

TAB 11

PALMETTO ELEMENTARY SCHOOL TRAFFIC CONCURRENCY STUDY

Prepared for:

Manatee County School Board

Prepared by:

Grimail Crawford, Inc.

GC# 10224.001

August, 2008

**PALMETTO ELEMENTARY SCHOOL
TRAFFIC CONCURRENCY STUDY**

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Prepared by:

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August, 2008

**Alejandro Anaya, PE
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PALMETTO ELEMENTARY SCHOOL TRAFFIC CONCURRENCY STUDY

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I. INTRODUCTION

The purpose of this report is to document a traffic concurrency analysis for a proposed elementary school to be located just north of 10th Street W and East of 17th Avenue W, in the City of Palmetto, Florida. Figure 1 illustrates the general location of the Project site, including the adjacent external roadway system. Access to the site is proposed from 17th Avenue W and 12th Street W.

The analysis undertaken is in response to City of Palmetto transportation concurrency requirements. This report summarizes the methodologies, procedures, and findings of the analysis.



Figure 1 - Proposed Project Location

II. METHODOLOGY

Prior to initiating the analysis, the proposed transportation methodology was discussed and agreed-upon with City staff. The general methodology used to develop this study is outlined in a copy of an electronic communication included in Appendix 1. The methodology encompasses the following study elements:

- Time Period to be Studied
- Trip Generation
- Study Area
- Existing Conditions
- Future Conditions

This study follows the methodology agreed to (as described in the communication provided under Appendix 1).

III. TIME PERIOD TO BE STUDIED

As per conversations with City of Palmetto staff, the analysis presented here is based on PM-peak traffic volumes. This is the time period indicated in the current concurrency regulations.

IV. PROJECT TRAFFIC GENERATION ESTIMATES

Traffic volumes generated by the project (during the PM-peak hour) were estimated based on information provided by the Manatee County School Board. The trip generation of the existing land uses in the project site (baseball fields) was estimated based on information provided by Mr. Scott Sullivan (President of the North River American Little League) and Mr. Mike Crawford (Coach of the Oldsmar Little League and member of the Board of Directors). It is important to note the trip generation for the existing uses was estimated assuming baseball-season conditions. The trip generations

for both scenarios were compared in order to determine whether or not the proposed school would generate more than 50 additional trips during the PM-peak hour, which is the City of Palmetto threshold to require a full traffic study.

The results of the trip generation estimation are summarized in Table 1.

Table 1 - Trip Generation Comparison

Land Use	Description of 4pm-to-6pm Vehicle Users*		Trips During PM-Peak Hour		
			In	Out	Total
Palmetto Elementary School (Proposed Land Use)	Admin Staff	20 Employees	0	10	10
	After School Care Program	100 Students	50	50	100
	Custodians	16 Custodians	8	4	12
					122
Baseball/Softball Fields (Existing Land Use)	Baseball/Softball Teams (Players/Parents/Coaches)	125 Vehicles	125	50	175

Estimated Variation in PM-Peak Trips:

-53

Based on Information Provided by:

- Manatee County School Board
- Scott Sullivan - President of the North River American Little League
- Mike Crawford - Coach of the Oldsmar Little League (for 6 years) and member of the Board of Directors.

As shown in Table 1, the net variation in pm-peak trips, once the school is operating, will be negative.

V. PROJECT DISTRIBUTION AND ASSIGNMENT

Project traffic assignments to the surrounding roadway network were estimated using the FSUTMS model. Appendix 2 shows the model output for Project trip distribution and Figure 2 illustrates the Project trips.

Figure 2
Site Generated Traffic

Palmetto Elementary School

GC#: 10224.001

Date
8/5/2008

Legend



P.M.-Peak-Hour Traffic Volumes

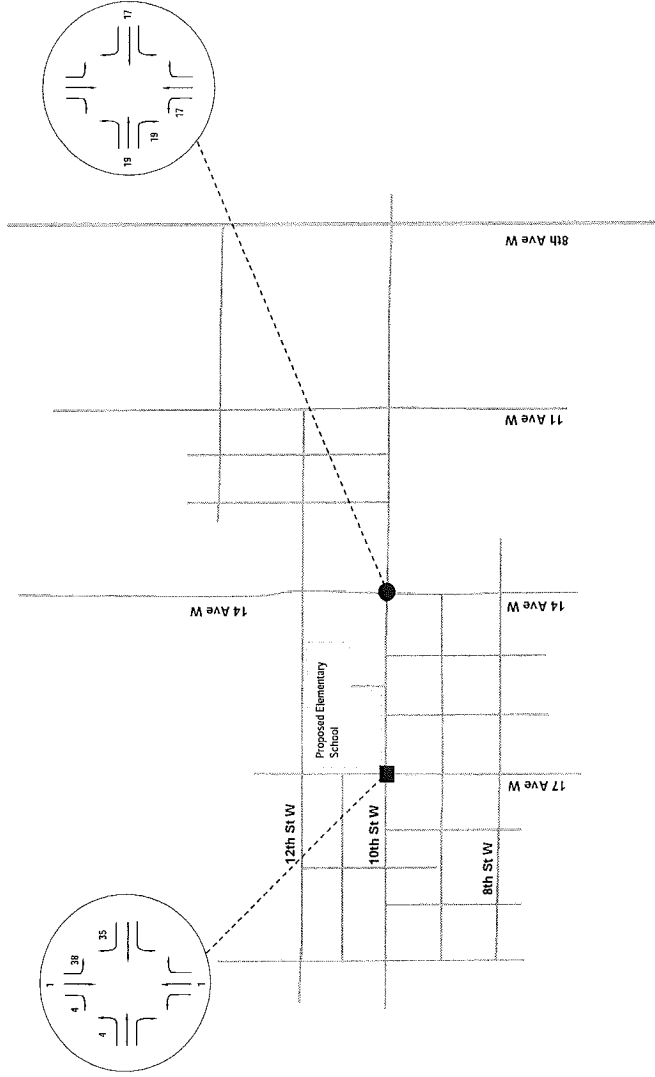


Signalized Intersection



Unsignalized Intersection

Notes



VI. STUDY NETWORK DETERMINATION

Based on the agreed-upon methodology, the study area includes the 10th Street W/14th Avenue W and 10th Street W/17th Avenue W intersections.

