

# TRAFFIC IMPACT ANALYSIS GUIDELINES

## INTRODUCTION

Morrow County requires all permit applications generating more than 400 new daily trips to prepare a traffic impact analysis (TIA). The TIA will determine the impacts of the project on the existing and future transportation system and will serve as a vehicle for determining appropriate mitigation. The following guidelines contain the elements that should be included in the analysis. Where appropriate, additional study may be required to assess the full impact of the proposed project.

While the determination of whether a TIA is required is based on the number of daily trips, traffic impacts are typically analyzed only during the PM peak-hour of area-wide traffic, which is the one-hour period of highest traffic during the two-hour peak period, typically 4:30-5:30 PM on weekdays. Land uses that generate peak traffic on weekends or evenings (e.g. theaters or recreation facilities) may require additional periods to be counted.

## DETERMINATION OF TIA REQUIREMENT

An initial step is necessary to determine whether the proposed project must complete a TIA. This step can often be performed by the applicant using information found in this document.

Calculate the number of daily trips generated using the attached table or using the rate found in the ITE Trip Generation Manual. Where a project is replacing an existing use, the net trip generation is used (trips generated by project less the former use). Projects that produce in excess of 400 new daily trips must complete a TIA.

## COST OF A TIA

The cost of a TIA varies by the size of the development and the relative location to roadway facilities that are near or at capacity. Typical costs range from a minimum of \$2,500 (small subdivision) to over \$15,000 (new retail area).

## QUALIFICATIONS OF PREPARER

A registered professional engineer is required for all TIA studies, unless approval is obtained by the planning director.

### PROJECT DESCRIPTION AND STUDY AREA

The TIA should introduce the project and describe the approximate study area. A location map showing the site and the study area intersections should be included.

- I. Project identification and description - The following information is included:
  - Project location.
  - Project name or name of developer or company.
  - Project description. Building area, types of uses, number of units, on-site parking stalls.
  - Project buildout year. The year the proposed project is assumed to be completed and occupied.

- II. Definition of the study area - The study area is defined by the number and location of the study intersections. The study intersections are determined as follows:
- The study intersections are defined as those within 1,000 feet in either direction of each edge of the parcel for arterial access points, and within 600 feet in either direction of each edge of the parcel for collector or local access points that are likely to be impacted by more than 10 PM-peak-hour trips or are directly associated with the project (e.g. driveways). A trip generation, distribution and assignment process (see Project Conditions) can be used to identify the study area.

## EXISTING CONDITIONS

The existing conditions section describes the existing roadway and traffic characteristics within the study area. The following topics are included:

- I. Peak period traffic counts – Counts should be completed at each study intersection. Counts must be conducted as follows:
- Counts are completed on Tuesdays, Wednesdays or Thursdays during a two-hour peak period which includes the system PM peak-hour (typically 3:00 PM to 5:00 PM, or 4:00 PM to 6:00 PM). Counts must be collected by individual turning movement at each intersection. Land uses that generate substantial traffic during evenings or weekends (e.g. recreational uses or entertainment facilities) may require traffic counts to be conducted during additional time periods.
  - Features such as the number of pedestrians, bicyclists and length of vehicle queuing should be noted.
  - Seasonal adjustments should be made to represent peak conditions.
  - Counts from other sources may be used if they are less than three years old and are factored to the current year using the background growth rate (see Background Conditions).
- II. LOS Calculation – Using the latest published Highway Capacity Manual methodology (currently the 2000 manual), the level of service (LOS) is calculated for existing conditions for each study intersection. LOS at either signalized or all-way stop controlled intersections is defined by the overall intersection LOS. At an intersection with stop controls only on the minor (side street) movements, the LOS is defined by the worst approach to the intersection, typically left turns from the minor street. For intersections within the study area that are on State facilities, the volume-to-capacity ratio (V/C ratio) must also be calculated and reported.
- III. Accident data - Five years of accident data is used to describe the number, type and severity of accidents that occurred at each study intersection. Accident data can be obtained from ODOT. High accident locations (where five or more recorded accidents occur annually) should be identified.
- IV. Pedestrian, Bicycle and Equestrian Facilities – Include a description of all pedestrian, bicycle and equestrian facilities within the study area.
- V. Transit – Describe any transit routes in the area. Include a description of school bus service and stop locations, if applicable.

## BACKGROUND CONDITIONS

This section refers to the future year traffic operations before project trips are added. The background volumes need to account for the following elements:

- I. Planned changes to roadway facilities and intersections scheduled to occur prior to the project buildout year.
- II. Planned changes in land use within the study area resulting from approved development yet to be built and/or fully occupied. This step requires the collection of other TIAs and the inclusion of new trips that may occur as a result of these analyses.
- III. Background growth rate at which overall traffic has grown in the area. This rate will be determined by the County.
- IV. The calculation of background traffic volumes involve factoring existing traffic to the future year using the background growth rate, then adding all project trips in other TIAs that affect the study intersections.
- V. LOS analysis based on background traffic volumes for each study intersection. All study intersections that exceed the LOS standard (or the V/C standard for state facilities) should be noted.
- VI. Any planned changes to bicycle, pedestrian and equestrian facilities occurring through the project year should be noted.

