Technical Memorandum

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8/3/2017

Date: August 3rd, 2017

Subject: **Soleste Bay Village - Trip Generation Comparison**

This technical memorandum was prepared to provide a comparison between the vehicle trips associated with the new proposed development and the previous development program for the subject project. The subject project is located at 18301 South Dixie Highway in the Village of Palmetto Bay, Florida. The land uses are as follows:

Previous Development

- LU 220: Apartments with 218 Dwelling Units (11 Live/Work Units)
- LU 710: General Office with 3,100 Square Feet
- LU 826: Retail (11 Live/Work Units) with 9,135 Square Feet
- LU 826: Specialty Retail with 3,400 Square Feet

New Proposed Development

- LU 220: Apartments with 211 Dwelling Units (11 Live/Work Units)
- LU 710: General Office with 3,100 Square Feet
- LU 826: Retail (11 Live/Work Units) with 9,135 Square Feet
- LU 826: Specialty Retail with 3,400 Square Feet

Based on the Traffic Impact Study dated May 12th, 2017 and prepared by our firm, the trip generation analysis for the **previous development** yielded **128 gross trips** during the **AM peak hour** and **174 gross trips** during the **PM peak hour**. In comparison, the trip generation calculations for the **new proposed development** yielded **125 gross trips** during the **AM peak hour** and **170 gross trips** during the **PM peak hour**. The trip generation results revealed that the new proposed development will generate approximately 2 percent less vehicle trips during both the AM and PM peak hour.

In conclusion, the results documented in the Traffic Impact Study dated May 12th, 2017 remain valid and acceptable since the new proposed development will generate less traffic when compared to the previously proposed project. As such, no further analysis is recommended at this time. Attached please find the supporting documentation.

Attachment

TABLE: A1

TRIP GENERATION ANALYSIS
AM PEAK HOUR

Project Name: Soleste - Bay Village

LAND USE (LU)	UNITS	ITE LU CODE	ITE TRIP GENERATION RATE	AM PEAK HOUR TRIPS					Previous Development Proposed Trips	Percent Change (%)
				%	IN	%	OUT	TOTAL		
Existing										
Church	11.123 Th.Sq.Ft.	560	0.56	62%	4	38%	2	6		
Proposed										
Apartments	211 D.U.	220	0.51	20%	22	80%	86	108		
General Office	3.100 Th.Sq.Ft.	710	1.56	88%	4	12%	1	5		
Retail (11 Live/Work Units) *	9.135 Th.Sq.Ft.	820	0.96	62%	6	38%	3	9		
Specialty Retail *	3.400 Th.Sq.Ft.	820	0.96	62%	2	38%	1	3		
External Trips *(Proposed Trips)*				**27%**	**34**	**73%**	**91**	**125**	**128**	**-2.3%**
Internal Trip Capture			*3.0% of ExternalTrips*	*25%*	*1*	*75%*	*3*	*4*		
Net External Trips *(External Trips - Existing Trips - Internal Trips)*				**25%**	**29**	**75%**	**86**	**115**	**118**	**-2.5%**

Notes: ITE Trip Generation, 9th Edition & ITE Trip Generation Handbook, 3rd Edition.

* Since ITE does not provide AM data for Specialty Retail (LU 826), ITE's rate for LU 820 (Shopping Center) was used to estimate the AM peak hour trips.

TABLE: A2

TRIP GENERATION ANALYSIS
PM PEAK HOUR

Project Name: Soleste - Bay Village

LAND USE (LU)	UNITS	ITE LU CODE	ITE TRIP GENERATION RATE	PM PEAK HOUR TRIPS					Previous Development Proposed Trips	Percent Change (%)
				%	IN	%	OUT	TOTAL		
Existing										
Church	11.123 Th.Sq.Ft.	560	0.55	48%	3	52%	3	6		
Proposed										
Apartments	211 D.U.	220	0.62	65%	85	35%	46	131		
General Office	3.100 Th.Sq.Ft.	710	1.49	17%	1	83%	4	5		
Retail (11 Live/Work Units)	9.135 Th.Sq.Ft.	826	2.71	44%	11	56%	14	25		
Specialty Retail	3.400 Th.Sq.Ft.	826	2.71	44%	4	56%	5	9		
External Trips *(Proposed Trips)*				**59%**	**101**	**41%**	**69**	**170**	**174**	**-2.3%**
Internal Trip Capture			*9.6% of ExternalTrips*	*63%*	*10*	*38%*	*6*	*16*		
Net External Trips *(External Trips - Existing Trips - Internal Trips)*				**59%**	**88**	**41%**	**60**	**148**	**151**	**-2.0%**

Notes: ITE Trip Generation, 9th Edition & ITE Trip Generation Handbook, 3rd Edition.

TABLE: A3

TRIP GENERATION ANALYSIS
DAILY CONDITION

Project Name: Soleste - Bay Village

LAND USE (LU)	UNITS	ITE LU CODE	ITE TRIP GENERATION RATE	DAILY TRIPS					Previous Development Proposed Trips	Percent Change (%)
				%	IN	%	OUT	TOTAL		
Existing										
Church	11.123 Th.Sq.Ft.	560	9.11	50%	51	50%	50	101		
Proposed										
Apartment	211 D.U.	220	6.65	50%	702	50%	701	1,403		
General Office	3.100 Th.Sq.Ft.	710	11.03	50%	17	50%	17	34		
Retail (11 Live/Work Units)	9.135 Th.Sq.Ft.	826	44.32	50%	202	50%	203	405		
Specialty Retail	3.400 Th.Sq.Ft.	826	44.32	50%	75	50%	76	151		
Gross External Trips				**50%**	**996**	**50%**	**997**	**1,993**	**2,040**	**-2.3%**

Sources: ITE Trip Generation, 9th Edition & ITE Trip Generation Handbook, 3rd Edition.

