

GRTA DRI REVIEW PACKAGE

TECHNICAL GUIDELINES

GEORGIA REGIONAL TRANSPORTATION AUTHORITY

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GRTA DRI REVIEW PACKAGE TECHNICAL GUIDELINES

ARTICLE 1 GRTA DRI REVIEW PACKAGE PURPOSE

Section 1-101. Purpose.

The purpose of the GRTA DRI Review Package is to establish the technical guidelines for data and analysis required to be submitted to GRTA in order to provide GRTA with the information necessary to determine whether a DRI should be approved. All defined terms used in this document shall have the same meaning as set forth in the GRTA DRI Procedures and Principles.

ARTICLE 2 GRTA DRI REVIEW METHODOLOGY & METHODOLOGY MEETING

Section 2-101. Methodology Meeting.

The methodology to be employed in the preparation of a GRTA DRI Review Package shall be discussed at the Methodology Meeting hosted by GRTA. Wherein the Regional Commission (RC) has adopted procedures that include a pre-review meeting, the RC and GRTA should coordinate to hold one meeting to include the GRTA Methodology Meeting purpose.

Section 2-102. Required Methodology Information for Non-Expedited Review.

The applicant shall present the following information:

- Description of project location, size, and character, in particular how the project relates to existing development in the area, existing infrastructure, and governmental regulations (i.e. zoning, Future Land Use Plans, corridor plans, etc.).
- Map of development area
- DRI Plan of Development (site plan)
- Proposed methodology to be used for traffic distribution and assignment.
- Assumptions related to data collection activities. For example, what is the acceptable age of old traffic counts to be used, and how will they be factored to existing conditions?
- Method to be used to project future year background traffic.
- Assumptions related to use of TIP, RTP, and/or locally funded projects as part of existing or future conditions analysis.
- Capacity analysis procedures.
- Trip generation data sources, including all variables and assumptions used to calculate proposed trip generation.
- Mode split assumptions.
- Roadway character and classifications and related LOS standards.
- Contact information for the applicant team.
- Other pertinent factors.

Section 2-103. Required Methodology Information for Expedited Review.

The applicant shall present the following information:

- Description of project location, size, and character, in particular how the project relates to existing development in the area, existing infrastructure, and governmental regulations (i.e. zoning, Future Land Use Plans, corridor plans, etc.).
- Map of development area.
- DRI Plan of Development (site plan).
- A description of how the proposed DRI meets the Expedited Criteria and supportive data.
- Trip generation data sources, including all variables and assumptions used to calculate proposed trip generation.
- Proposed methodology to be used for an access analysis of site access points and nearby intersections.
- Contact information for the applicant team.
- Other pertinent factors.

ARTICLE 3 GRTA DRI REVIEW PACKAGE OVERVIEW

Section 3-101. Contents of the GRTA DRI Review Package.

The GRTA DRI Review Package shall include the following:

- A description of the proposed DRI and a site plan showing the location and intensity of proposed land uses, as well as the local case number(s) or reference number(s) for the application triggering the GRTA DRI Review.
- Detailed assessments of the extent to which the proposed DRI may satisfy the DRI review criteria for DRI Review.
- An analysis of the transportation impacts of the proposed DRI within the study network.
- Identification of planned and programmed transportation improvements within the Study Network.
- Identification of transportation services and access improvements that are required to serve the proposed DRI which may require federal or state funding.
- Transmittal letters identifying all parties which have received the review package.

Section 3-102. Transportation Analysis.

The transportation analysis required to be included in the GRTA DRI Review Package is to be prepared in accordance with the methodologies in these Technical Guidelines.

- A. **Intersection Analysis.** Intersection analyses shall be conducted according to the most recent release of Transportation Research Board (TRB) Report 209, The Highway Capacity Manual (HCM). Synchro Software developed by the Trafficware Corporation which complies with the HCM is an allowable alternative.
- B. **Roadway Segment Analysis.** The Highway Capacity Manual is the preferred method of analysis for roadway segments. However, the simplified analysis developed by Florida Department of Transportation (available on their website at <http://www.dot.state.fl.us/Planning/>) or any other previously approved methodology may also be used.

- C. **Service Volume Thresholds.** Table 5, included in the appendices, (an excerpt from FDOT’s Level of Service Handbook) sets forth the generalized service volume thresholds for given levels of service for varying facility types and the input assumptions for the level of service standards. These tables may be modified to reflect area-specific conditions, if approved by GRTA at the DRI Methodology Meeting based on appropriate documentation, and may be used as an alternative to detailed link analysis using HCM analysis procedures. A more detailed analysis may be employed at the applicant’s option.
- D. **Level of Service Standards (Analysis).** The level of service standards (“LOS”) established in the *Highway Capacity Manual*, published by the Transportation Research Board shall be used in the analysis of traffic impacts. (See Table 1). However, all LOS standards shall be constrained by a maximum volume to capacity (v/c) ratio of 1.2. For example, an urban signalized intersection operating at LOS E, with a v/c = 1.3 is considered to not meet the LOS standard.

