10/16/13

REGISTERED PROFESSIONAL ENGINEER
54983PE
OREGON
JULY 10, 2002
MICHAEL T. ARD
EXPIRES: 12/31/13

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October 16, 2013

Lori Gamroth
Rothsport Road and Race
21380 SW Chapman Road
Sherwood, OR 97140

RE: Rothsport Road and Race – Trip CAP Analysis

Dear Lori:

The City of Sherwood's Zoning and Development Code 6.306 requires developments impacting Highway 99W to obtain a Trip Allocation Certificate before development. This letter discusses the trip generation for the proposed Rothsport Road and Race facility located at 14015 SW Galbreath Drive in Sherwood. It also serves as a request for the required Trip Allocation Certificate.

The 1.89-acre site contains an existing building with an area of 23,000 square feet that was previously used for manufacturing. The proposed business manufactures engine, chassis and transmission parts for Porsche vehicles in addition to providing high-performance modifications for racing and street vehicles.

To determine the number of trips that were generated by the prior site use and will be generated by the proposed use, trip rates from land-use codes 140, *Manufacturing*, and 942 *Automobile Care Center* from *TRIP GENERATION*, Ninth Edition, were used. The trip rates are based on the square footage and were calculated for a 23,000-square-foot building.

Under existing conditions, the full 23,000 square-foot building is used for manufacturing. Based on the trip analysis, the site currently generates 17 trips during the evening peak hour, with 6 entering and 11 exiting the site.

The proposed Rothsport Road and Race facility does not precisely correlate with a single ITE land use category. Rothsport sells high-performance parts primarily via the internet, so most customers do not visit the site. Rothsport accepts customer vehicles for restoration and upgrades, however the typical turn-around time for these vehicles is six weeks to nine months, which is significantly longer than is typical for auto repair and service functions. Accordingly, it is anticipated that traffic volumes from the proposed site use will be substantially lower than for typical auto-care related land uses.

In order to provide a reasonable projection of site traffic volumes, the uses within the building were categorize as a mix of Warehousing, Auto Care Center and Manufacturing land uses. Based on detailed information provided by Rothsport, it is anticipated that 11,500

square feet of space will be allocated to Auto Care Center uses, 10,500 square feet will be allocated to warehousing uses, and 2,000 square feet will be allocated to manufacturing uses, including a lathe and performance testing equipment. This mix of uses was analyzed to determine the resulting traffic volumes. It is acknowledged that the Auto Care Center portion of the proposed development will likely generate far fewer trips than the average for this land use category, however for a conservative analysis the standard trip generation rates were used for this land use.

The closest category is "Automobile Care Center", however this land use description is typically associated with general repair and maintenance services rather than high performance tuning. Additionally, the Rothsport Road and Race facility does on-site manufacturing of high-performance parts, which aligns with the description of the "Manufacturing" land use.

A summary of the existing and proposed trip generation is contained in the table below. Detailed trip generation worksheets are included in the attached technical appendix.

TRIP GENERATION SUMMARY

Rothsport Road and Race

	Entering Trips	Exiting Trips	Total Trips
Existing Manufacturing (23,000 sq ft)			
PM Peak Hour	6	11	17
Proposed Auto Care Center (11,500 sq ft)			
PM Peak Hour	17	19	36
Proposed Warehousing (10,500 sq ft)			
PM Peak Hour	1	2	3
Proposed manufacturing (2,000 sq ft)			
PM Peak Hour	0	1	1
Net Increase in Site Trips			
PM Peak Hour	**12**	**11**	**23**

Based on the analysis, the subject property is projected to generate a total of 40 trips during the evening peak hour, which equates to 21.2 trips per net acre. A CAP Trip Analysis Worksheet is attached.

Notably, even if the entire 23,000 square foot building was used for an Automobile Care Center and the development generated trips at a rate typical for this land use category, the resulting trip generation would remain within the 43 trips per net acre limit established by the City of Sherwood.

Based on the analysis, a net increase of 23 site trips is projected for the proposed development. Of these trips, it is expected that 50 percent will travel to and from the east via Tualatin-Sherwood Road and Herman Road, 25 percent will travel to and from the north on Highway 99W, 15 percent will travel to and from the south on Highway 99W, and 10 percent will travel to and from the northwest on Roy Rogers Road. Using this distribution it is anticipated that the intersection of SW Galbreath Drive at SW Cipole Road will experience an increase of 14 site trips during the evening peak hour. The intersections of SW Galbreath Drive at SW Gerda Lane, SW Gerda Lane at SW Tualatin Sherwood Road, and SW Cipole Road at SW Herman Road are projected to experience an increase of 8 to 9 site trips during the evening peak hour. No other intersections are projected to experience an increase of 10 or more site trips during the evening peak hour.

We trust the information and analysis contained here will be sufficient to allow the issuance of a Trip Allocation Certificate. If you have any questions, please don't hesitate to call us.

Sincerely,

Michael Ard, PE
Senior Transportation Engineer

CAP TRIP ANALYSIS WORKSHEET

Trip Analysis conducted by:	Michael Ard, PE
Project Description:	Rothsport Road and Race
Land Use Application File No: Project Name:	Rothsport Road and Race

The CAP Trip Analysis Worksheet is meant to summarize the detailed information contained in the Traffic Study prepared by a professional engineer registered in the State of Oregon with expertise in traffic or transportation engineering and attached with the CAP Trip Analysis.

