

ARTICLE 23. TRAFFIC IMPACT STUDY

Section 23-1. Purpose

A traffic impact study may be required for conditional use permits, subdivisions, and planned building groups as defined in this Article. The study will enable the Town of Calabash to assess the impact of a proposed conditional use permit or development on the highway system when that system is at or near capacity or a safety problem exists. Its purpose is to insure that proposed developments do not adversely affect the highway network and to identify any traffic problems associated with access from the site to the existing transportation network. The purpose of the study is also to identify solutions to potential problems and to present improvements to be incorporated into the proposed development.

Section 23-2. Conduct

A traffic impact study shall be prepared by a qualified professional traffic engineer and/or certified transportation planner with previous traffic study experience. The procedures and standards for the traffic impact study are set forth in Section 23-5 of this Article.

Prior to the preparation of a traffic impact study, a scoping meeting shall be held, including the planning staff, the applicant, and the preparer of the study. The discussion at this meeting should set the study parameters, including the study area, planned and committed roadway improvements (by NCDOT or others), road links and intersections to be analyzed, preliminary traffic distribution, other planned developments to be considered, traffic growth rate, available data, periods for which analysis is to be performed, and other staff concerns. The qualifications of the preparer may be discussed at or prior to this meeting.

Section 23-3. Applicability

Except as described below, a traffic impact study shall be required for all conditional use permits and site plans that meet the following criteria:

- (A) Conditional Use Permit. Estimated traffic generated by the permit exceeds 100 peak hour trips.
- (B) Planned Building Group. Estimated traffic generated by the development exceeds 100 peak hour trips.
- (C) Single-Family Residential. Estimated traffic generated by the development exceeds 100 peak hour trips.
- (D) Planned Unit Development. Estimated traffic generated by the development exceeds 100 peak hour trips.
- (E) Subdivisions. Estimated traffic generated by the development exceeds 100 peak hour trips.

Conditional use permits that produce more than 100 peak hour trips per day traffic may be exempted from the requirements to prepare and submit a traffic impact study if: (1) a traffic impact study has previously been prepared for this particular project or development, and (2) there is to be no change in land use or density that would increase travel, or (3) material is submitted to demonstrate that traffic

created by the proposal when adding to existing traffic will not result in a need for transportation improvements. The Planning Board and Board of Commissioners will review material submitted in support of an exemption and will determine from that material whether or not to grant the exemption. All exemptions shall be concurred with by the NCDOT District 3 Office. If an exemption is granted, documentation of the exemption will be submitted as part of the staff recommendation.

The Town of Calabash may require any conditional use permit application to be accompanied by a traffic impact study when a road capacity or safety issue exists. If one is required, the Town will notify the applicant of the reason for the requirement.

If the project is reviewed as a Planned Development, only one traffic impact study is required for a conditional use permit and planned building group approval unless revisions are proposed that would increase traffic or change access.

Section 23-4. Capacity Analysis of the Existing System

An indication of the adequacy of the existing street system is a comparison of traffic volumes versus the ability of the streets to move traffic freely at a desirable speed. The ability of a street to move traffic freely, safely, and efficiently with a minimum delay is controlled primarily by the spacing of major devices utilized. Thus, the ability of a street to move traffic can be increased by restricting parking and turning movements, using proper sign and signal devices, and adding capacity by the application of other traffic engineering strategies.

