



Public Works Department Transportation Engineering Division

Policy Guidelines: Traffic Level of Service (LOS) Criteria For Private Development Review

**Adopted by the Traffic Advisory Committee
Last Update: **July 23, 2004****

Introduction

The purpose of these policy guidelines is to provide a general guide to applicants and their development teams in assessing the potential traffic impacts of new developments proposed within the City of Napa, including those which may result from related changes in zoning and General Plan amendments. Based on the current state-of-the-practice in transportation planning and development engineering, the following guidelines have been developed to provide a clear, orderly, and consistent technical approach to traffic impact analysis by establishing minimum standards for all traffic level of service (LOS) analysis. The Transportation Engineering Division (TED) reviews traffic studies and reports based on the guidelines presented herewith. [Traffic studies and reports prepared in compliance with these guidelines will be deemed adequate for CEQA¹ purposes. Alternatively, traffic reports and studies not in compliance with these guidelines may be deemed deficient.](#) TED shall also use these guidelines to guide the traffic review of publicly funded projects within the City of Napa sphere of influence.

A traffic impact study (TIS) is an important tool for determining the impacts of a proposed private land development project and identifying the need for any improvements to the transportation system to reduce congestion, maintain and improve safety, and provide site access and impact mitigation associated with the proposed project. Traffic impact studies provide the City of Napa, other public agencies, developers, communities and neighborhoods, interested stakeholders, and the general public a framework in making critical land use and site planning decisions regarding traffic and transportation issues.²

For the purposes of traffic impact analysis of proposed development projects, all land at one location—including existing development or available land for building development under common ownership or control by an applicant—shall be considered when determining if required criteria are met. An applicant and/or consultant shall not avoid the intent of the threshold criteria in these guidelines by submitting “piecemeal” applications or approval requests for building permits, development plans, subdivisions, etc. The phrase “at one location” means all adjacent land of the applicant, the property lines of which are contiguous or nearly contiguous at any point, or separated by other land of the applicant, or a public or private street, road, highway, or utility right-of-way or other public or private right-of-way.

¹ California Environmental Quality Act

² *Transportation Impact Studies, Advancing the Land Development Process* (Brochure), Institute of Transportation Engineers

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The applicant shall provide a project description that includes specific land uses intended for the site and the size of the proposed development (e.g. square footage, acreage, dwelling units, etc.) The project description shall be used as the basis for all traffic impact analysis. In the case of “shell” buildings with unidentified use or where the ultimate tenant use of the building cannot be enforceably restricted, the Community Development Department shall recommend the use of the highest traffic intensity among all permitted uses to establish traffic impacts and to calculate Development Impact Fees.

I. Level-of-Service Criteria from General Plan

Although the General Plan Policy Document ³ was based on the *1985 Highway Capacity Manual*, the following level of service (LOS) policy statements from the General Plan shall be implemented using the current *Highway Capacity Manual* (HCM) ⁴.

1. The City shall ensure that traffic levels of service (LOS) will not exceed midrange LOS ‘D’ at all signalized intersections on arterial and collector streets with the following exceptions, where midrange LOS ‘E’ will be permitted (see *Exhibit A: Local Areas Permitted with LOS ‘E’*):

- a. Downtown Napa within the area bounded by Soscol Avenue, First Street, California Boulevard, and Third Street
- b. Jefferson Street between Third Street and Old Sonoma Road
- c. Silverado Trail between Soscol Avenue and First Street

In addition, until the Caltrans interchange project to improve the intersection of Trancas Street/Redwood Road and SR-29 is completed, LOS ‘F’ shall be permitted.

2. For traffic signals on State highway facilities, the following criteria shall be used in a collaborative effort between the City of Napa and Caltrans District 4:
 - a. The City of Napa shall use as a reference the threshold level LOS ‘E’, consistent with the criteria used by the former Napa County Congestion Management Agency (CMA) for freeway mainline sections and freeway ramps. Facilities previously under the jurisdiction of the CMA in the City of Napa are the State Highways (SR-12, SR-29, SR-121, and SR-221). ⁵ (See *Exhibit B: State Highway Facilities with Permitted LOS ‘E’*.)
 - b. Caltrans has indicated that “Caltrans endeavors to maintain a target LOS at the transition between LOS ‘C’ and LOS ‘D’ ... on State highway facilities, however, Caltrans acknowledges that this may not always be feasible and recommends that

³ City of Napa General Plan, *Envision Napa 2020*, Policy Document, Adopted 12/1/98.

