



Chapter 6 - TRAFFIC IMPACT STUDY CRITERIA - DRAFT

6.1 GENERAL PROVISIONS

- 6.1.1. Purpose:** The purpose of this document is to outline a standard format for preparing a traffic impact study in the City of Steamboat Springs.

A traffic impact study assesses the affects of a proposed development on the City's transportation system. The study identifies if the transportation system can operate efficiently with the development, if there are existing conditions that need to be improved, or if improvements are required to mitigate site impacts.

The owner/developer of a project site is responsible for contracting a traffic consultant to assess project traffic impacts and for providing any necessary mitigation measures as part of the development.

- 6.1.2. Applicability:** The requirements listed in this document are applicable for all developments in the City of Steamboat Springs. In addition to the requirements of this document, owners/developers with sites having access to or within the influence area of a State Highway (for example US 40) must contact the Colorado Department of Transportation (CDOT) for specific requirements related to access permits, construction permits, or work in the CDOT right-of-way.

- 6.1.3. Amendments and Revisions:** The Public Works Director may periodically update these criteria to reflect current practices.

- 6.1.4. Other Standards:** Where no requirement is given in these criteria, the requirements of the State of Colorado State Highway Access Code and the Manual on Uniform Traffic Control Devices (MUTCD), latest edition, shall govern unless otherwise approved by the Public Works Director. If these standards do not cover a specific situation, applicable standards must be obtained from the Public Works Director prior to initiation of the related work. In addition to these criteria, owners/developers are responsible for following all other applicable federal, state, and local regulations.

- 6.1.5. Related Plans:** Any new infrastructure or modifications to existing infrastructure and any new development plans shall be in be in accordance with current City master plans including:

- Steamboat Springs Area Community Plan, Adopted May 2004
- Draft Transportation and Mobility Analysis for the Steamboat Springs Area Community Plan Update, Prepared by FHU, October 2003.
- City of Steamboat Springs Sidewalk Master Plan, Prepared by Fox Higgins, 2006
- Steamboat Springs Mobility and Circulation Plan, Prepared by Transplan Associates, June 1998

- Mountain Town Sub-Area Plan, Prepared by Design Workshop, September 1999
- Mountain Town Sub-Area Plan Update, Prepared by Clauson Associates, November 2005

6.1.6. Review and Approval: The Public Works Department will review and approve all submittals for general compliance with these criteria and standard traffic engineering practices.

6.1.7. Variances: On occasion the unique conditions of a site may not fit within the criteria established in this document. The Public Works Director may grant a variance. The variance should be submitted to the Public Works Director in writing, and should describe the criteria to be varied, the proposed alternate criteria, and technical support for the request.

6.2. TRAFFIC STUDY REQUIREMENTS

6.2.1. General - A traffic study may be required as part of the submittal documents for annexation, development plan, final development plan, rezoning, plat, reuse/remodel, or other development application. A traffic study is required for any development where any of the following conditions exist:

- Daily trip generation is 50 trips or more
- Peak hour trips of 10 or more
- Auxiliary lanes or signal upgrades may be needed within the study area
- Project study area includes an intersection with planned improvements such as:
 - Mt. Werner/ Steamboat Blvd signal
 - Elk River (CR 129)/ US 40 intersection improvements
 - Apres Ski/ Village Drive intersection improvements
 - Downhill Drive/ Elk River (CR 129) signal and intersection improvements
 - Walton Creek/US40 southbound left turn improvements
 - Stone Lane/ US 40 road extension, intersection improvements, and traffic signal
 - Mountain Town Subarea Plan roadway improvements
- A reuse/ remodel/ or redevelopment where site traffic increases by 10% or more
- A site that has other site-specific traffic issues that require evaluation
- Individual sites smaller than the trip generation criteria that are part of a larger development

6.2.2. Traffic Study Types: There are three types of studies that could be required:

6.2.2.1. Trip Generation Letter – A site with generally less than 100 trips per day/30 trips per hour that is located in an area with planned road improvements or identified potential lane additions. Access is generally to local roads. Based on the results of the trip generation letter, further analysis may be required.

