



Memorandum

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Cc: Steve Kooyman, P.E.  
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Date: December 8, 2011

Subject: Technical Memorandum #1 – Review of Existing Models and  
County’s GIS

As part of efforts to fully understand El Dorado County’s options for updating their existing travel forecasting process, Kimley-Horn and Associates, Inc. (KHA) conducted a review of documentation related to both the existing El Dorado County Model and SACOG’s SACMET model platforms. Although both models are based on the traditional four-step process (Trip Generation, Trip Distribution, Mode Split, and Trip Assignment) they are markedly different, both in terms of their data requirements and operation. In addition, a cursory review of the County’s Geographical Information System (GIS) was completed in recognition that County’s traffic forecast process could likely benefit from greater integration with the County’s existing GIS system.

**Comparison of El Dorado County and SACOG SACMET Models**

A comparative matrix documenting the major elements of these two platforms is provided in the attached **Model Comparison Matrix**. It is important to note that this comparison was based on SACOG’s SACMET platform and not the current SACSIM platform. Although SACOG has indicated that it no longer plans to continue its development of the SACMET platform, it is more similar to the existing El Dorado County model and it is more useful to ongoing discussion regarding the future of the El Dorado Model. The SACSIM model is an activity based model, which is commonly considered to be a more complicated model to develop and operate than a more traditional four step model. In the future it may be worthwhile to consider an activity based model, however for the purposes of this analysis it was not considered.

KHA obtained a copy of the current version of the SACMET model as well as associated future year traffic forecasts from SACOG. Likewise, KHA received

files and future year traffic forecasts from Dowling Associates (Consultant that provides ongoing model support to El Dorado County). For the purposes of comparison, KHA selected 17 locations along major roadways within El Dorado County to review daily traffic volumes for the 2025 planning horizon.

As shown in the attached **El Dorado County Traffic Model – Sample Output** table, there appears to be significant differences between the two models at the selected locations. The following observations are provided based on this limited analysis:

- At eight locations, either El Dorado County or SACOG are projecting 2025 volumes that are less than existing 2010 counts.
- The El Dorado County model forecasts higher 2025 traffic volumes for 13 of the 17 selected segments (an average of 27 percent greater than SACOG). Overall, the 2025 El Dorado County volumes are 16 percent greater than the SACOG forecasts.
- In general, it appears that the El Dorado County model forecasts more traffic (ranging from 6 to 26 percent more) on US-50 than the SACOG model.
- The selected locations exhibiting the greatest difference between forecasted volumes are predominantly arterial roadways with known, planned alignment or alternative route alignments (i.e., Bass Lake Road, Silva Valley Parkway, Cameron Park Drive).

These observations are offered for discussion purposes only, and as pointed out previously are based on a limited number of samples.

### **Traffic Analysis Zones in El Dorado County**

El Dorado County's current model has 318 Traffic Analysis Zones (TAZs) and provides coverage for the entirety of the County. The SACMET TAZ structure from 2007 has a total of 1,528 zones, of which 126 zones are in El Dorado County. The SACMET model does not include coverage of the Tahoe Basin (as the Tahoe Metropolitan Planning Organization has responsibility for this planning area).

KHA understands that County staff had, in 2010, undertaken an effort to update the TAZ structure. KHA received a memorandum dated February 16, 2010 prepared by Fehr & Peers from El Dorado County DOT staff that indicated a revised TAZ structure had been created that had 1,098 zones, with 875 in El Dorado County and 223 in Sacramento County. According to the memo the TAZs had been created based on the following:

- Update the old TAZ system to better align with the County Parcel database, roadway centerline geography, SACMET TAZ geography, and water features
- Input from County Staff
- Input from the members of the Traffic Impact Fee Mitigation Working Group

El Dorado County staff requested the electronic files from Fehr & Peers of this TAZ structure, but it appears, as of the preparation of this memorandum, that an interim work product was provided instead of the final product (materials provided via FTP from an email dated November 10, 2011). Interestingly the TAZ structure that was received had 934 zones with the highest identification number being 1,534. The authors of this memo have heard anecdotal stories of a “1,500+” zone system and wonder if this in fact is that zonal system. As such it is likely that many people misunderstand that the numbering scheme does not necessarily correspond to the number of zones and as such are under the impression that a 1500+ zone system exists (which may not be the case). It should be noted, that this is purely the speculation of the authors of this memorandum.

