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SECTION 2 – TRAFFIC IMPACT ANALYSIS

2.1 GENERAL

The following guidelines for a Traffic Impact Analysis (TIA) are intended to supplement the requirements of the Round Rock Code of Ordinances Part III, Zoning and Development Code.

2.2 ADMINISTRATIVE REQUIREMENTS

It is the City's intent that the implementation of Roadway Impact Fees will provide a structure for development to contribute its pro-rata share to regional transportation improvements necessitated by new development. Therefore, a Traffic Impact Analysis (TIA) may not be necessary for all projects. A TIA may be required for proposed developments that demonstrate unique or unusual traffic characteristics that may impact public roadways or for developments not currently within the City Boundaries. When required for projects within the City Limits, a TIA may be eligible for offsets to a project's Roadway Impact Fees.

The applicant is responsible for contacting the Transportation Director before a development application is submitted to determine the proposed trip generation for the site and confirm whether a TIA will be required. Trip generation shall be calculated based on the criteria in Section 2.3.2A. If a TIA is required, the draft scope of the TIA and the requirements for TIA content and format must be submitted for review and approval.

The applicant is responsible for submitting one (1) original and an electronic copy of the TIA report at the time that a development application is submitted. If the applicant fails to comply with the technical requirements and the scope of study outlined in the preliminary meeting, the applicant will be advised in writing that an addendum is needed. An addendum must be submitted eighteen (18) working days or twenty-six (26) calendar days prior to the date on which the project is scheduled for consideration by the City of Round Rock Planning and Zoning Commission. If the TIA addendum is not submitted within this time frame and the staff does not have adequate time to review the report and submit comments to be included in the Commission agenda packet, the development request may be postponed to the next scheduled Commission meeting.

After the TIA and any addenda have been approved by the staff, one (1) original copy and an electronic copy of the final version of the TIA incorporating all corrections and additions must be submitted as a permanent file record. A final TIA for a zoning case must be submitted before the first reading of the rezoning by the City Council. A final TIA for a site plan must be submitted before release of the site plan.

2.3 TECHNICAL CRITERIA AND REQUIREMENTS

Technical requirements have been established to standardize the format by which a TIA is prepared and to ensure that the content and quality of the TIA will result in an accurate and useful analysis. The Transportation Department will review a TIA based on these criteria and may require a revised report or an addendum for those reports which are incomplete or inaccurate.

There are five (5) major elements or activities in preparing a TIA.

A. Determine the scope of the TIA.
B. Estimate and distribute site-generated traffic, based on proposed phasing
C. Forecast future non-site related traffic.
D. Analyze the capacity and projected operation of roadways and intersections, based on each proposed phase
E. Recommend land use and/or appropriate traffic engineering modifications to mitigate traffic impacts and maintain an acceptable level of service.

2.3.1 Scope of the TIA

The study area or scope of a TIA shall be determined by the Transportation Director. Applicants are responsible for scheduling a meeting to determine the scope of the TIA and to discuss all requirements before any studies are conducted. The elements to be determined during the meeting shall include the following:

(1) Type of study - The possible types of reports include: a letter report, driveway analysis, full traffic impact analysis report or special report (e.g., sight distance survey).

(2) Impact area – Impact area will include identifying the study intersections and roadways to be analyzed in the study.

(3) Period of analysis - Periods of analysis generally includes AM peak and PM peak during a typical work day. Depending on the nature of the land use and vicinity to other uses, other periods such as mid-day peak, school peak, weekend peak or event peak hour may also be required to be analyzed.

(4) Analysis scenarios - Scenarios for analysis include existing conditions, opening year conditions without development, opening year conditions with development, and any phased considerations if the project will be developed in phases. Ten years after opening analysis may be required under special cases and will be determined by the Transportation Director. TIA update is required if phasing is modified.

(5) Type of Analysis – As a minimum intersection capacity analysis will be required. Depending upon the nature of the project, roadway capacity analysis, weaving analysis, etc. may also be required as determined by the Transportation Director.

(6) Assumptions – Assumptions include land use categories, trip generation, pass-by reductions, internal capture reductions, transit reductions, and growth rate assumptions.

(7) Roadway Improvements – Proposed roadway improvements that will be completed prior to the opening year of the development will need to be included in the analysis.

(8) Other projects – Other projects in the vicinity of the study area that will be completed prior to the opening year of the development will need to be

included in the analysis.

2.3.2 Site Generated Traffic

The following procedures are accepted practice in the City's Transportation Master Planning and should be addressed in each report: trip generation, trip distribution and traffic assignment.

A. **Trip Generation.**

Trip generation shall be based upon the proposed land use and density. A.M. peak, P.M. peak and total daily site-generated traffic must be calculated using an independent variable or determinant which has been confirmed by the City during the pre-application meeting. The applicant must identify and justify the applicability of the trip rates used. Gross square footage is the usually accepted determinant for office and gross leasable square footage is the usually accepted determinant for retail projects. The number of dwelling units is the most often accepted determinant for residential uses. A table of proposed land uses must also be included in each TIA report for review.

