



May 31, 2012

Mr. Nathan Benditz
Knoxville-Knox County Metropolitan Planning Commission
City/County Building, Suite 403
400 Main Street
Knoxville, TN 37902

RE: Traffic Impact Study Update – Shannon Valley Farms

Dear Mr. Benditz:

This correspondence provides a summary of conclusions reached regarding an assessment update of the impact on traffic flow for the referenced residential development, which is located as shown on FIGURE 1. The original traffic study for the development was conducted in September 2006. At the time of the original study, the development consisted of mixed residential and commercial land uses with two entrance/exits on Murphy Road. The updated development site plan consists of single-family detached residential units with one entrance/exit on Murphy Road. This entrance/exit will add a fourth leg to the existing three-legged intersection of Murphy Road with Horsetail Drive. The purpose of this update was to analyze the impact on traffic flow anticipated from the 42 residential units associated with the development.

The existing and background 2016 traffic volumes at the intersection of Murphy Road and Horsetail Drive are shown on FIGURE 2. These volumes were developed from a new traffic count that was conducted at the intersection of Murphy Road with Horsetail Drive, with background 2016 volumes resulting from a 2.5% annual traffic growth rate applied for a 4-year period. FIGURE 3 shows the trip distribution and generated trips for the proposed development which were derived as shown in the TABLE 1 Trip Generation Summary. These trips were distributed and assigned to the site roadway and Murphy Road in accordance with traffic count data conducted for this update. FIGURE 4 shows the combined 2016 traffic volumes with full build-out of the development.


Capacity analyses were performed for three scenarios: Existing Traffic, Year 2016 Background Traffic, and Year 2016 Combined Traffic (full build-out). In addition to the capacity analyses, a turn lane analysis was conducted using a spreadsheet developed by the Kentucky Transportation Cabinet, which uses the same criteria as the Knox County turn-lane warrant guide. Detailed capacity and turn-lane analyses printouts are located in the APPENDIX.

Mr. Nathan Benditz
May 31, 2012
Page 2 of 7

The capacity analyses indicate that for existing, background 2016 and combined 2016 assessments, all traffic movements will operate at LOS "D" or better, with one exception. This exception is the AM peak traffic period for the 2016 combined traffic conditions, where level-of-service "F" is anticipated, with an average delay of 54.0 seconds and a v/c ratio of 0.67. This is primarily a result of the heavy southbound Murphy Road traffic during this peak period, and traffic growth that has taken place recently on Horsetail Drive. Given these conditions, as well as the fact that this is a short duration issue (AM peak) with no easy method for mitigation, it is recommended that the proposed development be approved. It should also be noted that the left-turn lane and right-turn lane volume warrant thresholds on Murphy Road are not satisfied under the proposed development conditions.

Please do not hesitate to contact us if you have questions or require additional information.

