St. Lucie Transportation Planning Organization

Coco Vista Centre
466 SW Port St. Lucie Blvd, Suite 111
Port St. Lucie, Florida 34953
772-462-1593 ww.stlucietpo.org

STANDARDIZED TRANSPORTATION IMPACT STUDIES (TIS) METHODOLOGY AND PROCEDURES

ST. LUCIE COUNTY
CITY OF FORT PIERCE
CITY OF PORT ST. LUCIE

<u>Adopted</u>
January 2014

<u>Updated</u>
June 2016
August 2023

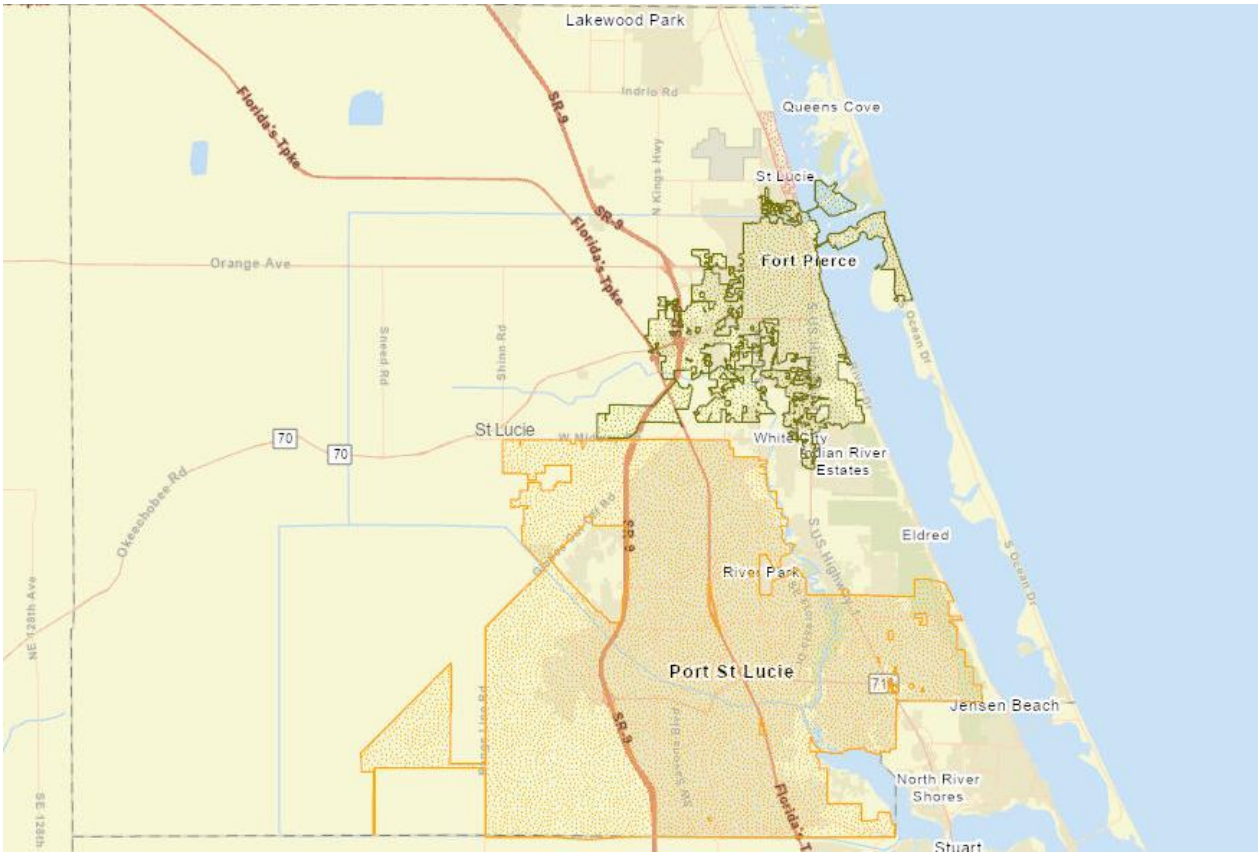
TABLE OF CONTENTS

APPENDICES

1.0 PURPOSE AND APPLICABILITY

The purpose of the Standardized Transportation Impact Studies (TIS) Methodology and Procedures is to provide a generally uniform methodology for identifying potential transportation impacts of new development and redevelopment on the multimodal transportation system, including roads, transit, bicycle, and pedestrian facilities, and developing mitigation strategies to offset those impacts. However, the need to perform a TIS, the timing for its completion, and the type of submittal (i.e. hard copy, digital, etc.) will be determined in accordance with the applicable local government requirements and provisions.

Any reference to the "Local Government" in these guidelines shall mean the City of Ft. Pierce, City of Port St. Lucie, St. Lucie County, the St. Lucie Transportation Planning Organization (TPO), their consultants, sub-consultants, contractors, or employees, as applicable. The boundaries of the Local Governments are depicted in the following map:



Any reference to the "Applicant" in these guidelines shall mean the person or party making application to the Local Government, to include the Applicant's consultants, sub-consultants, and contractors. The TIS shall be signed and sealed by a professional engineer licensed to practice in Florida.

Unless otherwise agreed to in an approved Methodology Statement, the procedures of this unified methodology document shall be followed.

A project impact is de minimis for transportation concurrency purposes if it would not affect more than 1 percent of the maximum volume at the adopted level of service of the affected transportation facility.

A Glossary of the terms used in the TIS is provided in Appendix A.

