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## Sec. 118-46. Streets.

(y) *Traffic impact analysis.*

- (1) *Requirements.* No master plan, plat, building permit or driveway access shall be approved unless a traffic impact analysis (TIA) worksheet or TIA report, as provided for in this section, is completed by the developer and approved by the city engineer. A TIA report may also be required by the planning director, the planning commission or the city council as part of a zoning change application.

If the specific land use is unknown, the land use TIA worksheet or appropriate level TIA shall be based on the Future Land Use Plan or Roadway Impact Fee Study with consideration to existing topography and comparable properties. Land use shall be based on the latest edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual.

The TIA report shall be prepared, signed and sealed by a licensed, qualified and experienced professional engineer with specific training and experience in traffic and transportation engineering and planning. The TIA report shall meet the requirements established in this section and generally follow the methodology, thresholds and principles described in the ITE Multimodal Transportation Impact Analysis for Site Development recommended practice.

The applicant shall comply with the separate policies and procedures for submitting and processing TIA applications consistent with the provisions of this section, including, but not limited to, forms, worksheets, fee schedules, meetings, and other items. A TIA Determination Form is required to be approved by the city engineer to confirm the TIA submittal type required by this chapter.

- (2) Submittal type and study impact area. The TIA submittal type and study impact area ~~is the area within which any traffic impact analysis is conducted in order to determine compliance with the level of service standards. This area~~ shall be based on the size of the development and the associated peak-hour trips PHTs projected to be generated by the proposed development. The peak-hour trips shall be based on the latest edition of the ITE Trip Generation Manual during the weekday a.m. or p.m. peak hour, whichever is greater. The submittal type and study impact areas shall be established in the TIA Impact Area Table ~~as shown below. shown in the following table:~~ Additional areas and intersections may be added by the city engineer and Texas Department of Transportation (TxDOT) based on development size and specific site or local issues. For special situations where peak traffic typically occurs at non-traditional times, other peak hours may be used to determine the submittal type and study area.

TIA Impact Area Table

| <u>Peak-hour Trips</u> | <u>Submittal Type</u>                   | <u>StudyImpact Area</u>                                                                                                                                                     |
|------------------------|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>1 – 99</u>          | <u>Level 1 or Level 2 TIA Worksheet</u> | <u>The site and area within one-quarter mile from the boundary of the site. Site</u>                                                                                        |
| <u>100 – 199</u>       | <u>Level 2 TIA Level 1</u>              | <u>Site and area adjacent to the site boundaryThe city engineer may require the area of study to be extended up to a maximum of one mile from the boundary of the site.</u> |
| <u>200 – 499</u>       | <u>Level 2</u>                          | <u>Site and area within 0.5 miles from the site boundary</u>                                                                                                                |
| <u>500+</u>            | <u>Level 3Level 3 TIA</u>               | <u>Site and area within 1 mile from the site boundaryThe site and area within one mile from the boundary of the site.</u>                                                   |

- (3) *Level 1 TIA.* A level 1 TIA shall be signed and sealed by a professional engineer, registered to practice in the state. The level 1 TIA shall consist of the following minimum information:

a. ~~Impact area.~~

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1. ~~Land use, site and study area boundaries, as defined (provide map).~~
  2. ~~Existing and proposed site uses.~~
  3. ~~Existing land uses on both sides of boundary streets for all parcels within the study area (provide map).~~
  4. ~~All major driveways and intersecting streets adjacent to the property shall be illustrated in detail sufficient to serve the purposes of illustrating traffic function; this may include showing lane widths, traffic islands, medians, sidewalks, curbs, traffic control devices (traffic signs, signals, and pavement markings), and a general description of the existing pavement condition.~~
  5. ~~Photographs of adjacent streets of the development.~~
- b. ~~Peak hour trip generation.~~
1. ~~The estimates of peak hour trips generated by the development during a street peak hour (provide table).~~
  2. ~~Estimates for the percentage distribution of such trips from each site exit and to each site entrance (provide map).~~
- c. ~~Narrative describing mitigation measures, conclusions and recommendations consistent with this section.~~
- (4) ~~Level 2 and 3 TIA report format. A level 2 and 3 TIA shall be signed and sealed by a professional engineer, registered to practice in the state. The Level 1, 2 and 3 level 2 and 3 TIA report shall consist of the following information, at a minimum information:~~
- a. *Impact area.*
    1. Land use, site and study area boundaries ~~(provide map).~~
    2. Existing and proposed site land uses.
    3. Existing and proposed land uses ~~on both sides of boundary streets~~ for all parcels within the study area ~~(provide map).~~
    4. Existing and proposed roadways and intersections ~~of boundary streets~~ within the study area ~~of the subject property, including traffic conditions (provide map).~~
    5. All major driveways and intersecting streets adjacent to the property will be illustrated in detail sufficient to serve the purposes of illustrating traffic function; this may include showing lane widths, traffic islands, medians, sidewalks, curbs, traffic control devices (traffic signs, signals, and pavement markings), sight distance, access spacing and a general description of the existing pavement condition.
    6. Photographs of adjacent streets of the development and an arterial photograph showing the study area.
  - b. *Trip generation and design hour volumes* ~~(provide table).~~
    1. A trip generation summary ~~table~~ listing each type of land use, units, ITE code, ITE unit, the building size assumed, the average trip generation rates used (total daily traffic and a.m./and p.m. street peak hours), and the resultant total trips generated shall be provided.
    2. Generated vehicular trip estimates may be discounted in recognition of other reasonable and applicable modes, e.g., transit, pedestrian, bicycles. Furthermore, trip generation estimates may also be discounted through the recognition of pass by trips and internal site trip satisfaction.
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- c. *Trip distribution.* Provide the estimates of percentage distribution of trips by turning movements to and from the proposed development by site access location ~~(provide table and figure).~~
- d. *Trip assignment.* Provide the direction of approach and departure of site traffic via the area's street system ~~(provide figure by site entrance and boundary street).~~
- e. Projected traffic volumes (provide figure for each item). Peak hour and daily traffic volumes shall be provided. Projected traffic volumes are the numbers of vehicles, excluding the site-generated traffic, on the streets of interest during the time periods listed below, in the build-out year. for existing, background, site, and buildout (background and site) conditions. Additional traffic volumes shall be provided for phased developments based on background and the estimated phase buildout year. Each phase shall include phase, cumulative phases, and culmuative phases plus associated background traffic.
1. ~~A.M. street peak hour site traffic (including turning movements).~~
  2. ~~P.M. street peak hour site traffic (including turning movements).~~
  3. ~~A.M. street peak hour total traffic including site-generated traffic and projected traffic (including turning movements).~~
  4. ~~P.M. street peak hour total traffic including site-generated traffic and projected traffic (including turning movements).~~
  5. ~~For special situations where peak traffic typically occurs at non-traditional times, e.g., major sporting venues, large specialty Christmas stores, etc., any other peak hour necessary for complete analysis (including turning movements).~~
  6. ~~Total daily existing traffic for street system in study area.~~
  7. ~~Total daily existing traffic for street system in study area and new site traffic.~~
  8. ~~Total daily existing traffic for street system in study area plus new site traffic and projected traffic from build-out of study area land uses.~~
  5. For special situations where peak traffic typically occurs at non-traditional times, e.g., major sporting venues, large specialty Christmas stores, etc., any other peak hour necessary for complete analysis (including turning movements).
- f. *Capacity analysis* ~~(the applicant shall provide analysis sheets in appendices).~~
1. A capacity analysis shall be conducted for all roadways~~public street~~, intersections and junctions of major driveways with public streets which are significantly impacted within the study area boundary as defined in this section as agreed to by the developer's engineer and the city engineer. The analysis shall be conducted for existing, background, buildout, and, if necessary, each phase traffic volumes. A capacity analysis is required as shown below.

TIA Required Analysis Table

| <del>Volumes</del><br>without<br>and with<br>site traffic | Boundary Street | Non-Boundary<br>Street<br>within<br>Study Area |
|-----------------------------------------------------------|-----------------|------------------------------------------------|
| Existing<br>conditions                                    | Required        | Required                                       |
| First phase                                               | Required        | Not required                                   |

|                    |          |              |
|--------------------|----------|--------------|
| Intermediate phase | Required | Not required |
| Final phase        | Required | Required     |

