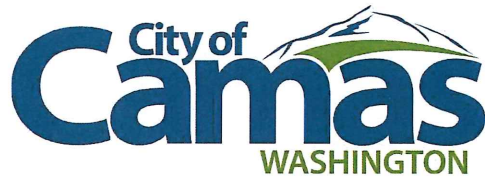




## **Transportation Impact Study Guidelines**



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### **PURPOSE**

A Transportation Impact Study documents the adequacy of the transportation system to serve a proposed development and the expected impacts of the proposal on the surrounding transportation system. This review is in conformance with the Growth Management Act concerning requirements and provides the City a standard set of information for assessing land use changes in Camas. The transportation impact study guidelines are used by the City of Camas to establish uniform guidelines for conducting transportation impact studies for proposed development activities, whether new or existing, which require access or modification of access to the City's street system. These guidelines are used to ensure consistent and proper traffic planning and engineering practices in conjunction with land use actions being considered in the City.

### **PROCESS**

A transportation impact study will be required when a proposed development generates 200 vehicles per day (vpd) or more. For developments generating under 200 vpd, a transportation impact report may be required for conditions such as non-single family development in single family residential areas, developments impacting known safety problems, or other situations where a study is deemed necessary by the City. In these cases, the City Engineer will decide if a transportation impact study is required.

Trip generation for proposed development:

200 vpd or more – transportation impact study required.

199 vpd or less – transportation impact study may be required.

### **STANDARD POLICY ISSUES**

1. Half-street improvements are required on all frontages. Improvements shall include sidewalks, planter strips, curb & gutter, storm drainage, grind & inlay of existing surfacing, and a full depth street section for a 20-foot wide minimum width.
2. Left-turn storage lanes are required on all arterial and collector streets.
3. All lots shall be provided full street access at the time of development. If directed by the City, a minimum of 24-foot half street shall be provided for streets centered on property lines.
4. Direct lot access to collector and arterial level streets is subject to approval by the City of Camas and is discouraged where reasonable alternatives exist.

## TRANSPORTATION IMPACT STUDY REQUIREMENTS

The preparer of the transportation impact study shall contact the Public Works Director to discuss study area limits (including the number of intersections to be analyzed, and key project issues) for their specific project prior to beginning the study. The preparing engineer is responsible to define key study variables with the City prior to completing work. A site plan indicating proposed access locations, development size, number of parking stalls and on-site circulation must be provided by the developer before beginning the transportation impact study. The transportation impact report shall be prepared under the supervision of a Registered Civil Engineer in the State of Washington with a traffic engineering background. Studies that do not address the guidelines adequately shall be returned to the engineer for modification. The attached checklist will be used for review by City Staff in accepting transportation studies for public review.

Peak hour traffic counts will be conducted at study area intersections. Intersections of arterials or collectors should be considered in determining study intersections (use of AM, mid-day, PM or weekend peak hour will depend on proposed use<sup>1</sup>. Existing traffic counts may be utilized provided they were conducted within the previous 12 months. A 24-hour traffic count and speed survey will be conducted near proposed project site points. If two project access points are located on the same roadway, and are within 2,000 feet, then one ADT/speed survey on the subject roadway will be required. Accident data at all study area intersections covering the most current three years should be obtained<sup>2</sup> and summarized in table format in the final report.

The following is a list of the minimum information required when conducting a transportation impact study in the City of Camas:

### **Executive Study with recap of the following:**

1. A **project description** including site location map and characteristics as well as all existing and proposed land uses for the site.
2. A **study area description** including description of roadway (roadway classification, posted speed, ADT volumes, number of lanes, traffic control, width of road, pedestrian/ bicycle facilities), transit stops and service, parking conditions, existing geometric deficiencies, accident data at study area intersections<sup>3</sup>, and other pertinent features. Planned roadway improvements identified in the City's Comprehensive Plan or in the Washington State Department of Transportation Capital Construction Program should be identified. A figure showing the study area as well as a figure showing existing AM and PM peak hour intersection turn movement volumes should be provided.

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<sup>1</sup> For example, residential and employment uses (office, warehouse, manufacturing and industrial) will consider AM and PM periods, schools will consider AM and afternoon periods, retail will consider PM and mid-day (for retail projects over 70,000 sf – access issues of driveway turn land storage for site and adjacent intersections will be reviewed on Saturdays. As a minimum, the analysis shall analyze the period of greatest traffic for adjacent study intersections and determine the period of greatest trip generation for the project.

<sup>2</sup> Accident data shall be obtained from WSDOT, Traffic Office, SW Regional Traffic Engineer.

