



September 3, 2008

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 **DRAFT**

Subject: Traffic Impacts of Measure "V" – The Oxnard Traffic Initiative

P08075

Dear Mr. Sotelo:

The attached report presents our assessment of the likely traffic impacts of Measure "V" the Oxnard Traffic Initiative. We have evaluated the likely impacts on the city's procedures for conducting traffic impact analyses as well as the likely impacts on the city's intersections themselves.

Our conclusions are briefly highlighted below and explained in more detail in the attached report.

1. The initiative will slow down but will not prevent traffic conditions from worsening in the City of Oxnard. This is because of the limitations inherent in any attempt by a single agency to control growth and because of various exemptions that are built into the initiative.
2. The City of Oxnard has made great progress over the last few years in reducing the number of intersections that fail to meet the level of service "C" standard, reducing the number of unsatisfactory intersections from 19 to 3 in the last 2 years. However because those 3 intersections continue to fail to meet the initiative's level of service "C" standard, even a complete cessation of all growth in the city would not achieve the initiative's LOS standard.
3. An aggressive road and intersection widening program will be required to achieve and then maintain the level of service "C" standards called for in the initiative. Businesses and homes fronting on critical intersections in the City will be significantly affected by the required road widenings.
4. The smaller development projects that the initiative exempts from a vote of the electorate will tend to be projects that are more auto intensive than larger developments. The vehicle trip generation rates per unit of development are highest for small residential and commercial developments.

5. Transit-oriented villages, which require higher density development to support superior transit service, cannot be built within the initiative's LOS standards. These types of development could only be built by the appropriate educational or religious non-profit company (because these companies are exempt under the initiative) or will require a vote of the people. The costs and uncertainty of this process for the typical for-profit company would discourage these kinds of development in Oxnard. Compliance with state initiatives to reduce green house gas emissions through sustainable communities strategies (AB32 and SB 375 for example) will be more difficult.
6. The costs of preparing traffic impact studies for new development and the cost to city staff reviewing these studies will more than double, because every intersection will need to be analyzed twice, once for volume/capacity ratio, a second time for delay. In addition, the geographic coverage of every study, regardless of size of the project, will be essentially city-wide.
7. The traffic report and the EIR for the City's current General Plan update effort will need to be entirely redone adding in the intersection delay computations called for in the initiative. New mitigations will be needed to meet the dual LOS "C" v/c and delay standards of the initiative.

These conclusions are further fleshed out in the attached report. Please contact me at 510-839-1742 x120 if you have any questions.

Sincerely,

Dowling Associates, Inc.



Richard Dowling, Ph.D., P.E.

Principal

Attachments: Report

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Traffic Impacts of Measure "V" – Oxnard Traffic Initiative

This report presents an assessment of the likely impacts of Measure "V", the Oxnard Traffic Initiative, on traffic conditions within the City of Oxnard.

1. SUMMARY OF INITIATIVE

The Oxnard Traffic Initiative mandates a level of service (LOS) "C" standard for all intersections in the City of Oxnard. All intersections within 5 miles of a proposed development project must operate at LOS C prior to project approval¹ by the City and they must be forecast to operate at LOS C one year after build out and full occupancy of the development project. Since the city is roughly 10 miles across, essentially most every intersection within the city must meet these requirements for any development anywhere in the city.²

The level of service at each intersection must be computed two ways: once using the City's current method of computing the volume/capacity (v/c) ratio of the intersection, the second using a different method that produces average delay for the intersection. Both the v/c ratio and the delay must meet the initiative's LOS C standard.

The initiative applies to "all intersections", not just signalized intersections.

The initiative provides for approval of developments failing to meet the LOS standard through a developer funded general election. A majority vote would be sufficient to override the LOS standard in the initiative.

The initiative exempts several types of development projects (Section 5):

- Very small residential and commercial development projects
- Public schools
- Religious facilities
- Any project sponsored by an educational non-profit organization
- Any hospitals or medical facilities.

¹ Section 2 of the initiative suggests that the objective of the initiative is that the intersections must operate satisfactorily for one year prior to project approval, but section 5(3), which implements the initiative, does not include this requirement.

