

**FORSYTH COUNTY
BOARD OF COMMISSIONERS**

MEETING DATE: _____ **AGENDA ITEM NUMBER:** _____

SUBJECT:

Zoning Text Amendment proposed by the City-County Planning Board to amend Chapter B to create a new Section 7-3.7 "General Submittal Requirements" regarding traffic impact analysis requirement and accompanying standards. (UDO-73).

COUNTY MANAGER'S RECOMMENDATION OR COMMENTS:-

SUMMARY OF INFORMATION:-

Zoning Text Amendment proposed by the City-County Planning Board to amend Chapter B to create a new Section 7-3.7 "General Submittal Requirements". regarding traffic impact analysis requirement and accompanying standards. (UDO-73).

After consideration, the Planning Board recommended approval of the text amendment.

ATTACHMENTS:- YES NO

SIGNATURE: _____ **DATE:** _____

Board of Aldermen — Action Request Form

Date: June 27, 2001

To: The City Manager

From A. Paul Norby, AICP, Director of Planning

Board Action Requested:

Zoning Text Amendment proposed by the City-County Planning Board to amend Chapter B to create a new Section 7-3.7 "General Submittal Requirements". regarding traffic impact analysis requirement and accompanying standards. (UDO-73).

Summary of Information:

Zoning Text Amendment proposed by the City-County Planning Board to amend Chapter B to create a new Section 7-3.7 "General Submittal Requirements". regarding traffic impact analysis requirement and accompanying standards. (UDO-73).

Committee Action:

Committee _____ **Action** _____

For _____ **Against** _____

Remarks:

STAFF REPORT

DOCKET # UDO-73

STAFF: Loretta W. Barren

CONTINUANCE HISTORY

This Petition was continued to the June 14, 2001 public hearing to allow additional review by the County Attorney.

REQUEST

Proposal to amend Section 7-3 "General Submittal Requirements" of Chapter B "Zoning" of the *Unified Development Ordinances* (UDO) to add "Section 7-3.7" regarding traffic impact analysis. To amend the "Appendix" to add Traffic Impact Standards.

BACKGROUND

Currently there are no standards in place to require and direct the preparation of traffic impact studies for proposed developments. Requests for traffic impact studies are made on a case-by-case basis, depending upon traffic conditions in a particular area. Traffic impact studies may or may not be requested on all developments along a particular roadway. There is no equitable process that is followed with regards to requesting traffic impact studies.

Often times citizens are before the elected and appointed boards to raise questions regarding traffic impacts from a proposed development. In many instances, detailed information is either not available at the staff level or this early in the process. Certain conditions regarding roadway improvements are imposed on developments without detailed information regarding the true impact of the development on a particular roadway.

The intent of this requirement is to insure that:

- a. all decisions regarding traffic impacts due to development are based upon technical study, and
- b. needed improvements are made in a cost effective and efficient manner.

ANALYSIS

It is being proposed that a traffic impact analysis be performed if any of the following conditions are met:

- a. any proposed development petitioned special use permit rezoning that will increase the approach traffic volumes at intersections or roadways by 150 or more vehicles in the peak hour;
- b. any proposed development in the vicinity of areas previously identified as having levels of service "E" or "F", hazardous locations or other adequacy concerns (as determined by North Carolina Department of Transportation, Metropolitan Planning Organization, Forsyth County, or City of Winston-Salem agencies);

- c. where a reduction in safety is expected at intersections or roadways.

A traffic signal warrant study may still be required even if a traffic impact study is not.

During calendar year 2000, four (4) traffic impact studies were requested, all of which were requested after zoning petitions had been filed with the City-County Planning Board. A review of the zoning petitions filed in 2000 showed that based upon the conditions proposed in this amendment, one of those requested would not have been asked for in this stage of the process, but a total of seven would have been submitted with the application for rezoning.

