F. Participation in Roadway Improvements

Applicants may be required by the Planning Board to participate in some of the roadway improvements included in a capital program. This participation, which will be proportional to the development impact on the improvement, will be determined by the staffs of Transportation Planning, DPWT and the Maryland State Highway Administration. If the traffic study identifies changes to roadway or other transportation-related activities that are required to mitigate the impact of the proposed development on or adjacent to the development site, these changes will be the responsibility of the applicant as part of satisfying Local Area Transportation Review (LATR) procedures.

VI. Methods to Reduce Local Area Transportation Review Impact

A. Methods to Reduce Local Area Transportation Review Impact For Residential and Non-Residential Development

1. Traffic Mitigation Agreement

The applicant may choose to reduce LATR impact by entering into a legally-binding agreement (or contract) with the Planning Board and the Department of Public Works and Transportation (DPWT) to mitigate the impact of all or a part of their site-generated trips within the policy area where the site is located. Each traffic mitigation program will be required to operate for at least 12 years but no longer than 15 years at the discretion of the Planning Board.

The following are examples of the measures that could be included in a TMA:

- Subsidizing transit fares to increase ridership on existing bus routes
- Providing the capital and operating costs to add a new bus route or extend an existing bus route
- Constructing a new park-and-ride facility
- Providing funds to increase use of an existing park-and-ride facility
- Funding a private shuttle service; e.g., to and from the site to a nearby Metrorail station
- Constructing queue-jumper lanes, traffic signal pre-emption, to improve bus travel times

TMAs may require monitoring, as appropriate for each project. If monitoring is required, it shall be done on a quarterly basis at the applicant's expense by DWPT staff or a consultant selected by the Planning Board to ensure compliance with the conditions of the contract. If the goals are not being met, DPWT staff or the

consultant shall monitor the TMA on a monthly basis until such time as the goals are met for three consecutive months. Transportation Planning staff and DPWT staff shall work with the applicant to seek additional measures to ensure compliance during periods when the goals are not being met.

2. Non-Automobile Transportation Amenities

To maintain an approximately equivalent transportation level of service at the local level considering both auto and non-auto modes of travel, the Planning Board may permit a reduction in the amount of roadway improvements or traffic mitigation needed to satisfy the conditions of Local Area Transportation Review in exchange for the installation or construction of non-automobile transportation amenities that will enhance pedestrian safety or encourage non-automobile mode choices, such as sidewalks, bike paths, curb extensions, countdown pedestrian signals, bus shelters and benches, bike lockers and static or real time transit information signs.

Such amenities must be implemented so as to offset the local area impact at the specific intersection(s) where the congestion standard has been exceeded and the need for an improvement has been identified. Thus, trip distribution and assignment assumptions are a key factor in determining local area intersection impacts and the level of trip mitigation required.

In determining the "adequacy" of such improvements in mitigating local area congestion, the Planning Board must balance the environmental and community impacts of reducing congestion at an intersection against the safe and efficient accommodation of pedestrians, bike riders and bus patrons.

a. Construction of Sidewalks, Bike Paths, Curb Extensions, or Countdown Pedestrian Signals

The applicant may ~~choose~~propose to reduce LATR impact by constructing off-site sidewalks and/or bike paths, curb extensions or countdown pedestrian signals which provide safe access from the proposed or an existing development to any of the following uses:

1) Transit stations or stops (rail or bus)
2) Public facilities (e.g., school, library, park, or post office)
3) Recreation centers
4) Retail centers that employ 20 or more persons at any time
5) Housing projects
6) Office centers that employ 100 or more persons
7) Existing sidewalks or bike paths
8) Adjacent development(s) or private amenity space; e.g., sitting area, theater, community center

These uses must be within one-quarter mile of the edge of the proposed or an existing development. For transit stations or stops, the frequency of transit service must be at intervals of 20 minutes or less during the weekday morning and evening peak periods.

b. Provision of Bus Shelters and Benches

An applicant may also ~~choose~~ propose to reduce LATR impact by constructing a bus shelter or bench, including a concrete pad, to encourage bus use, which reduces weekday peak-hour vehicle trips by diverting some person-trips to buses. The bus shelter must be within one-quarter mile of the edge of the proposed or an existing development and the frequency of the transit service must be at intervals of 20 minutes or less during the weekday morning and evening peak periods.

