TRANSPORTATION IMPACT ANALYSIS GUIDELINES

ADOPTED OCTOBER 2014

SANTA CLARA VALLEY TRANSPORTATION AUTHORITY

CONGESTION MANAGEMENT PROGRAM

Santa Clara Valley Transportation Authority
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October 2014

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PART I - STATUTE AND AUTHORITY

Chapter 1. CMP Statute and Intent of VTA *TIA Guidelines*

On January 1, 1995, the Santa Clara Valley Transportation Authority (VTA) was designated as Santa Clara County's Congestion Management Agency. The Congestion Management Program (CMP) statute requires that uniform methods be used for evaluating transportation impacts of land use decisions on the CMP System. Furthermore, the statute allows the agency responsible for the CMP to choose the analysis methods.

This document presents VTA's guidelines for preparing Transportation Impact Analyses (TIAs) for CMP purposes. TIAs are prepared to assess the transportation impacts of land development projects and to assist in identifying improvements to minimize a development project's impacts. TIAs are prepared by local jurisdictions as part of environmental assessments completed for development proposals. These *Guidelines* are intended to be used by Member Agencies as part of their regular process of evaluating land use decisions and may be viewed as a minimum scope for assessing transportation impacts. Member Agencies may maintain their own guidelines that supplement the procedures in the VTA *TIA Guidelines*, and Member Agencies may also have a lower size threshold for when a transportation analysis must be prepared in their jurisdiction. Therefore, a TIA may not be required by the CMP but may be required by Member Agencies.

The VTA *TIA Guidelines* are intended for transportation analysis related to land development projects. The VTA *TIA Guidelines* may be used as a reference point for the analysis of transportation improvement projects, subject to the judgment of the Lead Agency.

It is not intended that TIAs following the VTA CMP *TIA Guidelines* will provide all information required for California Environmental Quality Act (CEQA) purposes. VTA encourages Member Agencies to include any other pertinent information not outlined in the VTA *TIA Guidelines* to identify environmental impacts.

Finally, VTA encourages the development of transit-friendly, pedestrian-friendly, and bicyclist-friendly land use projects. In particular, projects in Cores, Corridors or Station Areas as defined in the VTA Community Design and Transportation (CDT) Program *Manual of Best Practices for Integrating Transportation and Land Use* are encouraged to follow CDT Program best practices.

1.1 Background

The *TIA Guidelines* were originally included in Santa Clara County's 1991 Congestion Management Program (CMP). In 1993, the CMP technical documents, including the VTA *TIA Guidelines*, were published in a document titled *Technical Standards and Procedures for the Santa Clara County Congestion Management Program*. Since then, the VTA *TIA Guidelines* has been subsequently updated.

This document supersedes the 2009 *TIA Guidelines* and includes the following sections:

Part I: Statute and Authority
- Chapter 1. CMP Statute and Intent of VTA *TIA Guidelines*
- Chapter 2. TIA Scoping

Part II: Notification and Review
- Chapter 3. TIA Notification, Preparation and Review Process

` Part III: TIA Contents and Methodology
- Chapter 4. Recommended TIA Table of Contents
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- Chapter 6. Existing Conditions
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- Chapter 9. Project Conditions and Impacts/Effects
- Chapter 10. Mitigation Measures and Multimodal Improvements
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- Chapter 12. Special Project Types

1.2 Definition of Transportation Impact Analysis

Transportation Impact Analysis (TIA) is the term used for the study of the expected effects of development projects on transportation facilities. The TIA's purpose is to determine whether the transportation system can accommodate the activity generated by the proposed development project and if improvements are needed to the roadways, bicycle and pedestrian facilities, and transit services and facilities affected by the project. TIA Reports are also intended to assist in identifying improvements to minimize a development project's transportation impacts, which may include reducing the number of automobile trips the project generates. This documentation helps decision makers determine whether to approve the project and what conditions to impose on the project.

1.3 Legislative Requirement

California's CMP statute requires that all CMAs develop a uniform program for evaluating the transportation impacts of land use decisions on the designated CMP System. Specifically, CMP Statute requires:

> *A program to analyze the impacts of land use decisions made by local jurisdictions on the regional transportation systems, including an estimate of the costs associated with mitigating those impacts. [California Government Code: 65089 (b) (4).]*

The *TIA Guidelines* are designed to meet the requirement for a uniform land use impact analysis program in the CMP Statute.

In order to conform with the CMP, Member Agencies must follow the methodologies described in this document to evaluate the transportation impacts of development projects on the CMP System.

In addition, as part of the CMP Land Use Impact Analysis Program, all Member Agencies are required to forward a summary of land use changes and their transportation impacts to VTA on an annual basis. The purpose of collecting land use data on an annual basis is to ensure that development projects that do not meet the threshold for preparing a TIA are evaluated in the CMP process. This land use data will be incorporated into the countywide transportation model maintained by VTA and will be used to monitor conformance with the CMP. Please see the latest version of VTA's *CMP Annual Monitoring and Conformance Requirements*, for more information on land use monitoring.

1.4 CMP Transportation Impact Analysis Requirements

Member Agencies must follow the methodologies presented in this document to prepare TIAs for land use decisions that impact the CMP System. In order to conform with the CMP, Member Agencies must do the following:

1. Use the VTA *TIA Guidelines* to evaluate the transportation impacts of all land use decisions within the Member Agency's jurisdiction that are projected to generate 100 or more net new weekday (AM or PM peak hour) or weekend peak hour trips, including both inbound and outbound trips.

2. Submit a copy of the TIA Report to VTA at least 20 calendar days before the development decision or recommendation is scheduled by the Member Agency.

Section 2.1 contains further information about when a TIA must be completed. ***Sections 3.1***, ***3.2*** and ***3.3*** detail the responsibilities of the Member Agency and VTA in meeting the CMP TIA requirements.

1.5 Benefits of CMP Transportation Impact Analysis Guidelines

The most significant benefit of these Guidelines is that they promote the use of uniform procedures for performing TIAs and evaluating land use decisions on CMP facilities in Santa Clara County. The use of these common procedures helps ensure that the performance of the CMP transportation system is not adversely affected by land use decisions, and that opportunities to minimize impacts and improve the transportation system are identified. Moreover, the use of a common set of Guidelines allows each Member Agency to understand the impacts of development projects in other jurisdictions. Furthermore, it allows a Member Agency to request mitigation measures on its transportation facilities as a result of a project under development in another jurisdiction.

The use of a standard set of TIA guidelines is the first step in developing stronger linkages between transportation and land use planning, which is a goal of VTA.

1.6 Exemption Process

Portions of the *TIA Guidelines* described in this document may need to be modified for use in analyzing the impacts of a specific situation. The following process should be used in order to obtain approval for modifying the requirements of the Guidelines contained herein:

1. The Member Agency should contact VTA requesting modification of a specific *TIA Guidelines* requirement for a project.[1] The Member Agency should provide the reasons for the request(s). VTA staff will take action on the request if the request requires immediate action and is of a nature to not require action by VTA Committees.

2. If action cannot be taken by VTA staff, the VTA Technical Advisory Committee (TAC), with input from the Systems Operations & Management (SOM) and Land Use / Transportation Integration (LUTI) Working Groups, will review the request and recommend an action to the VTA Board.

3. The VTA Board will review the TAC's recommendation(s) and take action.

1.7 CMP Technical Standards and Procedures Amendment Process

The VTA *TIA Guidelines* are part of the *Technical Standards and Procedures for the Santa Clara County Congestion Management Program* (referred to throughout this document as the *Technical Standards and Procedures*). The most recent versions of the *Technical Standards and Procedures*, including the *TIA Guidelines*, are posted on the VTA website. The intent is to update the *Technical Standards and Procedures* on a regular basis by providing revisions where appropriate.

Technical Update Memos may be prepared periodically to address technical questions regarding standards and procedures as these questions are raised by Member Agencies. Technical Update Memos are divided into two categories, each having its own approval process, as described below:

1. Memos with New or Revised Requirements: These memos are to be prepared by VTA staff, reviewed by the SOM and LUTI Working Groups and TAC, and approved by the VTA Board.

2. Memos with Clarifications or Additional Information: These memos are to be prepared by VTA staff, and received by the SOM and LUTI Working Groups and TAC.

Once adopted or received, these technical update memos have precedence over or clarify previously adopted procedures. Technical update memos are to be posted on the VTA website and emailed to all members of the VTA TAC, SOM Working Group, and LUTI Working Group.

[1] Modifications to VTA *TIA Guidelines* regarding the following aspects of a project's analysis do not require CMP action: trip generation rates, trip distribution/assignment, and default values used in the Auto Level of Service analysis. However, these modifications should be clearly documented in the TIA. Documentation should include source and comparison with values or procedures specified in the VTA *TIA Guidelines*.

The VTA *TIA Guidelines* must be reviewed and revised on a regular basis to incorporate all technical update memos adopted since the last revision and to address new policy direction adopted by the VTA Board. With VTA Board approval the revised *TIA Guidelines* shall be distributed to Member Agencies for incorporation into the *Technical Standards and Procedures*.

1.8 Local Transportation Model Consistency

If travel demand forecasting models are used to evaluate transportation impacts of land use decisions, they must be consistent with the VTA Countywide Transportation Model. VTA has developed procedures for Member Agencies to use in developing consistent models. These procedures are described in the *Local Transportation Model Consistency Guidelines* of the *Technical Standards and Procedures*.

1.9 Document Conventions

Throughout this document, certain conventions are used, which are listed below. In addition to these document conventions, a Glossary with definitions of key terms is provided at the end of the document.

1. The acronym "TIA" is used throughout this document to indicate Transportation Impact Analysis.

2. Unless explicitly identified, all references to documents in these VTA *TIA Guidelines* shall mean the most recent version of the document published.

3. In this document, the word "should" is used to indicate a recommended action. The words "shall" or "must" are used to indicate required actions.

4. The word "facility" is used generally in this document to refer to CMP System roadway facilities, which include CMP intersections, freeways, and rural highways. CMP facilities also include the CMP Transit Network and the CMP Bicycle Network, but these are generally called out specifically in the text.

5. The agency responsible for preparing the TIA is referred to in this document as the "Lead Agency."

Chapter 2. TIA Scoping

This section provides direction on the scoping of TIA studies. The Lead Agency is responsible for scoping the TIA, with input from VTA and other agencies through the process described in ***Chapter 3.*** The description of TIA scoping focuses on three areas:

1. Determining when and if a TIA needs to be completed;
2. Determining roadway facilities to be included in the analysis;
3. Determining other transportation issues to assess.

2.1 When Must a TIA be Completed?

The **Trip Threshold** for when a TIA must be completed is the following:

> A complete TIA for CMP Purposes shall be performed for any project in Santa Clara County expected to generate 100 or more net new weekday (AM or PM peak hour) or weekend peak hour trips, including both inbound and outbound trips.

The following are points that expand or provide detail on the above statement:

1. **Net New Peak Hour Trip:** Net new peak hour trips are defined as those proposed project trips not associated with an existing development on the site and not included in an approved project. If the proposed project involves a vacant or underutilized site with development rights, the number of net new trips that count towards the Trip Threshold are the proposed project trips minus the trips originally associated with the prior development. If the proposed project involves a vacant or underutilized site without development rights, all project trips are considered net new trips and count towards the Trip Threshold. Discounting of trips from existing or entitled development on the project site is subject to Lead Agency discretion. The Lead Agency may always take a more conservative approach than the one outlined in this document. For further guidance on trips from vacant or underutilized development, refer to item 7, below and ***Section 7.2***.

2. **Pass-by and Diverted Linked Trips:** The number of pass-by and diverted linked trips of the proposed project shall not be used to reduce the number of new peak hour trips for determining whether a TIA is to be completed except for the following uses:
    - Gas stations;
    - Fast food restaurants; and
    - Stand-alone mini-markets.

    For these uses, if the pass-by trip reduction results in less than 100 net new weekday peak hour trips, a TIA is not required. However, an operational analysis of the adjacent CMP facilities should be conducted with input from VTA staff. This analysis should be submitted to VTA.

3. **Trip Reductions:** The application of trip reductions (as described in ***Chapter 8, Trip Generation and Auto Trip Reductions***) shall not be used to reduce the number of new peak hour trips for determining whether a TIA is to be completed.

4. **Special Events:** Special events that do not require issuance of a discretionary permit or environmental review do not require a TIA. For example, holding a one-day "Harvest Festival" in a downtown area would not require a TIA, while building a theater for use on an irregular basis would require a TIA.

5. **Addition to Existing Development Project:** A TIA must be completed for an addition to an existing development when the addition is projected to generate 100 or more net new AM or PM peak hour trips.

6. **Revision to Approved Unbuilt Development Project:** A TIA must be completed for an approved but unbuilt development that originally was not projected to generate 100 or more net new weekday peak hour trips, if the development is revised so that it is projected to generate 100 or more net new peak hour trips.

7. **Re-Occupancy of Vacant or Underutilized Development:** Generally, Member Agencies will not require a new TIA to be conducted for the re-occupancy of vacant or underutilized buildings or developments unless a discretionary permit is required from the jurisdiction. A vacant or underutilized building is generally understood to have development entitlement. Two situations are described below that note whether a TIA is required:

    a. **Same Land Use:** A new tenant on a site who is planning to use the site *for the same use (i.e., the land use designation for trip generation calculation purposes would not change)* may not need to conduct a new TIA. For example, if the tenant improvements necessary to re-occupy the site do not require discretionary permits, a TIA is not required by VTA (though a TIA may be required by the Member Agency). However, if the tenant improvements require a discretionary permit and the project produces net new trips that meet or exceed 100 during the peak hour, a TIA is required.

    b. **Change of Land Use:** A new tenant occupying a vacant development or building who is *changing the original use (and, therefore, the site's trip generation characteristics)* may need to conduct a new TIA. If the change of use requires a discretionary permit and the number of net new trips during a peak hour meets or exceeds 100, a TIA is required. If the new land use is expected to generate significantly different travel patterns from the previous use (e.g. conversion from employment to residential), based on engineering judgment, net new trips may be calculated without subtracting all trips associated with the prior development.

    See ***Section 7.2*** for analysis approach for projects involving vacant and underutilized developments.

8. **General Plan Amendment:** General Plan Amendments (GPAs) may be of several types depending upon the jurisdiction and the specific situation. If the GPA approval grants an entitlement to build a specific development project (or allows approval of a project in the future as a right, or through a ministerial act) then a TIA must be completed for the GPA. Conversely, if the GPA does not grant an entitlement, then no TIA is required until a specific project application is considered by the Lead Agency.

   A TIA is not required for a GPA when:
   a. The GPA grants no specific project entitlement;
   b. The GPA is prepared for a citywide plan; or
   c. The GPA is submitted with an entitlement for a specific project, but that project is not expected to generate 100 or more net new peak hour trips.

   As long as a transportation analysis is being completed, VTA recommends that the analysis be consistent with the *TIA Guidelines* to the extent possible. Please refer to ***Section 11.3, Long-Term General Planning Efforts***, for details.

9. **Special Project Types:** For further guidance on large or unique projects; projects on the jurisdiction border; multi-agency projects; projects generating large numbers of pedestrian, bicycle or transit trips; or large projects or plans involving more extensive transit delay analysis, see ***Chapter 12***.

10. **Conformance Exemptions:** Some types of projects and situations are statutorily exempt from conforming with the CMP Auto Level of Service (LOS) standard. If this is the case for the project under consideration, a TIA must still be completed, but the particular exemption should be identified in the TIA Report.

    The types of projects and situations exempted from the CMP Auto Level of Service standards are described in California Government Code Section 65089.44(b). For complete information on how these exemptions is to be addressed in a TIA, see the VTA *Traffic Level of Service Analysis Guidelines.*

    Although these projects or situations are exempt from the CMP Auto Level of Service standard, these exemptions do not apply to the CEQA process. For example, the effects of freeway ramp metering on Auto Level of Service are exempt from the CMP standards; however, the effects of freeway ramp metering should be reflected in evaluating impacts under CEQA to properly address mitigation.

2.2 Which Roadway Facilities Should be Included in a TIA?

The Lead Agency is responsible for determining which CMP roadway facilities should be included in a TIA. The remainder of this section describes procedures for determining inclusion of intersections, freeway segments and rural highway segments on the CMP roadway network in a TIA.

2.2.1 Intersections

A CMP intersection shall be included in a TIA if it meets any one of the following conditions:

1. The proposed development project is expected to add 10 or more peak hour vehicles per lane to any intersection movement;
2. The intersection is adjacent to the project;
3. Based on engineering judgment, Lead Agency staff determines that the intersection should be included in the analysis.

Study intersections should be selected without consideration for jurisdictional boundaries. The 10 or more vehicles per lane requirement applies to any intersection movement (left turn, through or right turn). If a movement uses a shared lane, the shared lane shall be considered a full lane for these calculation purposes. For example, 40 new left turns in two lanes (one left turn lane and one shared left-through lane) should be calculated as 20 vehicles per lane. It should be remembered that this calculation is only intended for determining inclusion of an intersection in a TIA. The allocation of new trips to travel lanes for operational analysis purposes could be quite different from this equal allocation of trips to the travel lanes.

2.2.2 Freeway Segments

A freeway segment shall be included in a TIA if it meets any one of the following conditions:

1. The proposed development project is expected to add traffic equal to or greater than one percent of the freeway segment's capacity. The TIA must provide a tabulation, as shown in ***Appendix A*** (*Table A-1: Sample of Freeway Analysis Requirement Determination*), to show that freeway segments have been assessed to determine if freeway analysis is required, even in the case where it is determined that no freeway segments meet the one percent threshold, or include text indicating that this assessment has been conducted;
2. The proposed development project is adjacent to one of the freeway segment's access or egress points;
3. Based on engineering judgment, Lead Agency staff determines that the freeway segment should be included in the analysis.

The freeway segments analyzed in a TIA shall correspond to the segments included in the latest VTA CMP Monitoring and Conformance Report, which also correspond to Caltrans segment definitions.

For calculating the amount of added traffic compared to freeway segment capacity, the capacities cited in *Highway Capacity Manual 2000 (HCM 2000)* shall be used (2,200 vphpl for four-lane freeway segments and 2,300 vphpl for six-lane or larger freeway segments). For five-lane freeway segments, 2,200 vphpl shall be used for the two-lane direction and 2,300 vphpl for the three-lane direction. Auxiliary lanes shall not be considered for the purpose of this calculation.

2.2.3 Rural Highway Segments

A rural highway segment shall be included in a TIA if it meets any one of the following conditions:

1. The proposed development project is expected to add traffic equal to or greater than one percent of the rural highway segment's capacity;
2. The rural highway segment is adjacent to the project;
3. Based on engineering judgment, Lead Agency staff determines that the rural highway segment should be included in the analysis.

For calculating the amount of added traffic based on rural highway segment capacity, the capacities cited in *HCM 2000* shall be used. For two-lane highways, the capacity shall be 1,700 vph for each direction of travel. For four-lane highways, the capacity shall be 2,200 vphpl. For special conditions, refer to Chapter 20 of *HCM 2000* for guidance.

2.2.4 Determining Other Transportation Issues to Address

In addition to an Auto Level of Service (LOS) analysis covering the facilities identified in ***Section 2.2***, the TIA shall include an analysis of auto trip reductions; transit, bicycle and pedestrian conditions; project access and circulation; and other issues identified in ***Chapters 6, 7, 8*** and ***9*** of these Guidelines. In addition, the TIA may also include an analysis of other issues as determined by the Lead Agency. These analyses are not required for CMP purposes but may be included in a TIA to address local requirements or CEQA, and may include:

- Adequacy of automobile parking supply compared to demand or local standards;
- Queuing on local (non-CMP) facilities;
- Existing Plus Project analysis scenario (see ***Chapter 4, Recommended TIA Table of Contents***).

The Lead Agency may require that additional scenarios be analyzed in the TIA. For example, unfunded transportation facility improvements may be evaluated as part of an additional scenario. Phased projects may also require additional scenarios.

PART II – NOTIFICATION AND REVIEW

Chapter 3. TIA Notification, Preparation and Review Process

This chapter outlines the process for notifications regarding TIAs, the preparation of TIAs, and review of TIAs. The chapter begins with an overview of the process including a step-by-step summary and figure. This chapter also defines the roles of the Lead Agency and VTA by listing the key responsibilities of each in preparing or reviewing TIAs.

3.1 Overview of Process

The following is an outline of the key steps in the TIA Notification, Preparation and Review Process. These steps are shown in ***Figure 1***. Note that the term "Lead Agency" in this context refers to the agency responsible for preparing the TIA.

1. **Lead Agency Submits TIA Notification Form:** Lead Agencies are required to send notification that a TIA is being started to VTA, as well as to designated contacts for cities, towns, the County, and Caltrans as appropriate. The purpose of this notification is to inform interested agencies of the study and to allow them to comment on the scope of the analysis.

   A sample of the **TIA Notification Form** is provided in ***Appendix B***. A PDF version that may be electronically filled out will be posted on the VTA website. VTA is in the process of developing a web-based TIA Notification Form, which will be linked from the VTA website when available. The Lead Agency is encouraged to submit the draft work scope of the TIA along with the TIA Notification Form. Lead Agencies are encouraged to submit TIA Notification Forms and work scopes electronically rather than in hardcopy format wherever possible.

   Comments from interested agencies on the TIA scoping must be received by the Lead Agency ***within 15 calendar days*** of notification mailing.

2. **Lead Agency Submits TIA with Hearing Date:** Upon completion of the study and ***at least 20 calendar days before*** the project is considered for approval (e.g., City Council or Board of Supervisors hearing) or is "recommended for approval" (e.g., Planning Commission meeting), the Lead Agency is required to submit the TIA Report to VTA, as well as to designated contacts for cities, towns, the County, and Caltrans as appropriate.

   With the TIA submittal, the Lead Agency should indicate the expected hearing date for project approval or recommendation. Lead Agencies are encouraged to submit TIA Reports electronically (via an email with an attachment, or a link to the TIA location online) rather than in hardcopy format wherever possible. A draft version of the TIA may

also be submitted earlier in the process for preliminary feedback from VTA and other agencies.

VTA may grant exceptions to this submittal time frame. The Lead Agency must request the exemption to the submittal date ***at least 25 calendar days prior*** to the appropriate hearing dates.

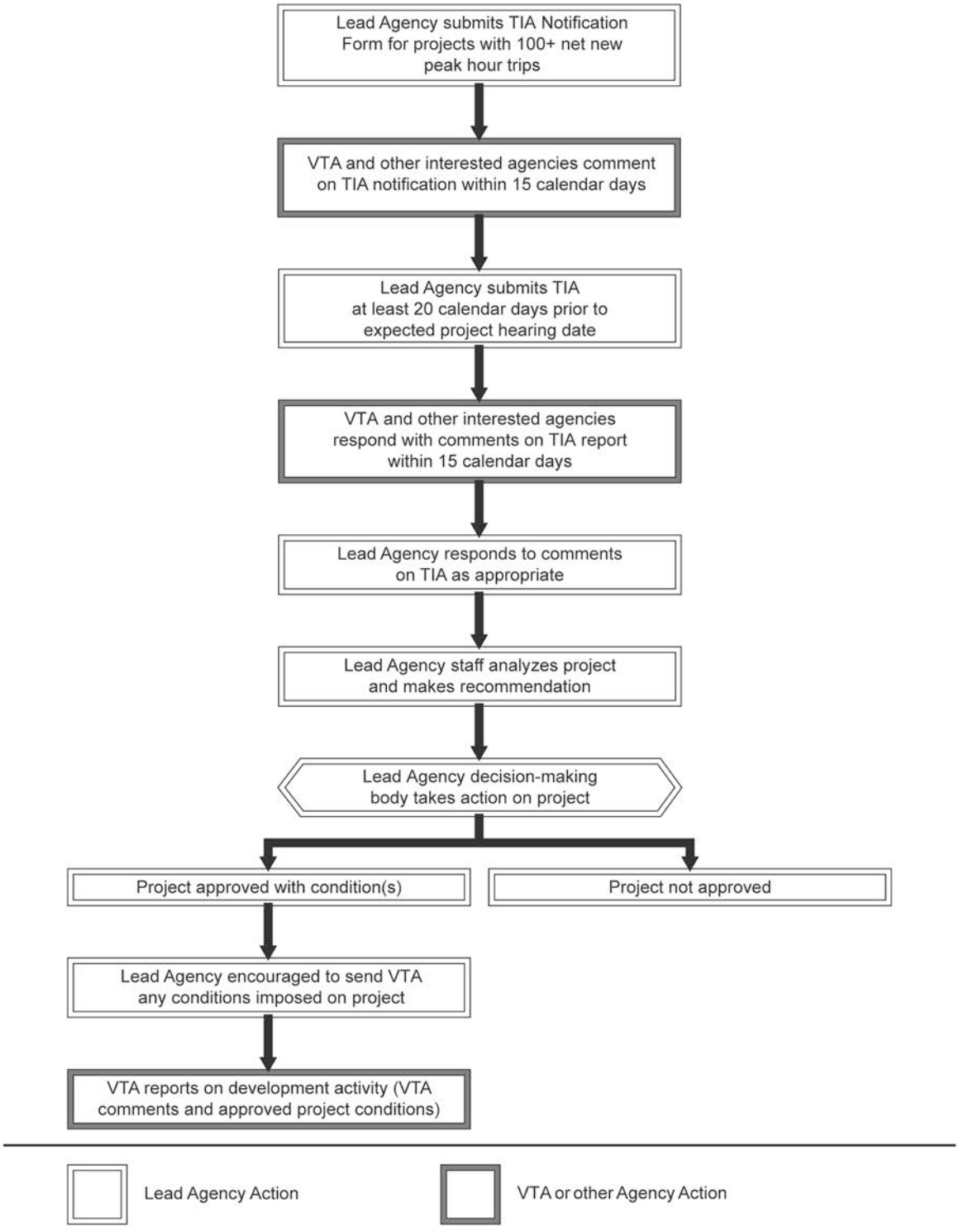
The deadline and process for TIA submittal are intended to apply to cases where the TIA is not submitted with an environmental document. When a TIA is submitted along with an environmental document following CEQA guidelines, the time frame provided by the CEQA process is considered to be sufficient.

3. **VTA and Other Agencies Respond**: VTA will review the TIA for consistency with CMP standards and with VTA's *CDT Manual*. VTA will forward a response to the Lead Agency staff prior to action by the Planning Commission and/or City Council with copies sent to the jurisdiction's members on the VTA Technical Advisory Committee (TAC), Policy Advisory Committee (PAC) and TAC Working Groups, as appropriate. Other interested agencies may offer suggestions for the Lead Agency at this point as well. Comments from interested agencies on the TIA Report must be received by the Lead Agency ***within 15 calendar days*** of the TIA mailing.

   The deadline and process for agency comments on TIAs are intended to apply to cases where the TIA is not submitted with an environmental document. When a TIA is submitted along with an environmental document following CEQA guidelines, the time frame provided by the CEQA process is considered to be sufficient.

4. **Lead Agency Addresses Comments**: Upon receiving comments on the draft TIA Report from VTA or other agencies, the Lead Agency should address these comments. If an EIR is being prepared for the project, the Lead Agency shall respond in writing to comments on the TIA and transportation analysis if they are received through the CEQA comment process, pursuant to the requirements of CEQA. If an EIR is not being prepared, the Lead Agency should contact the agency that submitted comments to discuss them. For comments that address the compliance of the TIA with CMP requirements, the Lead Agency shall submit a written response to VTA and other agencies as appropriate. The response may take the form of a revised TIA, supplemental memo, or email clarification, as appropriate. For other comments not related to CMP compliance, the Lead Agency is encouraged to respond to VTA and other agencies.

