Board of Supervisors Workshop Level of Service and the County's Travel Demand Model



OCTOBER 28, 2016 1:00 - 4:00 PM

Purpose

On August 30, 2016, the Board directed staff to:

"Conduct Board workshops to address the traffic and circulation issues underlying Measure E"

Agenda

- Overview of TDM (Kimley-Horn)
- Overview of Major CIP/TIM Fee Program
- Detailed discussion on LOS calculations (DKS Associates & Caltrans)
 - US 50 at the County Line
 - Volumes and Speed Data
- Public Comments received
- Questions & Comments

Agency Staff

El Dorado County

- Steve Pedretti, P.E. CDA Director
- Shawna Purvines CDA Interim Assistant Director
- Claudia Wade, P.E. Senior Civil Engineer
- Natalie Porter, P.E., T.E. Traffic Engineer
- Katie Jackson, P.E. Transportation Planner

Caltrans

 Andrew Brandt, P.E. – Deputy District Director for Maintenance and Traffic Operations

Kimley Horn – Mike Schmitt

Firm Qualifications

- Founded in 1967 originally as a transportation firm
- More than 2,800 employees nationwide
- ENR Top 100 Design Firm
- Fortune Magazine Top 100 Places to Work

Mike Schmitt, AICP CTP, PTP, Senior Project Manager

- Over 25 years of transportation planning experience
- Certified expert in transportation planning by both APA and TPCB
- National academies research experience
- Project manager for the El Dorado County Travel Demand Model Update

Kimley » Horn

Kittelson & Associates – Mike Aronson

Firm Qualifications

- Specializes in transportation
- Primary authors of national references
 - Highway Capacity Manual
 - Highway Safety Manual
- Long-time support to El Dorado County
 - Peer review of development
 - Corridor safety (Green Valley Road)

Mike Aronson, P.E., Principal Engineer

- Over 30 years experience
- Travel forecasting, area wide analysis, traffic operations
- El Dorado County –
 Completed earlier version of model and deficiency analysis





DKS Associates – John Long

Firm Qualifications

- National firm specializing in transportation engineering and planning
- Over the last 27 years, has worked for every city and county in the greater Sacramento region and has not worked for any private developers

DKS

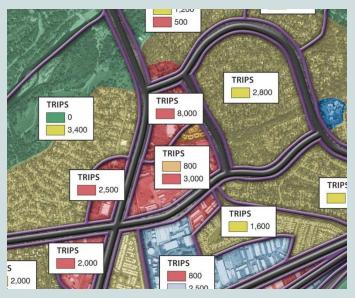
John Long, P.E., T.E., Principal

- 40 years of experience
- Developed regional travel demand models throughout US including SACOG (SACMET and SACSIM)
- Prepared traffic impact fee programs, CIPs and General Plan Updates for numerous counties and cities

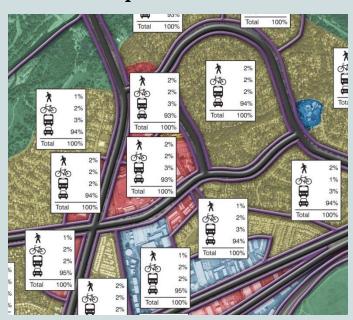
What is a Travel Demand Model?

- Forecasts trips onto transportation facilities, roadways, highways, etc.
- Tool used by most public agencies
- Part of the planning process
- CEQA Support
- Fair Share for Impact Fees (AB 1600)
- TDM does NOT calculate LOS

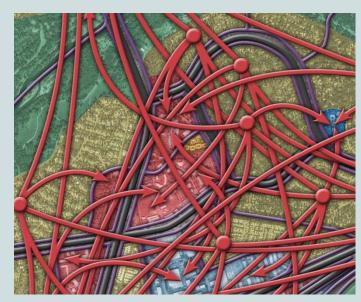
"Four Step" Model **Trip Generation Trip Distribution Mode Split Trip Assignment**