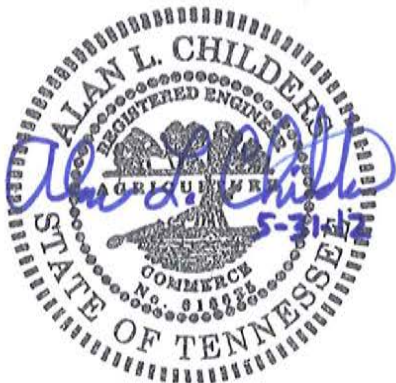
Sincerely,



Alan Childers, P.E.
Vice President

Attachments: Tables and Figures
Data
Analyses

cc: Ms. Cindy Pionke, P.E.
Mr. Wanis Rghebi
CCI Project File No. 00773-0002



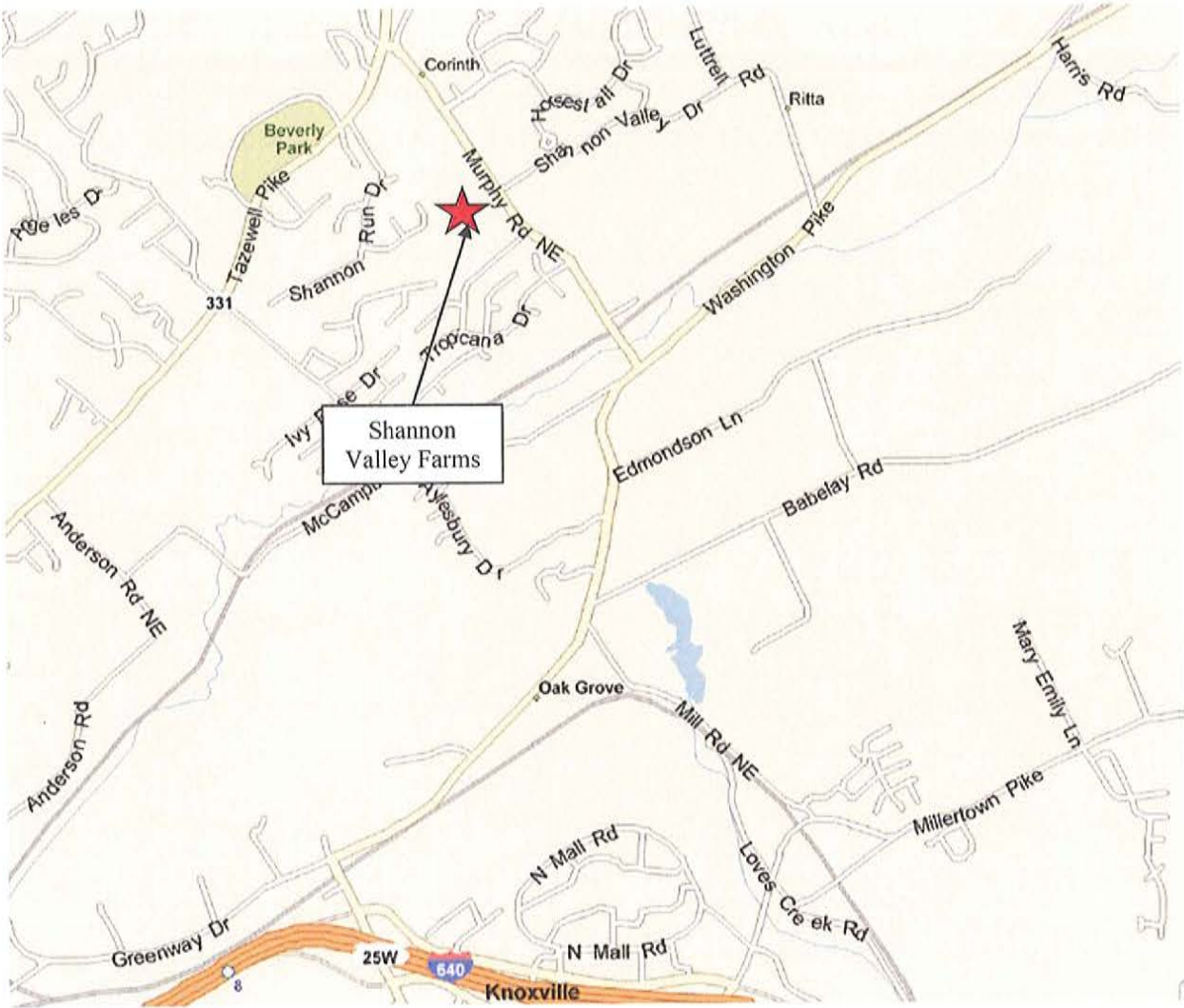


FIGURE 1: SITE LOCATION MAP

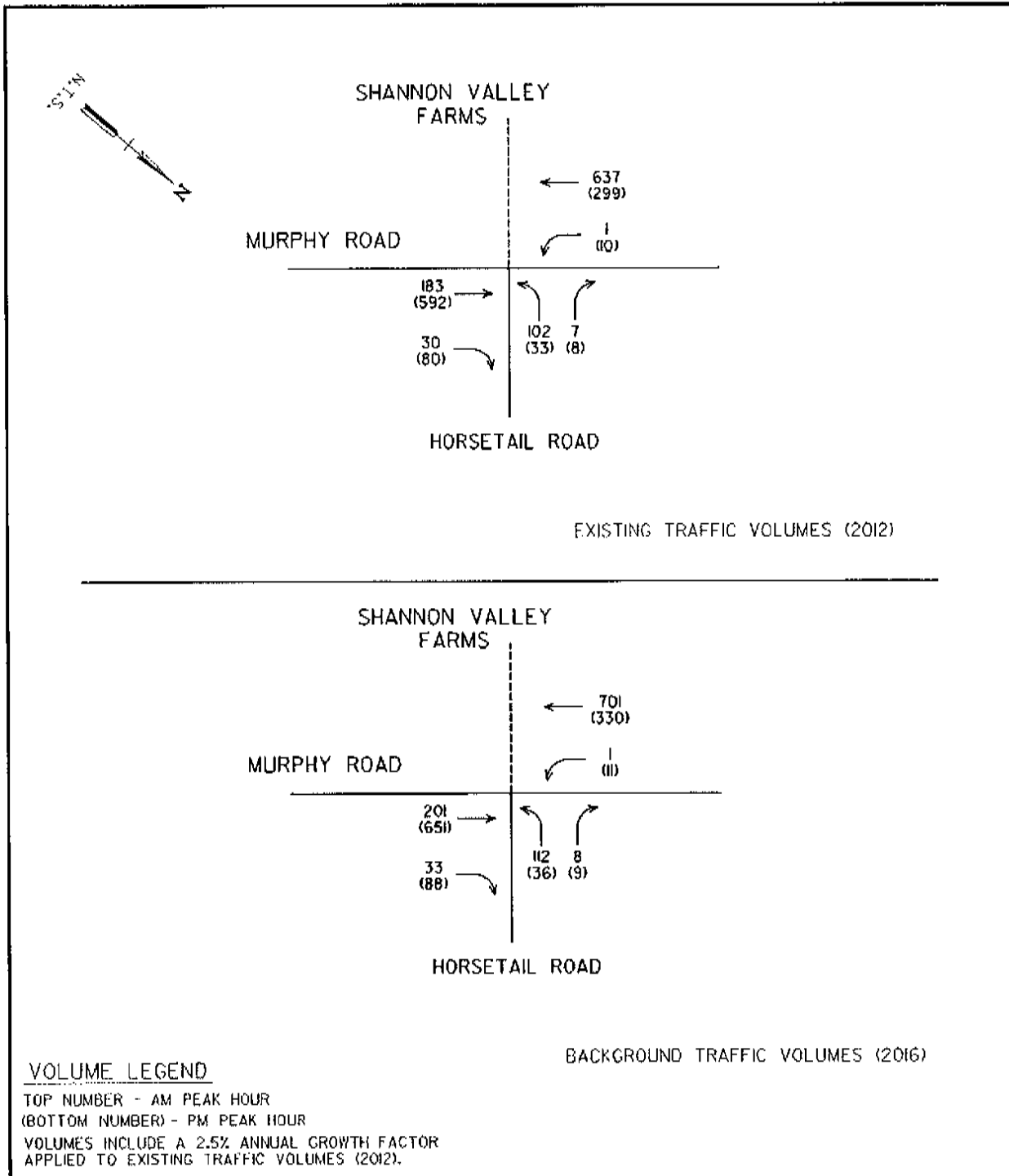


FIGURE 2: EXISTING TRAFFIC VOLUMES (2011), BACKGROUND TRAFFIC VOLUMES (2016)

Land Use	ITE Code	Size	AM Peak (trips/hour)		PM Peak (trips/hour)	
			Enter	Exit	Enter	Exit
Single-Family Detached Housing	210	42 Units	10	29	30	18
TOTAL TRIPS			39		48	