Apartment
(220)

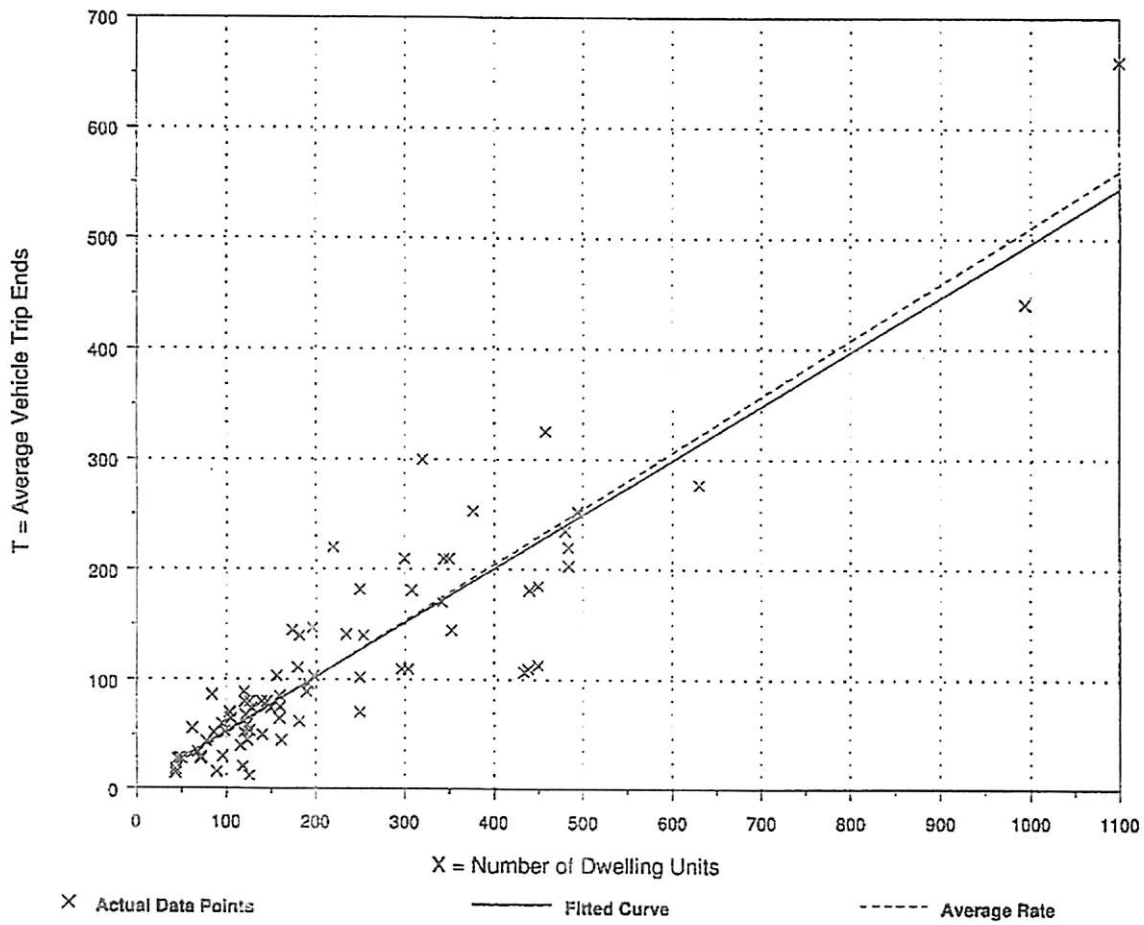
Average Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Number of Studies: 78
Avg. Number of Dwelling Units: 235
Directional Distribution: 20% entering, 80% exiting

Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.51	0.10 - 1.02	0.73

Data Plot and Equation



Fitted Curve Equation: $T = 0.49(X) + 3.73$ $R^2 = 0.83$

Apartment
(220)

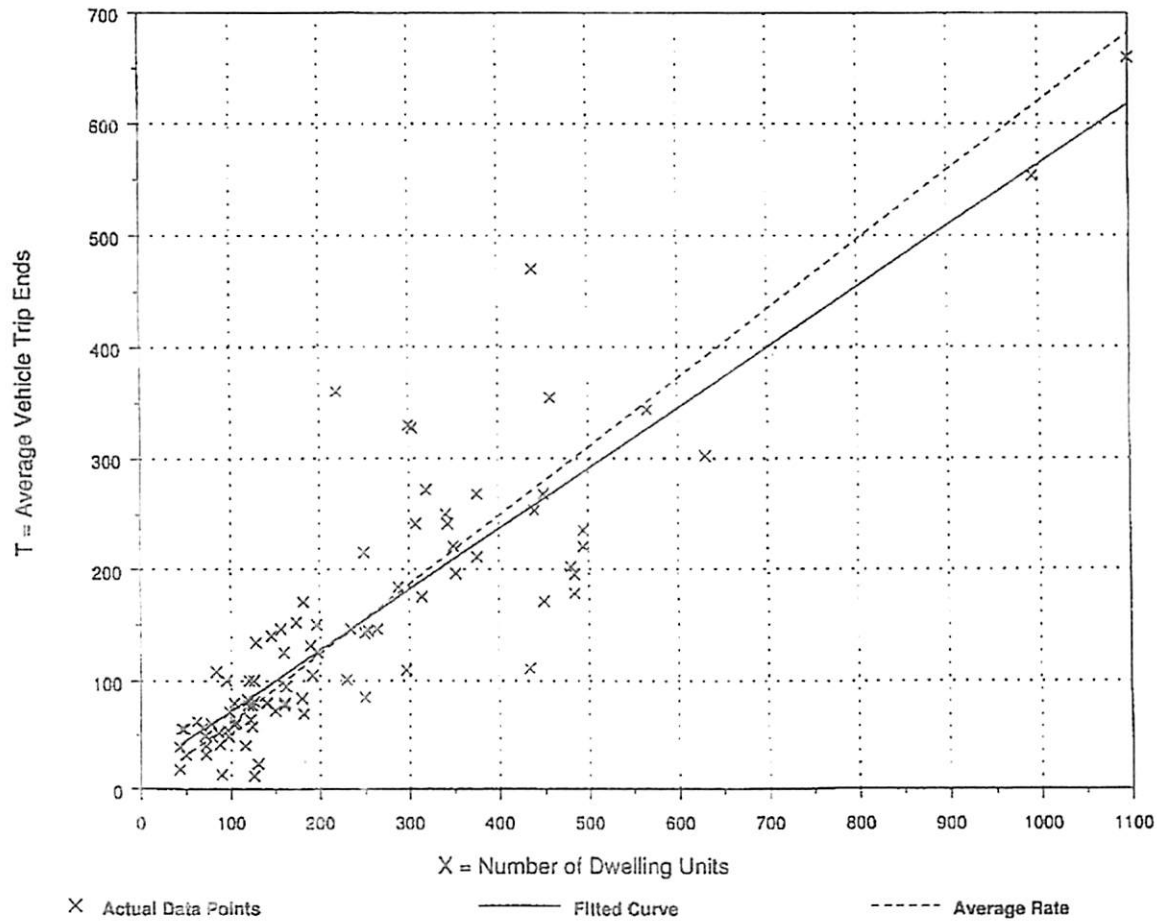
Average Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Number of Studies: 90
Avg. Number of Dwelling Units: 233
Directional Distribution: 65% entering, 35% exiting

Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.62	0.10 - 1.64	0.82

Data Plot and Equation



Fitted Curve Equation: $T = 0.55(X) + 17.65$ $R^2 = 0.77$

Apartment
(220)

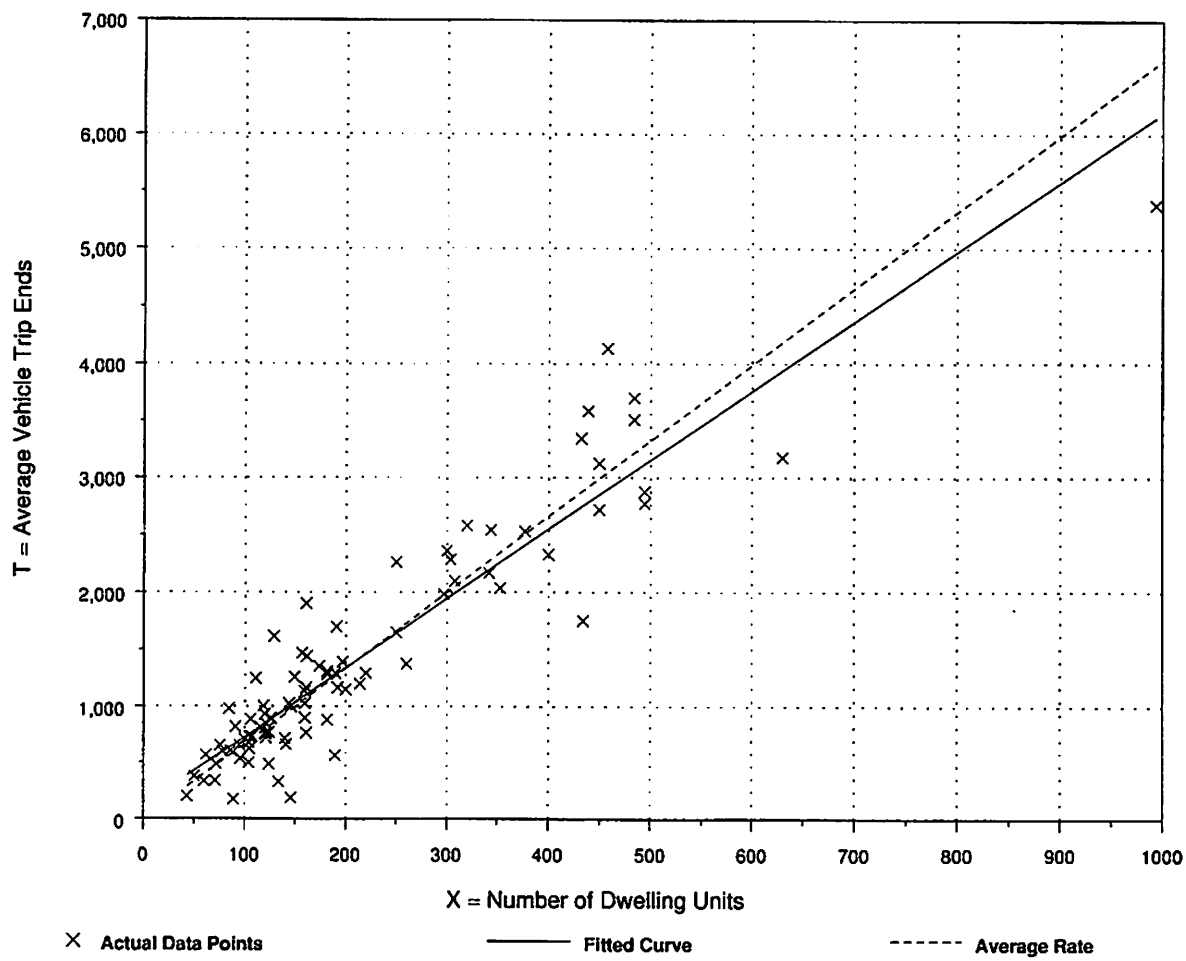
Average Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Number of Studies: 88
Avg. Number of Dwelling Units: 210
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
6.65	1.27 - 12.50	3.07

Data Plot and Equation



Fitted Curve Equation: T = 6.06(X) + 123.56 $R^2 = 0.87$

Church
(560)

