MEMORANDUM

TO: Mr. Edward Silva
Village Manager
Village of Palmetto Bay
9705 Hibiscus Street
Palmetto Bay, FL 33157

FROM: Steven Schindler, PE, PTOE
MARLIN Engineering Inc.
1700 NW 66th Avenue, Suite 106
Plantation, FL 33313

SUBJECT: Palmetto Bay Village Center
(former Burger King Headquarters site)
17777 Old Cutler Road Development

CC: Jeff Weidner and Ramon Soria
MARLIN Engineering Inc.

DATE: March 19, 2018

Dear Mr. Silva:

Marlin Engineering, Inc. (MEI) was retained by the Village of Palmetto Bay to perform a roadway capacity analysis for Old Cutler Road in the vicinity of the old Burger King headquarters site. The objective is to determine if there is any available capacity on the roadway that could accommodate new trips generated by an expansion to the site, and to determine if the new trips generated by the development could utilize other routes. The site, now known as the Palmetto Bay Village Center, is currently occupied with 315,000 square feet of office space utilized by various firms, and no residential dwellings. A proposed development would add 484 multifamily condominiums to the site. The plans for this development is titled "17777 Old Cutler Road". The developer is Goddard Investment Group, LLC, based in Atlanta, GA.

TRIP GENERATION

All trip generation data which follows was determined based on trip generation equations and rates provided in the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 10th Edition.* For the AM Peak and PM Peak trips, the Peak Hour of Adjacent Street Traffic, One Hour Between 7AM-9AM, and 4PM-6PM criteria, respectively, was utilized. The day of week utilized was Weekday. The Mid-Rise Land Use Code was used for the multifamily housing as the proposed buildings will be between three (3) and ten (10) story structures. All trip generation data that was obtained was based on the average rate and not the regression curve. Trip

generation printouts are included in the **Appendix** attached to this Memorandum. Included are descriptions of the Land Use Codes.

In 2008, the Village approved a development which would have constructed 400 residential dwellings on the site along with the existing 315,000 square feet of office space. This development did not come to fruition. It would have consisted of 300 senior citizen (non-assisted living) dwellings and 100 multifamily condominiums. The trip generation for this development is shown in the **Table 1** below.

Table 1. Approved 2008 Development Trip Generation of 300 Senior Adult Housing and 100 Multifamily Condominiums

Land Use	Intensity	Units	Daily			AM Peak			PM Peak		
			In	Out	Total	In	Out	Total	In	Out	Total
Senior Adult Housing-Attached	300	Dwelling Unit	555	555	1,110	21	39	60	43	35	78
Multifamily Housing (Mid-Rise)	100	Dwelling Unit	272	272	544	9	27	36	27	17	44
TOTAL			**827**	**827**	**1,654**	**30**	**66**	**96**	**70**	**52**	**122**

Senior Adult Housing- Attached Land Use Code 252

Daily: 50% In, 50% Out; AM Peak: 35% In, 65% Out; PM Peak: 55% In, 45% Out

Multifamily Housing (Mid-Rise) Land Use Code 221

Daily: 50% In, 50%Out; AM Peak: 26% In, 74% Out; PM Peak: 61% In, 39% Out

In 2016, another development was approved by the Village for the site. It was proposed for 400 multifamily condominiums, with no senior citizen dwellings. In addition, a transfer development rights (TDR) resulted in the addition of 85 additional multifamily condominiums, resulting in a total of 485 multifamily condominiums. Finally, a zoning change applied a condition that the trip generation of this development could not exceed the trip generation which would have been generated by the 2008 development shown in Table 1, plus what would be the trips generated by 85 single-family detached homes, even though there would not be any single-family detached homes. The trip generation for 485 multifamily condominiums is shown below in **Table 2,** and the trip generation of the 2008 development from Table 1 plus 85 single-family detached homes is shown in **Table 3.**

Table 2. 2016 Development Trip Generation of 485 Multifamily Condominiums

Land Use	Intensity	Units	Daily			AM Peak			PM Peak		
			In	Out	Total	In	Out	Total	In	Out	Total
Multifamily Housing (Mid-Rise)	485	Dwelling Unit	1,319	1,319	2,638	46	129	175	130	83	213
TOTAL			**1,319**	**1,319**	**2,638**	**46**	**129**	**175**	**130**	**83**	**213**

Multifamily Housing (Mid-Rise) Land Use Code 221

Daily: 50% In, 50%Out; AM Peak: 26% In, 74% Out; PM Peak: 61% In, 39% Out

Table 3. 2016 Development of 485 Residential Units: Restricted to Trip Generation of Approved 2008 Development Plus 85 Single-Family Detached Homes

Land Use	Intensity	Units	Daily			AM Peak			PM Peak		
			In	Out	Total	In	Out	Total	In	Out	Total
Senior Adult Housing-Attached	300	Dwelling Unit	555	555	1,110	21	39	60	43	35	78
Multifamily Housing (Mid-Rise)	100	Dwelling Unit	272	272	544	9	27	36	27	17	44
Single Family Detached Homes	85	Dwelling Unit	448	448	896	16	49	65	55	32	87
TOTAL			**1,275**	**1,275**	**2,550**	**46**	**115**	**161**	**125**	**84**	**209**

Senior Adult Housing- Attached Land Use Code 252

Daily: 50% In, 50% Out; AM Peak: 35% In, 65% Out; PM Peak: 55% In, 45% Out

Multifamily Housing (Mid-Rise) Land Use Code 221

Daily: 50% In, 50%Out; AM Peak: 26% In, 74% Out; PM Peak: 61% In, 39% Out

Single-Family Detached Homes Land Use Code 210

Daily: 50% In, 50%Out; AM Peak: 25% In, 75% Out; PM Peak: 63% In, 37% Out

As can be seen in comparing Table 2 and Table 3, the total trips generated by a 485 multifamily condominium development exceeds the 2008 development trip generation with 85 single-family detached homes added by a total of 88 trips (2,638 – 2,550). Thus, this zoning requirement is being exceeded.

Therefore, the 2016 development must be scaled down so that the total trip generation does not exceed the trip generation shown in Table 3. As per the 2016 ordinance, the 85 single-family detached homes component cannot be factored down. The total daily trip generation from 400 multifamily condominiums will be scaled down to match the total daily trip generation of Table 1 (the approved 2008 development). **Table 4** shows the trip generation for 400 multifamily condominiums.

Table 4. Trip Generation for 400 Multifamily Condominiums

Land Use	Intensity	Units	Daily			AM Peak			PM Peak		
			In	Out	Total	In	Out	Total	In	Out	Total
Multifamily Housing (Mid-Rise)	400	Dwelling Unit	1,088	1,088	2,176	37	107	144	107	69	176
TOTAL			**1,088**	**1,088**	**2,176**	**37**	**107**	**144**	**107**	**69**	**176**

Multifamily Housing (Mid-Rise) Land Use Code 221

Daily: 50% In, 50%Out; AM Peak: 26% In, 74% Out; PM Peak: 61% In, 39% Out

The total daily trips generated by 400 multifamily condominiums is 2,176, which is 522 trips higher than the total daily trips which would have been produced by the approved 2008 development shown in Table 1. After the total trips for the condominiums are factored down to match the 2008 trips, the trips generated by 85 multifamily condominiums would be added.

As per Table 4, each multifamily condominium accounts for 5.44 daily trips (2,176 / 400). 522 trips must be deleted so that the total trips equals the 2008 development trip generation: 2,176 – 522 = 1,654 trips. Therefore, the resulting number of multifamily condominiums is 1,654 / 5.44 = 304 multifamily condominiums. Next, 85 multifamily condominiums are added to result in the maximum number of multifamily condominiums allowed in the proposed development to abide by the 2016 ordinance, which is 304 + 85 = **389 multifamily condominiums.** Finally, **Table 5** shows the trip generation for 389 multifamily condominiums. During the AM peak hour on a typical weekday, 126 net new trips would be leaving the site (an average of roughly 2.1 more vehicles per minute compared to the current conditions), and during the PM peak hour, 85 net new trips would be entering the site (an average of roughly 1.4 more vehicles per minute compared to current conditions).

Table 5. Trip Generation for 389 Multifamily Condominiums

(Maximum number of units allowed to comply with 2016 Ordinance)

Land Use	Intensity	Units	Daily			AM Peak			PM Peak		
			In	Out	Total	In	Out	Total	In	Out	Total
Multifamily Housing (Mid-Rise)	389	Dwelling Unit	1,058	1,058	2,116	45	126	171	85	55	140
TOTAL			**1,058**	**1,058**	**2,116**	**45**	**126**	**171**	**85**	**55**	**140**

Multifamily Housing (Mid-Rise) Land Use Code 221

Daily: 50% In, 50%Out; AM Peak: 26% In, 74% Out; PM Peak: 61% In, 39% Out

OLD CUTLER ROAD and SW 184th STREET

Old Cutler Road is the main north-south roadway that leads to the site, which along the west edge of the site. It is accessed at two locations from the site- at a stop-signed controlled driveway at the north edge of the site, and at the intersection mentioned in the following paragraph. It is a two-lane roadway with a posted speed limit of 40 miles per hour (mph). It is a constrained facility which cannot be widened (only auxiliary lanes such as left-turn lanes at intersections can be added, but no additional through lanes can be added).

SW 184th Street is the main east-west roadway that leads to/from the site. It is a two-lane roadway that is the west leg of its signalized intersection with Old Cutler Road. The east leg of the intersection is the south entrance driveway to the site. Thus, traffic heading to or from the site via SW 184th Street does not have to travel on Old Cutler Road. The posted speed limit is also 40 mph.

As per the 2012 Florida Department of Transportation (FDOT) *Quality/Level of Service Handbook* Generalized Service Volumes tables, Table 1 (urbanized areas), the maximum annual average daily volume (AADT) to stay within Level of Service D for a two-lane, undivided, non-state signalized arterial interrupted flow facility with a 40 mph or higher speed limit is 17,700 vehicles per day (vpd) minus 10 percent, which equals 15,930 vpd. This would represent the maximum AADT to stay within Level of Service D. Volumes greater than LOS D become F because intersection capacities have been reached, as per FDOT's *Quality/Level of Service Handbook*. The FDOT Q/LOS tables are included in the **Appendix.**

As per the 2012 Florida Department of Transportation (FDOT) *Quality/Level of Service Handbook* Generalized Service Volumes tables, Table 7 (urbanized areas), the maximum peak hour directional volume (one direction) for a two-lane, undivided, non-state signalized arterial interrupted flow facility with a 40 mph or higher speed limit is 880 vehicles minus 10 percent, which equals 792 vehicles. This would represent the maximum one-direction peak hour volume to stay within Level of Service D. A peak hour one-direction volume greater than 792 vehicles would represent LOS F because intersection capacities have been reached, as per FDOT's *Quality/Level of Service Handbook*.

TRIP DISTRIBUTION

The site is located within Traffic Analysis Zone (TAZ) number 1139 as per the 2010 TAZ Boundaries Map from the Miami-Dade Long Range Transportation Plan Update to the Year 2040 produced by the Miami-Dade Transportation Planning Organization (TPO).

Using the trips generated shown in Table 5, for the maximum number of multifamily condominiums (389) allowable due to the 2016 zoning condition, 126 net new trips would be leaving the site during the AM peak hour on a typical weekday, and 85 net new trips would be entering the site during the PM peak hour on a typical weekday (on top of the current office traffic that currently is generated by the site and is accounted as background traffic in existing traffic counts).

During the AM peak hour on a typical weekday, the biggest impact from the new trips generated by the site would be motorists leaving the site to head to work, and during the PM peak hour on a typical weekday, the biggest impact from the new trips generated by the site would be motorists heading home from work.

As per the Miami-Dade 2010 Directional Distribution Summary, the trips to/from TAZ 1139 are to/from the NNE (11.3%), SSE (2.8%), SSW (10.7%), WSW (22.7%), WNW (25.2%), and NNW (27.2%) directions. This table is attached in the **Appendix.**

Based on this distribution, it can be assumed that approximately 38.5% (NNW and NNE) of the traffic heading to/from the site would use Old Cutler Road north of the site, 47.9% (WSW and WNW) of the traffic heading to/from the site would use NW 184th Street west of the site, and 13.5% (SSW and SSE) of the traffic heading to/from the site would use Old Cutler Road south of the site. This would be if each roadway was operating at a reasonable Level of Service during the peak hours, such as LOS D or better, for example.

CAPACITY ANALYSIS

Old Cutler Road is subjected to higher volumes north of the site compared to south of the site, as per FDOT's Florida Traffic Online (2016) website, operated by FDOT's Transportation Statistics Office.

Portable traffic monitoring site number 8206 is located on Old Cutler Road, 200 feet south of SW 168th Street. This location is approximately 0.5 mile north of the north entrance driveway to the site. The 2014 AADT for this site had a second-year estimate of 17,400 vpd. The 2015 AADT for the site had a computed estimate of 25,000 vpd AADT, and a 2016 first-year estimate of 25,000 vpd for the site. As previously mentioned, as per the 2012 Florida Department of Transportation (FDOT) *Quality/Level of Service Handbook* Generalized Service Volumes tables, Table 1 (urbanized areas), the maximum annual average daily volume (AADT) to stay within Level of Service D for a two-lane, undivided, non-state signalized arterial interrupted flow facility with a 40 mph or higher speed limit is 17,700 vehicles per day (vpd) minus 10 percent, which equals 15,930 vpd. This would represent the maximum AADT to stay within Level of Service D. Volumes greater than LOS D become F because

intersection capacities have been reached, as per FDOT's *Quality/Level of Service Handbook*. As a result, this segment is currently operating over capacity, without any new trips from the proposed development added.

South of the site, another FDOT portable traffic monitoring site, number 8205, is located on Old Cutler Road, 200 feet south of SW 184th Street. This site is located 200 feet south of the intersection of SW 184th Street (west leg of intersection) and the south entrance driveway to the site (east leg of intersection). The 2016 calculated AADT at this location is 15,900 vpd, which is right at the capacity of the roadway (15,930 vpd), without any new trips from the proposed development added.

SW 184th Street, which is the two-lane east-west link between Old Cutler Road and US 1, also has more than adequate excess capacity available. FDOT portable traffic monitoring site, number 7006, is located on SW 184th Street ¼ mile west of Old Cutler Road. The 2016 AADT is 5,600 vpd, which is considerably below capacity of the roadway (15,930 vpd). Thus, SW 184th Street is a more attractive option for motorists trying head to/from the site.

FDOT Historical AADT reports for these sites are included in the **Appendix.**

Since Old Cutler Road is operating over capacity north of the site, and operating basically at capacity south of the site, the trip distribution percentages were adjusted accordingly, so that a higher percentage of trips were allotted to SW 184th Street. Thus, Old Cutler Road north of the site was bumped down to 15%, Old Cutler Road south of the site was bumped down to 7%, and SW 184th Street west of the site was bumped up to 78%. Even when a roadway is operating at capacity, some motorists consisting of new trips would still utilize the facility. These were assumptions based on the over-capacity/at capacity condition of Old Cutler Road, and that SW 184th Street leads to alternate routes to head north and south, such as US 1 (South Dixie Highway) and Florida's Turnpike.

With these distributions during the AM peak hour, approximately 19 net new trips would be added to northbound Old Cutler Road north of the site, approximately 9 net new trips would be added to southbound Old Cutler Road south of the site, and approximately 98 net new trips would be added to westbound SW 184th Street west of the site (19+9+98= 126 net new trips leaving the site during the AM peak hour as per Table 5).

With these distributions during the PM peak hour, approximately 13 net new trips would be added to southbound Old Cutler Road north of the site, approximately 6 net new trips would be added to northbound Old Cutler Road south of the site, and approximately 66 net new trips would be added to eastbound SW 184th Street west of the site (13+6+66= 85 net new trips entering the site during the PM peak hour as per Table 5).