City staffs are aware that this amendment may increase the up-front cost of a proposed development. Such studies (and associated costs) are, however, often required later in the process. Staff believes that requiring a traffic impact study in the beginning of the planning process would be beneficial for the developer as well as the elected and appointed officials by providing good information early in the process. Requesting traffic impact studies after applications for zoning have been submitted lengthens the development process and adds additional cost to redesign plans and in some instances start the planning process over. In instances where traffic impact studies were requested, but were not available before the development process was complete, conditions were placed on zoning petitions that required developers to make whatever improvements the traffic study recommended. This means that recommendations were being made without complete knowledge of the traffic situation, or what the end result would be or the cost of implementing the requirements in the traffic impact study.

Draft proposed Traffic Impact Study guidelines have been provided to the HomeBuilders Association and the Realtors Association, along with the appropriate public agencies; discussions have been held with these groups. The current proposed standards (attached) incorporate many comments made by these groups.

The proposed changes to the ordinance consist of adding an item to the "General Submittal Requirements" and adding the Traffic Impact Study Standards to the appendix.

Staff believes that by requiring the traffic impact study at the beginning of the planning process, elected and appointed officials will have the benefit of reviewing site plans that address a proposed development's impact on the existing and future transportation system in our community.

STAFF RECOMMENDATION

Staff recommends **APPROVAL**.

PUBLIC HEARING - May 10, 2001

FOR: None

AGAINST: None

WORK SESSION

MOTION: Johnson moved continuance for 30 days (June 14, 2001) of the zoning text amendment.

SECOND: Powell

VOTE:

FOR: Avant, Doyle, Johnson, King, Powell, Williams

AGAINST: None

EXCUSED: None

PUBLIC HEARING-June 14, 2001

FOR: None

AGAINST: None

WORK SESSION

During discussion by the Planning Board, the following points were made:

1. This would be an appendix to the UDO.
2. "Needed improvements" refer to improvements caused by the development. This affords petitioners the opportunity to not do improvements when they are already scheduled to be done by another group.
3. There is a waiver provision which would allow the Director of Transportation to waive some requirements that would generate a traffic study.
4. When a traffic study is submitted to City staff, it becomes public record and is available for other developers to use.

MOTION: Schroeder moved for approval.

SECOND: Johnson

VOTE:

FOR: Avant, Doyle, Johnson, King, Norwood, Powell, Schroeder, Snelgrove

AGAINST: None

EXCUSED: None

A. Paul Norby, AICP
Director of Planning

**AN ORDINANCE
AMENDING CHAPTER B "ZONING ORDINANCE"
OF THE UNIFIED DEVELOPMENT ORDINANCES
REGARDING TRAFFIC IMPACT ANALYSIS**

Be it ordained by the Board of Commissioners of Forsyth County, North Carolina, that the *Unified Development Ordinances* is hereby amended as follows:

Section 1. Section 7-3 "General Submittal Requirements" of Chapter B "Zoning" is hereby revised by adding a new "Section 7-3.7" which reads as follows:

"7-3.7 TRAFFIC IMPACT ANALYSIS

A Traffic Impact Analysis is required in accordance with the Appendix labeled Traffic Impact Study Standards."

Section 2. The Appendix is amended by adding the Traffic Impact Study Standards.

Section 3. This ordinance shall become effective three months after it has been adopted.

**AN ORDINANCE
AMENDING CHAPTER B "ZONING ORDINANCE"
OF THE UNIFIED DEVELOPMENT ORDINANCES
REGARDING TRAFFIC IMPACT ANALYSIS**

Be it ordained by the Board of Aldermen of the City of Winston-Salem, North Carolina, that the *Unified Development Ordinances* is hereby amended as follows:

Section 1. Section 7-3 "General Submittal Requirements" of Chapter B "Zoning" is hereby revised by adding a new "Section 7-3.7" which reads as follows:

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AMENDING CHAPTER B "ZONING ORDINANCE"
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REGARDING TRAFFIC IMPACT ANALYSIS**

Be it ordained by the Board of Aldermen of the Town of Kernersville, North Carolina, that the *Unified Development Ordinances* is hereby amended as follows:

Section 1. Section 7-3 "General Submittal Requirements" of Chapter B "Zoning" is hereby revised by adding a new "Section 7-3.7" which reads as follows:

"7-3.7 TRAFFIC IMPACT ANALYSIS

A Traffic Impact Analysis is required in accordance with the Appendix labeled Traffic Impact Study Standards."

