



# Transportation Impact Analysis Guidelines

THE CITY OF ASPEN



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# TRANSPORTATION IMPACT ANALYSIS GUIDELINES

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# 1. 1. INTRODUCTION

Transportation impact analysis (TIA) guidelines assist applicants with assessing the potential transportation impacts of proposed projects. The following guidelines have been developed to provide a technical approach to transportation impact analysis for development projects within the City of Aspen that is simple, consistent and fair while ensuring that the City continues to meet its longstanding goal of limiting trips over the Castle Creek Bridge to 1993 levels.

This document establishes protocol for transportation impact analyses and mitigation based on the current state-of-the-practice in transportation planning and engineering. These guidelines outline different tiered levels of TIA requirements and mitigation based on the size and location of a project.

The requirements listed in this document are applicable for specific land use development projects in the City of Aspen. It is expected that a property owner and/or developer will maintain improvements located on their property and pay for any on-going maintenance costs unless otherwise established through a land use approval or the municipal code. Unless already required by municipal code, a land use approval should address how off-site improvements will be maintained.

Exempted projects (as outlined in the trigger section of this document) will not be subject to the requirements of a TIA. For projects that do not meet the exempt threshold, mitigation for any new trips is required through implementation of TDM and MMLOS measures. Larger projects, as outlined in the Triggers Section, are required to complete more comprehensive analysis.

The City of Aspen has established Aspen-specific trip generation data for all land uses. Development applications should use these standardized figures to determine trip generation and mitigation requirements.

## Definitions:

### **Transportation Impact Analysis (TIA)**

A Transportation Impact Analysis (TIA) evaluates the potential adverse effects of proposed projects on surrounding and supporting transportation infrastructure and services. A TIA determines if the adverse effects constitute significant impacts, and, if so, how the significant impacts can be mitigated.

### **Multi-Modal Level of Service (MMLOS)**

Multi-Modal Level of Service (MMLOS) evaluates the safety and quality of access and flow for transit, pedestrians and bicyclists.

### **Transportation Demand Management (TDM)**

Transportation Demand Management (TDM) is the application of strategies and policies to reduce travel demand (specifically that of single-occupancy vehicles)



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## Intent of Study Guidelines

The purpose of these guidelines is to create a standardized system for developments to determine and mitigate transportation impacts. This document applies to both new development and redevelopment. These guidelines address key elements required for preparing and reviewing transportation impact analyses in the City of Aspen. This document is a resource to be applied in concert with professional judgment. The following major issues are addressed in this document.

- Scope and extent of the required study.
- Transportation Impact Analysis (TIA) triggers.
- Mitigation measure requirements including TDM and MMLOS.
- Criteria to determine if the transportation-related impacts of a proposed project are significant.
- Monitoring and reporting requirements for mitigation measures.
- Guidelines for submittal.

The City of Aspen will primarily review transportation studies and reports based on the guidelines presented in this document. However, each project is unique, and guidelines are not intended to require measures that cannot be reasonably implemented. Not all criteria and analyses described in this document will apply to every project. Early and consistent communication with the Engineering and Transportation Departments is encouraged to confirm the type and level of analysis required on a case-by-case basis.

## How to use the Guidelines

The following provides a guide to the various sections in the TIA Guidelines:

**Triggers Requiring a Transportation Impact Analysis:** This section will help you determine whether your project is exempt, a minor project, or a major project. The primary difference between whether a project is minor or major is due to its location. Minor projects are located inside the roundabout whereas major project are located outside of the roundabout. The reason for this distinction is due to the constraints to vehicle capacity in town. Meaning, the road network in town is fixed, as a result there is not an opportunity to add additional lanes to the roads in town. However, there is opportunity to improve the pedestrian and bike network both in town and outside of the roundabout.

**Level One TIA:** This section applies to minor projects. The Level One TIA helps you to determine your project's transportation impact and how your project can mitigate those impacts. To determine your project's impact, no traffic counts are necessary rather the City has standardized how each project can determine its impacts. This standardization was developed using Aspen specific traffic generation rates.

After a project determines its impact, the project must mitigate those impacts with a menu of options. These options provide the project with various alternatives for mitigation by utilizing MMLOS and TDM tool. These mitigation alternatives range from providing bus shelter amenities such as benches and trash receptacles to providing bus passes for the project's employees to installing landscaping to improve the pedestrian experience.



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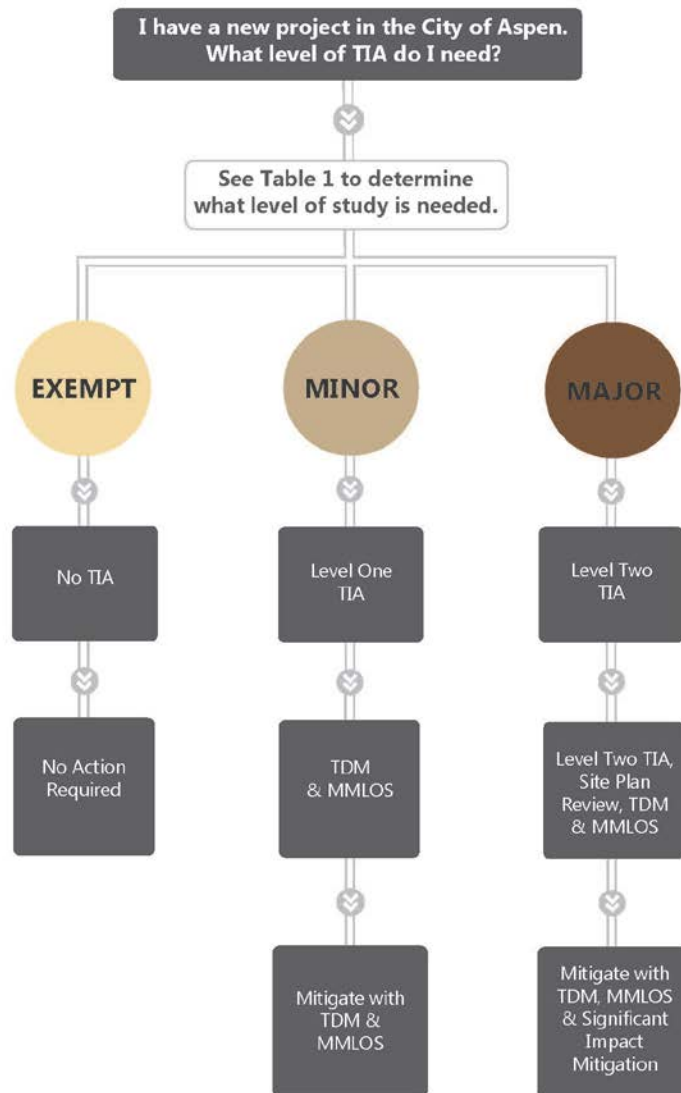
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**Level Two TIA:** This section applies to Major Projects. Under the Level Two TIA projects must determine their impacts by performing a transportation analysis. This includes performing traffic counts and utilizing the Highway Capacity Manual. Projects under this section will be required to hire a Transportation Engineer to perform the transportation analysis. Once the impacts are determined the project must mitigate those impacts. The mitigation options are the same as the Level One TIA with the added mitigation requirement for vehicle level of service and significant impact mitigation. Examples of vehicle level of service and significant impact mitigation include the addition of a right turn lane and or the contribution toward pedestrian underpass.



## 2. TRIGGERS REQUIRING A TRANSPORTATION IMPACT ANALYSIS

Follow the flowchart below and Table 1 to determine the path for your development.



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## Level of Study and Mitigation

Table 1 shall be used to determine the level of transportation impact study and mitigation required for the proposed development. These thresholds are based on the City's Growth Management Quota System (GMQS), and may be amended administratively over time to reflect applicable changes to GMQS. For the purposes of this document, development is divided into three categories: Exempt Development, Minor Development, and Major Development.

- **Exempt Development:** All development currently exempt under Growth Management would be exempt from any new transportation mitigation system. This includes adding 500 sq ft or less of commercial space, adding a single residential unit, or adding 2 lodge units to a project. If a project falls under this category it is exempt from TIA requirements and TDM and MMLOS mitigation. The project may proceed directly to land use review or building permit as applicable.
- **Minor Development** All development exceeding the exempt thresholds above, and located inside the roundabout, regardless of size, is considered minor development. In addition, any development outside the roundabout (along Highway 82, or up Castle or Maroon Creek Roads), is considered minor development if it meets the following thresholds under "Minor Development – Outside the Roundabout" in Table 1. All minor developments are required to perform a Level One TIA which includes mitigation using Aspen specific TDM and MMLOS mitigation tools.
- **Major Development** refers to any significant development located outside the Roundabout (i.e. along the Castle Creek, Maroon Creek, and Highway 82 corridors), and is required to perform a Level Two TIA which includes Capacity Analysis and a Site Plan Review. Additionally the development will mitigate using Aspen specific TDM and MMLOS mitigation tools in addition to mitigating its significant impacts.

If a project falls within multiple development categories, it will be subject to the highest requirement. For instance, if a project located along Castle Creek Road proposed 100 lodge rooms, 8,000 sq ft of net leasable space, and 10 residential units, the development would be required to meet the major development requirements because the lodge and commercial components trigger that threshold. Similarly, if a project located inside the roundabout along Main Street proposed 200 sq ft of new net leasable space, 2 new free market residential units, and 3 new affordable housing units, the entire project would be reviewed under the minor development requirements because the 5 new residential units trigger that threshold.





