WITHOUT OAKLAND FARM APARTMENTS

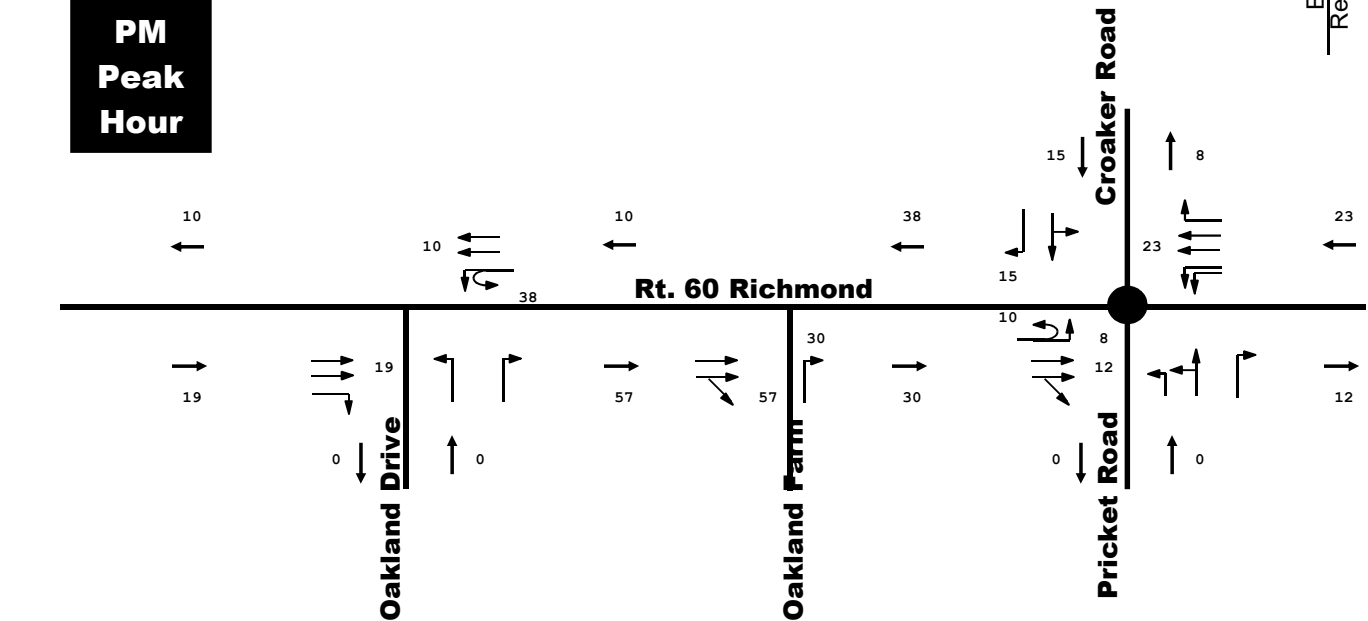
DRW Consultants, LLC
804-794-7312

Exhibit 8

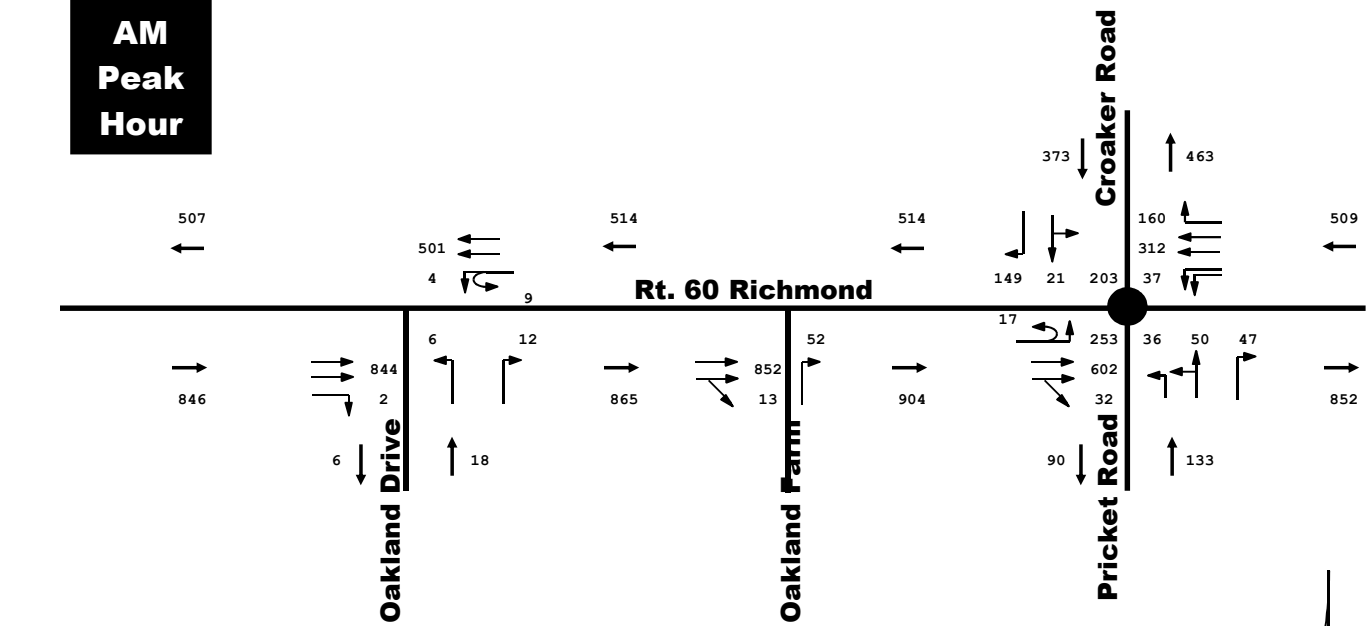
**AM
Peak
Hour**



**PM
Peak
Hour**



**AM
Peak
Hour**



TO

WILLIAMSBURG

**PM
Peak
Hour**

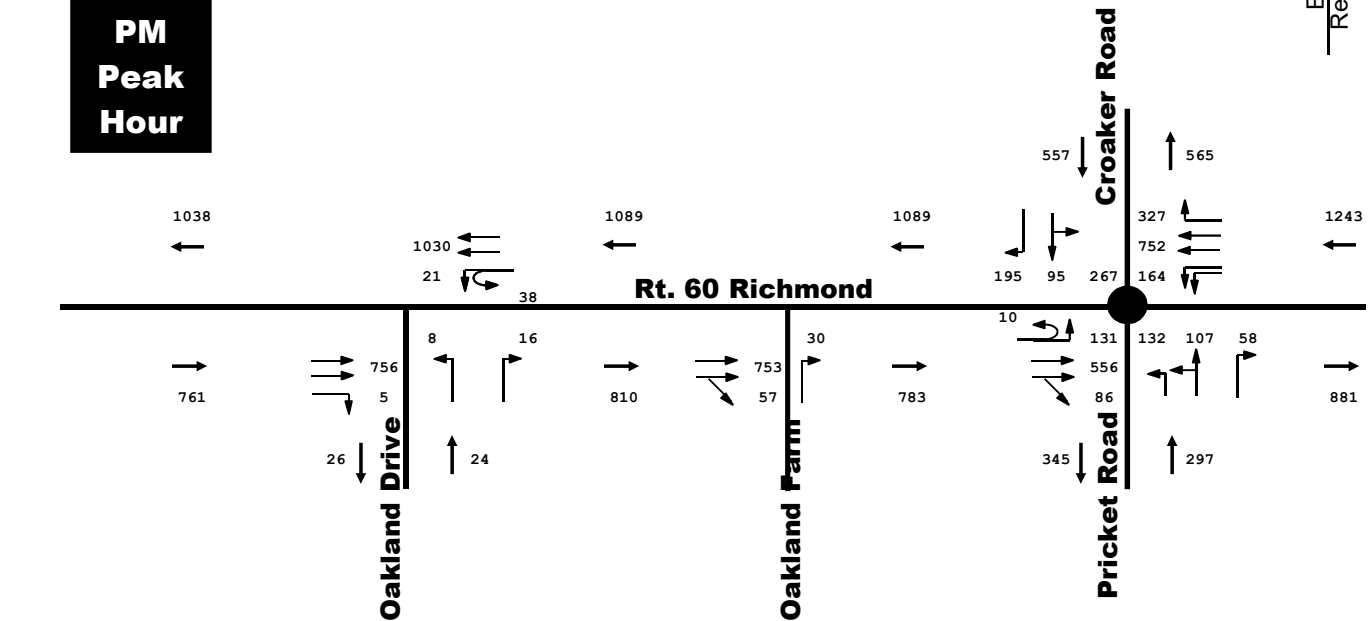
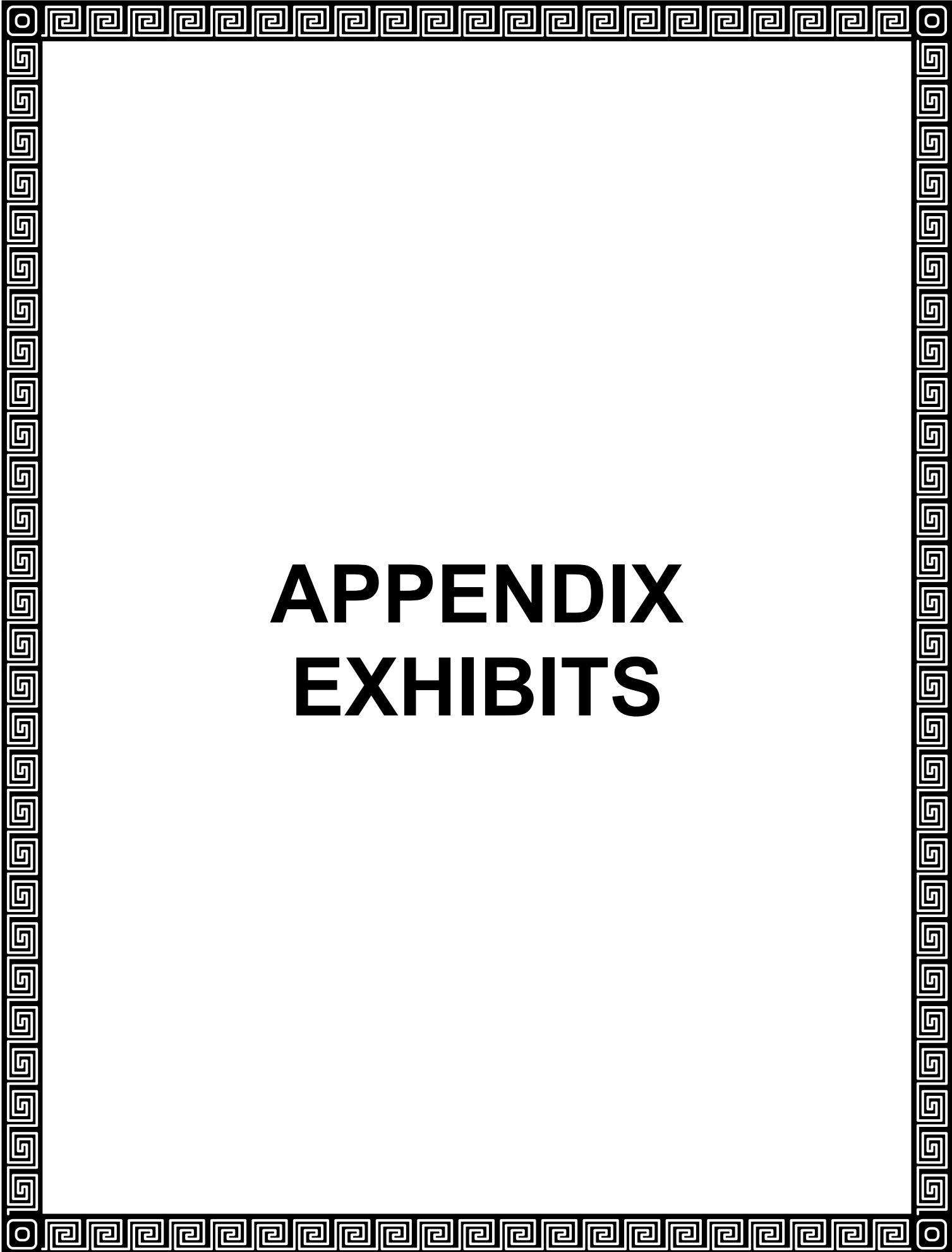


Exhibit
Reference

2025 TOTAL PEAK HOUR TRAFFIC
WITH OAKLAND FARM APARTMENTS

DRW Consultants, LLC
804-794-7312

Exhibit 10



APPENDIX EXHIBITS

APPENDIX TABLE OF CONTENTS

APPENDIX EXHIBITS	Number
2017 Tabulated Total Traffic Counts:	AM PM
Rt. 60 Richmond Road/Croaker Road	A3 A6
Rt. 60 Richmond Road/Oakland Drive	B3 B6
2017 Tabulated Eastbound Left Turn Queues	AM PM
Rt. 60 Richmond Road/Croaker Road	C1 C2
2017 Counts Without Balance	AM PM
	D D
2017 Development Trip Distribution	AM PM
	E E
Turn Lane Warrants	AM PM
Rt. 60 Westbound Left Turn At Oakland Drive	F F
Rt. 60 Eastbound Right Turn At Oakland Pointe	F1 F1
HCM 2000 Signalized Intersection LOS	AM PM
Existing	J1 J2
Rt. 60 Richmond Road/Croaker Road	Page 1
2025 Background	J3 J4
Rt. 60 Richmond Road/Croaker Road	Page 1
2025 With Site Existing Timing	J5 J6
Rt. 60 Richmond Road/Croaker Road	Page 1
2025 With Site Optimized Timing	J7 J8
Rt. 60 Richmond Road/Croaker Road	Page 1
Unsignalized LOS	AM PM
Existing	K1 K2
Rt. 60 Richmond Road/Oakland Drive	Page 1
2025 Background	K3 K4
Rt. 60 Richmond Road/Oakland Drive	Page 1
2025 With Site	K5 K6
Rt. 60 Richmond Road/Oakland Drive	Page 1
Rt. 60 Richmond Road/Site Access	Page 2
Synchro Queues	AM PM
Existing	L1 L2
Rt. 60 Richmond Road/Croaker Road	Page 1
2025 Background	L3 L4
Rt. 60 Richmond Road/Croaker Road	Page 1
2025 With Site – Existing Timing	L5 L6
Rt. 60 Richmond Road/Croaker Road	Page 1
2025 With Site – Optimized Timing	L7 L8
Rt. 60 Richmond Road/Croaker Road	Page 1
SimTraffic Queuing & Blocking Report	AM PM
Existing – 60 Minute Interval	M1 M2
Rt. 60 Richmond Road/Croaker Road	Page 1
Rt. 60 Richmond Road/Oakland Drive	Page 1
2025 Background	M3 M4
Rt. 60 Richmond Road/Croaker Road	Page 1
Rt. 60 Richmond Road/Oakland Drive	Page 1
2025 With Site – Existing Timing	M5 M6
Rt. 60 Richmond Road/Croaker Road	Page 1
Rt. 60 Richmond Road/Oakland Drive	Page 1
2025 With Site – Optimized Timing	M7 M8
Rt. 60 Richmond Road/Croaker Road	Page 1
Rt. 60 Richmond Road/Oakland Drive	Page 1

Peggy Malone & Associates, Inc.