### **Geographical Information System (GIS) and Transportation Modeling**

El Dorado County has a sophisticated modern GIS system. It is maintained by the Surveyor’s department which among other things is responsible for maintaining computerized maps of parcels, roads, and political jurisdictions in El Dorado County. The system has approximately 50 layers and utilizes industry standard ESRI products. Based on interviews conducted with County staff the following was also determined:

- GIS data is frequently updated, sometimes multiple times a day, and existing GIS layers are current.
- Existing server storage and capabilities should be more than adequate to meet the needs of a typical travel forecast model. It was also indicated that there were no known network limitations that would make it difficult for DOT staff to utilize modeling/GIS applications.
- There are approximately 35 active licenses for ESRI software products. Additionally, a viewing application is available for additional installs.
- The primary user of GIS information is currently the Assessor’s Office.

The current El Dorado County model does not utilize GIS. Although the TAZ layer is available as a GIS layer from El Dorado County, it is not a functional aspect of the actual operation of the model. As such the existing TAZ layer’s primary value is for the purpose of mapping and other visual depictions unrelated to the actual forecasting process. The existing model platform, MINUTP, a

Citilabs product was not developed with GIS compatibility. Citilabs did not introduce full GIS compatibility until about 2006 as part of its CUBE platform. No other current GIS layers have a direct relationship to the exiting travel demand model.

As the County contemplates the development of its next generation model, GIS will likely be an integral part. Accordingly, several GIS layers from among the approximately 50 available layers will be critical to the development of the model, including the following:

- Roads
- Road Names
- Traffic Analysis Zones

These layers will likely be copied and subsequently renamed and edited to fit the specific requirements of the model. For example, the Roads layer will need to be reduced to include only those roadways that will be modeled and will need to have numerous attributes such as capacity and number of lanes (and others depending on the specific design of the model) associated with it to function as part of the model. Additionally, it will be desirable to have traffic count data associated with the model network layer for the purpose of calibration, validation or other comparative analyses. Ideally traffic count data should be uploaded on a regular basis to GIS. A GIS based model will likely result in several new layers, including:

- Model Network
- Traffic Analysis Zones (revised for updated model)
- Numerous outputs (for example 2025 forecast)

Numerous other layers will be of value during the associated land use forecast process and for the purposes of mapping output, including:

- Aerials (SID format 2006)
- Community Regions
- Land Use
- Market Regions
- Parcel Data
- TIM fee zones
- Multi family unit database (not a GIS layer, but it is understood that it can be linked to the parcel database).

Assuming the model is constructed on the basis of parcels, alternative scenario runs will require that the Parcel Data also be identified as a critical layer.