Capacity is the maximum number of vehicles which has a “reasonable expectation” of passing over a given section of roadway, during a given time period under prevailing roadway and traffic conditions. The relationship of traffic volumes to the capacity of the roadway will determine the level of service (LOS) being provided. Six levels of service have been selected for analysis purposes. They are given letter designations from A to F with LOS A representing the best operating conditions and LOS F the worst

- (A) LOS A. Describes primarily free flow conditions. The motorist experiences a high level of physical and psychological comfort. The effects of minor incidents of breakdown are easily absorbed. Even at the maximum density, the average spacing between vehicles is about 528 feet or 26 car lengths.
- (B) LOS B. Represents reasonably free flow conditions. The ability to maneuver within the traffic stream is only slightly restricted. The lowest average spacing between vehicles is about 330 feet or 18 car lengths.
- (C) LOS C. Provides for stable operations, but flows approach the range in which small increases will cause substantial deterioration in service. Freedom to maneuver is noticeably restricted. Minor incidents may still be absorbed, but the local decline in service will be great. Queues may be expected to form behind any significant blockage. Minimum average spacings are in the range of 220 feet or 11 car lengths.
- (D) LOS D. Borders on unstable flow. Density begins to deteriorate somewhat more quickly with increasing flow. Small increases in flow can cause substantial deterioration in service. Freedom to maneuver is severely limited, and the driver experiences drastically reduced comfort levels. Minor incidents can be expected to create substantial queuing. At the limit, vehicles are spaced at about 165 feet or nine car lengths.

- (E) LOS E. Describes operation at capacity. Operations at this level are extremely unstable, because there are virtually no usable gaps in the traffic system. Any disruption to the traffic stream, such as a vehicle entering from a ramp, or changing lanes, requires the following vehicles to give way to admit the vehicle. This can establish a disruption wave that propagates through the upstream traffic flow. At capacity, the traffic stream has no ability to dissipate any disruption. Any incident can be expected to produce a serious breakdown with extensive queuing. Vehicles are spaced at approximately six car lengths, leaving little room to maneuver.
- (F) LOS F. Describes forced or breakdown flow. Such conditions generally exist within queues forming behind breakdown points.

Section 23-5. General Requirements and Standards

The traffic impact study shall contain the following information:

- (A) General Site Description. The site description shall include the size, location, proposed land uses, number of units and gross square footage by land use, existing land use and zoning, construction staging, and completion date of the proposed land development to the extent known or able to be described at the time the application is prepared. If the development is residential, types of dwelling units and number of bedrooms shall also be included. A brief description of other major existing and proposed land developments within the study area shall be provided. The general site description shall also include probable socio-economic characteristics of potential site users to the extent that they may affect the transportation needs of the site (i.e., number of senior citizens).
- (B) Transportation Facilities Description. The description shall contain a full documentation of the proposed internal and existing external transportation system. This description shall include proposed internal vehicular, bicycle, and pedestrian circulation; all proposed ingress and egress locations; all internal roadway widths and rights-of-way, turn lanes, parking conditions, traffic channelizations; and any traffic signals or other intersection control devices at all intersections within the site.

The report shall describe the entire external roadway system within the study area. Major intersections in the study area and all intersections or driveways adjacent to or within 800 feet of the site shall be identified and sketched. All existing and proposed public transportation services and facilities within one-mile of the site shall also be documented. Future highway improvements, including proposed construction and traffic signalization, shall be noted. All proposed traffic signals shall be approved by the NCDOT District 3 Office. This information shall be obtained from North Carolina's Transportation Improvement Program and the Calabash Thoroughfare Plan. Any proposed roadway improvements due to proposed surrounding developments shall also be noted.

- (C) Existing Traffic Conditions. Existing traffic conditions shall be documented for all roadways and intersections in the study area. This shall include documentation of traffic accident counts as recorded by the NC Department of Transportation District Engineers Office, Town law enforcement, and the NC Highway Patrol. Existing traffic volumes for average daily traffic, peak highway hour(s) traffic, and peak development generated hour(s) traffic, if appropriate, shall be recorded. Manual traffic counts at major intersections in the study area shall be conducted, encompassing the peak highway and development generated hour(s), if appropriate, and documentation shall be included in the

report. Existing average daily or peak-hour traffic counts made within one year of the study date may be used subject to Administrator approval. A volume/capacity analysis based upon existing volumes shall be performed during the peak highway hour(s) and the peak development generated hour(s), if appropriate, for all roadways and major intersections expected to be impacted by development traffic. Levels of service shall be determined for each signalized intersection or roadway segment analyzed above.