For any off-site improvement shown in Table 4, pedestrians and bicyclists should be able to safely cross any roadway to reach their destination. The applicant may provide improvements that Transportation Planning staff agrees would increase the safety of the crossing.

c. Provision of Bike Lockers

An applicant may also ~~choose~~ propose to reduce LATR impact by providing bike lockers for a minimum of eight bikes at an activity center located within a one-mile radius of the edge of the development.

d. Provision of Static and Real-Time Transit Information

An applicant may also ~~choose~~ propose to reduce LATR impact by providing static or electronic signs at bus shelters, large office buildings, retail centers, transit centers, or residential complexes that indicate scheduled or real-time transit information, e.g., the scheduled or estimated arrival of the next bus on a given route.

e. Maximum Trip Reduction

Related to the construction or provision of the above (a through d), the maximum trip reduction for any development is related to the congestion standard for that policy area. In policy areas with higher congestion standards, the maximum reduction in trips is higher in recognition of the desire to enhance pedestrian safety and/or encourage transit and bike use in these areas. (See Table 45.)

The size of the development is a factor in determining the reduction in the number of trips that will be allowed for the construction of a sidewalk or bike path. The applicant may get a credit of one trip for each 130-foot section of sidewalk or bike path for 100 new employees or dwelling units within one-eighth mile of the off-site sidewalk or bike path being constructed. For example, if there are 100 new housing

units within one-eighth mile of an off-site sidewalk or bike path being constructed, and the length of the off-site sidewalk or bike path is 1,300 feet, then the applicant may get credit for ten trips. For bus shelter construction or real-time transit information sign installation, a residential applicant may get a credit of one trip reduction for every 25 new dwelling units to be constructed within one-quarter mile of the new shelter or sign, with a maximum of 10 trips per bus shelter or sign.

Table 4 identifies trip reduction options. Any or all of the options may be used for a given application. The maximum trip reduction per development is a function of the policy area congestion standard, as shown in Table 5.

Table 4: Trip Reduction for Residential and Non-Residential Development

Construction of:	Off-Site Sidewalks, Bike Paths, Curb Extensions, and Countdown Pedestrian Signals	Bus Shelters and Benches	Bike Lockers (eight-locker facility)	Static and Real-Time Transit Information Signs
Reduction in Trips during the Weekday Peak Hour	1 trip per 130 linear feet, with a minimum of 100 DUs or employees within 1/8 mile either side of the new sidewalk	1 trip per 25 DUs or employees within ¼ mile of the shelter	1 trip per locker ~~set~~	1 trip per 25 DUs or employees within 1/4 mile of sign
Maximum Trip Reduction	10 trips per sidewalk or bike path link 5 trips per curb extension or countdown pedestrian signal	10 trips per shelter 2 trips per bench	1 trip per locker ~~set~~	10 trips per real-time electronic sign 5 trips per static sign

Table 5: Maximum Trip Reduction per Development

Congestion Standard	Trips
~~1450-1600~~ 1400-1500	60
~~1650-1800~~ 1550-1600	90
1800	120

B. Procedures for Application of Section VI - Trip Reduction Methods

The determination of the total number of trips generated by a proposed development will be made prior to any reduction. If a proposed development generated more than ~~50~~ 30 total weekday peak-hour trips, a traffic study would be required. If an applicant proposes a ~~trip~~ traffic ~~reduction~~ mitigation ~~program~~agreement or non-automobile transportation amenities, the reduction could be accounted for in the traffic study. At the request of Transportation Planning staff, an applicant proposing these alternatives to physical improvements will be

required to gather data on current bus ~~stop~~ patronage or pedestrian activity within the local area to aid in evaluating effectiveness.

The applicant may only apply a trip reduction method after the total number of peak-hour trips is determined using standard trip rates. Trip reduction derived from this section may not be applied in policy areas where the Annual Growth Policy does not allow the application of the special procedure for limited residential development. ~~Trip reductions derived from this section may not be applied to staging ceilings.~~

VII. Methods for Assigning Values to Factors Used in a Traffic Study

A. Capital Improvements Program Definition

If the applicant finds it necessary or appropriate in the preparation of the traffic study to incorporate programmed transportation improvements, they must rely upon the County's Capital Improvement Program (CIP) or the State's Consolidated Transportation Program (CTP). For a project to qualify to be used in ~~an LATR~~a traffic study, the project must be fully funded for construction within ~~five~~ four years in the CIP or CTP as of the date of submission of the traffic study.