Net Trips means the number of trips generated by a regulated activity during the p.m. peak hour. Net trips equal new trips, diverted trips, and trips from existing activities on a site that will remain. Net trips do not include: pass-by trips, internal trips, trips from existing facilities that will be removed, and trips reduced due to implementation of transportation demand strategies.

The following types of projects and activities are specifically excluded from the provisions of the CAP: (1) churches; (2) elementary, middle, and high schools; (3) residential; and (4) changes in use that do not increase the number of trips generated by the current use.

1. **Net Trips**

   a 17 Existing Site Net Trips

   b 40 Proposed Development Net Trips (proposed development includes existing sites that will remain)

   c 0 Future (Full-Build-Out) Development Net Trips

   d 40 Proposed and Future Development Net Trips (1b+1c)*

2. **Acreage**

Tax Lot Number	Total Acreage	Net Acreage (Total Minus 100-Year Flood plain)	Proposed Development Net Acreage	Future Development Net Acreage (2b-2c)
00500	1.89	1.89	1.89	0
TOTAL	a 1.89	b 1.89	c 1.89	d 0

3. **Net Trips Per Acre**

a 9.0 Existing Net Trips per Net Acre (1a/2b)

b 21.2 Proposed Development Net Trips per Net Acre (1b/2c)

c 21.2 Proposed & Future Development Net Trips per Net Acre (1d/2b)

d **43** Net Trips per Net Acre Allowed **(City of Sherwood Trip Limit)**

4. Proposed Mitigation:

*If proposed and future net trips per net acre (3c) are less than the existing net trips per net acre (3a) then the application is EXEMPT from CAP Ordinance requirements.

If any changes are proposed for the regulated activity (i.e. type of activity, acreage, etc.) the trip analysis worksheet shall be resubmitted with the original for comparative purposes and approval.

Comments:

10/10/15

REGISTERED PROFESSIONAL ENGINEER 64983PE OREGON JULY 10, 2002 MICHAEL T. ARD

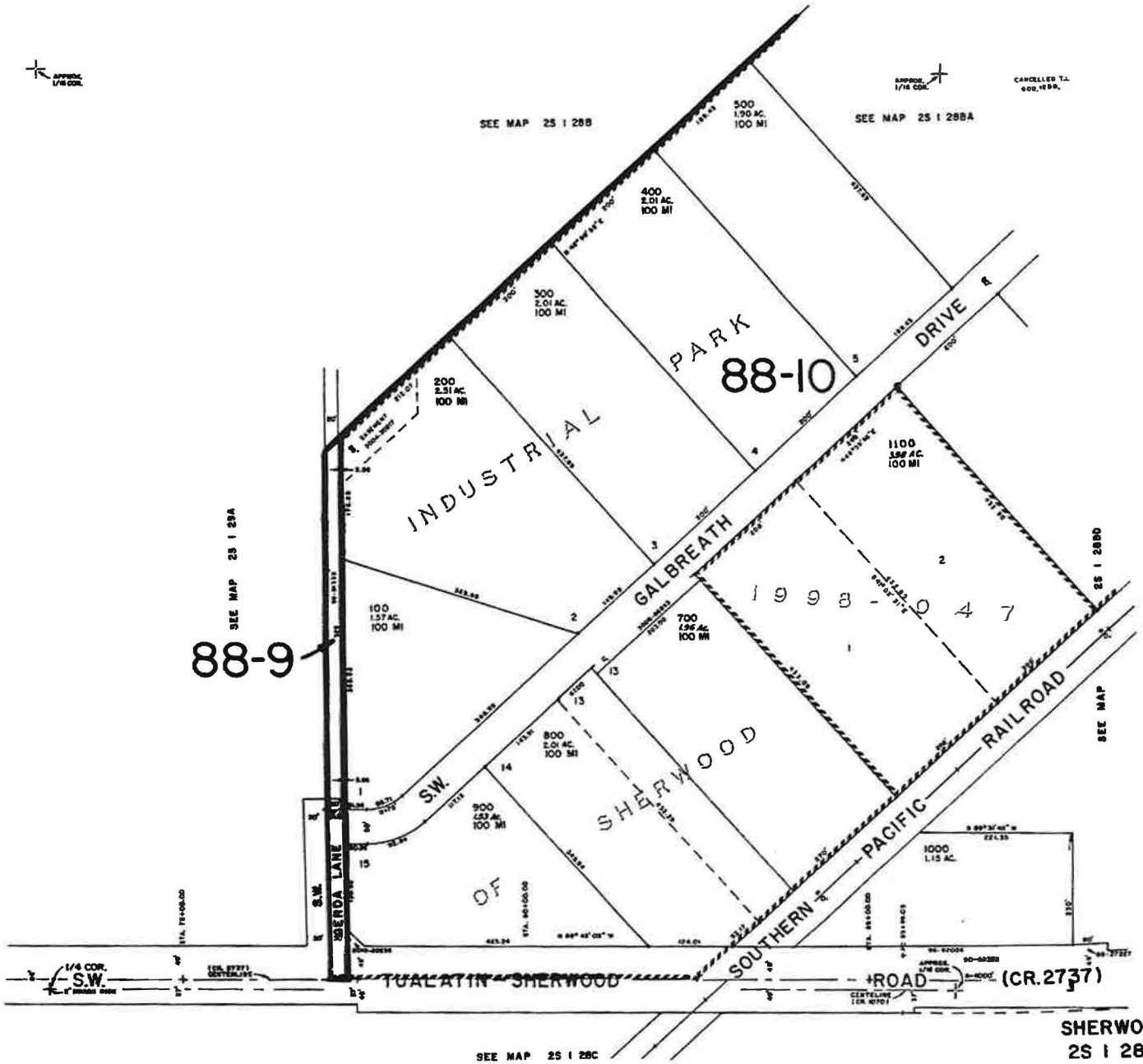
EXPIRES: 12/31/15

Engineers Stamp

FOR ASSESSMENT PURPOSES ONLY. DO NOT RELY ON FOR ANY OTHER USE.

