Kern Council of Governments

AGENDA
KERN REGIONAL
TRANSPORTATION MODELING COMMITTEE (TMC)

A sub-committee of Transportation Technical Advisory Committee (TTAC)
(merged with the Kern Climate Change Task Force in May 2010)

KERN COG BOARD ROOM — WEDNESDAY
1401 19TH STREET, THIRD FLOOR — July 25, 2012
BAKERSFIELD, CALIFORNIA — 9:00 A.M.
WEB SITE: http://www.kerncog.org/cms/agendas-minutes/transportation-modeling
PARKING: All-day free parking in the unmarked spaces of the garage located at 19th and L Streets. This is an open meeting; local government planning, public works staffs are encouraged to attend.
DISCLAIMER: This agenda includes the proposed actions and activities, with respect to each agenda item, as of the date of posting. As such, it does not preclude the Committee from taking other actions on items on the agenda which are different or in addition to those recommended.

I. Introductions/Sign-in Sheet

II. Meeting Notes from June 27, 2012 – See *Attachment* – Approve

III. Regional Planning Advisory Committee – Meeting notes from the July 3, 2012 RPAC *See Attachment*. – Information

IV. Socio-Economic Data Development (Raymond) – Information

V. Land Use Urban/Built area update (Heimer) - Approve

VI. New Transportation Model Development (Ball) – Information

VII. SCS Scenarios Development (Hightower) – Information

VIII. Initial Comparison of San Joaquin Valley Portion of Kern to Countywide (Ball) – Information

IX. Land Use Model Update M24 (Raymond) – Information

X. Model Improvement Program Timeline and Valley Coordination (Ball) – Information

XI. Kern COG Modeling Activity Report (Liu/Flickinger) – Information

XII. Regional Traffic Count Program (Heimer/Flickinger) – Information

XIII. Other Business/Schedule Next Meeting – **Wed., August 23, 2012** 9:00AM at Kern COG

XIV. Adjourn

Kern Council of Governments

Kern Regional Transportation Modeling Committee (TMC)
A Subcommittee of the Kern COG TTAC

Meeting Notes
June 27, 2012

I. Members Present:

Brian Blacklock	County of Kern Roads
Steve Young	County of Kern Roads
Warren Maxwell	County of Kern Roads
Mike McCabe	City of Delano
Wayne Clausen	City of Shafter
Sue George	City of Taft
David Berggren	Caltrans
John Ussery	City of Bakersfield
Ed Murphy	City of Bakersfield
Karl Davisson	City of Bakersfield

Staff Present:

Vincent Liu	Kern Council of Governments
Troy Hightower	Kern Council of Governments
Ed Flickinger	Kern Council of Governments
Ben Raymond	Kern Council of Governments
Rob Ball	Kern Council of Governments
Rochelle Invina	Kern Council of Governments
Michael Heimer	Kern Council of Governments

II. Meeting Notes from May 23, 2012 – Approved.

III. Regional Planning Advisory Committee – Information. Minutes from the June 6, 2012 meeting were available for committee review.

IV. Land Use Model Scenarios Discussion – Reviewed updated SCS development Worksheet. There is still little difference between most scenarios and the Base (2035). The Combined Scenario had the most improvement. The committee discussed the ARB targets. Informed committee that other COG's have found the MIP model to be more sensitive to the scenarios than the existing models. Kern COG Staff plans to begin converting scenario datasets to run using the MIP model. A follow-up meeting occurred with some of the TMC members including Karl Davisson from the City of Bakersfield. The conclusion was to use the Traffic Impact Fee Core area as an attraction for the model. Karl has supplied GIS shape files for that Core area. In addition, members requested that we develop a new scenario where we increase the model input parameters from using the medium average density to the maximum density allowed for in the Metro General Plan. Information.

V. Revised 2014 RTP/SCS Development Timeline – Would like to adjust vehicle occupancies and increase van pooling. Scenarios need to be finalized by July.

VI. Model Improvement Program (MIP) Update – Reported that the updated Kern MIP model is now working. Staff is reviewing the recalibration of the updated model. Will be able to improve modeling of non-motorized scenarios and pricing scenarios. **–** Information.

VII. **Kern COG Modeling Activity Report –** Hired consultant for on call support. Initial task will be conversion of socio economic data to new categories. - Information.

VIII. **Regional Traffic Count Program –** Will add locations on Olive Drive East and West of SR 99 to traffic count list. - Information.

IX. **Other Business/Schedule Next Meeting – Wed., July 25, 2012 9:00 AM at Kern COG**.

X. **Adjournment**

KERN COUNCIL OF GOVERNMENTS
REGIONAL PLANNING ADVISORY COMMITTEE

KERN COG CONFERENCE ROOM
1401 19TH STREET, THIRD FLOOR
BAKERSFIELD, CALIFORNIA

TUESDAY
July 3, 2012
1:30 P.M.

Chairman Clausen called the meeting to order at 1:30 p.m.

I. ROLL CALL

MEMBERS PRESENT:	Wayne Clausen	City of Shafter
	Patty Poire	Community Member
	Lorelei Oviatt	County of Kern
	Jim Eggert	City of Bakersfield
	Dennis McNamara	City of McFarland (phone)
	Mike Bevins	City of California City
	Jeff Sorensen	Caltrans District 6 (phone)
STAFF:	Ahron Hakimi	Kern COG
	Rob Ball	Kern COG
	Linda Urata	Kern COG
	Rochelle Invina	Kern COG
	Troy Hightower	Kern COG
	Becky Napier	Kern COG
	Bob Snoddy	Kern COG
	Robert Phipps	Kern COG
OTHER:	Daniel O'Connell	American Farmland Trust
	Cayman Howard	Community Member
	Craig Pope	County of Kern
	Warren Maxell	County of Kern
	Jeff Caton	ESA (Phone)
	Keith Woodcock	Fresno State
	John Taylor	Air Resources Board
	Jennifer Gress	Air Resources Board
	Lucille Van Ommering	Air Resources Board

II. **PUBLIC COMMENTS:** This portion of the meeting is reserved for persons to address the Committee on any matter not on this agenda but under the jurisdiction of the Committee. Committee members may respond briefly to statements made or questions posed. They may ask a question for clarification; make a referral to staff for information or request staff to report to the Committee at a later meeting. SPEAKERS ARE LIMITED TO TWO MINUTES. PLEASE STATE YOUR NAME AND ADDRESS FOR THE RECORD PRIOR TO MAKING A PRESENTATION.

None

III. **APPROVAL OF DISCUSSION SUMMARIES:** Meeting of Wednesday July 3, 2012 and Meeting of May 2, 2012.

There was no quorum, therefore the meeting minutes were unable to be approved. They were tabled until the meeting of August 1, 2012.

IV. REGION ENERGY ACTION PLANS UPDATE (Project Team)

Mr. Caton provided a brief update on the Region Energy Action Plan status.

V. CONSIDERATION OF MEMBERSHIP WITH CAL VANS (Snoddy)

Mr. Snoddy stated that CalVans is a public vanpool service that serves Central California. Mr. Snoddy gave a brief overview of CalVans services. He advised the committee that the Transportation Technical Advisory Committee had recommended that the Transportation Planning Policy Committee approve a membership with Calvans at the upcoming Kern COG Board Meeting on July 19th.

This item was for information only.

VI. SUSTAINABLE COMMUNITY STRATEGY SUCCESS STORIES (Invina)

Ms. Invina stated that the staff report had been presented at the last three RPAC meetings. She went on to inform the committee that to date staff has compiled a total of fourteen SCS success stories that have been submitted by member agencies and staff. The SCS success stories include CMAQ projects and other related SB 375 projects.

Ms. Invina advised the committee that the SCS stories will be submitted to the Air Resources Board at the end of the month to demonstrate what the region is doing to comply with the State climate change goals. Staff requests that committee members submit additional success stories and comments by July 18, 2012.

This item was for information only.

VII. SUSTAINABLE COMMUNITIES STRATEGY SCENARIO DEVELOPMENT UPDATE (Hightower)

Mr. Hightower gave the monthly update of the Sustainable Communities Strategy Scenario Development. The update included that the scenarios modeled have very little reduction in emissions. Mr. Hightower in a slide presentation demonstrated how the current travel model was not sensitive to changes in residential density due to the limits of one housing category in the model. Mr. Hightower explained the new Model Improvement Program (MIP) model that is under development, has up to ten housing categories. This should make the new model much more responsive to density related scenarios and/or housing redistribution scenarios.

A lengthy discussion ensued amongst the committee.

Committee member Lorelei H. Oviatt from the County of Kern recommended that planners identify potential commercial areas located within urban areas and add those areas as attractions in the modeling.

At the conclusion of the discussion, Chairman Clausen gave direction to staff, to focus on developing local strategies for Kern County, in lieu of developing a scenario for the eight county regions.

This item was for information only.

VIII. BLUEPRINT INTEGRATION PROJECT (Napier)

Ms. Napier stated that the Blueprint Integration Project is a program to provide support to the smaller cities (population under 50,000) to integrate Blueprint growth principles into General Plans. Ms. Napier advised that it was suggested at the May 2, 2012 RPAC meeting that the RPAC members in cities with populations under 50,000 pool the resources of the circuit planners to focus on sustainable transportation planning measures that do not change land use. She also advised that the consultant, URS, is meeting next week with the circuit planners to finalize an agreement that will be between the circuit planners and each city to outline expectations and products of the circuit planner project.

This item was for information only.

IX. DISCUSSION SUMMARIES/MEETING UPDATES:

The Transportation Technical Advisory Committee Meeting Discussion Summary of June 6, 2012 was distributed to the Committee.

X. INFORMATION/ANNOUNCMENTS

Ms. Napier announced that a kick-off meeting for the preliminary RTP/SCS will be held on July 10, 2012 in the Kern COG Board Room from 10:30 a.m. to 12:00 p.m. All committee members are welcome to participate.

She stated that there will also be an Environmental Justice Stakeholder meeting on July 10, 2012 from 2:00 p.m. to 4:00 p.m.

Ms. Invina stated that the review committee selected PMC as the consultant for the 2013 Kern Regional Housing Report.

XI. MEMBER ITEMS

Chairmen Clausen stated that at the previous Modeling Committee meeting, COG staff modelers made the request to run scenarios regarding land use. Chairmen Clausen asked Mr. Hightower to request this from the planners at the RPAC meeting.

Mr. Hightower requested that the planners submit any areas that they believe suitable for development or higher densities.

Committee member Jim Eggert from the City of Bakersfield responded by identifying a corridor along Chester Avenue from Brundage Lane to the Garces Circle as an area suitable for modeling higher density development.

XII. ADJOURNMENT

With no further business the meeting was adjourned at 3:25 p.m.

The next meeting will be Tuesday August 1, 2012 at 1:30 p.m.

Kern Council of Governments

July 25, 2012

TO: Kern Regional Transportation Modeling Committee

FROM: Ahron Hakimi
Executive Director

BY: Ben Raymond, Planner II

SUBJECT: AGENDA ITEM IV:
Socio-Economic Data Development

DESCRIPTION:

Discuss the methodology for the socio-economic data development for the land use model and Model Improvement Program (MIP) model. See Attachments.

DISCUSSION:

Background

The existing 2035 spreadsheet data was updated in October 2009.

In early 2010 a major infill project in Metro Bakersfield was identified which moved approximately 750 households and 300 employees to the downtown area.

At the March 2010 TMC meeting Kern COG staff requested the review of mapped socio-economic data by member agencies to identify any areas were previous planning assumptions had changed or new growth might be expected. Through this process the member agencies were able to identify areas that would most likely not be able to reach the household and employment growth by 2035 as shown in the 2035 spreadsheet data. While other member agencies had requested additional households in areas that they expected to see growth but was not shown in the spreadsheet data.

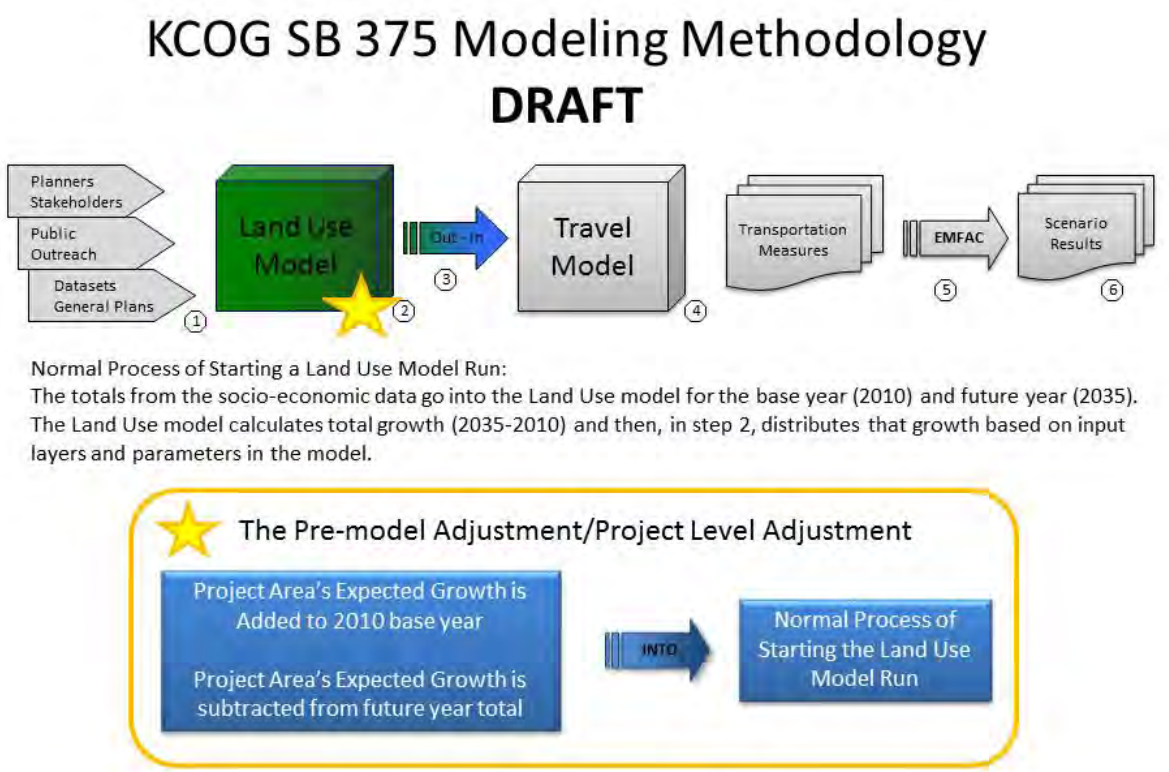
In March 2011 Kern COG received household and population data from the 2010 census. Through a lengthy process, Kern COG staff updated the 2010 forecast year to align with the census data. Closely following the 2010 census update, future years were slightly adjusted to account for growth seen in the 2010 Census that was not shown in the future year data. The census updated socio economic data was reviewed and accepted by the TMC at the December 2011 meeting.

Land Use Model Base Scenario Socio-Economic Data Development

The land use model outputs growth at the TAZ level. The total growth is equal to the future year totals from the existing spreadsheet data minus the 2010 forecast year from the existing spreadsheet. The land use model's TAZ level output is added to the 2010 forecast year data to create the future year totals per TAZ.

The future year data from the land use model is mapped and discussed at the TMC meetings. Based on feedback from the TMC meetings, Kern COG staff refined the input layers of the land use model to reflect the planning assumptions of the member agencies.

Land use model run M18 was presented to the TMC in March 2012 and was accepted, however special planning areas were identified which needed additional households and employment. Kern COG staff developed a pre-model adjustment which places employment and household growth in designated planning areas. The pre-model adjustment uses the same method as the project level adjustment: growth is added to the project area TAZs in the 2010 base year input file; the total employment and household numbers are entered into the land use model; the future year total values are reduced so the model will no longer distribute the growth (since it is already included in the 2010 base year). See below graphic.



When the land use model starts the output step (step 3), it now adds the growth to the adjusted 2010 base year.

MIP Base Scenario Socio-Economic Data Development

The San Joaquin Valley COGs contracted a consulting firm to develop a model improvement program (MIP) which would deliver to each of the COGs a new transportation model that could be more sensitive to trip generators. The new sensitivity of the model will allow the model to be more responsive to SB375 scenarios. One of the improvements in the new model is its ability to use more detailed socio-economic data. The new model uses 21 employment types versus the 6 employment types used by the existing model. The new model uses 10 housing types versus the household category used in the existing model.

The consultants used Kern COG's existing spreadsheet data and redistributed the data amongst the new categories using Census housing data and Census LED data (further details can be found in the model improvement program model documentation).

Using aerial photography and land use data as a background layer under the new socio-economic data categories, Kern COG staff was able to identify and update errors in the new MIP data. The corrected version of the socio-economic data was sent to the consultants and has been included in the new model delivered to Kern COG in July 2012. Comparison Tables and Maps are included in "Attachment 1".

Converting Land Use Model data to MIP format

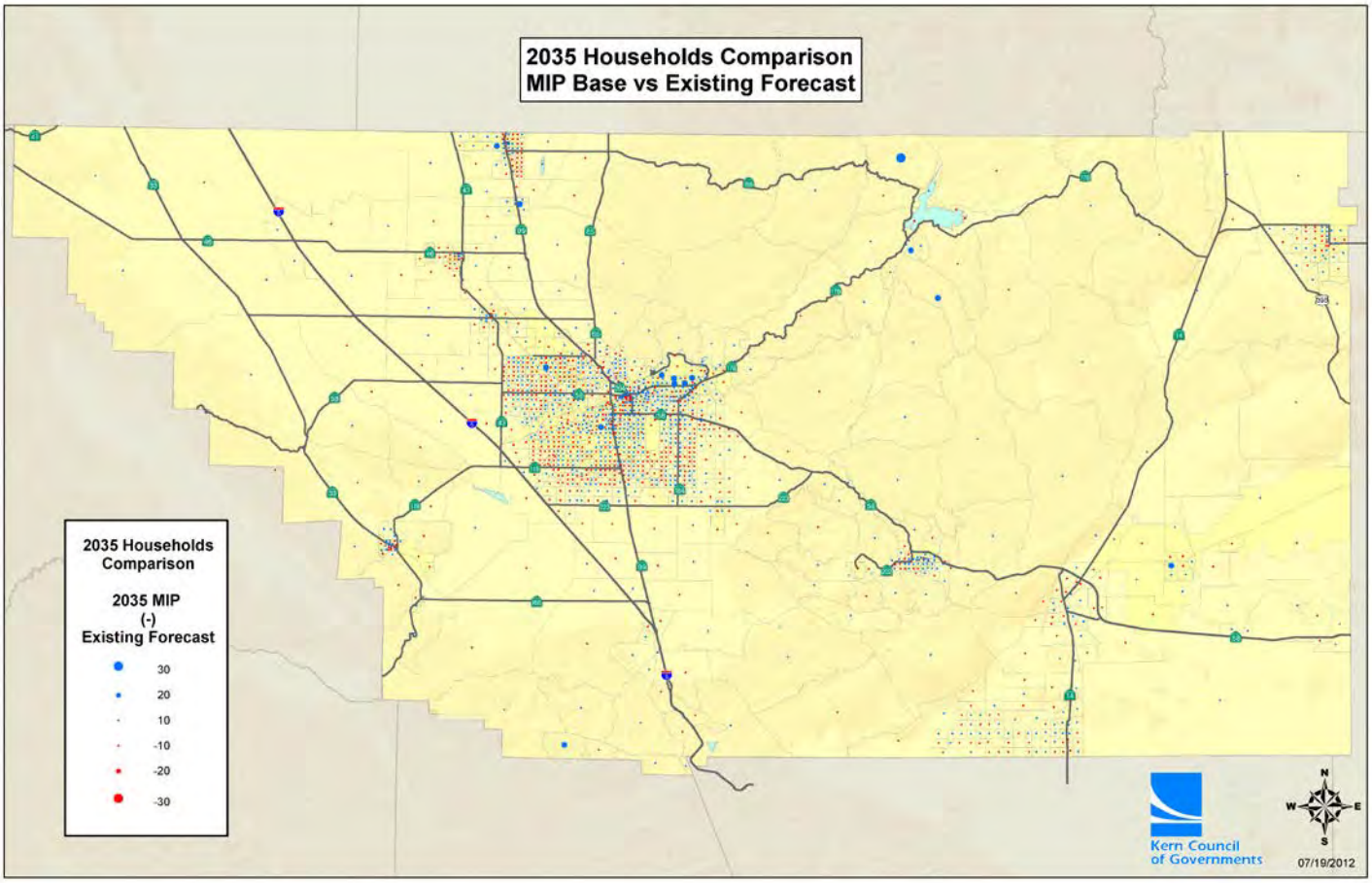
The land use model generates the 6 employment types that are used in the current transportation model. In order to use outputs from the land use model in the MIP model, Kern COG staff created a conversion sheet to convert the employment types into the MIP employment categories. The base MIP employment data is distributed into 21 NAICS (North American Industry Classification System) employment types. The NAICS employment categories were tied to the respective employment categories used in the transportation model. Kern COG staff used California Employment Development Department (EDD) forecasts for Kern County 2040 NAICS employment distribution as a control point for the employment category distribution. Based on the conversion sheet, a script was created to automate the conversion of the land use data from the land use model to MIP format.

Attachments (copies of attachments and model data are available on the Kern COG website)

1. Comparison Tables and Maps: 2035 Existing Forecast vs 2035 MIP Data

ACTION: Information

	2035 Spreadsheet Derived Values						2035 MIP Output Values						Difference Between MIP	
Subregion- and RSA	Total Population	Household Population	Group Quarters	Number of Households	Total Employment	Emp/HH	Total Population	Household Population	Group Quarters	Number of Households	Total Employment	Emp/HH	Number of Households	Total Employment
Westside Kern	**34503**	**26158**	**8345**	**9085**	**15104**	1.7	**39884**	**31683**	**8201**	**9093**	**15092**	1.7	**8**	**(12)**
Greater Taft/Maricopa	34503	26158	8345	9085	15104	1.7	39884	31683	8201	9093	15092	1.7	8	(0)
Delano_McFarland	**91048**	**71899**	**19149**	**17787**	**30355**	1.7	**75928**	**62627**	**13301**	**17892**	**30365**	1.7	**105**	**0**
Greater Delano/McFarland	91048	71899	19149	17787	30355	1.7	75928	62627	13301	17892	30365	1.7	105	0
Wasco	**48000**	**39215**	**8785**	**10725**	**18163**	1.7	**46583**	**37671**	**8912**	**10734**	**18144**	1.7	**9**	**(1)**
Greater Wasco	48000	39215	8785	10725	18163	1.7	46583	37671	8912	10734	18144	1.7	9	(1)
Tehachapi_Frazier	**75437**	**68703**	**6735**	**27964**	**27181**	1.0	**93692**	**87083**	**6609**	**28050**	**27177**	1.0	**86**	**(0)**
Greater Frazier Park	17912	17912	0	7752	7805	1.0	27212	27195	17	7789	7809	1.0	37	0
Greater Tehachapi	57526	50791	6735	20212	19376	1.0	66480	59888	6592	20261	19368	1.0	49	(0)
Metro	**928416**	**918440**	**9976**	**294835**	**304756**	1.0	**899034**	**886450**	**12584**	**295631**	**304591**	1.0	**796**	**(7)**
Greater Arvin	32805	32445	360	7695	5712	0.7	21793	21661	132	7701	5695	0.7	6	(1)
Greater Shafter	61763	57297	4467	15886	36180	2.3	60035	53880	6156	15899	36202	2.3	13	1
Metro - Central	24201	23390	811	9681	39664	4.1	29043	27298	1745	9705	39660	4.1	24	(0)
Metro - N.O.R.	233707	233311	396	80824	83060	1.0	246778	246412	366	80942	83014	1.0	118	(2)
Metro - Northeast	169132	167691	1441	54171	24453	0.5	162031	159988	2042	54440	24433	0.4	269	(1)
Metro - Southeast	184954	183584	1370	51167	41105	0.8	152824	152048	776	51383	41054	0.8	216	(2)
Metro - Southwest	221854	220723	1130	75410	74582	1.0	226529	225163	1366	75561	74533	1.0	151	(2)
Southeast Kern	**75009**	**70475**	**4533**	**26812**	**36978**	1.4	**82573**	**75951**	**6622**	**26875**	**36964**	1.4	**63**	**(1)**
Greater Cal City/Mojave	37969	33677	4292	13395	13087	1.0	44936	38317	6619	13433	13081	1.0	38	(0)
Greater Rosamond	37039	36798	241	13417	23891	1.8	37637	37634	3	13442	23883	1.8	25	(0)
Lake Isabella	**25296**	**25217**	**79**	**12515**	**5727**	0.5	**35025**	**34711**	**314**	**12578**	**5733**	0.5	**63**	**0**
Greater Lake Isabella	25296	25217	79	12515	5727	0.5	35025	34711	314	12578	5733	0.5	63	0
Indian Wells	**43291**	**43093**	**198**	**17476**	**22617**	1.3	**49937**	**49581**	**356**	**17510**	**22608**	1.3	**34**	**(0)**
Greater Ridgecrest	43291	43093	198	17476	22617	1.3	49937	49581	356	17510	22608	1.3	34	(0)
Grand Total	**1321000**	**1263200**	**57800**	**417200**	**460882**	1.1	**1322655**	**1265756**	**56900**	**418363**	**460674**	1.1	**1,163**	**(8)**


2035 Households Comparison
MIP Base vs Existing Forecast
2035 Households Comparison
2035 MIP
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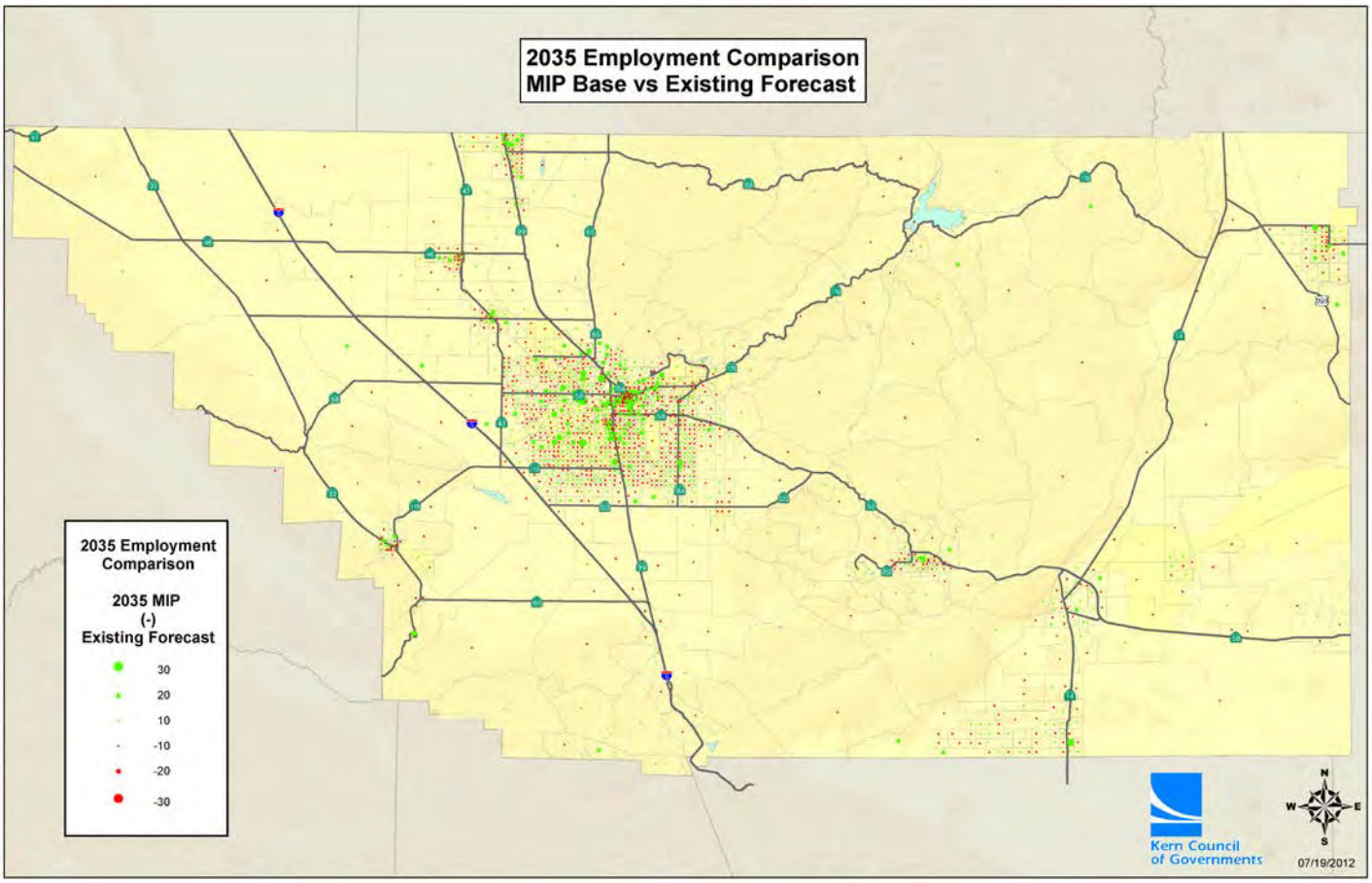
2035 Employment Comparison
MIP Base vs Existing Forecast
2035 Employment Comparison
2035 MIP
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Kern Council of Governments

July 25, 2012

TO: Kern Regional Transportation Modeling Committee

FROM: Ahron Hakimi
Executive Director

BY: Michael Heimer, Planner III

SUBJECT: AGENDA ITEM: V
Land Use Urban/Built Area Update

DESCRIPTION:

Updated versions of the 2005, 2008, and 2010 urban/build area for the UPlan land use model have been created.

DISCUSSION:

Kern COG staff has also developed versions of the urban/built areas for the years 2005, 2008, and 2010 for use with both infill and no-infill scenarios.

The 2005 layers used the 2006 Farmland Mapping and Monitoring Program (FMMP) Urban and Built-up Land classification as a base. Non-urban areas such as holding ponds and agricultural storage yards were removed using 2006 aerial imagery as a reference. Nonagricultural or vacant parcels with an improvement value greater than $5000 and with a structure built on or before 2005 were added. The resulting layer is the "2005 Urban/Built" layer. Using a combination of aerial imagery and assessor's parcel information, vacant lots were removed from the "2005 Urban/Built" layer to form the "2005 Urban/Built Infill" layer.

The 2008 layers used the 2008 FMMP Urban and Built-up Land classification as a base. Non-urban areas such as holding ponds and agricultural storage yards were removed using 2008 aerial imagery as a reference. Nonagricultural or vacant parcels with an improvement value greater than $5000 and with a structure built on or before 2008 were added. The resulting layer is the "2008 Urban/Built" layer. Using a combination of aerial imagery and assessor's parcel information, vacant lots were removed from the "2008 Urban/Built" layer to form the "2008 Urban/Built Infill" layer.

The 2010 layers used the 2010 FMMP Urban and Built-up Land classification as a base. Non-urban areas such as holding ponds and agricultural storage yards were removed using 2010 aerial imagery as a reference. Nonagricultural or vacant parcels with an improvement value greater than $5000 and with a structure built on or before 2010 were added. The resulting layer is the "2010 Urban/Built" layer. Using a combination of aerial imagery and assessor's parcel

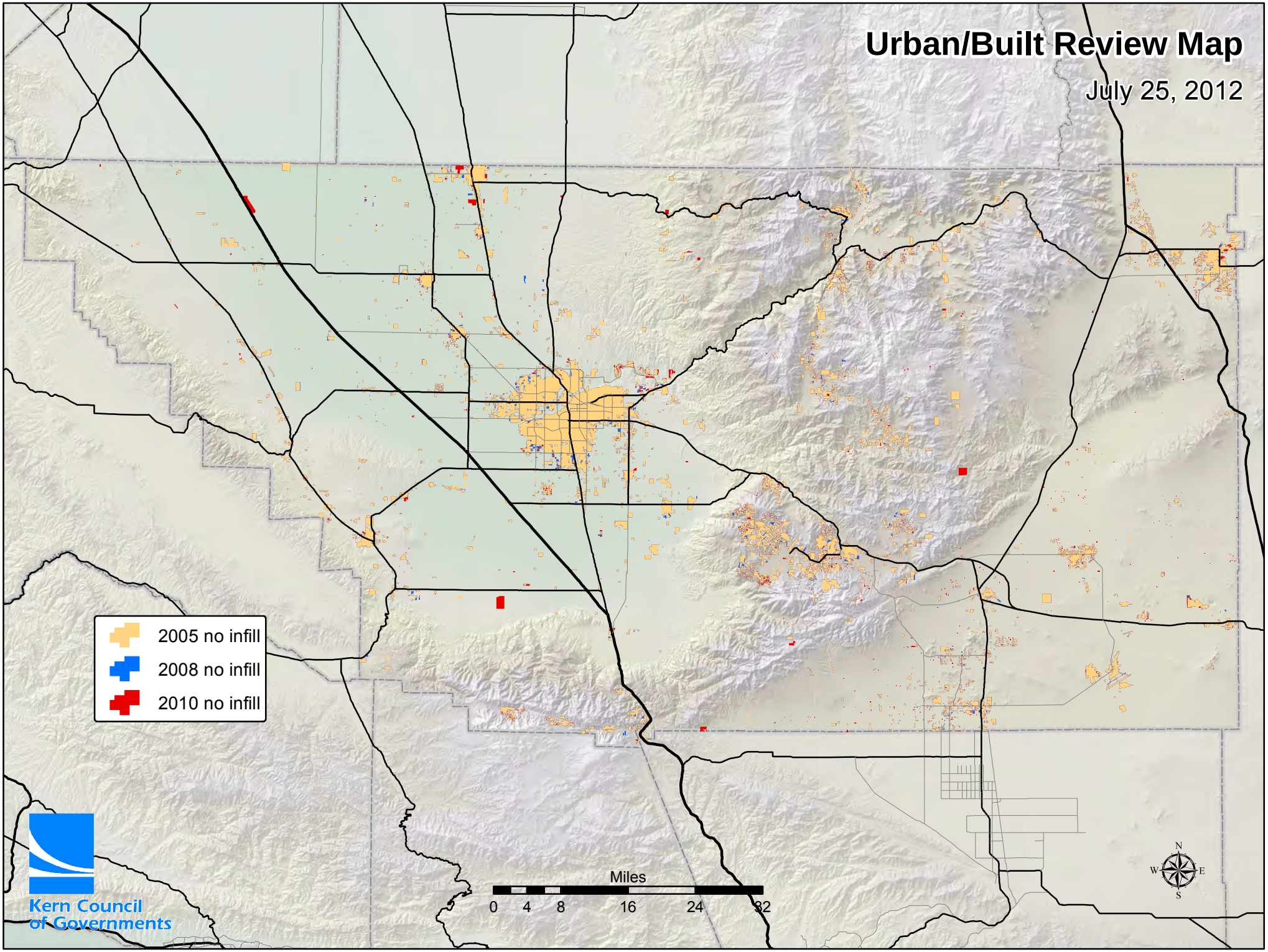
information, vacant lots were removed from the “2010 Urban/Built” layer to form the “2010 Urban/Built Infill” layer.