Trip generation rates shall be adopted from the latest edition of "TRIP GENERATION, An ITE Informational Report, Institute of Transportation Engineers, Washington DC, 2012" (or latest edition). If the above source does not contain the appropriate trip rates for the proposed land use, other sources may be used at the discretion of the Transportation Director. The other sources may include collection of local traffic data for similar land uses, research papers, etc.

Average weekday trip rates shall be used in estimating total daily trips generated unless otherwise indicated by staff in defining the scope of study. Weekend or other trip rates shall also be required if the peak hour does not occur on an average weekday. The trip rate for peak hour of adjacent street traffic shall be used to estimate A.M./P.M. peak hour traffic entering and exiting the site. Guidelines in the Trip Generation manual shall be used for determining whether to use average trip rates or equations.

If the TIA is filed in conjunction with a site plan review, trip generation shall be based upon the uses and intensities identified on the site plan. If a site plan is not available, trip generation shall be based upon the maximum allowable density for the most intensive use. Reductions for internal capture, pass-by traffic, and transit usage should be discussed during the pre-application meeting and must be supported by adequate documentation. No reductions in trip rates may be made for driveway turning movements unless it can be documented that certain trips will not use the driveway. Guidelines contained in ITE's Trip Generation Handbook (2004 or latest edition) shall be used to document internal capture and pass-by trips.

B. **Trip Distribution.**

Percentages for directional distribution of the site generated traffic must be well referenced. The basis for directional attraction shall largely rely on the following information:

1. Marketing Study
2. Subarea Transportation Study
3. City or Regional Travel Demand Model Estimation
4. Local Traffic Data Collected as part of the TIA

The site traffic distribution on the impacted roadway network shall be documented in the TIA report.

C. **Traffic Assignment.**

This is the assignment of site generated traffic according to the percentages of distribution determined in the previous step. Traffic assignments shall be clearly illustrated with roadway and intersection geometry. The proposed roadway network shall include all the study intersections and roadways identified during the pre-application meeting.

2.3.3 Forecasting Future Non-site Traffic

Non-site related traffic must be estimated for the proposed build-out year of the project. In forecasting future traffic, the following factors must be considered:

A. Existing traffic.

B. Existing and proposed street network.

C. Traffic growth rates, using historic trends.

D. Traffic from any site plan within or adjacent to the study area of the TIA.

E. A reasonable portion of traffic from any project with a preliminary plat or recorded subdivision plat within or adjacent to the study area of the TIA.

F. A reasonable portion of traffic from any project with approved zoning within or adjacent to the study area of the TIA, unless there is reason to believe that the project is unlikely to be built within the time frame covered in the TIA.

Traffic growth rates and projects to be considered in background traffic should be determined during the pre-application meeting. Existing 24-hour traffic counts and A.M./P.M. peak hour intersection turning movement counts are needed as input. A copy of the traffic counts with the date and time they were conducted must be provided. Annual traffic growth rates must be well documented. A comparison should be made with other recent forecasts where available.

2.3.4 Capacity Analysis and Traffic Impact Assessment

Levels of service for roadways and intersections must be calculated before and after the proposed development. The acceptable software models for calculating levels of service are:

A. HCS (Highway Capacity Software), latest edition by McTrans

B. PASSER V, latest edition by Texas Transportation Institute

C. Synchro plus SimTraffic, latest edition by Trafficware Ltd.

D. Other methodologies as approved by the Transportation Director.

In a multi-phased development, levels of service must be evaluated before and after each new phase. Unless otherwise indicated during the pre-application meeting, Level of Service D shall be the minimum acceptable standard. In addition, the following characteristics shall be addressed when evaluating capacity and level of service:

A. Physical Configuration - intersection and roadway geometry.

B. Traffic Characteristics - volume, peak hour factor, heavy vehicle factor.

C. Traffic Control - signalized or unsignalized control.

D. Environmental Condition - topography, sight distance and other safety hazards.

E. Capacity - as determined in the latest edition of the Highway Capacity Manual, Transportation Research Board.

The applicant must indicate all assumptions used in the analysis, including cycle length, phasing, G/C ratios, etc. Default values must be used for percent of heavy vehicles, peak hour factor, arrival type, etc. (as per the criteria established in the Highway Capacity Manual) unless the applicant can document other values through field data.

A capacity analysis must be performed for study intersections within and adjacent to the site, as determined in the scope of the TIA. Volume/capacity ratios for the critical movements (X_C) must be provided for each intersection analyzed. If the overall level of service is D or worse, volume/capacity ratios must also be provided for each movement within the intersection.

The TIA must present conclusions regarding the impacts of the proposed development on the roadway system. These conclusions should be expressed in quantitative terms whenever possible. The report must specifically address any adverse traffic impacts (worse than level of service D) which cannot be avoided if the development occurs and recommend improvements to mitigate the traffic impacts. Transit-related or pedestrian/bicycle-related issues should also be discussed if applicable.