Figure 1: TIA Notification and Review Process



5. **Lead Agency Decision and Project Conditions**: The Lead Agency staff analyzes the project and makes recommendations to the appropriate decision-making body (Planning Commission, City Council and/or County Board of Supervisors). The decision-making body takes action on the project. If the decision-making body rejects the project, no further action by the Lead Agency is required. If the project is modified substantially so that a new TIA is required, the Lead Agency must complete the TIA process again, beginning with TIA notification. If the project is approved, the Lead Agency is encouraged to send text of the relevant adopted conditions relating to the CMP Transportation System and the promotion of alternative transportation modes to VTA.

6. **VTA Reports on Development Activity**: VTA will prepare regular reports summarizing relevant VTA comments on projects reviewed by VTA, and relevant conditions on projects approved by Member Agencies that improve CMP facilities, relate to alternative transportation modes, and/or meet other goals such as those related to VTA's CDT Program. The report is typically presented on a quarterly basis to the VTA Board, the Congestion Management Program and Planning (CMPP) Committee, and the Technical, Citizen, Bicycle and Pedestrian, and Policy Advisory Committees (TAC, CAC, BPAC and PAC), and TAC Working Groups. VTA will also report on Member Agency compliance with CMP requirements though the CMP Monitoring and Conformance Program.

3.2 Key Lead Agency Responsibilities

1. The agency that is responsible for certifying the project's CEQA environmental document shall be responsible for performing the TIA.

2. The Lead Agency is responsible for notifying all appropriate jurisdictions that a TIA is being prepared by submitting a **TIA Notification Form** to all appropriate jurisdictions.

3. The Lead Agency is responsible for providing direction on the TIA study scope including:

    a. Determining roadway facilities to be included in analysis (following the procedure set forth in ***Section 2.2*** in these Guidelines);
    b. Defining analysis scenarios (following the procedures outlined in ***Chapters 4*** and ***5*** of these Guidelines);
    c. Determining the proper analysis method to use in a study when more than one approach is possible.

4. The Lead Agency is responsible for preparing and submitting the TIA Report that meets all the requirements included in these Guidelines to VTA within the time frame outlined in ***Section 3.1*** of these Guidelines.

5. The Lead Agency is responsible for addressing comments on the draft TIA Report as described in ***Section 3.1.***The Lead Agency is encouraged to consult with VTA in preparing any Conditions of Approval that relate to improving CMP facilities and promoting alternative transportation modes.

6. After project approval, the Lead Agency is encouraged to send to VTA any adopted Conditions of Approval that relate to improving CMP facilities and promoting alternative transportation modes.

3.3 VTA Review for Conformance

VTA shall review TIA Reports for consistency with the *TIA Guidelines*. This review shall not constitute approval or disapproval of the project that is the subject of the report. VTA does not have the authority to approve or reject projects; that decision rests with the Lead Agency. However, VTA may provide comments to the Lead Agency on the TIA Report based on staff review. When appropriate, Lead Agency staff should discuss these comments with the preparer of the TIA Report to insure that future TIAs comply with CMP requirements. VTA will monitor the final project TIA Reports to ensure that they are consistent with CMP standards.

VTA will prepare regular reports of projects that were approved through the TIA process. These reports will summarize adopted conditions that improve CMP facilities and relate to alternative transportation modes, and will be presented to the VTA Board and its committees as described earlier in this chapter.

PART III – TIA CONTENTS AND METHODOLOGY

Chapter 4. Recommended TIA Table of Contents

This chapter presents a recommended outline and organization of a TIA. For more detailed guidelines, the chapter is noted where the guidelines are further discussed.

1. **Executive Summary**

The executive summary should summarize major findings from the TIA. At a minimum, topics covered should include:

- Project Description;
- Existing Conditions;
- Brief summary of project trip generation and auto trip reductions, including Auto Trip Reduction Statement – *See **Appendix C**;*
- Project impacts/effects and proposed mitigation measures/improvements.

2. **Project Description, Study Area and Analysis Parameters**

This section should provide a description of the project, the transportation context surrounding it and the parameters of the transportation analysis. Topics covered should include:

- Location of Proposed Project;
- Proposed Land Use and Project Size;
- Site Plan, indicating buildings, vehicular access, and pedestrian and bicycle accommodations – *See **Section 9.4, Project Access and Circulation**;*
- Study Intersections and Freeway Segments – *See **Chapters 2*** and ***5**;*
- Analysis Periods and Methodologies – *See **Chapter 5;***
- Analysis Scenarios – *See **this chapter*** and ***Chapter 11, Future Year Scenarios (Cumulative Conditions)***.

3. **Existing Conditions**

This study scenario shall evaluate existing conditions. Topics in this section should include:

- Roadway Network;
- Existing Transit System;
- Existing Bicycle and Pedestrian Facilities and TDM Programs;
- Existing Volumes and Lane Configurations;
- Existing Intersection Auto Level of Service;
- Existing Freeway Segment Auto Level of Service;
- Field Observations.

See ***Chapter 6*** for more information on what is required in the existing conditions section.

4. **Trip Generation and Auto Trip Reductions**

This section shall document the methods used in the TIA for estimating trip generation associated with a project, approaches for reducing automobile trips to and from the project and documenting these reductions in a TIA Report, and assumptions about how trips are distributed throughout the transportation network.

Topics covered in this section should include:

- Trip Generation;
- Auto Trip Reductions and Transportation Demand Management;
- Trip Distribution and Assignment;
- Pass-by Trips and Diverted Linked Trips.

See ***Chapter 8*** for more information on these topics.

5. ***Optional:*** **Existing Plus Project Conditions**

This study scenario typically evaluates the addition of the project, along with estimated project-generated trips, to the existing conditions. This section typically identifies project impacts on the surrounding transportation network, including an analysis of roadways, freeway segments, and queuing. For any impacts identified, mitigation measures are typically developed based on the results of this study scenario. If mitigation measures are proposed, then an analysis with the mitigations measures is typically conducted.

Note: *This scenario is not required for CMP purposes but may be included in a TIA to address local requirements or CEQA. However, Existing + Project freeway analysis is required for CMP purposes for all projects meeting freeway analysis requirement conditions. Please refer to* ***Section 2.2.2*** *regarding analysis conditions and* ***Section 5.2.8*** *regarding analysis methods.*

6. **Background Conditions (Existing + Approved Projects)**

This study scenario shall evaluate background conditions, based on the sum of existing trips and trips from approved developments in the area, along with any changes to roadways and intersections associated with approved development or other funded changes to the transportation network.

Topics covered in this section should include:

- Approved Development Projects;
- Secured Roadway/Intersection Improvements;
- Background Intersection Analysis and Auto LOS.

See ***Chapter 7*** for more information on how to conduct the Background Conditions analysis.

7. **Background Plus Project Conditions (Existing + Approved Projects + Project)**

This study scenario shall evaluate the addition of the project, along with estimated project-generated trips, to the background conditions. This section shall identify project impacts on the surrounding transportation network, including an analysis of roadways

and queuing. The Lead Agency is encouraged, but not required, to include an analysis of freeway segments under Background Plus Project Conditions. For any impacts identified, mitigation measures shall be developed based on the results of this study scenario. If mitigation measures are proposed, then an analysis with the mitigations measures shall be conducted.

See ***Chapter 9*** for more information on how to conduct the Project Conditions analysis.

8. **Multimodal Evaluation, Site Access and Circulation**

This section shall include an analysis of transit, bicycle and pedestrian modes under Plus Project Conditions (Existing, Background and/or Cumulative conditions with the addition of the project), if not included elsewhere in the TIA. In addition, this section shall include an analysis of project access and circulation.

See ***Chapter 9*** for more information on how to conduct this analysis.

9. **Future Year (Cumulative) Conditions**

This study scenario shall evaluate the addition of the project, along with estimated project-generated trips, to longer term conditions than those described under Background Plus Project conditions. In general, the Cumulative Conditions scenario is analyzed as the combination of Background Conditions (Existing Conditions + Approved Projects) + Expected Growth + Project. This section shall identify project impacts on the surrounding transportation network. For any impacts identified, mitigation measures shall be developed based on the results of this study scenario. The parameters of the Cumulative Conditions scenario should be clearly defined in the TIA. Cumulative scenarios can be near- or long-term, as follows:

- **Near-Term Cumulative Conditions**: This scenario is a near-term cumulative analysis scenario to be provided for each jurisdiction's planning and information purposes. The analysis shall include expected growth until the project is expected to be available for final occupancy;
- **Alternate Cumulative Conditions Analysis** - The Lead Agency may substitute an alternate Cumulative Conditions analysis for the near-term Cumulative Conditions analysis described above. For example, the long-term Cumulative Conditions analysis conducted as part of an environmental analysis may be provided in place of the near-term Cumulative Conditions analysis.

See ***Chapter 11*** for more information on Cumulative Scenario analysis**.**

Chapter 5. Analysis Periods and Methodologies

This section describes the typical analysis parameters to be included in the TIA. The Lead Agency shall be responsible for defining the analysis periods and documenting the analysis methodologies in the TIA.

5.1 Analysis Period

The TIA shall include, at a minimum, an analysis of transportation conditions in the peak hours for which the project generates 100 or more net new trips. In other words:

- If the project is expected to generate 100 or more net new weekday trips during both the AM and PM peak hours, then both weekday peak hours must be analyzed;
- If the project is expected to generate 100 or more net new weekday AM peak-hour trips but less than 100 new weekday PM peak hour trips, then only the AM peak hour must be analyzed;
- If the project is expected to generate 100 or more net new weekday PM peak hour trips but less than 100 new weekday AM peak hour trips, only the PM peak hour must be analyzed.

The TIA Report must document the project's trip generation for both the weekday AM and PM peak periods to justify the peak period(s) analyzed in the TIA.

The Lead Agency may require that additional periods be analyzed, based on engineering judgment. For example, additional analysis of midday or weekend peak periods may be required.

5.2 Analysis Methodologies

This section describes analysis method requirements for the various types of CMP roadway facilities: arterials, intersections, freeways, and rural highways. This section also describes analysis methodologies for non-vehicular facilities, i.e. bicycle, pedestrian and transit facilities. Much of this information is also described in the VTA *Traffic Level of Service Analysis Guidelines*. This section also includes discussion about the use of the VTA travel demand forecast model and other local models.

A more detailed description of analysis requirements and thresholds for determination of Auto Level of Service (LOS) impacts are provided in ***Chapter 9, Project Conditions and Impacts/Effects***.

5.2.1 Urban Arterials

The analysis of CMP urban arterials, including County Expressways, is accomplished by evaluating designated intersections along the arterials. The analysis of these intersections is to be conducted following the guidelines and the default values for CMP intersection analysis in the latest Board-adopted VTA *Traffic Level of Service Analysis Guidelines*. Thresholds for determination of an impact are described in ***Chapter 9***.

When conducting Auto LOS analysis on County Expressway and/or Caltrans intersections, the Lead Agency should consult with County and/or Caltrans staff to determine the appropriate actual signal timing information for the analysis. Lead Agencies are also encouraged to obtain appropriate actual signal timing information for local intersections with traffic-adaptive signal timing.

In certain situations, more detailed analysis may be needed than what can be provided using isolated intersection analysis software. In these cases, such as on corridors with coordinated or adaptive signal control, the Lead Agency may choose to conduct additional analysis using other software programs, such as microsimulation software for operational analysis, when appropriate.

5.2.2 Rural Highways

The analysis of rural highways shall be based on the methodology described in latest Board-adopted VTA *Traffic Level of Service Analysis Guidelines.* The analysis is primarily segment-based, but in some cases, it may also be appropriate to evaluate adjacent rural highway intersections, as discussed in the VTA *Traffic Level of Service Analysis Guidelines*.

5.2.3 High Occupancy Vehicle Lanes

In cases where roadways with High Occupancy Vehicle (HOV) lanes are analyzed and project trips are assigned to the HOV facility, HOV lane usage and impacts must be evaluated. The following applies to the evaluation of an HOV lane:

- Assignment of trips to an HOV lane shall be described and justified in the TIA Report;
- Operational analysis of an HOV lane (including analysis of impacts) shall be documented in the TIA Report;
- Auto Level of Service (LOS) analysis for an HOV lane should be performed according to VTA *Traffic Level of Service Analysis Guidelines*;
- Caltrans recommends maintaining LOS C operations on HOV facilities, which occurs at approximately 1,650 vphpl;[2]
- For County Expressway HOV lane capacity, the Lead Agency should consult with County staff to determine the saturation flow rate as it varies depending on the Expressway segment.

Refer to the latest CMP *Monitoring and Conformance Report* for existing performance data for freeway HOV lane segments. Consult with County staff for the latest Expressway HOV lane volumes, including volumes at Expressway intersections.

[2] "The occupancy requirements for HOV facilities should be based on the following considerations: … C. Maintaining a free flow condition, preferably LOS-C… For buffered or contiguous HOV facilities, Caltrans considers LOS-C occurs at approximately 1,650 vehicles per hour, less if there is significant bus volume or if there are physical constraints." Caltrans, *High-Occupancy Vehicle Guidelines*, 2003 Edition, Section 2.5.

5.2.4 Express Lanes

In cases where roadways with Express Lanes are analyzed and project trips are assigned to the Express Lane facility, Express Lane usage and impacts must be evaluated. The following applies to the evaluation of an Express Lane:

- Assignment of trips: Lead Agency shall consult with VTA, and assignment shall be described and justified in the TIA Report;
- Operational analysis of an Express Lane (including analysis of impacts) shall be documented in the TIA Report;
- Auto LOS analysis for an Express Lane should use the following saturation flow rates: 1,650 vehicles per hour per lane (vphpl).[3]

The CMP *Monitoring and Conformance Report* includes performance data for freeway Express Lane segments.

5.2.5 Bicycle

A Quality of Service (QOS)-based methodology, such the one in the *Highway Capacity Manual 2010* (Chapters 16 – 18) or a similar methodology,[4] is encouraged for analysis of bicycle conditions. Bicycle QOS methodologies typically measure features of the physical environment that affect the comfort and safety of bicyclists from the user's perspective, such as the presence of dedicated bicycle facilities (lanes, paths, etc.), intersection delay and exposure to automobile traffic. The TIA should include a description of the methodology being used as part of the analysis. See ***Section 9.3*** for more information on bicycle analysis requirements.

5.2.6 Pedestrian

A Quality of Service (QOS)-based methodology, such the one in the *Highway Capacity Manual 2010* (Chapters 16 – 18) or a similar methodology,[5] is encouraged for analysis of pedestrian conditions. Pedestrian QOS methodologies typically measure features of the physical environment that affect comfort and safety for pedestrians from the user's perspective, such as lateral separation from traffic, crossing distance and delay, and presence of landscaped buffer or trees. The TIA should include a description of the methodology being used as part of the analysis. See ***Section 9.3*** for more information on pedestrian analysis requirements.

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[3] For Express Lanes, which function to provide a time savings over non-tolled lanes, the relevant performance measure is the maintenance of LOS C operations. Per Caltrans Guidelines (see footnote 2), this occurs at approximately 1,650 vphpl.

[4] Alternative QOS methodologies, including City of San Francisco's Bicycle Environmental Quality Index, are described in ***Appendix G.***

[5] Alternative QOS methodologies, including City of San Francisco's Pedestrian Environmental Quality Index, are described in ***Appendix G.***

5.2.7 Transit

The transit analysis shall consider the effects of the project on transit delay and transit access and facilities. See ***Section 9.2*** for more information on transit analysis requirements.

5.2.8 Freeway Segments

The analysis of freeway segments is to be conducted following the guidelines in the latest Board-adopted VTA *Traffic Level of Service Analysis Guidelines*. One criterion for assessing the impact of a development project on freeways is Auto Level of Service (LOS). As in the CMP Monitoring and Conformance Program, density is the parameter for determining Auto LOS for freeway segments in TIAs in Santa Clara County. The relationship between density, speed and flow rate (or traffic volume) is described as follows:

$$d = \frac{V}{N \times S} \qquad \text{(Eqn. 1)}$$

where: d = density (vehicles per mile per lane, vpmpl)
V = peak hour volume (vehicles per hour, vph)
N = number of travel lanes (lanes)
S = average travel speed (miles per hour, mph)

A table of Freeway Auto LOS criteria based on density ranges is provided in the *Traffic Level of Service Analysis Guidelines.* For Existing Conditions, the number of lanes as well as performance data for freeway segments in Santa Clara County are included in the most recent CMP *Monitoring and Conformance Report* produced by VTA.

For the analysis of project conditions, the volume (V) used in the density calculation (Equation 1) is:

$$V = V_o + V_p \qquad \text{(Eqn. 2)}$$

where: V_o = existing peak hour volume (vph)
V_p = peak hour project trips distributed on the freeway segment (vph)

The Lead Agency is encouraged, but not required, to include an analysis of freeway segments under Background Plus Project Conditions and Cumulative Conditions. The TIA should include a description of the methodology being used to forecast future traffic volumes on freeways, which could include use of a transportation model.

The TIA shall include freeway analysis table(s) identifying whether the project would have an impact on the freeway system. Tables for the freeway analysis determination and impact analysis should include detailed data such as project trips, density and speed. Sample tables are shown in ***Appendix A*** (*Table A-1: Sample of Freeway Analysis Requirement Determination* and *Table A-2: Sample of Freeway Analysis Summary*).

5.3 Use of Transportation Models

Travel demand forecasting models may be used for long-term analysis of development projects, planning efforts or transportation facilities. The use of a forecasting model for a buildout scenario should only be used for a period of at least five years from the preparation of a TIA Notification Form. If the project were to be built entirely within five years, the "near-term" development approach discussed in ***Section 11.1.1 , Opening Year/Short-Term Analysis***, shall be used.

The long-term analysis may include the use of either the countywide transportation model or local transportation models as described below:

1. **Countywide Transportation Model:** The countywide transportation model developed and maintained by VTA may be used for transportation impact analyses. Use of this model may be appropriate for the long-term analyses of large projects and general planning efforts. The cost for this modeling may be borne by the Lead Agency on the work effort.

2. **Local Transportation Models**: In some cases, local sub-area transportation models are appropriate. Under the CMA statutes, VTA must approve any local sub-area transportation models used for TIAs. VTA has adopted guidelines for developing local land use transportation impact models that are designed to ensure that local models are consistent with the countywide model. These guidelines are documented in the *Local Transportation Model Consistency Guidelines* in the *Technical Standards and Procedures.*

Chapter 6. Existing Conditions

The TIA Report shall include a description of the existing transportation system in the area affected by the project. The project area transportation system shall include all CMP system facilities affected by the project (see ***Section 2.2, Which Roadway Facilities Should be Included in a TIA?***). The following section details the items that should be included in the description of roadways, transit, bicycle and pedestrian facilities, and other transportation elements.

6.1 Counts and Data Collection

Field data, including counts and field observations, will be needed in order to accurately assess existing conditions. The following are key points regarding data collection for TIA completion:

1. **Data for Existing Study Scenario Analysis:** Freeway and intersection data collected as part of VTA's CMP Monitoring and Conformance Program are available for use in all TIAs. When possible, these data from VTA shall be used in the TIA.

2. **Additional Data**: In some cases, additional data will need to be collected for a different time period or to more accurately reflect existing travel that differs from the most recent CMP Monitoring data. The study should not use traffic volume data more than two years old. The use of growth factors should be considered if the traffic volume data is older than one year. Other data collected as required by the Lead Agency shall be provided to VTA (as part of the TIA Report) so that VTA's database may be updated. Submittal of data electronically (i.e., in files that can be used with traffic analysis software) is encouraged, where feasible.

3. **Bicycle and Pedestrian Data:** The collection of pedestrian and bicycle counts is encouraged whenever new traffic volume counts are conducted.

4. **Field Data Collection Methodology:** Field data should be collected using procedures outlined in the most recent version of the Institute of Transportation Engineers (ITE) *Manual of Transportation Engineering Studies*, or in the most recent version of the Transportation Research Board's *Highway Capacity Manual*.

5. **Field Observations:** Field observations of traffic conditions, access points, intersection geometries, traffic signal operations, pedestrian and bicycle accommodations, transit facilities and access, and adjacent land uses should be conducted in the study area for the proposed project. The Lead Agency may also request additional information from the field. Field observations should be noted and may be used to refine or revise Auto Level of Service (LOS) calculations when there are discrepancies in the observed and calculated Auto LOS.

6.2 Description of Existing Roadways

The following information shall be provided for the project area's CMP Roadway System:

a. Local/arterial roadway, County Expressway, and freeway network description and map; all County Expressway and freeway descriptions must include a description of High Occupancy Vehicle (HOV) facilities (including HOV lanes and ramp metering bypasses) and Express Lane facilities;
b. Intersection geometry, traffic controls, and traffic signal timing parameters;
c. Recent turning movement counts (*see* ***Section 6.1, Counts and Data Collection***);
d. Existing Auto Level of Service (LOS) evaluated using VTA-approved Auto LOS methodology and standard values (see ***Chapter 5, Analysis Periods and Methodologies***). In most cases, the existing Auto LOS should be those presented in the latest CMP *Monitoring and Conformance Report.* However, counts may need to be taken to reflect a change in travel patterns since the last monitoring cycle;
e. Existing locations of congested traffic conditions (as identified with assistance of Lead Agency staff and field observations). This information includes description of queues extending into the upstream intersection(s), queue "spill-back" in turn lanes, effects of ramp metering, and duration of congestion;
f. Funded and planned roadway improvements.

It may be necessary to provide field measurements of delay and queuing to accurately reflect existing conditions. Field measurements could account for situations where the congestion is more than that represented by the calculated Auto LOS. Additional information gathered from field observations may also be included in the TIA.

6.3 Description of Existing Transit System

The following information shall be provided for the project area's transit system (the project area transit system shall be defined as transit routes within 2,000 feet of the project boundaries):

a. Transit route description and map;
b. Transit station/stop locations;
c. Site access to major regional transit providers (BART, Caltrain, etc.);
d. Transit hours of operation and headway information;
e. Public or private shuttle services provided in the project area;
f. Location of park-and-ride lots in project area;
g. Planned transit facilities within the project area; determination of planned transit facilities or services should occur in consultation with VTA and other operators, as appropriate.

6.4 Description of Existing Bicycle and Pedestrian Facilities and TDM Programs

The following information shall be provided for the bicycle facilities within the project area:

a. Existing bicycle paths, lanes, and routes as well as bicycle/pedestrian over and under crossings;

b. Future planned or programmed bicycle improvements including, but not limited to, those facilities, routes, and programs in the Lead Agency's adopted Bicycle Plan, Pedestrian Plan, Trails Master Plan, and/or bicycle/circulation element of their General Plan, and in other agencies' plans (e.g., adjacent cities' Bicycle Plans or Pedestrian Plans, cross-county bicycle corridors in the VTA *Santa Clara Countywide Bicycle Plan*, Bay Trail Plan);
c. A basic characterization of existing bicycling conditions in terms of safety, ease of access to the project site, and Quality of Service indicators, emphasizing gaps and deficiencies in the bicycle network near the site (e.g., missing bicycle lanes, narrow outside lanes);
d. Map showing existing bicycle facilities within 2,500 feet of the project boundaries. This map should indicate bicycle paths, lanes, and routes as well as bicycle/pedestrian over and under crossings;
e. The description and map of existing bicycle conditions should focus on the project street frontages and paths to major attractors such as transit facilities, schools, shops and services, and major residential developments.

The following information shall be provided for the project area's pedestrian facilities:

a. Existing pedestrian facilities in project area including sidewalks, crosswalks and other crossing control devices (e.g. beacons, refuge islands, etc.), and other non-motorized connections and paths in project area;
b. Future planned or programmed pedestrian improvements including, but not limited to, those facilities, improvements, and programs in Member Agencies' pedestrian elements and plans;
c. A basic characterization of existing walking conditions in terms of safety and Quality of Service indicators such as tree barriers, landscape buffers, and sidewalk width,-emphasizing gaps and deficiencies in the pedestrian network near the site (e.g., missing crosswalks, missing pedestrian signal heads/phases, inadequate Americans with Disabilities Act (ADA) accommodations);
d. Map showing existing pedestrian facilities within 1,000 feet of the project boundaries. This map should indicate sidewalks (showing each side of a street), sidewalk gaps, crosswalks, other crossing control devices (e.g., beacons, refuge islands, etc.), and bicycle/pedestrian over and under crossings;
e. The description and map of existing pedestrian conditions should focus on the project street frontages and paths to major attractors such as transit facilities, schools, shops and services, and major residential developments.

When applicable, the following information shall be provided on Transportation Demand Management (TDM) or unique transportation or land use plans affecting the project area:

a. TDM ordinances in effect for the project site (reference to ordinance and key aspects affecting project is sufficient);
b. TDM programs at an existing facility, in the case of a project that is an expansion or a relocation from a nearby facility.
c. Other transportation plans or land use plans unique to the project area;

Chapter 7. Background Conditions

This study scenario shall evaluate Background Conditions, based on the sum of existing trips and trips from approved developments in the area, along with any changes to roadways and intersections associated with approved development or other funded changes to the transportation network.

The following sections present additional information on estimated trips from approved development projects, appropriate transportation facility improvements to include in the analysis, and other considerations.

7.1 Approved Development Projects

Approved projects include not yet completed or occupied projects that have undergone an approval process (i.e., been granted a land use entitlement). Approved projects may be projects within the Lead Agency's jurisdiction or a neighboring jurisdiction. Local jurisdictions are encouraged to maintain an inventory of “approved trips.” This inventory would include anticipated intersection turning movement volumes from approved projects. This information is useful in ensuring consistency among TIAs in the analysis of Background and Cumulative Conditions.

7.2 Vacant or Underutilized Buildings

If the proposed project involves a vacant or underutilized site with development rights, the number of trips originally associated with that development may be included in the Background Conditions. The background trips associated with the vacant or underutilized development should be estimated from driveway counts or trip generation rates, size, and land use type of the existing site. The "project trips" would be the additional trips generated by the redevelopment and/or re-occupancy of the site, i.e., the total number of trips generated by the proposed project minus the estimated background trips of the vacant or underutilized development. If the proposed project involves a vacant or underutilized site without development rights, all trips generated by the proposed project would be "project trips." The Lead Agency always has the discretion to consider trips associated with prior development rights to be project trips, rather than background trips.

7.3 Addition to Existing Development Project

If the proposed project involves the addition of a new use or expansion of an existing use at the site of an existing development, the number of trips originally associated with that site would be included in the Background Conditions. The background trips associated with the existing development should be estimated from driveway counts or trip generation rates, size, and land use type of the existing site. The "project trips" would be the additional trips generated by the addition or expansion project.

7.4 Transportation Facility Improvements

The transportation network for Background Conditions shall include all funded transportation facility improvements expected to be completed within one year of the proposed development project's completion. With VTA approval, a Lead Agency may request inclusion of other funded improvements or other developer-conditioned improvements.

7.5 Background Auto Level of Service Analysis

Transportation system operations for Background Conditions should be analyzed in a manner consistent with the analysis presented under Existing Conditions and following the methodology in ***Chapter 5, Analysis Periods and Methodologies***.

Chapter 8. Trip Generation and Auto Trip Reductions

This chapter describes methods for estimating trip generation associated with a project; approaches for reducing automobile trips to and from the project and for documenting these reductions in a TIA Report; and assumptions about how trips are distributed throughout the transportation network.

8.1 Trip Generation

The TIA should clearly identify the source of each trip generation rate used in the transportation analysis.