US 1 (SOUTH DIXIE HIGHWAY)

US 1 (South Dixie Highway) is located approximately 2.4 miles west of Old Cutler Road, and is a major north-south urban principal interrupted-flow, signalized arterial with three (3) travel lanes in each direction. The posted speed limit is 45 mph. According to the count station data on the Florida Traffic Online site, US 1 has the available capacity to accommodate all of the net new trips generated by the development during both the AM and PM peak hours.

US 1 has a peak hour directional capacity of 3,020 vehicles per hour at LOS D. As per the FDOT Q/LOS Table 7, LOS E becomes LOS F for Class I roadways with a 40 mph or higher posted speed limit.

As per FDOT traffic count station 2563, US 1 northbound just north of SW 184th Street, has an AM peak hour volume of 2,228 vehicles, which is below the peak hour directional capacity of 3,020 vehicles at LOS D. The US 1 northbound roadway can accommodate the net new trips generated by the site during the AM peak hour which are heading north. The situation is much the same during the PM peak hour for US 1 southbound. During the PM peak hour, US 1 southbound, just north of SW 184th Street, has a PM peak hour volume of 2,326 vehicles, which is below the peak hour directional capacity of 3,020 vehicles at LOS D. The US 1 southbound roadway can accommodate the net new trips generated by the site during the PM peak hour which are heading south which would then turn east onto SW 184th Street. US 1 northbound or southbound can accommodate the new trips generated by the site.

SW 184th Street, the east-west two-lane link between the south entrance driveway to the site and US 1, is well below capacity with a 2016 AADT of 5,600 vpd as per the FDOT Florida Traffic Online site- which is well below the maximum volume of 13,320 vpd to stay within LOS D, as per the FDOT *Quality/Level of Service Handbook.*

CONCLUSION AND RECOMMENDATIONS

While Old Cutler Road is a constrained facility and is currently operating over capacity, the south entrance driveway to the site intersects Old Cutler Road at a signalized intersection where the south driveway is the east leg, SW 184th Street is the west leg, and Old Cutler Road is the north and south legs. SW 184th Street leads directly to US 1 (South Dixie Highway), located 2.4 miles west of Old Cutler Road. Thus, a motorist can access US 1 to/from the site without having to travel on Old Cutler Road. Both SW 184th Street and US 1 have available capacity to accommodate all of the net new trips generated by the development. New residents of the completed development would try out different routes until they found a route that worked best for them,

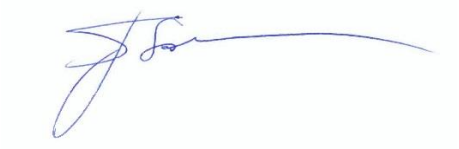
and that route would tend to naturally gravitate to using SW 184th Street and US 1 in the majority of cases. They would, over time, find the "path of least resistance".

Other recommendations include improving transit services, utilizing more frequent bus schedules, and providing incentives to residents, such as tax breaks for those who carpool, use transit, go carless by using rideshare services or Uber, or use non-motorized transportation such as bicycles.

Finally, the maximum number of condominiums as per the 2016 zoning requirement would be **389 multifamily condominiums.** The development plan currently under review by the Village consists of 484 multifamily condominiums as of this writing, **which is a difference of 95 units.**

Sincerely,

MARLIN ENGINEERING, INC.



Steven Schindler, PE, PTOE
Traffic Engineering Department Manager

Attachment: Appendix

APPENDIX

Land Use: 210
Single-Family Detached Housing

Description

Single-family detached housing includes all single-family detached homes on individual lots. A typical site surveyed is a suburban subdivision.

Additional Data

The number of vehicles and residents had a high correlation with average weekday vehicle trip ends. The use of these variables was limited, however, because the number of vehicles and residents was often difficult to obtain or predict. The number of dwelling units was generally used as the independent variable of choice because it was usually readily available, easy to project, and had a high correlation with average weekday vehicle trip ends.

This land use included data from a wide variety of units with different sizes, price ranges, locations, and ages. Consequently, there was a wide variation in trips generated within this category. Other factors, such as geographic location and type of adjacent and nearby development, may also have had an effect on the site trip generation.

Single-family detached units had the highest trip generation rate per dwelling unit of all residential uses because they were the largest units in size and had more residents and more vehicles per unit than other residential land uses; they were generally located farther away from shopping centers, employment areas, and other trip attractors than other residential land uses; and they generally had fewer alternative modes of transportation available because they were typically not as concentrated as other residential land uses.

Time-of-day distribution data for this land use are presented in Appendix A. For the six general urban/suburban sites with data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 7:15 and 8:15 a.m. and 4:00 and 5:00 p.m., respectively. For the two sites with Saturday data, the overall highest vehicle volume was counted between 3:00 and 4:00 p.m. For the one site with Sunday data, the overall highest vehicle volume was counted between 10:15 and 11:15 a.m.

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in California, Connecticut, Delaware, Illinois, Indiana, Maryland, Minnesota, Montana, New Jersey, North Carolina, Ohio, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Vermont, and Virginia.

Source Numbers

100, 105, 114, 126, 157, 167, 177, 197, 207, 211, 217, 267, 275, 293, 300, 319, 320, 356, 357, 367, 384, 387, 407, 435, 522, 550, 552, 579, 598, 601, 603, 614, 637, 711, 716, 720, 728, 735, 868, 903, 925, 936

Land Use: 221
Multifamily Housing (Mid-Rise)

Description

Mid-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have between three and 10 levels (floors). Multifamily housing (low-rise) (Land Use 220), multifamily housing (high-rise) (Land Use 222), off-campus student apartment (Land Use 225), and mid-rise residential with 1st-floor commercial (Land Use 231) are related land uses.

Additional Data

In prior editions of *Trip Generation Manual*, the mid-rise multifamily housing sites were further divided into rental and condominium categories. An investigation of vehicle trip data found no clear differences in trip making patterns between the rental and condominium sites within the ITE database. As more data are compiled for future editions, this land use classification can be reinvestigated.

For the six sites for which both the number of residents and the number of occupied dwelling units were available, there were an average of 2.46 residents per occupied dwelling unit.

For the five sites for which the numbers of both total dwelling units and occupied dwelling units were available, an average of 95.7 percent of the total dwelling units were occupied.

Time-of-day distribution data for this land use are presented in Appendix A. For the eight general urban/suburban sites with data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 7:00 and 8:00 a.m. and 4:45 and 5:45 p.m., respectively.

For the four dense multi-use urban sites with 24-hour count data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 7:15 and 8:15 a.m. and 4:15 and 5:15 p.m., respectively. For the three center city core sites with 24-hour count data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 6:45 and 7:45 a.m. and 5:00 and 6:00 p.m., respectively.

For the six sites for which data were provided for both occupied dwelling units and residents, there was an average of 2.46 residents per occupied dwelling unit.

For the five sites for which data were provided for both occupied dwelling units and total dwelling units, an average of 95.7 percent of the units were occupied.

The average numbers of person trips per vehicle trip at the five center city core sites at which both person trip and vehicle trip data were collected were as follows:

- 1.84 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 7 and 9 a.m.
- 1.94 during Weekday, AM Peak Hour of Generator
- 2.07 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 4 and 6 p.m.
- 2.59 during Weekday, PM Peak Hour of Generator

The average numbers of person trips per vehicle trip at the 32 dense multi-use urban sites at which both person trip and vehicle trip data were collected were as follows:

- 1.90 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 7 and 9 a.m.
- 1.90 during Weekday, AM Peak Hour of Generator
- 2.00 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 4 and 6 p.m.
- 2.08 during Weekday, PM Peak Hour of Generator

The average numbers of person trips per vehicle trip at the 13 general urban/suburban sites at which both person trip and vehicle trip data were collected were as follows:

- 1.56 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 7 and 9 a.m.
- 1.88 during Weekday, AM Peak Hour of Generator
- 1.70 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 4 and 6 p.m.
- 2.07 during Weekday, PM Peak Hour of Generator

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Alberta (CAN), British Columbia (CAN), California, Delaware, District of Columbia, Florida, Georgia, Illinois, Maryland, Massachusetts, Minnesota, New Hampshire, New Jersey, Ontario, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Utah, Virginia, and Wisconsin.

Source Numbers

168, 188, 204, 305, 306, 321, 357, 390, 436, 525, 530, 579, 638, 818, 857, 866, 901, 904, 910, 912, 918, 934, 936, 939, 944, 947, 948, 949, 959, 963, 964, 966, 967, 969, 970

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 onsite 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), assisted living (Land Use 254), and continuing care retirement community (Land Use 255) are related uses.

Additional Data

Time-of-day distribution data for this land use are presented in Appendix A. For the one general urban/suburban site with data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 11:45 a.m. and 12:45 p.m. and 12:00 and 1:00 p.m., respectively.

The sites were surveyed in the 1980s, the 1990s, and the 2000s in Alberta (CAN), California, Illinois, New Hampshire, New Jersey, New York, and Pennsylvania.

Source Numbers

272, 501, 576, 602, 703, 734, 741, 902, 970

Senior Adult Housing - Attached (252)

300 units

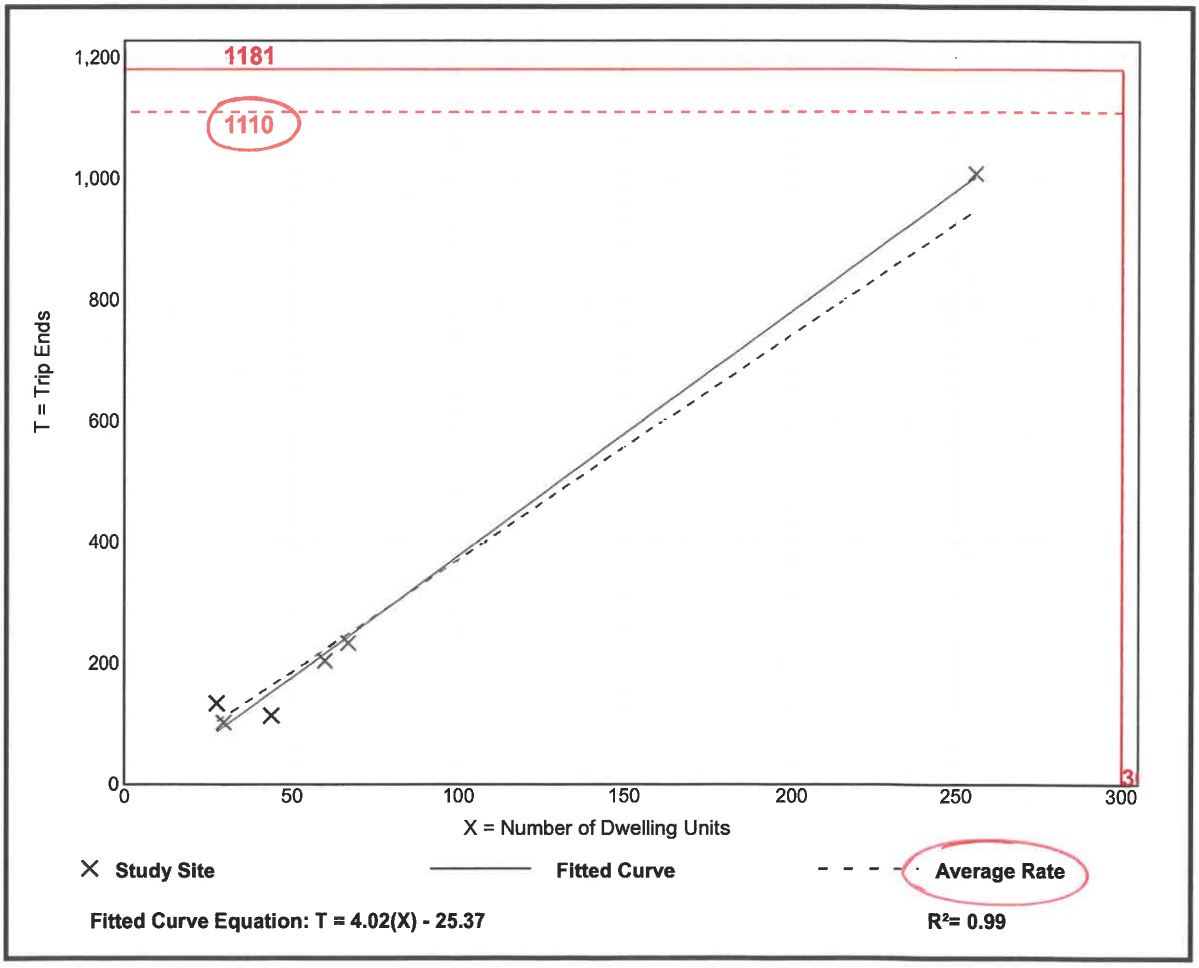
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 6
Avg. Num. of Dwelling Units: 81
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
3.70	2.59 - 4.79	0.53

Data Plot and Equation



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Senior Adult Housing - Attached (252)

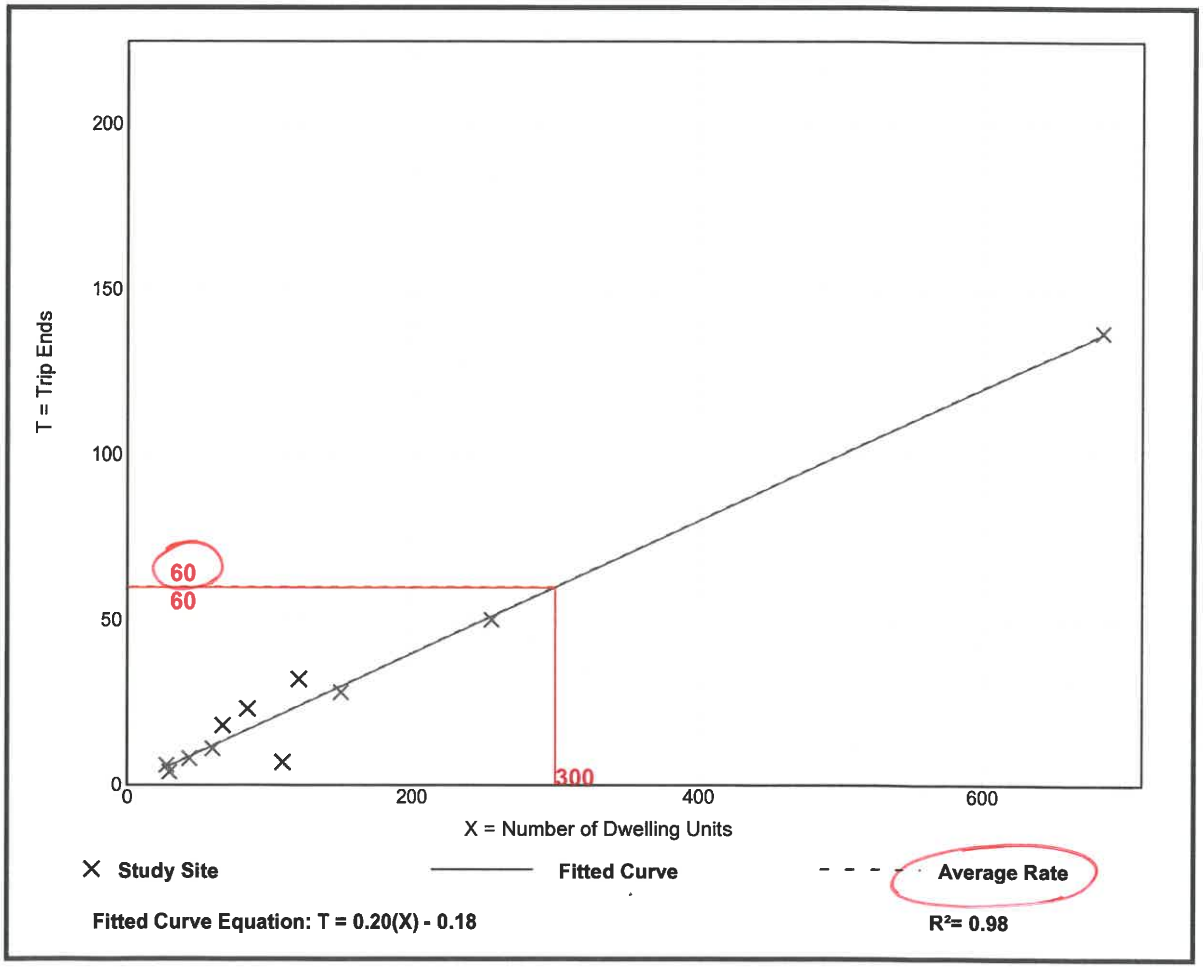
300 units

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 11
Avg. Num. of Dwelling Units: 148
Directional Distribution: 35% entering, 65% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.20	0.06 - 0.27	0.05