⁴ *Highway Capacity Manual*, Transportation Research Board, National Research Council, Washington, D.C., 2000

⁵ City of Napa General Plan Revised Draft EIR, 12/8/97

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the lead agency consult with Caltrans to determine the appropriate target LOS. If an existing State highway facility is operating at less than the appropriate target LOS, the existing MOE (measure of effectiveness) should be maintained.”⁶ Through the use of the Napa TMP Traffic Model, which was co-sponsored by the City of Napa, Caltrans, NCTPA, and NCFWCWD, the State highway intersections operating at less than appropriate target LOS per Caltrans criteria have been identified (see *Exhibit C: State Highway Intersections with LOS “E” & “F”*) as a preliminary reference.

3. The City shall ensure that all new development and redevelopment will meet adopted service levels (LOS) for transportation facilities unless findings are made that achieving other specific public goals found in this General Plan outweigh this requirement.
4. The City shall focus on signalized intersections when evaluating street system LOS.
5. When reviewing projects, the City shall monitor stop controlled intersections using LOS and the *Highway Capacity Manual* as a guideline, applying Caltrans signal warrant evaluation as indicated, and requiring mitigation as necessary.

The above General Plan policy statements are supplemented by the following LOS criteria for unsignalized or stop-controlled intersections.

6. For unsignalized intersections, the minimum acceptable level of service recommended by the Draft Policy Document is midrange LOS ‘E’.⁷
7. For unsignalized intersections, a low-volume movement may have delays that yield LOS ‘E’ or ‘F’ but may still be considered as having “acceptable operation” by considering both total delay and LOS (defined in terms of average control delay). An intersection traffic movement at a stop-controlled approach can be deemed to have acceptable operation under the following conditions (see *Exhibit D: Operation Analysis, Unsignalized Intersections* for nomograph):⁸
 - a. Total delay less than 4.0 vehicle-hours for single lane movement with low volume
 - b. Total delay less than 5.0 vehicle-hours for multilane movement with low volume
8. For freeway mainline sections and freeway ramps, the following criteria shall be used in a collaborative effort between the City of Napa and Caltrans District 4:
 - a. The City of Napa shall use as a reference the threshold level LOS ‘E’, consistent with the criteria used by the former Napa County Congestion Management Agency

⁶ *Caltrans Guide for the Preparation of Traffic Impact Studies*, State of California Department of Transportation, Dec. 2002

⁷ *Ibid*

⁸ *NCHRP Report 457, Evaluating Intersection Improvements: An Engineering Study Guide*, Transportation Research Board, National Research Council, National Academy Press, Washington, D.C., 2001

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(CMA). Facilities previously under the jurisdiction of the CMA in the City of Napa are the State Highways (SR-12, SR-29, SR-121, and SR-221).⁹ (See *Exhibit B: State Highway Facilities with Permitted LOS 'E'*.)

b. Caltrans has indicated that “Caltrans endeavors to maintain a target LOS at the transition between LOS ‘C’ and LOS ‘D’ ... on State highway facilities, however, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS. If an existing State highway facility is operating at less than the appropriate target LOS, the existing MOE (measure of effectiveness) should be maintained.”¹⁰

II. Guidelines for Determination of Significant Impacts

1. Traffic impact determination for a proposed development project shall begin with the comparison of the intersection level of service (LOS) between traffic operating conditions pre- and post-project, depending on the proposed phasing and implementation timing of development projects:

a. “Existing” Conditions vs. “Existing” Plus Project

b. “Interim Baseline” (Without Project) vs. “Interim Baseline” Plus Project

The above comparison(s) is/are anticipated to reveal the direct impacts of project trips on the LOS of the study intersections.

2. In accordance with CEQA requirements, the ultimate determination of the significance of project-related traffic impacts and the appropriate mitigation measure(s) will be made by the Planning Commission and the City Council on a case-by-case basis. The Public Works Department will make technical recommendations to the Planning Commission and City Council. As a starting point in assessing the significance of traffic impacts and the appropriate mitigation measures, the Public Works Department uses the following guidelines:

a. When a signalized intersection operates at midrange LOS ‘D’ (as allowed by the General Plan in most locations) or better under existing or future baseline conditions, the addition of project trips degrades the intersection operations to LOS ‘E’ or ‘F’. The project mitigation should bring the facility to operate at midrange LOS ‘D’, at a minimum.

b. When a signalized intersection operates at midrange LOS ‘E’ (as allowed by the General Plan in some locations and for State Highways facilities) or better under existing or future baseline conditions, the addition of project trips degrades the intersection operations to LOS ‘F’. The project mitigation should bring the facility to operate at midrange LOS ‘E’, at a minimum.

