

ST. JOHNS COUNTY TRAFFIC IMPACT STUDY METHODOLOGY AND PROCEDURES

1. Purpose

- (a) The purpose of a traffic impact study is to identify the potential impacts of new Development on the St. Johns County transportation system and to provide information which will allow a concurrency determination to be made on each impacted segment. The traffic impact study will identify Development traffic volumes on each impacted segment, identify those segments on which the adopted Level of Service cannot be maintained, include link and intersection analysis, and recommend potential solutions for those segments and intersections on which the adopted Level of Service is not being met.

2. Intent

- (a) The intent of this document is to define the requirements, procedures and methodology for the submission of a traffic impact study in St. Johns County and to provide an equitable, consistent and systematic means of determining the future impact of proposed Developments while maintaining the adopted service levels on all roadways.
- (b) Nothing contained in this document shall waive any requirement contained elsewhere in the St. Johns County Land Development Code.

3. Applicability

- (a) The requirements, procedures and methodology for a traffic impact study contained in this Section shall apply to all Development Orders in unincorporated St. Johns County. In all cases, it will be the responsibility of the Applicant to demonstrate to the County that a proposed Development will not unduly impact the road system.
- (b) A traffic impact study for a multi-phase project shall be submitted in conjunction with the first application for Concurrency Determination for the project and shall include all future Development phases. The traffic study shall remain valid and in effect for a one (1) year period. Subsequent Development phases seeking a Final Concurrency Determination shall be required to update the traffic impact study with current data if the application for Concurrency Determination for said Development phases is submitted more than one (1) year from the project's original application for Concurrency Determination. All applications for Development phases seeking a Final Concurrency Determination shall be required to submit intersection and segment capacity analyses prescribed under Sections (14) and (15) notwithstanding the time limits specified above.

4. Types of Traffic Impact Studies

(a) Small Projects

Developments generating 10 or fewer average weekday peak hour trips will be considered to have a negligible impact on the Major Road Network. No further

review of the transportation impacts of Small Projects will be required and a Final Concurrency Determination may be issued subject to other provisions of Article XI of this Code.

(b) Minor Traffic Review

1. Developments generating 11 to 50 average weekday peak hour trips will be subject to a Minor Traffic Review.
2. The Minor Traffic Review will include: a description and location of the project, land Use category and number of units from the Trip Rate and Percent New Trips Data Table, an estimate of the number of p.m. peak hour trips generated, the number of net new project trip ends that will impact the public road system (e.g. after internal capture and/or adjacent street capture is considered), the existing vested and reserved traffic p.m. peak hour volumes on each Directly Accessed Segment and one (1) additional segment in all directions, the Generalized Planning Maximum Service Volume of the Directly Accessed Segment and one (1) additional segment in all directions, and identification of any improvements to the Directly Accessed Segment and one (1) additional segment in all directions, and identification of any improvements to the Directly Accessed Segments and one (1) additional segment in all directions and the improvement schedule. If the project does not access a Directly Accessed Segment, then the impact of the project traffic on the first directly Accessed Segment and one (1) additional segment in all directions on the Major Road Network at minimum, shall be evaluated relative to its adopted Level of Service. If the project traffic on any study segment as defined above for Minor Traffic Review is less than one percent (1.0%) of the maximum service volume of the adopted Level of Service standard, then the project impact on that segment shall be considered to have a negligible impact and no further review will be required on the subject segment. Based upon this information, a determination shall be made by the County whether or not the road facilities are adequate to maintain adopted service levels upon build-out of the proposed Development. A Certificate of Concurrency may then be issued according to the procedures identified in the Article XI of this Code.
3. If the information submitted pursuant to Section (4)(b)2. above indicates the Level of Service will fall below the adopted standard, then the Applicant may undertake a more detailed evaluation of future roadway operating conditions to demonstrate acceptable operating conditions, or the Applicant may propose roadway improvements to restore acceptable conditions.
4. The appeals process for a Minor Traffic Review shall be governed by the procedures set forth in Article XI of this Code.

(c) Land Development Traffic Assessment (LDTA)

1. A Land Development Traffic Assessment shall be required for all Developments generating more than 50 average weekday peak hour trip ends.