<sup>3</sup> An average of 2 accidents per year over the most recent 3 years at a particular intersection shall mandate further study of the intersection.



3. **Intersection level of service** should be determined for study area intersections for the peak hours using the current edition of the *Highway Capacity Manual*<sup>4</sup>.
4. **Project-related trip analysis** should include expected trip generation, trip distribution, and trip assignment. A table should be provided identifying the type and size of each proposed land use, daily and peak hour (AM and PM) vehicle trip rates<sup>5</sup> and the total number of daily and peak (AM and PM) vehicle trips. A figure showing Project Trip Distribution (in percentages) should be provided.
5. **An evaluation of the project site plan** should include site access locations, vehicle queue storage, left turn/right turn lane needs, pedestrian circulation and conflicts, parking, existing deficiencies, and efficiency of proposed vehicular circulation/facilities, and recommendations for on-site channelization and traffic controls.
6. **An evaluation of project impacts** on roadway operating conditions to include:
  - a. An analysis of level of service and volume/capacity at study area intersections and project access points. Intersection analysis should be conducted for the following scenarios:
    - Existing plus Project on existing roadways.
    - Existing plus Project plus Approved (traffic from projects which have been approved by the City but not constructed) on the existing roadways plus any roadway that has secure funding for construction within two years.
    - Future Year or End Year Comprehensive Plan plus Project on the same roadway networks as noted above Mitigated Future Year, if needed.

Figures showing AM and PM peak hour traffic volumes used in each analysis described above should be included. The level of service results for study area intersections and access points should be shown in a table with the level of service calculation sheets provided in the appendix of the report. Approved projects should be those projects approved by the City yet not constructed. The City should provide a listing of approved projects.

- b. Operational analysis should include turning conflicts and queue spill-back locations, which may adversely affect adjacent intersections or driveways. Turn lane warrants should be evaluated for project access points and all unsignalized study area intersections.
- c. A discussion of traffic safety impacts.
  - Signal warrant analysis and four-way stop analysis based on the *Manual on Uniform Traffic Control Devices for Streets and Highways*

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<sup>4</sup> Highway Capacity Manual, Special Report 209, Transportation Research Board, latest revision.

<sup>5</sup> Based upon Trip Generation, Institute of Transportation Engineers most current edition or actual similar site surveys/counts.

(MUTCD) should be conducted at study area unsignalized intersections.

- Left turn lane requirements for different scenarios should utilize *A Policy on Geometric Design of Highways and Streets, (AASHTO Green Book)*, current edition. If storage lanes are required, the study will include the length of the storage lane needed and its storage capacity. Provision of turn lanes will be consistent with policy for arterial and collector streets.
- Project access should be evaluated including sight distance requirements based on the current edition of the *AASHTO Green Book*.
- Access spacing to adjacent driveways/public streets (including both sides of the street) shall be documented.
- Pedestrian and Bicycle safety issues. The study should address the safety of pedestrians leaving and entering the site. For residential projects it should address provision of a safe walking environment for students leaving the site and traveling to the nearest Elementary and Middle/Junior High Schools, or to the nearest school bus stop(s) serving these and High Schools. The study will also address when and where the school bus stop is provided. The school district shall be contacted to discuss locations for bus pullouts<sup>6</sup>. Safe pedestrian and bicycle access to the nearest transit stop (if within ½ mile of the project site) should be addressed.
- Bicycle access for the site should be identified indicating the closest bicycle lane (existing or comprehensive plan) and their status in terms of connectivity within the City.
- The transit accessibility of the project shall be described and evaluated. Planned transit system changes/modifications shall be documented including bus stop locations<sup>7</sup>.

7. **Mitigation measures for site access and transportation system improvements.** The location, nature, and extent of all project specific and area-wide mitigation measures should be described to achieve acceptable operating conditions for both the short-term and long-term analysis years should be identified. The level of service and impacts associated with these improvements should be identified. Transportation demand management programs (as required by county and state) should be outlined for the project.

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<sup>6</sup> Contact Camas School District Maintenance and Transportation Department Director.

<sup>7</sup> Contact C-Tran Planning Department Planner.

## METHODOLOGY

**Trip Generation Analysis** – Trip generation should be determined using the current edition of *Trip Generation, Institute of Transportation Engineers (ITE) Manual*, unless more appropriate local data is available. If trip generation rates other than those given by ITE manual are used they must be approved by the City Engineer.

On zone change and conditional use cases, a comparison table between trip rates for proposed use and uses permitted under the current zoning should be provided.