VII. EXISTING TRAFFIC CONDITIONS

The existing PM peak-hour conditions are based on PM peak-hour turning movement counts, adjusted to the peak season using the latest FDOT peak season factors. Copies of the turning movement counts are included in Appendix 3. Figure 3 illustrates the existing traffic volumes at the intersections located within the study area. Additional field data collected included lane configuration and traffic control devices at each intersection.

Figure 3
Existing Traffic

Palmetto Elementary School

GC#: 10224.001

Date
8/5/2008

Legend

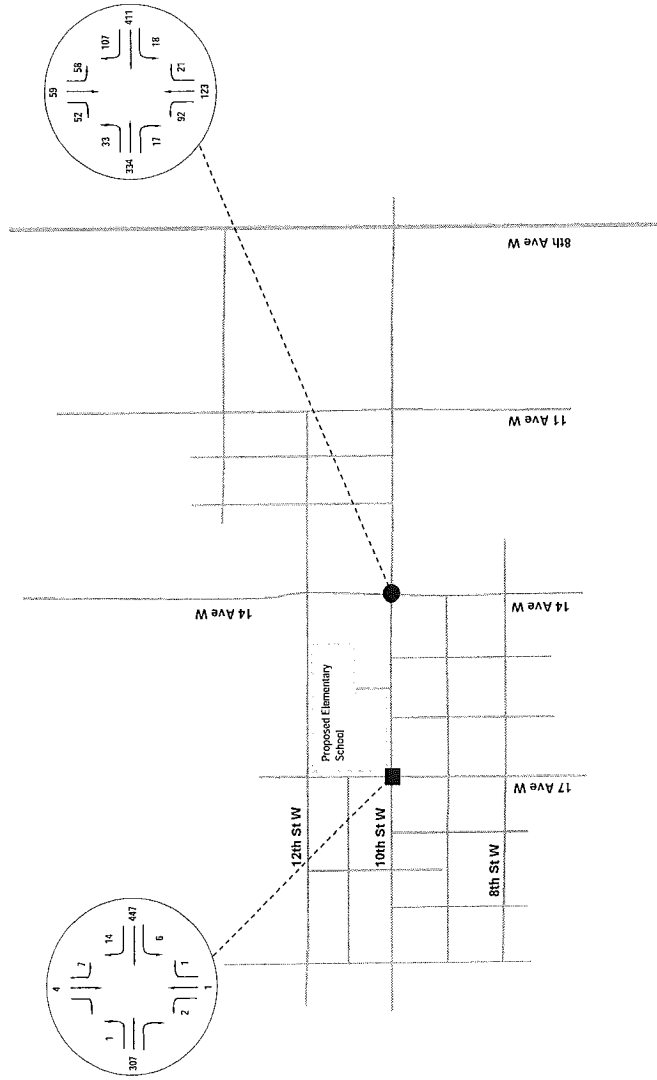


PM-Peak-Hour Traffic Volumes

Signalized Intersection

Unsignalized Intersection

Notes



Intersection capacity analyses were conducted for the 10th Street W/14th Avenue W and 10th Street W/17th Avenue W intersections. These capacity analyses are based on the 2000 Highway Capacity Manual (HCM) and the supporting Highway Capacity Software (HCS) v5.2.

Table 2 provides the results of the intersection capacity analysis under existing conditions and the corresponding HCS worksheets are provided in Appendix 4.

Table 2 - Intersection Capacity Analysis – Existing Conditions

Location	Operation Type	v/c ratios ≥ 1	Existing PM Peak Hour LOS
10th Street W @ 14th Avenue W	Signalized	All v/c ratios < 1	B
10th Street W @ 17th Avenue W	Unsignalized TWSC	All v/c ratios < 1	NB-LTR / SB-LTR C / C

Based on the intersection capacity analyses, both intersections are operating above acceptable LOS standards.

VIII. EXISTING + PROJECT TRAFFIC CONDITIONS

To develop the existing + project traffic volumes, the existing trips (addressed in section VII) were combined with the distributed project trips (addressed in section V). The existing + project traffic volumes were obtained by adding the existing trips and the future site generated trips (generated by the elementary school). Potential trips generated by the existing land-uses were not deducted because the turning-movement counts were performed before the beginning of the baseball season and no site generated traffic was observed during the PM-peak hour. Existing + project traffic volumes are illustrated in Figure 4. A detailed table of turning movement volumes

including the existing volumes and the project volumes for the intersections in the study area is provided in Appendix 5.