2. Submission of a Land Development Traffic Assessment is required for a Determination of Application Completeness in the Concurrency Review Process.
3. The Applicant is required to attend a pre-application conference to discuss the traffic study requirements and final report outline as it pertains to the specific Development prior to conduct of the study.
4. Each Land Development Traffic Assessment must meet the following submission requirements to receive a Determination of Application Completeness.
 - a. Two (2) paper copies and one electronic copy of the completed Land Development Traffic Assessment must be submitted to the County at the time of the submittal of the Concurrency Determination Application.
 - b. The format of the Land Development Traffic Assessment must follow the outline identified in Section (4)(c), Format of Land Development Traffic Assessment.
 - c. A Land Development Traffic Assessment must be submitted by an individual with an engineering or planning degree with responsible transportation planning experience and must be a registered professional engineer (PE) or certified through the American Institute of Certified Planners (AICP), acting as the designated representative of the owner.
5. The County shall determine if all required data has been submitted and is acceptable. This determination, as well as the determination that additional data is necessary, will be made according to the procedures and time frames identified in Article XI of this Code.
6. The Appeals process for a Land Development Traffic Assessment shall be governed by the procedures set forth in Article XI of this Code.
7. Site access for a proposed Development shall be consistent with the requirements identified in the St. Johns County Code. The Applicant is required to provide a site access plan at the pre-application conference. The site access plan is subject to review and approval by the County. This review will be made according to currently accepted traffic engineering principals.
8. Format of Land Development Traffic Assessment

To simplify staff review, each Land Development Traffic Assessment will be required to follow the outline below. Further definition and clarification of the items listed in the outline may be found in subsequent sections. Figures and maps are to be used to the maximum extent possible.

- a. Letter of transmittal

- b. Title page
- c. Table of Contents
 - 1. List of Figures
 - 2. List of Tables
- d. Introduction (includes description and location of project, current and proposed zoning, both address and map format, size of the project, summary of methodologies agreed to in pre-application conference and statement of approval sought).
- e. Area of influence (determination of impacted road segments to be included on study network, based on criteria of Section (7)(a)).
- f. Inventory of existing conditions (including listing of all segments within the study area, existing traffic volumes and identification of roadway characteristics).
- g. Trip generation estimate (from P.M. Peak Hour Trip Rate and Percent New Trips Data Table, the most recent edition of the Institute of Transportation Engineers *Trip Generation* Information Report or other professionally accepted methodology).
- h. Percent new trips and internal capture estimates (from P.M. Peak Hour Trip Rate and Percent New Trips Data Table and Section (11) and Section (13))
- i. Traffic distribution and assignment methodology.
- j. Projected traffic volumes within the study area.
- k. Intersection analysis (required when the peak hour traffic volume on one (1) or more links forming a leg of a major intersection is equal to or exceeds ninety percent (90%) of the maximum service volume of the adopted Level of Service standard).
- l. Roadway needs (identification of proposed improvements and cost).
- m. Internal site circulation and access needs.
- n. Appendix (as applicable to the specific traffic impact study)
 - 1. Traffic count data
 - 2. Trip generation, internal and adjacent street capture worksheets
 - 3. Trip distribution and assignment worksheets
 - 4. Intersection capacity analysis worksheets using the 2000 Highway Capacity Manual or latest edition.

5. Link capacity analyses
6. Computerized modeling documentation (if performed)
7. Other analysis worksheets

5. Pre-Application Conference

- (a) The purpose of the mandatory pre-application conference for a Land Development Traffic Assessment is to provide guidance and direction to the Applicant concerning the conduct of the study. For a Minor Traffic Review, it is strongly recommended that the Applicant request a pre-application conference to discuss submission requirements.
- (b) The Applicant shall request a pre-application conference, and shall transmit a general description of the proposed Development and study methodologies to the County at least five (5) working days prior to the meeting.
- (c) At a minimum, the following topics will be discussed and approval obtained from the County at the pre-application conference.
 1. The Applicant will provide a site access and internal circulation plan.
 2. Review the format of a traffic impact study.
 3. Vested Developments in the vicinity of the proposed Development will be identified and procedures to estimate their associated traffic volumes shall be identified.
 4. The Major Road Network form will be provided to the Applicant.
 5. Procedure to track the project's traffic will be defined.
 6. Availability and use of County data.
 7. Procedures for traffic counts, the location of current traffic count stations, and the identification of possible additional locations.
 8. Source of trip generation for project traffic.
 9. Selection of origin / destination survey sites for determination of percent new trips factor.
 10. Traffic distribution and assignment technique.
 11. Justification of an internal capture factor if different than those presented in Section (13)(b).
 12. Methodology and approach for intersection analysis.

13. Methodology and approach for segment analysis.

- (d) Failure by the Applicant to discuss and obtain resolution to the above topics may result in disapproval of the traffic impact study or a request for additional information.
- (e) The methodologies and assumptions agreed upon at the pre-application conference will be valid for a period of ninety (90) days from the date of the pre-application conference. If the Concurrency Determination Application is not submitted to the County within ninety (90) days of the pre-application conference, the Applicant must obtain approval from the County for the continued use of these methodologies and assumptions, or revise the methodologies and assumptions as necessary with updated information.