B. Trip Generation

Trip generation equations and rates are shown in Appendix A for nine general land uses: general office, retail, residential, fast food restaurants, child day-care centers, private schools/ educational institutions, senior/elderly housing, mini-warehouse, and automobile filling stations with or without ancillary uses for car washes, convenience stores, and garages. Equations for calculating trips from other land uses or zoning classifications can be obtained from the latest edition of the *Trip Generation* Report published by ITE. Assistance with the calculation of trips can be obtained from Transportation Planning staff and/or use of the trip tables in Appendix B. In the Silver Spring, Bethesda, and Friendship Heights CBDs, different rates reflecting higher transit use are used as shown in Appendix C.

The rate for a retail site over 200,000 square feet GLA will be set after discussion with Transportation Planning staff and analysis by the applicant of one or more similar-sized retail sites within Montgomery County. In lieu of data collection, a retail rate set at two times the latest edition of ITE's *Trip Generation* Report rate may be used.

Transportation Planning staff is authorized to make minor technical changes to Appendices A, B, and C as needed, to reflect new information or to correct errors. Therefore, the user should check with ~~the~~ Transportation Planning staff to ensure

the latest version is being applied. Transportation Planning staff will have copies of the latest version available for distribution upon request.

In some cases, adjustment of the trips from the equations may be appropriate. Examples include the effect of pass-by trips for retail, including fast food restaurants, child day-care centers, and automobile filling stations, and the total trips from mixed uses such as office and retail. These will be considered on a case-by-case basis, using the best available information concerning each site situation. There may ~~also~~ be instances where a site will have special considerations that make it appropriate to deviate from the rates shown in the referenced sources. These proposed deviations in trip rates could be determined by ground counts of comparable facilities, preferably in Montgomery County, and will be considered by Transportation Planning staff and used with their concurrence.

C. Peak Hour

The traffic study shall be based on the highest one-hour period that occurs during the typical weekday morning (6:30 a.m.-9:30 a.m.) and/or evening (4:00 p.m.-7:00 p.m.) peak periods, i.e., the street peak, or the time period established and agreed to in Section II.A. This one-hour period shall be determined from the highest sum of the existing traffic entering all approaches to each intersection during four consecutive 15-minute intervals.

D. Trip Distribution

The directional distribution of the office and residential generated trips for both background and site traffic shall be provided to the applicant by Transportation Planning staff, per the latest edition of the *"Trip Distribution and Traffic Assignment Guidelines"* (see Appendix E). The distribution of trips entering and leaving the proposed development and all background development via all access points must be justified by the relative locations of other traffic generators (i.e., employment centers, commercial centers, regional or area shopping centers, transportation terminals, or the trip table information provided by Transportation Planning staff). For land uses, i.e., retail, not covered by the guidelines, distribution should be developed in consultation with Transportation Planning staff.

E. Directional Split

The directional split is the percentage of the generated trips entering or leaving the site during the peak hour. Refer to ~~Table 5~~ the tables in Appendix A to obtain the directional split for general office, retail, residential, child day-care center, auto filling station with convenience store, and fast food restaurant uses. See Appendix C for directional split assumptions for the Bethesda, Friendship Heights, and Silver Spring CBDs. For all other uses, refer to "directional distribution" as noted in the latest edition of ITE's *Trip Generation* Report. If data are not available,

Transportation Planning staff, along with the applicant, will determine an appropriate in/out directional split.

~~Table 5: In/Out Directional Split~~

~~Land Use~~	~~AM~~		~~PM~~	
	~~Enter~~	~~Exit~~	~~Enter~~	~~Exit~~
~~General Office~~	~~87%~~	~~13%~~	~~17%~~	~~83%~~
~~Retail~~	~~52%~~	~~48%~~	~~52%~~	~~48%~~
~~Residential:~~				
~~Single-Family~~	~~25%~~	~~75%~~	~~64%~~	~~36%~~
~~Townhouse~~	~~17%~~	~~83%~~	~~67%~~	~~33%~~
~~Garden Apartments~~	~~20%~~	~~80%~~	~~66%~~	~~34%~~
~~High-Rise~~	~~25%~~	~~75%~~	~~61%~~	~~39%~~
~~Fast Food~~	~~53%~~	~~47%~~	~~53%~~	~~47%~~
~~Child Day-Care~~	~~54%~~	~~46%~~	~~47%~~	~~53%~~
~~Auto Filling Station w/ Convenience Store~~	~~52%~~	~~48%~~	~~51%~~	~~49%~~

~~Other Uses: See latest edition of ITE's *Trip Generation* Report~~

F. Trip Assignment

The distribution factors furnished by Transportation Planning staff shall be applied to the generated trips, and the resulting traffic volumes shall be assigned to the road network providing access to the proposed development. These trips will be added to existing traffic as well as the trips generated by background development to determine the impact on the adequacy of the transportation facilities. The assignment is to be extended to the nearest major intersection, or intersections, as determined by Transportation Planning staff (see Table 3).