All layers were cross checked for consistency. Built areas in 2005 will be in 2008 and 2010 unless they have been demolished.

Attachments (copies of attachments and layers are available on the Kern COG website)

1. Urban/Built Area Maps

ACTION: Approve Urban/Built Areas


Urban/Built Review Map
July 25, 2012
2005 no infill
2008 no infill
2010 no infill
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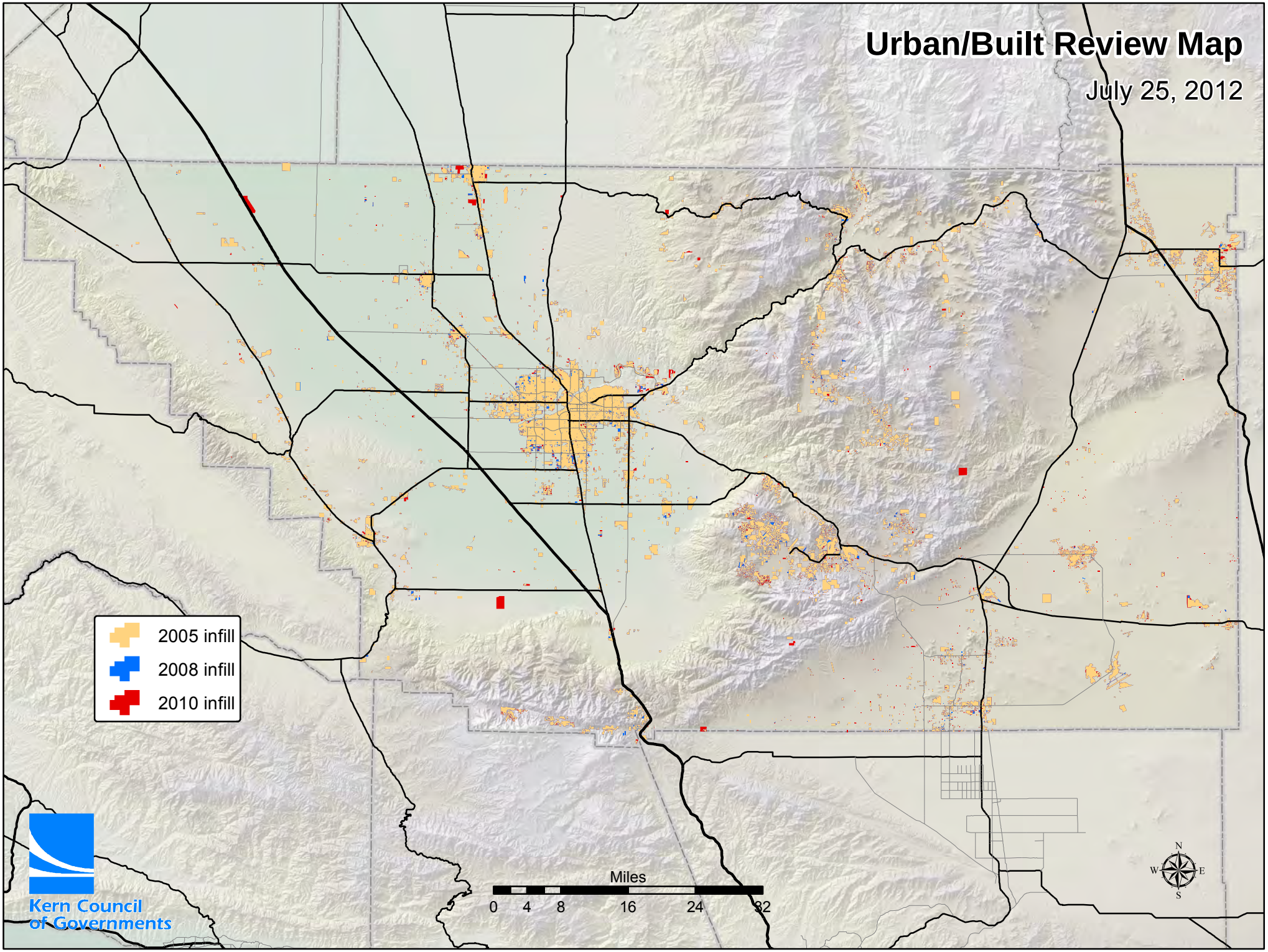
Urban/Built Review Map
July 25, 2012
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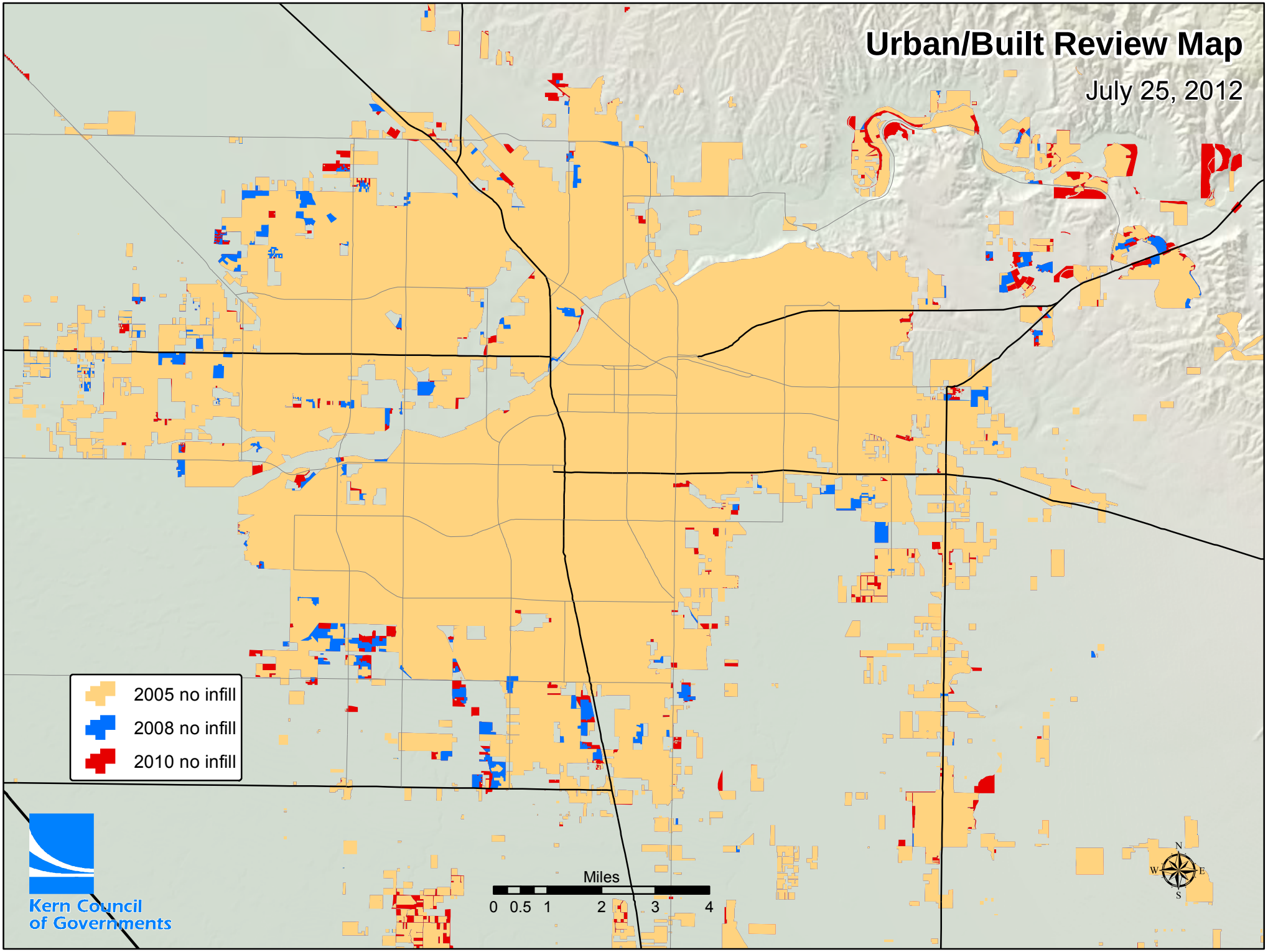
Urban/Built Review Map
July 25, 2012
2005 no infill
2008 no infill
2010 no infill
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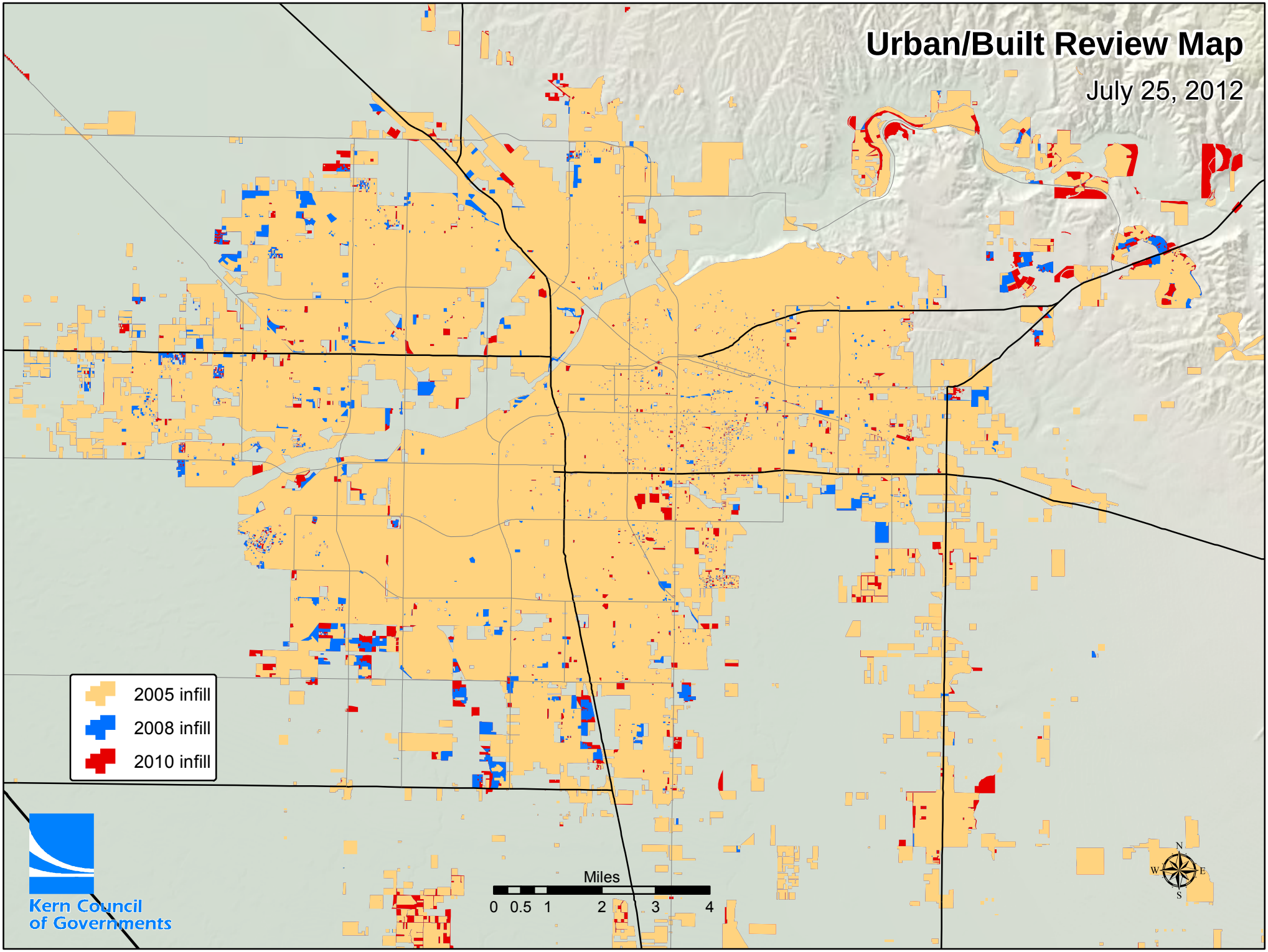
Urban/Built Review Map
July 25, 2012
2005 infill
2008 infill
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Kern Council of Governments

June 25, 2012

TO: Kern Regional Transportation Modeling Committee (TMC)

FROM: Ahron Hakimi
Executive Director

BY: Rob Ball, Director of Planning

SUBJECT: AGENDA ITEM VI.
New Transportation Model Development – Model Improvement Program (MIP)

DESCRIPTION:

In compliance with SB 375, a revised transportation model is being developed to update and demonstrate progress toward state climate change targets.

DISCUSSION:

The new climate change regulation, SB 375, requires the Regional Transportation Plan to contain a Sustainable Communities Strategy for reducing climate change emissions from passenger vehicle travel. This reduction is demonstrated through the use of a transportation model. Transportation models use observed traffic counts, travel surveys, socio-economic forecasts, future roadway improvements, and other inputs to predict vehicle travel.

The new model is being funded through a grant from the California Resources Agency using Proposition 84 bond funds. The grant was awarded to the 8 central California COGs. The new model includes the following features not available in the current Kern COG transportation model that can improve accuracy of modeling vehicle travel.

- Variable travel costs (fuel, operating costs, etc.)
- Increased sensitivity to walk and bike modes
- Increased sensitivity to housing type trip generation rates
- Vehicle availability sub-model
- Improved reporting (breakout of East Kern)

FHWA Model Validation and Reasonableness Checking Manual (1997) recommends that total vehicle miles traveled (VMT) be within 3% of the Highway Performance Monitoring System (HPMS) for areas that in moderate non-attainment or worse for CO_2. Kern is currently in attainment maintenance for CO_2; however it is a good idea to make sure the new model stays close to HPMS observed VMT. The MIP is 2.8% over HPMS VMT in the 2008 base validation year.

Of the 544 counts in the model 62% were within the Caltrans maximum deviation. Additional work is needed to improve the validation of the model with the observed counts. However, it appears that for system level analysis the model should be useable for proposing alternative targets.

Two-Way Volume Model Validation Results 7/12/12

DAILY Assignment		
Model/Count Ratio =	**0.96**	
Percent Within Caltrans Maximum Deviation =	**62%**	> 75%
Percent Root Mean Square Error =	**55%**	< 40%
Correlation Coefficient =	**92%**	> 0.88
%of Screenlines Within Caltrans Standard Dev. =	**100%**	100%
Externals M/C Ratio =		
Externals % RMSE =		
Total Count	544	
Link Within Deviation	337	
Link Outside Deviation	207	

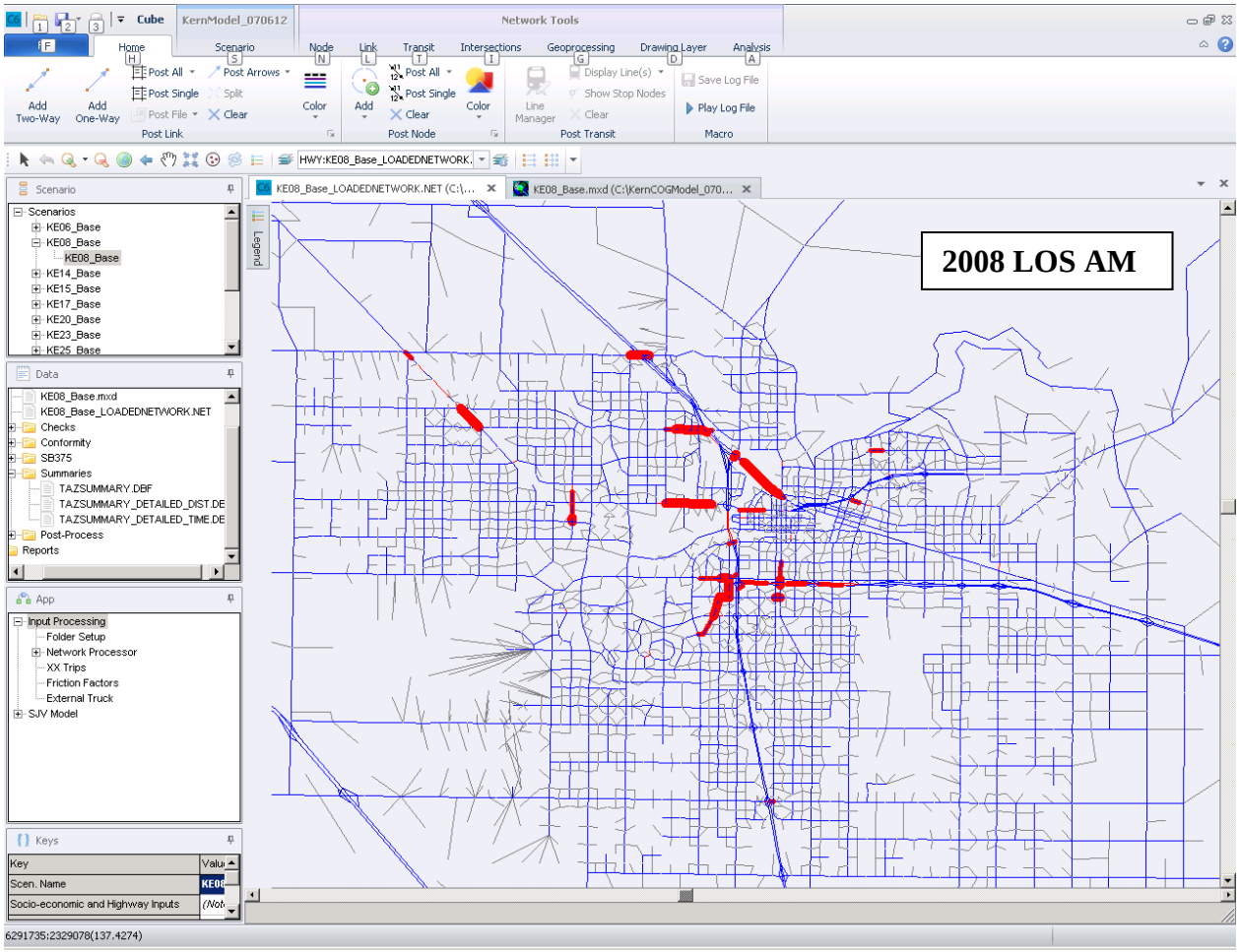
The 2035 MIP base run is currently 13% lower VMT that the previous model validated in 2006. Attached are outputs from the model that show reasonable level of service (LOS) results considering the lower VMT. Also attached is a high level summary of improvements to the model.

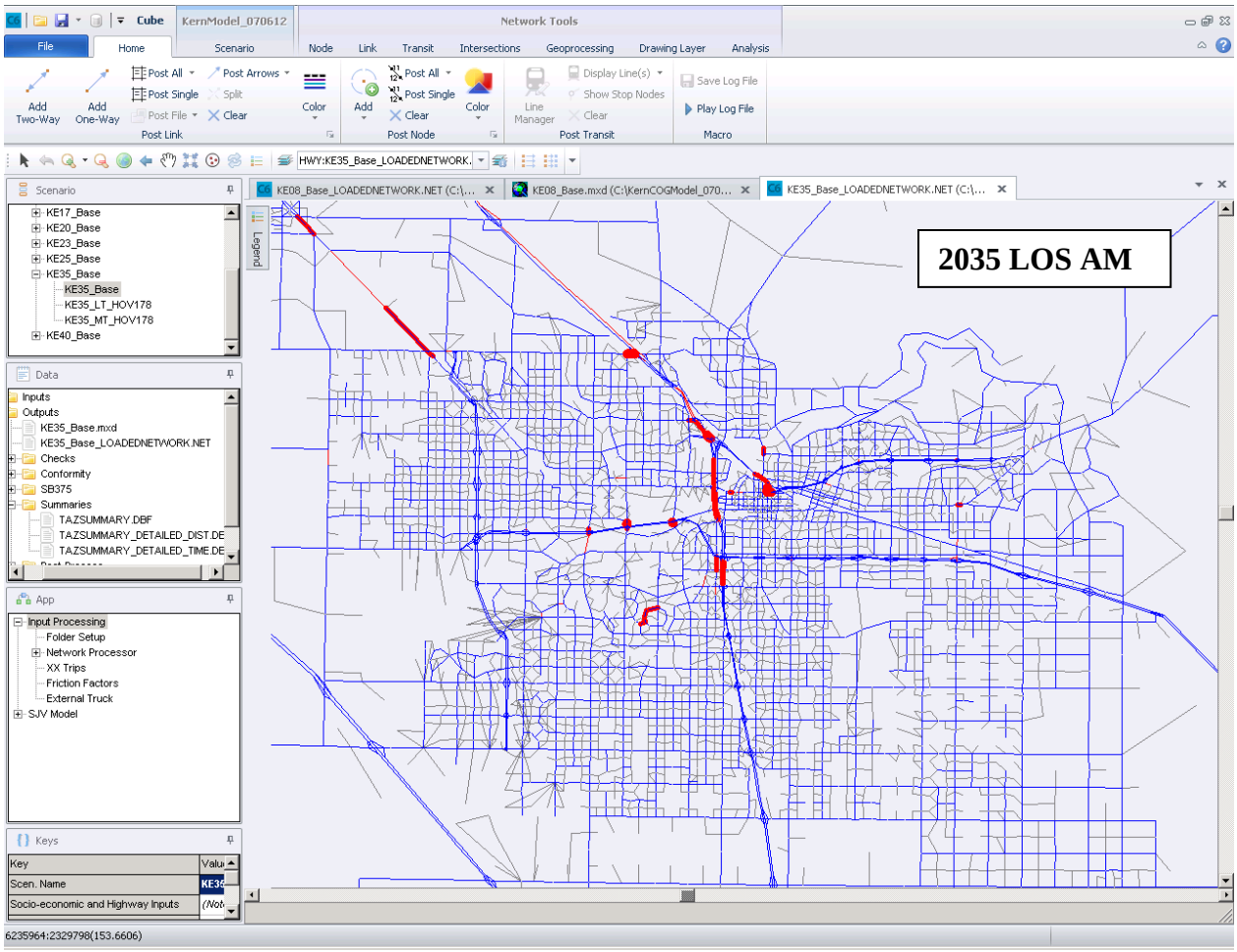
Attachments

1. Model outputs of LOS results
2. Executive Summary for the Eight San Joaquin Valley MPO Traffic Models to Meet the Requirements of SB 375

ACTION: Information

Attachment 1





Attachment 2

Executive Summary for the Eight San Joaquin Valley MPO Traffic Models to Meet the Requirements of SB 375

IMPORTANT NOTICE

The electronic documents included in the model files and documentation are the tools developed based on the data provided and the associated standard items for the *Traffic Model Improvements for each of the Eight San Joaquin Valley MPO Traffic Models to meet the Requirements of SB 375* (SJV MIP) (Fehr & Peers, November 2010). The data, analysis, and results presented herein have been prepared for the sole purpose of this project. The model scenarios were developed based on consultation with the San Joaquin Valley MPO staff. Post processing functions were based on the translation of the intent of the pre-MIP scripts to the MIP models and Fehr & Peers may not agree with the method or assumptions. We have relied on scenario data and other information provided to us by the San Joaquin Valley MPOS as well as data from publicly available information sources. The opinions presented as a result of our analysis cannot be taken as an endorsement or inducement for any financial transaction. Fehr & Peers does not make any warranty, guarantee, certification or other representation with respect to the information contained herein if applied to any other project or for any other purpose without the prior written consent of Fehr & Peers, which expressly denies any and all liability for damages or losses of any kind resulting from use of the information contained herein for any purposes other than this project. We do not accept any responsibility for damages, if any, that may result from decisions made or actions taken by any third parties based on its analysis. Any use that a third party makes of our analysis and opinions will be the sole responsibility of such third party.
The preparation of this report has been financed in part through grants from the United Stated Department of Transportation.

February 29, 2012

WC10-2778

FEHR & PEERS

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OVERVIEW

This document provides a brief high-level summary of the overall San Joaquin Valley Model Improvement Plan (SJV MIP), including a summary of the model specifications used in developing the components for the standard model and highlighting the improvements to address the requirements of California Transportation Commission (CTC) Guidelines for Regional Transportation Plans in response to SB375.

PURPOSE

CALIFORNIA TRANSPORTATION COMMISSION REGIONAL TRANSPORTATION PLAN GUIDELINES

The CTC publishes and periodically updates guidelines for the development of long range transportation plans that include SACOG's MTP/SCS. Pursuant to Government Code Section 65080(d), each regional transportation planning agency (RTPA) is required to adopt and submit an updated regional transportation plan (RTP) to the California Transportation Commission (CTC) and the Department of Transportation (Caltrans) every four years. SACOG is the designated RTPA for Sacramento, Yolo, Sutter and Yuba counties. The El Dorado County Transportation Commission (EDCTC) and the Placer County Transportation Planning Agency (PCTPA) are the RTPAS for their respective counties.
Under Government Code Section 14522, the CTC is authorized to prepare guidelines to assist in the preparation of RTPs. The CTC's RTP guidelines suggest that projections used in the development of an RTP should be based upon available data (such as from the Bureau of the Census), use acceptable forecasting methodologies, and be consistent with the Department of Finance baseline projections for the region. The guidelines further state that the RTP should identify and discuss any differences between the agency projections and those of the Department of Finance.
The most recent update to the RTP guidelines was published in 2010, and includes new provisions for complying with Senate Bill 375 (see below), as well as new guidelines for regional travel demand modeling. The regional travel demand model guidelines are "scaled" to different sizes of MPO's. SACOG is included in the "E" grouping of the MPO's serving the largest populations in the state. The guidelines for regional travel demand modeling are the most ambitious for the "E" group, and include (among many other things):

- Guidelines and standards for validation and sensitivity testing of the model;
- Transition to an activity-based demand model;
- Participate in peer review every ten years; and
- Build a microeconomic land use model as soon as is practical.

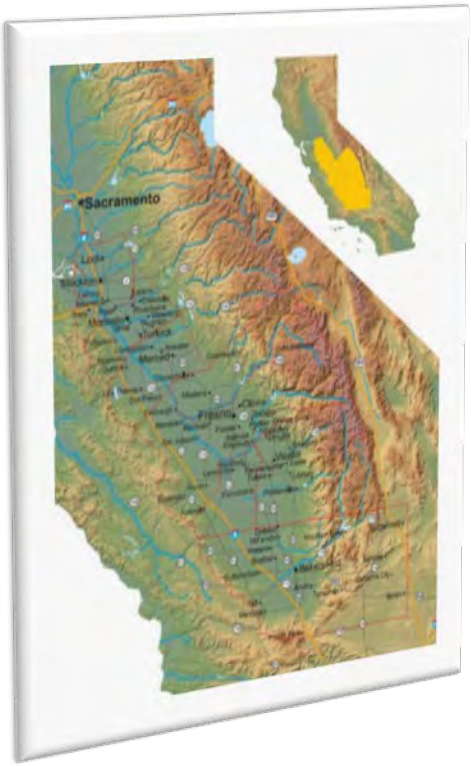
SACOG has already transitioned to an activity-based demand model. The guidelines and standards for model validation and sensitivity testing are being followed. SACOG participated in a peer review for its SACSIM travel demand model in November 2008. SACOG is developing a spatial economic model which would meet the terms of the "microeconomic land use model" described in the guidelines, but the model was not ready for this update. SACOG intends to complete development and testing work in time to use the model in the next MTP/SCS update.

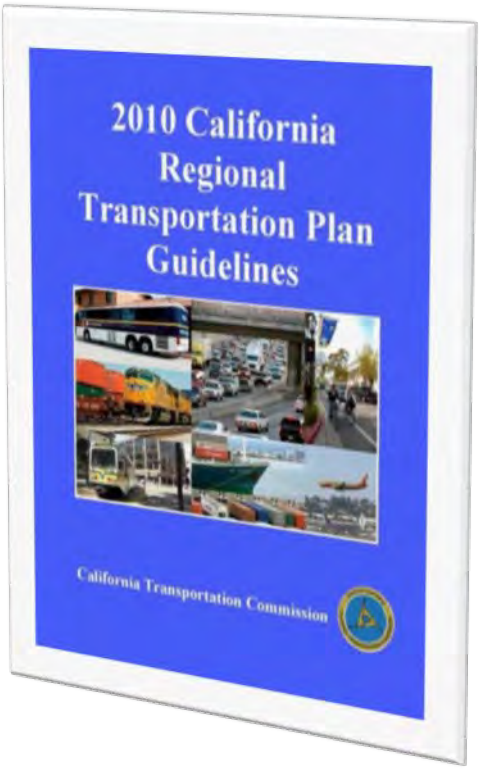
SENATE BILL 375

Sen. Bill No. 375 (Stats. 2008, ch. 728) (SB 375) requires MPOs to prepare a Sustainable Communities Strategy (SCS) that demonstrates how the region will meet its greenhouse gas (GHG) reduction targets through integrated land use, housing and transportation planning. Specifically, the SCS must identify a transportation network that is integrated with the forecasted development pattern for the plan area and will reduce GHG emissions from automobiles and light trucks in accordance with targets set by the California Air Resources Board. Chapter 8 – Energy and Climate Change includes a more in-depth discussion of SB 375 and its implications for the Proposed MTP/SCS.

MTP/SCS 2035 Sacramento Area Council of Governments Draft Environmental Impact Report Chapter 16 – Transportation – Page 16-19

In the CTC guidelines, each of the San Joaquin Valley Metropolitan Planning Organizations (SJV MPOs) is grouped with similar MPOs based on population, growth, and other factors and has specific requirements, recommendations, and areas for potential future improvements based on the grouping.





The SJV MPOs are grouped as follows:

- Group B – Kings, Merced, Madera
- Group C – Tulare
- Group D – Fresno, Kern, San Joaquin, Stanislaus

Tables summarizing the requirements, recommendations, and the Pre-MIP and Post-MIP models for each MPO can be found in Appendix A.

- **Tables E-A1 and E-A2** summarize for each MPO the RTP Requirements and Recommendations, respectively.
- **Table E-A3** contains side-by-side detail for all Pre-MIP MPO models.

SJ VALLEY RESPONSE TO SB 375 AND RTP GUIDELINES

The San Joaquin Valley Model Improvements Project (SJV MIP) includes a number of model upgrades that respond directly to the requirements of the CTC guidelines:

- Land Use – demographic characteristics that influence travel behavior
- Geographic scale – land use and transportation system refinements in transit oriented developments, central business districts, and mixed-use developments (TODs/CBDs/MXDs)
- Sensitivity to mode – person trips, auto availability, mode choice/split, transit assignment

- Pricing – auto operations (fuel, maintenance, etc), parking, toll, transit fare
- Sensitivity to congestion – time of day refinements, influence on auto availability and distribution
- Air Quality/Greenhouse Gas – speed, trucks, interregional travel
- Best Management Practices – sensitivity to smart growth, demand and/or system management within model or as quick-response tools
- Validation – formal static and dynamic tests
- Documentation – Clear and fully documented for executive/public and technical staff including limitations and potential ways to overcome limitations

BEYOND SB 375 AND RTP GUIDELINES

In addition to the addressing the CTC requirements, the SJV MIP includes a number of other model enhancements:

- Standardized Process – knowledge, data, parameter, documentation/graphics/reports, and other processes
- Coordination – 8 counties sharing resources and information with parallel studies
- Ease of Use – Development and Application modes, Graphical User Interface, Geographic Information Systems (GIS) and Excel
- Three-County Activity Based Model (ABM) – Transportation Analysis Zone (TAZ) level for San Joaquin, Stanislaus, and Merced Counties
- Three-County Origin-Destination (OD) Survey – Cell phone data, speed/classification counts, and roadside surveys for San Joaquin, Stanislaus, and Merced Counties
- Single County Activity Based Model – Parcel level for Fresno County
- Integrated GI- Based Land Use/Transportation Model – UPlan/Cube Land for Kern County
- Transferability – ABM, OD survey method, Integrated Model and supporting processes and data developed for transferability
- Software – Enterprise license of software, and Integrated Model developed and delivered in Cube Application for all 8 counties

Figure E-1 summarizes the model functionality by MPO.

