

Nassau County, Florida Transportation Impact Analysis Guidelines

These guidelines provide a consistent and transparent process from expanding, updating or proposed developments. This process ensures that a full evaluation of the transportation opportunities and affects are understood and documented.

DECEMBER 2019

1. INTRODUCTION

The County has established guidelines for the preparation of Traffic Impact Analysis (TIA) reports. The purpose of these guidelines is to streamline development review and approval by promoting consistent and adequate traffic analyses. A TIA is prepared for a project before a discretionary action is approved. This may be a land use zoning change, subdivision map, use permit, or other development application. By providing clear assumptions, methods, and formats these guidelines help to speed the creation and review of TIA reports consistent with County and State requirements. The vision relies upon an integrated and multimodal transportation system that provides choices and accessibility for everyone living and working in the County. Key strategies to achieve this vision promote non-auto travel. These include public transit services, parking strategies, bicycle facilities, and pedestrian components that are well coordinated and connected with a larger regional transportation system.

2. PURPOSE

The ability of a community to balance and facilitate the different components of its transportation system is important to the creation and preservation of the quality of living and a business environment. The function of a community's transportation system is to provide for the movement of people and goods. It includes ease of access for pedestrians, bicyclists, transit and other vehicle traffic flows within and through the community.

The Mobility Element of the County's Comprehensive Plan sets forth goals and policies to improve overall transportation in the County and region. The Mobility Element is based on approaches that address the needs of multimodal corridors and streets as well as community neighborhoods and overlay districts that are affected by traffic. These guidelines have been developed to ensure that transportation system improvements necessary to support current and new development (while maintaining quality of life within the community) are identified prior to project approval and funded prior to construction.

It is important for the report to be prepared in close coordination with County transportation and planning staff and other affected agencies.

Coordination should include:

- ☑ A pre-application meeting. Including a discussion of the requirements for the TIA
- ☑ The development of an approved scope of work - including the study area, appropriate scenarios, data and analysis requirements, and any special issues
- ☑ A review of all traffic assumptions and existing conditions

- ☑ Review of the draft report

The supplemental analysis may be required after the draft TIA is submitted based on review by County staff and comments from citizens and other affected agencies, the Planning Commission, or the County Council.

3. BASIC REQUIREMENTS

All final TIA reports submitted to the County shall be prepared and approved by the County planning and engineering departments.

3.1 When a TIA is required- A TIA is is required as determined by the County Engineer. The County Engineer and Planning Director will decide the participation of other County Department staff based on the Application request.

The County Engineer shall determine the level of the analysis to be conducted for a study, review any study provided by the Applicant, or review the proposed construction plans. This is also applicable if the Application has been submitted during development review.

The County Engineer shall review the Application in accordance with best practices within the industry and with local, state and federal design standards and guidelines and shall make a determination if a traffic study waiver is granted. Formal written communication shall be sent to the Applicant upon determination.

A TIA may also be required in areas where any amount of additional traffic may impact a congested location, or when specific site access issues are of concern. These determinations will be made during the preparation of the study scope.

The Florida Department of Transportation provides additional guidance for projects affecting state facilities in the [Site Impact Handbook](#) (or access the [FDOT Systems Management](#) website).

3.3 When to update an existing TIA- A TIA is to be updated if a proposed project is changed in a way that will increase the project trips. Additionally, an update is required if a proposed project undergoes any other significant changes as determined by the County such as mobility, connectivity, accessibility changes or scheduling/phasing changes after the TIA has been prepared. The TIA shall be supplemented or updated as shown in Table 1 following page).

TABLE 1 Guidelines for Updating or Supplementing an Existing TIA

Criteria	Guideline
If the project trips increase	Revise the TIA
If the TIA is older than 2 years	Provide a Technical Memorandum confirming the same conclusions – or – Revise the TIA
If the Project has changed (access or distribution etc.) has significantly changed as determined by the County	Provide a Technical Memorandum confirming the same conclusions – or – Revise the TIA

3.4 Submittals and Review- The project applicant shall submit **3 bound copies** and one digital of the draft TIA report, including appendices, to the County. An example of the study format is provided in Appendix A. A **preliminary review** will determine if the draft report is consistent with these guidelines. A copy of the preliminary review form is provided in Appendix F. If significant deviations are identified, the draft TIA shall be considered incomplete and the County will forward a notice of technical deficiencies to the Applicant/preparer.

a) County will request to perform a review of the TIA technical files, for example the Travel Demand Model Files, Synchro Files, or similar. Engineering Services will perform a sufficiency review within fifteen (15) days and notify the applicant of any technical deficiencies.

Once the analysis has been deemed complete, the County Engineer and the Planning Director will provide the applicant with comments within forty-five (45) days. When the applicant re-submits three (3) copies and digital copy of the TIA, they shall provide a written reiteration of the original comments followed by a response.

Engineering Services will provide comments on re- submittals within thirty (30) days. The submittal process shall be repeated until all comments have been satisfied.

Once all comments have been satisfied, the County Engineering or their designee shall approve the TIA. In no case shall the Development Review Committee approve a project prior to the TIA or Traffic Statement being approved by Engineering Services.

Upon submittal of a draft TIA report consistent with these guidelines, the County will conduct a **final review and provide a final review transmittal letter to the applicant.**

4. ANALYSIS PARAMETERS

To facilitate development review, the applicant and the applicant's consultants/transportation planner should meet with the County County Engineer and Planning Director. They should include the affected County departments and other appropriate agencies, to determine the study scope. The meeting will include Engineering Services, the Department of Planning and Economic Opportunity, depending on the project size, other County departments such as Fire/Rescue may be included.

A standard scoping form is provided in Appendix B for use during a scoping meeting. Preparation of the draft traffic study should not begin until after the County approves the completed study scope form. The planner assigned to the project will provide a letter to the applicant approving the scope of the TIA. The approved scope governs in the event of any discrepancy with these guidelines.

Not every TIA will require all of the items listed below. Considerations for the study scope may include the following:

4.1 General Information

EXECUTIVE SUMMARY AND INTRODUCTION

An executive summary shall be provided at the front of the report. The purpose of the executive summary is to provide a short synopsis of the important findings and conclusions. The executive summary shall be understandable as a stand-alone document and shall include the following information:

- a description of the site location of the proposed development with regard to the area road network
- a description of the proposed development with respect to the types and sizes of all proposed land uses, construction phasing (where applicable) and proposed access points and their relationship to the areas roadway system
- a discussion of all major findings including existing traffic conditions, programmed roadway/transportation improvements (where applicable), site generated traffic
- volume, background traffic volume and total traffic volume (site and background)
- Levels of service with and without the proposed development
- any roadway and/or intersection improvements that may be proposed to mitigate any potential negative impacts of the proposed development

A) Study Area- The study limits are based on the proposed development size, the land use, existing traffic conditions, and discussion with County and other affected agency staff. The TIA shall describe the basis for selecting the study area/extent.