2.3.5 Recommendations on Roadway Improvements and Traffic Control Modifications

The TIA must include specific recommendations to mitigate the transportation impacts of site-generated traffic on roadways and intersections to an acceptable level of service. Various traffic control improvements or land use decisions can be used to mitigate traffic impacts on adjacent roadways and intersections. These include, but are not limited to, the following:

A. **Roadway Improvements.**

1. Lane addition and reconfiguration
   a. through traffic lane
   b. right turn lane
   c. left turn lane
2. Sight distance improvement
3. Grade separation

4. Geometric or alignment improvements

B. **Traffic Control Modifications.**

1. Stop sign control
2. Signal controls
    a. new installation
    b. upgrade existing traffic signal
3. Other improvements
    a. restricted turns
    b. channelized islands

C. **Land Use Controls.**

1. Reduce density
2. Alter proposed land use

D. **Alternative Modes and Demand Management Options.**

1. Transit Incentives
2. Ridesharing Incentives
3. Flexible Work Hours
4. Other Options

In some cases, a combination of the above strategies may be necessary.

Site driveways and roadways shall include a right turn deceleration lane if the projected right turn peak hour volume is 50 or more vehicles per hour.

The TIA must clearly identify in the recommendations any roadway improvements (including geometric changes), traffic control modifications (including signal retiming), or other measures necessary to mitigate site-generated traffic impacts.

2.3.6 Certification Statement

The TIA must be completed by a professional engineer who is competent in traffic engineering and registered in Texas. The TIA report shall include the following statement, signed and sealed by the professional engineer responsible for the contents of the document:

"I hereby certify that this report complies with Ordinance requirements and applicable technical requirements of the City of Round Rock and is complete and accurate to the best of my knowledge."

2.4 SUBMITTAL REQUIREMENTS

Below is a checklist of TIA submittal requirements for Zoning Cases, Site Plans, Subdivision Platting, and General Plan Amendments.

A. **Scope of TIA.**
   1. Study area (as defined in consultation with staff).
   2. Target year for project build-out and each phase.

B. **Trip Generation.**
   1. Proposed land use or zoning district for each tract.
   2. Generation rates based on proposed land use intensity
      a. Daily (24 hour)
      b. Peak hour (A.M., P.M., other)

C. **Trip Distribution.**
   1. Percentages for directional distribution.
   2. Sources of information.

D. **Traffic Assignment**.
   1. Roadway network in study area (existing and proposed).
   2. Access points (Driveways) .

E. **Traffic Forecast.**
   1. Existing 24-hour A.M./P.M. peak traffic, including copies of field data.
   2. Assumptions on annual growth rate or other source of future background traffic at time of build-out.
   3. Projected site, background and total traffic for 24-hour, A.M./P.M. peak at time of build-out.

F. **Capacity Analysis for Street Intersections and Driveways.**
   1. Intersection/roadway geometry (existing and proposed).
   2. Traffic control (signalized or unsignalized).
   3. Traffic characteristics (turn movements, percent trucks and buses).

G. **Traffic Impact Assessment.**
   1. Impacts expressed in quantitative terms.
   2. Adverse impacts which cannot be avoided.
   3. Transit issues (if applicable).
   4. Pedestrian issues (if applicable).

H. **Recommendations.**
   1. Roadway improvements.
   2. Traffic operation modifications.
   3. Limitation of land use intensity.

I. **Certification Statements (as provided in Section 2.3.6 above)**

If a TIA has been reviewed and approved for a zoning case on a project and if a

site plan, subdivision platting, and general plan amendment are submitted for the same project, a TIA addendum and/or update may be required if there are significant changes to the land uses, anticipated target year (build-out year), trip generation, trip distribution, background traffic or funded improvements. The level of detail needed for the revised analysis should be discussed with the Transportation Director during the scoping meeting.

2.5 FISCAL POSTING

In cases where a Roadway Impact fee has not been paid by the development, the developer shall be responsible for posting the pro-rata share of the fiscal for any traffic signal(s) identified in the TIA that are not constructed at the time of development. The TIA shall contain a table clearly identifying the recommended improvements, entity responsible for the improvements, the cost of construction, site traffic as a percentage of total traffic, and the developer's pro-rata cost. The table may include offsets applied for paid or expected Roadway Impact fees assigned to the project. For a multi phased development, the above information shall be provided for each phase of development. The fiscal shall be posted prior to final plat recordation, site development permitting, and/or building permit issuance, whichever is first.

2.6 TIA VALIDITY PERIOD

The TIA will be valid for a 12 month period beyond the ultimate build-out year of the development. If the certificate of occupancy is not obtained by the developer within this time frame and the build out is delayed, a TIA update may be required at the discretion of the Transportation Director.

2.7 PHASED DEVELOPMENTS

If a TIA is required for phased developments, the TIA shall be completed to include analysis for all phases and recommend improvements for each phase. The mitigation can also be phased based on the horizon year of each phase. However, if the future phases generate more traffic than what was assumed in the TIA, an addendum may be required. If the developer proposes to build in phases and submits only one phase of development for approval, the developer should be aware that traffic conditions may change when other phases are added, requiring additional analysis and/or on-site and off-site improvements.

Figure 2-1 Flow Chart for Traffic Impact Analysis