SB 375 and RTP Guidelines	
Land Use	Demographic characteristics that influence travel behavior
Geographic scale	Land use and transportation system refinements in TOD/CBD/MXD
Sensitivity to mode	Person trips, auto availability, mode choice/split, transit assignment
Pricing	Auto operations (fuel, maintenance, etc), parking, toll, transit fare
Sensitivity to congestion	Time of day refinements, influence on auto availability and distribution
Air Quality/Greenhouse Gas	Speed, trucks, interregional travel
BMPs	Within model or as quick-response tools
Documentation	Clear and fully documented for executive/public and technical staff including limitations and potential ways to overcome limitations
Beyond (SB 375 and RTP Guidelines)	
Standardized process	Knowledge, data, parameter, documentation/graphics/reports, and other processes
Coordination	8 counties sharing resources and information with parallel studies
Ease of use	Development and Application modes, Graphical User Interface, utilize GIS and Excel
Three-County Activity Base Model	TAZ level for San Joaquin, Stanislaus, and Merced
Three-County Origin-Destination Survey	Cell phone data, speed/classification counts, and roadside surveys for San Joaquin, Stanislaus, and Merced
Single County Activity Based Model	Parcel level for Fresno
Integrated GIS Based Land Use/Transportation Model	UPlan/Cube Land for Kern
Transferability	ABM, OD survey method, Integrated Model and supporting processes and data developed to easily transfer
Software	Enterprise license of software for all 8 counties, and Integrated Model developed and delivered in Cube Application to all counties

ORGANIZATION OF DOCUMENTATION

The remainder of this document describes the model improvements for each MPO and highlights their functions and, capabilities including how they relate to the Required, Recommended, or Potential Future Enhancement as identified in the 2010 RTP Guidelines on implementation of SB 375. They are grouped into the two major model types: trip based models and activity based models. The study area and type of model for the SJV MIP models is shown on **Figure E-1.** The detailed functions, parameters, calibration procedures, static and dynamic validation results, and other technical summaries are referenced in this document and contained in the *Technical Summary for the Eight San Joaquin Valley MPO Travel Models to Meet the Requirements of SB 375*.

TRIP BASED MODEL SUMMARY

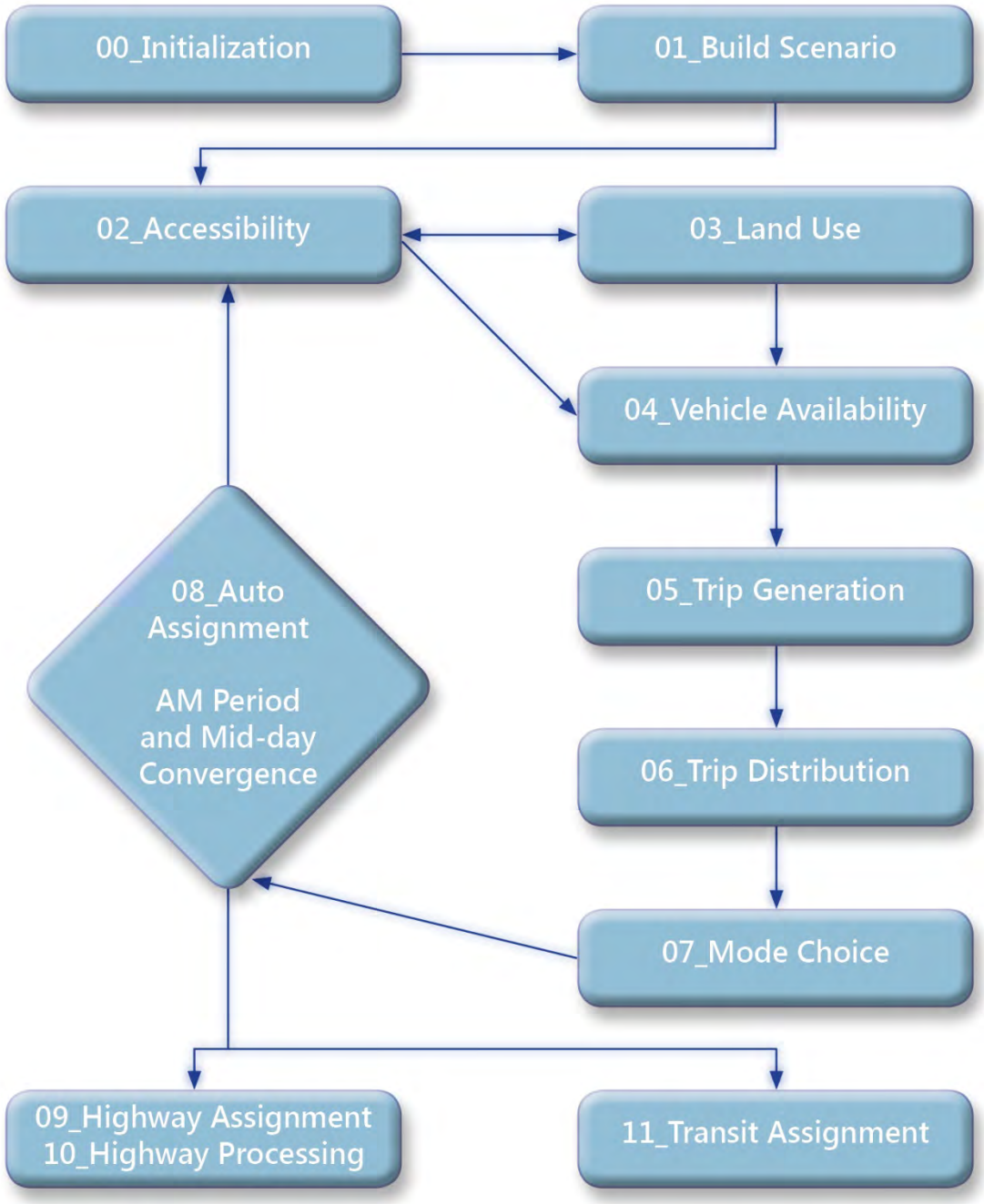
The SJV MIP models are sophisticated travel model demand forecasting models that are similar in structure to most other current area-wide models used for traffic forecasting. They use land use, socioeconomic, cost, and transportation system data to estimate travel patterns, roadway traffic volumes and transit volumes.
The SJV MIP models differ from a basic trip model through the integration of the components.

FORECASTING PROCESS

Four primary sub-models are involved in the travel demand forecasting process:

1) **Trip Generation**. This initial step calculates person or truck trip ends using trip generation rates established during model calibration, cross-classified residential data, employment, and student enrolment. This step also uses the demographics to determine the household passenger vehicle availability. For models with an integrated land use component, the land use forecast is implemented prior to trip generation.
2) **Trip Distribution**. The second general step estimates how many trips travel from one zone to any other zone. The distribution is based on the number of trip ends generated in each of the two zones, and on factors that relate the likelihood of travel between any two zones to the travel time between the two zones such as distance, cost, time, and varies by accessibility to passenger vehicles, transit, and walking or biking.
3) **Mode Choice**. This step uses demographics and the comparison of distance, time, cost, and access between modes to estimate the proportions of the total person trips using drive-alone or shared-ride passenger auto, transit, walk or bike modes for travel between each pair of zones.
4) **Trip Assignment**. In this final step, vehicle trips or transit trips from one zone to another are assigned to specific travel routes between the zones. Congested travel information is used to influence each of the steps described above starting with vehicle availability for all models, and starting with land use location for integrated land use transportation models.

A flow chart of the travel model process is shown in **Figure E-2**. Detailed descriptions of each step and sub-step, standard and calibrated parameters, static and dynamic validation results, and detailed summaries for each MPO can be found in the *Technical Summary* document.



Notes: Solid lines represent standard processes for all 8 MPOs. Dashed lines represent optional processes such as Cube Land or Transit Assignment that vary by MPO.

MODEL COVERAGE AND TRANSPORTATION ANALYSIS ZONES (TAZS)

The model area is divided into transportation analysis zones (TAZs) representing land use within the model area, and by gateway zones at major road crossings of the model boundary. To allow for maximum flexibility in the future and through coordination of each SJV MIP model and parallel projects such as the Air Resources Board Eight-County SJV Model, the following gateway, TAZ, and screenline numbering process was developed:

- Gateways external to SJV: Gateways 1-60
- Gateways within the SJV: Gateways 61-100
- TAZs within a model: 101-10,000
  - TAZs allocated alphabetically within each model first by County, then by sphere of influence
  - Gaps in numbering sequence allow for additional zone detail in the future
- Screenline numbering identical for models that share a boundary and unique number range
  - Hundreds place designates screenline
  - Tens place designates location
    - Odd number: North or East
    - Even number: South or West

The concept used for distinguishing and coordination between the models covering the SJV and areas outside the SJV model study areas is shown on Exhibit E2-1. Detailed tables and maps for individual models can be found in the *Technical Summary* document.

SOCIOECONOMIC INPUTS

The travel demand model includes socioeconomic inputs aggregated by TAZ. Previous models relied on land use data while the updated models have been expanded to include additional socioeconomic variables. Population-related inputs include numbers of housing units stratified by structure type, household income, age of population in households, and housing density. Employment-related inputs are employee by detailed sector and employment density.

In addition to employees, schools are represented by student enrolment. “Special Generators," primarily for unique uses not covered specifically by a standard land use category, are represented as total person trips by purpose. Similarly, interaction with land uses outside

the model area are represented by total person productions and attractions by purpose based on the California Statewide Travel Demand Model.
The enriched set of land use descriptors address two model improvement objectives: to make the models more sensitive to socio-demographic and urban form characteristics that influence travel behavior, and to expand and refine the range of regional growth scenarios and policies that regions are able to consider in developing their SB 375 Sustainable Communities Strategies.

- Residential: increase from 2 to 10 categories
  - Aggregated to 3 residential unit types and cross-classified by
    - Household Size (5 group)
    - Household Income (5 groups)
    - Age of Head of Household (7 groups)
  - Default cross-classification values based on block group level data
  - User can adjust parameters as needed (can also review County specific parameters against others to identify outliers)
- Employment: increase from 3 to 20 categories
- Enrolment: Elementary, High School, College/University
- Optional reallocation during integrated land use/transportation system planning\

New or Expanded Sensitivity	Policy or Scenario Evaluation
Household Variables: Unit Type matches Census, Income, Size, Age of Head of Household	Dwelling Unit Types and Densities
Population: Age Range	Household Income
Employment Categories: Increase to 21 based on North American Industrial Classification System	Population Age Distribution
Enrolment: Increase from 0 categories to 3	Retirement Age
	Mix of employment categories
	Unique travel characteristics by employment type

New or expanded sensitivities

- Household Variables: Unit Type matches Census, Income, Size, Age of Head of household
- Population: Age Range of head of household
- Employment Categories: Increase from 3 to 21 based on North American Industrial Classification System
- Enrolment: Increase from 0 to 3 categories

Scenario testing

- Dwelling Unit Types and Densities
- Household Income
- Population Age Distribution
- Retirement Age
- Mix of employment categories
- Unique travel characteristics by employment type
- Magnet vs. local school

Required Land Use Sensitivities	Recommended Land Use Sensitivities
Fresno	Kings
Kern	Madera
San Joaquin	Merced
Stanislaus	Tulare

NETWORK CHARACTERISTICS

The model roadway network includes nodes and links. Link types include freeway, highway, expressway, arterial, collector, local, and freeway ramps. The model distinguishes roadways by adjacent development (central business district, fringe, urban, suburban, or rural) and terrain (flat, rolling or mountainous).

For models with transit networks, links have been coded to represent walk/bike access, drive access, park-and-ride lots, highway based (i.e. local bus) and non-highway based (i.e. rail) transit in the model area. For models without transit networks, transit headway indicators for TAZs with access to transit and the highway network serve as the "synthetic transit network" and have only walk/bike access to transit.

The North American Datum (NAD) 83 State Plane California (feet) coordinate projection is used so that the model network can be viewed together with other GIS data such as street centerlines, TAZ boundaries and Census information.

New or Expanded Network Sensitivity	Policy or Scenario Evaluation
Operational Characteristics (Facility Type, Adjacent Development)	Pricing at roadway segment (i.e. toll, VMT tax) or point (i.e. parking)
Mixed-flow lanes	Easily add/remove lanes or facilities
HOV (2+ or 3+), Toll lanes	Implement HOV/managed lanes

Transit (drive, Park-in-Ride, walk/bike)	Change transit availability in TAZ
Walk or Bike	Adjust frequency or type of transit service
Truck prohibitions	
Sensitive to non-highway for walk/bike trips	

New/Expanded Network Features

- Operational Characteristics (Facility Type, Terrain, Adjacent Development)
- Mixed-flow lanes not reserved for high occupancy vehicle (HOV)
- HOV (2+ or 3+), Toll
- Transit (drive, Park-in-Ride, walk/bike access)
- Walk or Bike
- Truck prohibitions
- Sensitive to non-highway for walk/bike trips

Policy Evaluation Capabilities

- Highway Network
  - Pricing at roadway segment (i.e. toll, VMT tax) or point (i.e. parking)
  - Easily add/remove lanes or facilities
  - Implement HOV/managed lanes
- Transit Network
  - Change routes
  - Adjust frequency or type of service

Required Network Sensitivities	Recommended Network Sensitivities
Fresno	Kings
Kern	Madera
San Joaquin	Merced
Stanislaus	Tulare

TRAVEL CHARACTERISTICS

Much of the new model structure is interactive and dynamic. The accessibility, vehicle availability, transportation system (highway, transit, walk or bike networks), pricing, and socio-economic factors are used in multiple components of the model. An overview of the model functions relating to travel characteristics is presented first, followed by details on each component.

New or Expanded Sensitivity	Policy or Scenario Evaluation
Fuel, maintenance, user fees	Influence of changing socio-economic or employment distributions
Refined sensitivity to travel characteristics	Attractiveness of various modes
Accessibility to goods/services/jobs	Vehicle availability
Comparison of driver, passenger, transit, walk, bike	Destinations and travel distance
Available modes to select destination	Mode of travel
Destination and mode vary by purpose	Route of travel, speed, and GHG

New/Expanded Travel Sensitivities

- Fuel, maintenance, user fees
- Refined sensitivity to travel characteristics
- Accessibility to goods/services/jobs
- Comparison of driver, passenger, transit, walk, bike
- Available modes to select destinations
- Destination and mode vary by purpose

Policy Evaluation Capabilities

- Influence of changing socio-economic or employment distributions
- Attractiveness of various modes
- Vehicle availability
- Destinations and travel distance
- Mode of travel
- Route of travel, speed, and GHG

Recommended	Recommended
Fresno	Kings
Kern	Madera
San Joaquin	Merced
Stanislaus	Tulare

Beyond the general modeling capabilities mentioned above, the new SJV MIP models have improved functionality and sensitivities in their treatment of individual travel influences: vehicle availability, trip generation, trip distribution, mode choice, and travel route assignment, as described below..

Vehicle Availability

- Dynamically influenced by demographics and accessibility
- Auto operating cost (fuel, toll, congestion, parking)

Trip Generation

- Person trip generation rather than vehicle trip generation, allowing travelers to select modes based on competitive performance and costs among the available modes.
- Survey-estimated trip rates with reasonableness checks and transparent adjustments to allow easy review and identification of outliers
- Trip purposes expanded from typical 3 or 5 to 11 (**bold** indicates new purposes for all models)
    - Home-Work
    - Home-Shop
    - **Home-K12**
    - **Home-College**
    - Home-Other
    - Work-Other
    - Other-Other
    - **Highway Commercial**
    - **Trucks-Small**
    - **Trucks-Medium**
    - **Trucks-Heavy**

Trip Distribution

- Sensitive to congestion and vehicle availability

Mode Choice

- Models with Transit Networks – influenced by

demographics, purpose, accessibility to transit stop and line, transit system variables (transfers, fares, time), and vehicle availability

  - Drive Alone
  - Shared Ride 2 people per vehicle
  - Shared Ride 3+ people per vehicle
  - Transit with Walk Access
  - Transit with Drive Access
  - Bicycle
  - Walk
- Models without Transit Networks – influenced by trip purpose, accessibility of zone, scheduled frequency of transit service, time, and vehicle availability
  - Drive Alone
  - Shared Ride 2
  - Shared Ride 3+
  - Transit
  - Walk
  - Bike

Pricing

New/Enhanced

- Parking (employee and non-employee)
- Toll road/plaza
- User fee (fuel, VMT, or other usage fee)
- Induced/Suppressed Demand

Policy/Sensitivity

- Pricing strategies
- Parking charge/cash-out, transit subsidy
- Toll, express, HOT, user fees

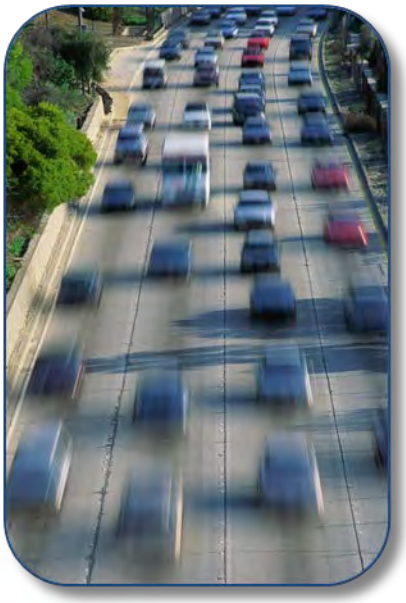
Required	Recommended
Fresno	Kings
Kern	Madera
San Joaquin	Merced
Stanislaus	Tulare

PERSON AND VEHICLE ASSIGNMENT

The model distributes trips for each of eleven trip purposes at the person level for passenger trips and at the vehicle level for truck trips. For transportation route choice and network assignment, the model converts persons to vehicles for automobile driver and passenger trips, while persons are assigned individually for transit. Route assignment of walk or bike trips is not included in the model.

Highway Vehicle Assignment

- Drive Alone
- Drive Alone Toll
- Shared Ride 2
- Shared Ride 3+
- Trucks
  - Small, Medium, Heavy
  - Long and short haul
- Medium Truck
- Heavy Truck



Transit Assignment

- Utilize newest software to increase flexibility and ease of implementation and reporting

FORECAST TIME PERIODS

The SJV MIP travel models estimate travel demand and traffic and

transit volumes for the average weekday (Monday through Friday). The daily roadway volumes are aggregated from AM and PM peak period, and Mid-day and Evening off-peak periods. The daily transit volumes are aggregated from a peak period and an off-peak period. In addition, AM and PM peak one-hour traffic volume estimates are available for roadways.

FEEDBACK LOOPS

The SJV MIP models include a feedback loop that uses the congested speeds estimated from traffic assignment to recalculate the accessibility among regional trip generators. Accessibility influences all steps except land use allocation. In the Kern COG model, where an integrated land use transportation model is used, all components of the model are sensitive to congestion.

SMART GROWTH AND AIR QUALITY

Local and national research indicates that travel generation levels are sensitive to a series of "D" factors that describe urban form and accessibility:

- Density
- Diversity
- Design
- Destinations
- Distance to Transit
- Development Scale
- Demographics
- Demand Management

These factors are most influential when considered at a fine grained level of analysis, but affect aggregate amounts of vehicle miles travelled (VMT) within a region. In accordance with the CTC guidelines, the SJV MIP models are equipped with adjustments to the basic model calculations that account for research-based sensitivities to the "D" variables.

Recommended	Recommended
Fresno	Kings
Kern	Madera
San Joaquin	Merced
Stanislaus	Tulare

LAND USE AND TRANSPORTATION

Reallocation of Land Use

- Geographic and/or Socio-Economic
- Willingness to pay
- Supply/demand
- Accessibility and other factors

Dynamic Response to Transportation Changes

- Congestion

- Transit/walk/bike access

Recommended	Potential Future Enhancement
Fresno	Kings
Kern	Madera
San Joaquin	Merced
Stanislaus	Tulare

QUICK-RESPONSE AND VISIONING TOOLS

- Useful in Coordinating with Local Jurisdictions
- Project Scale
- Utilizes Details from Regionally Valid Model
- Test Variety of Demand Management Strategies
- Spreadsheet Based
- Minutes vs. Hours

Land Inputs

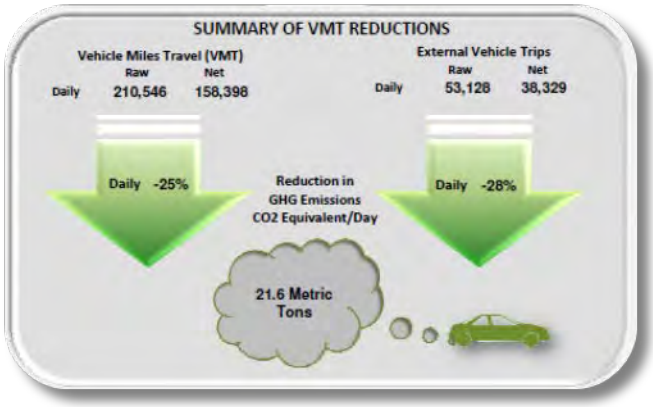
Project level, development scale and units
Much information derived from COG model (e.g., trip lengths by purpose for VMT)

Travel Demand Management Inputs

Air District Rule – reduction determined and outcome evaluated
Other TDM Measures – influence and participation determined independently and outcome evaluated

Reductions in Vehicle Trips, VMT, GHG shown instantly

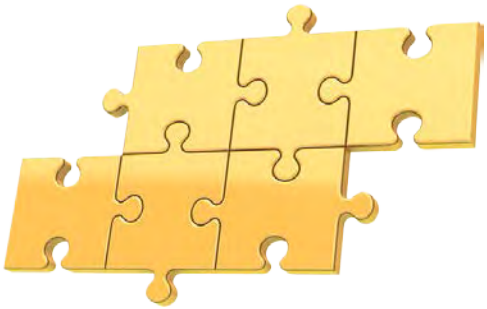
Results from RT designed to closely match full model results



Recommended	Recommended
Fresno	Kings
Kern	Madera
San Joaquin	Merced
Stanislaus	Tulare

INTERREGIONAL COORDINATION

- Land Use Based on Best Available Data
- Travel Sensitive to Interregional Economic Activity
- Distance of Travel Based on Statewide Model
- Coordination with ARB 8-County Model
- Captures Through, Imported, Exported Travel
- Consistent between all 8 MPOs
- Conformity, Target Setting, Multi-Regional Projects



Required	Required
Fresno	Kings
Kern	Madera
San Joaquin	Merced
Stanislaus	Tulare

Kern Council of Governments

July 25, 2012

TO: Kern Regional Transportation Modeling Committee (TMC)

FROM: Ahron Hakimi
Executive Director

BY: Troy Hightower, Planner II

SUBJECT: TMC AGENDA ITEM: VII
Sustainable Communities Strategy Scenario Development Update

DESCRIPTION:

SB 375 requires regions to analyze scenarios to reduce per capita greenhouse gas emissions (GHG) from passenger vehicle travel for use in development of the Sustainable Communities Strategy (SCS).

DISCUSSION:

An initial list of scenarios, based on guidance from California Air Resources Board (ARB) was first reviewed by the Kern Regional Planning Advisory Committee at its meeting on January 4, 2011 and again at the TMC February 22, 2012 meeting. The table is a guide that will be updated and presented at future meetings.

The following table contains core policy variables that ARB associated with key land use and transportation-related components associated with GHG reductions. These variables and factors are consistent with those qualitatively assessed in the 18 Metropolitan Planning Organizations (MPOs) model sensitivity analysis during the target setting process. While ARB staff believes this list includes the most important variables for analysis, ARB staff realizes it may not be appropriate for an MPO to do a sensitivity test on each one, given the MPO‘s unique SCS, complexity, and resources.

Table 1 – Potential Kern SCS Modeling Scenarios to Evaluate Core Policy Variables

Tool Used			
Travel Model	Land Use Model	ARB Modeling Variable	Scenario Status
		1. Land Use:	
x	x	a. Modify distribution of households, population, jobs or other variables (infill along major transit corridor consistent with GP)	Updated
x	x	b. Rebalance the mix of land uses (housing/employment ratios)	Draft
x	x	c. Increase the level of density (housing demand shift)	Updated
x	x	d. Improve the pedestrian environment (walk distance to transit)	MIP(future)
		2. Road Projects:	
x		a. Add HOV lanes	HOV Study
x		b. Implement Intelligent Transportation Systems (ITS)/Traffic management (e.g., change auto travel times, change highway free-flow speed)	Off Model
x		c. Add general purpose roadway lanes (e.g., change highway capacities)	Testing
		3. Transit:	
x		a. Construct new transit lines	GET Plan
x		b. Increase service (e.g., change transit headways, increase network connectivity)	Draft
x		c. Upgrade transit service (e.g., change from bus to light rail)	GET Plan
x	x	d. Improve accessibility (e.g., change bike/walk access distance to transit stations, change auto access distance to transit stations)	Draft
		4. Pricing:	
x		a. Develop tolls and toll roads	HOV Study
x		b. Implement HOT lanes	HOV Study
x		c. Increase the cost of parking	Draft
x		d. Change in transit fares	MIP(future)
X		e. Change in auto operation cost	MIP(future)
		5. Transportation Demand Management:	
X		a. Promote carpooling, vanpooling, telecommuting and teleconferencing	Off Model
X	x	b. Promote walking and biking	Draft
X		c. Implement employer-based trip reduction strategies and Indirect Source Rule	Off Model

Source: Adapted from ARB SCS Review Methodology 7/21 (www.arb.ca.gov/cc/sb375/scs_review_methodology.pdf)

Table 1indicates the scenarios Kern COG currently can model with the existing Land Use and Travel models. Current Kern COG modeling capabilities include: 1) the new Model Improvement Program (MIP) model currently undergoing initial testing; 2) the Travel model updates related to the GET Long-range Transit Plan; 3) the High Occupancy

Vehicle (HOV) study modeling scenarios; 4) the current travel model and improvements to the travel model as part of the MIP; and 5) an off-model process to adjust modeling results to reflect ITS and other traffic management strategies.

The last column was renamed to "Scenario Status" to indicate current status for each of the scenarios under development.

Scenario Development

Kern COG staff has developed a Scenario Detail Sheet as an attachment to the SCS Development Worksheet (see attachment 1). The Scenario Detail Sheet contains more detailed information on the inputs and assumptions used for a specific scenario listed on the worksheet (see attachment 2). As scenarios are more fully development the scenario detail sheets will be updated.

All the scenarios have been run and in some cases additions runs where made with updated inputs or parameters. The summary bar chart illustrates that there is little reduction in emission for most scenarios. The Long Term Transit scenario had the best improvement of 4.9% lower than the base, but still remains 12.8% above the target, followed by the Improve Walk and Bike (off model) and Infill scenarios.

Both the table above and the SCS development worksheet were developed from templates provided by ARB for SCS development. You may find out more information by downloading ARB report "Sustainable Communities Strategy Review Methodology" from July 2011at: http://www.arb.ca.gov/cc/sb375/scs_review_methodology.pdf

Collaboration with the Regional Planning Advisory Committee

The modeling methodology and SCS development process is an ongoing effort done in collaboration with the TMC and the RPAC. The TMC is now holding monthly meetings to review, provide data and direction to Kern COG staff. They also provide suggestions and recommendations to the RPAC.

At the April 24, 2012 meeting the TMC recommended Kern COG staff develop an additional worksheet or matrix that presented an analysis of the modeling results when multiple scenarios are combined. This new worksheet would be a used to supplement the SCS Scenario Development Worksheet and the Scenario Detail Sheets. Staff has developed a summary bar graph that can be used in side by side analysis of the scenarios (see attachment 3). The summary bar graph was presented to the RPAC at their June 6th. The RPAC after reviewing the SCS Development worksheet, Scenario Detail sheet and the new summary bar chart commented that we have a long way to go to reach the target.

At the July 3, 2012 RPAC meeting the RPAC discussed SCS development for Kern and concerns related to developing a San Joaquin Valley wide SCS and/or targets. The RPAC directed staff to continue to develop a Kern only SCS and targets. Call was made requesting planners input for new scenarios or

Model Improvement Program Model Development

Kern COG has received an updated version of the MIP model. Improvements continue to be made as the model is still under development. Staff has worked with the consultants DKS Associates to develop a method to convert the land use model scenario output files into inputs for the MIP. The MIP is more sensitive to land use changes than the existing travel model (se attachment 4). The conversion Initial runs have been made with the 2035 M24r Base and the S01 Increased Density scenarios. The results of the M24r base are very close to the MIP base. The S01 Density scenario results show a 6.4% reduction in VMT (34,086,706 vs 36,424,657).

More testing and validation of the MIP is needed, but these initial runs are encouraging. Staff plans to convert other scenarios listed on the SCS Development Worksheet to be run using the MIP.

Off Model Strategies from the Big 4-MPOs

In addition to these variables or scenarios, the 4 biggest MPOs prepared a memo about "off-model" strategies that would be used adjust their GHG emissions forecast. The following is a list of those strategies from last year. SACOG took credit for an additional 1-2% points in per capita reduction using their off model methodology. See Table 6 from the following memo online at: http://www.arb.ca.gov/cc/sb375/mpo/prelimreport.mtc.sacog.sandag.scag.pdf

The California Air Resources Board (ARB) has releases their technical evaluation of the SCAG Sustainable Community Strategy that they recently approved. ARB explained that this document can be used as a guide for the information they would like to see in the SCS's submitted to them by MPO's for their approval. You can review the document online at: http://www.arb.ca.gov/cc/sb375/sacog_scs_tech_eval0512.pdf

Kern SB 375 Framework: Compliance With Core Values

In February 2012 the Kern COG Board adopted 4 core values and 13 core actions to help govern Kern COG's activity related to SB 375 target setting and SCS development. Staff is using these values and actions to guide its activity for the effort. The following is a brief summary of Kern COG's activities related to the 4 core values:

1) The Sustainable Community Strategy relies on the existing and planned circulation networks and land use designations for Kern County and its eleven (11) incorporated cities.

   Related COG Activities: Updated circulation networks and land use designations using latest general plans as of Summer/Fall 2011.

2) The Sustainable Communities Strategy shall not hinder the local land use authority of Kern County and its eleven (11) incorporated cities.

   Related COG Activities: Added disclaimer to maps to refer users to local general plans for latest local planning information.

3) The Sustainable Community Strategy shall allow Kern County and its eleven (11) incorporated cities to continue the pursuit and promotion of a diversified economic base.

Related COG Activities: Development of modeling that supports an ambitious and achievable target for Kern that avoids the need for creation of an Alternative Planning Strategy (APS). Some consider the APS a source of potential challenges to future economic projects in the region.

4) Kern County shall continue to discuss cooperation and coordination with the seven (7) other counties located in the Central San Joaquin Valley to develop a regional Sustainable Community Strategy that recognizes the both shared and unique characteristics of each of the eight (8) counties.

Related COG Activities: COG Staff and Kern COG's representatives on the Regional Planning Advisory Committee are participating in the 8 county SCS coordination efforts. COG staff is developing a set of modeling tools that differ from the other 7 counties to better reflect our unique characteristics.

Attachments

1. SCS Development Worksheet
2. Scenario Detail Sheets
3. SCS Scenario Graph
4. Existing Travel Model Constraints
5. Draft Modeling Methodology Documentation

ACTION: Information/Discussion

Attachment 1

SCS Development Worksheet

Kern COG Draft SCS Scenario Development - Indicator Comparison Table As of June 26, 2012

DRAFT Worksheet

Category	Scenario Title	Spreadsheet Based Data			Land Use Model Data (Uplan Runs)				Travel Model					Off Model	Land Use + Travel Model	
		Target Setting Process 2010			Adjusted Base Model	Redistribution	Rebalance	Increased Density	Road Projects		Short Term Transit	Long Term Transit	Pricing	Combined MIP/Off Model	1a. Infill R05 Transit Areas	
	Indicators and Measures	2005 Backcast from 2006 model base year	Proposed Kern 2035 Target	Updated 2035 Base	M24	1a. Infill R26 Transit Areas	1b. Housing Employment Ratios M24r	1c. Housing Demand Shift N26	2a. Add HOV Lanes	2c. Roadway Lanes Hageman Flyover	3b. Increase Service + 3d. Accessibilty	3b. Increase Service + 3d. Accessibilty	4c. Downtown Parking Cost	1d Improve Walkability 5b. Walking Biking	3b. Increase Service	
DEMOGRAPHIC DATA	Household Population	765,750	1,264,100	1,264,100	1,264,100	1,264,100	1,264,100	1,264,100	1,264,100	1,264,100	1,264,100	1,264,100	1,264,100	1,264,100	1,264,100	1,264,100
	Households	260,700	417,200	417,102	417,115	417,105	417,115	416,963	417,115	417,115	417,115	417,115	417,115	417,115		
	Jobs	286,432	460,730	460,882	460,483	460,681	460,483	460,236	460,483	460,483	460,483	460,483	460,483	460,483		
LAND USE DATA (Growth Only)	Households 2010 - 2035		156,750	156,652	156,665	156,655	156,665	154,004	156,665	156,665	156,665	156,665	156,665	156,665		
	Residential Acreage Developed	--	--	--	46,579	46,579		37,396		46,579	46,579	46,579	46,579	46,579		
	Households per Acreage Developed	--	--	--	3.36	3.36		4.12		3.36	3.36	3.36	3.36	3.36		
				0.14												
	Population within a 1/4 mile of a Transit Stop	142183*	173,661	176,008	159,890				159,890							
	Residential High (acres)				804	804		1,687	804	804	804	804	804	804		
	Residential Medium				1,956	1,956		3,272	1,956	1,956	1,956	1,956	1,956	1,956		
	Residential Low				32,019	32,019		26,101	32,019	32,019	32,019	32,019	32,019	32,019		
	Residential Very Low				11,800	11,800		6,336	11,800	11,800	11,800	11,800	11,800	11,800		
MODEL OUTPUT DATA - Passenger Travel Mode Shares - All Trips (%VMT)	SOV															
	HOV															
	Public Transit (Boarding)	22028*		29,919	26,861	27,189				26,861	55,021	28,522		25,546		
	Bike+Walk (Non-Motorized)															
MODEL OUTPUT DATA - CO2 and Vehicle Miles Traveled	Per Capita SB 375 CO2 Emissions by Passenger Vehicles per Weekday (lbs)	14.79	16.17	16.32	16.05	16.00	15.93	15.99	0.00	16.05	16.00	15.94	16.05	15.70		
	Per Capita SB 375 CO2 Emissions by Passenger Vehicles per Weekday (lbs) - Pavley															
	Difference between Scenarios and 2005 Base Per Capita CO2 14.79 lbs (0% reduction below 2005 Base. Increases in red)	0.0%	9.3%	10.3%	8.5%	8.2%	7.7%	8.1%		8.5%	8.2%	7.8%	8.5%	6.2%		
	Difference between Scenarios and Per Capita CO2 target of 13.31 lbs (10% reduction below 2005 Base. Increases in red)	10.0%	17.7%	18.4%	17.1%	16.8%	16.4%	16.7%		17.1%	16.8%	16.5%	17.1%	15.2%		
	Total VMT per Weekday (Miles, in Thousands)	22,619	41,750	41,751	40,770	40,634	40,504	40,600	40,681	40,770	40,555	40,461	40,762	39,949		0
	Total SB 375 VMT by Passenger Vehicles per Weekday (-XX,-50% IXXI, Miles, in Thousands)			27,760	26,883	26,669	26,639	26,744	26,906	26,883	26,783	26,689	26,876	26,302		

Category	Scenario Title	Spreadsheet Based Data			Land Use Model Data (Uplan Runs)				Travel Model					Off Model	Land Use + Travel Model	
		Target Setting Process 2010			Adjusted Base Model	Redistribution	Rebalance	Increased Density	Road Projects		Short Term Transit	Long Term Transit	Pricing	Combined MIP/Off Model	1a. Infill R05 Transit Areas	
	Indicators and Measures	2005 Backcast from 2006 model base year	Proposed Kern 2035 Target	Updated 2035 Base	M24	1a. Infill R26 Transit Areas	1b. Housing Employment Ratios M24r	1c. Housing Demand Shift N26	2a. Add HOV Lanes	2c. Roadway Lanes Hageman Flyover	3b. Increase Service + 3d. Accessibilty	3b. Increase Service + 3d. Accessibilty	4c. Downtown Parking Cost	1d Improve Walkability 5b. Walking Biking	3b. Increase Service	

Kern SB 375Scenario Development - Notes and Assumptions (See Scenario Detail Sheets for more information)

This is a modified version of the spreadsheet compiled by ARB staff after the MPO baseline information gathering effort. The purpose of this spreadsheet is to facilitate scenario data review and development.
Backcast from Kern 2006 base model to 2005 model required by ARB.
Population projections are based on Kern COG Growth Forecast adopted in Oct 2009 without Group Quarters. Updated 2035 Base with 2010 Census data.
Travel model is used for all scenarios unless noted otherwise.
Land Use Scenarios do not change General Plan densities or areas.
* 2006 Boardings
Adjusted 2035 M24 Base using network with Hageman minus two lanes

DRAFT

Attachment 2

Scenario Detail Sheets

Scenario Detail Sheet

For Discussion Purposes Only

Scenario Title: Redistribution 1a. Infill Transit Areas – R26 run

Status as of June 20, 2012: Draft

Scenario Description and Assumptions:
The existing Urban Area for Metro Bakersfield was modified to allow growth in the Bus Rapid Transit Corridor identified in the GET Long Range Transit plan. See map below.