⁹ City of Napa General Plan Revised Draft EIR, 12/8/97

¹⁰ *Caltrans Guide for the Preparation of Traffic Impact Studies*, State of California Department of Transportation, Dec. 2002

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- c. When a signalized intersection operates at LOS 'F' (a violation of the General Plan LOS policy) under existing or future baseline conditions, the addition of more than 50 peak-hour project trips contributes to the continuing operational failure at the intersection. The project mitigation should bring the facility to pre-project conditions.
- d. At a unsignalized intersection when the minor stop-controlled approach operates at LOS 'E' or better or has acceptable operation in terms of total control delay (see section I-7 above), the addition of project trips increases the total control delay to more than 4.0 vehicle-hours for a single lane approach or 5.0 vehicle-hours for a multilane approach. The project mitigation should bring the facility to operate at LOS 'E' or to bring the total control delay to less than 4.0 vehicle-hours for a single lane approach or 5.0 vehicle-hours for a multilane approach, at a minimum.
- e. At a unsignalized intersection when the minor stop-controlled approach operates at LOS 'F' and does not have acceptable operation in terms of total control delay (see I-7 above), the addition of more than 50 peak-hour project trips contributes to the continuing operational failure at the minor approach. The project mitigation should bring the facility to pre-project conditions.
- f. When a freeway mainline, freeway ramp, or arterial corridor operates at LOS 'E' or better under existing, future, or cumulative baseline conditions, the addition of project trips degrades the segment to LOS 'F'. The project mitigation should bring the facility to operate at LOS 'E', at a minimum.
- g. When a freeway mainline, freeway ramp, or arterial corridor operates at LOS 'F' under existing, future, or cumulative baseline conditions, the addition of more than 50 peak-hour project trips contributes to the continuing operational failure at the segment. The project mitigation should bring the facility to pre-project conditions.
- h. If the proposed project is on a Crucial Corridor (see *Exhibit E: Crucial Corridors*) and the property is zoned :TI, the project generates more than 520 trips/gross acre/day (or gross floor area equivalent). Uses with higher trip generation characteristics are prohibited unless:
 - i). Adjustments in the gross floor area, gross acreage, operation, etc., are made to reduce the number of trips to an acceptable level as determined by the Public Works Director, or
 - ii). The Public Works Director finds that the transportation benefits of the project clearly outweigh the adverse effect on the crucial corridor. Transportation benefits of the project may include roadway and safety improvements, traffic system management strategies, transit service enhancements, travel demand management strategies, among others.

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III. Mitigation Measures

All significant project impacts shall be mitigated; typically this can be accomplished by meeting the criteria prescribed in the General Plan LOS policies (see I-1 through I-8).

When operational failures occur under existing or future baseline conditions, the project shall pay its fair share of the improvements necessary to bring the intersection in compliance with the General Plan LOS policies (see I-1 through I-8).

The consultant shall recommend appropriate traffic engineering improvements and/or land use modifications that will mitigate the operational impacts identified in the study, thereby maintaining an acceptable service level on adjacent roadways, intersections, transit, and parking facilities.

The mitigation measures may include the following examples, among others:

1. Roadway Improvements
 - Optimize location of access driveway(s) with respect to sight distance
 - Addition of through traffic lane(s), right turn lane(s), and left turn lane(s)
 - Improvement of sight distances at intersections and driveways to acceptable standards
 - Provide grade separation of facilities (for very large, major developments only)
2. Traffic Control Modifications (Warrants must be met)
 - Provide for yield or stop control
 - Install new traffic signals
 - Upgrade existing traffic signals
 - Modify/optimize phasing of existing traffic signals
 - Provide coordination/synchronization of traffic signals along a corridor
 - Provide channelization through raised islands
 - Restrict certain turn movements
3. Transit Facilities
 - Provide bus turn-outs, park-and-ride lots, bus stops, bicycle and/or pedestrian trails
4. Parking Facilities
 - Design parking facilities to allow free flow access to and from the street
 - Provide adequate off-street parking
 - Implement shared parking among complimentary land uses
5. Bicyclist and Pedestrian Circulation
 - Provide for access to, from, and through development for bicyclists and pedestrians
 - Recommend designating bicycle paths, lanes, and facilities