**TABLE 1: STUDY LEVELS**

Study Level	Criteria
<p><b>Exempt Development</b></p>	<ul style="list-style-type: none"> <li>1) All development involving Single-Family or Duplex residential dwelling units</li> <li>2) All development involving the remodel or expansion of existing free-market or affordable residential units that does not increase the total number of free-market or affordable residential units</li> <li>3) All development outlined as "exempt" in Growth Management (26.470.040)               <ul style="list-style-type: none"> <li>a) Remodeling or expansion of multi-family residential development as long as no demolition occurs and no new units are added</li> <li>b) Remodeling or replacement of existing commercial and lodging development when no new units or net leasable is added and there is no change in use</li> </ul> </li> <li>4) All development qualifying for an "administrative" review in Growth Management (26.470.060)               <ul style="list-style-type: none"> <li>a) Change in use of historic landmark sites and structures involving no more than 1 free-market residential unit</li> <li>b) Minor enlargement of historic landmark sites and structures involving                   <ul style="list-style-type: none"> <li>i) no more than 1 free-market residential unit and</li> <li>ii) expanding floor area or net leasable/lodge units but not both, OR expanding both floor area and net leasable/lodge units generating 4 or fewer FTEs</li> </ul> </li> <li>c) Minor expansion of a retail, office, lodge, or mixed-use development involving no more than 500 square feet of commercial net leasable space OR 2 lodge units</li> <li>d) Development involving no more than 500 square feet of essential public facility space</li> <li>e) Alley commercial space that is accessed entirely off an alley and has no internal connections to other spaces in the building</li> <li>f) Temporary food vending</li> <li>g) Sale of locally-made products in common areas of commercial buildings (26.470.060.7)</li> </ul> </li> </ul>
<p><b>Minor Development – Inside the Roundabout</b> (Level One TIA)</p>	<ul style="list-style-type: none"> <li>1) Any development located east of the City of Aspen Roundabout and larger than that outlined in Exempt Development</li> </ul>
<p><b>Minor Development – Outside of Roundabout</b> (Level One TIA)</p>	<ul style="list-style-type: none"> <li>1) Located outside of the City of Aspen Roundabout , and meeting one of the following:               <ul style="list-style-type: none"> <li>a) Change in use of non-historic sites and structures involving                   <ul style="list-style-type: none"> <li>i) Less than 11 new free-market or affordable residential unit, or</li> <li>ii) 3 - 24 lodge units, or</li> <li>iii) 501- 2,499 square feet of commercial net leasable space</li> </ul> </li> <li>b) Enlargement of a historic site or structure involving no more than 1 new free-market residential or affordable unit and generating between 4 and 8 FTEs</li> <li>c) Expansion or new commercial space between 501 and 2,499 square feet</li> <li>d) Development adding 3 - 24 new lodge units</li> <li>e) Development of non-historic sites and structures adding 1 free-market or affordable housing unit</li> <li>f) Development adding between 501 and 2,199 square feet of new essential public facility space</li> </ul> </li> </ul>



Study Level	Criteria
<p><b>Major Development - Outside of Roundabout with Significant Development</b> <i>(Level Two TIA)</i></p>	<p><b>1)</b> Located outside of the City of Aspen Roundabout , and meeting one of the following:</p> <ul style="list-style-type: none"> <li>a) Development adding more than 2,500 square feet of commercial net leasable space</li> <li>b) Development adding 25 or more lodge units</li> <li>c) Development adding 11 or more residential units (free-market, affordable, or combination)</li> <li>d) Development adding 2,200 or more square feet of new essential public facility space</li> </ul>



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## 3. LEVEL ONE TIA (FOR MINOR DEVELOPMENTS)

### Qualifying Conditions

A Level One TIA, consisting of a TDM and MMLOS analysis and mitigation, is required for submittal if a proposed development meets the criteria for Minor Development as shown in Table 1. Copies of the Level One TIA are to be submitted as part of the Land Use Application. The report shall be complete and in accordance with these guidelines. The Engineering and Transportation Departments will be referrals for these documents as part of the City's regular land use Development Review Committee (DRC) process.

The City is committed to complete analysis for all modes of travel. This section provides the framework for the scope and methodology used to apply and assess MMLOS and TDM for the City of Aspen.

### Preparation of the Level One TIA

The Project Applicant shall use the Aspen-Specific trip generation figures and calculations described in Appendix A, Table A-1 and A-2 to determine the existing baseline number of vehicle trips as well as the anticipated vehicle trips created by the project. These are based on AM and PM peak hour.

The Project Applicant is required to use the TDM and MMLOS tools (located at the following link: <http://www.aspenpitkin.com/Departments/Community-Development/Planning-and-Zoning/Current-Planning>) to identify TDM and MMLOS measures that have the capacity to fully reduce vehicle trips equal to or greater than the new peak hour trips generated by the project and that address negative impacts to multi-modal infrastructure. It is up to the Project Applicant to choose the measure(s) that will be compatible with the intended purpose of the project.

Selected TDM and MMLOS measures must be reviewed and approved by the City. A Project Applicant is encouraged to contact Engineering or Transportation Department staff with questions regarding the appropriateness of chosen mitigation measures.

#### What is Transportation Demand Management?

Transportation Demand Management (TDM) is the application of strategies and policies to reduce travel demand (specifically that of single-occupancy vehicles)

#### What is Multi-Modal Level of Service?

Multi-Modal Level of Service (MMLOS) evaluates the safety and quality of access and flow for pedestrians and bicyclists.



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## Level One TIA Outline

The Level One TIA shall follow this general outline:

### 1) Introductory Items

- Front Cover / Title Page
- Table of Contents, List of Figures, and List of Tables

### 2) Introduction

- Project Description
- Project applicant/contact info
- Site plan (include proposed driveways, roadways, traffic control, parking facilities, emergency vehicle access, and internal circulation for vehicles, bicyclists, and pedestrians)
- Location map (include major streets, study intersections, and neighboring zoning and land uses)

### 3) Project Trip Generation using the City of Aspen specific trip generation figures (Table A-1 and A-2 in Appendix A)

- AM Peak Trips by Land Use and for entire Project
- PM Peak Trips by Land Use and for entire Project

### 4) Proposed TDM and MMLOS Mitigation Program (Based off TDM and MMLOS Mitigation Tools)

- Copies of completed TDM and MMLOS toolkit spreadsheets
- TDM Measure Details (including location of measures)
- MMLOS Measure Details (including location of measures)
- Enforcement & Financing
- Scheduling and implementation responsibility of mitigation measures

### 5) Monitoring Report

- Assessment of Compliance with Guidelines
- Results and effectiveness of implemented measures
- Identification of Additional Strategies
- Surveys and other supporting data



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## Trip Generation

The peak hour trip generation for a level one TIA is based on Aspen specific trip generation rates and does not require an engineer to calculate. The Aspen specific trip generation rates are located in Appendix A in Tables A-1 and A-2. The Aspen specific trip generation rates were validated for winter and summer season conditions for the following land uses: commercial office, commercial retail, free-market housing, affordable housing, lodging, essential public facility, and mixed-use (included restaurant, residential, and commercial). The Community Development should be consulted if there are questions regarding which land use the proposed development is classified under.

## Mitigation Measures

All projects shall use the Aspen TDM and/or MMLOS Mitigation Tools (located at the following link: <http://www.aspenpitkin.com/Departments/Community-Development/Planning-and-Zoning/Current-Planning>) to determine mitigation measures that will be used for a project. The tools assign a percent reduction in vehicle trips (TDM) and point values (MMLOS) to specific measures used to offset **the largest peak hour trip generation**. For example, if a projects adds 10 Peak Hour AM trips and 9 Peak Hour PM trips, it will start with -10 points and will need to mitigate at least 100% of the new trips (10 trips) in the TDM and MMLOS Tools.

Copies of the completed TDM and MMLOS toolkits delineating the applicants chosen measures to mitigate at least 100% of the new trips must be provided to the City of Aspen with the completed TIA.

The TDM and MMLOS Mitigation Tools provide a list of mitigation measures and the percent trip reduction/points available for each measure, as well as the maximum allowable reduction for each category.

Proposed TDM or MMLOS mitigation measures should primarily occur on or immediately adjacent to the project site. For instance, a project may include mitigation measures within the right-of-way adjacent to the property, if the measures are approved by the City Engineer. Any development requesting a TDM or MMLOS mitigation measure that will be located off-site shall be approved by the Transportation and Engineering Departments. In such a case, the TDM and MMLOS plan shall include the following information:

- 1) Off-Site MMLOS Measures (for projects that want the opportunity to perform off site mitigation):
  - a) Existing roadway system within project site and within the project's walk shed. The walk shed shall be defined as a 250 foot radius from the project site. This includes on-street parking configuration, sight distance limitations, location of driveways.
  - b) Location and routes of nearest public transit system serving the project.



- c) Routes, location and width of pedestrian and bicycle facilities within the walk shed serving the project.

**2) Off-Site TDM Measures (for projects that want the opportunity to perform off site mitigation):**

- a) Existing transportation system within the transit shed of the project. The transit shed shall be defined as a ¼ mile radius of the project site. This includes transit service and facilities, carshare, and bikeshare facilities.

**Changes to Mitigation Measures**

Mitigation measures that are approved and implemented for a development must be ongoing for the occupied life of the development. Changes to specific on-site measures may be amended over time, as long as they result in trip mitigation equal to or greater than the original approval. Off-site MMLOS infrastructure measures may not be changed. Changes must be approved by the Engineering and Transportation Departments to ensure the proposed change is appropriate given the site’s context. Any change that results in the same number of trips mitigated may be approved administratively. Any major change to the development that reduces the amount of trips to be mitigated shall be approved by the body (City Council, HPC, or P&Z) that approved the original measures.

**Capital, Operations and Maintenance Contributions**

The City of Aspen’s preference for new trip mitigation is through the mitigation measures identified in the TDM and MMLOS toolkits. However, there is also the opportunity for capital and operational/maintenance contributions. Should a project be unable to mitigate its trips to the acceptable level, discussion may be had regarding possible one-time monetary contributions to capital, operations and/or maintenance of appropriate measures or programs (i.e. purchase of a car for the car share program, purchase of a bike for the bike share program, etc.).

The contribution will be assigned trip reduction credits. Below is a table showing the value of credits:

**TABLE 2: CONTRIBUTION CREDITS**

Trip Reduction Credit	Contribution Value
1	\$6,000

A project may only use contribution credits if it is pre-approved by Engineering and Transportation staff. Most often, these contributions will be applicable to projects or programs identified in Transportation/Engineering long range plans and within the City’s Asset Management Plan.

