TOWN OF CUTLER BAY

TRAFFIC IMPACT ANALYSIS

METHODOLOGY STANDARDS

PURPOSE AND APPLICABILITY

The purpose is to provide a generally uniform methodology for identifying potential traffic impacts of new development and redevelopment on the transportation system in the Town of Cutler Bay (the Town). The intent is to identify the effect on road and intersection levels of service that is due solely to the project's impact, distinct from level of service issues that may currently exist or develop over time without the project.

The Traffic Impact Statement (TIS) or Traffic Memo is to be signed and sealed by a registered professional engineer licensed to practice in the State of Florida.

The TIS or Traffic Memo must be reviewed by a registered professional engineer licensed to practice in the State of Florida.

METHODOLOGY STATEMENT

These standards apply whether the analysis is performed by a representative of the Town, or a representative of the applicant seeking development approval. In the latter case a formal methodology agreement must be prepared by the applicant and agreed to by a representative of the Town before the study is conducted. The purpose of the Methodology Statement is to establish methodologies and assumptions prior to the start of the study. Preparing a TIS involves many choices by the preparer. For any choice in methodology not described explicitly here, these choices should be made in favor of the safety and welfare of the citizens of the Town of Cutler Bay. Studies of traffic affecting State and County facilities will be reviewed by their representatives in addition to the Town.

It is the Applicant's responsibility to ensure that the TIS is not prepared or submitted without an approved Methodology Statement signed by a representative of the Town.

TRIP GENERATION

Trips to/from the site shall be estimated using the latest Institute of Transportation Engineers (ITE) *Trip Generation Manual*. Sufficient information about the different uses should be provided to explain the choice of land use codes used (eg. Indicate the number of stories in a multi-family structure to explain the choice of low-rise, mid-rise or high-rise multi-family land use codes). Use of the Manual's information (eg. Choice of average rate or equations) should follow the guidance provided in the latest edition of the ITE *Trip Generation Handbook* (Chapters 3 and 4 in the 3rd ed.).

Use of other than ITE rates should be supported by trip generation data ideally collected from at least two similar sites within Miami-Dade County. The method of collecting the trip generation data should follow guidance in the latest edition of the ITE *Trip Generation Handbook* (Chapter 9 in the 3rd ed.).

In order to estimate the net new trips from a project, vested trips and trips from existing use, if any, should be subtracted from the total trip generation potential of the proposed project. Trip reduction for existing land use, however, will be permissible only if the site was

operational within the last twelve months. For purposes of access management analysis, the total trips (prior vested plus additional, new trips) should be analyzed at site access and connection points to the road network.

INTERNAL CAPTURE

Internal capture estimates shall be based on methodologies contained in the latest edition of the ITE *Trip Generation Handbook* (Chapter 6 in the 3rd ed.). The handbook currently contains internal capture rate limits for six classes of land uses (residential, retail, restaurant, etc.). In a multi-use site with distinct uses that warrant separate ITE land use codes but belong to the same class, the trip capture calculation should be performed on the sum of their estimated trips as a group (eg. add all the single family and multi-family residential trip generation together and treat the sum as a single residential use for the purpose of internal capture).

PASS-BY AND DIVERTED TRIPS

Following the internal capture calculation, the total gross external trips of the project traffic for some land uses may be reduced by a pass-by capture rate to account for traffic that is already traveling on the adjacent roadway. The only land uses for which this reduction can be applied are those with pass-by capture data published in the latest edition of the ITE *Trip Generation Handbook*, (Chapter 10 in the 3rd ed.), and only for the periods (Daily, AM, PM) for which rates are published. For each land use, the average rate for the studied sites should be used. The split of pass-by traffic into entering and exiting components should be the same as the enter/exit split of the gross external trips, not 50/50. The split of pass-by traffic from the two directions of traffic on the roadway should be consistent with the directional split of the street traffic.

The total number of pass-by trips shall not exceed ten percent of the total background traffic on the adjacent roadway. In analysis of the site-access intersections the road network, the pass-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 as a source of captured trips; however, the effects of that traffic in the associated necessary left turns and U-turns and added flow at the upstream and downstream median openings or intersections should be identified as development traffic at those locations.

No reductions shall be made for diverted trips.