Section 2. The Appendix is amended by adding the Traffic Impact Study Standards.

Section 3. This ordinance shall become effective three months after it has been adopted.

**AN ORDINANCE
AMENDING CHAPTER B "ZONING ORDINANCE"
OF THE UNIFIED DEVELOPMENT ORDINANCES
REGARDING TRAFFIC IMPACT ANALYSIS**

Be it ordained by the Village Council of the Village of Clemmons, North Carolina, that the *Unified Development Ordinances* is hereby amended as follows:

Section 1. Section 7-3 "General Submittal Requirements" of Chapter B "Zoning" is hereby revised by adding a new "Section 7-3.7" which reads as follows:

"7-3.7 TRAFFIC IMPACT ANALYSIS

A Traffic Impact Analysis is required in accordance with the Appendix labeled Traffic Impact Study Standards."

Section 2. The Appendix is amended by adding the Traffic Impact Study Standards.

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**AN ORDINANCE
AMENDING CHAPTER B "ZONING ORDINANCE"
OF THE UNIFIED DEVELOPMENT ORDINANCES
REGARDING TRAFFIC IMPACT ANALYSIS**

Be it ordained by the Town Council of the Town of Lewisville, North Carolina, that the *Unified Development Ordinances* is hereby amended as follows:

Section 1. Section 7-3 "General Submittal Requirements" of Chapter B "Zoning" is hereby revised by adding a new "Section 7-3.7" which reads as follows:

"7-3.7 TRAFFIC IMPACT ANALYSIS

A Traffic Impact Analysis is required in accordance with the Appendix labeled Traffic Impact Study Standards."

Section 2. The Appendix is amended by adding the Traffic Impact Study Standards.

Section 3. This ordinance shall become effective three months after it has been adopted.

TRAFFIC IMPACT STUDY STANDARDS

Introduction

In accordance with North Carolina General Statute 160A- I 74(a), "a city may by ordinance define, prohibit, regulate, or abate acts, omissions, or conditions, detrimental to the health, safety, or welfare of its citizens and the peace and dignity of the city, and may define and abate nuisances." NC Gen. Stat. 160A- I 74(a) (hereinafter the General Statutes will be cited as G.S.). The comparable county statute is G.S. 153A-121; which provides counties are not authorized to regulate or control vehicular or pedestrian traffic on a street or highway under the control of the Board of Transportation. However, G.S. 153-A-341 and our local act provide that zoning regulations shall be designed to lessen congestion in the streets and to facilitate the adequate provision of transportation.

These standards are intended to provide the City-County Planning Board, and all other local elected and appointed boards located within Forsyth County the information necessary to make informed decisions regarding planned development impacts to traffic on their roads.

By adopting these standards the City-County Planning Board seeks to ensure that:

- a. all decisions regarding traffic impacts due to development are based upon technical study, and
- b. needed improvements are made in a cost effective and efficient manner.

The City-County Planning Department (CCPB) and the Winston-Salem Department of Transportation (WSDOT) and/or the North Carolina Department of Transportation (NCDOT) may review all proposed development plans for traffic impacts and these agencies are considered staff to the Winston-Salem Board of Aldermen, Forsyth County Board of Commissioners, the City-County Planning Board, and all other local elected and appointed boards. The WSDOT and/or the NCDOT still have the ultimate responsibility for resolving questions concerning traffic impact studies.

To facilitate the determination of adequacy of adjoining public transportation facilities these agencies may recommend that a traffic impact study be performed for any proposed commercial, industrial or institutional development, or non-residential single-family subdivision.

