



DEPARTMENT OF
FINANCE

ARNOLD SCHWARZENEGGER, GOVERNOR

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April 28, 2008

Mr. Will Kempton, Director
Department of Transportation
P.O. Box 942873
Sacramento, CA 94273-0001

Dear Mr. Kempton:

**Final Report—Review of the Department of Transportation's Intercity Rail Program,
Phase II**

Enclosed is the final report on our review of the Department of Transportation's (Caltrans) Intercity Rail Program, Phase II. The Department of Finance, Office of State Audits and Evaluations, performed this audit in accordance with an interagency agreement with Caltrans.

We appreciate Caltrans' assistance and cooperation with this review. If you have any questions, please contact Mary Kelly, Manager at (916) 322-2985.

Sincerely,

Original signed by:

David Botelho, Chief
Office of State Audits and Evaluations

Enclosure

cc: Mr. William D. Bronte, Chief, Division of Rail, Department of Transportation
Ms. Norma Ortega, Chief, Division of Budgets, Department of Transportation
Mr. Clem Bomar, Manager, Division of Rail, Department of Transportation

REVIEW

California Department of Transportation
Intercity Rail Program
Phase II

Prepared By:
Office of State Audits and Evaluations
Department of Finance

072660184

March 2008

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EXECUTIVE SUMMARY

The Department of Finance, Office of State Audits and Evaluations, conducted a review of The Department of Transportation's (Caltrans) methodology for forecasting future ridership and rail equipment requirements. Caltrans contracts with AECOM Consult (AECOM), an affiliate of DMJM Harris, to forecast intercity rail travel within California. The forecasting model is used to estimate the anticipated demand of future rail service based on certain desired service characteristics.

We determined that the model is a reasonable methodology for forecasting future rail ridership. It includes several elements which, if not industry best practices, do represent conventional practice. AECOM has extensive experience performing transportation modeling and exhibits a high level of modeling expertise. We have reported some weaknesses in the application of the methodology and noted concerns with the level of validation currently undertaken. While the model will benefit from systematic improvements, using the present model for rail ridership forecasting is a reasonable decision.

Conversely, the model cannot be used independently to forecast rail equipment requirements. The model provides important inputs to choosing among potential service improvements, but ridership and revenue represent only a portion of what should be considered.

We recommend that Caltrans undertake the following activities to ensure a comprehensive evaluation of rail equipment requirements:

- Include in planning scenarios the evaluation of the addition and subtraction of coaches to/from existing trainsets as recommended in the California Department of Transportation Intercity Rail Program Phase I Report. The reallocation of a single coach car to an existing trainset would eliminate over half the instances reported in the *Ridership Exceeding 80% of Capacity Report*. In addition, this reallocation of rail equipment would eliminate and/or significantly reduce the report standee issue. This could be accomplished without the expense of additional trainsets and their corresponding capital improvements.
- Ensure that discussion of equipment needs includes an analysis of the cost to upgrade infrastructure and rolling stock as compared to the benefits to be achieved.
- Collaborate with the Southern California Association of Governments and/or the Southern California Regional Rail Authority to develop a regional model to forecast ridership on the Pacific Surfliner. Various planning scenarios should be reviewed to study the impact of Metrolink activities on Amtrak's metropolitan commuter rail.

These factors should be key components in Caltrans' determination of short and long term rail equipment needs. They should also be used in developing the *10-Year State Rail Plan*. These enhancements would further Caltrans' goals of maximizing transportation system performance and accessibility, and efficiently delivering quality transportation services.

BACKGROUND, SCOPE, AND METHODOLOGY

BACKGROUND

The State of California assists the National Railroad Passenger Corporation (Amtrak) in providing rail service in California. Through Caltrans, the state provides capital grants and support for station and track improvements, locomotives and coaches, bus service connections and operating assistance. Caltrans' Division of Rail is responsible for managing and coordinating the intercity rail passenger service in partnership with Amtrak.

Government Code Section 14036 requires that Caltrans complete a *10-Year State Rail Plan* with both passenger rail and freight rail elements. Part I of the *2007-08 to 2017-18 State Rail Plan* prepared by the Division of Rail is the Passenger Rail Element which examines intercity and commuter passenger rail services in California and reviews their current operations. It also outlines 10-year plans for capital improvements and service expansions.

Part II of the *State Rail Plan* prepared by the Division of Transportation Planning is the Freight Rail Element. It provides a description of the freight rail network; issues concerning the freight rail industry; and policy recommendations and goals for the maintenance, preservation, improvement, and funding of the system.

SCOPE

The Department of Finance, Office of State Audits and Evaluations (Finance), was directed to perform a review of the Caltrans' Intercity Rail Program. The review, which encompassed two phases, was required by Chapter 171 Statutes of 2007 (Senate Bill 77, Ducheny). Phase I addressed ridership measurement, rail equipment availability, ridership capacity, and equipment configuration utilized to support ridership demand. The Phase I report was issued January 31, 2008. This report addresses Phase II, a review of Caltrans' methodology for forecasting future ridership and rail equipment requirements.

METHODOLOGY

Our review was initiated with a series of interviews of Caltrans and Amtrak representatives to gain an understanding of the use and assumptions of the forecasting model. We reviewed documents prepared by Caltrans, including the draft *2007-08 to 2017-18 California State Rail Plan*, the *Future Needs Report*, the *Description and Analysis of the Railroad Passenger Car and Passenger Locomotive Market Report*, and the 2007-08 business plans for all three state-supported routes. We reviewed the Caltrans/Amtrak forecasting model documentation and the *Development of Techniques for Forecasting Intercity Rail Travel Within California Report (December 2000)*.