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6. Land Use Controls
 - Reduce cumulative development density
 - Alter proposed land use mix
7. Travel Demand Management (TDM)
 - Flexible employee working hours
 - Institute preferential parking for carpools
 - Encourage employees to use carpools and public transportation
 - Prohibit high-traffic public uses during commute peak hours
 - Parking cash-out programs mandated by law under certain circumstances

IV. Project Fair Share

The project fair share contribution for an impacted intersection that fails operationally under existing or interim baseline conditions shall be determined through the use of traffic volumes during the critical peak hour. **The fair share for the project shall be calculated as the ratio of the project trips over the trips under 'Baseline + Project' conditions. "Baseline" may refer to either "Existing" or "Interim Baseline" scenario, as used in the traffic impact study.** Projects only pay based on what trips they add to post-project conditions.

The fair share for the project shall be calculated using the traffic volumes that enter an intersection during the most critical peak hour period analyzed. The project fair share calculation is demonstrated below:

P = Project Fair Share (in percent)

$T_{(P)}$ = Trips entering the intersection during the critical peak hour generated by the Project (in vehicles per hour)

$T_{(B+P)}$ = Trips entering the intersection during the critical peak hour under 'Baseline + Project' conditions (in vehicles per hour)

$$P = T_{(P)} / T_{(B+P)}$$



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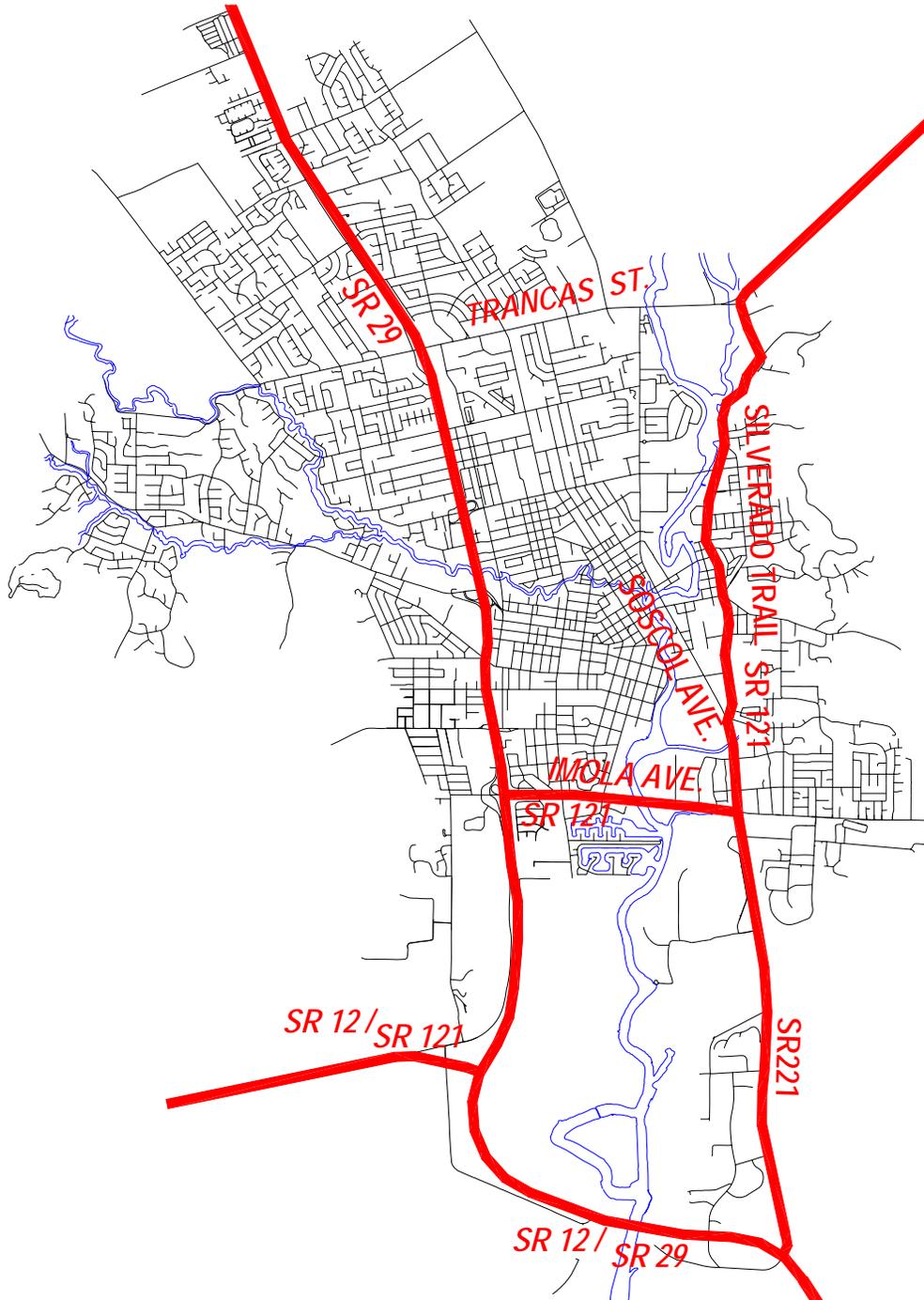
Exhibit A: Local Areas with Permitted LOS 'E'