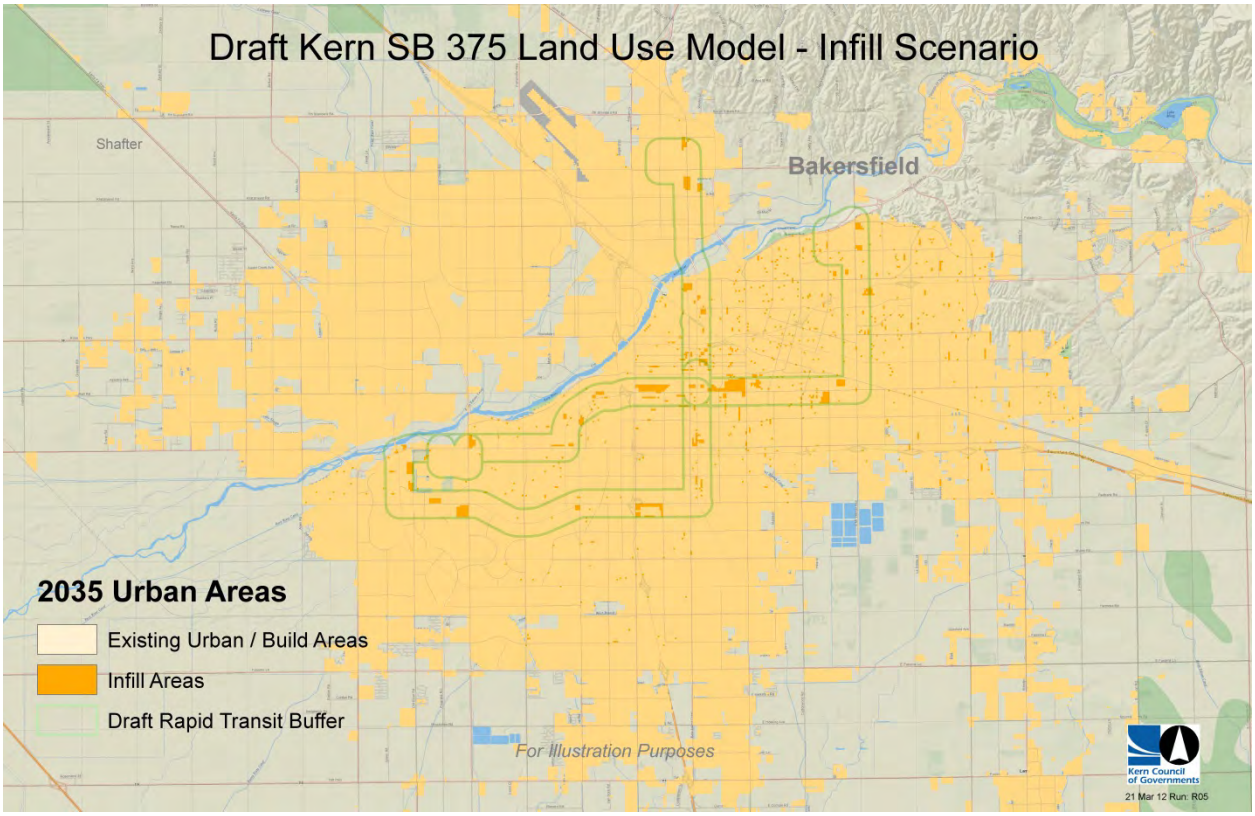
Summary of Inputs:
Based on M24 land use and the current travel model without Hageman lanes. A new Urban mask for 2010 has been created using aerial imagery and input from TMC committee members.

Summary of Results: Scenario is 16.8% above the Kern target of 13.31 lbs/capita

Indicator or Measure	Scenario	vs 2035 Adjusted Base*
Households per Acre (Growth Only)	3.36	0.0 %
Public Transit Boarding's	27,688	8.41 %
SB 375 CO2/Capita	16.00	- 0.29 %
Total PV VMT/Weekday (miles, in thousands)	40,635	- 0.33 %
Total SB 375 VMT (-xx,-50% ixxi,-50% military)	26,700	- 0.68 %

*** Based on M24 land use**

Reference Map/Table:



Scenario Detail Sheet

For Discussion Purposes Only

Scenario Title: Rebalance – 1b. Housing/Employment/Enrollment Ratios

Status as of June 19, 2012: Initial test run

Scenario Description and Assumptions:
The rebalance scenario is a post model adjustment to the land use model run M24 ratio of employees, households, and enrollment data at the Transportation Analysis Zone level. .

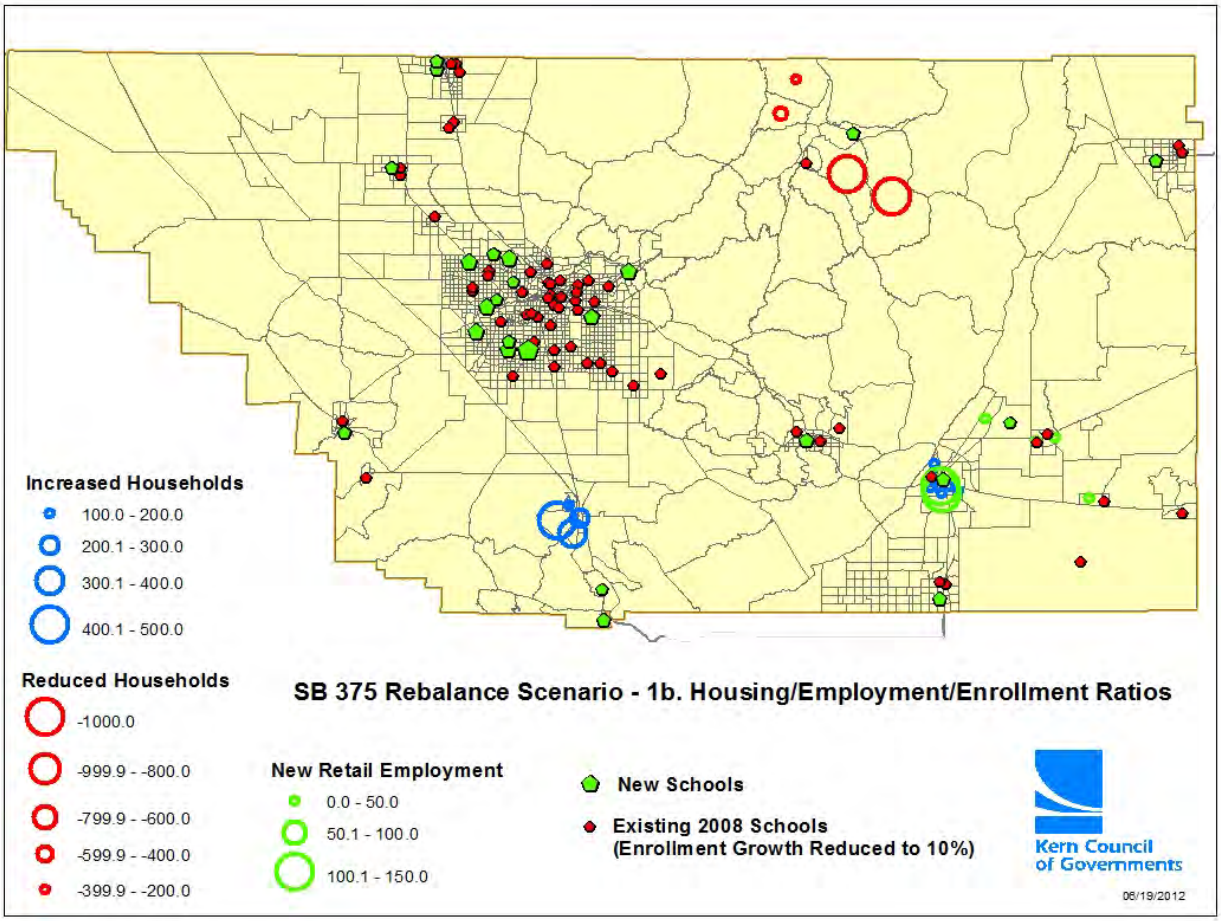
Summary of Inputs:
Based on the M24 land use model. Summary of post model adjustments: increased retail employment to balance employment types in Mojave area; assigned housing growth in residential uses around Mojave and San Emido to balance jobs/housing ratio; decreased housing growth in Isabella; rebalanced enrollment growth to match household growth distribution.

Summary of Results: Scenario is 16.1% above the Kern target of 13.31 lbs/capita

Indicator or Measure	Scenario	vs 2035 Adjusted Base*
SB 375 CO2/Capita	15.86	- 1.17 %
Total PV VMT/Weekday (miles, in thousands)	40,386	- 0.94 %
Total SB 375 VMT (-xx,-50% ixxi,-50%military)	26,519	- 1.36 %

*** Based on M24 land use**

Reference Map/Table:



Scenario Detail Sheet

For Discussion Purposes Only

Scenario Title: Increased Density 1c. Housing Demand Shift (Run N26)

Status as of June 20, 2012: Draft Model

Scenario Description and Assumptions:
Modified distribution of residential demand between High, Medium, Low and Very Low from the Base Case to ratios used for the Kern Regional Blueprint Alternative Scenario. This shifted approximately 10-15% from residential low to medium and high. Some growth was limited to remain constrained by General Plans.

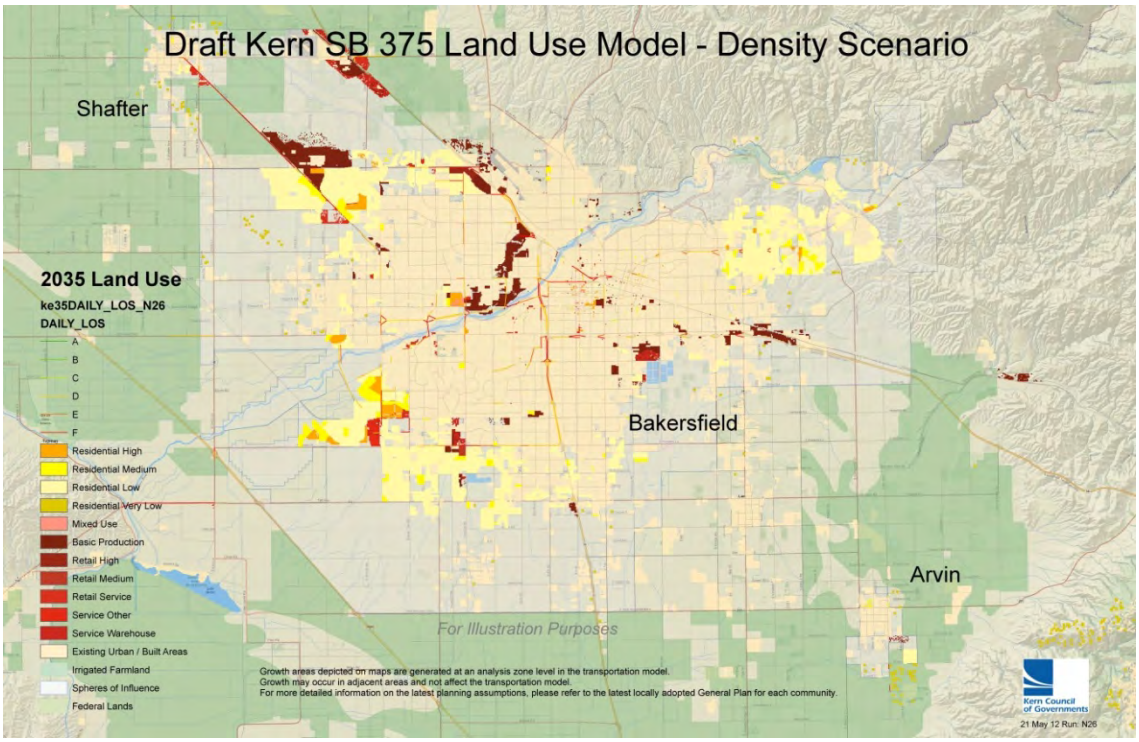
Summary of Inputs:
This scenario uses the urban built area developed for the Infill Scenario that allowed growth in the Rapid Bus Corridor. The scenario was run using the current transportation model.

Summary of Results: Scenario is 16.7% above the Kern target of 13.31 lbs/capita

Indicator or Measure	Scenario	vs 2035 Adjusted Base*
Households per Acre (Growth Only)	4.12	+ 22.4%
Public Transit Boarding's	27,391	+ 7.25%
SB 375 CO2/Capita	15.99	- 0.39 %
Total VMT/Weekday (miles, in thousands)	40,600	- 0.42 %
Total SB 375 VMT (-xx,-50% ixxi,-50% military)	26,744	- 0.52 %

*** Based on M24 land use**

Reference Map/Table:



Scenario Detail Sheet

For Discussion Purposes Only

Scenario Title: Road Projects - 2a. Add HOV Lanes

Status as of June 7, 2012: Initial test run

Scenario Description and Assumptions:
The HOV/BRT scenario applies recommended changes to the transportation model based on the HOV/BRT study. The larger scale recommendations can be seen in the map.

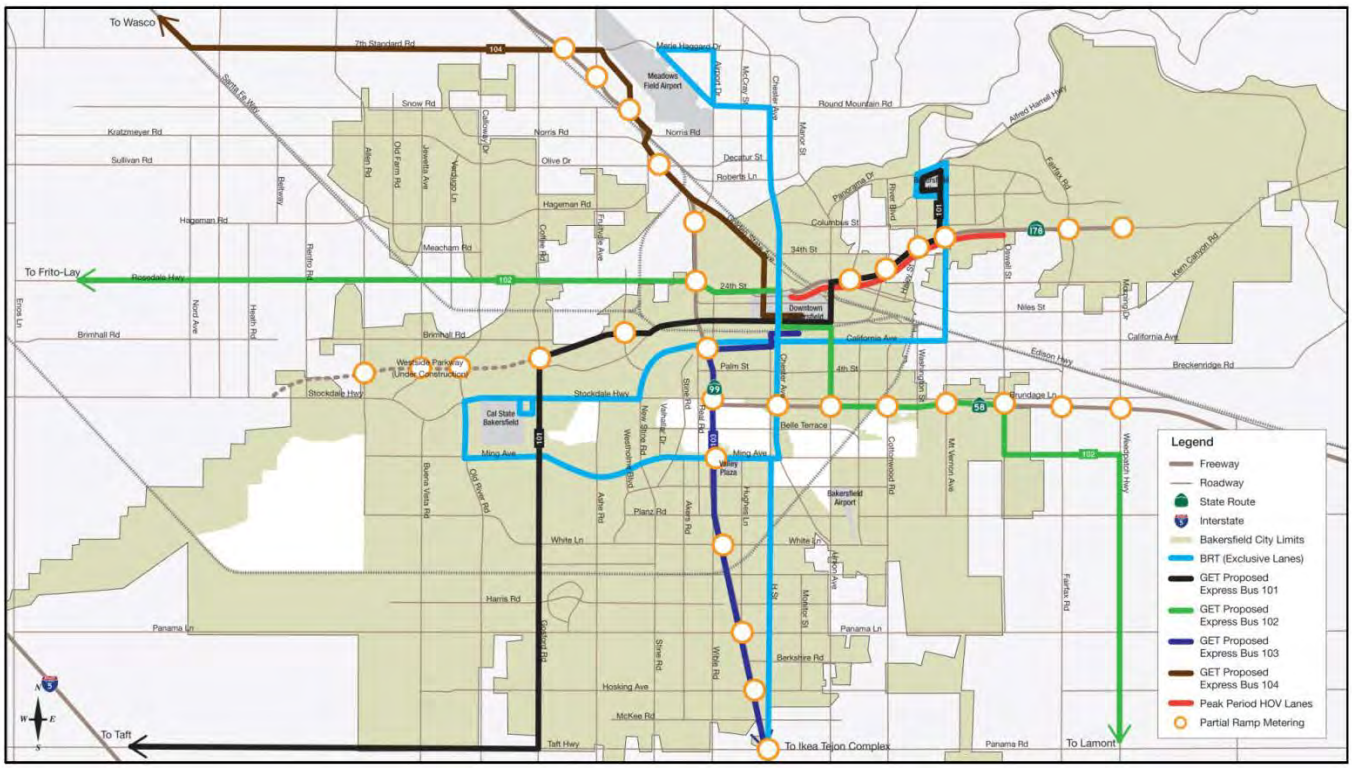
Summary of Inputs:
Adjustments to the transportation model network. Based on the M24 land use model outputs and the Long Range Transit Plan.

Summary of Results: Scenario is 17.1% above the Kern target of 13.31 lbs/capita

Indicator or Measure	Scenario	vs 2035 Adjusted Base*
Public Transit Boarding's	53,610	+ 109.91%
SB 375 CO2/Capita	16.05	0 %
Total PV VMT/Weekday (miles, in thousands)	40,681	- 0.22%
Total SB 375 VMT (-xx,-50% ixxi,-50%military)	26,906	+ 0.08%

*** Based on M24 land use**

Reference Map/Table:



Source: HOV/BRT Study Final Report, 2012.

Scenario Detail Sheet

For Discussion Purposes Only

Scenario Title: Road Projects - 2c.Add/Reduce Roadway Lanes (Hageman Flyover)

Status as of June 20, 2012: Initial test run

Scenario Description and Assumptions:
This scenario reduces 1 lane each direction on Hageman Flyover from Knudsen to SR 204.

Summary of Inputs:

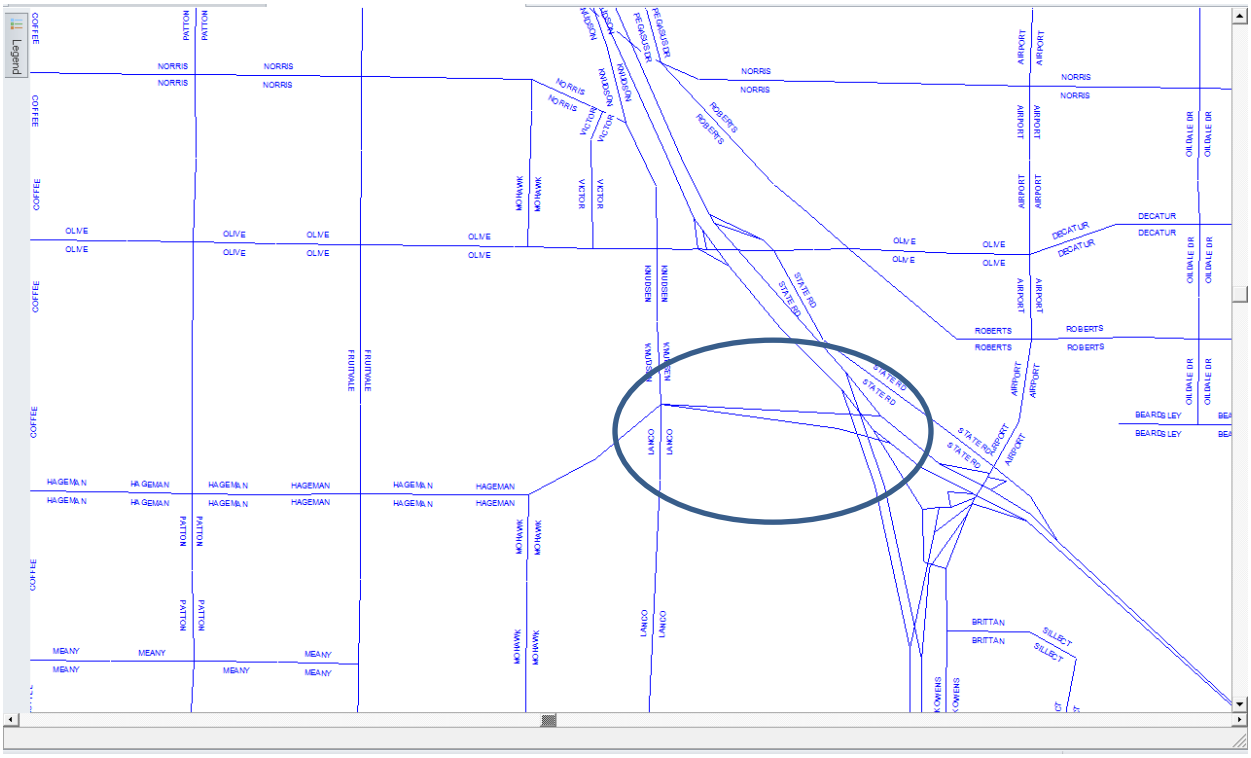
Based on the M24 land use and adding lanes to the Hagamen Flyover to the current travel.

Summary of Results: Scenario is 17.1 % above the Kern target of 13.31 lbs/capita

Indicator or Measure	Scenario	vs 2035 Adjusted Base*
Households per Acre (Growth)	3.36	-
Public Transit Boarding's	25,539	0.0 %
SB 375 CO2/Capita	16.05	0.0 %
Total VMT/Weekday (miles, in thousands)	40,770	0.0 %
Total SB 375 VMT (-xx,-50% ixxi,-50%military)	26,884	0.0 %

*** Based on M24 land use**

Reference Map/Table:



Scenario Detail Sheet

For Discussion Purposes Only

Scenario Title: Short Term Transit – 3b. Increase Service + 3c. Accessibility

Status as of June 20, 2012: Initial test run

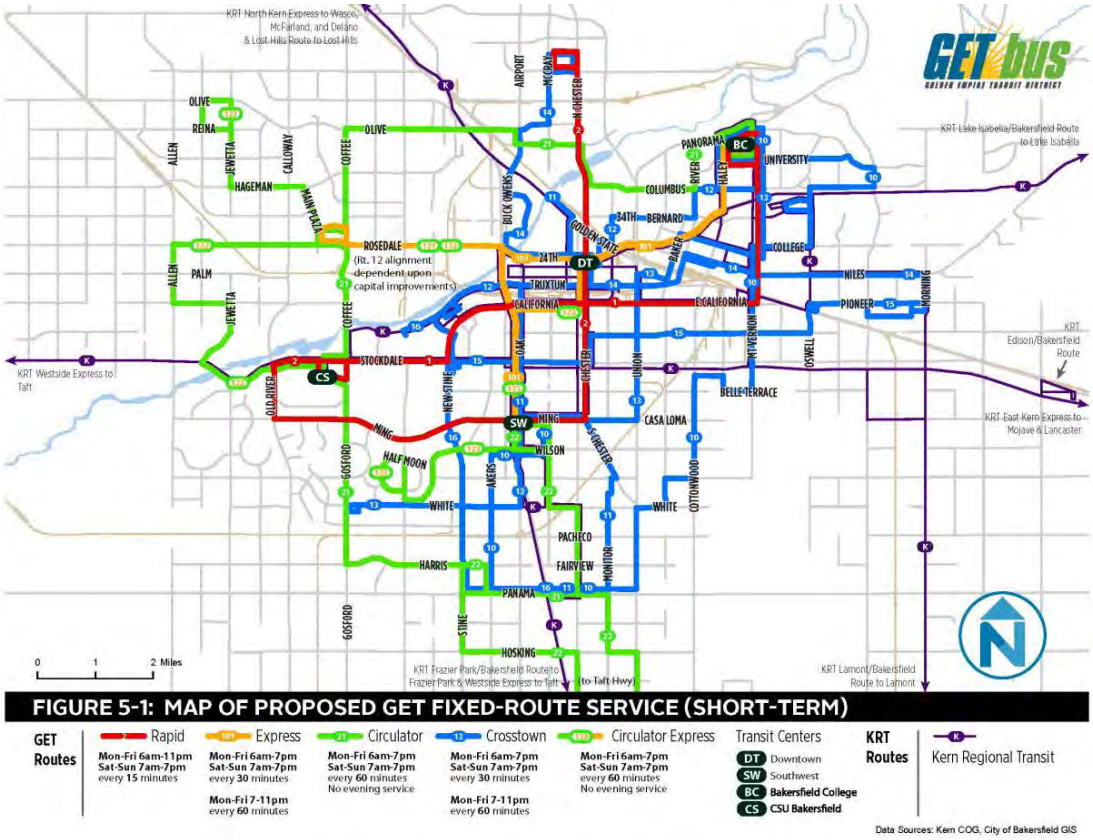
Scenario Description and Assumptions:
This scenario is based on the Metro Bakersfield Short Range Transit Plan.

Summary of Inputs:
Based on the M24 land use and the 2035 transportation network with Short Range Transit Plan.

Summary of Results: Scenario is 17.1% above the Kern target of 13.31 lbs/capita

Indicator or Measure	Scenario	vs 2035 Adjusted Base*
Households per Acre (Growth)	3.36	-
Public Transit Boardings	23,986	- 6.08 %
SB 375 CO2/Capita	16.05	0 %
Total PV VMT/Weekday (miles, in thousands)	40,768	- 0.01 %
Total SB 375 VMT (-xx,-50% ixxi,-50%military)	26,881	- 0.01 %

Reference Map/Table:



Scenario Detail Sheet

For Discussion Purposes Only

Scenario Title: Combined Transit – 3b. Increase Service and 3d. Accessibility

Status as of May 17, 2012: Initial test run

Scenario Description and Assumptions:

..

Summary of Inputs:

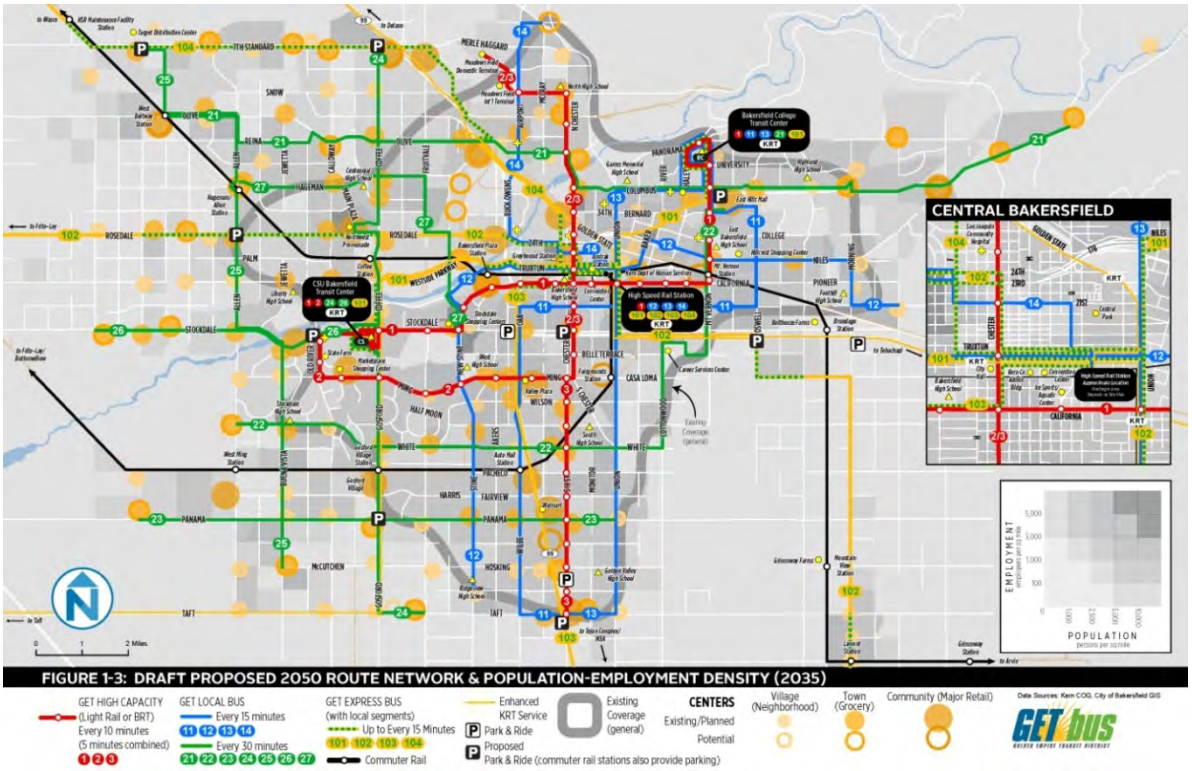
Improved transit network includes increase service to outlying areas and greater frequency. Based on Base M24 land use, Long Range Transit network and the current travel model.

Summary of Results:

Indicator or Measure	Scenario	vs 2035 Adjusted Base*
Households per Acre (Growth)	3.36	0.0 %
Public Transit Boarding's	53,343	108.87 %
SB 375 CO2/Capita	15.89	- 0.98 %
Total VMT/Weekday (miles, in thousands)	40,424	- 0.85 %
Total SB 375 VMT (-xx,-50% ixxi,-50%military)	26,647	- 0.88 %

*** Based on M24 land use**

Reference Map/Table:



Scenario Detail Sheet

For Discussion Purposes Only

Scenario Title: Pricing – 4c. Downtown Parking Cost

Status as of June 20, 2012: Initial test run

Scenario Description and Assumptions:
The downtown parking cost scenario applies a $3 parking cost to 33 TAZ's in Downtown Bakersfield. The $3 parking cost was determined to be the most aggressive and possibly achievable pricing scenario through discussions at the Kern Transportation Modeling Committee, and discussions with the City of Bakersfield.

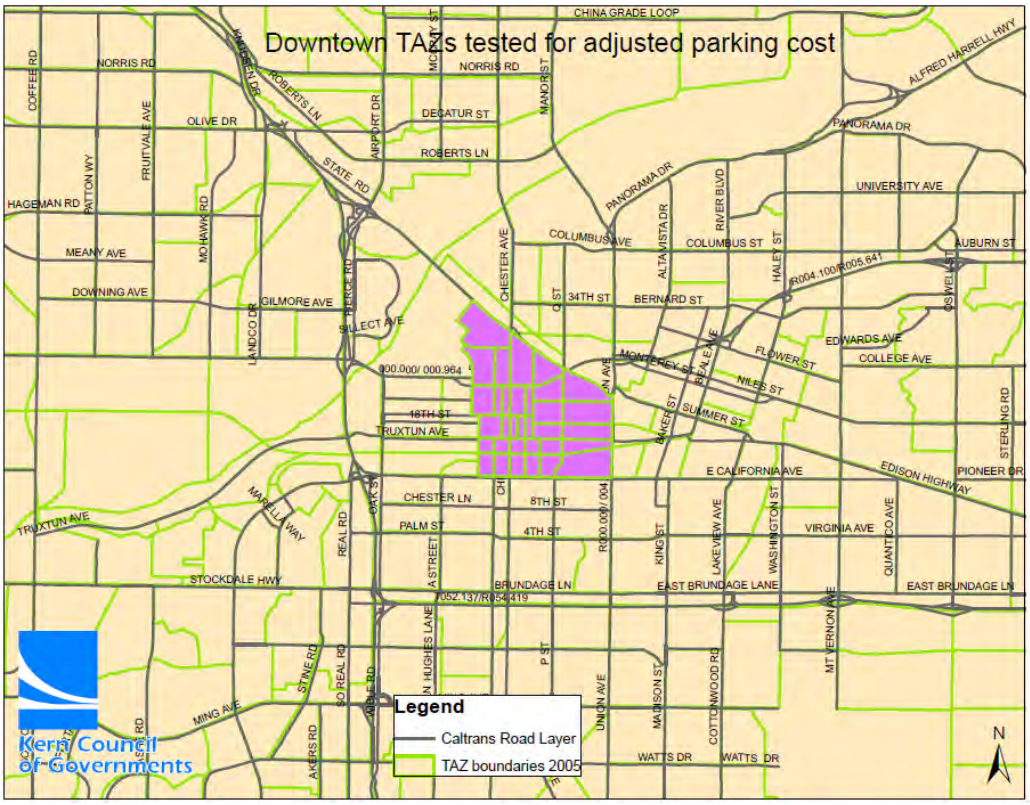
Summary of Inputs:
Parking Cost: increased from $0 to $3 in downtown Bakersfield, see map.
Based on the M24 land use and the Long Range Transit travel model.