We met with representatives of Caltrans' forecasting consultant and a transportation modeling expert. We validated the model by comparing ridership projections to actual ridership figures. Finally, we interviewed other rail authorities, including the Southern California Regional Rail Authority (SCRRA).

FORECASTING METHODOLOGY

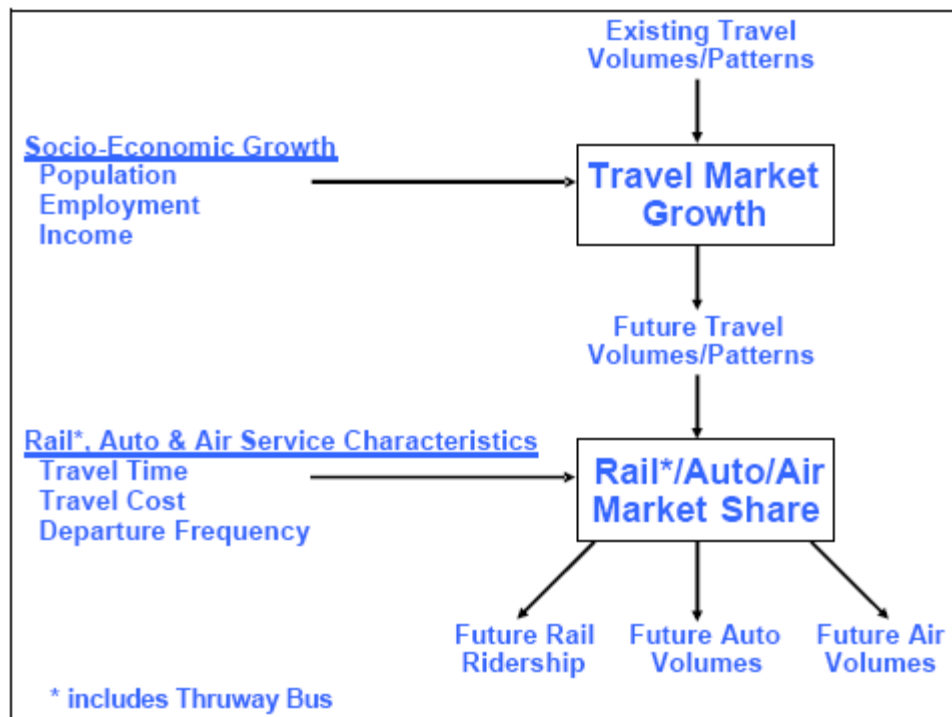
Caltrans contracts with AECOM Consult (AECOM), an affiliate of DMJM Harris, to forecast intercity rail travel within California. The forecasting model, developed by AECOM, provides Amtrak and Caltrans with a tool for short and long term business planning, for support of the annual budget and corridor development plans, and as input in the 10-Year State Rail Plan.

The forecasting model is designed to provide ridership and ticket revenue forecasts for consideration in short and long term route planning in California. The forecasting model is used to estimate the anticipated demand of future rail service based on certain desired service characteristics, such as new services, new stations, route extensions or truncations, frequency changes, fare changes, changes in on time performance, population growth, and rail travel time.

Model Overview

The forecasting model blends travel survey data and historical trend analysis to develop its two-stage forecast. The first stage, or total demand model, forecasts the total number of person trips in each market. The second stage, the mode choice model, predicts the market share captured by each available mode (rail, auto, air).

Forecasting Model Structure



Source: Caltrans/Amtrak California Intercity Rail Ridership/Revenue Forecasting Model

The total demand model determines the growth in intercity travel volume. The demand is calculated using existing travel market data and socio-economic growth in population, employment and income. The existing travel market data is based on highway and rail surveys conducted between 1992 and 2007. These surveys collected data on trip origins and destinations, purposes, departure times, and traveler demographics to understand travel patterns and develop profiles of California intercity travelers.

The total demand model uses population, employment, and income data developed by the Department of Finance and other state and local entities. This socio-economic data is the basis for measuring market size and growth.

The second stage of the forecast is a mode choice model to estimate the share of travel by mode (rail, auto, air). This model considers service characteristics, including: travel time, cost, frequency, and time of day for each travel mode. Ultimately, the forecasting model is a function of these inputs. The service characteristics for the rail mode are managed by Caltrans.

Observations:

1. The documentation provided does not indicate that the automobile survey expansion method accounts for multiple-counting of observations for origin-destination pairs. It was not apparent from the data provided whether the sample expansion adjusts for potential multiple counting.
2. The mode choice model is based on population averages. A better practice would be to use sample enumeration or market segmentation to eliminate a potential source of error.
3. The highway travel data was obtained over a long time frame, from 1992 to 2007. Because travel conditions may have changed considerably in the sixteen years since the implementation of data collection, inconsistencies in the data may exist.

Model Validation

AECOM reports that the model is consistently verified through comparison of forecasted ridership and revenue to actual ridership and revenue resulting from near term service changes. The examples provided in the documentation illustrated an immaterial difference between forecasted and actual results for two scenarios: faster travel times between Oakland and Sacramento (measured in April 2004) and the addition of a second Pacific Surfliner San Luis Obispo frequency (measured in November 2004).