Contribution scenarios include:

- **Concurrent Offsite Mitigation Projects:** A project cannot effectively mitigate trips within its own site, but a good opportunity is available at another location which can be funded by a financial contribution.



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- Mitigation Funds: A project cannot effectively mitigate trips within the menu options available and instead provides a financial contribution for the commencement, continuing operation, maintenance or improvement of an existing project or program.



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## Transportation Demand Management (TDM)

Transportation Demand Management (TDM) is the application of strategies and policies to reduce travel demand (specifically that of single-occupancy vehicles).

The Aspen TDM and MMLOS toolkit shall be utilized to determine a project's mitigation for peak hour new trips to the transportation system. This section delineates and summarizes the Aspen TDM approaches organized by category and setting that are included in the Aspen specific TDM toolkit. The toolkit can be used to identify appropriate TDM approaches. Minor projects must select at least two appropriate TDM measures as part of their mitigation strategy. Major developments must mitigate trips using a minimum of five TDM measures. The remainder of mitigation options for minor or major projects may be selected from TDM or MMLOS options at the discretion of the developer.

A description of all mitigation measures in the tool is located in Appendix C. The mitigation categories include Neighborhood/Site Enhancement, Transit, and Commute Trip Reduction.

## Multi-Modal Level of Service (MMLOS)

Similar to many cities throughout the United States, the City of Aspen desires to evaluate transportation services of roadways from a multimodal perspective. This section delineates and summarizes the MMLOS approaches organized by mode and setting that are included in the Aspen specific MMLOS toolkit.

The MMLOS toolkit must be completed in its entirety. If the completed toolkit results in negative points, as a result of not meeting minimum performance measures, these points, in addition to peak additional trip points, must be mitigated.

A description of all mitigation measures in the tool is located in Appendix C. The mitigation categories include Pedestrians, Bicycles, and Transit.

The Aspen TDM and MMLOS toolkit can be accessed here:

<http://www.aspenpitkin.com/Departments/Community-Development/Planning-and-Zoning/Current-Planning>

## City Comments and Recommendations

Copies of the completed TDM and MMLOS toolkit must be provided to the City as part of the TIA that is submitted as part of the Land Use Application. The city will evaluate the TDM and MMLOS Plan and comments will be provided to the developer/permittee as part of the Development Review Committee (DRC) process. Subsequent analysis may be requested regarding specific transportation issues. In some cases, minor comments raised by city staff may be addressed in an addendum letter.





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## Monitoring and Reporting Requirements

Following the implementation of Mitigation Measures, the property owner will be required to monitor whether the TDM and MMLOS Measures are having the intended effect. Minor developments will be required to assess and report their compliance each year for three years.

If it is found that the adopted mitigation measures are not effective in mitigating trips for the development, the mitigation measures should be modified in consultation with the Transportation and Engineering Departments for the next year. The next year's reporting should outline how successful the changes have been. If the property owner/developer has made a good faith effort to make changes to the mitigation measures but has not been successful at fully mitigating the trips as expected, the reporting period shall end after 3 years. If, however, the property owner/developer has not made real attempts to make changes the reporting period shall be extended by one year and the non-compliance may be reviewed by City Council to determine appropriate next steps to more accurately mitigate trips.

If an applicant fails to assess and report their compliance, the timeline for reporting will be extended by one year. Monitoring and Reporting requirements are tied to the property and must be provided regardless of change in ownership.

Property owners should make a good faith effort to survey the appropriate individuals/groups based on the development type. Examples include homeowners, tenants, employees and customers. The purpose of surveying is to determine level of participation and success of various measures. The owner will not be held responsible should a survey prove infeasible and/or response rates low as long as a good faith effort has been made. The owner should contact staff to discuss these types of issues as soon as possible. Traffic counts and analysis will not be required for Minor TIAs but can be used as an alternate assessment tool. Traffic counts and analysis will be paid for by the development applicant.

The process is illustrated in the flow chart below. Each project will collect the necessary data specific to their chosen measures and assess their compliance. The project will submit a report to the City Transportation Department to document the monitoring process and results. Details of each step are documented below.





### Assessment of Compliance with Guidelines

An annual employee, tenant, visitor, customer and/or homeowner survey is an important element of the monitoring program. Surveys will be conducted to assess whether measures are being maintained and if participation levels meet critical mass.

Survey results will provide insight into the success of various TDM measures and provide the project and the City with guidance on how to change, continue and/or improve upon those measures. If the measures are not successfully implemented and maintained, the project will be responsible to refine its program. If an applicant intends to collect vehicle trip data then they must follow the Vehicle Trip Data Collection guidelines located in the Level II TIA section of this document.

### Identify Additional Strategies

It is recommended that each project review the TDM tool in conjunction with the annual survey results to identify if refinements to existing strategies and new strategies to implement are necessary. The project will also identify a timeline for making changes to existing strategies and implementing new strategies.

### Annual Report Submittal

A monitoring report, submitted at least annually to the City of Aspen, will be developed by the project and the independent transportation firm. The report will include the following elements:



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- 1) Status of all existing TDM programs – including data on participation rates
  - 2) Status of all recommended TDM programs from prior monitoring report (if applicable) – including data on participation rates
  - 3) Data collection methodology
  - 4) Survey results
  - 5) Evaluation of performance compared to TDM/MMLOS plan
  - 6) Conclusion of whether compliance is met
  - 7) Next steps (if needed) – future modifications and enhancements of TDM Program, including time frame of implemented



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## 4. LEVEL TWO TIA *(FOR MAJOR DEVELOPMENTS)*

If the proposed development meets the criteria shown next to “Major Development” in Table 1, a Level Two TIA is required for submittal as part of the Land Use application. The contents and extent of a Level Two TIA depends on the location and size of the proposed development, and the prevailing conditions in the surrounding area. At a minimum, a Level Two TIA shall include a Site Plan Review, Trip Generation, Capacity Analysis, and TDM, MMLOS, and significant impact Mitigation Measures.

The developer/permittee is responsible for the preparation of a Level Two TIA. The study is applicable through a project’s vesting period.

The project applicant shall retain a professional traffic engineer to conduct the transportation impact analysis. It is recommended that the applicant’s consultant conduct the work in the following phased manner and seek City acceptance of each task before initiating the next task. In some cases, review by other affected jurisdictions will be required.

- **Transportation Analysis Scope of Work** detailing project description, site location, analysis method, area-wide assumptions, study intersections and/or roadways, peak hours for analysis, and traffic data collection.
- **Project Trip Generation and Trip Distribution** documenting all key technical assumptions, data sources, and references.
- **Administrative Draft Transportation Study Report** prepared according to the Scope of Work, Project Trip Generation, and Trip Distribution approved by the City Engineer.
- **Draft Transportation Study Report** addressing the City’s comments on the Administrative Draft Report.
- **Final Transportation Study Report / Response to Public Comments** addressing comments from the City (and, if applicable, other jurisdictions – i.e. Pitkin County, CDOT, neighboring cities, etc.)



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## Level Two TIA Outline

Details on requirements for the Level Two TIA outline items are defined later in this section.

The Level Two TIA shall follow this general outline:

### 1. Introductory Items

- Front Cover / Title Page – signed and sealed by a registered Colorado Professional Engineer
- Table of Contents, List of Figures, and List of Tables
- Executive Summary

### 2. Introduction/Background

- Project description
- Project applicant/contact info
- Type and size of development
- Site plan (include proposed driveways, roadways, traffic control, parking facilities, emergency vehicle access, and internal circulation for vehicles, bicyclists, and pedestrians)
- Location map (include major streets, study intersections, and neighboring zoning and land uses)

### 3. Existing Conditions

- Existing roadway system within project site and within the walk shed (within 250 feet radius)
  - On-street parking configuration
  - Sight distance limitations
  - Location of driveways
- Location and routes of nearest transit routes and facilities serving the project
- Routes, location and width of nearest pedestrian and bicycle facilities serving the project
- Figure of study intersections with seasonally adjusted AM and PM peak hour turning movement counts, lane geometries, signal timings, and traffic control
- Crash data on study roadways and intersections
- Map of study area showing ADT of study roadways
- Table of existing AM and PM peak hour average vehicle delay and LOS



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#### 4. Existing Plus Project Conditions

- Table of trip generation for Project Trip Generation using the City of Aspen specific trip generation figures (Table A-1 and A-2 in Appendix A)
- Figure/map of trip distribution (in percent)
- Maps of study area with applicable peak hour turning movements (Project Only and Existing Plus Project)
- Table of Existing and Existing Plus Project intersection peak hour average vehicle delay and LOS
- Table of Existing and Existing Plus Project MMLOS for pedestrians, bicycles, and transit
- Traffic signal and other warrants
- Findings of project impacts
- Access and Circulation Design
  - Sight distance limitations
  - Dimensions from adjacent driveways and intersections
  - Potential for shared access facilities
  - Demonstration that the number of proposed driveways is the fewest necessary
  - Support that the access points will provide safe and efficient multi-modal (traffic, pedestrian, bicycle and transit) flow
  - Internal circulation design, including adequacy of queuing (stacking) at site access points and other features that may affect traffic operations and safety
  - Pedestrian circulation system on-site and along frontage
  - Impact to existing transit routes and facilities

#### 5. Future Background Conditions

- Table of trip generation for approved project(s) – when applicable, apply reduction for pass-by trips, transit, internal capture, and other modes.
- Figure and/or table of approved projects trip distribution (in percent)
- Map of study area with applicable AM and PM peak hour turning movements (Approved Projects Only)
- Table of intersection peak hour average vehicle delay and LOS



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- Traffic signal and other warrants

## **6. Future Background Plus Project Conditions**

- Similar content to Existing Plus Project Conditions

## **7. Proposed Mitigation Program**

- Copies of completed TDM and MMLOS toolkit spreadsheets
- TDM Measure Details (including location of measure)
- MMLOS Measure Details (including location of measure)
- Enforcement & Financing
- Scheduling and implementation responsibility of mitigation measures
- Proposed Significant Impact Mitigation

## **8. Conclusion and Recommendations**

- Summary of results, findings, and recommended mitigation measures

## **9. Monitoring and Reporting Requirements**

- Vehicle Trip Data Collection
- Assessment of Compliance with Guidelines
- Identify Additional Strategies
- Annual Report Submittal

## **10. Appendices**

- Traffic counts
- Technical calculations for all analyses



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## Scope of Study

The contents and extent of a Level Two Transportation Impact Analysis depend on the location and size of the proposed development, the prevailing conditions in the surrounding area, and the technical questions being asked by decision makers and the public.