² A fine point is what are the city's obligations under this initiative for non-city intersections within the 5 mile radius? Must the city mitigate Port Hueneme, County, and Caltrans intersections as well as its own intersections? The City Attorney's opinion is that it does not impose on the City such an obligation. However, any development in an adjacent city impacting Oxnard intersections would have to be mitigated to LOS "C" before the City could approve new developments (unless exempted through a vote or otherwise)

- Any project within the City Urban Restriction Boundary necessary to meet the City's commitment in its December 2000 Housing Element for specific housing categories.

The city initiative cannot apply to developments located in other jurisdictions.

2. EXISTING CONDITIONS

According to the URS report, Traffic Circulation Study, City Of Oxnard, 2020 General Plan Update / EIR (April 23, 2008), nineteen out of the 119 signalized intersections they evaluated within the City failed to meet the City's volume/capacity (v/c) ratio LOS "C" standard during either or both the AM and PM peak hours in 2005 (see Exhibit 1).

Exhibit 1: Intersections Failing to Meet City's V/C LOS "C" Standard in 2005

Intersection	AM Peak Hour	PM Peak Hour
Most Critical Intersections		
Oxnard & Vineyard	D	E
Oxnard-Saviers & Wooley	E	F
Rose & 5th	D	F
Victoria & Doris	D	D
Critical AM Intersections		
Victoria & Wooley	D	A
Critical PM Intersections		
C St & Gonzales	B	E
Del Norte & SR-34 (5th St.)	A	E
H St & Gonzales	B	D
Rose & Auto Center	A	D
Rose & Camino del Sol	C	E
Rose & Gonzales	B	E
Rose & Lockwood	A	D
Rose & Oxnard	A	D
Rose & Third	A	D
Rose & Wooley	A	D
Santa Clara & Auto Center	A	D
Ventura & 5th St	A	D
Victoria & Gonzales	B	D
Vineyard & Esplanade	B	D

However, between 2005 and 2007 the Santa Clara River Highway 101 bridge, the Oxnard Blvd./US 101 interchange, and sewer line construction, which had disrupted traffic on Ventura and Gonzales Roads were completed. In addition, several intersection improvements were completed.

Consequently, when URS revisited the 19 critical intersections and conducted new counts and level of service analyses, they found that only 3 intersections still failed to meet the City's LOS "C" v/c standard in 2007 (see Exhibit 2).

Exhibit 2: Intersections Failing to Meet City's V/C LOS "C" Standard in 2007

Intersection	AM Peak Hour	PM Peak Hour
Most Critical Intersections		
Oxnard-Saviers & Wooley	E	F
Critical PM Intersections		
Rose & Gonzales	B	E
Santa Clara & Auto Center	A	D

The Rose Ranch Commercial Project, if it were approved by the City, would mitigate the intersection of Rose and Gonzales to v/c level of service standard "C" or better (Rose Ranch Commercial Project SEIR, Rincon Consultants, July 2008).

3. WHAT WOULD IT TAKE TO GET ALL INTERSECTIONS TO LOS "C"?

The initiative requires that all intersections be operating at a dual LOS "C" (v/c and delay) before the City can begin to contemplate non-exempt development applications. The intersection volume/capacity (v/c) ratio is computed according to the Intersection Capacity Utilization (ICU) method.

Exhibit 3 compares the ICU V/C based LOS to the HCM delay-based LOS. As can be seen in the table, the delay based LOS is often, but not always more severe than the ICU V/C LOS currently used by the City of Oxnard.

Exhibit 3: ICU V/C LOS Versus HCM Delay LOS (2005)

Intersection	ICU V/C LOS		HCM Delay LOS	
	AM	PM	AM	PM
Most Critical Intersections				
39. Oxnard-Saviers & Wooley	F (0.93 v/c)	F (1.06 v/c)	E (0.92 v/c, 77 secs)	F (1.06 v/c, 106 secs)
Critical PM Intersections				
64. Rose & Gonzales	A (0.59 v/c)	D (0.88 v/c)	D (0.80 v/c, 37 secs)	E (1.06 v/c, 70 secs)
73. Santa Clara & Auto Center	A (0.59 v/c)	D (0.88 v/c)	C (0.72 v/c, 34 secs)	E (0.94 v/c, 57 sec)