Data Plot and Equation



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Senior Adult Housing - Attached (252)

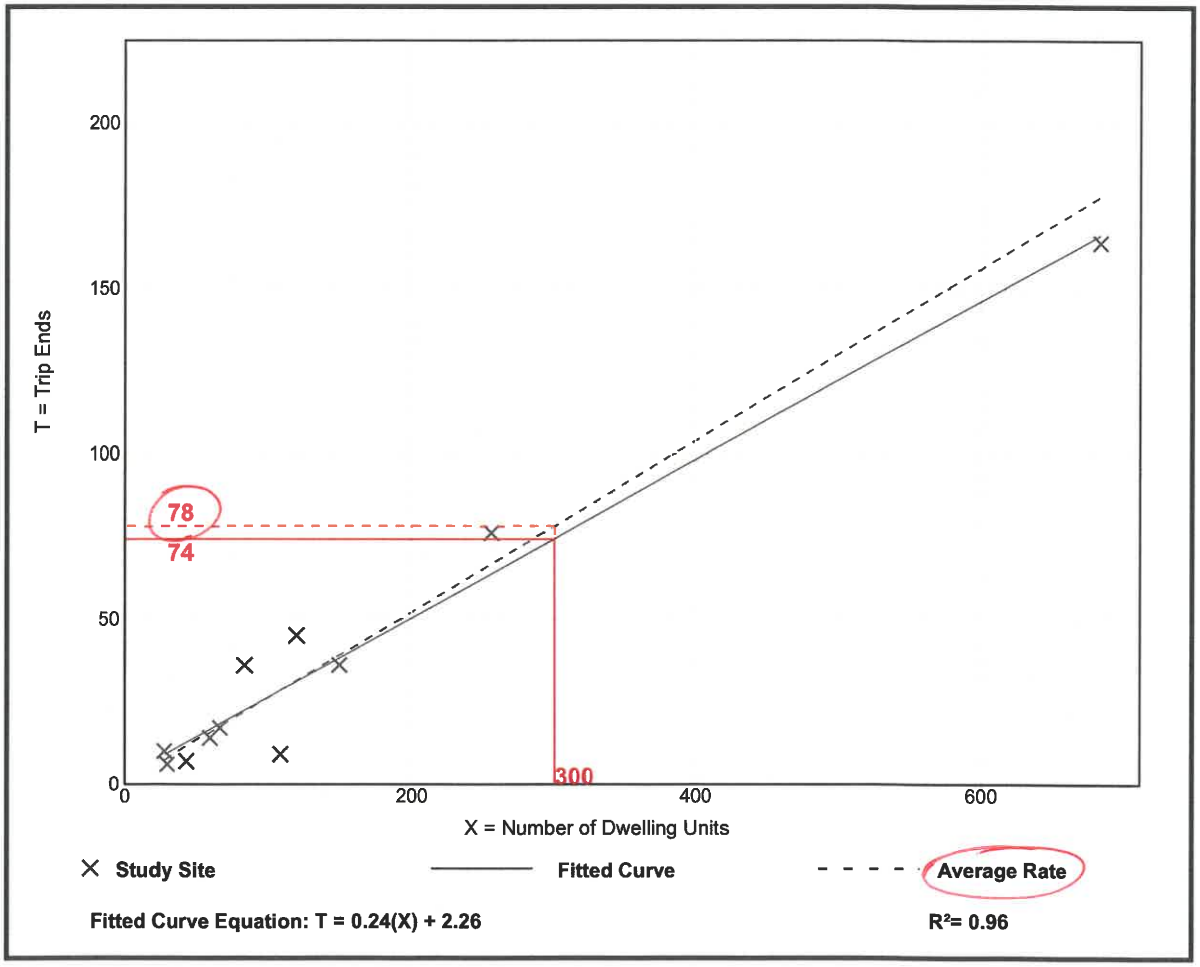
300 units

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 11
Avg. Num. of Dwelling Units: 148
Directional Distribution: 55% entering, 45% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.26	0.08 - 0.43	0.08

Data Plot and Equation



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Multifamily Housing (Mid-Rise) 100 units
(221)

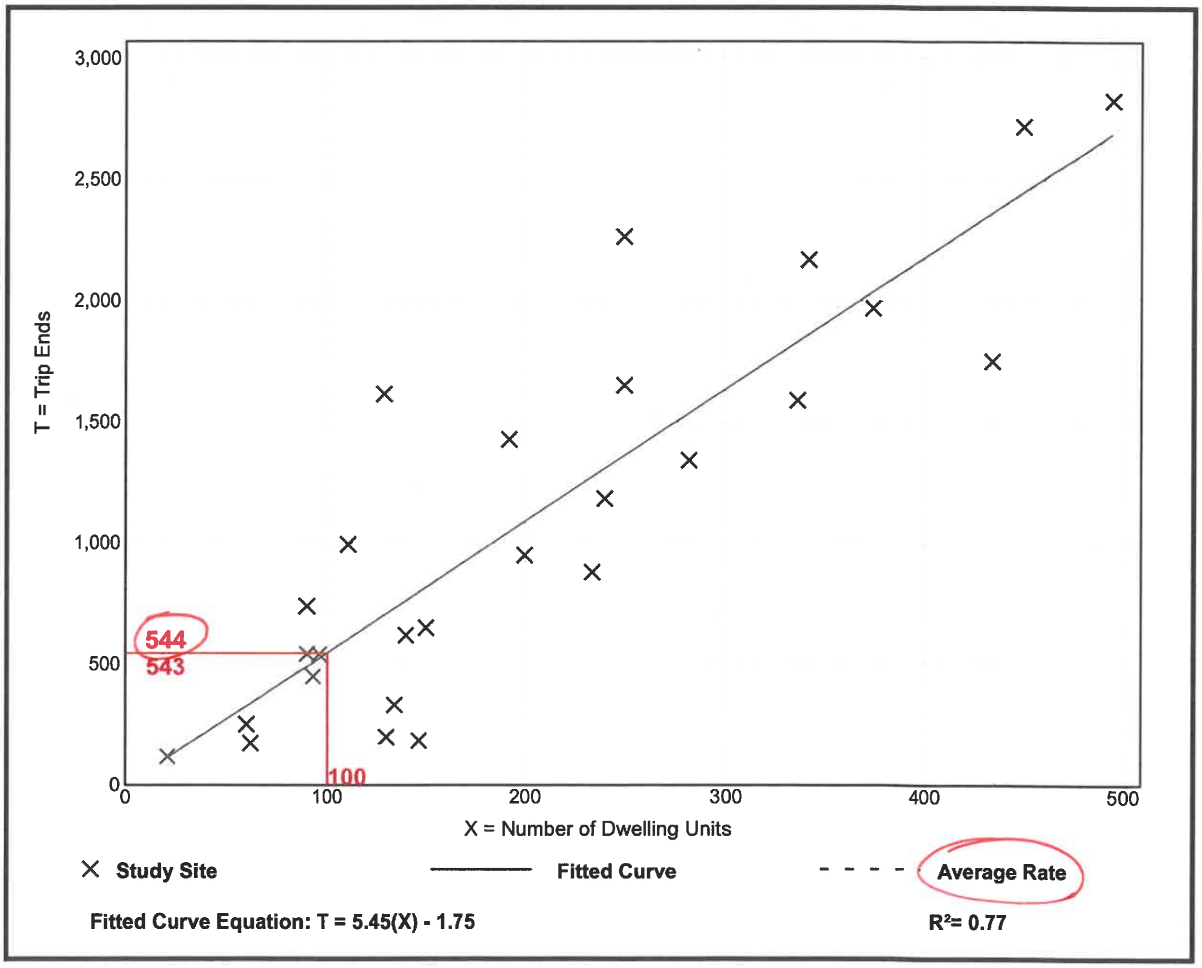
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 27
Avg. Num. of Dwelling Units: 205
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
5.44	1.27 - 12.50	2.03

Data Plot and Equation



Trip Generation Manual, 10th Edition • Institute of Transportation Engineers

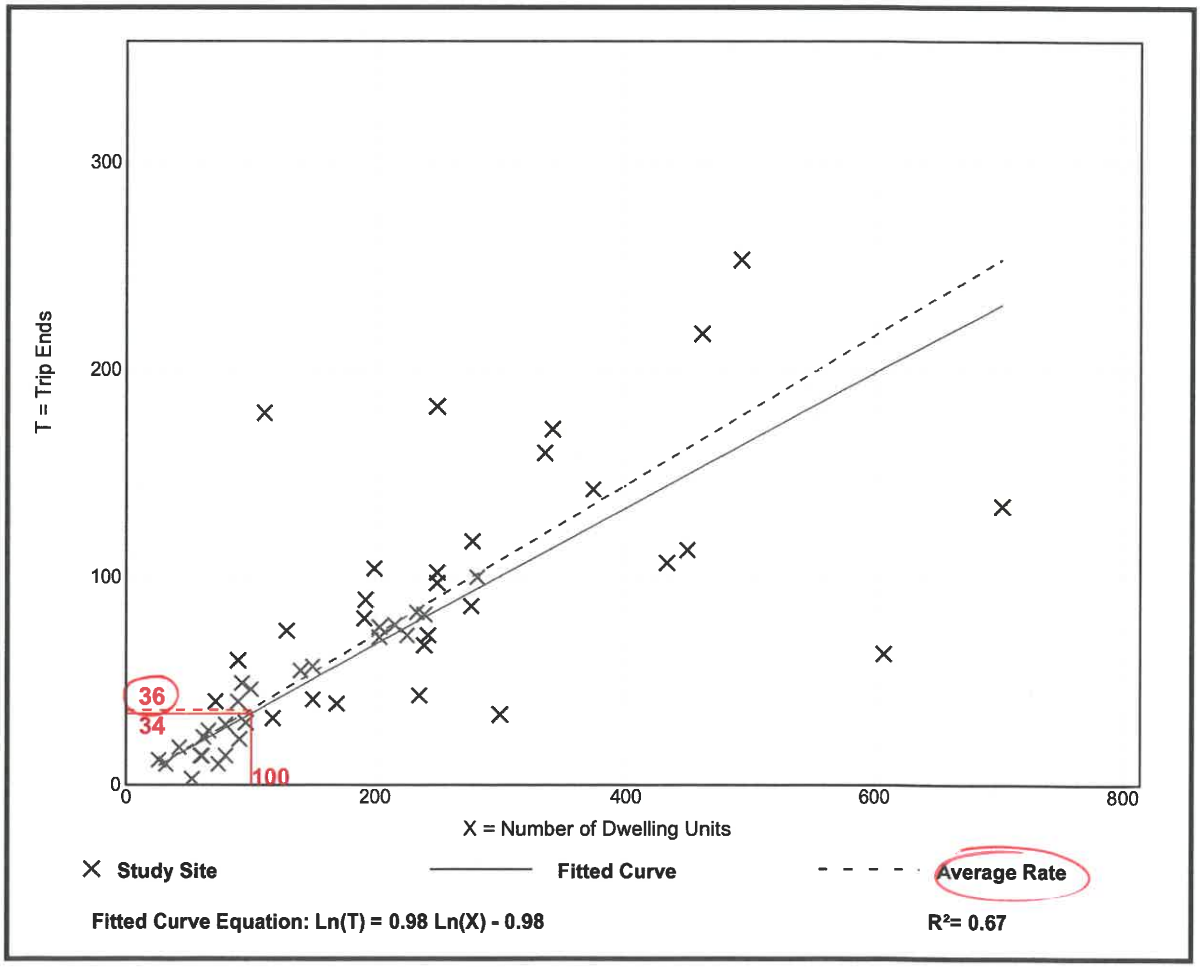
Multifamily Housing (Mid-Rise) 100 units
(221)

Vehicle Trip Ends vs:	**Dwelling Units**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 7 and 9 a.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	53
Avg. Num. of Dwelling Units:	207
Directional Distribution:	26% entering, 74% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.36	0.06 - 1.61	0.19

Data Plot and Equation



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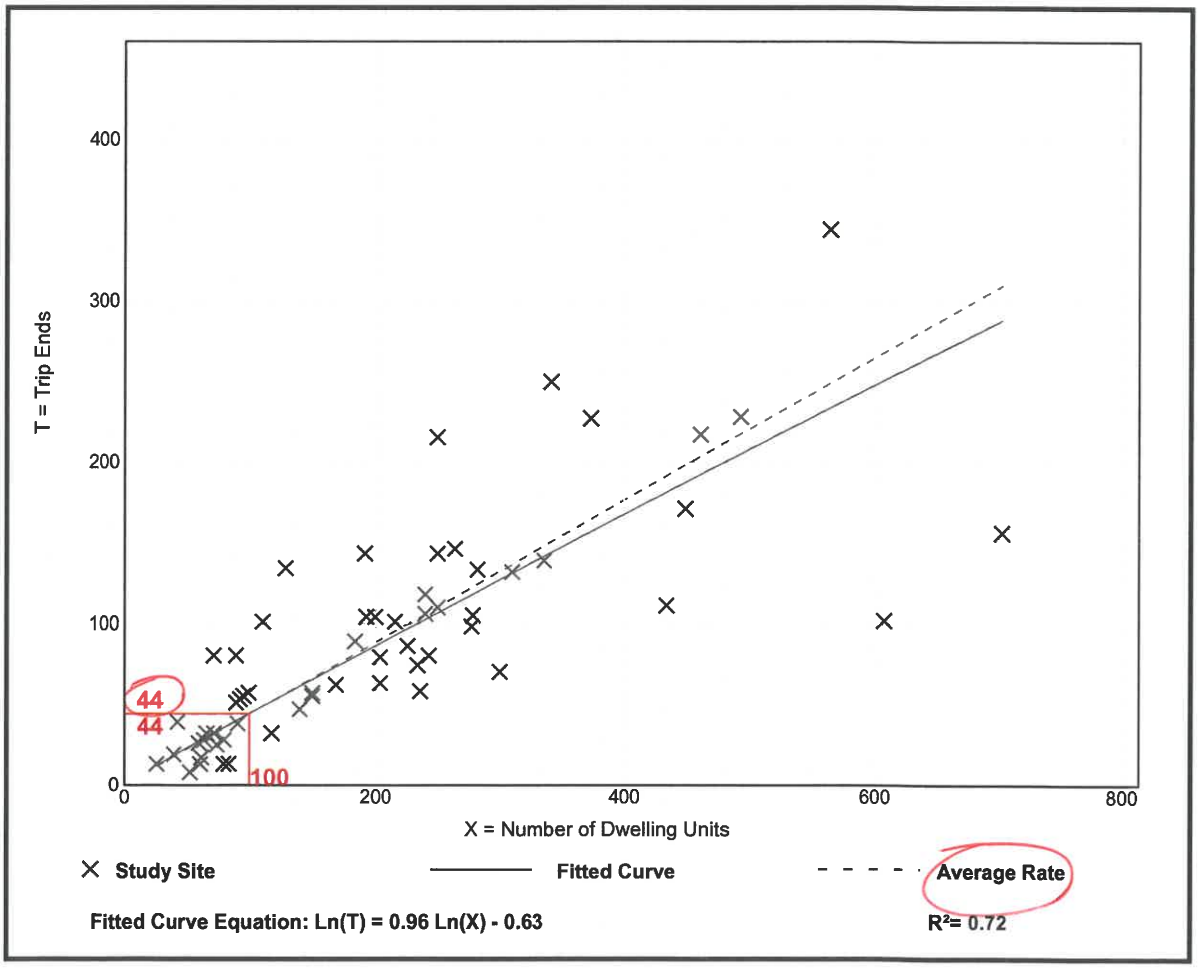
Multifamily Housing (Mid-Rise) 100 units
(221)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 60
Avg. Num. of Dwelling Units: 208
Directional Distribution: 61% entering, 39% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.44	0.15 - 1.11	0.19