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Exhibit B: State Highway Facilities with Permitted LOS 'E'





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Exhibit C: State Highway Intersections with LOS 'E' & 'F'

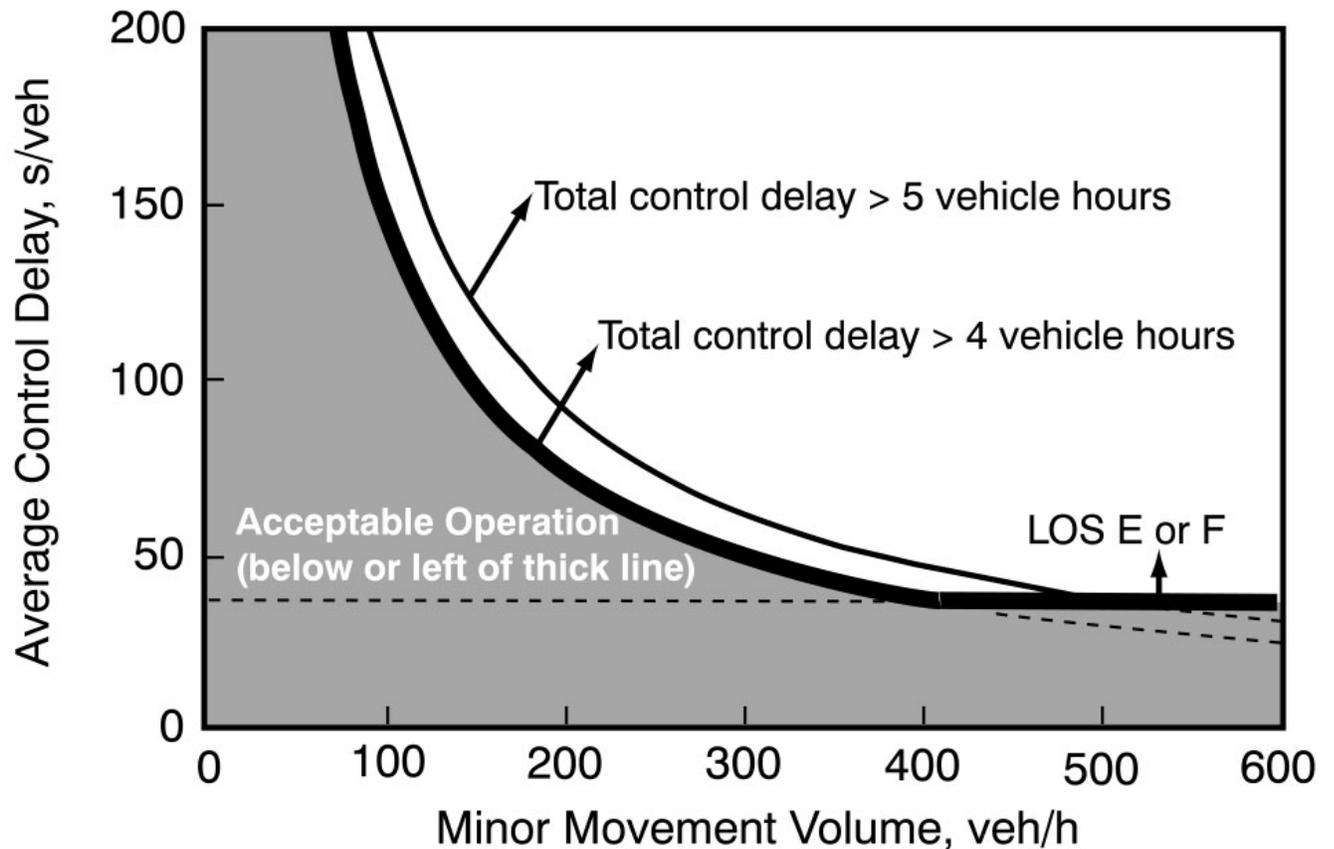
TMP Int #	Locations/ Intersections	Yr 2000				Yr 2005			
		Intersection Control	Unsig Int'n - Crit Mvmt	LOS - HCM2000	HCM2000 Control Delay	Intersection Control	Unsig Int'n - Crit Mvmt	LOS - HCM2000	HCM2000 Control Delay
3	Hwy 29/ Redwood Rd-Trancas St	Signalized		F	143.0	Full Interchange		N/A	N/A
8	Hwy 121 (Silverado Trail-Monticello Rd)/ Trancas St	STOP ALL approaches (except NBR)	NBL	E	39.7	STOP ALL approaches (except NBR)	NBL, EB	E	48.7
9	Hwy 29 SB Ramps on Solano Ave	STOP ALL approaches	SB	D	33.9	STOP ALL approaches	SB	E	37.8
10	Hwy 29 NB Ramps on Lincoln Ave	YIELD offramps	SBR	E	35.8	YIELD offramps	SBR	F	51.8
20	Hwy 29 NB Ramps on First St	Stop (NBL) & Yield (NBR)	NB	F	376.0	Stop (NBL) & Yield (NBR)	NB	F	386.8
30	Hwy 121 (Silverado Trail)/ Third St-East Ave-Coombsville Rd	Signalized		F	108.7	Signalized		F	124.2
33	Hwy 29 SB Ramps on Imola Ave	Stop ALL approaches	WB	F	58.4	Stop ALL approaches		F	109.7
34	Hwy 29 NB Ramps on Imola Ave	Stop on NB Approach	NB	F	73.8	Stop on NB Approach	NB	F	327.3