Trip Generation



Mode Split

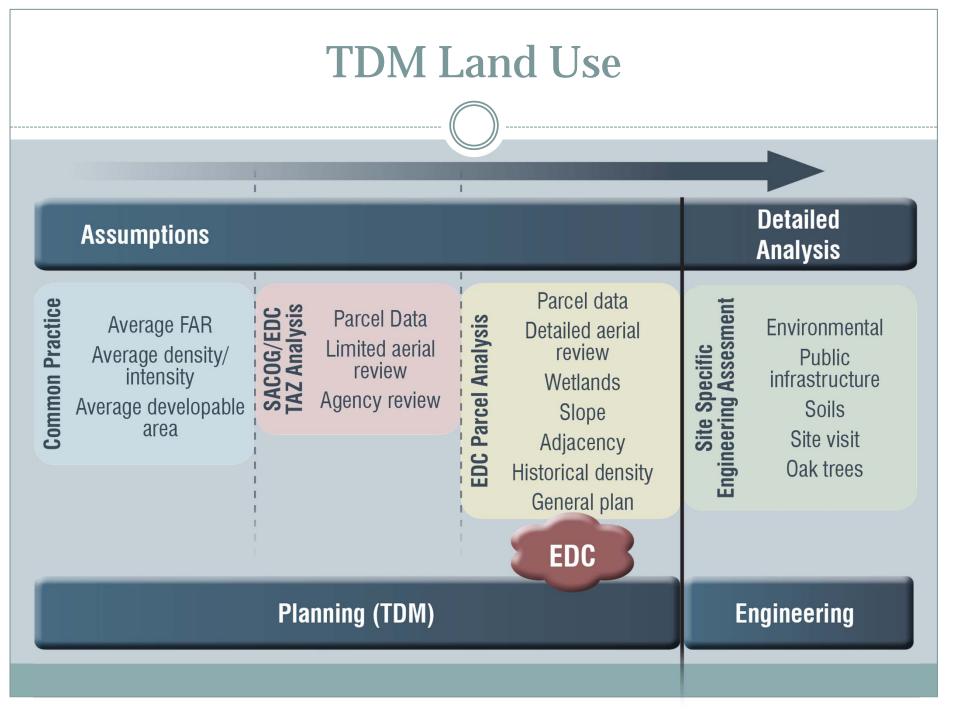


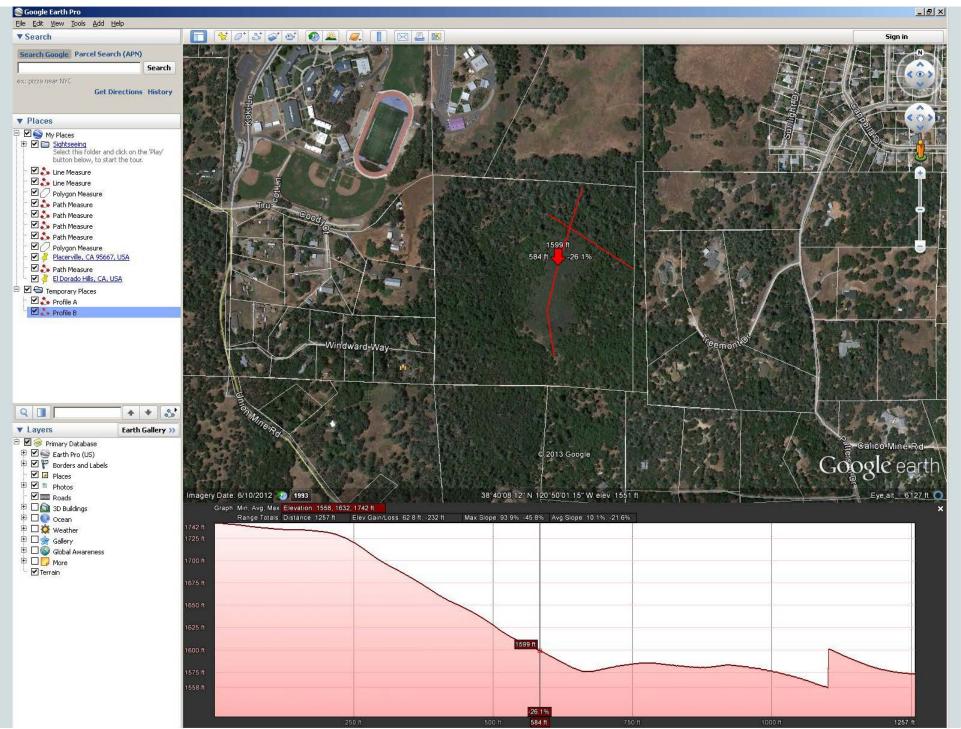
Trip Distribution



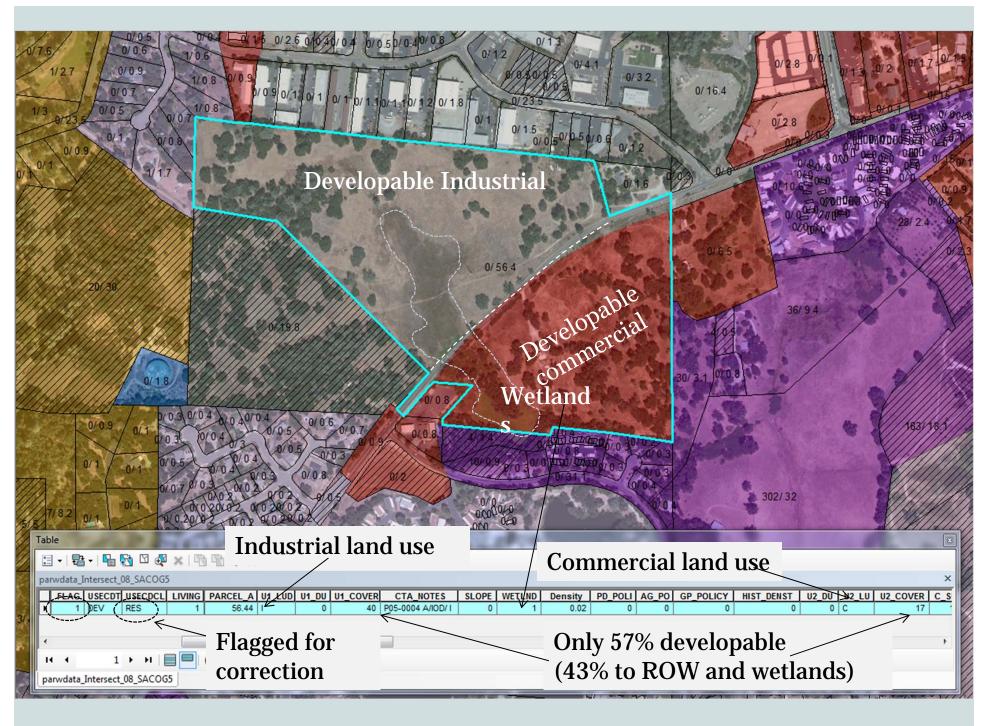
Trip Assignment

TDM and Planning Process **Public Input** Board of Supervisor Policies General Plan/CIP **Drivers Forcasted Market Conditions** Location/Intensity **Transportation Model Inputs** of Land Use Infrastructure Feedback Loop **TDM** Traffic Forecast/ **Model Output Performance Measures Technical Technical Assessment** Report

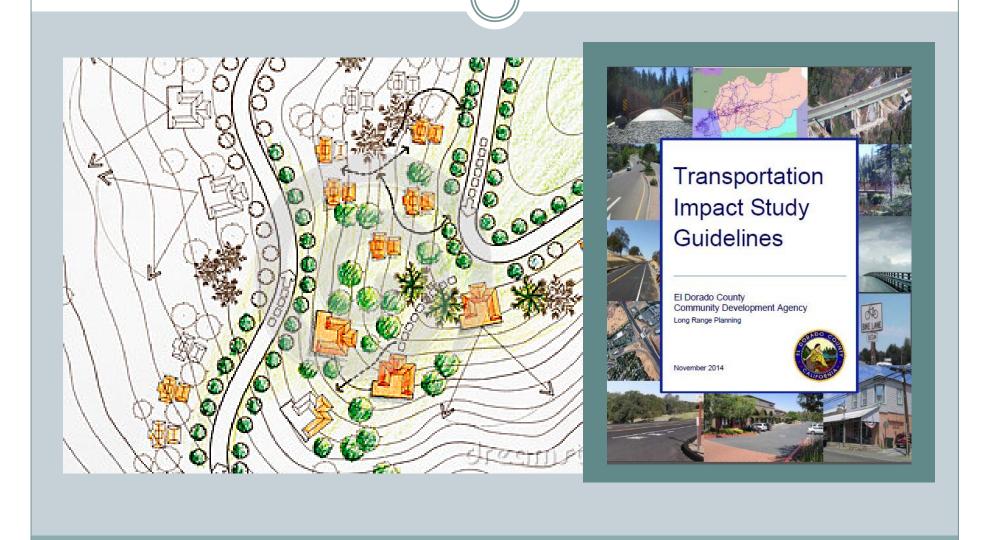




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Site Specific Analysis



KHA Public and Agency Involvement

- BOS Presentations previous to project
- BOS Land Use − 4/16/12
- Engineering Subcommittee 6/27/12
- Public Meeting 6/28/12
- BOS TAZ $\frac{7}{24}/12$
- Training Workshop 1/28/13
- EDC Staff Workshop 2/21/13
- BOS Overview − 4/1/13
- Agency Meeting 6/13/13
- BOS TDM Workshop 2/14/14

What is Validation?

