

Transportation Impact Analysis

Guidelines

City of Austin



Austin Transportation Department

Transportation Development Services Division

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Table of Contents

1	Background.....	3
2	Authority and Determination.....	3
3	Transportation Demand Management (TDM).....	5
3.1	Intent of TDM.....	5
3.2	TDM Plan.....	5
3.3	TDM Plan Requirements.....	5
3.3.1	Sustainable Modes Analysis.....	5
3.3.2	TDM Worksheet.....	6
4	Transportation Assessments and Full TIAs.....	7
4.1	Fees.....	8
4.2	Timeline for Review.....	8
4.3	Scope Guidance.....	8
4.3.1	Purpose.....	8
4.3.2	Submitting a Scope.....	9
4.3.3	Transportation Assessment Scoping.....	9
4.3.4	Study Area Selection Guidance.....	10
4.3.5	Trip Generation Guidance.....	11
4.3.6	Vehicle Trip Reductions and Mode Split Guidance.....	11
4.3.7	Projected Volume Analysis Guidance.....	11
4.3.8	Access Management Analysis and Queueing Analysis Guidance.....	12
4.3.9	Full TIA Scoping.....	12
4.4	Study Requirements and Guidance.....	12
4.4.1	Executive Summary.....	12
4.4.2	Table of Contents.....	12
4.4.3	Introduction and Background.....	13
4.4.4	Existing Road Network.....	13
4.4.5	Relevant Mobility Plans and Documents.....	13
4.4.6	Capacity Analysis Methodology and Guidance.....	13

City of Austin Transportation Impact Analysis Guidelines

4.4.7	Existing Conditions.....	15
4.4.8	No-Build (Forecasted) Conditions.....	16
4.4.9	Build (Site + Forecasted) Conditions.....	16
4.4.10	Mitigated (Build w/ Mitigations) Conditions	17
4.4.11	Summary of Results	18
4.4.12	Access Management Analysis and Queueing Analysis	18
4.4.13	Additional Sections	19
4.4.14	Conclusions and Identified Mitigation.....	19
4.4.15	Appendices.....	21
4.5	Submittal Requirements	21
4.6	Transportation Study Record Keeping and Release.....	22
4.7	Representation of Transportation Studies at Public Meetings.....	22
5	Projects Not Warranting a Transportation Assessment or Full TIA	22
5.1	Mitigation Location	23
5.2	Cost Estimates and Street Impact Fee (SIF) Considerations	23
6	TIA Compliance	23
7	Neighborhood Traffic Analysis	24
8	Zoning Transportation Analysis.....	25
	Figure 1: Development Process Flowchart	7
	Figure 2: Sample Results Table	18
	Table 1: Expected Timeline for Review.....	8
	Table 2: Sample Mitigation Table	19

1 Background

The purpose of the Transportation Impact Analysis (TIA) Guidelines is to provide applicants with the information needed to prepare transportation studies for review by the City of Austin.

A transportation study should assess the transportation aspects of a proposed development that has the potential of generating multi-modal trip activity. With new development comes changes to the vehicular, pedestrian, bicycle, and transit travel patterns in the area near the site, all of which need to be reviewed to ensure any impacts are identified and addressed. A transportation study should illustrate an understanding of the existing and proposed transportation conditions around the development, provide recommendations for measures to mitigate any adverse impacts caused by the development, and demonstrate that the proposed development meets the transportation goals established in City-adopted plans (e.g., the Austin Strategic Mobility Plan).

A transportation study shall:

- be signed by a licensed professional engineer with demonstrated experience in transportation engineering,
- provide a general description of the proposed development (e.g., site location, buildout year, land uses, etc.) and information detailing projected daily and AM/PM peak hour trip generation,
- assess the impacts of the proposed development on the surrounding transportation system via intersection capacity analysis and multi-modal assessment, and recommend measures and/or improvements to mitigate adverse effects,
- provide cost estimates and conceptual plans/exhibits for all recommended vehicular, pedestrian, bicycle, and transit improvements, and
- be valid for a period of up to five years, starting from the date of approval by either the City or the appropriate Commission, whichever is earlier.

2 Authority and Determination

According to the City of Austin's Land Development Code (LDC) *Chapter 25, Article 3, Section 25-6*, an applicant submitting a zoning or site plan application may be required to provide a transportation study based on the type of application being submitted and the trip generation characteristics of the proposed development. The types of transportation studies that may be required are as follows:

- Transportation Demand Management (TDM) Plan: required for site plans generating 2,000 or more unadjusted daily trips. TDM Plans may be performed at zoning under certain conditions.

City of Austin Transportation Impact Analysis Guidelines

- **Transportation Assessment:** required for developments generating 2,000 or more but less than 5,000 unadjusted daily trips. For zoning applications, a Zoning Transportation Analysis (see below) may be substituted for a Transportation Assessment at the discretion of the TDS Lead Development Review Engineer.
- **Full TIA:** required for developments generating 5,000 or more unadjusted daily trips. For zoning applications, a Zoning Transportation Analysis (see below) may be substituted for a Full TIA at the discretion of the TDS Lead Development Review Engineer.
- **Neighborhood Traffic Analysis (NTA):** required for developments taking access to residential streets and either generating 300 or more net new daily vehicle trips or if the application is for a public primary or secondary educational facility. See LDC *Section 25-6-114* for additional details.
- **Zoning Transportation Analysis (ZTA):** required for zoning applications generating 2,000 or more unadjusted daily trips when a Transportation Assessment or a Full TIA is not required.

An applicant or applicant's consultant shall submit a TIA Determination Worksheet to the Transportation Development Services (TDS) Division for review prior to beginning the scoping process for a new transportation study. The TIA Determination Worksheet contains details of the proposed development including project location, applicant information, application type, existing land use status, proposed land use and intensity, trip generation information, proposed site access points, and phases of site construction. TDS will complete the trip generation sections of the TIA Determination Worksheet and, based on the analysis thresholds established in the LDC, provide the applicant with direction on what type of transportation-related assessment is required. All appeals to a TIA determination will be made to TDS.

Following the City of Austin's Transportation Criteria Manual (TCM), the latest edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual should be used to determine the number of trips generated by a proposed development in the TIA Determination Worksheet. Vehicle trip reductions for internal capture, pass-by, and Transportation Demand Management (TDM) may not be applied when making the TIA determination; however, trip reductions due to existing land uses may be considered based on documentation of occupancy provided by applicant.