It should be noted that this is an estimate of the impact of future traffic on the nearby road network. Trip distribution and assignment are less accurate the further one goes from the trip origin/destination.

Once an intersection under assignment conditions of existing plus background traffic or existing plus background plus site-generated traffic exceeds a CLV of 2,000, diversions to alternate routes may be considered if there are feasible alternatives, as discussed in paragraph IV.C. Unavoidable Congestion. Appropriate balancing of assignments to reflect impacts of the site on both the primary and alternate routes is necessary. Impacts on the primary and alternate intersections must be identified and mitigated if appropriate in accordance with the congestion standards of these guidelines. Such situations should be discussed with Transportation Planning, SHA and DPWT staff and resolved on a case-by-case basis before presentation to the Planning Board.

G. Critical Lane Volume Analysis

At the intersections identified by Transportation Planning staff, the existing, background, and site-generated traffic is to be related to the adequacy of the intersection by using the critical lane volume method. (See Section J.) ~~The methodology and assumptions shall be updated to maintain consistency with revisions to the Highway Capacity Manual published by the Transportation Research Board of the National Research Council.~~ The analysis should be carried out for the peak hour of both the weekday morning and evening peak periods and should use traffic data for non-holiday weekdays.

H. Traffic Data

1. Current existing traffic volume data ~~are~~ may be available from either Transportation Planning's traffic count database, SHA or DPWT.

2. New traffic counts should be ~~made~~ conducted by the applicant if, in the opinion of Transportation Planning staff, traffic volumes have increased due to some change in the traffic pattern, such as the completion of a development project after the count was made.

3. If turning movement data are older than one year when the traffic study is submitted or, if there are locations for which data are non-existent, data must be acquired by the applicant using his/her own resources. This is in accordance with the ordinance and part of the applicant's submission of sufficient information and data, consistent with the decisions reached by the Development Review Committee and Transportation Planning staff.

4. Intersection traffic counts obtained from public agencies or conducted by the applicant must be manual turning movement counts of vehicles and pedestrian crossing volumes covering the typical weekday peak periods, i.e., 6:30 a.m. - 9:30 a.m. and 4:00 p.m.-7:00 p.m., or the time period established and agreed to in Section II.A. The data must be collected in 15-minute intervals so as to allow selection of the peak hour within the nearest 15 minutes (e.g., 4:00-5:00, 4:15-5:15, 4:30-5:30, 4:45-5:45, 5:00-6:00, 5:15-6:15, 5:30-6:30, 5:45-6:45, or 6:00-7:00 p.m.) as described in Section VII.C. All weekday peak-period (6:30 a.m.-9:30 a.m. and 4:00 p.m.-7:00 p.m.) turning movement data are required to be included with and submitted as part of the applicant's traffic study. All intersection traffic counts must be submitted in a digital format provided by Transportation Planning staff. The subsequent digital database being created by Transportation Planning staff will be available upon request to developers, consultants, and others.

5. For applicants resubmitting all or portions of their development plans for the Planning Board's approval under the expired Expedited Development Approval (EDA) legislation that require LATR, the traffic study must be

updated if the traffic counts were collected over one year from the date of resubmittal and must reflect the updated background developments.

I. Adequate Accommodation of Traffic

The ability of a highway system to carry traffic is expressed in terms of level of congestion at the critical locations (usually an intersection). CLV congestion standards for intersections and roadway links in each policy area have been established as shown in Tables 1 and 2. These congestion standards were derived based on achieving approximately equivalent total transportation levels of service in all areas of the County. Greater vehicular traffic congestion is permitted in policy areas with greater transit accessibility and use.

J. Critical Lane Volume Method

~~A technical description of the critical lane volume method was introduced in the January 1971 issue of *Traffic Engineering*.~~

The Critical Lane Volume method of calculating the level of congestion at a signalized or unsignalized intersection is generally accepted by most public agencies in Maryland, including the Maryland State Highway Administration, the Montgomery County Department of Public Works and Transportation, the Cities of Rockville, Gaithersburg, and Takoma Park and Transportation Planning staff at M-NCPPC. The methodology will fit most intersection configurations and can be varied easily for special situations and unusual conditions.