Techniques for determining the model is reasonably accurate

- Simply
 - TDM forecasts 2010 volumes
 - Obtain actual 2010 traffic counts
 - Compare the two using statistical methods
- If valid in 2010, assumed to be valid for future

Validation Criteria Sources









Model Validation Criteria

Validation Criteria	Question	Pass or Fail?
Correlation coefficient	Is the model a good predictor in total?	< PASS >
Percent Error	Do we have the right amount of total traffic on roadways?	< PASS >
Percent root mean square error (RMSE)	Are total model errors within a reasonable range?	< PASS >
Screenline Analysis	Are the traffic flows between areas reasonable?	< PASS >
Roadway Link Validation	Are individual roadway volumes reasonable?	<pass></pass>
Peak Period Validation	Considers just the highest 4 hour periods.	<pass></pass>
Peak Hour Validation	Considers just the highest 1 hour periods.	< PASS >
Dynamic Validation	Is the model sensitive to change?	<pass></pass>

Model Peer Review and Acceptance

Kittelson Peer Review

- Land Use Summary Check;
- External traffic growth assumption check;
- Trip Purpose and Trip Generation check (productions and attractions);
- Verify person trip vs. vehicle trip Origin-Destination (OD) matrix;
- 5-D Application assessment;
- Zone connector checks;
- Check/verify network coding conventions check against County's CIP list;
- Check logical link volume growth;
- · Volume comparisons for key facilities relative to past forecasts; and,
- Check and verify static validation statistics (if available and documented);

Caltrans & SACOG Endorsement

STATE OF CALIFORNIA-CALIFORNIA STATE TRANSPORTATION AGENCY

EDMUND G. BROWN Jr., Governor

DEPARTMENT OF TRANSPORTATION

DISTRICT 3 703 B STREET MARYSVILLE, CA 95901 PHONE (530) 741-4337 FAX (530) 741-4245 TTY 711 www.dot.ca.gov/dist3



Serious drought. Help save water:

September 22, 2014

Steve Pedretti, Director El Dorado County Community Development Agency 2850 Fairlane Court Placerville. CA 95667

Dear Mr. Pedretti

Thank you for addressing our concerns regarding the El Dorado County Travel Demand Model (EDCTDM). With the recent modifications, the EDCTDM conforms to the state-of-practice in travel demand modeling; meets overall traffic assignment validation standards suggested by FHWA and Caltrans; and is an appropriate tool for the County's long range planning purposes.

While the EDCTDM as a whole is acceptable and meets industry standards, please keep in mind when used for future specific projects, a subarea validation will be necessary for approval of traffic impact studies. Additionally, some areas of the model may exceed validation standards and/or generate unexpected outputs, which will require further model improvements and post processing to achieve acceptable results.

If you have any questions, please contact Nicholas Deal, Chief, Office of Travel Forecasting and Modeling at (530) 741-5151 or via email at nicholas.deal@dot.ca.gov.

Sincerely.

MARLON A. FLOURNOY Deputy District Director Planning & Local Assistance

c: Dave Defanti, Assistant Director of Community Development Agency Claudia Wade, CDA Long Range Planning Division Natalie Porter, CDA Long Range Planning Division Amarjeet S. Benipal, District 3 Director, Caltrans Sharon Scherzinger, EDCTC Mike McKeever, SACOG

"Provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability."

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tec: 916.321.9000 fax: 916.321.9551 tdd: 916.321.9550 www.secog.org SACOG

February 3, 2014

Kimberly A. Kerr
Acting Community Development Agency Director
Community Development Agency
2850 Fairlane Court
Placerville, CA 95667

Dear Ms. Kerr:

This is in response to your letter of November 7, 2013 regarding the El Dorado County Travel Demand Model. We appreciated the collegial spirit in which your agency engaged with SACOG over the course of the EDCTDM development. SACOG's involvement over the course of the development has been: providing parcel-level base year and future year land use data; providing documentation, data files, and programs from SACOG's pre-2007 travel demand model, SACMET07; and periodic staff checkins opportunities to review and comment on the project.

We understand that all of the base year data and other files provided by SACOG have been thoroughly reviewed and revised by your agency staff and your consultant for the project. The land use data was for all intents and purposes rebuilt entirely over the course of the project, and the future year land use data will be based on "achievable development" at "reasonably expected intensity" based on the County General Plan land use categories. Significant detail was added to the base year highway network and zone system, to allow for trip generation, distribution and assignment to be assessed for very small land areas. Also, the SACMET07 programs were revised to include a "5D's" post-processing adjustment, among other things.

We understand that the EDCTDM is intended primarily for County staff to analyze and forecast traffic for the County long-range transportation plan, the transportation improvement program, and other local studies. We appreciate that your agency understands that other travel demand models, such as SACOG's SACSIM regional travel demand model, are needed for planning studies and analyses which cover a larger area than the EDCTDM does, and that those models will be used for those studies and analyses instead of the EDCTDM. Good examples of such plans and studies are the Metropolitan Transportation Plan/Sustainable Community Strategy, and the emissions and air quality analysis which goes along with that. For all base year land use and network data for El Dorado County in SACOG models, we will continue to share and coordinate with your staff to ensure that the representation of the county in both models is consistent.

