

# COUNTY OF SONOMA GUIDELINES FOR TRAFFIC STUDIES

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# COUNTY OF SONOMA GUIDELINES FOR TRAFFIC STUDIES

## INTRODUCTION

The Permit and Resource Management Department (PRMD) and the Department of Transportation and Public Works (DTPW) are both responsible for the review and condition of private development projects. Traffic related conditions must be based on an analysis of the potential traffic impacts that establish a reasonable nexus between the impacts of the project and the required improvements or conditions. Conditions requiring traffic improvements must be roughly proportional to the impact of the project and/or reflect a fair share contribution toward improvements related to cumulative impacts. Recent case law has determined that conformance with adopted standards and/or payment of impact fees may not, in and of itself, provide sufficient mitigation.

## TRAFFIC STUDIES

A traffic study report prepared by a registered traffic engineer will be required when it appears that the criteria or any of the thresholds of significance identified below will be exceeded. The traffic study and any required peer review shall be provided at the sole expense of the applicant. Applications for development permits are considered incomplete until all required information is submitted and accepted as accurate and complete by PRMD. Peer review of traffic reports is required on all projects affecting State highways and may be required of any traffic study submitted by the applicant at the discretion of the PRMD or DTPW. Alternatively, the County may contract directly for a traffic study on behalf of an applicant and charge the cost to the applicant without requiring a peer review.

A previous traffic study for the development under review will only be acceptable if it is less than two (2) years old and only if the context in the general area has not changed significantly i.e. new development, changes in roadways, and/or land use or area plans have not occurred since preparation of the report.

The format and content of a traffic study should follow the outline provided in Attachment A, unless a different scope of work is approved by both PRMD and DTPW. If the project affects a State highway, Caltrans minimum requirements must also be included as defined in Caltrans', *"Guide for the Preparation of Traffic Impact Studies"*, available on-line or at DTPW or PRMD.

The following table provides a preliminary method for determining whether a traffic study is required and what type of study should be completed on a preliminary trip generation estimate for the critical peak hour. A preliminary estimate of peak hour trip generation for various land uses is provided in Attachment B. However, the critical peak hour may vary from location to location and by the type of use such that these tables should be used for a preliminary determination only. In any case, DTPW and PRMD staff may require a traffic study to address specific issues related to a project's access, on-site circulation, parking or other issues that arise during the review process, regardless of the preliminary method used in the attached tables.

**TRAFFIC IMPACT ANALYSIS REQUIREMENTS  
FOR PRIVATE PROJECT REVIEW**

Criteria <sup>1</sup>	Yes	No	Type of Traffic Analysis Required
<p>A. Is the proposed project located on or accessed from a State Highway?</p> <p>1. Is the state highway or area intersections currently or projected to operate at LOS D or worse?</p> <p>2. Will the project generate over 10 Critical Peak Hour trips?</p>			<p>If Yes, answer A1; If No, answer Section B.</p> <p>If Yes, then a Full Traffic Study is required. If No, then answer A2.</p> <p>If Yes, then a Focused Traffic Study may be required.</p>
<p>B. Is the project located in a study area where one or more streets or intersections are currently or projected to operate at LOS D or worse?</p>			<p>If Yes, then a Full Traffic Study is required? If No, then answer Section C.</p>
<p>C. Is the proposed project located in a study area where streets and intersections are currently or projected to operate at LOS C or better?</p> <p>1. Is the proposed project anticipated to generate less than 10 vehicle-trips in the critical peak hour?</p> <p>2. Is the proposed project anticipated to generate more than 10 but less than 25 vehicle-trips in the critical peak hour?</p> <p>3. Is the proposed project anticipated to generate more than 25 vehicle-trips in the critical peak hour?</p> <p>4. Is the project located in an area with potential hazard conditions?</p> <p>5. Is the proposed project anticipated to have a significant effect on the environment and may require an Environmental Impact Report (EIR)?</p> <p>6. Is the proposed project not easily categorized into one of the above categories?</p>			<p>If Yes, then a Trip Generation Analysis is required and respond to questions C1 through C6 below.</p> <p>If Yes, no further traffic analysis is required.</p> <p>If Yes, only a Focused Traffic Study is required.</p> <p>If Yes, conduct a Full Traffic Study.</p> <p>If Yes, a Focused Traffic Study is required.</p> <p>If Yes, a Full Traffic Study is required for incorporation into an EIR.</p> <p>If Yes, contact the Permit and Resource Management Department (PRMD) and the Department of Transportation and Public Works (DTPW) for assistance.</p>

<sup>1</sup> Criteria applies to all controlled intersections except for driveways and minor side streets that have more than 30 vehicle trips per hour per approach or exclusive left turn movement.