If, as required by the initiative, all intersections must meet the worst of both LOS standards, then the result will be a significant increase in the amount of road improvements to meet the dual LOS "C" standard. Many of the intersections found to be meeting the City's current LOS "C" standard in 2007 would no longer meet the redefined dual v/c and delay LOS "C" standard. Assessing the extra mitigations would require re-doing the entire URS study. For just the three critical intersections in 2007, the mitigations required to meet the new initiative's LOS "C" standard are as follows:

To meet the ICU V/C LOS Standard:

- Oxnard-Saviers & Wooley (calculated in Synchro):
 - Northbound: Add one left-turn lane
 - Southbound: Add two left-turn lanes
 - Eastbound: Add one right-turn lane
 - Westbound: Add one left-turn lane
 - Northwestbound: Add one left-turn lane and one right-turn lane
- Rose & Gonzales:
 - Add one southbound exclusive right-turn lane, or convert one existing eastbound through lane to an exclusive left turn lane (making it a triple left turn)
- Santa Clara & Auto Center:
 - Eastbound: Add one left-turn lane

To meet the delay LOS standard:

- Oxnard-Saviers & Wooley:
 - Northbound: Same as for ICU
 - Southbound: Same as for ICU
 - Eastbound: Add two right-turn lanes
 - Westbound: Same as for ICU
 - Northwestbound: Same as for ICU
- Rose & Gonzales:
 - Northbound: Add one left-turn lane and one through lane
 - Southbound: Add one through lane and one right-turn lane
 - Eastbound: Add one left-turn lane
 - Westbound: Add one through lane
- Santa Clara & Auto Center:
 - Eastbound: Same as for ICU

The other 116 intersections in Oxnard, plus others in Port Hueneme would need to be evaluated to determine what mitigations would be required for those intersections to meet the initiatives dual standards for LOS.

4. WHAT WILL IT BE LIKE IN 2020 WITHOUT THE INITIATIVE?

According to the URS traffic circulation study for the General Plan Update, the current 2020 General Plan (adopted in 1990), would allow 23 intersections to fail to meet the City's LOS "C" v/c standard at 2020 Buildout (see Exhibit 4).

Alternatives A, B, and C to the Updated General Plan, which promote higher density uses at urban transit-oriented villages, would cause between 25 and 45 intersections to fail to meet the LOS "C" v/c standard at Buildout.

A mitigated version of Alternative "B" (Compact Concentric Infill with Workforce Housing outside the City Urban Restriction Boundary), would reduce the number of failing intersections in 2020 to five (see Exhibit 5). Twenty-five intersections would need to be widened to accomplish this (see Table 7.3-1 of URS report). Wooley Road and Del Norte Road would need to be widened to 6 lanes (see Table 7.4-1 of URS report).

No feasible mitigations were found by URS for the intersections of:

- Oxnard-Saviers & Wooley
- C Street & Wooley
- Rose & Third

Exhibit 4: Intersections Failing to Meet LOS "C" in 2020 – Current 2020 General Plan Buildout

Intersection	AM Peak Hour	PM Peak Hour
Most Critical Intersections		
Oxnard-Saviers & Wooley	E	F
Rice & Gonzales	F	F
Rose & Gonzales	D	E
Rose & Pleasant Valley	D	E
Critical AM Intersections		
Victoria & Gonzales	D	C
Critical PM Intersections		
C St & 3rd St	C	D
C St & Gonzales	A	E
C St & Wooley	A	D
H St & Gonzales	C	D
Oxnard & Gonzales	B	D
Rice & Channel Islands	A	E
Rose & 5th St.	C	F
Rose & Auto Center	A	D
Rose & Channel Islands	C	E
Rose & Huene	C	E
Rose & Lockwood	C	D
Rose & Oxnard	A	D
Rose & Third	A	D
Rose & Wooley	A	D
Santa Clara & Auto Center	B	E
Saviers & Channel Islands	C	D
Ventura & Channel Islands	B	D
Vineyard & Esplanade	C	D

Source: Table 5.1-6, URS Traffic Impact Analysis Final Report.