Other sources of trip generation publications (e.g., National Cooperative Highway Research Program (NCHRP) Report 684) may be proposed during the TIA determination if and only if trip generation information is not available in the ITE Trip Generation Manual.

Transportation mitigation may still be required for projects that do not require analysis as stated in LDC *Section 25-6-101 – Mitigation of Transportation Impacts*. See [Section 5. Projects Not Warranting a Transportation Assessment or Full TIA](#) for more information.

3 Transportation Demand Management (TDM)

3.1 Intent of TDM

Transportation Demand Management (TDM) provides developments the opportunity to reduce vehicular trip generation through the promotion and implementation of multi-modal travel options over traditional vehicle use. As Austin continues to grow, it is imperative that new developments mitigate their impact on the surrounding transportation system and limit new single-occupancy vehicle trips by utilizing various TDM measures in both meaningful and measurable ways.

3.2 TDM Plan

A TDM Plan is required for developments that generate 2,000 or more unadjusted vehicle trips per day. The development of the TDM Plan is based on a points system, wherein each TDM measure is assigned a point value and the sum is used to determine a trip reduction percentage. The selected TDM measures should be tailored to the development's location, land use mix, intensity, and existence of nearby multi-modal infrastructure. There are specific requirements for point ratios and minimum point thresholds based on the site context. For additional information on the TDM Plan points system, please refer to the Transportation Criteria Manual (TCM) *Section 10.3.0 Transportation Demand Management*.

The TDM Plan should be included as an appendix and summarized in a section of the Transportation Assessment or Full TIA; should a TDM Plan be performed at zoning it shall be included in the Zoning Transportation Analysis if a Transportation Assessment or Full TIA was not required. The total TDM reduction determined in the TDM Plan will be used for purposes of trip generation calculations in the scoping process. Please refer to [Section 4. Transportation Assessments and Full TIAs](#) for additional information on how TDM is used in the transportation study process.

3.3 TDM Plan Requirements

A TDM Plan shall consist of the following components:

1. Sustainable Modes Analysis (see [Section 3.3.1 Sustainable Modes Analysis](#)).
2. TDM Worksheet showing selected site context, TDM measures, and their associated point values along with the total TDM percentage reduction based on the sum of the points.

3.3.1 Sustainable Modes Analysis

A Sustainable Modes Analysis shall be performed as part of the TDM Plan. A typical analysis will evaluate pedestrian, bicycle, and transit connectivity within a study area up to ½ mile from the

edge of the project boundaries. The study may also be defined based on pedestrian corridors, boundary streets, or desire lines to pedestrian generators. At a minimum, significant pedestrian generators and transit facilities should be included when determining the project area.

The following items are typically included in a Sustainable Modes Analysis:

1. An inventory of the existing pedestrian, bicycle, and transit infrastructure. The inventory should include descriptions of the facilities and their current state of repair, identification of gaps in the networks, and any physical constraints which would interfere with the completion of the non-vehicular networks.
2. Figures illustrating the “desire lines” between the proposed development and major pedestrian generators and transit facilities. Typically providing three figures, one each for pedestrian-, bicycle-, and transit-oriented facilities, is sufficient in defining all possible desire lines for the relevant mode users. Examples of generators include schools, community activity centers, recreation centers, transit stops, public places, and existing and/or planned bicycle networks.
3. A narrative and table describing needed improvements to the pedestrian, bicycle, and transit networks based on City-adopted mobility plans. The table should include the location, description, and cost estimate of all missing facilities.
4. Conceptual schematics for all proposed improvements and a description of any potential construction constraints.

3.3.2 TDM Worksheet

The TDM Worksheet is included within the Street Impact Fee (SIF) Calculator Worksheet as a separate tab. Detailed information for each TDM measure can be found in TCM *Section 10.3.5 TDM Measures Implementation Criteria*. Selection of appropriate TDM measures should be based on the site location, context, land uses, and surrounding transportation network. Once the TDM Worksheet is completed, a total TDM reduction percentage will be calculated based on the points from each selected TDM measure. The approved TDM Worksheet shall be included in the appendix of the Transportation Assessment or Full TIA and may be included in the Zoning Transportation Analysis if performed at zoning.

In addition to the measures listed in the TDM Worksheet, applicants may propose new and emerging technologies or strategies for consideration. The applicant must prove that the presented measure is appropriate for the proposed development and must justify the requested TDM reduction percentage via data or reports from industry publications. The approval of any TDM measure, and associated trip reduction percentage, not included in the TDM Worksheet shall be at the discretion of TDS.

4 Transportation Assessments and Full TIAs

Please see below for the development process flowchart. Further clarification on each step can be found in these guidelines.