We performed a validation of the model based on actual and forecasted ridership. Our review included forecasts made in the *10-Year State Rail Plans* issued in 2001-02, 2003-04, 2005-06, and 2007-08. We found that in the early forecasts there were significant discrepancies between the forecasted and actual ridership. While ridership on the Pacific Surfliner was significantly higher than the 2001-02 projection, actual ridership on the Capitol Corridor and San Joaquin was significantly lower. In subsequent projections, particularly the 2005-06 projection, the forecasted ridership more closely reflected actual ridership. We note that for the most recent forecasts there have only been two years of data with which to make a comparison. Also, there were no significant changes to services in the two comparison years.

Caltrans and AECOM representatives stated that changes in the desired service characteristics and forecast model adjustments have made the ridership projections more accurate. See Exhibit II for validation of the forecasts for the three state-supported corridors.

While refinements of the forecasts and other factors have improved the accuracy of the projections, significant issues or events could hamper the model's ability to accurately predict ridership. Such events include: market impacts, such as the 2001-02 recession; the model's assumption of unlimited capacity for additional passenger growth; and activities of other service providers, such as the Metrolink Rail 2 Rail agreement.

An example of a significant event which was not reflected in the forecasting model was the substantial growth of riders on the Pacific Surfliner resulting from the Metrolink Rail 2 Rail agreement. The 2001-02 ridership forecast figures were published March 2002 while the Rail 2 Rail agreement with Metrolink began in September 2002. This unanticipated growth resulted in a forecast which underestimated ridership by 23 percent, or 493,000 passengers, in 2005-06.

Observations:

1. The model validation activities should be expanded. The examples used by AECOM to exemplify its validation activities date from 2004. While it is not unusual for travel demand models to produce forecasting errors, model validation will assist in the detection and reduction of errors.
2. Documentation of model validation should be specific. For example, Table 2 in the *Caltrans/Amtrak California Intercity Rail Ridership/Revenue Forecasting Model* is an insufficient example of validation efforts. Specifically, it does not indicate when the forecasts for 2004 were made.

Ridership Projections/Equipment Requirements

The model is a reasonable methodology for forecasting future rail ridership. It includes several elements, which, if not industry best practices, do represent conventional practice. These elements include the use of traffic analysis zones in the travel surveys and market analysis, the model's use of independent elasticity values and damped frequencies, and the segmentation of the model by four trip purposes. Additionally, the model allows for adjustments to frequencies to ensure coverage during certain desirable travel times.

However, the model cannot be used independently to forecast rail equipment requirements. While it is a critical piece in this discussion, other issues require consideration in the determination of equipment requirements. The model provides important inputs to choosing among potential system improvements, but ridership and revenue represent only a portion of what should be considered.

For example, the model does not consider the impact of adding or subtracting individual coaches to/from existing trainsets. Any discussion of equipment needs should be initiated with an evaluation of the effect of reallocating rail equipment. As asserted by the Capitol Corridor's Joint Powers Authority's Managing Director in his February 2007 testimony before the State Senate Transportation Committee:

“From an economic standpoint, this is the most cost effective means of adding capacity and further improving growth and farebox recovery. Simply adding 2 cars to each of the 8 [Capitol Corridor] sets would increase passenger carrying capacity by 50%, at almost no cost. No additional locomotive is needed. No additional engineer is needed. No additional crew is needed. The only expense is the annual cost of maintenance of the coaches.”

Also, as discussed in the Model Validation section of this report, the model does not account for certain variables, such as the impact of Metrolink activities on the Pacific Surfliner route. We note that Metrolink is scheduled to increase its fleet by 70 percent during 2009-10. Just as the implementation of the Metrolink agreement resulted in a 23 percent under estimation of ridership, failure to consider increased Metrolink services could produce a significant overestimation of ridership.

Furthermore, in estimating future ridership, the model includes induced ridership which results from the addition of frequencies. However, the model does not reflect whether there are track slots available to Caltrans for the operation of added frequencies. The draft copy of Caltrans' *Future Needs Report* indicates that a total of 15 6-car trainsets will be needed through 2017-18. The first 6-car trainset is scheduled to come into service in 2010-11 on the Los Angeles to San Luis Obispo route with an extension to San Francisco (See Exhibit I). However, the Division of Rail staff has indicated that there are currently only two open slots between Oakland and Stockton where additional equipment may be used without capital improvements. As a result, until several capital projects are completed, the current rail network will not be able to accommodate additional trainsets. The induced ridership forecasted by the model will not materialize until and unless the capital projects are completed.

A comprehensive cost/benefit analysis should be completed prior to any decisions to add train frequencies. Costs should include expenditures for the additional rail equipment and capital projects to accommodate anticipated trainsets. Capital project expenditures may include adding new track and sidings, purchase of right of way, additional signaling, etc. Benefits derived from such projects may include user benefits from improved mobility and accessibility, travel cost savings, and environmental benefits.

Observations:

1. Caltrans should collaborate with the Southern California Association of Governments and/or the SCRRA to develop a regional model to forecast regional ridership on the Pacific Surfliner. Various planning scenarios should be reviewed to study the impact of Metrolink activities (ridership, equipment) on Amtrak's metropolitan commuter rail.
2. Caltrans should include in its planning scenarios the evaluation of the addition of coaches to existing trainsets. Our analysis disclosed that the addition of a single coach car to existing trainsets eliminates over half the instances of *Ridership Exceeding 80% of Capacity* and eliminated and/or significantly reduces the reported standee issue.
3. Caltrans should ensure that discussion of equipment needs includes several factors, not simply the forecast. Such discussions should include a cost benefit analysis of the cost to upgrade infrastructure and rolling stock with the benefits to be achieved. Such benefits would include: user benefits from improved mobility and accessibility, travel costs savings, and environmental benefits.