2.0 METHODOLOGY STATEMENT

Prior to conducting any study, a Methodology Statement shall be prepared by the Applicant and submitted to the Local Government for review and approval. The purpose of the Methodology Statement is to establish agreed upon methodologies and assumptions prior to the start of the study. The methodology shall address the following minimum elements:

- Description of land uses, site location, build-out schedule, and phasing
- Preliminary site plan
- Trip Generation
- Internal Capture
- Background Traffic Growth Procedure
- Distribution and Assignment
- Committed Network

It shall be the Applicant's responsibility to ensure that a transportation study is not prepared or submitted without a Methodology Statement approved by the Local Government.

3.0 IMPACTED ROADWAYS/INTERSECTIONS

At a minimum, all transportation facilities within the area of influence as defined by Appendix B shall be analyzed in the TIS. In addition, the following impacted roadway segments and intersections shall be analyzed in the TIS:

A. Any Major Road Segment on which the two-way peak-hour project traffic consumes 5 (five) percent or more of the existing or committed two-way peak-hour service capacity,

B. Any Road Segment to which development traffic makes its first connection to the Major Road Network, provided the development traffic consumes one percent or more of the existing or committed two-way peak-hour service capacity,

C. If the development has no direct connection to the Major Road Network, the intersections of the local/non-major roads (that provides access to the development) with the Major Road Network shall be analyzed, and

D. Major Intersections that are part of the impacted roadways.

To determine whether peak-hour development traffic consumes one or five percent or more of the existing service capacity of a road, the generalized roadway service volumes from the latest version of the Generalized Service Volumes tables of the Florida Department of Transportation (FDOT) shall be used or the peak hour service capacity as indicated on the latest version of the TPO's level of service report, whichever is lower. Roadway functional classification shall be based on the St. Lucie TPO's Federal Functional Classification Map and, for roads that are not contained on the map, it shall be based on the Local Government's Comprehensive Plan and any other roadways identified by the local governments.

4.0 ANALYSIS SCENARIOS

The Applicant shall be required to provide an analysis of the following scenarios:

A. **Existing scenario** is defined as the analysis of existing traffic on the Existing Network.

B. **Future background scenario** is defined as the analysis of existing traffic plus background traffic on the committed network which includes the projects programmed for construction in the Capital Improvements Program (CIP) of the local governments and Transportation Improvement Program (TIP) of the TPO.

C. **Future background scenario with mitigation** is defined as the analysis of existing traffic plus background traffic on the committed network with the inclusion of the minimum improvements that are required to restore a facility to its adopted level of service standard.

D. **Future buildout scenario** is defined as analysis of existing traffic, plus background traffic, plus project traffic on the committed network. This includes any mitigation improvements identified in Analysis Scenario 4c.

E. **Future Scenario with mitigation** is defined as analysis of existing traffic, plus background traffic, plus project traffic on the committed network with the inclusion of any other improvements (if needed) that are required to restore a facility to its adopted level of service standard.

Detailed definitions of the analysis scenarios are included in the Glossary of Terms in Appendix A.

5.0 GENERAL ANALYSIS REQUIREMENTS

A Level of Service (LOS) analysis shall be undertaken for all impacted roadways and intersections (as listed in Section 3 of this document) in accordance with the procedures below:

A. Detailed capacity and turn-lane length analyses shall be undertaken for site driveway connections to that facility and/or of the local street providing site traffic access to that Major Road facility.

B. Turn-lane length analysis shall be required for all turn lanes where project traffic exists at each of the intersections within the study area.

C. All signalized intersections and major unsignalized intersections within the study area shall be analyzed according to the following:

    1 Peak-hour factor (PHF), not to exceed 0.95 for the future conditions analysis

    2. The existing signal timing, including its maximum and minimum settings, shall be used for the initial analysis of future conditions. Any signal timing changes outside of the existing minimum and maximum setting may be presented for local agency approval as part of the mitigation strategy.

    3. Truck factors for each lane group should reflect existing conditions. If a portion of the proposed development includes industrial uses, then truck factors shall be recalculated for movements where project trips are present.

D. When the FDOT generalized roadway service volume tables are used, the following information shall be provided for each facility in a separate table:

    - Class of roadway (interrupted or uninterrupted)
    - Maintenance jurisdiction (city, county, or state-maintained)
    - Area type
    - Posted speed
    - LOS standard

E. Other parameters that govern the roadway/intersection capacity analysis shall be based on the parameters described in the latest version of the *Highway Capacity Manual*.

F. Where driveway movements are restricted (e.g. right-in/right-out driveways), the necessary U-turn movements and project traffic added at the upstream and downstream median openings or intersections should be identified and analyzed.

In addition to the requirements of Sub-sections (a) through (f) above, the Local Government may require the inclusion of proposed or anticipated traffic signals in the future year condition that may not exist in the "existing condition", including signals at development entrances.

6.0 SOFTWARE

Use of analysis software shall be discussed and agreed to during the Methodology phase. The Applicant shall provide an electronic copy of the analysis files as well as a hard copy of the summary sheets, unless an electronic from is requested by the Local Government. Preferred analysis software is listed below:

A. For unsignalized intersections, the Highway Capacity Software (HCS) or Synchro utilizing HCM methodologies is the preferred software for analyzing delay and LOS.

B. For signalized intersections, the use of the Highway Capacity Software is considered acceptable; however, the latest version of Synchro software using the latest HCM methodology is preferred.