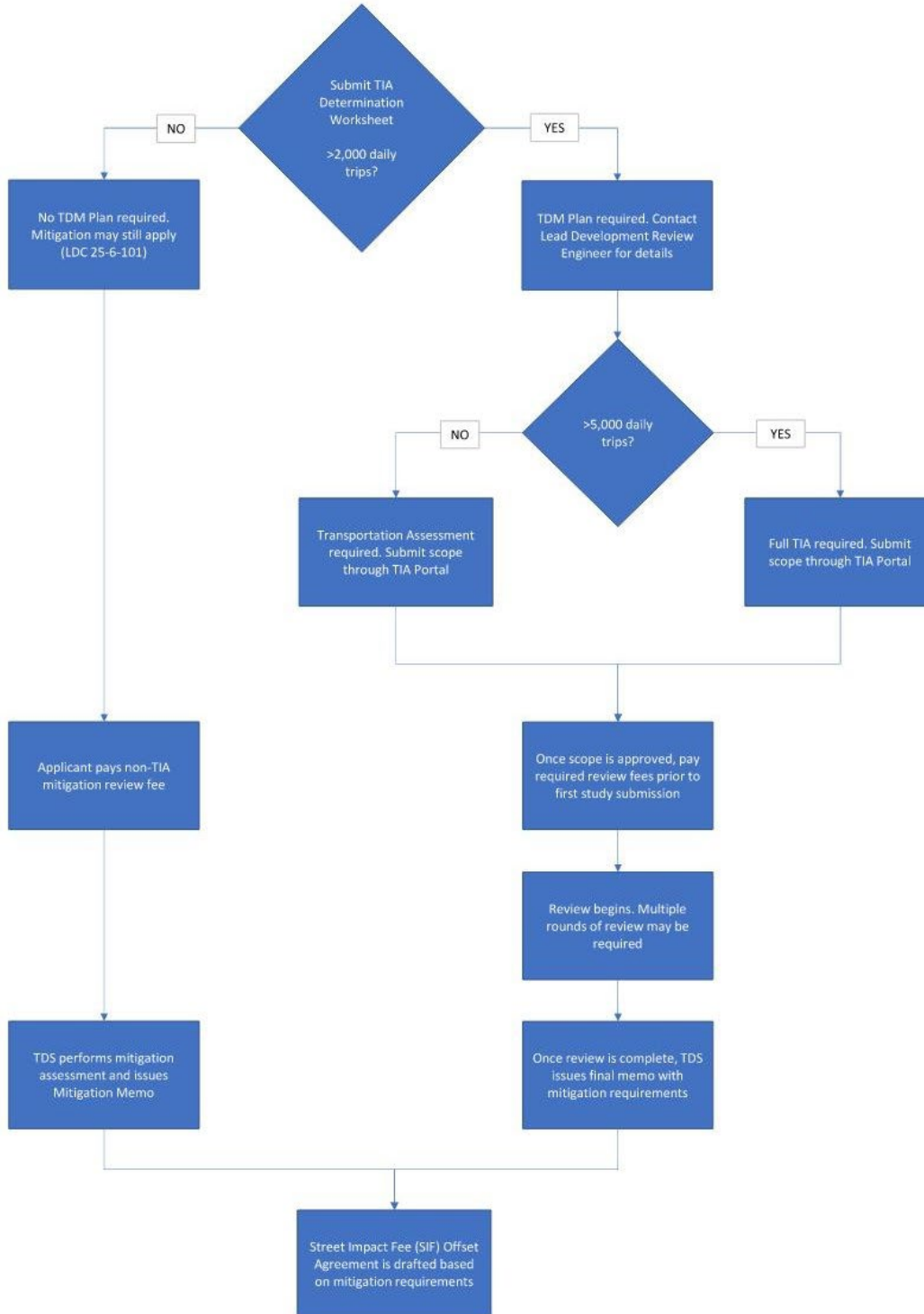


Figure 1: Development Process Flowchart

4.1 Fees

All applicable scope and transportation study review fees shall be paid prior to the review of the first Transportation Assessment or Full TIA submittal. All fees are assessed following the fee schedule published on the TDS website.

4.2 Timeline for Review

TDS attempts to maintain a general timeline for the review of submittals. Review time may vary based on the intensity of the development and any applicable special considerations. All reviews are conducted on a first-come-first-served basis. The official timeline for review will not begin until a complete submittal has been received and any required review fees have been paid. Table 1 provides average TDS review times once a complete submittal package has been received.

Table 1: Expected Timeline for Review

Item	Timeline (business days)	
	1st Submittal	Follow-up Submittals
Scope	10	5
Transportation Assessment 2,000-4,999 trips	20	10
Full TIA Review 5,000- 14,999 trips	30	15
Full TIA Review 15,000- 39,999 trips	30	15
Full TIA Review 40,000+ trips	40	20

A Transportation Assessment or Full TIA containing all necessary information and commentary should typically require only two submittals. Please note that the timelines in Table 1 are for TDS review time only; additional consideration will be needed for the time it takes an applicant to address TDS comments and time spent finalizing mitigation, which will require coordination between the applicant, City staff, and any other external stakeholders.

4.3 Scope Guidance

4.3.1 Purpose

A scope is required to determine the extent of the transportation study. The following sections will identify objective criteria to determine the study area, trip generation and reductions, annual growth rates, and other necessary requirements of the analysis.

These are general guidelines for preparing and submitting scopes; however, there may be exceptions based on the proposed development's land use and location. Engineering judgment should be applied where appropriate.

4.3.2 Submitting a Scope

If the review of a TIA Determination Worksheet determines that a Transportation Assessment or Full TIA is required for a proposed development, a scope should be submitted electronically via the TIA Portal on the TDS website (<http://www.austintexas.gov/department/transportation-development-services>). A scoping template is also provided on the website.

The proposed development will be assigned to the TDS Lead Development Review Engineer based on the applicable Council District as shown below. A map of the designated review areas and contact information can be found on the TDS website.

- North Area (D4, D7, D6, D10)
- Central Area (D1, D9)
- South Area (D2, D3, D5, D8)

The applicant's consultant should contact the appropriate TDS Lead Development Review Engineer should they have any questions regarding the scope. When submitting scope documents through the TIA Portal, applicants can request a meeting to discuss specific scoping questions; alternatively, meetings may also be requested after the draft scoping documents have been submitted for review. A copy of the scope signed by both the applicant's consultant and the relevant TDS Lead Development Review Engineer shall be recorded in the TIA Portal to document acceptance of the scope's provisions. The scoping and transportation study review fees shall be paid before the review of the first transportation study submittal begins. Studies received without an approved scope shall not be reviewed by TDS.

For proposed development projects in the City's Extraterritorial Jurisdiction (ETJ), the applicant/applicant's consultant should contact the corresponding government entity (e.g., county, TxDOT, etc.) for scoping and review. Studies for development projects in the City's ETJ will only be reviewed by TDS under special circumstances. (e.g., planned annexation, PUD zoning, etc.). If it is determined that TDS should scope and review a study in the ETJ, the City of Austin TIA Guidelines should be followed.

4.3.3 Transportation Assessment Scoping

A Transportation Assessment is effectively a Full TIA with a limited study area and is required for developments generating 2,000 or more but less than 5,000 unadjusted daily trips. The scoping requirements for a Transportation Assessment are applicable to Full TIAs as well.