This analysis will determine the adequacy of the existing roadway system to serve the current traffic demand. Roadways and/or intersections experiencing levels of service E or F shall be noted as congestion locations (see Section 23-4).

- (D) Transportation Impact of the Development. Estimation of vehicular trips to result from the proposed development shall be completed for the average weekday, the average daily peak hours of highway travel in the study area, and if appropriate, the peak hour of traffic generation by the development. Vehicular trip generation rates to be used for this calculation shall be obtained from an accepted source such as “Trip Generation” (Institute of Transportation Engineers, Fourth Edition, 1987 as amended). These development-generated traffic movements, as estimated, and the reference source(s) and methodology followed shall be documented. These generated volumes shall be distributed to the study area and assigned to the existing roadways and intersections throughout the study area. Documentation of all assumptions used in the distribution and assignment phase shall be provided. All average daily traffic link volumes within the study area shall be shown graphically. Peak hour turning movement volumes shall be shown for signalized and other major intersections, including all access points to the development. Pedestrian and bicycle volumes at school crossings and as otherwise applicable shall be reported. Any characteristics of the site that will cause trip generation to vary significantly from average rates available in published sources shall be documented, including such factors as diversion of passer-by traffic, internal capture, staggered work hours, or use of transit.
- (E) Analysis of Transportation Impact. The total traffic demand that will result from construction of the proposed development shall be calculated. This demand shall consist of the combination of the existing traffic, traffic generated by the proposed development, and traffic due to other developments and other growth in traffic that would be expected to use the roadway at the time the proposed development is completed. If staging of the proposed development is anticipated, calculations for each stage of completion shall be made. This analysis shall be performed for average weekday traffic, the peak highway hour(s) and, if appropriate, peak development-generated hour(s) for all roadways and major intersections in the study area. Volume/capacity calculations shall be completed for all major intersections. It is usually at these locations that capacity is most restricted.

All access points and pedestrian crossings shall be examined for adequate sight distance and for the necessity of installing traffic signals. The traffic signal evaluation shall compare the projected traffic and pedestrian volumes to the warrants for traffic signal installation.

- (F) Conclusions and Recommended Improvements. Levels of service for all roadways and signalized intersections serving 10% or more of peak-hour project traffic shall be reported. All roadways and/or signalized intersections showing a level of service below D in urban or developed areas or below C in rural areas shall be considered deficient, and specific recommendations for the elimination of these problems shall be listed (see Section 23-4). This listing of recommended improvements shall include, but not be limited to, the

following elements: internal circulation design, site access location and design, external roadway and intersection design and improvements, traffic signal installation and operation including signal timing, and transit service improvements. All physical roadway improvements shall be shown on the site plan.

Section 23-6. Submission and Implementation

The traffic impact study will be submitted to the Administrator within the applicable time frame indicated below. The Administrator will review the study as part of the development review process. Recommendations will be incorporated into the approval process as indicated below.

(A) Conditional use permits.

- (1) Time of Submission. The traffic impact study shall be submitted to the Administrator with, and as a part of, the application for the conditional use permit.
- (2) Implementation. The Administrator and such other agencies or officials as may appear appropriate in the circumstances of the case shall review the impact study to analyze its adequacy in solving any traffic problems that will occur due to the proposed use.

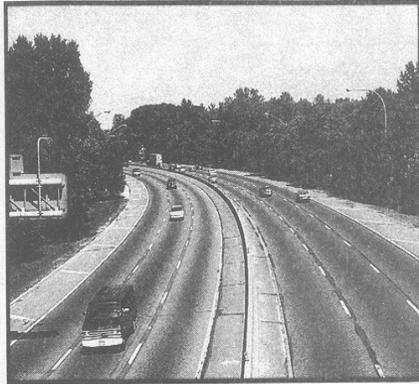
The Board of Commissioners or Board of Adjustment, as appropriate, shall consider the impact study and the analysis of the impact study before the application is approved or denied. The Board of Commissioners or Board of Adjustment, as appropriate, may decide that certain improvements on or adjacent to the site or on roadways or intersections for which the improvements are needed to adequately and safely accommodate site traffic are mandatory for conditional use permit approval and may make these improvements conditions of approval, may require modifications in the use, or may deny the permit.