C. For interrupted flow road segment (i.e. signalized roadways) analysis, the preferred software is the latest version of Synchro, and for roundabout analysis, the preferred software is the latest version of SIDRA.

D. For uninterrupted flow roads (those with more than two-mile signal spacing) the latest version of FDOT's HighPlan software may be used.

E. Other analysis software may be required by the Local Government to address situations not addressed by the above provisions, or if requested by the Applicant and approved by the Local Government during the Methodology Statement in Section 2 of this guideline.

Additional information regarding analysis requirements and software is provided in Appendix C.

7.0 TRIP GENERATION

Trips from/to the site shall be estimated using the latest Institute of Transportation Engineers (ITE) *Trip Generation Manual*, including separate trip generation estimates for interim traffic-generating uses. Other trip rates may be required by the Local Government or may be used if requested by the Applicant and approved by the Local Government during the Methodology Statement process (Section 2 of this document).

The use of any prior vested trips is subject to the approval of the Local Governments within the Study Area. The use of committed trips shall be subject to the approval of the Local Governments.

8.0 INTERNAL CAPTURE

Internal capture estimates shall be based on acceptable methodologies contained in the most current *ITE Handbook*, or, where the ITE data is not applicable, professional judgment should be applied. In no case will an internal capture of more than 20 percent (20%) of the gross project trip ends be allowed, unless the Local Governments within the Study Area accepts a higher internal-capture percentage based on verifiable documentation (e.g. field studies of comparable sites).

9.0 PASS-BY CAPTURE

The total gross external trips of the project traffic may be reduced by a passer-by factor to account for traffic that is already traveling on the adjacent roadway and once the project is constructed it will stop by the project on their way from an origin to a primary destination. Such factor shall be based on ITE acceptable methodologies and percentages.

In no event shall the total number of passer-by trips (i.e. entering plus exiting the site) exceed 10 percent of the total background traffic on the adjacent roadway. In analysis of the site-access intersections with major roads, the passer-by trips shall be included and separately identified.

In cases where median controls limit left-in/left-out access to the site, traffic on the "far side" of the road can be considered in assessing the upper limit of captured trips; however, the effects of that traffic in the associated necessary U-turns and added flow at the upstream and downstream median openings or intersections shall be identified as development traffic at those locations.

In accordance with the FDOT Transportation Site Impact Handbook, the passer-by capture percentage shall be computed as the total number of trips entering and exiting the site that is claimed as captured divided by the number of background trips passing by the site on major roads directly abutting or passing through the site. An example of this computation is provided in Appendix D.

10.0 DISTRIBUTION AND ASSIGNMENT

Manual trip distribution and assignment is acceptable for use as long as they are reviewed and accepted by the Local Government and logically replicates the existing and future travel patterns.

The latest adopted Greater Treasure Coast Regional Planning Model (GTCRPM) is also acceptable in determining the trip distribution percentages and trip assignments, especially when TIS is being performed for sizable developments and for multi-land use developments or when the buildout year is anticipated to be greater than five years. The results of the model will be reviewed by the Local Government for reasonableness and to ensure that existing and future travel patterns are correctly

simulated. Any changes to the GTCRPM made by the Applicant in determining the trip distribution percentages and trip assignments must be reviewed and approved by the St. Lucie TPO.

11.0 TRAFFIC COUNTS

All traffic counts shall be obtained from the most recent TPO Traffic Counts and Level of Service Report. If bicycle and pedestrian counts within the study area are requested by the Local Government, such counts shall be collected in accordance with general industry standards approved by the Local Government except for intersection turning movement counts and other traffic counts requested by the Local Governments which shall be conducted in accordance with Appendix E.

12.0 BACKGROUND TRAFFIC GROWTH/FUTURE TRAFFIC

Existing traffic counts shall be increased by a growth factor up to the project's build-out date, which shall be reasonably specified, to account for increases in existing traffic due to other approved or Pending Developments. The development build-out date shall be no less than three years and no more than ten years from the date of the initial transportation methodology submittal. The minimum annual growth rates in all cases shall be the higher of 2.5 percent or the results of a historical trend analysis which shall be completed for all roadways within the study area. Acceptable techniques to estimate annual traffic growth rates are provided in Appendix F.

13.0 LEVEL OF SERVICE STANDARDS

A. The adopted LOS standards for all major road segments shall be consistent with the standards per the Local Government's latest adopted Comprehensive Plan.

B. The overall intersection LOS standard shall be the same standard as that of the segment (facility) within which the intersection is located. Where different LOS standards apply to different legs of an intersection, the overall intersection LOS standard will be the same as the leg with the least restrictive LOS (e.g. one road LOS Standard "D" and the other road LOS Standard "E", then intersection LOS Standard is "E").

C. The delay for individual turning-movements and through-movements may exceed the segment standard by one letter grade provided that the volume/capacity (V/C) ratio for the subject movement remains less than or equal to one. Average delays of up to 100 seconds are acceptable for individual turning movements where the V/C ratio is less than 0.8.

D. For site access driveways and local street connections serving site access traffic, delays of up to 100 seconds will be considered acceptable.