TABLE 1 - LEVEL OF SERVICE (LOS) DESCRIPTIONS

General Roadway Segments

LOS	General Characteristics
A	Nearly free-flow conditions; full freedom to maneuver within traffic stream
B	Nearly free-flow conditions; with some restrictions on maneuverability
C	Nearly free-flow conditions; with noticeable restrictions on maneuverability
D	Declining speeds; increasing densities; restricted maneuverability
E	At capacity; unstable flow; reasonable speeds; very little, if any, freedom to maneuver
F	Unstable flow conditions; low speeds; significant queuing at constricted points

Measurement Statistics: For rural and suburban roadways, LOS is a function of the volume to capacity ratio (v/c). For urban roadways, LOS is defined by the average travel speed along a roadway segment.

- E. **Level of Service Standards (Assessment and Mitigation).** The LOS standards adopted within the transportation element of the local government’s Comprehensive Plan shall be used for impact assessment and mitigation analysis. If the local government does not have adopted LOS standards, then all roadways shall be evaluated at a LOS D standard.

For DRIs located in Major Activity Centers as defined by the RDP, a LOS standard one level lower than the standard set out above, provided that the reduced level of service is no lower than LOS E.

Where roadways are parallel to a fixed guideway or busway transit facilities, such roads will be evaluated at one LOS lower than the standard set out above.

Section 3-103. Report Outline.

The GRTA DRI Review Package for a particular DRI shall be prepared according to the outline in Table 2 below.

TABLE 2 - GRTA DRI NON-EXPEDITED REVIEW PACKAGE OUTLINE

- | | |
|--|--|
| 1. Project Description | |
| 2. Local Case Number(s) or Reference Number(s) | |
| 3. Review package transmittal letters | |
| 4. Site Plan | |
| 5. Consistency with Adopted Comprehensive Plans | |
| 6. Project Phasing Schedule | |
| 7. Bicycle and Pedestrian Facilities Description (On-site and Off-site) | |
| 8. Transit Facilities and Capacity Description (On-site and Off-site) | |
| 9. Trip Generation | |
| 10. Gross Trip Ends Analysis | |
| 11. Net Trip Ends Analysis | |
| 12. Internal Capture Reduction Analysis (If applicable) | |
| 13. Modal Analysis (If applicable) | |
| 14. Pass-by Trips Analysis (If applicable) | |
| 15. Trip Distribution and Assignment | |
| 16. Study Network Determination – “Study Area” | |
| 17. Existing Conditions | |
| 18. Planned and Programmed Improvements in Study Area | |
| 19. Description of Transportation Facilities in Study Network | |
| 20. Analysis Summary | |
| 21. Future Year Background Traffic | |
| 22. Future Year Total Traffic | |
| 23. Facility Needs Analysis (Background and Future) | |
| 24. Roadway Segment and Intersection Analysis | |
| 25. Site Access Analysis | |
| 26. Other Pertinent Information | |
| 27. Significant Impacts Analysis | |
| 28. Traffic Movement Diagrams Required If Not Otherwise Included in Package
(turning movements and intermediate balanced one-way segment volumes showing each
peak period on each diagram) | |
| 29. Existing Traffic | |
| 30. Background Future Traffic (one for each phase) | |
| 31. Site Traffic (based on net trip generation; one for each phase) | |
| 32. Total Future Traffic (one for each phase) | |

Use this list as a Checklist to aid in the Completeness Review.

ARTICLE 4 GRTA DRI NON-EXPEDITED REVIEW ELEMENTS

Section 4-101. Project Description.

A project description shall be provided for the project, including a location map and aerial photograph and a tabular description of site area, natural features, existing land uses, proposed land uses and intensity of uses, off-street parking, access points and any features which relate to the interaction between uses, trip making and alternative modes of transportation.

Section 4-102. Local Plan Summary.

An explanation as to how the proposed DRI relates to the local government's Comprehensive Plan in particular the transportation and capital improvements element, and any transportation improvements listed in the Short-Term Work Program(s) within the vicinity of the DRI.

Section 4-103. Project Phasing.

A phasing schedule shall be provided for any proposed DRIs involving multiple phases. The phasing schedule shall include the types and amounts of land uses to be developed and should be identified by phase, the site location of each land use by phase, the amenities to be developed with each phase, and all transportation elements. The transportation elements shall focus upon infrastructure in place, access to the development, and internal mobility during each phase analyzed.

Section 4-104. DRI Review Criteria and Users' Guide

As part of the GRTA DRI Review process, GRTA has established review criteria by which DRI submittals are to be evaluated. GRTA has established three types of criteria, which may be found in the *Procedures and Principles* document in Section 3-101: General Criteria Applicable to All Proposed DRIs, Section 3-102: Criteria for Expedited Review, and Section 3-103: Criteria for GRTA DRI Non-Expedited Review.

The criteria by which a proposed DRI shall be evaluated are determined by the type of review sought, either Expedited or Non-Expedited Review. All DRIs must provide information indicating conformance to the criteria established in Section 3-101: General Criteria Applicable to All Proposed DRIs. As an example, a proposed DRI seeking an Expedited Review would be required to comply with the criteria found in Section 3-101 and one of the options found in Section 3-102.

In order for a proposed DRI to conform to its respective criteria, each DRI submittal shall be required to include as part of the DRI Review Package detailed statements of how the proposed DRI is meeting the purpose and intent of each applicable criteria.

The DRI Review Package Submittal assessment shall be incorporated into the DRI Review and Technical Analysis Transmittal released by GRTA staff. The staff comments will then become the basis of the Staff Report and Recommendations.

In addition to these review criteria, GRTA has developed a *DRI Users' Guide* which better defines each criterion and that provides more detailed information concerning what GRTA will be seeking from a DRI Plan of Development and its infrastructure impacts.