**How do I determine the study area?**

## Study Area Boundary

Careful consideration of all modes and facilities (i.e., transit, pedestrian, bicycle, vehicle, etc.) is required when selecting the study area boundary.

**How many traffic analysis scenarios are required?**

The scope of the study area is ½ mile. The City Engineer must approve study locations before traffic data collection and analysis commences. Additional facilities may be studied based on circumstances unique to the site. Applicants should consult with the City Engineer early regarding any additional study locations based on local or site-specific issues, especially those related to pedestrians, bicycles, and transit.

## Analysis Scenarios

The transportation analysis scenarios are listed below. Additional analysis scenarios may be required in the transportation impact analysis dependent on project conditions and setting. For example, other scenarios may be needed to test phasing or other interim conditions, at the discretion of the City Engineer.

### PRESENT CONDITIONS

- **Existing Conditions** represented by transportation conditions for all travel modes in the study area based on recent field observations. Traffic volumes for roadway analysis should be based on recent count data (see Transportation Analysis Time Periods section below).
- **Existing plus Project Conditions** represented by project changes to existing transportation conditions for all travel modes in the study area. Traffic volume forecasts for roadway analysis should reflect existing conditions plus traffic generated by the proposed project. For re-use or conversion projects, this will involve accounting for any existing use of the site that remains or will be discontinued.

### FUTURE CONDITIONS (If required by City Engineer)

- **Future Background Conditions** represented by transportation conditions for all travel modes in the study area reflecting all approved projects plus pending projects or expected development of other areas of the City designated for growth. In most cases, the project site will likely be vacant under this scenario. In some cases though, this scenario may need to account for any existing uses on





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the site that could continue and potential increases in development allowed by ministerial approvals only.

- **Future Background plus Project Conditions** represented by Future Background Conditions plus changes to these conditions caused by the proposed project. This scenario needs to account for whether the project is changing any existing or planned land uses on the site.

## Analysis Time Periods

The determination of analysis time periods will depend on the travel modes being evaluated. For vehicular analysis, at a minimum, weekday AM and PM peak hour traffic volumes will be used in determining compliance with the vehicle level of service (LOS) standard. For recreational and other non-typical peak hour uses, weekday afternoon, weekday late evening, or weekends shall be considered.

**What time periods need to be analyzed?**

Based on the land use of the proposed project and upon consultation with the City, the study shall analyze traffic operations during the peak hour of the following time periods. The weekday time periods must occur on a Tuesday, Wednesday, or Thursday.

- Weekday morning peak (7:00 – 9:00 AM)
- Weekday evening peak (4:00 – 6:00 PM)

For some projects, the City may substitute or require additional peak hour analysis for the following time periods.

- Weekday mid-day peak (12:00 – 2:00 PM)
- Weekday afternoon peak (2:00 – 4:00 PM)
- Friday evening peak (5:00 – 7:00 PM)
- Weekend midday peak (11:00 AM – 1:00 PM)
- Weekend evening peak (4:00 – 7:30 PM)

The determination of study time periods should be made separately for each proposed project based upon the peaking characteristics of project-generated traffic and peaking characteristics of the adjacent street system and land uses. The time period(s) that should be analyzed are those that exhibit the maximum combined level of project-generated traffic and adjacent street traffic.



## Traffic Data Collection

Accurate data is essential to achieve a high level of confidence in transportation analysis results. Existing traffic conditions data shall be collected using the guidelines set forth in Table 3. The collected data will then be used to perform the respective analyses per the TIA guidelines.

**TABLE 3: EXISTING CONDITIONS DATA COLLECTION PROTOCOL**

Data Set	Procedure
Peak period turning movement counts	<ul style="list-style-type: none"> <li>➤ New traffic counts shall be collected if existing counts are more than two years old. Counts shall only be collected in winter months (December 15<sup>th</sup> through March 30<sup>th</sup>) and summer months (June 15<sup>th</sup> through Labor Day). No traffic count data should be collected outside these dates unless agreed upon by the City of Aspen. The peak hour traffic volumes should be seasonally adjusted to represent the typical average day of the year (the 30th highest hour across the Castle Creek bridge).</li> <li>➤ 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.</li> <li>➤ Collect data for all study intersections on a Tuesday, Wednesday, or Thursday.</li> <li>➤ Care should be taken to collect data on days when schools are in session.</li> <li>➤ Bicycles and pedestrians should be included in all counts.</li> <li>➤ Some projects may require vehicle classification or occupancy counts. Consult with the City on a case-by-case basis.</li> </ul>
Daily traffic counts	Collect data for all study roadway segments using the parameters described above for peak period turning movement counts with the exception of collecting bicycle and pedestrian data.
Multi-Modal Facilities	<p>Establish existing geometrics from a combination of aerial photography, as-built plans, and site visits.</p> <p>Map existing bicycle and pedestrian facilities within the study area (include sidewalks, crosswalks, signal heads, push buttons, related signing and striping). Document barriers, deficiencies and high-pedestrian demand land uses including schools, parking, senior housing facilities, and transit stops or centers. The City of Aspen's GIS department can provide this information.</p>
Travel time and speed	If necessary, travel time and speeds may be measured using radar, Bluetooth detectors, GPS probe vehicles (i.e., floating car survey), or other validated methodology.
Signal timing	Request timing from the City and other operating agencies such as CDOT. Verify timing in the field.
Crash data	Obtain crash data through the local law enforcement or CDOT if on Highway 82.
Mode split	Summarize daily and peak hour mode split from study area or communities adjacent to study area.
Transit routes and use	Map existing transit routes and stops serving the study area and identify service hours and levels of use. Document amenities (benches, shelters, bicycle parking, etc.) available at transit stops and centers within ¼-mile of non-residential projects and a ½-mile of residential projects. Complete MMLoS analysis per TIA guidelines.



## Trip Generation

Applicants required to complete a Level Two TIA are required to submit a trip generation analysis that identifies the number of new daily and peak hour vehicle-trips added by the proposed project. The trip generation estimation for all new or proposed development projects shall include the summation of primary trips and diverted linked trips.

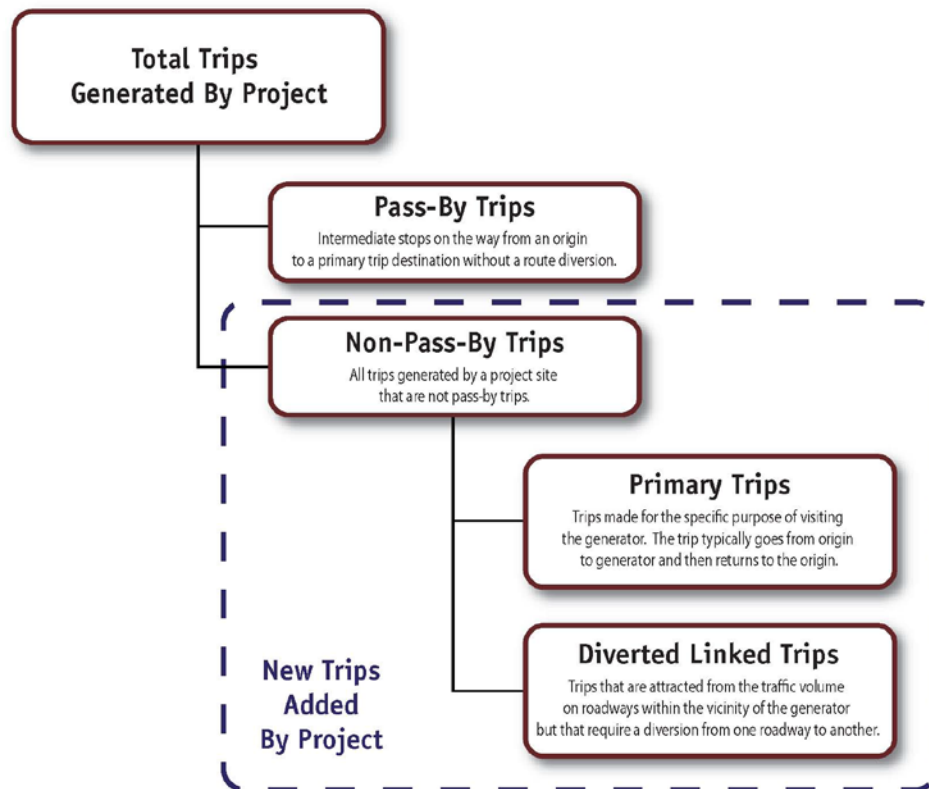
**How do I determine how many vehicle trips my project will generate?**

The estimation of new trips generated by the proposed development project may include credit for trips associated with existing uses on the site. Existing uses are those actively present on the project site at the time data is gathered for the Traffic Impact Analysis.

The final estimate of new daily and peak-hour trips associated with a proposed development project should represent the net contribution of the proposed project. The City will review the trip generation analysis and determine if additional analysis is required.

Trip generation analysis should be primarily based on Aspen specific trip generation rates. The Aspen specific trip generation rates and the respective directional distributions for the AM and PM peak hours are located in Appendix A in Tables A-1 and A-2. The Aspen specific trip generation rates were validated for winter and summer season conditions for the following land uses: commercial office, commercial retail, free-market housing, affordable housing, lodging, essential public facility, and mixed-use (included restaurant, residential, and commercial). The City Engineer should be consulted if the proposed development land use is not included in the validated land use categories listed in Tables A-1 and A-2.

The following figure describes trip types relevant to trip generation and the difference between the total trips generated by the project versus new trips added by the project.