14.0 INVENTORY OF EXISTING AND FUTURE CONDITIONS

At minimum, the following additional information shall be provided:

A. The geometry, speed limit, and the adopted LOS standard of all the existing roadways and intersections, based on the Local Government's adopted Comprehensive Plan, and committed intersection and roadway improvement projects within the impacted area,

B. Existing vehicle counts and data supporting heavy vehicle factors for capacity analysis,

C. Graphic representation (stick diagrams) of the project's proposed access locations, types, and internal roads with connections to public roadways. The graphic shall also cover the area immediately adjacent to the project and this graphic should include:

- All external, major roadways,
- Existing or future access points, and
- Types of developments surrounding the project,

D. Pavement marking plans/concept plans of roadways that provide direct access to the project and that have been completed or are undergoing design or route study phase, if available,

E. Graphic representation of project traffic (volume and percent distribution), existing traffic volumes, future background volumes, and future total volumes, and

F. Inventory of existing or committed traffic-control devices (i.e. traffic signals and stop signs).

15.0 SITE ACCESS

Driveway location(s) shall meet the Local Government's and/or FDOT's minimum standards regarding location, corner clearance, minimum distance between driveways, number of driveways serving a site, minimum sight distances, median openings, and U-turn restrictions, as or where applicable. Secondary access shall be required based on the threshold for trips as determined by the Local Government and when secondary emergency access is needed in cases when the primary access may be blocked by a disabled vehicle. Appendix G documents the procedures to determine the need for turn lanes and corresponding turn lane lengths.

16.0 MULTIMODAL CONSIDERATIONS

When designing the site, the following multimodal recommendations should be taken into consideration, and their applicability should be discussed with the Local Government during the Methodology Statement process in Section 2 of this document. At a minimum, the TIS should demonstrate how the project will maintain or improve upon the existing operations and safety for pedestrians, bicyclists, and transit riders. The TIS shall include a section for Multimodal Considerations and address each of the following modes separately.

A. For pedestrians:

1. Provide connectivity from the building structures to existing sidewalks adjacent to the site.

2. Internal circulation and connections to existing sidewalks should be provided so that pedestrians do not need to walk significantly "out of the way". In other words, pedestrian connections should be direct and reasonable, minimizing the distance that pedestrians need to walk to go from one place to another,

3. New external and internal crosswalks and any associated traffic control devices (if required).

4. To the extent possible, minimize pedestrian-vehicle conflicts.

5. Specify minimum cross-walk widths.

6. Depending on the hours of operation of the site, consideration should be given to the need for illuminated sidewalks and crosswalks.

7. For any proposed project with a residential component, identify any schools or colleges within 2 miles of the site and provide an inventory of available sidewalks, sidewalk conditions, missing sidewalk links, and pedestrian-actuated crossings.

B. For transit vehicles/users:

1. Provide an inventory of any transit stops or rail stations within 1/4-mile of the nearest access to the site with information on available sidewalks and crosswalks, the route number, hours of transit operation, headways, and existing transit amenities (i.e., shelter, concrete pad, trash receptacle, etc).

2. If there is a transit stop adjacent to the site or within walking distance of the site, adequate pedestrian connections need to be provided not only between the site and the bus stop but also between the main entrance of the building and the bus stop.

3. Relocation of an existing bus stop or creation of a new stop, in coordination with the Local Government Transit Manager and/or Community Transit, as applicable, to provide for safe or better access to the building and site.

4. Appropriate design of relocated or a new bus stop to address amenities (bench, shelter, etc.).

C. For bicycles:

1. If internal bike facilities are proposed, adequate connections to existing bike lanes and shared-use paths shall be provided as determined by the Local Government.

2. Provision of bike racks and secured bike lockers as determined by the Local Government.

17.0 MITIGATION OF IMPACTS

Acceptable mitigation options are:

1. Restore to adopted standard

2. Proportionate Share Mitigation

General guidance and further detail regarding the mitigation of impacts are provided in Appendix H.

APPENDICES

APPENDIX A
GLOSSARY OF TERMS

For purposes of this document, the following definitions shall apply:

Arterial Road: As classified by the local governments, a high-capacity urban road that sits below freeways/motorways on the road hierarchy in terms of traffic flow and speed. The primary function of an arterial road is to deliver traffic from collector roads to freeways or expressways, and between urban centers at the highest level of service possible.

Average Annul Daily Traffic (AADT): The total volume of vehicle traffic of a highway or road for a year divided by 365 days.

Background Scenario: Analysis of existing traffic, plus background traffic on the committed network.

Background Scenario with Mitigation: Analysis of existing traffic, plus background traffic on the committed network. For locations which are estimated to fail under background conditions, the Applicant shall identify improvements need to restore the adopted level of service standard.

Background Traffic: Existing traffic plus growth in existing traffic between the existing conditions and the future conditions. Please refer to Appendix F for acceptable techniques to estimate future background traffic volumes.

Capacity: The maximum service volume adopted by the local governments.

Collector Road: As classified by the local governments, major and minor roads that connect local roads and streets with arterials. Collectors provide less mobility than arterials at lower speeds and for shorter distances.

Committed Network: Existing Network plus transportation system improvements included in the adopted work programs of the County, TPO, FDOT, or other agencies with authority and responsibility for providing transportation system capacity, or other improvements that are guaranteed by a security instrument acceptable to the Local Government that ensures construction will begin in - such work programs.

Concurrency: The timely provision of public facilities and services relative to the demand for them.

Existing Network: Major Roads which are currently in use by the public.

Existing Scenario: Analysis of existing traffic on the Existing Network.

Functional Classification: The classification of roadways as interstate, arterial, collector, and local roadways based on the character of the service they provide in relation to the total roadway network.