Data Plot and Equation



Trip Generation Manual, 10th Edition • Institute of Transportation Engineers

Multifamily Housing (Mid-Rise) 485 units
(221)

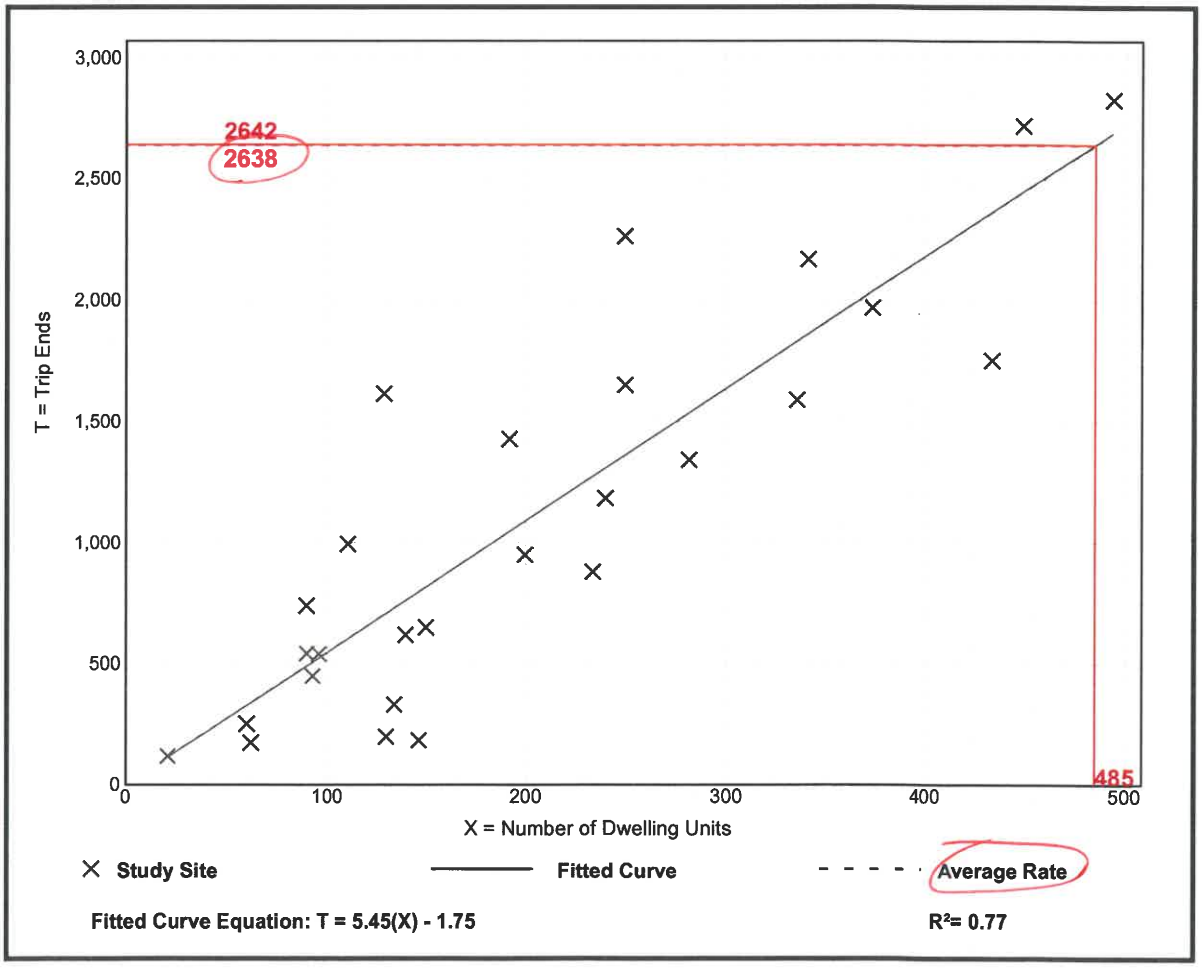
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 27
Avg. Num. of Dwelling Units: 205
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
5.44	1.27 - 12.50	2.03

Data Plot and Equation



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Multifamily Housing (Mid-Rise) 485 units
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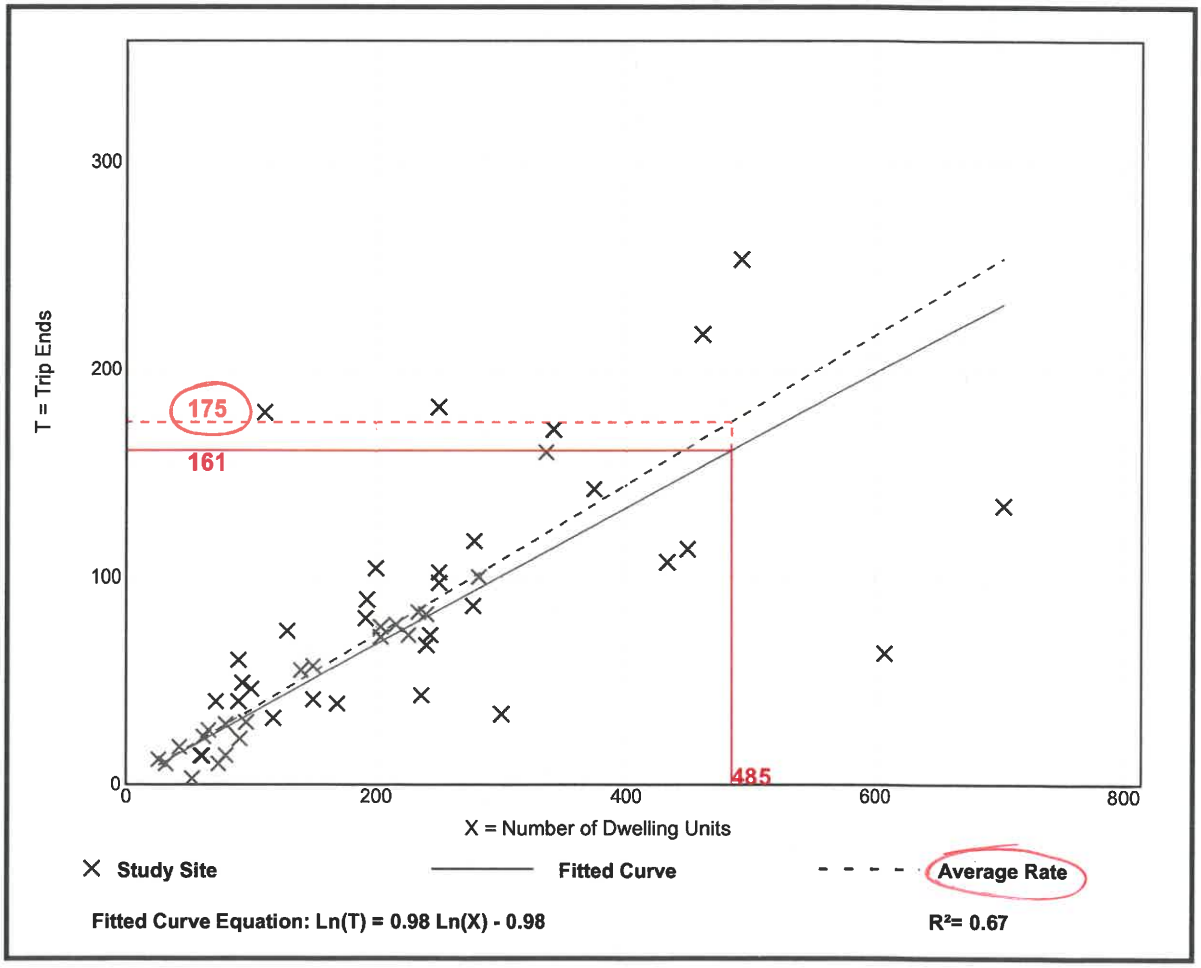

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Multifamily Housing (Mid-Rise)
(221)

485 units

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
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Avg. Num. of Dwelling Units: 208
Directional Distribution: 61% entering, 39% exiting

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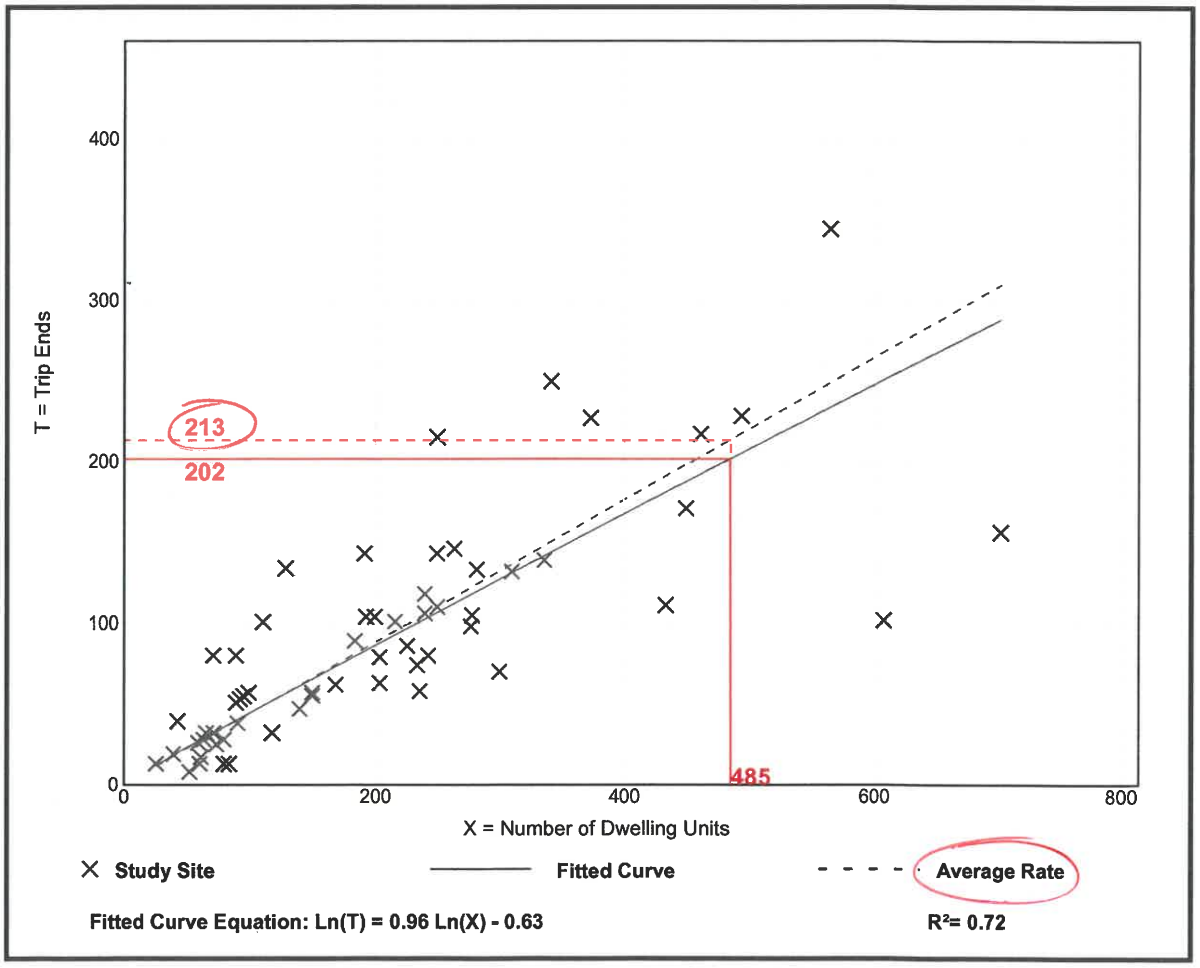
Average Rate	Range of Rates	Standard Deviation
0.44	0.15 - 1.11	0.19

Data Plot and Equation



Trip Generation Manual, 10th Edition • Institute of Transportation Engineers

Single-Family Detached Housing
(210)

85 units

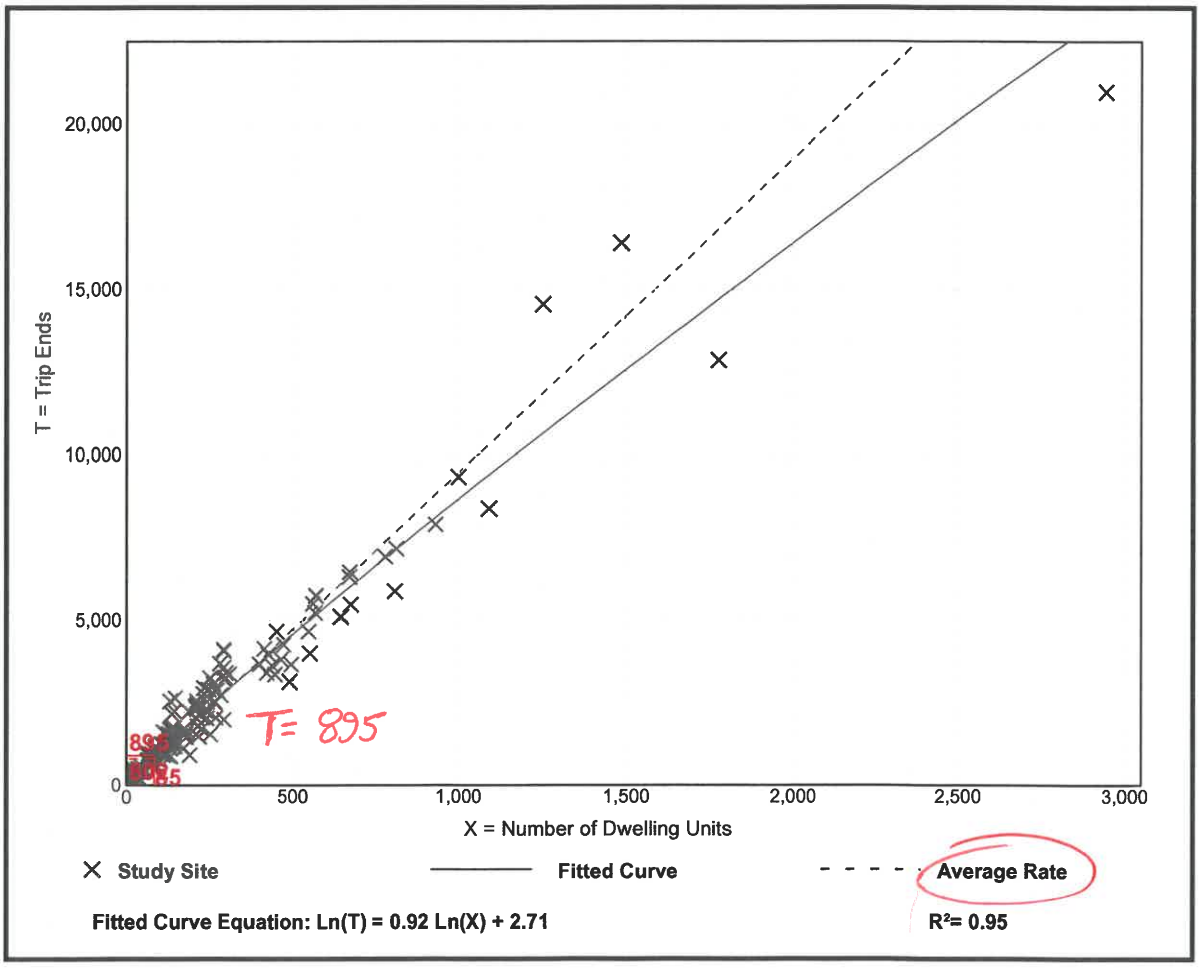
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 159
Avg. Num. of Dwelling Units: 264
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
9.44	4.81 - 19.39	2.10

