El Dorado County/Caltrans Coordination Meeting
Level of Service on U.S. Highway 50
October 30, 2013
Meeting Record

Location of Meeting: Caltrans District 3, Venture Oaks Building
2379 Gateway Oaks Drive, Suite 150
Sacramento, CA 95833

Attendees: Jasdeep Randhawa, Caltrans
Cynthia Smith, Caltrans
David Defanti, El Dorado County
Natalie Porter, El Dorado County
Claudia Wade, El Dorado County
Sharon Scherzinger, El Dorado County Transportation Commission
Dan Bolster, El Dorado County Transportation Commission

This was a follow up meeting to the October 23, 2013 discussion regarding Level of Service on U.S. Highway 50. The El Dorado County (EDC) Travel Demand Model (TDM) was also discussed.

<u>El Dorado County TDM</u>

Natalie distributed copies of the employment adjustments and the validation tables for AM and PM peak hours for the Missouri Flat Road Area (attached). The data was supplied by the El Dorado County Transportation Commission's consultant as support for their Diamond Springs/El Dorado Area Mobility and Livable Community Plan. The employment adjustments will be incorporated into the TDM.

Natalie distributed copies of a draft ramp validation table (attached). Caltrans had requested that the ramp validation be included as part of the TDM validation/calibration documentation. Ramps were identified that will need additional consideration. Jas said to use the same volume criteria for ramps as EDC used for the road segments. Sharon asked if the medical building at the casino was included in the land use.

Cynthia had previously sent actual count data for segments of State Route (SR) 49, selected ramps on U.S. Highway 50, and two mainline U.S. Highway 50 locations. Sharon felt it was important to add the information east of Placerville in order to potentially assess the Apple Hill concerns in the future. Cynthia asked about peer review of the TDM. Natalie stated that Kittelson & Associates did complete a review.

David indicated that EDC would like to have letters from Caltrans, Sacramento Area Council of Governments (SACOG) and potentially El Dorado County Transportation Commission (EDCTC) indicating that they agree that EDC's TDM was built using the industry standards of practice, validates/calibrates to the appropriate standards, EDC appropriately coordinated with the various technical staff from Caltrans and SACOG, and the TDM is appropriate for the intended use. EDC intends to use the TDM to create our updated Traffic Impact Mitigation Fee, updated Capital Improvement Program, and as one of the tools

to assess proposed new development in EDC. EDC understands that they cannot receive these letters until the updated catalogs and documentation are reviewed and assessed.

Action Items:

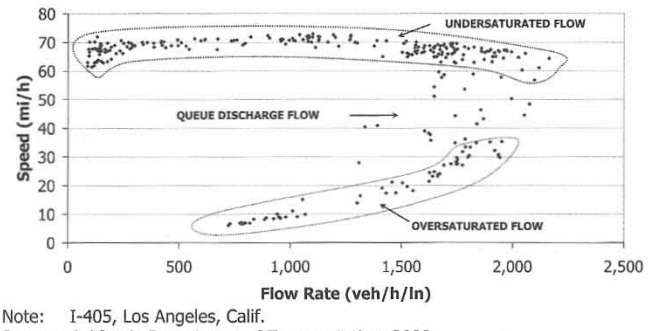
1) EDC to add the segments of SR 49, with actual counts, to the validation/calibration documentation.
2) EDC to add the two mainline U.S. 50 locations and ramp counts, with actual counts, to the validation/calibration documentation.
3) EDC to add the updated Missouri Flat Road area ADT to the validation/calibration documentation.
4) Natalie will verify if the medical building for the casino was built by 2010, and if not, ensure it is included in the future year land use.
5) Natalie to verify that the Trip Generation rates used were from the ITE 8th Edition or later.
6) Natalie to send updated catalogs and documentation to Caltrans and SACOG as soon as possible for review.
7) EDC to provide methodology comparison summary of inputs/outputs for calculation of Level of Service for U.S. Highway 50.

Level of Service (LOS) Calculations for U.S. Highway 50

As a follow up to last week's meeting regarding this subject, we discussed the methodology used to calculated level of service for U.S. Highway 50. The discussion is summarized in Table 1.

Jas said that if the volume to capacity ratio (V/C) >1 it is considered a demand to capacity ratio (D/C). When inputting volumes for HCS freeway analysis, Caltrans will use the highest peak hour volumes from their count book for each segment. HCM2010 Exhibit 11-1 is a good representation of the types of traffic flow and shows why speed is not used to determine LOS for freeway segments.