8.1.1 Sources and Methodologies

The Lead Agency may use trip generation rates from the most recent version of the Institute of Transportation Engineers' (ITE's) *Trip Generation Manual*, rates developed from local data, or rates developed using alternative trip generation methodologies.

For the most common land uses, numerous studies have been used in developing the ITE trip generation rates. In some cases, however, the published ITE trip generation rates are based on very limited data. There are at least four cases in which the Lead Agency should consider using alternative sources for trip generation rates:

- When ***ITE data is insufficient*** (e.g. small sample size, not statistically valid);
- When a project's ***specific land use*** is not covered by the ITE manual or is known to show trip generation characteristics that differ from the categories covered in the ITE manual;
- When the ***land use context***, such as high-density infill or development adjacent to transit, is not addressed by the ITE manual;
- When the project includes a mix of land uses (***mixed-use development*** type).

Lead Agencies may also develop trip generation rates based on local data specifically for use in the transportation impact analysis. If custom trip generation rates are developed, techniques in the ITE's *Manual of Transportation Engineering Studies* should be used. The local data used to develop a custom rate should either be included in the TIA or made readily available by the Lead Agency.

Trip generation rates from other methodologies may be used instead of ITE rates, where defensible and appropriate. Alternative methodologies include:

- SANDAG Traffic Generation Manual & Trip Generation for Smart Growth;
- City of San José Trip Generation Rates;
- MXD Model/SANDAG Model – US EPA;
- NCHRP 8-51 – Enhancing Internal Trip Capture Rate for Mixed-Use Development;
- Station Area Resident Survey – MTC;
- California Smart Growth Trip Generation Tool – Caltrans/UC Davis;
- Travel demand forecasting models;
- California Emissions Estimator Model (CalEEMod)[6]

Additional information on the research and professional practice basis of alternative trip generation methodologies can be found in ***Appendix D***.

Professional judgment should always be used when selecting a trip generation data source or methodology. When using trip rates from any of the alternate trip generation methodologies listed, the Lead Agency shall include in the TIA Report a full description of the trip generation methodology used and a summary of all inputs and assumptions. Professional judgment should be exercised to avoid double counting when using an alternate trip generation methodology. Some methodologies already account for attributes contained in the Standard Trip Reductions, which should not be taken on top of reductions provided by an alternate methodology.

In cases where the chosen trip generation methodology is based on a limited sample size, Lead Agencies are encouraged to conduct additional research or use local data to validate the trip rates before applying the suggested trip reductions from the alternate methodology.

8.1.2 Documentation of Trip Rates

A summary table showing trip generation for each type of land use in the project for each period of analysis (daily, AM peak, PM peak, etc.) shall be provided. The summary table shall include a quantification (square feet, number of units, etc.) upon which the trip generation calculation is based for each land use type, the trip generation rates used, and resulting generated trips.

The choice of trip generation rates shall be justified in the TIA. This includes any trip generation rate used for High Occupancy Vehicles.

Additionally, any unique project attributes affecting the trip generation calculations shall be documented. For example, assumptions regarding peak spreading and pass-by trips shall be documented.

[6] CalEEMod is recommended for Vehicle Miles Traveled (VMT) analysis by the California Air Pollution Control Officers Association (CAPCOA) and the Bay Area Air Quality Management District (BAAQMD). CalEEMod may be useful as a supplemental resource for verification and justification of trip generation and trip reductions. However, since CalEEMod does not produce detailed trip generation estimates, it is not recommended that Lead Agencies rely on CalEEMod as their primary source for trip generation when preparing a TIA. See ***Appendix D*** for more detail.

8.1.3 Mode Split

For large projects that use a transportation model (either the countywide model or a local model), the Lead Agency is encouraged to prepare a summary table for either the daily or peak hour that indicates the number of vehicle trips, transit trips, bicycle trips and pedestrian trips generated for each type of land use. The Lead Agency may determine the project mode split based on factors from the VTA countywide model, in consultation with VTA. Based on engineering judgment, some projects may need further analysis of bicycle and pedestrian trips generated by the project. See ***Chapter 12, Special Project Types***, for more information.

8.2 Automobile Trip Reductions and Transportation Demand Management

An important goal of VTA's CMP is to encourage development that reduces system wide traffic congestion and improves air quality in the region. Several strategies can be used to encourage this type of development and to accomplish these goals, including:

- Mixed-use development (which increases internal trips);
- A strong Transportation Demand Management (TDM) program (which provides incentives and services to encourage alternatives to the automobile);
- Project location and design features that encourage walking, bicycling and transit usage;
- Parking demand management programs, which discourage drive-alone trips; and
- Development near frequent transit services.

These strategies are most effective when combined into a comprehensive program that is integrated into the project's design and operation.

Implementation of one or more of these strategies will encourage reductions in automobile trips generated by new development projects compared to standard automobile-trip rates. Projects that incorporate these concepts into their design may be awarded trip reduction credits, which may be applied to the total number of trips generated by the project. Trip reduction credits are subject to Lead Agency approval and discretion.

This section outlines three approaches for developing automobile trip reductions for a TIA:

- ***Standard Trip Reductions*** are established percentage reductions based on research or local policy that are provided within the *TIA Guidelines*. They can be taken for projects which include a mix of land uses, are located near transit, and/or have certain programs for TDM;
- ***Target-Based Reductions*** may be taken when the project applicant has entered into an enforceable agreement with the Lead Agency that limits the number of automobile trips traveling to and from the project site. The trip reduction program must include a commitment to monitor trip generation and determine whether targets are met, an enforcement structure, and a commitment to summary-level data sharing;
- ***Peer/Study-Based Trip Reductions*** may be taken when studies of similar projects, or of other sites occupied by the project applicant, have demonstrated comparable trip reductions through survey results or other data. The trip reduction program must include a commitment to monitor trip generation, and a commitment to summary-level data sharing.

All auto trip reductions must be clearly explained, documented, and justified in the project's TIA Report. Lead Agencies must state which of the above approaches is being used to develop auto trip reductions, if any reductions are claimed. Trip reductions shall be summarized in an Auto Trip Reduction Statement in the Executive Summary of the TIA Report, using the form provided in ***Appendix C.***

8.2.1 Standard Trip Reductions

VTA has developed the following guidelines for estimating auto trip reductions due to mixed-use development (internal trips), certain TDM programs, and transit station proximity. These guidelines should be used to determine the standard reductions in project vehicle trip generation from the estimates produced using the trip generation sources and methodologies referred to in ***Section 8.1.1***. It must be emphasized that the vehicle trip reduction values or percentages should be applied carefully using professional judgment. In some cases, following the guidelines for standard trip reductions outlined in this section would overestimate trip generation from the project. ***Sections 8.2.2, Target-Based Trip Reductions***, and ***8.2.3, Peer/Study-Based Trip Reductions***, provide guidance for cases when trip reduction percentages are likely to be higher than those detailed in this section. These subsequent sections also provide the procedures for documenting and justifying larger trip reductions for "special circumstances" which are referred to in this section.

The effectiveness of mixed-use development, TDM programs, and location near transit at reducing project vehicle trip generation should be monitored by Lead Agencies as part of the CEQA mitigation measure monitoring process and/or the agency's TDM effectiveness monitoring program. Lead Agencies are encouraged to provide this type of monitoring data to VTA, when available, to assist in revising the vehicle trip reduction guidelines in the future. VTA will gather data on trip reduction experiences from Member Agencies through the CMP Monitoring and Conformance Program, and may share this data online to assist agencies in preparing TIAs.

Table 1: Standard Auto Trip Reduction Rates
summarizes the maximum trip reduction rates that can be applied under the Standard Trip Reduction Approach. It should be noted that standard vehicle-trip generation rates already include some measure of transit use, biking, walking and TDM programs, so trip reductions summarized in ***Table 1*** may be smaller than measured transit use and TDM program participation in a given project. The trip reduction values in this chapter may be revised as new information is gathered.

8.2.1.1 Mixed-Use Developments

The Standard Reduction approach allows the largest trip reductions (i.e., 10 to 15%) for mixed-use developments that combine retail uses with a housing or hotel component. Based on a review of mixed-use developments, other mixed-use projects will be allowed smaller trip reductions due to the reduced amount of internal trip-making found in these projects. ***Table 1: Standard Auto Trip Reduction Rates*** summarizes the maximum trip reductions for mixed-use developments under the Standard Reductions approach.

Table 1: Standard Auto Trip Reduction Rates

Trip Reduction Strategy	Standard Trip Reduction
Mixed-Use Development Project	
with housing and retail components	*15.0% off the smaller trip generator*[7]
with hotel and retail components	*10.0% off the smaller trip generator*[8]
with housing and employment	*3% off the smaller trip generator*[9]
with employment and employee-serving retail	*3% off employment component*[10]
Effective TDM Program[11]	
Financial Incentives	*up to 5.0%*[12]
Shuttle Program[13]	
- Project-funded dedicated shuttle	*3.0%*
- Partially-funded multi-site shuttle	*2.0%*
Location Within 2,000-Foot Walk of Transit Facility[14]	
Housing near LRT, BRT or Caltrain station	*9.0%**
Housing near a Major Bus Stop[15]	*2.0%**
Housing Near a BART station	*Case-by-Case***
Employment near LRT, BRT or Caltrain Station	*6.0%**
Employment near a Major Bus Stop[16]	*2.0%**
Employment Near a BART station	*Case-by-Case***

** Note: The LRT/BRT/Caltrain Station, BART Station, and Major Bus Stop reductions cannot be combined.*

*** Note: See* ***Section 8.2.1.3*** Proximity to Transit (Rail or Major Bus Line)*, below, for a description of the case-by-case method for proximity to BART stations*

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[7] The proposed trip reductions calculated for all land uses within the development area shall be based on the land use that produces the least amount of new trips. In other words, the same trip reduction rate for the land use that produces the least number of new trips should be used to determine the trip reduction for all developments.

[8] Same as footnote 7.

[9] Same as footnote 7.

[10] All trips made to retail services (employee-serving retail) within the proposed development/complex may be considered internal trips. However, to qualify for this reduction, the employee-serving retail must be integrated into the employment complex and must not have a dedicated parking area.

[11] In order for a project applicant to claim a TDM reduction, a commitment to make the TDM program available to all current and future occupants of the development must be included in a legally enforceable document. See ***Section 8.2.1.2, Transportation Demand Management (TDM) Program*** for more details.

[12] Financial incentives must be offered on an ongoing basis and must be roughly equivalent to or higher than the monthly maximum pre-tax commuter benefit allowed under federal law at the time of TIA preparation in order for the project to receive full trip reduction. See ***Section 8.2.1.2*** for more details.

[13] If the shuttle trip reduction is being combined with the "Employment near LRT, BRT or Caltrain Station" reduction, the maximum shuttle trip reduction that can be taken is 1.5%.

[14] See ***Section 8.2.1.3, Proximity to Transit (Rail or Major Bus Line)***, below, for further detail.

[15] A major bus stop is defined as a stop where six or more buses per hour from the same or different routes stop during the peak period in Core, Corridor or Station Areas.

[16] Same as footnote 15.

The following are further descriptions of the trip reduction categories listed in ***Table 1***:

1. **Housing/Retail Mixed-Use Projects:** Mixed-use development projects that include a substantial housing component and a retail component can reduce vehicle trips by increasing internal trips. For example, project residents patronizing the retail uses would reduce the number of external retail and residential trips. Hence, a reduction in vehicle trips can be taken off the smaller trip generator of the project in an amount not to exceed fifteen percent (15%) unless special circumstances are justified in the project's TIA.[17] The trips generated by the larger trip generator should be reduced by no more than the same number of trips reduced for the smaller trip generator.

2. **Hotel/Retail Mixed-Use Projects:** Mixed-use projects combining hotel and retail components will also increase internal trips. Hotel guests patronizing the project's retail uses would reduce the number of external retail and hotel trips. A reduction on the trips generated by the smaller trip generator can be taken in an amount not to exceed ten percent (10%) unless special circumstances are justified in the project's TIA.[18] The trips generated by the larger trip generator should be reduced by no more than the same number of trips reduced for the smaller trip generator.

3. **Housing/Employment Mixed-Use Projects:** Mixed-use projects combining housing and employment components may have trips made between the two uses if some housing residents are also employed on-site. No more than a three percent (3%) reduction off the trips generated by the smaller of the two trip generators shall be taken unless special circumstances are justified in the project's TIA.[19] The trips generated by the larger trip generator should be reduced by no more than the same number of trips reduced for the smaller trip generator.

4. **Retail/Employment Mixed-Use Projects:** Mixed-use projects combining employment and employee-serving retail components, such as dry cleaning, gift store, and service-oriented uses offer opportunities for employees to run errands during the day that they may have otherwise done during a peak period. In order to qualify for a trip reduction, the employee-serving retail must be integrated into the employment complex, with no designated parking area for the retail. The TIA should document that the project is eligible for a reduction. No more than a three percent (3%) reduction off the trips generated by the employment site shall

[17] This value is based on data cited in "Transit Oriented Development, Using Public Transit to Create More Accessible and Livable Neighborhoods" from the Victoria Transport Policy Institute, April 4, 2006; this value is comparable to Metropolitan Transportation Commission's *Characteristics of Rail and Ferry Station Area Residents in the San Francisco Bay Area: Evidence from the 2000 Bay Area Travel Survey (Volume I)*, September 2006.

[18] This value is based on VTA's review of mixed use literature available in 1998. Values for mixed-use trip reductions varied from 7% to 13%. See Institute of Transportation Engineers, *Trip Generation: An Informational Report, 5th Edition*, 1991, p, I-48 and California Air Resources Board, *Transportation-Related Land Use Strategies to Minimize Motor Vehicle Emissions: An Indirect Source Research Study*, June 1995, Appendix B.

[19] This value is based on Member Agency policies to encourage mixed-use development.

be taken unless special circumstances are justified in the project's TIA.[20] All of the employee-serving retail trips may be considered to be internal to the project.

8.2.1.2 Transportation Demand Management (TDM) Program

A reduction in project vehicle trip generation can be made for provision of a Transportation Demand Management (TDM) program. In the VTA *TIA Guidelines*, reductions for certain TDM programs may be taken through the Standard Trip Reduction approach below. It should be understood that most trip generation rates include a certain ambient level of non-single occupant vehicle trips. Therefore, the actual effectiveness of the TDM program is assumed to be greater than the values listed below, but the maximum trip reduction that may be taken from trip generation rates must comply with the guidelines below, for TIAs that take the Standard Trip Reductions approach.

In order for a project applicant to claim a TDM reduction in a TIA, a commitment to make the TDM program available to all current and future occupants of the development must be included in a legally enforceable document. Examples of such documents, for trip reduction documentation purposes, include Conditions of Approval, Development Agreements, CEQA Mitigation Monitoring & Reporting Programs (MMRPs), and/or Covenants, Conditions, & Restrictions (CC&Rs). The commitment to participate in a TDM program must be documented in the TIA.

VTA offers Standard Trip Reduction values for two types of TDM programs:

1. **Financial Incentives:** TDM programs that are based on financial incentives have the greatest effect on reducing trip generation. Trip reductions can be taken for projects which include the following types of financial incentives: transportation allowance for alternative modes to driving alone; parking cash-out; pre-tax commuter benefits for biking, carpooling, vanpooling, and using transit; and subsidies such as free transit passes or transit fare incentives provided by employers and/or residential complexes. In addition, charging for parking is a financial disincentive for solo driving and is considered a TDM measure. The maximum trip reduction that can be taken for such TDM programs is five percent (5%) unless special circumstances are justified in the project's TIA.[21]

   The actual trip reduction that can be used in the TIA will depend on the level of financial subsidy provided to residents and/or employees and the number of residents and/or employees eligible for the subsidy. The standard 5% reduction can be taken if the financial subsidy is offered to all residents and/or employees of the development on an ongoing basis and is roughly equivalent to or higher than the monthly maximum pre-tax commuter benefit allowed under federal law at the time of TIA preparation.

[20] This value is based on Member Agency policies to encourage mixed-use development.

[21] This figure is based on two sources: US Department of Transportation, "The Effects of Land Use and Travel Demand Management Strategies on Commuting Behavior," November, 1994, which indicated a reduction in Drive Alone mode of approximately 5% for sites providing financial incentives; and Donald Shoup, "Parking Cash Out," Chicago: Planning Advisory Service, 2005, indicating reductions in vehicle trips of at least 5% at employers offering parking cash-out.

The level of financial incentives to be provided must be documented in the TIA Report.

2. **Shuttle Programs:** Projects which participate in shuttle programs linking the site to major transit facilities or other locations with high employee densities will be allowed a three percent (3%) trip reduction unless special circumstances are justified in the project's TIA.[22] The full 3% trip reduction may be taken only when the project is committed to fully funding a dedicated shuttle to light rail, Caltrain, or BART facilities or other locations with high employee densities. A 2% reduction may be taken if the project is committed to partially funding a shuttle that serves other sites in addition to the project site. If the shuttle trip reduction is being combined with the 'Employment near LRT, BRT or Caltrain Station' reduction, the maximum shuttle trip reduction that can be taken is one and one-half percent (1.5%).

8.2.1.3 Proximity to Transit (Rail or Major Bus Line)

Housing and employment projects that are located near transit have different mode splits resulting in generally lower vehicle-trip generation characteristics. The extent is different for different types of transit facilities. To qualify for the Proximity to Transit trip reduction rates, developments must be located near existing or future Light Rail Transit (LRT) stations, Caltrain stations, BART stations, Bus Rapid Transit (BRT) stations, or major bus stops. For a project to qualify for an auto trip reduction near a future transit station, the transit capital project that will include the station must be under construction at the time of the TIA Notification Form issuance. A major bus stop for the purposes of trip reductions is defined as a stop where six or more buses per hour (from the same or different routes) stop during the peak period. A development qualifies as being located near transit if the project entrance (housing front door, office pedestrian entrance) and greatest density of the project are within approximately 2,000-foot walking distance of the specified transit facility.

Projects that take any of the trip reductions described in this section shall provide a map or text description indicating the walking route from the project to the transit stop. The TIA should identify any pedestrian barriers that affect access from the development to the transit facility, including gaps in the sidewalk network and/or street crossings that lack pedestrian crossing facilities. If any pedestrian barriers as described above exist in the route between the project site and the transit stop, the project would be disqualified from taking a trip reduction for proximity to transit unless the project commits to fully funding any improvements needed to close the gap.

It is recognized that the 2,000 foot walking distance is not all or nothing – since many residents and employees outside that radius still walk to transit, though at diminishing rates as the distance from the station increases. In the case where the full development is not within a 2000-foot walk, placement of the more concentrated land uses closest to the transit facility is recommended. Projects located greater than 2,000 foot walking distance *may* qualify for the trip reductions described below. To qualify, the TIA must include a justification for the trip reduction based on evidence from studies of similar projects. The evidence provided should demonstrate that the proposed trip reduction is

[22] Based on VTA's review of 1997 Caltrain and LRT shuttle ridership to and from Santa Clara County employment sites.

likely to be achieved given the land use context, distance from transit, type of transit service available, and pedestrian and bicycle conditions between the project site and the station. The Lead Agency may consider using the Peer/Study-based Approach to trip reductions (see ***Section 8.2.3***), if appropriate.

To bolster the case for a trip reduction at a distance of greater than 2,000 feet from transit, VTA recommends that the project increase the quality of the walk experience between the development and the transit facility. Examples of these types of improvements include constructing sidewalks greater than the minimum sidewalk width, providing pedestrian scale lighting and landscaping, and adding signs to direct pedestrians and bicyclists to transit. In addition, the project must show that safe, pedestrian-friendly sidewalks or paths extend all the way from the project site to the transit stop.

Professional judgment should be used when taking transit proximity-related trip reductions from trip generation developed using alternative methodologies. Where a travel demand model or mixed-use trip generation model is used to estimate trips on all modes (i.e., including a mode choice component), care should be taken to not double-count the effect of proximity to transit.

The trip reduction values allowed for each type of project are as follows:

1. **Housing Near Light Rail, Bus Rapid Transit or Caltrain Station:** Housing developments where the walking distance from the unit or the front door of the housing complex to the station is 2,000 feet or less may reduce their trip generation volumes by nine percent (9%).[23] *In the case that a development is located near a rail/BRT station and a major bus stop, a reduction can only be taken for either the major bus stop or the rail/BRT station, and not a combination of the two transit facilities.*

2. **Housing Near a Major Bus Stop:** Housing developments where the walking distance from the unit or the front door of the housing complex to the major bus stop is 2,000 feet or less may reduce their trip generation volumes by two percent (2%).[24] *This reduction may not be combined with the trip reduction for housing located near light rail, BRT or Caltrain.*

3. **Employment Near Light Rail, Bus Rapid Transit or Caltrain Station:** Employment sites where the walking distance from the front door of the development to the station is 2,000 feet or less may reduce their trip generation volumes by six percent (6%).[25] *In the case that a development is located near a rail/BRT station and a major bus stop, a reduction can only be taken for either the major bus stop or the rail/BRT station, and not a combination of the two transit facilities.*

4. **Employment Near a Major Bus Stop:** Employment sites where the walking distance from the front door of the development to the major bus stop is 2,000 feet or less may reduce their

[23] Santa Clara County Transportation Agency, "Transit-Based Housing Survey," September 1995.

[24] Same as previous footnote.

[25] Lund, Cervero, Wilson, *Travel Characteristics of Transit-Oriented Development in California*, Bay Area Rapid Transit District and California Department of Transportation, 2004.

trip generation volumes by two percent (2%). *This reduction may not be combined with the trip reduction for employment sites located near light rail, BRT or Caltrain.*

5. **Case-by-Case Approach for Proximity to BART Stations:** Residential and employment developments where the walking distance from the front door of the development to an existing or future BART station is 2,000 feet or less may apply a trip reduction in a TIA. When proposing such a reduction, Lead Agencies must obtain concurrence from VTA and provide a description of the methodology, source data and justification for the trip reduction in the TIA Report. The trip reduction for proximity to BART should take into account the attributes of the station area (land uses, transportation network, pedestrian and bicycle connections to the station) to ensure that the requested reductions are appropriate for the context. VTA may in the future provide suggested trip reduction rates (standard reductions) when data from the Santa Clara County BART stations becomes available.

8.2.1.4 Standard Trip Reduction Combinations

Projects that combine two or more trip reduction strategies for which Standard Reductions are specified may take reductions off the trips generated by individual project components, as discussed below. The reductions shall be clearly explained, documented, and justified in the project's TIA Report and shall conform to the values listed in ***Section 8.2*** unless special circumstances are justified in the project's TIA.

Application of multiple trip reduction strategies will depend on the type and ratio of uses present in the project under study. For example, a mixed-use project composed mostly of housing with some retail that also participates in a shuttle program is allowed a 15% mixed-use reduction on the retail trip generation of the project. The housing trips should be reduced by no more than the same number of retail trips internal to the project. In addition, the housing component of the project will be allowed a 3% reduction for participation in a shuttle program. However, if the shuttle will serve the retail use as well as the housing component, and the retail use is large and generates a majority of the daily project trips, the 3% reduction for shuttle participation may be applied to both the retail and housing components of the project.

Similarly, a mixed-use housing and retail project located near transit will be allowed 15% reduction on trips generated by the retail portion of the project to account for the mixed-use nature of the project. Again, the housing trips should be reduced by no more than the same number of retail trips internal to the project. In addition, the housing portion will be allowed a 9% reduction for the location near transit.

If the TDM shuttle trip reduction is being combined with the 'Employment near LRT, BRT or Caltrain Station' reduction, the maximum shuttle trip reduction that can be taken is one and one-half percent (1.5%).

8.2.1.5 Parking and Automobile Trip Reduction

Recognizing that parking oversupply may itself have negative secondary effects, the TIA should discuss the project's approach to parking management. A parking management plan, shared parking, parking cash out, unbundled parking, carpool parking, and parking layout and design can be ways to encourage the use of alternative modes and reduce auto trips. If the project is using any of these measures as part of its overall TDM/trip reduction strategy, the Lead Agency shall document it in the TIA, and note it in the Auto Trip Reduction Statement. The parking analysis must explicitly discuss the relationship between the project's parking supply, parking demand and parking costs (if any) to vehicle trip reductions applied to the project.

8.2.2 Target-Based Trip Reductions

In addition to Standard Trip Reduction and Peer/Study-Based Trip Reduction approaches, projects may take a Target-Based Trip Reduction if documentation and justification are provided in the TIA Report, based on the guidance below. This approach may be taken when the project applicant has entered into an enforceable agreement with the Lead Agency that limits the number of automobile trips traveling to and from the project site. The trip reduction program must include a commitment to monitor trip generation and determine whether targets are met, an enforcement structure, and a commitment to summary-level data sharing.

It is recognized that Lead Agencies ultimately make decisions on project approvals, and therefore commitments to certain elements that would justify a Target-Based Trip Reduction will occur as an agreement between the project applicant and the Lead Agency, and it is responsibility of the Lead Agency to enforce those commitments. For the purpose of a TIA, stating a commitment and providing the documentation noted below is sufficient, provided that the commitment also appears in a legally enforceable document. Examples of such documents, for trip reduction documentation purposes, include Conditions of Approval, Development Agreements, CEQA Mitigation Monitoring & Reporting Programs (MMRPs), and/or Covenants, Conditions, & Restrictions (CC&Rs).

The following elements are **required** in a TIA Report for a project taking a Target-Based Trip Reduction:

- State a commitment to a specific reduction target (percentage trip reduction, non-auto mode split or trip cap). This statement should specify the starting point for the reduction (e.g., ITE auto trip generation rates based on square footage or number of units, total person-trips based on employee/resident count) and the time period for the reduction (peak hour, peak period and/or full day). For targets based on mode split, the statement should include a clear explanation of how to convert these figures back to auto trip generation rates to allow later monitoring and comparison;
- Provide a description of the types of TDM/trip reduction measures that are proposed in the program. It is recognized that the list will be preliminary and may change over time;

- State a commitment to periodic monitoring of project trip reduction. The methodology should follow industry standards to determine auto trip generation rates or mode splits and should be conducted by the Lead Agency or a third party. The TIA Report should describe the proposed monitoring approach;
- State a commitment to an enforcement/penalty structure. Lead Agencies retain flexibility to determine the parameters, and the enforcement/penalty structure may take the form of a 'reinvestment clause' where the project applicant/owner is required to invest more in trip reduction efforts if not meeting the target;
- State a commitment to provide summary level monitoring data (e.g., auto trip generation rates, mode shares) to VTA, through the Lead Agency. Data shall be provided on a biennial basis as part of the CMP Monitoring and Conformance Program.

The following elements are **encouraged** in a TIA Report for a project taking a Target-Based Trip Reduction:

- Detailed description of the TDM/trip reduction measures that are proposed in the program;
- Sharing of trip monitoring reports or more in-depth trip generation or survey data for the purpose of improving the *TIA Guidelines* in the future.

8.2.3 Peer/Study-Based Trip Reductions

In addition to Standard Trip Reduction and Target-Based Trip Reduction approaches, projects may take a Peer/Study-Based Trip Reduction if documentation and justification are provided in the TIA Report, based on the guidance below. This approach may be used to justify a trip reduction based on a project's similarity to other projects with demonstrated trip reductions or a project occupant's track record of reducing trips at other sites, or to provide additional justification for trip rates based on local data collection efforts.