Figure 4
Existing + Project Traffic

Palmetto Elementary School

GC#: 10224.001

Date
8/5/2008

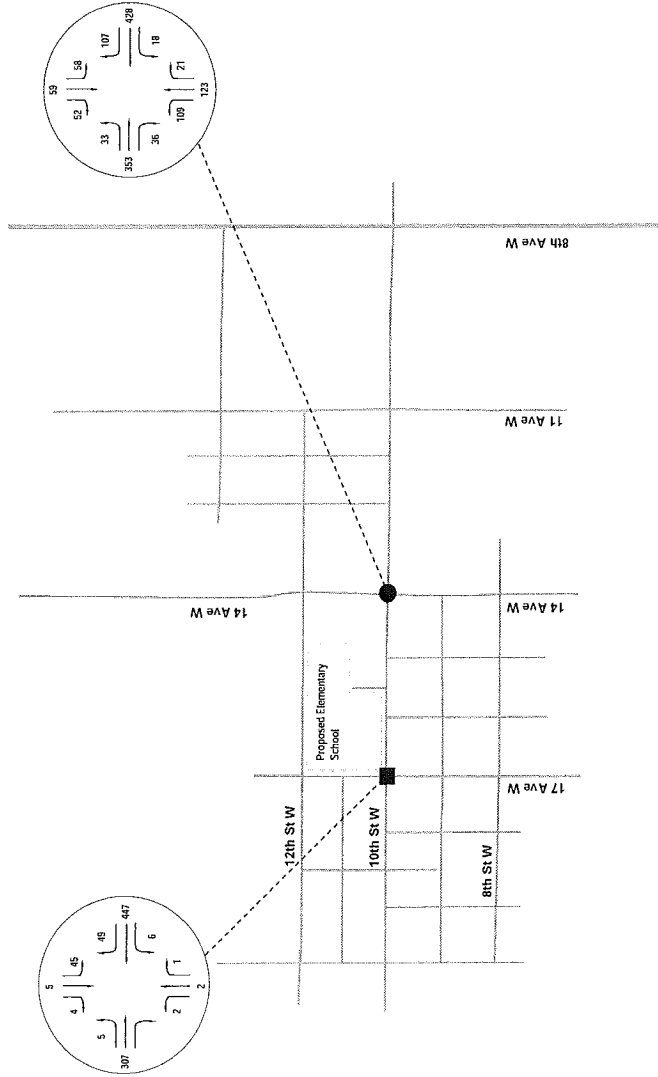
Legend
P1H-Peak-Hour Traffic Volumes



Signalized Intersection

Unsignalized Intersection

Notes



The 10th Street W/14th Avenue W and 10th Street W/17th Avenue W intersections were analyzed under existing + project traffic conditions. The findings of the intersection capacity analyses are provided in Table 3. The corresponding HCS worksheets are provided in Appendix 6.

Table 3 - Intersection Capacity Analysis - Existing + Project Traffic Conditions

Location	Operation Type	v/c ratios ≥ 1	Existing PM Peak Hour LOS
10th Street W @ 14th Avenue W	Signalized	All v/c ratios < 1	B
10th Street W @ 17th Avenue W	Unsignalized TWSC	All v/c ratios < 1	NB-LTR / SB-LTR C / C

Table 4 indicates that both study-area intersections will meet LOS standards under existing + project traffic conditions.

IX. FUTURE TRAFFIC CONDITIONS

In accordance with the agreed-upon methodology, future traffic conditions were not analyzed because the proposed elementary school will not generate more than 50 additional trips during the PM-peak hour. Moreover, the estimated net difference in trips will be negative, as explained in section IV of this document.

X. CONCLUSION

The traffic analysis conducted for this project evaluated the potential impact that the proposed Project consisting of an elementary school (with capacity for about 823 students) would have on the intersections included in the approved study area.

Intersection capacity analyses were conducted for the intersections included in the study network. The analyses performed follow the concurrency analysis procedures required by the City of Palmetto and an agreed-upon transportation methodology. Based on the capacity analyses conducted for this proposed project, the following conclusions are reached.

- All intersections included in the study area will meet LOS standards after the proposed elementary school begins operations.

APPENDIX 1
METHODOLOGY

Alejandro Anaya

From: Alejandro Anaya
Sent: Wednesday, July 30, 2008 3:59 PM
To: 'Dick Clarke'
Cc: 'bschmitt@palmettofl.org'; Bob Schmitt
Subject: RE: Palmetto Elementary - Traffic Concurrency Study (Methodology Outline)

Dick,

Below is the revised version of the methodology that we will use to prepare the traffic concurrency study for the proposed Palmetto Elementary School. The methodology is based on the phone conversation that we had earlier today.

- 1- **Time period to be studied:** Afternoon peak hour
- 2- **Trip Generation:** The PM-peak traffic that would be generated by the elementary school will be estimated based on information provided by the Manatee County School Board (number of employees, shifts, etc.) since ITE does not have PM-peak rates for elementary schools. This trip generation will be compared with the trip generation of the existing land uses (baseball fields) in order to determine if the elementary school will produce more than 50 additional PM-peak trips.
- 3- **Study Area:** will include the 10th Street W/14th Ave W and 10th Street W/17th Ave W intersections.
- 4- **Existing Conditions:** The existing traffic conditions in the vicinity of the project site will be analyzed based on PM-peak turning-movement counts at the 10th Street W/14th Ave W and 10th Street W/17th Ave W intersections.
- 5- **Future Conditions:** Future traffic conditions will only be analyzed if it is found that the proposed elementary school will generate more than 50 additional trips during the PM-peak hour.
- 6- **Improvements at site access points:** These improvements will not be considered in the traffic concurrency analysis. It is our understanding that required site access improvements will be included in the site plan application.
- 7- **Committed/Funded Improvements:** It is our understanding that the City of Palmetto has granted funds to improve the 10th Street W/14th Ave W intersection through a Congestion Management Program.

Please let me know if you have any comments or questions.

Cordially,
 Alex



Alejandro Anaya, PE, PTOE

Senior Project Manager

Grimail Crawford, Inc.

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From: Dick Clarke [mailto:DickC@ZNSeng.com]
Sent: Wednesday, July 30, 2008 3:24 PM
To: Alejandro Anaya
Cc: Bob Schmitt
Subject: FW: Palmetto Elementary - Traffic Concurrency Study (Methodology Outline)

8/8/2008

APPENDIX 2
PROJECT TRIP DISTRIBUTION (MODEL OUTPUT)

APPENDIX 3
EXISTING TURNING MOVEMENT COUNTS

Grimail Crawford, Inc.
 1511 North Westshore Boulevard
 Suite 1115
 Tampa, FL 33607

City/County: Palmetto/Manatee
 Weather: Clear
 Comments:

File Name : 10thSW_17thAVW_pm_08
 Site Code : 00008089
 Start Date : 07/30/2008
 Page No : 1

Groups Printed- Heavy Vehicles

Start Time	17TH AVENUE W From North						10TH STREET W From East						17TH AVENUE W From South						10TH STREET W From West					
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		Left		Thru		Right	
	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approch %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Start Time	17TH AVENUE W From North						10TH STREET W From East						17TH AVENUE W From South						10TH STREET W From West					
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		Left		Thru		Right	
	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																								
Intersection	04:30 PM						04:30 PM						3:45:00 PM						3:45:00 PM					
Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
04:30 Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Factor	0.0						0.0						0.0						0.0					
High Int.	3:45:00 PM						04:30 PM						3:45:00 PM						3:45:00 PM					
Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Factor	0.0						0.0						0.500						0.500					
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																								
By Approach	04:00 PM						04:00 PM						04:00 PM						04:00 PM					
Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Percent	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
High Int.	04:30 PM						04:30 PM						04:00 PM						04:00 PM					
Volume	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Peak Factor	-						-						-						-					

Adams Traffic, Inc.