It is recommended that before anyone performs a traffic impact study in Forsyth County they contact the WSDOT and/or the NCDOT to determine the traffic concerns of each agency and/or jurisdiction or to request a multi-agency meeting. These standards are intended to define study limits and analysis procedures acceptable to the WSDOT and/or the NCDOT. Any suggestion for additional analyses will be made at the time of initial contact, at the multi-agency meeting or by the mitigation plan (see Sections 20 and 21).

These standards are intended to provide structure for the traffic study preparer, where study recommendations will be determined on a case by case basis. If the traffic impact study submitted does not adhere to the established standards, then a revised study may be requested based on suggestions by the WSDOT and/or the NCDOT officials and should be prepared by the applicant for submission.

All traffic impact studies should conform to sound engineering principles and are subject to review by the WSDOT and/or the NCDOT. Three copies of the study should be submitted to the Planning Department, who will, upon receipt, distribute one copy each to the Winston-Salem Department of Transportation and the appropriate NCDOT Division 9 Engineer. When other jurisdictions and/or agencies are within the study area, additional copies of the study may be requested by that other jurisdiction (see item 4) and/or NCDOT (see item 5).

All methods used for analysis other than those mentioned in these standards should be explained, (include references), and their limitations described in an appendix to the traffic impact study. It should also be noted that for planning purposes, the planning department in consultation with the WSDOT and/or NCDOT has the final authority over the number and location(s) of driveways for any proposed development. NCDOT/WSDOT, in cooperation with the local planning department, will determine the engineering adequacy of any proposed driveways.

1. A traffic impact study may be requested during the contact and/or multi-agency meeting according to any of the following:
 - a. any proposed development petitioned special use district rezoning that will increase the approach traffic volumes at intersections or roadways by 150 or more vehicles in the peak hour.
 - b. proposed development is in the vicinity of areas previously identified as having levels of service "E" or "F", hazardous locations or other adequacy concerns (as determined by NCDOT, MPO, County, or City of Winston-Salem agencies).
 - c. where a reduction in safety is expected at intersections or roadways.A traffic signal warrant study may still be requested by NCDOT or **WSDOT even** if a traffic impact study is not.

2. In the land planning and development process a study may be recommended, based on the following:

A contact or multi-agency meeting will address the recommendations for and scope of the proposed study. The contact or multi-agency meeting provides a means to discuss the traffic concerns expressed by the developer, reviewing agencies and jurisdictions responsible for traffic operations in the vicinity of the proposed project site.

The traffic impact study may be performed and completed and due to City-County Planning Board along with a filing for special use district rezoning, and/or non-residential subdivision.

In those instances where a proposed development or non-residential subdivision project has been approved by the City-County Planning Board or any other elected board in Forsyth County based on recommendation from an acceptable traffic impact study and that project has not been completed after two (2) years of the date of approval, an updated traffic impact study may be recommended. If changes are made to the pre-approved site plan or non-residential subdivision plan that will require a new approval from the City-County Planning or other elected or appointed board in Forsyth County then a new and/or updated traffic impact study may be recommended.

3. This recommendation may be waived by the Director of WSDOT and/or the Division Engineer of NCDOT Division 9 upon written request by petitioner providing adequate justification for such waiver. The WSDOT and/or NCDOT shall respond in writing. Both letters shall be submitted with the proposed development petition.
4. A Traffic Impact Study can only be performed by a Professional Engineer licensed by the North Carolina Board of Registration for Engineers and Land Surveyors, to practice engineering in North Carolina and with experience in the preparation of traffic impact studies.
5. When performing a Traffic Impact Study in Forsyth County consideration should be given to the City-County Planning Board, the Winston-Salem Board of Aldermen, Forsyth County Board of Commissioners and/or other jurisdictions.

The City-County Planning Board has the authority to review and approve non-residential subdivision plans within their respective jurisdictions. The Winston-Salem Board of Aldermen and the Forsyth County Board of Commissioners have the authority to approve or disapprove of proposed developments within their respective jurisdictions. It is recommended that the contact and/or multi-agency meeting for proposed developments within multiple jurisdictions include a representative from each jurisdiction that is familiar with traffic issues concerning each jurisdiction (see the appendix for elected and appointed Boards meeting times, and locations, and phone numbers for each jurisdiction's contact person).