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## Vehicle Level of Service

Historically, vehicle levels of service (LOS) thresholds have been the prevailing criteria applied to transportation projects. The City of Aspen recognizes that vehicle LOS is one performance measure that needs to be carefully weighed against other City objectives to balance the preservation of community values with a safe and efficient circulation system. Vehicle LOS only assesses traffic operations from a driver's perspective. It does not capture the perspective of pedestrians and bicyclists nor does it recognize potential impacts of driving on air pollution or other environmental resources. As such, potential impacts identified based on the following City LOS thresholds will need to be weighed against other community values and objectives in developing mitigation acceptable to the City.

- LOS C or better during peak hours is acceptable within the City of Aspen.
- For individual turning movements, LOS D, E and F may be acceptable for left-turns or for minor street unsignalized movements; however some mitigation may be necessary.
- In instances where the existing LOS is already less than LOS C, the project should include mitigation to maintain the LOS and not degrade it further. Mitigation preferences should focus on reducing vehicle trips, improving the bicycle and walking network, improving transit services or facilities, and modifying traffic control operations (i.e., signal timings).

Traffic operations analysis methodology used to calculate LOS shall be based on the latest version of the Highway Capacity Manual (HCM).

If the TIA study area extends into an adjacent jurisdiction, their LOS threshold shall be used for the impact significance criteria for analysis locations in that jurisdiction. The applicant is responsible for analyzing project impacts against appropriate jurisdictional standards; however, impacts will be mitigated consistent with City TDM standards.

### Analysis Parameters

Analysis parameters (e.g., signal phasing, conflicting pedestrian volumes, etc.) for Existing and Existing plus Project conditions shall be based on field measurements taken during traffic count collection and field observations. This typically applies to Future Background and Future Background plus Project analysis.

In the absence of field data or for some future conditions analysis, the parameters in Table 3 may be used with City consultation.



**TABLE 4: ANALYSIS PARAMETER RECOMMENDATIONS**

Parameter	Recommendation
Peak hour factor (PHF)	Use measured approach PHF obtained through traffic data collection. For cumulative scenarios and existing conditions where peak hour factors are not available, refer to the HCM and maintain consistency through analysis scenarios and peak hours. <ul style="list-style-type: none"> <li>➤ If a simulation model is used for analysis, the PHF should be applied over more than a 15-minute period.</li> </ul>
Saturation flow rate	A field measurement of the saturation flow rate is recommended in accordance with procedure in the HCM. For cumulative conditions, use the value recommended in the most recent HCM unless physical conditions and traffic controls warrant a change. The 2010 HCM recommends 1,900 vehicles per hour per lane.
Yellow phase	4 seconds per phase (if traffic signal is present under existing conditions, use existing yellow phase).
All red phase	1 second per phase (if traffic signal is present under existing conditions, use existing red phase). Red phase may be greater on high-speed roadways.
Conflicting pedestrians for signalized intersections	Primarily based on existing pedestrian counts or observations. Otherwise, refer to the most current version of the HCM to determine the amount of pedestrian activations per cycle into appropriate categories. To determine conflicting pedestrians, assume one pedestrian per activation.
Traffic signal cycle lengths	Replicate existing cycle length and phasing (e.g., leading left turns) when possible. For new signalized locations, segment the cycle lengths into the following three categories unless other cycle lengths can be justified through the traffic operations analysis. <ul style="list-style-type: none"> <li>➤ In and around downtown – limit signal cycle lengths to less than 90 seconds</li> <li>➤ In and around suburban areas – limit signal cycle lengths to less than 90 seconds</li> </ul> Ensure that minimum pedestrian times are satisfied.
Lane utilization factor	If applicable, adjust lane utilization factors based on field observations.

**Analysis Tools and Methods**

Traffic operations analysis for local roadways and the state highway shall be conducted using tools and methods approved by the City of Aspen. Recommended analysis tools for Traffic Impact Studies include Synchro, SimTraffic, and VISSIM. Other tools or methods may be used upon receiving approval from the City Engineer.

Congested Conditions

Analysts should note that the HCM recommends the use of simulation models to analyze congested conditions. Since simulation tools can simultaneously evaluate vehicle interactions across a complete network (including the interaction of multiple modes), they can provide a more complete understanding of traffic operating conditions during peak congested periods and what may happen when a specific bottleneck is modified or eliminated. Recommended analysis tools for simulation analysis include SimTraffic and VISSIM. Other tools or methods may be used upon receiving approval from the City Engineer.



## Transit Level of Service

Information relating to the hours of weekday service, frequency of service, travel time, and peak passenger load is helpful for determining the extent and quality of service provided to a given location. The transit system performance measures are to be documented for multi-family housing, hotel/lodging, and commercial/retail developments that fall under the category of Major Development per the TIA guidelines.

Level of Service Metric	Standard	Notes
Hours of Weekday Service (number of hours service is provided)	20 hours peak/18 hours off- peak	When transit level of service standards are not met, the City of Aspen, RFTA, and project applicant should discuss potential improvements to the transit system by the project.
Season Frequency of Service (time between bus arrivals at a particular transit stop)	15-30 min peak/60 min off-peak	
Travel Time Factor (transit travel time / auto travel time to three specific destinations that can include popular destinations such as shopping centers, schools, or civic uses)	2.0 X	
Peak Load factor (# of passengers / # of seats)	<1.2	

The overall transit system performance LOS is determined as follows:

Level of Service Standards Met				
All 4	3 of 4	2 of 4	1 of 4	None
A	B/C	D	E	F

When overall transit system performance is operating at D or worse, the applicant and City staff should engage the transit provider to evaluate the potential for improving transit service for a particular development. This coordination between land use and the transit system is intended to increase the utility and attractiveness of the transit system to all users.



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## Site Plan Review

A detailed site review is required for every project and should, as a minimum, cover the items below. Appendix B includes a sample illustration of site review recommendations that should also be considered in the site plan review. Consideration should be given to the following qualitative and quantitative reviews and summarized in the TIA.

- Existence of any current traffic problems in the local area such as a high-accident location, non-standard intersection or roadway, or an intersection in need of a traffic signal.
- Applicability of context-sensitive design practices compatible with adjacent neighborhoods or other areas that may be impacted by the project traffic.
- Close proximity of proposed site driveway(s) to other driveways or intersections.
- Adequacy of the project site design to fully satisfy truck loading demand on-site.
- Adequacy of the project site design to provide at least the minimum required throat depth at project driveways.
- Adequacy of the project site design to convey all vehicle types
- Adequacy of on-site vehicle, bicycle, and pedestrian circulation and provision of safe pedestrian paths from residential areas to school sites, public streets to commercial and residential areas, and the project site to nearby transit facilities.
- Project site design resulting in inadequate emergency access or response times.

## Consultation with Other Jurisdictions

If the study area overlaps with other jurisdictions (i.e. CDOT, Pitkin County, etc.), the other jurisdictions should be consulted to verify study locations and to specify the impact significance criteria that should be used in the TIA for these locations. In most cases, overlap will occur for roadway system analysis.



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## Significant Impact Assessment

The main intent of the TIA is to determine potential transportation impacts of proposed projects. This information is essential for decision makers and the public when evaluating individual projects. This section explains what operating conditions shall be used when determining an impact. These guidelines also establish criteria for when a project impact is considered significant.

**Does my project result in a significant impact?**

### ***Scenario Evaluation***

Transportation impact determination for a proposed development project shall be based upon the comparison of the following scenarios using the significance criteria cited below.

- Existing Conditions vs. Existing Plus Project Conditions
- Future Background Conditions vs. Future Background Plus Project Conditions

### ***Significance Criteria***

A project impact is considered significant when it meets the criteria listed in Table 4.





**TABLE 5: TRANSPORTATION, CIRCULATION AND SIGNIFICANCE CRITERIA**

Elements	Evaluation	Significant Impact Determination
On-site Circulation	Review and evaluate site access locations, driveway throat depths, size of major circulation features with respect to operations and safety, turning movement volumes at site access points, queuing at site access driveways, dimensions of truck loading areas, and emergency access. Address and provide pedestrian and bicycle access to the proposed development. See Appendix B for a sample.	<ul style="list-style-type: none"> <li>➤ Project designs for on-site circulation, access, and parking areas fail to meet City or industry standard design guidelines.</li> <li>➤ Project fails to provide direct pedestrian and bicycle connection to the pedestrian and bicycle facilities on-site.</li> <li>➤ A project fails to provide adequate accessibility for service and delivery trucks on-site, including access to truck loading areas.</li> </ul>
Off-Site Traffic Operations	Conduct intersection and roadway level of service analyses using methods and procedures contained in the latest version of the <i>Highway Capacity Manual</i> (HCM) published by the Transportation Research Board.	<ul style="list-style-type: none"> <li>➤ A roadway segment or intersection operates unacceptably according to the City of Aspen LOS guidelines (Overall Intersection LOS C or better during peak hours, LOS D, E and F may be acceptable for left-turns or for Minor Street unsignalized movements. In instances where the existing LOS is already less than LOS C, the project should include mitigation to maintain the LOS and not degrade it further)</li> <li>➤ The project adds 10 or more peak hour trips that cannot be mitigated with TDM or MMLOS.</li> </ul>
Bicycle Facilities	Identify any existing or planned bicycle facilities that may be affected by the project. Focus on maintaining or enhancing connectivity and completing network gaps. Complete MMLOS analysis per TIA guidelines.	<ul style="list-style-type: none"> <li>➤ A project disrupts existing or planned bicycle facilities or conflicts with adopted City non-auto plans, guidelines, policies, or standards.</li> <li>➤ The project adds trips to an existing transportation facility or service (e.g., bike path) that cannot be mitigated with TDM or MMLOS.</li> </ul>
Pedestrian Facilities and Americans with Disabilities Act (ADA) compliance	Identify any existing or planned pedestrian facilities that may be affected by the project. Focus on maintaining or enhancing connectivity, completing network gaps, and removing barriers. Disclose evaluation and documentation of project features (e.g., driveway access points) with likely disparate impact on pedestrians (e.g., longer crossing time, added conflict points, etc.). Complete MMLOS toolkit analysis per TIA guidelines.	<ul style="list-style-type: none"> <li>➤ A project fails to provide accessible and safe pedestrian connections between buildings and to adjacent streets and transit facilities.</li> <li>➤ A project disrupts existing or planned pedestrian facilities or conflicts with adopted City non-auto plans, guidelines, policies, or standards.</li> <li>➤ The project adds trips to an existing transportation facility or service (e.g., sidewalk) that does not meet current design standards for minimum width and that cannot be mitigated with TDM or MMLOS.</li> </ul>