(888) 247-8602

File Name : 1-Croaker Rd._Pricket Rd. & Richmond Rd. AM
 Site Code :
 Start Date : 10/10/2017
 Page No : 1

Groups Printed- Car

	Richmond Rd Eastbound					Richmond Rd Westbound					Pricket Rd Northbound					Croaker Rd Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	77	132	5	1	215	4	70	44	0	118	2	7	1	1	11	41	2	52	0	95	439
07:15 AM	63	109	2	0	174	5	79	43	0	127	2	11	6	0	19	41	3	24	0	68	388
07:30 AM	39	147	5	0	191	5	61	29	0	95	3	4	10	0	17	43	1	23	0	67	370
07:45 AM	25	125	5	0	155	10	59	22	0	91	5	4	3	0	12	56	6	20	0	82	340
Total	204	513	17	1	735	24	269	138	0	431	12	26	20	1	59	181	12	119	0	312	1537
08:00 AM	28	111	4	0	143	18	59	37	0	114	2	3	4	0	9	51	4	18	0	73	339
08:15 AM	29	116	2	0	147	12	50	22	0	84	1	5	6	0	12	52	5	14	0	71	314
08:30 AM	21	133	12	0	166	14	52	19	0	85	8	2	5	0	15	65	6	17	0	88	354
08:45 AM	21	110	3	0	134	12	52	24	0	88	3	9	8	0	20	57	5	22	0	84	326
Total	99	470	21	0	590	56	213	102	0	371	14	19	23	0	56	225	20	71	0	316	1333
Grand Total	303	983	38	1	1325	80	482	240	0	802	26	45	43	1	115	406	32	190	0	628	2870
Apprch %	22.9	74.2	2.9	0.1		10	60.1	29.9	0		22.6	39.1	37.4	0.9		64.6	5.1	30.3	0		
Total %	10.6	34.3	1.3	0	46.2	2.8	16.8	8.4	0	27.9	0.9	1.6	1.5	0	4	14.1	1.1	6.6	0	21.9	

	Richmond Rd Eastbound				Richmond Rd Westbound				Pricket Rd Northbound				Croaker Rd Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	77	132	5	214	4	70	44	118	2	7	1	10	41	2	52	95	437
07:15 AM	63	109	2	174	5	79	43	127	2	11	6	19	41	3	24	68	388
07:30 AM	39	147	5	191	5	61	29	95	3	4	10	17	43	1	23	67	370
07:45 AM	25	125	5	155	10	59	22	91	5	4	3	12	56	6	20	82	340
Total Volume	204	513	17	734	24	269	138	431	12	26	20	58	181	12	119	312	1535
% App. Total	27.8	69.9	2.3		5.6	62.4	32		20.7	44.8	34.5		58	3.8	38.1		
PHF	.662	.872	.850	.857	.600	.851	.784	.848	.600	.591	.500	.763	.808	.500	.572	.821	.878

Peggy Malone & Associates, Inc.

(888) 247-8602

File Name : 1-Croaker Rd._Pricket Rd. & Richmond Rd. AM
 Site Code :
 Start Date : 10/10/2017
 Page No : 1

Groups Printed- Truck

	Richmond Rd Eastbound					Richmond Rd Westbound					Pricket Rd Northbound					Croaker Rd Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	5	7	2	0	14	0	2	1	0	3	0	0	0	0	0	2	1	4	0	7	24
07:15 AM	7	9	2	0	18	1	3	1	0	5	2	1	0	0	3	3	1	3	0	7	33
07:30 AM	3	4	1	0	8	1	7	4	0	12	0	2	0	0	2	2	0	4	0	6	28
07:45 AM	2	5	1	0	8	1	3	4	0	8	1	2	0	0	3	0	1	4	0	5	24
Total	17	25	6	0	48	3	15	10	0	28	3	5	0	0	8	7	3	15	0	25	109
08:00 AM	5	6	0	0	11	0	3	4	0	7	0	1	1	0	2	1	1	3	0	5	25
08:15 AM	5	4	1	0	10	1	2	3	0	6	0	1	0	0	1	3	0	2	0	5	22
08:30 AM	1	7	0	0	8	0	4	1	0	5	1	0	0	0	1	3	0	4	0	7	21
08:45 AM	2	11	1	0	14	2	3	2	0	7	2	0	0	0	2	2	1	3	0	6	29
Total	13	28	2	0	43	3	12	10	0	25	3	2	1	0	6	9	2	12	0	23	97
Grand Total	30	53	8	0	91	6	27	20	0	53	6	7	1	0	14	16	5	27	0	48	206
Apprch %	33	58.2	8.8	0		11.3	50.9	37.7	0		42.9	50	7.1	0		33.3	10.4	56.2	0		
Total %	14.6	25.7	3.9	0	44.2	2.9	13.1	9.7	0	25.7	2.9	3.4	0.5	0	6.8	7.8	2.4	13.1	0	23.3	

	Richmond Rd Eastbound				Richmond Rd Westbound				Pricket Rd Northbound				Croaker Rd Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	7	9	2	18	1	3	1	5	2	1	0	3	3	1	3	7	33
07:30 AM	3	4	1	8	1	7	4	12	0	2	0	2	2	0	4	6	28
07:45 AM	2	5	1	8	1	3	4	8	1	2	0	3	0	1	4	5	24
08:00 AM	5	6	0	11	0	3	4	7	0	1	1	2	1	1	3	5	25
Total Volume	17	24	4	45	3	16	13	32	3	6	1	10	6	3	14	23	110
% App. Total	37.8	53.3	8.9		9.4	50	40.6		30	60	10		26.1	13	60.9		
PHF	.607	.667	.500	.625	.750	.571	.813	.667	.375	.750	.250	.833	.500	.750	.875	.821	.833

Peggy Malone & Associates, Inc.

(888) 247-8602

File Name : 1-Croaker Rd._Pricket Rd. & Richmond Rd. AM
 Site Code :
 Start Date : 10/10/2017
 Page No : 1

Groups Printed- Car - Truck

	Richmond Rd Eastbound					Richmond Rd Westbound					Pricket Rd Northbound					Croaker Rd Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	82	139	7	1	229	4	72	45	0	121	2	7	1	1	11	43	3	56	0	102	463
07:15 AM	70	118	4	0	192	6	82	44	0	132	4	12	6	0	22	44	4	27	0	75	421
07:30 AM	42	151	6	0	199	6	68	33	0	107	3	6	10	0	19	45	1	27	0	73	398
07:45 AM	27	130	6	0	163	11	62	26	0	99	6	6	3	0	15	56	7	24	0	87	364
Total	221	538	23	1	783	27	284	148	0	459	15	31	20	1	67	188	15	134	0	337	1646
08:00 AM	33	117	4	0	154	18	62	41	0	121	2	4	5	0	11	52	5	21	0	78	364
08:15 AM	34	120	3	0	157	13	52	25	0	90	1	6	6	0	13	55	5	16	0	76	336
08:30 AM	22	140	12	0	174	14	56	20	0	90	9	2	5	0	16	68	6	21	0	95	375
08:45 AM	23	121	4	0	148	14	55	26	0	95	5	9	8	0	22	59	6	25	0	90	355
Total	112	498	23	0	633	59	225	112	0	396	17	21	24	0	62	234	22	83	0	339	1430
Grand Total	333	1036	46	1	1416	86	509	260	0	855	32	52	44	1	129	422	37	217	0	676	3076
Apprch %	23.5	73.2	3.2	0.1		10.1	59.5	30.4	0		24.8	40.3	34.1	0.8		62.4	5.5	32.1	0		
Total %	10.8	33.7	1.5	0	46	2.8	16.5	8.5	0	27.8	1	1.7	1.4	0	4.2	13.7	1.2	7.1	0	22	
Car	303	983	38	1	1325	80	482	240	0	802	26	45	43	1	115	406	32	190	0	628	2870
% Car	91	94.9	82.6	100	93.6	93	94.7	92.3	0	93.8	81.2	86.5	97.7	100	89.1	96.2	86.5	87.6	0	92.9	93.3
Truck	30	53	8	0	91	6	27	20	0	53	6	7	1	0	14	16	5	27	0	48	206
% Truck	9	5.1	17.4	0	6.4	7	5.3	7.7	0	6.2	18.8	13.5	2.3	0	10.9	3.8	13.5	12.4	0	7.1	6.7

	Richmond Rd Eastbound				Richmond Rd Westbound				Pricket Rd Northbound				Croaker Rd Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	82	139	7	228	4	72	45	121	2	7	1	10	43	3	56	102	461
07:15 AM	70	118	4	192	6	82	44	132	4	12	6	22	44	4	27	75	421
07:30 AM	42	151	6	199	6	68	33	107	3	6	10	19	45	1	27	73	398
07:45 AM	27	130	6	163	11	62	26	99	6	6	3	15	56	7	24	87	364
Total Volume	221	538	23	782	27	284	148	459	15	31	20	66	188	15	134	337	1644
% App. Total	28.3	68.8	2.9		5.9	61.9	32.2		22.7	47	30.3		55.8	4.5	39.8		
PHF	.674	.891	.821	.857	.614	.866	.822	.869	.625	.646	.500	.750	.839	.536	.598	.826	.892
Truck %	8	5	26		11	5	7		20	16	0		4	20	11		

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File Name : 1-Croaker Rd._Pricket Rd. & Richmond Rd. PM
Site Code :
Start Date : 10/10/2017
Page No : 1

Groups Printed- Car

	Richmond Rd Eastbound					Richmond Rd Westbound					Pricket Rd Northbound					Croaker Rd Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	28	102	8	0	138	21	152	66	0	239	20	12	7	0	39	68	10	35	0	113	529
04:15 PM	21	110	10	0	141	36	136	56	0	228	25	15	5	0	45	52	15	33	0	100	514
04:30 PM	41	88	7	0	136	34	171	65	0	270	20	19	7	0	46	60	24	55	0	139	591
04:45 PM	30	120	17	0	167	27	174	80	0	281	23	27	16	0	66	52	19	47	0	118	632
Total	120	420	42	0	582	118	633	267	0	1018	88	73	35	0	196	232	68	170	0	470	2266
05:00 PM	34	129	18	0	181	29	148	77	0	254	25	12	13	0	50	63	11	32	1	107	592
05:15 PM	25	121	13	0	159	36	163	65	1	265	29	23	8	0	60	57	21	38	0	116	600
05:30 PM	23	126	12	0	161	36	134	78	1	249	34	28	3	0	65	72	22	38	0	132	607
05:45 PM	16	119	15	0	150	29	158	59	1	247	26	14	13	0	53	68	19	33	0	120	570
Total	98	495	58	0	651	130	603	279	3	1015	114	77	37	0	228	260	73	141	1	475	2369
Grand Total	218	915	100	0	1233	248	1236	546	3	2033	202	150	72	0	424	492	141	311	1	945	4635
Apprch %	17.7	74.2	8.1	0		12.2	60.8	26.9	0.1		47.6	35.4	17	0		52.1	14.9	32.9	0.1		
Total %	4.7	19.7	2.2	0	26.6	5.4	26.7	11.8	0.1	43.9	4.4	3.2	1.6	0	9.1	10.6	3	6.7	0	20.4	

	Richmond Rd Eastbound				Richmond Rd Westbound				Pricket Rd Northbound				Croaker Rd Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	30	120	17	167	27	174	80	281	23	27	16	66	52	19	47	118	632
05:00 PM	34	129	18	181	29	148	77	254	25	12	13	50	63	11	32	106	591
05:15 PM	25	121	13	159	36	163	65	264	29	23	8	60	57	21	38	116	599
05:30 PM	23	126	12	161	36	134	78	248	34	28	3	65	72	22	38	132	606
Total Volume	112	496	60	668	128	619	300	1047	111	90	40	241	244	73	155	472	2428
% App. Total	16.8	74.3	9		12.2	59.1	28.7		46.1	37.3	16.6		51.7	15.5	32.8		
PHF	.824	.961	.833	.923	.889	.889	.938	.931	.816	.804	.625	.913	.847	.830	.824	.894	.960

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File Name : 1-Croaker Rd._Pricket Rd. & Richmond Rd. PM
 Site Code :
 Start Date : 10/10/2017
 Page No : 1

Groups Printed- Truck

	Richmond Rd Eastbound					Richmond Rd Westbound					Pricket Rd Northbound					Croaker Rd Southbound						
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total	
04:00 PM	0	5	0	0	5	0	4	1	0	5	0	0	0	0	0	0	1	1	0	0	2	12
04:15 PM	0	2	0	0	2	1	3	5	0	9	0	1	1	0	2	1	0	2	0	3	16	
04:30 PM	1	1	0	0	2	1	3	2	0	6	0	0	0	0	0	0	0	3	0	3	11	
04:45 PM	1	4	0	0	5	0	7	1	0	8	0	0	1	0	1	1	0	2	0	3	17	
Total	2	12	0	0	14	2	17	9	0	28	0	1	2	0	3	2	1	8	0	11	56	
05:00 PM	1	2	0	0	3	1	1	0	0	2	1	0	0	0	1	2	0	6	0	8	14	
05:15 PM	0	1	0	0	1	1	1	1	0	3	0	1	0	0	1	0	0	3	0	3	8	
05:30 PM	0	1	0	0	1	0	2	1	0	3	0	0	0	0	0	0	0	1	0	1	5	
05:45 PM	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	1	0	1	0	2	4	
Total	1	5	0	0	6	2	5	2	0	9	1	1	0	0	2	3	0	11	0	14	31	
Grand Total	3	17	0	0	20	4	22	11	0	37	1	2	2	0	5	5	1	19	0	25	87	
Apprch %	15	85	0	0		10.8	59.5	29.7	0		20	40	40	0		20	4	76	0			
Total %	3.4	19.5	0	0	23	4.6	25.3	12.6	0	42.5	1.1	2.3	2.3	0	5.7	5.7	1.1	21.8	0	28.7		

	Richmond Rd Eastbound				Richmond Rd Westbound				Pricket Rd Northbound				Croaker Rd Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	0	2	0	2	1	3	5	9	0	1	1	2	1	0	2	3	16
04:30 PM	1	1	0	2	1	3	2	6	0	0	0	0	0	0	3	3	11
04:45 PM	1	4	0	5	0	7	1	8	0	0	1	1	1	0	2	3	17
05:00 PM	1	2	0	3	1	1	0	2	1	0	0	1	2	0	6	8	14
Total Volume	3	9	0	12	3	14	8	25	1	1	2	4	4	0	13	17	58
% App. Total	25	75	0		12	56	32		25	25	50		23.5	0	76.5		
PHF	.750	.563	.000	.600	.750	.500	.400	.694	.250	.250	.500	.500	.500	.000	.542	.531	.853