Exhibit I

Service Improvements, Trainsets, Cars and Patronage Increases
By Fiscal Year 2006-07 through 2017-18

Fiscal Year	Planned Service Levels/ Improvement	Trainsets Required for Service Improve- ment	Total Cars in State- Supported Service	Cumula- tive Increase in Cars Required (vs. FY 2007)**	Cumula- tive % in Cars Required (vs. FY 2007)	Cumula- tive % Increase in Ridership vs. FY 2007
2006-07	Current	--	142*	--	--	--
2007-08	No change	--	142	0	0%	2%
2008-09	No change	--	142	0	0%	5%
2009-10	No change	--	142	0	0%	8%
2010-11	+1 R.T. LA-SLO-SF (extension from SLO)	+1	148	6	4%	11%
2011-12	+4 R.T. Oakland-SJ; +3 R.T. Sacto.-Roseville, +1 R.T. to Auburn; +1 R.T. Sacto.-Bfld; +2 R.T. Oakland-Stockton; +1 R.T. LA-SD	+3	166	24	12%	22%
2012-13	No change	--	166	24	12%	25%
2013-14	+2 R.T. Oakland-Sacto; +1 R.T. LA-SLO-SF	+3	184	42	30%	38%
2014-15	+1 R.T. Sacto.- Reno; +1 R.T. Sacto.- Auburn; +1 R.T. Sacto.- Roseville +1 R.T. LA-SD; +1 R.T. Oakland-Bfld.	+4	208	66	47%	49%
2015-16	+1 R.T. Sacto.- Redding	+1	214	72	51%	53%
2016-17	+1 R.T. Sacto.- Reno; +1 R.T. Sacto.- Roseville;	+1	220	78	55%	59%
2017-18	+3 R.T. Oakland-SJ; +2 R.T. Sacto.-Roseville	+2	232	90	63%	66%