6. Level of Service Standards

- (a) The Level of Service standards used for concurrency determination shall be consistent with the Transportation Element of the St. Johns County Comprehensive Plan.
- (b) When two (2) roads of differing classification or performance standards intersect and an intersection analysis is required, the lower Level of Service performance standard shall govern the intersection.

7. Traffic Impact Area

- (a) The following procedure will be used to determine the extent of the Traffic Impact Area.
 - 1. Peak hour traffic attributable to the Development will be assigned to all segments on the Major Road Network for residential and non-residential developments as follows:
 - a. Residential – peak hour traffic will be assigned to all segments impacted by Development traffic at a level equal to or greater than one percent (1.0%) of the maximum service volume of the adopted Level of Service standard up to a maximum radius of four (4) miles from the project site boundaries. The four (4) mile radius will be extended to include the next major intersection if an intersection analysis is required under the provisions of Section (14)(a).
 - b. Non-residential – peak hour traffic will be assigned to all segments impacted by Development traffic at a level equal to or greater than one percent (1.0%) of the maximum service volume of the adopted Level of Service standard up to a maximum radius of two (2) miles from the project site boundaries; and at a level equal to or greater than three percent (3.0%) of the maximum service volume for segments outside the two (2) mile radius, but within a four (4) mile radius from the project site boundaries. The two (2) mile radius and four (4) mile radius boundaries referenced in this section may be extended to include the next major intersection if an intersection analysis is required under the provisions of Section (14)(a).

2. Additional impacted segments, over and above those required by Section (7)(a)1., may be added to the study network when, as determined by the County, it would be in the best interest of St. Johns County to do so to maintain the adopted Level of Service standards.
3. Phased projects will be required to perform a traffic study which analyzes both the impact of the phase(s) seeking a Certificate of Concurrency and the ultimate build out of the entire project. The analysis of the total build out of the project will be performed as part of the concurrency application for the first phase of the project to assess the ultimate transportation needs of the entire project, but shall not be used as a basis for a determination of transportation concurrency or for issuance of a Certificate of Concurrency. The methodology for performing the analysis shall be based on the following:
 - a. The Study Area of the total build out of the project will be determined by the extent of all impacted segments for the total project, including future phases and phases which have previously received a Certificate of Concurrency or Concurrency Exemption. The phase(s) of the project seeking a Certificate of Concurrency will be evaluated for transportation concurrency based on the Traffic Impact Area using the criteria contained in Section (7)(a)1. above for the phase(s) seeking the Certificate of Concurrency and the cumulative Development within the project for which a Certificate of Concurrency has been issued subsequent to March 4, 1991.
 - b. Projects that consist of an expansion or an addition to existing Development constructed or permitted prior to March 4, 1991, will be analyzed based upon the cumulative impact of all Development for which a Concurrency Determination has been issued subsequent to March 4, 1991.
4. When a project's impacts are such that no roadways are impacted at the threshold defined in Section (7)(a)1., then the impact of the project traffic on the first Directly Accessed Roadway Segment(s) shall be evaluated for ensuring the maintenance of the adopted Level of Service standard on those roadways.
5. For the purpose of the LDTA project traffic will be assigned only to those roadways and future roadways:
 - a. Shown on the Major Road Network;
 - b. Proposed for inclusion as part of the Major Road Network and scheduled for initiation of Construction within the first three (3) years of the FDOT, St. Johns County, or other responsible jurisdiction's financially feasible adopted five (5) year work program, or
 - c. Scheduled for completion prior to the initial date of project impact on the roadway, if such roadway or improvement is to be completed pursuant to a local government Development Agreement or binding

contract and proposed for inclusion as part of the Major Road Network.

6. Where an improvement based on a local government Development Agreement or order is relied upon to achieve the acceptable Levels of Service, default on any such agreement by any party other than St. Johns County, shall be identified as a basis for reconsideration and, if necessary, invalidation of the Development Order and Certificate of Concurrence.

8. County Data

- (a) The County shall maintain and update several types of data. These types of data are described below.

1. Traffic Count Data

St. Johns County maintains traffic count data on all segments of the Major Road Network. New traffic counts as well as traffic count data from approved traffic impact analyses will be used to update the traffic counts in the concurrency management database on an annual basis. The Applicant may be required to supplement the traffic count data where needed, such as locations where data is not currently available, or counts conducted on weekends, holidays, or other time periods in which the project's peak trip generation does not coincide with the average weekday peak hour.

2. P.M. Peak Hour Trip Rate and Percent New Trips Data Table

A P.M. Peak Hour Trip Rate and Percent New Trips Data Table shall be available for use in traffic impact studies. This table will be updated periodically with trip rate and percent new trips information from traffic impact studies as approved by the County and from information contained in the most recent edition of the ITE *Trip Generation* Informational Report or other published studies as approved by the County Administrator.