## TRAFFIC STUDY PROTOCOL

A meeting with staff from PRMD and DTPW is recommended prior to beginning the study to define the required area and scope. If the project is located on or near a State highway consultation with Caltrans is also necessary. Topics for discussion should include study area, location and timing or traffic counts, trip generation, directional distribution of traffic, trip assignment, intersection analysis and methods of projection of build-out volume. The traffic study should include analysis of adjacent local roadways and intersections located in the vicinity, including all intersections which are operating near or below thresholds in the general area. Traffic studies should also identify and evaluate the nearest access to State highways or nearest major County roadway.

Five (5) copies of the study shall be submitted to PRMD and one (1) copy shall be submitted to DTPW-Land Development Division Manager. The report will be referred to Caltrans and other agencies (i.e. SCTA, affected cities) for comment. Once accepted by PRMD and DTPW, the traffic study will be incorporated into the environmental document for the project. The environmental document will then be made available for public review and circulated to responsible agencies prior to the hearing date.

## TRAFFIC IMPACT ANALYSIS METHODS

1. Study Area: Traffic studies must identify the study area including the nearest access to State highways or major County roadways in the vicinity. If the area is significantly affected by existing regional traffic patterns, then a larger study area may be needed to adequately address the traffic issues.
2. Methodology: Traffic studies should utilize current methods and practices as defined by Caltrans in the most recently adopted "Guide for the Preparation of Traffic Impact Studies" and the most current Institute of Transportation (ITE) trip generation rates or other measured counts as approved by DTPW.

The "Florida Guidelines" available at DTPW provide pre-calculated tables for different roadway configurations that may be used for an initial determination of delay on existing roadways.

3. Future Roadway Improvements: All assumptions used in the analysis must be clearly stated in the report. **Planned roadway improvements shall only be included in the traffic analysis if the improvement project has been fully funded and programmed for construction.** The traffic report must identify the specific improvements, funding source and time-frame for completion of any roadway improvements assumed to be in place.
4. Near Term and Future Land Uses: Projection of near-term and future projected land uses and development should be made in consultation with planning staff at PRMD. An interim near-term evaluation for existing conditions and a long-term growth projection to 2020 (consistent with the County General Plan) is required for cumulative impact analysis. The near-term analysis must identify projects in the study area that have been approved but not yet built, projects that are pending approvals and likely to be built by the time the proposed project is completed as well as, general projections of growth within or affecting the study area to the year the project is proposed to be operational. A tabulation of land uses by type and parcel number with the respective trip generation rates must be included in the report.

For long-term analysis, the Countywide traffic model which is maintained and updated by the Sonoma County Transportation Authority should be used for projected traffic volumes. The "Alternative 4-Committed Improvements" model run should be used that includes only the funded improvements that are committed with projected growth to 2020. The Projected 2020 Countywide traffic model runs include full-build-out of the cities with projections of growth in the unincorporated area. Model runs may need to be updated to include any funded improvements that have been or will be completed and to include any new information on existing and future development.

## THRESHOLDS

1. State Highways: The impact of a project on a State highway shall be evaluated based on criteria established by Caltrans in the "*Guide for the Preparation of Traffic Impact Studies*", as amended from time to time available on the internet at:

<http://www.dot.ca.gov/hq/traffops/developserv/operationalsystems/reports/tisguide.pdf>

Additionally, for analysis of cumulative impact, the "Traffic Impact Thresholds of Significance Criteria" for the County road systems identified in Attachment C shall be used to supplement Caltrans standards on State highways.

2. County Roads: Traffic Impact Thresholds of Significance Criteria "for evaluating traffic impacts on County roadways are defined in Attachment C. The County's standard for roadway segments is to maintain LOS C on the County roadway system as defined in the Sonoma County General Plan. The standard for intersections is to provide LOS D or better at build-out of the General Plan. Projects which take up significant existing reserve capacity at an intersection may have a significant traffic impact if the cumulative analysis indicates that the LOS deteriorates below the County standards.
3. Mitigation Measures: In order to reduce project impacts to levels of insignificance the proposed mitigation measures must result in post-development affected intersections and roadways that have an LOS that is no worse than the pre-project LOS; reduce safety impacts to insignificance by bringing the site up to Caltrans design standards; and provide adequate parking and alternative transportation facilities consistent with County plans and policies. The scope of the mitigation measures must reduce the project's impact below the identifiable thresholds found in Attachment C.

The payment of countywide traffic impact fees in and of itself may not be adequate to mitigate a project's local impacts if the existing facilities are already below standard and the required improvements are not fully funded or programmed to be operational at the time of the project's completion. The timing of the implementation of the mitigation measure may require off-site improvements to be constructed by the developer using a Reimbursement Agreement to pay for any oversized facilities associated with the public share of the improvement pursuant to Section 26-670 of the Sonoma County Code. Fees do not cover project specific impacts related to a particular project.

The project's contribution to cumulative impacts must also be addressed in proportion to the project's impact. A proportional fair share contribution to a

traffic improvement related to a cumulative impact may be required based on the Methodology for Calculating Equitable Mitigation Measures included in Caltrans "Guide for the Preparation of Traffic Impact Studies" as referenced above.

