500—Institutional

501—Military Base

Description: All military bases surveyed were located in San Diego. Actual study sites were confidential and are not available.

Average weekday vehicle trip ends ranged from 4,004 to 25,600. Number of employees ranged from 1,575 to 25,613, number of vehicles from 3,067 to 40,000.

Trip Characteristics: An analysis of the correlation between average weekday vehicle trip ends and the two available variables was made to determine the best variable for predicting vehicle trip ends. This analysis showed that the number of vehicles had the highest correlation (.958). Since the number of employees also had a high correlation (.898), trip generation rates were developed for both independent variables.

On the average, military bases generate 1.8 vehicle trip ends per employee and 0.9 per vehicle.

Data Limitations: The data are only for military bases located in California and only represent seven sites. They do not give any person but only vehicle trip ends.

SUMMARY OF TRIP GENERATION RATES

Land Use/Building Type: Military Base — ITE Land Use Code: 501

Independent Variable—Trips per: Employee

			Average Trip Rate	Maximum Rate	Minimum Rate	Correlation Coefficient	Number of Studies	Average Size of Independent Variable/Study
Average Weekday Vehicle Trip Ends			1.8	4.1	1.0		7	7747
Peak Hour of Adjacent Street Traffic	A.M. Between 7 and 9	Enter						
		Exit						
		Total						
	P.M. Between 4 and 6	Enter						
		Exit						
		Total						
Peak Hour of Generator	A.M.	Enter						
		Exit						
		Total						
	P.M.	Enter						
		Exit						
		Total						
Saturday Vehicle Trip Ends								
Peak Hour of Generator		Enter						
		Exit						
		Total						
Sunday Vehicle Trip Ends								
Peak Hour of Generator		Enter						
		Exit						
		Total						

Source Numbers: 18

ITE Technical Committee 6A-6—Trip Generation Rates

Date: 1975

SUMMARY OF TRIP GENERATION RATES

Land Use/Building Type: Military Base — ITE Land Use Code: 501

Independent Variable—Trips per: Vehicle

			Average Trip Rate	Maximum Rate	Minimum Rate	Correlation Coefficient	Number of Studies	Average Size of Independent Variable/Study
Average Weekday Vehicle Trip Ends			0.9	2.3	0.6		7	16002
Peak Hour of Adjacent Street Traffic	A.M. Between 7 and 9	Enter						
		Exit						
		Total						
	P.M. Between 4 and 6	Enter						
		Exit						
		Total						
Peak Hour of Generator	A.M.	Enter						
		Exit						
		Total						
	P.M.	Enter						
		Exit						
		Total						
Saturday Vehicle Trip Ends								
Peak Hour of Generator		Enter						
		Exit						
		Total						
Sunday Vehicle Trip Ends								
Peak Hour of Generator		Enter						
		Exit						
		Total						

Source Numbers: 18

ITE Technical Committee 6A-6—Trip Generation Rates

Date: 1975

520—Elementary School

Description: Elementary schools serve students between the kindergarten and high school levels. Usually, they are centrally located in residential communities in order to facilitate access by the young students they are designed to serve. In terms of travel modes, elementary students generally use school buses more than regular transit and are "dropped off" and "picked up" more than high school students, who are apt to walk longer distances, bicycle and, in some cases, drive cars. The elementary school sites surveyed exhibited significant variations in terms of facilities provided per student.

SUMMARY OF TRIP GENERATION RATES

Land Use/Building Type: Elementary Schools — ITE Land Use Code: 520

Independent Variable—Trips per: Employee

			Average Trip Rate	Maximum Rate	Minimum Rate	Correlation Coefficient	Number of Studies	Average Size of Independent Variable/Study
Average Weekday Vehicle Trip Ends			13.10	26.4	4.5		40	55
Peak Hour of Adjacent Street Traffic	A.M. Between 7 and 9	Enter						
		Exit						
		Total	2.94				1	151
	P.M. Between 4 and 6	Enter						
		Exit						
		Total	0.28				1	151
Peak Hour of Generator	A.M.	Enter	2.03				1	151
		Exit	0.91				1	151
		Total	3.39	7.6	1.2		40	55
	P.M.	Enter	0.70				1	151
		Exit	1.30				1	151
		Total	3.03	10.3	1.0		40	55
Saturday Vehicle Trip Ends								
Peak Hour of Generator		Enter						
		Exit						
		Total						
Sunday Vehicle Trip Ends								
Peak Hour of Generator		Enter						
		Exit						
		Total						