DISTRIBUTION AND ASSIGNMENT

Distribution of project traffic should in most cases use the cardinal distribution percentages published in the latest edition of the Miami-Dade Transportation Planning Organization (TPO)’s *Directional Trip Distribution Report*. This report is updated every five years along with the Long Range Transportation Plan (LRTP). It is based on the latest version of the Southeast Florida Regional Planning Model (SERPM) and contains eight distribution percentages for each of the Traffic Analysis Zone (TAZ)s in the model, for both the base or validation year, and also for the

LRTP's planning horizon year. It is acceptable to sum the percentages into four more traditional directions (North, South, East, West) if appropriate to the project location, or to average them into eight more traditional directions (NW, N, NE, E, etc.) if appropriate. The distribution pattern used, either as published or modified as described above should best reflect the road network surrounding the project site.

It is acceptable to use the distribution percentages from the report's base year for the TAZ that contains the project, and not necessary to interpolate between the report's base and horizon years for the project's particular buildout year.

It is acceptable to analyze a different project traffic distribution pattern if it is supported by data such as the home zip codes of students for a school.

The distribution of project traffic to multiple driveway connections should reflect the pattern of development intensity *within* the site, (i.e. the entering and exiting volumes at separate driveways should be commensurate with the development intensity nearest those driveways) and any access control restrictions present at the project's connection points to the road network.

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.

TRIP ATTENUATION

Trip attenuation (where project traffic finds destinations within a road segment) should seldom be considered. In most cases, the separation of project traffic among different turning movements at an intersection at the end of a significantly impacted road segment will tend to quickly reduce the amount of project traffic on subsequent segments below the significance threshold.

If attenuation is proposed it needs to be justified by either:

a. Travel demand model select zone analysis; or

b. Use of trip length frequency distributions (for all trip types).

Regardless which of the two methods are used, the maximum allowable attenuation of project traffic within any road segment is ten percent of the initial volume unless there is a major land use within the segment.

STUDY AREA LIMITS

The proposed project highest peak hour net new (excluding internal and pass-by capture) trip generation during the peak hour of the adjacent street traffic will determine whether the project is de-minimis and the limits of the trip distribution and analysis.

<u>De-minimis Impact</u>

If the net new project traffic is less than one percent of the service volume for the adopted LOS

standard of adjacent road segments, then the project is considered de-minimis and no study is required (GMP Policy T1-7J). A traffic memo is still required to demonstrate that the project is indeed de-minimis. As such, it must contain trip generation, trip distribution, and a comparison of project traffic volumes with adjacent roadway service volumes.

If the project's impact to the first road to which the project connects is de-minimis, a check must still be performed to confirm that the impact is also de-minimis on subsequent road segments with lower service volumes.

Non de-minimis Impact

If the project is not considered de-minimis then the study area should include:

a. The road segment to which the development makes its first connection, and

b. Moving outward, all subsequent road segments on which the two-way peak-hour net new project traffic exceeds three percent of the existing or committed two-way peak-hour service volume for the adopted LOS standard,

c. Site driveway connections to public roads.

d. Intersections that are part of the impacted roadways.

The service volume for the adopted LOS standard described above should come from the latest version of the Generalized Service Volume tables published by the Florida Department of Transportation (FDOT). Roadway functional classification shall be based on the Town's Comprehensive Plan.

ANALYSIS SCENARIOS

The following scenarios should be analyzed:

- **Existing scenario** is defined as the analysis of existing traffic on the Existing Network.
- **Future Background scenario** is defined as the analysis of existing traffic plus growth in background traffic on the existing plus committed network in the buildout year of the project.
- **Future Background scenario with mitigation** is defined as the analysis of existing traffic plus background traffic growth on the existing plus committed network with the inclusion of any other improvements that are required to restore a facility to its adopted level of service standard.
- **Future background plus project scenario** is defined as analysis of existing traffic, plus background traffic, plus project traffic on the existing plus committed network.
- **Future Background plus Project 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.

One additional scenario that may need to be created but not analyzed is a future background scenario that includes a change to the roadway network and hence circulation patterns that is understood to be constructed at the time of the project (not necessarily for LOS reasons as described above). In this instance, the future background scenario to be analyzed would exclude the network and circulation change, but the future with project scenario would include it.