Data Plot and Equation



Trip Generation Manual, 10th Edition • Institute of Transportation Engineers

Single-Family Detached Housing (210)

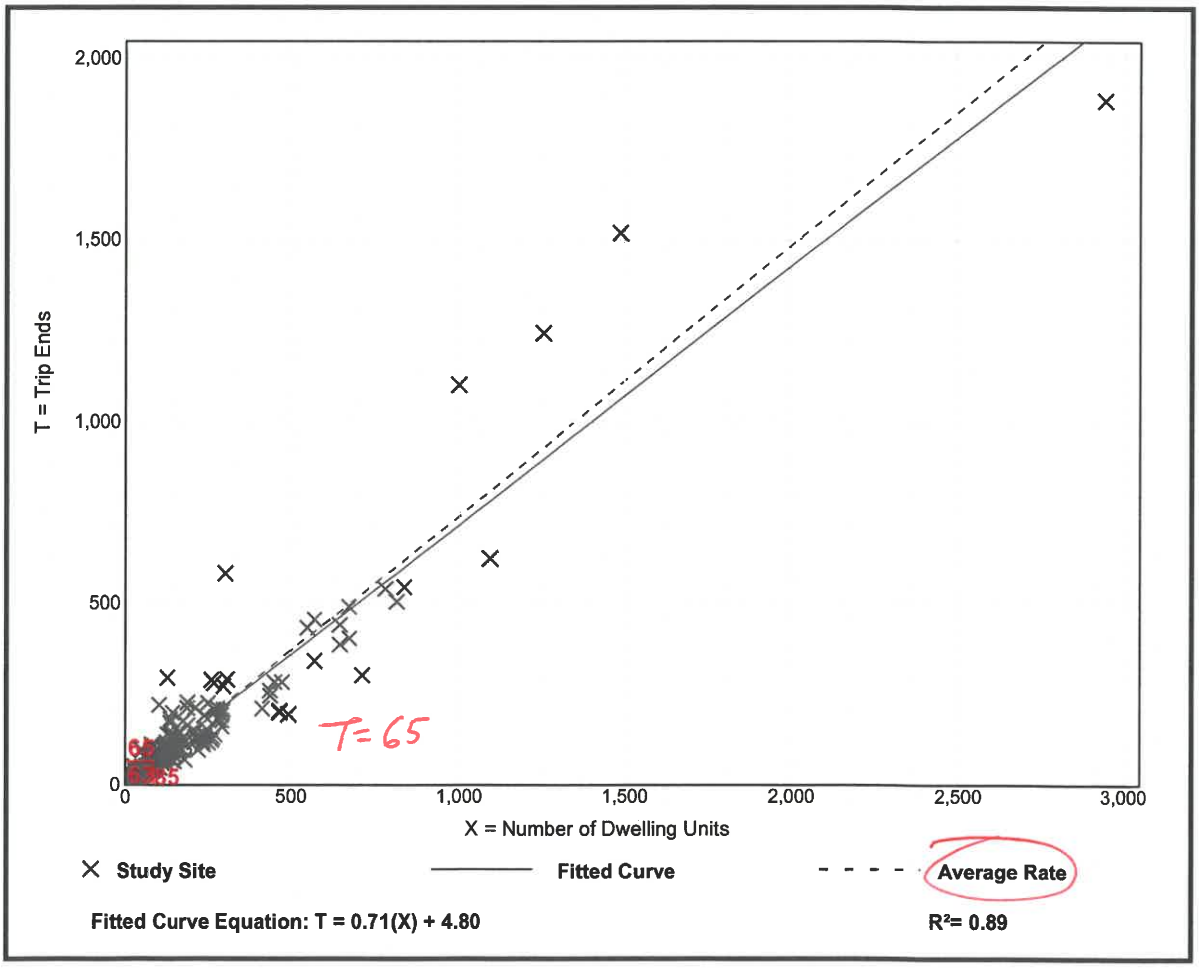
85 units

Vehicle Trip Ends vs:	**Dwelling Units**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 7 and 9 a.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	173
Avg. Num. of Dwelling Units:	219
Directional Distribution:	25% entering, 75% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.74	0.33 - 2.27	0.27

Data Plot and Equation



Trip Generation Manual, 10th Edition • Institute of Transportation Engineers

Single-Family Detached Housing (210)

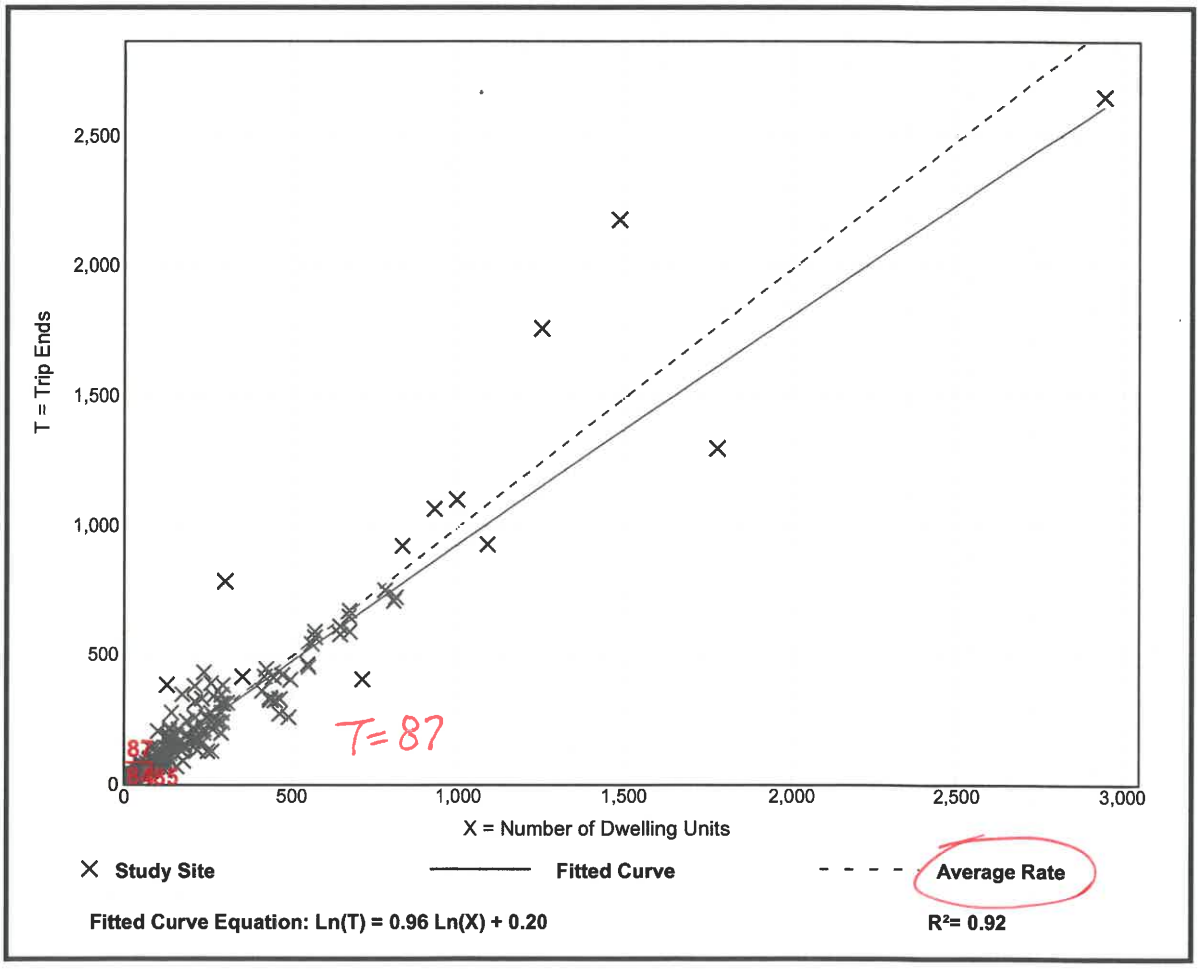
85 units

Vehicle Trip Ends vs:	**Dwelling Units**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 4 and 6 p.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	190
Avg. Num. of Dwelling Units:	242
Directional Distribution:	63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.99	0.44 - 2.98	0.31

Data Plot and Equation



Trip Generation Manual, 10th Edition • Institute of Transportation Engineers

Multifamily Housing (Mid-Rise) 400 units
(221)

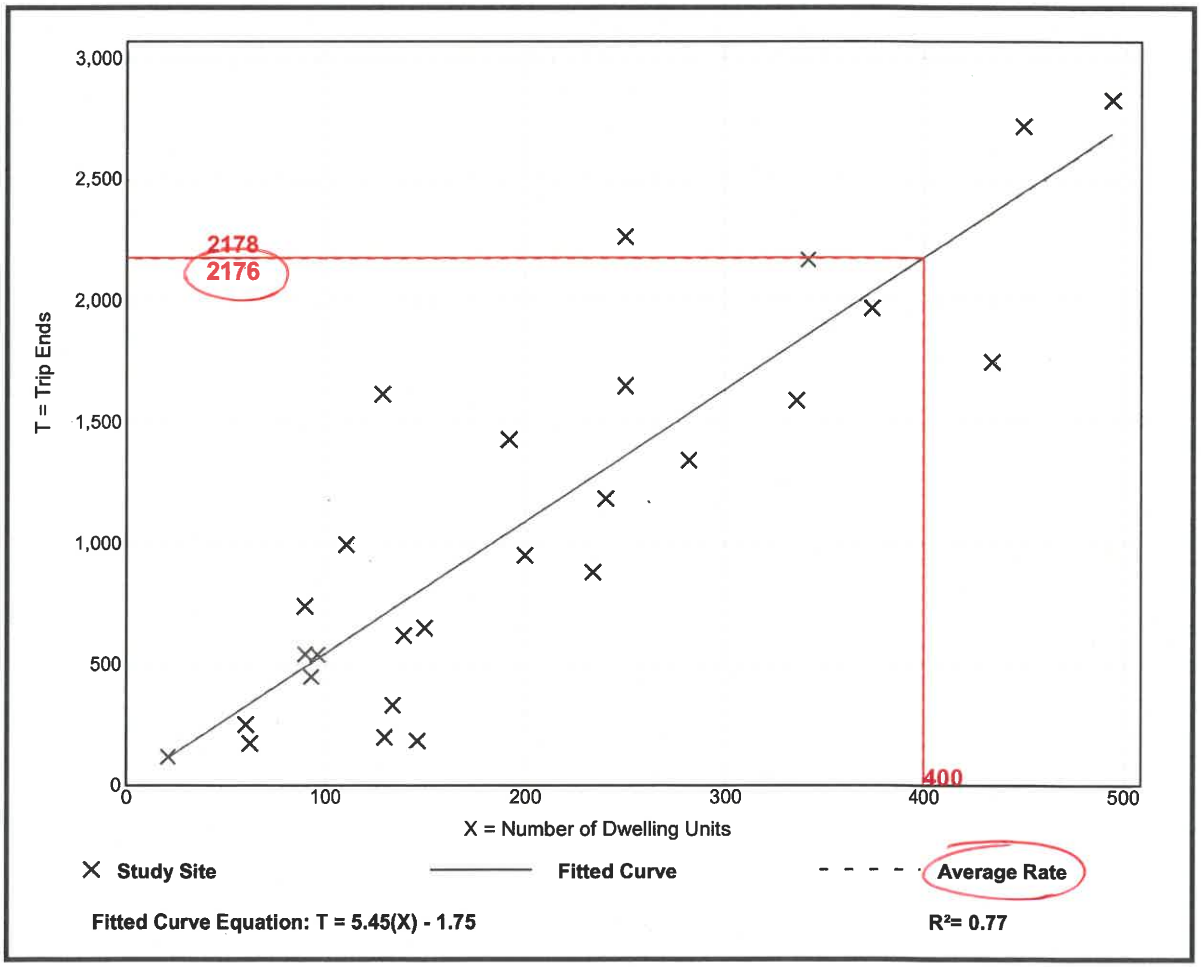
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 27
Avg. Num. of Dwelling Units: 205
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
5.44	1.27 - 12.50	2.03

Data Plot and Equation



Trip Generation Manual, 10th Edition • Institute of Transportation Engineers

Multifamily Housing (Mid-Rise) 400 units
(221)

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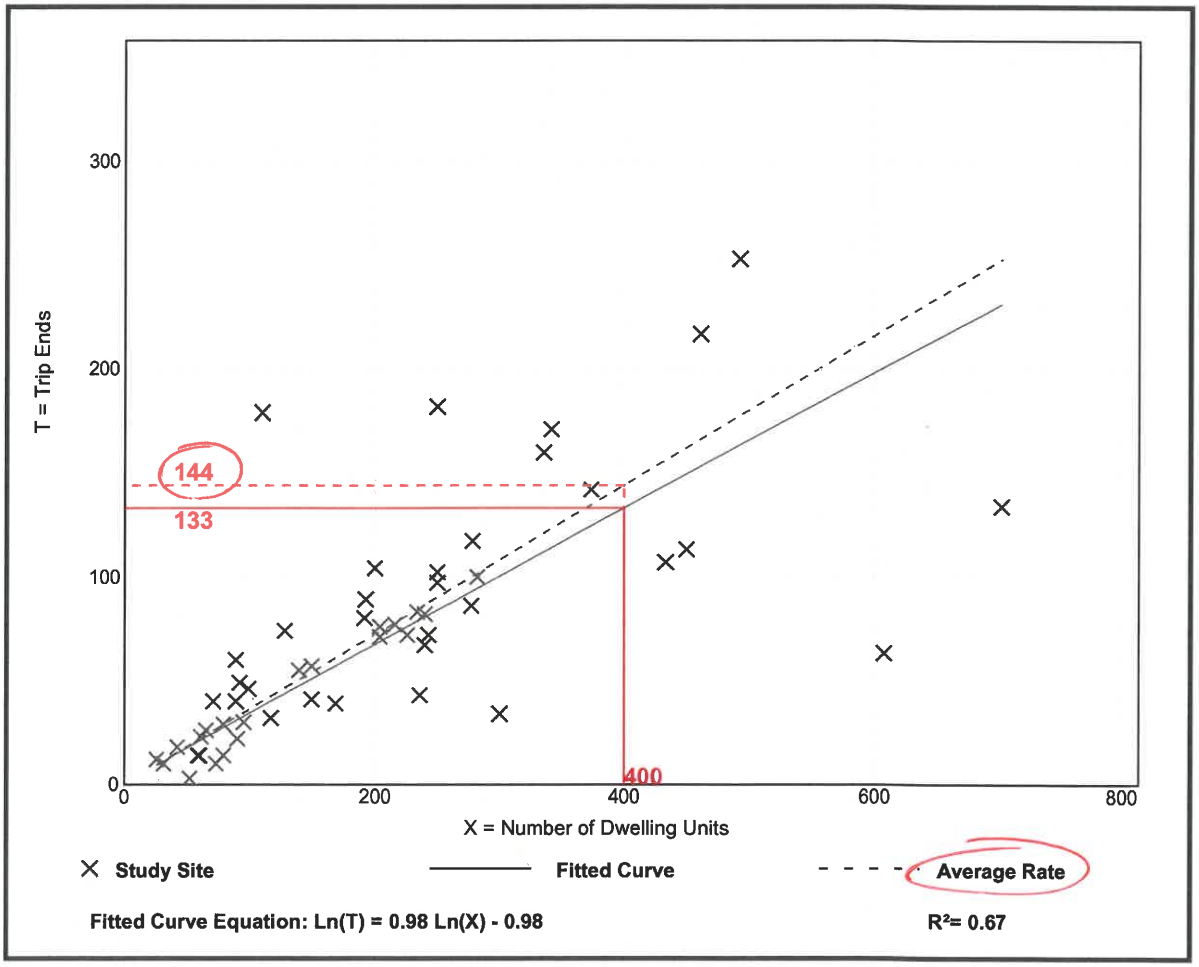
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 53
Avg. Num. of Dwelling Units: 207
Directional Distribution: 26% entering, 74% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.36	0.06 - 1.61	0.19