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Groups Printed- Car - Truck

	Richmond Rd Eastbound					Richmond Rd Westbound					Pricket Rd Northbound					Croaker Rd Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
04:00 PM	28	107	8	0	143	21	156	67	0	244	20	12	7	0	39	68	11	36	0	115	541
04:15 PM	21	112	10	0	143	37	139	61	0	237	25	16	6	0	47	53	15	35	0	103	530
04:30 PM	42	89	7	0	138	35	174	67	0	276	20	19	7	0	46	60	24	58	0	142	602
04:45 PM	31	124	17	0	172	27	181	81	0	289	23	27	17	0	67	53	19	49	0	121	649
Total	122	432	42	0	596	120	650	276	0	1046	88	74	37	0	199	234	69	178	0	481	2322
05:00 PM	35	131	18	0	184	30	149	77	0	256	26	12	13	0	51	65	11	38	1	115	606
05:15 PM	25	122	13	0	160	37	164	66	1	268	29	24	8	0	61	57	21	41	0	119	608
05:30 PM	23	127	12	0	162	36	136	79	1	252	34	28	3	0	65	72	22	39	0	133	612
05:45 PM	16	120	15	0	151	29	159	59	1	248	26	14	13	0	53	69	19	34	0	122	574
Total	99	500	58	0	657	132	608	281	3	1024	115	78	37	0	230	263	73	152	1	489	2400
Grand Total	221	932	100	0	1253	252	1258	557	3	2070	203	152	74	0	429	497	142	330	1	970	4722
Apprch %	17.6	74.4	8	0		12.2	60.8	26.9	0.1		47.3	35.4	17.2	0		51.2	14.6	34	0.1		
Total %	4.7	19.7	2.1	0	26.5	5.3	26.6	11.8	0.1	43.8	4.3	3.2	1.6	0	9.1	10.5	3	7	0	20.5	
Car	218	915	100	0	1233	248	1236	546	3	2033	202	150	72	0	424	492	141	311	1	945	4635
% Car	98.6	98.2	100	0	98.4	98.4	98.3	98	100	98.2	99.5	98.7	97.3	0	98.8	99	99.3	94.2	100	97.4	98.2
Truck	3	17	0	0	20	4	22	11	0	37	1	2	2	0	5	5	1	19	0	25	87
% Truck	1.4	1.8	0	0	1.6	1.6	1.7	2	0	1.8	0.5	1.3	2.7	0	1.2	1	0.7	5.8	0	2.6	1.8

	Richmond Rd Eastbound				Richmond Rd Westbound				Pricket Rd Northbound				Croaker Rd Southbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	31	124	17	172	27	181	81	289	23	27	17	67	53	19	49	121	649
05:00 PM	35	131	18	184	30	149	77	256	26	12	13	51	65	11	38	114	605
05:15 PM	25	122	13	160	37	164	66	267	29	24	8	61	57	21	41	119	607
05:30 PM	23	127	12	162	36	136	79	251	34	28	3	65	72	22	39	133	611
Total Volume	114	504	60	678	130	630	303	1063	112	91	41	244	247	73	167	487	2472
% App. Total	16.8	74.3	8.8		12.2	59.3	28.5		45.9	37.3	16.8		50.7	15	34.3		
PHF	.814	.962	.833	.921	.878	.870	.935	.920	.824	.813	.603	.910	.858	.830	.852	.915	.952
Truck %v	2	2	0		2	2	1		1	1	2		1	0	7		

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File Name : 2-Oakland Rd. & Richmond Rd. AM
 Site Code :
 Start Date : 10/10/2017
 Page No : 1

Groups Printed- Car

	Richmond Rd Eastbound				Richmond Rd Westbound				Oakland Dr Northbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
07:00 AM	208	0	0	208	2	118	1	121	1	2	1	4	333
07:15 AM	168	0	0	168	2	95	0	97	1	1	0	2	267
07:30 AM	181	1	0	182	0	92	0	92	0	4	0	4	278
07:45 AM	148	0	0	148	0	86	0	86	3	4	0	7	241
Total	705	1	0	706	4	391	1	396	5	11	1	17	1119
08:00 AM	144	0	0	144	0	81	0	81	0	2	0	2	227
08:15 AM	150	0	0	150	1	60	0	61	1	2	3	6	217
08:30 AM	164	0	0	164	0	78	0	78	0	2	0	2	244
08:45 AM	141	0	0	141	0	78	0	78	1	3	0	4	223
Total	599	0	0	599	1	297	0	298	2	9	3	14	911
Grand Total	1304	1	0	1305	5	688	1	694	7	20	4	31	2030
Apprch %	99.9	0.1	0		0.7	99.1	0.1		22.6	64.5	12.9		
Total %	64.2	0	0	64.3	0.2	33.9	0	34.2	0.3	1	0.2	1.5	

	Richmond Rd Eastbound			Richmond Rd Westbound			Oakland Dr Northbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	208	0	208	2	118	120	1	2	3	331
07:15 AM	168	0	168	2	95	97	1	1	2	267
07:30 AM	181	1	182	0	92	92	0	4	4	278
07:45 AM	148	0	148	0	86	86	3	4	7	241
Total Volume	705	1	706	4	391	395	5	11	16	1117
% App. Total	99.9	0.1		1	99		31.2	68.8		
PHF	.847	.250	.849	.500	.828	.823	.417	.688	.571	.844

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File Name : 2-Oakland Rd. & Richmond Rd. AM
 Site Code :
 Start Date : 10/10/2017
 Page No : 1

Groups Printed- Truck

	Richmond Rd Eastbound				Richmond Rd Westbound				Oakland Dr Northbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
07:00 AM	14	1	0	15	0	7	0	7	1	0	0	1	23
07:15 AM	18	0	0	18	0	7	0	7	0	0	0	0	25
07:30 AM	10	0	0	10	0	11	0	11	0	0	0	0	21
07:45 AM	7	0	0	7	0	7	0	7	0	0	0	0	14
Total	49	1	0	50	0	32	0	32	1	0	0	1	83
08:00 AM	11	0	0	11	0	6	0	6	0	0	0	0	17
08:15 AM	10	2	0	12	0	4	0	4	0	0	0	0	16
08:30 AM	8	0	0	8	0	10	0	10	0	0	0	0	18
08:45 AM	13	1	0	14	0	7	0	7	0	1	0	1	22
Total	42	3	0	45	0	27	0	27	0	1	0	1	73
Grand Total	91	4	0	95	0	59	0	59	1	1	0	2	156
Apprch %	95.8	4.2	0		0	100	0		50	50	0		
Total %	58.3	2.6	0	60.9	0	37.8	0	37.8	0.6	0.6	0	1.3	

	Richmond Rd Eastbound			Richmond Rd Westbound			Oakland Dr Northbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	14	1	15	0	7	7	1	0	1	23
07:15 AM	18	0	18	0	7	7	0	0	0	25
07:30 AM	10	0	10	0	11	11	0	0	0	21
07:45 AM	7	0	7	0	7	7	0	0	0	14
Total Volume	49	1	50	0	32	32	1	0	1	83
% App. Total	98	2		0	100		100	0		
PHF	.681	.250	.694	.000	.727	.727	.250	.000	.250	.830

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File Name : 2-Oakland Rd. & Richmond Rd. AM
 Site Code :
 Start Date : 10/10/2017
 Page No : 1

Groups Printed- Car - Truck

	Richmond Rd Eastbound				Richmond Rd Westbound				Oakland Dr Northbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
07:00 AM	222	1	0	223	2	125	1	128	2	2	1	5	356
07:15 AM	186	0	0	186	2	102	0	104	1	1	0	2	292
07:30 AM	191	1	0	192	0	103	0	103	0	4	0	4	299
07:45 AM	155	0	0	155	0	93	0	93	3	4	0	7	255
Total	754	2	0	756	4	423	1	428	6	11	1	18	1202
08:00 AM	155	0	0	155	0	87	0	87	0	2	0	2	244
08:15 AM	160	2	0	162	1	64	0	65	1	2	3	6	233
08:30 AM	172	0	0	172	0	88	0	88	0	2	0	2	262
08:45 AM	154	1	0	155	0	85	0	85	1	4	0	5	245
Total	641	3	0	644	1	324	0	325	2	10	3	15	984
Grand Total	1395	5	0	1400	5	747	1	753	8	21	4	33	2186
Apprch %	99.6	0.4	0		0.7	99.2	0.1		24.2	63.6	12.1		
Total %	63.8	0.2	0	64	0.2	34.2	0	34.4	0.4	1	0.2	1.5	
Car	1304	1	0	1305	5	688	1	694	7	20	4	31	2030
% Car	93.5	20	0	93.2	100	92.1	100	92.2	87.5	95.2	100	93.9	92.9
Truck	91	4	0	95	0	59	0	59	1	1	0	2	156
% Truck	6.5	80	0	6.8	0	7.9	0	7.8	12.5	4.8	0	6.1	7.1

	Richmond Rd Eastbound			Richmond Rd Westbound			Oakland Dr Northbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	222	1	223	2	125	127	2	2	4	354
07:15 AM	186	0	186	2	102	104	1	1	2	292
07:30 AM	191	1	192	0	103	103	0	4	4	299
07:45 AM	155	0	155	0	93	93	3	4	7	255
Total Volume	754	2	756	4	423	427	6	11	17	1200
% App. Total	99.7	0.3		0.9	99.1		35.3	64.7		
PHF	.849	.500	.848	.500	.846	.841	.500	.688	.607	.847

TRUCK %	7	5	0	7	17	0
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File Name : 2-Oakland Rd. & Richmond Rd. PM
Site Code :
Start Date : 10/10/2017
Page No : 1

Groups Printed- Car

	Richmond Rd Eastbound				Richmond Rd Westbound				Oakland Dr Northbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
04:00 PM	140	0	0	140	3	202	0	205	0	0	0	0	345
04:15 PM	143	2	0	145	1	198	0	199	0	1	0	1	345
04:30 PM	137	0	0	137	4	246	0	250	1	2	0	3	390
04:45 PM	154	2	0	156	6	227	0	233	0	6	0	6	395
Total	574	4	0	578	14	873	0	887	1	9	0	10	1475
05:00 PM	180	0	0	180	7	200	0	207	1	2	0	3	390
05:15 PM	154	1	0	155	1	235	0	236	3	4	0	7	398
05:30 PM	173	0	0	173	5	199	0	204	0	5	0	5	382
05:45 PM	129	1	0	130	2	210	0	212	0	4	0	4	346
Total	636	2	0	638	15	844	0	859	4	15	0	19	1516
Grand Total	1210	6	0	1216	29	1717	0	1746	5	24	0	29	2991
Apprch %	99.5	0.5	0		1.7	98.3	0		17.2	82.8	0		
Total %	40.5	0.2	0	40.7	1	57.4	0	58.4	0.2	0.8	0	1	

	Richmond Rd Eastbound			Richmond Rd Westbound			Oakland Dr Northbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	137	0	137	4	246	250	1	2	3	390
04:45 PM	154	2	156	6	227	233	0	6	6	395
05:00 PM	180	0	180	7	200	207	1	2	3	390
05:15 PM	154	1	155	1	235	236	3	4	7	398
Total Volume	625	3	628	18	908	926	5	14	19	1573
% App. Total	99.5	0.5		1.9	98.1		26.3	73.7		
PHF	.868	.375	.872	.643	.923	.926	.417	.583	.679	.988

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File Name : 2-Oakland Rd. & Richmond Rd. PM
Site Code :
Start Date : 10/10/2017
Page No : 1

Groups Printed- Truck

	Richmond Rd Eastbound				Richmond Rd Westbound				Oakland Dr Northbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
04:00 PM	6	0	0	6	0	6	0	6	0	0	0	0	12
04:15 PM	2	0	0	2	0	4	0	4	0	0	0	0	6
04:30 PM	2	0	0	2	0	6	0	6	0	0	0	0	8
04:45 PM	4	2	0	6	0	9	0	9	1	1	0	2	17
Total	14	2	0	16	0	25	0	25	1	1	0	2	43
05:00 PM	1	0	0	1	1	8	0	9	0	0	0	0	10
05:15 PM	2	0	0	2	0	3	0	3	1	0	0	1	6
05:30 PM	1	0	0	1	0	2	0	2	0	0	0	0	3
05:45 PM	2	0	0	2	0	2	0	2	0	0	0	0	4
Total	6	0	0	6	1	15	0	16	1	0	0	1	23
Grand Total	20	2	0	22	1	40	0	41	2	1	0	3	66
Apprch %	90.9	9.1	0		2.4	97.6	0		66.7	33.3	0		
Total %	30.3	3	0	33.3	1.5	60.6	0	62.1	3	1.5	0	4.5	

	Richmond Rd Eastbound			Richmond Rd Westbound			Oakland Dr Northbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:00 PM										
04:00 PM	6	0	6	0	6	6	0	0	0	12
04:15 PM	2	0	2	0	4	4	0	0	0	6
04:30 PM	2	0	2	0	6	6	0	0	0	8
04:45 PM	4	2	6	0	9	9	1	1	2	17
Total Volume	14	2	16	0	25	25	1	1	2	43
% App. Total	87.5	12.5		0	100		50	50		
PHF	.583	.250	.667	.000	.694	.694	.250	.250	.250	.632

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File Name : 2-Oakland Rd. & Richmond Rd. PM
 Site Code :
 Start Date : 10/10/2017
 Page No : 1

Groups Printed- Car - Truck

	Richmond Rd Eastbound				Richmond Rd Westbound				Oakland Dr Northbound				
Start Time	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
04:00 PM	146	0	0	146	3	208	0	211	0	0	0	0	357
04:15 PM	145	2	0	147	1	202	0	203	0	1	0	1	351
04:30 PM	139	0	0	139	4	252	0	256	1	2	0	3	398
04:45 PM	158	4	0	162	6	236	0	242	1	7	0	8	412
Total	588	6	0	594	14	898	0	912	2	10	0	12	1518
05:00 PM	181	0	0	181	8	208	0	216	1	2	0	3	400
05:15 PM	156	1	0	157	1	238	0	239	4	4	0	8	404
05:30 PM	174	0	0	174	5	201	0	206	0	5	0	5	385
05:45 PM	131	1	0	132	2	212	0	214	0	4	0	4	350
Total	642	2	0	644	16	859	0	875	5	15	0	20	1539
Grand Total	1230	8	0	1238	30	1757	0	1787	7	25	0	32	3057
Apprch %	99.4	0.6	0		1.7	98.3	0		21.9	78.1	0		
Total %	40.2	0.3	0	40.5	1	57.5	0	58.5	0.2	0.8	0	1	
Car	1210	6	0	1216	29	1717	0	1746	5	24	0	29	2991
% Car	98.4	75	0	98.2	96.7	97.7	0	97.7	71.4	96	0	90.6	97.8
Truck	20	2	0	22	1	40	0	41	2	1	0	3	66
% Truck	1.6	25	0	1.8	3.3	2.3	0	2.3	28.6	4	0	9.4	2.2