ANALYSIS PERIODS

The peak hours of background traffic on typical weekday mornings and afternoons on an average peak season day should be analyzed. Other periods may be necessary if the nature of the use generates significant traffic outside of these periods or on weekends. Periods may be omitted if evidence is provided that the project generates an insignificant amount of traffic during the peak of the background traffic (eg. School dismissal time typically precedes the afternoon peak hour).

DATA COLLECTION

TRAFFIC COUNTS

Traffic count collection shall be based on acceptable professional engineering standards. Raw turning movement counts (minimum 2 hours) and daily road volume counts (minimum 72 hours) shall be provided for all the intersections and road segments that are being analyzed. The road segment traffic counts must be collected and reviewed to identify the peak periods during which turning movement counts are to be collected.

The intersection turning movement volumes collected in the field may not reflect the demand for the individual movements. If residual queues are observed for any movement at an intersection, the turning movement volume will not reflect the true demand for that movement, but only the capacity of the intersection. Approach counts will be needed for those approaches where the demand is exceeding the capacity and residual queue builds up during the peak hour. The placement of the approach count machine is important to measure the demand. The count machines shall be placed at a location where the queues would not extend past the count machines.

The approach volume for the peak hour of the intersection shall be used to develop approach turning movement volumes based on the approach turning movement percentages. This shall be done for approaches with residual queue build-up during peak hours. The approach count machines shall be placed at a location where the queues would not extend past the count machines. In no event, however, should the estimated turning-movement counts be less than the existing field counts. The segment machine counts at mid-blocks shall be checked against turning-movement counts at the adjacent intersections. In general, the mid-block counts and turning-movement counts should not be substantially different unless the difference can logically be explained. Approved FDOT or County-maintained counts may be used for verification if they are less than one year old in the high growth areas. The counts shall be done on Tuesdays, Wednesdays, and Thursdays of a typical work week during normal school operations and are not to be done immediately before, during, or after a major holiday, or any event that would generate

atypical traffic patterns.

OTHER DATA

Other data to be collected as appropriate:

- Intersection control and geometry, turn lane lengths
- Signal timing data
- Crash data - 3 years
- Historical counts for trend estimation
- Roadway classification, maintaining agency, number of lanes, speed limits
- Video imagery of congestion hot spots and queue backups
- Vehicle classification data
- Parking accumulation
- FDOT Peak Season Factor Category report for latest year available

DEMAND VOLUMES

EXISTING CONDITIONS DEMAND VOLUMES

Raw counts (segment or intersection) shall be adjusted to reflect peak season conditions using the FDOT's most recently published Peak Season Conversion Factor (PSCF) for the week of the year the count was collected.

Segment volumes used for level of service analysis shall be based on a traffic volume count, not by summing volumes entering and exiting adjacent intersections.

The peak hour turning movement volumes to be analyzed should be the 60 minute interval within the two hour count period with the highest total entering volume.

FUTURE BACKGROUND TRAFFIC DEMAND VOLUMES

Existing traffic counts shall be increased by a growth factor to the project's build-out year or other horizon year depending on the nature of the entitlement being sought. The growth rates shall be from established count data bases. The historic growth rate should be based on at least three years of historical counts if available, unless an event within the period chosen makes the resulting trend atypical.

Having identified the nearest count locations suitable for predicting growth, it is acceptable to average those growth rates to a single value if the range of growth rates is within two percent. For example, if the observed growth rates are 2, 3, and 4 percent, it is acceptable to use 3 percent for all road segments and intersections. Conversely, if the observed growth rates are 1,1,0, and 10 percent, it is not acceptable to use 3 percent for all road segments and intersections. The exception to this is for segments with no count station on them, where it is acceptable to use the average observed among the nearest count stations, regardless of data range. In no case should the annual growth rate used to inflate to future conditions be less than 0.5 percent.

Future background traffic should include the contribution from unbuilt developments in the vicinity whose site plan had been approved by the date the TIS commenced (Notice To Proceed or approval of a Methodology Statement). This is a conservative approach that recognizes that some portion of past growth (when a positive trend is present) is due to new developments, and adding unbuilt development traffic to an extrapolated growth trend double counts to some degree.

Each intersection approach volumes should be inflated to future conditions using the annual growth rate chosen for that road segment.

Estimating future traffic volumes on facilities that do not currently exist may require the use of the regional travel demand model SERPM.

FUTURE TOTAL TRAFFIC DEMAND VOLUMES

For the analysis of driveways, the project traffic added to the future background condition is the net new project traffic including pass-by captured trips.