Source: Caltrans Draft Future Needs Report – January 7, 2008

Exhibit II

Model Validation by Corridor

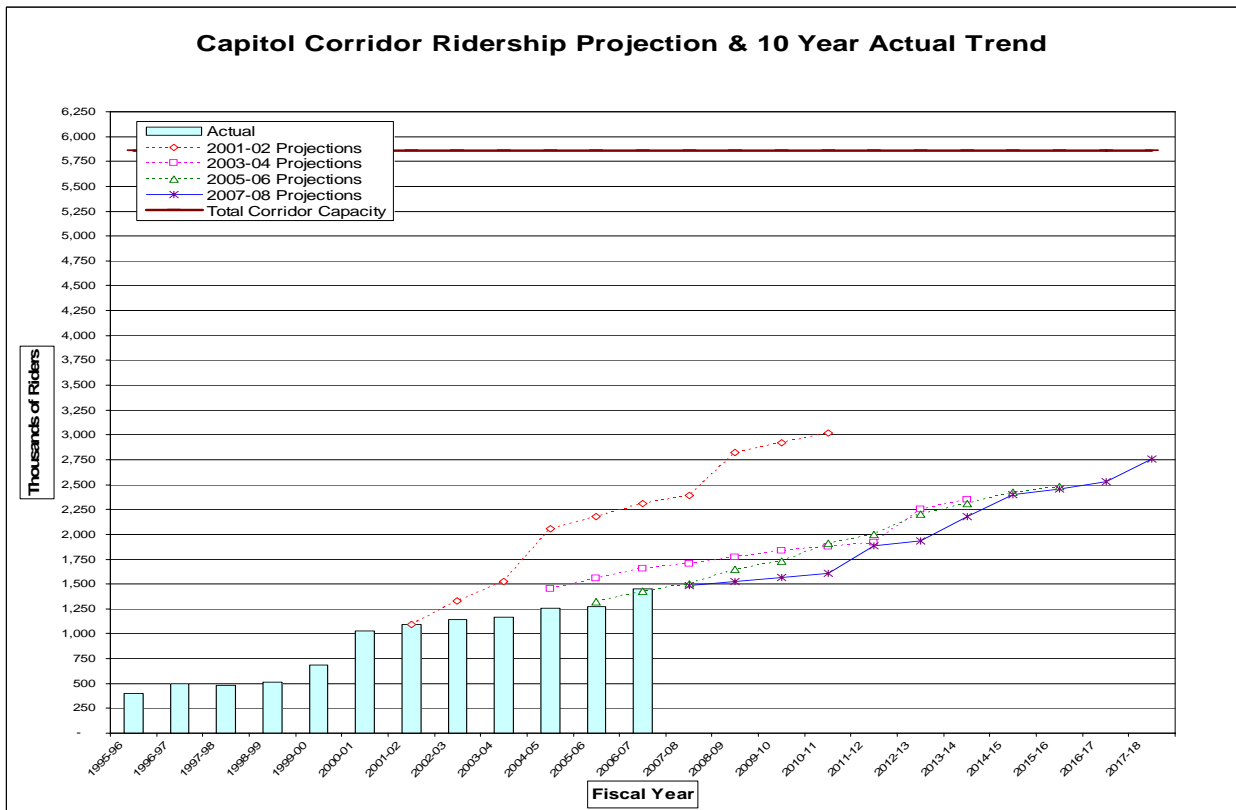
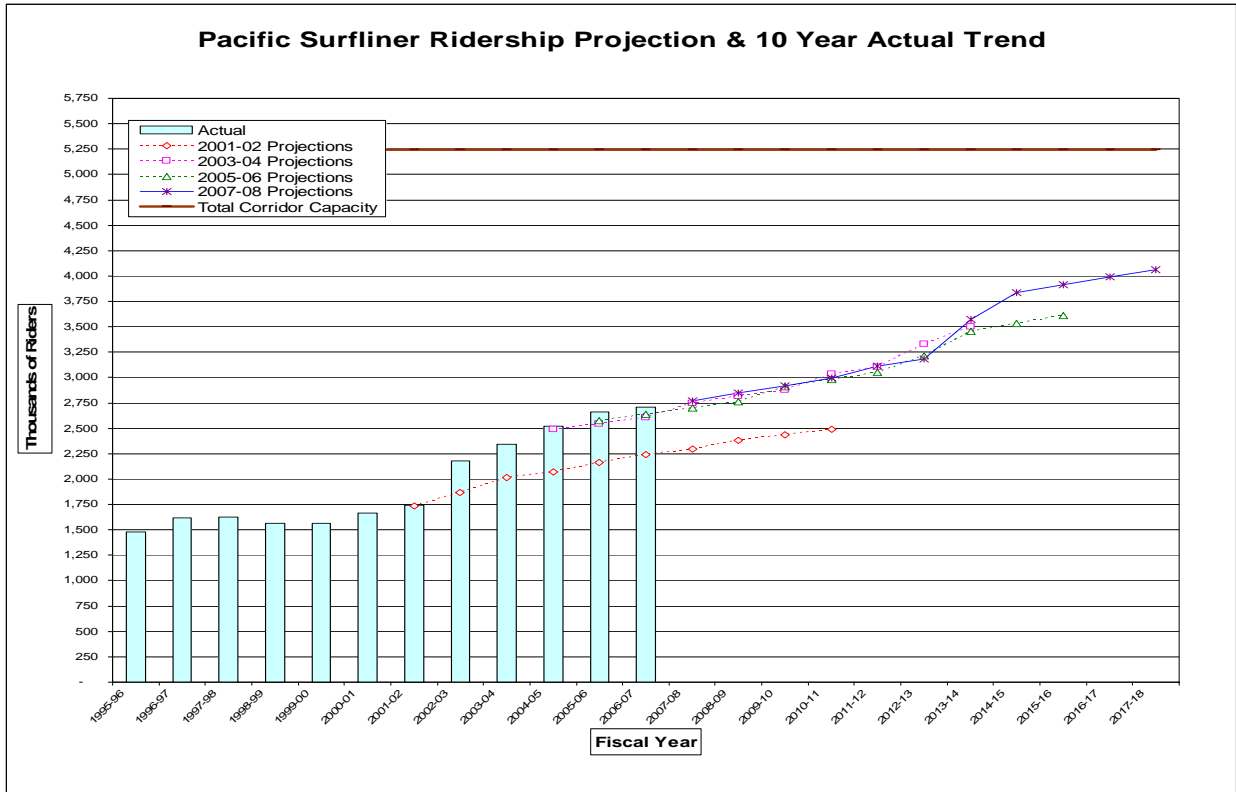
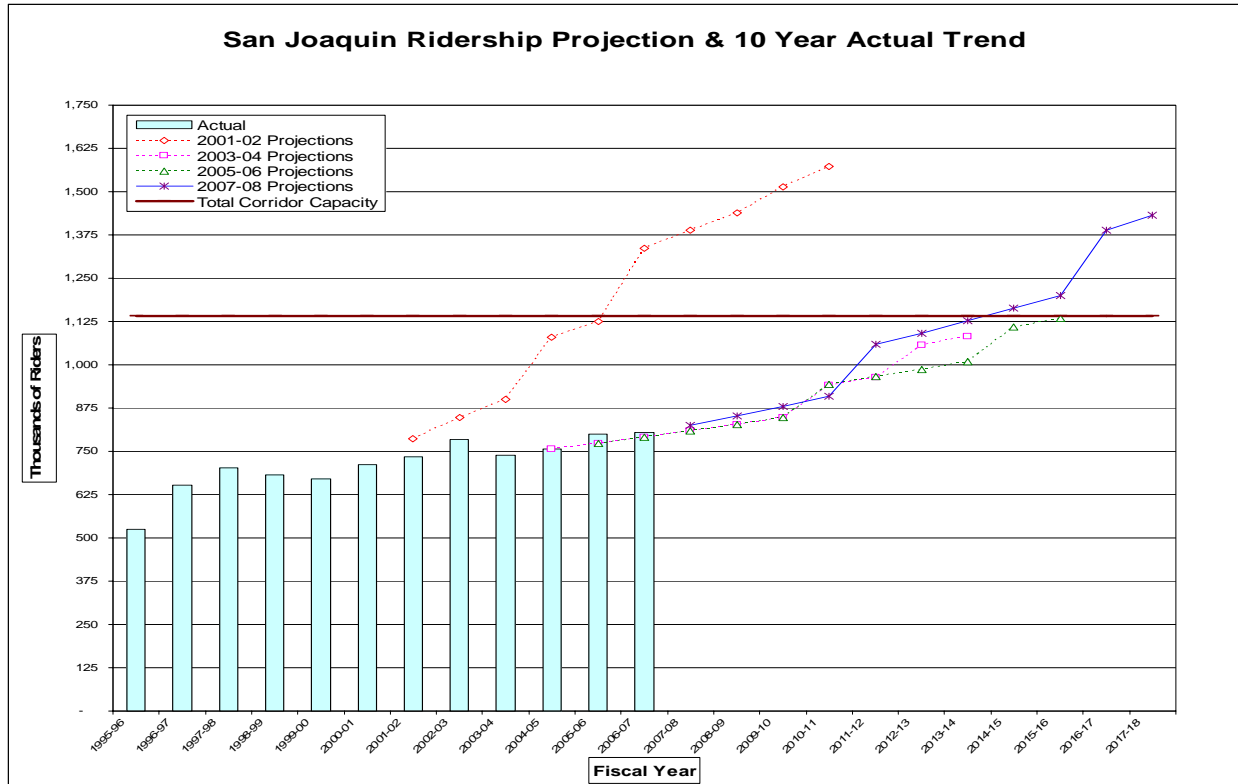