Febraury 3, 2014 s. Kimberly A. Kerr Page 2

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review of the

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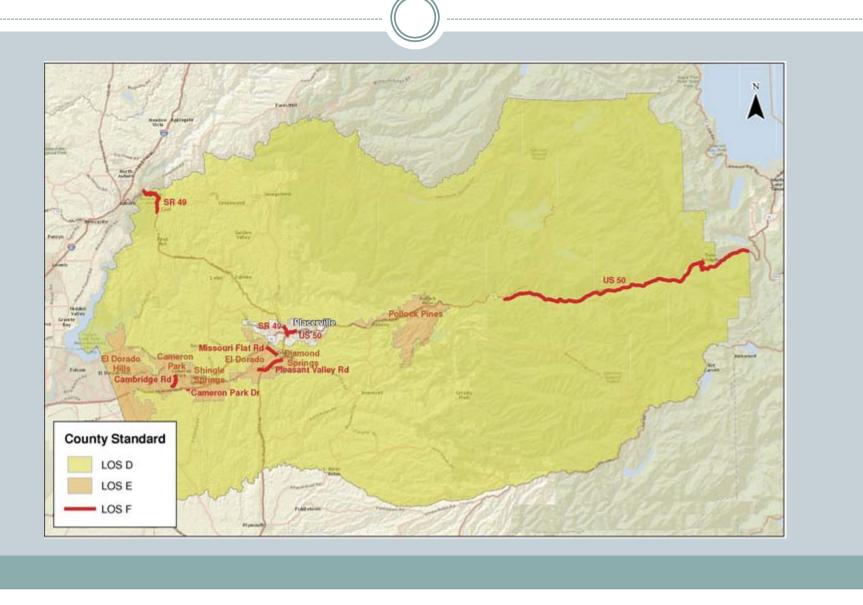
TIM Fee Improvement Needs Deficiency Analysis Improvement Phasing Growth **Project List Forecast**

2015 – 2035 Growth Forecast **Multi-Family Single Family Retail**

Level of Service (LOS) Thresholds

- LOS thresholds in General Plan Policy TC-Xd
- LOS determination based on 2010 Highway Capacity Manual (HCM)
 - Specific thresholds and LOS methods for each type of road freeways, rural roads, arterials and collectors
- Highway Capacity Manual
 - Standard reference in all 50 states and other countries
 - Published by the Transportation Research Board (TRB) part of the National Academy of Sciences
 - Mission: To provide leadership in transportation innovation and progress through research and information exchange, conducted within a setting that is objective, interdisciplinary, and multi-modal.
 - First published in 1950, the 2010 HCM is the fifth edition
 - Or. Richard Dowling, of Kittelson & Associates, was the TRB Committee Chair overseeing the research and publication of the HCM

Compare Forecasts to LOS Standards



TIM Fee Project List

Capacity Projects

- Local roadway widening
- Auxiliary lanes
- Interchange improvements
- Parallel capacity projects (e.g., Saratoga Way)

Reimbursement Obligations

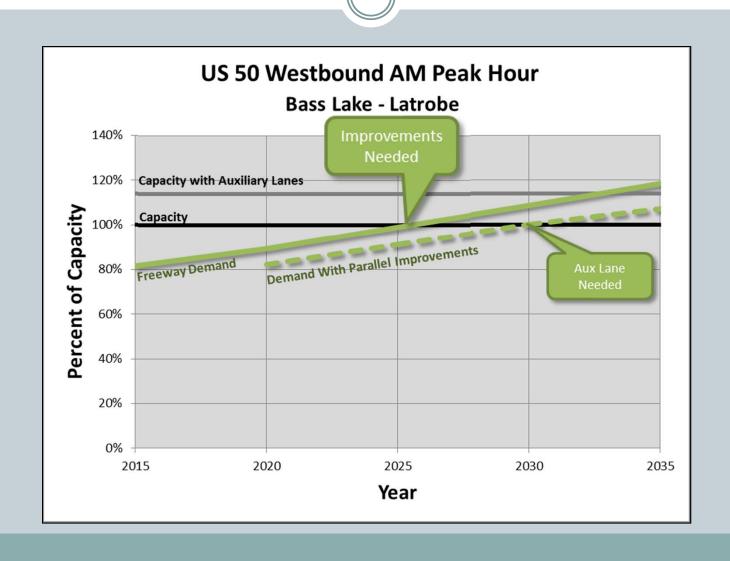
 Constructed projects (e.g., Silva Valley Parkway Interchange)

Other Program Costs

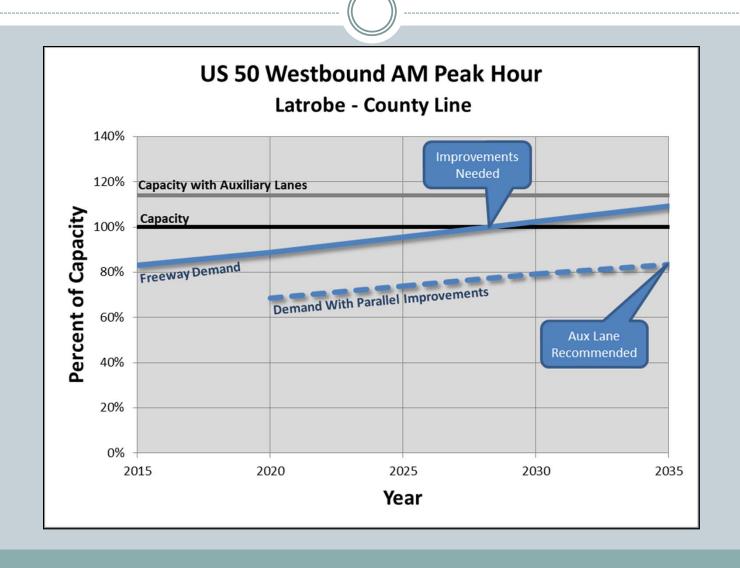
- Bridge replacement grant match funds
- Intersection improvements
- Transit capital improvements
- Program administration

TIM Fee Project Locations El Dorado Hills Blvd Silva Valley Pkwy Phase 2 Bass Lake Rd Cambridge Rd I-5 Cameron Park Dr Ponderosa Rd El Dorado Rd R-I Cameron Park Dr North of Palmer to Hacienda Rd R-2 Green Valley Rd From Sacramento/El Dorado County line to Sophia Pkwy R-3 Green Valley Rd East of Francisco Dr to east of Silva Valley Pkwy From Post St to Silva Valley Pkwy undercrossing R.5 Missouri Flat Rd From China Garden Rd to State Route 49 R-6 Saratoga Way R-7 Country Club Dr El Dorado Hills Blyd to Silva Valley Plowy R-8 Country Club Dr R-9 Country Club Dr From Tong Rd to Bass Lake Rd/Old Bass Lake Rd R-10 Country Club Dr From Bass Lake Rd/Old Bass Lake Rd to Tierre de Dios Dr R-11 Diamond Springs Pkwy From Missouri Flat Rd to SR-49 R-12 Latrobe Connection Sacramento/El Dorado County Line to Golden Foothill Plo County Roadway Improvements* **Highway Improvements** R-13 Headington Rd El Dorado Rd to Missouri Flat Rd Freeway Mainline Auxiliary Lane Improvements Parallel Facility - Roadway Extension, No Sidewalk Existing Interchange Structure to Remain R-12 Parallel Facility - Roadway Extension, Sidewalk on One Side Only New Interchange Structure A-I Eastbound Sacramento/El Dorado County Line to El Dorado Hills Blvd Interchang A-2 Eastbound Bass Lake Rd Interchange to Cambridge Rd Interchange Parallel Facility - Roadway Extension, Sidewalk on Both Sides Freeway Mainline - Auxiliary Lane Cambridge Rd Interchange to Cameron Park Dr Interchange A-3 Fastbound Roadway Widening, 3-Lane, No Sidewalk Cameron Park Dr Interchange to Ponderosa Rd Interchange A-5 Westbound Ponderosa Rd Interchange to Cameron Park Drive Interchange Roadway Widening, 4-Lane, Sidewalk on One Side Only A-6 Westbound Cambridge Rd Interchange to Bass Lake Rd Interchange A-7 Westbound Bass Lake Rd Interchange to Silva Valley Pkwy Interchange Roadway Widening, 4-Lane, Sidewalk on Both Sides 2 Miles A-8 Westbound El Dorado Hills Blvd Interchange to Sacramento/El Dorado County Line