Data Plot and Equation



Trip Generation Manual, 10th Edition • Institute of Transportation Engineers

Multifamily Housing (Mid-Rise)
(221)

400 units

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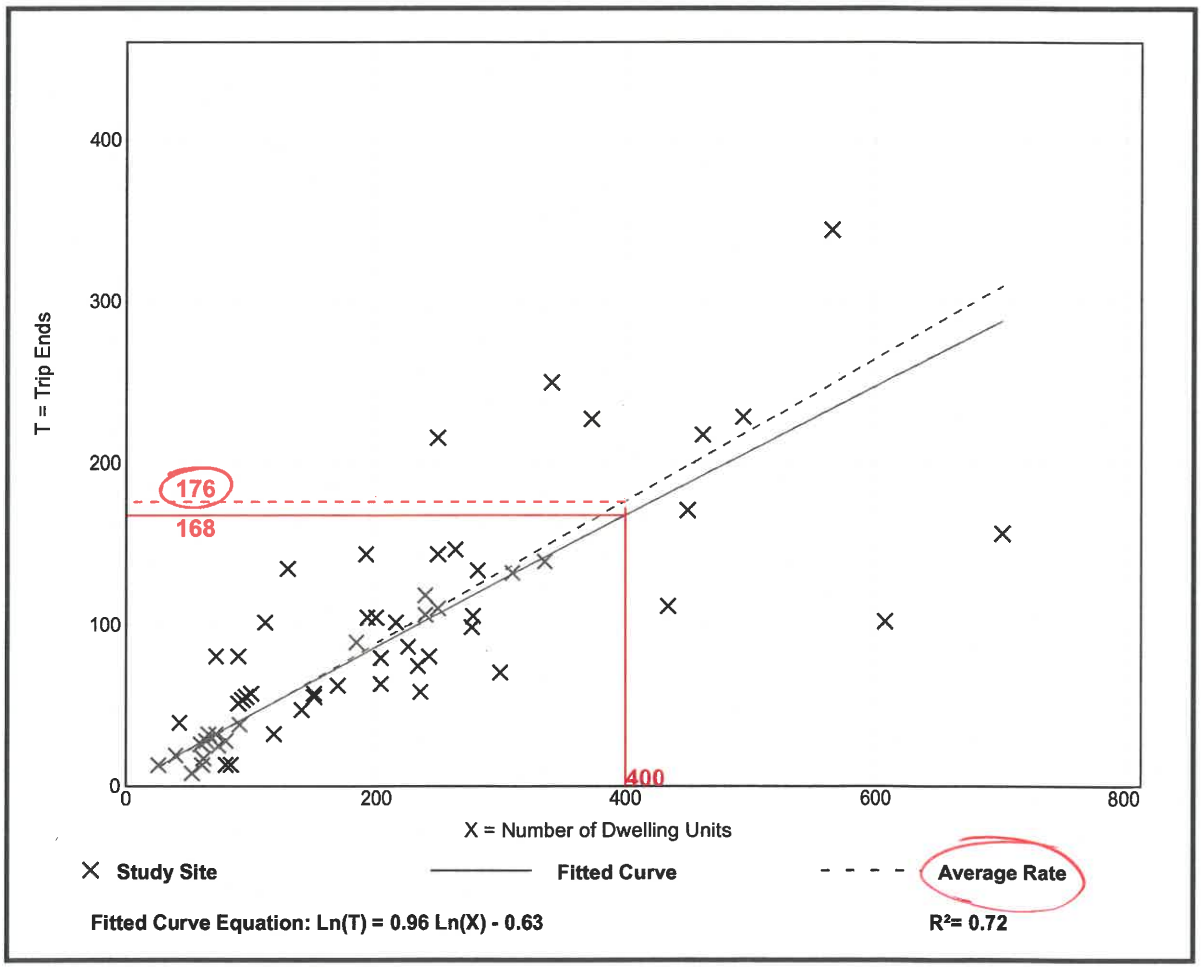

Trip Generation Manual, 10th Edition • Institute of Transportation Engineers

Multifamily Housing (Mid-Rise) 389 units
(221)

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On a: **Weekday**

Setting/Location: **General Urban/Suburban**
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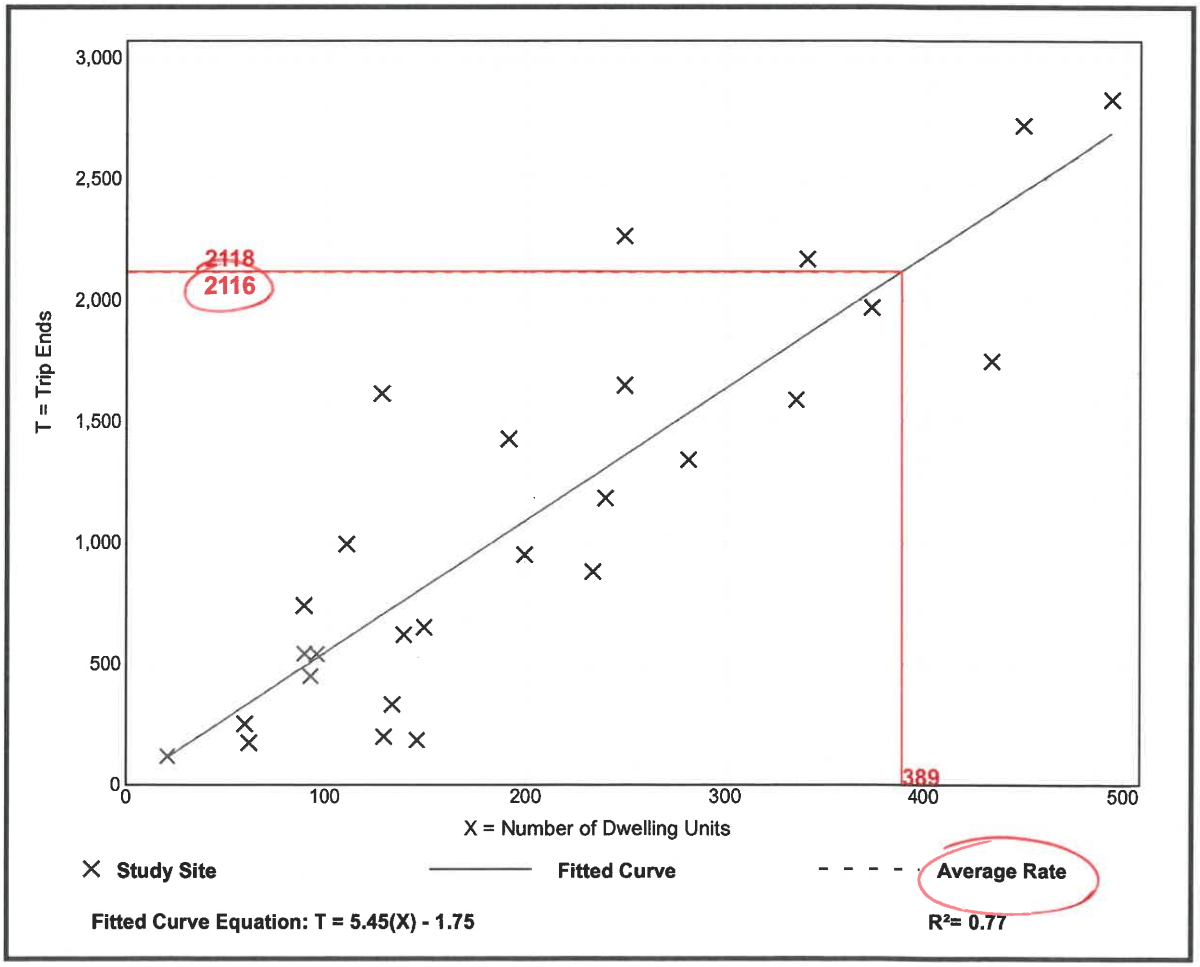

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Multifamily Housing (Mid-Rise)
(221)

389 units

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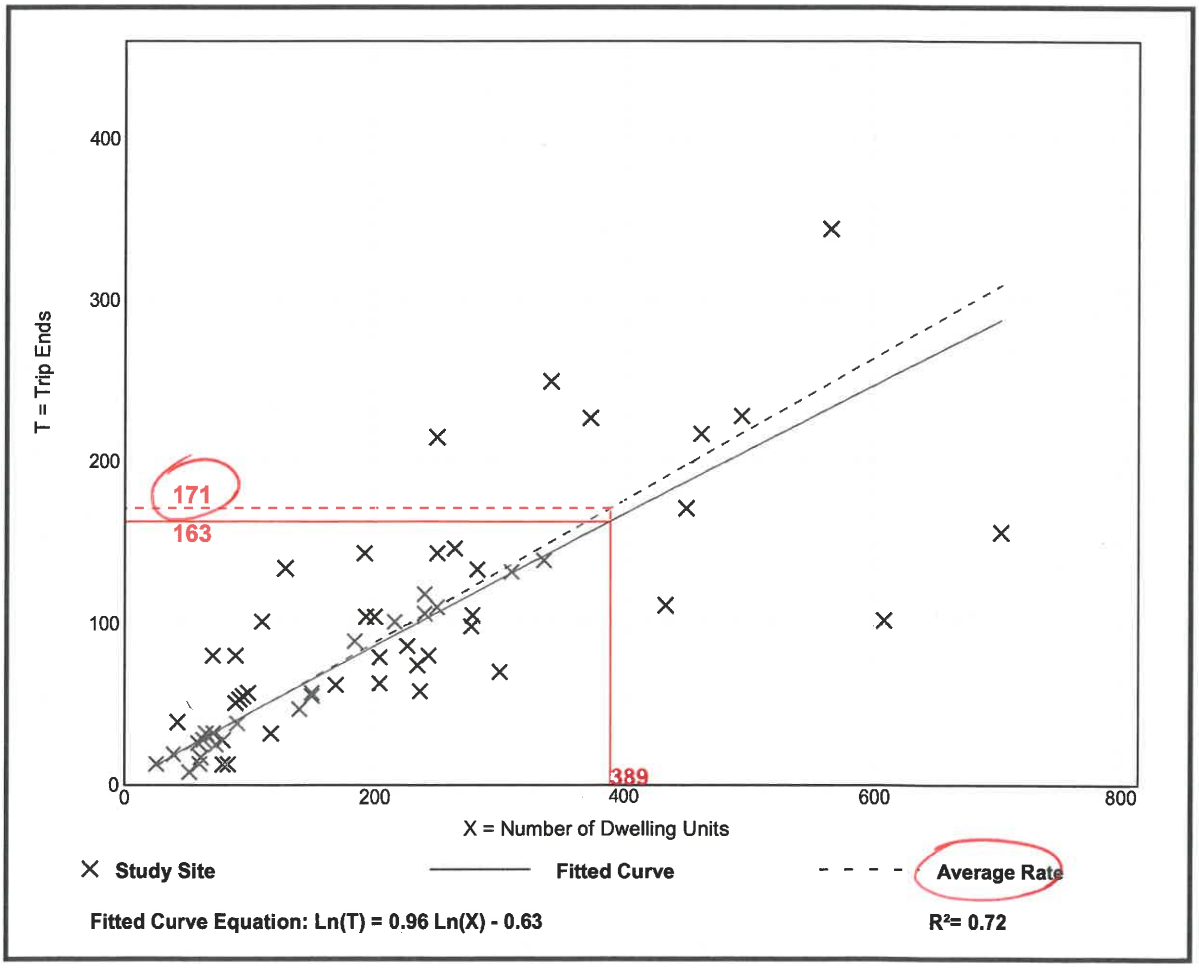

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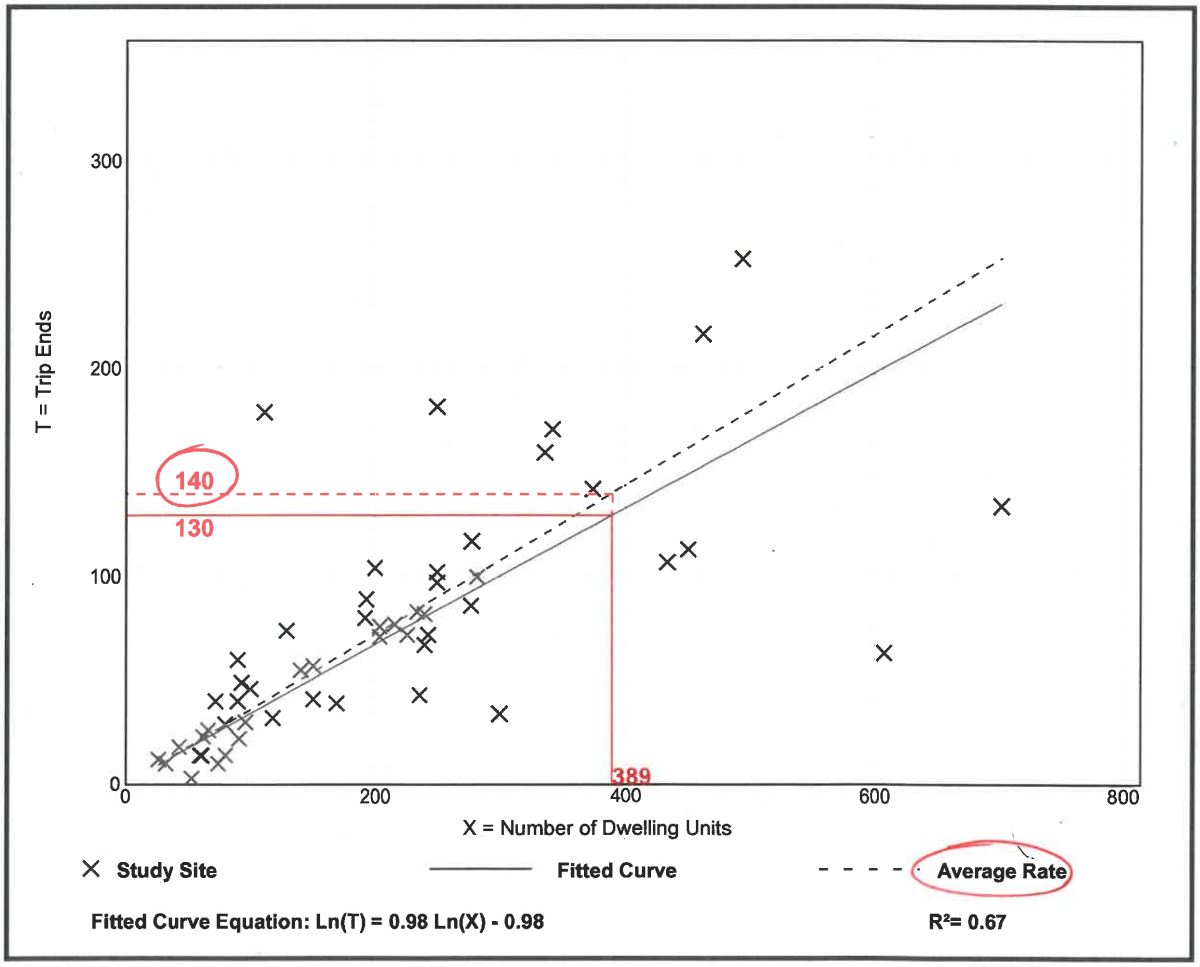

Trip Generation Manual, 10th Edition • Institute of Transportation Engineers

FLORIDA DEPARTMENT OF TRANSPORTATION
TRANSPORTATION STATISTICS OFFICE
2016 HISTORICAL AADT REPORT

COUNTY: 87 - MIAMI-DADE

SITE: 8206 - OLD CUTLER RD, 200' SOUTH OF SW 168TH STREET

YEAR	AADT	DIRECTION 1	DIRECTION 2	*K FACTOR	D FACTOR	T FACTOR
2016	25000 F	N 13000	S 12000	9.00	56.10	13.50
2015	25000 C	N 13000	S 12000	9.00	57.40	13.70
2014	17400 S	N 8300	S 9100	9.00	59.30	17.40
2013	17600 F	N 8400	S 9200	9.00	58.90	16.20
2012	17600 C	N 8400	S 9200	9.00	59.70	16.00