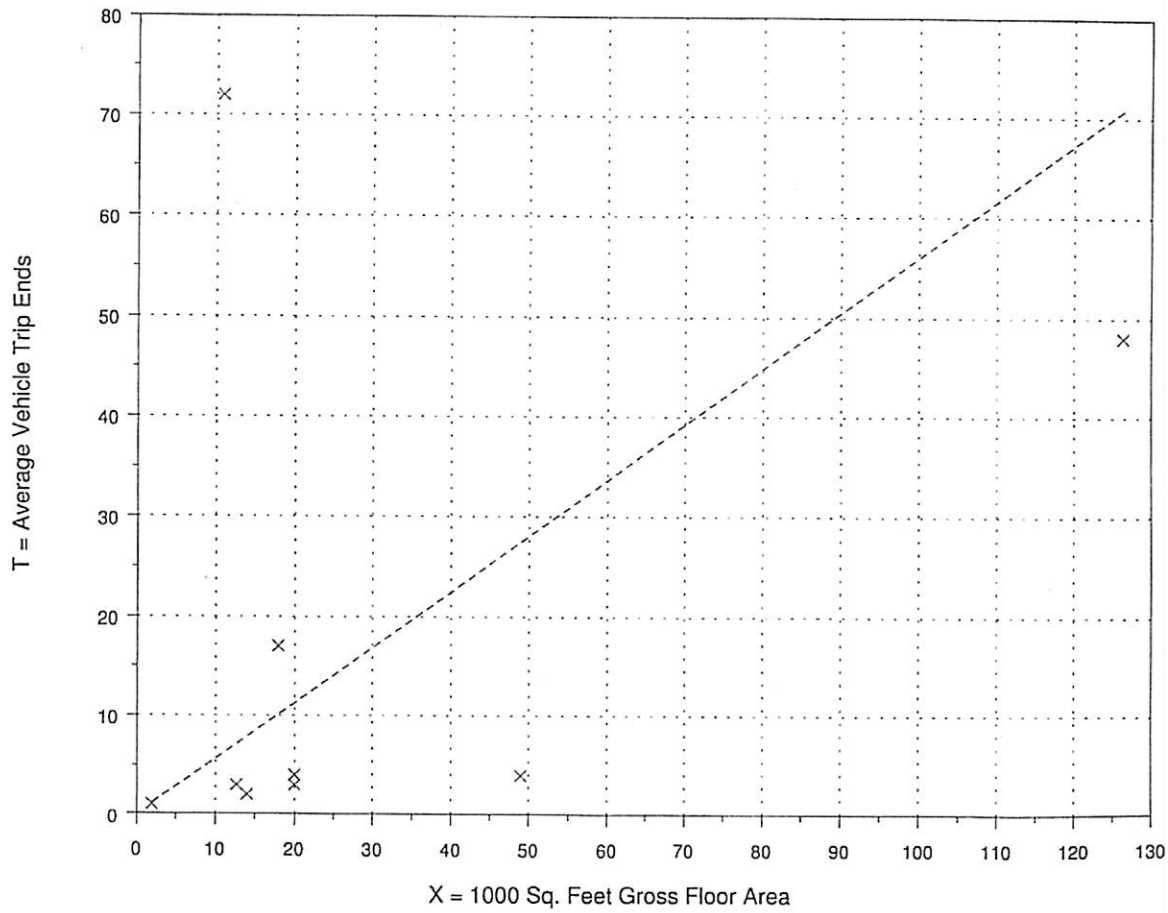
Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Number of Studies: 9
Average 1000 Sq. Feet GFA: 30
Directional Distribution: 62% entering, 38% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
0.56	0.08 - 6.61	1.45

Data Plot and Equation



× Actual Data Points

------ Average Rate

Fitted Curve Equation: Not given

R^2 = ****

Church
(560)

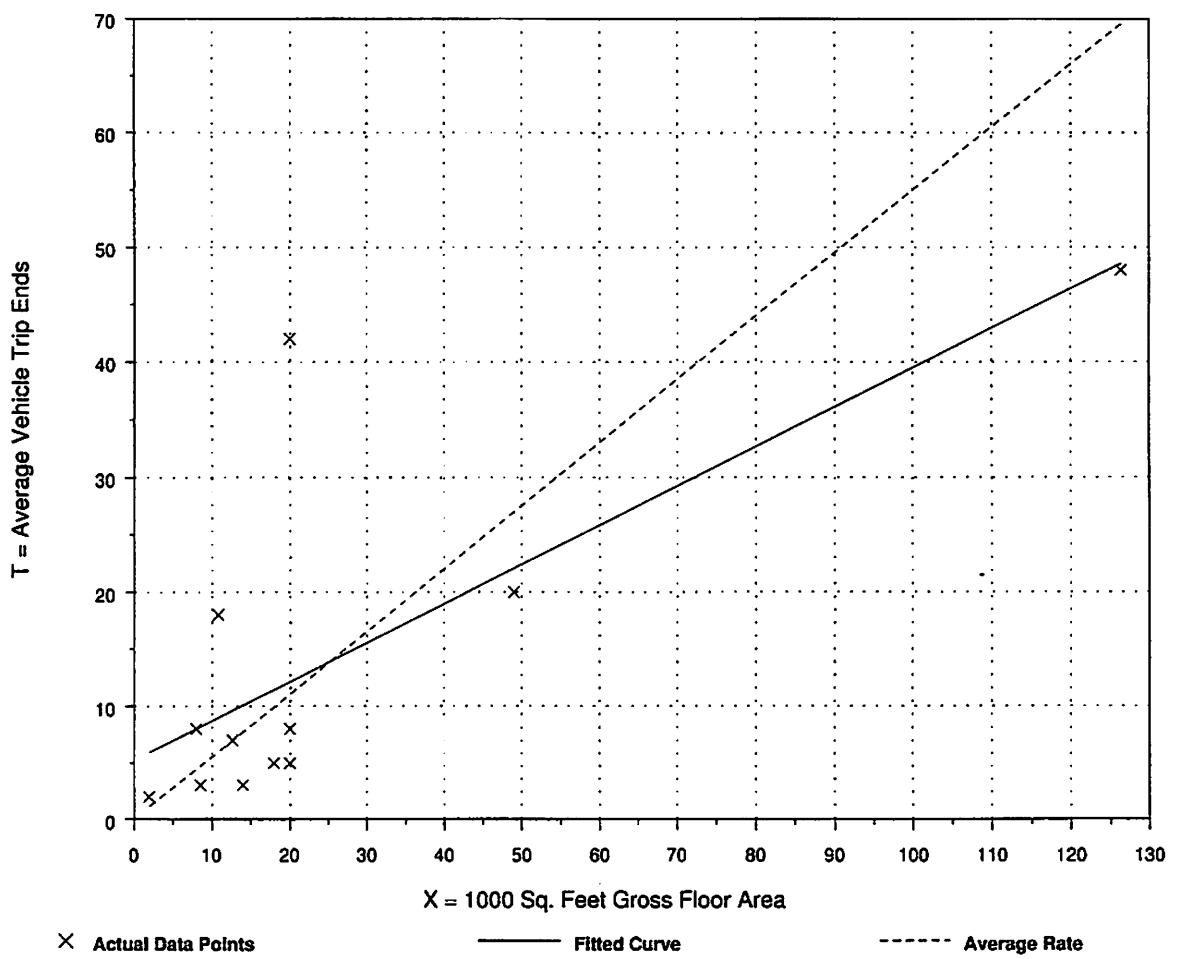
Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Number of Studies: 12
Average 1000 Sq. Feet GFA: 26
Directional Distribution: 48% entering, 52% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
0.55	0.21 - 2.10	0.87