3. Development Size Data

Development Size Data will be maintained by the County and will provide examples of the maximum size of Development by land Use category for Small Projects, and for those which a Minor Traffic Review is required. The Development Size Data will be provided in the P.M. Peak Hour Trip Rate and Percent New Trips Data Table. Development sizes greater than those indicated by land Use category for a Minor Traffic Review will be required to submit a Land Development Traffic Assessment.

4. Roadway Characteristics Inventory

A Roadway Characteristics Inventory will be maintained on each link in the St. Johns County Comprehensive Plan. The inventory will include the Major Road Network segment identification number, Florida Department of Transportation count station number, roadway name (including street name and state or County road number), roadway segment termini (from / to),

existing roadway area type, roadway functional classification, roadway number of lanes (existing and committed), and existing Right-of-Way. This inventory will be updated with new information on a periodic basis.

5. Transportation Analysis Spreadsheet

A Transportation Analysis Spreadsheet will be maintained for each roadway segment on the Major Road Network. The spreadsheet will include the Major Road Network road segment identification number, Florida Department of Transportation count station number, roadway name (including street name and state or County road number), roadway segment termini (from / to), existing roadway area type, approved road type (functional classification), planning area, adopted LOS standard, segment length in miles, traffic count date (year), Annual Average Daily Traffic count, annual growth factor, link K-factor, peak hour traffic, exempt Development traffic, approved concurrency traffic, total committed peak hour traffic, percent of service volume utilized, link status, traffic study service volume, and approved peak hour service volume. The Transportation Analysis Spreadsheet will be updated with new information periodically.

6. Major Road Network Map

A Major Road Network Map will be maintained by the County that illustrates all roads on the St. Johns County traffic impact study network. This Map will include road improvements scheduled for completion within the first three (3) years of the FDOT, St. Johns County, and local jurisdictions five (5) year capital improvement programs, and those roads scheduled for completion within three (3) years that will be built pursuant to a local government Development Agreement. All future roads added to the map must be approved by the County. Additionally, the map will illustrate those segments that are backlogged and/or constrained as well as those critical transportation segments in which the peak hour traffic volume equals or exceeds ninety percent (90%) of the maximum service volume of the adopted Level of Service standard.

7. Traffic Impact Study File

The County shall maintain a file of approved Minor Traffic Reviews, LDTA's and DRI/FQD reports. The County shall provide information and data, when available, to prevent duplication of efforts and unnecessary costs. The County shall approve the use of a prior study.

9. Procedures for Traffic Counts

- (a) The Concurrency Management Database will contain an inventory of all current traffic count locations and the most recent daily and peak hour traffic counts.
- (b) The Applicant may use available traffic count information for all impacted segments from the concurrency management database. If traffic count information is unavailable for the current calendar year on an impacted segment, the Applicant may elect to conduct a current traffic count according to the procedures identified in

Section (9)(c) and (d). Traffic counts not collected in the current calendar year will be factored by the approved annual growth rate to determine the current year traffic volume.

- (b) The Applicant will provide segment traffic counts, by direction, for a minimum of seventy-two (72) consecutive hours between 12:00 p.m. Monday and 12:00 p.m. Friday. Legal holidays or other days as specified by the County shall be excluded. Friday, weekend, or holiday counts may be required for land Uses active on weekends, as determined by the County. The data will include a summary of traffic volumes by direction in fifteen (15) minute increments. The a.m., p.m. and other peak hours should be identified as well as the peak hour-to-daily traffic ratio and peak hour directional split. The average daily traffic counts will be adjusted to Annual Average Daily Traffic (AADT) using appropriate FDOT seasonal adjustment factors and truck axle adjustment factors. The peak hour segment volume will be determined by applying the approved K-factor for that segment to the AADT volume. All data will be subject to review and acceptance by the County.
- (d) The Applicant will provide intersection turning movement counts as required by the County. These turning movement counts shall be made on one (1) typical weekday (Tuesday, Wednesday or Thursday) from 7:00 a.m. to 9:00 a.m., and 4:00 p.m. to 6:00 p.m., or as otherwise specified by the County. Legal holidays or other days as specified by the County shall be excluded. Friday, weekend, or holiday turning movement counts may be required for Development proposals for land Uses active on weekends, as determined by the County. The data will include a summary of traffic volumes in fifteen (15) minute increments, with a.m., p.m. and other peak hours being identified. All data will be subject to review and acceptance by the County.