Section 4-105. Site Plan.

A site plan in paper and digital forms (.jpeg, .gif, or .pdf formats) shall be provided that meets GRTA DRI Site Plan Guidelines (available in the Appendix). The site plan shall be accompanied by a description in the traffic analysis of: 1) any unique features or characteristics (for instance, if a retail center is composed of specialty uses, without large anchor tenants, etc); 2) required and provided parking by land use, together with any shared parking anticipated for the development; 3) an explanation of the physical relationship between the different uses within and adjacent to the site; and 4) any design features that encourage interactions between uses within and adjacent to the site.

The site plan shall also be accompanied by: 1) an explanation of the anticipated function of site access during peak periods; 2) the form, if any, of traffic control which is proposed; and 3) a turning movement analysis for all site access locations and any unique geometric features of the access points, if any.

Section 4-106. Bicycle and Pedestrian Facilities Description.

A description of any on and/or off-site provisions for non-motorized travel should be described, including:

- The location and character of any nearby local or regional trails;
- The location of bicycle paths or sidewalks in the immediate vicinity of the proposed DRI;
- An explanation of how on-site bicycle and pedestrian facilities relate to adjacent existing or proposed bicycle/pedestrian facilities;
- A description of proposed bicycle and pedestrian connections between uses within the proposed DRI to encourage interaction between the uses;
- An explanation of how bicycle and pedestrian facilities connect the development with adjacent and nearby uses, such as transit facilities, schools, parks, and other high trip generation uses;
- A description of the local government's requirements for bicycle/pedestrian facilities or identification of any special overlay district the development may be located within, and how the development meets or exceeds the requirements of the overlay zone.

If a proposed DRI relies upon bicycle and/or pedestrian travel as a basis for reducing off-site traffic impacts through on-site interactions between land uses, the GRTA DRI Review Package shall include a detailed explanation of the justification for the proposed reductions and the assumptions on which the explanation is based.

Section 4-107. Transit Facilities.

Provide a description of transit facilities in the vicinity of the DRI. If a reduction in off-site vehicle trips through the use of transit to and from the DRI is anticipated, the amenities, facilities or programs to be included in the proposed DRI that justify these reductions shall be described. Identify the location and character of connections to off-site transit facilities or bus stops. If bus stops are proposed on-site, provide a description of the on-site design features that allow access to these stops. If the location of additional bus stops will require existing bus routes, identify the affected routes. If the project is located within one half of one mile of the pedestrian entrance to

an existing or proposed fixed guideway transit facility, describe how the project will connect to and interact with these facilities. For a DRI not located within one half of one mile of the pedestrian entrance to a fixed guideway transit facility, some reduction in off-site trips to and from the DRI may also be justified if permanent shuttle services are provided between the transit facility and the DRI on a regular basis. Changes in transit service or bus stop location shall be discussed with the local transit provider prior to including proposed changes in service or bus stop locations in DRI application.

Section 4-108. Trip Generation.

The GRTA DRI Review Package shall include an explanation of all assumptions used and calculations performed to estimate the total number of trip ends to be generated by or attracted to the proposed DRI, including any reduction attributable to internal capture, transit or modal splits, and pass-by trips. In the case of proposed DRIs to be developed in phases, trip generation analyses shall be reported by project phase.

- A. **Gross Trip Ends Analysis.** The gross trip ends to be generated by the proposed DRI shall be identified in tabular format based on the most recent edition of Trip Generation, published by the Institute of Transportation Engineers (ITE) or as approved by GRTA. The table shall identify the use, the ITE Trip Generation land use category, the daily, peak period generation rates and generated trips. The standard procedure is to include AM and PM peak and daily trip generation analyses of traffic conditions; however, GRTA may request other peak periods (e.g., Saturday midday peak period or Sunday peak period for a church) or may waive requirements for the A.M. peak period. Such requests or waivers must be discussed and agreed upon at the Methodology Meeting based on local conditions and the peaking characteristics of the proposed land uses.

All analysis of trip generation shall follow the recommended procedures for selecting rates and equations shown in Figure 3.1 in Trip Generation Handbook—A Recommended Practice of the Institute of Transportation Engineers.

If ITE Trip Generation rates are not available or applicable, trip generation rates shall be provided by the applicant and the data collection methodology shall follow the guidelines established in Chapter 4, “Conducting a Trip Generation Study”, in Trip Generation Handbook—A Recommended Practice of the Institute of Transportation Engineers. Any proposed trip generation study methodology (and potentially, preliminary results) shall be discussed and agreed upon at the Methodology Meeting.

Certain types of Expedited Reviews, as indicated in the Procedures and Principles document, only require the submittal of a trip generation memorandum based upon the Trip Generation Handbook – A Recommended Practice of the Institute of Transportation Engineers or by other means as agreed upon with GRTA staff.

- B. **Net Trip Ends Analysis.** The gross trips calculated through application of the ITE rates or special studies may be reduced based on the interaction between land uses, modal split assumptions, or pass-by trips.

Net trip ends to be generated by the site will be defined as the total off-site trips to be generated by or attracted to the site. Analysis of these trips will be provided in the GRTA DRI Review Package for peak periods and for the daily trip generation and will be performed on a directional basis.

The net trip ends analysis will be summarized in matrix format, with trip reduction assumptions and actual numbers clearly identified.