Phasing of Improvements



Phasing of Improvements



Highway 50 Level of Service

- John Long, P.E., T.E., Principal DKS
- Andrew Brandt, P.E., Deputy District Director for Maintenance and Traffic Operations – Caltrans

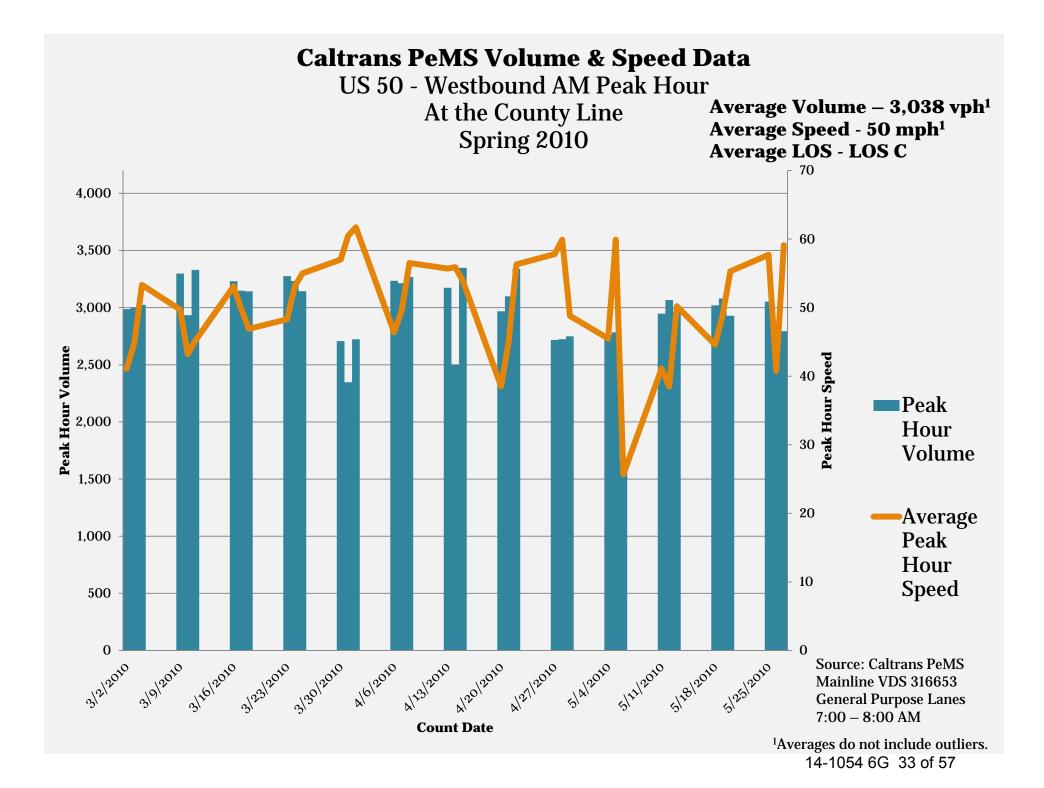


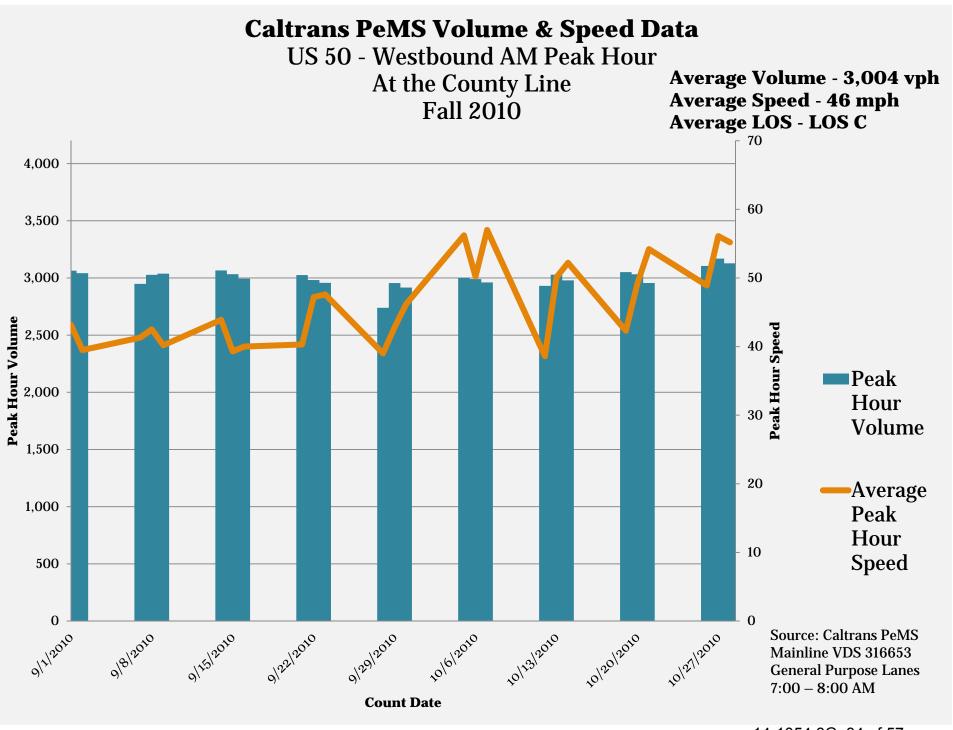
Caltrans Traffic Data

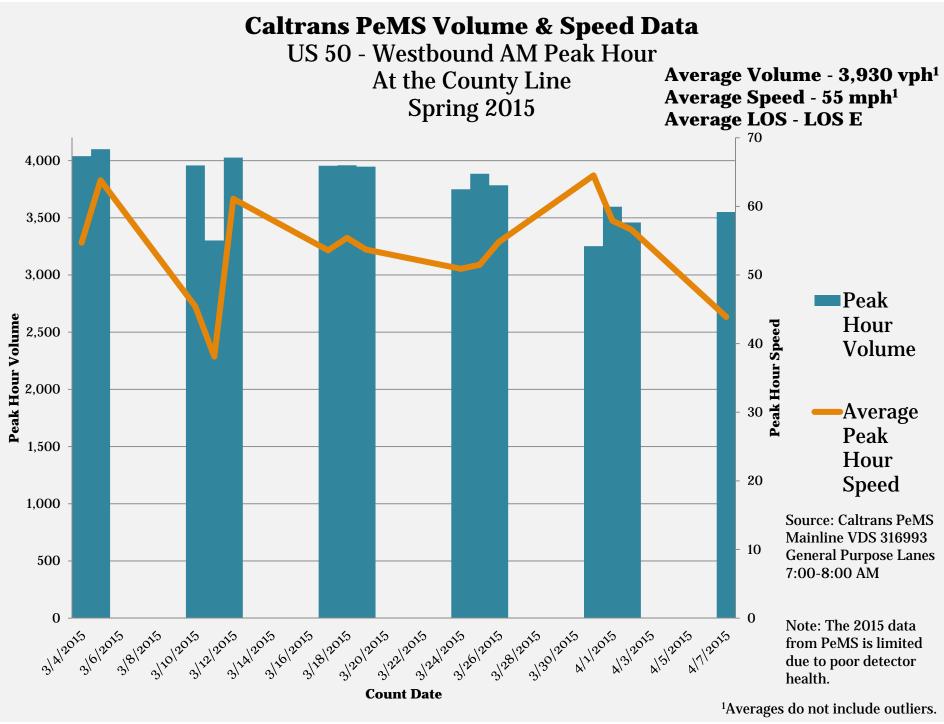
- For decades, Caltrans has relied on traffic census program:
 - Typically each location counted every 3 years with sample counts throughout year to estimate volumes
 - "Peak hour" represents estimate of heaviest traffic flow
 - For urban and suburban areas, the peak hour normally occurs on weekdays between 7 to 9 AM or 5 to 7 PM.
 - On roads with large seasonal fluctuations in traffic, the peak hour is the hour near the maximum for the year but excluding a few (30 to 50 hours)
- Over the last 10 years, Caltrans has worked hard at implementing a large number of permanent count stations that can provide year-round traffic volume and speed data