Data Plot and Equation



Fitted Curve Equation: T = 0.34(X) + 5.24 $R^2 = 0.55$

Church
(560)

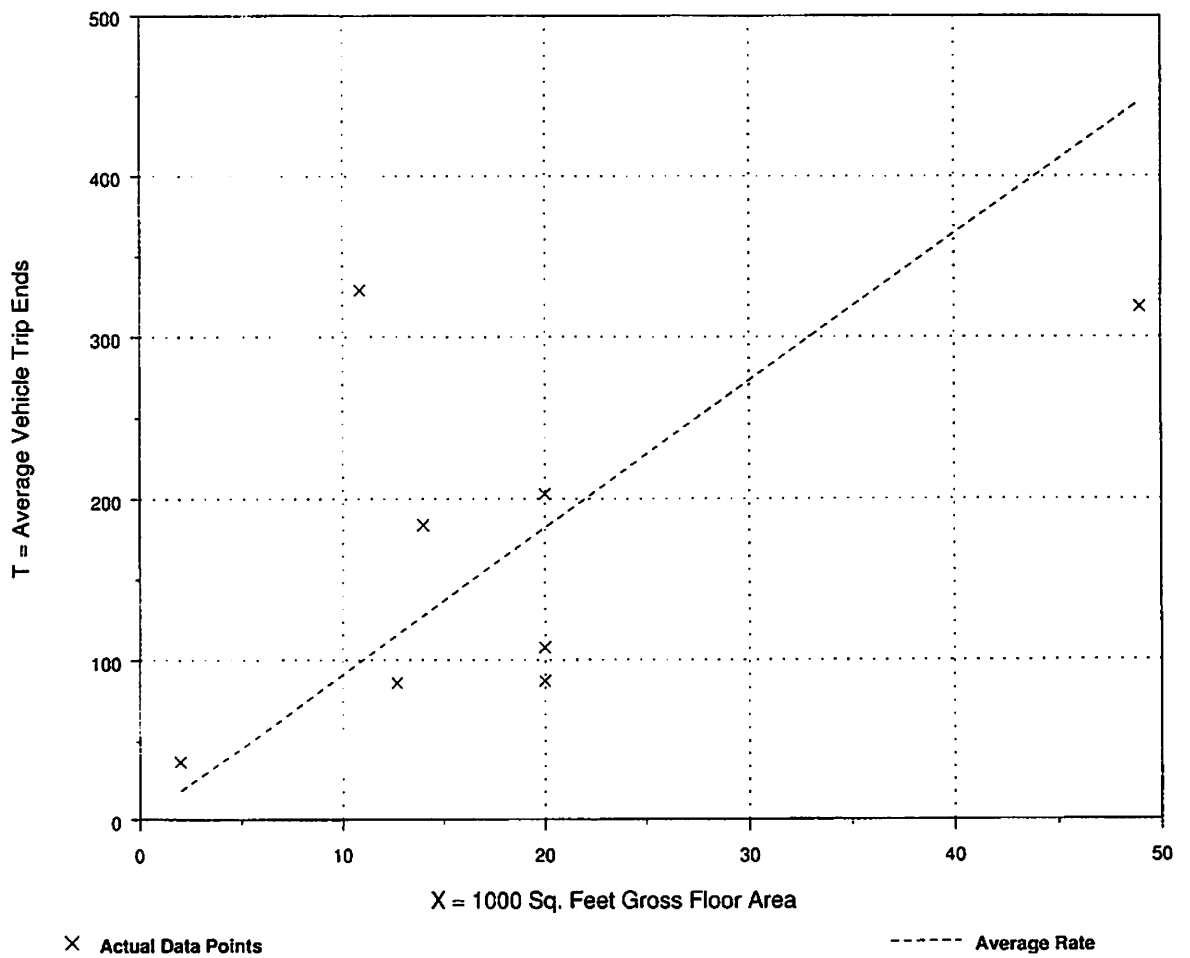
Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area
On a: Weekday

Number of Studies: 8
Average 1000 Sq. Feet GFA: 19
Directional Distribution: 50% entering, 50% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
9.11	4.35 - 30.20	7.20

Data Plot and Equation



Fitted Curve Equation: Not given

R^2 = ****

Shopping Center
(820)

