



## MEMORANDUM

Date: December 1, 2015

To: David Morrison, Napa County Planning Department

From: Julie Morgan and Dan Hennessey, Fehr & Peers

**Subject: Guidelines for Interpretation of General Plan Circulation Policies on Significance Criteria**

*SF15-0841*

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The 2008 update to the Napa County General Plan included policies that define significance thresholds for the determination of impacts in County transportation studies. Recent studies have had different interpretations of these policy statements, highlighting the inconsistency with which traffic studies have been carried out for sites in unincorporated Napa County since 2009. The absence of a uniform interpretation of significance criteria indicates a lack of clear guidance on what thresholds should be used in transportation studies.

This memorandum details an updated interpretation of the significance criteria and recommends a set of associated significance thresholds for arterials, signalized intersections, and unsignalized intersections for project conditions and for cumulative conditions. This interpretation is intended to allow for more consistent application of the current General Plan policies, during the interim period before the Circulation Element of the Napa County General Plan is next updated.



## SIGNIFICANCE CRITERIA

The Circulation Element of the Napa County General Plan, dated June 3, 2008, includes General Plan Policy CIR-16 regarding significance criteria for traffic conditions based on level of service (LOS):

*The County shall seek to maintain an adequate level of service on roads and at intersections as follows. The desired level of service shall be measured at peak hours on weekdays.*

- *The County shall seek to maintain an arterial Level of Service D or better on all county roadways, except where maintaining this desired level of service would require the installation of more travel lanes than shown on the Circulation Map.*
- *The County shall seek to maintain a Level of Service D or better at all signalized intersections, except where the level of service already exceeds this standard (i.e., Level of Service E or F) and where increased intersection capacity is not feasible without substantial additional right-of-way.*
- *No single level of service standard is appropriate for un-signalized intersections, which shall be evaluated on a case-by-case basis to determine if signal warrants are met.*

A number of traffic studies have been carried out for sites in unincorporated Napa County since the General Plan was completed, and these studies contain differing interpretations of the criteria. For example:

- Some studies have analyzed arterial segment LOS and some have instead analyzed intersection LOS at locations along the arterial.
- Some studies have used a one percent threshold for a considerable contribution to a significant cumulative traffic impact; another has used 50 trips based on the City of Napa's criteria.
- Significance criteria for unsignalized intersections vary across reports: some studies analyze approach LOS and set the significance threshold at LOS E. For another, only signal warrants were analyzed.

The absence of a uniform interpretation of significance criteria indicates the need for clear guidance on what thresholds should be used in traffic studies.



The following sections present an updated, clearer interpretation of the General Plan significance criteria both for project-specific conditions and for cumulative conditions, which we have developed through collaboration with County staff. We look forward to review and discussion of these suggested guidelines with staff.

## PROJECT CONDITIONS

For the evaluation of project-specific impacts, the General Plan defines separate significance criteria for arterials, signalized intersections, and unsignalized intersections, as detailed below.

### Arterial LOS

The guidance for arterial impacts included in Policy CIR-16 above is as follows:

*The County shall seek to maintain an arterial Level of Service D or better on all county roadways, except where maintaining this desired level of service would require the installation of more travel lanes than shown on the Circulation Map.*

The recommended interpretation of Policy CIR-16 for evaluating project conditions is as follows:

A project would cause a significant impact requiring mitigation if:

1. An arterial segment operates at LOS A, B, C or D during the selected peak hours without Project trips, and deteriorates to LOS E or F with the addition of Project trips; *or*
2. An arterial segment operates at LOS E or F during the selected peak hours without Project trips, and the addition of Project trips increases the total segment volume by one percent or more.<sup>1</sup>

For the second criteria, the following equation should be used if the arterial segment operates at LOS E or F without the Project:

$$\text{Project Contribution \%} = \text{Project Trips} \div \text{Existing Volumes}$$

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<sup>1</sup> A change of one percent in vehicular volume is well within the range of daily traffic variation, as well as being within the range of expected accuracy of travel forecasts, and is not likely to be noticeable to drivers if the road is operating under capacity. However, an arterial segment operating at LOS E or F would be operating at or over capacity; vehicle traffic flows break down quickly as the volume approaches capacity, which would be a perceptible change to drivers.



**Example:** An arterial operates at LOS F in the northbound direction during a peak hour without the Project. The existing northbound volume is 1,000 vehicles during that peak hour. A Project is anticipated to add 25 vehicles to the arterial in the northbound direction during that peak hour. Therefore, the Project contribution percentage would be:

$$25 \text{ trips} \div 1,000 \text{ existing volume} = 2.5\% \text{ Project Contribution}$$

Since the Project contribution is more than one percent, a **significant impact** would be identified.