- 6.2.2.2. **Short-Term Traffic Study** – Small to medium traffic generating sites or sites where auxiliary lanes or other improvements may be required. These are generally sites with between 100 – 1,000 trips per day or 30 – 100 trips per peak hour.
- 6.2.2.3. **Long-Term Traffic Study**. Generally larger development sites with greater than 1,000 trips per day, 100 trips per peak hour, or sites with US 40 intersections included in the study area.
- 6.2.2.4. **Trip Evaluation Letter** – For sites in the West of Steamboat Area a master traffic study will be prepared prior to the first development in that area. All subsequent developments will need to prepare a trip evaluation letter comparing the proposed development with the development type and density projected for the site in the master study. The letter may need to include additional analysis if there is a significant difference between the projected and the proposed development.
- 6.2.3. **Scope Approval Form** - Prior to starting a traffic study, the applicant must contact the City Public Works Department to complete a Scope Approval Form. This form will identify the type of study required, the study area and the parameters for the study. The Scope Approval Form must be approved by the City prior to starting the study and must be included as Attachment A in every traffic study submittal.
- 6.2.4. **Certification Requirements** - A short or long-term traffic study shall be prepared by a qualified traffic engineer or transportation planner and prepared by or under the supervision of a Professional Engineer (PE) licensed in the State of Colorado. Short-term and long-term studies shall be stamped and certified by a professional engineer. A trip generation letter or trip evaluation letter without additional analysis shall be prepared by a qualified traffic engineer or transportation planner – no stamp is required.
- 6.2.5. **Submittal Procedure** - Prior to submittal of a development application, the applicant shall contact Public Works to determine if a traffic study is required. If a study is required the applicant shall have his traffic professional coordinate with the Public Works Director to complete the Scope Approval Form. Once the Public Works Director signs the Scope Approval Form, the traffic professional can begin the study.

When a traffic study is required it shall be included with the development application. Studies will not be accepted prior to development application. After the City's initial review of the draft study, the traffic professional shall address City comments and submit a final study for City approval. The final traffic study shall include the PE's stamp, date, and signature when required. The final study must be approved by Public Works prior to scheduling the project's public hearing.

Submit two copies of all draft traffic studies and three copies of all final traffic studies– one draft and two final to the Public Works Director and one draft and final to the project Planner. Until notified by the City to produce the FINAL document, all submittals are considered draft and shall be labeled DRAFT on the cover at a minimum.

For sites with access to or within the influence area of state highways, the applicant is also required to contact CDOT for requirements and to get approval for the project from CDOT.

6.3. TRAFFIC STUDY FORMAT

6.3.1. General - The traffic study shall be legible, bound, typed, and in 8 ½" x 11" format. The traffic study submittals shall be prepared generally following the guidelines in the *Traffic Access and Impact Studies for Site Development*, Institute of Transportation Engineers, 1991. An outline of the minimum requirements for each type of study is listed in the following sections.

6.3.2. Trip Generation Letter Outline

- Project Description
- Trip Generation
- Existing and Total Traffic
- Improvement Contribution
- Conclusions
- Figures, Tables, and Appendices:
 - Figure 1 – Vicinity Map
 - Figure 2 – Site Plan
 - Table 1 – Trip Generation Summary
 - Appendix A – approved Scope Approval Form

6.3.3. Short-Term Traffic Study Outline

- Title Page
- Project Description
- Existing Conditions
- Project Traffic
- Short-Term Background Conditions
- Short-Term Total Conditions
- Site Access and Circulation Evaluation
- Additional Analysis
- Alternative Modes Summary
- Summary and Recommendations
- Figures, Tables, and Appendices – The following is a list of the minimum figures, tables, and appendices to include
 - Figure 1 - Vicinity Map
 - Figure 2 – Site Plan
 - Figure 3 – Existing Traffic Volumes
 - Figure 4 – Project Traffic Distribution
 - Figure 5 – Project Traffic Volumes
 - Figure 6 – Short-Term Background Traffic Volumes
 - Figure 7 – Short-Term Total Traffic Volumes
 - Table 1 – Project Trip Generation
 - Table 2 – LOS Summary Table
 - Appendix A – approved Scope Approval Form
 - Appendix B – Traffic Count Data
 - Appendix C – Highway Capacity Worksheets/ Synchro Worksheets

- Add additional tables, figures, and appendices as required to support additional analysis such as signal warrants, auxiliary lane summary, % signal contribution calculation, etc.

6.3.4. Long-Term Traffic Study Outline

- Title Page
- Project Description
- Existing Conditions
- Project Traffic
- Background Conditions (Short and Long)
- Short-Term Total Conditions
- Long-Term Total Conditions
- Site Access and Circulation Evaluation
- Additional Analysis
- Alternative Modes Summary
- Summary and Recommendations
- Figures, Tables, and Appendices
 - Figure 1 - Vicinity Map
 - Figure 2 – Site Plan
 - Figure 3 - Existing Traffic Volumes
 - Figure 4 – Project Traffic Distribution
 - Figure 5 – Project Traffic Volumes
 - Figure 6 – Short-Term Background Traffic Volumes
 - Figure 7 – Long-Term Background Traffic Volumes
 - Figure 8 – Short-Term Total Traffic Volumes
 - Figure 9 – Long-Term Total Traffic Volumes
 - Table 1 – Project Trip Generation
 - Table 2 – LOS Summary Table
 - Appendix A – approved Scope Approval Form
 - Appendix B – Traffic Count Data
 - Appendix C – Highway Capacity Worksheets/ Synchro Worksheets
 - Add additional tables, figures, and appendices as required to support additional analysis (such as signal warrants, auxiliary lane summary, % signal contribution calculation, etc).