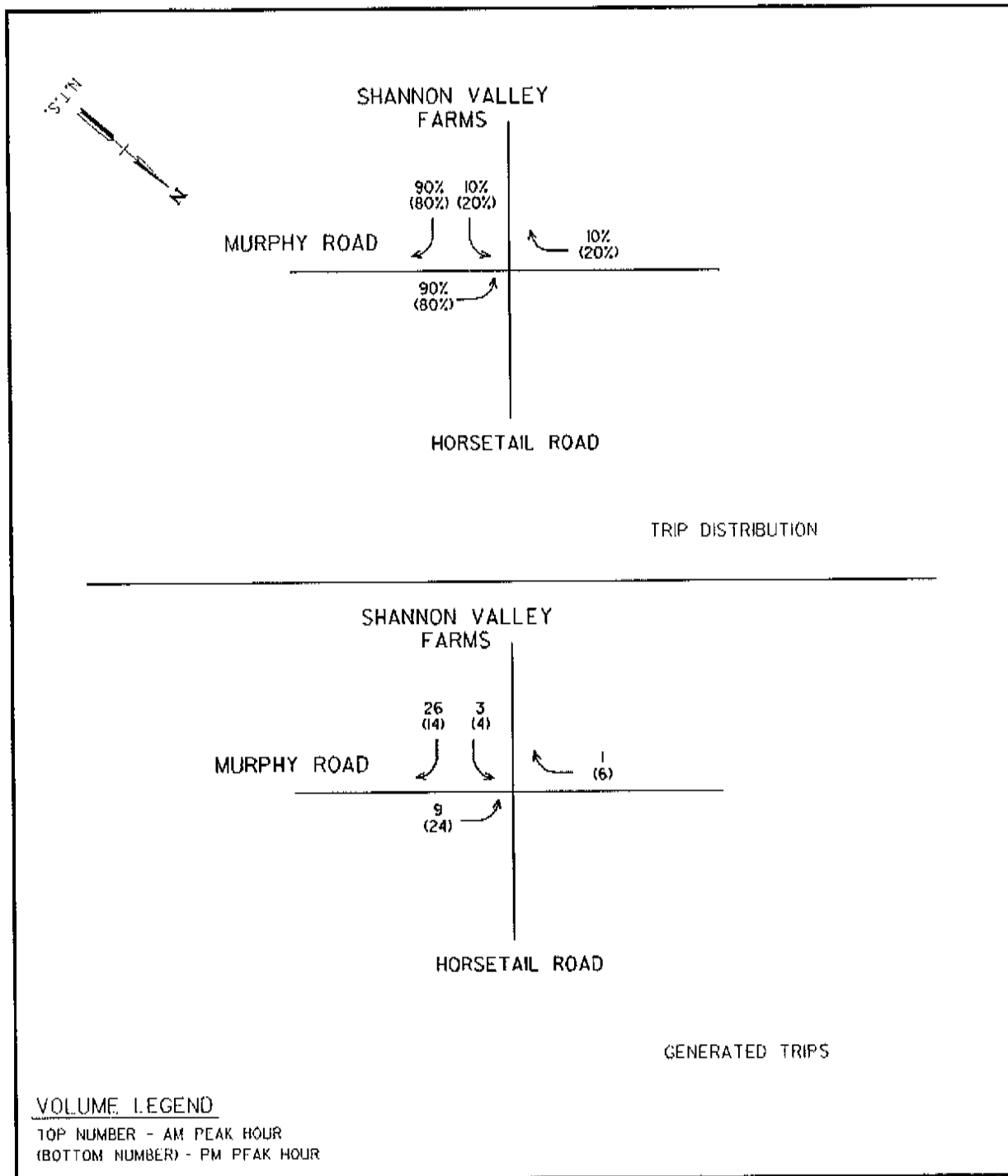


FIGURE 3: TRIP DISTRIBUTION, GENERATED TRIPS

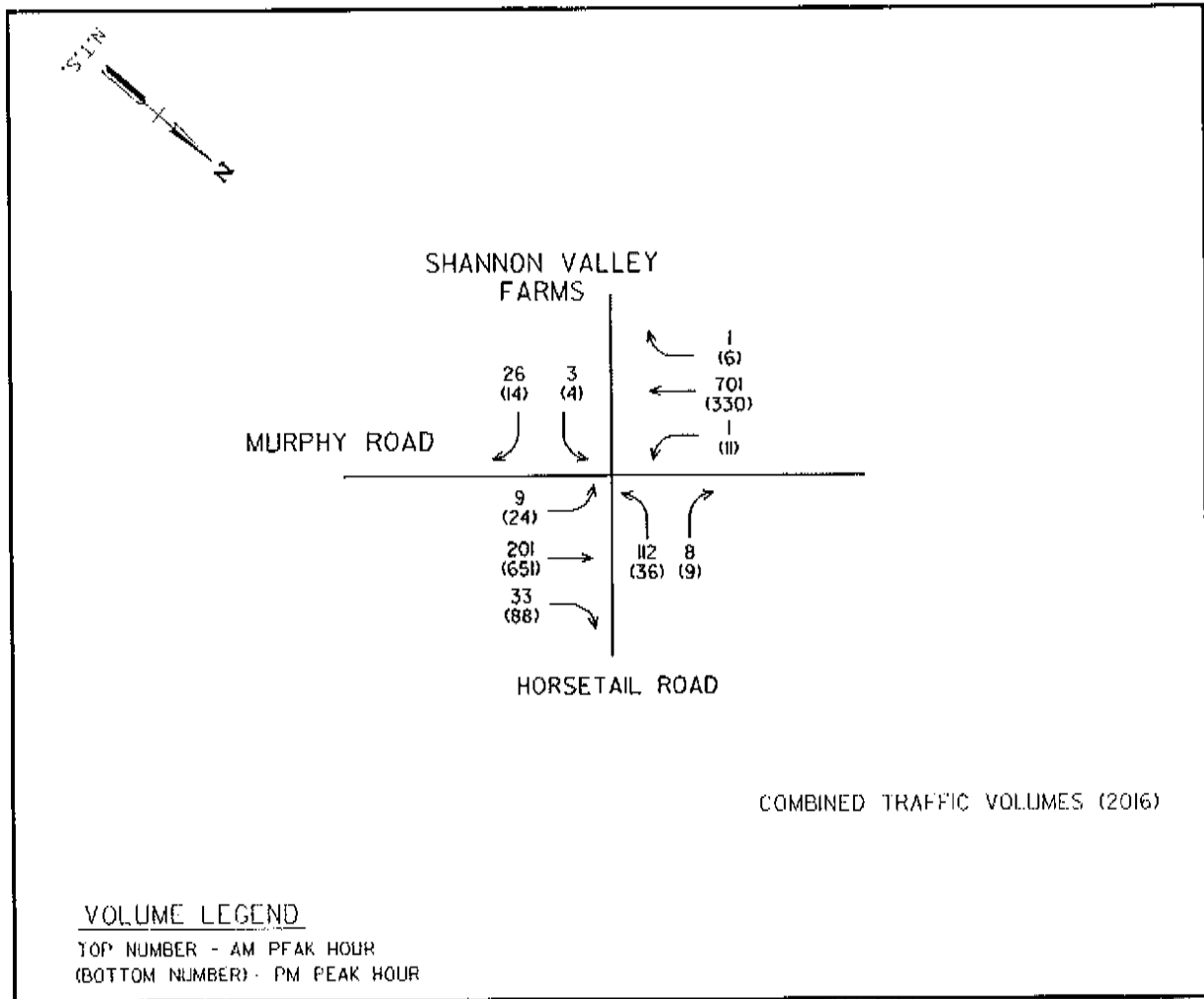


FIGURE 4: COMBINED TRAFFIC VOLUMES (2016)

Cannon & Cannon, Inc.
 Consulting Engineers - Field Surveyors
 8550 Kingston Pike
 Knoxville, TN 37919

CCI Project Name: Shannon Valley Farms
 CCI Project Number: 00773-0002
 Intersection: Murphy Rd. @ Horsetail Dr.
 Counted By: CCI

File Name : Murphy_Horsetail_4_24_12_am_pm
 Site Code : 00000001
 Start Date : 4/24/2012
 Page No : 1