If a Transportation Assessment is required per an approved TIA Determination Worksheet, the applicant or applicant's consultant should submit a Transportation Assessment scope through the TIA Portal for TDS review. A scope submitted to TDS shall include the following, at minimum:

1. Project location map
2. Site plan
3. TIA Determination Worksheet
4. Land use, size, and intensity of the proposed development
5. Proposed phases of development (if applicable) and full buildout year
6. Estimated annual traffic growth rate based on historic traffic counts
7. Estimated daily and peak hour trips generated by the proposed development
8. Pass-by trip reduction rates
9. Vehicle trip distribution exhibits, both percentages and volumes
10. List of study intersections (existing and future) for capacity analysis
11. List of roadways for projected volume analysis
12. List of jurisdictional agencies whose roadways are expected to be impacted by development traffic (e.g., Travis County, TxDOT, etc.)
13. Requirement of Access Management Analysis, for new driveway locations or locations with limited sight distance, and/or Queueing Analysis, for land uses which are likely to experience queueing (e.g., fast-food with drive-thru)
14. TDM measures and associated trip reduction percentage from an approved TDM Plan

4.3.4 Study Area Selection Guidance

The below guidelines should be followed to determine which existing and future intersections are to be analyzed. Documentation of this process should be submitted with the scope for review by the TDS Lead Development Review Engineer.

1. All driveways or access points to a proposed development shall be included, regardless of the number of peak-hour trips.
2. At the discretion of the TDS Lead Development Review Engineer, intersections within $\frac{1}{4}$ mile of the site boundary with 100 or more peak hour trips (AM or PM). Selection of these intersections may be based on, but not limited to, existing geometric constraints and safety concerns (e.g., limited sight distance, skewed intersections, etc.)

Exhibits showing the trip distribution percentages and actual trip volumes should be provided for both the AM and PM peak periods. A separate exhibit showing the site location and selected study intersections should also be included.

4.3.5 Trip Generation Guidance

Trip generation should be included with the scope and follow the latest edition of the ITE Trip Generation Manual. Figure 4.2 from the ITE Trip Generation Handbook, 3rd Edition should be used to determine whether the Average Rate or Fitted Curve Equation is appropriate for a given land use and intensity. Please contact the TDS Lead Development Review Engineer with any additional questions regarding trip generation.

4.3.6 Vehicle Trip Reductions and Mode Split Guidance

Vehicular trip reductions can be classified into three categories:

1. **Pass-by reductions** shall follow the latest edition of the ITE Trip Generation Manual.
2. **TDM reductions** are applied based on selected TDM measures recorded in the TDM Plan; only the total reduction should be reflected in the approved scope. Please note that reductions for internal capture are incorporated in the TDM process.
3. **Existing trip reductions** are based on the trip generation of any existing land uses on the subject property which are not considered vacant around the time of scoping.

The correct order in which to apply the reductions mentioned above is as follows: first pass-by, then TDM, followed by existing trips. TDM measures do not apply to pass-by trips because it is assumed that pass-by trips originate and terminate at locations other than the proposed development (i.e., a driver stopping at a new gas station on their way to work). After pass-by trips are removed, the total TDM reduction percentage should be applied to the remaining trips and subtracted from the trip totals. Lastly, any trips from existing land uses may be subtracted to determine the final adjusted trip generation values.

There may be cases in which, based on the sum of the allowable trip reductions, some scenarios show zero or negative trips. For these cases, the negative trips may be routed through the study intersections based on the trip distribution and later applied to the existing traffic counts to establish the Build scenario. Situations involving zero or negative trips should be discussed with the relevant TDS Lead Development Review Engineer.

4.3.7 Projected Volume Analysis Guidance

Projected volume analysis is used to ensure that appropriate street cross-sections are being applied. For all internal streets and Level 1 streets adjacent to the proposed development, Street Levels shall be recommended based on the estimated daily traffic volumes at full buildout. Street cross-sections shall include all behind-the-curb pedestrian and bicycle facilities as well as buffers and planting zones. Improvements for each Street Level can be found in TCM *Section 2 – Street Cross Sections* and the Austin Strategic Mobility Plan (ASMP).

4.3.8 Access Management Analysis and Queueing Analysis Guidance

Access Management Analysis shall be conducted to ensure safe and effective access for the site's operations. For certain uses where on-site queuing is probable, such as drive-thru restaurants or schools, a Queueing Analysis may be required. A Queueing Analysis should identify the project's queues and ensure that on-site storage can contain the queue generated by the development. Please see [Section 4.5.12 Access Management Analysis and Queueing Analysis](#) for more information.

4.3.9 Full TIA Scoping

A Full TIA will follow the same scoping requirements as a Transportation Assessment except for the determination of the study area. The study area for a Full TIA will be determined based on the following:

1. All existing and planned intersections of streets in the ASMP within ¼ mile of the site boundary or along the site boundary.
 - a. When adjacent to a Level 5 Street, the study area shall terminate at the furthest Level 4 Street frontage road intersection from the site.
 - b. Additional intersections may be added to the study area if the intersection is within ½ mile of the site boundary and 50 or more peak hour trips (either AM or PM peak) pass through the intersection at the discretion of the TDS Lead Development Review Engineer.
2. All existing and planned school sites, transit routes/stops, trails, sidewalks, and bike facilities within ¼ mile of the site boundary must be identified.

4.4 Study Requirements and Guidance

All studies submitted to TDS should contain the information described in the following sections.

4.4.1 Executive Summary

This section should contain a brief overview of the purpose of the study, location of the site, site description, site access, trip generation, and land use. The key results of the study should be presented, including principal findings, conclusions, and identified mitigation improvements.

4.4.2 Table of Contents

A table of contents should be provided which identifies sections of the report along with a list of tables, figures, and appendices.

4.4.3 Introduction and Background

This section contains a brief overview of the purpose of the study. Information such as site location, land use and intensity, daily trip generation, site access, and buildout year should be included. The study methodology should also be briefly summarized.

Two primary exhibits should be included in this section: 1) a map showing the site location, study intersections, and background projects (if applicable) and 2) a site plan showing land use information and proposed driveway access.

4.4.4 Existing Road Network

A brief narrative description of every road within the study area based on the approved study intersections should be included in this section. Information such as street classification, speed limit, number of lanes, cross-sectional elements (curb and gutter, median, sidewalks, bicycle facilities, etc.), and planned roadway improvements should be provided.

4.4.5 Relevant Mobility Plans and Documents

This section should list and describe the relevant mobility plans and other planning documents (Austin Strategic Mobility Plan, corridor plans, TxDOT plans, etc.) which were required in the approved scope.