Whereas some assumptions (e.g., lane use factors) may vary from jurisdiction to jurisdiction, the general CLV methodology is consistent. An excellent reference source is SHA's web site:
www.sha.state.md.us/businesswithsha/permits/ohd/impact_appendix/asp

The following step-by-step procedure should be sufficiently descriptive to enable the applicant to utilize the method at signalized or unsignalized intersections. For the latter, a two-phase operation should be assumed. The traffic volumes used in the analysis are those approaching the intersection as determined in each step of the traffic study (i.e., existing, existing plus background, and existing plus background plus site).

The following is a step-by-step description of how to determine the congestion level of an intersection with a simple two-phase signal operation.

Step 1. Determine the signal phasing, number of lanes and the total volume on each entering approach to an intersection, and the traffic movement permitted in each lane.

Step 2. Subtract from the total approach volume any right-turn volume that operates continuously throughout the signal cycle, (i.e., a free-flow right-turn by-pass). Also, subtract the left-turn volume if it is provided with an exclusive lane.

Step 3. Determine the maximum volume per lane for each approach by multiplying the volume calculated in Step 2 by the appropriate lane-use factor selected from the following table. (Note: Do not count lanes established for exclusive use such as right- or left--turn storage lanes -- the lane use factor for a single exclusive use lane is 1.00. Consult with Transportation Planning and/or DPWT staff regarding any overlap signal phasing).

Number of Approach Lanes	Lane Use Factor*
1	1.00
2	0.53
3	0.37
4	0.30
5	0.25

* Based on local observed data and the 2000 Edition of the Highway Capacity Manual

Step 4. Select the maximum volume per lane in one direction (e.g., northbound) and add it to the opposing (e.g., southbound) left turn volume.

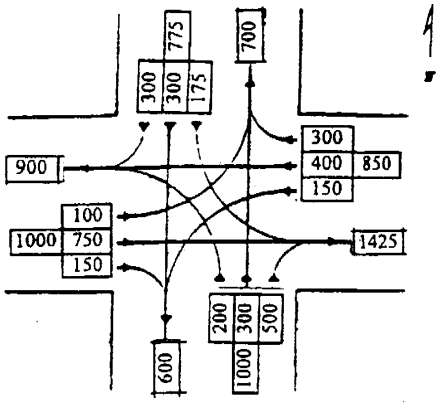
Step 5. Repeat Step 4 by selecting the maximum volume per lane in the opposite direction (e.g., southbound) and the opposing (e.g., northbound) left-turn volume.

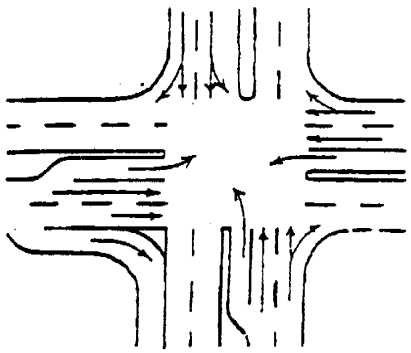
Step 6. The higher total of Step 4 or Step 5 is the critical volume for phase one (e.g., north-south).

Step 7. Repeat Steps 4 through 6 for phase two (e.g., east-west).

Step 8. Sum the critical lane volumes for the two phases to determine the critical lane volume for the intersection. (Note: At some intersections, two opposing flows may move on separate phases. For these cases, each phase becomes a part of the critical lane volume for the intersection. Check with Transportation Planning staff for clarification.)

Step 9. Compare the resultant critical lane volume for the intersection with the congestion standards in Table 1.





Turning Volumes **Intersection Geometrics**

Direction from the	Lane Approach Volume		Critical Lane-Use Factor		Approach Volume		Opposing Lefts		Lane Volume Per Approach
North	775 [1]	X	0.53	=	411	+	200	=	611
South	800 [2]	X	0.53	=	424	+	175	=	599
Or South	500	X	1.00	=	500	+	175	=	675 [5]
East	700 [3]	X	0.53	=	371	+	100	=	471
West	750 [4]	x	0.53	=	398	+	150	=	548 [5]

[1] Approach volumes sum of throughs, rights, and lefts in two lanes
[2] For a heavy right turn, evaluate worst of rights in one lane or through and rights in two lanes
[3] Approach volume sum of throughs and rights in two lanes
[4] Approach volume is through only because of free right and separate left
[5] Intersection Critical Lane Volume = higher sum = 675 + 548 = 1,223

K. Items That Must Be Submitted as a Part of the Traffic Study to Satisfy Local Area Transportation Review

In an effort to standardize the information that is to be included with a traffic study, the following items must be submitted before the ~~preliminary plan~~ application is considered complete.