- 1. Internal Capture Reduction.** In the event that complementary land use types are to be developed in a proposed DRI and the GRTA DRI Review Package relies upon a “mixed use reduction” or “internal capture,” the amount of the reduction and the interaction on which the reduction is based shall be documented by the applicant. Trip reduction analysis shall be prepared in accordance with the ITE Trip Generation Handbook, Chapter 7: Multi-Use Development.

Tables 7.1 and 7.2 of the ITE Trip Generation Handbook establish the maximum mixed use reductions which may be considered as a part of the trip reduction analysis. In order to qualify for a reduction in trip generation, the GRTA DRI Review Package shall demonstrate that site design features incorporated in the site plan justify the application of mixed use reductions to the proposed DRI.

Any proposed trip generation reductions shall be discussed at the Methodology Meeting. If there are other considerations beyond those described in the *ITE Trip Generation Handbook* that justify additional trip reductions, they should be presented to GRTA for approval prior to submitting an GRTA DRI Review Package.

- 2. Alternative Modes of Transportation.** Reductions in off-site vehicle trips may also be recognized for anticipated use of alternative modes of transportation including transit, bicycle or pedestrian access.

If trip generation reductions are assumed based on modal splits, the justifications for these assumptions shall be described in the GRTA DRI Review Package. In the case of transit, existing or proposed routes that service the site should be identified. In the case of non-motorized trips, the discussion of internal capture in the *ITE Trip Generation Handbook* may be used as a basis for the degree of interaction between adjacent land uses. Appendix B, Tables B.1 through B.3 sets out appropriate transit reduction factors that may be considered.

- 3. Pass-by Trips.** In the case of retail and other applicable uses, an additional adjustment in trip generation may be made to account for “pass-by capture”. For these land uses, some portion of the total trips generated will be trips which are already on the road that will be diverted from the adjacent traffic stream as the trip maker passes by the use while on the way to another destination. These trips are already present in the traffic stream and do not create additional trips on the adjacent roadway facilities, though there are impacts associated with them as turning movements at the project driveways.

In the preparation of a GRTA DRI Review Package for a proposed DRI, trip reduction for pass-by trips shall be determined by calculating pass-by trips as provided for in the *ITE Trip Generation Handbook*, limiting total pass-by trips associated with a site to 15% of the adjacent roadway’s projected traffic volume.

- 4. Order of Trip Reduction.** The order of analysis for mode split reduction, internal capture reduction, and passer-by reduction shall be: internal capture reductions,

mode split reductions, then pass-by reductions. Each of the reductions shall be applied to the net trips after the application of the immediately previous reduction.

Section 4-109. Trip Distribution.

Listed below, are three methods of trip distribution that are acceptable to GRTA for use in DRI analyses. In addition to these, GRTA will accept a combination of these methods with the inclusion of existing travel patterns as discussed at the Methodology Meeting with GRTA staff and with input provided by the local government, the RDC, and other agencies.

- Census tract analysis
- Market Analyses
- TRANPLAN-based analysis

If methods other than these are proposed, they will require prior approval by GRTA. Any method proposed should be reviewed with GRTA at the Methodology Meeting.

A. **Census Tract Analysis.** For the census tract analysis, population and employment projections in the project vicinity shall be obtained from ARC, and shall serve as the basis for this method. This method will develop site project traffic distribution by evaluating the distribution of productions or attractions near the site. For instance, for a retail facility, the distribution of population near the site would be reviewed. The distance of census tracts from the site to be used in the analysis should be proposed by the applicant. In general, the larger the site, the larger an area it will draw employees and patrons from, and so the larger an area of census tracts should be analyzed. For a housing-based DRI, the distribution of employment near the site would similarly be investigated.

In either case, the future year census projections to be used should be the projections that most closely approximate the anticipated build-out year of the project. For instance, a project with a proposed opening day in 2005 should use ARC's 2005 projections.

After deciding upon which tracts to use, the population or employment in the total study area is summed, and the percentage of the total represented in each tract is calculated. These percentages are then overlaid on a transportation map, and distributions to major transportation facilities are estimated.

B. **Market Analyses.** For many projects, a market analysis may have already been completed that identifies target demographics for the proposed site, and the distribution of these targeted populations in the project vicinity. For instance, a housing development may have a targeted income range, and the distribution of jobs in this range in the project vicinity may have been calculated. Similarly, many retail facilities target specific population segments, and the distribution of these demographics is part of the decision process related to the targeted tenants for the facility.

In cases where market analyses have been conducted for a property or development, it may be appropriate to use the results of this analysis as a means of developing project traffic distribution, and may be so used at the option of the applicant.

C. **TRANPLAN-Based Analysis.** Given that the adopted TRANPLAN model embodies the assumptions made in the development of the Regional Development Plan and Regional Transportation Plan, another method of developing project traffic distribution would be

the use of the TRANPLAN model. The simplest method in using the model would be the following:

- Locate the traffic analysis zone within which the project lies.
- Calculate the number of trips produced by and attracted to that zone.
- Execute a select zone analysis to identify the amount of traffic assigned by TRANPLAN to and from that zone to/from the surrounding transportation network.
- Calculate the percentage of trips assigned for to each segment.
- The resulting percentage calculated would represent the project trip distribution to be used for project traffic assignment.