Exhibit 5: Intersections Not Meeting LOS "C" in 2020 – Alt. B Updated GP, Mitigated

Intersection	AM Peak Hour	PM Peak Hour
Most Critical Intersections		
Oxnard-Saviers & Wooley	F	F
Critical PM Intersections		
C St. & Wooley	B	D
Rice & Gonzales	C	D
Rose & Pleasant Valley	C	D
Rose & Third	A	D

Source: Table 7.2-1, URS Traffic Impact Analysis Final Report.

The Five Points intersection of Oxnard-Saviers & Wooley would operate at LOS "F" during both the AM and PM peak hours under the Mitigated Alternative "B" of the General Plan Update. The other two intersections, C Street & Wooley, and Rose & Third, would operate at LOS D.

URS determined that the intersection of Rice and Gonzales could be feasibly mitigated only to LOS "D" not "C".

5. WHAT WILL IT BE LIKE IN 2020 WITH THE INITIATIVE?

Before the answer to this question can be known, the City and URS must first develop mitigations for the 5 intersections under Mitigated Alternative "B" Update for which mitigations were previously considered to be infeasible. These mitigations would probably involve displacements of existing businesses, more expensive construction (such as flyovers or relocating railroad tracks), and/or a reduction in the densities of the transit villages proposed under Alternative "B".

In addition, the URS analysis of the General Plan Update needs to be entirely redone, this time computing AM and PM peak hour delays for all 119 intersections. This analysis will reveal additional intersections needing mitigation and additional mitigations to mitigate them. These mitigations will significantly increase the costs of providing the circulation system for the General Plan Buildout and would probably involve significant business and residential relocations.

Should these additional analyses reveal that the costs of the mitigations (both environmentally and fiscally) are too great, then the City will be forced to consider reductions in the development densities and overall scale of development contemplated under Alternative B (mitigated) for the General Plan Update.

It is likely that the result will be less growth than called for in the current General Plan and in the General Plan Update. It is unlikely that the City will be able to have transit villages in its General Plan. Without the transit villages it is unlikely that the City will see significantly increased transit service because densities will not support the service.

Without the transit villages or the improved transit service, the City is unlikely to see much shifting of travel to the pedestrian, bike or transit modes of travel.

6. WHAT WILL IT BE LIKE BETWEEN NOW AND 2020 WITH THE INITIATIVE?

Under current regulations, a development project can be approved even if there are existing traffic problems, as long as it commits to mitigate the problem at occupancy to the City's satisfaction.

The initiative would require any LOS problems to be fixed first before further development is even "contemplated" (see Section 3(5), Paragraph A). Section 2, paragraph C states that the objective of the initiative is for the problem to be fixed "at all times of the preceding year".

Thus, the City could only consider exempt projects until such times as all of the intersection LOS problems are fixed everywhere in the City. All non-exempt projects would need to be put to a vote of the people.

The City therefore has two courses of action it might take:

- Fix all LOS problems now, and keep them fixed, or
- Submit all non-exempt developments to voters.

Either way, City would approve all exempt developments because they would no longer be subject to the City's Growth Management Element.

The problem with fixing the current problems now is that City will have to locate funding and displace businesses to mitigate the problems. For example, the only feasible solutions to the existing and future LOS problems at the Five Points intersection of Oxnard-Saviers & Wooley are probably a flyover for one of the movements or the closing of one of the approach legs to this intersection.

The other problem with fixing all problem intersections now is that the City will have to keep ahead of developments going on in Port Hueneme and the exempt developments within the City of Oxnard. Each exempt development and development in Port Hueneme digs a deeper hole for the City to climb out of for each problem intersection.