### Model Comparison Matrix

	El Dorado County	SACOG SACMET
<b>Source Document</b>	El Dorado Travel Demand Forecasting Model Development Report, October 1999, Fehr & Peers Associates, Inc.	Model Update Report, Sacramento Regional Travel Demand Model Version 2001 (SACMET 01), 2002, DKS Associates
<b>Software Platform</b>	MINUTP (supported by Citilabs but no longer available for purchase)	CUBE (a Citilabs product)
<b>GIS Compatibility</b>	No	Yes with binded ESRI product.
<b># of TAZs</b>	319 covering the entire County	1,528 (126 covering El Dorado County with the exception of the Tahoe Basin)
<b>Trip Generation</b>	<ul style="list-style-type: none"> <li>▪ Utilizes linear equations (trip generation rates) for 2 residential categories of land use (single family and multifamily)</li> <li>▪ Utilizes linear equations (trip generation rates) for 3 non-residential trip rates (retail employment, service employment, other employment).</li> <li>▪ Based on 3 trip purposes (Home-based Work, Home-based Other, and Non-Home-based).</li> </ul>	<ul style="list-style-type: none"> <li>▪ For residential, utilizes a sophisticated cross classification model based on household data including persons, workers, income, and auto ownership.</li> <li>▪ For non-residential, utilizes 5 categories of employment (manufacturing, office, retail, medical, education, other). Two types of school enrollment: K-12 and college are also used.</li> <li>▪ Based on 8 trip purposes (Home-based work, Home-based Shop, Home-based School, Home-based Other, Work-Other, Other-Other, 2 Axel Commercial, 3+ Axel Commercial)</li> </ul>
<b>Trip Distribution</b>	Gravity models using friction factors	Gravity models using friction factors for all purposes except Home-based Work which utilizes a nested destination/mode choice model.
<b>Mode Split</b>	Does not include a mode choice model, instead factors are applied to person-trips to reflect the impact of transit. This option was originally selected based on the model purpose and limited usage of transit.	Extensive mode choice models. Includes a system of four independent logit models and considers 7 modes (drive alone, shared ride-2, shared ride-3+, transit-walk access, transit-drive access, walk, and bicycle).
<b>Trip Assignment</b>	The standard volume delay function included in MINUTP was modified to steepen the volume-delay curve based on Consultant experience	User-equilibrium with the adaptation that single occupant vehicles cannot use high occupancy vehicle (HVO) facilities.

El Dorado County Traffic Model - Sample Output

	Road	Location	Count Source 2010	Count 2010	EDC 2025	SACOG SACMET 2025	EDC/SACOG Dif		EDC Annual Growth Rate	SACOG SACMET Annual Growth Rate
							Absolute	%		
1	Bass Lake Road	south of Serrano	EDC DOT	9,832	12,800	5,100	7,700	60%	2%	-4%
2	Salmon Falls Road	north of Lakehills	EDC DOT	2,707	6,000	2,700	3,300	55%	5%	0%
3	Missouri Flat Road	between Green Valley and El	EDC DOT	7,442	6,400	3,300	3,100	48%	-1%	-5%
4	Silva Valley Parkway	south of Green Valley	EDC DOT	7,308	10,200	5,300	4,900	48%	2%	-2%
5	Cameron Park Drive	south of Meder	EDC DOT	16,720	20,800	13,700	7,100	34%	1%	-1%
6	Pleasant Valley Road	east of Greenstone	EDC DOT	6,630	13,100	9,100	4,000	31%	5%	2%
7	US-50	east of Greenstone	Caltrans	46,000	70,200	52,000	18,200	26%	3%	1%
8	Latrobe Road	south of White Rock	EDC DOT	8,075	57,300	42,600	14,700	26%	14%	12%
9	Green Valley Road	between Bass Lake and Cambridge	EDC DOT	10,458	21,300	15,900	5,400	25%	5%	3%
10	White Rock Road	east of Sac County line	EDC DOT	8,072	7,900	5,900	2,000	25%	0%	-2%
11	US-50	east of Bass Lake	Caltrans	62,000	123,500	103,300	20,200	16%	5%	3%
12	SR-49 (South)	south of Pleasant Valley	Caltrans	9,600	9,900	9,200	700	7%	0%	0%
13	US-50	west of EDH/Latrobe	Caltrans	93,000	131,200	123,000	8,200	6%	2%	2%
14	Pleasant Valley Road	west of Big Cut	EDC DOT	12,251	13,000	14,000	-1,000	-8%	0%	1%
15	Green Valley Road	east of Sac County line	EDC DOT	24,739	28,300	31,000	-2,700	-10%	1%	2%
16	SR-49 (North)	north of Middletown	Caltrans	4,700	5,300	7,000	-1,700	-32%	1%	3%
17	El Dorado Hills	north of Serrano	EDC DOT	22,569	20,500	28,400	-7,900	-39%	-1%	2%

Note: The El Dorado County Model has not had any post processing applied

Note: Shading denotes future traffic forecasts less than 2010 counts