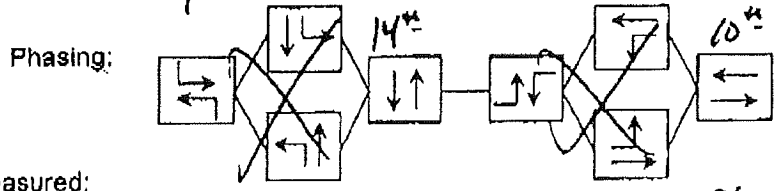
P.O. Box 997
Plant City, FL 33564
Tel:(813) 763-7763 Fax:(813) 659-8688

Project No.: 08089

Turning Movement Count
Field Data Sheet

Date: 7/30/08
Major Street: 10th Street W
Minor Street: 14th Avenue W
City/County: Palmetto / Manatee

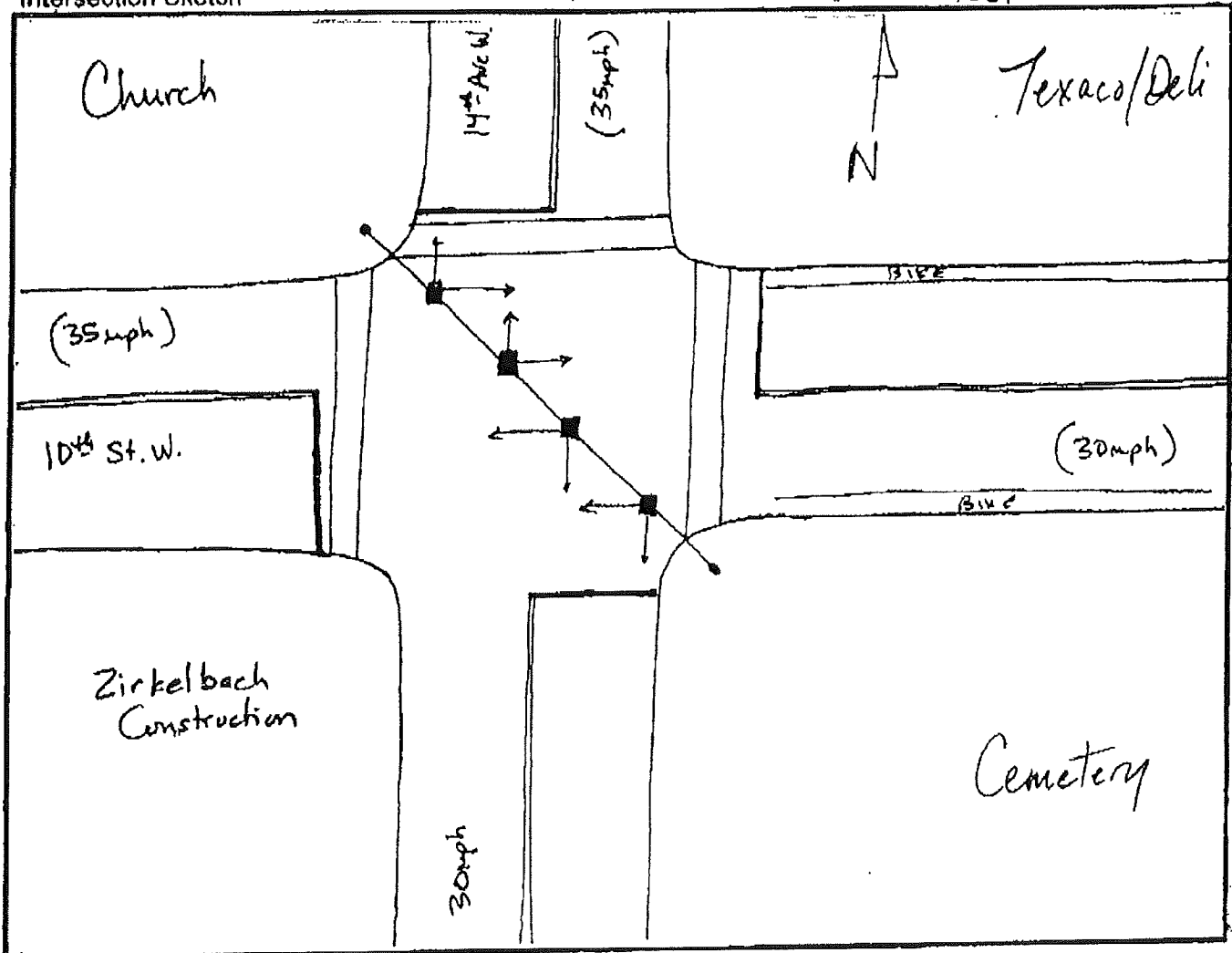
Count Times: 4:00pm
Direction: E-W Speed Limit: see sketch mph
Direction: N-S Speed Limit: see sketch mph
Weather: Clear



3 Cycles Measured:

16
19
17
26 - 42s.
25 - 44s.
26 - 43s.

Intersection Sketch



Adams Traffic, Inc.