SW1/4 NW1/4 SECTION 28 T2S R1W W.M.
WASHINGTON COUNTY
SCALE 1" = 100'

2S 1 28BC
SHERWOOD



SHERWOOD
2S 1 28BC

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TRIP GENERATION CALCULATIONS

Land Use: Manufacturing
Land Use Code: 140
Variable: 1,000 Square Feet
Variable Quantity: 23

AM PEAK HOUR

Trip Rate: 0.73

	Enter	Exit	Total
Directional Distribution	78%	22%	
Trip Ends	13	4	17

PM PEAK HOUR

Trip Rate: 0.73

	Enter	Exit	Total
Directional Distribution	36%	64%	
Trip Ends	6	11	17

WEEKDAY

Trip Rate: 3.82

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	44	44	88

SATURDAY

Trip Rate: 1.49

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	17	17	34

Source: TRIP GENERATION, Ninth Edition

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TRIP GENERATION CALCULATIONS

Land Use: Automobile Care Center
Land Use Code: 942
Variable: 1000 Sq Feet Gross Leasable Area
Variable Quantity: 11.5

AM PEAK HOUR

Trip Rate: 2.25

	Enter	Exit	Total
Directional Distribution	66%	34%	
Trip Ends	**17**	**9**	**26**

PM PEAK HOUR

Trip Rate: 3.11

	Enter	Exit	Total
Directional Distribution	48%	52%	
Trip Ends	**17**	**19**	**36**

SATURDAY

Trip Rate: 23.72

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**136**	**136**	**272**

SUNDAY

Trip Rate: 11.88

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**68**	**68**	**136**

Source: TRIP GENERATION, Ninth Edition

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TRIP GENERATION CALCULATIONS

Land Use: Warehousing
Land Use Code: 150
Variable: 1,000 Square Feet
Variable Quantity: 10.5

AM PEAK HOUR

Trip Rate: 0.30

	Enter	Exit	Total
Directional Distribution	79%	21%	
Trip Ends	2	1	3

PM PEAK HOUR

Trip Rate: 0.32

	Enter	Exit	Total
Directional Distribution	25%	75%	
Trip Ends	1	2	3

WEEKDAY

Trip Rate: 3.56

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	19	19	38

SATURDAY

Trip Rate: 1.23

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	6	6	12

Source: TRIP GENERATION, Ninth Edition

1e

TRIP GENERATION CALCULATIONS

Land Use: Manufacturing
Land Use Code: 140
Variable: 1,000 Square Feet
Variable Quantity: 2

AM PEAK HOUR

Trip Rate: 0.73

	Enter	Exit	Total
Directional Distribution	78%	22%	
Trip Ends	1	0	1

PM PEAK HOUR

Trip Rate: 0.73

	Enter	Exit	Total
Directional Distribution	36%	64%	
Trip Ends	0	1	1

WEEKDAY

Trip Rate: 3.82

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	4	4	8

SATURDAY

Trip Rate: 1.49

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	1	1	2

Source: TRIP GENERATION, Ninth Edition

1e

TRIP GENERATION CALCULATIONS

Land Use: Automobile Care Center
Land Use Code: 942
Variable: 1000 Sq Feet Gross Leasable Area
Variable Quantity: 23

AM PEAK HOUR

Trip Rate: 2.25

	Enter	Exit	Total
Directional Distribution	66%	34%	
Trip Ends	34	18	52

PM PEAK HOUR

Trip Equation: T = 2.41(X)+11.79

	Enter	Exit	Total
Directional Distribution	48%	52%	
Trip Ends	32	35	67

SATURDAY

Trip Rate: 23.72

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	273	273	546

SUNDAY

Trip Rate: 11.88

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	137	137	274

Source: TRIP GENERATION, Eighth Edition

Land Use: 140
Manufacturing

Description

Manufacturing facilities are areas where the primary activity is the conversion of raw materials or parts into finished products. Size and type of activity may vary substantially from one facility to another. In addition to the actual production of goods, manufacturing facilities generally also have office, warehouse, research and associated functions. General light industrial (Land Use 110), general heavy industrial (Land Use 120), industrial park (Land Use 130) and high-cube warehouse/distribution center (Land Use 152) are related uses.

Additional Data

Average weekday transit trip ends:
- 0.09 per employee
- 0.08 per 1,000 square feet gross floor area
- 1.25 per acre

Vehicle occupancy ranged from 1.2 to 1.3 persons per automobile on an average weekday.

The peak hour of the generator typically coincided with the peak hour of the adjacent street traffic.

Facilities with employees on shift work may peak at other hours.

The sites were surveyed in the late 1960s, the early 1970s, the mid-1980s, the 1990s and the 2000s throughout the United States.