Future Scenario: Analysis of existing traffic, plus background traffic, plus the project's traffic on the committed network. For locations which are estimated to fail, the Applicant shall identify when each failure is expected to occur as a fraction of the development trips, associated on-site land use quantities, and estimated year. These parameters may be estimated by interpolating between the "Existing Scenario" analysis and the "Future Scenario" (without mitigation) analysis. If new corridors that shift travel patterns are proposed as the solution, the interpolation should be based on an analysis that does not consider the new corridor. In the case of large Mixed Use Planned Unit Developments (MPUDs), the Local Government reserves the right to modify timing of failure estimates to reflect or incorporate other pending or approved developments that are presented or become effective between the time the methodology is approved and the time when the list of improvements to cure identified deficiencies at build-out are finalized by the Local Government.

Future Scenario with Mitigation: Analysis of existing traffic, plus background traffic, plus project traffic on the committed network with the inclusion of any other improvements that are required to restore the adopted level of service standard. This analysis scenario will be required only if mitigation is required as the result of the future scenario analysis. For purposes of analyzing site access requirements only, the Local Government may allow consideration of improvements scheduled in the first five years of the Capital Improvement Program. For large MPUDs, the Local Government may require an additional five, ten, and/or fifteen year analysis of the financial feasibility of the improvements that are required to restore the adopted level of service standard.

Heavy Vehicle: Vehicles that have more than four tires touching the pavement, including trucks, buses, and recreational vehicles (RVs). Trucks cover a wide range of vehicles, from lightly loaded vans and panel trucks to the most heavily loaded coal, timber and gravel haulers. RVs also include a broad range, including campers, both self-propelled and towed; motor homes; and passenger cars or small trucks towing a variety of recreational equipment, such as boats, snowmobiles, and motorcycle trailers.

Internal Capture: The portion of trips generated by a mixed-use development that both begin and end within the development without the need to access the external roadway network. The percentage of trips that are considered internal capture are subject to approval by the local governments.

Level of Service: A qualitative description of how well vehicle traffic flows along a roadway due to the operating conditions of the roadway based on factors such as speed, travel time, maneuverability, delay, and safety.

Major Intersections: All signalized intersections and/or unsignalized intersections with other major roadways.

Major Roadway, Major Road Network, or Regulated Road: Shall include all collector and above-classified roadways per the latest St. Lucie TPO's Federal Functional Classification Map and any other roadways identified by the local governments.

Pass-By Trip: A trip is present on a roadway adjacent to a development for a reason other than accessing the development but end up accessing the development. The percentage of trips that are pass-by trips are subject to approval by the local governments.

Peak-Hour: Traffic volumes during the one-hour period during which the greatest volume of traffic uses the road system, as identified separately for each segment of a transportation facility.

Peak-Hour Factor: Compares the traffic volume during the busiest 15-minutes of the peak hour with the total volume during the peak hour.

Pending Development: Is a development for which a complete application has been filed for (a) a Traffic Impact Study, (b) an Initial or Final Certificate of Capacity, or (c) an Initial or Final Certificate of Capacity Development Order.

Road Segment: In an interrupted flow facility, a road segment is the piece of road from one traffic signal to the next traffic signal and is usually considered to include the traffic signal at the "downstream" end of the segment. "Road Facilities" are usually composed of several contiguous road segments.

Strategic Intermodal System (SIS): The statewide network designated by the Florida Department of Transportation of high priority transportation facilities that seamlessly flows from one mode to the next with the goal of providing the highest degree of mobility for people and goods traveling throughout Florida.

Study Area: The geographic radius from the boundaries of the development that is analyzed for the transportation impacts caused by the development and consists of the area of influence defined in Appendix B plus any roadways beyond that area of influence that will receive 5 percent or more of traffic volume from the development compared to the capacity of that roadway.

Vested Trips: Trips from an approved development that are distributed on the roadway network and treated as existing trips.

APPENDIX B
AREA OF INFLUENCE

A. The area to be studied will be based on the New External Trip Generation of the proposed development. The table below shall determine the development's area of influence.

New External Daily Trip Generation	Radius of Area of Influence
0 – 200	All site driveway connections and segments directly accessed by the proposed development
201 – 500	0.5 miles
501 – 1,000	1.0 miles
1,001 – 5,000	2.0 miles
5,001 – 10,000	3.0 miles
10,001 – 20,000	4.0 miles
Over 20,000	5.0 miles

B. The radius of influence shall be measured from each connection of the project to the Major Road Network.

C. All major signalized and unsignalized intersections on the roadway segments within the area of influence shall be studied.

D. If the study radius ends between the intersections identified in 'C' above, the study area shall extend to the next major intersection.

APPENDIX C
ANALYSIS REQUIREMENTS

A. If any analysis software is used as an alternative to the FDOT's generalized tables, a detailed LOS analysis of all Major Intersections within the facility is required.