B) Scenarios- The scope should consider the following existing scenarios:

- Existing
- Project Only
- Existing + Proposed Project

The scope should consider the following cumulative scenarios:

Either:

- Existing + Approved/Pending Project List
- Existing + Approved/Pending Project List + Proposed Project

Or:

- The adopted Travel Demand Model (NERPM ABM) without Proposed Project
- The adopted Travel Demand Model (NERPM ABM) + Proposed Project

The scope for multi-phased projects may include evaluation of the estimated conditions one year after full occupancy of each development phase and may also include determination of the timing of recommended project improvements.

C) Approved and Pending Project List- When required by the County Engineer, a list of approved and pending projects, assumed to be constructed and fully occupied in the analysis, will be developed as part of the early coordination with the County Engineer and the Planning Director. County staff will provide a copy of any existing traffic studies.

D) Analysis Periods- Commercial projects should evaluate each scenario during weekday PM and Saturday mid-day peak hours, or as otherwise determined in the scope. Residential, office and industrial projects should evaluate each scenario for weekday AM and PM peak hours, or as determined in the scope.

E) Comprehensive Plan Amendments- When a project includes a Comprehensive Plan amendment that would increase the potential traffic generation compared to the existing land use designation, the study scope may require analysis based on the existing land use as well as the proposed new land use.

F) Programmed Transportation Improvements- The future roadway network (without the project) is assumed to include all programmed transportation facility improvements within the study area. This is reflected in the County's most recently adopted Capital Improvement Plan or as established with other project approvals. A list of programmed improvements will be developed as part of the early consultation with County transportation and planning staff and other affected agencies.

G) Changes to the Traffic Model and digital submittal- The TIA shall clearly describe, and document changes made to the travel demand model to accommodate the analysis of the proposed project. Documentation shall identify the original source model files, revisions to the road network, centroids, nodes, facility type, area type, revisions to Traffic Analysis

Zones (TAZ), parcel-level data, socioeconomic data revisions, and land use. Speeds and other constraints to the model are to be disclosed, documented, and approved by the County staff **PRIOR** to any changes to the travel demand model. A copy of the model no-build and build scenarios are to be digitally provided to the County staff for review and approval. Appendix C provides an example table for documenting changes to the model.

4.2 Study Data- Data required by the study scope shall be collected in accordance with the methods listed in section 4.1 and 4.2.

A) Traffic Counts- The scope of work shall require new counts to be collected at each of the study intersections and/or study roadway segments. Locations for truck counts, when required, shall also be identified in the study scope.

Existing traffic count data provided by the County or data from other projects' approved traffic studies may be used if the count data is less than 2 years old and no significant project development has occurred in the surrounding area.

B) Pedestrian Counts- The study scope may require new pedestrian counts at identified intersections.

C) Other Data- The County may request or can provide other available data, including existing traffic signal timing data and crash data if needed. The preparer should request available data when the scope of work is finalized.

4.3 Intersection Analysis- Intersection analysis required by the study scope shall be in accordance with the methods listed in section below.

A) Intersections- The scope shall identify study intersections to be evaluated for potential traffic impacts, including all project access locations. At each identified study intersection, the report appendix shall include analysis worksheets that provide an average delay, Level of Service (LOS), v/c ratios, and 95th percentile Queue Lengths. At two-way stop-controlled intersections, the report appendix shall provide these parameters for the worst-case movements or study area/extent.

B) Signal Warrants- The report shall provide the peak-hour volume warrant for each unsignalized intersection having a deficient LOS for each scenario.

C) Turn Lane Storage- The report shall identify and disclose turn lane storage deficiencies at each study intersection where project traffic causes queues to exceed the available storage length or spill over into adjacent intersections, based on estimated 95th percentile queue lengths.

D) Closely Spaced Intersections- The analysis shall account for the interaction between individual intersections, saturated flow metering, and queue spillback between intersections.

4.4 Roadway Segment Analysis- Roadway segment analysis required by the study scope shall be in accordance with the methods listed in section below.

A) Roadways- The scope will require roadway segment LOS analysis to identify potential traffic impacts on study roadway segments. When roadway segment analysis is required, the scope shall also identify which analysis method is used.

B) Local Streets and Residential Collectors- For any type of development, the scope may require identification of local streets and residential collectors, internal and adjacent to the project, which is estimated to exceed the acceptable levels of traffic for these facilities, with the addition of project traffic. The scope may require recommendations to reduce these volumes mitigation may include intersection improvements such as additional project access routes, traffic calming, and other recommendations.

C) State Facilities- The scope may require freeway mainline, weaving, and/or ramp merge/diverge LOS analysis on affected state facilities.

D) Speed Survey- The scope may require a speed survey on identified roadway segments to determine the average and 85th percentile speeds using either radar or traffic hoses as specified in the scope.

E) Floating Car Runs- The scope may require floating car runs to determine the existing average travel speed and LOS along a corridor.

F) Cut Through Traffic- The scope may require a cordon license plate survey or another definitive data collection method to determine existing cut-through traffic.

4.5 Project Analysis- Project trips shall be determined in accordance with the methods listed in section 4.3.

A) Project Driveways and Access- The scope may require evaluation of each proposed project access point for safety of ingress and egress to include:

- ☑ Minimum sight distance requirements
- ☑ Turn lane configuration, minimum required throat depth, 95th percentile queue lengths, and disclosure of turn lane spill-over
- ☑ Shared driveways and access management (right-in / right-out, etc.)
- ☑ Impacts on other driveways and intersections

- ☑ Conformance for entrances and setbacks

A signal warrant analysis shall be provided for any new signal proposed at project access, according to the methodology described in section 4.3. When required in the scope, cumulative analysis of project driveways shall include the effect of traffic loading from the build-out of vacant properties that would take into account any future access, or directly opposite the project access points. The extent of the cumulative analysis is the discretion and direction of the County staff. County staff typically have historical or additional information on current activities influencing the County's mobility trends.

- B) On-site Parking and Circulation-** This is handled during the Site Plan Review Process. However, the scope may require a review of the adequacy of on-site parking and identification of impacts to off-site parking. It may also require an evaluation of on-site circulation, including truck loading and turning radii, based on the site design and types of vehicle identified in the scope.
- C) Drive-Thru Facilities-** The scope may require a queuing analysis for proposed onsite drive-thru facilities.
- D) Diverted Trips-** Trips that will be diverted from other roadways because of the proposed development shall be considered as new trips.
- E) Project Phasing-** The scope may require certain projects to complete a phasing analysis to relate potential traffic impacts to specific phases of the proposed project.

