North Carolina Department of Transportation
Division of Highways

1995-1996 Speed Limit Study Procedures

BACKGROUND

In September, 1995, Congress repealed the National speed limit law giving individual states the authority to raise or lower limits on highways providing full control of access. North Carolina followed with its own legislation changes allowing speed limits up to 70 miles per hour. Rather than race to implement changes, the North Carolina Department of Transportation chose to adopt a methodical approach to determine appropriate sections of highways for raising speed limits. In September, 1995, the Traffic Engineering Branch was asked to conduct this study. State Traffic Engineer J. M. Lynch, PE then asked each of the five Area Traffic Engineering staffs to develop a list of locations that would warrant study for possible altering of existing speed limits. These lists were submitted and reviewed, modifications were made, and then locations to be studied were agreed upon. Criteria to be used to determine whether to raise limits was developed and an "Access" database was created to organize this information. The engineers then embarked on the study.

PROCEDURE

- Sections of highways exhibiting similar characteristics with regard to cross-section and ADT were assigned *Homogeneous Section Numbers*. One route may have been assigned multiple numbers depending upon the number of variations in these characteristics. The *Length* of each section was field measured by the engineers.

- *Design Speed* - Design speeds for each homogeneous section were requested by the engineers and obtained directly by memo from Roadway Design Unit personnel or obtained from existing Roadway Design plans for the specific sections.

- *85th Percentile Speed* - Engineers gathered this data for each section by one of three different means; Nu-Metrics® Data Collectors, Radar Guns, or stopwatches.

- *ADT* - ADT's for each section were obtained by memo from Statewide Planning Branch, Traffic Forecast Unit personnel or read from ADT maps which are updated yearly by the Statewide Planning Branch. The year this ADT was taken was also noted.

- *Directional Peak Hour Volume* - An "Excel" spreadsheet program was written to calculate this data based on formulas found in the Highway Capacity Manual, 1994 edition.

- *Peak Hour Factor* - The Peak Hour Factors were either calculated using peak hour volume data gathered or assumed to be 0.9. This value is widely used as a "rule of thumb" for calculations related to basic freeway sections. This value suggests a very moderate variability of flow within the peak hour, as found in the majority of the freeway segments under study. See Highway Capacity Manual, 1994, p.2-19.

- *Truck Percentage* - Vehicle classification data used to determine truck percentages were either obtained by memo from Statewide Planning Branch, Traffic Forecast Unit personnel, read directly from data obtained by the Nu-Metrics® Data Collectors, or estimated based on observations and engineering judgment.

- Engineers made field investigations for each section considered, noting *Terrain Type, Number of Lanes,* and whether *Median Barrier* was present and, if so, what type. *Lane Widths, Median Widths,* and *Lateral Clearances* were field measured. In addition, *Acceleration/Deceleration Lane Lengths* and *Spacing Between Interchanges* data was noted. Comments regarding the presence of rumble strips along the paved shoulders and the widths of these shoulders were also noted.

- *Lane Density* - Using the spreadsheet program, Highway Capacity Manual formulas, and data previously collected, Lane Density was calculated for each section.

- *Level of Service* - The levels of service resulting from the calculated lane densities were noted. The Highway Capacity Manual provides a chart showing Levels of Service for various densities.

- *Section Accident Rates and Critical Accident Rates* - The Traffic Safety Systems Management Unit of the Traffic Engineering Branch provided this data for each section.

- The engineers reviewed the Transportation Improvement Program (TIP) to determine if and when *Construction Projects* were scheduled for each section.