Source Numbers: 32, 86

ITE Technical Committee 6A-6—Trip Generation Rates

Date: 1979

SUMMARY OF TRIP GENERATION RATES

Land Use/Building Type Elementary Schools ITE Land Use Code 520

Independent Variable—Trips per Student

			Average Trip Rate	Maximum Rate	Minimum Rate	Correlation Coefficient	Number of Studies	Average Size of Independent Variable/Study
Average Weekday Vehicle Trip Ends			1.02	1.8	0.5		40	714
Peak Hour of Adjacent Street Traffic	A.M. Between 7 and 9	Enter						
		Exit						
		Total	0.15	0.16	0.15		2	1580
	P.M. Between 4 and 6	Enter						
		Exit						
		Total	0.03	0.20	0.01		2	1583
Peak Hour of Generator	A.M.	Enter	0.11				1	2860
		Exit	0.05				1	2860
		Total	0.26	0.55	0.11		40	714
	P.M.	Enter	0.04				1	2860
		Exit	0.07				1	2860
		Total	0.24				41	704
Saturday Vehicle Trip Ends								
Peak Hour of Generator		Enter						
		Exit						
		Total						
Sunday Vehicle Trip Ends								
Peak Hour of Generator		Enter						
		Exit						
		Total						

Source Numbers 32, 86

ITE Technical Committee 6A-6—Trip Generation Rates

Date: Rev. 1979

530—High School

Description: High schools are for students between the elementary and junior college or university levels. Those analyzed were generally separated from other land uses and had exclusive access points, parking facilities, etc. Acreage and floor space varied with populations served and the social and economic characteristics of the areas. The sites surveyed ranged from student populations of 700 to 2,900; floor areas of 89,000 to 540,000 square feet; and acreage from 12.5 to 54.

Correspondingly, there was a wide range in ratios such as square feet per student—from a low of 54 to a high of 410. There was also a wide disparity in parking spaces, ranging from 0.41 to 0.90 per student and 1.4 to 5.5 per staff member.

Trip Characteristics: Transit use data were available for four of the high schools surveyed and show significant use by students. Three sites showed above 30 percent use. The data did not differentiate between use by regular transit service and that by special school bus.

The site peak traffic for all of the locations surveyed occurred in the morning. The site P.M. peak hour was generally beginning at 3, which would be different from the adjacent street peak in most cases.

As shown on the following table, the high schools studied generated on the average 1.39 vehicle trip ends per student per average day.

Data Limitations: Due to the high transit use found, it is desirable that future surveys include related details. Information detailing number of students served by school bus would enable analyses to be refined to present trips per nonschool bus student. Since information on busing programs for most schools would normally be readily available, this refinement could prove useful in projecting high school trip ends. Since the purpose of trip generation is to enable the engineer to evaluate impact on the adjacent street system and access requirements, information on drop-off/pick-up trips versus trips with "ends" within the study sites could also prove useful. More analyses are needed for high schools.

SUMMARY OF TRIP GENERATION RATES

Land Use/Building Type: High School — ITE Land Use Code: 530

Independent Variable—Trips per: Student

			Average Trip Rate	Maximum Rate	Minimum Rate	Correlation Coefficient	Number of Studies	Average Size of Independent Variable/Study
Average Weekday Vehicle Trip Ends			1.39	2.49	0.71		27	1252
Peak Hour of Adjacent Street Traffic	A.M. Between 7 and 9	Enter						
		Exit						
		Total	0.27	0.54	0.14		2	1024
	P.M. Between 4 and 6	Enter						
		Exit						
		Total	0.20	0.48	0.06		2	1024
Peak Hour of Generator	A.M.	Enter	0.19	0.27	0.14		4	1674
		Exit	0.07	0.09	0.04		4	1674
		Total	0.30	0.47	0.14		27	1252
	P.M.	Enter	0.07	0.11	0.03		4	1674
		Exit	0.13	0.20	0.07		4	1674
		Total	0.27	1.80	0.10		28	1231
Saturday Vehicle Trip Ends			0.77	1.21	0.59		2	2027
Peak Hour of Generator		Enter	0.11	0.21	0.07		2	2027
		Exit	0.04	0.05	0.02		2	2027
		Total	0.15	0.22	0.12		2	2027
Sunday Vehicle Trip Ends			0.23	0.43	0.15		2	2027
Peak Hour of Generator		Enter	0.01	0.01	0.01		2	2027
		Exit	0.01	0.03	0.01		2	2027
		Total	0.02	0.04	0.01		2	2027