The following describes the requirements for documenting and justifying a Peer/Study-Based Trip Reduction percentage:

- Provide Data/Documentation in TIA Report: Lead Agencies may rely on existing studies or conduct their own study, as appropriate to develop the Peer/Study-Based trip reductions, and this data and documentation must be included in the TIA Report or its appendices. The documentation must include the data used to justify the Peer/Study-Based trip reduction rate, the source(s) referenced, and a detailed discussion of the assumptions and methodologies used. The methodology used to develop the Peer/Study-Based trip reduction rate should follow industry standards and in cases where the trip reduction rate is based on a limited sample size, professional judgment should be used to determine the suitability of the sample data;
- Ensure Appropriateness**:** Care must be taken to use data that is applicable to Santa Clara County conditions. As part of the documentation, Lead Agencies must specify the sample size, urban context, quality and type of transit services available, and any other relevant findings pertaining to the particular project attribute(s) in question;

- Provide a description of the types of TDM/trip reduction measures that are proposed in the program, if applicable;
- State a commitment to periodic monitoring of project trip reduction**:** The methodology should follow industry standards to determine auto trip generation rates or mode splits and should be conducted by the Lead Agency or a third party. The TIA Report should describe the proposed monitoring approach;
- State a commitment to provide summary level monitoring data (e.g., auto trip generation rates, mode shares) to VTA, through the Lead Agency. Data shall be provided on a biennial basis as part of the CMP Monitoring and Conformance Program.

See ***Table 2***, below, for a comparison of Standard, Peer/Study-Based and Target-Based trip reduction approaches.

Table 2: Comparison of Trip Reduction Approaches

	Standard Reductions	**Peer/Study-Based Reductions**	**Target-Based Reductions**
Maximum percentages in VTA *TIA Guidelines*?	Yes, see ***Table 1: Standard Auto Trip Reduction Rates***	No	No
Data required in TIA Report?	No	Yes, existing or new studies	No
Commitment to a target required?	No	No	Yes
Description of measures required?	No	Yes, if applicable	Yes
Monitoring required?	No	Yes	Yes
Enforcement required?	No	No	Yes
Data Sharing required?	No	Yes	Yes

8.3 Trip Distribution and Assignment

The trip distribution step of a TIA consists of forecasting the travel direction of project-generated trips to and from the project site.

The trip distribution percentages shall be included in the TIA Report on a figure showing an area map with transportation facilities (roadways, transit lines, etc.) and the project site. The trip distribution figure should, at a minimum, show trip percentages at gateways, on nearby freeway segments, and along major arterials that provide direct access to the project site.

The trip assignment step of a TIA consists of assigning trips to specific transportation facilities on the basis of the trip distribution percentages. Assignment of trips should be based on existing traffic volumes, existing travel patterns or expected future travel patterns. The assignment of trips shall account for pass-by and diverted linked trips on transportation facilities near the project site (see ***Section 8.3.1***). The trip assignments shall be included in the TIA Report on a figure showing project trips at study intersections.

The following are points that expand or provide detail regarding trip distribution and assignment:

1. **Review by Other Jurisdictions**: The Lead Agency shall be responsible for developing the trip distribution and assignment for a project. The trip distribution and assignment shall be reviewable by other jurisdictions (other cities, towns, the County, Caltrans, and/or VTA). Review by other jurisdictions should occur at the TIA Notification Form stage of the TIA preparation process. It is the responsibility of other jurisdictions to request trip distribution and assignment information from the Lead Agency once they are notified about a project.

2. **Use of VTA or Local Agency Models**: Model data may be used to develop trip distribution assumptions for a project. The use of this data is most appropriate for long-term projects or for near-term development projects where the roadway network in the vicinity of the project will change substantially. VTA can also provide trip tables by trip purpose and travel networks to Member Agencies that may be used to develop trip distribution assumptions for a project.

3. **Documentation of Assumptions**: The project's trip distribution and assignment assumptions shall be clearly documented in the TIA Report.

8.3.1 Pass-by Trips and Diverted Linked Trips

Some projects will attract a large number of trips already on the system. For example, many people who would stop at a new neighborhood convenience store would do so on their way home from work; these people would not be making new vehicle-trips on the roadway. These pass-by trips are generally captured by small neighborhood services such as dry cleaners, convenience stores, gas stations and coffee shops and to a lesser extent such uses as grocery stores, pharmacies, shopping centers and restaurants. Such trips are classified into two categories: pass-by and diverted linked trips. According to the ITE *Trip Generation Handbook*, pass-by trips are attracted from traffic passing a site on an adjacent street that contains direct access to the generator. Pass-by trips do not require a diversion from another roadway. Diverted linked trips are attracted from roadways in the vicinity of a site and require a diversion from one roadway to another to gain access to the site.[26]

8.3.2 Allowable Reductions for Pass-by Trips and Diverted Linked Trips

A reduction in project vehicle trip generation can be made for pass-by and diverted linked trips, provided that the reduction is applied according to the methodology outlined in the following

[26] Institute of Transportation Engineers, *Trip Generation Handbook*, 2nd Edition, 2004, Chapter 5, pp. 29-82.

section. *This reduction must be clearly explained, justified, and documented in the TIA Report*. The trip reduction for pass-by and diverted linked trips shall be determined from established sources, such as ITE's *Trip Generation Handbook*, SANDAG, or surveys of similar land uses. Note that reductions for pass-by trips often differ from those for diverted linked trips. The pass-by and diverted linked trip reduction may only be taken for commercial land uses and should not be more than a **thirty percent (30%) combined pass-by and diverted linked trip reduction**. In addition, pass-by and diverted linked trips may not be excluded from the calculation of the 100 net new peak hour trip threshold that triggers the requirement for conducting a TIA except as noted in ***Section 2.1***.

There are a few exceptions where pass-by and diverted linked trips may account for more than 30% of the trips made, such as at gas stations, fast food establishments, community centers, local public libraries, and isolated mini-markets. A higher trip reduction rate may be applied to these uses with approval of the Lead Agency and VTA. As with other pass-by trip reductions, the reduction rate must be clearly explained, justified, and documented in the TIA.

8.3.3 Application of Pass-by Trip and Diverted Linked Trip Reductions

Subtracting pass-by and diverted linked trips from a site's trip generation volumes lowers the number of new trips added to the surrounding transportation system. However, additional turning movements or changes to the turning movements due to pass-by and diverted linked trips should be taken into account in transportation analyses to determine their impact on adjacent roadways. Answers to questions such as whether left turn pockets are long enough, whether U-turns are allowed, and whether additional turning movements will slow or conflict with other traffic are dependent on all project trips including the pass-by and diverted linked trips. ***Appendix E*** includes a methodology for applying pass-by and diverted linked trip reductions.

Chapter 9. Project Conditions and Impacts/Effects

The TIA Report shall evaluate the addition of the project, along with estimated project-generated trips, to the "without project" analysis scenario (Existing, Background, or Cumulative Conditions without the project, as appropriate). This shall include the identification of any project impacts on CMP roadway facilities, and any negative effects on bicycle, pedestrian or transit conditions or vehicle queuing.[27] Mitigation measures and their associated costs shall be identified for impacts that exceed the impact thresholds described below. In some cases, such as a development project that closes a sidewalk gap or adds a bicycle lane to its frontage, effects on the transportation system may be beneficial as well as adverse. Lead Agencies are encouraged to describe the beneficial effects of a project; this information may also be included in a CEQA document.

9.1 Traffic

The TIA Report shall contain an evaluation of project impacts to traffic operations. Evaluation of impacts to traffic operations shall include, but not be limited to Auto Level of Service analysis and queuing analysis.

9.1.1 Auto Level of Service Analysis

The CMP Auto Level of Service (LOS) standard is LOS E. ***If the analysis shows that a development project is projected to cause Auto LOS on a CMP facility (roadway or intersection) to fall from LOS E or better to LOS F under project conditions, then the project is said to impact the facility***.

In addition, for facilities determined to have been at LOS F under the without project analysis scenario (Existing, Background or Cumulative Conditions without the project), a project is said to impact the facility if the analysis shows that the project will cause Auto LOS to deteriorate by a given threshold amount. The threshold amounts for each of the three CMP facility types are described as follows:

1. **Intersections at LOS F**: A project is said to impact an intersection determined to have been at LOS F under the without project analysis scenario if:
   - ***addition of the project traffic increases the average control delay for critical movements by four (4) seconds or more, and***
   - ***project traffic increases the critical v/c value by 0.01 or more.***

   The exception to this threshold is when the addition of project traffic reduces the amount of average control delay for critical movements, i.e., the change in average control delay for critical movements are negative. In this case, the threshold is when the project increases the critical v/c value by 0.01 or more.

2. **Freeway Segments at LOS F**: A project is said to impact a freeway segment determined to have been at LOS F under the without project analysis scenario if ***the number of new trips***

[27] The determination of which facilities to evaluate is described in ***Section 2.2*** of these Guidelines.

added by the project is more than one percent of the freeway capacity. This calculation shall be for each direction of travel. Analysis should be conducted for all freeway lane types to which project trips are assigned, including HOV and Express Lanes, if applicable. Tables for the freeway analysis determination and impact analysis should include detailed data such as density and speed. Sample tables are shown in ***Appendix A*** (*Table A-1: Sample of Freeway Analysis Requirement Determination* and *Table A-2: Sample of Freeway Analysis Summary*).

3. **Rural Highway at LOS F**: A project is said to impact a rural highway determined to have been at LOS F under the without project analysis scenario, if ***the number of new trips added by the project is more than one percent of the rural highway capacity***. This calculation shall consider both directions of travel.

9.1.2 Queuing Analysis

A queuing analysis shall be included in a TIA, at a minimum, in the following instances:

- At CMP intersections where Auto Level of Service (LOS) analysis indicates that there will be a significant impact according to the CMP LOS standard;
- At on-ramps with existing or planned operational ramp meters;
- At off-ramps controlled by signals at junctions with local streets;
- At any other intersection or freeway on-ramp, based on engineering judgment, proximity of the project to a freeway interchange, existing queuing situations (such as spillback onto local streets from on ramps), or localized conditions along the project's frontage.

Negative effects of queuing on CMP facilities shall be identified by comparing the calculated design queue to the available queue storage. Queuing effects to be identified include, but are not limited to the following:

- Spillback queues from turn lanes at intersections that block through traffic;
- Queues from one intersection or closely-spaced intersections that extend back and impact other intersections;
- Queues from bottleneck locations such as lane drops that impact the operation of the facility;
- Spillback queues on ramps that impact surface street or freeway operations;
- Queues at intersections in proximity to freeway ramps.

Evaluation of queuing effects is required for only the near-term analysis. However, Lead Agencies may require this analysis for longer term projects to plan for improvements in later years.

Refer to the VTA *Traffic Level of Service Analysis Guidelines* for further information on ramp queuing analysis. Lead agencies should contact Caltrans staff to obtain current ramp metering rates.

9.2 Transit

The TIA Report shall include an analysis of project effects on the transit system. The evaluation shall consider transit vehicle delay, transit access and facilities, as described below.

Transit Vehicle Delay: The TIA Report shall include an analysis of the effects of the project on transit vehicle delay. This analysis shall include the following components:

- A quantitative estimate of additional seconds of transit vehicle delay that will result from automobile congestion caused by the project and any changes to signal operations proposed by the project. This analysis may utilize information produced by the intersection Auto Level of Service (LOS) analysis or other sources, if available;
- A qualitative assessment of additional transit vehicle delay caused by any roadway or intersection geometry changes proposed by the project, taking into account unique considerations of transit vehicles compared to autos (e.g., pulling into and out of stops, longer gaps needed for left turns). These qualitative considerations may also inform the assessment of transit vehicle delay caused by auto congestion.

If increased transit vehicle delay is found in this analysis, the Lead Agency should work with VTA to identify feasible transit priority measures near the affected facility and include contributions to any applicable projects that improve transit speed and reliability in the TIA. Refer to ***Section 10.2*** for more information on improvements to address congestion effects on transit travel times.

More information on the practice and research basis for transit delay analysis can be found in ***Appendix F*****.**

Transit Access and Facilities: The TIA Report shall include an assessment of transit access and facilities near the project site. The assessment shall include the following elements:

- Description of pedestrian access from the project to nearby transit stops. This should include both an assessment of access within the site (i.e., from buildings on the site to the public sidewalks) and off-site (i.e., presence/absence of continuous sidewalks and safe crossings to access transit);
- Disclosure of any permanent or temporary reduction of transit availability or interference with existing transit users (e.g., relocation/closure of a transit stop or vacation of a roadway utilized by transit);
- Disclosure of project location more than 1/2 mile from existing or planned transit services, with the potential for generating a demand for such services. Such projects are encouraged to identify funding sources to provide public or private transit services, if needed;
- Description of proposed actions to enhance transit service, access or facilities (e.g., bus stop improvements on a project frontage), or to mitigate negative effects on existing transit systems or facilities that result from the proposed project.

9.3 Bicycle and Pedestrian

The TIA Report shall include an analysis of bicycle and pedestrian modes under project conditions. The analysis shall address project effects on existing bicyclists and pedestrians as well as the effects and benefits of site development and associated roadway improvements on bicycle/pedestrian infrastructure, circulation, Quality of Service (QOS), and conformance to existing plans and policies. (Bicycle/pedestrian site access and circulation are addressed in ***Section 9.4***.)

Quality of Service Analysis

Projects that propose changes to existing roadway or intersection geometry, or changes to signal operations, shall include a QOS analysis for bicyclists and pedestrians for those locations where changes are proposed.

Lead Agencies have the discretion to select appropriate methodologies for bicycle and pedestrian QOS analysis. Agencies must include a description and justification of the methodology being used, and identify key data inputs and assumptions for the methodology. Agencies are encouraged to use the methodology in the latest Highway Capacity Manual, or a similar methodology, for the QOS analysis. See ***Chapter 5*** and ***Appendix G*** for more information on pedestrian and bicycle QOS methodologies. VTA staff can act as an additional resource to Lead Agencies in selecting QOS methodologies.

Projects that do not propose changes to existing roadway or intersection geometry, or changes to signal operations, are not required to include a QOS analysis, but such analysis is encouraged for project frontages.

Descriptive Analysis

In addition to the QOS analysis (if applicable), the TIA Report shall include a descriptive evaluation of project effects on and benefits to bicycle and pedestrian conditions. The descriptive analysis should encompass a radius of 2,500 feet from the project site for bicycle facilities, and a radius of 1,000 feet from the project site for pedestrian facilities. Within this radius, the descriptive analysis should focus on the project street frontages, paths to major attractors (such as transit facilities, schools, shops and services, and major residential developments), and bicycle and pedestrian deficiencies identified in the Existing Conditions analysis.

The following questions should be addressed:

1. Consistency with Existing Adopted Plans
    - How does the project implement, preclude, modify, or otherwise affect proposed bicycle and pedestrian projects and/or policies identified in the Lead Agency's adopted Bicycle Plan, Pedestrian Plan, Trails Master Plan, and/or bicycle/circulation element of their General Plan?
    - How does the project implement, preclude, modify, or otherwise affect proposed bicycle and pedestrian projects and/or policies identified in other agencies' plans (e.g., Countywide Bicycle Plan, adjacent cities' Bicycle Plans or Pedestrian Plans, Bay Trail Plan)?
    - What provisions for bicycle parking and storage are provided by the project? Calculate the required bicycle parking in accordance with the City's ordinance or, if none, VTA *Bicycle Technical Guidelines (BTG)*, and indicate proposed type of Class 1 and Class 2 parking to be provided by the project. Proposed bicycle parking locations should be noted on the site plan. Refer to ***Appendix H*** for a table of Bicycle Parking Supply Recommendations from the VTA *BTG*.

2. Effects on Existing Bicyclist/Pedestrian Circulation in the Project Area
    - Would the project benefit or enhance existing bicycle and pedestrian access and circulation? For example, would it provide bicycle-friendly and pedestrian-friendly improvements like those identified in VTA *BTG*, *Pedestrian Technical Guidelines*, or *CDT Manual*? If so, describe;
    - Would the project reduce, sever or eliminate existing bicycle or pedestrian access and circulation? If so, describe;
    - How does the project address bicycle and pedestrian deficiencies identified in the Existing Conditions analysis?
    - If a new traffic signal is being installed as part of the project or project mitigation, the TIA should note that adequate bicycle and pedestrian detection and signal timing should be provided. (See VTA *BTG,* Chapter 6.)

9.4 Site Circulation and Access

The TIA Report shall include an analysis of site circulation and access. The evaluation of site circulation and access shall consider the following issues:

- The assessment of site circulation and access must explicitly discuss the relationship between site design and any vehicle trip reductions that are applied to the project. The assessment should include the pass-by and diverted trips that would access the site;
- The assessment of access shall include an analysis of trips entering and exiting the site at each driveway. Distribution of trips to access points should consider street configuration, storage lanes, acceleration and deceleration lanes, and sight distance;
- A Site Plan shall be provided with adequate detail to show auto, bicycle and pedestrian circulation within the site and connections to the outside transportation network;
- The site circulation and access assessment shall include an analysis of the proposed bicycle access and onsite circulation with recommendations to encourage bicycle trips to and within the site. Address adverse circulation issues, if any, which were identified in the Existing Conditions analysis;
- The assessment of site access shall include an analysis of the proposed pedestrian access and onsite circulation with recommendations to encourage pedestrian trips to and within the site. Include an assessment of pedestrian access between the site and the nearest bus stops. Address adverse site circulation issues, if any, which were identified in the Existing Conditions analysis. Also address the extent to which the ability of bicyclists and pedestrians to access the project site is inhibited by manmade and natural barriers such as railroad crossings, rivers, freeways, dead-end streets, and cul-de-sacs;
- The site circulation and access assessment may also include analysis of emergency vehicles and service vehicles, including delivery and garbage trucks.

Chapter 10. Mitigation Measures and Multimodal Improvements

This chapter describes the analysis required to evaluate 1) mitigation measures to address project impacts per CMP standards, and 2) improvements to address other project-related effects on the transportation system, including changes that affect transit, pedestrian and bicycle modes and queuing at ramps and intersections. Throughout this section, "impact" is used to refer to project effects on the CMP system as determined by the standards and impact thresholds established by VTA, and "mitigation" is used to refer to changes that address those impacts. The term "effect" refers to project-related effects on elements of the transportation system for which no CMP standard or impact threshold has been established, and "improvement" is used to refer to changes that address those effects. The TIA should particularly focus on project-related effects that tend to degrade pedestrian, bicycle and transit conditions.

10.1 Mitigations to Address CMP Standards

The TIA Report shall include a discussion of mitigation measures to address any impacts per CMP standards identified in the analysis. The TIA shall identify those mitigations for which the sponsor of the proposed project is responsible. The following issues regarding mitigation measures shall be addressed:

1. The goal of the Lead Agency shall be to maintain the CMP Auto Level of Service (LOS) standard on CMP facilities, and to mitigate any other impacts identified in the TIA Report. However, if this is not possible, mitigation measures that minimize impacts by limiting the degree or magnitude of the action and its implementation, and/or compensate for the impact by replacing or providing substitute resources shall also be considered. The mitigation measure could be fully-funded and implemented by the project sponsor or the project sponsor could make a contribution to the cost of implementing the measure, in coordination with other agencies. Information on voluntary contributions to regional transportation improvements can be found in ***Appendix I***, ***Board Memorandum: Update on Voluntary Contributions to Transportation Improvements***.

2. The Lead Agency shall consider all of the following categories of mitigation measures for impacts identified through the analysis:
   - Physical or capacity-enhancing improvements to the affected transportation facility (e.g., adding a turn lane to an intersection to address an Auto LOS impact);
   - Operational and/or efficiency improvements to the affected transportation facility (e.g., changing signal operations at an intersection or contributing to the implementation of Express Lanes on a freeway segment to address an Auto LOS impact);
   - Projects and programs used to reduce project auto trip generation, including TDM programs as well as capital improvements to transit, bicycle and pedestrian facilities, if not already included in the proposed project description. Examples could include constructing wider sidewalks, adding a bicycle lane or non-motorized trail, or a shuttle service from the proposed development to a nearby transit facility (e.g., BRT stop or light rail station).

3. The Lead Agency shall identify the feasibility of the proposed mitigation measures. Feasibility of physical improvements shall be verified in the field. Feasibility of all measures shall be confirmed with the appropriate agency or agencies (e.g., the agency responsible for maintaining a roadway or for implementing an operational improvement). Proposed mitigation measures for impacts to CMP facilities must be reviewed with VTA staff prior to the issuance of the TIA Report.

4. The description of all mitigation measures shall include identification of who is responsible for implementing each mitigation measure, when the mitigation measure will be implemented as it relates to the occupancy of the proposed project, and the cost of implementation, as appropriate. The cost estimate for mitigation shall be based on the feasibility analysis and/or a Capital Improvement Program estimate, if available. Lead Agencies are encouraged to have a registered civil engineer develop the cost estimate for any physical mitigations.

5. ***If a project causes a transportation impact that cannot be mitigated to the CMP Auto LOS standard, a Multimodal Improvement Plan must be provided along with the TIA, or the project applicant must agree in advance to participate in the implementation of the Multimodal Improvement Plan after project approval.*** Multimodal Improvement Plans are plans to identify offsetting measures to improve transportation conditions on CMP facilities in lieu of making physical traffic capacity improvements such as widening an intersection or roadway. Further information regarding steps for developing Multimodal Improvement Plans, and how Multimodal Improvement Plans relate to the land use approval process, is provided in the VTA *Deficiency Plan Requirements*.

   Multimodal Improvement Plans can range in size from Areawide (such as an entire city) to Specific Area (such as a roadway segment within a downtown area) to Mini (covering a single intersection). If the need arises for the preparation of a Multimodal Improvement Plan, VTA will work with the Lead Agency to tailor the level of the Multimodal Improvement Plan to match the scope of the deficiency. VTA will work with the Lead Agency as necessary to identify action items (or offsetting measures) as described in the VTA *Deficiency Plan Requirements*. Action items from the *Deficiency Plan Requirements* are provided in ***Appendix J.***

6. If a project impacts a CMP System facility that has a Multimodal Improvement Plan, it is subject to the conditions of the Plan. The project's TIA Report shall identify what role the project will play in implementing the Multimodal Improvement Plan actions.

7. Mitigation measures for Auto Level of Service (LOS) shall not unreasonably degrade bicycle, pedestrian or transit access, and circulation. If a project proposes mitigation for Auto LOS involving a change to existing roadway or intersection geometry, or changes to signal operations, the TIA shall analyze and disclose secondary effects on other modes, i.e., whether the mitigation would affect pedestrian or bicycle conditions or increase transit vehicle delay.

For the bicycle and pedestrian secondary effects analysis, a QOS-based methodology (as cited in ***Sections 5.2.5*** and ***5.2.6***) is encouraged, although a text description of changes may be substituted. At a minimum, the TIA shall disclose any of the following effects that would result from a recommended mitigation measure:

- Reducing, severing or eliminating existing bicycle or pedestrian access and circulation;
- Narrowing of sidewalk or removal of sidewalk (even if only on one side of street);
- Removal of crosswalk;
- Increased crossing distances;
- Longer signal cycles;
- Removal of a buffer between pedestrians and automobiles;
- Decreasing bike lane width or eliminating bike lane including at intersection approach due to addition of right-turn only lane;
- Reducing shoulder width to less than five feet on roadways without bike lanes (see VTA *BTG*, Section 7.4.2);
- Decreasing outside lane width on roadway without bike lanes or shoulders (see VTA *BTG*, Section 7.2);
- Installation of double right-turn lane, a free right-turn lane, or free-flowing freeway on and off ramps (see VTA *BTG*, Section 5.1);
- Revised signal timing and inadequate detection (see VTA *BTG*, Chapter 6, for recommendations on bicycle signal timing and detection at intersections);
- Changes to existing bike paths such as alignment, width of the trail ROW or trail tread, length of the trail, horizontal and vertical clearance;
- Precluding, modifying, or otherwise affecting proposed bicycle and pedestrian projects and/or policies identified in the Lead Agency's adopted Bicycle Plan, Pedestrian Plan, Trails Master Plan, and/or bicycle/circulation element of their General Plan; or other agencies' plans, e.g., Countywide Bicycle Plan, adjacent Cities' Bicycle Plan or Pedestrian Plan, Bay Trail Plan;
- Other roadway modifications that adversely impact bicycle or pedestrian conditions.

The analysis of secondary effects on transit vehicle delay resulting from proposed mitigation measures shall include the following components:

- A quantitative estimate of additional seconds of transit vehicle delay that will result from any signal operations changes proposed by the mitigation. This analysis may utilize information produced by the intersection Auto LOS analysis or other sources, if available;
- A qualitative assessment of additional transit vehicle delay caused by any change to existing roadway or intersection geometry proposed by the mitigation, taking into consideration unique considerations of transit vehicles compared to autos (e.g., pulling into and out of stops, longer gaps needed for left turns).

10.2 Improvements to Address Other Project-Related Effects

Per the requirements set forth in ***Chapter 9, Project Conditions and Impacts/Effects***, the *TIA Guidelines* require Lead Agencies to analyze project effects on certain parts of the transportation system for which no CMP standard or impact threshold has been established. For the bicycle and pedestrian analysis of Project Conditions, a QOS-based methodology is required in certain situations and a descriptive analysis is required in all cases (as described in ***Section 9.3***). For the transit analysis of Project Conditions, an analysis of transit vehicle delay, transit access and facilities is required (as described in ***Section 9.2***).

As no CMP standards or impact thresholds have been established for these modes, Lead Agencies may opt to use this analysis in the TIA for informational purposes only. However, if the bicycle, pedestrian and/or transit analysis shows that the project would degrade conditions for one or more of these modes, the Lead Agency is encouraged to identify improvements that would reduce the effects. Improvements may include, but are not limited to:

- Providing or improving sidewalks, providing pedestrian crossing facilities or pedestrian wayfinding systems, or modifying intersections to shorten crossing distances (e.g., by installing curb extensions);
- Providing additional bicycle lane markings at intersections, bicycle signage, and/or increasing bicycle lane widths;
- Modifying signal timing and/or signal equipment for bicyclists and pedestrians;
- Adding a queue jump lane or bulb-out transit stop to address a congestion effect on transit travel speed;
- Contributing to the implementation of Transit Signal Priority[28] to address a congestion effect on transit travel speed.

Some improvements to address congestion effects on transit travel speed may be feasible to implement on a case-by-case basis, such as queue jump lanes and bulb-out transit stops, while some measures would require closer coordination with VTA to determine whether an applicable project exists, such as transit priority signal timing and dedicated transit lanes. In all cases, the Lead Agency should consult with VTA to determine the feasibility of any improvement.

If the TIA includes queuing analysis (see ***Section 9.1.2***) and finds that freeway ramp spillback will occur, potential improvements include additional lanes (either HOV or mixed-flow) on ramps, or restriping. If the Lead Agency proposes a change to freeway ramps, including ramp metering flow rates, it should consult Caltrans. If the queuing analysis finds that spillback will occur at intersections, potential improvements include lengthening turn pockets, restriping, or changes to signal operations.

[28] VTA will coordinate with the Lead Agency before implementing Transit Signal Priority.

Chapter 11. Future Year Scenarios (Cumulative Conditions)

This chapter provides guidance for future year (Cumulative Conditions) scenario analysis for CMP purposes. In general, the Cumulative Conditions scenario is analyzed as the combination of Background Conditions (Existing Conditions + Approved Projects) + Expected Growth + Project.

Lead Agencies should note that future year/Cumulative Conditions scenarios may be defined differently for CEQA documents than for TIAs. The analysis method that shall be used for preparing a Cumulative Conditions Scenario in a TIA depends on the type of project under development or planning effort underway, as well as the time horizon. Analysis methods for preparing a TIA for near-term development projects, long-term development projects and long-term general planning efforts are presented in this chapter. Definitions for terms used in this chapter are provided in ***Appendix L***.

