
Traffic Impact Studies

A. General

A traffic impact study may be required for commercial, industrial, or residential developments in obtaining site plan, rezoning, or access permit approval. The Jurisdictional Engineer must be contacted to determine if a traffic impact study is required. If a study is required, the study scope (study limits, analysis years, scenarios, etc.) should be determined through discussion with the Jurisdictional Engineer.

B. Study Process

Traffic impact studies typically include the following elements. Specific tasks, level of analysis, and documentation requirements will depend on the specific needs of the study and Jurisdictional requirements.

- 1. Data Collection:** Gather and review needed information regarding existing and proposed conditions, possibly including:
 - Current and historic daily and hourly traffic volume counts.
 - Recent intersection turning movement counts.
 - Projected volumes from previous studies, travel demand models, or area transportation plans.
 - Current land uses, densities, and occupancy near the site.
 - Preliminary site plan for proposed development with land uses, building areas, phasing and completion dates, and proposed access locations identified.
 - Other approved projects and anticipated development near the site.
 - Land use and zoning plans near the site.
 - Current street system information (functional classifications, lane configurations, speed limits, access locations, traffic control, parking)
 - Traffic signal locations, phasing, timing, and coordination.
 - Planned or proposed transportation improvement projects in the area.
 - Crash history (3 to 5 years), if safety concerns have been identified.
- 2. Background Traffic:** Determine estimated background traffic for analysis years and scenarios. For simple studies with a short-term analysis year, this may simply be current traffic count data. For more complex studies or longer-range analysis years, background traffic may also include trip generation from proposed area development or land uses, annual traffic growth rates, and/or area travel demand model traffic forecasts.
- 3. Site Traffic:** If available, local data should be used in determining estimated daily and peak hour trip generation for the site. If local data is not available, the latest edition of *ITE Trip Generation* or other national data should be used as a basis for estimating trip generation for the site. Sound judgment must be used in reviewing, adjusting, and applying published trip generation data. Depending on specific site characteristics, generated trips may need to be adjusted for mixed-use developments (internal or multi-purpose trips) or unique pedestrian, bicycle, or transit usage. After site-generated trips are prepared, they are distributed and assigned to the study area roadway system, considering the following:

- Type of proposed development and area from which trips will be attracted
- Size of proposed development
- Surrounding land uses and population density
- Proposed site access locations and configurations
- Proposed or anticipated traffic control at access points
- Conditions of surrounding street system
- Competing developments, where applicable

Site traffic is normally distributed in terms of a percentage of inbound or outbound traffic at each study access point, intersection, or ramp junction for each analysis period. These distributions are then used to calculate assigned peak hour traffic turning movement volumes. Assigned traffic is combined with background traffic to determine total traffic for each analysis scenario to be analyzed. Depending on the type of development, the total traffic is often adjusted for pass-by trips. Pass-by trips (or diverted trips) are those trips already on the adjacent street network (background traffic) that will enter and exit the site.

- 4. Analysis:** Total peak hour traffic for each study access point, intersection, and ramp junction is analyzed for each analysis scenario according to current *Highway Capacity Manual* (HCM) procedures. Analyses will determine projected vehicle delays, volume/capacity ratios, levels of service, and vehicle queuing. Analysis software such as Highway Capacity Software (HCS) or *Synchro* is typically used. For complicated roadway systems or conditions, additional simulation analysis may also be necessary. In addition to capacity analysis results, several other factors should be considered in evaluating traffic operations for the study, including the following:
 - Crash history, crash rates, predominate crash types, and safety concerns
 - Traffic control needs, including MUTCD traffic signal warrant analysis
 - Anticipated impacts and vehicle queuing and access point/intersection spacing
 - On-site parking, circulation, and potential impacts on adjacent street system
 - Pedestrian, bicycle, and transit needs
 - Service and delivery vehicle access
- 5. Improvement Needs:** Based on analysis results, identify access and/or street network improvement needs necessary to provide acceptable operations. Perform capacity analyses with proposed improvements to evaluate expected operations. Typical improvement needs may include:
 - Adding or lengthening intersection turn lanes
 - Widening, reconstructing, or reconfiguring streets to provide needed lanes and geometry
 - Constructing new street connections for access or through traffic
 - Interchange modifications
 - Changes to traffic control or intersection type (such as all-way STOP, signalization, right-in/right-out only access, or roundabout)
 - Changes to traffic signal phasing, timing, and coordination
 - Access management (combining, eliminating, adding, or improving spacing of access points)
 - Revising site circulation or on-site queue storage
 - Signing or pavement marking modifications
- 6. Report:** Prepare and submit to Jurisdictional Engineer a draft traffic impact study report summarizing data collected, analyses performed, and recommendations. Include appropriate tables and graphics. Finalize the report based on comments or concurrence received from the Jurisdictional Engineer.

C. Iowa DOT Access Permits

If a new or modified access is proposed from a highway under the jurisdiction of the Iowa DOT, the applicable District office should be contacted early in the project development to determine access requirements, limitations, and documentation needed. Guidance is provided in the Iowa DOT *Iowa Primary Road Access Management Policy*. Analyses and documentation required will depend on the proposed type and size of development, current access provided, and priority type of the highway. For proposed Type “A” entrances, detailed geometric plans, opening year and full-build year traffic data, and proposed site data are required. Capacity analysis and MUTCD traffic signal warrant analysis may also be required.

D. References

- Institute of Transportation Engineers. *Manual of Transportation Engineering Studies*. 2010.
- Institute of Transportation Engineers. *Traffic Engineering Handbook*. 2009.
- Institute of Transportation Engineers. *Transportation Impact Analyses for Site Development: An ITE Recommended Practice*. 2010.
- Institute of Transportation Engineers. *Trip Generation: An ITE Informational Report*. 2008.
- Iowa Department of Transportation. *Iowa Primary Road Access Management Policy*. 2012.
- Transportation Research Board. *Highway Capacity Manual 2010*. 2011.
- US Department of Transportation, Federal Highway Administration. *Manual on Uniform Traffic Control Devices*. 2010.