D. **TRANPLAN Distribution Methodology.** The regional model in use in the Metro Atlanta area contains data and assumptions related to the Regional Development Plan, the Regional Transportation Plan, and the Regional Transportation Improvement Plan. The regional TRANPLAN model is an approved method of identifying traffic distribution and assignment for DRI projects under GRTA's review. GRTA recognizes that the model may not always be the best method for these analyses.

If trip distribution and assignment is based on TRANPLAN, the following methodology shall be used to develop projected traffic distribution and assignment:

- Start with the regional TRANPLAN model.
- Interpolate the land use and socioeconomic data sets to project conditions for the build-out year of the phase or project.
- Verify that the transportation network includes only existing plus committed facilities.
- Create a new traffic analysis zone for the proposed project. Within this new zone, input the amount of development proposed for the project. Execute the model as described previously to determine the project traffic distribution.
- Determine total trips generated by the new zone, so that the percentage of project trips assigned by the model can be determined.
- If there are additional roadways which should be part of the study area network and are not included in the model, then a post-model adjustment can be made to distribute traffic to these facilities.
- Calculate the percentage of trips assigned to each roadway segment in the project vicinity.
- Multiply the percentage of project traffic by the external trips generated by the site as determined previously under the new trips section of the analysis.

E. **Traffic Assignment.** The methodology to be employed for traffic assignment shall be discussed and agreed upon at the Methodology Meeting and shall be documented in the GRTA DRI Review Package.

Section 4-110. Study Network.

The roadway segments and intersections which carry significant amount of trips generated by a proposed DRI shall comprise the “Study Network”. This network shall be the geographic basis for the transportation analysis in a GRTA DRI Review Package for a proposed DRI.

The study network, as a minimum, shall include all access points and / or all accesses on major roads and extend in each direction to the nearest intersection with a major roadway. All intersections between the DRI and these endpoints shall also be included in the study network.

To determine if additional intersections are required, the following steps shall be taken:

- Assign trips generated by a proposed DRI to the road network according to the methodology set out in these Technical Guidelines using daily Gross Trip Ends Analyses.
- Compare project traffic assignments to the adjusted two-way generalized roadway service volumes at the appropriate level of service standard.
- Where the gross trips generated by a proposed DRI exceed 7% of the two-way, daily service volumes at the appropriate level of service standard, the segment will be included in the study network.
- All signalized intersections and any major unsignalized intersections, which are located within or at either end of roadway segments, which are a part of the Study, shall be included in the study network.

GRTA may, at its discretion, agree to a smaller study network under these technical guidelines, where the reduction in the study network is justified by a clear and convincing demonstration at the Methodology Meeting that analysis of the full study network will serve no useful purpose.

GRTA may, at its discretion, agree to reduce the number of intersections and access points to be studied within the study network in cases if minor intersections are signalized, and do not significantly impede traffic flow along a corridor. The applicant may remove these intersections from the analysis with prior approval from GRTA. Additionally, GRTA may require a larger study network at the request of an affected jurisdiction, agency, RDC, or GRTA staff.

An example application of the study network determination is provided in the Appendix.

Section 4-111. Existing Conditions.

A GRTA DRI Review Package for a proposed DRI shall include a description of existing traffic conditions in the Study Network.

- A. Description of Transportation Facilities in Study Network.** The GRTA DRI Review Package shall include a description of the existing major transportation facilities in the study network, including the number of lanes, existing traffic volumes, and other pertinent data. The information shall be shown on a map and shall include existing turn lanes and other geometric features of roadway segments and intersections that lie within the study network.
- B. Existing Operations Summary.** A summary of the existing conditions in the study network describing the intersection and roadway segment capacity analyses shall be included.

For roadway segments, signalized and unsignalized intersections the procedures in the Highway Capacity Manual (HCM) should be utilized. However, other methodologies may be used if approved by GRTA prior to submittal of the GRTA DRI Review Package.

In situations where a roadway segment or intersection is currently operating below the appropriate level of service standard, an improvements analysis shall be conducted to determine the minimum improvements required to provide the appropriate LOS standard for existing traffic, while taking into account any constraints in the roadway segment or intersection. The improvements analyses shall utilize procedures outlined in the Highway Capacity Manual for both intersections and roadway segments.

The summary of the existing LOS analysis shall be presented in tabular form and graphics shall be provided showing the improvements required (if any) to provide acceptable operating conditions for all roadway segments and intersections in the study network.

Section 4-112. Planned and Programmed Improvements in Study Network.

As part of the GRTA DRI Review Package, the applicant will review the adopted versions of the Transportation Improvement Program, the Regional Transportation Plan, MARTA's work program, GDOT's Construction Work Program, local government work programs (including SPLOST), and improvements associated with the build-out of other developments. The purpose of this review will be to identify projects planned or programmed within the study network during the development schedule of the proposed DRI. A list of projects, including the project name, the character of the improvement, the time frame in which the transportation improvement will be open to the public, the increase in capacity (if applicable), the information source, and the adoption date of the information shall be provided in tabular form in the report. If desired by the applicant, this information may also be shown on a map.

The applicant and GRTA must agree at the Methodology Meeting the planned and programmed improvements for which a proposed DRI may consider as new capacity for the purpose of level of service analyses, the timing of the improvements and the capacity added from such improvements.

Section 4-113. Future Year Background (No-Build) Traffic.

Future traffic on the study network, not including the trips generated by a proposed DRI, shall be estimated for each phase of a proposed DRI. There are two methods that the applicant may use to determine future year background traffic: 1) growth rates developed from historic traffic growth patterns; and 2) model-developed growth rates.