10. Trip Generation

- (a) Each traffic impact study will list all project land Uses, applicable ITE Land Use Code, Building size and/or Dwelling Units.
- (b) Allowable sources for trip generation rates for each land Use listed in (a) above are identified below:
 - 1. The trip generation rate for the specific land Use as identified in the St. Johns County P.M. Peak Hour Trip Rate and Percent New Trips Data Table.
 - 2. The trip generation rate from a previously approved St. Johns County traffic impact study of a similar land Use.
 - 3. The trip generation rates or equations contained in the most recent version of the ITE *Trip Generation* Informational Report as approved for use by the County.
 - 4. A site specific trip generation study of the same type or similar land Use approved by the County at the pre-application conference. Such a site specific study will be conducted at three (3) separate similar land Use sites. The survey data will be collected for at least a continuous seventy-two (72) hour period between Monday 6:00 p.m. and Friday at 6:00 a.m., or as

otherwise determined by the County. Legal holidays or other days specified by the County will be excluded. Selection of other trip generation study times will be made when it is determined by the County that collection of the data between the above times will not result in a reasonable estimation of the trip generating characteristics of the proposed land Use. The data will include a summary of traffic count data by fifteen (15) minute increments, average daily volume, volume during the a.m. and p.m. peak hours of the adjacent street. The accuracy of the traffic counts will be verified by performing manual counts and comparing them to machine count volumes twice daily; once in the a.m. and once in the p.m. for each day of the traffic counts. All data will be subject to review and acceptance by the County. This review will be based on currently accepted traffic engineering principals.

11. Percent New Trips

- (a) The percent new trips factor represents the percent by which the trip rate is multiplied to obtain only those new trips that are added to the roadway by the proposed Development. Thus, those trips going to the proposed Development that would have been on the roadway anyway and are included in the trip rate must be deducted from the total trips. The pass-by trip total shall not exceed 10 percent (10%) of background traffic volume on the adjacent roadway.
- (b) Each traffic impact study will list all land Uses, applicable ITE Land Use Code, Building size and/or number of Dwelling Units.
- (c) Allowable sources for the percent new trips factor for each land Use identified in (b) above are listed below:
 - 1. The percent new trips factor identified in the St. Johns County P.M. Peak Hour Trip Rate and Percent New Trips Data Table.
 - 2. Percent new trips factor from a previously approved study of a similar land Use or a published study as approved by the County.
 - 3. A site specific origin/destination survey of an identical or similar land Use as approved by the County.
 - a. The origin/destination survey shall collect, at a minimum, the following information:
 - 1. Date
 - 2. Location
 - 3. Time of Interview
 - 4. Time of the interviewee trip
 - 5. From where did the interviewee trip begin immediately prior to arriving? (1) home (2) work (3) retail (4) other

6. The city, area or zip code where the trip began (the last destination before arriving at the site being studied).
 7. The nearest intersecting streets closest to the location of where the trip began (the last destination before arriving at the site being studied).
 8. Transportation mode (1) car (2) walk (3) bike (4) bus (5) taxi drop off.
 9. Where the interviewee trip will end immediately upon leaving (1) home (2) work (3) retail (4) other.
 10. The city, area or zip code nearest the trip's next destination
 11. The nearest intersecting streets closest to the trip's next destination.
- b. The location at each origin and destination will be plotted graphically on a map and the trip lengths calculated. To determine whether the trip is to be considered a new trip, a rectangle will be drawn on the map in such a manner so as to locate the origin of the trip in one (1) corner and the destination of the trip in the opposite corner. If the interview location is outside the rectangle, the trip is considered to be a new trip and if the interview site is inside the rectangle, then the trip is not classified as a new trip. The percent new trips is computed by dividing the number of new trips by the total number of trips generated by the site.
 - c. Copies of the original surveys and maps indicating trip ends will be submitted as part of the study. All data will be subject to review and acceptance by the County. This review will be based on currently accepted traffic engineering principles.

12. Traffic Distribution and Assignment

- (a) The distribution and assignment of project traffic shall be made in accordance with the following procedures and in conformity with accepted traffic engineering principles, such as those documented in NCHRP Report 187, "Quick-Response Urban Travel Estimation Techniques and Transferable Parameters - Users Guide".
 1. Use of a gravity model as approved by the County.
 2. Observations of similar Developments in the vicinity of the proposed Development.
 3. Traffic distribution may be based upon a previously approved traffic impact study of a similar land Use in the vicinity of the proposed Development. Such use of a prior study must be justified, based upon sound traffic engineering principles and techniques and approved for use by the County.

- (b) The County will make available a summary listing of previously approved traffic impact studies within the Planning Area of the project.
- (c) The traffic distribution and assignment technique must be presented by the Applicant at the pre-application conference, and reviewed and approved by the County. This review will be based on currently accepted traffic engineering principles.