4.6 Other Analysis will be requested and the listing below is not limited to the following considerations.

- A) Bicycle and Pedestrian Facilities-** The scope may require determination of consistency with the *Parks, Trails and Open Space Master Plan* and identification of potential impacts to existing or planned bicycle and pedestrian facilities. The scope may require determination of pedestrian and bicycle generation and evaluation of on-site pedestrian and bicycle circulation.
- B) Transit-** The study shall identify all bus routes and potential stops within a ¼ mile of the project and evaluate pedestrian access routes from the project to the stops.
- C) Safety-** The scope may require a qualitative evaluation of potential traffic safety impacts caused by additional project traffic, design features or incompatible land uses. It may require recommendations for project improvements to address potentially increased hazards.
- D) Parks and Recreational Facilities**
- E) Historic Preservation**

F) Interjurisdictional and extra jurisdictional impacts/reviews

Review of the study by jurisdictions potentially impacted by the development shall be consistent with the regional efforts. Any comments received from the affected jurisdiction shall be addressed by the applicant, to the satisfaction of the County staff. If impacts on other jurisdictions are identified, such impacts shall be mitigated. The applicant shall be conditioned to enter into an agreement between the applicant (or its successors), the County and the affected jurisdiction. This agreement shall establish the manner in which the improvements will be made, timing of those improvements and the procedure for which funding shall be made by the applicant for the improvements.

G) Supplemental Documentation- The study scope may require other focused traffic analyses relative to the proposed development. Including traffic calming, safe routes to schools, emergency routes, traffic index for pavement sections, etc.

H) Identify Project Impacts

1. **Vehicle Miles Traveled (VMT) per Capita:** The project's incremental influence/contribution on countywide vehicle miles traveled per capita (VMT/capita). The project's incremental VMT/capita is determined by dividing the change in countywide VMT (with and without project) by the change in countywide service population (with and without the project) using the adopted Travel Demand Forecasting model.
2. **Vehicle Trip (VT) per Capita:** The project's incremental influence/contribution on countywide vehicle trips per capita (VT/capita). The project's incremental VT/capita is determined by dividing the change in countywide VT (with and without project) by the change in countywide service population (with or without the project) using the adopted Travel Demand Forecasting model.
3. **Bicycle and Transit Facilities:** Assess proximity and quality of bicycle and transit networks by estimating the project's change in percent of service population access within a ¼ mile of bicycle and transit facilities.
4. **Pedestrians Accessibility:** Estimate Project's change in countywide Pedestrian Accessibility such as Walkability Scores, counts etc.
5. **Trip Generation:** Estimate project's vehicular trip generation using the Trip Generation Manual, current edition, published by the Institute of Transportation Engineers as the primary document. Other trip production rates can be used if approved by the County. Any adjustments to standard rates, such as for special uses, mixed uses, high transit use, or pass-by trips must be approved by the County staff.

5. METHODS

In order to ensure the adequacy of traffic analysis, the TIA shall be based on the following data collection methods:

5.1 Data Collection Method

- A) Traffic Counts-** Turning movement counts for the weekday morning and evening peak hours shall be collected from 7:00 a.m. to 9:00 a.m. and from 4:00 p.m. to 6:00 p.m., respectively, at 15-minute intervals. Saturday mid-day counts shall be conducted from 11:00 a.m. to 1:00 p.m. at 15-minute intervals. Traffic counts for other time periods will be required if the peak hour trips for the project fall outside these time ranges. For example, schools, theaters, prisons, hospitals and religious institutions.

Weekday average vehicle counts should be conducted on Tuesdays, Wednesdays, and Thursdays in dry weather conditions.

Data shall not be collected during holidays, days immediately before or after holidays, or during the last two weeks in December. Data should not be collected during school spring break or summer break. Certain land uses with a justifiable exception must be approved during the scoping meeting or requested in writing. No traffic counts must be taken until the applicant receives formal written approval from the County.

Historical traffic counts may not be used if more than two years old. Professionally acceptable techniques should be used to address anomalies in the historical traffic counts.

5.2 Project Trip Generation Method

- A) Land Use-** Professional judgment should be used in determining appropriate land use categories from the current edition of *ITE Trip Generation*. When ITE data is not available or if it is inadequate for a specific project, other data sources may be acceptable. This includes the FDOT Trip Generation Supplemental, *ITE Journal* articles, or local trip generation rates based on a local trip generation study, following the procedures prescribed in *ITE Trip Generation*. Appropriate supporting information and pre-approval are required for the use of these other data sources.
- B) Trip Generation-** Trip generation for the proposed project and for all approved/pending projects shall be based on the latest edition of *ITE Trip Generation*, with the exceptions mentioned above in section 5.2 A. The time period selected should generally reflect peak travel periods on adjacent streets. The guidance provided in chapter three of the latest edition of *ITE Trip Generation Handbook* shall be used to determine the appropriate use of either the average rates or rates from the fitted curve equations given for each ITE land use.

On projects that include a comprehensive plan amendment, the potential trip generation for the existing land use, when required, shall be based on the average intensity allowed by the existing zoning for the project site.

C) Trip Reduction- Potential reductions in project trip generation may be considered when approved by the County in advance. Reductions to trip generation shall be based on the guidance provided in the latest edition of ITE's *Trip Generation Handbook*. The potential reductions are:

- 1) Existing project site trips may be deducted in the analysis if the trips are included in new traffic counts of existing conditions and the existing traffic distribution is similar to that of the proposed project.
- 2) Pass-by trip adjustments may be applied to commercial developments. Pass-by trips are existing trips which, when passing the site on an adjacent street with direct access to the site, are attracted to the project. The traffic impact study shall provide justification for reductions greater than 15%. Refer to the most recent edition of the ITE *Trip Generation Handbook* for pass-by percentages and adjustment methods. Analysis of turning movements at project access points generally shall include the pass-by trips.
- 3) Internal or captured trips are trips that do not enter or leave the driveways of a project within a mixed-use development's boundaries. Reductions greater than 5% require justification in the study. Refer to the most recent edition of the ITE *Trip Generation Handbook*.

D) Trip Distribution- Trip distribution assumptions are to be clearly stated in the report, including the distribution at all project access points. Directional trip distribution should be estimated based on the approved travel demand model, existing traffic patterns, market analysis, applied census data, and professional judgment. The trip distribution shall be presented for each phase if changes in roadway network, access, or land use are proposed. Final acceptance of the trip distribution assumption is subject to the approval of the County staff.