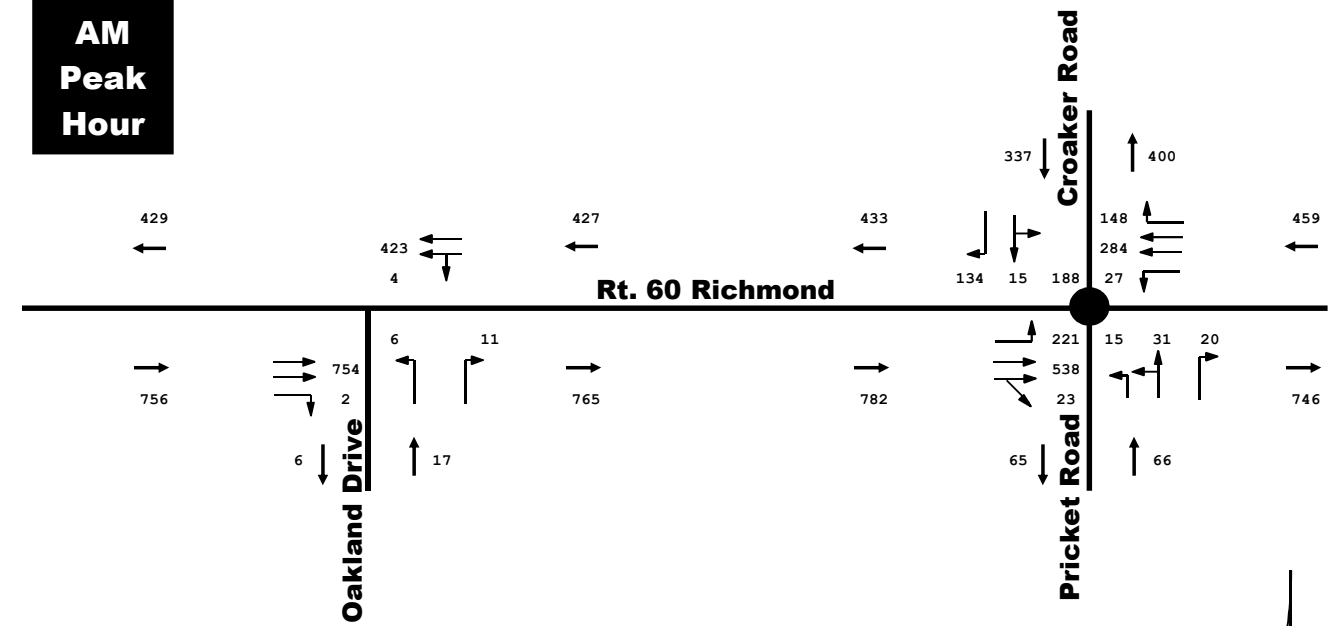
	Richmond Rd Eastbound			Richmond Rd Westbound			Oakland Dr Northbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	139	0	139	4	252	256	1	2	3	398
04:45 PM	158	4	162	6	236	242	1	7	8	412
05:00 PM	181	0	181	8	208	216	1	2	3	400
05:15 PM	156	1	157	1	238	239	4	4	8	404
Total Volume	634	5	639	19	934	953	7	15	22	1614
% App. Total	99.2	0.8		2	98		31.8	68.2		
PHF	.876	.313	.883	.594	.927	.931	.438	.536	.688	.979

TRUCK %	1	40	5	3	29	7
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Date:	10/10/2017	Observer: K. Leigh
Intersection Name: Croaker Rd. & US60 Eastbound Left Queue		
AM Shift: 7:00-9:00 AM		
	Approach: US60 EB	
	Left (1 lane)	
Time:	# veh	distance (feet)
7:00	5	125
	6	150
	7	175
	5	125
	4	100
	8	250
	6	200
	4	100
	8	200
	5	125
	8	225
7:15	4	150
	9	250
	7	200
	6	175
	10	250
	4	100
	6	150
	5	125
	4	125
	3	75
7:30	1	25
	3	75
	2	50
	1	25
	3	100
	5	125
	3	75
	3	75
	8	250
	4	125
	4	125
	5	175
7:45	2	50
	2	50
	2	50
	2	50
	4	100
	3	100
	1	25
	1	25
	1	25
Average	4	121
PM Peak 50th Percentile	4	125
PM Peak 95th Percentile	8	250
		Exhibit C1

Date:	10/10/2017	Observer: K. Leigh
Intersection Name:		
PM SHIFT 4:00-6:00 PM		
	Approach: US60 EB	
	Left (1 lane)	
Time:	# veh	distance (feet)
4:45	1	25
	4	100
	7	175
	3	75
	1	75
	4	100
	4	100
	1	25
	5	150
5:00	7	175
	6	150
	5	125
	6	150
	2	50
	4	100
5:15	4	100
	5	125
	5	125
	2	50
	3	75
	4	100
	3	75
	3	75
5:30	1	25
	4	100
	3	75
	2	50
	2	50
	2	50
	2	50
	5	125
	4	100
Average	3	91
AM Peak 50th Percentile	4	100
AM Peak 95th Percentile	6	161
		Exhibit C2