Exhibit 11-1
Three Types of Freeway Flow



Note: I-405, Los Angeles, Calif.
Source: California Department of Transportation, 2008.

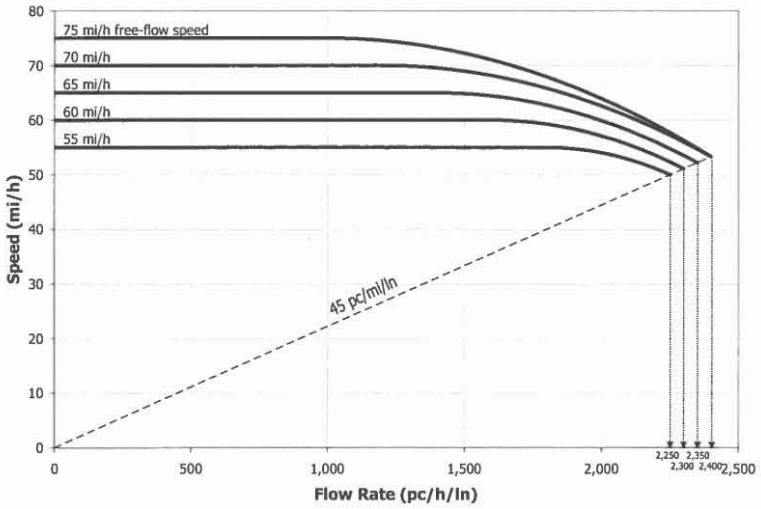


Exhibit 11-2
Speed–Flow Curves for Basic Freeway Segments Under Base Conditions

Exhibit 11-3 shows the equations that define each of the curves in Exhibit 11-2. Because estimating or measuring FFS is difficult, and there is considerable variation in observed and predicted values, no attempt should be made to

EDC Long Range Planning will be giving our Board of Supervisors our monthly update on December 3, 2013. The update will include: the clarification of the density vs. speed issue for LOS determination, PeMS data from the county line to Cameron Park, the table of similarities and differences for LOS calculations, and our meeting summaries. Caltrans staff and Sharon Scherzinger suggested attaching Exhibit 11-2 and 11-4 from the HCM2010 for illustrative purposes.

Exhibit 11-4 visually demonstrates the six LOS defined for basic freeway segments. LOS are defined to represent reasonable ranges in the three critical flow variables: speed, density, and flow rate.