Summary of Results: Scenario is 17.1% above the Kern target of 13.31 lbs/capita

Indicator or Measure	Scenario	vs 2035 Adjusted Base*
Households per Acre (Growth)		-
Public Transit Boarding's	27,142	+ 6.28 %
SB 375 CO2/Capita	16.05	+ 0.01 %
Total PV VMT/Weekday (miles, in thousands)	40,763	- 0.02 %
Total SB 375 VMT (-xx,-50% ixxi,-50%military)	26,876	- 0.03 %

*** Based on M24 land use**

Reference Map/Table:



Scenario Detail Sheet

For Discussion Purposes Only

Scenario Title: Combined - 1d Improve Walkability + 5b Improve Biking

Status as of June 7, 2012: Draft

Scenario Description and Assumptions:
The Bike Plan scenario reduces traffic based on recommendations from consultants Kittelson Associates/Dowling. Auto trips were reduced by 5% for AM Peak and PM Peak for Drive Alone and Shared Ride trips

Summary of Inputs:

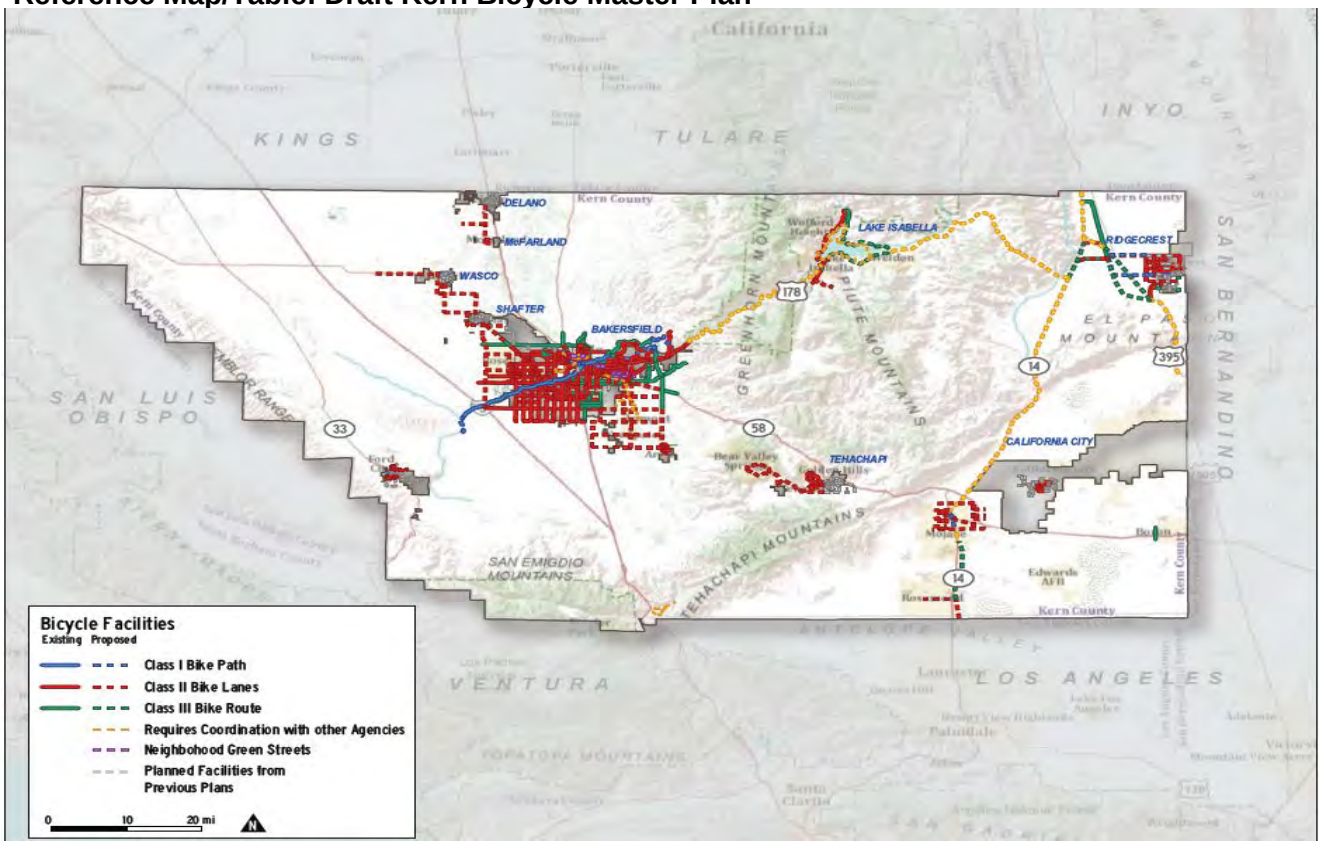
Based on the M24 land use and current travel model with adjusted auto trips.

Summary of Results: Scenario is 15.2% above the Kern target of 13.31 lbs/capita

Indicator or Measure	Scenario	vs 2035 Adjusted Base*
Households per Acre (Growth)	3.36	-
Public Transit Boarding's	25,546	+ 0.03 %
SB 375 CO2/Capita	15.70	- 2.18 %
Total PV VMT/Weekday (miles, in thousands)	39,949	- 2.02 %
Total SB 375 VMT (-xx,-50% ixxi,-50%military)	26,302	- 2.16 %

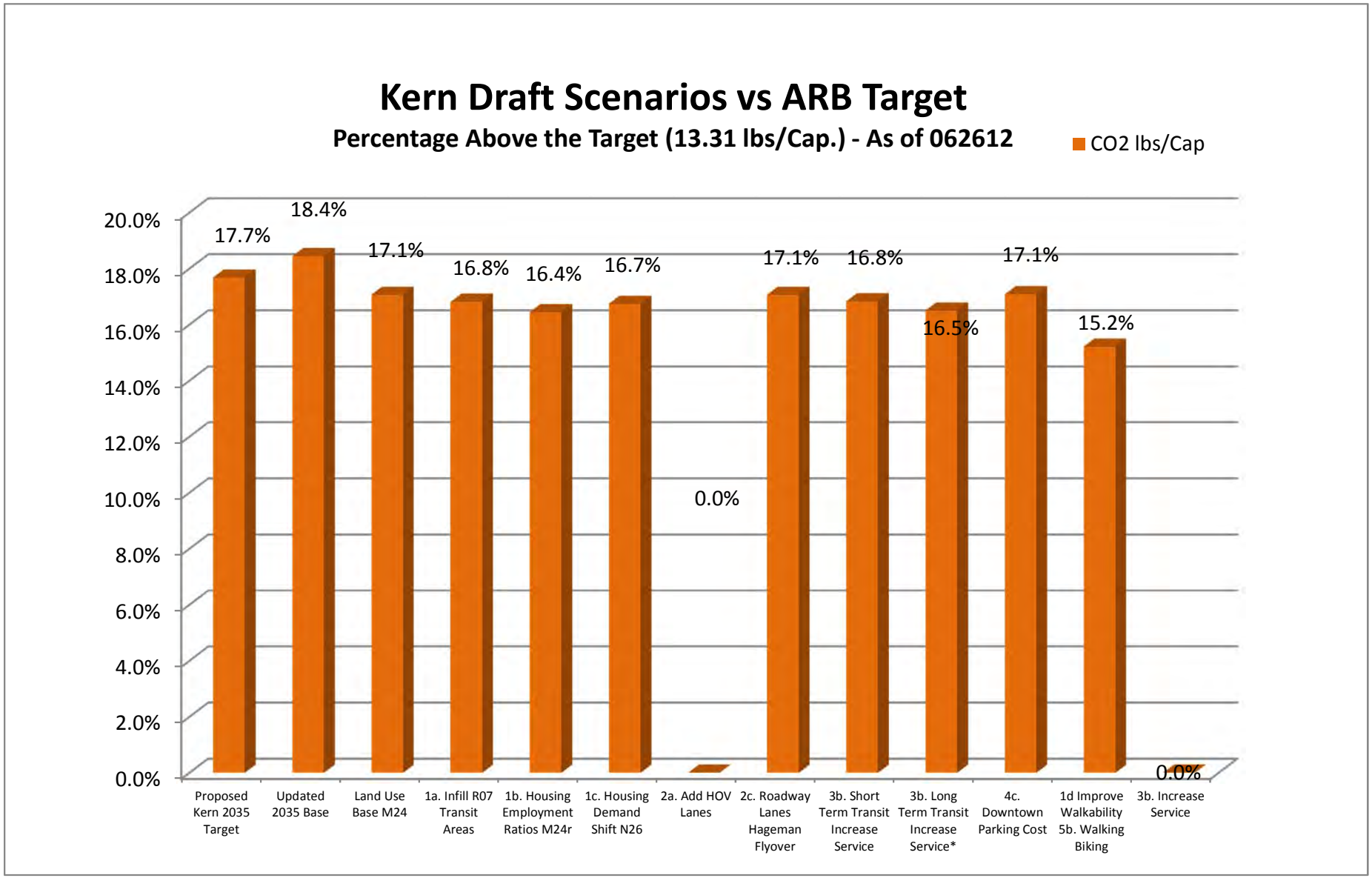
*** Based on M24 land use**

Reference Map/Table: Draft Kern Bicycle Master Plan



Attachment 3

SCS Scenario Graph – June 2012


Kern Draft Scenarios vs ARB Target
Percentage Above the Target (13.31 lbs/Cap.) - As of 062612
CO2 lbs/Cap
20.0%
18.0%
16.0%
14.0%
12.0%
10.0%
8.0%
6.0%
4.0%
2.0%
0.0%
17.7%
18.4%
17.1%
16.8%
16.4%
16.7%
0.0%
17.1%
16.8%
16.5%
17.1%
15.2%
0.0%
Proposed Kern 2035 Target
Updated 2035 Base
Land Use Base M24
1a. Infill R07 Transit Areas
1b. Housing Employment Ratios M24r
1c. Housing Demand Shift N26
2a. Add HOV Lanes
2c. Roadway Lanes Hageman Flyover
3b. Short Term Transit Increase Service
3b. Long Term Transit Increase Service*
4c. Downtown Parking Cost
1d Improve Walkability 5b. Walking Biking
3b. Increase Service

Attachment 4

Existing Travel Model Constraints
(Excerpt from RPAC July 3, 2012 Presentation)

Travel Model Constraints

- Land Use model allocates growth in 4 categories High, Medium, Low and Very Low
- Travel model generates trips based on one land use category Total Households
- New MIP travel model generates trips for up to ten Household Categories RU1 – RU10 (5 in use now)
- **Travel / MIP Model that is sensitive to Land Use generates 93% or 7% lower Total VMT than current travel model.**

	Land Use	Travel Model Trip Rate*	Total VMT
Low/RU1	0	0	
Med/RU2	0	0	
Total HHds	100	7.06	706

	Land Use	MIP Model Trip Rate*	Total VMT
Low/RU1	80	7.06	565
Med/RU2	20	4.59	92
Total HHds	100		657

Source: Kern Model Documentation Table 4.1 Daily Person Trip Generation Rates

Attachment 5

Draft Modeling Methodology Documentation

KERN SB 375 MODELING METHODOLOGY - ***DRAFT***

Kern Council of Governments

07/18/2012 version 10

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Technical Appendix

EXECUTIVE SUMMARY

SB 375 SUMMARY OF REQUIREMENTS

Municipal Planning Organizations "MPO" are required to prepare a Sustainable Communities Strategy as a part of the Regional Transportation Plan "RTP". The SCS must meet the emission targets set for each MPO by the Air Resources Board for the years 2020 and 2035.

The purpose of the SCS is to reduce vehicle emissions from light-duty trucks and passengers vehicles by improvements in Land Use and Transportation planning.

The targets for Kern Council of Governments "Kern COG" the MPO for the County of Kern are 5% reduction by 2020 and 10% reduction by 2035. These targets are planned for review by ARB in 2012.

MODEL DEVELOPMENT

LAND USE AND TRANSPORTATION MODEL DEVELOPMENT

Kern COG has adapted the same methodology used in the Blueprint process for land use modeling based on the UPlan modeling software developed by UC Davis.

Model parameters, assumptions, inputs, and reference information such as General Plans have been provided by Kern COG's member agencies. The Kern COG Transportation Modeling Committee and other stakeholders have provided input and oversight to the development of the model. The original spreadsheet based land use model will continue to be developed and supported.

Kern COG is using its existing Cube transportation model validated in 2006. It was enhanced in 2010 to include the 4D's, and modified to run in Cube Voyager.

INTEGRATED LAND USE AND TRANSPORTATION MODEL DEVELOPMENT

Kern COG has developed a procedure that allows the output from the Land Use model to become the input for the transportation model. Evaluation and testing of the new CubeLand integrated land use and transportation model is underway.

TECHNICAL METHODOLOGY

Kern COG intends to use the UPlan/Cube modeling platform to develop the many scenarios required for the development and adoption of the Sustainable Communities Strategy and Alternative Planning Strategy. Kern COG further intends to consult with member agencies, stakeholders, other MPO's and ARB as part of the SCS development process.

.

UPLAN PROGRAM OBJECTIVES AND METHODOLOGY

SB 375 BACKGROUND

Achieve GHG Emission Reduction Target Though SCS

Integrate Regional Planning for Transportation, Land Use, and Housing

Full and Open Participation

UPLAN HISTORY AND APPLICATIONS

UPLAN DEVOLPMENT AND FUNDING

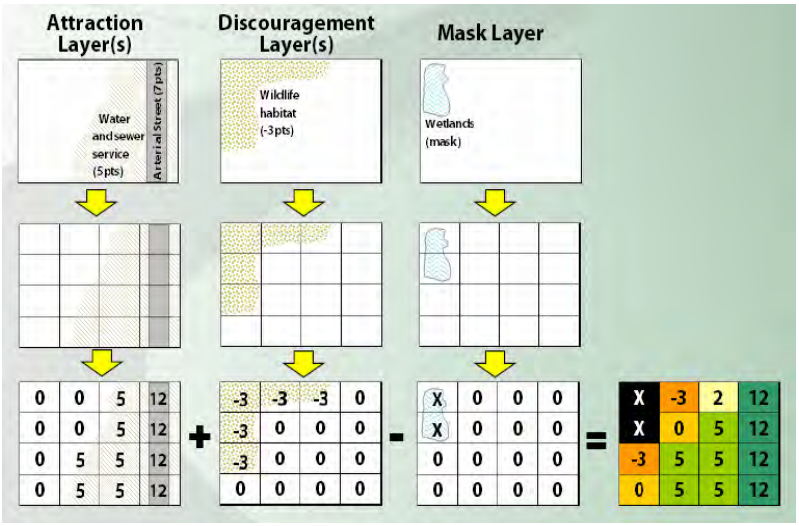
Developed at Information Center for the Environment at UC Davis

Funding received for development originates from several government agencies, including the California Department of Transportation and the California Energy Commission.

UPLAN'S OBJECTIVES AND USES

"UPlan was designed to help regions study the interactive effects of growth and development by projecting future land use patterns. It shows how decisions made today are most likely to impact the region decades into the future." (ShastaFORWARD)

HOW MODEL ALLOCATES NEW GROWTH

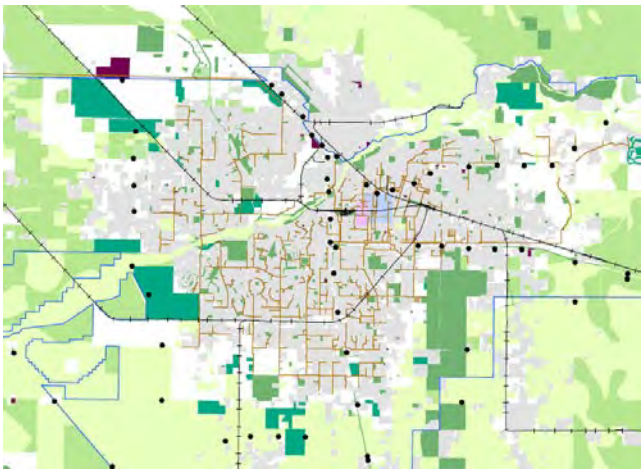


CELLS

UPlan functions by dividing land into “cells”, not parcels or TAZs. These cells are equal in size and can only contain one type of future planned growth, although hybrid types can be created to consolidate other types, such as the “Mixed Use” type, showing both residential and commercial growth. Kern’s model has 50 by 50 meter cells.

ATTRACTIONS

An attraction could be any number of things that would promote future growth in that particular region, such as availability of electricity, water, sewer, and road infrastructure. Attractions can also be non-physical things, such as political boundaries or tax incentives. An attraction will draw the allocation of growth to it, in other words, cells with attractions will have growth allocated to them before cells without.



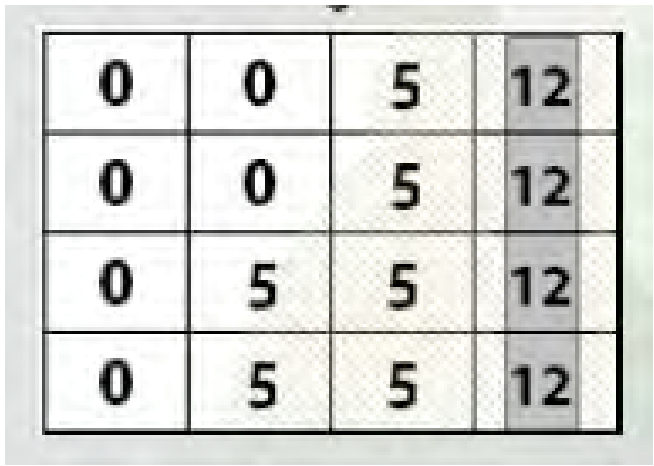
DISCOURAGEMENTS

A discouragement is the opposite of an attraction; an undesirable feature of a place where future development may take place, such as sandy soil. A discouragement does not prevent growth, although it will stop allocation of it until all other areas of that type are allocated. A discouragement represents an area that would cost more to develop or one that wouldn’t have good attributes.

Kern’s Land Use Model does not use discouragements

WEIGHTING

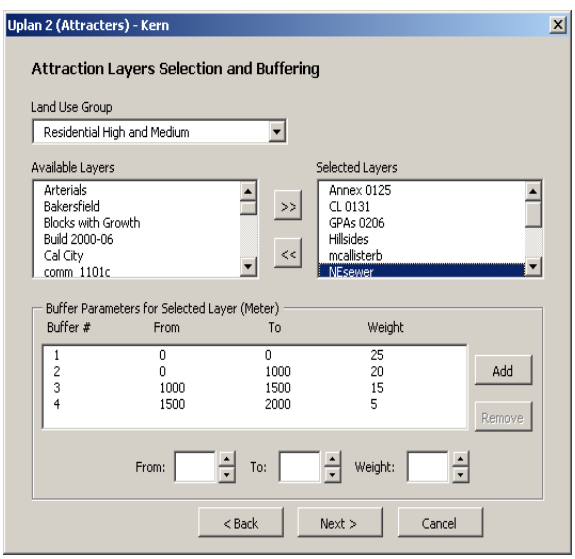
Weighting is how UPlan balances attractions and discouragements, as well as how the user can determine how much an attractor will attract growth and how much a discouragement will repel it. For example, if a cell has both an attractor and a discouragement, the values of them can be thought as positive and negative values, respectively. If the cell has an attractor with a weight of ten and a discourager with a weight of five, the total value of the cell will be 10 – 5 = 5, so the cell will still have an attractive value to it. An example of the usefulness of weighting something would be the absolute need for industrial areas to develop with a water supply, thus any water layers would have a very high attraction weight to them for industrial growth.

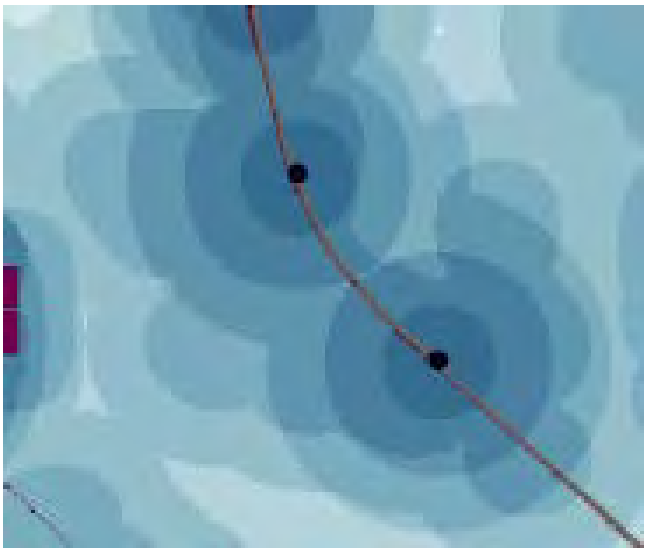


0	0	5	12
0	0	5	12
0	5	5	12
0	5	5	12

BUFFERS

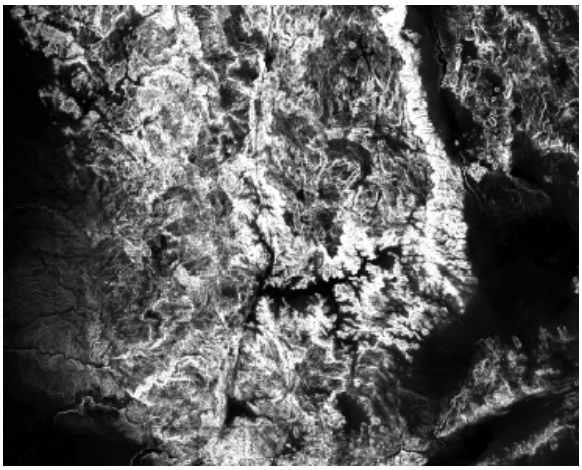
Attractions or discouragements may be surrounded by a user defined sphere of coordinates or 'buffer'. The user decides the number and width of the buffers. The highest attraction or discouragement values are given to buffers that have the greatest proximity to the feature. A buffer could be used in the situation of a freeway interchange and commercial growth. Clearly, businesses will wish to be closest to the freeway in order to obtain more costumers, so areas closest the freeway should be modeled with the highest attraction value, with areas further away slowly decreasing in value relative to the distance from the freeway. Below is a screen shot showing an example of the input parameters for a buffer and a screenshot showing the accumulated buffers the model will use as the attraction for each of the land use types.





MASKS

A mask is effectively an infinite discouragement, preventing all growth in that particular cell, even if all other cells have been assigned growth and unassigned growth still remains. A good candidate for a mask in UPlan would be lakes or cliffs where growth would be (by today's economic and technological standards) improbable.



KERN COG METHODOLOGY

SB 375 MODELING AND TARGET SETTING

KERN COUNTY CLIMATE CHANGE TASK FORCE

Objective:

To assist Kern COG and its member agencies to meet the goals and objectives of Senate Bill No. 375 (SB 375) within the required time frame.

While it is months away until the draft targets will be known, Kern COG has recognized the need to begin the daunting task of coordinating the regional planning, housing, and transportation planning processes into a strategy to meet the intention of the Legislation. This will be an evolving process as regions throughout the state work together to establish and understand the targets, educate stakeholders and decision makers, define the Sustainable Community Strategy, understand the transportation funding implications as well as the housing projections.

For the purposes of outlining the COG's effort in compliance with the Legislation and how Kern COG's consulting efforts may assist, we have broken the efforts into three consecutive steps. Within each step, there are three components: education, technical, and strategy.

The tasks outlined below are efforts we anticipate the COG to undertake ***with assistance and guidance from consulting services as needed***.

Phase 1: Positioning the COG to participate in the SB 375 implementation process. This part would begin now and would continue until CARB RTAC releases the draft GHG emission reduction target setting methodology. The purpose of this effort is ultimately to position the COG to be prepared to carry out the SB 375 requirements. *Timeline: Now to September 30, 2009.*

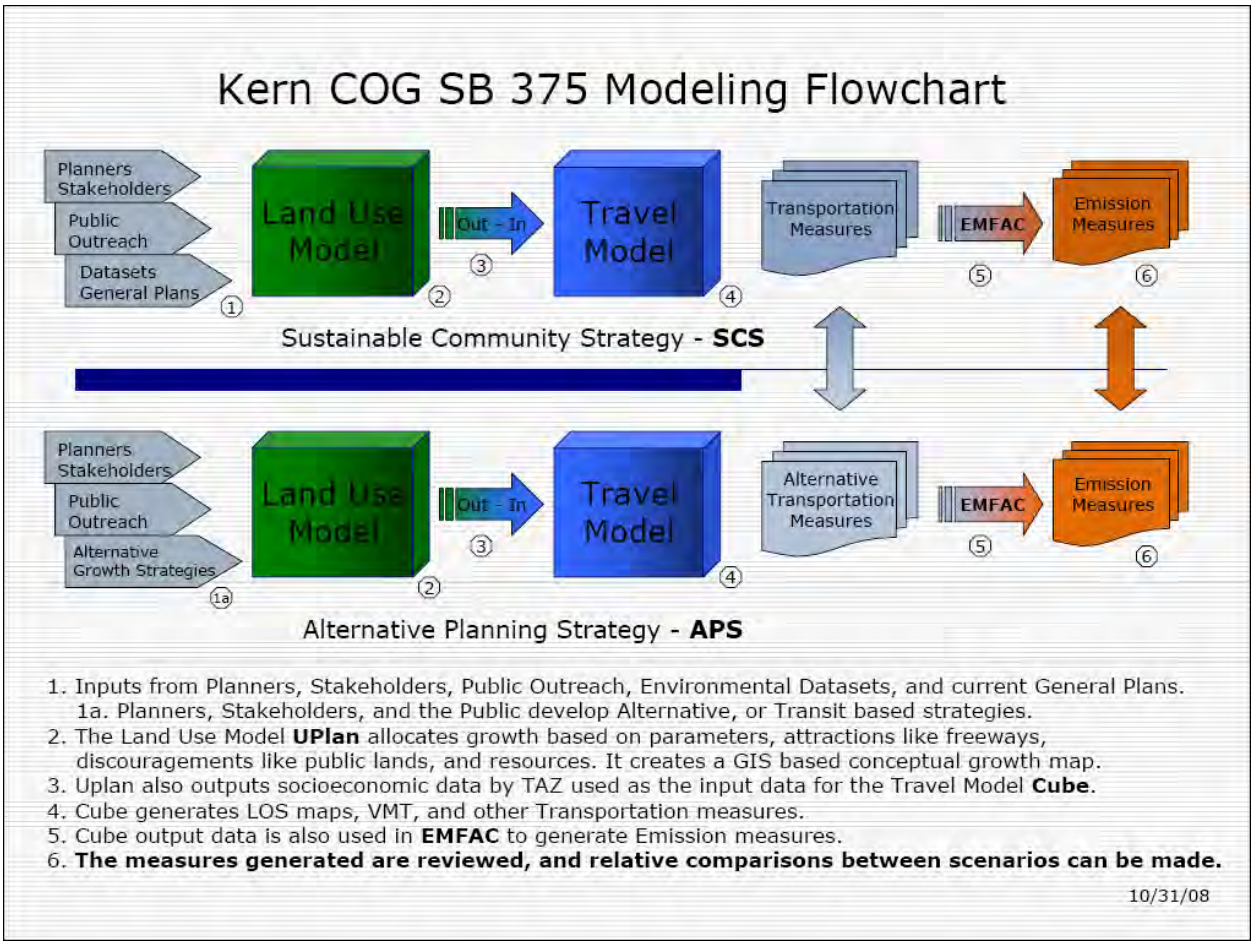
Phase 2: Preparing the structure to meet the targets. This period begins once CARB RTAC releases the target setting methodology to the COG. *Timeline: October 1, 2009 to September 30, 2010.*

Phase 3: Complying with SB 375. This period begins once the Regional targets are final and accepted and the COG must prepare the RTP, the SCS, and the RHNA. *Timeline: October 1, 2010 to adoption of the RTP and RHNA.*

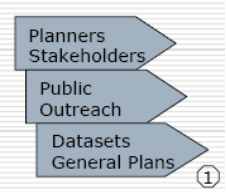
LAND USE MODEL METHOD

KERN COG SB375 MODEL

- U Developed from Blueprint Processed Modeling
- Based on GIS based UPlan land use model
- Use existing CUBE transportation model



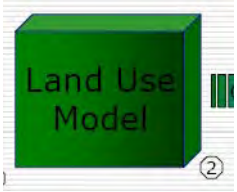
Planners & Public Information



The planners provide information about their forecasts and predictions using the spreadsheet model, public agencies provide general plans, and private stakeholders provide information on forthcoming developments. A

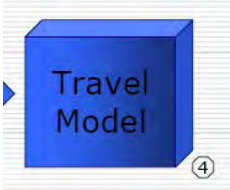
public outreach program is also conducted to better predict public opinion on future growth. This information is compiled and put into a matrix for the UPlan Land Use input.

UPlan Land Use Model



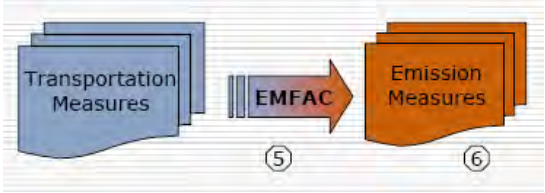
The UPlan model, as described earlier, takes this information and predicts where new growth will be allocated, this information is then inputted to the Cube Travel Model.

Cube Travel Model



The Cube Travel Model then takes this information and calculates VMT (Vehicle Miles Traveled); this provides input for the EMFAC.

EMFAC Conversion



EMFAC takes the Transportation Measures from Cube and calculates the carbon emissions.

BASIC RULES UPLAN OPERATES BY

People take up space

People live in groups known as Households

Different household types take up different amounts of space

Some portion of each household is employed

Different forms of employment require different amounts of space

Each residential type has attributes that attract or discourage growth

Each employment type has attributes that attract or discourage growth

Some things block all growth (i.e. a lake)

The general plan determines where future growth will occur and what type it will be

Growth will happen in the areas with the most attractions first, then the next most attractive, then the third most attractive, and so on.

CREATING SCENARIOS

TECHNICAL TOOLS

Existing Models

- Socioeconomic Growth Forecasts
- Trip-based travel demand model
- 4-D technical tool (intra-zonal travel demand)
- Emissions model (ARB's EMFAC Model)

New Model Development

- Land Use Model (UPlan)
- San Joaquin Valley MPO's Model Improvement Program "MIP" is in progress
- Cubeland integrated Land Use and Transportation model is in development

CURRENT TRENDS – BUSINESS AS USUAL

Current trends represent are the input parameters for what is "business as usual" without any major change, based on historic growth rates and "normal" planning methodologies.

ALTERNATIVE SCENARIOS

The alternative scenario is the "what if" part of the model. These scenarios are where planners can see what may happen in various hypothetical situations, which can be used to find a Sustainable Community Strategy.

ASSUMPTIONS

DATA

Base Years – 2005(2010), 2020, 2035

Census

Population

Employment

Existing Land Use

Existing Zoning

General Plans

Additional Blueprint Projects

Base Year Transportation Inventories

Baseline Transportation Inventories

MATRIXES (SPEARDSHEET BASED WORKSHEETS)

Population Matrix

5 Population Categories – (Consolidated from county and cities individual general plans)

High Density Residential

Medium Density Residential

Low Density Residential

Very Low Density Residential

Mixed Use (Residential & Industrial)

Demographic Reference Information:

Population – Kern Adopted Population Growth Tables

People per household

Future population

Employees per household

Employment Matrix

6 Employment Categories – (See previous definition on population categories)

BASIC – Basic Employment

RHRET – Retail High

RMRET – Retail Medium

RETSER – Retail Service

SOSER – Service Other

BWOTH – Basic Warehouse

GEOGRAPHIC PARAMETERS

DRAFT SUB-REGIONAL GHG TARGETS

Develop Draft Sub-regional Targets to meet Regional Target

Flexibility within Sub-region on SCS

Possible Joint Sub-regional SCS

KCOG Assistance to Sub-regions Where Necessary

Finalize Based on Regional Dialogue

SUBAREAS

Subarea #1 – Westside Kern – Major cities include Taft & Maricopa

Subarea #2 – Delano/McFarland

Subarea #3 – Wasco

Subarea #4 – Tehachapi/Frazier

Subarea #5 – Metro – Major cities include Bakersfield, Shafter, & Arvin

Subarea #6 – Southeast Kern – Major cities include Cal City, Mojave, & Rosamond

Subarea #7 – Lake Isabella

Subarea #8 – Indian Wells – Major cities include Ridgecrest & Inyokern

LAYERS

TAZ – Traffic Analysis Zones

Sub Areas – Consolidation of TAZs that the model uses

Extent – Kern County Lines

Cities General Plans

Slope – (sometimes as a mask)

Attractors (no discouragers are used for Kern's application)

Masks – (such as existing urban)

MODEL OUTPUTS

Final Allocation (All land use types)

Final Attraction Layer

Datasets output (spreadsheet.dbf)

- Allocation Stats
- Land Consumption (see Appendix B)
- Results by TAZ
- TAZ export to socio-economic spreadsheet (used for travel model)

SCENARIO ANALYSIS (IN PROGRESS)

SCS SCENARIO DEVELOPMENT WORKSHEET

Spreadsheet that summaries the 2005 Base case, 2035 base, and each of the scenarios development.

SCS SUMMARY GRAPH

Bar chart illustrating the CO2/capita results for each of the scenarios.