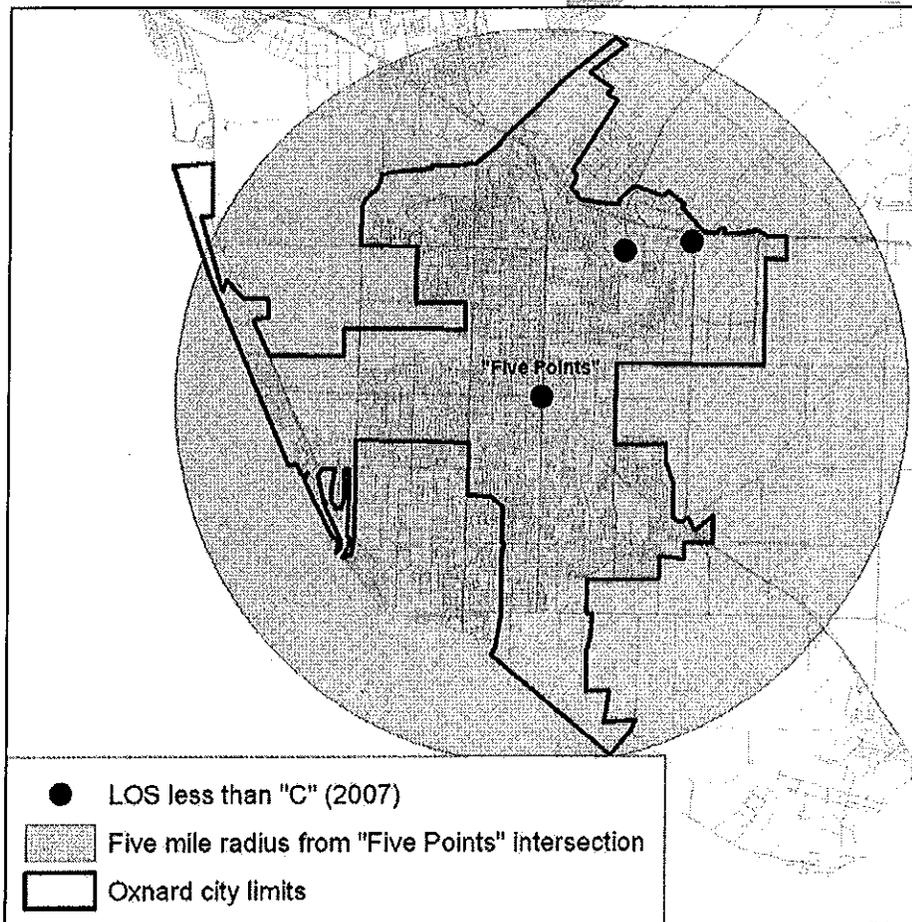
Appendices

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7. THE CITY AND THE FIVE MILE RADIUS

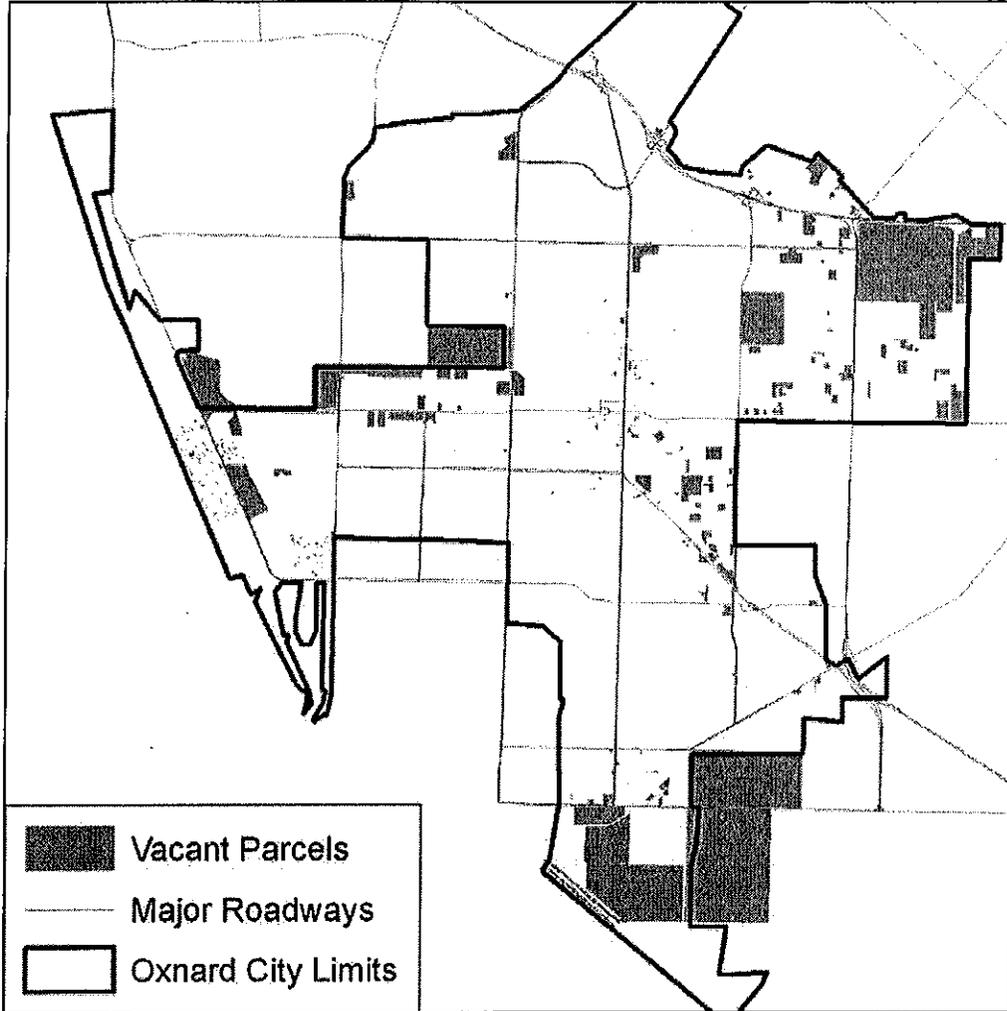
The Initiative will essentially affect the entire City of Oxnard. This impact is largely due to the requirement that all intersections within five miles of a proposed development be consistently operating at LOS "C" or better for one year prior to the development application. The figure below shows how the five mile radius requirement of the Initiative can impact development in the City of Oxnard if just a single intersection in the center of the City operates below LOS "C". Given the physical dimensions of the City, any intersection operating below LOS "C" would preclude any considerable developments from being approved by the local Planning Commission and City Council in the majority of the City area, as can be deduced from the figure.