13. Internal Capture

- (a) The use of an internal capture factor will be allowed for certain types and sizes of mixed Use Developments.
- (b) Allowable sources for internal capture rates for each land Use listed in (a) above are identified below:
 - 1. The internal capture rate from a previously approved St. Johns County traffic impact study of a similar land Use.
 - 2. The internal capture rates or equations contained in the most recent version of the ITE *Trip Generation Handbook* as approved for use by the County.
 - 3. A site specific internal capture study of the same type or similar Development approved by the County at the pre-application conference. Such a site specific study will be conducted at three (3) separate similar land Use sites. The survey data will be collected for at least a two consecutive hour period each day for three (3) days between Tuesday at 12:00 p.m. and Thursday at 8:00 p.m., or as otherwise determined by the County. Legal holidays or other days specified by the County will be excluded. Selection of other internal capture study times will be made when it is determined by the County that collection of the data between the above times will not result in a reasonable estimation of the internal capture characteristics of the proposed project. The data will include a summary of internal capture data by fifteen (15) minute increments during the p.m. peak hours of the adjacent street. All data will be subject to review and acceptance by the County. This review will be based on currently accepted traffic engineering principals.
- (c) Requests for use of internal capture factors other than those identified above must be submitted along with justification at the pre-application conference. All data will be subject to review and acceptance by the County. This review will be based on currently accepted traffic engineering principles.
- (d) The total internal capture trip ends shall not exceed twenty percent (20%) of the gross project trip ends.

14. Intersection Analysis

- (a) An intersection analysis must be performed on each major intersection (including signalized intersections, unsignalized intersections and those proposed to be signalized), where the total peak hour traffic volume on one (1) or more links forming a leg of the intersection is projected to equal or exceed ninety percent (90%) of the

maximum service volume of the adopted Level of Service standard and is impacted by Development traffic at a level equal to or greater than one percent (1.0%) of the maximum service volume of the adopted Level of Service standard for any phase of the project for which a Final Concurrency Determination is being sought.

- (b) The procedure for performing an intersection analysis will be based upon the methodology contained in the most recent edition of the Highway Capacity Manual, Transportation Research Board Special Report 209, or other professionally accepted methodology. Any questions, issues or methodology other than that referenced in the above publication must be submitted at the pre-application conference and will be subject to the review and approval from the County.
- (c) For each intersection at which the total traffic results in a Level of Service below the acceptable adopted Level of Service, the Applicant will recommend improvements to the intersection analysis by including:
 - 1. Printouts and worksheets for all highway capacity analysis performed on the intersections or roadway links.
 - 2. Copies of any traffic counts performed or used in the analysis, including the source of count data.
 - 3. Documentation of any assumptions used in the analysis including trip generation data, if not already specified for the analysis.
 - 4. Turning movement volumes and documentation of methodology used to project existing, prior vested and project traffic.
 - 5. Any other applicable data or information.

15. Segment Analysis

- (a) If the peak hour traffic on an impacted segment is projected to exceed the maximum service volume of the adopted Level of Service standard for any phase of the project for which a Final Concurrency Determination is being sought, a transportation analysis must be performed to determine if the actual roadway segment operating characteristics are such that additional capacity is available.
 - 1. The Applicant will submit, in writing, the methodology and approach to be used for each segment analysis prior to conducting the analysis, and will be subject to review and approval by the County. This review will be based on currently accepted traffic engineering principles.
- (b) A segment capacity analysis may be performed to review signal spacing and timing, as well as signal coordination. Such segment capacity analysis shall be performed in accordance with accepted traffic engineering principles and techniques using such computer software programs as the Highway Capacity Software, ART_TAB, ART_PLAN, Transyt-7F, Passer II, or Traf_Netsim at the discretion of the County.
- (c) A travel study may be performed to determine the operating speed and corresponding Level of Service at which the roadway is operating. All data and

analysis from each travel time study must be submitted as part of the report. The methodology for conducting a travel time study, including the number of sample runs, time periods, and length of the relevant roadway link, must be submitted in writing and receive approval by the County prior to conducting the study.