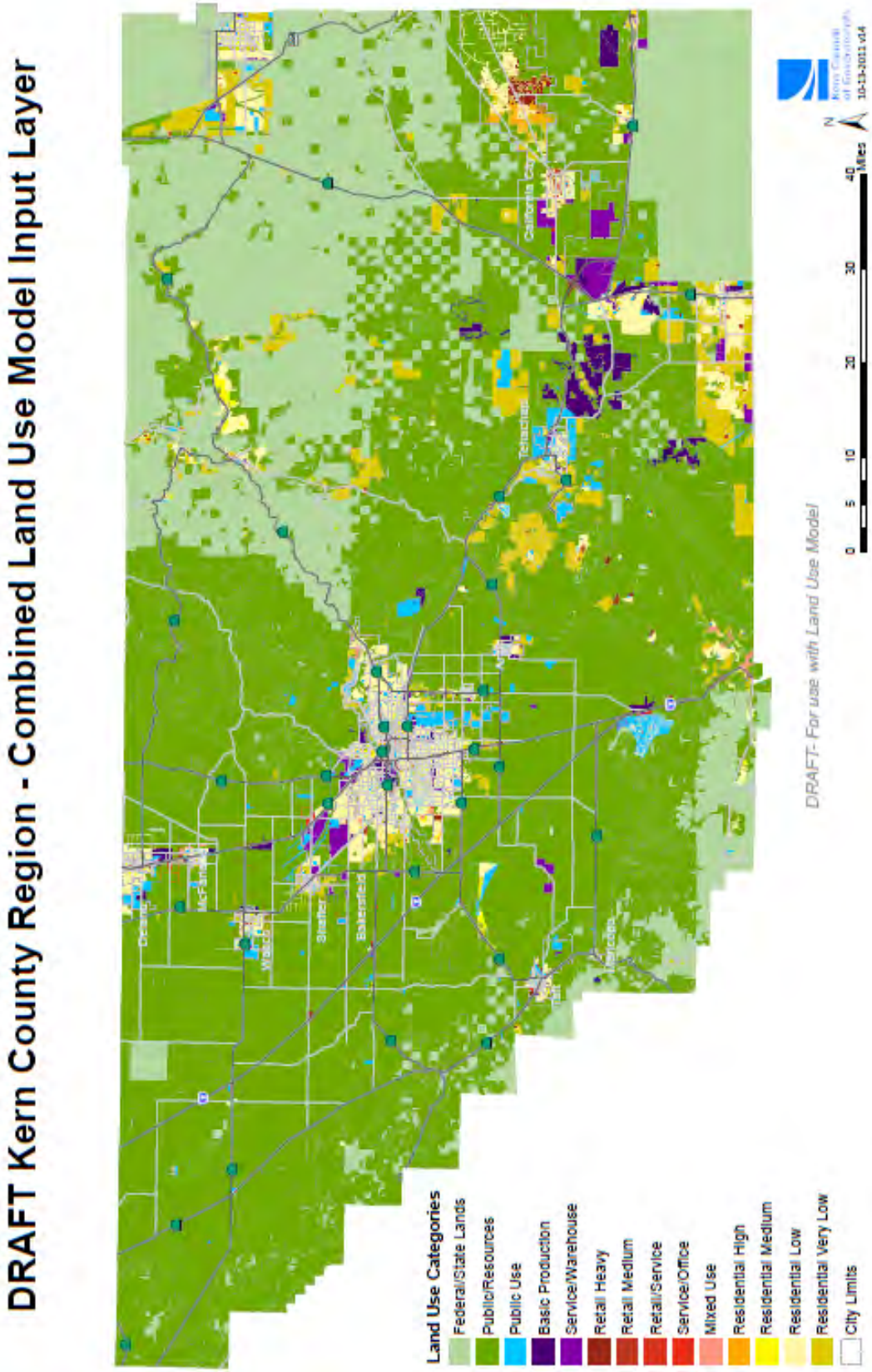
SCS SCENARIO DETAIL SHEETS

Single page summaries for each scenario describing the inputs, parameters and assumptions for the scenario.

Technical Appendix

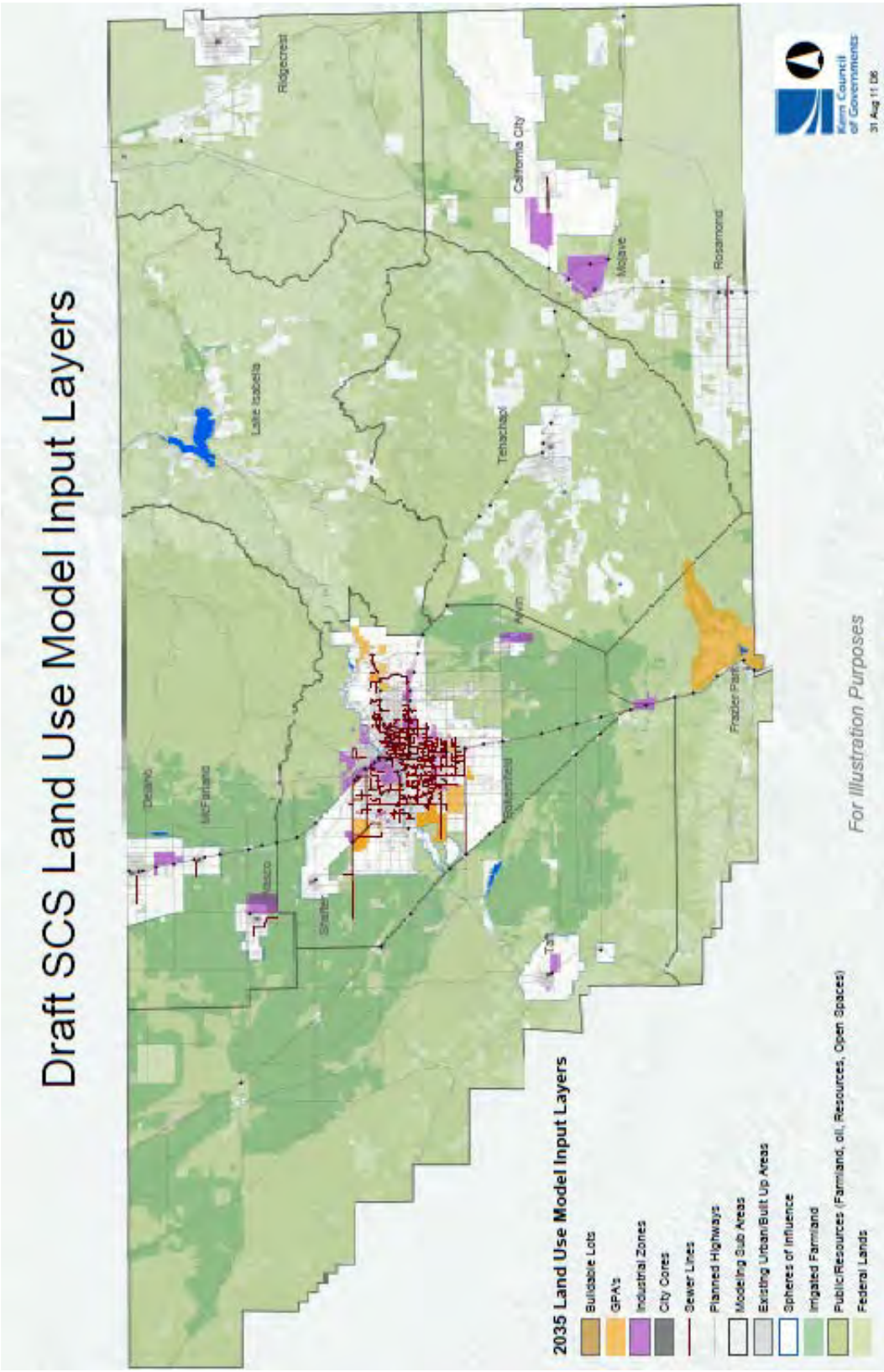
Appendix A

Combined Land Use Map – (13B)



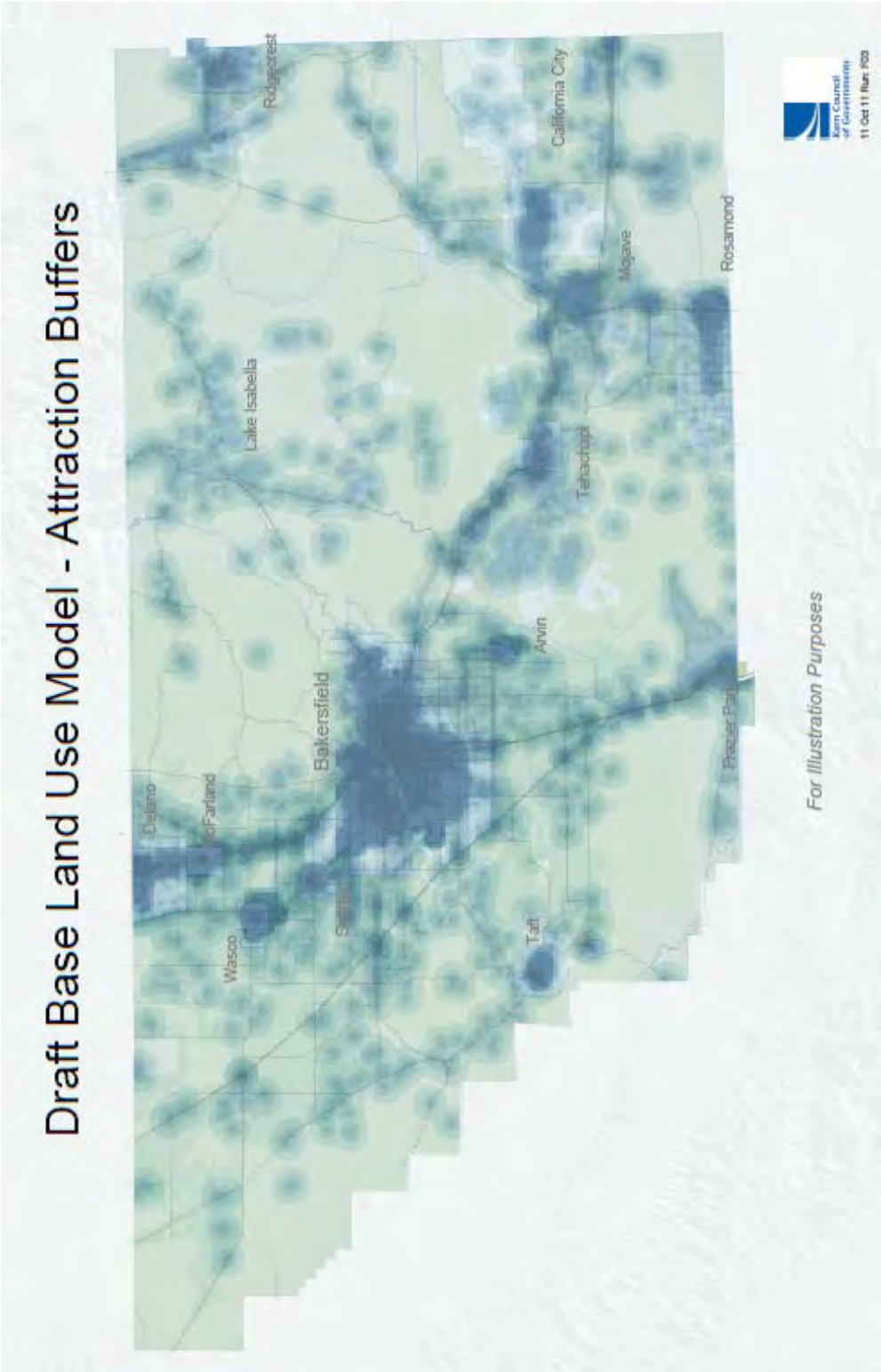
Appendix B

Land Use Model Attraction Layers



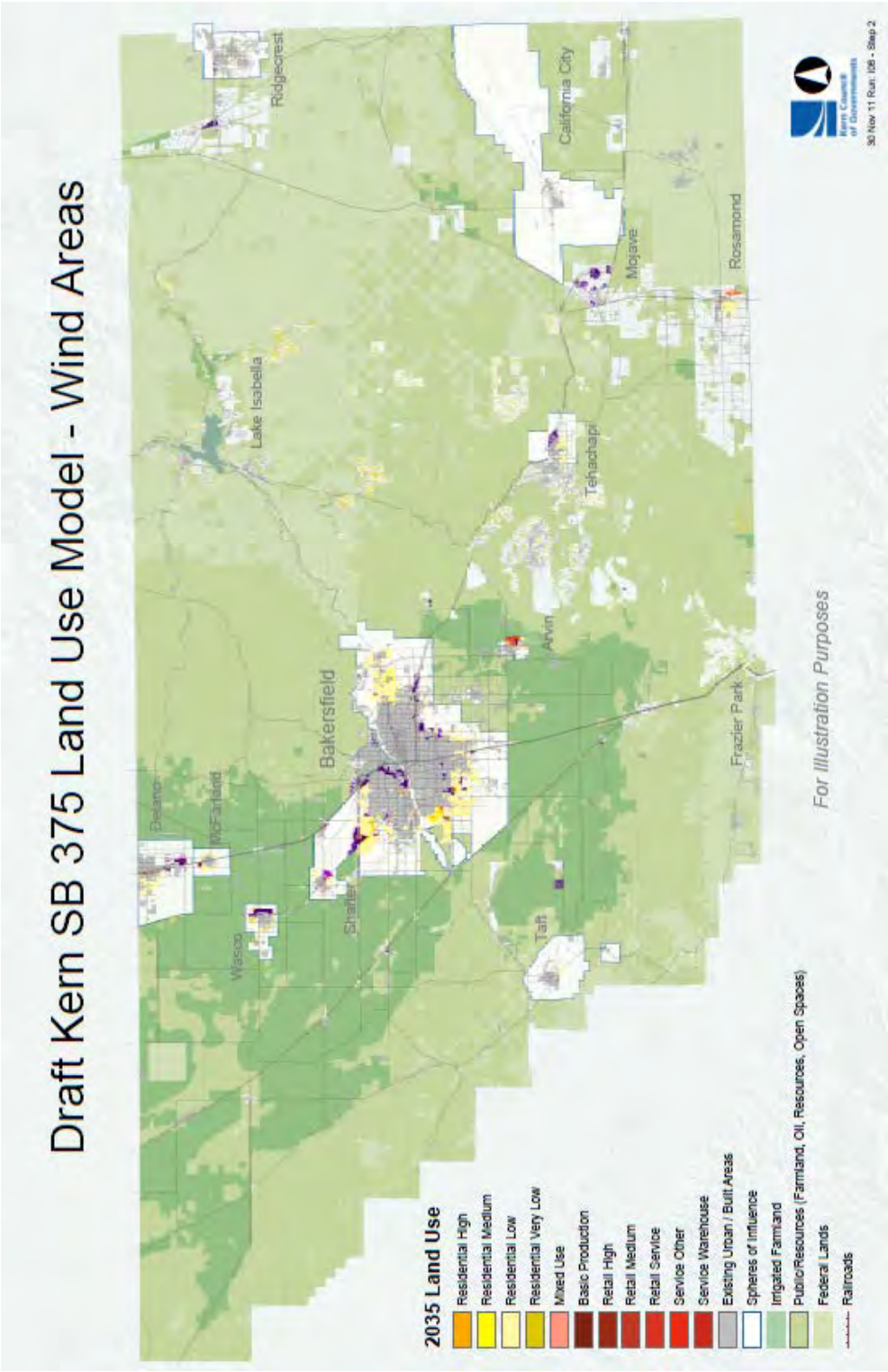
Appendix C

Accumulated Attraction Buffers



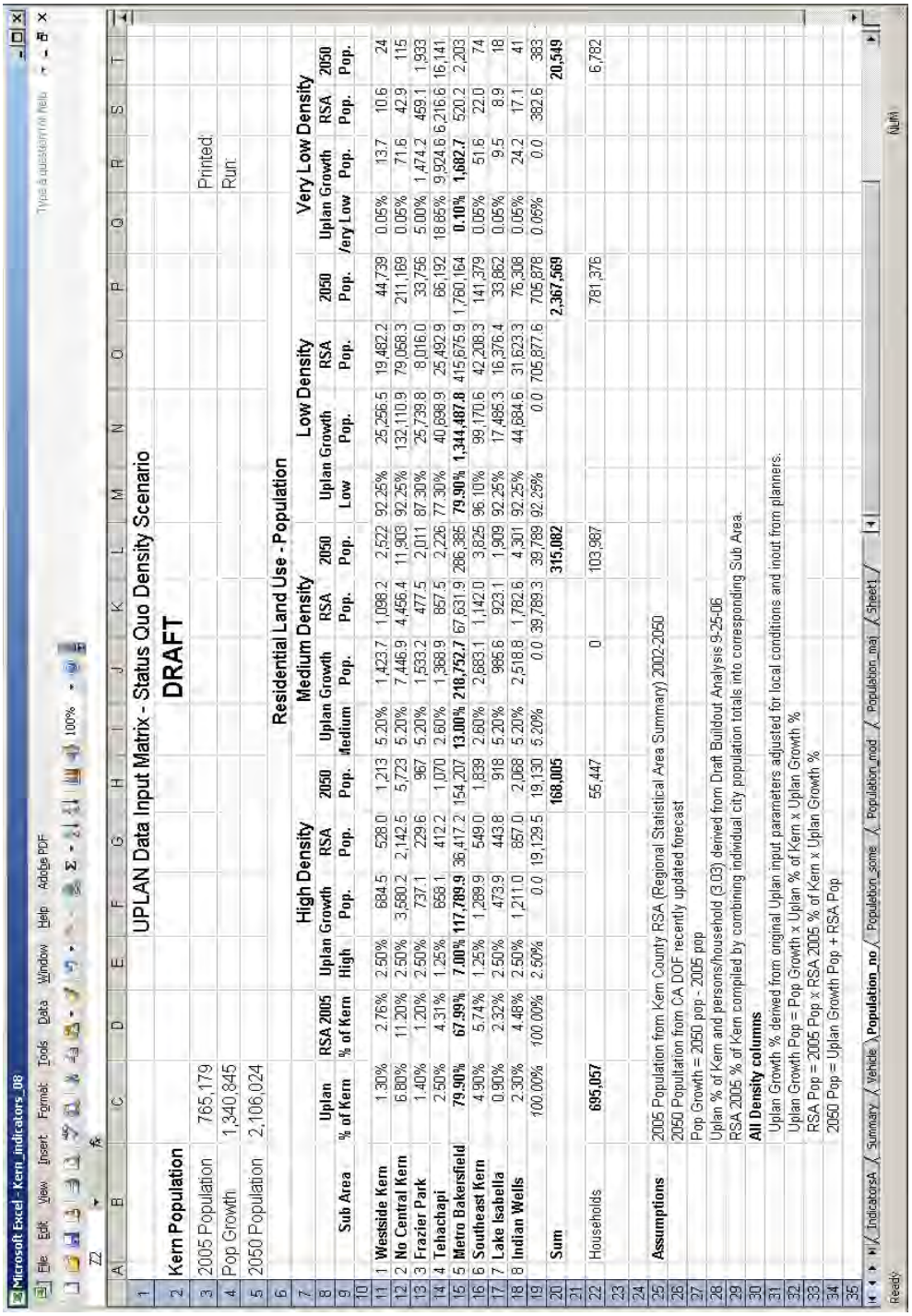
Appendix D

Sample Land Use Model Output Map



Appendix E

Sample Uplan Input – Population Distribution Matrix



UPLAN Data Input Matrix - Status Quo Density Scenario

DRAFT

Kern Population																													
2005 Population	765,179																											Printed:	
Pop Growth	1,340,845																											Run:	
2050 Population	2,106,024																												
								Residential Land Use - Population																					
							High Density					Medium Density					Low Density					Very Low Density							
Sub Area	Uplan % of Kern	RSA 2005 % of Kern	Uplan High	Uplan Growth Pop.	RSA Pop.	2050 Pop.	Uplan Medium	Uplan Growth Pop.	RSA Pop.	2050 Pop.	Uplan Low	Uplan Growth Pop.	RSA Pop.	2050 Pop.	Uplan Very Low	Uplan Growth Pop.	RSA Pop.	2050 Pop.
1 Westside Kern	1.30%	2.76%	2.50%	684.5	528.0	1,213	5.20%	1,423.7	1,098.2	2,522	92.25%	25,256.5	19,482.2	44,739	0.05%	13.7	10.6	24
2 No Central Kern	6.80%	11.20%	2.50%	3,580.2	2,142.5	5,723	5.20%	7,446.9	4,456.4	11,903	92.25%	132,110.9	79,058.3	211,169	0.05%	71.6	42.9	115
3 Frazier Park	1.40%	1.20%	2.50%	737.1	229.6	967	5.20%	1,533.2	477.5	2,011	87.30%	25,739.8	8,016.0	33,756	5.00%	1,474.2	459.1	1,933
4 Tehachapi	2.50%	4.31%	1.25%	658.1	412.2	1,070	2.60%	1,368.9	857.5	2,226	77.30%	40,898.9	25,492.9	66,192	18.65%	9,924.6	6,216.6	16,141
5 Metro Bakersfield	79.90%	67.99%	7.00%	117,789.9	36,417.2	154,207	13.00%	218,752.7	67,631.9	286,385	79.90%	1,344,487.8	415,675.9	1,760,164	0.10%	1,682.7	520.2	2,203
6 Southeast Kern	4.90%	5.74%	1.25%	1,289.9	549.0	1,839	2.60%	2,683.1	1,142.0	3,825	96.10%	99,170.6	42,208.3	141,379	0.05%	51.6	22.0	74
7 Lake Isabella	0.90%	2.32%	2.50%	473.9	443.8	918	5.20%	985.6	923.1	1,909	92.25%	17,485.3	16,376.4	33,862	0.05%	9.5	8.9	18
8 Indian Wells	2.30%	4.48%	2.50%	1,211.0	857.0	2,068	5.20%	2,518.8	1,782.6	4,301	92.25%	44,684.6	31,623.3	76,308	0.05%	24.2	17.1	41
	100.00%	100.00%	2.50%	0.0	19,129.5	19,130	5.20%	0.0	39,789.3	39,789	92.26%	0.0	705,877.6	705,878	0.06%	0.0	382.6	383
Sum						168,005				315,082				2,367,569				20,549
Households	695,057					55,447		0		103,987				781,376				6,782
Assumptions	2005 Population from Kern County RSA (Regional Statistical Area Summary) 2002-2050																	
	2050 Population from CA DOF recently updated forecast																	
	Pop Growth = 2050 pop - 2005 pop																	
	Uplan % of Kern and persons/household (3.03) derived from Draft Buildout Analysis 9-25-06																	
	RSA 2005 % of Kern compiled by combining individual city population totals into corresponding Sub Area.																	
	All Density columns																	
	Uplan Growth % derived from original Uplan input parameters adjusted for local conditions and inout from planners.																	
	Uplan Growth Pop = Pop Growth x Uplan % of Kern x Uplan Growth %																	
	RSA Pop = 2005 Pop x RSA 2005 % of Kern x Uplan Growth %																	
	2050 Pop = Uplan Growth Pop + RSA Pop																	

Appendix F

Sample Uplan Output – Land Consumption

Acres Consumed by Model Sub Area

Subareas

1. Westside Kern
2. North Central Kern
3. Frazier Park
4. Tehachapi
5. Metro Bakersfield
6. Southeast Kern
7. Lake Isabella
8. Indian Wells

Microsoft Excel - Kern_indicators_08

	A	B	C	D	E	F	G	H
1	Sub Area							
2								
3	Sub Area	RH Acres	RM Acres	RL Acres	RVL Acre	IN Acres	CH Acres	CL Acres
4	1	80	122	931	14	93	227	0
5	2	421	639	4870	75	3365	380	4
6	3	86	132	926	1548	335	83	0
7	4	144	200	1377	10424	495	347	0
8	5	6221	10816	38342	1767	14806	869	15644
9	6	282	393	3718	54	9231	503	0
10	7	56	85	644	10	0	32	0
11	8	143	216	1647	25	23	0	0
12								
13		7433	12603	52455	13917	28348	2441	15648
14					86408			

ResultsbySubArea / Sheet1 / Sheet2 / Sheet3

Acres Consumed by Model Scenario

Microsoft Excel - Kern_indicators_08

B6 =+'C:\UPlan\[report_0820bh.xls]ResultsbySubArea'!B13

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
3										Acres Used(1)						
4	Scenario	RH			RM					RL		RVL		Total	Ag Presv	
5		Acres	%													
6	Major	26,488	56.3%	56.31%	10,818	22.57%	**0.71%**	**1.06%**	22.6%	5,476	11.6%	4,461	9.5%	47,043	55,819	**46%**
7	Moderate	11,661	16.2%	16.21%	17,492	24.32%	**0.56%**	**0.83%**	24.3%	37,446	52.1%	5,330	7.4%	71,929	30,933	**70%**
8	Some	7,433	8.6%	8.60%	12,603	14.59%	**0.38%**	**0.57%**	14.6%	52,455	60.7%	13,917	16.1%	86,408	16,454	**84%**
9	No	2,035	2.0%	1.98%	5,968	5.80%	**0.15%**	**0.23%**	5.8%	80,942	78.7%	13,917	13.5%	102,862	0	**100%**
10		47,617			46,681					176,319		37,625				
11		2500			0.61776					24991.6						

ResultsbySubArea / AcresUsed / IndicatorsA / Sheet1 / Sheet2 / Sheet3

Appendix G

Draft Combined Land Use Map (Attachment A)

Conversion Matrix Table

Kern Council of Governments

July 25, 2012

TO: Kern Regional Transportation Modeling Committee (TMC)

FROM: Ahron Hakimi
Executive Director

By: Rob Ball, Director of Planning

SUBJECT: AGENDA Item VIII.
Initial Comparison of San Joaquin Valley Portion of Kern to Countywide

DESCRIPTION:

Comparison of the San Joaquin Valley portion of Kern per capita CO2 reductions when compared to Countywide.

DISCUSSION:

Using the current modeling tools Kern COG, at the request of the Kern Transportation Modeling Committee (TMC), had a special script prepared to pull out the travel in the San Joaquin Valley (SJV) portion of Kern. Using EMFAC 2007 we compared base and ah improved transit scenarios.

Comparison of Countywide CO2 Per Capita to SJV Portion Kern using Current Model

Scenario	Countywide		SJV Kern	
	CO2 lbs/capita	% chng. from 05	CO2 lbs/capita	% chng. from 05
2005 Base	14.3		12.2	
2035 Base (M24)	16.1	12%	15.4	26%
2035 Improved Transit scenario	15.9	11%	12.9	6%
% change between 2035 scenarios	-1%		-16%	

The results show that the current model is considerably more responsive to changes in Metropolitan Bakersfield. This is most likely because of the elimination of very long trips to East Kern. Additional testing is underway using the new Model Improvement Program (MIP) model. The new model has lower VMT in East Kern and may not show as great a difference.

ACTION: Information

Kern Council of Governments

July 25, 2012

TO: Kern Regional Transportation Modeling Committee

FROM: Ahron Hakimi
Executive Director

BY: Ben Raymond, Planner II

SUBJECT: AGENDA ITEM IX:
Draft Land Use Model Update (M24)

DESCRIPTION:

An updated version of the land use model for the Sustainable Communities Strategy (SCS) is available for review. See Attachments.

DISCUSSION:

Background

In September 2008 the Governor signed Senate Bill (SB) 375 to control Climate Change emissions from cars, SUVs and light duty trucks. SB 375 requires MPO's in the state to perform new levels of Land Use and Transportation modeling to support development of Sustainable Communities Strategies which are now required for Regional Transportation Plans. Copies of ARB staff reports and related material are available at http://kerncog.org/cms/climatechange.

Kern COG staff first presented the Land Use modeling methodology and Input (attraction) Layers at the September 29, 2009 meeting of the Climate Change Task Force, which has become the Transportation Modeling Committee (TMC). The methodology was largely derived from the UPlan GIS-based modeling process used to develop the Kern Regional Blueprint. The UPlan program has been upgraded to version 2.66. The input layers and parameters were updated as well. The process of updating the model is on-going.

On September 23, 2010 as required by statute under SB 375 the ARB Board of Directors set provisional targets to reduce emissions for the San Joaquin Valley (SJV) Metropolitan Planning Organizations (MPO's) at 5% by 2020, and 10% by 2035. ARB has given the SJV MPO's an opportunity to submit revised targets in 2012. Kern COG will be required to develop a Sustainable Communities Strategy (SCS) for the 2013/14 Regional Transportation Plan (RTP) that meets the target. Kern COG staff plans to use the Land Use model to assist in the development of the revised targets, and the SCS.

Kern COG is collaborating with the other 7 SJV MPO's in a Model Improvement Program (MIP). The goal of the MIP is to improve current modeling capabilities. The outcome of this program will be used to help SJV MPO's perform the modeling requirements of SB 375. This effort includes the land use models, but it is largely focused on the transportation models.

Recent Activity

On February 23, 2011, Kern COG staff presented to the TMC the modeling methodology and updated input layers for the Land Use model. A draft version of the land use model methodology documentation was distributed to the Committee. Initial model run results were also presented.

On May 25, 2011, Kern COG staff presented to the TMC the updated input layers that are being used in the land use model. Namely, the Combined (County-wide) Land Use Map, and the Input Attraction Layers. Committee members were asked to review the maps and provide comments by July 31, 2011.

On June 22, 2011, and August 3, 2011 Kern COG staff presented an overview of the latest Land Use model (Run D06) to the newly formed Regional Planning Advisory Committee. The comment period was extended to August 31, 2011.

On September 28, 2011 Kern COG staff announced at the RPAC meeting that a draft land use model (Run E02) was prepared based on the inputs received as of August 31, 2011 by member jurisdictions and stakeholders.

On October 19, 2011 Kern COG staff presented at the TMC meeting a draft Project Level land use model (Run P02) to illustrate how the land use model could be used to model growth for a specific project, or area.

Over the last year months Kern COG staff has been updating the input data and layers to reflect changes, new data and comments received from member jurisdictions, committee members, and other stakeholders. Kern COG staff has identified the model run M24 as the Draft 2035 New Base land use.

The SB 375 VMT and emissions report were generated using EMFAC 2007. The results of both the New Base model and the Existing Spreadsheet Model are summarized in the table below. Additional output data and detailed methodoly is attached.

Model Run	SB 375 VMT	CO 2 Emissions (lbs/Capita)
New Base Model – M24	26,883,576	16.05
Spreadsheet Model	27,412,832	16.32
Difference from Spreadsheet	- 529,256	- 00.27

Kern COG staff has also been developing documentation of the land use model methodology that is being used. Electronic versions of the input layers and documentation can be found at: http://kerncog.org/cms/climatechange.

Kern COG staff is presently working on many scenario model runs. Scenario development discussions have taken place at both the TMC meetings and RPAC meetings.

Next Steps

Kern COG plans to continue ongoing development of the land use models to assist in the preparation of the Sustainable Communities Strategy for the 2013/2014 RTP with the assistance and oversight of the Kern Regional Transportation Modeling Committee, and the Regional Planning Advisory Committee. This will include reviewing the modeling methodology and development of the UPlan and CubeLand based Land Use models. This same process will be used to submit revised targets to ARB in late 2012 for their consideration.

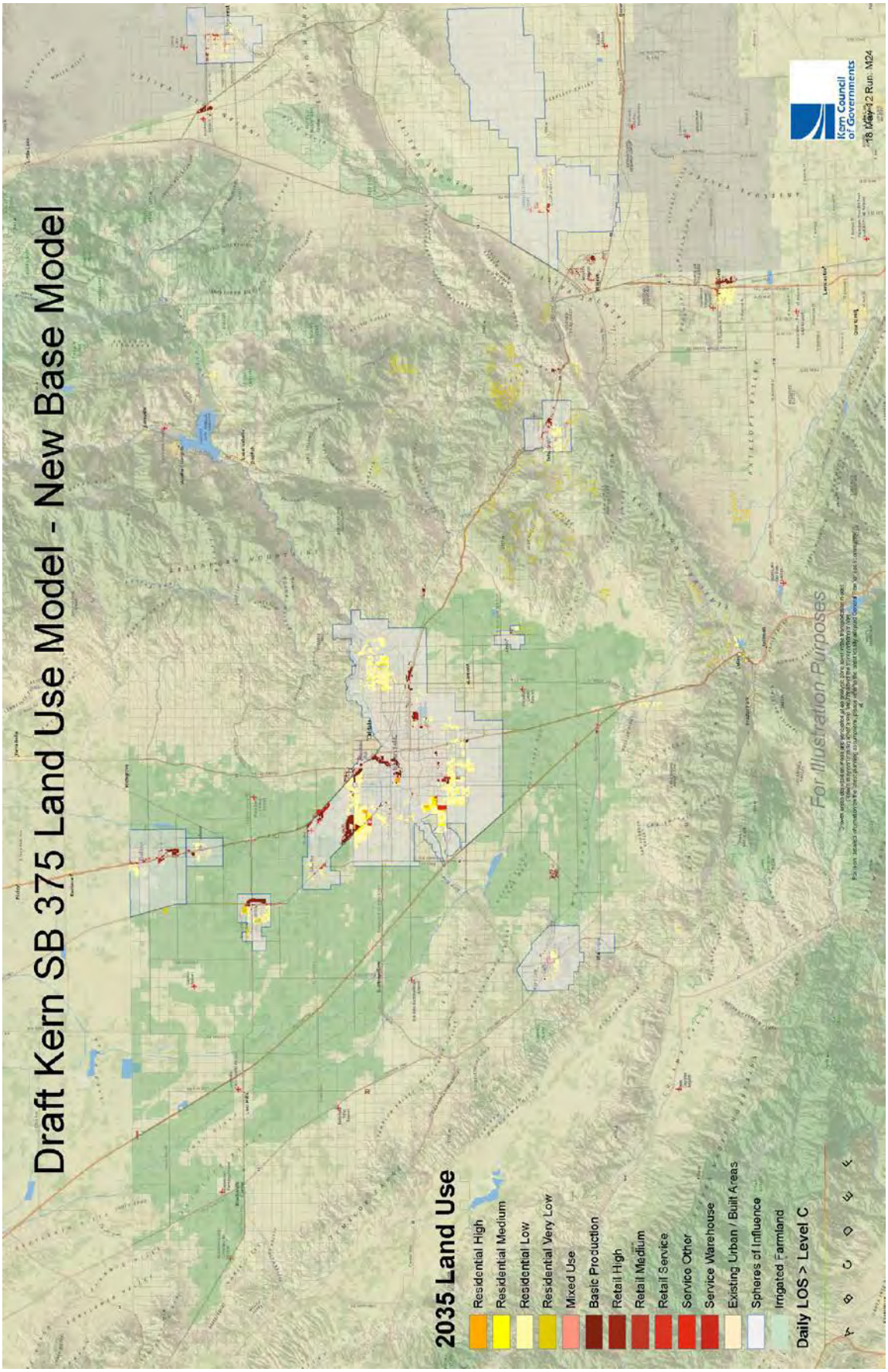
Kern COG staff has begun developing scenarios and plans to develop further scenarios from input and direction from the TMC. Scenario results will be compared to the Base model results.