**AM
Peak
Hour**



**PM
Peak
Hour**

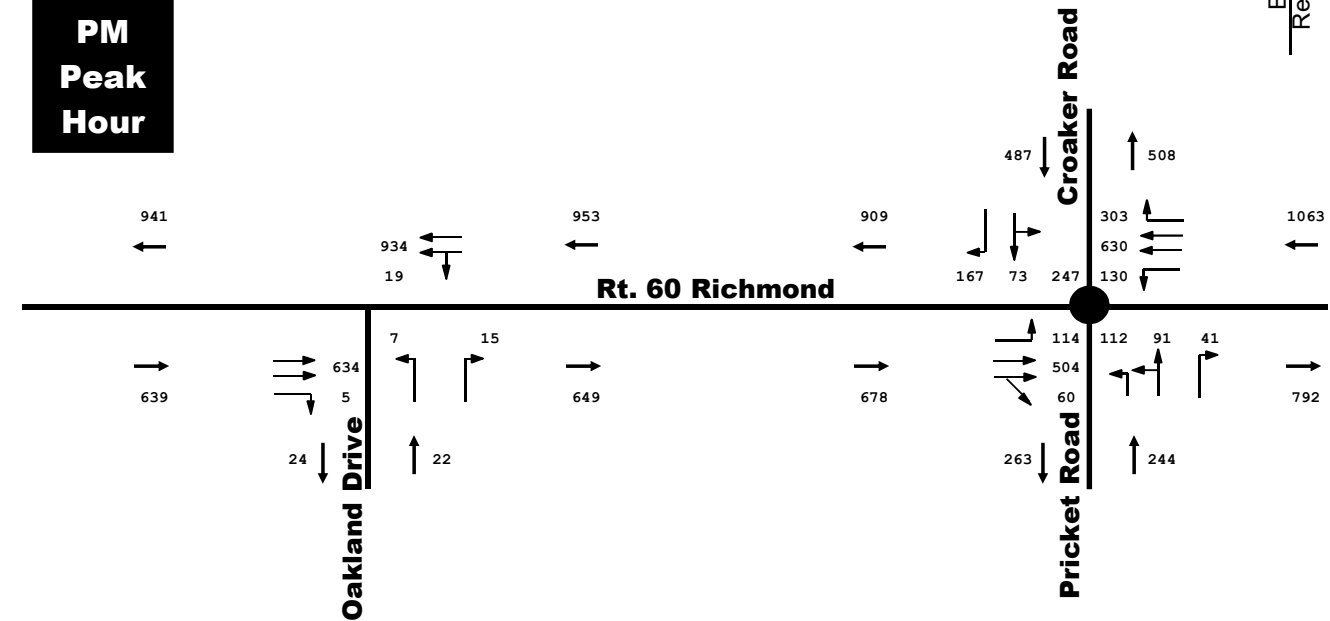


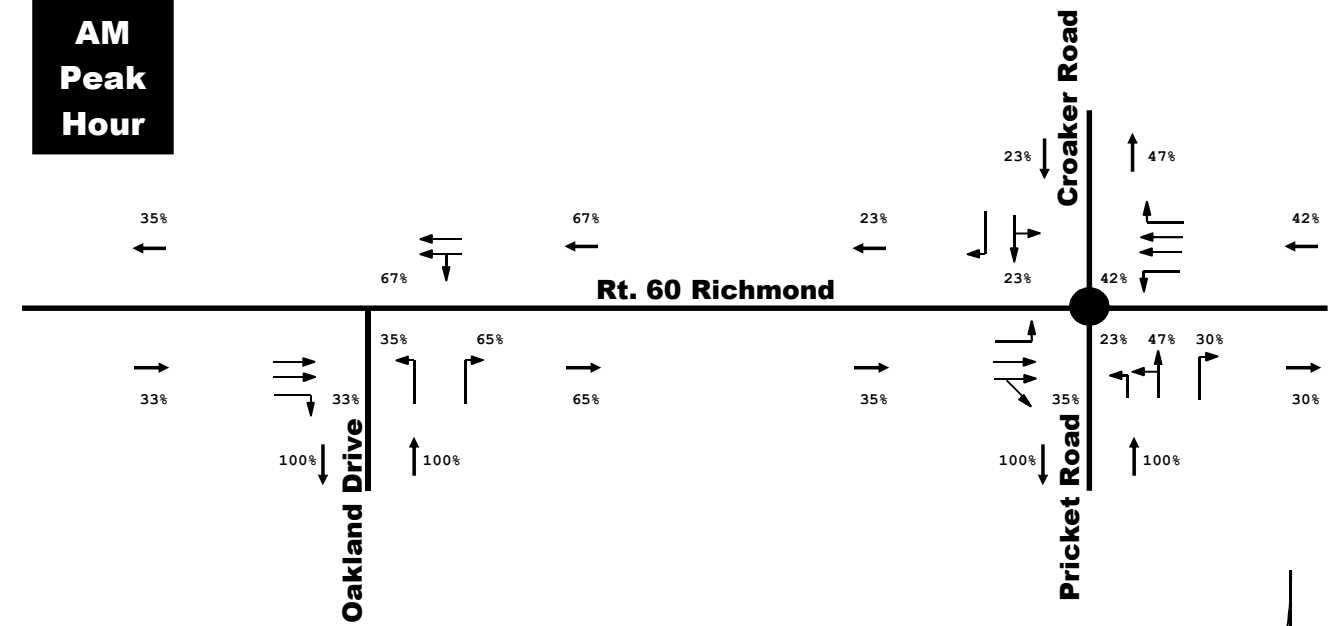
Exhibit
Reference

2017 PEAK HOUR COUNTS
WITHOUT BALANCE

DRW Consultants, LLC
804-794-7312

Exhibit D

**AM
Peak
Hour**



TO →

**PM
Peak
Hour**

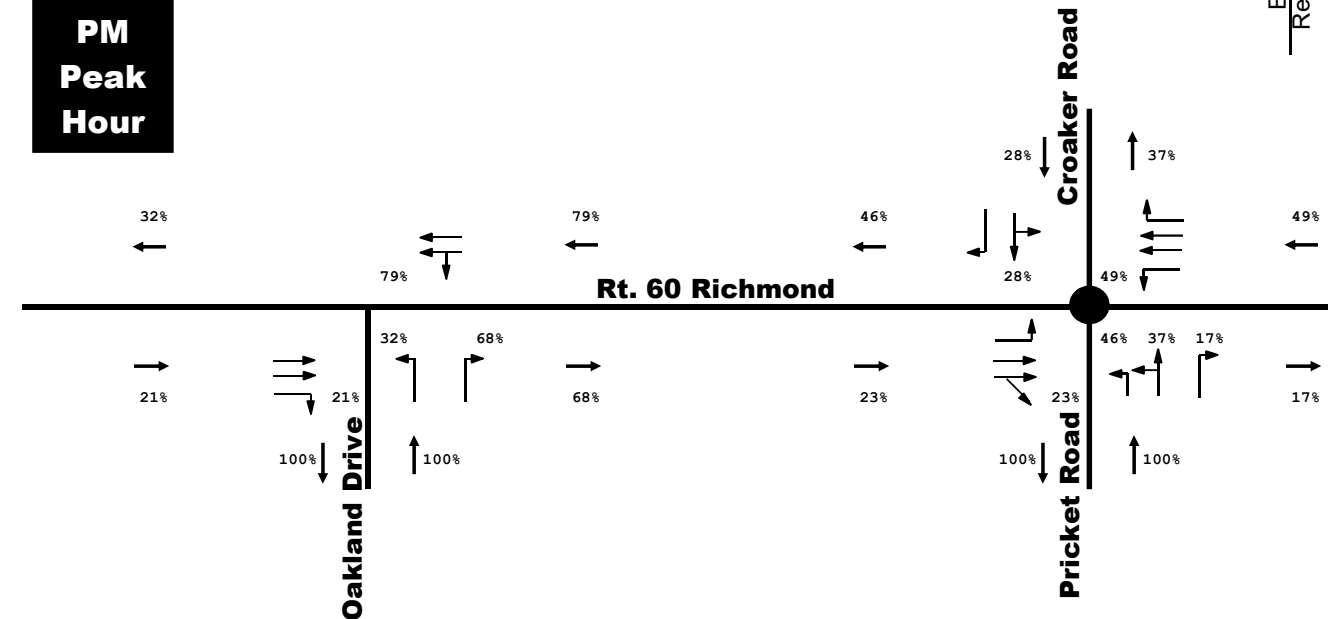


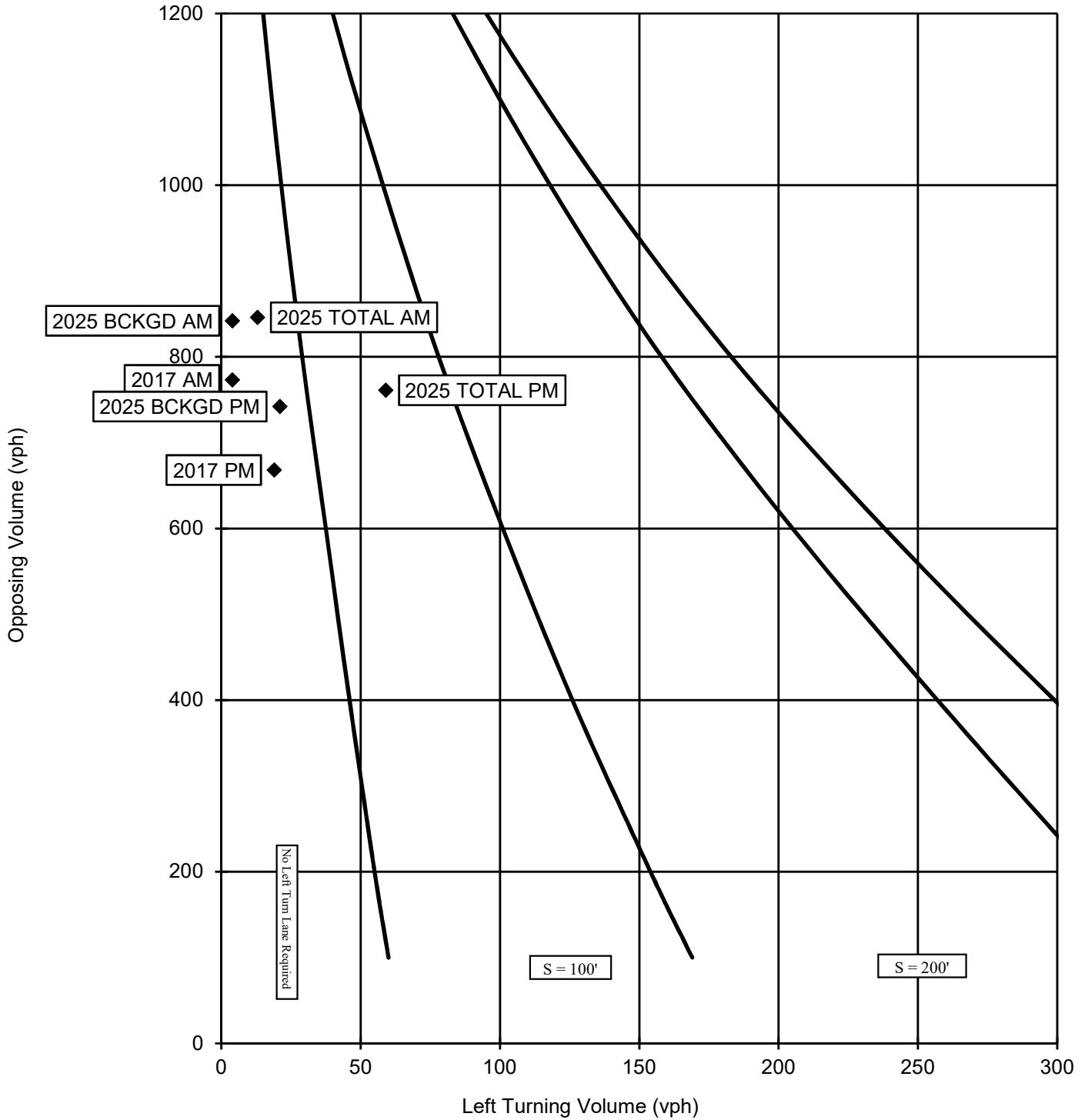
Exhibit
Reference

2017 PEAK HOUR COUNTS
TRIP DISTRIBUTION

DRW Consultants, LLC
804-794-7312

Exhibit E

LEFT TURN LANE WARRANT
FOUR LANE HIGHWAY
DIVIDED
S = Left Turn Storage



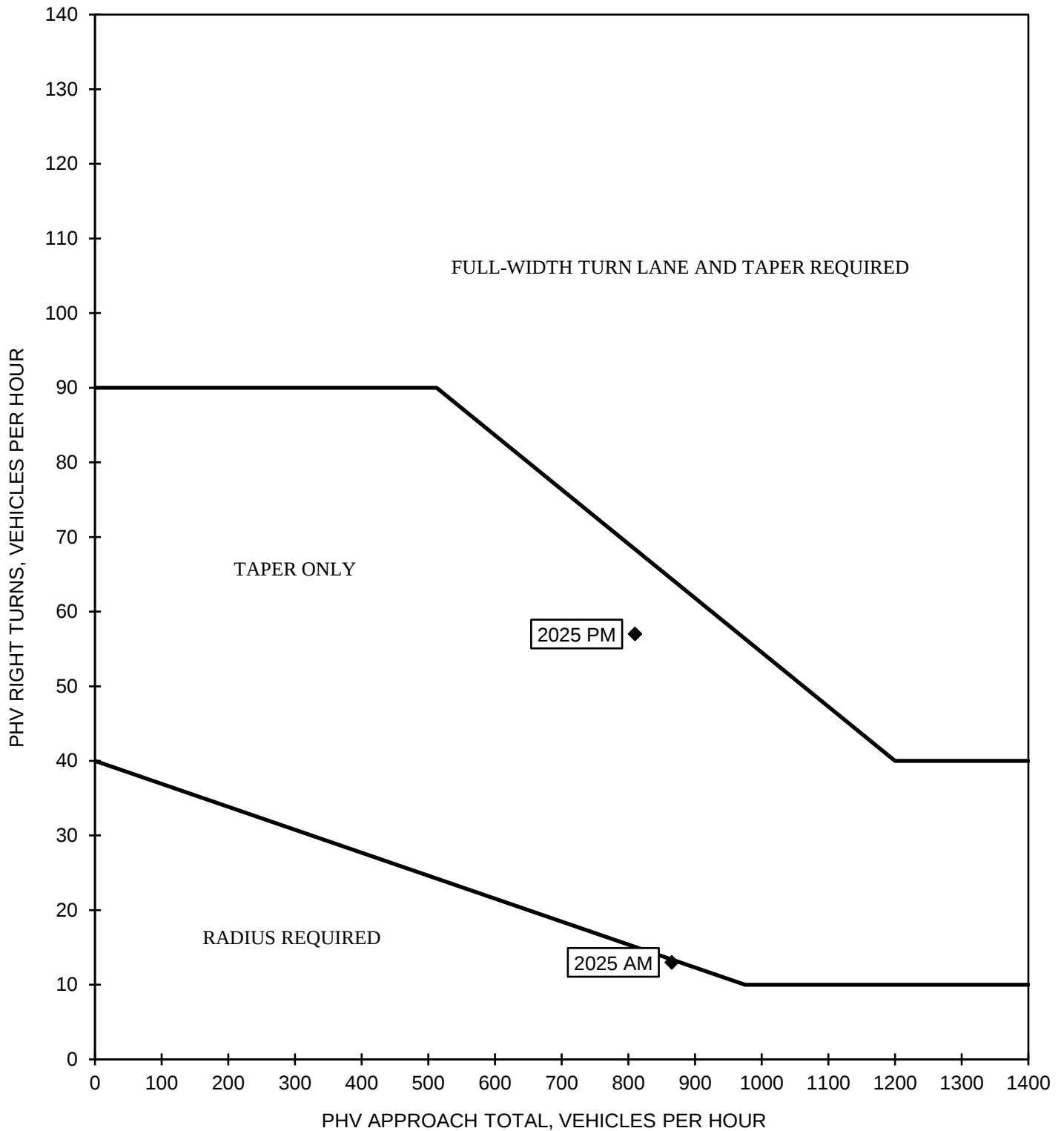
Source: VDOT Road Design Manual, Appendix C, derived from Highway Research Record Number 211

VDOT LEFT TURN LANE WARRANT
WESTBOUND LEFT TURN ON RT. 60
AT OAKLAND DRIVE

DRW Consultants, LLC
804-794-7312

Exhibit F

Guidelines for Right Turn Treatments 4 - Lane Highway



Source: VDOT Road Design Manual, Vol. 1, Page C-16, Figure C-1-9

VDOT RIGHT TURN LANE WARRANT
FOUR LANE ROAD
RT. 60 RICHMOND ROAD EASTBOUND AT
OAKLAND FARM APARTMENTS

DRW Consultants, LLC
804-794-7312

Exhibit F1

HCM Signalized Intersection Capacity Analysis

1: Croaker Road & Rt. 60/Richmond Road

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	221	538	23	27	284	148	15	31	20	188	15	134
Future Volume (vph)	221	538	23	27	284	148	15	31	20	188	15	134
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	6.0	6.0	7.5	6.0	6.0	7.0	7.0	7.0		8.0	8.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.95	0.95	1.00		1.00	1.00
Fr _t	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85
Fl _t Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00
Satd. Flow (prot)	1671	3438	1282	3155	3438	1509	1429	1556	1615		1727	1455
Fl _t Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00
Satd. Flow (perm)	1671	3438	1282	3155	3438	1509	1429	1556	1615		1727	1455
Peak-hour factor, PHF	0.86	0.86	0.86	0.87	0.87	0.87	0.75	0.75	0.75	0.83	0.83	0.83
Adj. Flow (vph)	257	626	27	31	326	170	20	41	27	227	18	161
RTOR Reduction (vph)	0	0	16	0	0	127	0	0	25	0	0	134
Lane Group Flow (vph)	257	626	11	31	326	43	20	41	2	0	245	27
Heavy Vehicles (%)	8%	5%	26%	11%	5%	7%	20%	16%	0%	4%	20%	11%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA	Perm
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases			2			6			4			3
Actuated Green, G (s)	15.4	34.6	34.6	1.8	21.5	21.5	5.5	5.5	5.5		14.3	14.3
Effective Green, g (s)	15.4	34.6	34.6	1.8	21.5	21.5	5.5	5.5	5.5		14.3	14.3
Actuated g/C Ratio	0.18	0.41	0.41	0.02	0.25	0.25	0.06	0.06	0.06		0.17	0.17
Clearance Time (s)	7.0	6.0	6.0	7.5	6.0	6.0	7.0	7.0	7.0		8.0	8.0
Vehicle Extension (s)	0.2	3.5	3.5	0.2	3.5	3.5	0.2	0.2	0.2		0.2	0.2
Lane Grp Cap (vph)	303	1404	523	67	872	383	92	101	104		291	245
v/s Ratio Prot	c0.15	c0.18		0.01	0.09		0.01	c0.03			c0.14	
v/s Ratio Perm			0.01			0.03			0.00			0.02
v/c Ratio	0.85	0.45	0.02	0.46	0.37	0.11	0.22	0.41	0.02		0.84	0.11
Uniform Delay, d ₁	33.5	18.1	14.9	41.0	26.1	24.3	37.6	38.0	37.1		34.1	29.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d ₂	18.6	0.3	0.0	1.8	0.3	0.2	0.4	1.0	0.0		18.6	0.1
Delay (s)	52.1	18.4	15.0	42.8	26.4	24.4	38.0	39.0	37.1		52.7	29.9
Level of Service	D	B	B	D	C	C	D	D	D		D	C
Approach Delay (s)		27.8			26.7			38.2			43.7	
Approach LOS		C			C			D			D	

Intersection Summary

HCM 2000 Control Delay	31.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	84.7	Sum of lost time (s)	28.5
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

1: Croaker Road & Rt. 60/Richmond Road

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	114	504	60	130	674	303	112	92	41	247	73	167
Future Volume (vph)	114	504	60	130	674	303	112	92	41	247	73	167
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	6.0	6.0	7.5	6.0	6.0	7.0	7.0	7.0		8.0	8.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.95	0.95	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00
Satd. Flow (prot)	1770	3539	1615	3433	3539	1599	1698	1787	1583		1815	1509
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00
Satd. Flow (perm)	1770	3539	1615	3433	3539	1599	1698	1787	1583		1815	1509
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.91	0.91	0.91	0.95	0.95	0.95
Adj. Flow (vph)	124	548	65	141	733	329	123	101	45	260	77	176
RTOR Reduction (vph)	0	0	45	0	0	234	0	0	40	0	0	138
Lane Group Flow (vph)	124	548	20	141	733	95	123	101	5	0	337	38
Heavy Vehicles (%)	2%	2%	0%	2%	2%	1%	1%	1%	2%	1%	0%	7%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA	Perm
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases			2			6			4			3
Actuated Green, G (s)	9.6	30.0	30.0	7.1	28.0	28.0	10.3	10.3	10.3		20.9	20.9
Effective Green, g (s)	9.6	30.0	30.0	7.1	28.0	28.0	10.3	10.3	10.3		20.9	20.9
Actuated g/C Ratio	0.10	0.31	0.31	0.07	0.29	0.29	0.11	0.11	0.11		0.22	0.22
Clearance Time (s)	7.0	6.0	6.0	7.5	6.0	6.0	7.0	7.0	7.0		8.0	8.0
Vehicle Extension (s)	0.2	3.5	3.5	0.2	3.5	3.5	0.2	0.2	0.2		0.2	0.2
Lane Grp Cap (vph)	175	1096	500	251	1023	462	180	190	168		391	325
v/s Ratio Prot	c0.07	0.15		0.04	c0.21		c0.07	0.06			c0.19	
v/s Ratio Perm			0.01			0.06			0.00			0.03
v/c Ratio	0.71	0.50	0.04	0.56	0.72	0.21	0.68	0.53	0.03		0.86	0.12
Uniform Delay, d1	42.2	27.3	23.3	43.3	30.8	26.0	41.7	41.0	38.8		36.6	30.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	10.2	0.4	0.0	1.7	2.5	0.3	8.2	1.4	0.0		16.9	0.1
Delay (s)	52.5	27.7	23.4	45.1	33.3	26.3	49.9	42.4	38.8		53.5	30.6
Level of Service	D	C	C	D	C	C	D	D	D		D	C
Approach Delay (s)		31.5			32.8			45.2			45.6	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			36.1	HCM 2000 Level of Service			D					
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			96.8	Sum of lost time (s)			28.5					
Intersection Capacity Utilization			66.6%	ICU Level of Service			C					
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: Croaker Road & Rt. 60/Richmond Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↱	↰	↱	↱	↰	↱	↱		↰	↱
Traffic Volume (vph)	239	581	32	37	307	160	36	50	47	203	21	145
Future Volume (vph)	239	581	32	37	307	160	36	50	47	203	21	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	6.0	6.0	7.5	6.0	6.0	7.0	7.0	7.0		8.0	8.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.95	0.95	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00
Satd. Flow (prot)	1671	3438	1282	3155	3438	1509	1429	1556	1615		1723	1455
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00
Satd. Flow (perm)	1671	3438	1282	3155	3438	1509	1429	1556	1615		1723	1455
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	260	632	35	40	334	174	39	54	51	221	23	158
RTOR Reduction (vph)	0	0	21	0	0	132	0	0	48	0	0	131
Lane Group Flow (vph)	260	632	14	40	334	42	39	54	3	0	244	27
Heavy Vehicles (%)	8%	5%	26%	11%	5%	7%	20%	16%	0%	4%	20%	11%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA	Perm
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases			2			6			4			3
Actuated Green, G (s)	15.4	32.4	32.4	2.8	20.3	20.3	5.7	5.7	5.7		14.3	14.3
Effective Green, g (s)	15.4	32.4	32.4	2.8	20.3	20.3	5.7	5.7	5.7		14.3	14.3
Actuated g/C Ratio	0.18	0.39	0.39	0.03	0.24	0.24	0.07	0.07	0.07		0.17	0.17
Clearance Time (s)	7.0	6.0	6.0	7.5	6.0	6.0	7.0	7.0	7.0		8.0	8.0
Vehicle Extension (s)	0.2	3.5	3.5	0.2	3.5	3.5	0.2	0.2	0.2		0.2	0.2
Lane Grp Cap (vph)	307	1330	496	105	833	365	97	105	109		294	248
v/s Ratio Prot	c0.16	c0.18		0.01	0.10		0.03	c0.03			c0.14	
v/s Ratio Perm			0.01			0.03			0.00			0.02
v/c Ratio	0.85	0.48	0.03	0.38	0.40	0.12	0.40	0.51	0.03		0.83	0.11
Uniform Delay, d1	33.0	19.3	15.9	39.6	26.6	24.7	37.4	37.7	36.4		33.5	29.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	18.3	0.3	0.0	0.8	0.4	0.2	1.0	1.8	0.0		16.6	0.1
Delay (s)	51.3	19.6	15.9	40.4	27.0	24.9	38.4	39.4	36.5		50.1	29.4
Level of Service	D	B	B	D	C	C	D	D	D		D	C
Approach Delay (s)		28.3			27.3			38.1			42.0	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	31.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	83.7	Sum of lost time (s)	28.5
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