- Caltrans has a permanent count station at the County Line

Existing Traffic Data – US 50 at County Line

- County line permanent count station provides traffic count and speed data by travel direction by 5 minute periods for 24-7 and 365 days
- Based on County policy, counts should reflect "typical weekday" conditions
- Best practice for a typical weekday is:
 - Tuesday, Wednesday, Thursday
 - With schools in session and away from holidays
 - March, April, May, September and October
- Data from County Line was compiled for those days in 2010 and 2015

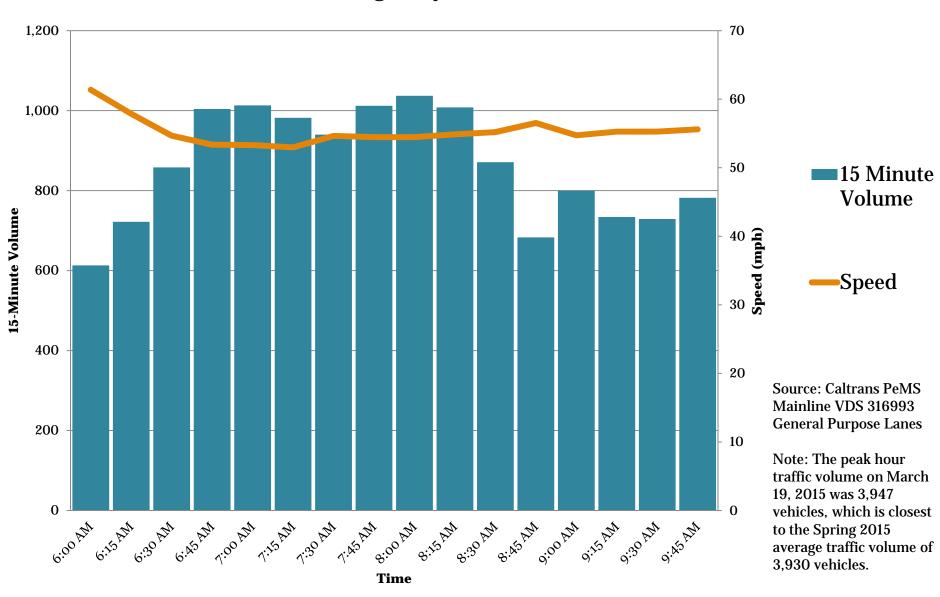






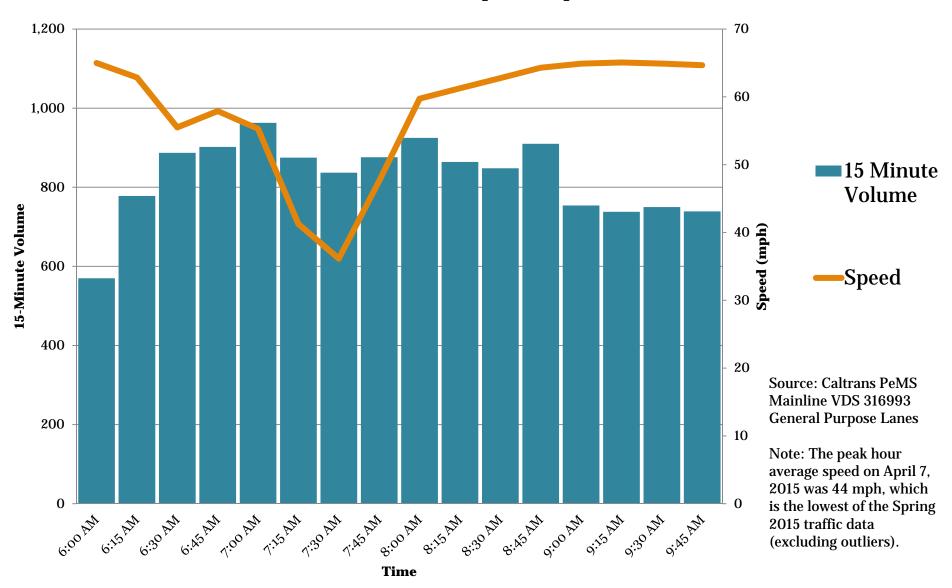
Caltrans PeMS Volume & Speed Data

US 50 - Westbound AM Peak Hour At the County Line Average Day - March 19, 2015



Caltrans PeMS Volume & Speed Data

US 50 - Westbound AM Peak Hour At the County Line Lowest Peak Hour Speed- April 7, 2015