### **PROJECT CONDITIONS**

This section shows the calculated trip generation, assumed distribution and assignment of trips:

- I. Trip generation – The number of trips generated as calculated from the attached table or from the latest version of the ITE Trip Generation Manual. Where a project is replacing an existing use, the net trip generation is required. A list of typical trip generation rates follows this document.
- II. Trip distribution – The percentage of trips traveling by direction, based on existing traffic patterns, unless preferable information is available (customer survey, market analysis, etc.).
- III. Trip assignment – The project trips are assigned to the roadway based on the trip distribution and the proportion of trips entering, and exiting volumes from the trip generation.
- IV. Future year LOS analysis – The LOS and V/C information for the study intersections based on the sum of the project trip assignment and the background trips.
- V. Identify project impacts – All potential impacts to the transportation system should be identified, including vehicle sight distance, truck traffic, roadway geometrics and traffic control, site access, vehicle queuing and turn lane needs, bicycle and pedestrian access, and safety.
- VI. Mitigation – Mitigation reflects the need for new development to pay for its fair share of traffic impacts. The following types of mitigation are required under county regulations:
  - When the addition of project trips cause an individual intersection to exceed the applicable LOS or V/C standard, the mitigation measures necessary to bring the intersection back into compliance need to be identified, as well as the cost, the project's contribution to the overall cost of the improvement (proportionate share), and how the proportionate share will be paid. Typical mitigation includes the following:
    - Adjustments to signal timing.
    - Addition of turning lanes through restriping or widening.
    - Lengthening storage length of existing turn lanes.
    - Installation of traffic signals or other traffic control devices.

- Improvements needed to provide adequate sight distance from the development's access onto the public road network.
- Note: developers are not required to mitigate individual intersections that exceed the LOS or V/C standard in existing or background conditions as determined by HCM methodology. They may, however, be required to contribute a roughly proportionate share to improve the facility as needed to meet LOS or V/C standards.
- Other mitigation should be considered as appropriate to alleviate the impacts to the transportation system, such as reduction of vehicle queuing, reduction in peak hour travel of employment uses through transportation demand management, and increases in pedestrian, bicycle or equestrian travel and safety.

### TRIP GENERATION TABLE

Below are some of the most common trip generation values. The first column defines the land use; the second, the average weekday rate; the third, the PM peak-hour rate; and the fourth, the percent of traffic entering and exiting during the peak-hour. More specific rates are found in the 7<sup>th</sup> edition of the ITE Trip Generation Manual. An example calculation is as follows:

Project: Construct 4 homes on a subdivided lot  
 Daily Trip Generation:  $9.57 \times 4$  dwelling units = 38 trips  
 PM Peak-Hour:  $1.01 \times 4 = 4$  trips (3 entering, 1 exiting)

Therefore, there are 38 daily trips and an impact of 4 trips during the PM peak-hour.

**TABLE 1  
 TRIP GENERATION RATES**

Land Use (ITE Code)	Weekday Daily Rate	PM Peak-Hour Rate	Percent Entering/ Exiting in Peak-Hour
Single Family Detached (210)	9.57 / D.U.	1.01 / D.U.	63% / 37%
Apartment (220-Post 1973)	6.72 / D.U.	0.62 D.U.	67% / 33%
Mobile Home Park (240)	4.99 / D.U.	0.59 / D.U.	62% / 38%
Church (560)	9.11 / 1000 GFA	0.66 / 1000 GFA	52% / 48%
Office-General (710)			

refer to ITE Trip Generation Equations  
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- <10,000 GFA  
17% / 83%
- 25,000 GFA  
18.4 / 1000 GFA  
4.28 / 1000 GFA

- 50,000 GFA  
15.64 / 1000 GFA  
2.70 / 1000 GFA

- 100,000 GFA  
13.34 / 1000 GFA  
1.91 / 1000 GFA

Restaurant-High Turnover (932)

127.15 / 1000 GFA  
10.92 / 1000 GFA  
61% / 33%

Fast Food Restaurant (934) (with drive-through)

496.12 / 1000 GFA  
34.64 / 1000 GFA  
52% / 48%

Supermarket (850)

102.24 / 1000 GFA  
10.45 / 1000 GFA  
51% / 49%

General Light Industrial (110)

6.97 / 1000 GFA  
0.98 / 1000 GFA  
12% / 88%

Manufacturing (140)

3.82 / 1000 GFA  
0.74 / 1000 GFA  
36% / 64%

*D.U.-Dwelling Units*

*GFA – Gross Floor Area*

*GLA – Gross Leasable Area*