1: Croaker Road & Rt. 60/Richmond Road

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	123	544	86	164	729	327	132	107	58	267	95	180
Future Volume (vph)	123	544	86	164	729	327	132	107	58	267	95	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	6.0	6.0	7.5	6.0	6.0	7.0	7.0	7.0		8.0	7.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.95	0.95	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00
Satd. Flow (prot)	1770	3539	1615	3433	3539	1599	1698	1787	1583		1819	1509
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.96	1.00
Satd. Flow (perm)	1770	3539	1615	3433	3539	1599	1698	1787	1583		1819	1509
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.91	0.95	0.95	0.95
Adj. Flow (vph)	134	591	93	178	792	355	143	116	64	281	100	189
RTOR Reduction (vph)	0	0	64	0	0	242	0	0	57	0	0	168
Lane Group Flow (vph)	134	591	29	178	792	113	143	116	7	0	381	21
Heavy Vehicles (%)	2%	2%	0%	2%	2%	1%	1%	1%	2%	1%	0%	7%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA	custom
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases			2			6			4			4
Actuated Green, G (s)	10.3	31.6	31.6	8.1	29.9	29.9	11.3	11.3	11.3		23.3	11.3
Effective Green, g (s)	10.3	31.6	31.6	8.1	29.9	29.9	11.3	11.3	11.3		23.3	11.3
Actuated g/C Ratio	0.10	0.31	0.31	0.08	0.29	0.29	0.11	0.11	0.11		0.23	0.11
Clearance Time (s)	7.0	6.0	6.0	7.5	6.0	6.0	7.0	7.0	7.0		8.0	7.0
Vehicle Extension (s)	0.2	3.5	3.5	0.2	3.5	3.5	0.2	0.2	0.2		0.2	0.2
Lane Grp Cap (vph)	177	1087	496	270	1029	465	186	196	174		412	165
v/s Ratio Prot	c0.08	0.17		0.05	c0.22		c0.08	0.06			c0.21	
v/s Ratio Perm			0.02			0.07			0.00			0.01
v/c Ratio	0.76	0.54	0.06	0.66	0.77	0.24	0.77	0.59	0.04		0.92	0.13
Uniform Delay, d1	45.0	29.6	25.1	46.0	33.3	27.8	44.5	43.6	40.9		38.9	41.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	15.0	0.6	0.1	4.4	3.6	0.3	15.7	3.2	0.0		26.0	0.1
Delay (s)	60.1	30.2	25.2	50.4	36.9	28.1	60.1	46.7	40.9		64.9	41.4
Level of Service	E	C	C	D	D	C	E	D	D		E	D
Approach Delay (s)		34.5			36.4			51.5			57.1	
Approach LOS		C			D			D			E	
Intersection Summary												
HCM 2000 Control Delay			41.4				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			102.8				Sum of lost time (s)			28.5		
Intersection Capacity Utilization			70.9%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: Croaker Road & Rt. 60/Richmond Road

												
Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	17	253	602	32	37	312	160	36	50	47	203	21
Future Volume (vph)	17	253	602	32	37	312	160	36	50	47	203	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	6.0	6.0	7.5	6.0	6.0	7.0	7.0	7.0		8.0
Lane Util. Factor		1.00	0.95	1.00	0.97	0.95	1.00	0.95	0.95	1.00		1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.96
Satd. Flow (prot)		1692	3438	1282	3155	3438	1509	1429	1556	1615		1723
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.96
Satd. Flow (perm)		1692	3438	1282	3155	3438	1509	1429	1556	1615		1723
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	18	275	654	35	40	339	174	39	54	51	221	23
RTOR Reduction (vph)	0	0	0	21	0	0	131	0	0	47	0	0
Lane Group Flow (vph)	0	293	654	14	40	339	43	39	54	4	0	244
Heavy Vehicles (%)	2%	7%	5%	26%	11%	5%	7%	20%	16%	0%	4%	20%
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA
Protected Phases	5	5	2		1	6		4	4		3	3
Permitted Phases				2			6			4		
Actuated Green, G (s)		15.4	32.7	32.7	2.8	20.6	20.6	5.8	5.8	5.8		14.4
Effective Green, g (s)		15.4	32.7	32.7	2.8	20.6	20.6	5.8	5.8	5.8		14.4
Actuated g/C Ratio		0.18	0.39	0.39	0.03	0.24	0.24	0.07	0.07	0.07		0.17
Clearance Time (s)		7.0	6.0	6.0	7.5	6.0	6.0	7.0	7.0	7.0		8.0
Vehicle Extension (s)		0.2	3.5	3.5	0.2	3.5	3.5	0.2	0.2	0.2		0.2
Lane Grp Cap (vph)		309	1335	497	104	841	369	98	107	111		294
v/s Ratio Prot		c0.17	c0.19		0.01	0.10		0.03	c0.03			c0.14
v/s Ratio Perm				0.01			0.03			0.00		
v/c Ratio		0.95	0.49	0.03	0.38	0.40	0.12	0.40	0.50	0.03		0.83
Uniform Delay, d1		34.0	19.5	15.9	39.9	26.6	24.7	37.5	37.8	36.6		33.7
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2		36.9	0.3	0.0	0.9	0.4	0.2	1.0	1.4	0.0		16.6
Delay (s)		70.9	19.8	15.9	40.7	27.0	24.9	38.5	39.2	36.6		50.3
Level of Service		E	B	B	D	C	C	D	D	D		D
Approach Delay (s)			34.9			27.3			38.1			42.0
Approach LOS			C			C			D			D
Intersection Summary												
HCM 2000 Control Delay			34.5									
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			84.2									
Intersection Capacity Utilization			65.9%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: Croaker Road & Rt. 60/Richmond Road

Movement	SBR
Lane Configurations	7
Traffic Volume (vph)	149
Future Volume (vph)	149
Ideal Flow (vphpl)	1900
Total Lost time (s)	8.0
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1455
Flt Permitted	1.00
Satd. Flow (perm)	1455
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	162
RTOR Reduction (vph)	134
Lane Group Flow (vph)	28
Heavy Vehicles (%)	11%
Turn Type	Perm
Protected Phases	
Permitted Phases	3
Actuated Green, G (s)	14.4
Effective Green, g (s)	14.4
Actuated g/C Ratio	0.17
Clearance Time (s)	8.0
Vehicle Extension (s)	0.2
Lane Grp Cap (vph)	248
v/s Ratio Prot	
v/s Ratio Perm	0.02
v/c Ratio	0.11
Uniform Delay, d1	29.5
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	29.6
Level of Service	C
Approach Delay (s)	
Approach LOS	
Intersection Summary	

HCM Signalized Intersection Capacity Analysis

1: Croaker Road & Rt. 60/Richmond Road

													
Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	
Lane Configurations													
Traffic Volume (vph)	10	131	556	86	164	752	327	132	107	58	267	95	
Future Volume (vph)	10	131	556	86	164	752	327	132	107	58	267	95	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		7.0	6.0	6.0	7.5	6.0	6.0	7.0	7.0	7.0		8.0	
Lane Util. Factor		1.00	0.95	1.00	0.97	0.95	1.00	0.95	0.95	1.00		1.00	
Frt		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		1.00	
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.96	
Satd. Flow (prot)		1770	3539	1615	3433	3539	1599	1698	1787	1583		1819	
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.96	
Satd. Flow (perm)		1770	3539	1615	3433	3539	1599	1698	1787	1583		1819	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.91	0.95	0.95	
Adj. Flow (vph)	11	142	604	93	178	817	355	143	116	64	281	100	
RTOR Reduction (vph)	0	0	0	63	0	0	233	0	0	57	0	0	
Lane Group Flow (vph)	0	153	604	30	178	817	122	143	116	7	0	381	
Heavy Vehicles (%)	2%	2%	2%	0%	2%	2%	1%	1%	1%	2%	1%	0%	
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA	
Protected Phases	5	5	2		1	6		4	4		3	3	
Permitted Phases				2			6			4			
Actuated Green, G (s)		11.4	33.4	33.4	8.2	30.7	30.7	11.4	11.4	11.4		23.3	
Effective Green, g (s)		11.4	33.4	33.4	8.2	30.7	30.7	11.4	11.4	11.4		23.3	
Actuated g/C Ratio		0.11	0.32	0.32	0.08	0.29	0.29	0.11	0.11	0.11		0.22	
Clearance Time (s)		7.0	6.0	6.0	7.5	6.0	6.0	7.0	7.0	7.0		8.0	
Vehicle Extension (s)		0.2	3.5	3.5	0.2	3.5	3.5	0.2	0.2	0.2		0.2	
Lane Grp Cap (vph)		192	1127	514	268	1036	468	184	194	172		404	
v/s Ratio Prot		c0.09	c0.17		0.05	c0.23		c0.08	0.06			c0.21	
v/s Ratio Perm				0.02			0.08			0.00			
v/c Ratio		0.80	0.54	0.06	0.66	0.79	0.26	0.78	0.60	0.04		0.94	
Uniform Delay, d1		45.6	29.3	24.8	47.0	34.1	28.4	45.5	44.5	41.8		40.1	
Progression Factor		1.00	1.03	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Incremental Delay, d2		18.9	0.6	0.1	4.7	4.2	0.4	16.9	3.3	0.0		30.2	
Delay (s)		64.4	30.8	24.8	51.7	38.2	28.7	62.4	47.8	41.8		70.3	
Level of Service		E	C	C	D	D	C	E	D	D		E	
Approach Delay (s)			36.2			37.5			53.1			57.3	
Approach LOS			D			D			D			E	
Intersection Summary													
HCM 2000 Control Delay			42.5									HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.84										
Actuated Cycle Length (s)			104.8									Sum of lost time (s)	28.5
Intersection Capacity Utilization			72.5%									ICU Level of Service	C
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis

1: Croaker Road & Rt. 60/Richmond Road

Movement	SBR
Lane Configurations	↑
Traffic Volume (vph)	195
Future Volume (vph)	195
Ideal Flow (vphpl)	1900
Total Lost time (s)	8.0
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1509
Flt Permitted	1.00
Satd. Flow (perm)	1509
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	205
RTOR Reduction (vph)	147
Lane Group Flow (vph)	58
Heavy Vehicles (%)	7%
Turn Type	Perm
Protected Phases	
Permitted Phases	3
Actuated Green, G (s)	23.3
Effective Green, g (s)	23.3
Actuated g/C Ratio	0.22
Clearance Time (s)	8.0
Vehicle Extension (s)	0.2
Lane Grp Cap (vph)	335
v/s Ratio Prot	
v/s Ratio Perm	0.04
v/c Ratio	0.17
Uniform Delay, d1	33.0
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	33.0
Level of Service	C
Approach Delay (s)	
Approach LOS	
Intersection Summary	

HCM Signalized Intersection Capacity Analysis

1: Croaker Road & Rt. 60/Richmond Road



Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↔	↕	↗	↖	↕	↗	↖	↕	↗	↖	↕
Traffic Volume (vph)	17	253	602	32	37	312	160	36	50	47	203	21
Future Volume (vph)	17	253	602	32	37	312	160	36	50	47	203	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	6.0	6.0	7.5	6.0	6.0	7.0	7.0	7.0		8.0
Lane Util. Factor		1.00	0.95	1.00	0.97	0.95	1.00	0.95	0.95	1.00		1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.96
Satd. Flow (prot)		1692	3438	1282	3155	3438	1509	1429	1556	1615		1723
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.96
Satd. Flow (perm)		1692	3438	1282	3155	3438	1509	1429	1556	1615		1723
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	18	275	654	35	40	339	174	39	54	51	221	23
RTOR Reduction (vph)	0	0	0	21	0	0	132	0	0	48	0	0
Lane Group Flow (vph)	0	293	654	14	40	339	42	39	54	3	0	244
Heavy Vehicles (%)	2%	7%	5%	26%	11%	5%	7%	20%	16%	0%	4%	20%
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA
Protected Phases	5	5	2		1	6		4	4		3	3
Permitted Phases				2			6			4		
Actuated Green, G (s)		17.9	36.3	36.3	2.6	21.5	21.5	5.8	5.8	5.8		15.2
Effective Green, g (s)		17.9	36.3	36.3	2.6	21.5	21.5	5.8	5.8	5.8		15.2
Actuated g/C Ratio		0.20	0.41	0.41	0.03	0.24	0.24	0.07	0.07	0.07		0.17
Clearance Time (s)		7.0	6.0	6.0	7.5	6.0	6.0	7.0	7.0	7.0		8.0
Vehicle Extension (s)		0.2	3.5	3.5	0.2	3.5	3.5	0.2	0.2	0.2		0.2
Lane Grp Cap (vph)		342	1411	526	92	836	367	93	102	105		296
v/s Ratio Prot		c0.17	c0.19		0.01	0.10		0.03	c0.03			c0.14
v/s Ratio Perm				0.01			0.03			0.00		
v/c Ratio		0.86	0.46	0.03	0.43	0.41	0.12	0.42	0.53	0.03		0.82
Uniform Delay, d1		34.0	19.0	15.5	42.2	28.1	26.0	39.7	40.0	38.7		35.3
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2		18.0	0.3	0.0	1.2	0.4	0.2	1.1	2.3	0.0		16.0
Delay (s)		52.0	19.2	15.6	43.4	28.5	26.2	40.8	42.3	38.7		51.3
Level of Service		D	B	B	D	C	C	D	D	D		D
Approach Delay (s)			28.9			28.8			40.6			43.2
Approach LOS			C			C			D			D
Intersection Summary												
HCM 2000 Control Delay			32.5									
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			88.4									
Intersection Capacity Utilization			65.9%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: Croaker Road & Rt. 60/Richmond Road

Movement	SBR
Lane Configurations	7
Traffic Volume (vph)	149
Future Volume (vph)	149
Ideal Flow (vphpl)	1900
Total Lost time (s)	8.0
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1455
Flt Permitted	1.00
Satd. Flow (perm)	1455
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	162
RTOR Reduction (vph)	134
Lane Group Flow (vph)	28
Heavy Vehicles (%)	11%
Turn Type	Perm
Protected Phases	
Permitted Phases	3
Actuated Green, G (s)	15.2
Effective Green, g (s)	15.2
Actuated g/C Ratio	0.17
Clearance Time (s)	8.0
Vehicle Extension (s)	0.2
Lane Grp Cap (vph)	250
v/s Ratio Prot	
v/s Ratio Perm	0.02
v/c Ratio	0.11
Uniform Delay, d1	30.9
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	31.0
Level of Service	C
Approach Delay (s)	
Approach LOS	
Intersection Summary	

HCM Signalized Intersection Capacity Analysis

1: Croaker Road & Rt. 60/Richmond Road

												
Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	10	131	556	86	164	752	327	132	107	58	267	95
Future Volume (vph)	10	131	556	86	164	752	327	132	107	58	267	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	6.0	6.0	7.5	6.0	6.0	7.0	7.0	7.0		8.0
Lane Util. Factor		1.00	0.95	1.00	0.97	0.95	1.00	0.95	0.95	1.00		1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.96
Satd. Flow (prot)		1770	3539	1615	3433	3539	1599	1698	1787	1583		1819
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		0.96
Satd. Flow (perm)		1770	3539	1615	3433	3539	1599	1698	1787	1583		1819
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.91	0.95	0.95
Adj. Flow (vph)	11	142	604	93	178	817	355	143	116	64	281	100
RTOR Reduction (vph)	0	0	0	64	0	0	229	0	0	57	0	0
Lane Group Flow (vph)	0	153	604	29	178	817	126	143	116	7	0	381
Heavy Vehicles (%)	2%	2%	2%	0%	2%	2%	1%	1%	1%	2%	1%	0%
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA
Protected Phases	5	5	2		1	6		4	4		3	3
Permitted Phases				2			6			4		
Actuated Green, G (s)		10.9	31.8	31.8	8.1	29.5	29.5	11.1	11.1	11.1		24.0
Effective Green, g (s)		10.9	31.8	31.8	8.1	29.5	29.5	11.1	11.1	11.1		24.0
Actuated g/C Ratio		0.11	0.31	0.31	0.08	0.29	0.29	0.11	0.11	0.11		0.23
Clearance Time (s)		7.0	6.0	6.0	7.5	6.0	6.0	7.0	7.0	7.0		8.0
Vehicle Extension (s)		0.2	3.5	3.5	0.2	3.5	3.5	0.2	0.2	0.2		0.2
Lane Grp Cap (vph)		186	1087	496	268	1008	455	182	191	169		421
v/s Ratio Prot		c0.09	0.17		0.05	c0.23		c0.08	0.06			c0.21
v/s Ratio Perm				0.02			0.08			0.00		
v/c Ratio		0.82	0.56	0.06	0.66	0.81	0.28	0.79	0.61	0.04		0.90
Uniform Delay, d1		45.4	29.9	25.3	46.4	34.4	28.7	45.0	44.1	41.4		38.6
Progression Factor		1.00	1.03	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2		23.4	0.7	0.1	4.7	5.2	0.4	18.3	3.7	0.0		22.0
Delay (s)		68.7	31.5	25.3	51.1	39.6	29.1	63.3	47.8	41.5		60.7
Level of Service		E	C	C	D	D	C	E	D	D		E
Approach Delay (s)			37.5			38.3			53.4			50.5
Approach LOS			D			D			D			D
Intersection Summary												
HCM 2000 Control Delay			42.0									D
HCM 2000 Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			103.5							28.5		
Intersection Capacity Utilization			72.5%							C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: Croaker Road & Rt. 60/Richmond Road