Source Numbers

3, 7, 10, 15, 17, 74, 85, 88, 177, 184, 241, 357, 384, 418, 443, 583, 598, 611, 728

Manufacturing
(140)

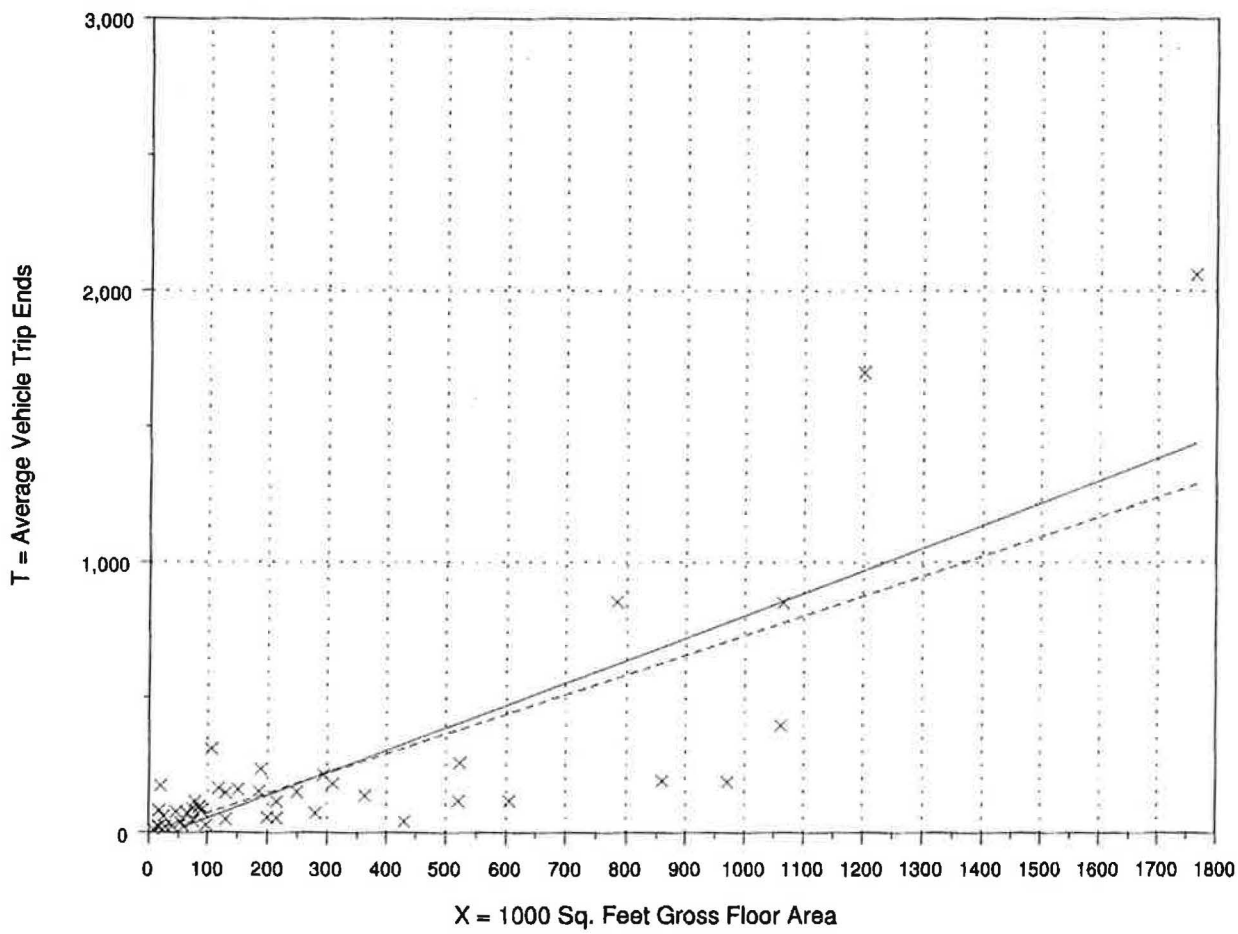
Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Number of Studies: 51
Average 1000 Sq. Feet GFA: 293
Directional Distribution: 78% entering, 22% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
0.73	0.10 - 8.75	1.04

Data Plot and Equation



× Actual Data Points ——— Fitted Curve ------ Average Rate

Fitted Curve Equation: T = 0.83(X) - 29.52 **R^2 = 0.67**

Manufacturing
(140)