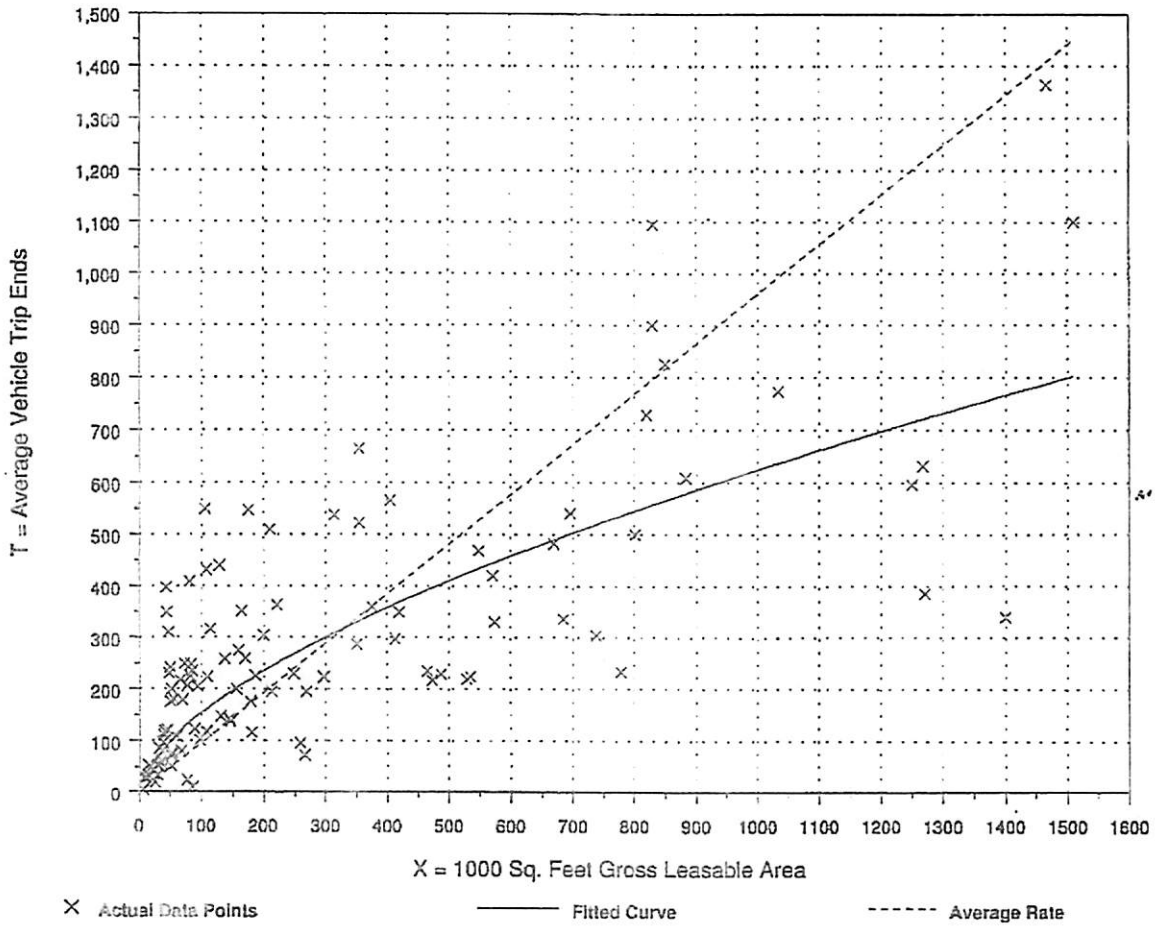
Average Vehicle Trip Ends vs: **1000 Sq. Feet Gross Leasable Area**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Number of Studies: 104
Average 1000 Sq. Feet GLA: 310
Directional Distribution: 62% entering, 38% exiting

Trip Generation per 1000 Sq. Feet Gross Leasable Area

Average Rate	Range of Rates	Standard Deviation
0.96	0.10 - 9.05	1.31

Data Plot and Equation



Fitted Curve Equation: $Ln(T) = 0.61\ Ln(X) + 2.24$ $R^2 = 0.56$

Specialty Retail Center
(826)

Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Leasable Area
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

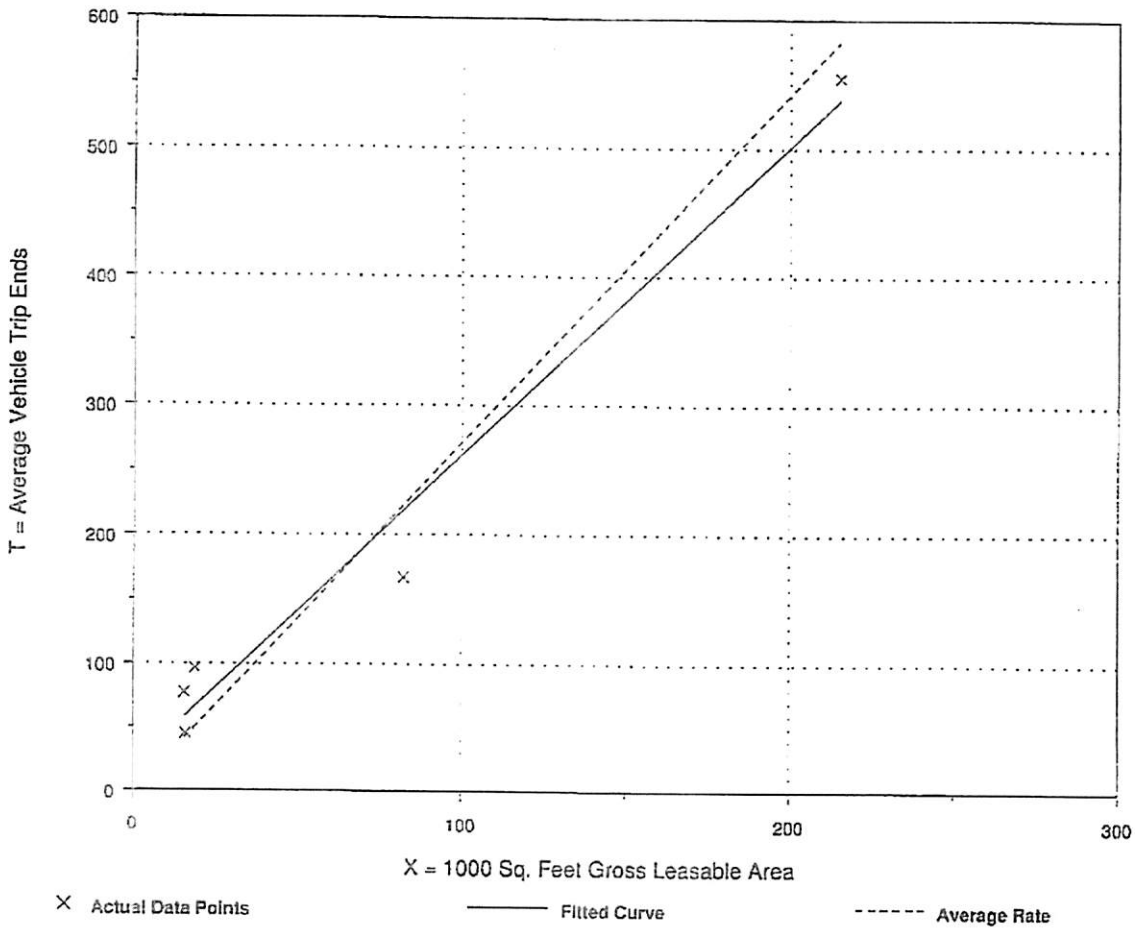
Number of Studies: 5
Average 1000 Sq. Feet GLA: 69
Directional Distribution: 44% entering, 56% exiting