4.4.6 Capacity Analysis Methodology and Guidance

The capacity analysis methodology for each scenario (Existing, No-Build, Build, and Mitigated) should be included in this section. For most developments, capacity analysis will involve Synchro modeling of the AM and PM peak period traffic operations. Additional peak hours, such as midday, special event, or weekend, may be required if the proposed development is likely to generate trips during non-standard periods. Multiple No-Build, Build, and Mitigated analysis scenarios may be required for developments constructed in phases. Improvements should be identified in the phase for which they are needed. Rather than making assumptions about unknown phasing plans, updates will be required with future site plans if the proposed project schedule is not available and the proposed land use mix in each phase is not known.

A description of the methodology and software (Synchro in most cases) used to complete the analysis should be included. Signal timing plans needed for analysis should be obtained from the City of Austin Arterial Management Division (AMD) or TxDOT and included in the appendix of the report. In the event of a proposed or planned traffic signal, a reasonable signal timing plan should be provided. All intersections for each analysis scenario must be modeled in one Synchro file (including unsignalized intersections). Synchro files must be in real-world coordinates and contain a connected network. SIDRA software should be used for any capacity analysis at a roundabout.

The latest Highway Capacity Manual (HCM) capacity analysis results should be presented in a tabular format (preferably in 11"x17") in the Summary of Results section of the study (see [Section 4.5.11 Summary of Results](#)). Previous versions of the HCM should be used if the latest version of the HCM is unable to analyze intersection operations and should be noted when such cases are experienced. Synchro Lane, Volume, and Timing reports should be presented only if Synchro is unable to analyze intersection operations using HCM methodology.

When results obtained from analyses completed in Synchro show poor intersection operations, the consultant shall validate the results with observations in the field for existing conditions or SimTraffic simulation for post-development/build conditions.

Given the significant differences in traffic characteristics between areas inside versus outside the urban core, there are different thresholds for what is considered "poor performance" based on where the site is located:

1. Results for Intersection Capacity Analysis Outside the Urban Core:

In areas outside the urban core, poor performance is defined by Level of Service (LOS) E or F, and/or a Volume/Capacity ratio over 0.95 for individual movements or the overall intersection. Poor performance may also include extensive queues for movements that extend beyond available storage and block other travel lanes or site driveways, or extensive queues on through movements which block adjacent intersections. If No-Build conditions are LOS D or better and the Volume/Capacity ratio is less than 0.95, Mitigated conditions should attempt to maintain LOS D or better and a Volume/Capacity ratio of less than 0.95 for individual movements and the overall intersection. Any excessive queues blocking travel lanes, adjacent intersections, and/or driveways expected in the Build scenario should be mitigated to address potential safety and mobility concerns.

The definition of poor performance, noted above, is provided as general guidance for study preparation. It is understood that it will not always be possible to bring a movement or intersection back to LOS D or better and a Volume/Capacity ratio to less than 0.95. In these cases, discussion and justification should be provided with any prohibitive constraints. Given that development projects vary in nature, scale, location, and impact on transportation infrastructure, each project will be assessed on a case-by-case basis. The purpose of this section is to provide general guidance on the acceptable traffic parameters.

2. Results for Intersection Capacity Analysis in the Urban Core:

Development intensities in the urban core may justify the need for different considerations of acceptable operating conditions. Within the urban core, LOS E or F may be considered acceptable based on the adjacent transportation system and reasonable

constraints. However, alternative mobility and safety improvements shall be recommended to address any impacts from the proposed development. The TDM Plan will act as an important document in the identification of non-vehicular transportation infrastructure (e.g., shared-use paths, sidewalks, separated bike lanes, transit stops, etc.) to alleviate mobility impacts from proposed developments where opportunities for roadway capacity improvements are limited.

In addition to intersection analysis, projected volume analysis may be required. The objective of projected volume analysis is to determine the appropriate cross-section and Street Level for a given road. While Synchro analysis provides information on traffic operations at intersections, it fails to provide details on cross-section requirements along segments of road. Projected volume analysis results should be presented in tabular format and additional calculations, if applicable, should be provided in the appendix.

Daily traffic volumes should be provided for roads identified for projected volume analysis in the scope. Using this data and information provided in TCM *Section 2 – Street Cross Sections*, appropriate cross-sections should be recommended for each identified road.

If daily traffic volumes are not available, projected volume analysis may be performed using AM/PM peak period traffic counts. First, calculate the segmental vehicles per hour (vph) from the average of the largest peak hour volume at the boundary intersections. Then, multiply the segmental vph by a factor of 10 (or a factor of 8 for areas of predominantly industrial land uses) to estimate the average daily trips.

Lastly, phased development projects have specific considerations given the need for multiple analysis scenarios. Signal retiming should be assumed in the No-Build scenario for phases three years or more beyond the Existing scenario year. Additionally, improvements identified during the mitigation assessment process should be tied to the phase for which they are triggered.

4.4.7 Existing Conditions

This section should provide a general summary of the existing conditions of the surrounding road network. The following components should be addressed:

1. Information on the collection of existing traffic count data, such as when the counts were collected, if adverse weather conditions were present, and any adjustment factors applied to the count data (e.g., if counts were collected during the summer, an adjustment factor would be required due to school being out of session). Please note that traffic counts during the summer are discouraged and will only be accepted in certain circumstances at the discretion of TDS.
2. An exhibit or exhibits showing existing traffic volumes for both the AM and PM peak periods. Daily traffic volumes may be presented in this section when relevant.

3. Detailed descriptions of each study intersection, including lane configuration for each approach, the type of control present (stop-controlled, signalized, or roundabout), any ongoing or planned road construction projects, and a discussion of the key results from the Synchro analysis (e.g., failing intersections/movements).

4.4.8 No-Build (Forecasted) Conditions

This section is to provide a detailed overview of the expected transportation infrastructure in the vicinity of the proposed development in the build year assuming the site is not developed. This section shall include the following components when applicable:

1. A description of how the annual growth rate was calculated and applied to the existing traffic counts. Additionally, any approved background projects should be summarized with trip generation and distribution information; relevant documentation (e.g., final TIA memos) should be included in the appendix.
2. A summary of any changes to the roadway network in the build year, such as new lane configurations, median construction, or proposed signals. If trip distribution needs to be modified based on future plans, a description of the required changes should be provided.
3. An exhibit or exhibits showing projected traffic volumes for both the AM and PM peak periods. Daily traffic volumes may be presented in this section when relevant. Exhibits should also be provided showing the distribution of any approved background project traffic.
4. A discussion on the key results of the No-Build Synchro analysis, in particular movements which went from Level of Service (LOS) D or better in the Existing scenario to E or worse.