Source Numbers: 31, 33, 34, 86

ITE Technical Committee 6A-6—Trip Generation Rates

Date: 1975, Rev. 1979

SUMMARY OF TRIP GENERATION RATES

Land Use/Building Type: High School — ITE Land Use Code: 530

Independent Variable—Trips per: Employee

			Average Trip Rate	Maximum Rate	Minimum Rate	Correlation Coefficient	Number of Studies	Average Size of Independent Variable/Study
Average Weekday Vehicle Trip Ends			455	937	4		27	508
Peak Hour of Adjacent Street Traffic	A.M. Between 7 and 9	Enter						
		Exit						
		Total						
	P.M. Between 4 and 6	Enter						
		Exit						
		Total						
Peak Hour of Generator	A.M.	Enter						
		Exit						
		Total	3.46	5.95	0.54		21	103
	P.M.	Enter						
		Exit						
		Total	2.70	5.38	1.13		21	103
Saturday Vehicle Trip Ends								
Peak Hour of Generator		Enter						
		Exit						
		Total						
Sunday Vehicle Trip Ends								
Peak Hour of Generator		Enter						
		Exit						
		Total						

Source Numbers: 86

ITE Technical Committee 6A-6—Trip Generation Rates

Date: 1979

540—Junior/Community College

Description: Included in this grouping were all two- and four-year educational institutions which called themselves a junior college, community college or college. Those identifying themselves as universities were grouped as such. This method of grouping was used because the available data did not always identify whether the institution had a two- or four-year curriculum. Hence, the more desirable two-year versus four-year distinction was not possible.

Trip Characteristics: The data summarized in tabular form shows a considerable variation in student population, ranging from a low of 700 students to a high of 14,317. Although a number of institutions also had sizable evening programs, their trip rate characteristics did not vary significantly from institutions having day programs only. The student population appeared to be the best and most consistent basis for establishing travel rates since other identifiable parameters such as numbers of staff, parking accommodations, campus acreage and building area varied considerably between institutions. The correlation coefficient between total students and average weekday vehicle trip ends was calculated at 0.864.

Data Limitations: Although the sample size (19) on which the generating equation is based is reasonable, the availability of additional data would have allowed greater refinement in developing a family of equations for use with varied situations.

SUMMARY OF TRIP GENERATION RATES

Land Use/Building Type: Junior/Community College — ITE Land Use Code: 540

Independent Variable—Trips per: Student

			Average Trip Rate	Maximum Rate	Minimum Rate	Correlation Coefficient	Number of Studies	Average Size of Independent Variable/Study
Average Weekday Vehicle Trip Ends			1.55	2.90	0.94		18	5985
Peak Hour of Adjacent Street Traffic	A.M. Between 7 and 9	Enter	0.15	0.19	0.12		7	5672
		Exit	0.02	0.06	0.01		7	5672
		Total	0.18	0.25	0.13		7	5672
	P.M. Between 4 and 6	Enter	0.04	0.09	0.01		7	5672
		Exit	0.08	0.19	0.02		7	5672
		Total	0.12	0.29	0.04		7	5672
Peak Hour of Generator	A.M.	Enter	0.16	0.19	0.12		7	5672
		Exit	0.03	0.26	0.01		7	5672
		Total	0.18	0.43	0.13		7	5672
	P.M.	Enter	0.05	0.18	0.01		7	5672
		Exit	0.11	0.25	0.07		7	5672
		Total	0.16	0.44	0.10		7	5672
Saturday Vehicle Trip Ends								
Peak Hour of Generator		Enter						
		Exit						
		Total						
Sunday Vehicle Trip Ends								
Peak Hour of Generator		Enter						
		Exit						
		Total						

Source Numbers: 7, 8, 9, 10, 14, 18, 40, 67

ITE Technical Committee 6A-6—Trip Generation Rates

Date: 10/15/75

550—University

Description: The institutions grouped together in the university category were so grouped solely on the basis of their being called universities. Those called a college of some sort—because a number of them could not be identified as two- or four-year institutions—were grouped in the college category (540).

Trip Characteristics and Data Limitations: Sufficient data were not available to allow the development of a satisfactory explainer equation. Average weekday vehicle trip end rates varied from a low of 1.40 per student for an institution of very modest size (1,176 students) to a high of 3.89. The largest institution (student population: 23,157) had a trip rate of 2.36. Considerably more data should be obtained on universities. Additionally, when it is possible to identify the curriculum lengths at all of the colleges, it would be interesting to rework the data to see what differences two-year versus four-year programs might make for this study's data base.