The preferred method for developing background traffic growth rates is historic traffic counts in the study network. These growth rates are applied to existing year traffic volumes to estimate future year background traffic.

In the event that historic growth rates vary by facility within the study network, the traffic analysis may be prepared using the actual rates by facility, or an average growth rate by major facility or facility type, or for the study network as a whole may be used subject to GRTA's approval at the Methodology Meeting.

Model developed growth rates may also be used in developing background traffic. Two variations of using the model are allowed:

- A. **Running the model.** Subtract the data from an existing year run of the TRANPLAN, from a model run based on an interpolated data set for the future year date. Comparison of the modeled link volumes for roadways in the study network will result in a growth rate predicted for each segment.
- B. **Using model output.** Obtain the latest approved regional travel demand model output from GRTA and identify volumes from the random roadways in the study network for two years—one nearest the existing conditions and one nearest the build-out year and use the difference between the two numbers to calculate an annual growth rate.

In cases where significant differences in traffic growth exist on the various roadways contributing to an intersection, the applicant may wish to use the projection procedures established in National Cooperative Highway Research Center (NCHRP) Report 253 in lieu of direct application of a standard rate to all intersection turning movements.

Section 4-114. Future Year Total (Build) Traffic.

After future year background traffic has been developed, trips generated by the proposed DRI shall be added to existing and background traffic to establish future year total traffic. Graphics shall be provided for each phase of development that identify background traffic, project traffic, and total traffic for intersections and roadway segments within the study area.

Section 4-115. Facility Needs Analysis.

After future background and future total traffic are identified, then a facility needs analysis shall be conducted to identify road and intersection improvements required to maintain an acceptable level of service. The GRTA DRI Review Package shall include documentation of the analysis assumptions, methods, and results.

- A. **Roadway Segment and Intersection Analysis.** In order to identify the mitigation that is required with the DRI built-out, the following analyses should be performed:
 - 1. Analyze background volumes with planned and programmed improvements that will be in place in the horizon year, excluding any improvements required in the existing conditions analysis.

If background conditions do not operate at the appropriate LOS standard, identify the minimum improvements needed to restore the LOS standard.
 - 2. Analyze future year total traffic conditions with planned and programmed improvements that will be in place in the horizon year plus traffic associated with the proposed DRI, excluding any geometric improvements required in the future background condition. If future conditions do not operate at the appropriate LOS standard, identify the minimum improvements required to restore the LOS standard.

Changes to signal timing splits or cycle lengths should not be considered mitigation. Changes to phasing, except in cases where there is a new approach to an intersection, can be considered toward mitigation. However, all the timing parameters shall comply with the general signal timing practices of the jurisdiction maintaining the signal. (An intersection analysis example is included in the Appendices in Table 6.)

If the traffic volumes in the area are low and it appears that the future operations will meet the required LOS standard, the future conditions may be analyzed first, with no improvements. If the future levels of service are at or better than the established standard, no further analysis is necessary.

3. The results of these analyses shall be presented in tabular form showing the following:
 - The LOS under each scenario; and,
 - Improvements necessary under future background and future total traffic conditions; and,
 - Required improvements shall be depicted on a map series, separately showing the improvements required for background traffic and the improvements required for total traffic.

- B. **Site Access Analysis.** Capacity and traffic generation analysis shall be prepared for all access between the proposed DRI and public roads. This analysis shall identify the level of service, geometric requirements, and control methods required for each access location to public roadway facilities. The geometrics required at each intersection shall be included on the graphic described under Total Traffic Analysis.

Section 4-116. Other Pertinent Information.

Other pertinent information may be provided at the applicant's option. Pertinent information could be anything germane to the project that GRTA could use to consider the merits of the project beyond the technical aspects of the transportation and air quality analysis. For instance, if a project represents an opportunity to create infill development in a desirable infill area, then this could be noted as other information important to the project. Similar items could include projects, which promote affordable housing, transit oriented development, developer mitigation commitments, or other information as deemed appropriate by the applicant.

The applicant has the option of submitting multiple recommendations as mitigation solutions to meet the required LOS standard as part of the transportation analysis. The inclusion of multiple recommendations should occur only when the context and character of the area require additional consideration. If multiple mitigation recommendations are provided, the traffic analysis shall identify the preferred alternative.

APPENDICES

TABLE 3 - GRTA DRI SITE PLAN INFORMATION GUIDELINES

These guidelines are intended to assist applicants in preparing DRI site plans for review, by listing the specific information that the applicant should include on the site plan that is submitted as a part of the DRI Review Package. GRTA and the applicant will agree to any modifications or additions to the following list of items prior to the applicant submitting the DRI Review Package.