35	Hwy 121-Imola Ave/ Jefferson St	Signalized		E	56.8	Signalized		E	67.5
36	Hwy 121-Imola Ave/ Coombs St	Signalized		E	58.0	Signalized		E	64.6
37	Hwy 121-Imola Ave/ Soscol Ave	Signalized		F	111.4	Signalized		F	112.0
38	Hwy 12-121/ Old Sonoma Rd	STOP on Old Sonoma Rd	SB	F	140.2	STOP on Old Sonoma Rd	SB	F	327.5
40	Hwy 12-121/ Golden Gate Dr/ Stanly Ln	STOP on Golden Gate-Stanly	NB/ SB	F	Very high	Signalized		F	94.7
41	Hwy 12-121/ Hwy 29	Signalized		E	75.6	Signalized		F	97.3
42	Hwy 12-29/ Napa Vallejo Hwy	Signalized		F	257.6	Signalized		F	491.1
43	Hwy 29/ Hwy 12-Aiport Blvd	Signalized		F	129.3	Signalized		F	105.6
44	Hwy 12-Airport Blvd/ Kelly Rd	Signalized		C	30.3	Signalized		F	87.6
59	Hwy 29/ Trower Ave	Signalized		F	155.1	Signalized		E	79.7

Reference: Napa TMP Traffic Model



Exhibit D: Operational Analysis Unsignalized Intersections

Control Delay on Stop-Controlled Minor Approach



Notes:

- 1). Use Total Control Delay > 5 vehicle hours for multi-lane approach.
- 2). Use Total Control Delay > 4 vehicle hours for single-lane approach.

Source: *NCHRP Report 457, Evaluating Intersection Improvements: An Engineering Study Guide*, Transportation Research Board, National Research Council, National Academy Press, Washington, D.C., 2001



Exhibit E: Crucial Corridors