6.3.5. Trip Evaluation Letter Outline

- Project Description
- Trip Generation Comparison
- Additional Analysis
- Conclusions
- Figures, Tables, and Appendices:
 - Figure 1 – Vicinity Map
 - Figure 2 – Site Plan
 - Table 1 – Trip Generation Summary
 - Add additional tables, figures, and appendices as required to support additional analysis
 - Appendix A - approved Scope Approval Form

6.4. TECHNICAL CRITERIA

- 6.4.1. Level of Service** – Within the City of Steamboat Springs LOS A - C is considered good, with LOS D acceptable. Overall intersections shall target LOS D or better during the peak hours. For individual movements, LOS E and F may be acceptable for left turns or for minor street unsignalized movements; however some mitigation may be necessary. Where the existing or future background LOS is already less than LOS D, the site shall target maintaining the LOS and not degrading it further or mitigation may be required.

The LOS shall be determined using the Highway Capacity Manual methods. Synchro software may be used to compute the analysis. If modifications are made to the default parameters, the modifications shall be noted and justification provided. Where improvements are proposed in the future that are not currently planned and funded, the analysis should show the LOS both with and without the improvements. The LOS results shall be summarized in Table 2 by planning horizon for each intersection overall and each individual movement showing both the delay and the LOS category.

The Highway Capacity Manual recognizes the delay equation used in the capacity analysis can predict LOS F for the left turn movement at unsignalized intersections, regardless of the volume of minor-street left turning traffic. The traffic study should clarify the results of the analysis considering the delay, the volume/capacity ratio, the queue lengths, the left turning traffic volume, and available alternate routes at signalized intersections when making recommendations for mitigation measures in these cases.

- 6.4.2. Auxiliary Lanes** – The need for auxiliary lanes shall be identified based on the CDOT access code criteria or NCHRP 279 Intersection Channelization Design Guide.
- 6.4.3. Traffic Signal Warrants** – The need for traffic signals shall be evaluated based on the traffic signal warrants listed in the MUTCD, latest edition. The peak our warrant shall generally not be utilized.
- 6.4.4. Stop signs and other signs** – Installations of traffic signs shall follow the guidelines listed in the MUTCD, latest edition.
- 6.4.5. Trip Generation** – Trip generation shall be estimated following the practices and methodologies listed in the *Institute of Traffic Engineers - Trip Generation*, current edition. For sites where ITE trip rates are not available, other industry sources or counts of similar sites may be used as approved on the Scope Approval Form. Reductions for alternate modes, internal capture, passby traffic, etc. shall not be taken unless approved on the Scope Approval Form. Trip generation results shall be summarized in Table 1 showing AM peak hour, PM peak hour, and daily unit trip rates and project results for inbound, outbound, and total trips by land use category.
- 6.4.6. Trip Generation Comparison and Additional Analysis** – For sites in the West of Steamboat Area a master traffic study will be prepared prior to the first development in that area. All subsequent developments will need to prepare a trip evaluation letter comparing the proposed development with the development type and density projected for the site in the master study. The comparison shall show the projected Table 1 Trip Generation Summary for that site from the master study

compared with the proposed Table 1 summary for the site. Where the proposed traffic is greater than the projected traffic, additional analysis will be required to demonstrate that the additional traffic does not adversely affect the transportation system. For minor to moderate increases the short-term analysis in the master study shall be updated with the new projections. For significant increases (more than 1,000 trips per day or 100 trips per peak hour) both the short-term and long-term traffic portions of the master traffic study shall be updated. Any updates shall include the increased contribution identified in other trip evaluation letters completed for the area.

6.4.7. Traffic Counts – New traffic counts shall be collected if existing counts are more than two years old. Counts in the Mountain Area shall be winter counts collected during Christmas, Presidents Day, Winter Carnival, or Martin Luther King weekends. Counts in the rest of town shall be summer counts collected during an event weekend between June 1 and August 31. Count collection dates shall be specified on the Scope Approval Form. For projects that need new counts in the study area, have existing counts that are 2 – 4 years old, and it is more than two months until the designated counting event, the existing counts may be utilized with a 3% growth factor applied. For estimating future background traffic a 3% growth rate shall be utilized. Where CDOT data for US 40 or data from historical growth demonstrate a lower growth factor, a lower factor can be used with Public Works Director approval. Traffic counts shall be collected over a two-hour period between 7-9 AM and 4-6 PM and the highest hour used for the existing counts. In some cases the peak period may be adjusted to account for afternoon ski departures.

