



San Diego Municipal Code

Land Development Code

Trip Generation Manual

Revised May 2003



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INTRODUCTION

The *Trip Generation Manual* is a collection of information about vehicular traffic that is generated by different land uses. This information is based on studies made to determine how many vehicles enter and exit a site devoted to a particular land use.

The process for a typical trip generation study includes a selection of several (usually four to seven) sites that can be categorized as having the same land use. Next, data regarding various characteristics of these sites is collected. Data collection varies according to the specifics of the subject land use. The collected data could include several different physical parameters attributed to the subject site such as location, lot size, structure size, number of employees, and other units of interest. Individual sites are isolated and traffic counters are placed at every entrance and exit point of these sites. The traffic counts are taken for a period of up to seven days. The results of these counts are compiled to determine daily and peak hour trip generation rates per the independent variable(s) for the subject use. Depending on the specific land use, the independent variable(s) may be square feet, acre, number of employees, dwelling units, rooms, etc. Additional data include the proportion of trips made in the morning and afternoon peak periods and the proportion of peak trips that entered and exited the sites.

The trip generation rates presented in this manual are the result of trip generation studies made by the City of San Diego, the San Diego Association of Governments (SANDAG), the Institute of Transportation Engineers (ITE), and other qualified sources. Where possible, local data was used. A task force made up of staff from the City of San Diego, SANDAG, and private consultants was created to provide input into the formation of this manual.

This manual includes the following information:

<u>TABLE</u>	
<u>NO.</u>	<u>DESCRIPTION</u>

- | | |
|----------|---|
| 1 | Trip Generation Rate Summary - This table includes rates or formulas for the calculation of driveway and cumulative trip generation rates (see Appendix A for definitions). It also includes percentage of trips for AM and PM peak hours. The proportion of trips entering and exiting the sites during the peak hours are also provided. |
| 2 | Regional Shopping Center - Studies show that the trip generation rate for a Regional Shopping Center depends on its size. However, since this relationship is not discrete, the trip generation rate for a Regional Shopping Center is represented as a logarithmic formula. The formula reflects that the number of trips do not increase proportionally to increases in the size of the Regional Shopping Center. Table 2 includes the calculated driveway and cumulative trip generation for selected sizes of Regional Shopping Centers. |

**TABLE
NO.**

DESCRIPTION

- 3** **Commercial Office** - Similar to Regional Shopping Centers, a logarithmic formula is used to determine the trip generation of office buildings. The formula calculates the trip generation rates that increase at a slower rate than the increase in the size of the Commercial Office. Trip generation for selected sizes of Commercial Offices is presented in this table.

- 4** **Additional Trip Generation Rates** - The trip generation rates obtained based on limited data for several specific land uses are included in Table 4. In absence of other information available, these rates may be used as a reference for a similar land use elsewhere.

- 5** **Centre City Cumulative Trip Generation Rates** - The trip generation rates in the Centre City area are generally lower than the rates elsewhere in the city. This is due to higher share of mass transit in mode split, high density of land use, high proportion of “walk” trips, parking availability, and parking costs.

- 6** **Centre City Trip Generation Look-Up Table** - The logarithmic formulas for Regional Shopping Centers and Commercial Offices in Centre City are calculated for selected sizes.

- 7** **Facilities Financing** - The trip generation rates for the purpose of fee collection toward financing the required infrastructure are in this table.

Appeal Process: The procedure to appeal a particular trip rate is included in the last section.

Appendices: General terms, physical land use parameters, definition of land use categories for trip generation purposes, and the City's land use zones are provided in the appendices.

Other Resources: Two other useful publications that assist in project traffic impact analysis are: the City's *Traffic Impact Study Manual*, prepared by the Transportation Development Section, Development Services Department; and the City's *Street Design Manual*. Both publications may be obtained from the Records Section of the Development Services Department, 1222 First Avenue, second floor.

TABLES 1-6 [NO CHANGE IN TEXT]