Mitigation measures for both project impacts and cumulative impacts must be implemented prior to occurrence of the impact. An analysis of the timing, funding and responsibilities for implementation of mitigation measures should be included in the traffic study.

Payment of the countywide traffic impact fee only mitigates or addresses cumulative countywide impacts related to projects that are programmed or listed to be funded by the fees on file with DTPW.

4. Peer Review: The County may require a peer review of any traffic report submitted by an applicant. The full cost of any traffic studies, required revisions, supplemental reports or peer reviews shall be borne by the applicant. Peer review of traffic reports will be required on all projects affecting a State highway.

## ATTACHMENTS

- A. Standards for Traffic Studies
- B. Peak Hour Trip Generation Table
- C. Traffic Impacts Thresholds of Significance Criteria.

Caltrans "Guide for the Preparation of Traffic Impact Studies", is available at DTPW or PRMD or on-line at:

[www.dot.ca.gov/hq/traffops/developserv/operationalsystems/reports/tisguide.pdf](http://www.dot.ca.gov/hq/traffops/developserv/operationalsystems/reports/tisguide.pdf)

## ATTACHMENT A STANDARDS FOR TRAFFIC STUDIES

### INTRODUCTION

A traffic study report may be required to assess impacts of developments on existing and/or planned roads. A registered Traffic Engineer shall prepare the traffic study. The County will require a Traffic Study whenever it is determined that a proposal may have a significant, but undetermined impact on the flow of public traffic. A Traffic Study more than two years old shall be updated unless the Department of Transportation and Public Works (DTPW) determines conditions have not significantly changed.

A meeting with the DTPW is recommended prior to beginning the study. Topics for discussion could include study area, trip generation, directional distribution of traffic, trip assignment, intersection analysis, and methods of projecting build-out volume.

Five (5) copies of the study shall be submitted to the Permit and Resource Management Department (PRMD). The report will be referred to the DTPW and Caltrans for review and approval. Once accepted by the reviewing agencies, the traffic study will be incorporated into the environmental document for the project. The Department shall be free to use an approved Traffic Study for any purpose whatsoever.

Calculations, assumptions and supporting data for the conclusion presented in the Traffic Study shall be submitted as part of the Traffic Study. The calculations shall be comprehensive and easily understood.

Maps and graphs shall be to scale and must include dimensioned road geometrics (e.g., width, radii, etc.). Intersection geometrics shall include bus stops, parking areas, pedestrian crossings, driveway restrictions, etc.

Daily trips may be reduced by allowing for public transit when a transit stop is located within one thousand (1,000) feet of the development. The maximum reduction allowed is five (5) percent. Transit reductions do not apply to hotels, restaurants, retail, or financial uses. Pass-by factors may be used for retail oriented development upon approval of the DTPW.

Revisions to the Traffic Study shall be made when required by the PRMD or the DTPW. The need for revisions could be based on completeness, accuracy, consistency with standards, impact evaluation methodology and assumptions, and compatibility of the access or development plan, or other considerations. Methodologies shall conform to those found in the Caltrans "Guide for the Preparation of Traffic Impact Studies", a copy of which is found in this manual.

## TRAFFIC STUDY FORMAT AND CONTENTS

Traffic studies shall be organized and present all required information using the format, content, and standards described below. A consistent format and standard will provide for easier comparison and evaluation of the report by County staff, and decision-making bodies, thus allowing for quicker review. Traffic reports must clearly state all assumptions and references used.

### REQUIRED CONTENTS FOR FOCUSED TRAFFIC STUDY

If the proposed project is estimated to generate less than 50 vehicles-trips in the critical peak hours, a focused site traffic study may be required in consultation with staff from DTPW. The study shall adhere to the following guidelines:

The project applicant shall retain a professional traffic engineer or civil engineer, who is licensed to practice Traffic Engineering in the State of California. Said engineer consultant shall conduct qualitative and/or quantitative analysis and submit a written "Focused Site Traffic Review" on each of the following areas that apply to the proposed project. Please note that when a concern is identified, the Traffic Engineer shall propose a solution:

Frontage Improvements: Identify and discuss all aspects of the road fronting the proposed project, which do not meet the County's minimum standards for roadways or driveways.

Parking: Discuss the parking associated with the proposed project compared with County Standards that are or may be found inadequate.

Emergency Access: Discuss proposed site designs that (may) result in inadequate emergency access.

Road Hazards: Discuss any anticipated substantial increases in potential hazards due to a design feature (e.g., sharp curves or dangerous intersections) or any perceived incompatible uses (e.g., farm equipment).

Vehicle Queues: Identify situations where the addition of project vehicles or pedestrian traffic cause the 95th percentile queue length to exceed existing roadway turn-lane storage capacity.

Signal Warrants: Identify situations where the addition of project vehicles or pedestrian traffic will cause an intersection to meet or exceed Caltrans signal warrant criteria.