- **General Information**
 - DRI Number
 - Project name
 - Location map showing relationship of project to adjacent roads
 - Drawing scale indicated and drawn at a minimum of 200' per inch
 - North arrow
 - Traffic consultant / site planner contact information
 - Client contact information
 - Date of the drawing including revision dates
 - Jurisdictional boundaries
- **Property information**
 - Site acreage
 - All property lines around the perimeter of the site
 - All property lines internal to the site, including those related to new subdivisions
 - All property lines, uses, zoning and ownership of parcels adjacent to the site
 - All right of way lines for roads adjacent to the site
- **Natural features**
 - Water features on site including Jurisdictional Waters of the U.S. (streams and wetlands)
 - Topographic lines with a 5' maximum interval (grey and/or thin lines)
- **Location, size, and character of the proposed development including:**
 - Building footprints and square footage excluding footprints and square footage for single family detached and single family attached housing
 - Total number of residential units and square footage of non-residential development
 - Uses of all existing and proposed buildings on site, including future uses of existing buildings where applicable
 - Number of stories in excess of one for each building on site
 - A delineation of phases if applicable
 - A calculation of density in gross residential units per acre and in a floor area ratio for all other uses.
 - Location and size of existing or proposed preserved open space and dedicated park space
- **Transportation infrastructure**
 - Traffic signalization, proposed and existing
 - Right of way width, number of through and turn lanes on existing and proposed public and private roads
 - The number and location of parking spaces to be provided and the minimum number required by the local government
 - The location, size and character of all site access locations
 - Access points along opposing road frontages
 - Road names including state and federal route numbers
 - Labeling of medians, sidewalks, bike lanes and trails, existing and proposed
 - Naming convention for all proposed roads and driveways (eg. Road A, Road B, and Road C or Driveway 1, Driveway 2, and Driveway 3) to match analysis report

TABLE 4 - STUDY NETWORK DETERMINATION EXAMPLE

Proposed Project: 1,000 single-family dwelling units
Trip Generation, per ITE: 8,622 trip ends per day

Study area road network assumptions:

Roadway A – 4 lane undivided urban roadway with turn lanes– 1 signal per mile – 4 LD-1
Roadway B – 4 lane divided urban roadway with turn lanes– 2 signals per mile – 4LD-2
Roadway C – 2 lane undivided unsignalized roadway without turn lanes – 2L -0
Roadway D – 2 lane divided – 1.5 signals per mile with turn lanes – 2L-1

Level of Service Standards:

Roadway A is a protected high-capacity corridor, with a LOS Standard of C
Roadway B is a typical urban facility, with a LOS Standard of D
Roadway C is a typical urban facility, with a LOS Standard of D
Roadway D is in a LOS maintenance area with a LOS Standard of E

Traffic Distribution:

Shown in Example table.

Presumptive Impact/Significance Threshold:

Project traffic >7% of facility capacity will be on study area network for further analysis.

Roadway Segment	Facility Type	Facility LOS Standard	Facility Service Volume @ Standard (vpd)	Adjusted Facility Service Volume @ Standard (vpd)*	Project Traffic Distribution	Project Trips Assigned	% Service Volume Consumed	Presumptive Impact (>7%)?
Roadway A	4LD-1	C	33,200	31,540	30%	2,587	8.2%	Yes
Roadway A	4LD-1	C	33,200	31,540	25%	2,156	6.8%	No
Roadway A	4LD-1	C	33,200	31,540	18%	1,552	4.9%	No
Roadway B	4LD-2	D	33,500	33,500	35%	3,018	9.0%	Yes
Roadway B	4LD-2	D	33,500	33,500	25%	2,156	6.4%	No
Roadway B	4LD-2	D	33,500	33,500	17%	1,466	4.4%	No
Roadway C	2L-0	D	24,800	24,800	15%	1,293	5.2%	No
Roadway C	2L-0	D	24,800	24,800	12%	1,035	4.2%	No
Roadway C	2L-0	D	24,800	24,800	10%	862	3.5%	No
Roadway D	2L-1	E	16,600	17,430	20%	1,724	9.9%	Yes
Roadway D	2L-1	E	16,600	17,430	15%	1,293	7.4%	Yes
Roadway D	2L-1	E	16,600	17,430	5%	431	2.5%	No

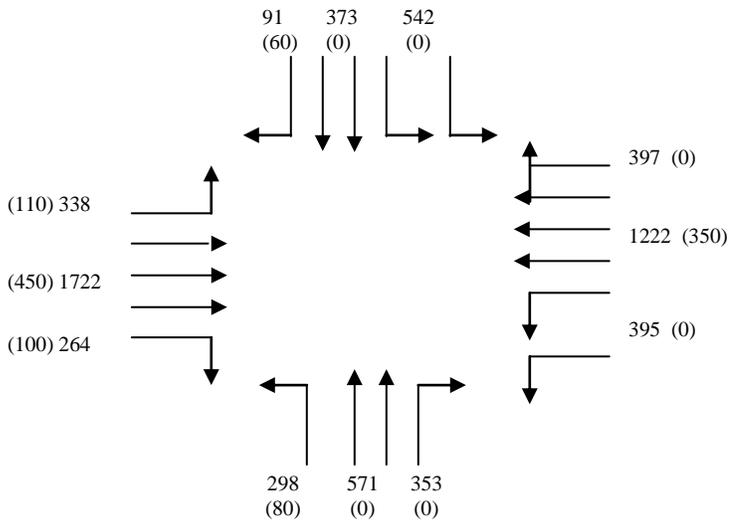
*Left-turn lane and divided roadway adjustments from Table 5-4