B. The input data to the software shall be field verified and provided in the report including, but not limited to:

- Geometry, including lane widths and turn-lane lengths
- Heavy vehicle factor
- Directional factor (D Factor, not to be less than 0.52 for the future conditions analysis)
- Peak-hour factor (PHF, not to exceed 0.95 for the future conditions analysis)
- Values of the above parameters should be estimated in the future conditions analysis to reflect unconstrained demand conditions
- Existing signal timing and phasing can be obtained from the traffic signal maintaining agency. The existing signal timing, including its maximum and minimum settings, shall be used for the initial analysis of future conditions. Any timing change outside of the existing minimum and maximum setting may be presented for Local Government approval as part of the mitigation strategy
- Segment lengths

C. If the FDOT generalized roadway service volume tables are used, the following information shall be provided in a separate table:

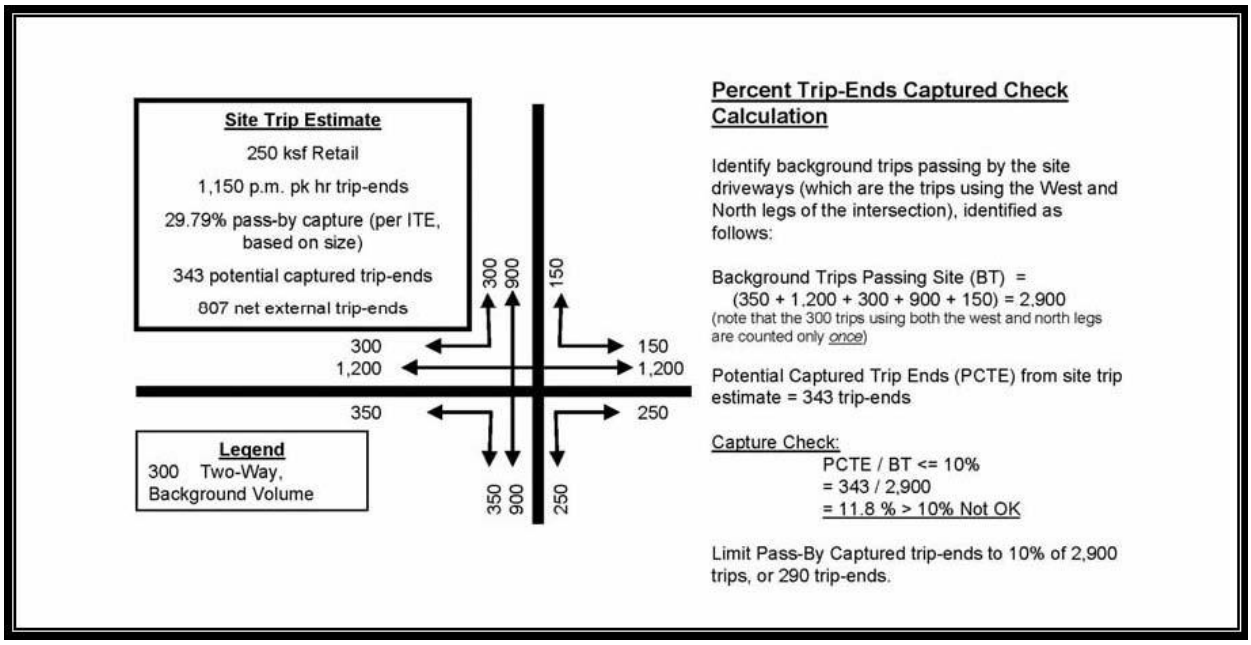
- Class of roadway (interrupted or uninterrupted)
- Maintenance jurisdiction (city, county, or state-maintained)
- Area type
- Posted speed
- LOS standard

D. Other parameters that govern the roadway/intersection capacity analysis shall be based on the parameters described in the latest version of the Highway Capacity Manual.

E. The Local Government may require the inclusion of proposed or anticipated traffic signals in the future year condition that may not exist in the "existing condition", including signals at development entrances.

APPENDIX D
EXAMPLE OF PASS-BY CAPTURE

The graphic below depicts an example of how passer-by capture may be computed.



APPENDIX E
TRAFFIC COUNTS

A. Approved FDOT or St. Lucie TPO maintained counts shall be used if they are less than two years old. However, new counts may be requested if there are recent impacts or improvements to the transportation system that cause significant changes in traffic patterns. Counts more than two years old will not be acceptable unless otherwise approved by the Local Government during the Methodology Statement.

B. Weekday traffic counts shall be collected during typical weekdays (Tuesdays, Wednesdays, or Thursdays) and not immediately before, during, or immediately after a holiday or special event.

C. All analyses undertaken shall be adjusted to the average of the peak season using FDOT's Peak Season Conversion Factors (PSCF). Other time periods or a.m. analysis may be required if requested during the methodology meeting or during the first review round.

D. For saturated intersections, the FDOT methodology shall be followed to estimate the turning movement counts by multiplying the average annual daily traffic (AADT) tube count at appropriate locations by field verified "D" and minimum K100 factors and by applying the percentage turns obtained from the field turning-movement counts.

E. In no event, however, shall the estimated, turning-movement counts be less than the existing field counts.

F. Tube counts at appropriate locations shall be provided for segment analysis using the FDOT procedures. The segment tube counts at mid-block locations shall be checked against turning-movement counts at near intersections. In general, the mid-block counts and turning-movement counts shall not be significantly different unless the difference can logically be explained.

APPENDIX F
ANNUAL TRAFFIC GROWTH RATE DETERMINATION

Background traffic growth rates and background traffic volume estimates to be used in the TIS shall be based on techniques approved in the Methodology Statement (Section 2 of this document). Any combination of the following techniques is considered acceptable:

A. Historical growth rates (minimum of the past five years) may be used in areas where the expected growth is representative of the past growth.

B. Traffic from approved and pending developments may be required in areas where the historical trend is determined by the Local Government to be inappropriate. This may be accomplished through application of the latest adopted GTCRPM.

C. To determine future traffic on roads that currently do not exist, the use of the GTCRPM (the latest, adopted model) is recommended.