Other government agencies (both state and local) may be requested by the Director of Planning to review any traffic impact study. When reviewing a traffic impact study in this capacity, other government agencies are to be considered as staff subordinate to the staff of the Planning Board recommending the traffic impact study.

6. Considerations should also be given to the NCDOT to eliminate any duplication of study recommendations, arrangements will be made by the City-County Planning Board to have a representative from the appropriate NCDOT Division 9 office present at the multi-agency meeting (or send their recommendations). This representative should indicate the NCDOT recommendations for a traffic impact study.

7. The following areas of investigation will generally be included in a Traffic Impact Study (The exact parameters may be defined at the contact and/or multi-agency meeting conference.):
 - a. An examination of traffic flows, exclusive of the site being studied, defined as "background traffic";
 - b. An examination of projected traffic flows when site traffic is added, defined as "total traffic";
 - c. A discussion of mitigation measures (if such measures are recommended);
 - d. An examination of projected traffic flows after site is developed and mitigation measures are implemented.

8. Traffic should be examined as follows:
 - a. From data collected by persons or agencies within the defined study area which is no more than two years old at the time of the pre-study conference;
 - b. From traffic counts obtained by the applicant based on the specification established at the pre-study conference (see item 13).

9. The study area should be determined as follows:

As a minimum standard, the study area should include each intersection with a major thoroughfare highway which can be considered as a logical travel path between the site and the major thoroughfare highway network. Major thoroughfare highways are so designated by the Winston-Salem/Forsyth County Thoroughfare (or Transportation) Plan.

Additional intersections between the site and the major thoroughfare intersection(s) as well as those intersections that are rationally identified as being impacted by a development should be included in the study area.

10. The design hour should be determined by:
 - a. the period for the proposed development which will generate/attract the highest traffic volumes; and/or
 - b. the period of highest traffic volumes on the traffic facilities within the study area.

11. The forecast year should be determined at the contact or multi-agency meeting according to some or all of following criteria:
 - a. a scheduled phase or the completion of the project (for this and other projects);
 - b. The Winston-Salem/Forsyth County Comprehensive Plan (*Legacy*);
 - c. locally adopted Transportation or Thoroughfare plan or capital improvement program schedule, or Transportation Improvement Program;
 - d. major transportation system changes.

12. The following technical procedures and guidelines should be used:

Roadways and intersections should be analyzed using the appropriate analysis method as depicted in the latest edition of the Highway Capacity Manual, Transportation Research Board.

Additional analyses may or may not be recommended depending on the traffic concerns expressed at the pre-study conference.

13. The minimum standard for traffic operations is defined as follows:

Level of service "D" is the lowest level of service that should be considered adequate for intersections and roadway approaches to intersections in Winston-Salem and Forsyth County. However, no development should bring a level of service down by more than one level without implementing roadway improvements.

14. Background traffic should be determined by:

Background traffic on roads in the study area should be determined by thoroughfare classification, as per the most current locally adopted Winston-Salem/Forsyth County Transportation or Thoroughfare Plan document:

- a. by historic and/or projected traffic increase rates on roads classified as being major thoroughfares (arterial or major collectors); and
- b. by developments/trips that have been approved (recorded) on roads classified as minor thoroughfares or streets (minor collectors or local roads).

Existing zoning activity information is available at the City-County Planning Department, at 336-727-2548. Average Daily Traffic (ADT) information is available from the Winston-Salem Department of Transportation at 336-727-2707 and/or the NCDOT Division 9 Traffic Engineering Office at 336-631-1375.

15. Trip Generation, Distribution and Assignment should be determined by:

Trip generation should be determined by using the following:

- a. the latest edition of the Trip Generation Manual, Institute of Transportation Engineers, (cite land use code and page number); or
- b. documented local trip generation rates, (as determined through previous or current studies).