5.3 Traffic Forecast Method

The current version of the approved travel demand model shall be used as the basis for projecting future traffic volumes. Projections shall be based on the growth rates/increment or predictive methods (see the [Transportation Research Board National Cooperative Highway Research Program \(NCHRP\) Report 765](#)). Any **negative increments** shall be justified and explained. The report shall evaluate the land use assumptions and model roadway network in the study area and make adjustments, as necessary.

When the study scope requires a weekend analysis, the following method shall be used to forecast traffic:

1. Use the adopted travel demand model to develop weekday daily traffic growth factors for individual roadways (approach and departure).
2. Apply these weekday growth factors to existing weekend peak hour roadway counts to develop future weekend peak hour roadway volumes.
3. Convert the future weekend peak hour roadway volumes to intersection turning movements by applying the iterative method provided in NCHRP Report 765.
4. Future years and growth rates:

It is important to discuss during the Scoping meeting the analysis period of the TIA. Forecasted AADTs are used to estimate capabilities and deficiency of a roadway or facility to determine future needs. To calculate the future AADT the current year, the average growth /change rate and number of years to be forecasted must be identified at the scoping meeting. Typically, anything beyond a 20-year forecast the data are unreliable, debatable, and imprecise.

The County requires the analysis be conducted in 5-year increments to the build out year of the development. The exception is for those developments that will be completed within a year. If the development is to be completed between 1 year to 5 years , each year of future growth and analysis must be completed. Change rate is a key parameter in designing the capacity of a transportation facility to meet the growing demand in the region. Change rate factors are applied for AADT values counted in prior years that need to be adjusted up to current year. Typically, the segments in the subject area are grouped based on their change rates or assigned volume factor groups. In this way, multiple change rate groups with varying change rates will be identified. These groups include urbanized areas – central cities and older suburbs; urbanized areas – newer suburbs; rural and small urban interstate system; other rural; and other small urban. In developing change rates, AADT values of the most current year along with its preceding year are required.

The growth rates should first be derived from the adopted regional model. In the absence of modeling, local population, local counts and even permits and gasoline tax growth rates can be used. In any instance the growth rates must be discussed and approved by the County staff prior to conducting the traffic impact analysis. The County must approve the Applicant/preparer results of the future years forecasts with County staff before other traffic analysis efforts are conducted.

Additional reference:

https://www.fhwa.dot.gov/policyinformation/pubs/pl18027_traffic_data_pocket_guide.pdf

5.4 Level of Service (LOS) Standard- The minimum LOS standard to be used in the analysis shall be consistent with the County Comprehensive Plan.

- ☑ LOS “C”- for Downtown area.
- ☑ LOS “D”- for special districts.
- ☑ LOS “D”- for streets within the State highway system and interchanges.

For two-way stop-controlled intersections, the minimum LOS standard is LOS “C” for the worst-case movement.

If an existing State highway facility is operating at less than the appropriate target LOS, the project impacting state facilities will be subject to review by FDOT staff and County Staff.

6. ASSUMPTIONS AND ANALYSIS METHODS

A) Assumptions- The technical parameters shown in Table 3 shall be assumed in the analysis unless specified otherwise in the study scope:

TABLE 3

- *Analysis period 0.25 hr.*
- *Peak Hour Factor 0.92*
- *Flat Grade*
- *Heavy Vehicles- on state facilities, obtain the actual existing % heavy vehicles. Otherwise, assume 2% as provided in the HCM*
- *25 ft. assumed vehicle length for stacking and queues*
- *Cycle length- 80-sec min., 150-sec max. (optimize the signal timing)*
- *Coordinated Cycle Length- use the actual existing coordinated cycle length provided by the County or FDOT*
- *Total lost time per signal phase- 4 seconds (24-sec max. for 8-phase)*
- *Ideal saturation flow rate- 1,900 vph or 1,710 vph as provided in the HCM*
- *Pedestrian calls- 5 per hour*
- *Pedestrian Speed- 3.5 ft/s walking and 10 mph for bicycles*

B) Intersection Analysis- LOS analysis for signalized and stop-controlled intersections in the study area shall be based on the latest edition of the Highway Capacity Manual (HCM). The Operational Methodology of the HCM shall be used for signalized intersections. Roundabout intersections should be analyzed using SIDRA software.

C) Signal Warrants- Evaluation shall be based on the latest edition of the *Manual on Uniform Traffic Control Devices*.

D) Closely Spaced Intersections- Microsimulation using the average of multiple runs (minimum of 5) shall be used in evaluating the compound effects of closely spaced intersections. This is when the distance between intersections is less than 300 feet or

when the estimated 95% queue lengths exceed the distance between intersections. The distance between intersections does not include any area within the intersections themselves.

E) Urban Street and Roadway Segment Analysis-

1. For FDOT collectors, arterials, and expressways, the study scope shall identify one of the following analysis methods:

Method 1 is based on average travel speed and the methods presented in the HCM. This method is not intended for application to a short roadway segment. While this method determines the directional LOS for each individual segment along a roadway, only the over-all directional LOS shall be used for identifying project impacts. The results for individual segments along the overall roadway shall be provided for information only.

Method 2 uses the following peak hour service volume
<https://www.fdot.gov/planning/systems/documents/sm/default.shtm#los>

A LOS analysis of selected intersections shall evaluate one-way streets.

2. For local roads access and livability are of primary importance. A capacity-based LOS analysis is not appropriate for evaluating project impacts. The County Engineer and Planning Director will work with the preparer of the TIA to ensure the proper street classification is identified.

F) Project Access- Minimum sight distances shall be in accordance with latest version of the Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways (commonly known as the Florida's Greenbook).

G) State Facilities- State facilities included in the study scope shall be analyzed using methods consistent with the latest version of the FDOT Site Impact Handbook. Highway weaving analysis shall be consistent with the *Highway Design Manual* methodology. Ramp merge and ramp diverge analysis shall be in accordance with the latest HCM methodology.

H) Multiple TIA Consistency- When two separate TIA reports are prepared concurrently by different consultants and they each study the same unsignalized intersection, the two analyses of that intersection shall be consistent and directly comparable. HCS software shall be used to analyze the overlapping unsignalized intersection in this case. TIA reports by different consultants that do not overlap may use any HCM based analysis software.