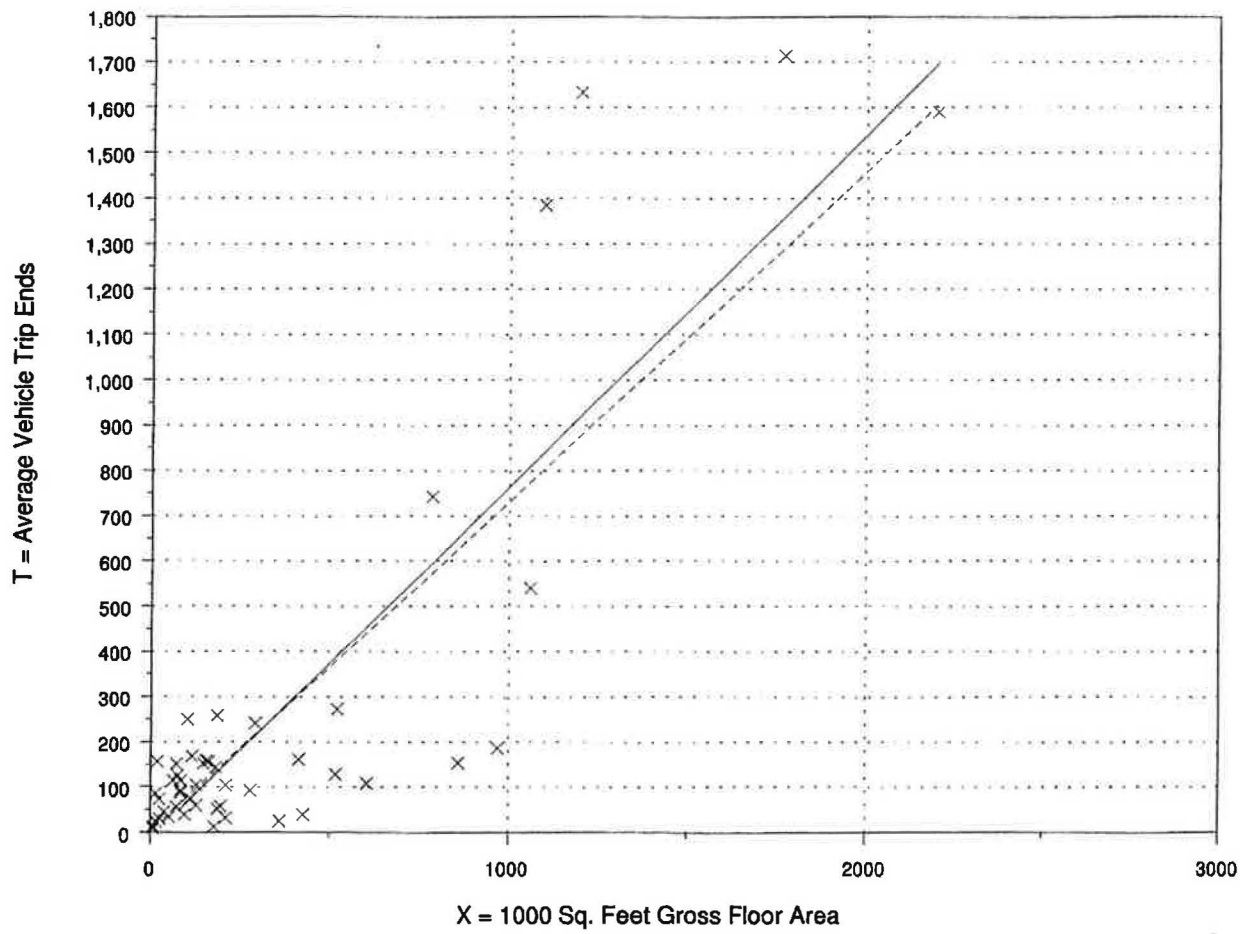
Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Number of Studies: 56
Average 1000 Sq. Feet GFA: 318
Directional Distribution: 36% entering, 64% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
0.73	0.07 - 7.85	1.01

Data Plot and Equation



× Actual Data Points ——— Fitted Curve ------ Average Rate

Fitted Curve Equation: T = 0.78(X) - 15.97 **R^2 = 0.75**

Land Use: 942
Automobile Care Center

Description

An automobile care center houses numerous businesses that provide automobile-related services, such as repair and servicing, stereo installation and seat cover upholstering. Quick lubrication vehicle shop (Land Use 941) and automobile parts and service center (Land Use 943) are related uses.

Additional Data

The P.M. peak hour of the generator typically coincided with the peak hour of the adjacent street traffic.

The sites were surveyed in 1988, 1989 and 1994 in California, Maryland and Florida.

Source Numbers

267, 273, 439, 715

Automobile Care Center
(942)