TRIP GENERATION RATES FOR FACILITIES FINANCING PURPOSES

LAND USE	VEHICLE TRIP RATE
AGRICULTURE (OPEN SPACE)	2 trips/acre
AIRPORT	
Commercial	100 trips/flight; 12 trips/acre
General Aviation	2 trips/daily flight; 6 trips/acre
Hangar	6 trips/aircraft
CEMETERY	5 trips/acre
COMMERCIAL-RETAIL	
Auto Parts Sales	56 trips/1,000 sq. ft.
Auto Repair Center	20 trips/1,000 sq. ft.
Auto Service & Gas Stations:	
Gasoline service station	20 trips/pump dispenser
Gasoline station with food mart ⁽⁴⁾	40 trips/1,000 sq. ft. + pump dispenser rate
Oil change and lubrication service	40 trips/1,000 sq. ft.
Tire store	23 trips/1,000 sq. ft.; 27 trips/service stall
Truck repair facility with office	140 trips/site
Automotive Sales:	
Car dealer	22 trips/1,000 sq. ft.
Car dealer storage	6.5 trips/1,000 sq. ft.
Recreational vehicle dealer	200 trips/acre
Car Wash:	
Full service	450 trips/site
Self-serve	0 trip/site (if complimentary)
Coin-operated	108 trips/stall
Catering Company	20 trips/1,000 sq. ft.
Convenience Market Chain ⁽⁴⁾	40 trips/1,000 sq. ft.
Discount Store/Discount Club	40 trips/1,000 sq. ft.
Drugstore	40 trips/1,000 sq. ft.
Equipment Manufacturing and Retail	1,069 trips/site
Furniture Store	5.4 trips/1,000 sq. ft.
Grocery/Convenience Market	25 trips/1,000 sq. ft.
Lumber/Home Improvement Store	27 trips/1,000 sq. ft.
Nursery	36 trips/1,000 sq. ft.
Restaurant:	
Quality	40 trips/1,000 sq. ft.
High Turnover (sit down)	40 trips/1,000 sq. ft.
Fast Food (with or without drive-through)	40 trips/1,000 sq. ft.
Shopping Center:	
Neighborhood (30,000 sq. ft. or more GLA on 4 or more acres)	60 trips/1,000 sq. ft.
Community (100,000 sq. ft. or more GLA on 10 or more acres)	70 trips/1,000 sq. ft.
Regional (300,000 sq. ft. or more GLA) ⁽²⁾	$0.8 [\ln(T) = 0.756 \ln(x) + 5.25]$ *
Specialty Retail Center/Strip Commercial	36 trips/1,000 sq. ft.
Supermarket	40 trips/1,000 sq. ft.
EDUCATION	
Day Care Center	80 trips/1,000 sq. ft.
Elementary School	39 trips/1,000 sq. ft.
Junior High/Middle School	12 trips/1,000 sq. ft.
High School	11 trips/1,000 sq. ft.
Community College (2 years)	18 trips/1,000 sq. ft.
University (4 years or higher)	100 trips/acre
University Seminar Facility	4.0 trips/1,000 sq. ft.

* See Table 2

**TRIP GENERATION RATES
FOR FACILITIES FINANCING PURPOSES**

LAND USE	VEHICLE TRIP RATE
FINANCIAL INSTITUTION	
Automated Teller Machine (ATM) ⁽³⁾	260 trips/ATM (stand-alone)
Bank or Credit Union:	
Excluding drive-through	112.5 trips/1,000 sq. ft.
With drive-through	150 trips/1,000 sq. ft.
Drive-through only	187.5 trips/1,000 sq. ft.
HEALTH CARE	
Convalescent/Nursing	3 trips/bed
General	20 trips/1,000 sq. ft.
Residential Care Facility	2 trips/bed
Substance Rehabilitation Center	4 trips/bed
HOUSE OF WORSHIP	
General	9 trips/1,000 sq. ft.
Without School or Day Care	5 trips/1,000 sq. ft.
INDUSTRIAL	
Asphalt Batch Plant	100 trips/usable acre
Industrial/Business Park (some commercial included)	16 trips/1,000 sq. ft.
Industrial Park, Large *	8 trips/1,000 sq. ft.
Industrial Park, Small *	15 trips/1,000 sq. ft.
Manufacturing/Assembly	4 trips/1,000 sq. ft.
Mining Operation	100 trips/gross usable acre
Rental Storage	2 trips/1,000 sq. ft.
Sand/Gravel Quarry Mine	100 trips/gross usable acre
Scientific Research and Development	8 trips/1,000 sq. ft.
Truck Terminal	10 trips/1,000 sq. ft.
Warehousing	5 trips/1,000 sq. ft.
LIBRARY	
Less than 100,000 sq. ft.	20 trips/1,000 sq. ft.
100,000 sq. ft. or more	16 trips/1,000 sq. ft.
LODGING	
Hotel (w/convention facilities/restaurant)	10 trips/room
Motel	9 trips/room
Resort Hotel	8 trips/room
MILITARY BASE	
	2.5 trips/employee (military or civilian)
OFFICE	
Commercial Office ⁽⁴⁾	$\ln(T) = 0.756 \ln(x) + 3.95$ **
Corporate Headquarters/Single Tenant Office	10 trips/1,000 sq. ft.
Court Facility	40 trips/1,000 sq. ft.
Department of Motor Vehicles	20 trips/1,000 sq. ft.
Express Shipping Distribution Center	10 trips/1,000 sq. ft.
Government Office (Civic Center):	
Less than 100,000 sq. ft.	20 trips/1,000 sq. ft.
100,000 sq. ft. or more	16 trips/1,000 sq. ft.
Medical Office:	
Less than 100,000 sq. ft.	20 trips/1,000 sq. ft.
100,000 sq. ft. or more	16 trips/1,000 sq. ft.