Maintaining LOS D or better on all County roadways would sometimes require widening a road to add travel lanes. In some locations around the County, widening a road could be in direct conflict with the County's goals of preserving the area's rural character, improving safety, and sustaining the agricultural industry, making these potential improvements infeasible. The County's Circulation Map (Figure CIR-1: Circulation Map) designates the maximum number of lanes for major roads in unincorporated Napa County.<sup>2</sup> For arterials that cannot be widened according to the Circulation Map, LOS E or F may be considered acceptable and the one percent threshold would not apply. On these segments, analysis of arterial LOS should still be presented for informational purposes.

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<sup>2</sup> According to the Circulation Element dated June 8, 2008, there is only one segment of arterial that can be widened: SR-29 between SR-221 and the Solano County line (in coordination with the City of American Canyon) from four lanes to six lanes. The significance criteria shown above should apply to facilities where appropriate based upon the most recent Circulation Element chapter of the General Plan.



## Signalized Intersections

The guidance for signalized intersection impacts included in Policy CIR-16 is as follows:

*The County shall seek to maintain a Level of Service D or better at all signalized intersections, except where the level of service already exceeds this standard (i.e., Level of Service E or F) and where increased intersection capacity is not feasible without substantial additional right-of-way.*

LOS for signalized intersections is defined as an average of the delay at all approaches. The recommended interpretation of Policy CIR-16 regarding signalized intersection significance criteria is as follows:

A project would cause a significant impact requiring mitigation if:

1. A signalized intersection operates at LOS A, B, C or D during the selected peak hours without Project trips, and deteriorates to LOS E or F with the addition of Project trips;  
*or*
2. A signalized intersection operates at LOS E or F during the selected peak hours without Project trips, and the addition of Project trips increases the total entering volume by one percent or more.

For the second criteria, the following equation should be used if the signalized intersection operates at LOS E or F without the Project:

$$\text{Project Contribution \%} = \text{Project Trips} \div \text{Existing Volumes}$$

**Example:** A signalized intersection operates at LOS E during a peak hour without the Project. The existing volume is 2,500 vehicles during that peak hour. A Project is anticipated to add 15 vehicles to the signalized intersection during that peak hour. Therefore, the Project contribution percentage would be:

$$15 \text{ trips} \div 2,500 \text{ existing volume} = 0.6\% \text{ Project Contribution}$$

Since the Project contribution is less than one percent, the impact on the signalized intersection due to the Project would be **less than significant**.

Maintaining LOS D or better at all signalized intersections would sometimes require expanding the physical footprint of an intersection. In some locations around the County, expanding



physical transportation infrastructure could be in direct conflict with the County's goals of preserving the area's rural character, improving safety, and sustaining the agricultural industry, making these potential improvements infeasible. The County's Circulation Element lists intersections that are slated for improvement or expansion in unincorporated Napa County.<sup>3</sup>

Transportation studies should individually consider the feasibility of potential mitigation measures with respect to right-of-way acquisition, regardless of the intersection's place in the Circulation Element's identified improvement lists, and present potential alternative mitigation measures that do not require right-of-way acquisition, including changes to the Project to reduce its peak hour trip generation. County staff would then review that information and make the decision about the feasibility of the identified potential mitigations.

For intersections that cannot be improved without substantial additional right-of-way according to both the Circulation Element and the individual transportation impact study, and where other mitigations such as updating signal timing, signal phasing and operations, signing and striping improvements, and/or reasonable modifications to the Project do not improve the LOS, LOS E or F may be considered acceptable and the one percent threshold would not apply. Analysis of signalized intersection LOS should still be presented for informational purposes, and there should still be an evaluation of effects on safety and local access, per Policy CIR-18.

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<sup>3</sup> According to the Circulation Element dated June 8, 2008, the following intersections can be altered or expanded as a mitigation measure: SR-12/Airport Boulevard/SR-29, SR-221/SR-12/Highway 29, and several intersections along SR-29 and SR-128 north of Napa. The significance criteria shown above should apply to facilities where appropriate based upon the most recent Circulation Element chapter of the General Plan.



## Unsignalized Intersections

The guidance for unsignalized intersection impacts included in Policy CIR-16 is as follows:

*No single level of service standard is appropriate for un-signalized intersections, which shall be evaluated on a case-by-case basis to determine if signal warrants are met.*

LOS for all-way stop controlled intersections is defined as an average of the delay at all approaches. LOS for side-street stop controlled intersections is defined by the delay and LOS for the worst-case approach. The recommended interpretation of Policy CIR-16 regarding unsignalized intersection significance criteria is as follows:

A project would cause a significant impact requiring mitigation if:

1. An unsignalized intersection operates at LOS A, B, C or D during the selected peak hours without Project trips, and the LOS deteriorates to LOS E or F with the addition of Project traffic; the peak hour traffic signal warrant criteria should also be evaluated and presented for informational purposes; *or*
2. An unsignalized intersection operates at LOS E or F during the selected peak hours without Project trips, and the project contributes one percent or more of the total entering traffic for all-way stop-controlled intersections, or ten percent or more of the traffic on a side-street approach for side-street stop-controlled intersections; the peak hour traffic signal warrant criteria should also be evaluated and presented for informational purposes.