AADT FLAGS: C = COMPUTED; E = MANUAL ESTIMATE; F = FIRST YEAR ESTIMATE
S = SECOND YEAR ESTIMATE; T = THIRD YEAR ESTIMATE; R = FOURTH YEAR ESTIMATE
V = FIFTH YEAR ESTIMATE; 6 = SIXTH YEAR ESTIMATE; X = UNKNOWN
*K FACTOR: STARTING WITH YEAR 2011 IS STANDARDK, PRIOR YEARS ARE K30 VALUES

FLORIDA DEPARTMENT OF TRANSPORTATION
TRANSPORTATION STATISTICS OFFICE
2016 HISTORICAL AADT REPORT

COUNTY: 87 - MIAMI-DADE

SITE: 8205 - OLD CUTLER RD, 200' SOUTH OF SW 184TH STREET

YEAR	AADT	DIRECTION 1	DIRECTION 2	*K FACTOR	D FACTOR	T FACTOR
2016	15900 F	N 7900	S 8000	9.00	56.10	13.50
2015	16100 C	N 8000	S 8100	9.00	57.40	13.70
2014	14400 S	N 7000	S 7400	9.00	59.30	17.40
2013	14400 F	N 7000	S 7400	9.00	58.90	16.20
2012	14400 C	N 7000	S 7400	9.00	59.70	16.00

AADT FLAGS: C = COMPUTED; E = MANUAL ESTIMATE; F = FIRST YEAR ESTIMATE
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FLORIDA DEPARTMENT OF TRANSPORTATION
TRANSPORTATION STATISTICS OFFICE
2016 HISTORICAL AADT REPORT

COUNTY: 87 - MIAMI-DADE

SITE: 7006 - EUREKA DR/SW 184TH ST, .25 MILE WEST OF OLD CUTLER RD

YEAR	AADT	DIRECTION 1	DIRECTION 2	*K FACTOR	D FACTOR	T FACTOR
2016	5600 F	E 2600	W 3000	9.00	56.10	6.50
2015	5600 C	E 2600	W 3000	9.00	57.40	6.50
2014	5700 F	E 2600	W 3100	9.00	59.30	12.60
2013	5700 C	E 2600	W 3100	9.00	58.90	12.60
2012	5900 F	E 2700	W 3200	9.00	59.70	11.10
2011	5900 C	E 2700	W 3200	9.00	58.20	11.50
2010	6400 F	E 3000	W 3400	7.87	58.27	12.30
2009	6400 C	E 3000	W 3400	7.98	59.96	13.60

AADT FLAGS: C = COMPUTED; E = MANUAL ESTIMATE; F = FIRST YEAR ESTIMATE
S = SECOND YEAR ESTIMATE; T = THIRD YEAR ESTIMATE; R = FOURTH YEAR ESTIMATE
V = FIFTH YEAR ESTIMATE; 6 = SIXTH YEAR ESTIMATE; X = UNKNOWN
*K FACTOR: STARTING WITH YEAR 2011 IS STANDARDK, PRIOR YEARS ARE K30 VALUES

COUNTY: 87
STATION: 2563
DESCRIPTION: SR5/US1 S.DIXIE HWY ONE WAY NB 300' S OF SW 174 ST
START DATE: 01/28/2016
START TIME: 0000

DIRECTION: N

TIME	1ST	2ND	3RD	4TH	TOTAL
0000	76	52	46	38	212
0100	37	26	22	35	120
0200	23	33	38	29	123
0300	42	48	66	58	214
0400	59	115	134	184	492
0500	261	389	481	717	1848
0600	583	659	608	498	2348
0700	517	512	573	579	2181
0800	544	532	561	522	2159
0900	540	544	504	476	2064
1000	410	432	452	407	1701
1100	446	402	426	444	1718
1200	452	435	467	430	1784
1300	438	475	426	431	1770
1400	425	450	434	490	1799
1500	428	419	457	433	1737
1600	414	360	446	398	1618
1700	412	408	423	375	1618
1800	376	377	352	326	1431
1900	320	251	294	263	1128
2000	280	225	238	227	970
2100	226	190	214	163	793
2200	168	147	146	95	556
2300	122	63	78	65	328
24-HOUR TOTALS:					30712

PEAK VOLUME INFORMATION

	HOUR	VOLUME
A.M.	730	2228
P.M.	1230	1810
DAILY	545	2567

COUNTY: 87
STATION: 2562
DESCRIPTION: SR5/US1 S DIXIE HWY ONE WAY SB 300' S OF SW 174 ST
START DATE: 01/28/2016
START TIME: 0000

DIRECTION: S

TIME	1ST	2ND	3RD	4TH	TOTAL
0000	160	134	109	95	498
0100	83	84	56	67	290
0200	37	43	47	34	161
0300	36	46	29	33	144
0400	31	25	47	48	151
0500	56	53	79	73	261
0600	138	187	167	186	678
0700	210	259	246	295	1010
0800	273	309	284	353	1219
0900	320	334	361	321	1336
1000	356	360	366	358	1440
1100	383	372	431	400	1586
1200	415	427	447	441	1730
1300	443	449	413	399	1704
1400	463	460	498	489	1910
1500	466	559	571	551	2147
1600	524	564	567	595	2250
1700	571	575	585	560	2291
1800	546	569	554	582	2251
1900	563	543	544	463	2113
2000	460	393	376	306	1535
2100	317	338	304	307	1266
2200	274	246	234	213	967
2300	203	240	170	168	781
24-HOUR TOTALS:					29719

PEAK VOLUME INFORMATION

	HOUR	VOLUME
A.M.	845	1368
P.M.	1645	2326
DAILY	1645	2326

TABLE 1

Generalized **Annual Average Daily** Volumes for Florida's **Urbanized Areas**

12/18/12

INTERRUPTED FLOW FACILITIES

STATE SIGNALIZED ARTERIALS

Class I (40 mph or higher posted speed limit)

Lanes	Median	B	C	D	E
2	Undivided	*	16,800	17,700	**
4	Divided	*	37,900	39,800	**
6	Divided	*	58,400	59,900	**
8	Divided	*	78,800	80,100	**

Class II (35 mph or slower posted speed limit)

Lanes	Median	B	C	D	E
2	Undivided	*	7,300	14,800	15,600
4	Divided	*	14,500	32,400	33,800
6	Divided	*	23,300	50,000	50,900
8	Divided	*	32,000	67,300	68,100

Non-State Signalized Roadway Adjustments

(Alter corresponding state volumes by the indicated percent.)

Non-State Signalized Roadways - 10%

Median & Turn Lane Adjustments

Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors
2	Divided	Yes	No	+5%
2	Undivided	No	No	-20%
Multi	Undivided	Yes	No	-5%
Multi	Undivided	No	No	-25%
–	–	–	Yes	+ 5%

One-Way Facility Adjustment

Multiply the corresponding two-directional volumes in this table by 0.6

BICYCLE MODE[2]

(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Paved Shoulder/Bicycle Lane Coverage	B	C	D	E
0-49%	*	2,900	7,600	19,700
50-84%	2,100	6,700	19,700	>19,700
85-100%	9,300	19,700	>19,700	**

PEDESTRIAN MODE[2]

(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Sidewalk Coverage	B	C	D	E
0-49%	*	*	2,800	9,500
50-84%	*	1,600	8,700	15,800
85-100%	3,800	10,700	17,400	>19,700

BUS MODE (Scheduled Fixed Route)[3]

(Buses in peak hour in peak direction)

Sidewalk Coverage	B	C	D	E
0-84%	> 5	≥ 4	≥ 3	≥ 2
85-100%	> 4	≥ 3	≥ 2	≥ 1

UNINTERRUPTED FLOW FACILITIES

FREEWAYS

Core Urbanized

Lanes	B	C	D	E
4	47,400	64,000	77,900	84,600
6	69,900	95,200	116,600	130,600
8	92,500	126,400	154,300	176,600
10	115,100	159,700	194,500	222,700
12	162,400	216,700	256,600	268,900

Urbanized

Lanes	B	C	D	E
4	45,800	61,500	74,400	79,900
6	68,100	93,000	111,800	123,300
8	91,500	123,500	148,700	166,800
10	114,800	156,000	187,100	210,300

Freeway Adjustments

Auxiliary Lanes Present in Both Directions	Ramp Metering
+ 20,000	+ 5%

UNINTERRUPTED FLOW HIGHWAYS

Lanes	Median	B	C	D	E
2	Undivided	8,600	17,000	24,200	33,300
4	Divided	36,700	51,800	65,600	72,600
6	Divided	55,000	77,700	98,300	108,800

Uninterrupted Flow Highway Adjustments

Lanes	Median	Exclusive left lanes	Adjustment factors
2	Divided	Yes	+5%
Multi	Undivided	Yes	-5%
Multi	Undivided	No	-25%

[1]Values shown are presented as two-way annual average daily volumes for levels of service and are for the automobile/truck modes unless specifically stated. This table does not constitute a standard and should be used only for general planning applications. The computer models from which this table is derived should be used for more specific planning applications. The table and deriving computer models should not be used for corridor or intersection design, where more refined techniques exist. Calculations are based on planning applications of the Highway Capacity Manual and the Transit Capacity and Quality of Service Manual.

[2] Level of service for the bicycle and pedestrian modes in this table is based on number of motorized vehicles, not number of bicyclists or pedestrians using the facility.

[3] Buses per hour shown are only for the peak hour in the single direction of the higher traffic flow.

* Cannot be achieved using table input value defaults.

** Not applicable for that level of service letter grade. For the automobile mode, volumes greater than level of service D become F because intersection capacities have been reached. For the bicycle mode, the level of service letter grade (including F) is not achievable because there is no maximum vehicle volume threshold using table input value defaults.

Source:
Florida Department of Transportation
Systems Planning Office
www.dot.state.fl.us/planning/systems/sm/los/default.shtm

TABLE 1
(continued)

Generalized **Annual Average Daily** Volumes for Florida's **Urbanized Areas**

12/18/12

INPUT VALUE ASSUMPTIONS	Uninterrupted Flow Facilities				Interrupted Flow Facilities					
					State Arterials				Class I	
	Freeways	Core Freeways	Highways		Class I		Class II		Bicycle	Pedestrian
ROADWAY CHARACTERISTICS										
Area type (u,lu)	lu	lu	u	u	u	u	u	u	u	u
Number of through lanes (both dir.)	4-10	4-12	2	4-6	2	4-8	2	4-8	4	4
Posted speed (mph)	70	65	50	50	45	50	30	30	45	45
Free flow speed (mph)	75	70	55	55	50	55	35	35	50	50
Auxiliary Lanes (n,y)	n	n								
Median (n, nr, r)			n	r	n	r	n	r	r	r
Terrain (l,r)	l	l	l	l	l	l	l	l	l	l
% no passing zone			80							
Exclusive left turn lane impact (n, y)			[n]	y	y	y	y	y	y	y
Exclusive right turn lanes (n, y)					n	n	n	n	n	n
Facility length (mi)	4	4	5	5	2	2	1.9	1.8	2	2
Number of basic segments	4	4								
TRAFFIC CHARACTERISTICS										
Planning analysis hour factor (K)	0.090	0.085	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090
Directional distribution factor (D)	0.547	0.547	0.550	0.550	0.550	0.560	0.565	0.560	0.565	0.565
Peak hour factor (PHF)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Base saturation flow rate (pcphpl)			1,700	2,100	1,950	1,950	1,950	1,950	1,950	1,950
Heavy vehicle percent	4.0	4.0	2.0	2.0	1.0	1.0	1.0	1.0	2.5	2.0
Local adjustment factor	0.91	0.91	0.97	0.98						
% left turns					12	12	12	12	12	12
% right turns					12	12	12	12	12	12
CONTROL CHARACTERISTICS										
Number of signals					4	4	10	10	4	6
Arrival type (1-6)					3	3	4	4	4	4
Signal type (a, c, p)					c	c	c	c	c	c
Cycle length (C)					120	150	120	120	120	120
Effective green ratio (g/C)					0.44	0.45	0.44	0.44	0.44	0.44
MULTIMODAL CHARACTERISTICS										
Paved shoulder/bicycle lane (n, y)									n, 50%, y	n
Outside lane width (n, t, w)									t	t
Pavement condition (d, t, u)									t	
On-street parking (n, y)										
Sidewalk (n, y)										n, 50%, y
Sidewalk/roadway separation(a, t, w)										t
Sidewalk protective barrier (n, y)										n

LEVEL OF SERVICE THRESHOLDS

Level of Service	Freeways	Highways		Arterials		Bicycle	Ped	Bus
	Density	Two-Lane %ffs	Multilane Density	Class I ats	Class II ats	Score	Score	Buses/hr.
B	≤ 17	> 83.3	≤ 17	> 31 mph	> 22 mph	≤ 2.75	≤ 2.75	≤ 6
C	≤ 24	> 75.0	≤ 24	> 23 mph	> 17 mph	≤ 3.50	≤ 3.50	≤ 4
D	≤ 31	> 66.7	≤ 31	> 18 mph	> 13 mph	≤ 4.25	≤ 4.25	< 3
E	≤ 39	> 58.3	≤ 35	> 15 mph	> 10 mph	≤ 5.00	≤ 5.00	< 2

% ffs = Percent free flow speed ats = Average travel speed

TABLE 4

Generalized **Peak Hour Two-Way** Volumes for Florida's **Urbanized Areas**[1]

12/18/12

INTERRUPTED FLOW FACILITIES

STATE SIGNALIZED ARTERIALS

Class I (40 mph or higher posted speed limit)

Lanes	Median	B	C	D	E
2	Undivided	*	1,510	1,600	**
4	Divided	*	3,420	3,580	**
6	Divided	*	5,250	5,390	**
8	Divided	*	7,090	7,210	**

Class II (35 mph or slower posted speed limit)

Lanes	Median	B	C	D	E
2	Undivided	*	660	1,330	1,410
4	Divided	*	1,310	2,920	3,040
6	Divided	*	2,090	4,500	4,590
8	Divided	*	2,880	6,060	6,130

Non-State Signalized Roadway Adjustments

(Alter corresponding state volumes by the indicated percent.)

Non-State Signalized Roadways - 10%

Median & Turn Lane Adjustments

Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors
2	Divided	Yes	No	+5%
2	Undivided	No	No	-20%
Multi	Undivided	Yes	No	-5%
Multi	Undivided	No	No	-25%
–	–	–	Yes	+ 5%

One-Way Facility Adjustment

Multiply the corresponding two-directional volumes in this table by 0.6

BICYCLE MODE[2]

(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Paved Shoulder/Bicycle Lane Coverage	B	C	D	E
0-49%	*	260	680	1,770
50-84%	190	600	1,770	>1,770
85-100%	830	1,770	>1,770	**

PEDESTRIAN MODE[2]

(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Sidewalk Coverage	B	C	D	E
0-49%	*	*	250	850
50-84%	*	150	780	1,420
85-100%	340	960	1,560	>1,770

BUS MODE (Scheduled Fixed Route)[3]

(Buses in peak hour in peak direction)

Sidewalk Coverage	B	C	D	E
0-84%	> 5	≥ 4	≥ 3	≥ 2
85-100%	> 4	≥ 3	≥ 2	≥ 1

UNINTERRUPTED FLOW FACILITIES

FREEWAYS

Lanes	B	C	D	E
4	4,120	5,540	6,700	7,190
6	6,130	8,370	10,060	11,100
8	8,230	11,100	13,390	15,010
10	10,330	14,040	16,840	18,930
12	14,450	18,880	22,030	22,860

Freeway Adjustments

Auxiliary Lanes Present in Both Directions	Ramp Metering
+ 1,800	+ 5%

UNINTERRUPTED FLOW HIGHWAYS

Lanes	Median	B	C	D	E
2	Undivided	770	1,530	2,170	2,990
4	Divided	3,300	4,660	5,900	6,530
6	Divided	4,950	6,990	8,840	9,790

Uninterrupted Flow Highway Adjustments

Lanes	Median	Exclusive left lanes	Adjustment factors
2	Divided	Yes	+5%
Multi	Undivided	Yes	-5%
Multi	Undivided	No	-25%

[1] Values shown are presented as peak hour two-way volumes for levels of service and are for the automobile/truck modes unless specifically stated. This table does not constitute a standard and should be used only for general planning applications. The computer models from which this table is derived should be used for more specific planning applications. The table and deriving computer models should not be used for corridor or intersection design, where more refined techniques exist. Calculations are based on planning applications of the Highway Capacity Manual and the Transit Capacity and Quality of Service Manual.