Trip distribution should be determined by using the following:

- a. gravity model;
- b. trip assignment of the traffic demand forecasting model;
- c. utilization of demographic data leading to trip purpose and trip tables;
- d. current directional distribution only if no future changes to land use and no improvements to transportation facilities are expected until the design year;
- e. trips should be assigned to the study area network during the study's design hour.

16. Pass-by Trips should be determined by using either of the following:

- a. the Institute of Transportation Engineers pass-by trip rates; or
- b. documented local pass-by trip rates, (as determined through previous or current studies).

17. Traffic should be apportioned to the proposed project in the following manner:
 - a. First, the projected level of service for the study area is forecast without the proposed project.
 - b. Second, the projected level of service is forecast with the addition of the proposed project.

Then the two forecasts are evaluated to determine whether the traffic projected to be generated by the proposed development will lower the projected Levels of Service (LOS) within the study area to below LOS "D" or one level below the current level of service.

18. When a traffic impact study projects that the intersection(s) or roadway(s) in the study area will be adequate then the following occurs:

Once a plan has met the level of service standard, and other recommendations identified in consultation or in the multi-agency meeting no further approval for traffic impact is to be recommended by the City-County Planning Department. However, it is possible that the NCDOT Division Engineer or the Winston-Salem Department of Transportation may still recommend additional analyses and/or improvements.

19. When a traffic impact study projects that the intersection(s) or roadway(s) in the study area will be inadequate then either of the following alternatives may be considered by the City-County Planning:
 - a. The project is deferred or reduced in scope so that the level of service standard is not exceeded, or
 - b. A mitigation plan is submitted for review by the CCPB, the WSDOT and/or the NCDOT. The mitigation plan together with the recommendations of the departments are presented to the Planning Board and subsequently to the appropriate elected board with a recommendation from the City-County Planning Board. The elected body has the authority to either approve or disapprove those projects solely under its jurisdiction.
 - c. The improvements recommended in the mitigation plan are the sole responsibility of the developer to implement unless 100% of construction costs for the projected improvements are in the subject budget year of the seven year Transportation Improvement Program or the local Government's Capital Improvements Program.
 - d. The developer may agree to pay fees to fund the necessary improvements by written agreement with the WSDOT and/or NCDOT.
- 19A. If the existing level of service is inadequate (i.e., "E" or "F"), or the existing plus the background growth (not including the site) causes an inadequate level of service, then the developer will be expected to mitigate only the traffic to be generated by the proposed project.
- 19B. If the proposed development is of significant economic importance it may be recommended that the developer be granted an exception and/or waiver where improvements are scheduled or included in either the NCDOT TIP or locally approved Capital Improvements Program.

20. A mitigation plan is:
- a. an addition to a traffic impact study, (the recommendation for which is identified by preliminary study results);
 - b. intended to identify specific causes of lowered levels of service (traffic impacts);
 - c. recommends improvements that will moderate the effects of projected traffic impacts;
 - d. recommends transportation demand management options.

Where legally allowed, examples of possible mitigation plan improvements may include, but are not limited to: construction of new roads, road improvements, traffic signals, ridesharing programs, off-site parking facilities and para-transit, signal timing/phasing changes, channelization modifications, changes in ingress/egress points, reducing the number of entrances, and/or lane widening.

21. Mitigation Plan improvements may be phased and shall be sensitive to the following:
- a. timing of short-term and long-term network improvements that are already planned, scheduled and/or funded;
 - b. time schedules of adjacent developments;
 - c. size and timing of individual phases of development;
 - d. right-of-way needs and availability of additional right-of-way within appropriate time frames;
 - e. local priorities for transportation improvements and funding;
 - f. local priorities for transportation demand management strategies;
 - g. necessary lead time for additional design and construction;
 - h. that the sum of improvements are proportional to the projected impact.

Analysis of traffic needs by development phase should provide the information needed to determine the appropriate sequence of improvements.

22. Additional analyses, with references, may be recommended, typical examples with references are as follows:

Sight Distance Analysis, Improvement Plan for Geometric Conditions, - A Policy on Geometric Design of Highways and Streets, American Association of State Highway Transportation Officials, 1990.