11.1 Near-Term Development Project (occupancy within five years of approval)

Near-term development projects include most development projects encountered by local agencies as part of their day-to-day operations. The development proposal for a near-term project, when approved, will generally result in the granting of an entitlement for the construction of a specific type and size development. A near-term project will usually be built and occupied within five years of project approval.

The *TIA Guidelines* must be followed to analyze transportation impacts associated with near-term specific development projects. For near-term development projects, Lead Agencies may use two cumulative analysis scenarios for planning and information purposes: Opening Year/Short-Term and Long-Term.

11.1.1 Opening Year/Short-Term Analysis

The opening year/short-term Cumulative Conditions analysis of a near-term development project shall consist of an analysis of growth expected until the project is available for final occupancy. The Lead Agency shall be responsible for determining the approach for calculating Expected Growth. Expected Growth can be estimated in three ways:

a. Apply an annual growth rate to Background Conditions;
b. Estimate trips generated by other proposed development projects in the area; or
c. Apply an annual growth rate and estimate trips generated by other proposed development projects in the area.

Data from the CMP Monitoring and Conformance Program can be used to estimate an annual traffic growth rate for near-term developments. If other proposed development projects are expected to generate more trips in the area than the estimated trips using a growth rate, then the Expected Growth should be based on method (b) or (c) above.

11.1.2 Long-Term Analysis

The Lead Agency may choose to conduct a long-term Cumulative Conditions analysis (e.g., over a 20 or 25-year time horizon) for CEQA or local purposes. The Lead Agency shall be responsible for determining the approach for calculating Expected Growth. In this case, Expected Growth is typically analyzed in one of two ways:

a. Apply an annual growth rate to Background Conditions; or
b. Use information from a travel demand forecasting model for the Expected Growth in the horizon year.

11.2 Long-Term Development Project (occupancy beyond five years from approval)

Long-term development projects include those that have a specific development proposal that is expected to be built and occupied in more than five years from the date of approval. Due to this project completion time, most long-term development projects are phased-development projects. The following describes the analysis approach for a long-term project with full entitlement and a long-term project with phased entitlement:

- **Entire Project Granted Full Entitlement:** If the entire long-term project is to receive development entitlement, the *TIA Guidelines* must be followed to analyze transportation impacts associated with the entire long-term project. This analysis shall set the likely magnitude of mitigations required of the developer.
- **Phased Project with Phased Entitlement:** The approach to assessing the effects of a long-term project where development entitlement will be phased consists of initially completing a long-term analysis for the entire project at buildout. This analysis shall set the likely magnitude of mitigations required of the developer. This may require the use of a transportation demand model to assist in estimating traffic volumes or travel patterns and conduct the analysis for the buildout scenario. The approach also consists of following the *TIA Guidelines* to analyze transportation impacts for each phase of the project.

With the analysis of each subsequent project phase after the first phase, the long-term analysis for the entire project at buildout shall be re-evaluated. If conditions have not changed, the initial mitigation measures for buildout conditions would remain valid. If conditions have changed, a revised set of mitigation measures for buildout conditions would be developed. The advantage of this approach is that it is unlikely that there will be significant unanticipated transportation impacts of the project that the Member Agency itself will need to mitigate.

Use of the countywide transportation model developed and maintained by VTA or a local transportation sub-model may be appropriate for the analyses of long-term development projects. Refer to ***Section 5.3, Use of Transportation Models***, for more information on modeling procedures and consistency.

11.3 Long-Term General Planning Efforts

Long-term general planning efforts typically include General Plan Amendments, General Plan updates, Precise Plans and Specific Plans, which grant no entitlements for any specific development project. In many cases, preparation of these planning efforts will require environmental review, which will consider transportation. As long as a transportation analysis is being completed, VTA recommends that the analysis be consistent with the *TIA Guidelines* to the extent possible.

Use of the countywide transportation model developed and maintained by VTA may be appropriate for the analyses of long-term general planning efforts. Refer to ***Section 5.3*** for more information on modeling procedures and consistency.

In many cases, the transportation analysis for a long-term general planning effort may produce freeway and arterial volumes, but there may not be enough data to perform detailed intersection-level analyses. The analysis of intersection turning movements as part of a long-term general planning effort analysis should recognize the difficulty in predicting specific travel patterns within a long-term planning horizon. The Lead Agency may wish to supplement the analysis with other, broader measures, such as percent of congested lane-miles, Vehicle Miles Traveled, changes in mode share, and/or measures of network connectivity and distance to destinations for pedestrians and bicyclists.

PART IV – OTHER CONSIDERATIONS

Chapter 12. Special Project Types

12.1 Large or Unique Projects

Lead Agencies that are evaluating large or unique development projects such as arenas, stadiums, large scale mixed-use developments, and large Transit-Oriented Developments (TODs), should facilitate early coordination with the agencies whose jurisdictions will be affected by the projected increased vehicle and person trips by using the TIA Notification Form. Examples of transportation related areas that may require early coordination are trip assignment and trip distribution, assessment of approved projects for the Background Conditions, and assumptions that may be used to identify mitigation measures and improvements.

12.2 Projects on a Jurisdiction Border

Similar to the early coordination process recommended for large or unique projects, a Lead Agency evaluating a development project that is located near or on the city or county border and projected to generate 100 or more net new peak hour trips, should coordinate with the adjacent jurisdiction(s) to discuss transportation related issues such as assessment of existing conditions, trip assignment, trip distribution, and mitigation measures and improvements as appropriate.

12.3 Multi-Agency Projects

For projects that extend in multiple jurisdictions such as shopping centers or large developments, the Lead Agency should facilitate early coordination with the participating agencies. Examples of transportation-related areas that may require early coordination are assessment of approved projects for Background Conditions, assumptions for the travel demand model, and feasibility of and responsibility for mitigation measures and improvements.

12.4 Projects Generating Large Numbers of Pedestrian, Bicycle or Transit Trips

For projects that generate unusually large volumes of pedestrian, bicycle or transit trips, it may be necessary to include a quantitative analysis of demand and capacity for these modes. Examples of typical land uses that may require a pedestrian, bicycle or transit capacity analysis are arenas and stadiums, special event sites, large mixed-use developments and TODs, and schools.

The transit capacity analysis should consider the existing ridership and load factors of transit routes near the proposed project, which can be obtained by consulting with VTA and other transit operators that may be affected (e.g. Caltrain, ACE, etc.). If the new transit ridership generated by the project causes the load factor of one or more transit routes to exceed the standard established by the applicable transit agency, the project should contribute to transit improvements to enhance the capacity of the affected route or provide alternative facilities.

Projects that generate unusually large pedestrian or bicycle volumes should consider the effects of those volumes on pedestrian or bicycle facilities. VTA recommends using a methodology that accounts for pedestrian and bicycle capacity, spacing, and conflicts, such as the Highway Capacity Manual 2010 methodology (Chapters 16 and 23), or similar methodologies. If the additional bicycle or pedestrian volumes generated by the project would unreasonably degrade conditions on bicycle and pedestrian facilities, the project should contribute to improvements to the conditions of the affected facility or provide alternative facilities.

12.5 Transit Delay Analysis for Large Projects, General Plans and Areawide Plans

Large development projects, General Plan Amendments and updates, and area-wide plans should include a more extensive quantitative analysis of transit delay than the analysis discussed in ***Section 9.2***. VTA recommends using travel demand model data, when available, to estimate transit delay on transit corridors within the project study area. If a travel demand model is not prepared for the project, VTA recommends that transit delay be analyzed based on the methodology discussed in in ***Section 9.2***.

If increased transit vehicle delay is found in this analysis, the Lead Agency should work with VTA to identify feasible transit priority measures near the affected facility and include contributions to any applicable projects that improve transit speed and reliability in the TIA. Refer to ***Section 10.2*** for more information on improvements to address congestion effects on transit travel times.

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APPENDIX A: Sample Freeway Analysis Tables

TABLE A-1: SAMPLE OF FREEWAY ANALYSIS REQUIREMENT DETERMINATION

Freeway	Segment	Direction	Peak Hour	Lanes	Capacity	Project Trips	< 1%
101	Capitol to Tully	NB	AM	3	6600	45	yes
101	Capitol to Tully	NB	PM	3	6600	40	yes
			AM				
			PM				
			AM				
			PM				
			AM				
			PM				
			AM				
			PM				
			AM				
			PM				
			AM				
			PM				
			AM				
			PM				
			AM				
			PM				

TABLE A-2: SAMPLE OF FREEWAY ANALYSIS SUMMARY

Freeway	Segment	Direction	Peak Hour	EXISTING					PROJECT			
				Lanes	Average Speed	Volume	Density	LOS	Project Trips	Density	LOS	% Impact
101	Capitol to Tully	SB	AM	2	45	2500	45.5	D	68	46.5	D	----
101	Capitol to Tully	SB	PM	3	25	4500	65.0	F	85	----	F	1.8%
101	Capitol to Tully	NB	AM									
101	Capitol to Tully	NB	PM									
101	Capitol to Tully	SB HOV	AM	1	----	----	----	----	----	----	----	
101	Capitol to Tully	SB HOV	PM	0								
101	Capitol to Tully	NB HOV	AM	0								
101	Capitol to Tully	NB HOV	PM	1								
			AM									
			PM									
			AM									
			PM									
			AM									
			PM									
			AM									
			PM									
			AM									
			PM									

Note: HOV lanes shall be analyzed if project trips are assigned to the HOV lane. See *TIA Guidelines* for details.

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APPENDIX B: TIA Notification Form

CMP ID: _____

Congestion Management Program
Transportation Impact Analysis (TIA) NOTIFICATION FORM

Lead Agency: _____

Lead Agency File Number: _____

Project: _____

Project Size (SF or DU): _____

Net New Trips: _____

Project Address: _____

Analysis Periods: _____

Analysis Scenarios: _____

Study Intersections: *(continue in attachment if necessary)* _____

Study Freeway Segments: *(continue in attachment if necessary)* _____

Agency Contact: _____

Telephone: _____

E-mail: _____

Developer: _____

Transportation Consultant: _____

Form Prepared By: _____

Date: _____

This form sent to:

Agency	**Name of Person(s)**
☐ City of Campbell	
☐ City of Cupertino	
☐ City of Gilroy	
☐ City of Los Altos	
☐ Town of Los Altos Hills	
☐ Town of Los Gatos	
☐ City of Milpitas	
☐ City of Monte Sereno	
☐ City of Morgan Hill	
☐ City of Mountain View	
☐ City of Palo Alto	
☐ City of San Jose	
☐ City of Santa Clara	
☐ City of Saratoga	
☐ City of Sunnyvale	
☐ County of Santa Clara	
☐ Caltrans	
☐ VTA	

* SF=square feet; DU=dwelling units

Note: The Lead Agency is encouraged to submit the draft TIA work scope along with this form when circulating it to other agencies. Comments from interested agencies on the TIA scoping must be received by the Lead Agency within 15 calendar days of the mailing of this TIA Notification Form.

APPENDIX C: Auto Trip Reduction Statement

Introduction

The Auto Trip Reduction Statement is intended to provide a concise summary of automobile trip reduction efforts made by a project. It is intended only as a summary; any automobile trip reductions claimed for the development must be fully documented and justified in the TIA. Lead Agencies must complete an Auto Trip Reduction Statement for all TIAs and include the Statement in the TIA Executive Summary, whether or not trip reductions are claimed. ***Section 8.2*** of the VTA *TIA Guidelines* describes three different approaches to auto trip reduction in TIAs.

The Auto Trip Reduction Statement must describe trip reductions claimed in the trip generation section of the TIA. It may also be used to describe additional trip reduction efforts undertaken in order to mitigate project impacts. A Lead Agency may choose to provide an initial Statement with the reductions that are used in the Project Conditions analysis, and a revised statement with the final reductions reflecting mitigation measures. Examples have been provided of Auto Trip Reduction Statements for typical projects using the Standard, Peer/Study-Based and Target-Based trip reduction approaches.

Brief Guidelines for filling out the Auto Trip Reduction Statement

Project Auto Trip Generation – Specify trip generation methodology (ITE or Other). If "Other" is selected, briefly describe methodology used. Refer to ***Section 8.1*** for more information about trip generation methodologies.

Auto Trip Reduction Approach – Specify the approach taken in the TIA. See section 8.2 for further information about the three approaches.

Standard Approach – List any reductions claimed based on the Standard Reductions described in ***Table 1*** of the *TIA Guidelines*. See ***Section 8.2.1*** for further information.

Peer/Study-Based Approach – Document the project's Peer/Study-Based approach to trip reduction, if applicable (see ***Section 8.2.3***). This approach may be used to justify a trip reduction based on a project's similarity to other projects with demonstrated trip reductions or a project occupant's track record of reducing trips at other sites, or to provide additional justification for trip rates based on local data collection efforts. The "Basis of Reduction" box should note the starting point for the trip reduction claimed, whether starting from ITE auto trip generation rates based on square footage or number of units, or total person-trips based on employee/resident count. The "Total Reduction Claimed" box should also reference the starting point. Note that in some cases the "Total Reduction Claimed" box may not be applicable, depending on the methodology.

Target-Based Approach – Document the project's Target-Based approach, if applicable (see ***Section 8.2.2***). This approach may be taken when the project applicant has entered into an enforceable agreement with the Lead Agency that limits the number of automobile trips traveling to and from the project site. The "Description" should note the starting point for the trip reduction claimed, whether starting from ITE auto trip generation rates based on square footage or number of units, or total person-trips based on employee/resident count. The "Total Reduction Claimed" box should also reference the starting point. Note that in some cases the "Total Reduction Claimed" box may not be applicable, depending on the methodology.

AUTO TRIP REDUCTION STATEMENT

UPDATED: October 2014

SANTA CLARA Valley Transportation Authority

PROJECT INFORMATION	*Relevant TIA Section:*		
Project Name:			
Location:			
Description:			
Size (net new):	*D.U. Residential*	*Sq. Ft. Comm.*	*Acres (Gr.)*
Density:	*D.U. / Acre*		*Floor Area Ratio (FAR)*
Located within 2000 feet walking distance of an LRT, BRT, BART or Caltrain station or major bus stop? Yes/No			

PROJECT AUTO TRIP GENERATION	*Relevant TIA Section:*		
Auto Trips Generated:	*AM Pk Hr*	*PM Pk Hr*	*Total Weekday*
Methodology (check one)	☐ **ITE**	☐ **Other** *(Please describe below)*	
Describe alternative trip generation methodology, if applicable			

AUTO TRIP REDUCTION APPROACH	*Relevant TIA Section:*		
☐ **Standard** *Complete Table A below*	☐ **Peer/Study-Based** *Complete Table B below*	☐ **Target-Based** *Complete Table C below*	☐ **None Taken**

TRIP REDUCTION REQUIREMENTS	*Relevant TIA Section:*	
Is the project required to meet any trip reduction requirements or targets? Yes/No		**If so, specify percent:**
Reference code or requirement:		

TRIP REDUCTION APPROACHES

A. STANDARD APPROACH	*Relevant TIA Section:*			
Type of Reduction *Specify reduction. See Table 2 in TIA Guidelines*		**% Reduction from ITE Rates**	**Total Trips Reduced (AM/PM/Daily)**	**TOTAL REDUCTION CLAIMED**
				% / **Trips**
Transit				Specify AM, PM, and/or Daily reduction / Specify AM, PM, and/or Daily reduction
Mixed-Use				
Financial Incentives				
Shuttle				

B. PEER/STUDY-BASED APPROACH	*Relevant TIA Section:*	
Basis of Reduction	**TOTAL REDUCTION CLAIMED**	
	%	**Trips**
Summarize basis of reduction, addressing: -Data used to justify trip reduction rate -Source(s) referenced -Assumptions and methodologies used to develop the trip reduction -How the trip reduction rate is appropriate for the proposed development	Specify AM, PM, and/or Daily reduction	Specify AM, PM, and/or Daily reduction

C. TARGET-BASED APPROACH			Relevant TIA Section:			
Type of Reduction (check all that apply)					TOTAL REDUCTION CLAIMED	
❒ % Trip Reduction	❒ % SOV mode share		❒ Trip Cap		%	Trips
If checked, state reduction here	If checked, state reduction here		If checked, state cap here		Specify AM, PM, and/or Daily reduction	Specify AM, PM, and/or Daily reduction
Description	e.g., ITE auto trip generation rates based on square footage or number of units, total person-trips based on employee/resident count					
Time period for reduction	Peak Hour		Peak Period	Full Day		
	❒ AM/PM		❒ AM/PM	❒		

OTHER TDM/REDUCTION MEASURES			
Bicycle/Pedestrian	Yes/No	Relevant TIA Section:	
Describe any bicycle/pedestrian improvements related to the project. Note both infrastructure (improvements to sidewalks, bicycle facilities, etc.) and programs (subsidies, bike share, etc.)			
Parking Management	Yes/No	Relevant TIA Section:	
Describe any parking management strategies that would lead to reduced auto trips, such as parking pricing, parking cash-out, unbundled parking, etc.			
Transit	Yes/No	Relevant TIA Section:	
Describe any transit service or access improvements that would lead to reduced auto trips, such as improved pedestrian connections to transit, added shuttle service, etc.			
Site Planning and Design	Yes/No	Relevant TIA Section:	
Describe features of the site plan and design of the project that encourage walking, biking, and transit use, while discouraging solo automobile trips.			
TDM Program	Yes/No	Relevant TIA Section:	
Describe any other TDM program elements at the site, such as: carpool/vanpool programs, emergency ride home service, trip planning, on- site mobile services, etc.			

IMPLEMENTATION		Relevant TIA Section:	
Have the project sponsor and Lead Agency agreed to any of the following measures?			
❒ Monitoring	Describe.		
❒ Enforcement	Describe.		
❒ Data Sharing	Describe.		

Example: Standard Reduction Approach

AUTO TRIP REDUCTION STATEMENT

UPDATED: October 2014

SANTA CLARA Valley Transportation Authority

PROJECT INFORMATION	*Relevant TIA Section:*	Chapter 2: Project Description
Project Name: Baytown Apartment Complex		
Location: Baytown, CA		
Description: Construct 250 apartment units on a 5-acre vacant site. Main complex entrance located 1,250 feet walking distance from Baytown Light Rail Station.		

Size (net new):	250 *D.U. Residential*	*Sq. Ft. Comm.*	*Acres (Gr.)*
Density:	50 *D.U. / Acre*		*Floor Area Ratio (FAR)*
Located within 2000 feet walking distance of an LRT, BRT, BART or Caltrain station or major bus stop?			Y

PROJECT AUTO TRIP GENERATION	*Relevant TIA Section:*	Chapter 2: Project Description	
Auto Trips Generated:	126 *AM Pk Hr*	155 *PM Pk Hr*	1639 *Total Weekday*
Methodology (check one)	✓ **ITE**	❒ **Other** *(Please describe below)*	
Describe alternative trip generation methodology, if applicable			

AUTO TRIP REDUCTION APPROACH	*Relevant TIA Section:*	Chapter 2: Project Description	
✓ **Standard** *Complete Table A below*	❒ **Peer/Study-Based** *Complete Table B below*	❒ **Target-Based** *Complete Table C below*	❒ **None Taken**

TRIP REDUCTION REQUIREMENTS	*Relevant TIA Section:*	
Is the project required to meet any trip reduction requirements or targets?		N
If so, specify percent:	**Reference code or requirement:**	

TRIP REDUCTION APPROACHES

A. STANDARD APPROACH		*Relevant TIA Section:*	Chapter 2: Project Description		
Type of Reduction *Specify reduction. See Table 2 in TIA Guidelines*		**% Reduction from ITE Rates**	**Total Trips Reduced (AM/PM/Daily)**	**TOTAL REDUCTION CLAIMED**	
				%	**Trips**
Transit	*Proximity to LRT (within 2000 ft walk)*	9.0%	11/14/148	9.5%	AM - 12 PM - 15 Daily - 156
Mixed-Use					
Financial Incentives	*Unbundled Parking*	0.50%	1/1/8		
Shuttle					

B. PEER/STUDY-BASED APPROACH	*Relevant TIA Section:*		
Basis of Reduction		**TOTAL REDUCTION CLAIMED**	
Summarize basis of reduction, addressing:		**%**	**Trips**
• *Data used to justify trip reduction rate* • *Source(s) referenced* • *Assumptions and methodologies used to develop the trip reduction* • *How the trip reduction rate is appropriate for the proposed development*		*Specify AM, PM and/or Daily reduction*	*Specify AM, PM and/or Daily reduction*

Example: Standard Reduction Approach

C. TARGET-BASED APPROACH		Relevant TIA Section:			
Type of Reduction (check all that apply)				**TOTAL REDUCTION CLAIMED**	
❒ **% Trip Reduction**	❒ **% SOV mode share**	❒ **Trip Cap**		**%**	**Trips**
If checked, state % reduction here	*If checked, state % reduction here*	*If checked, state cap here*		*Specify AM, PM and/or Daily reduction*	*Specify AM, PM and/or Daily reduction*
Description	*e.g., ITE auto trip generation rates based on square footage or number of units, total person-trips based on employee/resident count*				
Time period for reduction	**Peak Hour**	**Peak Period**	**Full Day**		
	❒ *Specify AM, PM or both*	❒ *Specify AM, PM or both*	❒		

OTHER TDM/REDUCTION MEASURES			
Bicycle/Pedestrian	Y	***Relevant TIA Section:***	Chapter 7: Multimodal Evaluation
- Fill sidewalk gaps on south side of project site - Pedestrian and bicycle crossing improvements at adjacent intersections: bicycle detector loops, high-visibility ladder crosswalks - Bicycle parking: 85 spaces in locked section of garage, 20 outdoor spaces near building entrances			
Parking Management	Y	***Relevant TIA Section:***	Chapter 9: TDM Plan
- Unbundled parking: First parking space included in rent, $300/month for second parking space			
Transit	N	***Relevant TIA Section:***	
Site Planning and Design	Y	***Relevant TIA Section:***	Chapter 8: Site Access and Circulation
- Building entrance oriented to face street, with small public plaza - Mixed use pedestrian and bicycle paths within site to connect buildings			
TDM Program	Y	***Relevant TIA Section:***	Chapter 9: TDM Plan
- On-site transit and alternative travel information kiosk - Unbundled parking as noted above			

IMPLEMENTATION	Relevant TIA Section:	
Have the project sponsor and Lead Agency agreed to any of the following measures?		
❒ **Monitoring**	*Describe.*	
❒ **Enforcement**	*Describe.*	
❒ **Data Sharing**	*Describe.*	

Example: Peer/Study-Based Reduction Approach

AUTO TRIP REDUCTION STATEMENT

UPDATED: October 2014

SANTA CLARA Valley Transportation Authority

PROJECT INFORMATION	*Relevant TIA Section:*	Chapter 2: Project Description
Project Name: Technology Office Expansion		
Location: Techville, CA		
Description: Replace 1.4 Million SF of office space in one building with 1.5 Million SF of office in one building and 620 KSF of R&D space in another building, on a 49-acre site.		

Size (net new):	*D.U. Residential*	720,000 *Sq. Ft. Comm.*	*Acres (Gr.)*
Density:	*D.U. / Acre*	1.0 *Floor Area Ratio (FAR)*	
Located within 2000 feet walking distance of an LRT, BRT, BART or Caltrain station or major bus stop?			N

PROJECT AUTO TRIP GENERATION	*Relevant TIA Section:*	Chapter 3: Trip Generation and Distribution	
Auto Trips Generated:	1,316 *AM Pk Hr*	1,358 *PM Pk Hr*	14,769 *Total Weekday*
Methodology (check one)	❒ **ITE**	✓ **Other** *(Please describe below)*	
Driveway counts at existing 1.4 Million sf office space were used to calculate per-employee trip rates. These rates were multiplied by net new employees projected for the new office space.			

AUTO TRIP REDUCTION APPROACH	*Relevant TIA Section:*	Chapter 3: Trip Generation and Distribution	
❒ **Standard** *Complete Table A below*	✓ **Peer/Study-Based** *Complete Table B below*	❒ **Target-Based** *Complete Table C below*	❒ **None Taken**

TRIP REDUCTION REQUIREMENTS	*Relevant TIA Section:*	
Is the project required to meet any trip reduction requirements or targets?		N
If so, specify percent:	**Reference code or requirement:**	

TRIP REDUCTION APPROACHES

A. STANDARD APPROACH	*Relevant TIA Section:*			
Type of Reduction *Specify reduction. See Table 2 in TIA Guidelines*		**% Reduction from ITE Rates**	**Total Trips Reduced (AM/PM/Daily)**	**TOTAL REDUCTION CLAIMED**
				% / **Trips**
Transit				*Specify AM, PM and/or Daily reduction* / *Specify AM, PM and/or Daily reduction*
Mixed-Use				
Financial Incentives				
Shuttle				

B. PEER/STUDY-BASED APPROACH	*Relevant TIA Section:*	Chapter 3: Trip Generation and Distribution	
Basis of Reduction			**TOTAL REDUCTION CLAIMED**
			% / **Trips**
Trip generation studies were conducted at the existing campus. The rates used in the TIA are based on number of employees rather than building square footage and assume that Technology Employer's existing TDM program will be expanded to the expanded campus.			30% non-SOV mode share for all AM and PM peak hour trips /

Example: Peer/Study-Based Reduction Approach

C. TARGET-BASED APPROACH			*Relevant TIA Section:*		
Type of Reduction (check all that apply)				**TOTAL REDUCTION CLAIMED**	
❒ **% Trip Reduction**	❒ **% SOV mode share**	❒ **Trip Cap**		**%**	**Trips**
If checked, state % reduction here	*If checked, state % reduction here*	*If checked, state cap here*		*Specify AM, PM and/or Daily reduction*	*Specify AM, PM and/or Daily reduction*
Description	*e.g., ITE auto trip generation rates based on square footage or number of units, total person-trips based on employee/resident count*				
Time period for reduction	**Peak Hour**	**Peak Period**	**Full Day**		
	❒ *Specify AM, PM or both*	❒ *Specify AM, PM or both*	❒		

OTHER TDM/REDUCTION MEASURES			
Bicycle/Pedestrian	Y	***Relevant TIA Section:***	Chapter 9: Multimodal Evaluation
- Improve off-campus bicycle facilities: Connect bicycle lanes on Woodland Lane to campus main entrance - Construct curb extensions at intersection of Woodland Lane and Techville Avenue (at corner of site) to shorten pedestrian crossing distance - Bike lockers (275) in parking garage, 75 short-term bicycle parking spaces outside main entrance			
Parking Management	N	***Relevant TIA Section:***	
Describe any parking management strategies that would lead to reduced auto trips, such as parking pricing, parking cash-out, unbundled parking, etc.			
Transit	Y	***Relevant TIA Section:***	Chapter 9: Multimodal Evaluation
- Long-distance private commuter shuttles - Financial contribution to shuttle service to nearest Caltrain station (Downtown Techville) - Transit subsidy for commuters: VTA Eco Pass and Caltrain Go Pass provided at no cost on ongoing basis			
Site Planning and Design	Y	***Relevant TIA Section:***	Chapter 10: Site Access and Circulation
- Parking located far from work areas to discourage driving for commuting - Long-distance commuter shuttle and Caltrain shuttle pick-up and drop-off at main building entrance			
TDM Program	Y	***Relevant TIA Section:***	Chapter 11: TDM Plan
- Carpool matching service provided to all employees - Flexible work schedules and telecommuting encouraged as company policy - On-site amenities (free cafeteria, coffee stand, dry cleaning pick-up and drop-off)			

IMPLEMENTATION		***Relevant TIA Section:***	Chapter 11: TDM Plan
Have the project sponsor and Lead Agency agreed to any of the following measures?			
✓ **Monitoring**	Annual monitoring via driveway surveys and employee TDM surveys will be conducted by outside consultants and reported to City of Techville.		
❒ **Enforcement**			
✓ **Data Sharing**	City of Techville will share annual monitoring reports with VTA after staff approval of reports.		