P.O. Box 997

Plant City, FL 33584

Tel:(813) 763-7763 Fax:(813) 659-8688

Project No.: 08089

Turning Movement Count Field Data Sheet

Date: 7/30/08

Count Times: 4:45pm

Major Street: 10th Street W

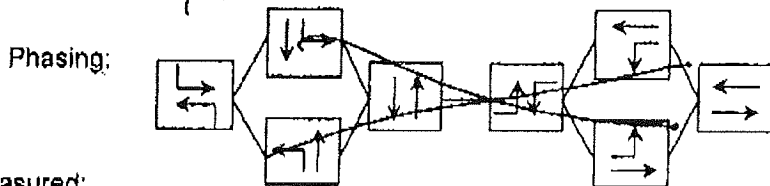
Direction: E-W Speed Limit: 35 mph

Minor Street: 17th Avenue W

Direction: N-S Speed Limit: 25 mph

City/County: Palmetto / Manatee

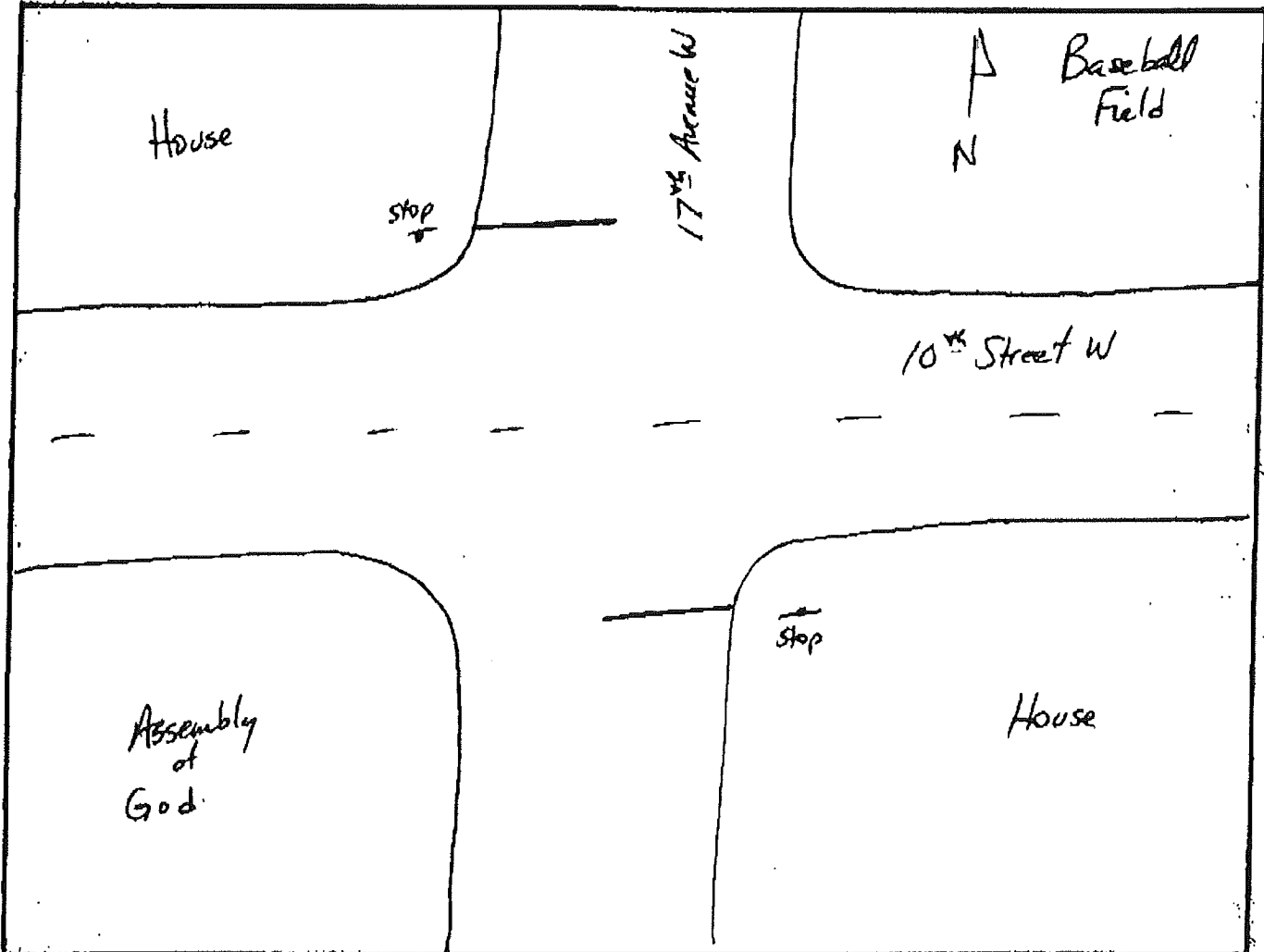
Weather: Clear



3 Cycles Measured:

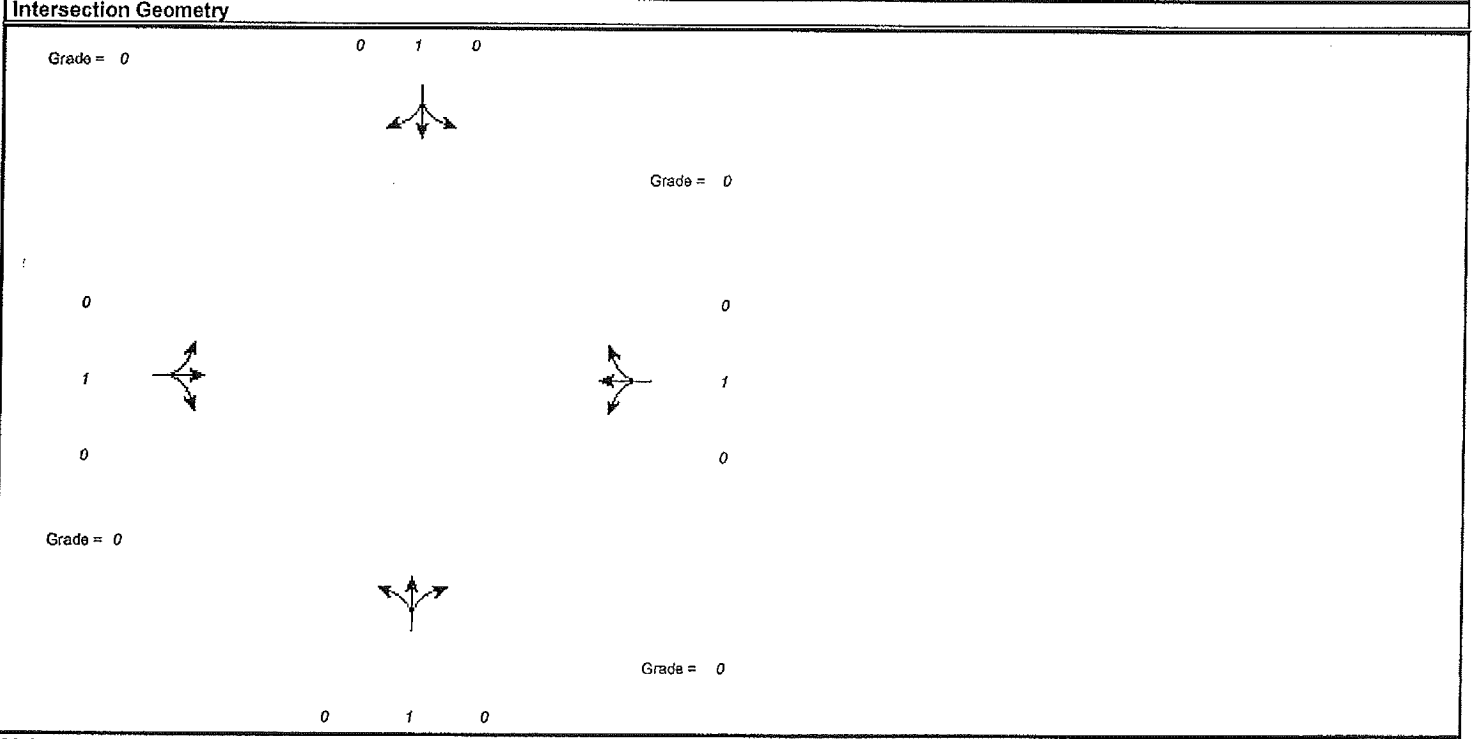
Unsignalized

Intersection Sketch



APPENDIX 4
EXISTING VOLUMES – HCS WORKSHEETS

FULL REPORT			
General Information		Site Information	
Analyst	AA	Intersection	10th St W and 14th Ave W
Agency or Co.		Area Type	All other areas
Date Performed	8/5/2008	Jurisdiction	City of Palmetto
Time Period	PM-Peak	Analysis Year	Existing Traffic



	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (vph)	33	334	17	18	411	107	92	123	21	58	59	52
% Heavy Veh	2	2	2	2	2	2	2	2	2	2	2	2
PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Actuated (P/A)	A	A	A	A	A	A	A	A	A	A	A	A
Startup Lost Time		2.0			2.0			2.0			2.0	
Extension of Effective Green		2.0			2.0			2.0			2.0	
Arrival Type		3			3			3			3	
Unit Extension		3.0			3.0			3.0			3.0	
Ped/Bike/RTOR Volume	0	0	0	0	0	3	0	0	2	0	0	6
Lane Width		12.0			12.0			12.0			12.0	
Parking (Y or N)	N		N	N		N	N		N	N		N
Parking/Hour												
Bus Stops/Hour		0			0			0			0	
Pedestrian Timing	3.2			3.2			3.2			3.2		
Timing	EW Perm	02	03	04	NS Perm	06	07	08				
	G = 20.5	G = 0.0	G = 0.0	G = 0.0	G = 14.0	G = 0.0	G = 0.0	G = 0.0				
	Y = 5.5	Y = 0	Y = 0	Y = 0	Y = 5	Y = 0	Y = 0	Y = 0				
Duration of Analysis (hrs) = 0.25							Cycle Length C = 45.0					

VOLUME ADJUSTMENT AND SATURATION FLOW RATE WORKSHEET

General Information

Project Description *Palmetto Elementary School*

Volume Adjustment

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume	33	334	17	18	411	107	92	123	21	58	59	52
PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adjusted Flow Rate	38	380	19	20	467	118	105	140	22	66	67	52
Lane Group		LTR			LTR			LTR			LTR	
Adjusted Flow Rate		437			605			267			185	
Proportion of LT or RT	0.087	--	0.043	0.033	--	0.195	0.393	--	0.082	0.357	--	0.281

Saturation Flow Rate

Base Satflow		1900			1900			1900			1900	
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
f_w		1.000			1.000			1.000			1.000	
f_{HV}		0.980			0.980			0.980			0.980	
f_g		1.000			1.000			1.000			1.000	
f_p		1.000			1.000			1.000			1.000	
f_{bb}		1.000			1.000			1.000			1.000	
f_a		1.000			1.000			1.000			1.000	
f_{LU}		1.000			1.000			1.000			1.000	
f_{LT}		0.920	--		0.979	--		0.810	--		0.828	--