### *All-Way Stop-Controlled Intersections*

For the second criteria at an all-way stop-controlled intersection, the following equation should be used if the all-way stop-controlled intersection operates at LOS E or F without the Project:

$$\text{Project Contribution \%} = \text{Project Trips} \div \text{Existing Volumes}$$

**Example:** An all-way stop-controlled intersection operates at LOS E during a peak hour without the Project. The existing volume is 1,500 vehicles during that peak hour. A Project is anticipated to add 30 vehicles to the all-way stop-controlled intersection during that peak hour. Therefore, the Project contribution percentage would be:

$$30 \text{ trips} \div 1,500 \text{ existing volume} = 2.0\% \text{ Project Contribution}$$



Since the Project contribution is more than one percent, a **significant impact** would be identified.

#### *Side-Street Stop-Controlled Intersections*

For the second criteria at a side-street stop-controlled intersection, the following equation should be used if the side-street stop-controlled intersection operates at LOS E or F without the Project:

$$\text{Project Contribution \%} = \text{Project Trips} \div \text{Existing Volumes}$$

Both of those volumes are for the stop-controlled approaches only. Each stop-controlled approach that operates at LOS E or F should be analyzed individually.

**Example:** The side-street stop-controlled eastbound approach at an intersection operates at LOS F during a peak hour without the Project. The existing volume on that approach is 200 vehicles during that peak hour. A Project is anticipated to add 10 vehicles to the stop-controlled approach during that peak hour. Therefore, the Project contribution percentage would be:

$$10 \text{ trips} \div 200 \text{ existing volume} = 5.0\% \text{ Project Contribution}$$

At the same intersection during the same peak hour, the side-street stop-controlled westbound approach at an intersection operates at LOS E during a peak hour without the Project. The existing volume on that approach is 100 vehicles during that peak hour. A Project is anticipated to add 15 vehicles to the stop-controlled approach during that peak hour. Therefore, the Project contribution percentage would be:

$$15 \text{ trips} \div 100 \text{ existing volume} = 15.0\% \text{ Project Contribution}$$

Because the Project contribution is more than ten percent on the westbound approach, a **significant impact** would be identified. The impact to the eastbound approach would be **less than significant**.

Potential mitigations may include adding a signal if the signal warrant criteria are met and other conditions are appropriate, geometric modifications to the intersection configuration, changes to the Project to reduce its peak hour trip generation, and/or converting the intersection to a roundabout per Policy CIR-13.5:

*While not suitable for all intersections, roundabouts have a wide variety of applications, and Napa County will consider them as an alternative for intersection improvements.*





*Roundabouts have been used extensively in Europe for several decades, and their use in the United States has grown substantially over the past several years. Research shows that they have the potential to reduce accidents, traffic delays, fuel consumption, air pollution, maintenance, and in some cases construction costs compared to more traditional intersection controls.*

In some cases, there may be a significant impact at an unsignalized intersection at which no physical changes are appropriate. For example, an intersection at a private driveway may not be an appropriate location for either a signal or a roundabout if queue lengths are short on the County road. As is true with any mitigation, the County will ultimately determine the feasibility and appropriateness of the potential mitigation measure.



## CUMULATIVE CONDITIONS

In addition to evaluating project-specific impacts, transportation studies typically also address cumulative conditions, in which the Project is part of the overall amount of growth expected in the County during the planning horizon. A significant cumulative impact would be identified if the overall amount of expected growth caused conditions to deteriorate such that any of the significance criteria described above are met.

The question then becomes whether the Project's contribution to that cumulative impact is considerable, in which case the Project would be required to contribute to the mitigation of that impact. A Project's contribution to a cumulative condition would be calculated as the Project's percentage contribution to the total growth in traffic.

$$\text{Project Contribution \%} = \text{Project Trips} \div (\text{Cumulative Volumes} - \text{Existing Volumes})$$

This calculation applies to arterials, signalized intersections, and unsignalized intersections. In each category, the Project's contribution to a significant cumulative impact would be considerable if it is equal to or greater than five percent.

**Example (Signalized Intersection):** A signalized intersection operates at LOS E during a peak hour with the Project under Cumulative Conditions. The existing volume is 2,500 vehicles during that peak hour. A Project is anticipated to add 15 vehicles to the signalized intersection during that peak hour. The forecasted Cumulative volumes at the intersection is 2,750 vehicles during that peak hour, including the Project. Therefore, the Project contribution percentage would be:

$$15 \text{ trips} \div (2,750 \text{ cumulative volume} - 2,500 \text{ existing volume}) = 3.0\% \text{ Project Contribution}$$

$$15 \text{ trips} \div 250 \text{ volume growth} = 3.0\% \text{ Project Contribution}$$

Since the Project contribution to the growth is less than five percent, the impact on the signalized intersection due to the Project under Cumulative Conditions would be **less than significant**.

This concludes our recommendations for significance criteria on transportation facilities in unincorporated Napa County. Please contact Dan at (415) 348-0300 with any questions or comments. We look forward to discussing this with staff at our upcoming meeting.