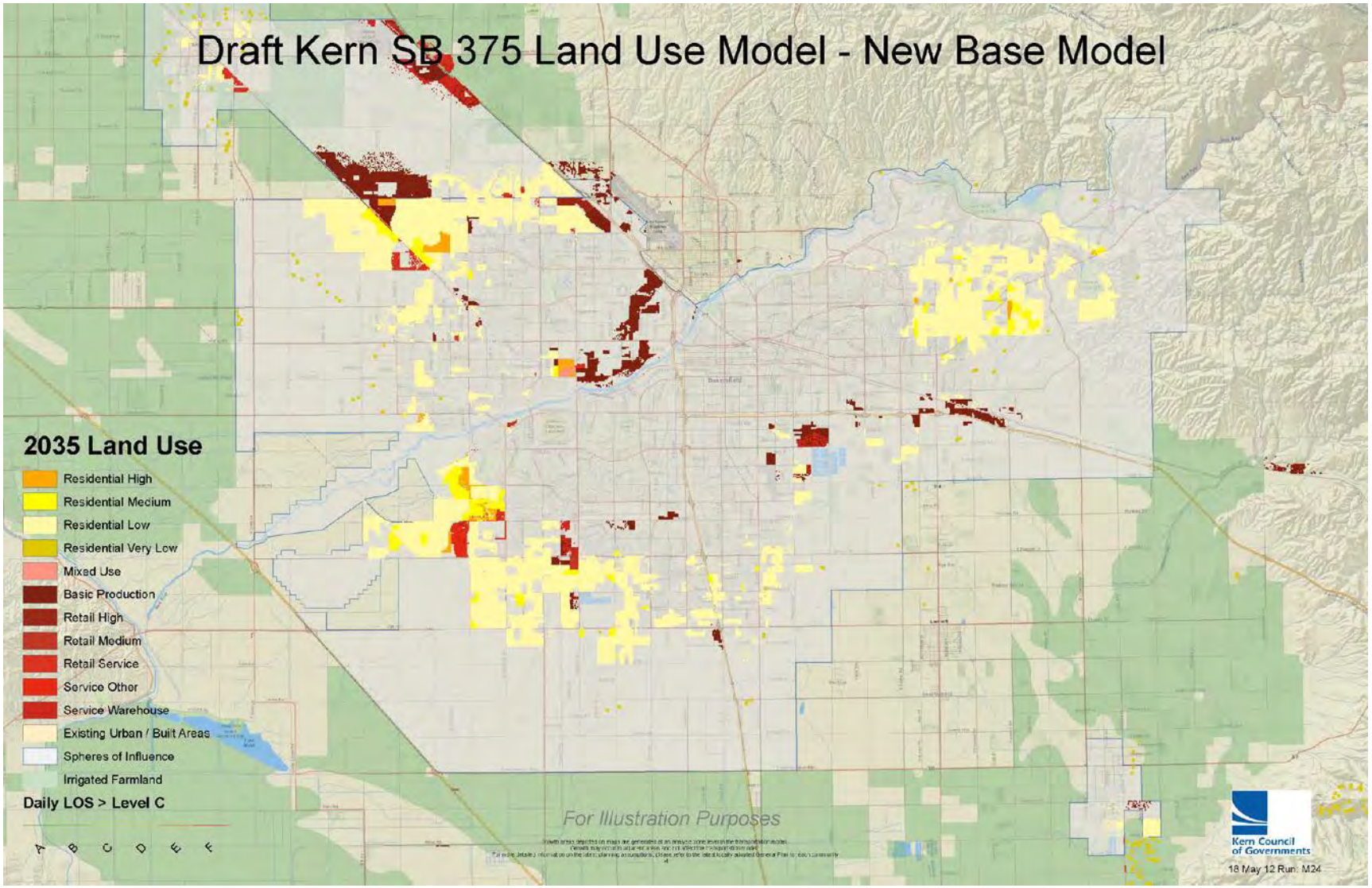
Attachments (copies of attachments and model data are available on the Kern COG website)

1. Draft Land Use Map – M24
2. Draft Socio Economic Data Comparison Maps
3. Comparison Tables

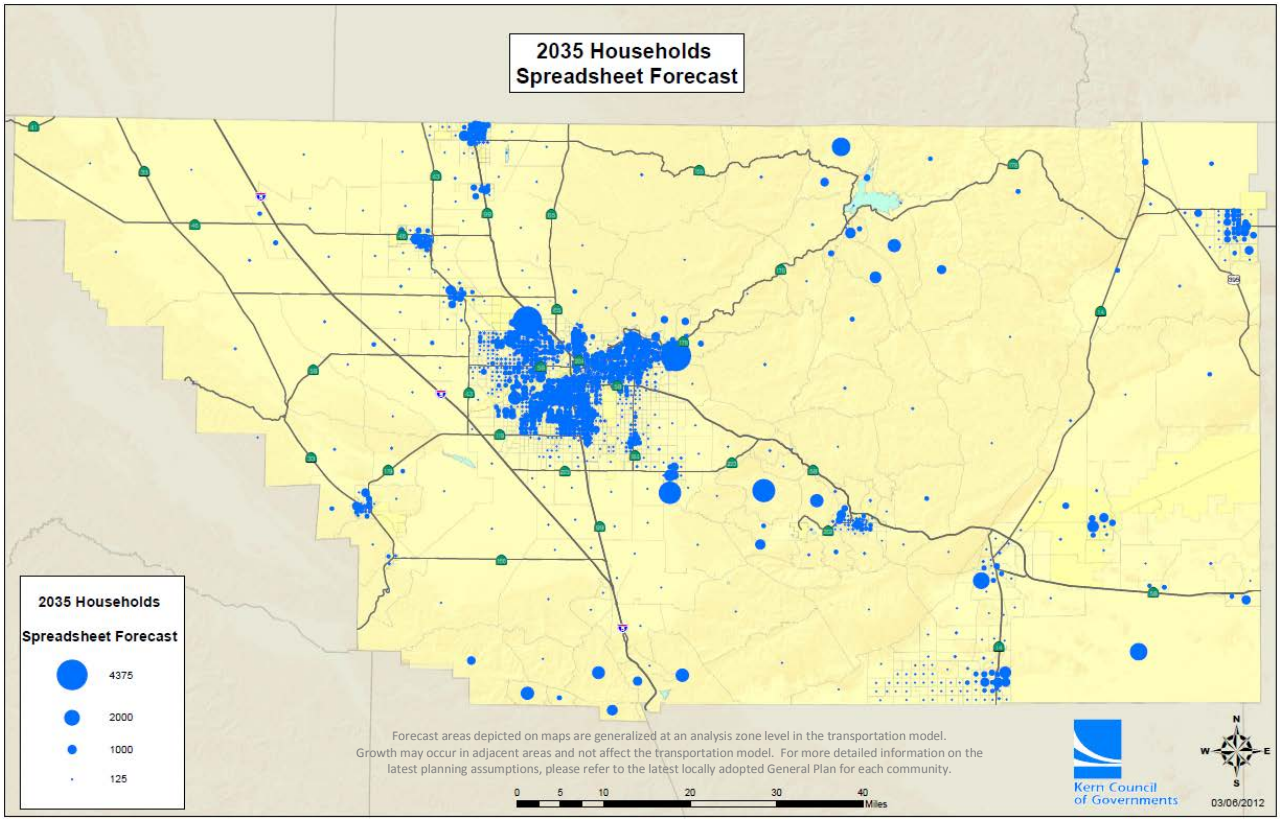
ACTION: Information

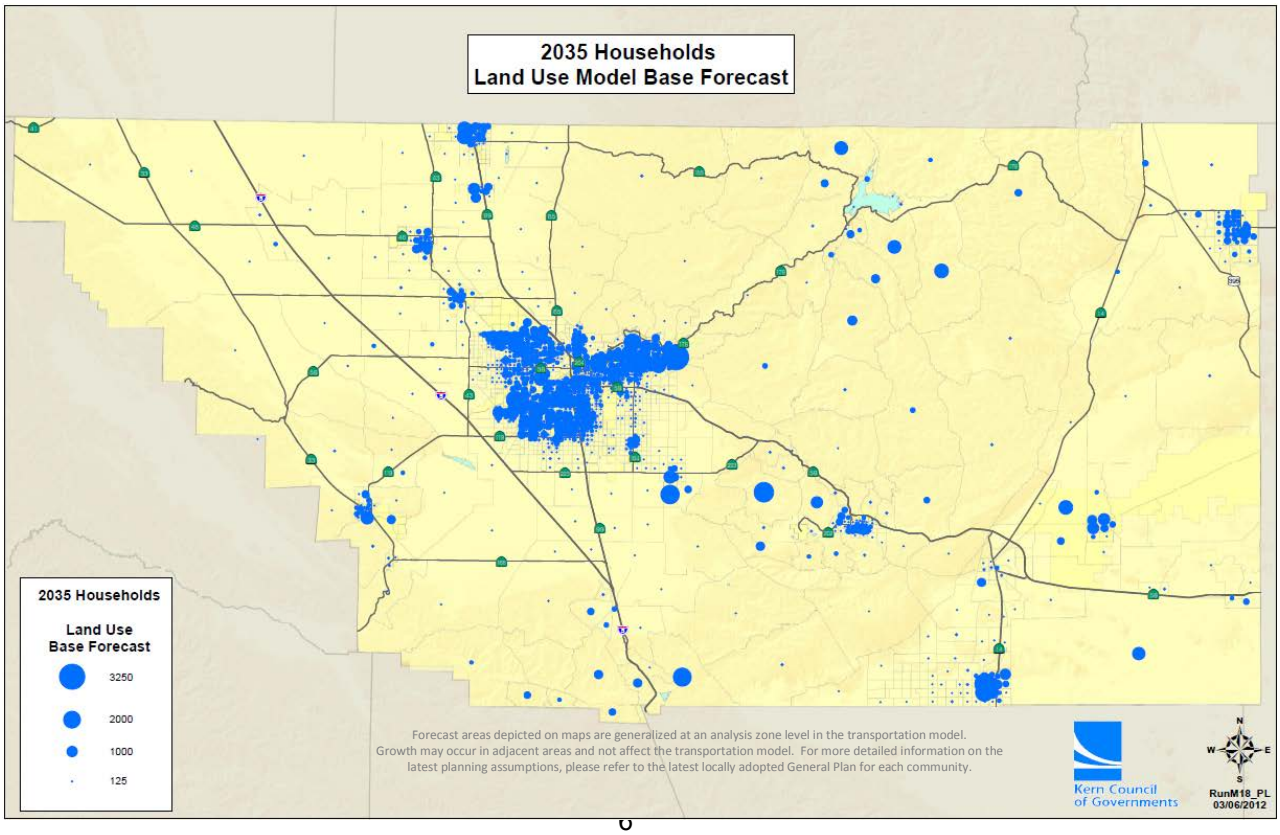
Attachment 1

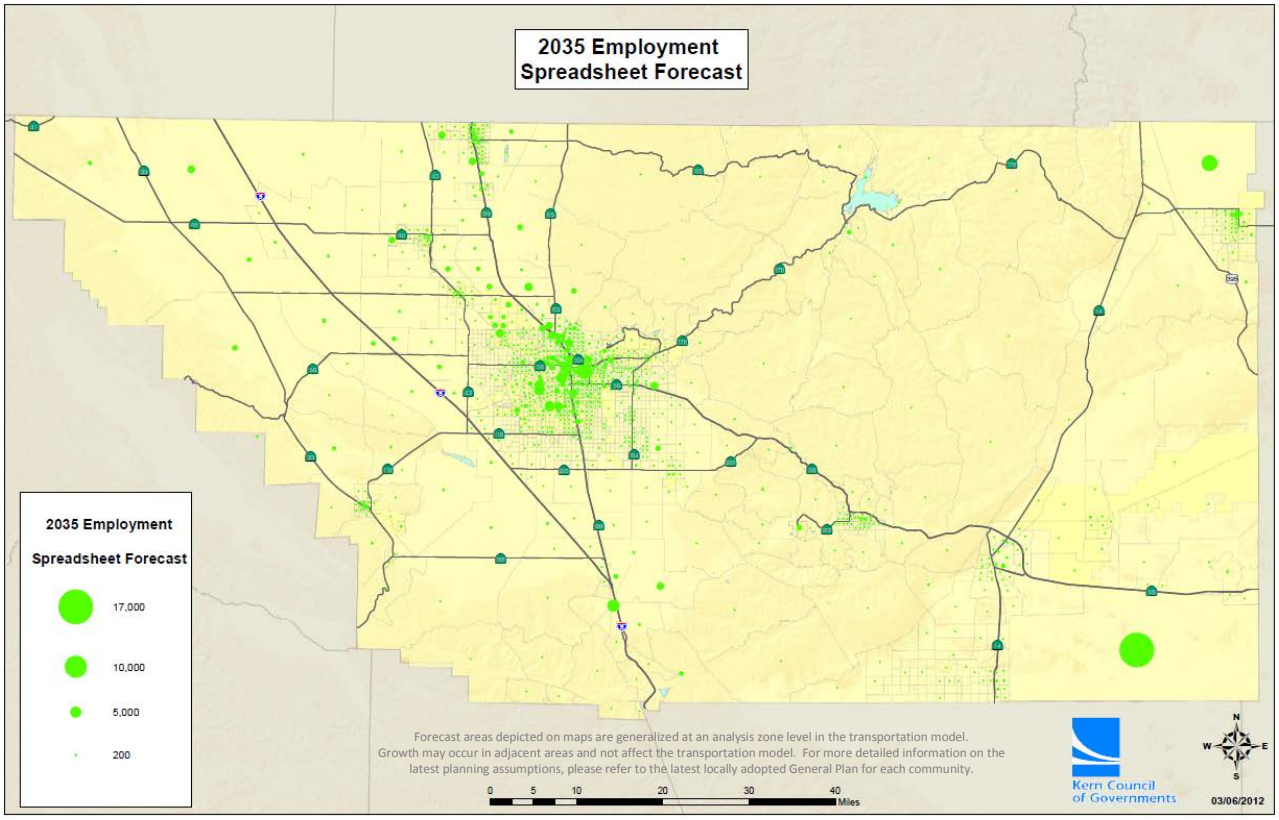


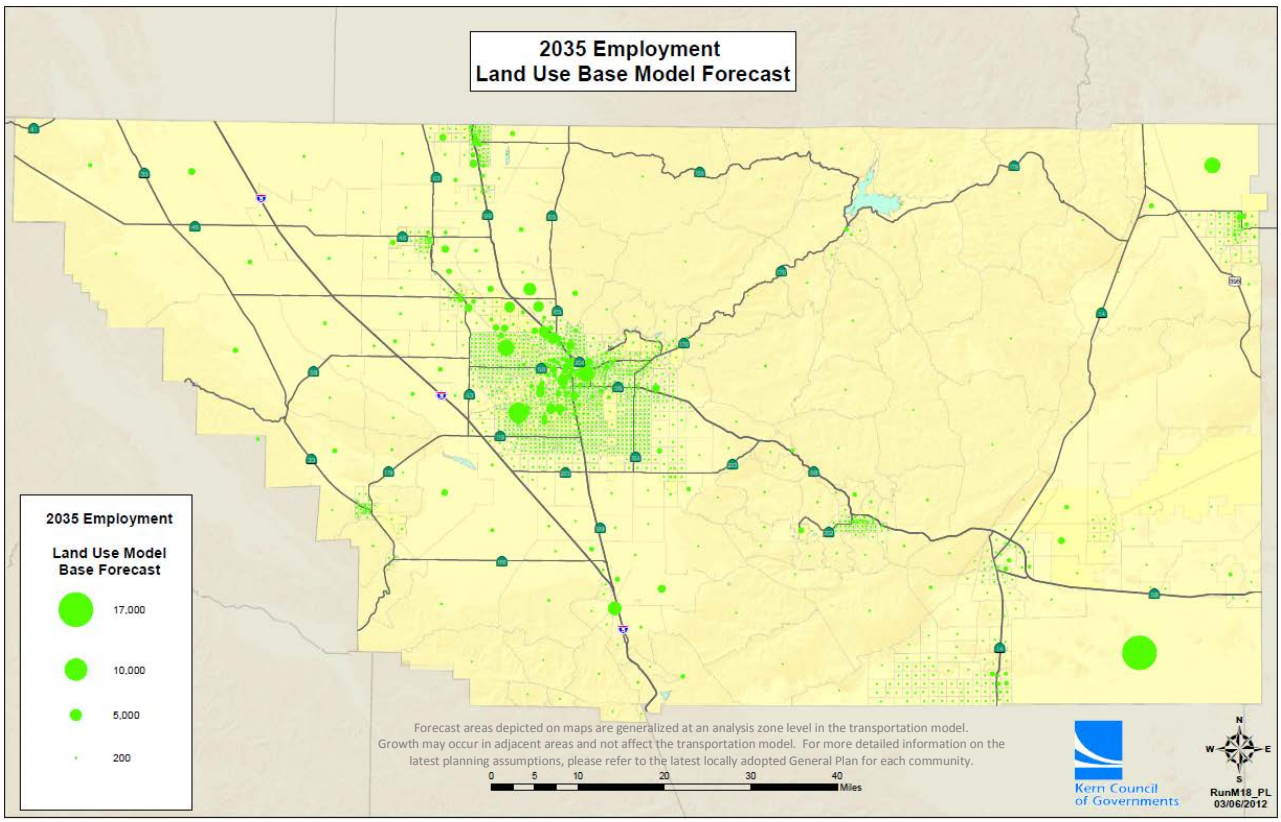

Draft Kern SB 375 Land Use Model - New Base Model
2035 Land Use
Residential High
Residential Medium
Residential Low
Residential Very Low
Mixed Use
Basic Production
Retail High
Retail Medium
Retail Service
Service Other
Service Warehouse
Existing Urban / Built Areas
Spheres of Influence
Irrigated Farmland
Daily LOS > Level C
A
B
C
D
E
F
For Illustration Purposes
Kern Council of Governments
18 May 12 Run: M24

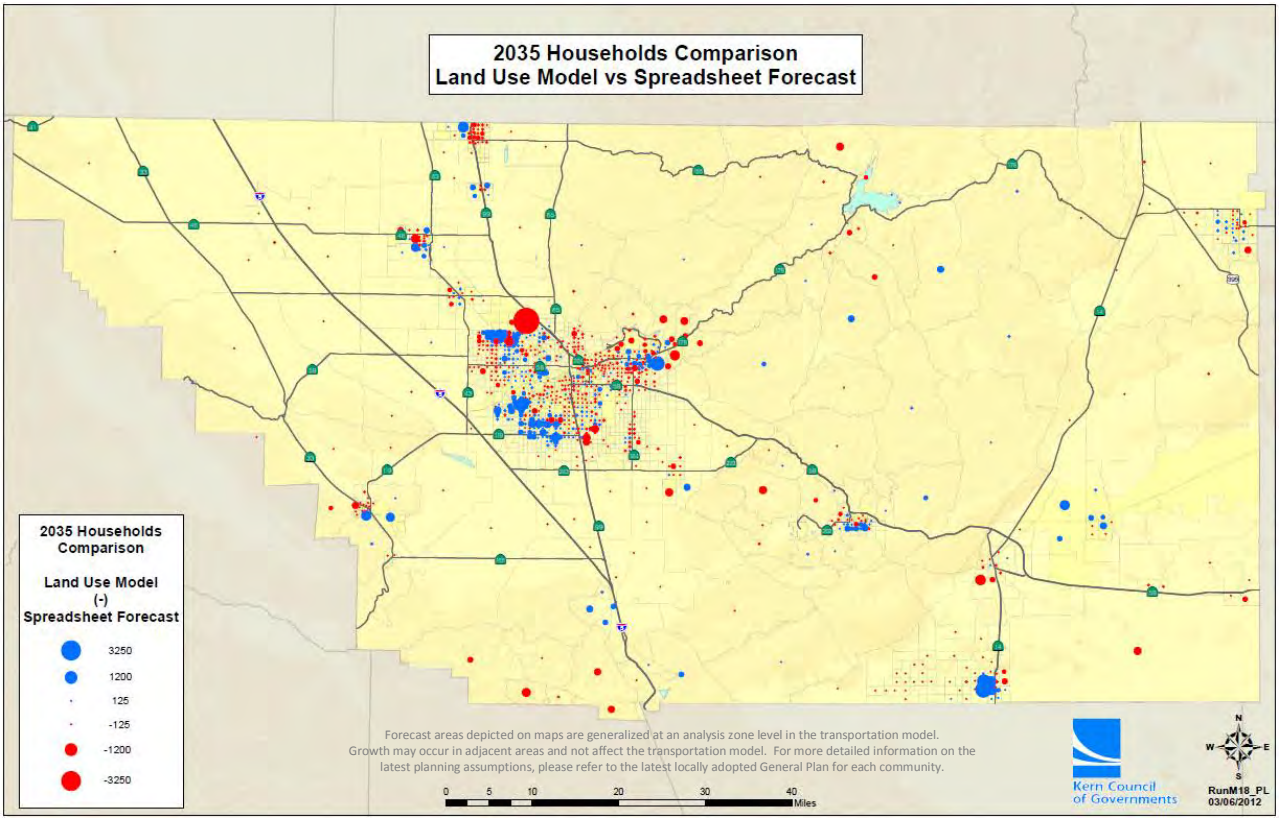
Attachment 2

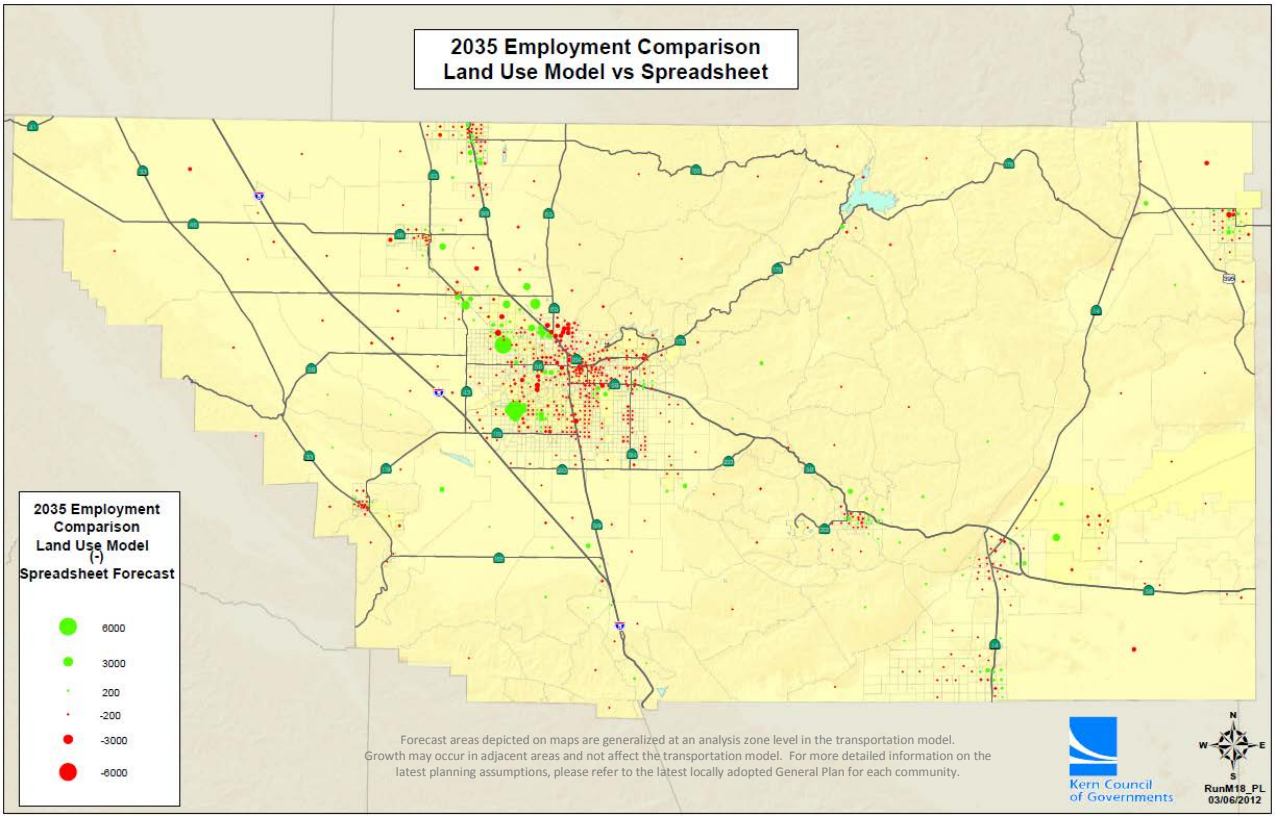


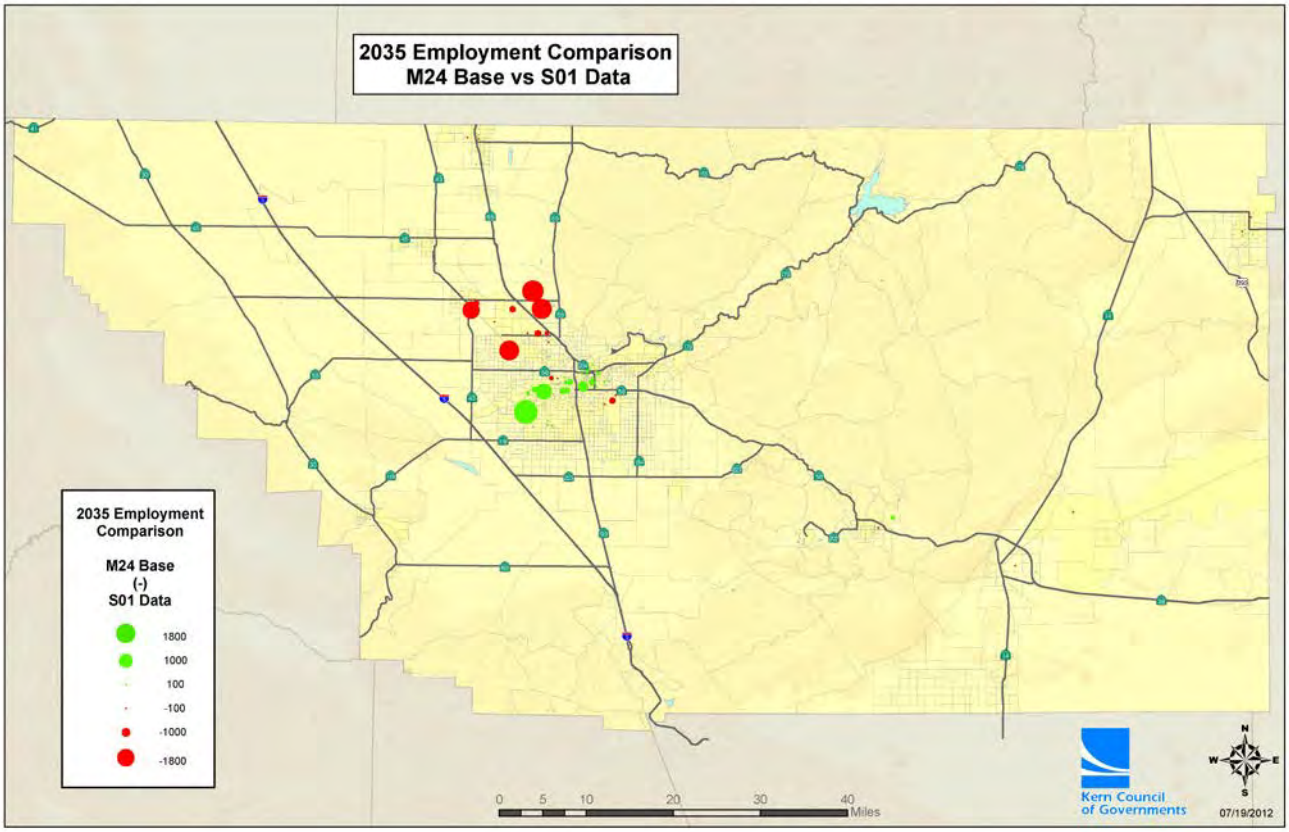


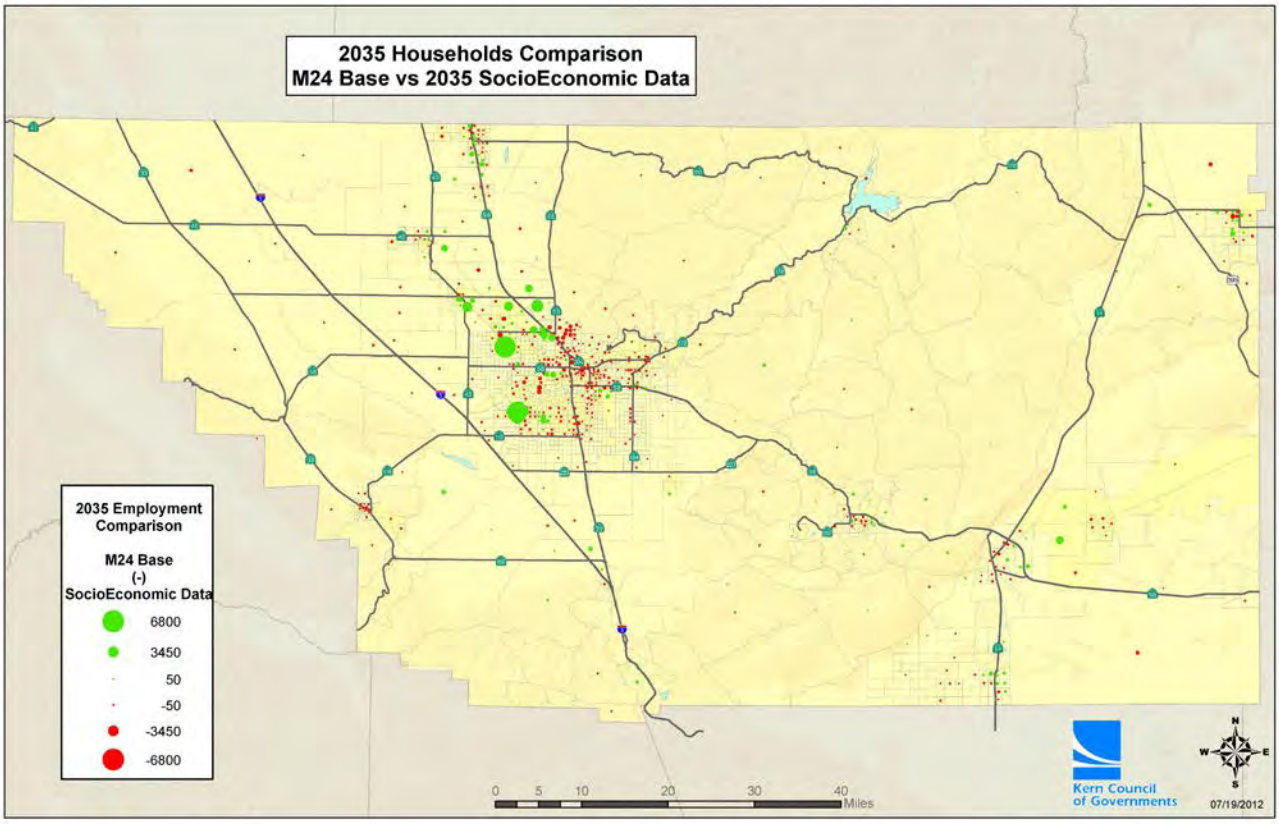

2035 Employment
Spreadsheet Forecast
2035 Employment
Spreadsheet Forecast
17,000
10,000
5,000
200
Forecast areas depicted on maps are generalized at an analysis zone level in the transportation model.
Growth may occur in adjacent areas and not affect the transportation model. For more detailed information on the
latest planning assumptions, please refer to the latest locally adopted General Plan for each community.
0 5 10 20 30 40
Miles
Kern Council
of Governments
N
W
E
S
03/06/2012