1. A site or area map showing existing roads that serve the site.

2. The location on the site map of programmed highway improvements, if any, in the County's Capital Improvements Program (CIP) or the State's Consolidated Transportation Program (CTP), that affect traffic at the critical intersection(s) to be studied.

3. Existing weekday morning and evening peak period vehicle and pedestrian traffic count summaries for the critical intersections identified by Transportation Planning staff for analysis.

4. Nearby approved but unbuilt developments and associated improvements that would affect traffic at the critical intersection(s) or link(s), with their location shown on the area map. (This information is provided by Transportation Planning staff and included as part of the report.)

5. A table showing the weekday morning and evening peak-hour trips generated by each of the nearby approved but unbuilt developments, including the source of the generation rates/equations for each type of development.

6. The trip distribution patterns, in percent, for the nearby approved but unbuilt developments during the weekday morning and evening peak hours, with the pattern being shown on an area map.

7. Weekday morning and evening peak-hour trips entering and leaving the site, generated by the proposed development, including the site driveways.

8. The trip distribution patterns, in percent, for the proposed development during the weekday morning and evening peak hours, with the pattern being shown on an area map.

9. Maps that show separately and in combination:

   a. Existing weekday morning and evening peak-hour traffic volumes using the affected highway system, including turning movements at the critical intersections.

   b. Projected weekday morning and evening peak-hour trips assigned to the affected highway system for all nearby approved developments, included as part of the background.

   c. The traffic volumes derived by adding trips from approved development to existing traffic.

   d. Projected weekday morning and evening peak-hour trips assigned to the affected highway system for the proposed development.

   e. The traffic volumes derived by adding site trips to the sum of existing plus background traffic.

10. Any study performed to help determine how to assign recorded or proposed development trips, such as a license plate study or special turning movement counts.

11. Copies of all critical lane volume analyses, showing calculations for each approach.

12. A listing of all transportation improvements, if any, that the applicant agrees to provide and a scaled drawing of each improvement showing available or needed right-of-way, proposed roadway widening, and area available for sidewalks, bike path, landscaping, as required.

13. Electronic copies of all traffic counts in digital format on a 3-½-inchdisk as stipulated by Transportation Planning staff.

Appendix A: Weekday Peak-Hour Trip-Generation Formulas and Rates for Use in Local Area Transportation Review

Table A-1: General Office

Applicable Size	Formula/Rate	Directional Distribution			
		AM		PM	
		Enter	Exit	Enter	Exit
Under 25,000 sf GFA	**AM**: T = 1.38(A) **PM**: T = 2.24(A)	87%	13%	17%	83%
25,000 sf GFA and over	**AM**: T = 1.70(A) – 8 **PM**: T = 1.44(A) + 20				
Over 300,000 sf GFA with special characteristics (See Table B-1)	**AM**: T = 1.70(A) + 115 **PM**: T = 1.44(A) + 127				
Within 1,000-foot radius of Metrorail station and outside the Beltway (D)	**AM**: Deduct P = 50% total trips from "T" **PM**: Deduct P = 4 (1000-D)/100 from "T"				

T = weekday peak-hour trips
P = percentage reduction in trips (P/100)
A = gross floor area (GFA) of building in 1,000 sf
D = straight line distance (in feet) from the main entrance to station

Table A-2: General Retail

Applicable Size	Formula/Rate	Directional Distribution			
		AM		PM	
		Enter	Exit	Enter	Exit
All sizes except convenience retail	**AM**: Use 25% of the weekday evening peak-hour trips	52%	48%	52%	48%
Under 50,000 sf GLA	**PM**: T = 12.36(A)				
From 50,000 sf up to 200,000 sf GLA	**PM**: T = 7.43(A) + 247				
Over 200,000 sf GLA	Special analysis required by applicant or use two times applicable ITE rate				
Convenience retail not part of a shopping center or groups of stores	**AM and PM**: Use applicable ITE rate				

T = weekday peak-hour trips
A = gross leasable area (GLA) of building in 1,000 sf
Deduct adjustment (P) for no major food chain store: P = 0.05 + 0.002 (200-A)