D. The socioeconomic data shall reasonably represent, if appropriate, the approved or pending developments in the vicinity of the project as approved in the Methodology Statement. Minimum annual growth rates in all cases shall be one percent, unless otherwise approved in the Methodology Statement.

E. The assumed growth rate for each impacted roadway segment analyzed shall be presented in tabular form. The background traffic growth estimates will be reviewed by the Local Government to ensure growth reasonably reflects recent and expected growth trends. The connections of surrounding traffic analysis zones in the model should be reviewed to reflect other approved and pending developments and to ensure appropriate network loading.

APPENDIX G
TURN LANE NEED AND LENGTH DETERMINATION

A. Right Turn Lanes

The potential need for right-turn lanes at the site access connections shall be evaluated based on guidelines provided in the National Cooperative Highway Research Program (NCHRP) 457 and Florida Design Manual (FDM) 212.

B. Left Turn Lanes

The need for left-turn lanes is typically evaluated based on research documented in NCHRP Report 457 Intersection Channelization Design Guide. The curves included in this report are included below.

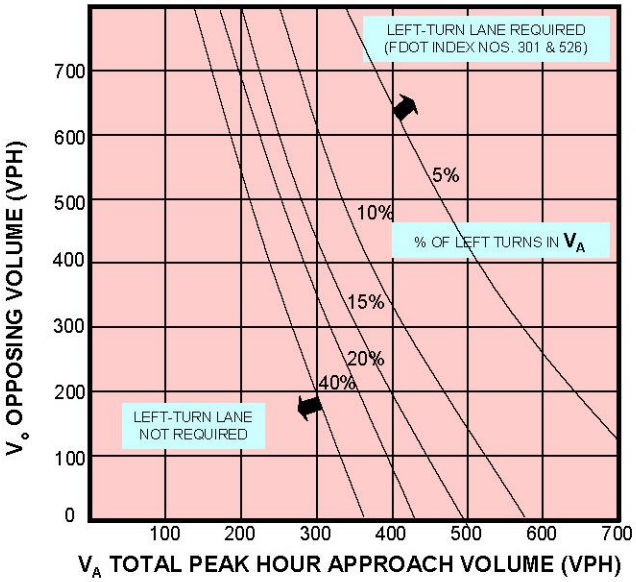
C. Deceleration and Storage Lengths

1. Deceleration length shall be based on FDM index 212.

2. Storage Length shall be based on 95th percentile queue estimates provided by the software used in the level of service computation.

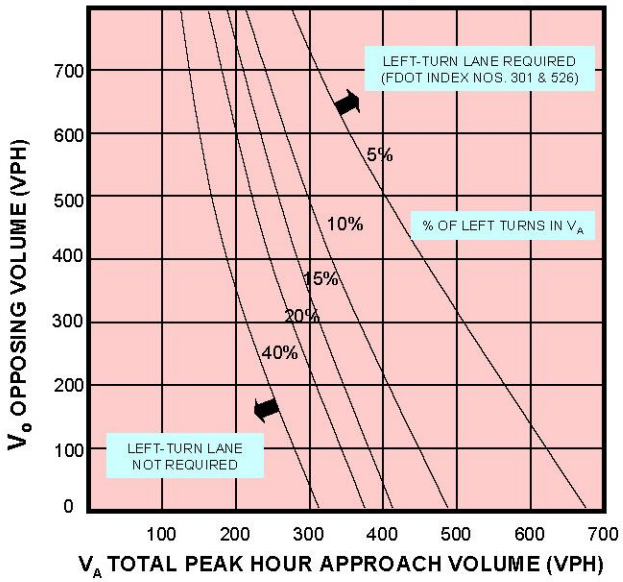
3. The provision of deceleration and storage lengths may be modified or waived by the Local Government's Engineer or his/her designee if it is determined that due to site specific constraints, the implementation will not be feasible or practical.

GRAPH 2A. LEFT-TURN LANE WARRANTS – TWO-LANE FACILITIES (≤ 40 MPH)



Note: Left-turn lane not required when intersection of V_A and V_O is below the curve corresponding to the % of left turns in V_A.

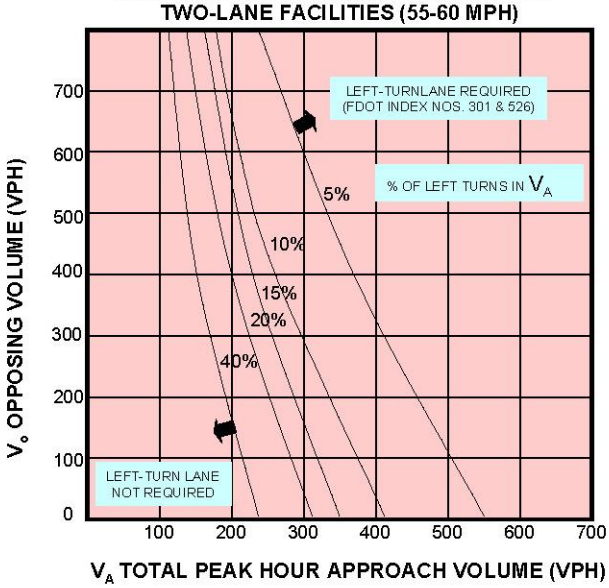
GRAPH 2B. LEFT-TURN LANE WARRANTS – TWO-LANE FACILITIES (45-50 MPH)



Note: Left-turn lane not required when intersection of V_A and V_O is below the curve corresponding to the % of left turns in V_A.

