

## **Appendix B Requirements for Transportation Impact Study**

### **1. Purpose and Applicability.**

A transportation impact study shall be submitted as part of all requests for change of zoning and under any other conditions where specified by this Chapter or by the Borough Subdivision and Land Development Ordinance. This study will enable Borough officials to assess the impact of a proposed change of zoning on the transportation system, both highways and public transportation, in the Borough. The purpose of the impact study is to insure that proposed developments do not adversely affect the transportation network and to identify any traffic problems associated with access from the site to the existing transportation network. The study's purpose is also to delineate solutions to potential problems and to present improvements to be incorporated into the proposed development. The study shall assist in the protection of air quality, the conservation of energy and the encouragement of public transportation use.

The Borough, at its sole discretion, may require any subdivision or land development application to be accompanied by a Transportation Impact Study if, in the opinion of the Borough, such a survey is necessary to determine the impact the proposed development will have on Borough and state roads in the vicinity of the proposed development. The Transportation Impact Study required pursuant to this section shall be performed in accordance with the standards as set forth hereinafter in this section. In those situations where the Borough may require a Transportation Impact Study, such a requirement shall be communicated in writing to the applicant immediately following the Planning Commission's first meeting to consider the proposal. Such a notification shall specify the reason for the requirement, citing the proposal's particular location or existing problems at that location, or type of use (i.e., generation of heavy truck traffic).

### **2. Definitions**

- A. Public Transportation—Transportation service for the general public provided by a common carrier of passengers generally on a regular route basis, by the Southeastern Pennsylvania Transportation Authority, or a private operator offering service to the public.
- B. Study Area—This area will extend along all adjacent roadways in all directions from the site access points. The study area will include all major intersections in the vicinity of the proposed development. Where doubt exists, the transportation engineer shall seek guidance from the Borough Planning Commission prior to the submission of the traffic impact study to ensure agreement on the study area boundaries.
- C. Major Intersection—Any intersection, either signalized or unsignalized, where traffic generated by the proposal will have a significant impact on the operation of the intersection and/or any other intersection with an arterial or collector road.

Where doubt exists the transportation engineer shall seek guidance from the Borough Planning Commission prior to the submission of the traffic impact study to ensure agreement on the location of major intersections.

- D. Volume/Capacity Analysis—Procedures used to determine Level of Service and to evaluate the operational characteristics of a roadway or intersection. The procedures are described in the 1985 Highway Capacity Manual, Transportation Research Board, and the results are expressed in Level of Service for roadways, signalized and unsignalized intersections.
- E. Level of Service—Level of service (LOS), as described in the 1985 Highway Capacity Manual, Special Report 209, Transportation Research Board, indicates how well traffic moves on a particular highway facility or through a specific intersection. There are six levels of servicing ranging from A through F. Level of service A indicates generally free movement. Level of service E represents maximum capacity of the facility. Level F indicates congestion. Level of service C is considered the design level of service, representing a stable traffic flow and a relatively satisfactory travel speed.
- F. Trip Generation Rates—The total count of trips to and from a study site per unit of land use as measured by parameters such as dwelling units, acres, etc. which said trip generation rates are established by the Institute of Transportation Engineers, Trip Generation Report, 6<sup>th</sup> Edition or other later edition.
- G. Warrants for Traffic Signal Installation—This is a series of warrants which detail the minimum traffic or pedestrian volumes or other criteria necessary for the installation of a traffic signal. These warrants are contained in the Manual on Uniform Traffic Control Devices for Streets and Highways, U.S. Department of Transportation, Federal Highway Administration, 1988, as amended.

### **3. General Requirements and Standards.**

A transportation impact study shall be performed by a qualified traffic engineer and/or transportation planner with previous traffic study experience and shall contain the following information:

- A. General Site Description—The site description shall include the size, location, proposed land uses, construction staging and completion date of the proposed subdivision or land development. If the development is residential, types of dwelling units shall also be included. A brief description of other major existing and proposed subdivisions and 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). The general site description shall also contain a demographic study which includes projections as to where new residents to be served by the development would work or shop, and

where employees of new commercial developments would live, and the traffic generation effects of such a study. The general site description shall also include analysis of both vehicular and pedestrian traffic projected to be generated by children in any new residential development going to and from school.

- 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, parking conditions, traffic channelizations, and any traffic signals or other intersection control devices at all intersections within the site. The site design shall be shown to maximize potential public transportation usage to and from the development, such as providing adequate turning radii at all access points to allow a bus to enter the development. Bus shelter and sign locations shall be designated where appropriate.

The report shall describe the entire external roadway system within the study area. Major intersections in the study area shall be identified and illustrated. All existing and proposed public transportation services and facilities within a one-mile radius of the site shall also be documented. All regional rail stations within a three-mile radius of the site shall also be documented. All future highway improvements, including proposed construction and intersection signalization, shall be noted. This information shall be obtained from the 4-Year Regional Transportation Improvement Program maintained by the Delaware Regional Planning Commission, and from the 12-Year Transportation Program maintained by the Pennsylvania Department of Transportation. Any proposed roadway improvements due to proposed surrounding developments shall be recorded.