Trip Generation per 1000 Sq. Feet Gross Leasable Area

Average Rate	Range of Rates	Standard Deviation
2.71	2.03 - 5.16	1.83

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: $T = 2.40(X) + 21.48$

$R^2 = 0.98$

Specialty Retail Center
(826)

Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Leasable Area
On a: Weekday

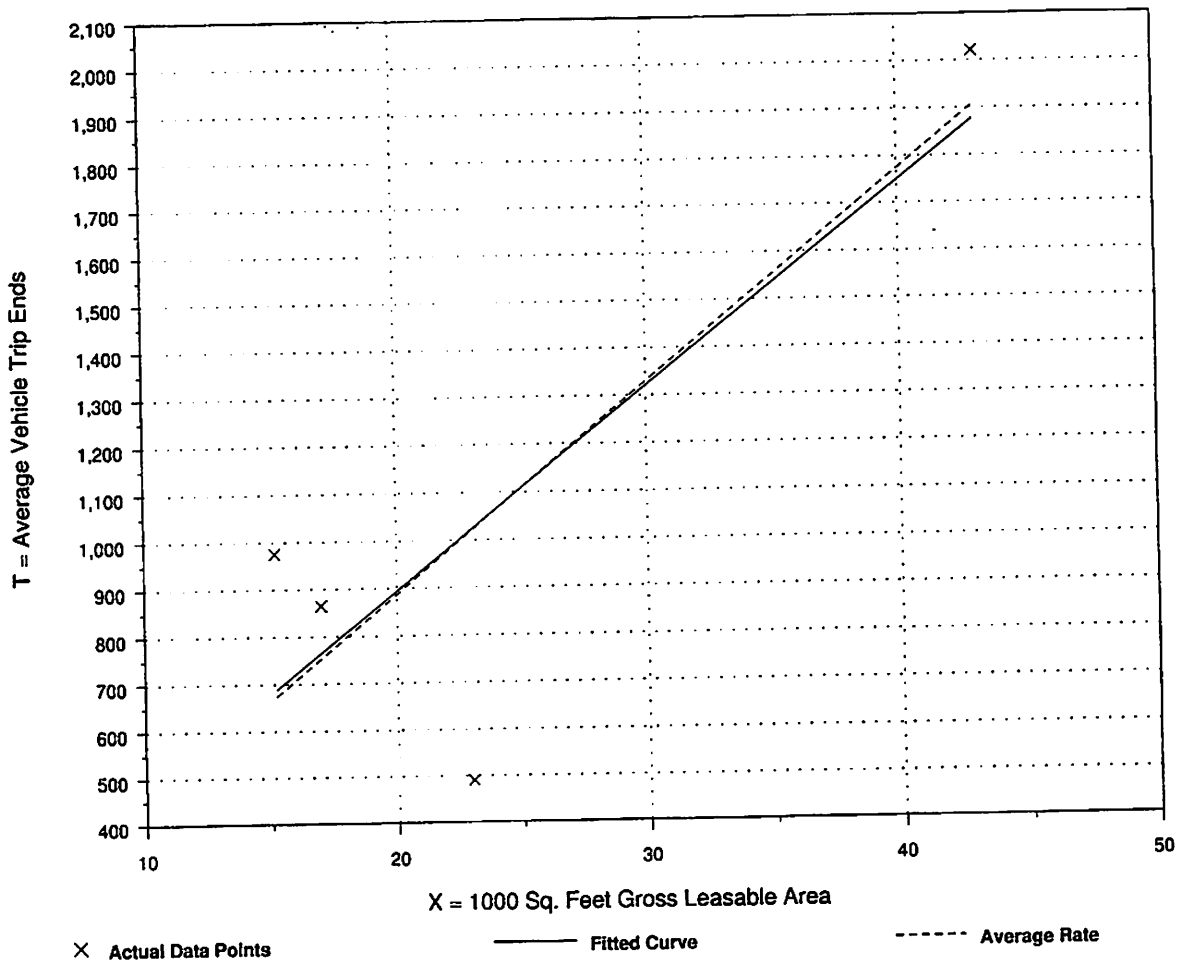
Number of Studies: 4
Average 1000 Sq. Feet GLA: 25
Directional Distribution: 50% entering, 50% exiting

Trip Generation per 1000 Sq. Feet Gross Leasable Area

Average Rate	Range of Rates	Standard Deviation
44.32	21.30 - 64.21	15.52

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Fitted Curve Equation: T = 42.78(X) + 37.66