Table A-3: Fast Food Restaurants

	Formula/Rate	Directional Distribution			
		AM		PM	
		Enter	Exit	Enter	Exit
Weekday peak-hour trip-generation rates of fast food restaurants vary based on their type of menu selection (e.g., hamburgers vs. tacos vs. chicken) and their location relative to traffic volume on the adjacent roadway.	Develop trip-generation rates based on driveway counts from existing similar fast food restaurants at similar locations (e.g., McDonald's Restaurant on major highways) if data are available or can be obtained from previous studies. Otherwise, use ITE trip-generation data.	53%	47%	53%	47%

Table A-4: Residential

Applicable Size	Formula/Rate		Directional Distribution			
			AM		PM	
			Enter	Exit	Enter	Exit
Single-Family Detached	Under 75 units	75 units or over	25%	75%	64%	36%
	AM: T = 0.95 (U)	**AM:** T = 0.62 (U) + 25				
	PM: T = 1.11 (U)	**PM:** T = 0.82 (U) + 21				
Townhouses	Under 100 units	100 units and over	17%	83%	67%	33%
	AM: T = 0.48 (U)	**AM:** T = 0.53 (U) – 5				
	PM: T = 0.83 (U)	**PM:** T = 0.48 (U) + 35				
Garden and Mid-Rise Apartments (one to nine stories)	Under 75 units	75 units and over	20%	80%	66%	34%
	AM: T = 0.44 (U)	**AM:** T = 0.40 (U) + 3				
	PM: T = 0.48 (U)	**PM:** T = 0.47 (U) + 1				
High-Rise Apartments (ten or more stories)	Under 100 units	100 units and over	25%	75%	61%	39%
	AM: T = 0.40 (U)	**AM:** T = 0.29 (U) + 11				
	PM: T = 0.46 (U)	**PM:** T = 0.34 (U) + 12				

T = weekday peak-hour trips U = housing units

Table A-5: Private School (Weekday Morning Peak Period)

Applicable Size	Formula/Rate	Comments
K-8	**AM:** T = N x 0.92	For the weekday morning peak period, a special study is required to determine the trip-generation rate for private schools with over 400 students.
K-12	**AM:** T = N x 0.78	For the evening peak period, the applicant may be required to provide more data on site-generated traffic if it is anticipated that there will be major school-sponsored events during the evening peak period that would generate 50 or more weekday peak-hour trips.
Private schools predominately grades 10-12	Use the rates in the Institute of Transportation Engineer's *Trip Generation* Report for high schools (Land Use Code 530)	Trip-generation formulas or rates for private schools were developed based on the number of students during only the weekday morning peak period. Since classes for private schools end before the weekday evening peak period, a trip-generation rate during the weekday evening peak period was not developed.

	Trip Purpose			Directional Distribution	
Grade	New	Pass-by	Diverted	Enter	Exit
K-8	53%	15%	32%	54%	46%
K-12	65%	6%	29%	59%	41%

T = weekday peak-hour trips N = number of students

Table A-6: Automobile Filling Station

Applicable Size	Formula/Rate			
	Trip Rates per Pumping Station[1]:	**AM**	**PM**	
For stations with/without car washes, convenience stores, and garages	Station with fuel sales and:		Upcounty[2]	Downcounty[2]
	1) no other facilities	11.31	14.96	14.96
T = N x (trip rate)	2) garage	11.00	16.67	11.09
	3) convenience store[3]	12.28	21.75	12.32
	4) car wash and convenience store	17.33	21.75	15.08

Percentage by Trip Purpose				Directional Distribution			
				AM		**PM**	
Weekday Peak Period	New	Pass-by	Diverted	Enter	Exit	Enter	Exit
AM	15%	60%	25%	53%	47%	51%	49%
PM	15%	50%	35%				

T = weekday peak-hour vehicle trips N = number of pumping stations (or positions)

[1]A pumping station is defined as the area at which any one vehicle can stop and pump fuel at any one time. A pumping station could also be referred to as a fueling position in front of a single nozzle dispenser or a multi-produce dispenser

[2]Downcounty locations are considered the urbanized areas with a congestion standard of 1,500 or higher (See Table 1). All other locations are considered upcounty.

[3]Note that a convenience store as *an accessory use* to an automobile filing station must have *less than 1,650 square feet of patron area*. Otherwise, such land uses are considered to be a "convenience store with gasoline pumps" with trip-generation rates available in the ITE *Trip Generation Report* as Land Use Code 853.