7. SIGNIFICANT IMPACT AND MITIGATION THRESHOLDS

A nexus exists between a proposed development and significant traffic impact when the development causes any of the following thresholds to be exceeded in any scenario:

7.1 Signalized Intersections

- ☑ The project causes an acceptable LOS to decline to an unacceptable LOS, or
- ☑ The project increases the average delay by more than 5 seconds per vehicle at an intersection having an unacceptable LOS without project traffic

7.2 All-Way Stop Intersections

- ☑ The project causes an acceptable LOS to decline to an unacceptable LOS, or
- ☑ The project increases the overall average delay by more than 5 seconds per vehicle at an intersection that has an unacceptable LOS without the project and the intersection also meets the peak hour volume signal warrant

7.3 Two-Way Stop Intersections

The project causes the following to occur for the worst-case movement:

- ☑ The LOS declines to an unacceptable LOS, and
- ☑ The volume to capacity ratio exceeds 0.75, and
- ☑ The 95th percentile queue exceeds 75 feet (3 vehicles), or
- ☑ The project causes the worst-case movement's acceptable LOS to decline to an unacceptable LOS and the peak hour volume signal warrant is met, or
- ☑ The project increases the average delay for the worst-case movement by more than 5 seconds per vehicle at an intersection that has an unacceptable LOS without the project and the intersection also meets the peak hour volume signal warrant

7.4 Roadways

- ☑ The project causes an acceptable LOS to decline to an unacceptable LOS, or
- ☑ The project causes the V/C ratio to increase by more than 0.05 on a roadway having an unacceptable LOS without project traffic

7.5 Site Access

- ☑ The project causes traffic at site access points to interfere with traffic flow on public streets

7.6 Bicycles and Pedestrians

- ☑ The project adversely affects an existing bikeway or pedestrian facility, or
- ☑ The project interferes with the implementation of a planned bikeway as shown in the Parks, Trails and Recreation & Open Space plans

8. RECOMMENDED PROJECT MITIGATION

The report shall make feasible recommendations that reduce the project's significant impacts to a less-than-significant level. The report shall clearly identify responsibility for implementing each recommendation, as provided below. The timing for implementation of specific recommendations shall be identified in the report, either by estimated year or by development threshold.

The report shall provide LOS analysis of recommended project mitigations and shall summarize the results in a map figure of the study area. An example of the Mitigation Map Figure is provided in Appendix E.

8.1 Impacts in Existing plus Project Conditions-

It is the project's responsibility to install the project's recommended improvements at the time of development in order to mitigate impacts to a less-than-significant level. The project is 100% responsible for these improvements.

8.2 Complete Streets/Context Sensitive measures-

The County staff and Applicant/preparer will incorporate context sensitive solutions and may include the measures listed below.

- Curb Extensions
- Pedestrian and bike traffic signal upgrades/enhancements
- Turn-restrictions
- Neighborhood gateways (raised medians)
- Traffic circles
- Traffic calming devices (speed bumps/humps)
- Signal metering
- Pedestrian lighting to and from major transit stops
- Pedestrian and Bike Traffic signal upgrades/enhancements
- Installation of non-vehicular improvements at studied intersections

8.3 Analysis of Recommended Project Mitigations-

The study shall provide LOS analysis of recommended project mitigations. The study scope may also require:

- The cumulative percentage for improvements, based on the County's approved methodology
- A preliminary cost estimate for improvements
- A schematic scaled drawing or a preliminary design to show the feasibility of the recommended mitigations and geometric improvements, including the right of way needs for significantly impacted facilities

8.4 Impacts in Cumulative Conditions-

- A. If the project's mobility fee of a cumulative impact is 25 percent or more, then the recommended improvements shall be installed at the time of development, subject to a reimbursement agreement. If the recommended improvement is included in the current list of mobility plan projects, reimbursement will be in the form of either credit or payment from the impact fee.

- B. If the project's mobility fee of a cumulative impact is less than 25 percent, then the project will be required to pay its impact fee of the cost of the improvements to be constructed later by others, prior to the realization of the impact. If the recommended improvement is included in the current list of mobility plan projects, then payment of the project's fee will be considered mitigation for the impact.

Proposed Geometric Features

1) Immediate Access Design

New accesses should be designed to County standards. New accesses and changes in access onto State Highways must be approved by the County Utilities and Permits Unit.

2) Left and Right Turn Lane Warrant Analyses

Left-turn lane warrants and design considerations should be checked for un-signalized intersections. Reference: Green Book

3) Queuing Length Analysis

The Traffic Impact Study should perform a Queuing Analysis in all scenarios assuming vehicle length of 25 feet and 95% percentile queue length.

4) Storage lengths

The Traffic Impact Study should check all scenarios—"storage lengths vs. length of queue" and propose mitigation to cure any deficiency.

5) Merging, Acceleration, and Deceleration lanes

The Traffic Impact Study should address, particularly on high speed roads, the need for Merging, Acceleration and/or Deceleration Lanes. Any, addition or modification to these lanes, shall be supported with an analysis of the impact that their modification or addition has on the corridor.

6) Signing and Pavement Marking

The Traffic Impact Study should investigate if the subject development will require modifications and/or additions to the existing roadway signs and pavement markings. Should the subject project so require, the Traffic Impact Study should include an Existing Signing and Marking Survey and conform to the Manual of Uniform Traffic Control Devices latest edition, for code reference and for the design of the proposed addition and or modification.

Sight Distance

The Traffic Impact Study should address sight distance issues, implement at least a minimum standard-compliance and resolve sight distance issues with clearly feasible improvements, if needed.

1) Transit Facilities

The Traffic Impact Study should indicate the existence of, the need-for or the modification-to the following facilities. The following list is not all-encompassing and are examples. Other needs can be discussed at the scoping meeting.

- Stops
- Route modification
- Routes
- Bus shelters
- Signs
- Pull-offs, etc.

2) Non-motorized transportation facilities

The Traffic Impact Study should indicate the existence-of, the need for or the modification to the following facilities:

- Sidewalks
- Crosswalks
- Bicycle lanes, etc.
- Shared use paths
- Other facilities

3) Bike/Pedestrian Network versus Proper Roadway Geometry

The Traffic Impact Study should address proper roadway geometry to safely accommodate pedestrian and bicycle traffic on the site and adjacent to the site, as well as to the general connectivity of the site to the public network. The quality and completeness of the bicycle and pedestrian network should be addressed and approved by the County.