Exhibit II (continued)

Model Validation by Corridor



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*Flex your power!
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April 17, 2008

Mr. David Botelho
Chief
Office of State Audits and Evaluations
Department of Finance
300 Capitol Mall, Suite 801
Sacramento, CA 95814

Dear Mr. Botelho:

On April 7, 2008, the California Department of Transportation (Caltrans) received a copy of the Office of State Audits and Evaluations (OSAE) draft report (Draft Report) on the "Review-California Department of Transportation Intercity Rail Program - Phase II." This evaluation was called for in the 2007 Budget Act, Chapter 171, Statutes of 2007. The Department appreciates the opportunity to comment on the Draft Report's findings.

Overall, we found the OSAE Phase II review thorough and thoughtful. We have a few minor differences with the Draft Report's "Observations" which are outlined in the enclosure. Following the responses to the Observations, we commented on other statements contained in the Draft Report.

If you have any questions or concerns, please contact William D. Bronte, Chief, Division of Rail, at (916) 654-6542.

Sincerely,

Original signed by:

WILL KEMPTON
Director

Enclosure

c: William D. Bronte, Chief, Division of Rail
Norma Ortega, Chief, Division of Budgets

"Caltrans improves mobility across California"

**California Department of Transportation
Detailed Response to the Draft Report**

**"Review - California Department of Transportation
Intercity Rail Program-Phase II"**

April 17, 2008

MODEL OVERVIEW

1. Observation

The documentation provided does not indicate that the automobile survey expansion method accounts for multiple counting of observations for origin-destination pairs. It was not apparent from the data provided whether the sample expansion adjusts for potential multiple counting.

Caltrans' Response

We agree that this detail was not stated in the documentation that was provided. However, the automobile survey expansion methodology does account for multiple estimates of the same market from different survey locations and includes adjustment factors to correct for multiple counting when different survey locations are combined.

2. Observation

The mode choice model is based on population averages. A better practice would be to use sample enumeration or market segmentation to eliminate a potential source of error.

Caltrans' Response

Although "sample enumeration" may indeed represent "better practice," it does not necessarily produce more accurate forecasts. The Amtrak/Caltrans model draws upon an extensive set of survey data and aggregate data collected and assembled over time that would be difficult to incorporate within a pure "sample enumeration" approach. In particular, Amtrak's actual ridership data provides a rich continuous source of aggregate data on ridership by market, train, time-of-day, and price paid, which could not be duplicated by surveys (as would be used in the "sample enumeration" approach) within reasonable budget constraints. These time series data have been used to develop, enhance, and validate many of the model relationships over time. Furthermore, while "sample enumeration" is not used, the Amtrak/Caltrans model includes market segmentation by trip purpose.

3. Observation

The highway travel data was obtained over a long time, from 1992 to 2007. Because travel conditions may have changed considerably in the 16 years since the implementation of data collection, inconsistencies in the data may exist.

Caltrans' Response

Although the highway survey data collection was initiated in 1992, all highway survey data used in the model has been updated since 2004 for all but the following three locations:

- Interstate 5 (I-5) at San Juan Capistrano (data first collected in 1997)-new data was collected at this location and a parallel location on I-15 in late 2007, with processing and analysis completed in early 2008.
- US Highway 101 near Gilroy (data first collected in 1999)-new data collection is scheduled for May 2008, with processing and analysis to be completed later in 2008.
- I-10 at Beaumont (data collected in 1992)-this location is considered a low priority for update by Caltrans/Amtrak since there is no corridor service in this market now nor is any expected within the next few years; a new survey may be scheduled within the next few years.

MODEL VALIDATION

1. Observation

The model validation activities should be expanded. The examples used by AECOM Consult to exemplify its validation activities date from 2004. While it is not unusual for travel demand models to produce forecasting errors, model validation will assist in the detection and reduction of errors.

Caltrans' Response

While we agree that more model validation is desirable, there have been limited opportunities to compare forecasts to actual performance associated with changes in service. Since 2004 the only significant service change that has not been validated is the increase in Capitol Corridor service in August 2006, and currently there is only a little over one year of ridership data for that service change.

The Department of Finance (DOF) states they performed model validation by comparing actual ridership with forecasted ridership from a number of State Rail Plans. In virtually all these cases the model forecasts were for a service plan that was not implemented. Comparing model forecasts associated with a specific service plan with actual performance associated with a different service plan does not test the validity of the model. Moving forward, we will continue to identify and analyze situations where model forecasts can be compared to actual performance.

2. Observation

Documentation of model validation should be specific. For example, Table 2 in the Caltrans/Amtrak California Intercity Rail Ridership/Revenue Forecasting Model is an insufficient example of validation efforts. Specifically, it does not indicate when the forecasts for 2004 were made.