Secondary f_{LT}			--			--			--			--
f_{RT}	--	0.994		--	0.974		--	0.989		--	0.962	
f_{Lpb}		1.000	--		1.000	--		1.000	--		1.000	--
f_{Rpb}	--	1.000		--	1.000		--	1.000		--	1.000	
Adjusted Satflow		1703			1776			1493			1483	
Secondary Adjusted Satflow			--			--			--			--

CAPACITY AND LOS WORKSHEET												
General Information												
Project Description <i>Palmetto Elementary School</i>												
Capacity Analysis												
	EB			WB			NB			SB		
Lane Group		LTR			LTR			LTR			LTR	
Adjusted Flow Rate		437			605			267			185	
Satflow Rate		1703			1776			1493			1483	
Lost Time		2.0			2.0			2.0			2.0	
Green Ratio		0.46			0.46			0.31			0.31	
Lane Group Capacity		776			809			464			461	
v/c Ratio		0.56			0.75			0.58			0.40	
Flow Ratio		0.26			0.34			0.18			0.12	
Critical Lane Group		N			Y			Y			N	
Sum Flow Ratios											0.52	
Lost Time/Cycle											10.50	
Critical v/c Ratio											0.68	
Lane Group Capacity, Control Delay, and LOS Determination												
	EB			WB			NB			SB		
Lane Group		LTR			LTR			LTR			LTR	
Adjusted Flow Rate		437			605			267			185	
Lane Group Capacity		776			809			464			461	
v/c Ratio		0.56			0.75			0.58			0.40	
Green Ratio		0.46			0.46			0.31			0.31	
Uniform Delay d ₁		9.0			10.1			13.0			12.2	
Delay Factor k		0.16			0.30			0.17			0.11	
Incremental Delay d ₂		0.9			3.9			1.8			0.6	
PF Factor		1.000			1.000			1.000			1.000	
Control Delay		9.9			14.0			14.8			12.8	
Lane Group LOS		A			B			B			B	
Approach Delay	9.9			14.0			14.8			12.8		
Approach LOS	A			B			B			B		
Intersection Delay	12.8			Intersection LOS						B		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	AA	Intersection	10th St W and 17th Ave W
Agency/Co.		Jurisdiction	City of Palmetto
Date Performed	8/5/2008	Analysis Year	Existing Traffic
Analysis Time Period	PM- Peak		
Project Description Palmetto Elementary School			
East/West Street: 10th St W		North/South Street: 17th Ave W	
Intersection Orientation: East-West		Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	1	307	0	6	447	14
Peak-Hour Factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Hourly Flow Rate, HFR (veh/h)	1	337	0	6	491	15
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	2	1	1	7	4	0
Peak-Hour Factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Hourly Flow Rate, HFR (veh/h)	2	1	1	7	4	0
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR	LTR			LTR		
v (veh/h)	1	6	4			11		
C (m) (veh/h)	1059	1222	330			284		
v/c	0.00	0.00	0.01			0.04		
95% queue length	0.00	0.01	0.04			0.12		
Control Delay (s/veh)	8.4	8.0	16.0			18.2		
LOS	A	A	C			C		
Approach Delay (s/veh)	--	--	16.0			18.2		
Approach LOS	--	--	C			C		