Groups Printed- Unshifted

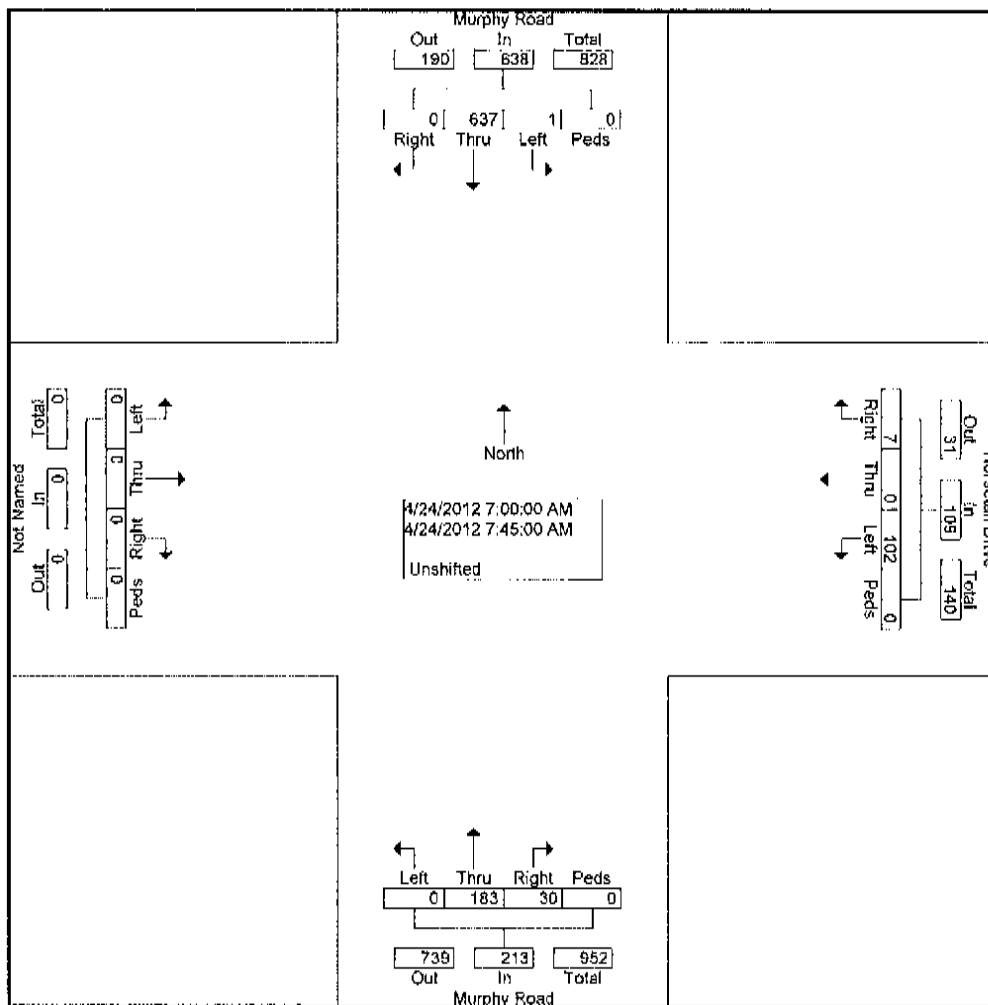
Start Time	Murphy Road Southbound					Horsetail Drive Westbound					Murphy Road Northbound					Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
07:00 AM	0	164	0	0	164	22	0	1	0	23	0	38	3	0	41	0	0	0	0	0	228
07:15 AM	0	176	0	0	176	31	0	0	0	31	0	48	11	0	59	0	0	0	0	0	266
07:30 AM	0	149	0	0	149	30	0	3	0	33	0	48	9	0	57	0	0	0	0	0	239
07:45 AM	1	148	0	0	149	19	0	3	0	22	0	49	7	0	56	0	0	0	0	0	227
Total	1	637	0	0	638	102	0	7	0	109	0	183	30	0	213	0	0	0	0	0	960
08:00 AM	2	129	0	0	131	18	0	0	0	18	0	62	5	0	67	0	0	0	0	0	216
08:15 AM	1	91	0	0	92	19	0	1	0	20	0	50	6	0	56	0	0	0	0	0	168
08:30 AM	0	105	0	0	105	16	0	1	0	17	0	42	2	0	44	0	0	0	0	0	166
08:45 AM	0	67	0	0	67	10	0	0	0	10	0	35	1	0	36	0	0	0	0	0	113
Total	3	392	0	0	395	63	0	2	0	65	0	189	14	0	203	0	0	0	0	0	663
*** BREAK ***																					
04:00 PM	0	63	0	0	63	6	0	2	0	8	0	118	11	0	129	0	0	0	0	0	200
04:15 PM	1	64	0	0	65	8	0	1	0	9	0	123	19	0	142	0	0	0	0	0	216
04:30 PM	1	76	0	0	77	4	0	1	0	5	0	141	9	0	150	0	0	0	0	0	232
04:45 PM	2	70	0	0	72	11	0	1	0	12	0	135	12	0	147	0	0	0	0	0	231
Total	4	273	0	0	277	29	0	5	0	34	0	517	51	0	568	0	0	0	0	0	879
05:00 PM	2	72	0	0	74	11	0	1	0	12	0	145	18	0	163	0	0	0	0	0	249
05:15 PM	4	84	0	0	88	6	0	3	0	9	0	148	16	0	164	0	0	0	0	0	261
05:30 PM	2	71	0	0	73	10	0	3	0	13	0	152	29	0	181	0	0	0	0	0	267
05:45 PM	2	72	0	0	74	6	0	1	0	7	0	147	17	0	164	0	0	0	0	0	245
Total	10	299	0	0	309	33	0	8	0	41	0	592	80	0	672	0	0	0	0	0	1022
Grand Total	18	1601	0	0	1619	227	0	22	0	249	0	1481	175	0	1656	0	0	0	0	0	3524
Apprch %	1.1	98.9	0.0	0.0		91.2	0.0	8.8	0.0		0.0	89.4	10.6	0.0		0.0	0.0	0.0	0.0		
Total %	0.5	45.4	0.0	0.0	45.9	6.4	0.0	0.6	0.0	7.1	0.0	42.0	5.0	0.0	47.0	0.0	0.0	0.0	0.0	0.0	

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 Counted By: CCI

File Name : Murphy_Horsetail_4_24_12_am_pm
 Site Code : 00000001
 Start Date : 4/24/2012
 Page No : 2

Start Time	Murphy Road Southbound					Horsetail Drive Westbound					Murphy Road Northbound					Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour From 07:00 AM to 12:30 PM - Peak 1 of 1																					
Intersection	07:00 AM																				
Volume	1	637	0	0	638	102	0	7	0	109	0	183	30	0	213	0	0	0	0	0	960
Percent	0.2	99.8	0.0	0.0	638	93.6	0.0	6.4	0.0	109	0.0	85.9	14.1	0.0	213	0.0	0.0	0.0	0.0	0.0	960
Volume	0	176	0	0	176	31	0	0	0	31	0	48	11	0	59	0	0	0	0	0	266
Peak Factor	0.902																				
High Int.	07:15 AM																				
Volume	0	176	0	0	176	30	0	3	0	33	0	48	11	0	59	6:45:00 AM					
Peak Factor	0.906					0.826					0.903										