Movement	SBR
Lane Configurations	7
Traffic Volume (vph)	195
Future Volume (vph)	195
Ideal Flow (vphpl)	1900
Total Lost time (s)	8.0
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1509
Flt Permitted	1.00
Satd. Flow (perm)	1509
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	205
RTOR Reduction (vph)	156
Lane Group Flow (vph)	49
Heavy Vehicles (%)	7%
Turn Type	Perm
Protected Phases	
Permitted Phases	3
Actuated Green, G (s)	24.0
Effective Green, g (s)	24.0
Actuated g/C Ratio	0.23
Clearance Time (s)	8.0
Vehicle Extension (s)	0.2
Lane Grp Cap (vph)	349
v/s Ratio Prot	
v/s Ratio Perm	0.03
v/c Ratio	0.14
Uniform Delay, d1	31.6
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	31.6
Level of Service	C
Approach Delay (s)	
Approach LOS	
Intersection Summary	

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↖	↗
Traffic Vol, veh/h	771	2	4	429	6	11
Future Vol, veh/h	771	2	4	429	6	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	61	61
Heavy Vehicles, %	7	5	0	7	17	0
Mvmt Flow	907	2	5	505	10	18
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	909	0	1171	455
Stage 1	-	-	-	-	908	-
Stage 2	-	-	-	-	263	-
Critical Hdwy	-	-	4.1	-	7.14	6.9
Critical Hdwy Stg 1	-	-	-	-	6.14	-
Critical Hdwy Stg 2	-	-	-	-	6.14	-
Follow-up Hdwy	-	-	2.2	-	3.67	3.3
Pot Cap-1 Maneuver	-	-	757	-	165	558
Stage 1	-	-	-	-	320	-
Stage 2	-	-	-	-	714	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	757	-	164	558
Mov Cap-2 Maneuver	-	-	-	-	259	-
Stage 1	-	-	-	-	317	-
Stage 2	-	-	-	-	714	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.1		14.4	
HCM LOS	B					
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	259	558	-	-	757	-
HCM Lane V/C Ratio	0.038	0.032	-	-	0.006	-
HCM Control Delay (s)	19.4	11.7	-	-	9.8	0
HCM Lane LOS	C	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-

Intersection						
Int Delay, s/veh	0.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Traffic Vol, veh/h	663	5	19	934	7	15
Future Vol, veh/h	663	5	19	934	7	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	93	93	69	69
Heavy Vehicles, %	1	40	5	3	29	7
Mvmt Flow	753	6	20	1004	10	22
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	759	0	1298	380
Stage 1	-	-	-	-	756	-
Stage 2	-	-	-	-	542	-
Critical Hdwy	-	-	4.2	-	7.38	7.04
Critical Hdwy Stg 1	-	-	-	-	6.38	-
Critical Hdwy Stg 2	-	-	-	-	6.38	-
Follow-up Hdwy	-	-	2.25	-	3.79	3.37
Pot Cap-1 Maneuver	-	-	829	-	122	604
Stage 1	-	-	-	-	361	-
Stage 2	-	-	-	-	477	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	829	-	115	604
Mov Cap-2 Maneuver	-	-	-	-	229	-
Stage 1	-	-	-	-	341	-
Stage 2	-	-	-	-	477	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.4		14.4	
HCM LOS	B					
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	229	604	-	-	829	-
HCM Lane V/C Ratio	0.044	0.036	-	-	0.025	-
HCM Control Delay (s)	21.4	11.2	-	-	9.5	0.2
HCM Lane LOS	C	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0.1	-

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Traffic Vol, veh/h	840	2	4	484	6	12
Future Vol, veh/h	840	2	4	484	6	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh In Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	7	5	0	7	17	0
Mvmt Flow	913	2	4	526	7	13
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	915	0	1185	458
Stage 1	-	-	-	-	914	-
Stage 2	-	-	-	-	271	-
Critical Hdwy	-	-	4.1	-	7.14	6.9
Critical Hdwy Stg 1	-	-	-	-	6.14	-
Critical Hdwy Stg 2	-	-	-	-	6.14	-
Follow-up Hdwy	-	-	2.2	-	3.67	3.3
Pot Cap-1 Maneuver	-	-	754	-	161	555
Stage 1	-	-	-	-	317	-
Stage 2	-	-	-	-	707	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	754	-	160	555
Mov Cap-2 Maneuver	-	-	-	-	256	-
Stage 1	-	-	-	-	315	-
Stage 2	-	-	-	-	707	-
Approach	EB	WB		NB		
HCM Control Delay, s	0	0.1		14.2		
HCM LOS	B					
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	256	555	-	-	754	-
HCM Lane V/C Ratio	0.025	0.024	-	-	0.006	-
HCM Control Delay (s)	19.4	11.6	-	-	9.8	0
HCM Lane LOS	C	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	↑
Traffic Vol, veh/h	737	5	21	1020	8	16
Future Vol, veh/h	737	5	21	1020	8	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	93	93	69	69
Heavy Vehicles, %	1	40	5	3	29	7
Mvmt Flow	838	6	23	1097	12	23

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	844
Stage 1	-	-	841
Stage 2	-	-	595
Critical Hdwy	-	4.2	7.38
Critical Hdwy Stg 1	-	-	6.38
Critical Hdwy Stg 2	-	-	6.38
Follow-up Hdwy	-	2.25	3.79
Pot Cap-1 Maneuver	-	769	97
Stage 1	-	-	323
Stage 2	-	-	445
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	769	90
Mov Cap-2 Maneuver	-	-	199
Stage 1	-	-	298
Stage 2	-	-	445

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	15.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	199	567	-	-	769	-
HCM Lane V/C Ratio	0.058	0.041	-	-	0.029	-
HCM Control Delay (s)	24.2	11.6	-	-	9.8	0.4
HCM Lane LOS	C	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0.1	-

Intersection							
Int Delay, s/veh	0.3						
Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑↑	↑	↑
Traffic Vol, veh/h	844	2	9	4	501	6	12
Future Vol, veh/h	844	2	9	4	501	6	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	None	-	None
Storage Length	-	-	-	100	-	0	0
Veh in Median Storage, #	0	-	-	-	0	1	-
Grade, %	0	-	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92	92
Heavy Vehicles, %	7	5	2	0	7	17	0
Mvmt Flow	917	2	10	4	545	7	13

Major/Minor	Major1		Major2		Minor1		
Conflicting Flow All	0	0	920	919	0	1219	460
Stage 1	-	-	-	-	-	918	-
Stage 2	-	-	-	-	-	301	-
Critical Hdwy	-	-	6.44	4.1	-	7.14	6.9
Critical Hdwy Stg 1	-	-	-	-	-	6.14	-
Critical Hdwy Stg 2	-	-	-	-	-	6.14	-
Follow-up Hdwy	-	-	2.52	2.2	-	3.67	3.3
Pot Cap-1 Maneuver	-	-	374	751	-	153	554
Stage 1	-	-	-	-	-	316	-
Stage 2	-	-	-	-	-	682	-
Platoon blocked, %	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	435	435	-	148	554
Mov Cap-2 Maneuver	-	-	-	-	-	246	-
Stage 1	-	-	-	-	-	306	-
Stage 2	-	-	-	-	-	682	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	14.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	246	554	-	-	435	-
HCM Lane V/C Ratio	0.027	0.024	-	-	0.032	-
HCM Control Delay (s)	20	11.7	-	-	13.6	-
HCM Lane LOS	C	B	-	-	B	-
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0.1	-

Intersection						
Int Delay, s/veh	0.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑		↑
Traffic Vol, veh/h	852	13	0	514	0	52
Future Vol, veh/h	852	13	0	514	0	52
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	100	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	926	14	0	559	0	57
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	-	-	-	463
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	546
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	546
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB		NB		
HCM Control Delay, s	0	0		12.4		
HCM LOS	B					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT		
Capacity (veh/h)	546	-	-	-		
HCM Lane V/C Ratio	0.104	-	-	-		
HCM Control Delay (s)	12.4	-	-	-		
HCM Lane LOS	B	-	-	-		
HCM 95th %tile Q(veh)	0.3	-	-	-		

Intersection							
Int Delay, s/veh	0.7						
Movement	EBT	EBR	WBU	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↔	↑↑	↔	↔
Traffic Vol, veh/h	756	5	38	21	1030	8	16
Future Vol, veh/h	756	5	38	21	1030	8	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	None	-	None
Storage Length	-	-	-	100	-	0	0
Veh in Median Storage, #	0	-	-	-	0	1	-
Grade, %	0	-	-	-	0	0	-
Peak Hour Factor	88	88	92	93	93	69	69
Heavy Vehicles, %	1	40	2	5	3	29	7
Mvmt Flow	859	6	41	23	1108	12	23
Major/Minor	Major1		Major2		Minor1		
Conflicting Flow All	0	0	865	865	0	1544	433
Stage 1	-	-	-	-	-	862	-
Stage 2	-	-	-	-	-	682	-
Critical Hdwy	-	-	6.44	4.2	-	7.38	7.04
Critical Hdwy Stg 1	-	-	-	-	-	6.38	-
Critical Hdwy Stg 2	-	-	-	-	-	6.38	-
Follow-up Hdwy	-	-	2.52	2.25	-	3.79	3.37
Pot Cap-1 Maneuver	-	-	405	755	-	81	557
Stage 1	-	-	-	-	-	314	-
Stage 2	-	-	-	-	-	398	-
Platoon blocked, %	-	-			-		
Mov Cap-1 Maneuver	-	-	473	473	-	70	557
Mov Cap-2 Maneuver	-	-	-	-	-	168	-
Stage 1	-	-	-	-	-	272	-
Stage 2	-	-	-	-	-	398	-
Approach	EB		WB		NB		
HCM Control Delay, s	0		0.8		17.1		
HCM LOS	C						
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT	
Capacity (veh/h)	168	557	-	-	473	-	
HCM Lane V/C Ratio	0.069	0.042	-	-	0.135	-	
HCM Control Delay (s)	28	11.7	-	-	13.8	-	
HCM Lane LOS	D	B	-	-	B	-	
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0.5	-	

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑		↑
Traffic Vol, veh/h	753	57	0	1089	0	30
Future Vol, veh/h	753	57	0	1089	0	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	100	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	818	62	0	1184	0	33
Major/Minor						
	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	409
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	592
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	-	592
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach						
	EB		WB		NB	
HCM Control Delay, s	0		0		11.4	
HCM LOS					B	
Minor Lane/Major Mvmt						
	NBLn1	EBT	EBR	WBT		
Capacity (veh/h)	592	-	-	-		
HCM Lane V/C Ratio	0.055	-	-	-		
HCM Control Delay (s)	11.4	-	-	-		
HCM Lane LOS	B	-	-	-		
HCM 95th %tile Q(veh)	0.2	-	-	-		

Queues

1: Croaker Road & Rt. 60/Richmond Road

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	257	626	27	31	326	170	20	41	27	245	161
v/c Ratio	0.79	0.41	0.04	0.15	0.45	0.37	0.15	0.28	0.09	0.78	0.40
Control Delay	52.3	20.0	0.1	41.0	31.3	6.6	40.1	42.6	0.6	48.9	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.3	20.0	0.1	41.0	31.3	6.6	40.1	42.6	0.6	48.9	7.9
Queue Length 50th (ft)	123	101	0	7	76	0	9	20	0	117	0
Queue Length 95th (ft)	#286	208	0	23	127	40	29	49	0	189	36
Internal Link Dist (ft)	1267			1429			615			808	
Turn Bay Length (ft)	200		10	200		200	165		150		200
Base Capacity (vph)	327	1616	700	598	1528	773	280	305	457	519	553
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.39	0.04	0.05	0.21	0.22	0.07	0.13	0.06	0.47	0.29

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

1: Croaker Road & Rt. 60/Richmond Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	124	548	65	141	733	329	123	101	45	337	176
v/c Ratio	0.72	0.50	0.10	0.57	0.72	0.47	0.69	0.53	0.14	0.87	0.38
Control Delay	67.8	29.8	0.3	55.9	36.7	5.8	64.7	55.3	0.9	61.8	8.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.8	29.8	0.3	55.9	36.7	5.8	64.7	55.3	0.9	61.8	8.5
Queue Length 50th (ft)	78	147	0	45	219	0	82	66	0	205	0
Queue Length 95th (ft)	150	220	0	85	323	66	157	132	0	#422	59
Internal Link Dist (ft)	1267			1429			615			808	
Turn Bay Length (ft)	200		10	200		200	165		150		200
Base Capacity (vph)	279	1315	716	523	1266	783	268	282	397	439	498
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.42	0.09	0.27	0.58	0.42	0.46	0.36	0.11	0.77	0.35

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

1: Croaker Road & Rt. 60/Richmond Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	260	632	35	40	334	174	39	54	51	244	158
v/c Ratio	0.80	0.45	0.06	0.19	0.46	0.37	0.28	0.36	0.16	0.79	0.40
Control Delay	54.0	22.3	0.2	41.9	31.5	6.9	43.2	44.8	1.1	50.1	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.0	22.3	0.2	41.9	31.5	6.9	43.2	44.8	1.1	50.1	7.8
Queue Length 50th (ft)	125	137	0	9	78	0	18	27	0	117	0
Queue Length 95th (ft)	#324	228	0	29	136	46	58	73	0	216	45
Internal Link Dist (ft)		1267			1429			615		808	
Turn Bay Length (ft)	200		10	200		200	165		150		200
Base Capacity (vph)	325	1581	689	594	1519	770	278	303	455	515	551
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.40	0.05	0.07	0.22	0.23	0.14	0.18	0.11	0.47	0.29