Turn Lanes: Identify situations where the addition of project traffic at an intersection, including project driveways, causes an intersection to meet or exceed criteria for provision of a right or left-turn lane on an intersection approach.

Sight Distance: Identify situations where the proposed project add traffic to an existing un-signalized intersection(s), including project related driveways that have inadequate sight distance based on Caltrans and County criteria.

Pre-Project Traffic Concerns: Identify and discuss any current traffic problems in the local area, such as, high accident locations (if this applies, include a collision diagram(s) and accident rate analysis) or confusing intersections.

Neighborhood Traffic Sensitivities: Identify and discuss the sensitivities of adjacent neighborhoods or other areas that may be perceived as adversely impacted by the proposed project.

Site Driveways: Identify and discuss proposed or existing site driveway(s) that are in close proximity to other driveways or intersections that are adversely impacted by the proposed project.

Transit Operations: Identify and discuss the potential for the proposed project to adversely impact transit operations.

Pedestrian Operations: Identify and discuss the potential for the proposed project to adversely impact pedestrian safety and the adequacy of nearby pedestrian facilities.

Bicycle Operations: Identify and discuss the potential for the proposed project to adversely impact bicycle safety and the adequacy of nearby bicycle facilities.

Alternative Transportation Policies: Identify and discuss aspects of the proposed project that are/may be in conflict with adopted policies, plans or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks, etc.).

Truck Operations: When it is anticipated that the number of truck deliveries and service call will exceed an average of 10 per day, discuss the ability of the proposed project's site design to adequately handle truck loading demand and traffic circulation. Discuss excessive wear and tear associated with ongoing truck operations on County roadways.

Response to Expressed Concerns: Respond to traffic circulation comments on the proposed project that have been received others, including public agencies (e.g., Caltrans, Cities, SCTA).

Level of Service: Identify existing, projected and cumulative conditions, including documentation of all assumptions or land use and planned improvements.

## REQUIRED FORMAT AND CONTENTS FOR FULL TRAFFIC REPORTS

### I. TITLE PAGE

- A. Project name and location
- B. Project sponsor and contact person
- C. Person/organization preparing the report and contact information

### II. TABLE OF CONTENTS

- A. Study outline
- B. List of figures
- C. List of tables

### III. EXECUTIVE SUMMARY

- A. A summary description of the scope of the study.
- B. A summary description of the proposed development, including a description of each of its components and the size of each of the components.
- C. A summary of the traffic generated by each of the development's components.
- D. Descriptions of the primary access route(s) to the development site.
- E. A description of the access point to the development site.
- F. A description of the study area, including identification of the study area roads.
- G. A description of the study area land use and zoning
- H. A brief discussion of the findings, mitigations, and recommendations of the study.

### IV. INTRODUCTION/STUDY PARAMETERS

- A. Description of the proposed development
  - 1. Project location
  - 2. A description of the existing use of the development site.
  - 3. A description of the project including the project purpose or goal and planned completion date or phasing.
  - 4. A description of each of the project's components, including the size of each component and operating characteristics.
  - 5. Site plan (figure) with dimensions showing the proposed development, including all parking and access driveways, easements and pedestrian access.
- B. Study area, circulation network and land uses
  - 1. A description of the study area limits, including the roadways and intersections to be studied along with the reasoning behind the choice of the study area limits.
  - 2. A map of the study area illustrating the circulation network, including all access to state and local roadways.
  - 3. Maps depicting both existing and proposed land uses and zoning in the study area.
  - 4. Table identifying all existing, approved and proposed developments, in the study area.
  - 5. References to other traffic studies.
- C. Operating scenarios and hours to be studied
  - 1. A description of the operating scenarios that will be considered in the

- report and the reasoning behind the selection of these scenarios.
2. A description of the hours of operation that will be considered in the report and the reasoning behind the selection of these hours. Include separate statements on weekday activities and weekend activities.
3. Phasing plan including proposed dates of project completion.

D. Description of methodologies and assumptions

1. The methodologies used in the traffic study (methods must conform to those found in the Caltrans "Guide for the Preparation of Traffic Impact Studies", unless otherwise approved by the Department. A copy of the Caltrans guide can be obtained from:  
<http://www.dot.ca.gov/hq/traffops/developserv/operationalsystems/>
2. All assumptions and the basis or rationale including all land use projections and assumed roadway improvements.
3. The assumptions used in calculating LOS for each intersection and each roadway segment.

E. Operating standards

1. Level of service (LOS) operating standards and thresholds of significance, (standards must conform to the CEQA guidelines and thresholds provided in Attachment B "Caltrans Guide" and Sonoma County "Traffic Impact Thresholds" provided in Attachment C).
2. The projected horizon (year) for the assessment.
3. Roadway capacity criteria.
4. Volume to capacity ratios.