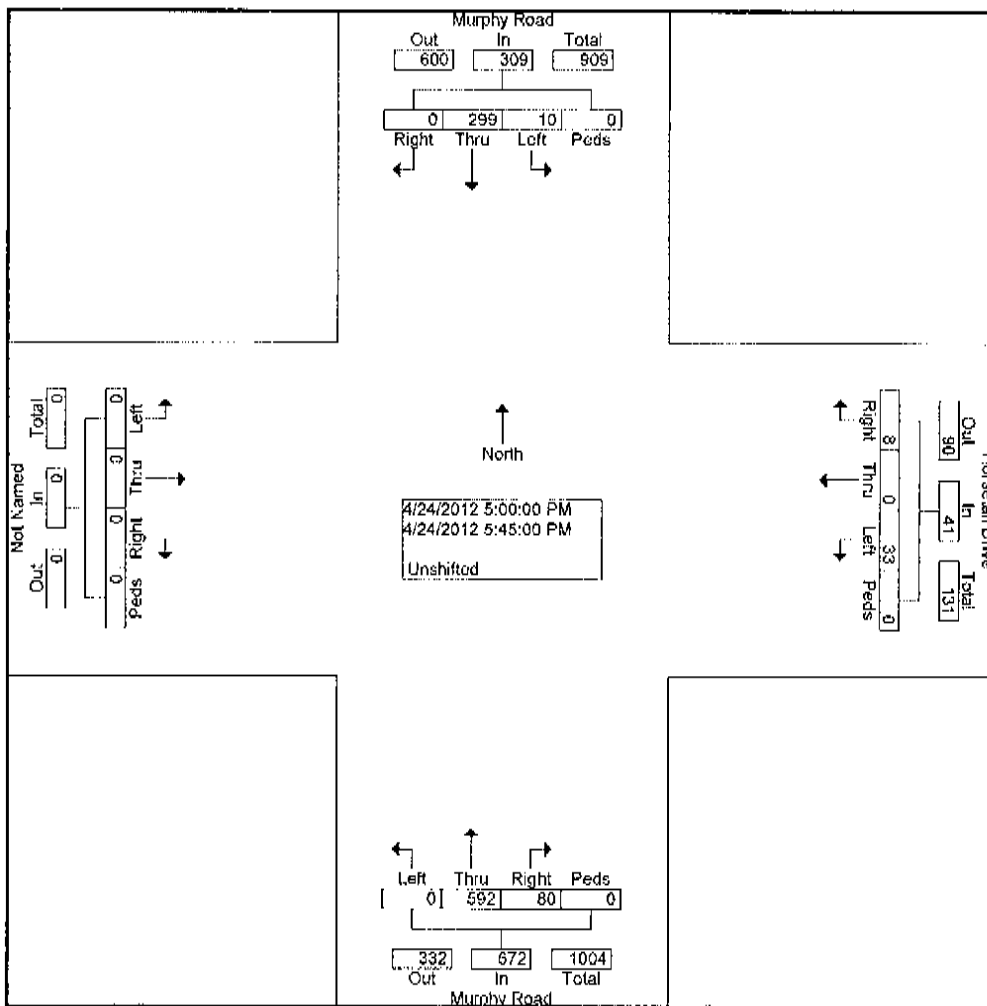


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Start Time	Murphy Road Southbound					Horsetail Drive Westbound					Murphy Road Northbound					Eastbound							
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total		
Peak Hour From 12:45 PM to 05:45 PM - Peak 1 of 1																							
Intersection	05:00 PM																						
Volume	10	299	0	0	309	33	0	8	0	41	0	592	80	0	672	0	0	0	0	0	1022		
Percent	3.2	96.8	0.0	0.0		80.5	0.0	19.5	0.0		0.0	88.1	11.9	0.0		0.0	0.0	0.0	0.0				
05:30 Volume	2	71	0	0	73	10	0	3	0	13	0	152	29	0	181	0	0	0	0	0	267		
Peak Factor	0.957																						
High Int. Volume	05:15 PM					05:30 PM					05:30 PM												
Peak Factor	4	84	0	0	88	10	0	3	0	13	0	152	29	0	181						0.878	0.788	0.928



Station #	County	Location	Route #
000462	Knox	MURPHY RD. - BETWEEN SR-331 & WASHINGTON AVE.	05616

Record	Year	AADT
1	2011	9843
2	2010	10443

Use 2.5% annual growth for 4 years

Factor = $1.025^4 = 1.10$

Station	Street	Location	2007	2008	2009	2010
T464	Murdock Rd	E of Lovell Rd				6681
C240	Murphy Ave	S of Massachusetts Ave		1492		
M374	Murphy Rd	N of Washington Pike	10670	11125	10540	10750
T462	Murphy Rd	S of Tazewell Pike				10443
C444	Murray Dr	E of Metler Dr	197	125		

Single-Family Detached Housing (210)