APPENDIX 5
TRAFFIC VOLUME DATA TABLE

**Palmetto Elementary School
Traffic Volume Data
8/5/2008**

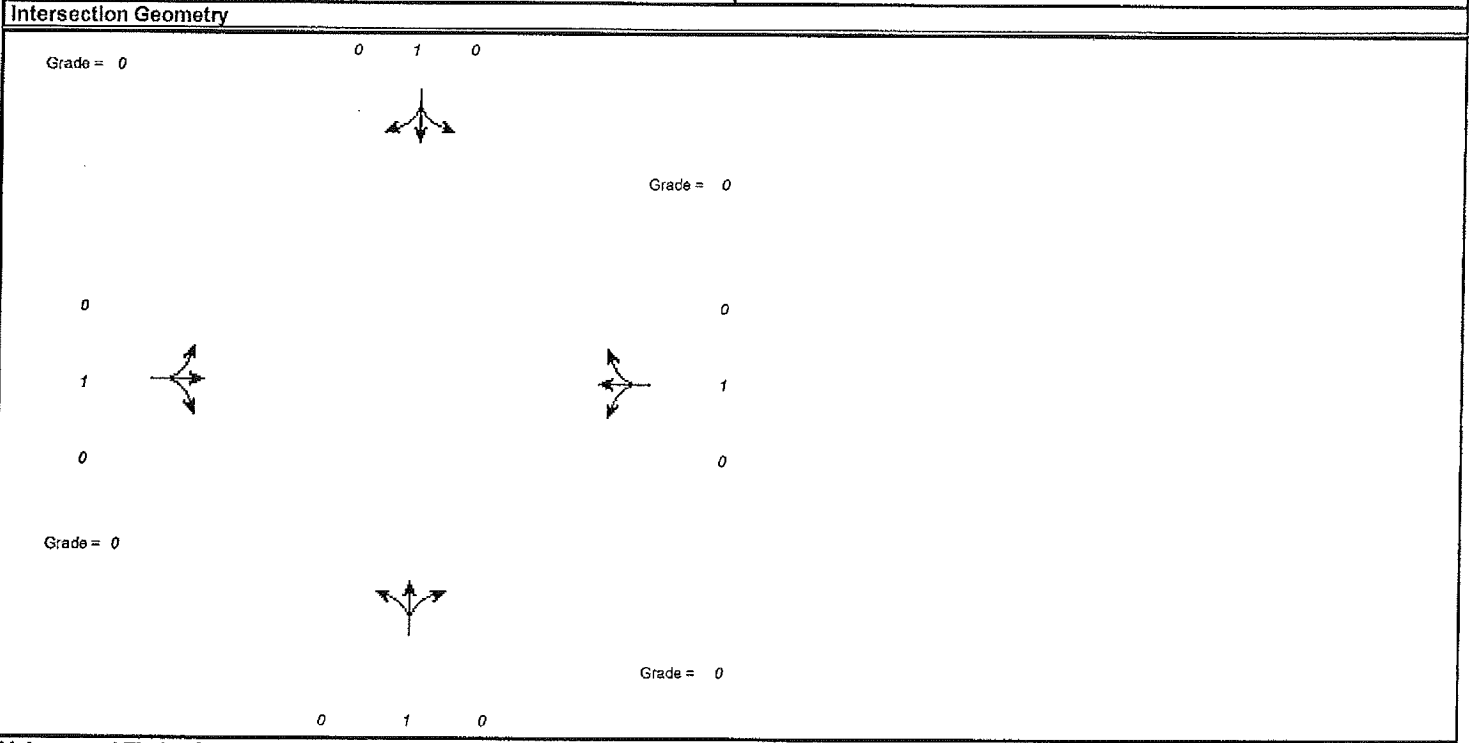
10th St W @ 17th Ave W												
P.M. Peak Hour	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Existing Volumes	EXISTING TRAFFIC (I)											
% Turning Movements	1	307	0	6	447	14	2	1	1	7	4	0
Peak Hour Factor	0.3%	99.7%		1.3%	95.7%	3.0%	50.0%	25.0%	25.0%	63.6%	36.4%	
	0.91			0.91			0.91			0.91		
Project Traffic	SITE GENERATED TRAFFIC (I)											
External Trips	4					35		1		38	1	4
Total Traffic	TOTAL TRIPS (I)											
Total Volumes	5	307	0	6	447	49	2	2	1	45	5	4
% of Trucks	2%			2%			2%			2%		

10th St W @ 14th Ave W												
P.M. Peak Hour	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Existing Volumes	EXISTING TRAFFIC (I)											
% Turning Movements	33	334	17	18	411	107	92	123	21	58	59	52
Peak Hour Factor	8.6%	87.0%	4.4%	3.4%	76.7%	20.0%	39.0%	52.1%	8.9%	34.3%	34.9%	30.8%
	0.88			0.88			0.88			0.88		
Project Traffic	SITE GENERATED TRAFFIC (I)											
External Trips		19	19		17		17					
Total Traffic	TOTAL TRIPS (I)											
Total Volumes	33	353	36	18	428	107	109	123	21	58	59	52
% of Trucks	2%			2%			2%			2%		

APPENDIX 6
EXISTING + PROJECT VOLUMES – HCS WORKSHEETS

FULL REPORT

General Information		Site Information	
Analyst	AA	Intersection	10th St W and 14th Ave W
Agency or Co.		Area Type	All other areas
Date Performed	8/5/2008	Jurisdiction	City of Palmetto
Time Period	PM-Peak	Analysis Year	Existing + Project Traffic