Table A-7: Senior / Elderly Housing

Type of Facility	Formula/Rate
Retirement Community with active seniors and minimal support services	Use ITE Land Use Code 250
Independent-Living Facilities with some support services plus minimal assisted-living and nursing home facilities	Formula Up to 150 units: **AM:** T = 0.05 (U) PM: T = 0.04 (U) Over 150* units: **AM:** T = 0.08 (U) PM: T= 0.11 (U)
Assisted-Living Facilities	**AM:** T = 0.03 (U) **PM:** T = 0.06 (U)
Nursing Homes	As a land use requiring a special exception, site-generated traffic can be determined based on the statement of operations rather than using ITE's trip-generation data. Except for the administrative staff, employees usually arrive before the weekday morning peak period to prepare and serve breakfast. They usually stay through the weekday evening peak period to prepare and serve dinner.

T = weekday peak-hour vehicle trips U = detached, attached apartment unit and/or room

*Usually large facilities with different levels of support services; may be considered "life cycle" care

Table A-8: Mini-Warehouse

Type of Facility	Formula/Rate	Comments
On-Site Vehicle Rental		
No	**AM:** T = 0.01 (N) PM: T = 0.01 (N)	Based on ITE Land Use Code 151 supplemented with more current local data
Yes	**AM:** T = 0.015 (N) PM: T = 0.02 (N)	

T = weekday peak-hour vehicle trips N = number of storage units

Table A-9: Child Day-Care Center

Applicable Size	Formula/Rate
For 6 to 25 staff	**AM:** T = 1.75N + 17 **PM:** T = 2.06N + 16

Trip Purpose				Directional Distribution			
				AM		PM	
Peak Period	New	Pass-by	Diverted	Enter	Exit	Enter	Exit
AM	32%	27%	41%	53%	47%	49%	51%
PM	27%	12%	61%				

T = weekday peak-hour vehicle trips N = number of staff

Appendix B: Weekday Peak-Hour Trips Generated by Land Use for Use in Local Area Transportation Review

Table B-1: Number of Weekday Peak-Hour Trips Generated by General Office

General

Bldg Size (SF of GFA)	Weekday Peak-Hour Trips AM	PM
5,000	7	11
10,000	14	22
15,000	21	34
20,000	28	45
25,000	35	56
30,000	43	63
40,000	60	78
50,000	77	92
60,000	94	106
70,000	111	121
80,000	128	135
90,000	145	150
100,000	162	164
110,000	179	178
120,000	196	193
130,000	213	207
140,000	230	222
150,000	247	236
160,000	264	250
170,000	281	265
180,000	298	279
190,000	315	294
200,000	332	308
220,000	366	337
240,000	400	366
260,000	434	394
280,000	468	423
300,000	502	452
320,000	536	481
340,000	570	510
360,000	604	538
380,000	638	567
400,000	672	596
420,000	706	625
440,000	740	654
460,000	774	682
480,000	808	711
500,000	842	740

Equations Used

AM peak-hour trips = 1.38(GFA/1000)
PM peak-hour trips = 2.24(GFA/1000)

25,000 sf and over

AM peak-hour trips = 1.70 (GFA/1000) – 8
PM peak-hour trips = 1.44(GFA/1000) + 20

Special Cases

If a building is within 1,000 feet of a Metrorail station and outside the Beltway, reduce weekday peak-hour trips from chart at left.

Straight Line Distance to Station (in feet)	Percent Reduction in Trips AM	PM
0	50%	40%
50	50%	38%
100	50%	36%
150	50%	34%
200	50%	32%
250	50%	30%
300	50%	28%
350	50%	26%
400	50%	24%
450	50%	22%
500	50%	20%
550	50%	18%
600	50%	16%
650	50%	14%
700	50%	12%
750	50%	10%
800	50%	8%
850	50%	6%
900	50%	4%
950	50%	2%
1,000	50%	0%

If a building is over 300,000 sf with a single employer and NOT part of an activity center with different land uses

Building Size (SF of GFA)	Weekday Peak-Hour Trips AM	PM
300,001	625	559
320,000	659	588
340,000	693	617
360,000	727	645
380,000	761	674
400,000	795	703
420,000	829	732
440,000	863	761
460,000	897	789
480,000	931	818
500,000	965	847

Equations Used

AM peak-hour trips = 1.70(GFA/1000) + 115
PM peak-hour trips = 1.44(GFA/1000) + 127

Please note: Trip generation rates are calculated using the size of individual buildings, not the combined size of a group.