SUMMARY OF TRIP GENERATION RATES

Land Use/Building Type: University — ITE Land Use Code: 550

Independent Variable—Trips per: Student

			Average Trip Rate	Maximum Rate	Minimum Rate	Correlation Coefficient	Number of Studies	Average Size of Independent Variable/Study
Average Weekday Vehicle Trip Ends			2.41	3.89	1.40		5	9875
Peak Hour of Adjacent Street Traffic	A.M. Between 7 and 9	Enter						
		Exit						
		Total						
	P.M. Between 4 and 6	Enter						
		Exit						
		Total						
Peak Hour of Generator	A.M.	Enter						
		Exit						
		Total						
	P.M.	Enter						
		Exit						
		Total						
Saturday Vehicle Trip Ends								
Peak Hour of Generator		Enter						
		Exit						
		Total						
Sunday Vehicle Trip Ends								
Peak Hour of Generator		Enter						
		Exit						
		Total						

Source Numbers: 18, 26

ITE Technical Committee 6A-6—Trip Generation Rates

Date: 10/15/75

590—Library

Description: Libraries include universities and other public and private facilities.

Trip generation information was found for only two libraries. These ranged between 23 and 50 employees and between 25,000 and 60,000 square feet of gross floor area. Both were located in suburban central business districts within an SMSA.

Trip Generation Characteristics: Since there were only two observations, no correlation analysis was performed for libraries to determine which independent variables were most relevant. On the average, libraries were found to generate 51 weekday vehicle trip ends per employee and 41.8 weekday vehicle trip ends per 1,000 square feet of gross floor area. See the summary tables for peak hour and Saturday and Sunday generation rates.

Data Limitations: Two libraries are not sufficient as a sample on which to base trip generation rates. More data are sorely needed.

SUMMARY OF TRIP GENERATION RATES

Land Use/Building Type: Library — ITE Land Use Code: 590

Independent Variable—Trips per: Employee

			Average Trip Rate	Maximum Rate	Minimum Rate	Correlation Coefficient	Number of Studies	Average Size of Independent Variable/Study
Average Weekday Vehicle Trip Ends			51.0	81.9	36.8		2	36.5
Peak Hour of Adjacent Street Traffic	A.M. Between 7 and 9	Enter						
		Exit						
		Total						
	P.M. Between 4 and 6	Enter						
		Exit						
		Total						
Peak Hour of Generator	A.M.	Enter	1.4				1	50
		Exit	1.4				1	50
		Total	3.2	4.4	2.6		2	36.5
	P.M.	Enter	3.8				1	50
		Exit	3.4				1	50
		Total	8.2	12.6	6.2		2	36.5
Saturday Vehicle Trip Ends			41.0				2	36.5
Peak Hour of Generator		Enter	2.2				1	50
		Exit	1.6				1	50
		Total	4.7	6.5	3.8		2	36.5
Sunday Vehicle Trip Ends			36.5				1	23
Peak Hour of Generator		Enter						
		Exit						
		Total	5.2				1	23

Source Numbers: 10, 12

ITE Technical Committee 6A-6—Trip Generation Rates

Date: 1975

SUMMARY OF TRIP GENERATION RATES

Land Use/Building Type: Library — ITE Land Use Code: 590

Independent Variable—Trips per: 1,000 Gross Square Feet

			Average Trip Rate	Maximum Rate	Minimum Rate	Correlation Coefficient	Number of Studies	Average Size of Independent Variable/Study
Average Weekday Vehicle Trip Ends			41.8	75.4	28.8		2	45
Peak Hour of Adjacent Street Traffic	A.M. Between 7 and 9	Enter						
		Exit						
		Total						
	P.M. Between 4 and 6	Enter						
		Exit						
		Total						
Peak Hour of Generator	A.M.	Enter	1.1				1	64
		Exit	1.1				1	64
		Total	2.6	4.0	2.0		2	45
	P.M.	Enter	3.0				1	64
		Exit	2.7				1	64
		Total	6.7	11.6	4.8		2	45
Saturday Vehicle Trip Ends			33.6	49.6	27.3		2	45
Peak Hour of Generator		Enter	1.7				1	64
		Exit	1.3				1	64
		Total	3.8	6.0	3.0		2	45
Sunday Vehicle Trip Ends			3.4				1	25
Peak Hour of Generator		Enter						
		Exit						
		Total	4.8				1	25

Source Numbers: 10, 12

ITE Technical Committee 6A-6—Trip Generation Rates

Date: 1975