(B) Site Plan Approval and Subdivisions.

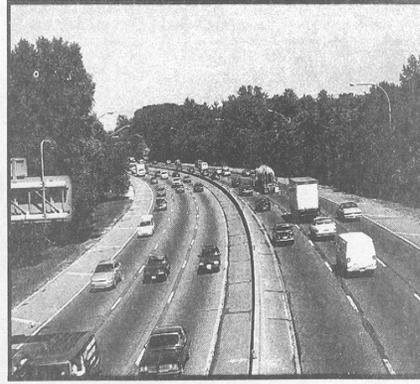
- (1) Time of Submission. The traffic impact study will be submitted to the Administrator with, and as a part of, the site plan.
- (2) Implementation. The Administrator and such other agencies or officials as may appear appropriate in the circumstances of the case shall review the impact study to analyze its adequacy in solving any traffic problems that will occur due to development proposed on the site plan. The Administrator may recommend that certain improvements on or adjacent to the site or on roadways or intersections for which the improvements are needed to adequately and safely accommodate site traffic are mandatory for site plan approval and may require these improvements to be on the approved site plan.

Graphic Representation of Various Roadway Levels of Service

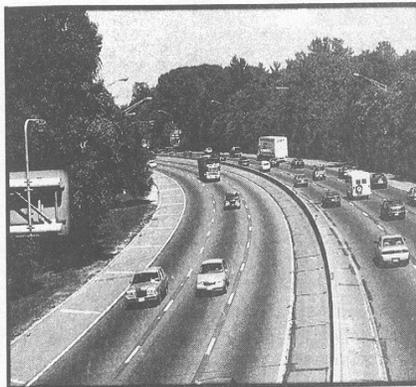
Source: 1994 Highway Capacity Manual



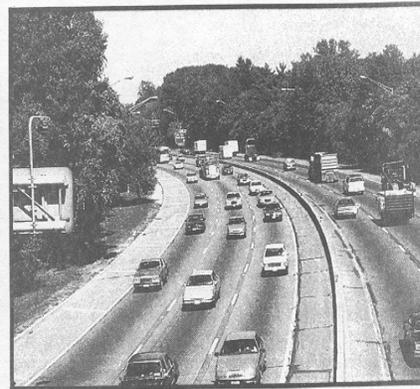
LOS A.



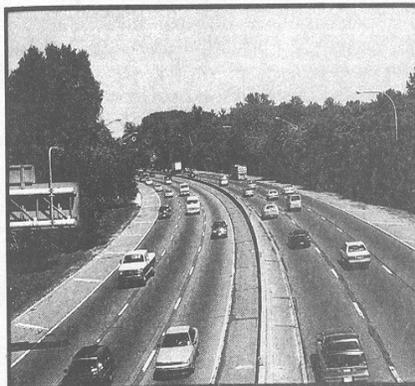
LOS D.



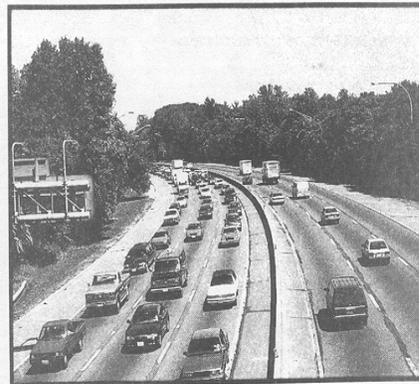
LOS B.



LOS E.



LOS C.



LOS F.