V. **TRAFFIC ANALYSIS**

A. Existing near-term conditions

1. The anticipated land uses that affect the roadway system in the year the project is anticipated to be completed, including a tabulation of land uses by type and parcel number with the respective trip generation rates.
2. A list of prior traffic studies.
3. Traffic circulation system within the study area, including traffic controls at key intersections.
4. Key road geometric features affecting the proposed development, including roads, intersections, storage lengths and the existing access to the project site.
5. Describe existing deficiencies on roads that will be used by the project.
6. Posted speed limits within the study area.
7. Existing daily traffic counts and turning movements within the study area and the source of this information.
8. Trip generation for the existing use of the site, if any.
9. Roadway segment traffic counts within the study area.
10. Intersection traffic counts at key intersections and the source of this information.
11. Estimated pedestrian activity.
12. Estimated bicycle activity.
13. Estimated transit activity.
14. Queuing analysis.
15. Existing level of service conditions including both in terms of seconds of delay and letter LOS designation for the existing site with no project in accordance with current Caltrans methods and practices. Provide this information for key intersections and road segments in the study area. Provide the source of this information.

16. A map showing the above features.

B. Accident history evaluation

1. A tabulation of accidents for the most recent years within the study area.
2. A comparison of the accident rate with statewide averages for similar situations.

C. Future conditions

1. Project generated trips

- a. Each component of the development that generates new trips.
- b. The size of each traffic generating component of the development.
- c. Average one-way trip generation rates for each traffic-generating components of the proposal (daily and peak hour).
- d. ADT generated by project during work week.
- e. ADT generated by project during weekend.
- f. Peak hour trips generated by project during a work week.
- g. Peak hour trips generated by project during peak weekend day.
- h. Percentage pass-by traffic (if applicable).
- i. Winery tasting room traffic (if applicable).
- j. Special events matrix showing special events by type, timing of traffic movements related to each event type and volumes of traffic associated with each event type.
- k. Trip generation rates taken from the Institute of Transportation Engineer's (ITE) "Trip Generation Manual" report. Upon approval of the Department of Transportation and Public Works rates from other sources (e.g., Caltrans) or traffic counts from similar uses may be used. For mixed-use developments, combined ITE rates may be used to estimate average daily traffic.
- l. Trip generation for the proposed use shall be calculated for the highest use or worst case scenario allowed under the proposal. If the development is staged, the trip generation related to full development shall be used for the analysis.
- m. Separate trip generation figures for truck traffic and non-truck traffic related to the development.
- n. Peak hour may be estimated by using ten (10) percent of average daily traffic upon approval of the DTPW.
- o. Passerby factors may be used upon approval of the DTPW.
- p. Internal trip reductions and modal split assumptions require analytical support and approval from the DTPW.
- q. Estimated trip generation from known future developments within the study area.
- r. Volume projections for background traffic growth may be available from the DTPW.
- s. A map(s) showing the above information.
- t. Parking analysis.
- u. Describe truck operations and excessive wear and tear associated with truck traffic.

2. Project generated trip distribution

- a. Trip distribution and assignment for the access to the development and for intersections in the vicinity of the development, including the direction and percentage trip distribution for trips entering the development and the direction and percentage trip distribution for trips exiting the development.

- b. A discussion of survey data (e. g., origin-destination surveys) to support these estimates.
  - c. Market studies, area planning, council data, driveway counts at adjacent developments or other information (e.g., origin-destination surveys) to support these estimates.
  - d. A map(s) showing distribution of trips between the development and destinations.
3. Existing and project condition
- a. Projected daily traffic volumes with existing and the proposed development, including turning movements, facility geometry (including storage lengths) and traffic controls (including signal phasing and multi-signal progression where appropriate).
  - b. Projected level of service and warrant analysis.
  - c. Potential impact of project on key intersections including entrance(s) to the site (percentage volume increase and impact on level of service conditions in both seconds of delay and letter LOS designation).
  - d. Potential impact of project on key roadway segments serving the proposal. This information should be presented in terms of percentage volume increase and impact on level of service conditions in both seconds of delay and letter LOS designation.
  - e. The impact of this condition on volume to capacity ratios.
  - f. Adequacy of on-site parking.
  - g. Adequacy of provisions for pedestrians, bicycles, emergency access, and loading areas.
4. Cumulative conditions without project
- a. A listing of approved and reasonably foreseeable future developments within the study area.
  - b. Estimated trip generation from anticipated future developments within the study area.
  - c. Projected daily traffic volumes with existing and anticipated development (existing + other known or anticipated development) include turning movements, facility geometry (including storage lengths) and traffic controls (including signal phasing and multi-signal progression where appropriate).
  - d. Traffic volume projections for background traffic growth.
  - e. Potential impact on key intersections including entrance(s) to the site. Percentage volume increase and impact on level of service conditions in both seconds of delay and letter LOS designation.
  - f. Potential impact on key roadway segments serving the proposal. This information should be presented in terms of percentage volume increase and impact on level of service conditions in both seconds of delay and letter LOS designation.
  - g. The impact of this condition on volume to capacity ratios.
5. Cumulative conditions with project
- a. Projected daily traffic volumes with the project and existing and anticipated development within the study area (existing + project + other known or anticipated development) including turning movements, facility geometry (including storage lengths) and traffic controls (including signal phasing and multi-signal progression where appropriate).
  - b. Traffic volume projections for background traffic growth.