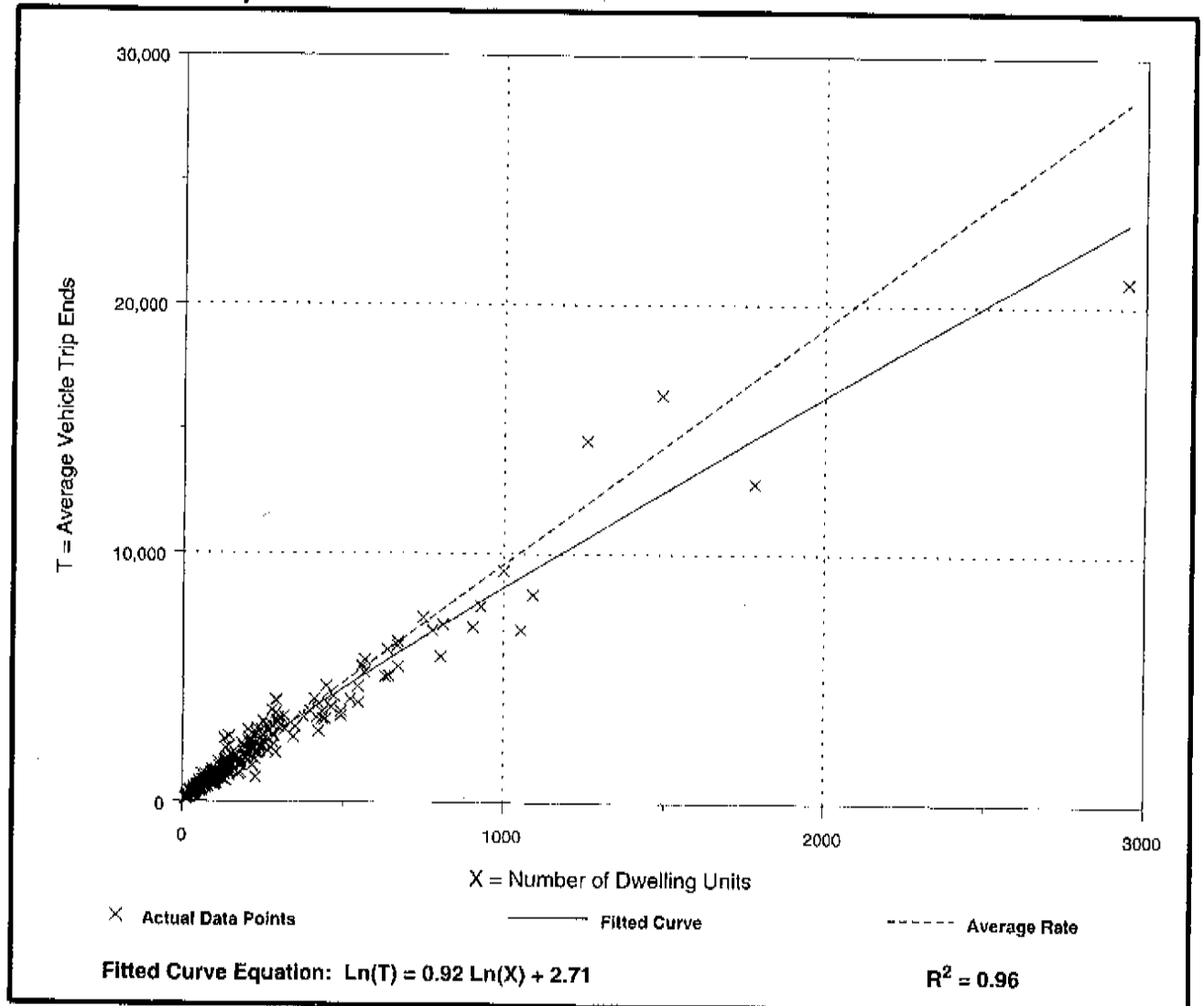
Average Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Number of Studies: 351
Avg. Number of Dwelling Units: 197
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
9.57	4.31 - 21.85	3.69

Data Plot and Equation



Single-Family Detached Housing (210)

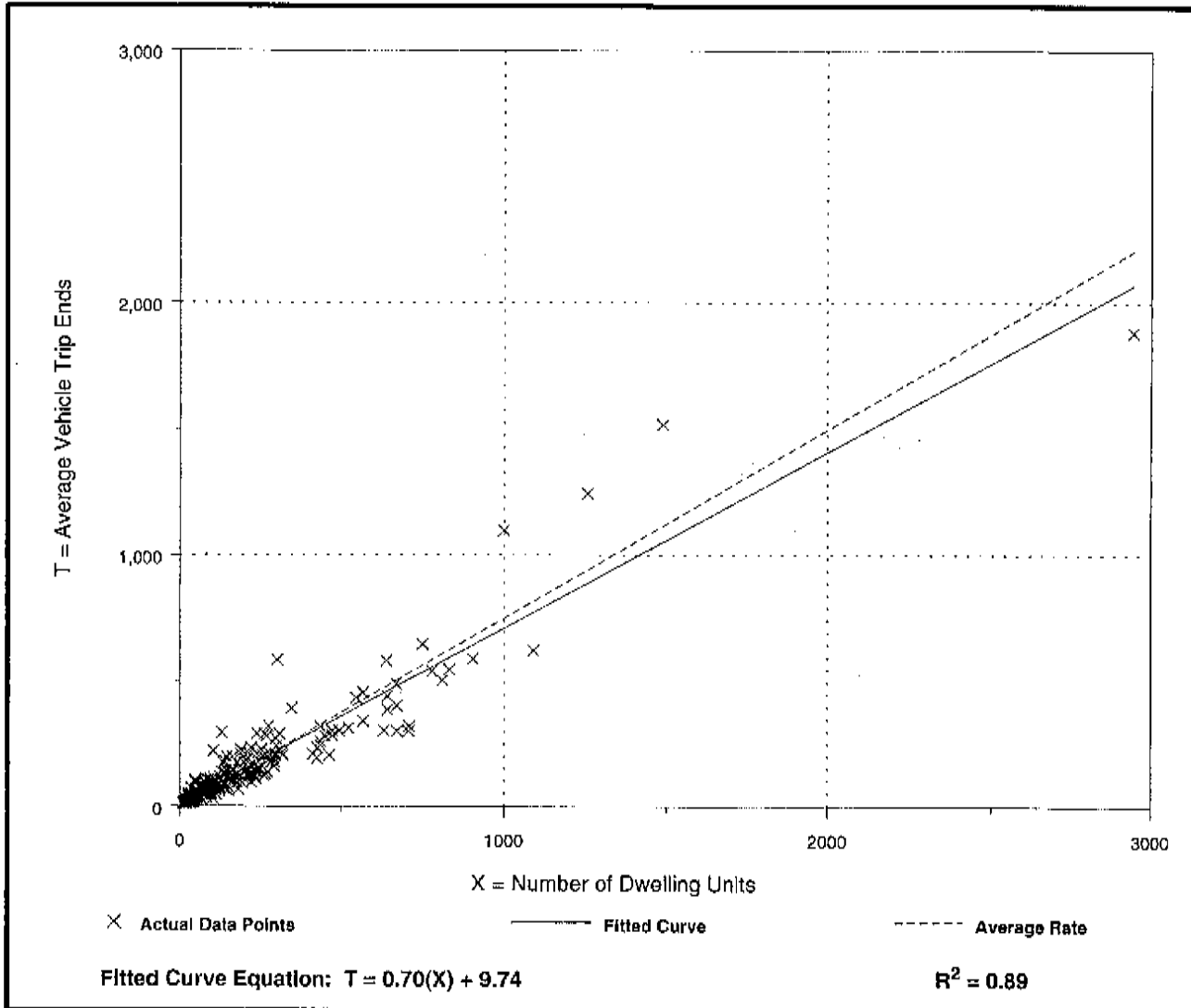
Average Vehicle Trip Ends vs: Dwelling Units
 On a: Weekday,
 Peak Hour of Adjacent Street Traffic,
 One Hour Between 7 and 9 a.m.