Example: Target-Based Reduction Approach

AUTO TRIP REDUCTION STATEMENT

UPDATED: October 2014

SANTA CLARA Valley Transportation Authority

PROJECT INFORMATION	*Relevant TIA Section:*	Chapter 3: Project Description
Project Name: Large Company Campus Expansion		
Location: Treeview, CA		
Description: Redevelop 9 acre site into two office buildings totalling 470,000 sf of office with structured parking, to replace four existing buildings totalling 123,000 sf of office space and surface parking, resulting in 347,000 sf of net new growth.		

Size (net new):	*D.U. Residential*	347,000 *Sq. Ft. Comm.*	*Acres (Gr.)*
Density:	*D.U. / Acre*	1.2 *Floor Area Ratio (FAR)*	
Located within 2000 feet walking distance of an LRT, BRT, BART or Caltrain station or major bus stop?			Y

PROJECT AUTO TRIP GENERATION	*Relevant TIA Section:*	Chapter 3: Project Description	
Auto Trips Generated:	507 *AM Pk Hr*	467 *PM Pk Hr*	3,477 *Total Weekday*
Methodology (check one)	✓ **ITE**	❐ **Other** *(Please describe below)*	
Describe alternative trip generation methodology, if applicable			

AUTO TRIP REDUCTION APPROACH	*Relevant TIA Section:*	Chapter 3: Project Description	
❐ **Standard** *Complete Table A below*	❐ **Peer/Study-Based** *Complete Table B below*	✓ **Target-Based** *Complete Table C below*	❐ **None Taken**

TRIP REDUCTION REQUIREMENTS	*Relevant TIA Section:*	Chapter 2: Existing Conditions
Is the project required to meet any trip reduction requirements or targets?		Y
If so, specify percent: Daily - 20%, Peak Hour - 30%	**Reference code or requirement:** Treeview Business Park Specific Plan (2013)	

TRIP REDUCTION APPROACHES

A. STANDARD APPROACH	*Relevant TIA Section:*			
Type of Reduction *Specify reduction. See Table 2 in TIA Guidelines*		**% Reduction from ITE Rates**	**Total Trips Reduced (AM/PM/Daily)**	**TOTAL REDUCTION CLAIMED**
				% / **Trips**
Transit				*Specify AM, PM and/or Daily reduction* / *Specify AM, PM and/or Daily reduction*
Mixed-Use				
Financial Incentives				
Shuttle				

B. PEER/STUDY-BASED APPROACH	*Relevant TIA Section:*	
Basis of Reduction		**TOTAL REDUCTION CLAIMED**
		% / **Trips**
Summarize basis of reduction, addressing: • *Data used to justify trip reduction rate* • *Source(s) referenced* • *Assumptions and methodologies used to develop the trip reduction* • *How the trip reduction rate is appropriate for the proposed development*		*Specify AM, PM and/or Daily reduction* / *Specify AM, PM and/or Daily reduction*

Example: Target-Based Reduction Approach

C. TARGET-BASED APPROACH			Relevant TIA Section:	Chapter 3: Project Description	
Type of Reduction (check all that apply)				TOTAL REDUCTION CLAIMED	
✓ % Trip Reduction	❒ % SOV mode share		❒ Trip Cap	%	Trips
Daily - 20%, Peak Hour - 30%	*If checked, state % reduction here*		*If checked, state % reduction here*	AM: -30% PM: - 30% Daily: -20%	AM: - 152 PM: - 467 Daily: - 695
Description	Target reduction based on ITE trip generation estimates for Large Company site. Reduction taken in compliance with Treeview Business Park Specific Plan (2013).				
Time period for reduction	**Peak Hour**	**Peak Period**	**Full Day**		
	Both		Yes		

OTHER TDM/REDUCTION MEASURES			
Bicycle/Pedestrian	Y	***Relevant TIA Section:***	Chapter 8: Multimodal Evaluation
- Improving project's street frontage with wider sidewalks and landscape buffer with street trees to help offset effect of increased auto traffic - Bike lockers (58), showers (2), pumps and tools provided in bicycle center (Building A), plus mobile bicycle repair services 1x/week - Free bike share program for employees traveling between buildings and within Treeview Business Park			
Parking Management	N	***Relevant TIA Section:***	
Describe any parking management strategies that would lead to reduced auto trips, such as parking pricing, parking cash-out, unbundled parking, etc.			
Transit	Y	***Relevant TIA Section:***	Chapter 8: Multimodal Evaluation
- Vanpool service provided to all employees - FreeCaltrain and VTA passes provided to employees on an ongoing basis			
Site Planning and Design	Y	***Relevant TIA Section:***	Chapter 7: Site Circulation and Access
- Multi-use paths between buildings designed to encourage bicycle and pedestrian travel on campus			
TDM Program	Y	***Relevant TIA Section:***	Chapter 8: TDM Program
- Carpool matching provided for all employees - Telecommuting encouraged - Guaranteed ride home program			

IMPLEMENTATION		Relevant TIA Section:	Chapter 8: TDM Program
Have the project sponsor and Lead Agency agreed to any of the following measures?			
✓ **Monitoring**	Monitoring agreement with City of Treeview: quarterly trip generation monitoring via driveway counts for first two years of full occupancy; annual monitoring thereafter.		
✓ **Enforcement**	City of Treeview will assess a $1000 per-trip fee for vehicle trips that exceed peak hour or daily trip generation estimated in TIA.		
✓ **Data Sharing**	Monitoring reports will be made available to VTA after City of Treeview staff approval.		

APPENDIX D: Alternative Trip Generation Resources

Introduction

Chapter 8 of the *TIA Guidelines* presents several trip generation methodologies that may be appropriate for development projects in Santa Clara County. Typically, Lead Agencies rely on trip generation rates published by the Institute of Transportation Engineers (ITE). In some cases, however, the published ITE trip generation rates are based on very limited data. There are at least four cases in which the Lead Agency should consider using use alternative sources for trip generation rates:

- When ***ITE data is insufficient*** (e.g. small sample size, not statistically valid);
- When a project's ***specific land use*** is not covered by the ITE manual or is known to show trip generation characteristics that differ from the categories covered in the ITE manual;
- When the ***land use context***, such as high-density infill or development adjacent to transit, is not addressed by the ITE manual;
- When the project includes a mix of land uses (***mixed-use development*** type).

Professional judgment should always be used when selecting a trip generation methodology. When using trip rates from any of the alternate trip generation methodologies identified in ***Chapter 8*** and in this appendix, the Lead Agency shall include in the TIA Report a full description of the trip generation methodology used and a summary of all inputs and assumptions.

This appendix includes information on the research and practice basis of several alternative trip generation methodologies identified in the *TIA Guidelines*. ***Table D-1***, next page, provides an overview of trip generation methods and tools identified in the *TIA Guidelines.* The following pages present profiles that may be helpful to Lead Agencies selecting between methodologies.

TABLE D-1: SUMMARY OF TRIP GENERATION METHODOLOGIES AND TOOLS

Tool/ Method	Tool Type	Project Type/ Context	Validation Locations	Level of Effort	Outputs	Notes
City of San José	Rate Table and Guidelines	Typically used for projects in San Jose	National, San Diego, Other	Low	N/A	For alternative rates, seek approval from City of San Jose staff
NCHRP 684	Spreadsheet tool	Mixed use developments	Georgia and Texas	High	• Internal trip capture • External trip mode split • AM peak, PM peak, and Daily periods	Recommended for developments of up to 300 acres; not recommended for larger developments, suburban activity centers or new towns
EPA MXD	Spreadsheet tool	Mixed use developments	National with a California emphasis	High	• Internal trip capture • External trip mode split • AM peak, PM peak, and Daily periods	Sensitive to 7D's (land use characteristics); combined MXD/NCHRP 684 model has been adapted for use in several TIAs in Santa Clara County
SANDAG MXD	Trip Generation table with Spreadsheet tool	Site within a Priority Development Area	San Diego	High	• Internal trip capture • External trip mode split • AM peak, PM peak, and Daily periods	This was developed for "Smart Growth Opportunity Areas" in San Diego, but may be appropriate for use in the Priority Development Areas in Santa Clara County.
CalEEMod	Model with option to adjust rates	Air quality analysis for any site	California	Med.	• Criteria pollutant and greenhouse gas (GHG) emissions	Required by BAAQMD for air quality analysis. Not recommended as primary source for trip generation, but may be useful as supplemental resource for justification of trip reductions.

TABLE D-1: SUMMARY OF TRIP GENERATION METHODOLOGIES AND TOOLS

Tool/ Method	Tool Type	Project Type/ Context	Validation Locations	Level of Effort	Outputs	Notes
MTC STARS	Mode share tables	Site within 1/2 to 1 mile of rail or ferry stops	San Francisco Bay Area	Low	N/A	May be a resource to help justify a reduction in trip generation rates based on non-auto mode share data.
Caltrans/ UC Davis	Spreadsheet tool	Single use sites within smart growth areas	California	Low	• Reduction to ITE rate • Adjustment can be applied to AM peak, PM peak, and Daily rates	For use only with a single land use that is part of a multi-use site, and only at sites located in smart-growth areas. Other limitations may apply – see documentation.

Methodology Profiles

City of San José Trip Generation Rates

The City of San Jose maintains a *Traffic Impact Analysis Handbook* which includes a set of trip generation rates based on the Institute of Transportation Engineers (ITE) *Trip Generation* report, San Diego *Traffic Generators*, data from other agencies and publications, reports and estimates. ITE rates and rates obtained through surveys of similar land uses may also be used when appropriate. The trip generation rates provided in the tables do not account for mixed use environments or proximity to transit, however the City of San Jose *TIA Handbook* allows for standard reductions to trip generation using the VTA methodology included in VTA *TIA Guidelines.* The City of San Jose has final authority to approve the trip generation rates used in the TIA analysis.

- City of San Jose. *Traffic Impact Analysis Handbook. 2009.* San Jose, California: Author. *https://www.sanjoseca.gov/DocumentCenter/View/4366*

NCHRP 684 – Enhancing Internal Trip Capture Rate for Mixed-Use Development

The National Cooperative Highway Research Program (NCHRP) Report 684, *Enhancing Internal Trip Capture Estimation for Mixed-Use Developments*, analyzed the internal-capture relationships of mixed use sites and examined the travel interactions among six individual types of land uses: office, retail, restaurant, residential, cinema, and hotel. The study looked at three master-planned developments in Georgia and Texas to ascertain the interactions among these six land use types within each of the sites. The study considered site context factors and described percentage reductions in site-wide traffic generation that might result from the availability of transit service and other factors. Researchers then verified analysis results by comparing them to trip generation for three earlier ITE studies at Florida mixed use sites. The validation confirmed that the estimated values were a reasonable match for observed traffic. The interaction percentages among the land use types are then used to discount ITE trip-generation rates by the number of trips that would remain internal to the project site due to the presence of multiple land uses.

The tool provides peak period trips and requires the user to input mode split, vehicle occupancy by land use, and distance between land uses. Researchers recommend its use for developments of up to 300 acres, but do not recommend use of this method for larger developments, suburban activity centers or new town types of development. This method could be used for mixed-use developments in an urban context, including station area plans or transit oriented developments. Recently findings from this study and the MXD tool developed by EPA were combined into one comprehensive tool – MXD+. (See below.)

- National Cooperative Highway Research Program. (2011). *NCHRP Report 684: Enhancing Internal Trip Capture Estimation for Mixed-Use Developments*. 2011. Washington, D.C.: Transportation Research Board, National Research Council. *http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_684.pdf*
- Walters, J., B. Bochner, R. Ewing. (2013). Getting Trip Generation Right: Eliminating the Bias Against Mixed Use Development. *American Planning Association: Planning Advisory Service Report, May 2013.* Chicago, Illinois: American Planning Association. *http://asap.fehrandpeers.com/wp-content/uploads/2012/05/APA_PAS_May2013_GettingTripGenRight.pdf*

MXD Model – US EPA

This spreadsheet tool is based on a robust national sample of 239 mixed-use developments in six metro areas and has been validated at 40 sites, mostly in California. The tool applies elasticities for transportation behavior response to land-use variables from peer-reviewed literature. It is sensitive to 7 "D's" factors: density, diversity, design, distance from transit, destination accessibility, development scale, and demographics. More recently, a tool has been developed that combines the EPA MXD model with the National Cooperative Highway Research Program Report 684 (see above). The combined EPA/NCHRP MXD model has been adapted for use in several transportation impact analysis studies in Santa Clara County, including the Apple Campus II EIR, the Lawrence Station Area Plan for the City of Sunnyvale, as well as a number of impact analysis projects in other Bay Area counties.

- Ewing, et al. (2011). Traffic Generated by Mixed-Use Developments – A Six Region Study Using Consistent Built Environment Measures. Washington, D.C.: United States Environmental Protection Agency. *http://www.epa.gov/dced/mxd_tripgeneration.html*
- Walters, J., B. Bochner, R. Ewing. (2013). Getting Trip Generation Right: Eliminating the Bias Against Mixed Use Development. *American Planning Association: Planning Advisory Service Report, May 2013.* Chicago, Illinois: American Planning Association. *http://asap.fehrandpeers.com/wp-content/uploads/2012/05/APA_PAS_May2013_GettingTripGenRight.pdf*
- Alameda County Transportation Commission. (2013). *2013 Congestion Management Program Update. Appendix K.* Oakland, California: Author. *http://www.alamedactc.org/app_pages/view/5224*

SANDAG Traffic Generation Manual & Trip Generation for Smart Growth

The San Diego Association of Governments (SANDAG) published the *San Diego Traffic Generators Manual* in 2000, which includes trip generation rates based on traffic counts collected at four to seven sites for each land use category provided within the manual. In 2010, SANDAG released *Trip Generation for Smart Growth: Planning Tools for the San Diego Region* as a supplement to the manual in order to provided reductions for mixed use that accounted for the specific context of a site.

The study resulted in a spreadsheet tool which is based on the MXD tool developed for EPA (see above), but modified for use by SANDAG. The study validated the MXD tool for use within the San Diego region by comparing the method's trip generation estimates to actual travel data from twenty of the region's Smart Growth Opportunity Areas (SGOAs) and six smaller mixed-use/transit-oriented development (TOD) sites. Travel data for a representative group of SGOAs was compiled from the SANDAG 2006 Regional Household Travel Behavior Survey and 24 hour counts were conducted for use in the study. Based on observed data, the MXD tool was an excellent predictor of external vehicle trips generated by smart growth development. SANDAG's SGOAs are similar to Priority Development Areas (PDAs) as planned for in the San Francisco Bay Area's Regional Transportation Plan and Sustainable Communities Strategy, or *One Bay Area* Plan. This tool could be useful for developments within PDAs as it has been refined for this type of focused growth.

- San Diego Association of Governments. (2010). *Trip Generation for Smart Growth: Planning Tools for the San Diego Region.* San Diego, California: Author. *http://www.sandag.org/index.asp?projectid=334&fuseaction=projects.detail*

CalEEMod – CAPCOA/BAAQMD

The California Emissions Estimator Model (CalEEMod) was released by the California Air Pollution Control Officers Association (CAPCOA) and is used by the Bay Area Air Quality Management District (BAAQMD) for determining air quality conformity. The tool calculates vehicle trips and vehicle miles traveled (VMT) in order to estimate air pollution and greenhouse gas emissions arising from development. ITE *Trip Generation* (8th Edition) trip generation rates are used as default in the program, although users have the option to manually add rates. Trip types are broken down by residential and commercial trips. Residential trips include home-work, home-shopping and home-other trips. The trip type breakdown is from the 1999 Caltrans Statewide Travel Survey; however, users can overwrite these inputs if sufficient justification for alternative sources of data (e.g., project-specific traffic study) can be provided. The tool also identifies a number of mitigation measures that can be chosen by the user, such as changes to land use, parking policies, transportation systems management and transportation demand management that can be used to reduce the resulting VMT. It should be noted, however, that the CalEEMod trip model does not produce detailed trip generation estimates or output reductions to vehicle trips, but rather reductions to VMT. The tool may be therefore be most appropriate for analyses that primarily examine VMT rather than peak-hour trip generation.

- California Air Pollution Control Officers Association (CAPCOA). (2013). *California Emissions Estimator Model Users Guide.* http://www.caleemod.com/

Station Area Resident Survey – MTC

The Metropolitan Transportation Commission (MTC) Station Area Residents Survey (STARS) was conducted in 2006. It characterizes the demographic and travel characteristics of transit station area residents in the San Francisco Bay Area. A GIS analysis was conducted using county-level results from the 2000 *Bay Area Travel Survey* to group residents based on population density and their proximity to rail or ferry stations. MTC's website provides tables showing mode split by population densities and proximity to rail and ferry stops. The STARS tables can be used to help justify a reduction in trip generation rates based on actual survey data for Santa Clara County that shows residents near transit have higher non-auto mode shares.

- Metropolitan Transportation Commission (MTC). (2006). *Characteristics of Rail and Ferry Station Area Residents in the San Francisco Bay Area: Evidence from the 200 Bay Area Travel Survey.* Oakland, California: Author. http://www.mtc.ca.gov/planning/smart_growth/stars/
- Alameda County Transportation Commission. (2013). *2013 Congestion Management Program Update. Appendix K.* Oakland, California: Author. http://www.alamedactc.org/app_pages/view/5224

California Smart Growth Trip Generation Tool – Caltrans/UC Davis

This spreadsheet tool provides ITE rate adjustment factors based on a database of vehicle trip counts and site/context data for a sample of 50 smart growth sites in California. The tool can be used for daily or peak rates. The tool was validated at 11 mixed-use sites for the AM peak period and 13 mixed-use sites for the PM peak period. Rates are based on density, land use mixture, regional location, transit service, and parking. The research team defined specific criteria that should be met in order to apply the model, which can be found in the *California Smart-Growth Trip Generation Rates Study* report cited below. Resulting models are only appropriate for

analysis for a single land use that is part of a multi-use site, and only at sites located in smart-growth areas. (UCSD, 2013 p. 10) For example, for residential development analysis, the input for the tool is the number of dwelling units for an entire residential-only site or targeted residential use within a multi-use building or multi-use site.

- University of California, Davis for the California Department of Transportation. (2013). *California Smart-Growth Trip Generation Rates Study.* *http://ultrans.its.ucdavis.edu/projects/smart-growth-trip-generation*
- Alameda County Transportation Commission. (2013). *2013 Congestion Management Program Update. Appendix K.* *http://www.alamedactc.org/app_pages/view/5*

APPENDIX E: ITE Methodology for Applying Pass-By and Diverted Linked Trip Reductions

ITE Methodology for Applying Pass-by and Diverted Linked Trip Reductions

The Institute of Transportation Engineers methodology for applying pass-by and diverted linked trip reductions should be used in TIAs and is summarized below.[1]

1. Obtain peak hour traffic volumes passing the project site driveway(s) in both directions for a two-way street or the travel direction on a one-way street.

2. Obtain driveway volumes entering and exiting the site. The driveway volumes are determined from the project size and trip rates.

3. For each driveway, calculate the number of pass-by and diverted linked trips by multiplying the total number of project trips by the appropriate reduction percentage. (Other methods may be used to determine the reduction. See Chapter VII of ITE's *Trip Generation* report.) *Note that reductions for pass-by trips often differ from those for diverted linked trips*.

4. Determine the trip distribution on roadways adjacent to the site for pass-by trips, and determine the trip distribution on roadways that would be used by diverted linked trips.

5. Determine pass-by and diverted linked trip distribution based on the volume of traffic passing the driveway in both directions.

6. Assign pass-by and diverted linked trip volumes to the driveway based on the distributions calculated in Step 5 above. These trips should also be analyzed on the street system to accurately reflect the turning movements necessary to access the site.

Figure C-1 illustrates the application of the pass-by trip methodology. Diverted linked trips are not included in this example but should be analyzed in TIAs. In ***Figure C-1***, the 50 pass-by trips should be examined in the context of the turning movements already handled by existing facilities. For example, can the existing left turn pockets and/or signal timing accommodate the eight additional U-turns added by the project?

[1] Institute of Transportation Engineers, *Trip Generation Handbook*, 2nd Edition, 2004, Chapter 5, pp. 29-82.

Figure C-1: Application of Pass-by Trips

(Note: Diverted linked trips are not included in this example but should be analyzed in TIAs.)

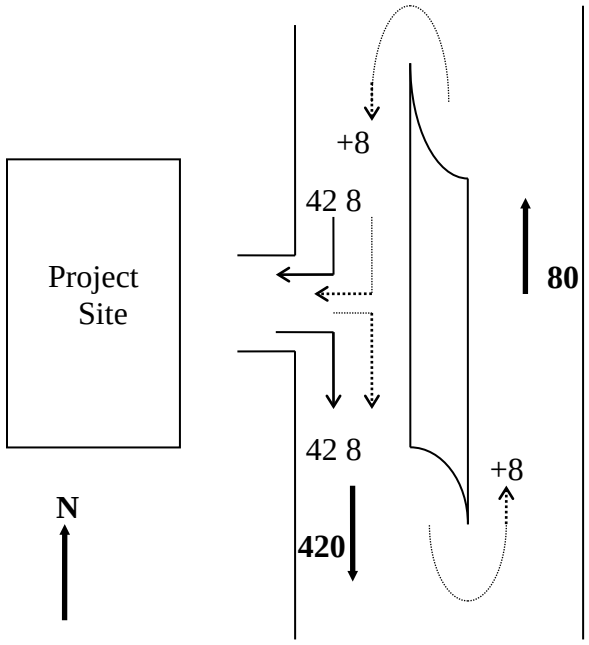
Base Peak Hour Traffic Volumes on Street
420 VPH Southbound
80 VPH Northbound

Total Project Trips
200 VPH In
200 VPH Out

Pass-by Trips = 25%
50 VPH In
50 VPH Out

Based on Base Volumes (84% SB, 16% NB)
Southbound Pass-by Trips = 42 VPH
Northbound Pass-by Trips = 8 VPH

KEY
____ Southbound Pass-by Trips
____ Northbound Pass-by Trips



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APPENDIX F: Transit Delay Analysis Resources

Introduction

To provide a more meaningful and relevant analysis of project effects on transit service, the 2014 *TIA Guidelines* shifted a portion of the transit analysis requirements from a capacity-based to a delay-based approach for most projects. The *TIA Guidelines* require basic analysis of project effects on transit vehicle delay and on transit access and facilities near the project site. For large or unique projects that are likely to generate high numbers of transit trips, the *Guidelines* recommend a transit capacity analysis as well as the delay analysis. The following section provides additional information on the research and professional practice basis of the transit delay analysis requirement.

Transit Delay Analysis Overview and Methodology

Current research thoroughly documents the impacts of roadway congestion on transit performance. Traffic congestion has negative impacts on bus travel time and service reliability (McKnight et al. 2003) (Perk et al. 2008).This congestion also leads to higher operational costs for the transit provider due to more vehicle hours in service for the transit vehicle (McKnight et al. 2003).

To date, some Transportation Impact Analysis (TIA) reports in Santa Clara County have examined transit delay as part of the analysis of a proposed land use development or general planning effort.

The Apple Campus II TIA (2013) examines transit delay due to increased traffic from the proposed development. The TIA found that project traffic will result in increased congestion at intersections, which will increase travel time for transit vehicles. The project is also likely to indirectly increase transit ridership. This is due to the conversion of current auto trips in the project area to transit trips to avoid increased roadway congestion. Near the project site, this will affect bus routes traveling in the vicinity. To mitigate this impact, the TIA proposed improving amenities at bus stops near the project site by adding elements such as shelters, benches, and lighting.

The San Antonio Village Phase II TIA (2014) also examines transit delay due to increased traffic from future development. The TIA found that the project will increase congestion on the surrounding roadway network, which will also increase travel time for transit vehicles. Intersection capacity improvements are proposed to mitigate impacts due to project traffic; these capacity improvements will also benefit transit vehicles. Transportation Demand Management (TDM) policies for the project will also reduce the number of trips during the peak hour, which will further reduce impacts due to project traffic on the roadway network used by transit.

In addition to being evaluated in published TIA Reports, transit delay analysis is required or encouraged in several technical guidelines and policy documents in the San Francisco Bay Area, notably Alameda County *TIA Technical Guidelines* and the City of San Jose's General Plan.
The Alameda County Transportation Commission has a requirement for analyzing transit delay as part of its *2013 Congestion Management Program TIA Technical Guidelines*. This requirement states that "The analysis should evaluate if vehicle trips generated by the project will

cause congestion that degrades transit vehicle operations. Analysis may be qualitative and may be based on auto traffic circulation analysis."

The *Envision San Jose 2040 Plan*, published by the City of San Jose in 2011, is a General Plan for development and smart growth in the City. The plan provides goals and policies for many different aspects of development, including land use and transportation. In the Environmental Impact Report for the plan, the City analyzed the effects of future proposed growth in the plan on transit travel times and speeds along 14 key corridors, referred to as "Grand Boulevards." These key corridors connect city neighborhoods and serve as primary routes for public transit vehicles. Transit vehicles are given priority in the roadway design over automobiles, trucks, and other vehicles. The plan also details what transit impacts would be considered significant, including when they would:

- Disrupt existing, or interfere with planned transit services or facilities;
- Cause the average speed on a transit priority corridor (referred to as a Grand Boulevard in the General Plan Update's Draft Circulation Element) to drop below 15 mph or decrease by 25% or more during the AM peak hour; or.
- Cause a transit priority corridor with an existing average speed below 15 mph to decrease by one mph or more during the AM peak hour.

A TIA in the City of San Jose could implement these policies by evaluating delay to transit vehicles as a result of project-related congestion.

References

- Alameda County Transportation Commission. (2013). *Congestion Management Program 2013.* Oakland, California: Author.
- City of San Jose. (2011). *Program Environmental Impact Report for the Envision San Jose 2040 General Plan.* San Jose, California: Author.
- McKnight, C. E., H. S. Levinson, K.. Ozbay, C. Kamga, R. E. Paaswell. (2003). *Impact of Congestion on Bus Operations and Costs.* New York City: Region 2 University Transportation Research Center.
- Perk, V., J. Flynn, J. Volinski. (2008). *Transit Ridership, Reliability, and Retention.* Tampa, Florida: National Center for Transit Research.

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APPENDIX G: Pedestrian and Bicycle Quality of Service Analysis Resources

Introduction

To provide a more meaningful and relevant analysis of project effects on pedestrian and bicycle conditions, the 2014 *TIA Guidelines* shifted a portion of the pedestrian and bicycle analysis requirements from a capacity-based to a Quality of Service (QOS)-based approach for most projects. For large or unique projects that are likely to generate high numbers of pedestrian or bicycle trips, the *Guidelines* recommend a capacity analysis as well as the QOS analysis.

For additional detail on bicycle and pedestrian analysis, refer to ***Chapter 5***, ***Section 9.3*** and ***Chapter 12*** of the *TIA Guidelines*. The following section provides additional information on the research and professional practice basis of the pedestrian and bicycle QOS analysis requirement.

This appendix provides selected QOS methodologies that TIA preparers may find useful for evaluating bicycle and pedestrian conditions. This summary is adapted from materials prepared by Fehr & Peers in their *MMLOS Toolkit*.