[2] Level of service for the bicycle and pedestrian modes in this table is based on number of motorized vehicles, not number of bicyclists or pedestrians using the facility.

[3] Buses per hour shown are only for the peak hour in the single direction of the higher traffic flow.

* Cannot be achieved using table input value defaults.

** Not applicable for that level of service letter grade. For the automobile mode, volumes greater than level of service D become F because intersection capacities have been reached. For the bicycle mode, the level of service letter grade (including F) is not achievable because there is no maximum vehicle volume threshold using table input value defaults.

Source:
Florida Department of Transportation
Systems Planning Office
www.dot.state.fl.us/planning/systems/sm/los/default.shtm

TABLE 4
(continued)

Generalized **Peak Hour Two-Way** Volumes for Florida's **Urbanized Areas**

12/18/12

INPUT VALUE ASSUMPTIONS	Uninterrupted Flow Facilities			Interrupted Flow Facilities					
				State Arterials				Class I	
	Freeways	Highways		Class I		Class II		Bicycle	Pedestrian
ROADWAY CHARACTERISTICS									
Area type (lu, u)	lu	u	u	u	u	u	u	u	u
Number of through lanes (both dir.)	4-12	2	4-6	2	4-8	2	4-8	4	4
Posted speed (mph)	70	50	50	45	50	30	30	45	45
Free flow speed (mph)	75	55	55	50	55	35	35	50	50
Auxiliary lanes (n,y)	n								
Median (n, nr, r)		n	r	n	r	n	r	r	r
Terrain (l,r)	l	l	l	l	l	l	l	l	l
% no passing zone		80							
Exclusive left turn lane impact (n, y)		[n]	y	y	y	y	y	y	y
Exclusive right turn lanes (n, y)				n	n	n	n	n	n
Facility length (mi)	4	5	5	2	2	1.9	1.8	2	2
Number of basic segments	4								
TRAFFIC CHARACTERISTICS									
Planning analysis hour factor (K)	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090
Directional distribution factor (D)	0.547	0.550	0.550	0.550	0.560	0.565	0.560	0.565	0.565
Peak hour factor (PHF)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Base saturation flow rate (pcphpl)		1,700	2,100	1,950	1,950	1,950	1,950	1,950	1,950
Heavy vehicle percent	4.0	2.0	2.0	1.0	1.0	1.0	1.0	2.5	2.0
Local adjustment factor	0.91	0.97	0.98						
% left turns				12	12	12	12	12	12
% right turns				12	12	12	12	12	12
CONTROL CHARACTERISTICS									
Number of signals				4	4	10	10	4	6
Arrival type (1-6)				3	3	4	4	4	4
Signal type (a, c, p)				c	c	c	c	c	c
Cycle length (C)				120	150	120	120	120	120
Effective green ratio (g/C)				0.44	0.45	0.44	0.44	0.44	0.44
MULTIMODAL CHARACTERISTICS									
Paved shoulder/bicycle lane (n, y)								n, 50%, y	n
Outside lane width (n, t, w)								t	t
Pavement condition (d, t, u)								t	
On-street parking (n, y)								n	n
Sidewalk (n, y)									n, 50%, y
Sidewalk/roadway separation (a, t, w)									t
Sidewalk protective barrier (n, y)									n

LEVEL OF SERVICE THRESHOLDS

Level of Service	Freeways	Highways		Arterials		Bicycle	Ped	Bus
	Density	Two-Lane %ffs	Multilane Density	Class I ats	Class II ats	Score	Score	Buses/hr.
B	≤ 17	> 83.3	≤ 17	> 31 mph	> 22 mph	≤ 2.75	≤ 2.75	≤ 6
C	≤ 24	> 75.0	≤ 24	> 23 mph	> 17 mph	≤ 3.50	≤ 3.50	≤ 4
D	≤ 31	> 66.7	≤ 31	> 18 mph	> 13 mph	≤ 4.25	≤ 4.25	< 3
E	≤ 39	> 58.3	≤ 35	> 15 mph	> 10 mph	≤ 5.00	≤ 5.00	< 2

% ffs = Percent free flow speed ats = Average travel speed

TABLE 7

Generalized **Peak Hour Directional** Volumes for Florida's **Urbanized Areas**[1]

12/18/12

INTERRUPTED FLOW FACILITIES

STATE SIGNALIZED ARTERIALS

Class I (40 mph or higher posted speed limit)

Lanes	Median	B	C	D	E
1	Undivided	*	830	880	**
2	Divided	*	1,910	2,000	**
3	Divided	*	2,940	3,020	**
4	Divided	*	3,970	4,040	**

Class II (35 mph or slower posted speed limit)

Lanes	Median	B	C	D	E
1	Undivided	*	370	750	800
2	Divided	*	730	1,630	1,700
3	Divided	*	1,170	2,520	2,560
4	Divided	*	1,610	3,390	3,420

Non-State Signalized Roadway Adjustments

(Alter corresponding state volumes by the indicated percent.)

Non-State Signalized Roadways - 10%

Median & Turn Lane Adjustments

Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors
1	Divided	Yes	No	+5%
1	Undivided	No	No	-20%
Multi	Undivided	Yes	No	-5%
Multi	Undivided	No	No	-25%
–	–	–	Yes	+ 5%

One-Way Facility Adjustment

Multiply the corresponding directional volumes in this table by 1.2

UNINTERRUPTED FLOW FACILITIES

FREEWAYS

Lanes	B	C	D	E
2	2,260	3,020	3,660	3,940
3	3,360	4,580	5,500	6,080
4	4,500	6,080	7,320	8,220
5	5,660	7,680	9,220	10,360
6	7,900	10,320	12,060	12,500

Freeway Adjustments

Auxiliary Lane	Ramp Metering
+ 1,000	+ 5%

UNINTERRUPTED FLOW HIGHWAYS

Lanes	Median	B	C	D	E
1	Undivided	420	840	1,190	1,640
2	Divided	1,810	2,560	3,240	3,590
3	Divided	2,720	3,840	4,860	5,380

Uninterrupted Flow Highway Adjustments

Lanes	Median	Exclusive left lanes	Adjustment factors
1	Divided	Yes	+5%
Multi	Undivided	Yes	-5%
Multi	Undivided	No	-25%

BICYCLE MODE[2]

(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Paved Shoulder/Bicycle Lane Coverage	B	C	D	E
0-49%	*	150	390	1,000
50-84%	110	340	1,000	>1,000
85-100%	470	1,000	>1,000	**

PEDESTRIAN MODE[2]

(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Sidewalk Coverage	B	C	D	E
0-49%	*	*	140	480
50-84%	*	80	440	800
85-100%	200	540	880	>1,000

BUS MODE (Scheduled Fixed Route)[3]

(Buses in peak hour in peak direction)

Sidewalk Coverage	B	C	D	E
0-84%	> 5	≥ 4	≥ 3	≥ 2
85-100%	> 4	≥ 3	≥ 2	≥ 1

[1] Values shown are presented as peak hour directional volumes for levels of service and are for the automobile/truck modes unless specifically stated. This table does not constitute a standard and should be used only for general planning applications. The computer models from which this table is derived should be used for more specific planning applications. The table and deriving computer models should not be used for corridor or intersection design, where more refined techniques exist. Calculations are based on planning applications of the Highway Capacity Manual and the Transit Capacity and Quality of Service Manual.

[2] Level of service for the bicycle and pedestrian modes in this table is based on number of motorized vehicles, not number of bicyclists or pedestrians using the facility.

[3] Buses per hour shown are only for the peak hour in the single direction of the higher traffic flow.

* Cannot be achieved using table input value defaults.

** Not applicable for that level of service letter grade. For the automobile mode, volumes greater than level of service D become F because intersection capacities have been reached. For the bicycle mode, the level of service letter grade (including F) is not achievable because there is no maximum vehicle volume threshold using table input value defaults.

Source:
Florida Department of Transportation
Systems Planning Office
www.dot.state.fl.us/planning/systems/sm/los/default.shtm

TABLE 7
(continued)

Generalized **Peak Hour Directional** Volumes for Florida's **Urbanized Areas**

12/18/12

INPUT VALUE ASSUMPTIONS	Uninterrupted Flow Facilities			Interrupted Flow Facilities					
				State Arterials				Class I	
	Freeways	Highways		Class I		Class II		Bicycle	Pedestrian
ROADWAY CHARACTERISTICS									
Area type (lu, u)	lu	u	u	u	u	u	u	u	u
Number of through lanes (both dir.)	4-12	2	4-6	2	4-8	2	4-8	4	4
Posted speed (mph)	70	50	50	45	50	30	30	45	45
Free flow speed (mph)	75	55	55	50	55	35	35	50	50
Auxiliary lanes (n,y)	n								
Median (n, nr, r)		n	r	n	r	n	r	r	r
Terrain (l,r)	l	l	l	l	l	l	l	l	l
% no passing zone		80							
Exclusive left turn lane impact (n, y)		[n]	y	y	y	y	y	y	y
Exclusive right turn lanes (n, y)				n	n	n	n	n	n
Facility length (mi)	4	5	5	2	2	1.9	1.8	2	2
Number of basic segments	4								
TRAFFIC CHARACTERISTICS									
Planning analysis hour factor (K)	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090
Directional distribution factor (D)	0.547	0.550	0.550	0.550	0.560	0.565	0.560	0.565	0.565
Peak hour factor (PHF)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Base saturation flow rate (pcphpl)		1,700	2,100	1,950	1,950	1,950	1,950	1,950	1,950
Heavy vehicle percent	4.0	2.0	2.0	1.0	1.0	1.0	1.0	2.5	2.0
Local adjustment factor	0.91	0.97	0.98						
% left turns				12	12	12	12	12	12
% right turns				12	12	12	12	12	12
CONTROL CHARACTERISTICS									
Number of signals				4	4	10	10	4	6
Arrival type (1-6)				3	3	4	4	4	4
Signal type (a, c, p)				c	c	c	c	c	c
Cycle length (C)				120	150	120	120	120	120
Effective green ratio (g/C)				0.44	0.45	0.44	0.44	0.44	0.44
MULTIMODAL CHARACTERISTICS									
Paved shoulder/bicycle lane (n, y)								n, 50%, y	n
Outside lane width (n, t, w)								t	t
Pavement condition (d, t, w)								t	
On-street parking (n, y)								n	n
Sidewalk (n, y)									n, 50%, y
Sidewalk/roadway separation (a, t, w)									t
Sidewalk protective barrier (n, y)									n

LEVEL OF SERVICE THRESHOLDS

Level of Service	Freeways	Highways		Arterials		Bicycle	Ped	Bus
	Density	Two-Lane %ffs	Multilane Density	Class I ats	Class II ats	Score	Score	Buses/hr.
B	≤ 17	> 83.3	≤ 17	> 31 mph	> 22 mph	≤ 2.75	≤ 2.75	≤ 6
C	≤ 24	> 75.0	≤ 24	> 23 mph	> 17 mph	≤ 3.50	≤ 3.50	≤ 4
D	≤ 31	> 66.7	≤ 31	> 18 mph	> 13 mph	≤ 4.25	≤ 4.25	< 3
E	≤ 39	> 58.3	≤ 35	> 15 mph	> 10 mph	≤ 5.00	≤ 5.00	< 2

% ffs = Percent free flow speed ats = Average travel speed

TAZ 1139

Miami-Dade 2010 Directional Distribution Summary

Origin TAZ			Cardinal Directions								Total
County TAZ	Regional TAZ		NNE	ENE	ESE	SSE	SSW	WSW	WNW	NNW	
1128	4028	PERCENT	26.6	9.1	0.8	0.8	8.4	23.2	13.1	18.0	
1129	4029	TRIPS	642	178	178	13	212	561	313	553	2,650
1129	4029	PERCENT	24.2	6.7	6.7	0.5	8.0	21.2	11.8	20.9	
1130	4030	TRIPS	288	33	0	0	35	222	130	258	966
1130	4030	PERCENT	29.8	3.4	0.0	0.0	3.6	23.0	13.5	26.7	
1131	4031	TRIPS	1,042	43	0	0	204	683	751	901	3,624
1131	4031	PERCENT	28.8	1.2	0.0	0.0	5.6	18.9	20.7	24.9	
1132	4032	TRIPS	216	57	3	28	119	172	207	133	935
1132	4032	PERCENT	23.1	6.1	0.3	3.0	12.7	18.4	22.1	14.2	
1133	4033	TRIPS	293	10	0	0	56	165	264	266	1,054
1133	4033	PERCENT	27.8	1.0	0.0	0.0	5.3	15.7	25.1	25.2	
1134	4034	TRIPS	361	35	0	0	59	299	424	450	1,628
1134	4034	PERCENT	22.2	2.2	0.0	0.0	3.6	18.4	26.0	27.6	
1135	4035	TRIPS	2	0	0	0	0	3	1	3	9
1135	4035	PERCENT	22.2	0.0	0.0	0.0	0.0	33.3	11.1	33.3	
1136	4036	TRIPS	434	20	0	0	72	273	321	664	1,784
1136	4036	PERCENT	24.3	1.1	0.0	0.0	4.0	15.3	18.0	37.2	
1137	4037	TRIPS	151	0	0	0	42	176	118	220	707
1137	4037	PERCENT	21.4	0.0	0.0	0.0	5.9	24.9	16.7	31.1	
1138	4038	TRIPS	295	10	0	0	63	151	315	312	1,146
1138	4038	PERCENT	25.7	0.9	0.0	0.0	5.5	13.2	27.5	27.2	
1139	4039	TRIPS	115	0	0	28	109	231	260	277	1,020
1139	4039	PERCENT	11.3	0.0	0.0	2.8	10.7	22.7	25.5	27.2	
1140	4040	TRIPS	999	43	3	104	152	408	332	502	2,543
1140	4040	PERCENT	39.3	1.7	0.1	4.1	6.0	16.0	13.1	19.7	
1141	4041	TRIPS	470	25	10	36	95	131	208	367	1,342
1141	4041	PERCENT	35.0	1.9	0.8	2.7	7.1	9.8	15.5	27.4	
1142	4042	TRIPS	908	146	0	91	262	363	403	596	2,769
1142	4042	PERCENT	32.8	5.3	0.0	3.3	9.5	13.1	14.6	21.5	
1143	4043	TRIPS	1,255	115	142	254	631	401	427	768	3,993
1143	4043	PERCENT	31.4	2.9	3.6	6.4	15.8	10.0	10.7	19.2	
1144	4044	TRIPS	505	14	67	159	404	257	160	247	1,813
1144	4044	PERCENT	27.9	0.8	3.7	8.8	22.3	14.2	8.8	13.6	
1145	4045	TRIPS	1,446	175	159	550	1,577	637	558	727	5,829
1145	4045	PERCENT	24.8	3.0	2.7	9.4	27.1	10.9	9.6	12.5	
1146	4046	TRIPS	1,318	134	87	523	1,115	852	764	890	5,683
1146	4046	PERCENT	23.2	2.4	1.5	9.2	19.6	15.0	13.4	15.7	
1147	4047	TRIPS	1,202	213	130	89	721	416	506	737	4,014
1147	4047	PERCENT	30.0	5.3	3.2	2.2	18.0	10.4	12.6	18.4	
1148	4048	TRIPS	1,321	298	142	285	1,914	1,048	803	1,516	7,327
1148	4048	PERCENT	18.0	4.1	1.9	3.9	26.1	14.3	11.0	20.7	