For the analysis of road segments and offsite intersections, the project traffic added to the future background condition is the net new traffic excluding pass-by captured trips.

LEVEL OF SERVICE STANDARDS

a. The adopted LOS standards for all major road segments shall be consistent with the standards in the Town's latest adopted Comprehensive Plan. The service volume corresponding to the adopted standard letter grade should be from the most recently updated version of the FDOT Generalized Service Volume Tables.

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 for project traffic entering and exiting the site of up to 100 seconds will be considered acceptable.

ROADWAY SEGMENT ANALYSIS

The initial roadway level of service analysis should involve a comparison of the peak hour segment traffic volume with the service volume in the FDOT Generalized Service Volume Table for the minimum LOS standard for the facility.

When using these tables, the following information shall be provided for each facility:

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

If this comparison suggests a LOS deficiency then a more detailed analysis is required. It should conform to the methods contained in the latest edition of the Highway Capacity Manual (HCM).

The most frequent type of segment analysis will likely be interrupted flow. Level of service for this type of facility compares free flow speed with the congested speed that includes intersection delay. The analysis should utilize and display in a table the through movement delay at the subject intersections that are consistent with the operational analyses for those intersections. The travel time between the intersections is based on free flow speed. The free flow speed used shall be the posted speed limit plus 5 mph.

<u>Travel Time and Delay Study</u>

The traditional method to confirm the actual average (including intersection delay) travel speed along roads, which is the basis of interrupted flow facility LOS, and against which all interrupted flow facility LOS techniques and software are validated, is a Travel Time and Delay Study. It involves driving a vehicle the length of the road segment repeatedly. This can be costly. Depending on the variability of the actual speeds observed, the specified margin of error and the specified confidence level, the number of repeated runs necessary to provide sufficient statistical certainty in the average observed can be substantial.

Because LOS analyses are meant to reflect a typical peak season weekday, this type of measurement, if intended as a LOS determination, should only be done in a week whose traffic is typical of the average for the entire peak season. This week can be identified using the FDOT peak season factors. There is no adjustment factor to convert a travel time and delay study result from any other week of the year to convert it to a peak season equivalent. The result cannot be

inflated into the future to assess future conditions. In short, a travel time and delay study result provides a single measurement of a road segment's level of service for the traffic volume observed on the day of the study.

Emerging Technologies

Cell phones, navigation apps and smart phone location-based-services (LBS) all produce vast quantities of user position data (with varying degrees of positional accuracy) that can be purchased from aggregators of this data, and can be used to determine travel times and patterns of the source device users.

Stationary Bluetooth signal detectors can be used to record the passage of Bluetooth devices (most vehicles today contain at least two: the car itself and a cell phone inside) past the points where detectors are deployed. Using this data to estimate travel times along a segment requires care to ensure that the result reflects segment congestion only and not stops along the way.

In the same way as a travel time and delay study, these emerging technologies can be used to evaluate existing conditions for informational purposes only. However, a project's impact by definition is the difference between a future condition without the project, and one with it. These scenarios cannot be analyzed using these techniques and will always involve some type of computational technique or analysis software to measure the project's impact.

In summary, the Travel Time and Delay Study, and similar measurements using passively collected location data are of limited use in a Traffic Impact Study save for information purposes. The results cannot be converted to a peak season condition, nor inflated into the future, nor be adjusted with the addition of project traffic in order to identify the effect of project traffic. The computational technique contained in the HCM that uses traffic volume as an input and reports interrupted flow facility LOS was designed to ensure that the result conforms as closely as possible with the result of a Travel Time and Delay Study conducted with the same traffic volume and intersection conditions. Tools such the FDOT ARTPLAN spreadsheet and Generalized Service Volume tables are less burdensome in their data requirements than an HCM analysis but trade accuracy of result for ease of use, by fixing input variables that cannot be adjusted by the user.

INTERSECTION ANALYSIS

All intersections on significantly impacted roadway segments shall be analyzed. Unsignalized intersections on significantly impacted roadway segments shall be analyzed if the project traffic contributes to movements controlled by a stop sign. All site driveways shall be analyzed. Intersection analyses shall report delay, level of service and queue lengths for all movements, with a comparison of the queue length to the available turn lane storage length.

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.