	EB			WB			NB			SB			
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Volume (vph)	33	353	36	18	428	107	109	123	21	58	59	52	
% Heavy Veh	2	2	2	2	2	2	2	2	2	2	2	2	
PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	
Actuated (P/A)	A	A	A	A	A	A	A	A	A	A	A	A	
Startup Lost Time		2.0			2.0			2.0			2.0		
Extension of Effective Green		2.0			2.0			2.0			2.0		
Arrival Type		3			3			3			3		
Unit Extension		3.0			3.0			3.0			3.0		
Ped/Bike/RTOR Volume	0	0	0	0	0	3	0	0	2	0	0	6	
Lane Width		12.0			12.0			12.0			12.0		
Parking (Y or N)	N		N	N		N	N		N	N		N	
Parking/Hour													
Bus Stops/Hour		0			0			0			0		
Pedestrian Timing		3.2			3.2			3.2			3.2		
Timing	EW Perm	02	03	04	NS Perm	06	07	08					
	G = 20.5	G = 0.0	G = 0.0	G = 0.0	G = 14.0	G = 0.0	G = 0.0	G = 0.0					
	Y = 5.5	Y = 0	Y = 0	Y = 0	Y = 5	Y = 0	Y = 0	Y = 0					
Duration of Analysis (hrs) = 0.25							Cycle Length C = 45.0						

VOLUME ADJUSTMENT AND SATURATION FLOW RATE WORKSHEET												
General Information												
Project Description <i>Palmetto Elementary School</i>												
Volume Adjustment												
	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume	33	353	36	18	428	107	109	123	21	58	59	52
PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adjusted Flow Rate	38	401	41	20	486	118	124	140	22	66	67	52
Lane Group		LTR			LTR			LTR			LTR	
Adjusted Flow Rate		480			624			286			185	
Proportion of LT or RT	0.079	--	0.085	0.032	--	0.189	0.434	--	0.077	0.357	--	0.281
Saturation Flow Rate												
Base Satflow		1900			1900			1900			1900	
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
f_w		1.000			1.000			1.000			1.000	
f_{HV}		0.980			0.980			0.980			0.980	
f_g		1.000			1.000			1.000			1.000	
f_p		1.000			1.000			1.000			1.000	
f_{bb}		1.000			1.000			1.000			1.000	
f_a		1.000			1.000			1.000			1.000	
f_{LU}		1.000			1.000			1.000			1.000	
f_{LT}		0.926	--		0.978	--		0.795	--		0.824	--
Secondary f_{LT}			--			--			--			--
f_{RT}	--	0.988		--	0.974		--	0.990		--	0.962	
f_{Lpb}		1.000	--		1.000	--		1.000	--		1.000	--
f_{Rpb}	--	1.000		--	1.000		--	1.000		--	1.000	
Adjusted Satflow		1704			1775			1466			1477	
Secondary Adjusted Satflow			--			--			--			--

CAPACITY AND LOS WORKSHEET

General Information

Project Description *Palmetto Elementary School*

Capacity Analysis

	EB		WB		NB		SB	
Lane Group	LTR		LTR		LTR		LTR	
Adjusted Flow Rate	480		624		286		185	
Satflow Rate	1704		1775		1466		1477	
Lost Time	2.0		2.0		2.0		2.0	
Green Ratio	0.46		0.46		0.31		0.31	
Lane Group Capacity	776		809		456		460	
v/c Ratio	0.62		0.77		0.63		0.40	
Flow Ratio	0.28		0.35		0.20		0.13	
Critical Lane Group	N		Y		Y		N	
Sum Flow Ratios	0.55							
Lost Time/Cycle	10.50							
Critical v/c Ratio	0.71							

Lane Group Capacity, Control Delay, and LOS Determination

	EB		WB		NB		SB	
Lane Group	LTR		LTR		LTR		LTR	
Adjusted Flow Rate	480		624		286		185	
Lane Group Capacity	776		809		456		460	
v/c Ratio	0.62		0.77		0.63		0.40	
Green Ratio	0.46		0.46		0.31		0.31	
Uniform Delay d ₁	9.3		10.3		13.3		12.2	
Delay Factor k	0.20		0.32		0.21		0.11	
Incremental Delay d ₂	1.5		4.6		2.7		0.6	
PF Factor	1.000		1.000		1.000		1.000	
Control Delay	10.8		14.9		16.0		12.8	
Lane Group LOS	B		B		B		B	
Approach Delay	10.8		14.9		16.0		12.8	
Approach LOS	B		B		B		B	
Intersection Delay	13.6		Intersection LOS				B	

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information				
Analyst	AA		Intersection	10th St W and 17th Ave W			
Agency/Co.			Jurisdiction	City of Palmetto			
Date Performed	8/5/2008		Analysis Year	Existing + Project Traffic			
Analysis Time Period	PM- Peak						
Project Description Palmetto Elementary School							
East/West Street: 10th St W			North/South Street: 17th Ave W				
Intersection Orientation: East-West			Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments							
Major Street	Eastbound			Westbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)	5	307	0	6	447	49	
Peak-Hour Factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	
Hourly Flow Rate, HFR (veh/h)	5	337	0	6	491	53	
Percent Heavy Vehicles	2	--	--	2	--	--	
Median Type	Undivided						
RT Channelized			0			0	
Lanes	0	1	0	0	1	0	
Configuration	LTR			LTR			
Upstream Signal		0			0		
Minor Street	Northbound			Southbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)	2	2	1	45	5	4	
Peak-Hour Factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	
Hourly Flow Rate, HFR (veh/h)	2	2	1	49	5	4	
Percent Heavy Vehicles	2	2	2	2	2	2	
Percent Grade (%)	0			0			
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0			0	
Lanes	0	1	0	0	1	0	
Configuration		LTR			LTR		
Delay, Queue Length, and Level of Service							
Approach	Eastbound	Westbound	Northbound			Southbound	
Movement	1	4	7	8	9	10	11
Lane Configuration	LTR	LTR	LTR			LTR	
v (veh/h)	5	6	5			58	
C (m) (veh/h)	1025	1222	304			275	
v/c	0.00	0.00	0.02			0.21	
95% queue length	0.01	0.01	0.05			0.78	
Control Delay (s/veh)	8.5	8.0	17.0			21.6	
LOS	A	A	C			C	
Approach Delay (s/veh)	--	--	17.0			21.6	
Approach LOS	--	--	C			C	