- c. Potential impact on key intersections including entrance(s) to the site (percentage volume increase and impact on level of service conditions in both seconds of delay and letter LOS designation).
- d. Potential impact on key roadway segments serving the proposal. This information should be presented in terms of percentage volume increase and impact on level of service conditions in both seconds of delay and letter LOS designation.
- e. The impact of this condition on volume to capacity ratios.

D. Site access evaluation

1. Discuss requirements for the access to the development.
2. Discuss the impact of access to the project on adjoining neighborhoods.
3. Provide a left-turn ingress analysis.
4. Provide a right-turn/deceleration ingress turn analysis.
5. Provide a left-turn egress acceleration lane analysis.
6. Provide a right-turn/acceleration lane egress turn analysis.
7. Provide a sight-distance analysis.

**VI. SUMMARY OF CONCLUSIONS**

A. Identify and describe potentially significant adverse impacts without mitigation measures.

1. Intersection(s) with peak-hour level of service.
2. Road segments with peak-hour level of service.
3. Project generated increases in traffic that exceed the LOS or delay thresholds as outlined in Attachment B or C.
4. Cumulative increases in traffic that exceed the LOS or delay thresholds outlined in Attachment C.
5. Unsafe access point(s) to the development.
6. Unsafe primary access route(s) to the development. (e.g., substandard width for traffic volume carried, side ditches, sharp curves, poor sight distance, inadequate pavement, inadequate intersections).
7. Miscellaneous other unsafe conditions.
8. Adverse impacts on pedestrian and bicycle movements.
9. The need for a traffic signal(s) shall be justified by identifying which, if any, Caltrans Traffic Manual signalization warrants is met.
10. Temporary construction impacts.
11. Adequacy of on-site parking.
12. Adequacy of provisions for pedestrians, bicycles, emergency access, and loading areas.
13. Summarize impacts in a table/matrix.

**VII. RECOMMENDATIONS**

A. The study shall recommend improvements or revisions to the project to mitigate each of the adverse impacts. Improvements and/or mitigation measures shall maintain peak-hour level of service "C" or better on roads and state highway facilities and a peak-hour level of service "D" or better at local intersections. The recommendation should include:

1. Descriptions of each recommended improvement and the timing, phasing plan or required thresholds for implementing the improvement.
2. Map(s) or schematic drawings of the recommended improvements.
3. Dimensioned diagrams of the nature and extent of recommended improvements.
4. An analysis of the timing, funding and responsibilities for implementation

- of mitigation measures.
5. Define responsibilities for implementation of mitigation measures and funding source. Differentiate between improvements to be constructed by the developer and those to be constructed by others, including government agencies. Explain how each improvement mitigates the related adverse impact.
  6. Countywide impact fees can be identified as funding of mitigation measures only if the specified improvement is included in the fee program list.
  7. Define the fair share allocation as a percentage for traffic related improvements involving several developments using the "Methodology for Calculating Equitable Mitigation Measures" included in Caltran's "Guide for the Preparation of Traffic Impact Studies" provided in Attachment B.

#### **VIII. APPENDICES**

- A. Data collected for the study including traffic counts (e.g., average daily, peak hour turning movements) and work sheets.
- B. Projected land use assumptions (table).
- C. References.
- D. Study participants and persons contacted.
- E. A completed winery trip generation form (if applicable).
- F. A completed special events trip generation form (if applicable).

**ATTACHMENT B  
PEAK HOUR TRIP GENERATION  
FOR VARIOUS LAND USES**

Land Use / Building Type	ITE Code <sup>1</sup>	AM Peak Trip Rate Per Unit	PM Peak Trip Rate Per Unit	Unit	25' Threshold for Full Traffic Study
<b>INDUSTRIAL</b>					
Truck terminal	30	7.28	6.55	ACRES	3.43
Light industrial	110	0.92	0.98	1000 Sq. Ft.	25,500
Heavy industrial	120	0.51	0.68	"	36,800
Industrial Park	130	0.89	0.92	"	27,200
Manufacturing	140	0.73	0.74	"	33,800
Warehousing	150	0.45	0.51	"	49,000
<b>RESIDENTIAL</b>				<b>DWELLING UNITS</b>	
Single Family Detached	210	0.75	1.01	"	25
Apartments	220	0.51	0.62	"	40
Condominium/Townhouse	230	0.44	0.54	"	46
Mobile Home Park	240	0.40	0.56	"	45
Land Use / Building Type	ITE Code	AM Peak Trip Rate Per Unit	PM Peak Trip Rate Per Unit	Unit	25' Threshold for Traffic
Senior Housing Detached	251	0.21	0.23	"	109
Senior Housing/Community	250/253	0.17	0.19	"	132
<b>LODGING</b>				<b>ROOMS</b>	
Hotel	310	0.56	0.61	"	41
Motel	320	0.45	0.47	"	53
Resort Hotel	330	0.31	0.42	"	60
<b>INSTITUTIONAL / EDUCATIONAL</b>				<b>STUDENTS</b>	