Number of Studies: 286
 Avg. Number of Dwelling Units: 194
 Directional Distribution: 25% entering, 75% exiting

Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.75	0.33 - 2.27	0.90

Data Plot and Equation



Single-Family Detached Housing (210)

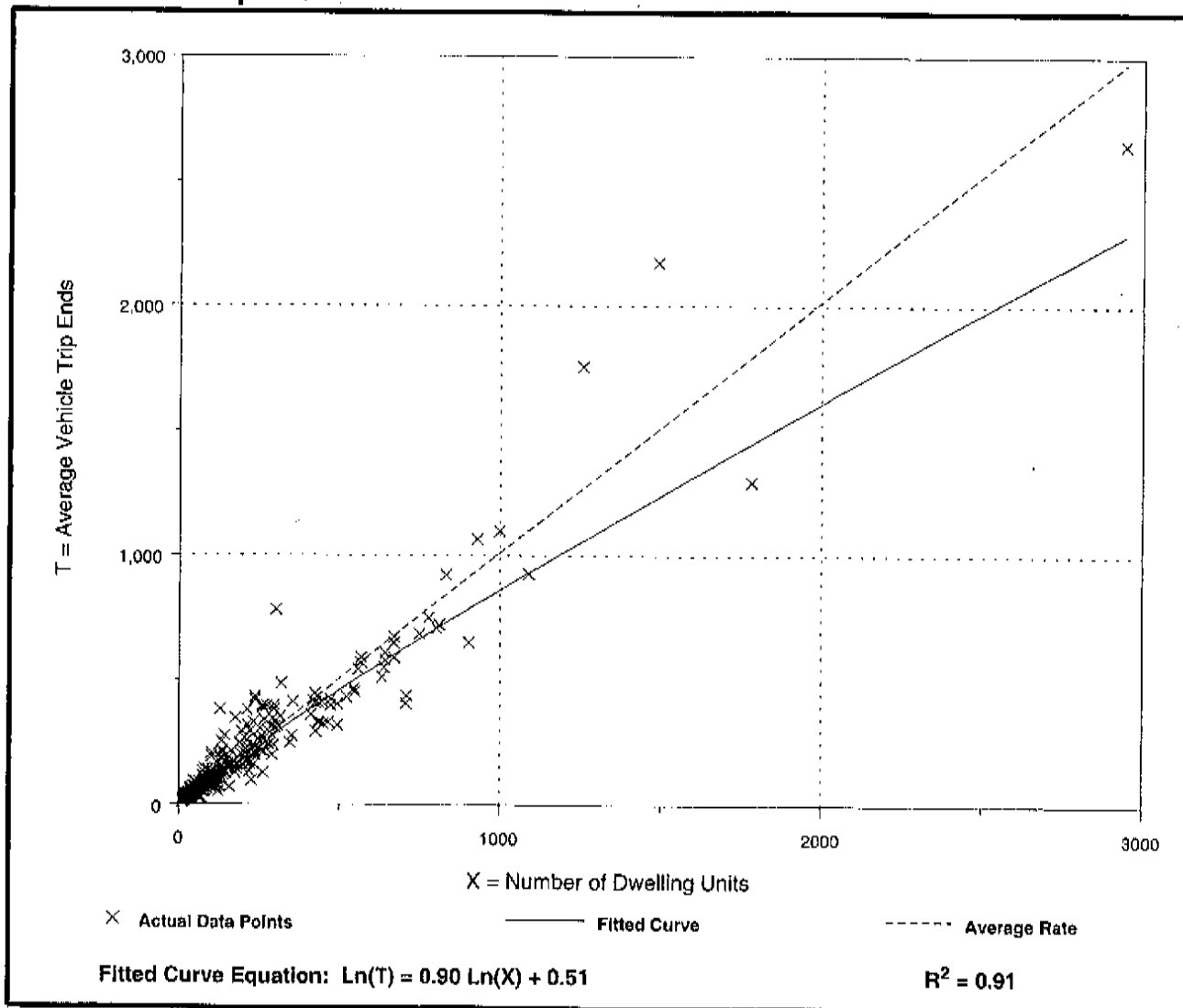
Average Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Number of Studies: 314
 Avg. Number of Dwelling Units: 208
 Directional Distribution: 63% entering, 37% exiting

Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
1.01	0.42 - 2.98	1.05

Data Plot and Equation



TRIP GENERATION

SHANNON VALLEY FARMS

ITE TRIP GENERATION (210)

42 DWELLING UNITS

WEEKDAY

$$T = e^{(.92 \cdot \ln(X) + 2.71)}$$

$$T = 468.09$$

50% ENTERING = 234

50% EXITING = 234

AM PEAK

$$T = .7 \cdot (X) + 9.74$$

$$T = 39.14$$

25% ENTERING = 10

75% EXITING = 29

PM PEAK

$$T = .9 \cdot \ln(X) + .51$$

$$T = 48.13$$

63% ENTERING = 30

37% EXITING = 18

TWO-WAY STOP CONTROL SUMMARY								
General Information			Site Information					
Analyst	BJH		Intersection	Murphy @ Horsetail				
Agency/Co.	Cannon & Cannon, Inc.		Jurisdiction	Knox County				
Date Performed	4/26/2012		Analysis Year	Existing 2012				
Analysis Time Period	AM Peak							
Project Description 773-0002								
East/West Street: Horsetail Drive			North/South Street: Murphy Road					
Intersection Orientation: North-South			Study Period (hrs): 0.25					
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		183	30	1	637			
Peak-Hour Factor, PHF	1.00	0.90	0.90	0.90	0.90	1.00		
Hourly Flow Rate, HFR (veh/h)	0	203	33	1	707	0		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration			TR	LT				
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)				102		7		
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.90	1.00	0.90		
Hourly Flow Rate, HFR (veh/h)	0	0	0	113	0	7		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration					LR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		1		120				
C (m) (veh/h)		1343		312				
v/c		0.00		0.38				
95% queue length		0.00		1.75				
Control Delay (s/veh)		7.7		23.6				
LOS		A		C				
Approach Delay (s/veh)	--	--		23.6				
Approach LOS	--	--		C				

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	BJH			Intersection	Murphy @ Horsetail			
Agency/Co.	Cannon & Cannon, Inc.			Jurisdiction	Knox County			
Date Performed	4/26/2012			Analysis Year	Existing 2012			
Analysis Time Period	PM Peak							
Project Description 773-0002								
East/West Street: Horsetail Drive				North/South Street: Murphy Road				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		592	80	10	299			
Peak-Hour Factor, PHF	1.00	0.95	0.95	0.95	0.95	1.00		
Hourly Flow Rate, HFR (veh/h)	0	623	84	10	314	0		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration			TR	LT				
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)				33		8		
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.95	1.00	0.95		
Hourly Flow Rate, HFR (veh/h)	0	0	0	34	0	8		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration					LR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		10		42				
C (m) (veh/h)		901		292				
v/c		0.01		0.14				
95% queue length		0.03		0.50				
Control Delay (s/veh)		9.0		19.4				
LOS		A		C				
Approach Delay (s/veh)	--	--		19.4				
Approach LOS	--	--		C				