Signal Warrant Analysis, Traffic Control Plan During Construction - Manual of Uniform Traffic Control Devices, Federal Highway Administration, 1988.

Traffic Signal Progression Analysis - any recognized software application (i.e., PASSER 11 or TRANSYT 7F).

Local Trip Generation Study, Pass-By and Diverted Linked Trip Analysis - ITE Trip Generation Manual, latest edition.

Accident Analysis, Transit Analysis, Pedestrian Analysis, Parking Analysis - Traffic Engineering Handbook, Institute of Transportation Engineers.

Environmental Analysis - For specific treatments contact the local and NCDOT Environmental Agencies.

23. Findings, Conclusions and Recommendations of the traffic impact study may be presented and documented in the following manner:

The following format (as depicted below) is recommended to be used as a guide for the presentation of those items as required in the pre-study conference:

Chapter I Executive Summary

- A. Development description
- B. Pre-study contact/multi-agency meeting work scope, site location & study area (w/map).
- C. Principal findings with Level of Service Map
- D. Conclusions
- E.* Mitigation Plan Summary

Chapter II Description of All Proposed Developments in Study Area

- A. Off-site approved future developments in the area (w/map).
- B. On-site developments & phasing to include build-out year (w/map)

Chapter III Existing Conditions

- A. Site accessibility
- B. Traffic Volumes Map & Level of Service Map
- C. Illustration of existing road & intersection lane use configurations

Chapter IV Projected Conditions without Proposed Development During Build-out Year

- A. Site accessibility
- B. Projected Background and Regional Traffic Volumes Map & Level of Service Map
- C. Illustration of projected road and intersection lane use configurations

Chapter V Projected Conditions with Proposed Development at Projected Completion

- A. Site accessibility
- B. Projected Traffic Volumes Map & Level of Service Map
- C. Illustration of projected road & intersection lane use configurations (if different than Chapter IV, part C).

Chapter VI* Mitigation Plan/or Additional Analysis Recommended
Appendix

- A.* Description of analysis method(s).
- B.* Statement of method(s) limitations
- C. Count Data
- D. Software Work Sheets

*Optional items that are required during the contact/multi-agency meeting or included by the person(s) performing the traffic impact study.

24. Level of Service (LOS) Descriptions

Los A Free flow. Individual users are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to maneuver within the traffic stream is extremely high. The general level of comfort and convenience provided to the motorist, passenger, or pedestrian is excellent. Turning movements are easily made.

Los B Upper range of stable operation, but the presence of other users in the traffic stream begins to be noticeable. Freedom to select desired speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver within the traffic stream from LOS A. The level of comfort and convenience provided is somewhat less than at LOS A, because the presence of others in the traffic stream begins to affect individual behavior.

Los C Mid range of stable flow, but is the beginning of the range of flow in which the operation of individual users becomes significantly affected by interactions with others in the traffic stream, but not objectionably so. The selection of speed is now affected by the presence of others, and maneuvering within the traffic stream requires substantial vigilance on the part of the user. Back-ups may develop behind turning vehicles. The general level of comfort and convenience declines noticeably at this level.

Los D High density, but stable flow. Speed and freedom to maneuver are severely restricted, and the driver or pedestrian experiences a generally poor level of comfort and convenience. Small increases in traffic flow will generally cause operational problems at this level. Delays to vehicles approaching signalized intersections may be substantial peak hours.

Los E Unacceptable, operations near capacity. All speeds are reduced to a low, but relatively uniform value. Freedom to maneuver within the traffic stream is extremely difficult, and it is generally accomplished by forcing a vehicle a vehicle or pedestrian to "give way" to accommodate such maneuvers. Comfort and convenience levels are extremely poor, and driver or pedestrian frustration is generally high. Operations at this level are usually unstable, because small increases in flow or minor perturbations within the traffic stream will cause breakdowns.

Los F Unacceptable, forced or breakdown flow, representing jammed conditions. The amount of traffic approaching an intersection cannot be accommodated adequately.