6.4.8. Site Contribution – the percent contribution for a site shall be determined as follows:

- Traffic Signal – calculate the percent site traffic of the total traffic for the side street generating the demand for the signal. Right turn traffic may be excluded where there is a separate right turn lane that turns into an acceleration lane. The maximum percentage between the AM peak hour and PM peak hour shall be used to determine the site contribution.
- Intersection Improvements – calculate the percent site traffic of the total intersection traffic. The maximum percentage between the AM peak hour and PM peak hour shall be used to determine the site contribution.
- Other improvements – as identified on the Scope Approval Form

6.4.9. Mitigation Measures – Where the LOS falls below acceptable levels, mitigation will be required. Acceptable mitigation measures may include capacity and access improvements, signalization, signal operation improvements, street widening, additional connections, or other physical improvements. Where existing conditions prevent physical improvements (i.e. steep terrain, adjacent buildings, limited ROW, etc.), a project may be required to reduce density, or implement transportation demand management (TDM) measures to minimize the demand for vehicle trips and encourage alternate mode use. The TDM strategies may include incentives for carpooling, transit ridership, enhanced bicycle or pedestrian facilities, provisions for telecommuting, or addition of use mixes to increase internal trips.

6.5. DESCRIPTION OF MAJOR REPORT SECTIONS

- 6.5.1. Title Page – Include the name and contact information for the study author and developer/owner. List the site name, location, original date, and any subsequent revision dates. Include “Draft” or “Final” based on the status of the study.
- 6.5.2. Project Description – Include a description of the project location, access locations, adjacent roads, proposed land use and size of project, any phasing, pedestrian and bike facilities, and study area boundaries. Describe adjacent land use and note any proposed future connections adjacent to the site. Include the name and contact information for the study author and site developer/owner.
- 6.5.3. Existing Conditions – Describe the existing conditions of the study area intersections and roadways including laneage, traffic control, road classification, and speed limit. Evaluate the LOS at the study area intersections identifying any issues for both intersections and individual movements. Identify improvements (lanes, phasing, traffic control, split changes, etc.) needed to maintain adequate intersection operations. For a trip generation letter identify any concerns for capacity based on the volumes (since no LOS is conducted).
- 6.5.4. Project Traffic - Estimate site traffic based on the average rates or equations, whichever is higher, contained in the current version of the Institute of Transportation Engineers’ *Trip Generation Manual*. For sites where information is not available in the ITE guide, other industry sources or counts of similar sites as approved on the Scope Approval Form meeting may be used.
- 6.5.5. Background Conditions – Estimate background traffic based on growth rates identified in the Scope Approval Form for the estimated project build-out year. Include traffic from any developments within the study area that are approved but not yet constructed. Also include any planned and budgeted intersection improvements. Describe background study area conditions, LOS, and identify any issues or mitigation measures needed.
- 6.5.6. Total Conditions – Add site traffic to background traffic. Describe study area conditions, LOS, and identify any issues or mitigation measures needed to accommodate site traffic.
- 6.5.7. Site Access and Circulation Evaluation – Include a discussion of the adequacy of the site accesses for the projected site traffic. As required, review vehicle turning paths, stacking distances, design layout’s ability to control speeds and provide efficient circulation, and the potential conflict points.
- 6.5.8. Additional Analysis - Include any additional analysis (auxiliary lanes, % signal contribution, etc) required in the Scope Approval Form. Procedures for additional analysis shall generally follow the guidelines in the CDOT State Highway Access Code unless otherwise indicated in the Scope Approval Form.
- 6.5.9. Alternative Modes Summary – Describe how the site provides opportunities for pedestrians, bicycles, and transit. Describe sidewalks, trails, bus stops/routes,

travel demand management strategies, etc. Indicate the extent and type of any offsite improvements necessary to connect the site to existing infrastructure.

- 6.5.10.** Summary and Recommendations – Provide a brief summary of the study. Include a list of any improvements proposed, noting who will construct and fund the improvements. Identify if Right-of-Way is available or is needed to construct the proposed improvements.

Study Parameters

List of Study Area Intersections

1.		
2.		
3.		
4.		
5.		
6.		
7.		

Key Analysis items

- Existing + site traffic at study intersections
- Peak Hour LOS at study intersections
- % Site contribution to signal at _____
- Auxiliary lane evaluation at _____
- Traffic signal warrants at _____
- Four-way stop sign warrants at _____
- Queuing Analysis at _____
- Other _____

Approvals

Prepared By: _____ Date _____ Phone _____

Janet Hruby _____ Date _____ Phone _____
City Engineer