Appendices

- A) Example Study Format
- B) Standard Scoping Form
- C) Traffic Model Changes
- D) Example Impact Summary Tables
- E) Example Mitigation Map Figure
- F) Preliminary Review Form

Appendix A- Example of Study Format

The content and scope of Traffic Impact Analysis (TIA) reports will vary with the needs of each project. As determined in the scope of the TIA, the following information should be included in the report:

1. Cover sheet including name and location of the project, developer name and address, preparer signature, and date
2. Table of Contents, including a list of Figures and Tables
3. Executive Summary: a brief stand-alone summary of the study findings, including a description of the project, study scope, and recommended project improvements. The executive summary includes “Impact Summary Tables” and a “Mitigation Map Figure,” as provided in Appendix D & E.
4. Introduction, purpose, and scope
5. Description of the proposed development including:
 - ☑ Location map showing study area land use and streets
 - ☑ Site plan showing internal circulation, parking, driveways, access locations
 - ☑ Proposed uses with existing and proposed zoning requirements
 - ☑ Phasing plan including proposed dates of project phase completion
6. Setting: Describe the existing roadway system within and around the project area; describe the programmed roadway improvements; describe location and routes of nearby public transit service; describe location and routes of the nearest bicycle and pedestrian facilities serving the project. Provide maps.
7. References to other related traffic impact studies
8. Clearly stated assumptions and thresholds of significance
9. Analysis of Existing Conditions:
 - ☑ Land use / Zoning, study intersections, and roadway segments
 - ☑ Lane geometry, daily volumes and peak hour turning movements
 - ☑ Level of Service (LOS)
 - ☑ Signal warrants; signal phasing and coordination
 - ☑ Queue analysis

- ☑ Collision history and collision rate analysis
- ☑ On-Street Parking
- ☑ Pedestrian & Bicycle Facilities and counts, and Transit Services

10. Trip Generation and Distribution

11. Analysis of Project Only Conditions:

- ☑ Project access, on-site circulation, and parking
- ☑ Trip Generation table showing rates and clearly showing any trip discounts
- ☑ Trip distribution percentages figure
- ☑ Project trip assignment figure showing project-only trips at all study intersections, roadway segments, and project driveways.

12. Analysis of Existing + Project Conditions:

- ☑ Daily volumes and peak hour turning movements
- ☑ Level of Service (with and without recommended project improvements)
- ☑ Signal warrants
- ☑ Queue analysis (with and without recommended project improvements)
- ☑ Qualitative Traffic Safety

13. Traffic forecast

14. Analysis of Cumulative Conditions without the project:

- ☑ Daily volumes and peak hour turning movements
- ☑ Level of Service
- ☑ Signal warrants
- ☑ Queue analysis

15. Analysis of Cumulative Conditions with the project:

- ☑ Daily volumes and peak hour turning movements
- ☑ Level of Service (with and without recommended project improvements)
- ☑ Signal warrants

- ☑ Queue analysis (with and without recommended project improvements)
- ☑ Qualitative Traffic Safety

16. Transit, bicycle, and pedestrian Analysis

17. Traffic Impacts and Recommended Project Improvements:

- ☑ Summary table of daily and peak hour LOS, with and without project improvements
- ☑ Findings for short term and cumulative impacts and special analysis
- ☑ Responsibility for mitigation of short term and cumulative impacts
- ☑ Mitigation measure phasing plan
- ☑ The project's mobility impact and fee
- ☑ Cost estimates for mitigation and financing plan
- ☑ Map or aerial photo identifying proposed improvements

18. Technical Appendices:

- ☑ Detailed worksheets for all LOS analysis (including project improvements), Signal Warrants, Queuing analysis calculations, and Fair share calculations
- ☑ Raw traffic count data
- ☑ Crash data
- ☑ Other back-up data
- ☑ Travel Demand output and network

19. Final TIA report and all appendices provided in electronic format, including both PDF and native file formats, as specified in the scope.

Scope for Traffic Impact Analysis

Date: _____ Application No.: _____ Project Name:

Developer: _____

Traffic Consultant: _____

Traffic Impact Analysis for the above listed project shall encompass this scope, in accordance with the County’s Traffic Impact Analysis Guidelines.

1 General Information and Assumptions

A. Study Area Limits and map: _____

B. Scenarios to be studied (check if applicable):

- Existing (Year: _____)
- Project Only
- Existing + Proposed Project

Either:

- Cumulative (Existing + Approved/Pending Project List)
- Cumulative (Existing + Approved/Pending Project List + Proposed Project)

Or:

- Cumulative (County Travel Demand Model without Project)

- Cumulative (Travel Demand Model + Proposed Project)
- Assumed Cumulative Model Year: __

C. Approved and Pending Projects List:

D. Analysis Periods (check if applicable):

- Weekday AM peak hour
- Weekday PM peak hour
- Weekday Mid-day peak hour
- Saturday mid-day peak
- Sunday mid-day peak hour
- Other: _____

E. Comprehensive Plan Amendment (check if applicable):

Provide analysis based on the existing land use, assuming average intensity, in addition to analysis based on the proposed new land use with the project.

F. Programmed Transportation Improvements

G. Forecast Approval: Project trip generation, reductions, distribution, and any traffic model changes shall be submitted for pre-approval prior to submitting the draft traffic report, consistent with sections 4.2 and 4.3 of the Traffic Impact Analysis Guidelines.

H. Assumed Year of Project Completion: _____

I. Assumed Project Phasing (units/phase and years):

J. Technical Assumptions: The technical parameters shown [insert reference or copy] of the Traffic Impact Analysis Guidelines shall be assumed in the analysis unless specified otherwise:

2 Study Data Requirements

A. Data Collection (check if applicable):

- Peak hour turning movements at study intersections
- Directional daily traffic on study roadway segments

Truck Counts- location(s): _____ Pedestrian counts- location(s): _____ Speed Survey- location(s): _____

Radar Tube Camera

Floating car runs- arterial segment(s): _____

License plate survey for cut-through traffic location(s): _____

Determine actual grade(s) location(s): _____

- Other Data Collection: _____

B. Recent/Available Traffic Studies and Data:

3 Intersection Analysis

Study Intersections:

Q- Designates locations, where Queuing and turn lane storage analysis, is required.

T- Designates locations where Truck counts are required in addition to total counts.

4 Roadway Segments

Study Roadway Segments:

- | | | |
|----|-------------|-----------|
| 1) | from: _____ | to: _____ |
| 2) | from: _____ | to: _____ |
| 3) | from: _____ | to: _____ |
| 4) | from: _____ | to: _____ |

5 Project Analysis Elements

A. Project Driveways, Access, and on-site circulation (check if applicable):

For All Projects:

- Project Only Trips
- LOS analysis of each recommended project mitigation
- Impact analysis for each development phase of the project

For Projects with Driveway Access:

- Minimum sight distance requirements at project driveways
- Project Access Queue and LOS, including:
 - Minimum required throat depth at project driveways
 - 95th percentile queue lengths at driveways and turn lane spill-over
 - Conformance to County policy/code/regulations entrances and setbacks
 - Review for shared driveways and access management (right-in / right-out, etc.)