At a minimum, methodologies used to evaluate bicycle and pedestrian QOS should:

- Directly address bicycling and/or walking
- Measure factors that can be addressed by project sponsors and/or Lead Agencies (such as sidewalk widths, presence of bicycle lanes, signal operations, etc.)
- Be readily adaptable for use in Santa Clara County

VTA has not evaluated all of these methodologies in depth and does not recommend one methodology over another. The methodologies described below address different priorities and some may be more appropriate than others for specific projects. In some cases, the TIA preparer may need to calibrate or otherwise adapt a methodology to better reflect local conditions. Quality of Service methodologies continue to be developed, and other methodologies not included in this appendix may be more appropriate than those presented here, depending on the nature of the project. Over time, VTA and its Member Agencies may revisit these methodologies and provide further guidelines for TIA preparers. Therefore, professional judgment should be applied when selecting a QOS methodology for TIAs.

Table G-1, next page, summarizes major features of the methodologies presented in this appendix.

TABLE G-1: QOS METHODOLOGIES COMPARISON

Methodology	Analysis Level		Project Type		Mode		Data Required	Reference
	Intersection	Street Segment	Development	General Plan	Pedestrian	Bicycle		
Charlotte Bicycle and Pedestrian LOS	X		X	*	X	X	Medium	City of Charlotte *Urban Street Design Guidelines*, Appendix B
Pedestrian/Bicycle Environmental Quality Index	X	X	X	*	X	X	High	San Francisco Dept of Public Health, *Bicycle* and *Pedestrian Environmental Quality Index*
HCM 2010 Bicycle and Pedestrian LOS	X	X	X	*	X	X	High	*HCM 2010: Highway Capacity Manual*
Layered Network Approach		X		X	X	X	Varies	*LA Street Classification and Benchmarking System*, 2010.
Level of Traffic Stress	X	X	X	X		X	Medium	Mekuria, Furth and Nixon, 2012. *Low-Stress Bicycling and Network Connectivity*
Built Environment Factors	X	X	X	X	X	X	Varies	- Fort Collins, Colorado, *Pedestrian Plan*, 2011. Level of Service - Burien, Washington, *Transportation Master Plan, 2012*. Table 4, Pedestrian LOS Checklist.
* This methodology is appropriate for General Plan-level goal setting, but evaluating an entire street network would involve a substantial effort.								

Research and Practice Basis of QOS Methodologies

Several bicycle and pedestrian quality of service (QOS) methodologies have been developed to measure how well transportation infrastructure and streetscape features support bicycling and walking. The VTA *TIA Guidelines* identify several QOS methodologies that could be used in TIAs in Santa Clara County. This section describes the research and professional practice basis for these methodologies. Summaries of each methodology, with links to web-based resources for applying them, are presented on pages G-6 through G-11 of this appendix.

Numerous recent research studies have shown that the built environment has a substantial effect on travel behavior, particularly walking and bicycling. Access to destinations and a well-connected street network correlate to higher levels of walking and bicycling (Ewing and Cervero 2010; Saelens et al. 2003). Infrastructure design is also tied to walking and bicycling. People are more likely to walk where sidewalks are present (Saelens and Handy 2008), to prefer walking on wide sidewalks with landscaping separating them from vehicle traffic, and to feel more comfortable at intersections with short crossing distances (Transportation Research Board, 2008). People also prefer to ride bicycles in dedicated lanes and on low-traffic streets (Buehler and Pucher 2012; Broach et al. 2012).

- Buehler, R. and J. Pucher. (2012). Cycling to Work in 90 Large American Cities: New Evidence on the Role of Bike Paths and Lanes. *Transportation 39 (2),* 409-432.
- Broach, J., J. Dill, J. Gliebe. (2012). Where do cyclists ride? A route choice model developed with revealed preference GPS data. *Transportation Research Part A: Policy and Practice. 46 (10),* 1730-1740.
- Ewing, R. and R. Cervero. (2010). Travel and the Built Environment. A Meta-Analysis. *Journal of the American Planning Association.* 76 (3, 265-294.
- Ewing, R., A. Hajrasouliha, K. Neckerman, M. Purciel, A. C. Nelson. (2014). Streetscape Features Related to Pedestrian Activity. *TRB 93rd Annual Meeting Compendium of Papers.* Washington, D.C.: Transportation Research Board, National Research Council.
- Saelens, B. and S. Handy. (2008). Built Environment Correlates of Walking: A Review. *Medicine & Science in Sports & Exercise.* 40 (7 Suppl): S550–S566.
- Saelens, B., J.F. Sallis, L.D. Frank. (2003). Environmental correlates of walking and cycling: findings from the transportation, urban design, and planning literatures. *Annals of Behavioral Medicine, 25(2),* 80–91.
- Transportation Research Board. *NCHRP Report 616: Multimodal Level of Service Analysis for Urban Streets. (*2008). Washington, D.C.: Transportation Research Board, National Research Council.

Pedestrian and Bicycle Environmental Quality Indices (PEQI and BEQI)

The San Francisco Department of Public Health developed the Pedestrian Environmental Quality Index (PEQI) and Bicycle Environmental Quality Index (BEQI) based on reviews of existing literature and with input from bicycle and pedestrian experts, advocates and facility users. To develop the PEQI, researchers conducted a literature review to identify specific indicators of pedestrian quality of service, such as vehicle speeds and sidewalk widths. These indicators were then assigned weights based on results from surveys of transportation experts and pedestrian advocates. The BEQI was developed using a similar two-part process: first identifying indicators of bicycle quality of service, such as bicycle lane width and pavement quality, and then weighting those indicators based on surveys of experts, advocates and local bicyclists. Site

assessments are conducted via a walking audit and checklist; this data can be collected using an Android smart phone application and integrated into a GIS database. The PEQI has been used for community planning and health assessment projects in San Francisco, Los Angeles, Denver and Massachusetts. The BEQI has been used primarily in San Francisco.

- San Francisco Department of Public Health. *The Pedestrian Environmental Quality Index (PEQI)*. (2008). San Francisco, California: Program on Health, Equity and the Environment, San Francisco Department of Public Health.
- San Francisco Department of Public Health. *The Bicycle Environmental Quality Index (BEQI)*. 2007. Program on Health, Equity and the Environment, San Francisco Department of Public Health.

Charlotte Pedestrian and Bicycle LOS

In 2007 the City of Charlotte, North Carolina, developed a methodology to assess design features that impact pedestrians and bicyclists crossing signalized intersections. The methodology was developed with input from several professional standards documents published by the Federal Highway Administration, the Institute of Transportation Engineers, Florida DOT and the City of Portland. Developers also consulted with local government staff and transportation consultants when identifying and ranking variables. These variables were compiled into two intersection scoring tools that grade intersections from A to F for pedestrian and bicycle travel. The City of Charlotte uses these tools to evaluate proposed intersection improvements. If automobile-oriented improvements would degrade pedestrian and bicycle conditions, alternative improvements or capacity enhancements are considered.

- Steinman, N. K. Hines. (2003). A Methodology to Assess Design Features for Pedestrian and Bicyclist Crossings at Signalized Intersections. Presented at the 2nd Urban Street Symposium, Anaheim, California.
- Charlotte Department of Transportation. 2007. Pedestrian & Bicycle Level of Service Methodology for Crossings at Signalized Intersections. Charlotte, North Carolina: Author.

HCM 2010 Bicycle and Pedestrian Level of Service

The Highway Capacity Manual 2010 (HCM 2010) is published by the Transportation Research Board (TRB) of the National Research Council, the preeminent transportation research organization in the United States. HCM 2010 bicycle and pedestrian evaluation methodologies were developed via a user-focused research effort that built on two decades of prior research on bicycle and pedestrian level of service. Researchers conducted a literature review and pilot tests to determine which factors in the bicycling and pedestrian environments are most important to street users. Locations that represented a mix of these factors were identified in Tampa, Florida (bicycle and pedestrian modes) and San Francisco (pedestrian only). At these locations, video footage was collected showing street segments and intersections from bicyclist and pedestrian points of view. Over one hundred survey participants in four cities around the United States then ranked video clips from A (excellent quality of service) to F (extremely poor quality of service). Regression models were developed to determine which variables had the greatest influence on user ratings of street segments, and equations were created to evaluate pedestrian and bicycle quality of service on street segments and at intersections.

- Transportation Research Board. *NCHRP Report 616: Multimodal Level of Service Analysis for Urban Streets. (*2008). Washington, D.C.: Transportation Research Board, National Research Council.

Layered Network Approach

The Layered Network Approach is a planning-level evaluation of a local area's transportation network. The approach was articulated in a white paper developed for the City of Los Angeles in its most recent update of the Transportation Element of its General Plan. The methodology is based on planning practice in cities that have assigned travel mode priorities to streets in order to create a complete streets network. Several cities have adopted this method, including Seattle, Austin, Denver, Alameda, CA and Glendale, CA. In cities that have identified the creation of layered networks as transportation planning priorities, the TIA can identify how a proposed project would contribute to or detract from that network.

- Fehr & Peers, Rifkin Transportation Group and Nelson\Nygaard Consulting. (2010). *LA Street Classification and Benchmarking System.*

Level of Traffic Stress

Researchers at the Mineta Transportation Institute developed the Level of Traffic Stress methodology to evaluate level of service for bicycle travel. Based on Dutch design standards for bicycle facilities and resident surveys from Portland, Oregon, the method classifies bicycle facilities on a scale from one to four. Lower numbers are assigned to facilities with low exposure to auto traffic and easy crossings at intersections, indicating low-stress environments attractive to many types of cyclists. The researchers piloted a network-wide analysis of San Jose, California using the Level of Traffic Stress model. They analysis measured the street network's connectivity for each of the four levels of traffic stress. Researchers then identified and tested intersection improvements that could increase the low-stress connectivity throughout the city.

- CROW (The National Information and Technology Centre for Transport and Infrastructure). (1994.) *Sign Up for the Bike: Design Manual for a Cycle-friendly Infrastructure.* Ede, The Netherlands: CROW.
- Geller, R. (c. 2007). *Four Types of Cyclists*. Portland, Oregon: City of Portland Office of Transportation.
- Mekuria, M.C., P.G. Furth., H. Nixon. (2012). *Low-Stress Bicycling and Network Connectivity.* San Jose, California: Mineta Transportation Institute.

Built Environment Factors

As described in the introduction to this section, many variables in the built environment affect whether a street or intersection supports walking and bicycling. QOS methodologies measuring these built environment factors have been customized for specific urban contexts, notably San Francisco, California, Charlotte, North Carolina (as described above) and Fort Collins, Colorado. Similar methodologies could be developed for other local areas, relying on existing research, professional judgment and local knowledge. The papers cited below and under the introduction to this section provide a starting point for developing such a methodology.

- Dill, J., S. Handy, J. Pucher. (2013). How to Increase Bicycling for Daily Travel. A Research Brief. Princeton, NJ: Active Living Research, a National Program of the Robert Wood Johnson Foundation.
- Ewing, R., S. Handy, R. Brownson, O. Clemente, E. Winston. (2006). Identifying and Measuring Urban Design Qualities Relating to Walkability. *Journal of Physical Activity and Health, 3, Suppl 1*, S223-S240.

CHARLOTTE BICYCLE AND PEDESTRIAN LOS

Summary

The City of Charlotte, North Carolina, developed a methodology to assess bicyclist and pedestrian safety and comfort at intersections. Quality of service is calculated based on a point system, with points awarded for design and operational features that improve or worsen conditions for bicyclists or pedestrians. The sum of the points accumulated for each mode establishes the LOS, with LOS A receiving the highest points and LOS F receiving the lowest points.

For pedestrian LOS, key characteristics include crossing distance, signal phasing and timing, corner radius, right-turn on red, crosswalk treatment, and adjustment for one-way street crossings. For bicycle LOS, key characteristics include width of bicycle travel way, speed of adjacent traffic, signal features, right-turning vehicle conflicts, right-turn on red, and crossing distance.

Reference

City of Charlotte, North Carolina. 2007. Appendix B of Urban Street Design Guidelines.

http://charmeck.org/city/charlotte/transportation/planprojects/pages/urban%20street%20design%20guidelines.aspx

Advantages

- Medium level of data input required
- Focused on factors within the public right-of-way, which can be addressed through planning and engineering
- Intersection-level analysis allows straightforward comparison with auto LOS

Disadvantages

- Does not address bicycle and pedestrian QOS between intersections

Data Requirements

- Signal phasing
  - RTOR
  - Left-turn conflicts
  - Pedestrian phasing
  - Countdown timer
- Intersection measurements:
  - Crosswalk type
  - Crossing distances
  - Lane widths
  - Curb radii
  - Presence and width of bicycle lanes
- Motorized traffic speeds

PEDESTRIAN/BICYCLE ENVIRONMENTAL QUALITY INDEX (PEQI & BEQI)

Summary

The San Francisco Department of Public Health developed the Pedestrian Environmental Quality Index (PEQI) and Bicycle Environmental Quality Index (BEQI) to measure the effects of built environment factors on bicycle and pedestrian environmental quality, activity and safety.

The PEQI and BEQI evaluate QOS for pedestrians and bicyclists at the intersection and street segment levels. The intersection-level assessment looks only at safety features that aim to protect pedestrians and bicyclists from vehicle traffic, while the segment-level assessment looks at land use, traffic and design features as well as perceived safety from crime and safety measures to increase cyclist visibility.

Reference

San Francisco Department of Public Health Program on Health, Equity and Sustainability. 2010.

Bicycle Environmental Quality Index.
http://www.sfhealthequity.org/component/jdownloads/viewcategory/19-beqi?Itemid=62

Pedestrian Environmental Quality Index.
http://www.sfhealthequity.org/component/jdownloads/viewcategory/20-peqi?Itemid=62

Advantages

- Straightforward application: checklist and index
- Basic software requirements (Microsoft Access, ArcGIS) for network analysis

Disadvantages

- Does not address street connectivity and presence of pedestrian attractors
- May not address all relevant design factors
- Not designed for use outside urban areas
- Requires extensive data inputs, many of which must be measured in the field

Data Requirements

Substantial data requirements for:

- Intersection safety features (e.g. pedestrian crossing treatments, signal operations)
- Auto speeds and volumes
- Street design (e.g. sidewalks, bicycle facilities, landscaping signage)
- Land use (e.g. street-fronting retail, bicycle parking)
- Perception of safety (e.g. lighting, litter, abandoned buildings)

HCM 2010 BICYCLE AND PEDESTRIAN LOS

Summary

The 2010 Highway Capacity Manual (HCM 2010) provides detailed instructions on calculating QOS for bicycles and pedestrians on urban streets (at the link, segment and facility levels) and at signalized and 2-way stop intersections. QOS scores are based on pedestrian or cyclist perception of their travel experience, taking into account dedicated facilities, accommodation at intersections, and exposure to automobiles.

Note that early testing in Santa Clara and Los Angeles Counties has indicated that this methodology is not fully sensitive to all input changes; in some cases (e.g. road diets) it produces results that are inconsistent with expectations or typical professional judgment. Further information on VTA's evaluation of HCM 2010 methodology is available on request from VTA staff.

Reference

National Research Council (U.S.). 2010. *HCM 2010: Highway Capacity Manual.* Washington, D.C: Transportation Research Board.

Advantages

- Provides a comprehensive evaluation of bicycle and pedestrian QOS at different scales
- Focused on factors within the public right-of-way, which can be addressed through planning and engineering
- Letter scoring enables straightforward comparison to auto LOS

Disadvantages

- Requires extensive data inputs
- Scores are heavily influenced by automobile volumes, which are difficult to mitigate in a planning or engineering context
- May not address all relevant design factors
- Can be insensitive to some input changes; some scenarios (e.g. road diets) produce inconsistent results

Data Requirements

Substantial data requirements for:

- Street segment and intersection geometry
- Intersection operations
- Automobile traffic speed and volumes
- Locations of landscaping, parking and sidewalk obstructions

LAYERED NETWORK APPROACH

Summary

This approach, which is suitable for General Plan-level analysis, designates travel mode priority by street to create a complete streets network. Layered networks recognize that while all travel modes need to be accommodated within a community, no single street can accommodate all transportation users at all times.

The layered network concept envisions streets as systems, with each street type designed to create a high quality experience for its intended users. A layered network approach can also use context-sensitive land use and mode overlays to enhance additional transportation modes. This approach can also be integrated with methodologies that measure quality of service for bicyclists and pedestrians at the intersection and corridor level. Implementing this methodology may require a commitment to rethinking the transportation network of an entire city or plan area.

Reference

Fehr & Peers, Rifkin Transportation Group and Nelson\Nygaard Consulting. 2010.

LA Street Classification and Benchmarking System. http://planning.lacity.org/PolicyInitiatives/Mobility%20and%20Transportation/LA%20Street%20Classification%20Final%20Report%20October%202010.pdf

Advantages

- Helps mitigate the challenge of accommodating all users on every roadway
- Creates flexibility and options with multiple travel routes, accommodating different travel modes on different streets
- Allows network layout and roadway design for ideal bicycle or transit networks
- Works well with other QOS methodologies

Disadvantages

- May require additional street connectivity and redundancy to create the multi-modal network
- Less effective if land uses do not support design of layered networks

Data Requirements

Data requirements vary, depending on whether the approach includes QOS methodologies and on which methodologies are used.

LEVEL OF TRAFFIC STRESS

Summary

The Level of Traffic Stress (LTS) method evaluates bicycle QOS by measuring low-stress connectivity, defined as "the ability of a network to connect traveler' origins to their destinations without subjecting them to unacceptably stressful links."

Based on Dutch standards for bicycle facility design, the method classifies bicycle facilities on a scale from one to four. Better scores are assigned to facilities with low exposure to auto traffic and easy crossings at intersections, indicating low-stress environments which are attractive to many types of cyclists.

Level of traffic stress can be mapped onto an entire transportation network, producing stress maps and making it possible to evaluate how well an entire network serves bicyclists.

Reference

Mekuria, M.C., Furth, P.G., Nixon, H. 2012.
Low-Stress Bicycling and Network Connectivity.
Mineta Transportation Institute, San José State University; San Jose, California.
http://transweb.sjsu.edu/project/1005.html

Advantages

- Focuses on factors that government planners and engineers can control
- Most data are readily available in public records

Disadvantages

- May require further adaptation to be used outside San José
- Stress mapping requires GIS extensions developed specifically for LTS evaluation
- Does not address pedestrian QOS

Data Requirements

- Street geometry: width, number of lanes, bicycle lane widths, presence of parking and width of parking lanes
- Other data: intersection control type, functional street classification or average daily traffic, percent of time bicycle lane is blocked

BUILT ENVIRONMENT FACTORS

Summary

An inventory of each category of physical features translates to a facility's perceived quality of service based on the elements of the built environment. This QOS approach evaluates two levels of physical features: basic (key) elements and enhancement elements.

For example, when assessing the pedestrian experience, key features would include: travel and crossing lane widths and presence of sidewalks, crosswalks and pedestrian signals. Enhancement features would include: pedestrian refuges, curb extensions, landscape buffers and pedestrian-oriented lighting. A similar approach could be used to evaluate bicycle QOS. Use of this methodology should involve a rating system with weights assigned to key and enhancement features, which would then be translated into a QOS score for the facility.

To adapt this methodology for use in TIAs, the Lead Agency should identify sets of basic and enhanced features for bicycle and pedestrian facilities and consider adding a rating system, in consultation with VTA staff. The methodology should be documented in the TIA.

Examples

Fort Collins, Colorado, *Pedestrian Plan,* 2011. Level of Service.
http://www.fcgov.com/transportationplanning/pedplan.php

Burien, Washington, *Transportation Master Plan, 2012.* Table 4, Pedestrian LOS Checklist.
http://www.burienwa.gov/index.aspx?NID=949

Advantages

- Design and intervention-focused
- Straightforward measurement of variables
- Can readily be adapted to specific contexts

Disadvantages

- Does not necessarily address presence of motor vehicles, which can have significant effect for bicycles and pedestrians
- Lead Agency must use discretion in determining relevant factors

Data Requirements

Data requirements vary significantly based on what factors are considered. This method may require traffic volumes, posted speed limits, bicycle facility locations, transit system data, and measurements and inventory of streetscape amenities.

Most local governments do not collect detailed information about the built environment as it applies to pedestrians. Information on the presence and attributes of bicycle facilities are generally easier to obtain.

APPENDIX H: Bicycle Parking Supply Recommendations

(Table 10-3 of VTA *Bicycle Technical Guidelines)*

Table 10-3
Bicycle Parking Supply Recommendations

Use	Required Number of Bicycle Spaces[1][2]
Residential (such as apartments, condominiums & townhouses)	
• General, multi-dwelling	1 Class I per 3 units + 1 Class II per 15 units.
• Primarily for students & low-income families, multi-dwelling	1 Class I per 2 units + 1 Class II per 15 units
• Primarily for residents 62 and older, multi-dwelling	1 Class I per 30 units + 1 Class II per 30 units
Schools	1 Class I per 30 employees[3] + 1 spot per 12 students (50% Class I and 50% Class II)
• Elementary, middle & high schools	
• Colleges - Student residences	1 Class I per 4.5 beds + 1 Class I per 30 employees
• Academic buildings and other university facilities	1 Class I per 30 employees + 1 spot per 9 student seats (25% Class I and 75% Class II)
Park-and-Ride Lots/Parking Garages	7% of auto parking (75% Class I & 25% Class II)
Transit Centers	2% of daily home-based boardings (75% Class I and 25% Class II)
Cultural/Recreational (includes libraries, theaters, museums, & religious institutions)	Class I per 30 employees + (Class II 1,500 sq. ft. or Class II per 60 seats (whichever is greater)
Parks/Recreational Fields	1 Class I per 30 employees + Class II per 9 users During peak daylight times of peak season
Retail Sales/Shopping Center/Financial Institutions/Supermarkets	1 Class I per 30 employees + Class II per 6,000 sq. ft.
Office Buildings/Offices	1 per 6,000 sq. ft. (75% Class I & 25% Class II)
Hotels/Motels/Bed-&-Breakfasts	1 Class I per 30 rooms + Class I per 30 employees
Hospitals	1 Class I per 30 employees + 1 Class II per 45 beds
Restaurants	1 Class I per 30 employees + 1 Class II per 3,000 sq. ft.
Industrial	1 Class I per 30 employees or 1 Class I per 15,000 sq. ft.
Day Care Facilities	1 Class I per 30 employees + 1 Class II per 75 children
Auto-Oriented Services	1 Class I per 30 employees
Other Uses	Same as most similar use listed

Notes

(1) For cities with less than 2% bicycle commuter rate. Cities with different bicycle commute rates should pro-rate these accordingly.

(2) The minimum number of required Class II Bicycle parking spaces is 4, except when the code would require 1 or less, in which case 2 bicycle spaces must be provided.

(3) Employees = maximum number of employees on duty at any one time.

Source: League of American Bicyclists, 1994.

APPENDIX I: Board Memorandum: Update on Voluntary Contributions to Transportation Improvements (March 6, 2014)

6.18

SANTA CLARA
Valley Transportation Authority

Date: February 26, 2014
Current Meeting: March 6, 2014
Board Meeting: March 6, 2014

BOARD MEMORANDUM

TO: Santa Clara Valley Transportation Authority
Board of Directors

THROUGH: General Manager, Nuria I. Fernandez

FROM: Chief CMA Officer, John Ristow

SUBJECT: Update on Voluntary Contributions to Transportation Improvements

FOR INFORMATION ONLY

BACKGROUND:

Santa Clara County is projected to continue to add substantial population and jobs in the coming years, and travel demand for all freeway segments is projected to grow. Many development projects, especially those closest to freeway ramps, will likely have significant impacts on the already congested freeway segments. However, the ability to add freeway capacity is limited due to right of way, financial and environmental constraints, making traditional capacity increasing improvements no longer feasible. As a result, local agencies are increasingly turning to other approaches to mitigate impacts to freeways.

One approach taken by certain Member Agencies in Santa Clara County is to identify contributions to improvements of freeway, transit and other regional facilities as mitigation measures for significant freeway impacts resulting from proposed land development projects. Other Member Agencies are also recognizing the value and need of pursuing mitigation for freeway impacts even if the impacts are not fully mitigated, and some have had conversations with VTA on this topic.

DISCUSSION:

At the request of some Member Agencies, VTA developed a structure for a program of Voluntary Contributions to Transportation Improvements. This structure provides guidance for local agencies pursuing contributions and provides VTA staff a consistent approach to commenting on projects with significant transportation impacts. The structure is also designed for flexibility recognizing that different circumstances will present different opportunities to contribute. Local agencies can use this voluntary program structure in their "tool box" of measures to address freeway impacts as part of their project approval process. The proposed voluntary program includes the following process and responsibilities:

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a. VTA, as the Congestion Management Agency, comments on projects with significant impacts on the Congestion Management Program (CMP) facilities, including freeways, County Expressways, CMP intersections, bicycle and pedestrian facilities, and the transit system;

b. The Member Agency (City or County) approving the project, in its role as the California Environmental Quality Act (CEQA) Lead Agency, could choose to request a voluntary contribution from the developer toward transportation improvements as a mitigation measure for impacts to freeways using one or more of the agreed upon formulas;

c. The local agency would subsequently condition the project to pay the determined voluntary contribution toward regional transportation projects, and may cite this contribution in their CEQA documentation;

d. VTA and the local jurisdiction would execute agreements that would provide for the transfer of funds to regional transportation projects.

Benefits for VTA and local jurisdictions:

- VTA can follow a consistent process to comment on development projects with significant impacts on CMP freeway facilities;
- VTA can collect funds for regional transportation improvements that are already planned or under development and would otherwise could take longer to implement;
- Member Agencies, in their role as CEQA Lead Agencies, may benefit from a streamlined and more predictable CEQA process, specifically related to freeway impacts;
- In some cases, the Lead Agency may not need to issue a Statement of Overriding Considerations for significant freeway impacts that are mitigated through this Program; In other cases, the Lead Agency may be able to present findings, including efforts to reduce impacts, when issuing the Statements of Overriding Considerations;
- The transportation projects that receive funding from voluntary contributions would improve overall mobility in Santa Clara County and thereby increase business competitiveness, economic vitality, and quality of life.

Voluntary Contribution Commitments to Date

As of January 2014, four projects in Santa Clara County, in the Cities of Cupertino and Sunnyvale, have included commitments to provide voluntary contributions to transportation improvements within CEQA documents (summarized in Table 1, below). These contributions will be executed by funding agreements between the City and VTA, triggered when the project applies for a building permit or other development agreements. Two additional projects in the City of San José include commitments to contribute to transportation improvements tied to the issuance of permits such as a Caltrans Encroachment Permit, building permit, or tract/parcel map.

In the City of Cupertino, the Draft Environmental Impact Report (DEIR) for Apple Campus 2 found significant impacts on I-280 and SR 85 and included a commitment of approximately $1.3 million to freeway and transit projects on these freeways and parallel corridors as mitigation. In the City of Sunnyvale, three projects, the NetApp Master Plan, Moffett Place and Moffett Gateway, found significant impacts on US 101 and SR 237 and identified contributions to Express Lanes projects on these facilities as mitigation. In the case of the Moffett Place project, the developer has applied for a building permit and the City has initiated a funding agreement to transfer the voluntary contributions to VTA to help fund the Express Lanes projects.