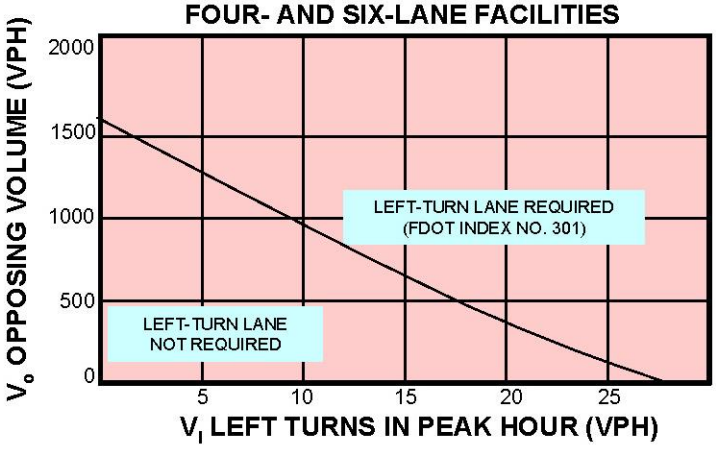
Graph 2A & 2B – Source: Derived from National Cooperative Highway Research Program Report #279.

GRAPH 2C. LEFT-TURN LANE WARRANTS – TWO-LANE FACILITIES (55-60 MPH)



Note: Left-turn lane not required when intersection of V_A and V_O is below the curve corresponding to the % of left turns in V_A.

GRAPH 2D. LEFT-TURN LANE WARRANTS – FOUR- AND SIX-LANE FACILITIES



Note: When V_O < 400 VPH, a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as left-turning traffic exceeds 400 VPH. (V_A > 400 VPH).

Graph 2C & 2D – Source: Derived from National Cooperative Highway Research Program Report #279.

APPENDIX H
MITIGATION OF IMPACTS

This Appendix provides guidance on how the adequacy of mitigation will be technically determined and reviewed by the Local Government.

A. General Guidance

1. Improvements for mitigation of impacts at an individual location must work effectively and flow efficiently and safely relative to upstream and downstream roadway conditions. As examples:

    - A proposed improvement that relies upon dual lefts, three thru lanes, and a right turn lane to provide adequate capacity to serve the traffic demand at an intersection approach where only one lane feeds traffic might not be considered an effective, efficient or safe improvement because (for example) one lane can only feed traffic at a rate of 1,850 vehicles per hour but the intersection capacity analysis relies upon approach lane capacity in excess of the 1,850 vehicles per hour.
    - A proposed improvement that cannot achieve effective lane utilization due to downstream conditions would not be considered an effective improvement. For example, provision of a second through lane with a receiving lane on the far side of an intersection of only 300 feet in length would not be effective
    - Analyses of improvements to closely-spaced intersections should include evaluations of the traffic flow interaction and signal timings of the two intersections to ensure that the proposed improvements will achieve the intended result.

2.. For unsignalized intersections, below-standard conditions should be mitigated by first considering the addition of auxiliary lanes, then consideration of signalization. If development traffic contributes to side-street volumes but the deficient delay is not mitigated through auxiliary lane addition, warrants for signalization are not met, and signalization is shown to be a viable solution when warranting conditions are met, then a financial contribution to future signalization may be considered as mitigation. See the "Proportionate Share Mitigation" section below for share computation methodology for adding a traffic signal at a previously unsignalized location.

3. Widening of the major road may also be necessary.

B. Mitigation Options

1. Restore to adopted standard – Identify an improvement at an impacted location that restores level of service to the adopted standard for the "future year with development traffic" condition, as defined in the Analysis Scenarios section of these Guidelines.

2. Proportionate Share Mitigation – The proportionate share payment shall be calculated as follows:

   a. Identify all the needed improvements to bring all deficient locations in the study network back to the adopted LOS standard.

   b. Submit a cost estimate of the required improvements.

   c. Calculate the proportionate-share cost of those improvements per the following formula:

      i) For road segments:
         Proportionate share cost = Total cost of improvement triggered by the project x Project traffic / Increase in capacity created by the improvement. The increase in facility capacity shall be based on the generalized service volume table provided in the "Impacted Roadways/Intersections" section of this document. The above values shall be in units of peak hour, two-way values.

      ii) For signalized and unsignalized intersections (where signalization is not needed):
         Proportionate share cost = Total cost of improvement triggered by the project x Project traffic / Increase in capacity created by the improvement.
         Where: Project traffic is the development traffic in all movements at the intersection increase in capacity is the sum of the changes in physical capacity of all of the movements at the intersection

      iii) For installation of signals at unsignalized locations:
         Proportionate share cost = Total cost of improvement x Project traffic / Increase in capacity created by the improvement,
         Where: Project traffic is the development traffic in *all* movements at the intersection Increase in capacity is the sum of the changes in physical capacity for the *minor-street movements only* at the intersection

      If other unforeseen situations arise, they will be dealt with on a case-by-case basis.

   d. Cost values shall include route study costs, design, right-of-way, construction, construction engineering/inspection costs, and contingency costs.

   e. Where an improvement to an alternate road (which draws background traffic away from an existing road that has been estimated to fail) is identified as a solution to congestion and where development traffic is

assigned to both the existing road as well as the alternate road, the proportionate share computation will include the total development traffic on the existing road and the new road.