Caltrans' Response

We agree that model validation results should include more information and regret that this was omitted from the summary documentation. Here is some more descriptive information on the validation examples:

Capitol Corridor Example: Faster travel times were implemented on the Capitol Corridor between Oakland and Sacramento with the Spring (late April) 2004 timetable change. Prior to implementing this timetable change, AECOM Consult was asked to prepare forecasts (in March 2004), and used the Amtrak/Caltrans intercity passenger rail demand model to estimate the ridership/revenue impacts associated with the improved travel time schedule. The resulting increase of 82,041 riders and \$1,002,825 in ticket revenue mirrors the forecasted annual impact of 82,100 riders and \$990,000 in ticket revenue associated with the faster travel times.

Pacific Surfliner Example: A second frequency to San Luis Obispo (SLO) was implemented on the Pacific Surfliner Route in November 2004. Prior to implementing this timetable change, AECOM Consult was asked to prepare forecasts for several different SLO service alternatives using the Amtrak/Caltrans intercity passenger rail demand model. The selected alternative that was implemented in November 2004 was addressed by AECOM Consult estimates prepared in January 2004 and used to develop the fiscal year 2005 ridership and revenue budget for the Pacific Surfliner Route. The resulting increase of 83,622 riders and \$1,611,182 in ticket revenue is almost identical to the forecasted annual impact of 83,300 riders and \$1,670,000 ticket revenue associated with the new frequency.

RIDERSHIP PROJECTIONS/EQUIPMENT REQUIREMENTS

1. Observation

Caltrans should collaborate with the Southern California Association of Governments and/or the Southern California Regional Rail Authority (SCRRA) to develop a regional model to forecast regional ridership on the Pacific Surfliner. Various planning scenarios should be reviewed to study the impact of Metrolink activities (ridership, equipment) on Amtrak's metropolitan commuter rail.

Caltrans' Response

While Amtrak intercity rail and Metrolink commuter rail operate on the same corridor, they serve two separate markets with some overlap. It should be noted that Amtrak operates intercity rail service that passes through a metropolitan area; they do not operate metropolitan commuter rail. A regional model that would project both intercity and commuter rail ridership would be extremely complex and costly to develop, and it would be very difficult to produce a model that could project ridership for specific train schedules, which is the intent of the Amtrak/Caltrans intercity passenger rail demand model.

However, Caltrans agrees that it is important to attempt to account for the impact of actual and projected commuter rail ridership when projecting intercity rail ridership. Caltrans plans future enhancements of the Amtrak/Caltrans intercity passenger rail demand model that will project in more detail the impacts of commuter rail ridership.

Additionally, Caltrans works closely with the Los Angeles-San Diego-San Luis Obispo Rail Corridor Agency (LOSSAN) in coordinating intercity and commuter rail services in Southern California. LOSSAN, which acts as a planning and advisory group for intercity rail in Southern California includes representation of Southern California commuter rail agencies.

Recently the Orange County Transportation Authority (OCTA) and Caltrans Division of Rail initiated a study with an objective of identifying potential improvements for rail services on the LOSSAN rail corridor that (1) would enhance the utility of rail service for riders, (2) could be implemented within a year, and (3) could be implemented with minimal expense. Service improvement concepts were solicited from the LOSSAN Technical Advisory Committee. This Committee consists of representatives from Caltrans, SCRRA, North County Transit District (NCTD) (operator of Coaster commuter rail service in the San Diego area), OCTA, Los Angeles County Metropolitan Transportation Authority (Metro), Ventura County Transportation Commission (VCTC), Santa Barbara County Association of Governments (SBCAG), San Diego Association of Governments (SANDAG), San Luis Obispo Council of Governments (SLOCOG), and Amtrak. The study team reviewed the recommendations and came up with 20 concepts for implementation including: consolidated timetables; mutual aid agreements; Amtrak bus/Metrolink coordination; joint marketing, ticketing, information distribution, and transfers; and others.

2. Observation

Caltrans should include in its planning scenarios the evaluation of the addition of coaches to existing trainsets. Our analysis disclosed that the addition of a single coach car to existing trainsets eliminates over half the instances of ridership exceeding 80 percent of capacity and eliminated and/or significantly reduces the reported standee issue.

Caltrans' Response

The addition of one coach to each trainset for additional capacity, would mean Caltrans would need to acquire 23 additional coaches (one for each trainset currently in service on weekdays plus four to be used as "protect"). Adding two cars to each Capitol trainset (as suggested by the Managing Director of the Capitol Corridor Joint Powers Authority in the quote in the Draft Report) would require 16 additional cars, plus three to use as "protect" and would not provide any additional capacity for the Pacific Surfliners or San Joaquins.

However, Caltrans does not have excess equipment in the existing fleet to add cars to trainsets. Thus, DOF's suggestion that we add a coach to each trainset to relieve the standing problem supports that additional equipment is needed and the procurement of rolling stock should begin immediately due to the lengthy acquisition process.

3. Observation

Caltrans should ensure that discussion of equipment needs includes several factors, not simply the forecast. Such discussions should include a cost-benefit analysis of the cost to upgrade infrastructure and rolling stock with the benefits to be achieved. Such benefits would include user benefits from improved mobility and accessibility, travel cost savings, and environmental benefits.

Caltrans' Response

Caltrans agrees that equipment needs should not simply be driven by ridership forecasts. The service expansion program contained in the State Rail Plan, which drives the projections for equipment needs, takes into consideration all of the benefits mentioned by the DOF. The State Rail Plan is a comprehensive program approach which includes a 10-year capital and operating program, and the costs and benefits of those programs.