Existing Traffic Data – US 50 at County Line

 Data from County Line count station for typical weekdays indicate typical fluctuation of volumes and speeds

AM Peak Hour Westbound Traffic Data			
Year	Avg. Volume	Avg. Speed	Avg. LOS
2010	3,000 vph	46-50	С
2015	3,900 vph	55 mph	E

 Data from County Line count station is consistent with calculated levels of service using Highway Capacity Manual (HCM) and observed conditions

Caltrans Volumes from 2014 TCR/CSMP

- Caltrans reports a volume of 4,590 for peak hour at the County line
- Peak hour volume of 4,590 is higher than PeMS count data from County line station - for multiple "typical weekdays"
- Volume is thus not appropriate for use in the TIM Fee Nexus Study

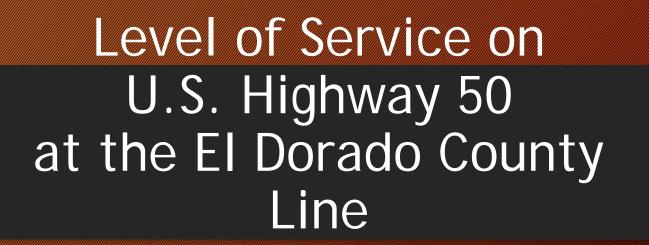
Caltrans Participation

- Peer Review of TDM resulting in its acceptance
- Review of assumptions for existing and future LOS
- Provided volume data used for Highway 50 for existing conditions used for the Major CIP and TIM Fee Update

July 5, 2016 Caltrans letter to El Dorado County related to the Major CIP and TIM Fee Update states:

"We agree with the traffic analysis methodology, traffic analysis assumptions, and associated analysis results for US 50 for the existing and future scenarios."

**Important to note that Caltrans is involved with project-level studies from the County, including all relevant development projects and County CIP projects. The County and Caltrans will continue to coordinate.



Volume Data used in CSMPs/TCRs

- Traffic volumes used in CSMPs/TCRs are from traffic counts provided by the Caltrans Traffic Census Program: http://www.dot.ca.gov/trafficops/census/
 - Both AADT and Peak Hour Volumes are used
 - Highest volume within freeway segments are reported and used for analysis
- These volumes are used because:
 - Volumes are provided for all Freeways/Highways in the State
 - Eliminates ambiguity of selecting an applicable volume for analysis
 - Volumes are available to the public

Volume Data used in CSMPs/TCRs

The Peak Hour Volumes from the Volumes Book

- Provides an estimate of the "peak hour" traffic at all points on the state highway system.
- This value is useful to traffic engineers in estimating the amount of congestion experienced, and shows how near to capacity the highway is operating
- A few hours each year are higher than the "peak hour", but not many.
- In urban and suburban areas, the peak hour normally occurs every weekday, and 200 or more hours will all be about the same.
- On roads with large seasonal fluctuations in traffic, the peak hour is the hour near the maximum for the year but excluding a few (30 to 50 hours) that are exceedingly high and are not typical of the frequency of the high hours occurring during the season.

Volume Data used in CSMPs/TCRs

AADT from the Volumes Book

- Annual average daily traffic is the total volume for the year divided by 365 days.
- Very few locations in California are actually counted continuously.
- Traffic Counting is generally performed by electronic counting instruments moved from location throughout the State in a program of continuous traffic count sampling.
- The resulting counts are adjusted to an estimate of annual average daily traffic by compensating for seasonal influence, weekly variation and other variables which may be present.
- Annual ADT is necessary for presenting a statewide picture of traffic flow, evaluating traffic trends, computing accident rates, planning and designing highways and other purposes.

Other Data used in CSMPs/TCRs

- Directional Splits (D%) are also provided by the Caltrans Traffic Census Program
 - Not enough data for every segment so the D% from the nearest segment is used
 - In some cases where no data is available, the highest D% within the peak period from PeMS is used
- PeMS data is used for:
 - Daily and Peak Hour Delay
 - Daily and Peak Hour Vehicle Miles Traveled
 - Bottleneck Data
 - Average Peak Hour Speeds

Level of Service Calculations in CSMPs/TCRs

- Highway Capacity Manual 2010 is used
 - Level of Service defined by Density, not Speed
- Uniform process for every highway/freeway segment
- The analysis does not specify direction (EB/WB)
- In this case, the volumes book peak hour volumes and directional split were high, leading to a directional peak hour volume that was higher than observed counts.

Level of Service Calculations in CSMPs/TCRs

- Caltrans is looking to update the LOS methodology for future planning documents
 - Possibly incorporating some of the methodology El Dorado County CIP/TIM analysis
- Based on updated PeMS Volumes, U.S 50 currently operates at LOS E