4.4.9 Build (Site + Forecasted) Conditions

This section is meant to provide a detailed description of the proposed development including land use, intensity, access points, and any other details that may have an impact on the transportation system. The following components should be included when applicable:

1. Daily and AM/PM peak hour trip information described in narrative form and presented in a table. Any reductions for existing trips, pass-by, and TDM measures should also be described and reflected in the trip summary table.
2. A summary of the TDM Plan with the entire report included in the appendix. The approved TDM measures should be described along with detail as to how the measures will be implemented. Lastly, an explanation should be provided as to how the final TDM

reduction percentage shown in the trip generation table was calculated. Please refer to [Section 3. Transportation Demand Management](#) for additional information.

3. A site plan showing the proposed land uses and site access. If the site plan was provided in the Introduction and Background section, it may be referenced instead.
4. Distribution of site traffic based on the guidelines defined in [Section 4.4.4 Study Area Selection Guidance](#). Traffic volumes for the Build scenario are calculated by adding the site-generated trips to the No-Build traffic. Exhibits showing AM and PM peak period traffic volumes, both for the site only and the overall Build scenario, should be provided. Daily traffic volumes may be presented in this section when relevant.
5. A discussion on the key results of the Build Synchro analysis, in particular movements which went from Level of Service (LOS) D or better in the No-Build scenario to E or worse. Mitigation must be proposed for all movements which experience “poor performance” as defined in [Section 4.5.6 Capacity Analysis Methodology and Guidance](#).
6. A discussion on projected volume analysis, if applicable. A table should be provided with daily traffic volumes from the Existing, No-Build, and Build scenarios as well as the recommended cross-section and Street Level for each road identified for analysis.

4.4.10 Mitigated (Build w/ Mitigations) Conditions

This section is meant to provide a detailed description of improvements needed to mitigate the development’s impact on the surrounding transportation network. The following components should be included when applicable:

1. Identification of roadway improvements used to mitigate the adverse traffic impacts caused by the development. If an improvement is identified but there are constraints impacting the feasibility of construction, then these issues should be described in detail.
2. Improvements should be identified for each phase of construction, if applicable.
3. Conceptual exhibits of the proposed improvements should be provided and should contain the following:
 - a. ROW information
 - b. Lane configurations and widths (measured from the lip of the gutter)
 - c. Sidewalks and ramps
 - d. Signal pole and utility locations (if applicable)
 - e. Signage and striping
 - f. Driveway spacing
 - g. Aerial imagery
 - h. Bicycle facilities
 - i. Transit locations
4. A discussion on the key results of the Mitigated Synchro analysis, in particular movements which cannot be improved through mitigation.

Identified mitigation should not negatively impact safe operations of the intersection. For example, signal re-phasing such as permissive left turns or a reduction in pedestrian crossing time may not be allowed unless it can be proven to improve safety or has documented approval from ATD. Also, improvements should not be proposed which significantly degrade another movement. For example, adding more green time to a northbound left-turn movement while taking time from a southbound through movement causing a degradation in LOS to the southbound movement may not be acceptable.

4.4.11 Summary of Results

The primary purpose of this section is to provide the Synchro results summary table. The results from the capacity analysis for all scenarios should include the following:

1. LOS results for overall intersection operations and individual movements
2. Volume/Capacity (v/c) ratio
3. Delay (seconds)
4. 95th percentile queue length (feet)
5. Existing turn lane bay length, when applicable

Any intersection or movement in the Mitigated scenario experiencing “poor performance” as defined in [Section 4.5.6 Capacity Analysis Methodology and Guidance](#) should be highlighted in red. Please see Figure 2 below for a sample summary table.

Intersection / Movement	Existing					No-Build				Build				Mitigated (w/ Imps)				
	LOS	Delay	V/C	95th % Queue (ft)	Bay Length (ft)	LOS	Delay	V/C	95th % Queue (ft)	LOS	Delay	V/C	95th % Queue (ft)	LOS	Delay	V/C	95th % Queue (ft)	Bay Length (ft)
Example Street and Frist Street	C	22.3	0.74	-	-	C	34.8	1.19	-	F	153.0	2.14	-	F	95.6	2.14	-	-
EBL	C	22.0	0.20	61	100	C	22.3	0.38	107	E	74.5	1.00	462	E	73.0	1.00	461	100
EBT/R	C	20.5	0.53	567	-	A	9.1	0.79	166	A	8.4	0.83	296	A	7.9	0.83	252	-
WBL	E	61.2	0.57	96	100	F	160.5	1.19	327	F	190.0	1.28	373	F	190.9	1.28	377	100
WBT/R	A	6.1	0.46	60	-	B	16.4	0.78	550	C	20.1	0.86	702	C	20.6	0.86	742	-
NBL	D	46.0	0.44	110	150	E	76.4	0.81	202	F	120.0	1.00	227	F	120.0	1.00	277	300
NBT	E	62.0	0.44	153	-	E	62.9	0.53	230	F	146.5	1.14	561	F	146.5	1.14	561	-
NBR	A	6.4	0.32	24	50	B	15.6	0.42	76	B	19.8	0.47	95	B	19.8	0.47	95	50
SBL	D	43.4	0.35	97	100	E	56.1	0.62	160	F	281.4	1.48	303	F	281.4	1.48	280	300
SBT	E	76.3	0.74	209	-	F	84.9	0.87	301	F	550.8	2.14	998	F	550.8	2.14	998	-
SBR	B	11.3	0.60	15	50	F	102.4	1.11	349	F	500.7	2.05	1099	E	65.6	1.00	338	50

Figure 2: Sample Results Table

4.4.12 Access Management Analysis and Queueing Analysis

Access Management Analysis and, if required per the approved scope, Queueing Analysis shall be performed and include the following:

1. The number of driveways to/from the proposed development. The number of access points should be minimized as excessive driveways create additional conflict points and potential safety issues.