SOFTWARE

Analysis software should produce results consistent with the latest edition of the Highway

Capacity Manual. This includes Synchro (preferred), Highway Capacity Software, FDOT LOS planning worksheets (ARTPLAN, HIGHPLAN, FREEPLAN), and SIDRA for roundabouts. Other analysis software may be required by the Town to address situations not addressed by the above provisions, to be determined in the preparation and approval of the Methodology Memorandum.

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 shall 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 the Town's approval as part of the mitigation strategy
- Segment lengths

SITE ACCESS

Driveway location(s) shall meet the Town's, County's 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.

MULTIMODAL CONSIDERATIONS

The growing number of mobility choices requires attention to the utilization of the boundary between the public right of way and private parcels, also known as "curb management." When designing the site, the following multimodal recommendations should be taken into consideration, and their applicability should be discussed with the Town during the methodology development.

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. These connections should be direct and reasonable, minimizing the distance that pedestrians need to walk between the site and the offsite pedestrian network.

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.

b. For transit vehicles/users:

1) 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,

2) 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, and

3) 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 should be provided, and

2) Provision of bicycle parking.

d. For mobility services (ride sharing, scooters):

1) A clearly marked pickup/drop off location and safe connections between it and the surrounding transportation network.

MITIGATION OF IMPACTS

Acceptable mitigation options are:

1. **Restore to adopted standard -** Identify an improvement at an impacted location that restores level of service to the adopted standard for the future background plus project scenario, as defined in the Analysis Scenarios section of these Standards.

2. **Proportionate Share Mitigation** – This analysis should identify the improvement that will restore level of service to the adopted standard (or avoid a queue spillback from a turn lane) in the future background plus project scenario. The proportionate share percentage of the improvement's cost due from the applicant is the project's consumption of the capacity (vehicles per hour or feet of queue storage) being added by the improvement.

   This definition is consistent with the definition of proportionate share contained in F.S. Ch 163.3180. That language notes that project applicants are not responsible for correcting level of service deficiencies either currently existing or projected to exist in the future without project scenario. But that language also reflects the fact that public infrastructure

improvements are not implemented in increments scaled to each new development's impact. It is not in the public interest to repeatedly improve facilities in small increments; actual improvement projects add significant extra capacity when they occur, and the calculation method described above keeps the applicant's contribution proportional to their impact alone. Any impact or mobility fees charged by the Town would be credited against the resulting proportionate share amount.

REPORT FORMAT

The report should explain clearly all assumptions, data sources and intermediate steps between raw data and final demand volumes. At a minimum, there should be tables that contain, for all road segments and intersections analyzed, for all analysis periods:

1) Raw counts
2) Peak Season Conversion Factor
3) Growth factor from count year to existing conditions if applicable
4) Existing peak season condition
5) Growth factor from existing conditions to the project opening year
6) Future (inflated) background traffic
7) Traffic from approved but unbuilt developments
8) Total Future No-Build traffic
9) Percentage of project entering traffic
10) Project entering traffic
11) Percentage of project exiting traffic
12) Project exiting traffic
13) Total Project traffic
14) Future Total Build Condition traffic

Figures should be provided to display the contents of rows 4, 6, 7, 8, and 14.

For complex site conditions, separate figures should be provided to display the contents of rows 9 through 13. For simpler site conditions, figures combining entering and exiting distributions percentages, and entering and exiting project traffic volumes are acceptable. All project traffic distribution percentages and volumes should be shown clearly at all site driveways, offsite intersections, and road segments. All figures depicting project traffic volumes should note which volumes include or exclude pass-by traffic.

Intersection result tables should show level of service, delay and queue lengths for all movements, along with the available turn lane queue storage length, at all site driveways and offsite intersections.

All Figures of Existing and Future conditions should contain the analysis year in the figure title.

Synchro reports should show clearly the year, scenario and analysis period in the report footer.

Due to the method used to determine the limits of the project influence for analysis purposes, the order of report elements should be as follows:

1) Introduction describing the project, its anticipated buildout year with a site location map.
2) Trip Generation
3) Trip Distribution
4) Identification of significantly impacted road segments (if de-minimis, the report ends here)
5) Existing Conditions Analysis
6) Future No-Build Condition Analysis
7) Future Total Build Condition Analysis
8) Proposed Mitigation.

The submitted report should include one printed copy and one digital copy.

END