Table 1: Summary of Projects Committing to Voluntary Contributions to VTA for Transportation Improvements

Lead Agency	Project	City Action / Date	Contribution Amount	Transportation Improvements Identified for Contributions
City of Cupertino	Apple Campus 2	Certified DEIR - 10/15/2013	$1,292,215	SR 85 Express Lanes Project, improvements on SB I-280 between El Monte Rd. and Magdalena Ave., BRT stations, or an alternative improvement or study towards on the impacted I-280 corridor
City of Sunnyvale	NetApp Master Plan	Certified MND - 2/29/2012	Not yet identified	US 101 Auxiliary Lanes, US 101 Express Lanes Project, SR 237 Express Lanes Project Phase II
City of Sunnyvale	Moffett Place	Certified DEIR, - 12/3/2-13, Issued building permit and initiated agreement with VTA - Dec. 2013	$577,062	US 101 Express Lanes Project, SR 237 Express Lanes Project Phase II
City of Sunnyvale	Moffett Gateway	Certified MND - 8/26/2013	$1,162,042	US 101 Express Lanes Project, SR 237 Express Lanes Project Phase II
City of San José	America Center (Legacy Partners)	Approved March 2000, Contribution tied to Caltrans Encroachment Permit	$1,000,000	SR 237 corridor improvements
City of San José	Valley Fair Expansion	Approved April 2007, Contribution tied to Tract/Parcel Map or Building Permit	$2,500,000	I-800/Stevens Creek Boulevard Interchange Project

Notes:
DEIR - Draft Environmental Impact Report
MND - Mitigated Negative Declaration

Outreach Summary and Committee Comments

Staff previously brought an item on voluntary contributions to the March 2013 of the Technical Advisory Committee (TAC) and brought a follow-up item to the August 2013 meetings of the TAC, Citizens Advisory Committee (CAC) and Policy Advisory Committee (PAC), and the September 2013 meeting of the Board of Directors as an information item. Staff also presented the item to the Systems Operations and Management (SOM) Working Group and the Land Use /Transportation Integration (LUTI) Working Group, two of TAC's working groups.

There was general concurrence from all groups that a structure for voluntary contributions could offer a useful tool for jurisdictions to consider when reviewing development projects. VTA can provide a suite of common methodologies or approaches to estimating voluntary contributions that all jurisdictions can use, cautioning that flexibility should be retained to allow jurisdictions to respond as effectively as possible to individual projects. The TAC asked VTA to proceed with more detailed development of a concept Voluntary Contribution Program for consideration by the Board of Directors. By request, VTA also brought a follow-up item to the October 2013 meeting of the SOM Working Group providing examples of potential contribution formulas for city staff to consider when conditioning a project to provide contributions.

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Next Steps

VTA and City of Sunnyvale staff are working on finalizing the funding agreement for the voluntary contributions to Express Lanes projects included in Moffett Place project approval. Once the funding agreement is finalized, it will be brought before the Board of Directors as an Action Item for approval.

Voluntary contributions from the other projects listen in Table 1, as well as future projects that commit to contributions, will be executed by funding agreements between the Lead Agency and VTA and will be brought to the Board of Directors for approval.

ADVISORY COMMITTEE DISCUSSION/RECOMMENDATION:

This item was on the Regular Agenda at the February 2014 Citizens Advisory Committee (CAC), Technical Advisory Committee (TAC), and Policy Advisory Committee (PAC).

CAC Chairperson Hadaya asked how contribution amounts are determined and staff responded that they are determined by agreement between the City and the project applicant. He further

asked if the contributions are part of a City's Transportation Impact Fee program and staff responded that the contributions are separate from that program. Committee member Blaylock asked if this would supersede other approaches to transportation demand management and staff responded that the approaches could be used in tandem. Member Powers and Vice Chair Wadler asked why the program is voluntary and staff responded that it will continue to be a voluntary program unless staff is directed by the Board to adopt a mandatory program, such as a Countywide Traffic Impact Fee program. Member Rogers asked if County Expressways are included and staff responded that the County has separately been collecting contributions for Expressway improvements.

At TAC, staff gave a brief presentation. Member Salvano noted that the City of San Jose conditioned the Valley Faire Mall Expansion project to contribute $2.5 million to the I-880/Stevens Creek interchange and should be added to the list of projects. He also suggested a wording change to the America Center project. Committee member Saleh asked if there are any guidelines on calculating the contribution amount and staff responded that staff works with Cities to suggest contribution formulas but it is ultimately the City's decision which formula to use. Committee member Salvano asked about the time limit on the use of contributions. Committee member Batra commented that the time limit applies to the programming of funds and committee member Borden commented that the time limit does not apply when the contribution is part of a development agreement.

At PAC, staff gave a brief presentation. Member Jensen asked how a nexus is established between the contributions and the impacts and staff responded that the project's transportation analysis would establish the nexus by analyzing the impacts and their locations. Vice Chairperson Carr asked if there are transportation projects in every part of the County that developments could contribute to, and staff responded that in some cases there may not be an appropriate project for contributions. Committee member Abe-Koga asked if the purpose of the contribution is to fund a transportation improvement that would mitigate the level of service impact back to "less than significant" and staff responded that operational and efficiency improvements are acceptable even if they do not mitigate all the way to "less than significant." Member Allan asked staff to explain how contribution amounts are determined. Vice Chairperson Carr asked if the contributions would fully fund the transportation improvements and staff responded that the contributions would go towards project development and VTA would need to leverage other funds. He also asked if VTA would oppose an EIR if a project has significant impacts on the freeway. Staff responded that there is no action as "oppose" in the CEQA process. VTA's role is to comment on the transportation impacts and will continue to do so consistently. Committee members Kniss, Miller, Davis and Jensen questioned the use of the term "voluntary" and suggested changing the name of the program. Some of the members stated that if a City requires a contribution, it is not voluntary. Staff agreed and explained that the word "voluntary" distinguishes it from a mandatory regional impact fee program, as in some other Counties.

STANDING COMMITTEE DISCUSSION/RECOMMENDATION:

This item was on the Regular Agenda at the February 2014 Congestion Management Program & Planning Committee (CMPP). Staff gave a brief presentation, followed by questions from the committee. Committee Chairperson Pirzynski brought the committee's attention to the

comments made at the PAC meeting. He asked staff to explain how the program is voluntary when it is implemented through enforceable documents such as development agreements and Environmental Impact Reports. Staff responded that the program is voluntary on the part of the Cities because it is not part of a mandatory regional impact fee. Member Whittum expressed support for VTA's comments on development projects. He stated that the voluntary contribution doesn't necessarily have to be a CEQA mitigation, it could just be a condition for approval. Chairperson Pirzynski stated that the Silicon Valley continues to be a magnet for jobs and this could be a valuable tool to mitigate traffic impacts on the freeway system. Vice Chairperson Herrera stated that certainty in the development process is the key and this program is a "good carrot". She asked staff to confirm that contribution from the City of San Jose's Valley Fair Mall Expansion project would be added to the list of projects. She asked how this program relates to the Cities' own Traffic Impact Fees (TIF). Staff responded that Cities' own TIF programs don't include freeway improvements so this one would be in addition to the individual TIF programs. Committee Members had a discussion on how the contribution is calculated. Staff explained that VTA could provide some examples on how to calculate the contribution based on a percentage impact on specific freeway segments, but ultimately it is the City Council's decision to determine the amount through negotiation with the developer. Chairperson Pirzynski requested that staff continue to update the committee as future projects come forward with contributions. Member Whittum asked which Cities don't have TIF programs and staff responded that staff would provide the information separately. He also suggested VTA may facilitate a nexus study for several small Cities that don't have sufficient resource to conduct one.

Prepared By: Robert Cunningham
Memo No. 4473

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APPENDIX J: CMP Multimodal Improvement Plan

Action List

Table 4-1
Deficiency Plan Action List

A. BICYCLE AND PEDESTRIAN MEASURES

A1. Improved Roadway Bicycle Facilities and Bike Paths
A2. Transit and Bicycle Integration
A3. Bicycle Lockers and Racks at Park and Ride Lots
A4. Bicycle Facilities and Showers at Developments
A5. Improved Pedestrian Facilities
A6. Pedestrian Signals
A7. Lighting for Pedestrian Safety

B. TRANSIT

B1. Improvement of Bus, Rail, and Ferry Transit Service
B2. Expansion of Rail Transit Service
B3. Expansion of Ferry Services
B4. Preferential Treatment for Buses and In-Street Light Rail Vehicle (LRVs)
B5. Transit Information and Promotion
B6. Transit Pricing Strategies to Encourage Ridership and Reduce Transit Vehicle Crowding
B7. Transit Fare Subsidy Programs
B8. Transit Centers
B9. Improved and Expanded Timed Transfer Programs
B10. Improved and Expanded Fare Coordination
B11. Signal Preemption by Transit Vehicles
B12. Bus Stop Bulbs
B13. School Bus Transit Service

C. CARPOOLING, BUSPOOLING, VANPOOLING, TAXIPOOLING, JITNEYS, CASUAL CARPOOLING AND OTHER SHARED RIDES (Ridesharing)

C1. Preferential Treatment for Shared Ride Vehicles
C2. Increased Use of Commuter/Employer Services

D. HIGH OCCUPANCY VEHICLE (HOV) FACILITIES

D1. Preferential Treatment for HOVs
D2. Bus and Carpool/Buspool/Vanpool/Taxipool Priority Lanes on Local Arterials
D3. Accelerated Implementation of the 2005 HOV Master Plan
D4. HOV to HOV Facilities
D5. Direct HOV Lane Entrance/Exit Ramps to Arterials and Space Generators

E. OTHER TCMs, RELATED MEASURES

E1. Stricter Travel Demand Management/Trip Reduction Ordinance
E2. Expanded Public Education Programs
E3. Child Care Facilities at or close to Employment Sites, Transit Centers and Park and Ride Lots
E4. Retail Services at or close to Employment Sites, Transit Centers and Park and Ride Lots
E5. Telecommuting Centers and Work-at-Home Programs
E6. Parking Management

F. TRAFFIC FLOW IMPROVEMENTS

F1. Preferential Treatment of HOVs (See measures B4 and C1)
F2. Ramp Metering
F3. Auxiliary Lanes
F4. Signalization Improvements
F5. Computerized Traffic and Transit Control/Management on Arterials
F6. Turn Lanes at Intersections
F7. Turn Restrictions at intersections
F8. Reversible Lanes
F9. One-Way Streets
F10. Targeted Traffic Enforcement Programs
F11. Restrictions on Curb Side Deliveries and On-Street Parking

Source: Table 4-1, Santa Clara Valley Transportation Authority, *Deficiency Plan Requirements*, 2010. For more information, refer to Appendix C in the above document.

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APPENDIX K: TIA Preparation Checklist

TIA Preparation Checklist

This checklist is intended to provide a concise summary of the key items a Lead Agency must consider when preparing a TIA Report for CMP purposes. It is designed to serve as an aid to assist agency staff and consultants. However, it is not intended to replace the *TIA Guidelines* themselves, and does not provide the same level of detail or cover every required topic. Lead Agencies should still consult the main *TIA Guidelines* document to ensure that all requirements are being addressed.

TIA Scoping, Notification and Preparation

☐ 1) Determine if a TIA is required for CMP purposes (project generates > 100 net new trips without applying trip reductions), ***Section 2.1***;

☐ 2) Determine whether the project falls into any of the Special Project Types identified in the *TIA Guidelines* (Large or Unique Projects; Projects on a Jurisdiction Border; Multi-Agency Projects; Projects Generating Large Numbers of Pedestrian, Bicycle or Transit Trips; or Large Projects, General Plans or Areawide Plans where a more extensive transit delay analysis may be appropriate); If the project falls into any of these Types, refer to ***Chapter 12*** for more guidance;

☐ 3) Notify all appropriate jurisdictions that a TIA is being prepared using the TIA Notification Form, see ***Section 3.1*** and ***Appendix B***;

☐ 4) Provide guidance to TIA preparer/consultant on TIA study scope, considering both Lead Agency direction and other agency input from the TIA Notification process. This guidance will include:
- Determination of roadway facilities that should be included in analysis, ***Section 2.2***;
- Determination of other transportation issues to address, ***Section 2.3***;
- Identification of the appropriate study scenarios, See ***Chapter 4, Recommended TIA Table of Contents***, and ***Chapter 11, Future Year Scenarios (Cumulative Conditions)***;

☐ 5) Prepare and submit a draft TIA Report to VTA and other agencies within the time frame outlined in ***Section 3.1***, Item 2;

☐ 6) Address comments received on the draft TIA Report, ***Section 3.1***, Item 4;

☐ 7) Send adopted conditions for approved projects that relate to the CMP Transportation System and the promotion of alternative transportation modes to VTA, ***Section 3.1***, Item 5 *(Encouraged)*.

Project Description, Study Area and Existing Conditions

☐ 8) Provide a description of the project and the transportation context surrounding it. Topics covered should include: Location of Proposed Project; Proposed Land Use and Project Size; and Site Plan, ***See Chapter 4, Recommended TIA Table of Contents***;

☐ 9) Provide information about the existing Project Area roadway system, ***Section 6.2***;

☐ 10) Use a table similar to ***Table A-1: Freeway Analysis Requirement Determination*** to assess whether freeway segment analysis is required; ***Section 5.2.8*** and ***Appendix A***;

☐ 11) Provide a description and map of the existing Project Area transit system, ***Section 6.3***;

☐ 12) Provide a description and map of the existing Project Area bicycle system, ***Section 6.4***;

☐ 13) Provide a description and map of the existing Project Area pedestrian system, ***Section 6.4***;

☐ 14) When applicable, provide information on Transportation Demand Management (TDM) or unique transportation or land use plans affecting the Project Area, ***Section 6.4***;

Trip Generations and Trip Reductions

☐ 15) Clearly identify the source of each trip generation rate used in the transportation analysis; Include in the TIA Report a full description of the trip generation methodology used and a summary of all inputs and assumptions, ***Section 8.1***;

☐ 16) Consider all available options to reduce project-generated automobile trips, including mixed-use development, a strong TDM program, project location, parking management, and development near frequent transit service. Clearly explain, document and justify all auto trip reductions claimed in the TIA Report; this includes stating which trip reduction approach (Standard, Peer/Study-Based, and/or Target-Based) is being used, ***Section 8.2***;

☐ 17) Provide a trip generation rate summary table, ***Section 8.1.2***; This table should show:
- Quantification (e.g. square feet, number of units, etc.) of trip generation for each land use type;
- Trip generation rates used;
- Resulting trips generated;
- If applicable, any trip reductions;

☐ 18) If the project is using parking management measures as part of its overall TDM/trip reduction strategy, document this in the TIA Report and note it in the Auto Trip Reduction Statement, ***Section 8.2.1.5*** and ***Appendix C***;

☐ 19) For all projects, summarize trip generation and any trip reductions, if applicable, in an Auto Trip Reduction Statement in the Executive Summary of the TIA Report, using the form provided in ***Appendix C***;

Trip Distribution and Assignment

☐ 20) Provide trip distribution percentages on an area map with transportation facilities and the project site, ***Section 8.3***;

☐ 21) Provide clear explanation with justification and documentation of pass-by and diverted trip reductions, ***Sections 8.3.1, 8.3.2*** and ***8.3.3***;

☐ 22) Provide trip assignments on a figure showing project trips at study intersections, ***Section 8.3***;

Project Conditions

☐ 23) Provide a Traffic Analysis of the "without project" scenario(s) (Existing, Background or Cumulative, as applicable); This analysis shall include, but not be limited to evaluation of Auto Level of Service and queuing impacts, ***Section 9.1***;

☐ 24) Provide a Traffic Analysis of Project Conditions compared to the "without project" scenarios(s) (Existing, Background or Cumulative, as applicable); This analysis shall include, but not be limited to evaluation of Auto Level of Service and queuing impacts, ***Section 9.1***;

☐ 25) Provide an analysis of project effects on the transit system; The evaluation shall consider transit vehicle delay, transit access and facilities, ***Section 9.2***;

☐ 26) Provide an analysis of bicycle and pedestrian modes under project conditions; This analysis shall address project effects on existing bicyclists and pedestrians as well as the effects and benefits of site development and associated roadway improvements on bicycle/pedestrian infrastructure, circulation, Quality of Service (QOS), and conformance to existing plans and policies, ***Section 9.3***;

☐ 27) Provide an analysis of site circulation and access, ***Section 9.4***;

Mitigation Measures and Multimodal Improvements

☐ 28) Discuss mitigation measures to address project impacts per CMP standards, and improvements to address other project-related effects on the transportation system; The discussion of mitigation measures and improvements shall take into account all the issues noted in ***Chapter 10*** of the *TIA Guidelines*, including consideration of all categories of mitigation measures and improvements (physical or capacity-enhancing improvements, operational and/or efficiency improvements, and projects and programs used to reduce project auto trip generation), identification of the feasibility of proposed measures, who is responsible for implementing each measure, when the measure will be implemented, and the cost of implementation, as appropriate;

☐ 29) If a project causes a transportation impact that cannot be mitigated to the CMP Auto Level of Service (LOS) standard, a Multimodal Improvement Plan must be provided along with the TIA, or the project applicant must agree in advance to participate in the implementation of a Multimodal Improvement Plan after project approval, ***Section 10.1***, Item 5;

☐ 30) If a project impacts a CMP System facility that has a Multimodal Improvement Plan, it is subject to the conditions of the Plan; The project's TIA Report shall identify what role the project will play in implementing the

Multimodal Improvement Plan Actions, ***Section 10.1***, Item 6;

☐ 31) Mitigation measures for Auto Level of Service (LOS) shall not unreasonably degrade bicycle, pedestrian or transit access, and circulation. If a project proposes mitigation for Auto LOS involving changes to roadway segment or intersection geometry, or changes to signal operations, the TIA shall analyze and disclose whether the mitigation would affect pedestrian or bicycle conditions or increase transit vehicle delay, ***Section 10.1***, Item 7;

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APPENDIX L: Glossary of Terms

The following are definitions for terms used in the *TIA Guidelines*:

Approved Project: A specific project for which an entitlement to build has been granted.

Auto Level of Service: Auto Level of Service (LOS) describes the operations of roadway segments or intersections in terms of vehicle speed, volume and capacity, freedom of movement, traffic delay, comfort, convenience and safety. Auto LOS measurements are given by letter designations, from A (least congested) to F (most congested). Procedures to analyze Auto LOS are defined in the VTA Traffic LOS Analysis Guidelines. Auto LOS evaluates operations for all common motor vehicle types, including automobiles, light and heavy trucks, and motorcycles. In addition, although congestion also affects transit vehicles operating in general purpose lanes, transit operations are affected by additional factors and are typically evaluated separately from Auto LOS.

Background Conditions: The analysis scenario including Existing Conditions and approved projects.

Carpooling: Commuting in a privately-owned vehicle with at least two passengers. Carpooling can be arranged informally or with employer assistance.

CDT Program: VTA's Community Design & Transportation Program to integrate transportation and land us planning. The Program includes the Cores, Corridors and Station Areas framework, which shows VTA and local jurisdiction priorities for supporting concentrated development in the County.

CEQA: California Environmental Quality Act. This act requires that Lead Agencies disclose and evaluate the significant environmental impacts of proposed projects and adopt all feasible mitigation measures to reduce or eliminate those impacts. Although there is some overlap in the analysis of transportation impacts under CEQA and the CMP, it is not intended that TIAs following the VTA CMP *TIA Guidelines* will provide all information required for CEQA purposes.

Changes to Roadway Segment or Intersection Geometry: Changes to the geometry of existing roadway segments or intersections, including, but not limited to, adding travel lanes on roadway segments, adding turn lanes at intersections, and changing pedestrian and/or bicycle crossing distance.

Changes to Signal Operations: Substantive changes to traffic signal operations, including, but not limited to, changes to phasing or cycle length.

CMA: Congestion Management Agency: The CMA is a countywide organization responsible for preparing and implementing the county's Congestion Management Program. In Santa Clara County, VTA is the designated CMA.

CMP: Congestion Management Program: A comprehensive program designed to reduce traffic congestion, to enhance the effectiveness of land use decisions, and to improve air quality. Unless otherwise specified, CMP means Santa Clara County's Congestion Management Program.

Cumulative Conditions: The analysis scenario including Background Conditions (Existing Conditions plus Approved Projects) and expected growth, plus the project.

Deficiency Plan: See *Multimodal Improvement Plan*.

Diverted Linked Trip: Trips generated by the proposed project that would be attracted from roadways in the vicinity of a proposed project site. This type of trip requires a diversion from one roadway to another to gain access to the site.

Effect: Used to refer to project-related effects on elements of the transportation system for which no CMP standard or impact threshold has been established. Distinct from "impact," which refers to project effects on the CMP system as determined by the standards and impact thresholds established by VTA. The TIA should particularly focus on project-related effects that tend to degrade pedestrian, bicycle and transit conditions.

Existing Conditions: Roadway, transit, bicycle and pedestrian conditions at the time that the Lead Agency issues the TIA Notification Form.

Express Lanes: Express Lanes are HOV (high-occupancy vehicle) lanes which solo drivers can access by paying a toll. Tolls vary by congestion levels to keep the lanes operating at a minimum of 45 mph. In other areas outside Santa Clara County, Express Lanes may be called high-occupancy toll (HOT) or managed lanes.

Facility: A part of the transportation network, such as a roadway, intersection, bicycle lane, sidewalk or transit station. The word "facility" is used generally in this document to refer to CMP System roadway facilities, which include CMP intersections, freeways, and rural highways. CMP facilities also include the CMP Transit Network and the CMP Bicycle Network, but these are generally called out specifically in the text.

Financial Incentives: Transportation Demand Management (TDM) programs sometimes offer financial incentives to participants who choose to commute by carpooling, vanpooling, transit, bicycling or walking. Incentives can include: transportation allowances; parking cash-out; pre-tax commuter benefits; and subsidies such as free transit passes or transit fare incentives.

General Planning Efforts: General planning efforts are planning studies that are designed to provide basic guidelines for land uses, the transportation system, and design characteristics in a relatively large area. The key element of this definition is that these types of planning efforts do not confer, as a right, the ability to develop a specific project.

HCM: Highway Capacity Manual. A manual published by the Transportation Research Board (TRB) that contains concepts, guidelines, and equations to calculate the level of service on highways and intersections. In 2010 the manual was updated to include new level of service/quality of service measures for transit, pedestrians, and bicycles.

HOV: High Occupancy Vehicle Lane. A lane on a street or highway reserved for the use of high occupancy vehicles either all day or during specified periods (for example, during rush hours). Buses, carpools, and/or vanpools are allowed to use HOV lanes.

ITE: The Institute of Transportation Engineers is a professional organization that publishes technical guidelines for transportation engineering. ITE *Trip Generation* is a standard reference for estimating trips based on the type and size of proposed development.

Impact: Used to refer to project effects on the CMP system as determined by the standards and impact thresholds established by VTA. Distinct from "effect," which refers to project-related effects on elements of the transportation system for which no CMP standard or impact threshold has been established.

Improvement: A change that addresses the effects, particularly negative effects, of a development project on elements of the transportation system for which no CMP standard or impact threshold has been established.

Lead Agency: The agency responsible for preparing the Transportation Impact Analysis report.

Level of Service (LOS): This is a measure used by transportation professionals to grade performance of transportation facilities. LOS is graded on a scale of A (the best performance) to F (the worst performance).

Long-Term Development Project: A specific development project expected to be completed beyond five years from the date of approval. Most long-term development projects will also be phased-development projects.

Member Agency: A local jurisdiction that is a signatory of the CMA's Joint Powers Agreement. This includes all cities within the county, Santa Clara County, and the Santa Clara Valley Transportation Authority.

Mitigation: A change that addresses the impacts of a development project on elements of the transportation system for which a CMP standard or impact threshold has been established.

Mixed-Use Development: A project that combines one or more land uses. Depending on the land uses, the vehicle trips generated by the development may be fewer than if the uses were developed separately.

Mode Split: The share of all trips to and from a project site taken by each of the four major transportation modes (automobile, transit, bicycle and pedestrian).

Multimodal Improvement Plan: VTA terminology for "Deficiency Plan" as defined by CMA statute. Multimodal Improvement Plans are plans to identify offsetting measures to improve transportation conditions on CMP facilities in lieu of making physical traffic capacity improvements such as widening an intersection or roadway.

Near-Term Development Project: A near-term development project will be built and occupied within five years of project approval. Most near-term development projects will also be specific development projects.

Net New Peak Hour Trip: Proposed project trips which are not associated with an existing development on the site and not included in an approved project.

Parking Management Program: Parking policies that are designed to make the most efficient use of parking supply, and encourage alternatives to driving alone, such as parking charges, parking cash out, shared parking, or preferential parking for carpool or vanpool vehicles.

Pass-By Trips: Trips generated by the proposed project that would be attracted from traffic passing the proposed project site on an adjacent street that contains direct access to the generator.

PDA: Priority Development Area. These locations were identified for concentrated development as part of Plan Bay Area, the Metropolitan Transportation Commission's 2040 Regional Transportation Plan for the nine-county Bay Area.

Peak Hour: The highest morning or evening hour of travel reported on a transportation network or street.

Peer/Study-Based Reduction: Automobile trip reduction approach that may be used when studies of similar projects, or of other sites occupied by the project applicant, have demonstrated comparable trip reductions through survey results or other data.

Phased-Development Project: A project that will be completed in separate pieces over a period of time.

Pre-Tax Commuter Benefit: Federal tax code allows the use of tax-free dollars to pay for transit commuting and parking costs. The monthly benefit amount varies from year to year based on adopted legislation.

Project Conditions: A study scenario evaluating the addition of the project, along with estimated project generated trips, to the "without project" scenario (Existing, Background, or Cumulative Conditions, as appropriate).

Quality of Service (QOS): A metric used to evaluate how well a transportation facility serves its users. Several different QOS methodologies are currently used by transportation professionals, often with a focus on bicyclists, pedestrians or transit passengers.

Queuing: Formation of a line of vehicles at an intersection or driveway, when vehicle arrival rates are higher than departure rates.

Specific Development Project: A project that, when approved, grants an entitlement for construction of a particular size and type.

Target-Based Reduction: Automobile trip reduction approach that may be used when the project applicant has entered into an enforceable agreement with the Lead Agency that limits the number of automobile trips traveling to and from the project site.

TDM: Transportation Demand Management. This is a term used to describe policies and programs to reduce the number of cars on the road. Examples of transportation demand management include flextime, ridesharing, telecommuting, and financial incentives.

Transit Fare Incentives: Transit fare incentives are financial incentives offered to reduce drive-alone commuter trips, such as free transit passes or pre-paid fares.

Transportation Demand Forecasting Model: An analytical tool that predicts travel patterns based upon the spatial relationship between various types of land uses and connecting transportation facilities (e.g., roadways and transit).

Trip Assignment: The trip assignment step of a TIA consists of assigning trips to specific transportation facilities on the basis of the trip distribution percentages.

Trip Distribution: The trip distribution step of a TIA consists of forecasting the travel direction of project-generated trips to and from the project site.

Trip Generation: Trip generation predicts the total number of trips to and from a project site.

Trip Reduction: Similar to but broader than TDM, trip reduction refers to any effort to reduce the number of automobile trips generated by a development project. The VTA *TIA Guidelines* provide guidance on several approaches that encourage and document reductions in automobile trips generated by new development projects compared to standard automobile-trip rates.

Trip Threshold: A complete TIA for CMP Purposes shall be performed for any project in Santa Clara County expected to generate 100 or more net new weekday (AM or PM peak hour) or weekend peak hour trips, including both inbound and outbound trips.

Vanpooling: Commuting in a seven- to 15-passenger van, with driving undertaken by commuters. The riders usually pay for some portion of the van's ownership and operating cost. The van may be privately owned, employer-sponsored or provided through a private company that leases vehicles.