Figure 1. Impact of "Five Mile Radius" on Development



Source: Data adapted from Census 2000 Tiger GIS files

Figure 2. Vacant Parcels In/Near the City of Oxnard



Source: Data adapted from City of Oxnard vacant parcel database, Census 2000 Tiger GIS files

8. CURRENT PLANS TO MITIGATE DEFICIENT INTERSECTIONS

The traffic counts performed in 2007 by the City of Oxnard found the following three intersections to be operating below LOS "C":

- Oxnard Blvd / Saviers Road at Wooley Rd ("Five Points")
- Rose Ave at Gonzales Rd
- US-101 at Rice Ave (Specifically, Santa Clara/Rice at Auto Center)

The US-101 at Rice Ave location is programmed to be improved under State Proposition 1B; the pre-construction planning is already in progress (e.g., design, land acquisition) however construction has not yet started.

Improvements for the intersection of Rose Ave at Gonzales Rd are being evaluated by the City.³

As the "Five Points" intersection at Oxnard Blvd (SR 1) / Saviers Road and Wooley Road (highlighted in the figure) has consistently operated below LOS "C" from the time that the current General Plan was adopted in 1990 through the present, this intersection on its own would preclude any considerable developments from being approved by the local Planning Commission and City Council. The improvements for this specific intersection are estimated at greater than \$40 million and must be coordinated with Caltrans. Additionally, grade separation between multiple roadways and freight railroad tracks would be necessary and would likely require considerable use of eminent domain to acquire the needed land.⁴

³ Discussion with Jason Samonte, City of Oxnard Traffic Engineer, on August 28, 2008.

⁴ Discussion with Matthew Winegar, City of Oxnard Development Service Director, on August 27, 2008.

9. DELAY VERSUS ICU V/C LEVEL OF SERVICE

Level of service (LOS) at a signalized intersection is an indicator of the driver's perception of the ease with which he or she can pass through an intersection. It is measured using a letter grade system going from LOS "A", the best level of service, to LOS "F", the worst level of service.

ICU Method

All cities in Ventura County, including the City of Oxnard, currently use the Intersection Capacity Utilization (ICU) method to estimate LOS for traffic impacts and to determine appropriate mitigations. It is a variation of the planning method first elaborated in the Transportation Research Board, "Interim Materials on Highway Capacity," Circular 212, issued in 1980. The ICU method is preferred by many agencies in Southern California because it is straightforward to apply, easy to check, and applicable to 90% of the intersections in the region.