2. Determination of the need for deceleration and/or acceleration lanes at the development’s access points based on roadway speed and safety considerations.
3. Pick-up/drop-off operations, valet, trash, loading/unloading, and any other operations which require idling on or adjacent to the site.
4. Queuing Analysis, if required, should show adequate on-site storage for any anticipated queues (e.g., school pick-ups and drop-offs).

4.4.13 Additional Sections

Additional analysis, listed below, should be included as required:

1. Safety/Geometric Review for complex or non-standard designs (e.g., non-perpendicular intersection approaches)
2. Sight Distance Studies for intersection configurations with potential sight distance issues (e.g., trees in the median)
3. Signal Warrant Studies whenever a signal is recommended as an improvement

4.4.14 Conclusions and Identified Mitigation

Improvements should be identified to mitigate the site’s impact on the transportation network and may include vehicular improvements as well as pedestrian, bicycle, and transit facilities. Identified improvements should be described in the report narrative and summarized in tabular format. Table 2 shows a sample improvements table.

Table 2: Sample Mitigation Table

Location	Improvement	Estimated Cost	Site Traffic (%)	Description of Site Traffic
Street A & Street B	NB left-turn lane	\$250,000	18%	NBL site traffic
	SB right-turn lane	\$150,000	16%	SBR site traffic
	Signal retiming	\$5,000	100%	
Street A	Widen to 4 lane cross-section	\$800,000	22%	Site traffic along segment
Street B between site and transit stop	Sidewalk	\$40,000	N/A	N/A
Street B & Street C	Bus stop improvements	\$27,800	N/A	N/A
Totals		\$1,272,800		

City of Austin Transportation Impact Analysis Guidelines

Either planning-level or itemized cost estimates for each improvement must be provided with applicable supporting documentation. Estimates should incorporate all costs reasonably expected to design, permit, and construct a given improvement, including but not limited to:

1. Engineering costs
2. Contingency
3. Mobilization costs
4. Right-of-way preparation
5. Traffic control
6. Concrete and asphalt excavation and addition
7. Traffic signal equipment removal, relocation, and addition
8. Traffic signal re-timing
9. Traffic signs and markings
10. Sidewalks and curb ramps
11. Pavement resurfacing
12. Drainage modifications
13. Right-of-way acquisition

The cost estimates for the improvements shall be for the year in which they are intended to be built. The cost for future years may include an annual inflation rate that must be approved for use by the TDS Lead Development Review Engineer. In cases where the applicant is required to construct an improvement and the ultimate construction cost exceeds the estimated cost of the improvement, no refund or credit will be given for the difference.

With the introduction of the Street Impact Fee (SIF) ordinance (20201210-061 & 20201210-062), developers may be eligible for offsets to their required SIF collection amount if they choose to construct improvements. Coordination with TDS will be required to ensure the improvements proposed for construction are eligible for SIF offsets. If the total cost of improvements required for construction exceeds the SIF collection amount, no refund shall be given for the difference.

Construction costs, cost estimates provided in the study, or an engineer's estimate shall be used in the development of SIF offset agreements, whereby the SIF collection amount is reduced based on the cost of improvements the developer has agreed to construct. For improvements identified in the SIF Roadway Capacity Plan, preliminary project costs are provided that may serve as a starting point for developing more accurate cost estimates. In general, the Roadway Capacity Plan is a helpful document for determining high priority improvements for a given area. Please note that actual construction costs cannot be used to retroactively modify an approved SIF offset agreement based on cost estimates; however, if the improvements are constructed prior to SIF payment then actual construction costs may be used in the calculation of offsets.

Please refer to the Street Impact Fee Guidelines for additional information.

4.4.15 Appendices

Supporting documentation, data, and calculations are to be included in the report appendix.

Sections may include:

1. TIA Determination Worksheet
2. Scoping document
3. Trip generation
4. Traffic counts (AM/PM and daily, if applicable)
5. Signal timing sheets
6. Cost estimates
7. Referenced City of Austin improvement documents/exhibits
8. Signal warrants
9. Projected volume analysis calculations
10. Synchro reports
11. Mitigation schematics
12. TDM Plan

4.5 *Submittal Requirements*

A complete submittal should be provided through the TIA Portal found on the TDS website and include the items below. Individual files may be combined and submitted as zip files in lieu of submitting them separately (e.g., all Synchro files may be submitted as one zip file). Please note that an incomplete submittal will not be accepted for review.

1. An electronic (PDF) copy of the entire Transportation Assessment or Full TIA with appendices (see [Section 4.5 Study Requirements and Guidance](#) for more information).
2. Synchro files showing a connected roadway network for all scenarios analyzed.
3. Excel spreadsheets with overall trip generation calculations, pass-by trip capture calculations, site traffic distribution and assignment within the roadway system, and site driveways for each scenario.

All review fees must be paid before the review of the first submittal begins. TDS will issue an invoice for any applicable review fees, which may be paid online, via mail, or over the phone. Please refer to the review fee invoice email for payment options.

The applicant's consultant should contact any other appropriate agencies (e.g., TxDOT, Travis County, etc.) for their submission requirements.

4.6 Transportation Study Record Keeping and Release

Transportation Assessments and Full TIAs shall be kept on Austin Transportation Department (ATD) servers and archived for future reference. While a Transportation Assessment or Full TIA is under review, any public requests to obtain transportation-related documents shall be formally submitted through a Public Information Request (PIR) here:

<https://www.austintexas.gov/service/request-public-information-or-records>.

For studies in which a final memo has been issued, the public may either access these documents via Austin Build + Connect (<https://www.austintexas.gov/page/austin-build-connect-abc>) or by contacting the relevant TDS Lead Development Review Engineer for the area where the development is located. Please note that only the PDF version of the transportation study and appendices will be provided; other files such as trip distribution Excel spreadsheets or Synchro files will not be released unless permission is obtained from the author of said documents.

4.7 Representation of Transportation Studies at Public Meetings

At boards, commissions, and City Council, the applicant's consultant who prepared the transportation study is responsible for presenting the content of the study, the analysis performed, and the resulting recommendations. TDS staff will address questions regarding the study process, the adequacy of the analysis, and mitigations required by the City to offset their traffic impacts. Applicants must represent their own cases; TDS staff will not do so on their behalf or in their absence.