2. Capacity analysis will follow the principles established in the latest edition of the Transportation Research Board's *Highway Capacity Manual* (HCM), unless otherwise directed by the city engineer. Capacity will be reported in quantitative terms as expressed in the HCM and in terms of traffic level of service ~~(LOS)-based on control delay by movement or lane group~~. LOS for two-way stop-control is not defined for an intersection as a whole and shall not be represented in any such way in the TIA report.
  3. Capacity analysis will include traffic queuing estimates for all critical applications where the length of queues is a design parameter, e.g., auxiliary turn lanes, and at traffic gates.
  4. Roadway analysis will include maximum daily traffic for all local and residential collector streets, and HCM or planning level analysis for all other streets. Potential through traffic shall be included in the analysis.
    - g. Site Accessibility. Provide an assessment of existing and planned future conditions of access management, site circulation, parking, goods movement delivery and pedestrian, bicycle and transit connectivity to accommodate site demand on the street system.
    - h. Neighborhood traffic control plan. Provide overall signing, marking, and signal traffic control plan for a new public street system in accordance with the Texas Manual on Uniform Traffic Control Devices (TMUTCD). Include recommended speed limit signs, stop signs and warning signs.
    - i. School accessibility and traffic control plan. Provide site circulation and overall signing, marking, and signal traffic control plan in accordance with the TMUTCD. Include recommended school routes, school crossings and school speed zones.
    - gj. Conclusions and requirements. Provide a narrative describing mitigation measures, conclusions and recommendations consistent with this section.
- (45) Mitigation. If the TIA report's determination for roadways and intersections indicates that the proposed development would cause a reduction in the level of service for any roadway or intersection within the impact area that would cause the roadway to fall below (1)the level of service LOS D if the background traffic operates at LOS D or better, (2) LOS E if the background traffic operates at LOS E, and (3) LOS F if the background traffic LOS threshold exceeds 10% for LOS F, the proposed development will be denied unless the developer agrees to one of the following conditions:
- a. The deferral of certificate of occupancy~~building permits~~ until the improvements necessary to upgrade the substandard facilities are constructed; or
  - b. A reduction in the density or intensity of development; or
  - c. The dedication or construction of facilities needed to achieve the level of service required herein;  
~~or~~ or
  - d. Escrow with the city an amount equivalent to the cost of the improvements necessary to mitigate the adverse traffic impact;~~;~~ or
  - e. Execute a development agreement with the city in accordance with this chapter;~~;~~ or
  - f. Any combination of techniques identified herein that would ensure that development will not occur unless the levels of service for all roadways and intersections within the traffic impact analysis study are adequate to accommodate the impacts of such development.

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Additionally, the developer is responsible for mitigation identified as part of the site accessibility, neighborhood traffic control plan and school accessibility and traffic control plan as required in this section.

- (56) *Implementation.* For phased construction projects, the TIA report shall include the phase and corresponding peak hour trip for implementation. Implementation of these traffic improvements must be accomplished no later than the completion of the project phase for which the capacity analyses show they are required. Plats for project phases subsequent to a phase for which a traffic improvement is required may be approved only if the traffic improvements are completed or secured as approved by the city engineer.
- (67) *Traffic mitigation concepts.*
- a. Voluntary efforts, beyond those herein required, to mitigate traffic impacts are encouraged as a means of providing enhanced traffic handling capabilities to users of the land development site as well as others.
  - b. Traffic mitigation concepts include, but are not limited to, pavement widening, turn lanes, median islands, access controls, curbs, sidewalks, traffic signalization, traffic signing, pavement markings, etc.
- (78) *Traffic signal warrants analysis.* A TIA report that contains a traffic impact mitigation for installation of a new traffic signal location shall include a traffic signal warrants analysis satisfying the requirements of the ~~TMUTCD Texas Manual of Uniform Traffic Control Devices.~~ If a traffic signal is required to mitigate level of service but not warranted, the mitigation of the traffic signal shall meet the mitigation requirements of this section.
- (89) *Turn lane requirements.* Turn lanes are exclusive deceleration and storage lanes that allow for vehicles to turn left and right at intersections outside the through lane. The guidelines for the application and design ~~Design~~ of deceleration lanes for city streets and the state highway system shall be in accordance with the latest TxDOT requirements. ~~edition of AASHTO A Policy on Geometric Design of Highways and Streets.~~
- a. ~~Left and right turn lanes shall be required:~~
    1. ~~At all driveway or street intersections with a daily entering traffic volume of 500 vehicle trips or 50 vehicle peak hour trips;~~
    2. ~~At all driveway or street intersections on the state highway system at the option of TxDOT; or~~
    3. ~~Based on other factors such as street classification, travel speeds, sight distance, truck traffic, crash history, and other site conditions.~~
  - ab. ~~The design of turn lanes shall be based on the existing centerline of the roadway.~~ The existing and new pavement for turn lane improvements shall be designed based on the development traffic loads and may include rehabilitation. At minimum, a surface course treatment is required for the full improvements including taper and pavement marking area.
  - bc. The construction of turn lanes may be limited due to topographic conditions or need to obtain right-of-way from adjacent property owners. The applicant must show that all reasonable efforts have been made to implement turn lanes required by the TIA report or this chapter. This may include relocating driveways or streets to allow for the construction of turn lanes or alternate design options.
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