<sup>1</sup>Institute of Transportation Engineering

<sup>2</sup>Projects that meet or exceed the threshold require a full traffic study

<sup>3</sup>Projects that meet or exceed the threshold require a focused traffic study

Elementary School	520	0.29	0.13	"	86 stu
Middle School / Junior High	522	0.46	0.16	"	54 stu
High School	530	0.46	0.15	"	54 stu
Church	560	0.72	0.66	1000 Sq. Ft.	34,700
Day Care Center	565	0.81	0.86	STUDENT	29 stu
Library	590	1.06	7.09	1000 Sq. Ft.	3,500
MEDICAL				BEDS	
Hospital	610	1.07	1.22	"	20 b
Nursing Home	620	0.17	0.20	"	125
Medical / Dental Office	720	2.43	3.66	1000 Sq. Ft.	6,800
OFFICE				1,000 Sq. Ft.	
General Office	710	1.56	1.49	"	16,000
Corporate Headquarters	714	1.47	1.39	"	17,000
Land Use / Building Type	ITE Code	AM Peak Trip Rate Per Unit	PM Peak Trip Rate Per Unit	Unit	25 Thre for Traffic
Single Tenant Office	715	1.78	1.72	"	14,000
Post Office	732	8.02	10.79	"	2,300
Office Park	750	1.74	1.50	"	14,400
Research & Development Center	760	1.24	1.08	"	20,200
Business Park	770	1.43	1.29	"	17,500
RESTAURANT				"	
Quality Restaurant	831	0.81	7.49	"	3,300
High Turnover Restaurant	832	9.27	10.86	"	2,300
Fast Food w/o Drive-Thru	833	43.87	26.15	"	600 s
RETAIL				"	
Discount Superstore	813	1.84	3.82	"	6,500
Speciality Retail Center	814	0.00	2.59	"	9,700
Discount Store	815	0.99	4.24	"	5,900
Hardware / Paint Store	816	1.08	4.42	"	5,700
Nursery (Garden Center)	817	1.31	3.80	"	6,600
Nursery (Wholesale)	818	2.40	5.17	"	4,800

Shopping Center	820	1.03	3.74	"	6,700
Factory Outlet Center	823	0.67	2.29	"	10,900
Quick Lube Vehicle Shop	837	0.00	5.19	SERVICE POSITION	pos
Land Use / Building Type	ITE Code	AM Peak Trip Rate Per Unit	PM Peak Trip Rate Per Unit	Unit	25 Thre: for Traffic
Automobile Care Center	840	2.94	3.38	1,000 Sq. Ft.	7,400
New Car Sales	841	2.21	2.80	"	8,900
Auto Parts Sales	843	2.21	5.98	"	4,200
Gasoline / Service Station	844	12.27	14.56	FUELING POSITION	:
Gasoline w/ Convenient Mkt.	845	10.06	13.38	"	:
Gasoline w/Convenient Mkt. & Carwash	846	10.64	13.19	"	:
Sel-Service Carwash	847	0.00	5.79	WASH STALL	4 sl
Tire Store	848	2.85	4.12	1,000 Sq. Ft.	6,100
Wholesale Tire Store	849	1.34	2.11	"	7,800
Super Market	850	3.25	11.51	"	2,200
Convenient Market (24 hour)	851	65.39	53.73	"	400 s
Convenient Market (15-16 hour)	852	31.02	34.57	"	700 s
Convenient Market w/Gas	853	45.58	60.61	"	400 s
Discount Club	861	0.65	3.80	"	6,600
Home Improvement Superstore	862	1.48	2.87	"	8,700
Electronics Superstore	863	0.00	4.50	"	5,600
Furniture Store	890	0.17	0.45	"	55,600
Land Use / Building Type	ITE Code	AM Peak Trip Rate Per Unit	PM Peak Trip Rate Per Unit	Unit	25 Thre: for Traffic
Video Rental Store	896	0.00	13.60	"	1,800
BANKING SERVICE				1,000 Sq. Ft.	
Walk-In Bank	911	21.49	42.02	"	600 s

Drive-Thru Bank	912	12.63	54.77	"	500
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## ATTACHMENT C TRAFFIC IMPACT THRESHOLDS

### SIGNIFICANCE CRITERIA FOR PROJECT-LEVEL AND CUMULATIVE IMPACTS

The project would have a significant traffic impact if it results in any of the following conditions:

1. **On-site roads and frontage improvements:** Proposed on-site circulation and street frontage would not meet the County's minimum standards for roadway or driveway design, or potentially result in safety hazards, as determined by the County in consultation with a registered traffic engineer.
2. **Parking:** Proposed on-site parking supply would not be adequate to accommodate parking demand.
3. **Emergency Access:** The project site would have inadequate emergency access.
4. **Alternative Transportation:** The project provides inadequate facilities for alternative transportation modes (e.g., bus turnouts, bicycle racks, pedestrian pathways) and/or the project creates potential conflicts with adopted policies, plans, or programs supporting alternative transportation.
5. **Road Hazards:** Hazards are increased due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment, heavy pedestrian or truck traffic).
6. **Vehicle Queues:** The addition of project traffic causes the 95<sup>th</sup> percentile queue length to exceed roadway turn lane storage capacity <sup>1</sup>.
7. **Signal Warrants:** The addition of the project's vehicle or pedestrian traffic causes an intersection to meet or exceed Caltrans signal warrant criteria.
8. **Turn Lanes:** The addition of project traffic causes an intersection to meet or exceed criteria for provision of a right or left turn lane on an intersection approach <sup>2</sup>.
9. **Sight Lines:** The project constructs an unsignalized intersection (including driveways) or adds traffic to an existing unsignalized intersection approach that does not have adequate sight lines based upon Caltrans criteria for state highway intersections and County criteria for County roadway intersections.
10. **County Intersections:** The County Level of Service standard for intersections is Level of Service D or better. The project would have a significant traffic impact if the project's traffic would cause an intersection currently operating at an acceptable level of service (LOS D or better) to operate below the standard (LOS E or F).

If the intersection currently operates or is projected to operate below the County standard (at LOS E or F), the project's impact is significant and cumulatively considerable if it causes the delay <sup>3</sup> to increase by five seconds or more. The delay will be determined by comparing intersection operations with and without the project's traffic for both the existing baseline and project future conditions.

*The above criteria apply to all signalized, all-way stop controlled, and side street*

*controlled intersections with project traffic volumes over 30 vehicles per hour per approach or per exclusive left turn movement.*

11. **County Roadway Operations:** The County Level of Service Standard for County roadway operation is to maintain a Level of Service C, or for specific roadway segments, the level of service standard adopted in the General Plan Figures CT2c-CT2d. The project would have a significant traffic impact if the project's traffic would cause a road currently operating at an acceptable level of service to operate at an unacceptable level (i.e. LOS D, E or F).

If a road segment currently operates or is projected to operate below the adopted standard referenced above, the project's impact would be significant and cumulatively considerable if it causes the average speed to decrease by the amounts shown in Table 1 below. The change will be determined by comparing roadway conditions with and without the project's traffic for both the existing baseline and projected future conditions.

TABLE 1  
TRAFFIC IMPACT THRESHOLDS FOR  
2-LANE COUNTY HIGHWAYS AND RURAL CLASS 1 ROADWAYS  
WITH LEVEL OF SERVICE BELOW LOS C

If the Baseline or Projected LOS without project is:	Then the existing average travel speed is (miles per hour [mph]): <sup>3</sup>	The project's impact is considered significant if the decrease in average travel speed associated with the project is:
D	40-45 mph	2 mph
E	40 mph or less	1 mph
F <sup>4</sup>		0.5 mph

*These criteria apply to Rural Class 1 roadways. Other roadways will be evaluated on a case-by-case basis.*

12. **State Highways:**<sup>5</sup> Caltrans' level of service on State Highways is to maintain the level of service at the transition between LOS C and LOS D. A project would have a significant impact if the project traffic would cause the operation of a State highway to operate below LOS C. If a State highway currently operates or is projected to operate below the standard, the project's impact would be significant and cumulatively considerable if it does not maintain the existing "measure of effectiveness". Measures of effectiveness are: (a) control delay per vehicle for signalized intersections; (b) average control delay per vehicle for unsignalized intersections; (c) average speed for two lane highways, and (d) density for multi-lane highways<sup>6</sup>.

Footnotes:

1. Based upon HCS analysis methodology for signalized intersections and formula

contained in November 2001 ITE Article (*Estimation of Queue Length at Unsignalized Intersections*) for side street stop sign controlled intersections, or its equivalent.

2. Based upon Caltrans criteria for state highways and *Intersection Channelization Design Guide* (NCHRP Report 279, Transportation Research Board, 1985) for county roadways.
3. Average delay shall be used as defined in the year 2000 Highway Capacity Manual for the signalized and all-way stop intersections and delay for any approach or turning movement shall be used for side street stop sign controlled intersections.
4. The year 2000 Highway Capacity Manual does not provide an average travel speed breakpoint between LOS E and LOS F operation.
5. State Highway thresholds are based on *Caltrans Guide for the Preparation of Traffic Impact Studies*, State of California Department of Transportation, June 2001. The most recent version of this handbook may be found on the internet. (<http://www.dot.ca.gov/hq/traffops/developserv/operationalsystems/>)
6. Measures of effectiveness are defined in the most recent version of the *Highway Capacity Manual*, Transportation Research Board, National Research Council.