- C. Existing Traffic Conditions - Existing traffic conditions shall be measured and documented for all roadways and intersections in the study area. Existing traffic volumes for average daily traffic, peak highway hour(s) traffic, and peak development-generated hour(s), and documentation shall be included in the report. Manual traffic counts at major intersections in the study area shall be conducted, encompassing the peak highway and development-generated hour(s), and documentation shall be included in the report. All documentation shall be included in a technical appendix and consist of highway peak hour turning movement counts expressed in fifteen-minute increments, development-generated peak hour turning movement counts expressed in fifteen minute increments, capacity analysis worksheets and all quantitative information used in the traffic analysis. A Level of Service analysis based upon existing volumes shall be performed during the peak highway hour(s) and the peak development-generated hour(s) for all roadways and major intersections in the study area. Levels of service shall be determined for each location. 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 D, E, or F shall be noted as congested locations.

D. Transportation Impact of the Development - Estimation of vehicular trips to result from the proposal shall be completed for the average daily peak highway hour(s) and peak development-generated hour(s). Vehicular trip generation rates to be used for this calculation shall be obtained from Trip Generation, Institute of Transportation Engineers, 6<sup>th</sup> Edition, or other later edition. For all land uses proposed but not listed in the Institute report, the traffic engineer shall seek guidance from the Borough Planning Commission. All turning movements shall be calculated. These development-generated traffic 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 in the technical appendix. Traffic volume shall be assigned to individual access points. Pedestrian volumes shall be calculated, if applicable. If school crossings are to be used, pedestrian volumes shall be assigned to each crossing. Any characteristics of the site that will cause particular trip generation problems shall be noted.

E. Analysis of Transportation Impact - The total future traffic demand shall be calculated. This demand shall consist of the combination of the existing traffic expanded to the completion year (using an annual background traffic growth rate which best reflects the intensity of growth projected in Hulmeville Borough). The background growth rate shall reflect the consideration of other proposed developments within the study area. A list of the proposed developments may be obtained from the Borough Planning Commission and/or Borough Engineer. The rates shall be based on acceptable parameters such as population and employment and be monitored to insure that the rate accurately reflects local conditions, the development generated traffic, and the traffic generated by any other proposed developments in the study area.

A second Level of Service analysis shall be conducted using the total future demand and the future roadway capacity. If staging of the proposed development is anticipated, calculations for each stage of completion shall be made. This analysis shall be performed during the peak highway hour(s) and peak development-generated hour(s) for all roadways and major intersections in the study area. Level of Service 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 as to the feasibility of installing traffic signals. This evaluation shall compare the projected traffic and pedestrian volumes to the warrants for traffic signal installation.

F. Analysis of Existing Roadway Pavement Conditions - Where the Subdivision and Land Development ordinance requires the widening of existing pavement, the applicant shall:

- (1) Take pavement cores and CBR values of the existing pavement at 400 foot intervals staggered left to right in the path of the outside wheels of vehicles traveling the existing roadway;
- (2) Submit an analysis of the existing pavement based on the foregoing core sample and analysis and the traffic volume, to determine the extent of roadway reconstruction needed.
- (3) Submit a plan, profile and detailed road cross-sections at 50 foot intervals with existing and proposed elevations.

**G. Conclusions and Recommended Improvements**

- (1) Levels of service for all roadways and intersections shall be listed. All roadways and/or intersections or portions of intersections showing a level of service below C shall be considered deficient, and specific recommendations for the elimination of these problems shall be listed, unless design limitations preclude Level of Service C. Where such conditions exist, the Traffic Engineer shall seek guidance from the Borough Planning Commission prior to submission of the Traffic Impact Study. 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 design improvements, All physical roadway improvements shall be shown in sketches.
- (2) Other circulation conditions shall be described and analyzed, including sight distance at all proposed access points to the site; circulation of commercial vehicles (trucks, etc.) in nonresidential developments and in multi-family developments.
- (3) Existing and/or future public transportation service shall also be addressed. A listing of all actions to be undertaken to increase present public transportation usage and improve service, if applicable, shall be included.
- (4) The listing of recommended improvements for both roadways and transit shall include, for each improvement, the party responsible for the improvement, the cost and funding of the improvement, and the completion date for the improvement.

**4. Time of Submission.**

- A. The traffic impact study shall be submitted to the Borough and Borough Engineer as part of the preliminary plan application. The submission of the preliminary

plan application shall be deemed incomplete if the required transportation impact study is not included in the submission.

- B. The improvement plans shall not be submitted to Pennsylvania Department of Transportation until after review by the Hulmeville Borough Planning Commission, the Borough Engineer, and approved by the Borough Council. The submittal to PennDOT shall be accompanied by comments of Hulmeville Borough.

**5. Implementation.**

The Hulmeville Borough Planning Commission, Engineer, and Council shall review the Transportation Impact Study to analyze its adequacy in solving any traffic problems that will occur due to the subdivision or land development. The Borough Council may decide that certain improvements on- or off- site are mandatory for plan approval and may attach these conditions to the approval.