TABLE 5

Generalized Annual Average Daily Volumes for Use in GRTA's DRI Review											
State Two-Way Arterials						Freeways					
Unsignalized (Uninterrupted Flow)						Group I (w/in urban area 500,000+ w/in 5 miles of CBD)					
Lanes /Divided	Level of Service					Lanes	Level of Service				
	A	B	C	D	E		A	B	C	D	E
2/undivided	8,900	13,900	18,900	24,800	33,100	4	21,200	34,300	51,500	66,200	81,700
4/divided	21,500	35,800	50,100	60,100	71,600	6	32,600	52,700	79,000	101,600	125,400
6/divided	32,200	53,700	75,200	90,200	107,400	8	44,500	71,800	107,800	138,600	171,100
						10	55,600	89,800	134,700	173,200	213,800
						12	65,200	105,400	158,100	203,200	250,900
Interrupted Flow						Group II (w/in urban area 500,000+ not included in Group I)					
Class I (> 2 signalized intersections per mile)						Level of Service					
Lanes /Divided	Level of Service					Lanes	Level of Service				
	A**	B	C	D***	E***		A	B	C	D	E
2/undivided	N/A	10,800	15,600	16,600	16,600	4	20,900	32,800	49,200	62,600	74,500
4/divided	N/A	23,500	33,200	35,000	35,000	6	32,100	50,400	75,600	96,200	114,500
6/divided	N/A	35,800	49,900	52,500	52,500	8	43,800	68,800	103,200	131,300	156,300
8/divided	N/A	45,300	61,400	64,400	64,400	10	54,700	86,000	129,000	164,200	195,400
						12	64,100	100,800	151,200	192,400	229,100
Class II (2-4.5 signalized intersections per mile)						Non-State Roadways (Major City/County Roads)					
Lanes /Divided	Level of Service					Lanes	Level of Service				
	A**	B**	C	D	E		A**	B**	C	D	E
2/undivided	N/A	N/A	9,900	14,900	16,200	2/undivided	N/A	N/A	8,600	14,600	16,000
4/divided	N/A	N/A	22,900	32,500	34,300	4/divided	N/A	N/A	19,800	31,700	33,900
6/divided	N/A	N/A	35,500	48,900	51,700	6/divided	N/A	N/A	30,800	47,800	51,000
8/divided	N/A	N/A	44,700	60,100	63,400						
Class III (> 4.5 signalized intersections per mile but not in CBD)						Other Signalized Roadways (Signalized Intersection Analysis)					
Lanes /Divided	Level of Service					Lanes	Level of Service				
	A**	B**	C	D	E		A**	B**	C	D	E
2/undivided	N/A	N/A	3,300	12,100	15,800	2/undivided	N/A	N/A	4,800	10,900	11,900
4/divided	N/A	N/A	7,800	27,800	33,600	4/divided	N/A	N/A	11,600	23,800	25,400
6/divided	N/A	N/A	12,100	43,300	50,500						
8/divided	N/A	N/A	15,300	54,200	62,100						
Class IV (> 4.5 signalized intersections per mile within CBD)						Adjustments (Divided/Undivided)					
Lanes /Divided	Level of Service					(Alter corresponding two-way volumes by indicated percentage)					
	A**	B**	C	D	E	Left Turn			Adjustment		
2/undivided	N/A	N/A	3,700	13,800	15,300	Lanes	Median	Bays	Factor		
4/divided	N/A	N/A	8,900	29,900	32,600	2	divided	Yes	+5%		
6/divided	N/A	N/A	14,000	45,500	49,000	2	undivided	No	-20%		
8/divided	N/A	N/A	17,500	56,200	60,100	Multi	undivided	Yes	-5%		
						Multi	undivided	No	-25%		
						One-Way					
						(Alter corresponding two-way volumes by indicated percentage)					
						One-Way	Equivalent		Adjustment		
						Lanes	2-Way Lanes		Factor		
						2	4		-40%		
						3	6		-40%		
						4	8		-40%		
						5	8		-25%		
<p>* This table is based on the 1997 Highway Capacity Manual and data generated by the Florida DOT. For the purposes of GRTA review this table can be used for Level of Service Analysis in Section 2.2.</p> <p>** Cannot be achieved.</p> <p>*** Volumes are comparable because intersection capacities have been reached.</p>						<p>SOURCE: The Florida Department of Transportation, Systems Planning Office, 605 Suwannee Street - Mail Station # 19, Tallahassee, Florida, 32399-0450 September 1998 - www.dot.state.fl.us/planning</p> <p><<<The assumptions made in the development of this table appear in the 1998 Level of Service Handbook published by Florida DOT.>>></p>					

TABLE 6 - SAMPLE SIGNALIZED INTERSECTION ANALYSIS

Intersection Geometry and Volumes:



Where:

- The number not in parentheses represents total traffic, and
- The number in parentheses represents project traffic only
- Arrows indicate number of lanes for each movement
- All left turns are made from exclusive lanes

Proportionate Share Calculation (all data obtained from HCS worksheets):

Step 1: Determine critical movements (from HCS Capacity Analysis Worksheet):

Step 2: Develop adjusted project traffic volumes

Step 3: Calculate total adjusted project volumes for critical movements

Step 4: Calculate total capacity for critical movements

Step 5: Calculate capacity consumed by project

Critical Movement	(A) Total Traffic	(B) Project Traffic	(C) Adjusted Flow Rate	(D) Adjustment Factor {C/A}	(E) Adjusted Project Traffic {A*D}	(F) Movement Capacity
Eastbound through	1,722	450	1,813	1.05	473	1,810
Westbound left	395	0	416	1.05	0	465
Northbound through	571	0	601	1.05	0	670
Southbound left	542	0	571	1.05	0	633
TOTALS					473	3,578

Step 5:

Total adjusted project traffic: 473

Total capacity: 3,578

Capacity Consumed: 13.2%