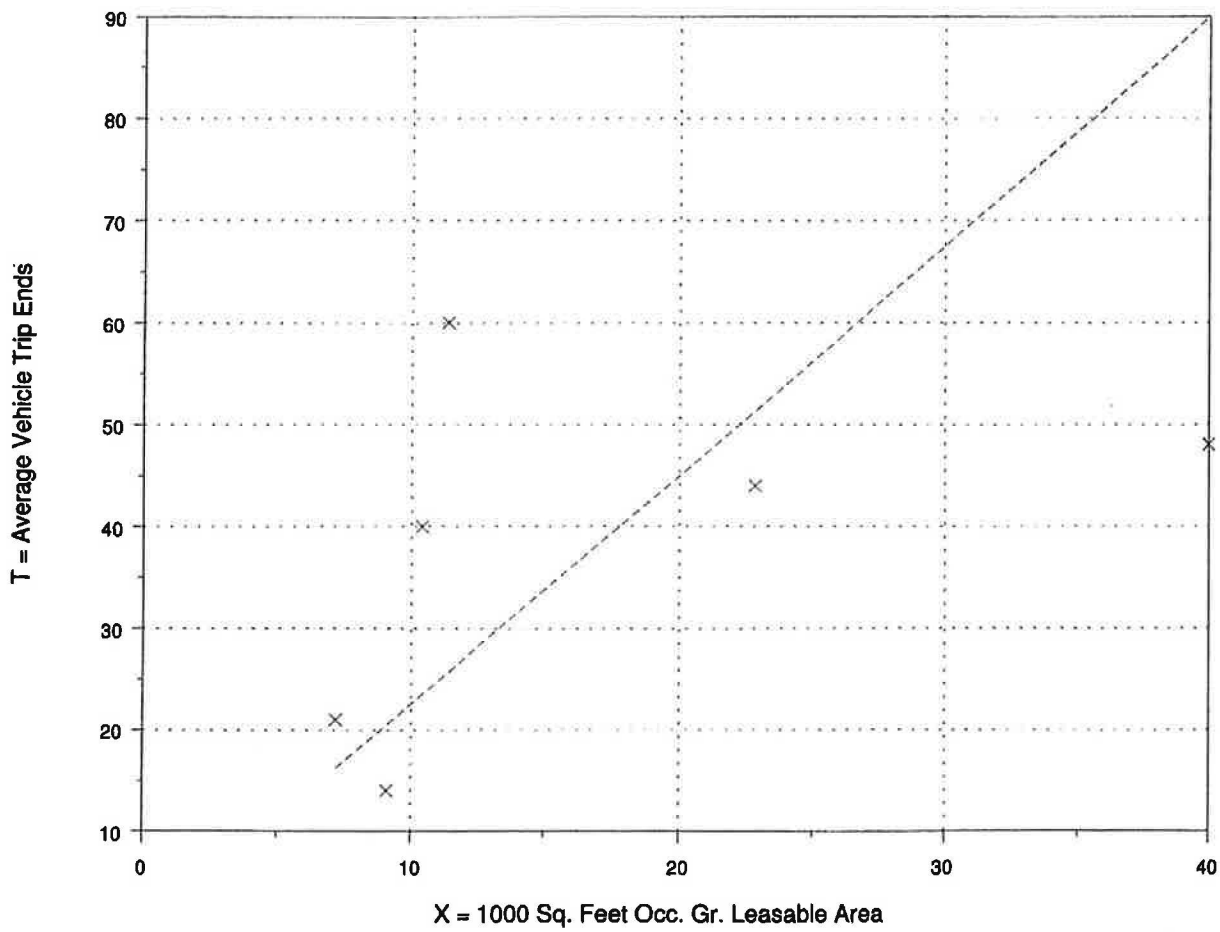
Average Vehicle Trip Ends vs: 1000 Sq. Feet Occ. Gr. Leasable Area
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Number of Studies: 6
Average 1000 Sq. Feet OGLA: 17
Directional Distribution: 66% entering, 34% exiting

Trip Generation per 1000 Sq. Feet Occ. Gr. Leasable Area

Average Rate	Range of Rates	Standard Deviation
2.25	1.20 - 5.29	1.99

Data Plot and Equation



× **Actual Data Points**

------ **Average Rate**

Fitted Curve Equation: Not given

R^2 = ****

Automobile Care Center
(942)

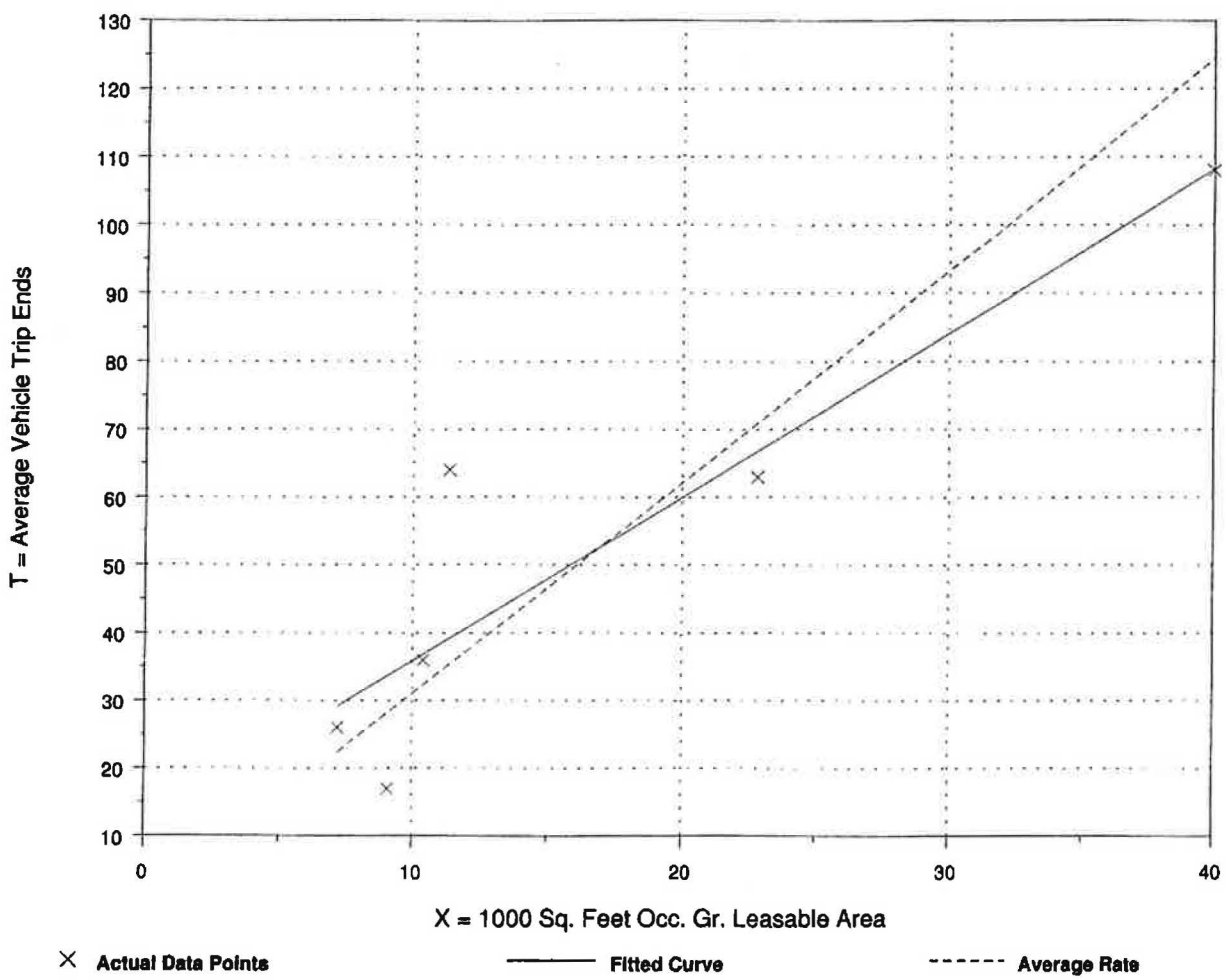
Average Vehicle Trip Ends vs: 1000 Sq. Feet Occ. Gr. Leasable Area
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Number of Studies: 6
Average 1000 Sq. Feet OGLA: 17
Directional Distribution: 48% entering, 52% exiting

Trip Generation per 1000 Sq. Feet Occ. Gr. Leasable Area

Average Rate	Range of Rates	Standard Deviation
3.11	1.87 - 5.64	1.98

Data Plot and Equation



Fitted Curve Equation: T = 2.41(X) + 11.79 $R^2 = 0.83$

Land Use: 150
Warehousing

Description

Warehouses are primarily devoted to the storage of materials, but they may also include office and maintenance areas. High-cube warehouse/distribution center (Land Use 152) and business park (Land Use 770) are related uses.

Additional Data

Truck trips accounted for 20 percent of the weekday traffic at one of the sites surveyed.

No vehicle occupancy data were available specifically for warehousing, but the average was approximately 1.3 persons per automobile for all industrial uses.

The peak hour of the generator typically coincided with the peak hour of the adjacent street traffic.

Facilities with employees on shift work may peak at other hours.

Two sources indicated that the warehousing sites comprised multiple buildings.

The sites were surveyed from between the late 1960s and the 2000s throughout the United States and Canada.

Source Numbers

6, 7, 12, 13, 15, 17, 74, 184, 192, 390, 406, 411, 436, 443, 571, 579, 583, 596, 598, 611

Warehousing
(150)

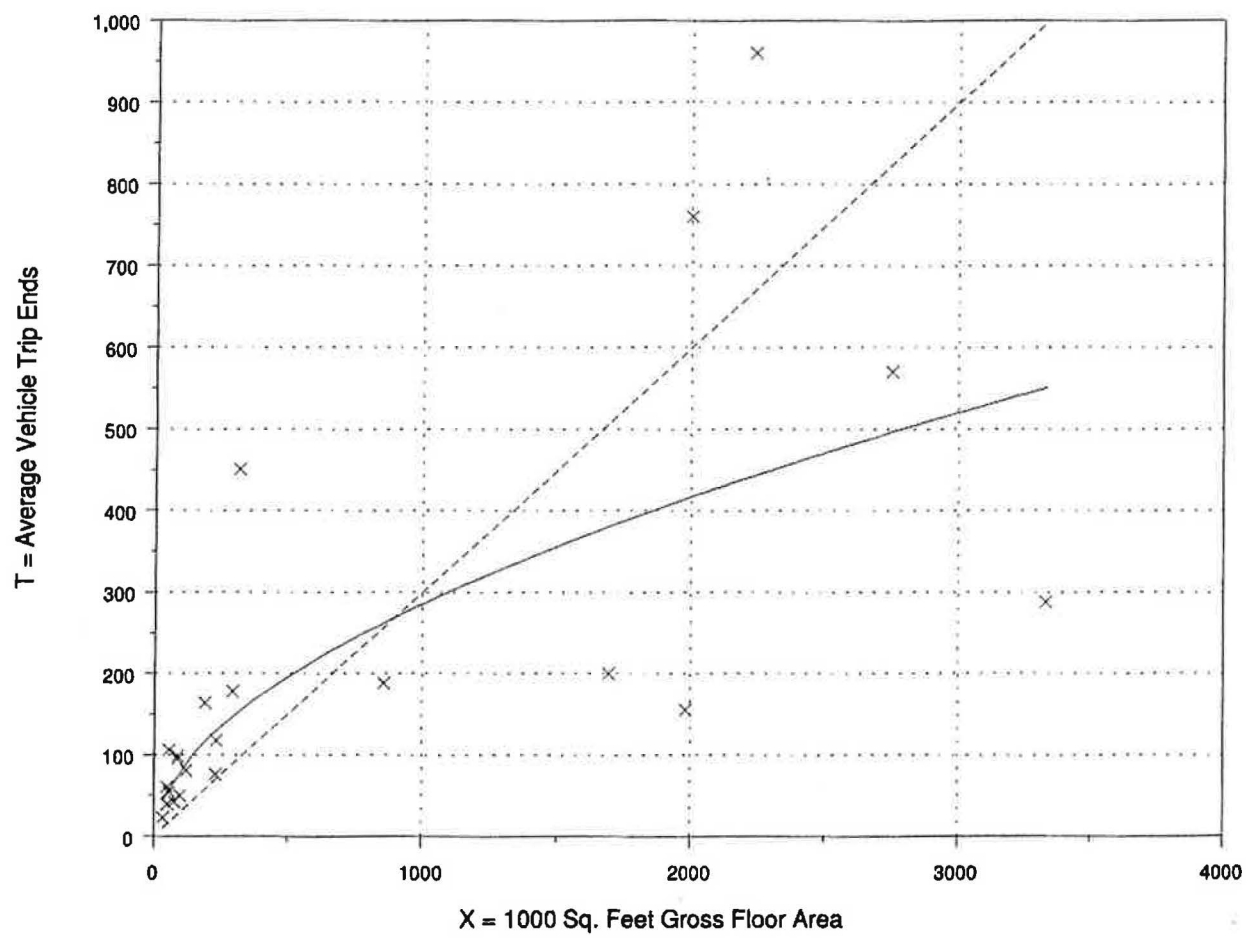
Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Number of Studies: 23
Average 1000 Sq. Feet GFA: 745
Directional Distribution: 79% entering, 21% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
0.30	0.08 - 1.93	0.63

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.55 Ln(X) + 1.88 $R^2 = 0.67$

Warehousing
(150)

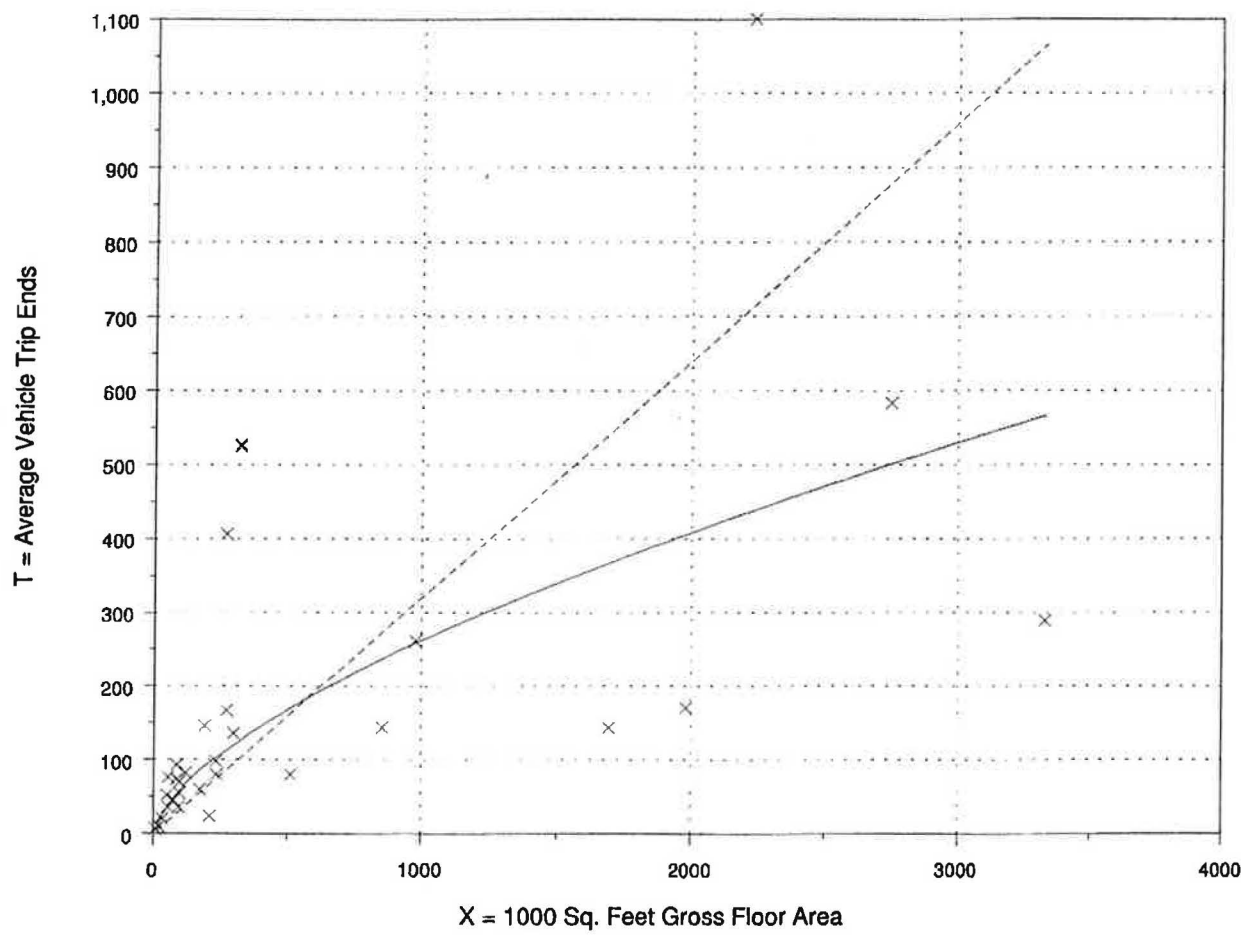
Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Number of Studies: 31
Average 1000 Sq. Feet GFA: 572
Directional Distribution: 25% entering, 75% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
0.32	0.09 - 1.66	0.67

Data Plot and Equation



× Actual Data Points ——— Fitted Curve ------ Average Rate

Fitted Curve Equation: Ln(T) = 0.64 Ln(X) + 1.14 **R^2 = 0.64**