Elements	Evaluation	Significant Impact Determination
Transit	Identify any existing or planned transit facilities that may be affected by the project. Focus on maintaining or enhancing connectivity and completing network gaps. Complete MMLOS toolkit analysis per TIA guidelines.	<ul style="list-style-type: none"> <li>➤ A project disrupts existing or planned transit facilities and services or conflicts with adopted City non-auto plans, guidelines, policies, or standards or results in significant degradation of service quality.</li> </ul>
Intersection Traffic Control	Evaluate unsignalized intersections located within the study to determine appropriate traffic control with or without the project. Evaluate signalized intersections located within the study to determine appropriate signal timing changes needed with or without the project.	<ul style="list-style-type: none"> <li>➤ The addition of project traffic causes an all-way stop-controlled or side street stop-controlled intersection to meet Manual on Uniform Traffic Control Devices (MUTCD) signal warrant criteria.</li> </ul>
Other Jurisdictional Requirements	In situations where several agencies must approve a development or are responsible for affected roadways, the applicant must contact lead and responsible agencies to determine issues to be addressed, scope of study, etc. In general, the applicant will be responsible for analyzing project impacts against appropriate jurisdictional thresholds; however, the analysis methodology will be determined by the City in compliance with the TIA guidelines and the impacts will be mitigated consistent with City standards.	<ul style="list-style-type: none"> <li>➤ The project exceeds established significance criteria thresholds for locations under the jurisdiction of other agencies.</li> </ul>



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## Mitigation Measures

All projects shall use the Aspen TDM and/or and MMLOS Mitigation Tools to determine mitigation measures that will be used for a project. The tools assign a percent reduction in vehicle trips (TDM) and point values (MMLOS) to specific measures used to offset the largest peak hour trip generation. For example, if a projects adds 50 Peak Hour AM trips and 40 Peak Hour PM trips, it will start with -50 points and will need to mitigate 100% of the new trips (50 trips) in the TDM and MMLOS Toolkits. Major Projects may not be able to achieve enough points to mitigate 100% of the peak trips through TDM and MMLOS. In these situations additional mitigation measures are required and must be discussed with and approved by the City of Aspen Engineering and Transportation Departments (see Table 4).

Copies of the completed TDM and MMLOS toolkits delineating the applicants chosen measures to mitigate at least 100% of the new trips must be provided to the City of Aspen with the completed TIA.

### Changes to Mitigation Measures

TDM and MMLOS Mitigation measures that are approved and implemented for a development must be on going for the occupied life of the development. Changes to specific on-site measures may be amended over time, as long as they result in the same amount of trips mitigated as the original approval. Off-site MMLOS infrastructure measures may not be changed. Changes must be approved by the Engineering and Transportation departments to ensure the proposed change is appropriate given the site's context. Any change that results in the same number of trips mitigated may be approved administratively. Any change that reduces the amount of trips generated shall be approved by the body (City Council, HPC, or P&Z) that approved the original measures.

If after TDM and MMLOS mitigation has been applied and the net new trips to the system are not mitigated and/or the project meets the significance criteria in Table 4, additional significant impact mitigation may be required. In consultation with the City of Aspen Engineering and Transportation Departments, the mitigation may include modifications to the site plan to increase pedestrian and bicycle connectivity, signal timing modifications, intersection traffic control modifications, etc. Every effort to mitigate shall first be made by TDM and MMLOS measures.

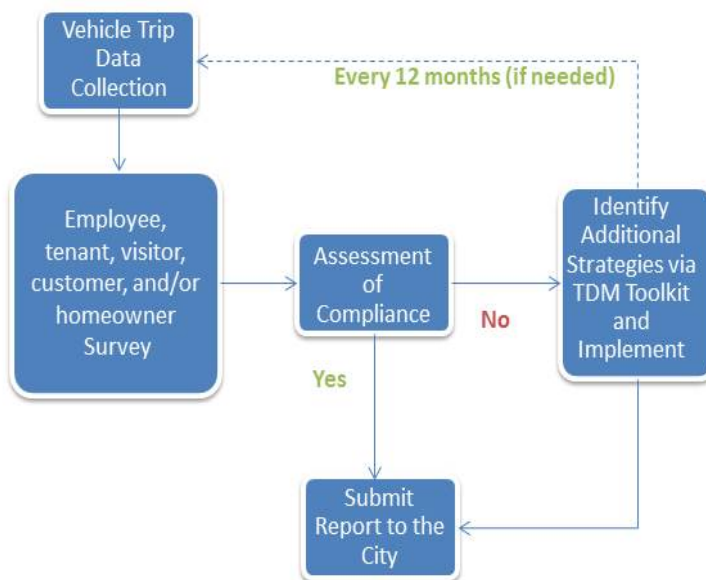


## Monitoring and Reporting Requirements

Following the implementation of Mitigation Measures, the property owners will be required to monitor motor vehicle traffic to ensure that the TDM and MMLOS Measures are having the intended effect. Major developments will be required to assess and report their compliance each year for five years. If an applicant fails to assess and report their compliance, the timeline for reporting will be extended one year.

Property Owners will need to collect traffic count data to evaluate travel behavior near the development. Traffic counts and analysis will be paid for by the development applicant.

The process is illustrated in the flow chart below. Each project will collect vehicle trip data for their project and assess their compliance. The project will submit a report to the City to document the monitoring process and results. Details of each step are documented below.



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## Vehicle Trip Data Collection

Data collection will be conducted by an independent transportation firm at least once a year. The data collection should include the following:

- 1) Selecting a week to conduct the vehicle counts that is consistent with the TIA data collection and prior year's data collection time frame. The selection of the week should be agreed upon by the City's Engineering and Transportation Departments.
- 2) The driveway counts will be conducted for:
  - a) Tuesday, Wednesday, and Thursday of the selected week
  - b) Daily (24 hours), morning peak period (7:00 AM to 10:00 AM) , and evening peak period (4:00 to 7:00 PM)
  - c) For the driveways providing access to the project
- 3) Field observations will be conducted during the AM and PM peak periods for each of the data collection days to confirm that the survey reflects a typical day.

The independent transportation firm will calculate the AM and PM peak hour vehicle counts entering the specified driveways. The AM and PM peak hour vehicle counts will be an average over the three day data collection period. If appropriate, the AM and PM peak hour vehicle counts may be adjusted based on field observations (i.e. if employees are parking on the street and thus not captured by the driveway counts).

## Survey Collection

Collection of an annual employee, tenant, visitor, customer and/or homeowner survey is an important element of the monitoring program. Surveys will be conducted to assess whether measures are being maintained and if participation levels meet critical mass.

## Assessment of Compliance with Guidelines

Vehicle trip data and survey results will provide insight into the success of various measures. The daily, AM, and PM trips will be compared to the submitted TDM and MMLOS plan within the TIA.

If the trip reduction measures are not successfully implemented and maintained, the project will be responsible to refine its program.

## Identify Additional Strategies

It is recommended that each project review the TDM/MMLOS tools in conjunction with the annual survey results to identify if refinements to existing strategies and new strategies to implement are necessary. The project will also identify a timeline for making changes to existing strategies and implementing new strategies.



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## **Annual Report Submittal**

A monitoring report, submitted at least annually to the City of Aspen, will be developed by the project and the independent transportation firm. The report will include the following elements:

- 1) Status of all existing TDM programs – including any data on participation rates
- 2) Status of all recommended TDM programs from prior monitoring report (if applicable) – including any available data on participation rates
- 3) Data collection methodology
- 4) Documentation of trip reduction methodology and results
- 5) Evaluation of performance compared to TDM plan
- 6) Conclusion of whether compliance is met
- 7) Next steps (if needed) – future modifications and enhancements of TDM Program, including time frame of implemented
- 8) Detail of data collection (including AM, PM, and daily counts)
- 9) Survey results



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## **Submittal of Level Two TIA**

A copy of the Level Two TIA shall be submitted as part of the Land Use Application along with other required development documents. The report shall be complete, in accordance with these guidelines, and be stamped and signed by the developer/permittee's transportation consultant engineer.

## **City Comments and Recommendations**

The City will evaluate the TIA and comments will be provided to the developer/permittee as part of the City's Development Review Committee (DRC) process. Subsequent analysis may be requested regarding specific transportation issues. In some cases, minor comments raised by city staff may be addressed in an addendum letter.



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# **Appendix A: Aspen Specific Trip Generation Calculations**





The following tables exemplify how trip generation information and assumptions should be prepared and documented for submittal to the City of Aspen.