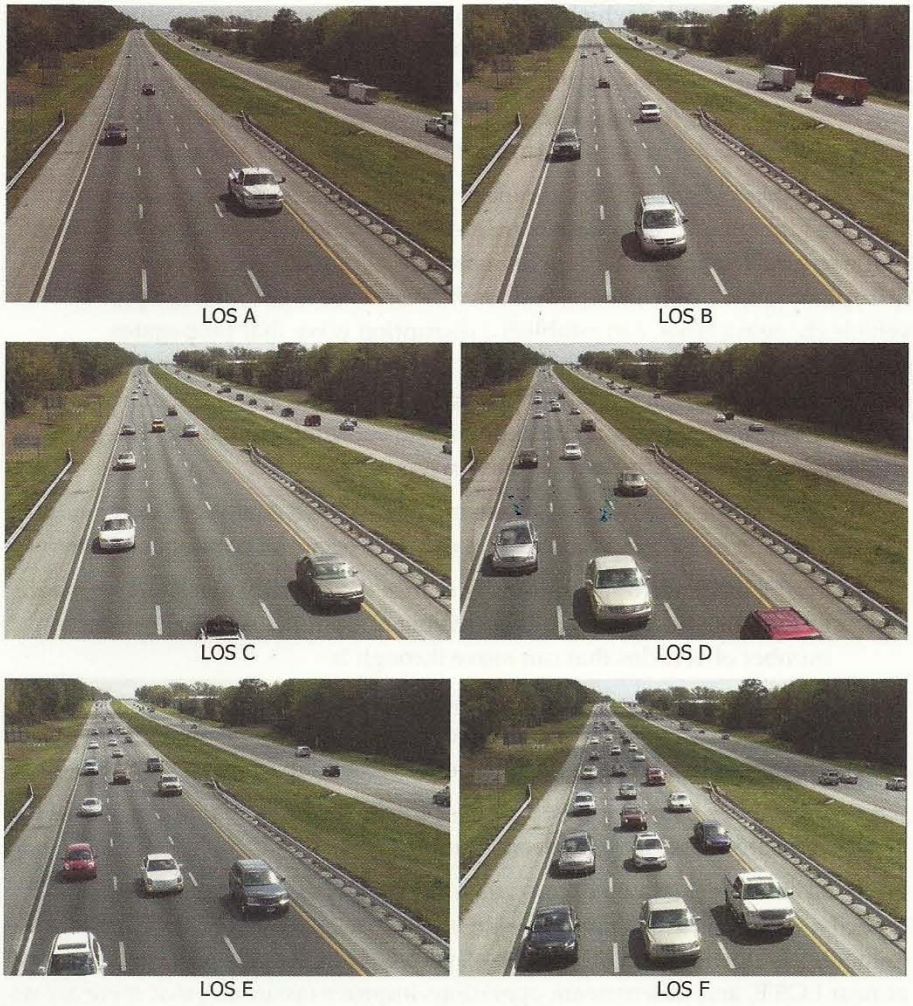


Exhibit 11-4
LOS Examples

Table 1: Comparison Summary for Level of Service Calculations for U.S. Highway 50

Assumptions for Input	El Dorado County Long Range Planning	Caltrans Planning	Consistent?	Comments
What methodology do you use to calculate LOS on U.S. Hwy 50?	Highway Capacity Manual 2010 (HCM2010) Basic Freeway Segments	Highway Capacity Manual 2010 (HCM2010) Basic Freeway Segments	Yes	See note[1]
What Free Flow Speed (FFS) is assumed for the basic segment from the County line to El Dorado Hills Blvd./Latrobe Road?	70 mph	70 mph	Yes	Other segments along U.S. Highway 50 may have lower assumed FFS.
What do you use for the D factor (percent traffic in the peak direction)?	Use actual counts. If no actual current data is available, use Caltrans count book.	Use the lasted count book for the nearest appropriate segment or State Highway Inventory (internal document) for the 30th highest hour if count book data is not available for the segment in question.	Sometimes	Caltrans traffic volume books reports the average over the whole year (365 days/year), while EDC looks at the 5-day weekday average. [2]
What do you assume for Truck Volumes?	Lower than the default value for the peak hour as large trucks typically do not travel during peak hour. The default value for the daily calculations.	Use the percentages from their state truck counts for daily, and use a 1/3 reduction from the ADT truck percentage for the peak hour. This is dependent upon the area type, (i.e., I-5 would be higher)	Sometimes	Caltrans staff verified that a 1/3 reduction was used (6% reduced to 4%)
What type of terrain do you assume for the segment (County line to El Dorado Hills /Latrobe Interchange)?	Rolling	Rolling	Yes	

What lane width do you assume for the segment (County line to El Dorado Hills /Latrobe Interchange)?	12' lanes (if we do not assume 70mph as the FFS)	Does not input this data for this segment, however for areas with less than standard lane widths Caltrans does not assume 70 mph FFS and calculates the BFFS	Yes	This information is needed if the FFS is not known. [3]
What volumes do you use as input data?	Collected weekday counts (5-day counts), consistent with the adopted General Plan Policy.	Caltrans count books as source. Counts are based on a 7 day week (includes weekends).[2]	No	EDC uses Caltrans count books as a comparison, but prefers the use of actual counts.
What total ramp density (TRD) do you assume for the segment? (County line to El Dorado Hills /Latrobe Interchange)	WB TRD = 1.0 ramps per mile EB TRD = 1.2 ramps per mile	WB TRD = 1.0 ramps per mile EB TRD = 1.2 ramps per mile	Yes	If 70 mph is being used as the FFS then TRD is omitted from the calculation. The same applies to Lane widths and Right-side lateral clearance
Assumptions for Post-Processing				
Do you include HOV lane volumes and auxiliary lane volumes in the calculations?	HOV lane volumes are excluded for the peak hour LOS calculation. If the auxiliary lane is functioning as a mixed flow lane, it is assessed as a mixed flow lane.[4]	No, the HOV lane volumes and auxiliary lane volumes are excluded from the calculation.	Yes for HOV, No for Aux lanes	Mixed flow lanes accommodate all types of vehicles, HOV lanes are open only to high occupancy vehicles (2 or more persons/veh.) during the AM and PM peak hours
How many and what types of lanes do you assume for the U.S. Highway 50 segment from the County line to El Dorado Hills/Latrobe Interchange under existing conditions?	WB = Two mixed flow lanes, one HOV lane EB = Three mixed flow lanes, one HOV lane	WB = Two mixed flow lanes, one HOV lane EB = Two mixed flow lanes, one transitional aux lane, one HOV lane	Yes for WB, No for EB	See comment above.
What capacity do you assume for the mixed flow lanes?	2,400 passenger cars per hour per lane (pc/h/ln) for a 70 mph FFS	2,400 passenger cars per hour per lane (pc/h/ln) for a 70 mph FFS	Yes	See attached Exhibit 11-2 from the HCM2010 for capacities associated with FFS