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	BJH			Intersection	Murphy @ Horsetail			
Agency/Co.	Cannon & Cannon, Inc.			Jurisdiction	Knox County			
Date Performed	4/26/2012			Analysis Year	Background 2016			
Analysis Time Period	AM Peak							
Project Description 773-0002								
East/West Street: Horsetail Drive				North/South Street: Murphy Road				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		201	33	1	701			
Peak-Hour Factor, PHF	1.00	0.90	0.90	0.90	0.90	1.00		
Hourly Flow Rate, HFR (veh/h)	0	223	36	1	778	0		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration			TR	LT				
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)				112		8		
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.90	1.00	0.90		
Hourly Flow Rate, HFR (veh/h)	0	0	0	124	0	8		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration					LR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		1		132				
C (m) (veh/h)		1317		275				
v/c		0.00		0.48				
95% queue length		0.00		2.44				
Control Delay (s/veh)		7.7		29.6				
LOS		A		D				
Approach Delay (s/veh)	--	--	29.6					
Approach LOS	--	--	D					

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	BJH			Intersection	Murphy @ Horsetail			
Agency/Co.	Cannon & Cannon, Inc.			Jurisdiction	Knox County			
Date Performed	4/26/2012			Analysis Year	Background 2016			
Analysis Time Period	PM Peak							
Project Description 773-0002								
East/West Street: Horsetail Drive				North/South Street: Murphy Road				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		651	88	11	330			
Peak-Hour Factor, PHF	1.00	0.95	0.95	0.95	0.95	1.00		
Hourly Flow Rate, HFR (veh/h)	0	685	92	11	347	0		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration			TR	LT				
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)				36		9		
Peak-Hour Factor, PHF	1.00	1.00	1.00	0.95	1.00	0.95		
Hourly Flow Rate, HFR (veh/h)	0	0	0	37	0	9		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration					LR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		11		46				
C (m) (veh/h)		848		257				
v/c		0.01		0.18				
95% queue length		0.04		0.64				
Control Delay (s/veh)		9.3		22.0				
LOS		A		C				
Approach Delay (s/veh)	--	--	22.0					
Approach LOS	--	--	C					

TWO-WAY STOP CONTROL SUMMARY							
General Information				Site Information			
Analyst	BJH			Intersection	Murphy @ Horsetail		
Agency/Co.	Cannon & Cannon, Inc.			Jurisdiction	Knox County		
Date Performed	5/30/2012			Analysis Year	Combined 2016		
Analysis Time Period	AM Peak						
Project Description 773-0002							
East/West Street: Horsetail Drive				North/South Street: Murphy Road			
Intersection Orientation: North-South				Study Period (hrs): 0.25			
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)	9	201	33	1	701	1	
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	
Hourly Flow Rate, HFR (veh/h)	10	223	36	1	778	1	
Percent Heavy Vehicles	0	--	--	0	--	--	
Median Type	Undivided						
RT Channelized			0				0
Lanes	0	1	0	0	1	0	
Configuration	LTR			LTR			
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)	3	0	26	112	0	8	
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	
Hourly Flow Rate, HFR (veh/h)	3	0	28	124	0	8	
Percent Heavy Vehicles	0	0	0	0	0	0	
Percent Grade (%)	0			0			
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0			0	
Lanes	0	1	0	0	1	0	
Configuration		LTR			LTR		
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
Lane Configuration	LTR	LTR	LTR			LTR	
v (veh/h)	10	1	132			31	
C (m) (veh/h)	847	1317	197			366	
v/c	0.01	0.00	0.67			0.08	
95% queue length	0.04	0.00	4.06			0.28	
Control Delay (s/veh)	9.3	7.7	54.0			15.7	
LOS	A	A	F			C	
Approach Delay (s/veh)	--	--	54.0			15.7	
Approach LOS	--	--	F			C	

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	BJH			Intersection	Murphy @ Horsetail			
Agency/Co.	Cannon & Cannon, Inc.			Jurisdiction	Knox County			
Date Performed	5/30/2012			Analysis Year	Combined 2016			
Analysis Time Period	PM Peak							
Project Description 773-0002								
East/West Street: Horsetail Drive				North/South Street: Murphy Road				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	24	651	88	11	330	6		
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95		
Hourly Flow Rate, HFR (veh/h)	25	685	92	11	347	6		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration	LTR			LTR				
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	4	0	14	36	0	9		
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95		
Hourly Flow Rate, HFR (veh/h)	4	0	14	37	0	9		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration	LTR			LTR				
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR	LTR			LTR		
v (veh/h)	25	11	46			18		
C (m) (veh/h)	1217	848	186			405		
v/c	0.02	0.01	0.25			0.04		
95% queue length	0.06	0.04	0.94			0.14		
Control Delay (s/veh)	8.0	9.3	30.6			14.3		
LOS	A	A	D			B		
Approach Delay (s/veh)	--	--	30.6			14.3		
Approach LOS	--	--	D			B		

Left Turn Lane Warrants

Input Fields

Left Turn Volume (vph)	9	Speed Limit (mph)	40
Advancing Volume (vph)	234	No. of through lanes	1
Opposing Volume (vph)	703	Percent Heavy Vehicles (decimal percent)	0.05



Note: This spreadsheet is intended to supplement the guidance provided in the Auxiliary Turn Lane policy outlined in the KYTC Highway Design Manual. This policy should be fully reviewed and understood prior to using this application.

Shannon Valley Farms

2016 Combined Volumes

AM Peak

Left Turn Lane Warrants

Input Fields

Left Turn Volume (vph)	24	Speed Limit (mph)	40
Advancing Volume (vph)	739	No. of through lanes	1
Opposing Volume (vph)	335	Percent Heavy Vehicles (decimal percent)	0.05



Note: This spreadsheet is intended to supplement the guidance provided in the Auxiliary Turn Lane policy outlined in the KYTC Highway Design Manual. This policy should be fully reviewed and understood prior to using this application.

Shannon Valley Farms
2016 Combined Volumes
PM Peak

Right Turn Lane Warrants

Input Fields

Right Turn Volume (vph)

1

Speed Limit (mph)

40

Advancing Volume (vph)

702



Note: This spreadsheet is intended to supplement the guidance provided in the Auxiliary Turn Lane policy outlined in the KYTC Highway Design Manual. This policy should be fully reviewed and understood prior to using this application.

Shannon Valley Farms

2016 Combined Volumes

AM Peak

Right Turn Lane Warrants

Input Fields

Right Turn Volume (vph)

6

Speed Limit (mph)

40

Advancing Volume (vph)

341



Note: This spreadsheet is intended to supplement the guidance provided in the Auxiliary Turn Lane policy outlined in the KYTC Highway Design Manual. This policy should be fully reviewed and understood prior to using this application.

Shannon Valley Farms

2016 Combined Volumes

PM Peak