* Some local serving commercial included

** See Table 3

**TRIP GENERATION RATES
FOR FACILITIES FINANCING PURPOSES**

LAND USE	VEHICLE TRIP RATE
OFFICE (continued)	
Post Office:	
Less than 100,000 sq. ft.	20 trips/1,000 sq. ft.
100,000 sq. ft. or more	16 trips/1,000 sq. ft.
Research and Development (may include light manufacturing)	18 trips/1,000 sq. ft.
RECREATION	
Auditorium	0.6 trip/1,000 sq. ft.
Bowling Center	30 trips/lane
Bungee Jumping Tower	115 trips/site
Golf Course	600 trips/course
Marina	4 trips/berth
Movie Theater	80 trips/1,000 sq. ft.; 1.8 trips/seat
Park:	
Beach, Ocean or Bay	600 trips/1,000 sq. ft. of shoreline
Developed	50 trips/acre
Undeveloped	5 trips/acre
Racquetball/Tennis/Health Club	40 trips/1,000 sq. ft.
Roller Skating Rink	40 trips/1,000 sq. ft.
San Diego Zoo	115 trips/acre
Sea World	80 trips/acre
Sport Facility:	
Indoor	30 trips/acre
Outdoor	50 trips/acre
Swimming Pool	3.1 trips/parking space
RESIDENTIAL	
Convent	2 trips/room
Estate Housing	12 trips/dwelling unit
Mobile Home	5 trips/dwelling unit
Multiple Dwelling Unit:	
Under 20 dwelling units/ acre	8 trips/dwelling unit
Over 20 dwelling units/ acre	6 trips/dwelling unit
Physically Disabled Residence	4.5 trips/dwelling unit
Recreational Vehicle Park	3 trips/hook up
Recreational Vehicle Monthly Rental	2 x 1/(T.O.) x number of hookups x 0.85
Retirement/Senior Citizen Housing	4 trips/dwelling unit
Single Dwelling Unit:	
Urbanized Area	9 trips/dwelling unit
Urbanizing Area	10 trips/dwelling unit
Single Resident Occupancy	2.5 trips/room
SOCIAL SERVICES	
Homeless Shelter	2 trips/bed
Salvation Army	610 trips/1,000 sq. ft.
Senior Citizen's Center	2 trips/parking space
Work Furlough Facility	4 trips/bed
TRANSPORTATION FACILITIES	
Bus Depot	25 trips/1,000 sq. ft.
Park & Ride Lots	400 trips/acre; 600 trips/paved acre
Transit Station (rail)	300 trips/acre

Notes:

- (1) For each 750 sq. ft. (or any portion thereof greater than 500 sq. ft.) of convenience store floor area, a discount of 50% shall be applied to one automotive fuel dispensing position. All other dispensing positions shall be charged the normal rate.
- (2) Refer to note 6 (page 6) under Table 1.
- (3) If any ATM is new to an institution, the rate is also 260 trips/ATM.
- (4) Refer to note 6 (page 6) under Table 1.

APPEAL PROCESS

The trip generation rates in this manual may be appealed if the proposed project is unique and does not conform to the land uses in the City's *Trip Generation Manual*. A trip generation study of similar sites must be conducted by a registered traffic engineer. The study method must be approved in advance by the City before the study may be conducted.

Prior to conducting a trip generation study, the consultant must meet with the City's Transportation Development Section of the Development Services Department to discuss the appeal. The purpose of the meeting is to decide if it is appropriate to have a separate trip rate for the particular land use in question, and if so, how the trip generation study is to be conducted. The methodology must be approved by the Transportation Development Section in advance of the trip generation study.

A study of several sites is typically required for the trip generation study. Typically four study sites are desired. All study sites and procedures must be approved by the Transportation Development Section in advance. The studies will require a twenty-four-hour machine count at each driveway site for a minimum of two days. Additional days, or specific days of the week, may be required depending on the land use being studied.

Once the sites and the procedures have been approved, the data collection may begin. The completed field count data would then be submitted to the Transportation Development Section with a summary of the proposed trip generation rate for the studied land use. This data should be supplemented with an explanation of why the proposed trip generation rate should be used instead of the City's trip generation rate.

The Senior Traffic Engineer of the Transportation Development Section will review and comment on the trip generation study. If approved, the consultant may use the new trip generation rate for the traffic study of the project with unique character. The Transportation Development Section will inform the Facilities Financing Section and the Transportation Planning Division when a new rate is approved for the studied land use.

APPENDICES

- A. DEFINITIONS AND GENERAL TERMS**
- B. PHYSICAL LAND USE PARAMETERS**
- C. DEFINITION OF LAND USE CATEGORIES
FOR TRIP GENERATION PURPOSES**
- D. CITY'S LAND USE ZONES**

APPENDICES A-D [NO CHANGE IN TEXT]