[1] Highway Capacity Manual 2010 identifies three types of freeway analyses, all of which are based on the same speed flow curve (HCM 2010 11-6) and density table (HCM 2010 11-5): 1) Operational analysis, 2) Design analysis, and 3) Planning and Preliminary Engineering analysis. The

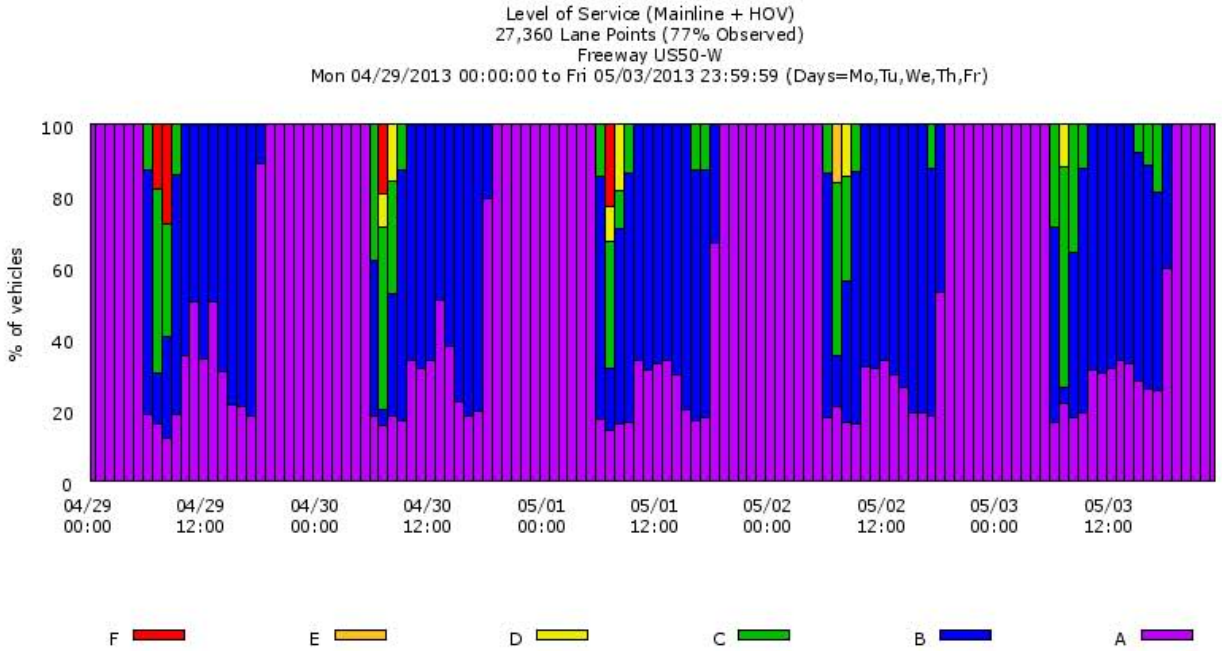
Operational analysis application begins with all input parameters specified and is used to find the expected LOS that would result from the prevailing roadway and traffic conditions. The Design analysis uses a known demand volume to determine the number of lanes needed to deliver a target LOS. The Planning and Preliminary Engineering analysis is used to get a general idea of the number of lanes that will be required to deliver a target LOS, many default values will be used and the demand volume is usually expressed as annual average daily traffic (AADT). These analyses allow the user to input data in different ways while keeping the LOS calculation methodology constant.