**TABLE A-1: ASPEN SPECIFIC AM PEAK HOUR TRIP GENERATION**

<b>Table A-1 Aspen Trip Generation - AM Peak Average</b>			
<b>Land Use</b>	<b>Trip Rate<sup>1</sup></b>	<b>% Entering</b>	<b>% Exiting</b>
Commercial	2.27	69%	31%
Free-Market Housing	0.67	29%	71%
Affordable Housing	0.75	48%	52%
Lodging <sup>2</sup>	0.25	57%	43%
Essential Public Facility	0.86	62%	38%
<sup>1</sup> per thousand square feet for commercial and essential public facility; per unit/occupied room for housing and lodging			
<sup>2</sup> Includes vehicle and shuttle trips			
* For mixed-use (at least 2 of the established land uses) sites, a 4% reduction can be applied to the trip generation			

**TABLE A-2: ASPEN SPECIFIC PM PEAK HOUR TRIP GENERATION**

<b>Table A-2 Aspen Trip Generation - PM Peak Average</b>			
<b>Land Use</b>	<b>Trip Rate<sup>1</sup></b>	<b>% Entering</b>	<b>% Exiting</b>
Commercial	4.14	40%	60%
Free-Market Housing	0.82	56%	44%
Affordable Housing	0.89	55%	45%
Lodging <sup>2</sup>	0.31	52%	48%
Essential Public Facility	1.66	40%	60%
<sup>1</sup> per thousand square feet for commercial and essential public facility; per unit/occupied room for housing and lodging			
<sup>2</sup> Includes vehicle and shuttle trips			
* For mixed-use (at least 2 of the established land uses) sites, a 14% reduction can be applied to the trip generation			



**SAMPLE TRIP GENERATION TABLE UTILIZING THE ASPEN SPECIFIC TRIP GENERATION RATES.  
HIGHLIGHTED CELLS INDICATE DATA DIRECTLY FROM TABLE A-1 AND TABLE A-2.**

Table 1 Trip Generation Summary - Proposed Development includes a 75 Room lodge + a 25,000 square foot commercial development													
Proposed Land Use	Size	Trip Generation Rates <sup>1</sup>		Trips Generated									
		AM PEAK	PM PEAK	AM Peak-Hour			PM Peak-Hour			Total	Total		
				Entering	Exiting	Total	Entering	Exiting	Total				
		% Trips <sup>1</sup>	Trips	% Trips <sup>1</sup>	Trips	% Trips <sup>1</sup>	Trips	% Trips <sup>1</sup>	Trips	% Trips <sup>1</sup>	Trips	% Trips <sup>1</sup>	Trips
New Aspen Lodge	75 RMS	0.25	0.31	57%	11	43%	8	19	52%	12	48%	11	23
Aspen Commercial Development	25 KSF	2.27	4.14	69%	39	31%	18	57	40%	41	60%	62	103
<b>Total New Trips:</b>					50		26	76		53		73	126

(Size) x (Trip Generation Rate) x (% Trips Entering) = Peak Hour Entering Trips: I.E: (75) rooms x (0.25) x (57%) = 11 trips for AM Peak entering.

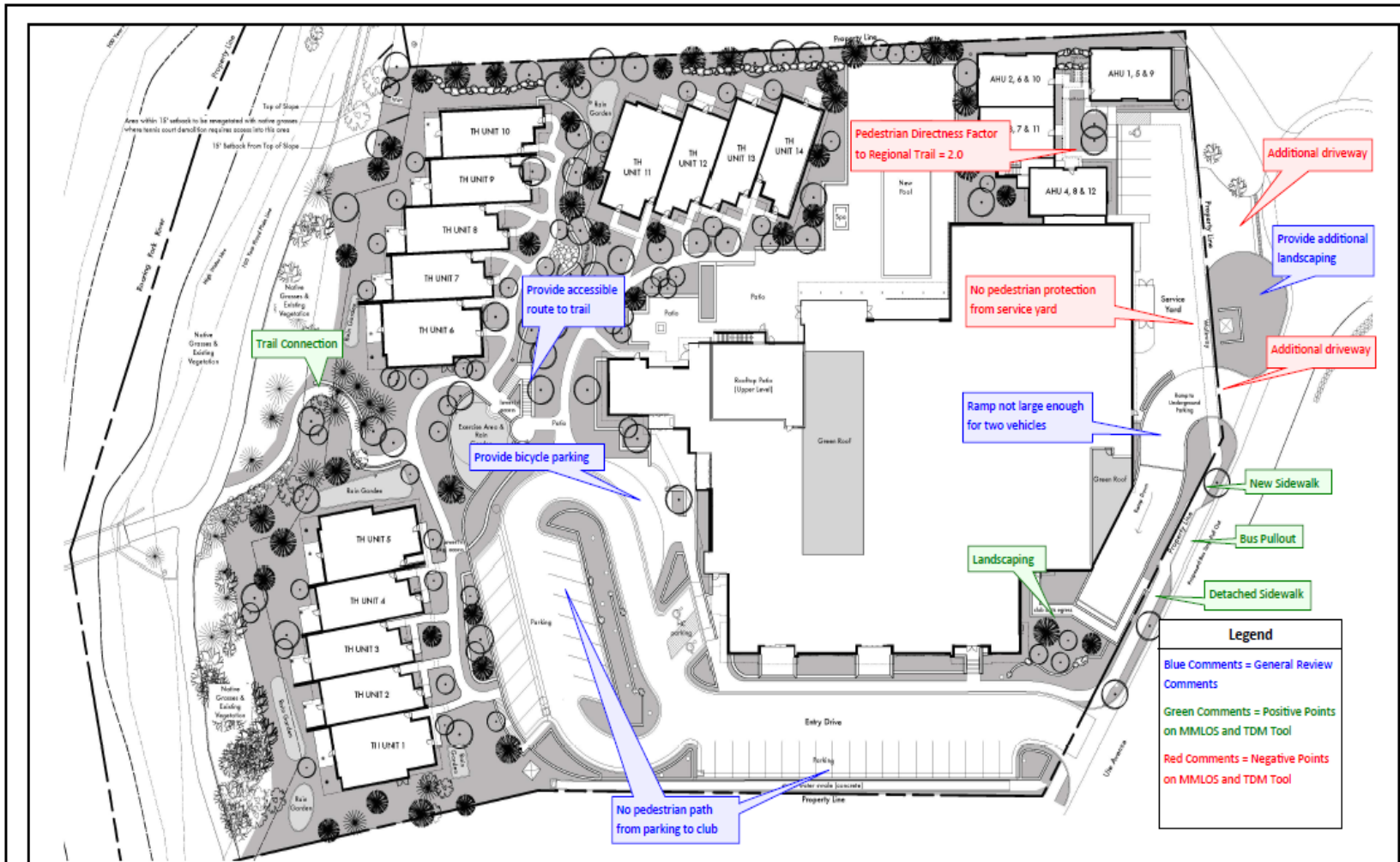
KSF = Thousand Square Feet  
RMS = Number of rooms

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# **Appendix B: Sample Site Plan Review for Major Developments**





# Appendix C: TDM & MMLOS GLOSSARY

## Transportation Demand Management (TDM):

Transportation Demand Management (TDM) is the application of strategies and policies to reduce travel demand (specifically that of single-occupancy vehicles)

### Neighborhood/Site Enhancement

- On-Site Servicing - Providing creative onsite amenities reduces the need for SOV trips throughout the day. Services within the development that will reduce the need for auto trips include healthy vending, grocery, restaurant, recreation rental, dry cleaning, child care, bicycle repair stations, etc.
- Shared Shuttle Service – The use of hotel or other customer service vehicles to shuttle employees can maximize the use of on-site resources while reducing SOV trips. The successful project will creatively consider the use of necessary business vehicles for shuttle purposes. For example, a health club with a guest shuttle could provide employee transfers to a transit center or park and ride.
- Non-Motorized Zones - (Only applicable to Major developments) Larger areas of non-motorized travel zones provide safe and comfortable space that encourages walking and bicycling, thus reducing SOV trips. Non-motorized zones are applicable for larger redevelopment or specific areas only. Public amenity space already required by the City of Aspen does not qualify for this reduction.

### Transit

- Network Expansion - (Only applicable to Major developments) - The successful project will expand the local transit network by adding or modifying existing transit service to enhance the service near the project site. This will encourage the use of transit thus reducing SOV trips. The successful project will work with City of Aspen staff to develop a plan that offers the best trip reduction opportunity.
- Service Frequency/Speed – (Only applicable to Major developments) - Reducing transit-passenger travel time through reduced headways and increased speed and reliability makes transit service more attractive, thus reducing SOV trips. The successful project will work with City of Aspen staff to develop a plan for increased service frequency that offers the best trip reduction opportunity.
- Transit Access Improvement – Provision of safe and comfortable access to transit service is important for generating and maintaining transit ridership, thus reducing SOV



trips. The successful project will improve pedestrian access to a transit stop via formalization of trails, addition and/or improvement of sidewalk, installation of lighting and/or way finding or other measures.

- Intercept Lot - The provision of a convenient location at which to park a vehicle and transfer onto an alternative mode can reduce SOV trips. The successful project will provide for a safe, convenient intercept lot at an appropriate location. Alternatively, a project can propose methods by which existing intercept lot use can be expanded. Examples include shuttles to/from existing lots, improvements to existing lots, etc.

### **Commute Trip Reduction**

- Participation in TOP - The Transportation Options Program (TOP) is a City of Aspen operated employer trip reduction service. All TOP employer services are free and include grant opportunities, bus schedule kiosks and information distribution. The successful project will work with City of Aspen staff to determine whether TOP membership is appropriate and, if so, to join the program. (Note: Grant funding from the TOP program may not be used to offset mitigation measures during until the reporting period has been successfully completed).
- Transit Fare Subsidy - The successful project will provide subsidized/discounted daily or monthly public transit passes for the RFTA valley system. These passes can be partially or wholly subsidized by the project, with additional credit being provided for larger subsidies. Many entities use revenue from parking to offset the cost of such a project.
- Employee Parking Cash-out - The term cash-out is used to describe the provision of employee choice of forgoing their current subsidized/free parking for a cash payment equivalent to the cost of the parking space. The successful project will require employers to offer employee/guest parking cash-outs.
- Workplace Parking Pricing - The successful project will implement workplace parking pricing at its employment centers. This may include: explicitly charging for employee parking, or implementing above market-rate pricing.
- Compressed Work Weeks - Compressed work week schedules allow an employee to work the typical 40-hour workweek in an alternative manner such as 4/10s or 9/80s. This eliminates the need for work-related travel on the days not worked, thus reducing SOV trips. The successful project will demonstrate that it will offer compressed work week schedules to a minimum of 25% of its employees.
- Employer Sponsored Vanpool - Employer-sponsored vanpool programs entail an employer purchasing or leasing vans for employee use, and subsidizing the cost of program operations and administration. The driver usually receives personal use of the van, often for a mileage fee. Scheduling is within the employer's purview, and rider charges are normally set on the basis of vehicle and operating cost. The successful project will implement an employer-sponsored vanpool, thus reducing the need for SOV trips to and from the workplace.