**Trip Distribution and Assignment** – Traffic generated from the development should be logically distributed and assigned at the access point(s) and study area intersections. The traffic distribution should be based on recently collected traffic data, the surrounding land use pattern census data and/or available travel demand model information. All assumptions and data sources used to determine trip distribution and assignment should be documented in the report, including a figure showing distribution percentages.

**Capacity Analysis** – Capacity analysis procedures provided in the latest edition of the *Highway Capacity Manual* must be used. A table showing the results of the level of service analysis (volume-to-capacity ratio, LOS, average delay) for each scenario should be presented.

**Design Standards** – The city comprehensive plan indicates the widths (number of lanes) for streets in Camas. These widths should not be exceeded. A minimum level of service of C on minor and local streets, and D on collector/arterials or better should be maintained for traffic operations. Site related traffic which contributes to traffic levels exceeding the level of service D indicates the need for roadway improvements or mitigation measures to be included in the recommendations. Mitigation requiring street widths beyond those identified in the comprehensive plan will require City approval. New streets outlined in the comprehensive plan should be discussed, indicating project needs for new streets and when they will be built. If a project would be served by a future comprehensive plan roadway, it should be discussed.



## REPORT OUTLINE

The transportation impact report should include the following sections:

### **Executive Summary**

**Introduction and Summary.** Include trip generation, summary of transportation operation and mitigation.

**Existing Conditions.** This section should include a study area description and existing study area level of service.

**Impacts.** This section should include a brief review of the site plan including a site plan layout, project related trip analysis, and an evaluation of the project site plan. A figure showing the assumed Future Year roadway network (number and type of lanes at each intersection) should be provided.

**Mitigation.** Project specific and area-wide specific mitigation measures should be recommended.



## Transportation Impact Study Guideline Technical Completeness Checklist

Project Name: \_\_\_\_\_  
City Reference Code: \_\_\_\_\_

### TRAFFIC REQUIREMENT

- Yes  No Traffic generated greater than 200 vehicles per day  
 Yes  No Study Required Comment: \_\_\_\_\_ Date: \_\_\_\_\_

### BACKGROUND INFORMATION

- Yes  No Washington PE Stamp and Signature

### INTRODUCTION AND SUMMARY

- Yes  No

### EXISTING CONDITIONS

- Yes  No Roadway Network – summary of roadway classifications and description of study area  
 Yes  No Analysis Period Correct (AM, Mid-day, PM and/or Saturday)  
 Yes  No Existing Traffic Operations (Existing Level of Service, traffic volumes, speeds, accident data, etc.)

### IMPACTS

- Yes  No Trip Generation – Daily, peak hour trips generated by site development: ITE Trip Generation Manual/Survey  
 Yes  No Trip Distribution  
 Yes  No Level of Service Analysis – projected LOS with site build out, existing traffic, and background traffic growth (Identify existing and projected LOS deficiencies)  
 Yes  No Signal Warrant Analysis  
 Yes  No Turn Lane Warrant Analysis  
 Yes  No Analysis of sight distance at frontage road access point(s)  
 Yes  No Identify safe route to school or school bus stop (contact with school district)  
 Yes  No Analysis of safe pedestrian/bicycle access to nearest transit stop (if within 1/2 mile of project site)  
 Yes  No Identify accessibility to public transit  
 Yes  No Neighborhood Traffic Management – On and Off Site

### MITIGATION

- Yes  No Identify need for right/left turn lanes, storage capacity and length  
 Yes  No Identify possible corrections of any LOS deficiencies  
 Yes  No Identify any access deficiencies (including pedestrian/bicycle connections)  
 Yes  No Neighborhood Traffic Management – On and Off Site

### FIGURES

- Yes  No Vicinity Map  
 Yes  No Site Plan  
 Yes  No Existing peak hour turn movement volumes (counts conducted within previous 12 months)  
 Yes  No Trip Distribution (%) including Added Project Peak Hour Traffic Volumes (see sample)  
 Yes  No Project Completion Year Peak Hour Traffic Volumes (see sample)  
 Yes  No Comprehensive Plan Future Year turn movement volumes  
 Yes  No Programmed transportation improvements and transportation mitigation outlined in study

### TABLES

- Yes  No Intersection Performance Existing Conditions  
 Yes  No Project Trip Generation  
 Yes  No Intersection Level of Service

### OTHER

- Yes  No Technical appendix – sufficient material to convey complete understanding of traffic issues (e.g., HCM analyses, trip generation calculations, signal warrant analyses, turn lane warrant analyses, etc.)

Completed By: \_\_\_\_\_ Date: \_\_\_\_\_