Table 1
St. Johns County P.M. Peak Hour Trip Rate and Percent New Trips Data

ITE Land Use Code	Land Use Description	Independent Variable	P.M. Peak Hour Trip End Estimation Method	Land Use Maximum Size Threshold By Unit			Percentage New Trips
				Small <= 10.00 PHT Trips	Minor > 10.00 to <= 50.00 PHT Trips	Major (LDTA) > 50.00 PHT Trips	
022	General Aviation Airport	Average Flights Per Day	0.30	33	166	> 166	90%
110	General Light Industrial < 150,000 sf GFA	1,000 sf GFA	0.97	10,309	51,546	> 51,546	92%
110	General Light Industrial > or = 150,000 sf GFA	1,000 sf GFA	$T = 1.43 (X) - 157.36$	N/A	N/A	>	92%
130	Industrial Park	1,000 sf GFA	$T = 0.77(X) + 42.11$	N/A	10,246	> 10,246	92%
140	Manufacturing	1,000 sf GFA	$T = 0.78 (X) - 15.97$	33,294	84,576	> 84,576	92%
150	Warehousing	1,000 sf GFA	$\ln(T) = 0.64 \cdot \ln(X) + 1.14$	6,150	76,042	> 76,042	92%
151	Mini-Warehousing	1,000 sf GFA	$\ln(T) = 1.02 \cdot \ln(X) - 1.49$	41,191	199,557	> 199,557	92%
210	Single Family Detached Housing	Dwelling Units	$\ln(T) = 0.90 \cdot \ln(X) + 0.51$	7	43	> 43	100%
220	Apartment	Dwelling Units	$T = 0.55 (X) + 17.65$	N/A	58	> 58	100%
230	Residential Condominium/Townhouse	Dwelling Units	$\ln(T) = 0.82 \cdot \ln(X) + 0.32$	11	79	> 79	100%
240	Mobile Home Park	Occupied Dwelling	$T = 0.57(X) + 2.06$	13	84	> 84	100%
253	Congregate Care Facility	Occupied Dwelling	0.17	58	294	> 294	74%
254	Assisted Living	Beds	0.22	45	227	> 227	100%
310	Hotel	Occupied Rooms	$\ln(T) = 1.20 \cdot \ln(X) - 1.55$	24	94	> 94	71%
311	All-Suites Hotel	Occupied Rooms	0.55	18	90	> 90	71%
320	Motel	Occupied Rooms	$T = 0.53 (X) + 5.95$	7	83	> 83	59%
330	Resort Hotel	Occupied Rooms	$\ln(T) = 1.13 \cdot \ln(X) - 1.52$	29	122	> 122	75%
412	County Park	Acres	0.06	166	833	> 833	90%
416	Campground/Recreational Vehicle Park	Occupied Camp Sites	0.37	27	135	> 135	90%
417	Regional Park	Acres	0.20	50	250	> 250	90%
420	Marina	Berths	0.19	52	263	> 263	90%
430	Golf Course	Acres	$T = 0.13 (X) + 31.30$	N/A	143	> 143	90%
432	Golf Driving Range	Driving Positions	1.25	8	40	> 40	75%
437	Bowling Alley	1,000 sf GFA	3.54	2,824	14,124	> 14,124	75%
444	Movie Theatre with Matinee	Movie Screens (Friday)	45.91	N/A	1	> 1	85%
492	Health/Fitness Club	1,000 sf GFA	$\ln(T) = 0.95 \cdot \ln(X) + 1.43$	2,505	13,635	> 13,635	75%
520	Elementary School	1,000 sf GFA	1.21	8,264	41,322	> 41,322	80%
530	High School	1,000 sf GFA	0.97	10,309	51,546	> 51,546	90%
540	Junior/Community College	1,000 sf GFA	2.54	3,937	19,685	> 19,685	90%
550	University/College	Students	$T = 0.19 (X) + 118.58$	N/A	N/A	>	90%
560	Church (without school) up to 100,000 sq. ft.	1,000 sf GFA	0.55	18,181	90,909	> 90,909	90%
565	Day Care Center	1,000 sf GFA	12.46	802	4,012	> 4,012	74%
590	Library	1,000 sf GFA	7.30	1,369	6,849	> 6,849	90%
610	Hospital	1,000 sf GFA	1.14	8,771	43,859	> 43,859	77%
620	Nursing Home	1,000 sf GFA	0.74	13,513	67,567	> 67,567	75%
630	Clinic	1,000 sf GFA	5.18	1,930	9,652	> 9,652	92%
640	Animal Hospital/Veterinary Clinic	1,000 sf GFA	4.72	2,118	10,593	> 10,593	70%
710	General Office Building < 33,557 sf GFA	1,000 sf GFA	1.49	6,711	33,557	> 33,557	92%
710	General Office Building > or = 33,557 sf GFA	1,000 sf GFA	$T = 1.12 (X) + 78.81$	N/A	N/A	>	92%
720	Medical/Dental Office Building	1,000 sf GFA	$\ln(T) = 0.88 \cdot \ln(X) + 1.59$	2,247	13,994	> 13,994	77%
732	United States Post Office	1,000 sf GFA	11.12	N/A	4,496	> 4,496	25%