- ☑ Impacts on other driveways and intersections
- ☑ On-site parking and circulation
- ☑ Signal warrant analysis (MUTCD) for any new signal proposed at a project access
- ☑ Evaluate the adequacy of on-site parking and identify impacts to off-site parking
- ☑ Evaluate on-site circulation, including truck loading and turning radii Design Vehicle
- ☑ Queuing analysis of on-site drive-thru facilities

B. Traffic Analysis (circle if applicable):

- ☑ Intersection Level of Service (LOS)
- ☑ Closely spaced intersection analysis
- ☑ Queue analysis)
 - ☑ Signal warrants (MUTCD)
 - ☑ Roadway segment analysis:
 - ☑ Peak Hour Volume method, or
 - ☑ HCM method
 - ☑ Identify Local Residential Streets internal or adjacent to the project estimated to exceed acceptable traffic levels and make
 - ☑ Recommendations
 - ☑ Coordinated corridor analysis
 - ☑ Average and 85th percentile speeds
 - ☑ Drive-thru queuing analysis
 - ☑ Collision history and rate analysis
 - ☑ On-Street Parking
 - ☑ Road LOS:_____
 - ☑ Cumulative fair share calculation
 - ☑ Traffic calming recommendations
 - ☑ Cost estimates for mitigation
 - ☑ The financing plan for improvements
 - ☑ Weaving section LOS location(s):_____
 - ☑ Ramp merge and diverge LOS:
 - ☑ Ramp Meter Analysis:_____

6 Other Analysis Elements

A. Other Analysis (circle if applicable):

- Transit Services within ¼ mile and pedestrian access routes
- Preliminary design to demonstrate feasibility of proposed mitigation(s)
- Existing and planned Pedestrian & Bicycle Facilities: Bike Plan consistency, onsite circulation, trip generation, and potential impacts
- Qualitative evaluation of traffic safety related to the addition of project traffic
- Recommendations for Safe Routes to School
- Other Analysis:

7 Submittal Requirements

A. Draft TIA document:

- Number of bound copies _____
- Copies of Study Appendix, including calculation worksheets
- Travel Demand model files

B. Final TIA document (check if applicable):

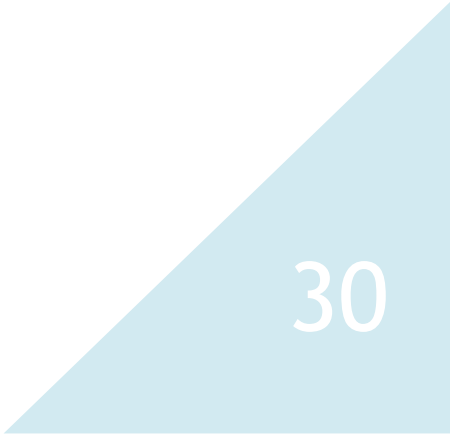
- Number of bound copies _____
- Electronic report and Appendices, including PDF and native file formats:
 - CD, or
 - Preparer's FTP site, or
 - Email to: _____

▪ Other: _____

Persons and Agencies present during project scoping:

SIGNED: _____ Date: _____
Applicant or Consultant

SIGNED: _____ Date: _____
County Representative



Appendix C Traffic Model Changes

The regional travel demand model is an activity-based model and is not a conventional travel demand forecasting model similar in structure to most current area-wide models used for traffic forecasting. The model uses land use, socioeconomic, and road network data to estimate travel patterns, roadway traffic volumes, and transit volumes at a parcel level.

Traffic Impact Studies which make use of the adopted travel demand model and shall provide documentation of the use and modifications to the model files, similar to the following:

1. Model Files Provided: The model runs used in this study are based on “Version month year” of the Travel Demand Model as provided by the adopting authority.

2. Model Revisions: The model files were revised to create these new scenarios:

- ☑ Existing + approve/pending projects + project
- ☑ Cumulative 2040 + project

Modifications to the model files affected only the project area. No modifications were made outside of the immediate project area.

3. Road Network Revisions: The travel model uses coded representations of the region’s existing and future roadway networks. A “master network” was developed for the LRTP update of the model. The master network contains information on the years that various road improvement projects are programmed for implementation. The master network can be used to generate the model road network for any study year.

Changes to the Master Network:

Changes to a specific Scenario Network:

- 4. Traffic Analysis Zone (TAZ) and Parcel Revisions:** The Traffic Analysis Zones (TAZ) assigned to the project area were reallocated to best represent the proposed site layouts

5. Land Use Revisions: Land use assumptions are contained in the land use database stored a database in GIS format. The workbook produces the trip generation inputs to the model. The land use inputs for TAZs within the project area were modified to represent the land uses that are proposed as part of the proposed project.

The following changes were made to the Land Use Database

6. Other Revisions:

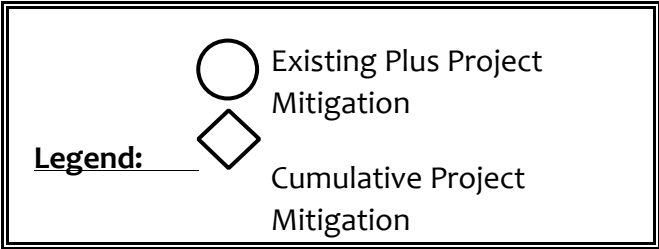
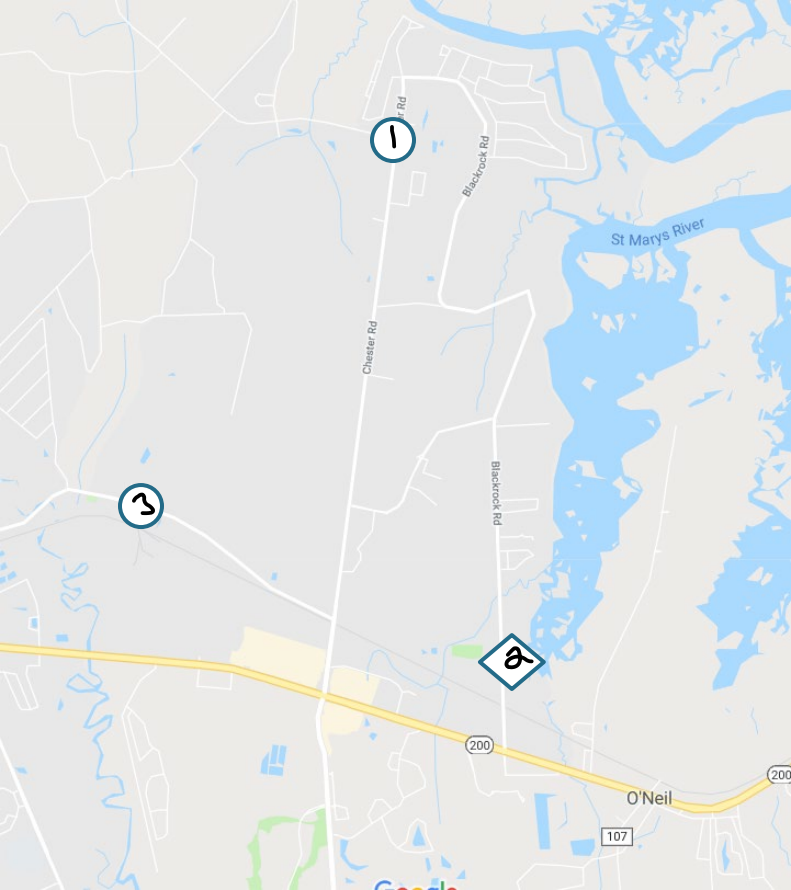
Reallocation of Local Intersection Volumes. The traffic model often aggregates multiple individual lands uses into larger traffic analysis zones that are represented as single points. As a result, all traffic to and from each land use within a zone is assumed to use the identical routes when the reality is that traffic will follow more specific local access routes to logically arrive at a specific destination within the zone. The following manual reassignments were made to correct for aggregation of trips within a TAZ:

Roadway Impact Summary Example

		1		2		3		4	
		Road		Segment		Segment		Segment	
Target LOS		C		C		C		C	
Arterial Class		II		III		II		II	
Posted Speed Limit		40		35		45		45	
Direction	Peak Hr.	Eastbound	Westbound	Northbound	Southbound	Eastbound	Westbound	Northbound	Southbound
Roadway Operations		Speed LOS	Speed LOS	Speed LOS	Speed LOS	Speed LOS	Speed LOS	Speed LOS	Speed LOS
Existing	AM PM	37.6 A 37.5 A	37.1 A 37.1 A	37.6 A 37.5 A	37.1 A 37.1 A	37.6 A 37.5 A	37.1 A 37.1 A	37.6 A 37.1 A	37.1 A 37.1 A
Existing Plus Project	AM PM	34.7 B 37.5 A	34.3 B 37.2 A	34.7 A 37.5 A	34.3 A 37.2 A	34.7 B 37.5 A	34.3 B 37.2 A	34.7 B 37.5 A	34.3 B 37.2 A
Cumulative without Project	AM PM	31.4 B 34.6 B	31.1 B 34.2 B	31.4 A 34.6 A	31.1 A 34.2 A	21.0 D 20.7 D	31.1 B 34.2 B	31.4 B 34.6 B	31.1 B 34.2 B
Cumulative Plus Project	AM PM	23.4 C 33.4 B	23.1 C 33.1 B	23.4 C 27.9 B	23.1 C 28.7 B	18.0 D 18.3 D	23.1 C 33.1 B	23.4 C 33.4 B	23.1 C 33.1 B

Appendix E- Example Mitigation Map Figure

Example Mitigation Map



Appendix F Preliminary Review Form

Date: _____

Application No.: _____

Project Name: _____

Project Description: _____

Developer: _____

Traffic Consultant: _____

The draft Traffic Impact Analysis report for the above listed project shall be prepared in consistent with the study scope, in accordance with the County's Traffic Impact Analysis Guidelines.

Preliminary Review Checklist:

	<u>Consistency with Scope and Guidelines</u>	
1. Executive Summary	<input type="checkbox"/> OK	<input type="checkbox"/> Needs Revision*
2. Executive Summary Tables	<input type="checkbox"/> OK	<input type="checkbox"/> Needs Revision*
3. Project Site Plan	<input type="checkbox"/> OK	<input type="checkbox"/> Needs Revision*
4. Scenarios	<input type="checkbox"/> OK	<input type="checkbox"/> Needs Revision*
5. Approved / Pending Project List	<input type="checkbox"/> OK	<input type="checkbox"/> Needs Revision*
6. Analysis Periods	<input type="checkbox"/> OK	<input type="checkbox"/> Needs Revision*
7. Technical Parameters	<input type="checkbox"/> OK	<input type="checkbox"/> Needs Revision*
8. Existing Lane Configurations	<input type="checkbox"/> OK	<input type="checkbox"/> Needs Revision*
9. Existing Road Network	<input type="checkbox"/> OK	<input type="checkbox"/> Needs Revision*
10. Intersection Analysis	<input type="checkbox"/> OK	<input type="checkbox"/> Needs Revision*
11. Roadway Segment Analysis	<input type="checkbox"/> OK	<input type="checkbox"/> Needs Revision*
12. Project Trip Generation	<input type="checkbox"/> OK	<input type="checkbox"/> Needs Revision*
13. Project Trip Reductions	<input type="checkbox"/> OK	<input type="checkbox"/> Needs Revision*
14. Project Trip Distribution	<input type="checkbox"/> OK	<input type="checkbox"/> Needs Revision*
15. Approved/Pending Trip Generation	<input type="checkbox"/> OK	<input type="checkbox"/> Needs Revision*
16. Approved/Pending Reductions	<input type="checkbox"/> OK	<input type="checkbox"/> Needs Revision*

17. Approved/Pending Distribution	<input type="checkbox"/> OK	<input type="checkbox"/> Needs Revision*
18. Project Only Trip Figure	<input type="checkbox"/> OK	<input type="checkbox"/> Needs Revision*
19. Significance Threshold	<input type="checkbox"/> OK	<input type="checkbox"/> Needs Revision*
20. Project Access Ques & LOS	<input type="checkbox"/> OK	<input type="checkbox"/> Needs Revision*
21. On-site drive-thru Ques	<input type="checkbox"/> OK	<input type="checkbox"/> Needs Revision*
22. Intersection LOS	<input type="checkbox"/> OK	<input type="checkbox"/> Needs Revision*
23. Roadway Segment LOS method	<input type="checkbox"/> OK	<input type="checkbox"/> Needs Revision*
24. Fair Share Calculation	<input type="checkbox"/> OK	<input type="checkbox"/> Needs Revision*
25. Traffic Calming Recommendation	<input type="checkbox"/> OK	<input type="checkbox"/> Needs Revision*
26. Potential Impacts Identified	<input type="checkbox"/> OK	<input type="checkbox"/> Needs Revision*
27. Appropriate and adequate mitigation	<input type="checkbox"/> OK	<input type="checkbox"/> Needs Revision*
28. Responsibility for mitigation	<input type="checkbox"/> OK	<input type="checkbox"/> Needs Revision*
29. Appendix included	<input type="checkbox"/> OK	<input type="checkbox"/> Needs Revision*
30. Other	<input type="checkbox"/> OK	<input type="checkbox"/> Needs Revision*

* See separate list for details of needed revisions.