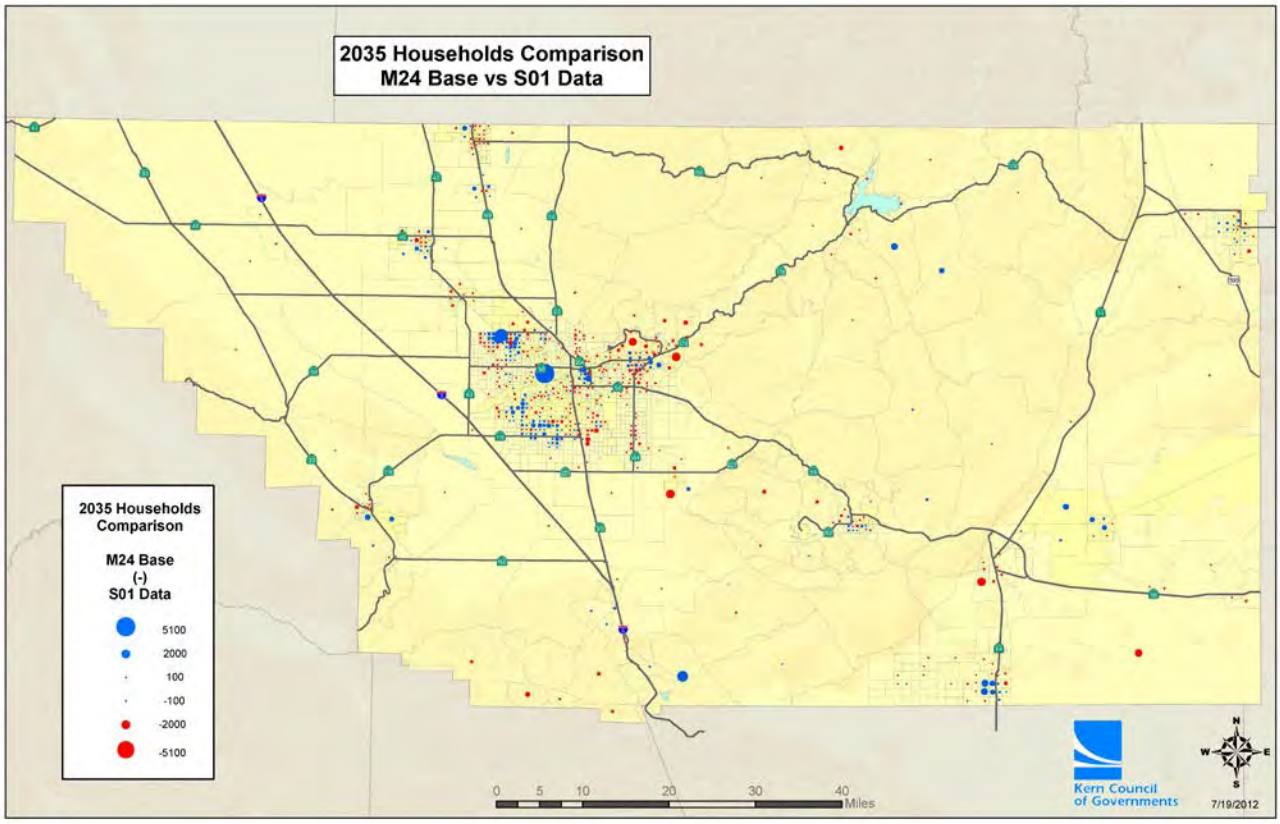

2035 Employment
Land Use Base Model Forecast
2035 Employment
Land Use Model
Base Forecast
17,000
10,000
5,000
200
Forecast areas depicted on maps are generalized at an analysis zone level in the transportation model.
Growth may occur in adjacent areas and not affect the transportation model. For more detailed information on the
latest planning assumptions, please refer to the latest locally adopted General Plan for each community.
0 5 10 20 30 40
Miles
Kern Council
of Governments
N
W
E
S
RunM18_PL
03/06/2012

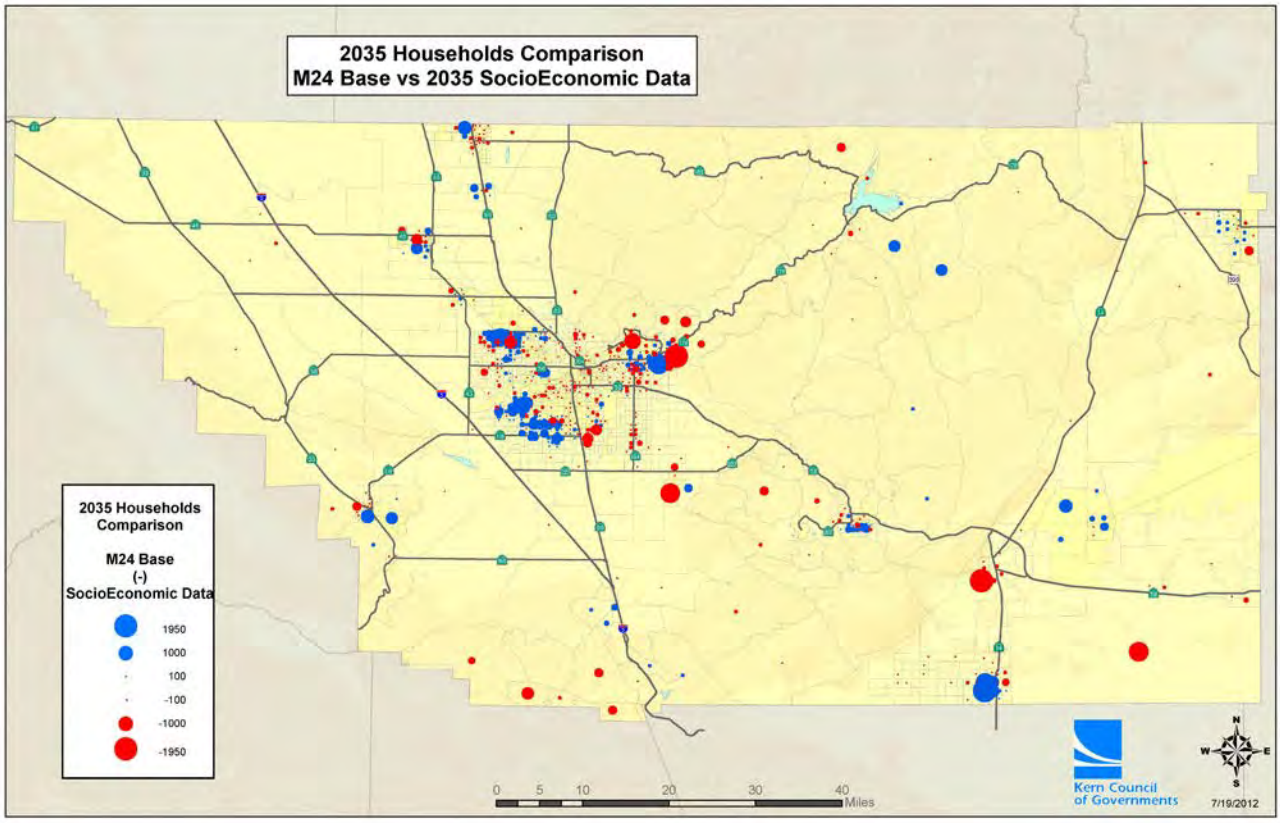

2035 Households Comparison
Land Use Model vs Spreadsheet Forecast
2035 Households Comparison
Land Use Model
(-)
Spreadsheet Forecast
3250
1200
125
-125
-1200
-3250
Forecast areas depicted on maps are generalized at an analysis zone level in the transportation model.
Growth may occur in adjacent areas and not affect the transportation model. For more detailed information on the latest planning assumptions, please refer to the latest locally adopted General Plan for each community.
0 5 10 20 30 40 Miles
Kern Council of Governments
N
W
E
S
RunM18_PL
03/06/2012


2035 Employment Comparison
Land Use Model vs Spreadsheet
2035 Employment Comparison
Land Use Model
(-)
Spreadsheet Forecast
6000
3000
200
-200
-3000
-6000
Forecast areas depicted on maps are generalized at an analysis zone level in the transportation model.
Growth may occur in adjacent areas and not affect the transportation model. For more detailed information on the latest planning assumptions, please refer to the latest locally adopted General Plan for each community.
Kern Council of Governments
N
W
E
S
RunM18_PL
03/06/2012


2035 Employment Comparison
M24 Base vs S01 Data
2035 Employment Comparison
M24 Base
(-)
S01 Data
1800
1000
100
-100
-1000
-1800
0 5 10 20 30 40 Miles
Kern Council of Governments
07/19/2012


2035 Households Comparison
M24 Base vs 2035 SocioEconomic Data
2035 Employment Comparison
M24 Base
(-)
SocioEconomic Data
6800
3450
50
-50
-3450
-6800
0 5 10 20 30 40 Miles
Kern Council of Governments
07/19/2012


2035 Households Comparison
M24 Base vs S01 Data
2035 Households Comparison
M24 Base
(-)
S01 Data
5100
2000
100
-100
-2000
-5100
0 5 10 20 30 40 Miles
Kern Council of Governments
7/19/2012


2035 Households Comparison
M24 Base vs 2035 SocioEconomic Data
2035 Households Comparison
M24 Base
(-)
SocioEconomic Data
1950
1000
100
-100
-1000
-1950
0 5 10 20 30 40 Miles
Kern Council of Governments
7/19/2012

Attachment 3
Comparison Tables –
M18 model vs Spreadsheet data

	2035 Spreadsheet Derived Values				2035 with Delano updated and Census 3/12/12		2035 Land Use Model Derived Values - RunM18v4					
Subregion- and RSA	Total Population	Household Population	Group Quarters	Number of Households	Total Employment	Emp/HH	Total Population	Household Population	Group Quarters	Number of Households	Total Employment	Emp/HH
Westside Kern	**34503**	**26158**	**8345**	**9085**	**15104**	2	**34727**	**26526**	**8201**	**8930**	**14675**	1.64
Greater Taft/Maricopa	34503	26158	8345	9085	15104	2	34727	26526	8201	8930	14675	1.64
Delano_McFarland	**91048**	**71899**	**19149**	**17787**	**30355**	2	**81425**	**68124**	**13301**	**17675**	**29681**	1.68
Greater Delano/McFarland	91048	71899	19149	17787	30355	2	81425	68124	13301	17675	29681	1.68
Wasco	**48000**	**39215**	**8785**	**10725**	**18163**	2	**45770**	**36858**	**8912**	**10552**	**17829**	1.69
Greater Wasco	48000	39215	8785	10725	18163	2	45770	36858	8912	10552	17829	1.69
Tehachapi_Frazier	**75437**	**68703**	**6735**	**27964**	**27181**	1	**83561**	**76952**	**6609**	**28401**	**30601**	1.08
Greater Frazier Park	17912	17912	0	7752	7805	1	15094	15077	17	5780	8095	1.40
Greater Tehachapi	57526	50791	6735	20212	19376	1	68467	61875	6592	22621	22506	0.99
Metro	**928416**	**918440**	**9976**	**294835**	**304756**	1	**918444**	**905860**	**12584**	**295389**	**303051**	1.03
Greater Arvin	32805	32445	360	7695	5712	1	21434	21302	132	4933	5151	1.04
Greater Shafter	61763	57297	4467	15886	36180	2	56551	50395	6156	15565	47706	3.06
Metro - Central	24201	23390	811	9681	39664	4	22114	20369	1745	8248	35928	4.36
Metro - N.O.R.	233707	233311	396	80824	83060	1	234603	234237	366	81704	78320	0.96
Metro - Northeast	169132	167691	1441	54171	24453	0	161482	159440	2042	51617	18465	0.36
Metro - Southeast	184954	183584	1370	51167	41105	1	157555	156779	776	42843	31398	0.73
Metro - Southwest	221854	220723	1130	75410	74582	1	264704	263338	1366	90479	86082	0.95
Southeast Kern	**75009**	**70475**	**4533**	**26812**	**36978**	1	**81818**	**75196**	**6622**	**26514**	**36690**	1.38
Greater Cal City/Mojave	37969	33677	4292	13395	13087	1	38635	32016	6619	11508	12304	1.07
Greater Rosamond	37039	36798	241	13417	23891	2	43183	43180	3	15006	24386	1.63
Lake Isabella	**25296**	**25217**	**79**	**12515**	**5727**	0	**30121**	**29807**	**314**	**12362**	**5455**	0.44
Greater Lake Isabella	25296	25217	79	12515	5727	0	30121	29807	314	12362	5455	0.44
Indian Wells	**43291**	**43093**	**198**	**17476**	**22617**	1	**45133**	**44777**	**356**	**17292**	**22500**	1.30
Greater Ridgecrest	43291	43093	198	17476	22617	1	45133	44777	356	17292	22500	1.30
Grand Total	**1321000**	**1263200**	**57800**	**417200**	**460882**	1	**1321000**	**1264100**	**56900**	**417115**	**460483**	1.10

	2010-2035 Spreadsheet Annual Growth Rates		2010-2035 Land Use Model Annual Growth Rates		Difference in Annual Growth Between Spreadsheet and Land Use Modal		Difference in Growth Between Spreadsheet and Land Use Modal	
Subregion- and RSA	Number of Households	Total Employment	Number of Households	Total Employment	Number of Households	Total Employment	Number of Households	Total Employment
Westside Kern	**116**	**170**	**110**	**152**	**(6)**	**(17)**	**(155)**	**(429)**
Greater Taft/Maricopa	116	170	110	152	(6)	(17)	(155)	(429)
Delano_McFarland	**163**	**305**	**159**	**278**	**(4)**	**(27)**	**(112)**	**(674)**
Greater Delano/McFarland	163	305	159	278	(4)	(27)	(112)	(674)
Wasco	**186**	**184**	**179**	**171**	**(7)**	**(13)**	**(173)**	**(334)**
Greater Wasco	186	184	179	171	(7)	(13)	(173)	(334)
Tehachapi_Frazier	**515**	**531**	**532**	**667**	**17**	**137**	**437**	**3,420**
Greater Frazier Park	171	175	92	187	(79)	12	(1,972)	290
Greater Tehachapi	344	355	440	480	96	125	2,409	3,130
Metro	**4,626**	**3,926**	**4,648**	**3,858**	**22**	**(68)**	**554**	**(1,705)**
Greater Arvin	124	78	13	55	(110)	(22)	(2,762)	(561)
Greater Shafter	387	680	374	1,141	(13)	461	(321)	11,526
Metro - Central	57	229	0	80	(57)	(149)	(1,433)	(3,736)
Metro - N.O.R.	1,455	1,293	1,490	1,103	35	(190)	880	(4,740)
Metro - Northeast	989	295	887	56	(102)	(240)	(2,554)	(5,988)
Metro - Southeast	547	523	214	135	(333)	(388)	(8,324)	(9,706)
Metro - Southwest	1,067	827	1,670	1,287	603	460	15,069	11,500
Southeast Kern	**487**	**536**	**476**	**524**	**(12)**	**(12)**	**(298)**	**(288)**
Greater Cal City/Mojave	244	299	168	268	(75)	(31)	(1,887)	(783)
Greater Rosamond	244	236	308	256	64	20	1,589	495
Lake Isabella	**195**	**105**	**189**	**95**	**(6)**	**(11)**	**(153)**	**(272)**
Greater Lake Isabella	195	105	189	95	(6)	(11)	(153)	(272)
Indian Wells	**148**	**351**	**141**	**346**	**(7)**	**(5)**	**(184)**	**(116)**
Greater Ridgecrest	148	351	141	346	(7)	(5)	(184)	(116)
Grand Total	**6,436**	**6,107**	**6,433**	**6,091**	**(3)**	**(16)**	**(85)**	**(399)**

2035 Spreadsheet Model Distribution by Subarea - 2010 Census Update

3/22/2012

County Division Regional Statistical Area	Households	Household Population	Percent of County Population	Total Employment	Emps. per Household	Vehicle Miles Traveled (VMT)	Percent of County VMT	VMT Per HH Pop + Emp
Westside Kern	**9,085**	**26,158**	**2.1%**	**15,101**	**1.66**	**1,438,216**	**3.3%**	**34.86**
Greater Taft/Maricopa	9,085	26,158	2.1%	15,101	1.66	1,438,216	3.3%	34.86
Delano_McFarland	**17,787**	**71,899**	**0.7%**	**30,353**	**1.71**	**1,824,196**	4.2%	**17.84**
Greater Delano/McFarland	17,787	71,899	0.7%	30,353	1.71	1,824,196	4.2%	17.84
Wasco	**10,725**	**39,215**	**3.1%**	**18,163**	**1.69**	**1,836,102**	**4.2%**	**32.00**
Greater Wasco	10,725	39,215	3.1%	18,163	1.69	1,836,102	4.2%	32.00
Tehachapi_Frazier	**27,964**	**68,703**	**5.4%**	**27,179**	**0.97**	**4,717,766**	**10.8%**	**49.20**
Greater Frazier Park	7,752	17,912	1.4%	7,805	1.01	1,609,612	3.7%	62.59
Greater Tehachapi	20,212	50,791	4.0%	19,374	0.96	3,108,154	7.1%	44.30
Metro	**294,835**	**918,440**	**72.7%**	**304,760**	**1.03**	**25,263,253**	**57.8%**	**20.65**
Greater Arvin	7,695	32,445	2.6%	5,715	0.74	1,442,665	3.3%	37.81
Greater Shafter	15,886	57,297	4.5%	36,181	2.28	3,217,342	7.4%	34.42
Metro Bakersfield	271,254	828,699	65.6%	262,864	0.97	20,603,246	47.1%	18.87
Southeast Kern	**26,812**	**70,475**	**5.6%**	**36,971**	**1.38**	**5,197,219**	**11.9%**	**48.37**
Greater Cal City/Mojave	13,395	33,677	2.7%	13,085	0.98	3,107,338	7.1%	66.45
Greater Rosamond	13,417	36,798	2.9%	23,886	1.78	2,089,881	4.8%	34.44
Lake Isabella	**12,515**	**25,217**	**2.0%**	**5,726**	**0.46**	**1,541,742**	**3.5%**	**49.83**
Greater Lake Isabella	12,515	25,217	2.0%	5,726	0.46	1,541,742	3.5%	49.83
Indian Wells	**17,476**	**43,093**	**3.4%**	**22,617**	**1.29**	**1,889,153**	**4.3%**	**28.75**
Greater Ridgecrest	17,476	43,093	3.4%	22,617	1.29	1,889,153	4.3%	28.75
Kern County Total	**417,199**	**1,263,201**	**100.0%**	**460,870**	**1.10**	**43,707,647**	**100.0%**	**25.35**

*Population is the total household population; does not included group quarters and prisons

2035 Uplan Land Use Model Distribution by Subarea - M 18 v4

3/22/2012

County Division Regional Statistical Area	Households	Household Population	Percent of County Population	Total Employment	Emps. per Household	Vehicle Miles Traveled (VMT)	Percent of County VMT	VMT Per HH Pop + Emp
Westside Kern	**8,930**	**26,526**	**2.1%**	**14,675**	**1.64**	**1,510,402**	**3.6%**	**36.66**
Greater Taft/Maricopa	8,930	26,526	2.1%	14,675	1.64	1,510,402	3.6%	36.66
Delano_McFarland	**17,675**	**68,124**	**0.7%**	**29,681**	**1.68**	**1,733,781**	4.2%	**17.73**
Greater Delano/McFarland	17,675	68,124	0.7%	29,681	1.68	1,733,781	4.2%	17.73
Wasco	**10,552**	**36,858**	**2.9%**	**17,829**	**1.69**	**1,760,580**	**4.2%**	**32.19**
Greater Wasco	10,552	36,858	2.9%	17,829	1.69	1,760,580	4.2%	32.19
Tehachapi_Frazier	**28,401**	**76,952**	**6.1%**	**30,601**	**1.08**	**4,503,636**	**10.8%**	**41.87**
Greater Frazier Park	5,780	15,077	1.2%	8,095	1.40	1,195,145	2.9%	51.58
Greater Tehachapi	22,621	61,875	4.9%	22,506	0.99	3,308,491	8.0%	39.21
Metro	**295,389**	**905,860**	**71.7%**	**303,051**	**1.03**	**24,547,322**	**59.1%**	**20.31**
Greater Arvin	4,933	21,302	1.7%	5,151	1.04	975,545	2.3%	36.88
Greater Shafter	15,565	50,395	4.0%	47,706	3.06	3,798,365	9.1%	38.72
Metro Bakersfield	274,891	834,163	66.0%	250,194	0.91	19,773,412	47.6%	18.24
Southeast Kern	**26,514**	**75,196**	**5.9%**	**36,690**	**1.38**	**4,436,984**	**10.7%**	**39.66**
Greater Cal City/Mojave	11,508	32,016	2.5%	12,304	1.07	2,559,117	6.2%	57.74
Greater Rosamond	15,006	43,180	3.4%	24,386	1.63	1,877,867	4.5%	27.79
Lake Isabella	**12,362**	**29,807**	**2.4%**	**5,455**	**0.44**	**1,682,277**	**4.0%**	**47.71**
Greater Lake Isabella	12,362	29,807	2.4%	5,455	0.44	1,682,277	4.0%	47.71
Indian Wells	**17,292**	**44,777**	**3.5%**	**22,500**	**1.30**	**1,376,871**	**3.3%**	**20.47**
Greater Ridgecrest	17,292	44,777	3.5%	22,500	1.30	1,376,871	3.3%	20.47
Kern County Total	**417,115**	**1,264,100**	**100.0%**	**460,483**	**1.10**	**41,551,853**	**100.0%**	**24.09**

*Population is the total household population; does not included group quarters and prisons

Kern Council of Governments

July 25, 2012

TO: Kern Regional Transportation Modeling Committee (TMC)

FROM: Ahron Hakimi
Executive Director

BY: Rob Ball, Director of Planning

SUBJECT: AGENDA ITEM: X
Model Improvement Program Timeline and Valley Coordination

DESCRIPTION:

2014 Regional Transportation Plan (RTP) with the new required Sustainable Communities Strategy (SCS) board adoption is scheduled for October 2013. This item has been reviewed by the Transportation Modeling Committee.

DISCUSSION:

The RTP is the long range, 20+ year plan of transportation projects in the region. The new climate change regulation, Senate Bill (SB) 375, requires the RTP to contain a Sustainable Communities Strategy for reducing greenhouse gas emissions from passenger vehicle travel. Regulations also require that the same forecast assumptions to be used for the RTP, Regional Housing Needs Allocation (RHNA), and local General Plan Housing Elements.

In September 2011 Kern COG staff provided a timeline for the development of the first Kern COG RTP implementing new state climate change regulations.

In February 2012 the Kern COG board approved a framework for development of the Sustainable Communities Strategy. Staff has been working closely with Transportation Modeling Committee (TMC) and the Regional Planning Advisory Committee (RPAC) to develop an RTP/SCS the meets the new requirements and is consistent with the approved framework.

SB 375 required the California Air Resources Board (ARB) to set future targets for greenhouse gas emissions. In 2010, ARB set per capita reduction targets for Kern COG, and the 7 other COGs in the San Joaquin Valley at 5% by 2020 and 10% by 2035.

Kern COG and the 7 other COGs have an opportunity propose changes to the targets based on new modeling. The following is a list of key meetings for this target revision process.

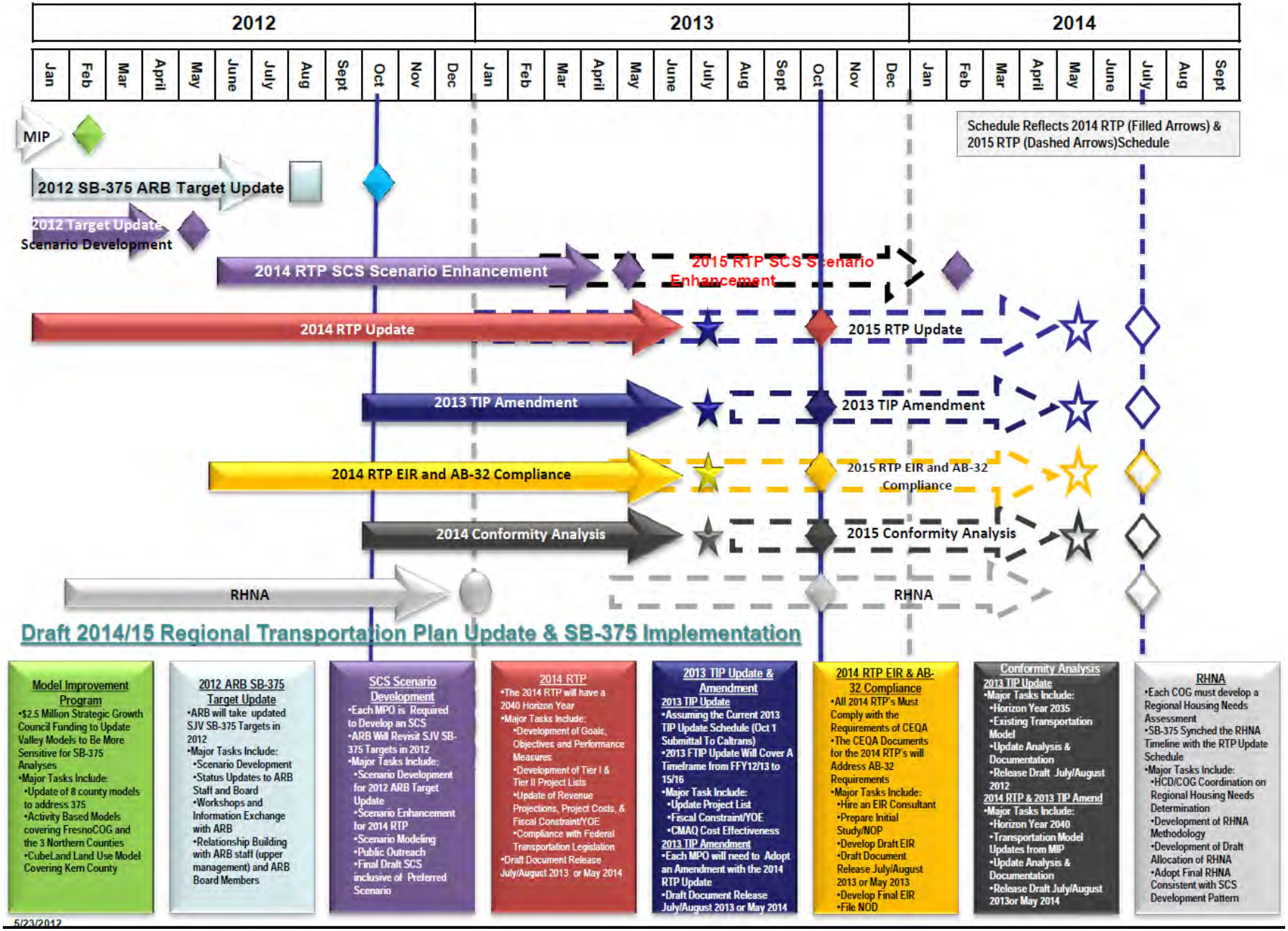
Date	Event
July 25, 2012	Transportation Modeling Committee – Review Draft Target Revision Scenario
August 1, 2012	Regional Planning Advisory Committee – Review Draft Target Revision Scenario
August 22, 2012	Transportation Modeling Committee – Recommend Target Revision to TTAC

September 1, 2012	Regional Planning Advisory Committee – Recommend Target Revision to TPPC
September 6, 2012	Tentative Special San Joaquin Valley Regional Policy Council Meeting
September 20, 2012	Transportation Planning Policy Committee (TPPC)/COG Board – Approve Proposed Target Revision
October 11-12, 2012	San Joaquin Valley Regional Policy Council – Fall Policy Conference in Lemoore – Consider joint submittal of Target Revision to ARB.
November 15-16, 2012	California Air Resources Board Meeting – in Bakersfield (TBA)

Staff is working independent of the 7 other COGs in the San Joaquin Valley to develop scenarios for consideration in target setting. All 8 COGs have received a grant to improve our transportation modeling capabilities. Under SB 375 the 8 COGs have the option to propose a coordinated target for the 8 County region. Kern COG participation in any coordinated target proposal would be subject to approval of the Kern COG Board.

Attachments: Draft 2014/15 RTP Update and SB 375 Implementation schedules

ACTION: Information


2012
2013
2014
Jan Feb Mar April May June July Aug Sept Oct Nov Dec
Jan Feb Mar April May June July Aug Sept Oct Nov Dec
Jan Feb Mar April May June July Aug Sept
Schedule Reflects 2014 RTP (Filled Arrows) & 2015 RTP (Dashed Arrows)Schedule
MIP
2012 SB-375 ARB Target Update
2012 Target Update Scenario Development
2014 RTP SCS Scenario Enhancement
2015 RTP SCS Scenario Enhancement
2014 RTP Update
2015 RTP Update
2013 TIP Amendment
2013 TIP Amendment
2014 RTP EIR and AB-32 Compliance
2015 RTP EIR and AB-32 Compliance
2014 Conformity Analysis
2015 Conformity Analysis
RHNA
RHNA
Draft 2014/15 Regional Transportation Plan Update & SB-375 Implementation
Model Improvement Program
•$2.5 Million Strategic Growth Council Funding to Update Valley Models to Be More Sensitive for SB-375 Analyses
•Major Tasks Include:
•Update of 8 county models to address 375
•Activity Based Models covering FresnoCOG and the 3 Northern Counties
•CubeLand Land Use Model Covering Kern County
2012 ARB SB-375 Target Update
•ARB will take updated SJV SB-375 Targets in 2012
•Major Tasks Include:
•Scenario Development
•Status Updates to ARB Staff and Board
•Workshops and Information Exchange with ARB
•Relationship Building with ARB staff (upper management) and ARB Board Members
SCS Scenario Development
•Each MPO is Required to Develop an SCS
•ARB Will Revisit SJV SB-375 Targets in 2012
•Major Tasks Include:
•Scenario Development for 2012 ARB Target Update
•Scenario Enhancement for 2014 RTP
•Scenario Modeling
•Public Outreach
•Final Draft SCS inclusive of Preferred Scenario
2014 RTP
•The 2014 RTP will have a 2040 Horizon Year
•Major Tasks Include:
•Development of Goals, Objectives and Performance Measures
•Development of Tier I & Tier II Project Lists
•Update of Revenue Projections, Project Costs, & Fiscal Constraint/YOE
•Compliance with Federal Transportation Legislation
•Draft Document Release July/August 2013 or May 2014
2013 TIP Update & Amendment
2013 TIP Update
•Assuming the Current 2013 TIP Update Schedule (Oct 1 Submittal To Caltrans)
•2013 FTIP Update Will Cover A Timeframe from FFY12/13 to 15/16
•Major Task Include:
•Update Project List
•Fiscal Constraint/YOE
•CMAQ Cost Effectiveness
2013 TIP Amendment
•Each MPO will need to Adopt an Amendment with the 2014 RTP Update
•Draft Document Release July/August 2013 or May 2014
2014 RTP EIR & AB-32 Compliance
•All 2014 RTP's Must Comply with the Requirements of CEQA
•The CEQA Documents for the 2014 RTP's will Address AB-32 Requirements
•Major Tasks Include:
•Hire an EIR Consultant
•Prepare Initial Study/NOP
•Develop Draft EIR
•Draft Document Release July/August 2013 or May 2013
•Develop Final EIR
•File NOD
Conformity Analysis
2013 TIP Update
•Major Tasks Include:
•Horizon Year 2035
•Existing Transportation Model
•Update Analysis & Documentation
•Release Draft July/August 2012
2014 RTP & 2013 TIP Amend
•Major Tasks Include:
•Horizon Year 2040
•Transportation Model Updates from MIP
•Update Analysis & Documentation
•Release Draft July/August 2013or May 2014
RHNA
•Each COG must develop a Regional Housing Needs Assessment
•SB-375 Synched the RHNA Timeline with the RTP Update Schedule
•Major Tasks Include:
•HCD/COG Coordination on Regional Housing Needs Determination
•Development of RHNA Methodology
•Development of Draft Allocation of RHNA
•Adopt Final RHNA Consistent with SCS Development Pattern
5/23/2012

Draft SB-375 Target Setting Schedule

July 17, 2012

Task	Anticipated Deliverable	Schedule/Deadline	Notes:
MPO Director meeting to review 2011 RTP baseline scenario results	Summary of MPO 2011 RTP (as amended) Baseline 375 Results	July 17, 2012, 1 pm, FresnoCOG (Conference Call Option will be Provided)	Summary will be provided prior to meeting for review.
Compilation of Preferred SB-375 target scenario of 8 Valley MPOs into summary document for discussion	MPOs submit Preferred Target Setting Scenario MIP Model Results to Cari for Incorporation into 375 Summary Document	July 23, 2012	
MPO Director meeting to review 2011 RTP Preferred scenario results	Summary of MPO Preferred Scenario 375 Results	August 2, 2012, 1 pm, Madera CTC	
Development of Target Recommendation	Target Recommendation	August 3, 2012, through August 9, 2012	Recommendation to be developed based on August 2nd discussion with directors. Determine form of Target (e.g. 8 individual, groupings of MPOs 3-4-1, all 8 MPOs)
MPO Director meeting to review Target recommendation	Target Recommendation	Week of August 13, 2012	Please complete the when is good request. This will facilitate the scheduling of this meeting.
Update target recommendation based on director input	Updated Target Recommendation	August 24, 2012	
Director 2nd Review Target Recommendation	Updated Target Recommendation	August 28, 2012	Comments from this review will be addressed in the final draft policy council staff report. A conference call will be scheduled, if necessary.
Policy Council Staff Report Submittal Deadline	Final Draft Target Recommendation Policy Council Staff Report	August 30, 2012	One Week Prior to Policy Council
Tentative Special Policy Council Meeting	Tentative Special Policy Council Meeting	September 6, 2012	Tentative date that will need to be confirmed.
Update target recommendation based on Policy Council input	Updated Target Recommendation	September 20, 2012	
Director Review Target Recommendation	Updated Target Recommendation	September 27, 2012	Comments due
Director Conference Call to Review Director Comments	Conference call to review and reach consensus on how to incorporate directors comments	September 28, 2012	If necessary
Update target recommendation based on director input	Updated Target Recommendation	October 2, 2012	
Director Committee Staff Report Due	Target Recommendation	October 3, 2012	
Director Committee Meeting	Target Recommendation	October 10, 2012	
Anticipated Policy Council Action on Valley Target Recommendation	Policy Council Action	October 12, 2012	
ARB Board Presentation by Valley MPOs and ARB Board Nod of Intent, if Appropriate/Applicable (Anticipated Location: Bakersfield, CA)	ARB Board Presentation	November 15 & 16, 2012	ARB has indicated no "official" action will be taken on a target recommendation from the Valley at this meeting.