

**Pushing Back on the California High-Speed Rail Authority's Myths
About High-Speed Rail**

Paper 2

4,300 Miles of Highway Lanes as an Alternative to High-Speed Rail

by Mark R. Powell
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4,300 Miles of Highway Lanes as an Alternative to High-Speed Rail

Abstract

The Authority's most recent hyping of the need for high-speed rail, a June 2015 brochure entitled *California High-Speed Rail Big Picture*, makes the claim that Phase 1 Blended, connecting San Francisco and Los Angeles, provides a transportation capacity equivalent to 4,300 new highway lane miles, 115 additional airport gates, and four new airport runways costing \$158 billion. A second claim is that high-speed rail provides this capacity at half the cost.

This paper dissects these deceptive claims where the Authority uses "capacity" instead of "ridership" knowing full well that the theoretical capacity of Phase 1 Blended will dwarf its ridership and that the itemized highway lane miles will not be necessary this century, if ever, whether Phase 1 Blended is built or not built.

The paper then traces the evolution over two decades of the asserted highway benefits of high-speed rail from the thousands of miles of highway lanes reported in the Authority's 2005 *California High-Speed Train Final Program EIR/EIS* back to earlier minimal assertions made in its first business plan and those made by its predecessor, the Intercity High-Speed Rail Commission.

Lastly, this paper looks at California Department of Transportation (Caltrans) traffic data and Caltrans long range planning documents. The data and planning documents prove how the Authority grossly overestimated future highway infrastructure needs for the year 2016 in its 2005 *California High-Speed Train Final Program EIR* and attempts to give readers information sufficient to see for themselves high-speed rail's true impact on future highway needs over the next 20_____ years.

Pushing Back on the Authority's Myths About High-Speed Rail

California High-Speed Rail Authority Myth #2

"HIGH-SPEED RAIL MORE COST EFFECTIVE THAN ALTERNATIVES

Providing the equivalent new capacity on the state's highways and airports would cost more than double the investment required to develop a high-speed rail system between San Francisco and Los Angeles. If it was even possible, that would mean building 4,300 new highway lane miles, 115 additional airport gates, and four new airport runways at an estimated cost of \$158 billion. While the high-speed rail system will operate without subsidies, Caltrans estimates operations and maintenance costs on those new highway lanes at \$132.8 billion for over 50 years."¹

(Source: *California High-Speed Rail Big Picture* brochure, dated June 2015)

Part I – Claims Made Recently by the Authority:

The quotation cited above, first written into the Authority's 2012 Business Plan², is cleverly crafted not to enlighten, but rather to confuse a public who would likely equate "capacity" with "ridership" and view construction of a high-speed rail system as a means of avoiding double the investment in roads and airports. But capacity and ridership are distinctly different.

Parsons Brinkerhoff, the Authority's prime contractor, makes this clear in their report entitled *Comparison of Providing the Equivalent Capacity to High-Speed Rail through Other Modes*, dated April 2012. Quoting directly:

"This analysis was designed to answer the following questions:

1. What is the people-carrying capacity of the 520-mile Phase 1 HSR system?
2. What would be the composition and cost of providing this same capacity increase through freeways and airports?

However, this is not an assessment of the whether the state would *need* to or *choose* to build this infrastructure if it did not build high-speed rail."³ (emphases on not, *need*, and *chose* were made in the source document)

"Capacity" for the purpose of the Parsons Brinkerhoff report assumed construction of the Full Build Phase 1 system with northbound trains capable of seating 1000 passengers, but only 70% full, leaving Los Angeles every 5 minutes and identically loaded southbound trains leaving San Francisco at the same frequency.⁴ Parsons Brinkerhoff avoided specifying how many hours per day or days per year the trains would operate and by doing so avoided reporting the system's capacity in terms of persons transported per year. However, Parsons Brinkerhoff identified additional airport infrastructure as supplying 25% of the alternate capacity and specified that this would require 115 new gates. Furthermore, Parsons Brinkerhoff placed the annual capacity of a new gate at 525,000 passengers.⁵ A passenger utilizes two gates, one to board and a second to deplane. Therefore, it appears Parsons Brinkerhoff was envisioning new airport capacity for 30 million ($115/2 \times 525,000$) passengers per year and additional highway infrastructure for

90 million new passengers traveling by automobile between San Francisco and Los Angeles.

As far as highway infrastructure was concerned, Parsons Brinkerhoff reported the 90 million new highway travelers would require an additional 6 lanes added to every major highway along multiple routes from Los Angeles to San Francisco. Table 5 *Summary of Highway Segments* in their report itemizes the impacted routes totaling a distance of 775.3 miles. (Attachment 1) It is only about 500 highway miles from Los Angeles to San Francisco along the proposed route of the train, but Table 5 segments include 275 additional miles because widening by 6 lanes of both SR-99 and I-5 through the Central Valley are included. Multiplying 775.3 by 6 lanes yields a result of 4652 highway lane miles. Parsons Brinkerhoff then adjusted this result downward to 4300 miles to account for Phase 1 Blended's capacity being lower than that of Full Build Phase 1.⁶ No date was provided for the completion of these additional lanes, but the Authority's implied date for their need is 2029, the completion date for Phase 1 Blended.

Highway traffic count data acquired by Caltrans monitoring equipment helps to put the current and future situations in perspective. The prime automobile route between Los Angeles and San Francisco for persons interested in a short travel time, and therefore good candidates for diversion to high-speed rail, is Interstate 5 through the Central Valley. According to Caltrans, the lowest traffic volume on I-5 occurs between its junctions with Hwy 41 and Hwy 165. Along this 83 mile stretch of I-5 the sum of the traffic in both directions averages 32,600 vehicles per day.⁷ Truck traffic (excluding 4 wheel light pickup trucks) amounts to 9,300 vehicles per day leaving only 23,300 automobiles and light trucks . Traffic is spread across four lanes or about 5800 automobiles and light trucks per lane per day. This represents the highest number of automobiles and light trucks on I-5 that could possibly be traveling between the end points of San Francisco and Los Angeles. