

TRIP GENERATION MANUAL

9th Edition • Volume 3: Data



Institute of Transportation Engineers

Land Use: 251

Senior Adult Housing—Detached

Description

Senior adult housing consists of detached independent living developments, including retirement communities, age-restricted housing and active adult communities. These developments may include amenities such as golf courses, swimming pools, 24-hour security, transportation and common recreational facilities. However, they generally lack centralized dining and on-site health facilities. Detached senior adult housing communities may or may not be gated. Residents in these communities are typically active (requiring little to no medical supervision). The percentage of retired residents varies by development. Senior adult housing—attached (Land Use 252), congregate care facility (Land Use 253) and continuing care retirement community (Land Use 255) are related land uses.

Additional Data

Caution should be used when applying trip rates for this land use as it may contain a wide variety of studies ranging from communities with very active, working residents to communities with older, retired residents. As more data becomes available, consideration will be given to future stratification of this land use.

Many factors affected the trip rates for detached senior adult housing. Factors such as the average age of residents, development location and size, affluence of residents, employment status and vehicular access should be taken into consideration when conducting an analysis. Some developments were located within close proximity to medical facilities, restaurants, shopping centers, banks and recreational activities.

The peak hour of the generator typically did not coincide with the peak hour of the adjacent street traffic. The A.M. peak hour of the generator typically ranged from 7:00 a.m. to 12:00 p.m. and the P.M. peak hour of the generator typically ranged from 1:00 p.m. to 6:00 p.m.

The sites were surveyed in the 1980s, the 1990s and the 2000s in California, Florida, New Hampshire, New Jersey, Pennsylvania and Canada.

Source Numbers

221, 289, 398, 421, 500, 550, 598, 601, 629, 734

Senior Adult Housing - Detached (251)

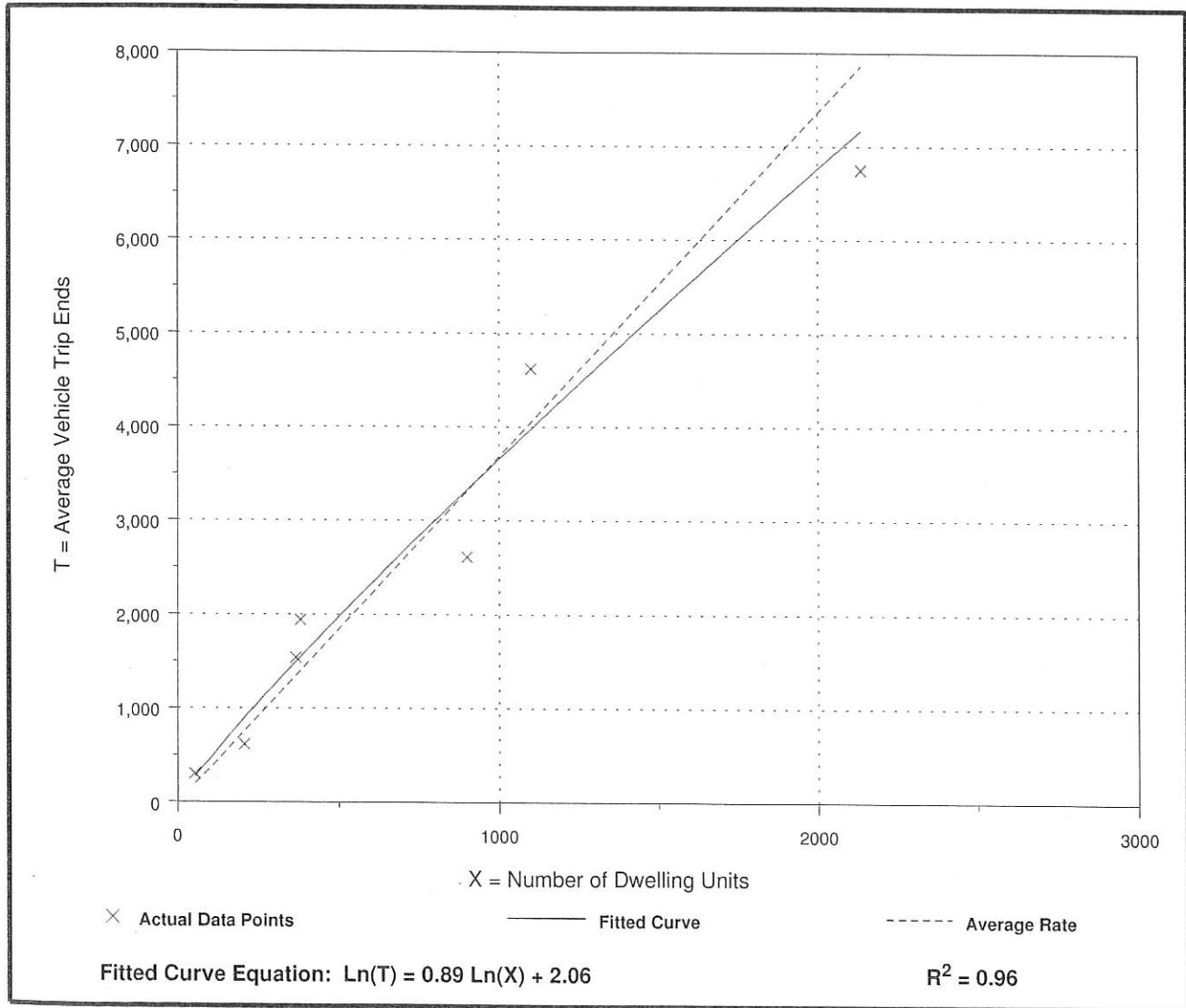
Average Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Number of Studies: 8
Avg. Number of Dwelling Units: 780
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
3.68	2.90 - 5.70	2.04

Data Plot and Equation



Senior Adult Housing - Detached (251)

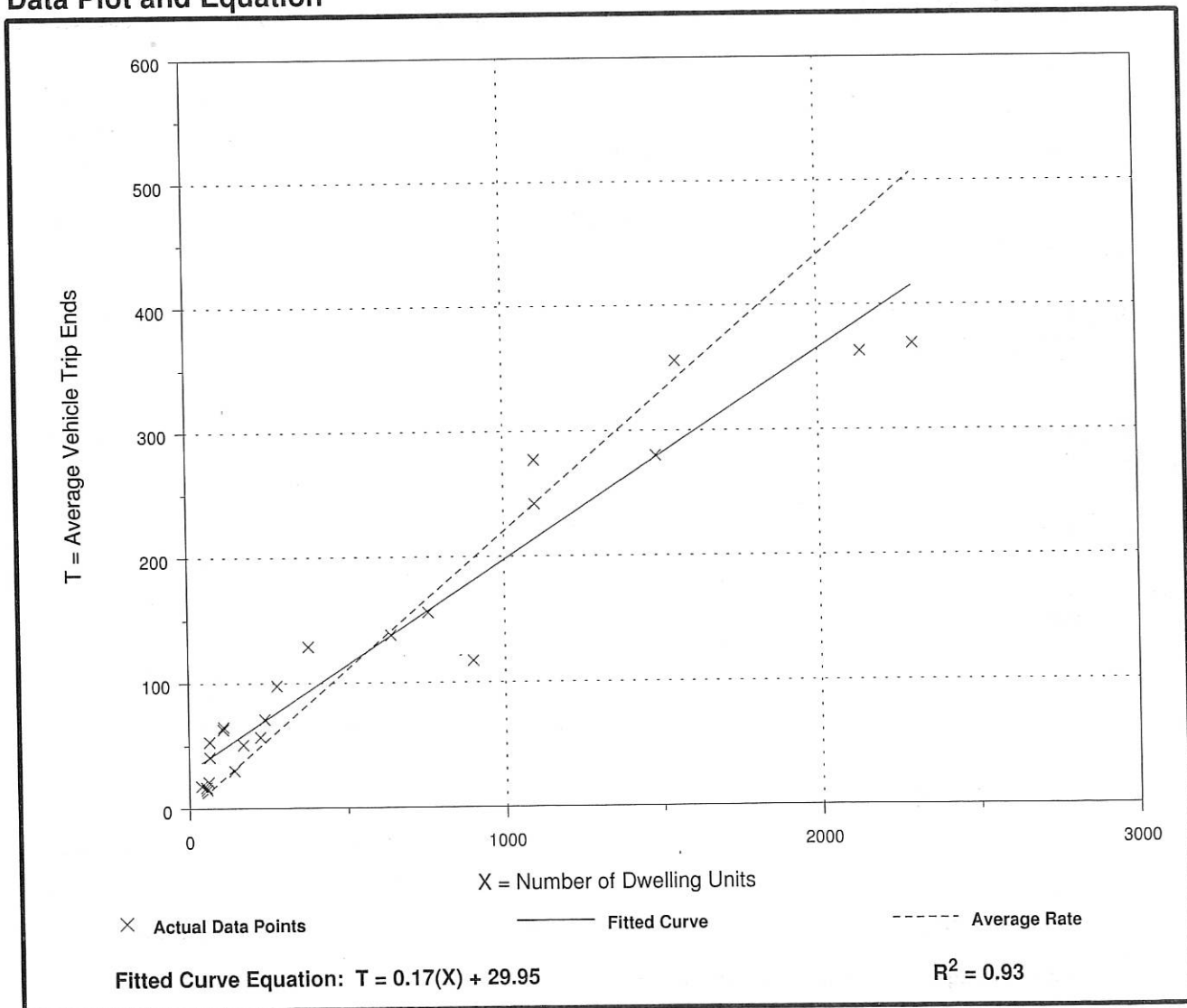
Average Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Number of Studies: 23
 Avg. Number of Dwelling Units: 607
 Directional Distribution: 35% entering, 65% exiting

Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.22	0.13 - 0.84	0.47

Data Plot and Equation



Senior Adult Housing - Detached (251)

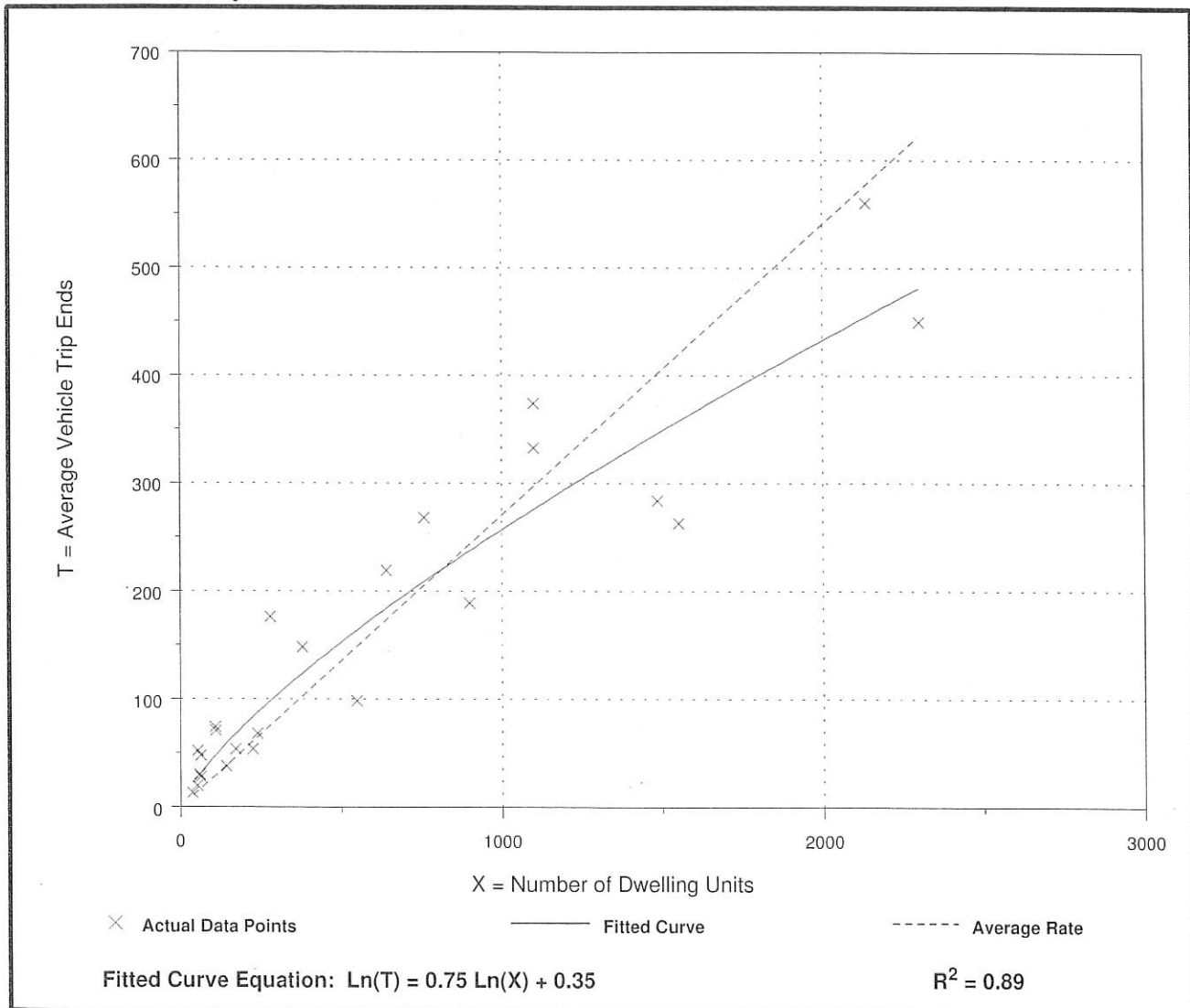
Average Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Number of Studies: 24
Avg. Number of Dwelling Units: 605
Directional Distribution: 61% entering, 39% exiting

Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.27	0.17 - 0.95	0.53

Data Plot and Equation



Land Use: 252

Senior Adult Housing—Attached

Description

Senior adult housing consists of attached independent living developments, including retirement communities, age-restricted housing and active adult communities. These developments may include limited social or recreational services. However, they generally lack centralized dining and on-site medical facilities. Residents in these communities live independently, are typically active (requiring little to no medical supervision) and may or may not be retired. Senior adult housing—detached (Land Use 251), congregate care facility (Land Use 253) and continuing care retirement community (Land Use 255) are related uses.

Additional Data

The peak hour of the generator typically did not coincide with the peak hour of the adjacent street traffic. The A.M. peak hour of the generator typically ranged from 8:30 a.m. to 12:00 p.m. and the P.M. peak hour of the generator typically ranged from 1:00 p.m. to 6:00 p.m. **It should also be noted that in some cases, because of the limited sample size and variation in the data received, the projected trip generation estimate for the independent variable “dwelling units” exceeds the trip generation estimate for the independent variable “occupied dwelling units”. By definition, this is impossible; therefore, knowledge of the project site and engineering judgment should be used to select the appropriate trip generation approximation.**

The sites were surveyed between the 1980s and the 2000s in California, Illinois, Maryland, New Hampshire, New Jersey, Pennsylvania and Canada.

Source Numbers

237, 272, 501, 576, 602, 703, 734, 741

Senior Adult Housing - Attached (252)

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

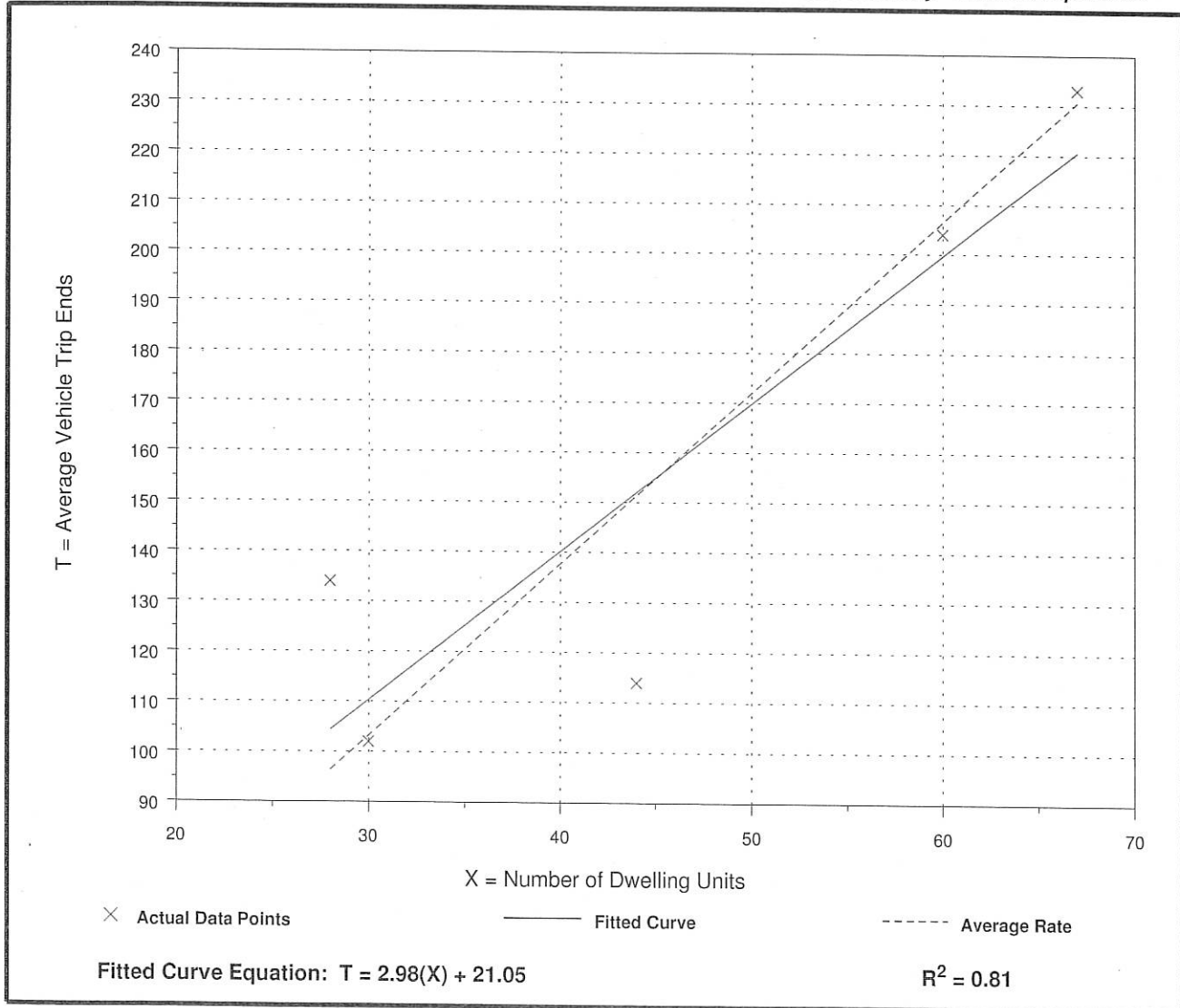
Number of Studies: 5
Avg. Number of Dwelling Units: 46
Directional Distribution: 50% entering, 50% exiting

Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
3.44	2.59 - 4.79	1.93

Data Plot and Equation

Caution - Use Carefully - Small Sample Size



Senior Adult Housing - Attached (252)

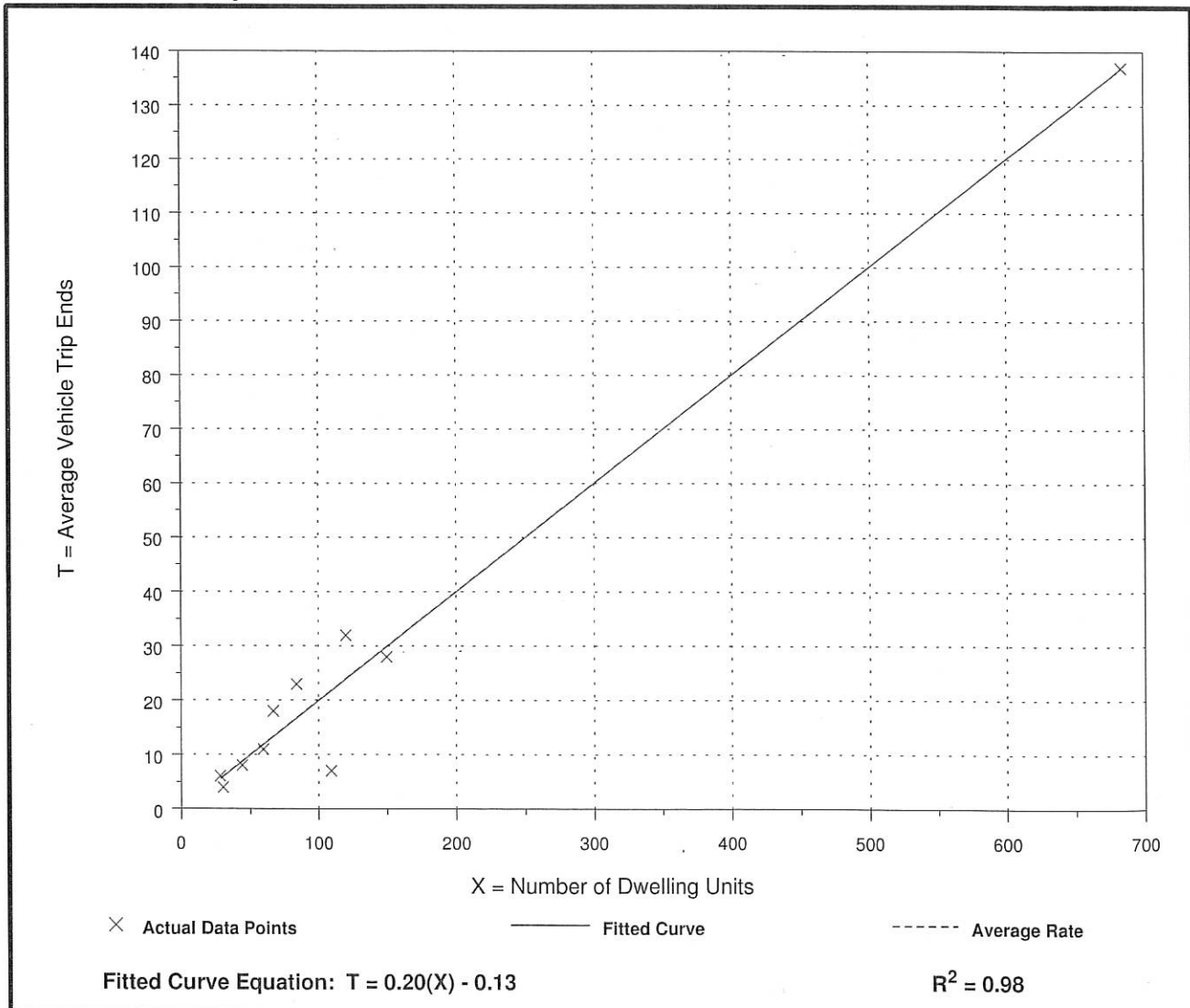
Average Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Number of Studies: 10
 Avg. Number of Dwelling Units: 138
 Directional Distribution: 34% entering, 66% exiting

Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.20	0.06 - 0.27	0.45

Data Plot and Equation



Senior Adult Housing - Attached (252)

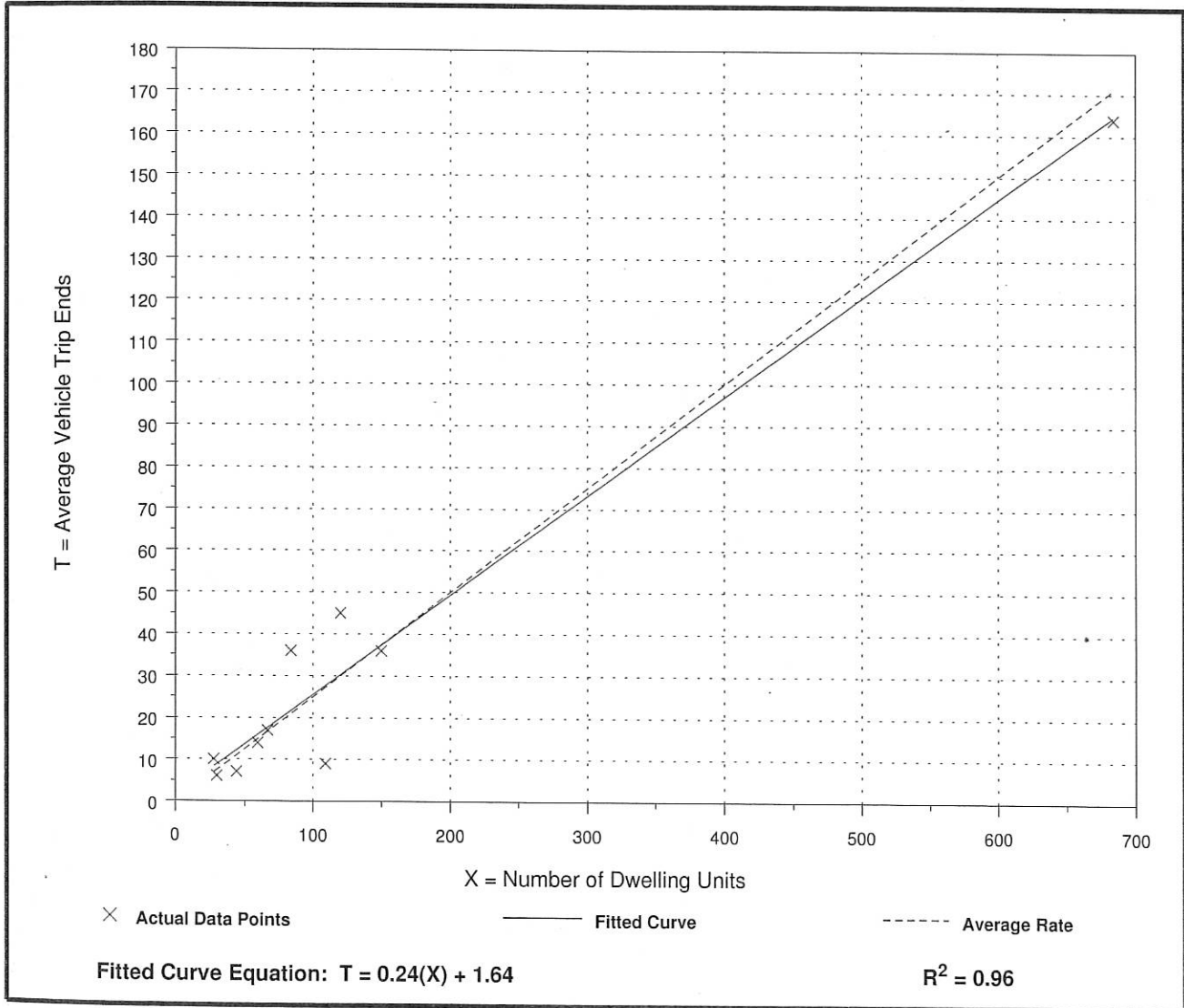
Average Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Number of Studies: 10
 Avg. Number of Dwelling Units: 138
 Directional Distribution: 54% entering, 46% exiting

Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.25	0.08 - 0.43	0.50

Data Plot and Equation



Land Use: 492

Health/Fitness Club

Description

Health/fitness clubs are privately-owned facilities that primarily focus on individual fitness or training. Typically they provide exercise classes; weightlifting, fitness and gymnastics equipment; spas; locker rooms; and small restaurants or snack bars. This land use may also include ancillary facilities, such as swimming pools, whirlpools, saunas, tennis, racquetball and handball courts and limited retail. These facilities are membership clubs that may allow access to the general public for a fee. Racquet/tennis club (Land Use 491), athletic club (Land Use 493) and recreational community center (Land Use 495) are related uses.

Additional Data

The sites were surveyed between the 1970s and the 2000s in California, Connecticut, New Jersey, Pennsylvania and Vermont.

Source Numbers

113, 253, 571, 588, 598, 728

Land Use: 492 Health/Fitness Club

Independent Variables with One Observation

The following trip generation data are for independent variables with only one observation. This information is shown in this table only; there are no related plots for these data.

Users are cautioned to use data with care because of the small sample size.

<u>Independent Variable</u>	<u>Trip Generation Rate</u>	<u>Size of Independent Variable</u>	<u>Number of Studies</u>	<u>Directional Distribution</u>
1,000 Square Feet Gross Floor Area				
Weekday	32.93	15	1	50% entering, 50% exiting
Saturday	20.87	15	1	50% entering, 50% exiting
Sunday	26.73	15	1	50% entering, 50% exiting
Sunday Peak Hour of Generator	2.47	15	1	Not available

Health/Fitness Club (492)

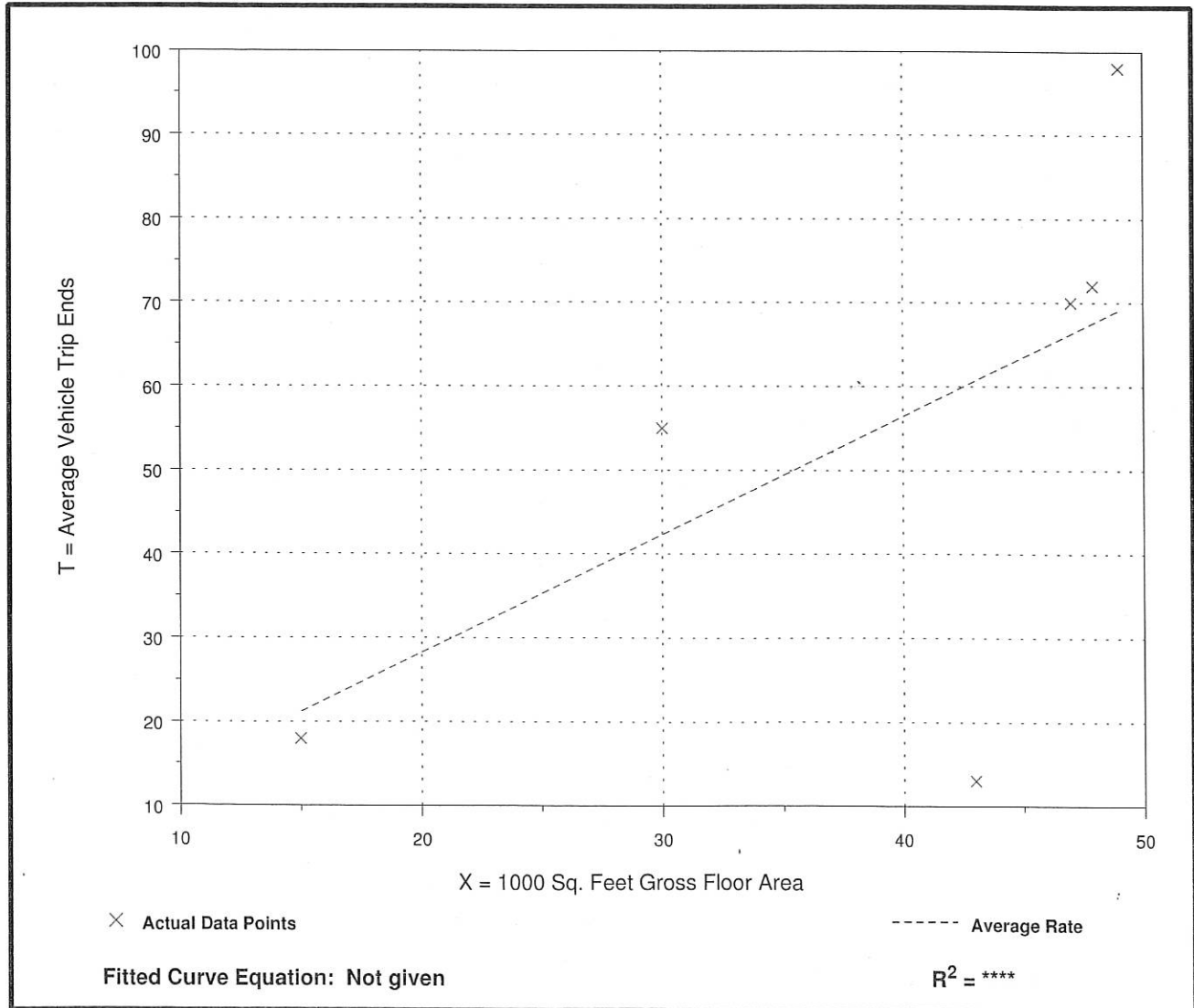
Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Number of Studies: 6
Average 1000 Sq. Feet GFA: 39
Directional Distribution: 50% entering, 50% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
1.41	0.30 - 2.00	1.31

Data Plot and Equation



Health/Fitness Club (492)

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: 6

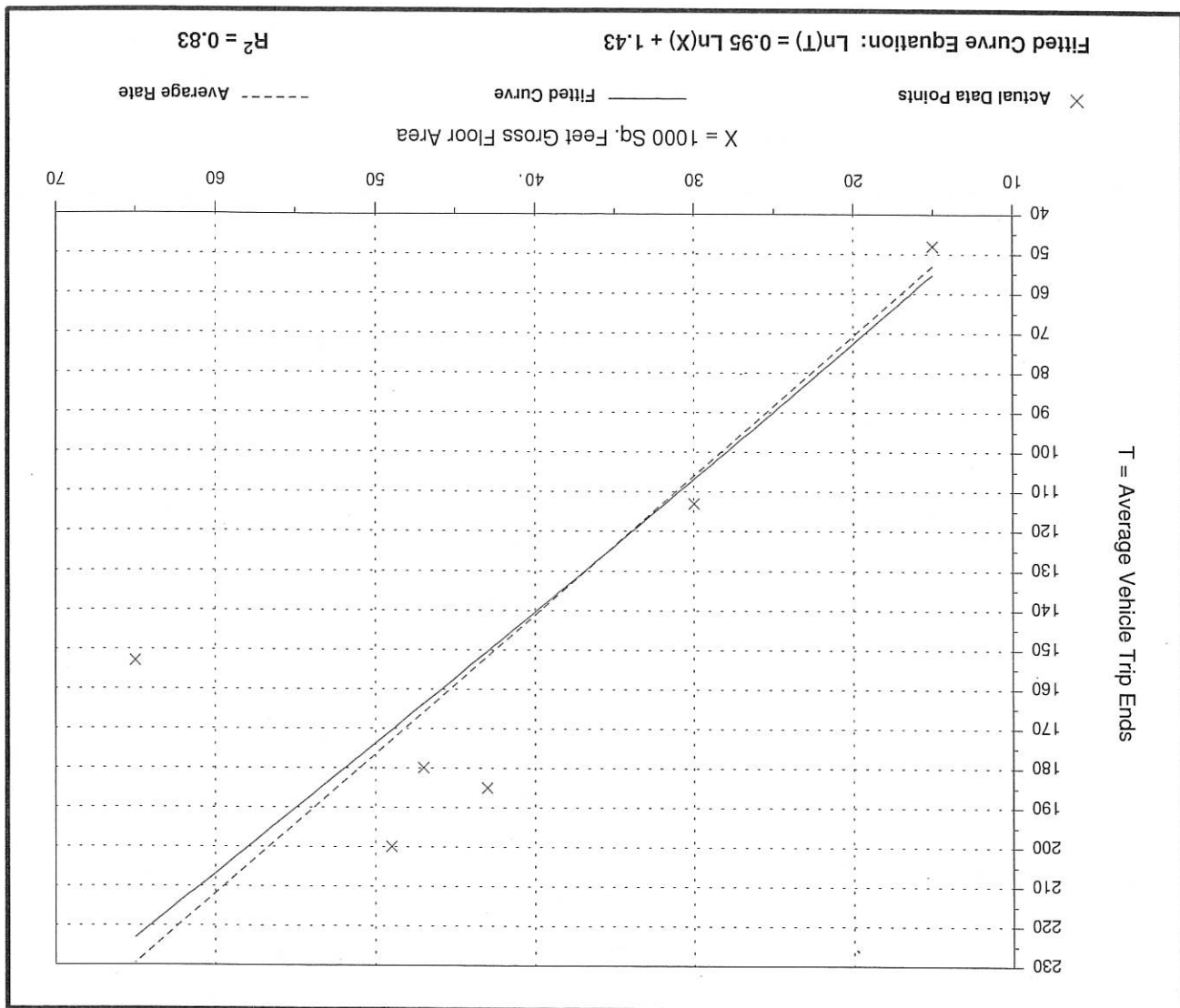
Average 1000 Sq. Feet GFA: 42

Directional Distribution: 57% entering, 43% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	3.53
Range of Rates	2.35 - 4.30
Standard Deviation	2.00

Data Plot and Equation



Land Use: 932

High-Turnover (Sit-Down) Restaurant

Description

This land use consists of sit-down, full-service eating establishments with typical duration of stay of approximately one hour. This type of restaurant is usually moderately priced and frequently belongs to a restaurant chain. Generally, these restaurants serve lunch and dinner; they may also be open for breakfast and are sometimes open 24 hours per day. These restaurants typically do not take reservations. Patrons commonly wait to be seated, are served by a waiter/waitress, order from menus and pay for their meal after they eat. Some facilities contained within this land use may also contain a bar area for serving food and alcoholic drinks. Quality restaurant (Land Use 931), fast-food restaurant without drive-through window (Land Use 933), fast-food restaurant with drive-through window (Land Use 934) and fast-food restaurant with drive-through window and no indoor seating (Land Use 935) are related uses.

Additional Data

Users should exercise caution when applying statistics during the A.M. peak periods, as the sites contained in the database for this land use may or may not be open for breakfast. In cases where it was confirmed that the sites were not open for breakfast, data for the A.M. peak hour of the adjacent street traffic were removed from the database.

Information on approximate hourly variation in high-turnover (sit-down) restaurant traffic is shown in the following table. It should be noted, however, that the information contained in this table is based on a limited sample size. Therefore, caution should be exercised when applying the data. Also, some information provided in the table may conflict with the results obtained by applying the average rate or regression equations. When this occurs, it is suggested that the results from the average rate or regression equations be used, as they are based on a larger number of studies.

High-Turnover (Sit-Down) Restaurant (932)

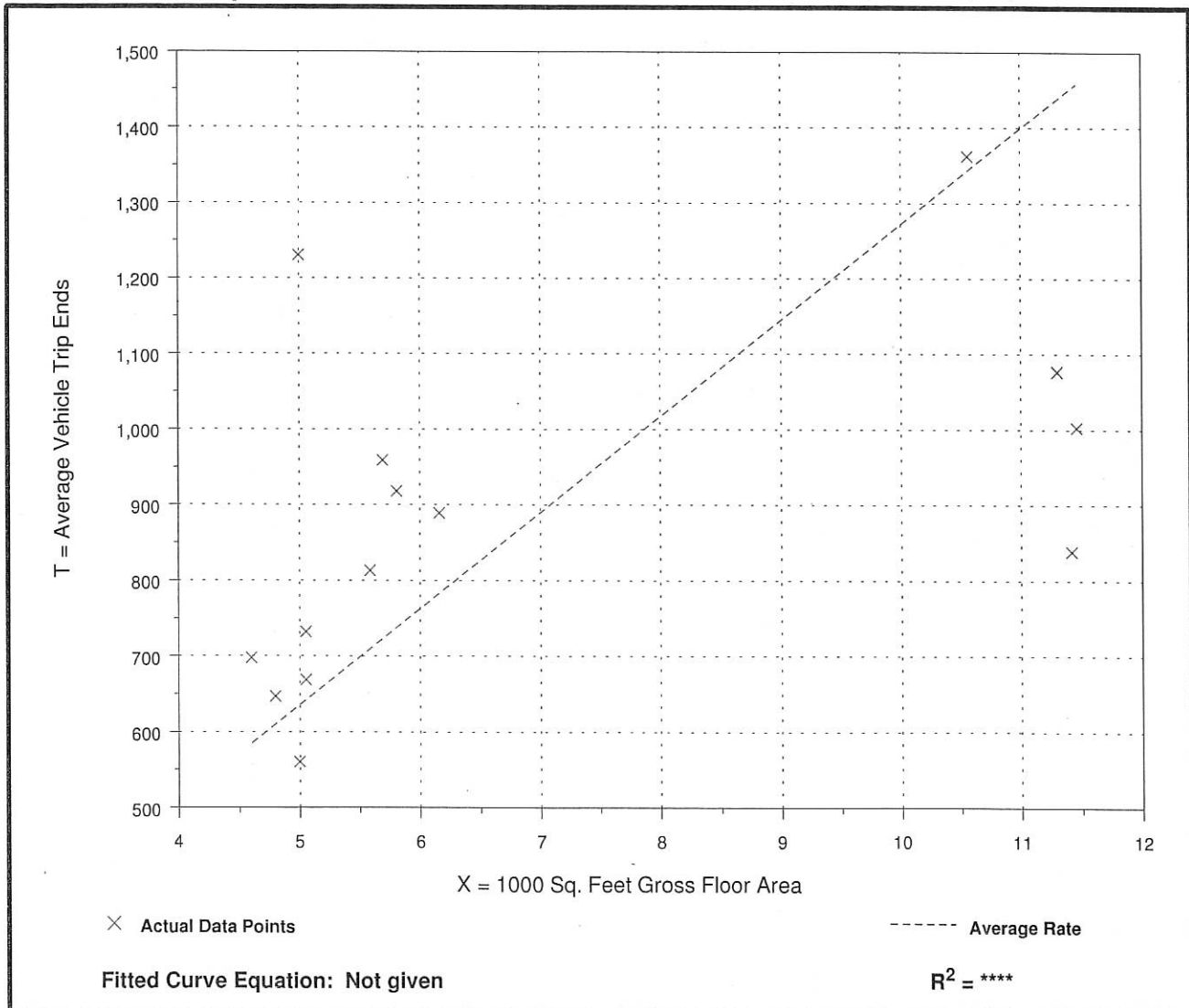
Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area
On a: **Weekday**

Number of Studies: 14
Average 1000 Sq. Feet GFA: 7
Directional Distribution: 50% entering, 50% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
127.15	73.51 - 246.00	41.77

Data Plot and Equation



High-Turnover (Sit-Down) Restaurant (932)

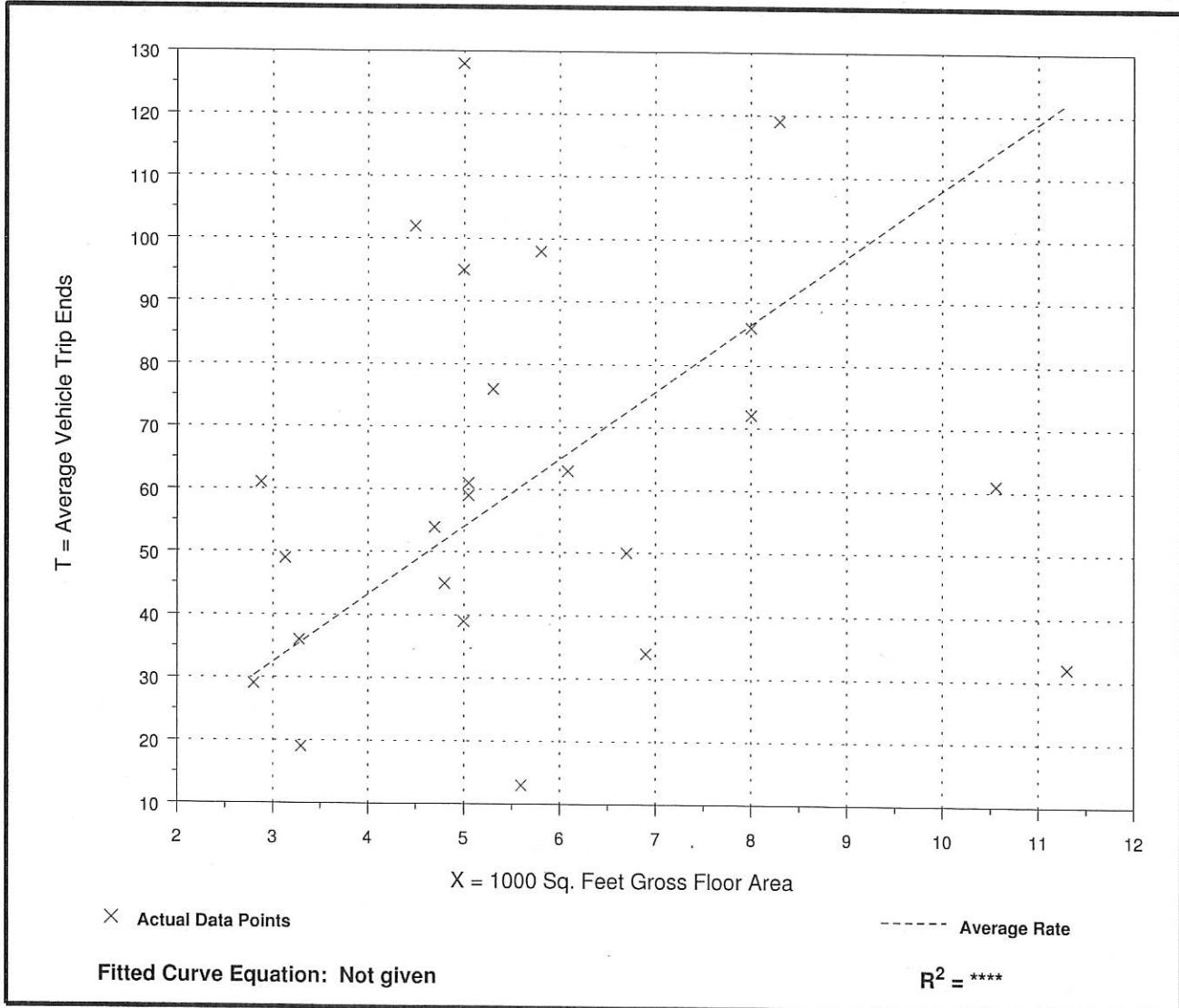
Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Number of Studies: 24
Average 1000 Sq. Feet GFA: 6
Directional Distribution: 55% entering, 45% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
10.81	2.32 - 25.60	6.59

Data Plot and Equation



High-Turnover (Sit-Down) Restaurant (932)

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: 60
Average 1000 Sq. Feet GFA: 6
Directional Distribution: 60% entering, 40% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
9.85	0.92 - 62.00	8.54

Data Plot and Equation