5 Projects Not Warranting a Transportation Assessment or Full TIA

If a proposed development does not trigger either a Transportation Assessment or Full TIA per an approved TIA Determination Worksheet, the applicant may still be required to provide improvements that address pedestrian, bicycle, and/or transit infrastructure needs in the surrounding area. Per LDC *Section 25-6-101*, improvements are limited to the following:

1. Sidewalks and curb ramps
2. Traffic signs, markings, and upgrades to signal infrastructure
3. Traffic calming devices
4. Bike lanes or upgrades to bike facilities (e.g., shared-use path)
5. Rectangular rapid flashing beacons
6. Pedestrian refuge islands
7. Pedestrian hybrid beacons
8. Urban trail improvements
9. Right-of-way dedications
10. Measures to limit transportation demand.

5.1 Mitigation Location

Per LDC *Section 25-6-101*, system improvements for developments that do not trigger a Transportation Assessment or Full TIA must be located:

- within the boundaries of the development for which they are required; or
- no farther from the proposed development than:
 - one-quarter mile; or
 - three-fourths of a mile, for an improvement required to provide access between the proposed development and a school, bus stop, public space, or major roadway as designated under the transportation plan.

5.2 Cost Estimates and Street Impact Fee (SIF) Considerations

Similar to the requirements for a Transportation Assessment and Full TIA, cost estimates will need to be provided for any proposed mitigation. These estimates may be high-level for general improvements (e.g., sidewalk construction) or detailed for more complex improvements (e.g., pedestrian bridge).

Any improvement identified for construction which can be included in the SIF Roadway Capacity Plan may be eligible for an offset credit to the required SIF collection amount invoiced at time of building permit. All SIF offsets will need to be documented in an offset agreement signed by both the applicant and the appropriate TDS Lead Development Review Engineer.

6 TIA Compliance

For zoning amendments or site plan applications associated with another application that required a Transportation Assessment or Full TIA, the applicant will need to show that their proposed development complies with the requirements of the approved transportation study. To show compliance with the assumptions and trip information of the approved study, the applicant must submit a TIA Compliance Letter for review. A typical TIA Compliance Letter will include the following information:

1. A brief description of the development, including location and land use information.
2. Details of the original Transportation Assessment or Full TIA, including zoning case number, approval date, final TIA memo, and phasing agreement, if applicable.
3. The trip generation table from the original transportation study showing daily and AM/PM peak hour trips.
4. Trip generation information, preferably in a table, for all previously approved site plan and/or subdivision applications showing daily and AM/PM peak hour trips.

5. Trip generation information for the proposed development showing daily and AM/PM peak hour trips. This information may be included in the table from item 4 if the subject site plan is clearly identified.
6. An accounting of the remaining capacity in terms of total number of trips originally approved, trips used in previous site plans, and trips being used with the current application for daily and AM/PM trips.
7. Identification of the mitigation requirements from the original transportation study, the status of said improvements (i.e., not constructed, under construction, constructed, paid, etc.), and any improvements triggered with the current development application.

Trip generation information for previously approved developments should be based on the ITE Trip Generation Manual that was in effect at the time they were approved, unless otherwise noted in any relevant zoning ordinances, phasing agreements, or restrictive covenants. For the development being reviewed, trip generation information should be based on the most recent version of the ITE Trip Generation Manual unless otherwise noted as described above.

TIA Compliance Letters shall be submitted for review through the TIA Portal on the TDS website (<https://www.austintexas.gov/department/transportation-development-services>). Review fees shall be issued to the zoning or site plan case folder and must be paid prior to the issuance of an approved TIA Compliance Letter.

For situations in which the assumptions of the original transportation study are no longer valid or the allowable daily or AM/PM peak hour trips from the original transportation study have been exhausted, an updated study or supplemental analysis may be required. The TDS Lead Development Review Engineer will assess the need for supplemental analysis or, depending on the size of the proposed development, an entirely new transportation study based on the extent to which the original assumptions and trip information have changed.

7 Neighborhood Traffic Analysis

Neighborhood Traffic Analyses (NTAs) are intended to provide transportation review for developments taking access to residential streets as defined in LDC *Section 25-6-114*. These developments must either generate 300 or more net new daily trips or consist of school projects. A typical NTA will include the following information:

1. Projected daily traffic generated by the proposed development
2. Existing 24-hour traffic counts at locations approved by TDS
3. An access management plan and queueing analysis, when applicable
4. Proposed driveway locations and site trip distribution
5. Sustainable Modes Analysis identifying and recommending transportation mitigation items per LDC *Section 25-6-101*

NTAs are unique in that TDS staff are responsible for writing the memos; the applicant or applicant's consultant is responsible only for providing the required traffic counts and development information (e.g., land use, intensity, location, etc.). TDS staff will use the information provided by the applicant to determine traffic impacts to local streets and identify appropriate mitigation recommendations. The exception to this standard practice is if there is a Transportation Assessment or Full TIA requirement associated with the development, in which case the applicant will perform the NTA and include it as a section in the transportation study.

The applicant or applicant's consultant shall provide the requested information via email to the appropriate TDS Lead Development Review Engineer and shall be responsible for paying the review fee before the final NTA memo is issued.

8 Zoning Transportation Analysis

For zoning cases generating 2,000 or more unadjusted daily trips, a Zoning Transportation Analysis (ZTA) will be required unless the TDS Lead Development Review Engineer requires a Transportation Assessment or Full TIA instead; furthermore, a ZTA does not relieve a development of its Transportation Assessment or Full TIA requirement at time of site plan. A ZTA is intended to provide zoning staff, commissions, City Council, and interested parties with an overview of potential transportation-related impacts due to rezoning and developing the subject property. A ZTA shall be limited to the following scope components:

1. Trip generation for most intensive use proposed by zoning
2. Anticipated TDM Plan measures or a full TDM Plan if applicant chooses to perform one at zoning
3. Sustainable Modes Analysis, unless included in full TDM Plan
4. Projected volumes analysis to identify appropriate Street Levels and cross-sections for adjacent and internal streets (see [Section 4.5.6 Capacity Analysis Methodology and Guidance](#))
5. Site driveway access analysis, including sight distance analysis and safety assessment, as available
6. Assessment of right-of-way needs and dedication of right-of-way, if applicable

As with Transportation Assessments and Full TIAs, ZTAs shall be scoped and submitted through the TIA Portal. All required scoping and review fees shall be paid before review of the first ZTA submittal begins.