However, it should be noted that it is difficult to make a quantitative comparison of the public benefits of intercity rail with the quantitative costs of intercity rail. The benefits (as partly mentioned by the DOF) include air quality and energy savings in comparison to auto and air travel, land use benefits, congestion relief, and the provision of a travel mode alternative. The basic operating cost/benefit statistic used in public transportation is the farebox ratio—a comparison of operating revenues to operating expenses. The State Rail Plan shows that the farebox ratio on all three routes improves over the ten years of the plan.

The State's intercity rail capital program is developed in a manner parallel to the State's highway capital program as mandated by State law, and as such follows a similar cost/benefit analysis as the State's highway program. The intercity rail program is funded from many of the same sources as the State's highway program—the State Transportation Improvement Program, the Traffic Congestion Relief Program, and now the Proposition 1B Bond Program. A parallel rigorous planning and programming process is required for intercity rail projects as for highway projects.

OTHER STATEMENTS

Statement

Model Validation, Page 4

“We performed a validation of the model based on actual and forecasted ridership. Our review included forecasts made in the *10-Year State Rail Plans* issued in 2001-02, 2003-04, 2005-06, and 2007-08. We found that in the early forecasts there were significant discrepancies between the forecasted and actual ridership. While ridership on the Pacific Surfliner was significantly higher than the 2001-02 projection, actual ridership on the Capitol Corridor and San Joaquin was significantly lower.”

Caltrans' Response

These earlier model forecasts (2001-02) show potential ridership assuming a significant increase in the level of service. Those service levels were never implemented and as a result there is no way to determine whether the earlier forecast levels would have been achieved.

Statement

Model Validation, Page 5

“While refinements of the forecasts and other factors have improved the accuracy of the projections, significant issues or events could hamper the model’s ability to accurately predict ridership. Such events include: market impacts, such as the 2001-02 recession; the model’s assumption of unlimited capacity for additional passenger growth; and activities of other service providers, such as Metrolink Rail 2 Rail agreement.”

Caltrans' Response

The DOF comments that significant issues or events could hamper the model’s ability to accurately predict ridership. Cited as examples were two events that were unknown at the time the 2001-02 forecast was undertaken. No model or forecast can adjust for unforeseen events. For example, DOF’s fiscal year 2000 population and employment forecasts (a major input to the model) showed no adjustment for the 2001-02 recession.

The assumption of unlimited capacity is fundamental to the forecasting process. The key first output for any forecasting process is to find the maximum demand the assumed schedules, travel time, fares, and frequencies can generate. Constraining demand due to equipment constraints is the next stage, as part of the operational planning process.

We acknowledge the Department of Transportation's (Caltrans) response to our draft audit report and have incorporated it into this final report. While Caltrans disagreed with and provided additional comments on our observations, our observations stand as originally reported in the draft report. However, we would like to offer clarification on several of Caltrans' responses.

Ridership Projections/Equipment Requirements

Rail Equipment

Finance is not recommending additional rail equipment be purchased to increase trainset capacities. We recommend the forecasting model be enhanced to determine the impact of adding or subtracting individual cars to/from existing trainsets to accommodate ridership needs. The report has been revised to clarify this issue.

As stated in our Phase I report, we recommended Caltrans complete an analysis to determine how existing rail equipment may be redistributed among the three corridors to better accommodate ridership patterns. In addition, as noted in our Phase I report, some Pacific Surfliner trainsets are reaching or exceeding their current seating capacities. At the same time, according to Caltrans' ridership statistics, several Capitol Corridor and San Joaquin trainsets have very low ridership with excess seating capacities.

Passenger Rail Markets

Finance disagrees with Caltrans' assertion that Metrolink and Amtrak (Pacific Surfliner) serve two separate markets. Both rail services share the same track, share the majority of the same station stops, and maintain a reciprocal use agreement—the Rail to Rail program. Caltrans stated it does not operate a metropolitan commuter rail, when in fact, according to Caltrans' statistics, 562,306 Metrolink monthly pass holders rode the Pacific Surfliner in 2006-07. These metropolitan commuters made up 21 percent of the Pacific Surfliner passengers in 2006-07. As a result, Finance continues to recommend that planning efforts between the Southern California Regional Rail Authority and Amtrak be coordinated in the future.

Cost Benefit Analysis

Finance continues to recommend that Caltrans complete a comprehensive cost/benefit analysis as part of its planning process. The analysis should include capital project expenditures required to add the additional rail equipment, additional rail equipment purchases, and recurring operating costs. Benefits should include increases in projected ridership, improved mobility and accessibility, travel cost savings, and environmental benefits.

Farebox ratio is not a valid cost/benefit statistic because it does not take into account the considerable capital improvement expenditures required for additional trainsets. Farebox ratios are simply operating revenues divided by operating expenses. This statistic does not factor in

the significant one-time expenditures necessary for additional tracking, sidings, and signaling, associated with accommodating new trainsets.

Caltrans stated it is difficult to make a quantitative comparison of public benefits, when in fact, Caltrans' own forecaster was able to provide us with a projection of new riders that would result from adding one trainset to each of the three routes. Caltrans should use similar projections as a basis for its analysis.

Model Validation

Caltrans stated they will continue to identify and analyze situations where model forecasts can be compared to actual performance. Finance agrees that model validation activities should be expanded.

We believe that by implementing our recommendations Caltrans' Division of Rail will achieve improved forecasting and planning for the Intercity Rail Program.