750	Office Park	1,000 sf GFA	$T = 1.22 (X) + 95.83$	N/A	N/A	>	92%
760	Research and Development Centers	1,000 sf GFA	$\ln(T) = 0.82 \cdot \ln(X) + 1.09$	4,387	31,233	> 31,233	92%
770	Business Park	1,000 sf GFA	$\ln(T) = 0.92 \cdot \ln(X) + 0.78$	5,232	30,095	> 30,095	92%
813	Free-Standing Discount Superstore	1,000 sf GFA	4.61	2,169	10,845	> 10,845	72%
814	Specialty Retail Center	1,000 sf GLA	$T = 2.40 (X) + 21.48$	N/A	11,883	> 11,883	50%
815	Free-Standing Discount Store	1,000 sf GFA	5.00	2,000	10,000	> 10,000	83%
816	Hardware/Paint Store	1,000 sf GFA	$T = 3.31 (X) + 27.59$	N/A	6,770	> 6,770	74%
820	Shopping Center	1,000 sf GLA	$\ln(T) = 0.67 \cdot \ln(X) + 3.37$	N/A	N/A	>	Equation
823	Factory Outlet Center	1,000 sf GFA	$\ln(T) = 0.43 \cdot \ln(X) + 3.68$	N/A	N/A	>	Equation
843	Automobile Parts Sales	1,000 sf GFA	$T = 7.87 (X) - 14.86$	3,158	8,241	> 8,241	72%
848	Tire Store	Service Bays	3.54	2	14	> 14	72%
849	Tire Superstore	Service Bays	3.17	3	15	> 15	72%
850	Supermarket	1,000 sf GFA	$\ln(T) = 0.61 \cdot \ln(X) + 3.95$	N/A	939	> 939	64%
851	Convenience Market (Open 24 Hours)	1,000 sf GFA	52.41	N/A	954	> 954	39%
853	Convenience Market with Gasoline Pumps	Vehicle Fueling Positions	19.07	N/A	2	> 2	34%
857	Discount Club	1,000 sf GFA	4.24	N/A	11,792	> 11,792	83%
862	Home Improvement Superstore	1,000 sf GFA	2.37	N/A	21,097	> 21,097	52%
863	Electronics Superstore	1,000 sf GFA	4.99	N/A	10,020	> 10,020	60%
880	Pharmacy/Drugstore without Drive-Through Window	1,000 sf GFA	8.42	1,187	5,938	> 5,938	47%
881	Pharmacy/Drugstore with Drive-Through Window	1,000 sf GFA	10.35	966	4,830	> 4,830	51%
890	Furniture Store	1,000 sf GFA	0.45	22,222	111,111	> 111,111	47%
896	Video Rental Store	1,000 sf GFA	$\ln(T) = 0.93 \cdot \ln(X) + 2.61$	718	4,055	> 4,055	70%
911	Walk-In Bank	1,000 sf GFA	12.13	824	4,122	> 4,122	80%
912	Drive-In Bank	Drive-In Windows	27.41	N/A	1	> 1	53%
931	Quality Restaurant	1,000 sf GFA	7.49	1,335	6,675	> 6,675	56%
932	High-Turnover (Sit-Down) Restaurant	1,000 sf GFA	11.15	896	4,484	> 4,484	57%
933	Fast-Food Restaurant without Drive-Through Window	1,000 sf GFA	26.15	382	1,912	> 1,912	57%
934	Fast-Food Restaurant with Drive-Through Window	1,000 sf GFA	33.84	295	1,477	> 1,477	50%
935	Fast-Food Restaurant with Drive-Through & No Indoor Seating	1,000 sf GFA	153.85	N/A	324	> 324	50%
936	Coffee/Donut Shop with Drive-Through Window	1,000 sf GFA	42.93	232	1,164	> 1,164	50%
941	Quick Lubrication Vehicle Shop	Servicing Positions	5.19	1	9	> 9	72%
945	Gasoline/Service Station with Convenience Market	Vehicle Fueling Positions	13.38	N/A	3	> 3	44%
947	Self-Service Car Wash	Wash Stalls	5.54	1	9	> 9	67%
N/A	Auto Repair/Detailing Center (a)	1,000 sf GFA	2.75	3,636	18,181	> 18,181	83%

Sources:

- Institute of Transportation Engineers, Trip Generation, Eighth Edition, 2008.
- Institute of Transportation Engineers, Trip Generation, Seventh Edition, 2003.
- Institute of Transportation Engineers, Trip Generation, Sixth Edition, 1997.
- Institute of Transportation Engineers, Trip Generation, Fifth Edition, 1991.
- Institute of Transportation Engineers, Trip Generation Handbook, 1998.
- Tindale, Oliver & Associates, Inc.

Notes:

- a Land Use 843 peak hour rate (5.98) divided by daily rate (61.91) produces a peak-to-daily ratio of 0.097. Auto Repair/Detailing Center daily rate (28.40) multiplied by 0.097 produces a 2.75 peak hour average rate.