The ICU method is designed to be applied to signalized intersections only. It treats an intersection as if all traffic has to pass through a single critical point. The critical point has a capacity of 1600 vehicles per hour per lane. The critical left turn and through movements at the intersection are divided by the number of lanes available for each movement and summed to obtain the critical volume. The critical volume divided by 1600 gives the percent capacity utilization. A lookup table, summarized below, is then used to convert the percent capacity utilization to a letter level of service grade.

ICU Level of Service Table

Level of Service	Volume/Capacity Ratio
LOS A	0 - 0.60
LOS B	0.61 - 0.70
LOS C	0.71 - 0.80
LOS D	0.81 - 0.90
LOS E	0.91 - 1.00
LOS F	1.01 or above

The more lanes that is able to feed traffic through the critical point, the greater the traffic capacity of the intersection. In fact, that is the only way in the ICU method to mitigate an intersection capacity utilization problem, add more lanes. The ICU method is designed for suburban intersections with separate left turn lanes and left turn arrows (protected phases) for all left turns, standard lane widths, relatively level grades, and little or no interference from pedestrians, bicycles, buses, or parked cars. The ICU method tends to over estimate the capacity of older non-suburban intersections with non-standard designs.

Although the intersection evaluation methodology is not specified in the Initiative, the levels of service presented are consistent with the ICU LOS table above.

HCM Method

The Highway Capacity Manual (HCM) signal delay method was developed in 1985 and updated in 1994, 1997, and 2000 to estimate delay and level of service for a broader range of intersection operating conditions than the ICU method is designed to address. The computed delay is a function of the signal timing, lane widths, as well as the number of pedestrians, bicycles, trucks, and buses. The computations are complex enough that it is not realistic to implement the HCM signal delay method in a spreadsheet. Commercially available software must be used. A lookup table, summarized below, is used to convert the predicted mean delay per vehicle to a letter level of service grade.

HCM Signalized Level of Service Table

Level of Service	Traffic Delay (secs.)
LOS A	Less than 10
LOS B	10 - 20
LOS C	20 - 35
LOS D	35 - 55
LOS E	55 - 80
LOS F	More than 80

The HCM method is particularly sensitive to signal timing. Signal timing is a key input required by the method. A low volume street can have an LOS of "F" if the signal timing is very conservative. A high volume street can have an LOS of "D" or "E", even if the volume/capacity ratio slightly exceeds 1.00, if the signal timing is particularly good.

Although ICU is the prevalent method for agencies in Ventura County, the Initiative also presents intersection level of service thresholds based on traffic delay. The methodology to calculate intersection delay is not specified in the Initiative; however, the levels of service definitions are consistent with those of the HCM criteria for signalized intersections summarized above.

Comparison of ICU and HCM

The levels of service thresholds for signalized intersection for the ICU and HCM methods do not correspond directly. The HCM signalized delay method generally results in equal or poorer levels of service compared to the same intersection evaluated using the ICU method. However, it is not uncommon for the HCM method to yield better results than the ICU method since it takes into account and is sensitive to more variables affecting capacity and level of service. As a result, an intersection shown to be deficient based on level of service calculations using the ICU method can be shown to operate acceptably using the HCM method. This lack of consistency could affect the determination of project traffic impacts and mitigation measures.

Unsignalized Intersections

The Initiative acknowledges calculations for signalized and unsignalized intersections are different due to the variation in traffic control, but does not provide a methodology to evaluate unsignalized intersections. One common approach for the evaluation of unsignalized intersections is the methodology outlined in the Highway Capacity Manual 2000. Using this method, the level of service at unsignalized intersections is determined by the weighted average delay for all vehicles entering the intersection. For intersections with a stop control on the minor approach only, the delay and LOS for the worst-case stop-controlled movement is reported in addition to the average delay and LOS for the intersection as a whole. The table below presents the average delay criteria used to determine the level of service at unsignalized intersections.

HCM Unsignalized Level of Service Table

Level of Service	Average Delay (secs)
LOS A	Less than 10
LOS B	10 – 15
LOS C	15 – 25
LOS D	25 – 35
LOS E	35 – 50
LOS F	More than 50

10. REFERENCES

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