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

1: Croaker Road & Rt. 60/Richmond Road

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	134	591	93	178	792	355	143	116	64	381	189
v/c Ratio	0.76	0.55	0.15	0.66	0.77	0.50	0.77	0.59	0.19	0.93	0.57
Control Delay	73.4	32.2	0.5	59.7	39.9	6.7	72.6	58.3	1.3	71.7	13.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.4	32.2	0.5	59.7	39.9	6.7	72.6	58.3	1.3	71.7	13.8
Queue Length 50th (ft)	91	170	0	62	252	7	101	81	0	261	0
Queue Length 95th (ft)	162	244	0	102	353	79	#190	149	0	#499	67
Internal Link Dist (ft)		1267			1429			615		808	
Turn Bay Length (ft)	200		10	200		200	165		150		200
Base Capacity (vph)	260	1226	680	489	1182	761	250	263	382	410	383
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.48	0.14	0.36	0.67	0.47	0.57	0.44	0.17	0.93	0.49

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

1: Croaker Road & Rt. 60/Richmond Road

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SEB
Lane Group Flow (vph)	293	654	35	40	339	174	39	54	51	244	162
v/c Ratio	0.89	0.46	0.06	0.19	0.46	0.37	0.28	0.36	0.16	0.78	0.41
Control Delay	65.2	22.5	0.2	42.2	31.5	6.8	43.5	45.1	1.1	50.0	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.2	22.5	0.2	42.2	31.5	6.8	43.5	45.1	1.1	50.0	8.2
Queue Length 50th (ft)	144	144	0	9	80	0	20	27	0	117	0
Queue Length 95th (ft)	#376	237	0	29	138	46	58	73	0	218	48
Internal Link Dist (ft)		654			1429			615		808	
Turn Bay Length (ft)	400		10	200		200	165		150		200
Base Capacity (vph)	329	1576	688	592	1514	768	277	302	454	513	550
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.41	0.05	0.07	0.22	0.23	0.14	0.18	0.11	0.48	0.29

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Queues

1: Croaker Road & Rt. 60/Richmond Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	153	604	93	178	817	355	143	116	64	381	205
v/c Ratio	0.80	0.54	0.15	0.66	0.79	0.51	0.78	0.60	0.20	0.95	0.43
Control Delay	76.1	32.8	0.5	60.8	41.2	7.4	74.3	59.4	1.3	76.4	10.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.1	32.8	0.5	60.8	41.2	7.4	74.3	59.4	1.3	76.4	10.3
Queue Length 50th (ft)	107	177	0	63	268	12	104	83	0	269	9
Queue Length 95th (ft)	m#191	252	m0	102	367	88	#190	149	0	#499	75
Internal Link Dist (ft)		654			1429			615		808	
Turn Bay Length (ft)	300		10	200		200	165		150		200
Base Capacity (vph)	255	1226	680	479	1158	745	245	258	378	402	481
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.49	0.14	0.37	0.71	0.48	0.58	0.45	0.17	0.95	0.43

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

Queues

1: Croaker Road & Rt. 60/Richmond Road

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	293	654	35	40	339	174	39	54	51	244	162
v/c Ratio	0.81	0.44	0.05	0.20	0.48	0.34	0.28	0.36	0.14	0.78	0.36
Control Delay	51.6	21.5	0.2	48.1	36.3	2.7	48.9	50.3	0.8	53.6	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.6	21.5	0.2	48.1	36.3	2.7	48.9	50.3	0.8	53.6	3.2
Queue Length 50th (ft)	147	146	0	10	85	0	21	28	0	123	0
Queue Length 95th (ft)	289	242	0	33	172	9	66	85	0	252	11
Internal Link Dist (ft)		654			1429			615		808	
Turn Bay Length (ft)	400		10	200		200	165		150		200
Base Capacity (vph)	670	1991	820	201	870	569	186	202	421	572	638
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.33	0.04	0.20	0.39	0.31	0.21	0.27	0.12	0.43	0.25
Intersection Summary											

Queues

1: Croaker Road & Rt. 60/Richmond Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	153	604	93	178	817	355	143	116	64	381	205
v/c Ratio	0.83	0.56	0.15	0.67	0.82	0.52	0.79	0.61	0.20	0.91	0.41
Control Delay	81.0	34.7	0.5	61.4	43.8	8.5	77.2	61.2	1.4	66.5	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	81.0	34.7	0.5	61.4	43.8	8.5	77.2	61.2	1.4	66.5	7.6
Queue Length 50th (ft)	109	190	0	65	290	19	107	85	0	265	1
Queue Length 95th (ft)	m#216	265	m0	103	#381	100	#208	151	0	#425	60
Internal Link Dist (ft)		654			1429			615		808	
Turn Bay Length (ft)	300		10	200		200	165		150		200
Base Capacity (vph)	225	1167	657	370	1693	715	224	236	361	516	574
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.52	0.14	0.48	0.75	0.50	0.64	0.49	0.18	0.74	0.36

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

Intersection: 1: Croaker Road & Rt. 60/Richmond Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	T	R	L	LT	R
Maximum Queue (ft)	197	104	124	24	5	56	114	71	80	8	56	17
Average Queue (ft)	126	76	75	9	1	28	80	45	43	2	30	9
95th Queue (ft)	221	115	139	32	9	68	117	84	90	14	67	22
Link Distance (ft)		1278	1278				1450	1450			618	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	200			10	200	200			200	165		150
Storage Blk Time (%)	3		25	1								
Queuing Penalty (veh)	7		6	3								

Intersection: 1: Croaker Road & Rt. 60/Richmond Road

Movement	SB	SB
Directions Served	LT	R
Maximum Queue (ft)	159	54
Average Queue (ft)	112	25
95th Queue (ft)	176	57
Link Distance (ft)	797	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		200
Storage Blk Time (%)	1	
Queuing Penalty (veh)	1	

Intersection: 2: Oakland Drive & Rt. 60

Movement	WB	NB	NB
Directions Served	LT	L	R
Maximum Queue (ft)	11	17	29
Average Queue (ft)	2	6	10
95th Queue (ft)	14	28	32
Link Distance (ft)	1278	1199	1199
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 17

Intersection: 1: Croaker Road & Rt. 60/Richmond Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	T	R	L	LT	R
Maximum Queue (ft)	164	149	164	78	80	122	226	220	131	165	218	152
Average Queue (ft)	73	92	92	23	18	62	138	111	57	39	117	21
95th Queue (ft)	133	142	147	58	52	109	205	190	101	131	193	73
Link Distance (ft)		1278	1278				1450	1450			618	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	200			10	200	200			200	165		150
Storage Blk Time (%)	0		38	4			1	0		0	6	
Queuing Penalty (veh)	0		23	11			1	1		0	6	

Intersection: 1: Croaker Road & Rt. 60/Richmond Road

Movement	SB	SB
Directions Served	LT	R
Maximum Queue (ft)	840	831
Average Queue (ft)	694	491
95th Queue (ft)	980	1117
Link Distance (ft)	797	797
Upstream Blk Time (%)	56	39
Queuing Penalty (veh)	0	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Oakland Drive & Rt. 60

Movement	WB	WB	NB	NB
Directions Served	LT	T	L	R
Maximum Queue (ft)	74	47	52	55
Average Queue (ft)	12	2	8	13
95th Queue (ft)	45	20	36	40
Link Distance (ft)	1278	1278	1199	1199
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 42

Intersection: 1: Croaker Road & Rt. 60/Richmond Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	T	R	L	LT	R
Maximum Queue (ft)	253	214	175	45	4	65	122	86	76	5	104	23
Average Queue (ft)	202	110	97	14	1	24	90	37	50	1	62	15
95th Queue (ft)	356	266	191	50	7	70	143	89	83	9	120	33
Link Distance (ft)	1278		1278				1450	1450			618	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	200			10	200	200			200	165		150
Storage Blk Time (%)	27	0	30	2							0	
Queuing Penalty (veh)	80	0	9	5							0	

Intersection: 1: Croaker Road & Rt. 60/Richmond Road

Movement	SB	SB
Directions Served	LT	R
Maximum Queue (ft)	232	125
Average Queue (ft)	175	70
95th Queue (ft)	381	253
Link Distance (ft)	797	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	200	
Storage Blk Time (%)	18	
Queuing Penalty (veh)	26	

Intersection: 2: Oakland Drive & Rt. 60

Movement	WB	NB	NB
Directions Served	LT	L	R
Maximum Queue (ft)	11	18	28
Average Queue (ft)	3	6	14
95th Queue (ft)	18	26	40
Link Distance (ft)	1278	1199	1199
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 120

Intersection: 1: Croaker Road & Rt. 60/Richmond Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	T	R	L	LT	R
Maximum Queue (ft)	173	208	217	174	128	149	245	223	175	221	309	223
Average Queue (ft)	91	106	105	32	28	75	149	123	72	86	157	37
95th Queue (ft)	150	167	171	86	79	129	219	199	126	209	254	133
Link Distance (ft)		1278	1278				1450	1450			618	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	200			10	200	200			200	165		150
Storage Blk Time (%)	0	0	42	6			1	0	0	0	19	
Queuing Penalty (veh)	0	0	36	17			2	1	0	1	23	

Intersection: 1: Croaker Road & Rt. 60/Richmond Road

Movement	SB	SB
Directions Served	LT	R
Maximum Queue (ft)	838	837
Average Queue (ft)	775	651
95th Queue (ft)	931	1169
Link Distance (ft)	797	797
Upstream Blk Time (%)	77	59
Queuing Penalty (veh)	0	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Oakland Drive & Rt. 60

Movement	WB	WB	NB	NB
Directions Served	LT	T	L	R
Maximum Queue (ft)	84	35	46	62
Average Queue (ft)	15	1	8	17
95th Queue (ft)	54	15	33	47
Link Distance (ft)	1278	1278	1199	1199
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 81

Intersection: 1: Croaker Road & Rt. 60/Richmond Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	UL	T	T	R	L	T	T	R	L	LT	R	LT
Maximum Queue (ft)	292	221	198	40	59	114	92	73	32	93	23	229
Average Queue (ft)	224	132	106	14	26	80	42	38	8	63	14	172
95th Queue (ft)	418	329	247	43	59	132	99	82	46	114	29	283
Link Distance (ft)		662	662			1450	1450			618		797
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	400			10	200			200	165		150	
Storage Blk Time (%)	6		34	1								13
Queuing Penalty (veh)	18		11	4								20

Intersection: 1: Croaker Road & Rt. 60/Richmond Road

Movement	SB
Directions Served	R
Maximum Queue (ft)	115
Average Queue (ft)	45
95th Queue (ft)	154
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	200
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: Oakland Drive & Rt. 60

Movement	WB	NB	NB
Directions Served	UL	L	R
Maximum Queue (ft)	16	21	34
Average Queue (ft)	5	4	14
95th Queue (ft)	22	24	40
Link Distance (ft)		1199	1199
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	100		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Oakland Farm & Rt. 60

Movement	NB
Directions Served	R
Maximum Queue (ft)	29
Average Queue (ft)	15
95th Queue (ft)	35
Link Distance (ft)	336
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 52

Intersection: 1: Croaker Road & Rt. 60/Richmond Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	UL	T	T	R	L	L	T	T	R	L	LT	R
Maximum Queue (ft)	188	182	190	116	125	145	238	212	156	210	293	116
Average Queue (ft)	95	105	103	28	25	81	159	134	78	72	154	27
95th Queue (ft)	169	163	163	71	76	132	230	212	139	190	247	96
Link Distance (ft)		662	662				1450	1450			618	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	300			10	200	200			200	165		150
Storage Blk Time (%)			41	6			2	0	0	0	18	
Queuing Penalty (veh)			36	17			4	2	0	1	22	

Intersection: 1: Croaker Road & Rt. 60/Richmond Road

Movement	SB	SB
Directions Served	LT	R
Maximum Queue (ft)	845	365
Average Queue (ft)	754	315
95th Queue (ft)	1038	509
Link Distance (ft)	797	
Upstream Blk Time (%)	77	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		200
Storage Blk Time (%)	89	0
Queuing Penalty (veh)	174	0

Intersection: 2: Oakland Drive & Rt. 60

Movement	WB	WB	NB	NB
Directions Served	UL	T	L	R
Maximum Queue (ft)	70	26	53	46
Average Queue (ft)	27	1	7	14
95th Queue (ft)	60	19	34	40
Link Distance (ft)		558	1199	1199
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	100			
Storage Blk Time (%)	0			
Queuing Penalty (veh)	2			

Intersection: 3: Oakland Farm & Rt. 60

Movement	NB
Directions Served	R
Maximum Queue (ft)	52
Average Queue (ft)	14
95th Queue (ft)	36
Link Distance (ft)	336
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 257

Intersection: 1: Croaker Road & Rt. 60/Richmond Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	UL	T	T	R	L	L	T	T	R	L	LT	R
Maximum Queue (ft)	279	138	134	37	10	39	134	84	74	22	74	31
Average Queue (ft)	201	90	84	11	2	17	84	47	50	7	46	19
95th Queue (ft)	337	155	152	41	13	44	140	94	88	31	85	40
Link Distance (ft)		662	662				1450	1450			618	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	400			10	200	200			200	165		150
Storage Blk Time (%)	0		29	1								
Queuing Penalty (veh)	1		9	3								

Intersection: 1: Croaker Road & Rt. 60/Richmond Road

Movement	SB	SB
Directions Served	LT	R
Maximum Queue (ft)	248	59
Average Queue (ft)	140	33
95th Queue (ft)	276	63
Link Distance (ft)	797	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		200
Storage Blk Time (%)	6	
Queuing Penalty (veh)	9	

Intersection: 2: Oakland Drive & Rt. 60

Movement	WB	NB	NB
Directions Served	UL	L	R
Maximum Queue (ft)	22	17	34
Average Queue (ft)	5	4	14
95th Queue (ft)	23	20	40
Link Distance (ft)		1199	1199
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	100		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Oakland Farm & Rt. 60

Movement	NB
Directions Served	R
Maximum Queue (ft)	30
Average Queue (ft)	18
95th Queue (ft)	38
Link Distance (ft)	336
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 22

Intersection: 1: Croaker Road & Rt. 60/Richmond Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	UL	T	T	R	L	L	T	T	R	L	LT	R
Maximum Queue (ft)	230	173	169	53	134	161	278	266	174	202	291	194
Average Queue (ft)	110	102	106	26	27	78	166	142	76	79	153	28
95th Queue (ft)	202	155	160	51	84	136	242	226	137	197	247	97
Link Distance (ft)		662	662				1450	1450			618	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	300			10	200	200			200	165		150
Storage Blk Time (%)	0		43	6		0	3	1	0	0	17	
Queuing Penalty (veh)	0		37	17		0	4	3	0	1	21	

Intersection: 1: Croaker Road & Rt. 60/Richmond Road

Movement	SB	SB
Directions Served	LT	R
Maximum Queue (ft)	848	365
Average Queue (ft)	742	322
95th Queue (ft)	1023	504
Link Distance (ft)	797	
Upstream Blk Time (%)	70	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		200
Storage Blk Time (%)	88	0
Queuing Penalty (veh)	172	1

Intersection: 2: Oakland Drive & Rt. 60

Movement	WB	NB	NB
Directions Served	UL	L	R
Maximum Queue (ft)	61	64	61
Average Queue (ft)	25	10	16
95th Queue (ft)	53	39	48
Link Distance (ft)		1199	1199
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	100		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Oakland Farm & Rt. 60

Movement	NB
Directions Served	R
Maximum Queue (ft)	46
Average Queue (ft)	16
95th Queue (ft)	36
Link Distance (ft)	336
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 256