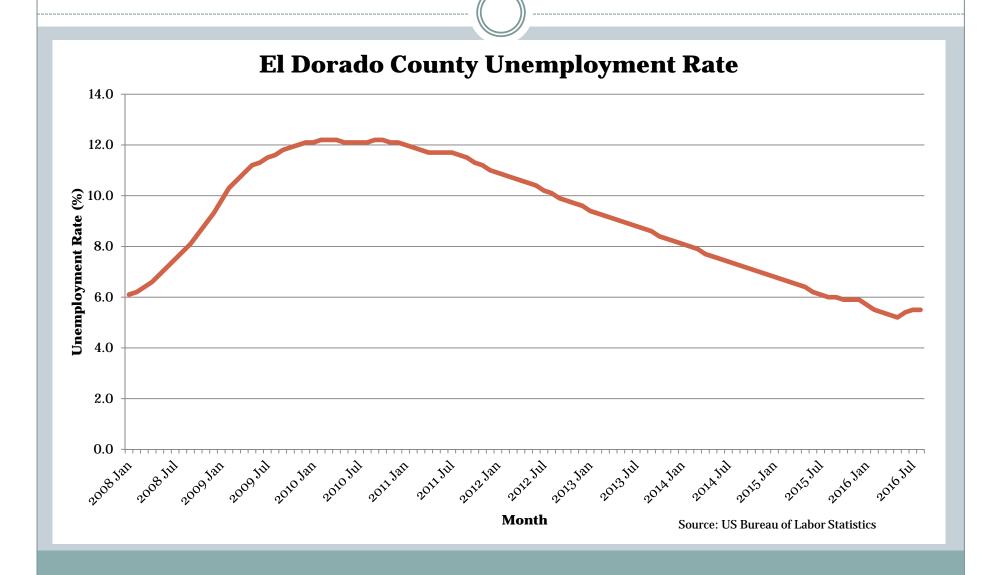
Future

- Senate Bill 743 Caltrans is shifting its focus for our Local Development-Intergovernmental Review program from auto delay based metrics to those focused on reducing Vehicle Miles Traveled (VMT).
- Technical comments may still be provided related to Level of Service on the State Highway System for documents shared with us for our review, but our primary focus of letters and requested mitigation will be to reduce project generated VMT

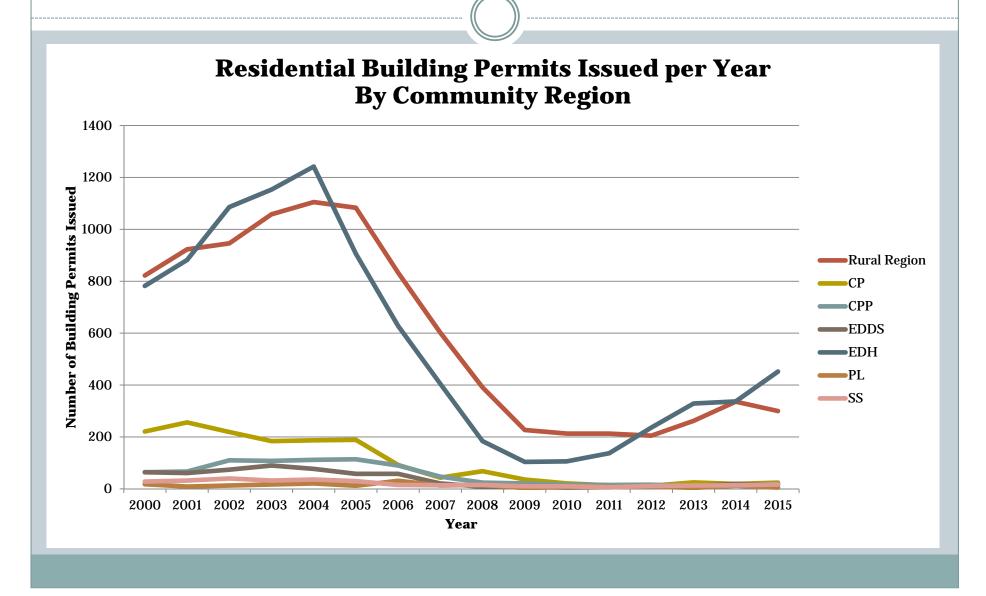
Why doesn't public perception match the technical calculations?

- People tend to remember the worst days
- Fluctuations in traffic volumes & speed
 - Incidents, work zones, weather, school schedules, special events, seasonal attractions, heavy vehicles, platooning, etc.
- Level of Service is calculated for the entire hour, not for a single point in time
- American Society of Civil Engineers (ASCE) research shows that certain LOS grades are difficult for the general public to identify and
- Perception varies from person to person

Why have traffic levels increased?



Why have traffic levels increased?



What is the County doing to prevent LOS F at the County Line?

Recent Projects

- 2010 HOV Lanes
- 2011 El Dorado Hills Blvd Interchange Improvements
- 2016 Silva Valley Pkwy Interchange
- 2016 Carson Crossing Drive

Future Projects

- Adjust ramp metering rate (Caltrans)
- Saratoga Way Extension
- White Rock Road Widening
- Auxiliary lanes on US 50
- Green Valley Road Widening (City of Folsom)

What is the County doing to prevent LOS F and improve roads throughout the County?

Traffic Operations

- Annual Traffic Count Program
- Intersection Needs Prioritization Process
- Regular TDM Updates
- Annual and Major Updates to CIP and TIM Fee Program
- CIP Projects
 - 24 projects in Construction
 - 31 projects in Planning, Design, or ROW Phases

Other Monitoring Programs

- Pavement Management Program
- Annual Accident Location Survey
- Traffic Advisory Committee
- Maintenance Requests

General Plan Assumptions

On page 5 under the PLAN ASSUMPTIONS of the 2004 El Dorado County General Plan A Plan for Managed Growth and Open Roads; A Plan for Quality Neighborhoods and Traffic Relief, assumption #7 Traffic Level of Service states:

"In determining what levels of growth-related traffic are acceptable, the Plan balances a number of competing considerations. If the County sized its roadways solely to guarantee the smooth flow of traffic during limited peak periods in which commuter trips push traffic to maximum levels, one result would be the need to modify many rural two-lane roads by adding new lanes, thereby reducing the rural character of the affected adjacent lands. Such modifications would also entail enormous expense, while generating benefits only realized during limited periods. In addition, County revenue financing mechanisms, such as user fees in the form of gasoline tax or a road benefit assessment, are limited. In light of these considerations, the Plan has been designed to match any increases in the size of roadways to those necessary to meet the Level of Service and concurrency policies included in the Transportation and Circulation Element."

Public Workshop on October 10, 2016

- A public workshop was held at the El Dorado Hills Fire station on October 10, 2016 at 6:30 PM
- It was well attended with approximately 30 members of the public, three Board members, a Caltrans Deputy Director, three consultants, and six County staff members
- A power point presentation similar to this one was made by County staff, Caltrans and the consultants
- Comments and questions were encouraged
- County staff received one comment card that evening, five comment letters and a copy of the video of the meeting was requested and subsequently provided
- The response to the comments received is attached to the staff report

Some common public questions or comments

- What was the purpose of this workshop?
- What is the Level of Service on Highway 50?
- Why isn't Level of Service based on speed?
- Why is the unemployment rate unlikely to drop significantly in the future?
- What is the funding for the current year Capital Improvement Projects?
- Why does the County only use "typical days" for data collection?
- How does the County address traffic that is not within their control, such as Folsom's contribution on Highway 50?
- Do any jurisdictions build roadways for accidents?