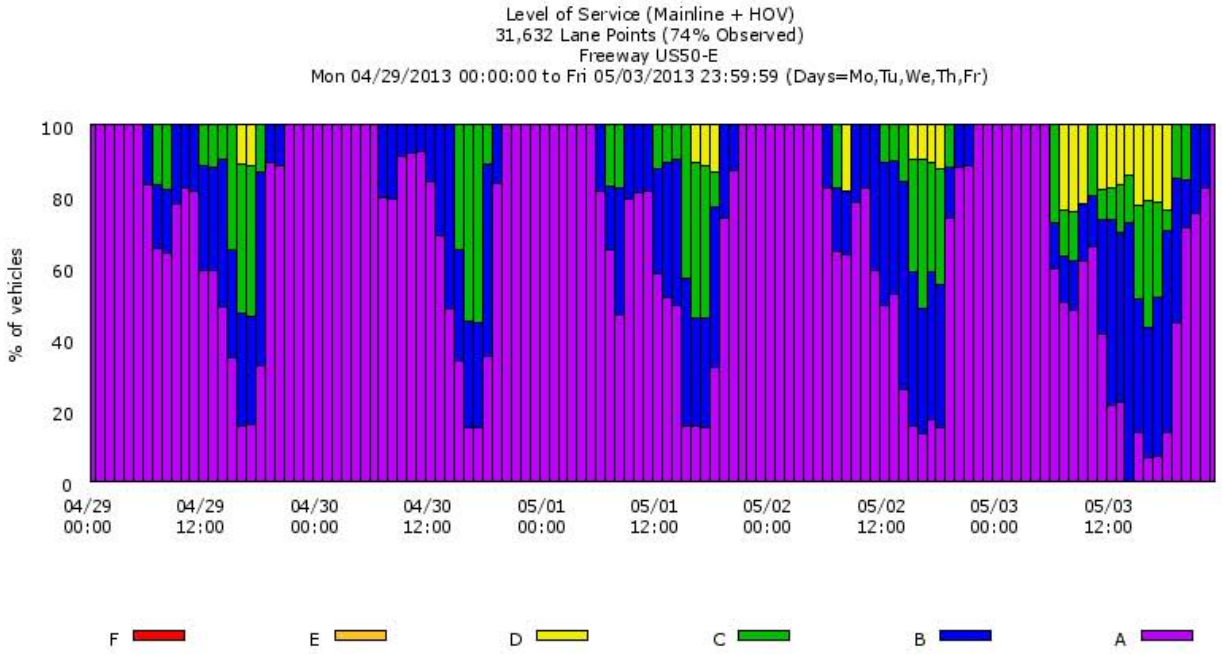
[2] Caltrans determines the input for AADT from the current CT Traffic Volumes Book. The HOV peak hour volume and auxiliary lane peak hour volumes are subtracted, the K factor (2-way peak hour percent of AADT) and D factor (percent traffic in the peak direction) are applied to the remaining peak hour volume to determine the AADT. Caltrans count data for freeways are counted throughout the year with some locations counted continuously. Locations that are not counted throughout the year are sampled every 3 years at different times during the count year. Final volumes are adjusted by compensating for seasonal influence, weekly variation, and other variables which may be present. For CSMP LOS Calculations, Caltrans does not use the volumes directly from PeMS. For future planning, Caltrans determines the annual growth from the SACMET and SACSIM models and applies the traffic growth to the baseline conditions to determine the 20-year volumes.

[3] Caltrans uses the Highway Capacity Software (HCS) operational analysis with the input parameters mentioned above to determine LOS and how the highway network will work as a whole for planning purposes. EDC uses the planning level analysis for the macro TDM, but uses the specific collected data for micro level traffic impact studies.

[4] Examples: EDC would consider the third lane on eastbound U.S. Highway 50 between E. Bidwell and El Dorado Hills Blvd. as a mixed flow lane not an auxiliary or transitional lane. An example of an auxiliary lane is the additional lane on westbound U.S. Highway 50 between the on-ramp at Placerville Drive/Forni Road and the off-ramp at Missouri Flat Road.

Additional Information
PeMS Level of Service Chart
County Line to Cameron Park





Additional Information
PeMS Level of Service Chart
County Line to El Dorado Hills Blvd./Latrobe Road