- Carpool Matching - Facilitating the formation of employee carpool groups is a method of reducing SOV trips. The successful project will include use the city of Aspen Commuter Connect service to create an employee portal to allow for the formation of carpools as well as the sharing of other important transportation information via a custom employer web page.
- Carshare Program - Carshare programs have been linked to increased use of alternative transportation modes and reduced SOV trips. The successful project will provide access to Aspen's CAR TO GO carshare program. Carshare memberships can be provided to all employees or residents of new developments.
- Bikeshare Program - Bikesharing provides access to a fleet of bicycles for short trips, thus reducing SOV travel. The successful project will provide membership to and/or enhance the existing public bikeshare program. Options include membership for staff and/or membership for guests/customers.
- End of Trip Facilities - The provision of convenient facilities for pedestrians and cyclists encourages these types of alternative modes, thus reducing SOV trips. Non-residential projects may provide facilities such as showers, secure bicycle lockers, personal lockers, changing spaces, etc.
- Self-Funded Emergency Ride Home - Emergency Ride Home programs reduce barriers associated with alternative commute modes, thus reducing SOV trips. The successful project will develop and fund a program to provide commuters who carpool, vanpool, bike, walk or take transit to work with a reliable and free ride home - usually in a taxi or rental car when unexpected emergencies arise. The use of the TOP program's Emergency Ride Home feature is not applicable for mitigation purposes.
- Carpool/Vanpool Priority Parking - Priority parking for carpools and vanpools encourages and incentivizes employees to ride-share to work, thus reducing SOV trips. The successful project will locate reserved carpool and vanpool spaces at the front entrances of the buildings and manage/monitor the use of parking spaces to ensure compliance.
- Private Employer Shuttle - Offering employees a customized trip to work via private shuttle reduces the need for SOV trips. The successful project will provide an employee shuttle from nearby transit stations or other identified pick up points to the place of employment.
- Information sharing and marketing/incentivizing are important components to successful commute trip reduction programs. The successful project will implement marketing strategies to reduce SOV trips. A trip reduction marketing programs should include a number of the following strategies:
  - orientation to trip reduction programs and benefits
  - orientation to specific alternative transportation modes such as bus service information, bike/walk route maps, etc.



- publishing of web or traditional informational materials;
- events and contests such as commuter fairs, new employee orientations, bike to work days, etc.
- educational opportunities such bicycle commute/repair classes
- web or traditional materials aimed at guests/customers such as bike/walk maps, free transit day passes, etc.





## Multi-Modal Level of Service (MMLOS):

Multi-Modal Level of Service (MMLOS) evaluates the safety and quality of access and flow for pedestrians and bicyclists.

### Pedestrians

Pedestrian Level of Service (LOS) is based on the criteria outlined below. If the site is not meeting the minimum sidewalk Level of Service (LOS) B, the project will be required to mitigate additional points to offset the project's inability to meet LOS B. The mitigation of not meeting minimum LOS is in addition to mitigating peak hour new trips. If the site is not meeting the minimum sidewalk Level of Service (LOS) B, the project will be required to mitigate additional points to offset the project's inability to meet LOS B.

The existing sidewalk and pedestrian path Level of Service (LOS) is characterized by sidewalk continuity, sidewalk width, presence of a landscape buffer, and ADA compliance.

**LOS A** is characterized by a continuous sidewalk that provides an effective width that exceeds Aspen's minimum sidewalk width standards and has a five foot landscape buffer. Effective width is measured using the sidewalk width and subtracting the shy distance for pedestrians. Pedestrians avoid the edge of the sidewalk close to the street because it often contains utility poles, bus shelters, parking meters, sign poles, and other street furniture. Pedestrians also avoid traveling in the 24 inches of the sidewalk close to buildings to avoid retaining walls, street furniture, and fences. The sidewalk area that pedestrians tend to avoid is referred to as the shy distance.

**LOS B** provides a continuous sidewalk that meets Aspen's minimum sidewalk width standards and has a five foot landscape buffer. Encroachments into the sidewalk including door swings, will be subtracted from the sidewalk width.

**LOS C** occurs when there are no gaps in the pedestrian sidewalk, but the sidewalk does not meet current design standards or has encroachments that affect the sidewalk width below the minimum width standards.

- Sidewalk Condition on Project Frontage – The sidewalk along the project frontage will be assigned points based on whether the sidewalk is detached, if the effective width is greater than the standard minimum width, and if the proposed landscape buffer is greater than the standard minimum width.
- Sidewalk Condition on Adjacent Blocks – The project will be given opportunity to mitigate points off site. If the project proposed to improve the condition of sidewalk on adjacent blocks to the proposed project will be assigned points based on whether the sidewalk is detached, if the effective width is greater than the standard minimum width, and if the proposed landscape buffer is greater than the standard minimum width.
- Pedestrian Routes – The pedestrian routes with the proposed project will be assigned points based on whether the slopes between the back of curb and sidewalk are equal to or less than 5%, if the curbs are equal to 6 inches, if new pedestrian access points allow access without crossing a street, if new landscaping is proposed at the access point, if there is implementation of a crosswalk that improves access to the proposed access point, if changes to pedestrian access points preserve or enhance the pedestrian experience, and if the pedestrian access is enhanced to address any deficiencies.
- Driveways, Parking, and Access Considerations - While modifications to driveways, access, and parking are often necessary for new developments, the design and placement of access points can have potentially negative impacts. Whereas access considerations have typically focused on the automobile, the goal of this policy is to promote and implement access schemes that are multi-modal by creating no net negative impact on the surrounding pedestrian or cyclist.
- Traffic Calming - Providing traffic calming measures encourages people to walk or bike instead of using a vehicle, resulting in decreased SOV trips. Traffic calming features may include: curb extensions, speed tables, raised crosswalks, raised intersections, median islands, tight corner radii, chicanes/chokers, and others. The presence of traffic calming results in improved pedestrian LOS and vice-versa, therefore the City of Aspen Asset Management Plan identifies the areas with the greatest need. Proposed projects can mitigate impacts by contributing funds for the City of Aspen to install proposed traffic calming measures. If a project applicant provides a compelling reason for installing traffic calming measures (i.e. traffic speeds, high levels of activity) not included in City of Aspen's Asset Management Plan, the City may consider additional traffic calming measures.
- Pedestrian Network - The City of Aspen implements enhanced street crossings at intersections and midblock locations, as appropriate. The City of Aspen has developed a plan that identifies locations for the proposed installation of crosswalks (see City of Aspen Asset Management Plan). The presence of enhanced crosswalks result in improved pedestrian LOS and vice-versa, therefore the Asset Management plan identifies the areas with the greatest need. Proposed projects can mitigate



impacts by contributing funds for the City of Aspen to install proposed crossings. If a project applicant provides a compelling reason for installing a crosswalk (i.e. traffic speeds, high levels of activity) that is not included in Aspen's Asset Management Plan, the City may consider additional enhanced crosswalks outside of the asset management plan.

Pedestrian Route Directness (PRD) is the ratio of route distance to straight-line distance for two selected points. The lowest possible value is 1.00, where the route is the same distance as the "crow flies" distance. Numbers closer to 1.00 indicate a more direct route, theoretically representing a more connected network. Providing a pedestrian access network to link areas of the Project site encourages people to walk instead of drive, thus reducing Single Occupancy Vehicles (SOV) trips.

The successful project will provide a pedestrian access network that internally links all uses and connects to all existing or planned external streets and pedestrian facilities contiguous with the project site. The project will minimize barriers to pedestrian access and interconnectivity. Physical barriers such as walls, landscaping, and slopes that impede pedestrian circulation will be eliminated.

## **Bicycles**

- Modifications to Existing Bicycle Paths - When modifications to a bicycle path are requested, the overall modifications should not result in any net negative impact to the bicycle path, as determined by the City of Aspen Parks Department and Engineering Department.
- Bicycle Parking - Vehicular trips are facilitated at origins and destinations by the provision of minimum vehicular parking requirements. As many drivers know, the availability and ease of finding parking at one's destination can greatly affect one's access to their destination, overall experience, and may require additional travel as one searches for an available parking space. Providing bicycle parking is a simple and relatively low-cost measure that can be used to provide cyclists with parking at various land uses: commercial/retail, hotel/lodging, mixed-use developments, and multi-family residential.

Short-term parking is intended for cyclists who will park for two hours or less. It should be located on the street level, near pedestrian access to the building, and on the exterior of the building. Long-term parking is intended for cyclists who will store their bicycle for several hours or longer. This parking should, therefore, provide greater security and protection from the elements. It is recommended that long-term bicycle parking be covered and locked. All parking should be located in a secure location, with adequate lighting, outside of the public right-of-way, and separate from vehicle parking. Long-term parking should be covered, as previously discussed. Inverted U-racks and the post-n-ring are recommended for short-term parking (each accommodates two bicycles). If the project proposes to use bicycle parking, the size and location must be pre-approved by the city.

## **Transit**



A project is responsible for determining the existing number of points at each bus stop within the study area, identifying the level of improvement required to meet Aspen's basic amenities standard, and implementing or funding the implementation of the improvements. At a bus stop, the project may elect to provide an enhanced amenity in-lieu of meeting the minimum amenity standard, per discussions with City staff. All bus stop modifications should be compliant with City of Aspen and/or RFTA bus stop standards (depending on location).

- Basic Amenities - Transit patron experiences are enhanced by the provision of amenities at bus stops that provide seating, protection from the elements, way finding, transit system information, trash cans, and design elements that facilitate access to transit.
- Enhanced Amenities - General purpose vehicles and transit vehicles typically share right-of-way and drive on the same roads and lanes; however, in some instances there are modifications that could potentially improve the quality of service for vehicles in general, and for both individual motorists and/or the transit vehicles and associated patrons. Relocation of a bus stop to the far-side of an intersection can benefit multiple modes. For instance, general purpose and transit vehicles benefit by removing conflicts between through buses and right-turning vehicles, while transit patrons enjoy improved sight distance at intersection crossings when walking to/from bus stops. Another example of an enhanced amenity is a bus pull out.