R^2 = 0.69

Analyst CV

Date 5/10/2017

MULTI-USE DEVELOPMENT TRIP GENERATION AND INTERNAL CAPTURE SUMMARY

Time Period AM Peak Hour

LAND USE A Apartment

ITE LU Code 220
Size 211 DU

	Total	Internal	External
Enter	22	0	22
Exit	86	1	85
Total	108	1	107
%	100%	1%	99%

Exit to External: 85

Enter from External: 22

1% 1 Demand

1 Balanced

17% 1 Demand

2% 0 Demand

0 Balanced

14% 1 Demand

2% 2 Demand

0 Balanced

3% 0 Demand

0% 0 Demand

0 Balanced

1% 0 Demand

LAND USE B Retail

ITE LU Code 826
Size 12,535 SF

	Total	Internal	External
Enter	8	1	7
Exit	4	1	3
Total	12	2	10
%	100%	15%	86%

Exit to External: 3

Enter from External: 7

32% 3 Demand

0 Balanced

28% 0 Demand

29% 1 Demand

0 Balanced

4% 0 Demand

LAND USE C Office

ITE LU Code 710
Size 3,100 SF

	Total	Internal	External
Enter	4	0	4
Exit	1	0	1
Total	5	1	4
%	100%	11%	89%

Enter from External: 4

Exit to External: 1

Net External Trips for Multi-Use Development

	LAND USE A	LAND USE B	LAND USE C	TOTAL
Enter	22	7	4	32
Exit	85	3	1	89
Total	107	10	4	121
Single-Use Trip Gen. Est.	108	12	5	125

INTERNAL CAPTURE: 3.0%

Source: Trip Generation Handbook, 3rd Edition.

Analyst CV

Date 5/10/2017

MULTI-USE DEVELOPMENT TRIP GENERATION AND INTERNAL CAPTURE SUMMARY

Time Period PM Peak Hour

LAND USE A Apartment

ITE LU Code 220
Size 211 DU

	Total	Internal	External
Enter	85	5	80
Exit	46	2	44
Total	131	7	124
%	100%	5%	95%

Exit to External: 44

Enter from External: 80

42% 19 Demand

2 Balanced

10% 2 Demand

46% 39 Demand

5 Balanced

26% 5 Demand

4% 2 Demand

1 Balanced

57% 1 Demand

4% 3 Demand

0 Balanced

2% 0 Demand

LAND USE B Retail

ITE LU Code 826
Size 12,535 SF

	Total	Internal	External
Enter	15	2	13
Exit	19	5	14
Total	34	8	26
%	100%	22%	78%

Exit to External: 14

Enter from External: 13

8% 1 Demand

1 Balanced

20% 1 Demand

2% 0 Demand

0 Balanced

31% 0 Demand

LAND USE C Office

ITE LU Code 710
Size 3,100 SF

	Total	Internal	External
Enter	1	1	0
Exit	4	1	3
Total	5	2	3
%	100%	35%	65%

Enter from External: 0

Exit to External: 3

Net External Trips for Multi-Use Development

	LAND USE A	LAND USE B	LAND USE C	TOTAL
Enter	80	13	0	93
Exit	44	14	3	61
Total	124	26	3	154
Single-Use Trip Gen. Est.	131	34	5	170

INTERNAL CAPTURE: 9.6%

Source: Trip Generation Handbook, 3rd Edition.

Table 6.1 Unconstrained Internal Person Trip Capture Rates for Trip Origins within a Mixed-Use Development

		WEEKDAY	
		AM Peak Hour	PM Peak Hour
From OFFICE	To Retail	28%	20%
	To Restaurant	63%	4%
	To Cinema/Entertainment	0%	0%
	To Residential	1%	2%
	To Hotel	0%	0%
From RETAIL	To Office	29%	2%
	To Restaurant	13%	29%
	To Cinema/Entertainment	0%	4%
	To Residential	14%	26%
	To Hotel	0%	5%
From RESTAURANT	To Office	31%	3%
	To Retail	14%	41%
	To Cinema/Entertainment	0%	8%
	To Residential	4%	18%
	To Hotel	3%	7%
From CINEMA/ENTERTAINMENT	To Office	0%	2%
	To Retail	0%	21%
	To Restaurant	0%	31%
	To Residential	0%	8%
	To Hotel	0%	2%
From RESIDENTIAL	To Office	2%	4%
	To Retail	1%	42%
	To Restaurant	20%	21%
	To Cinema/Entertainment	0%	0%
	To Hotel	0%	3%
From HOTEL	To Office	75%	0%
	To Retail	14%	16%
	To Restaurant	9%	68%
	To Cinema/Entertainment	0%	0%
	To Residential	0%	2%

Source: Bochner, B., K. Hooper, B. Sperry, and R. Dunphy. NCHRP Report 684: *Enhancing Internal Trip Capture Estimation for Mixed-Use Developments*. Washington, DC: Transportation Research Board, Tables 99 and 100, 2011.

Table 6.2 Unconstrained Internal Person Trip Capture Rates for Trip Destinations within a Mixed-Use Development

		Weekday	
		AM Peak Hour	PM Peak Hour
To OFFICE	From Retail	4%	31%
	From Restaurant	14%	30%
	From Cinema/Entertainment	0%	6%
	From Residential	3%	57%
	From Hotel	3%	0%
To RETAIL	From Office	32%	8%
	From Restaurant	8%	50%
	From Cinema/Entertainment	0%	4%
	From Residential	17%	10%
	From Hotel	4%	2%
To RESTAURANT	From Office	23%	2%
	From Retail	50%	29%
	From Cinema/Entertainment	0%	3%
	From Residential	20%	14%
	From Hotel	6%	5%
To CINEMA/ENTERTAINMENT	From Office	0%	1%
	From Retail	0%	26%
	From Restaurant	0%	32%
	From Residential	0%	0%
	From Hotel	0%	0%
To RESIDENTIAL	From Office	0%	4%
	From Retail	2%	46%
	From Restaurant	5%	16%
	From Cinema/Entertainment	0%	4%
	From Hotel	0%	0%
To HOTEL	From Office	0%	0%
	From Retail	0%	17%
	From Restaurant	4%	71%
	From Cinema/Entertainment	0%	1%
	From Residential	0%	12%

Source: Bochner, B., K. Hooper, B. Sperry, and R. Dunphy. NCHRP Report 684: *Enhancing Internal Trip Capture Estimation for Mixed-Use Developments*. Washington, DC: Transportation Research Board, Tables 101 and 102, 2011.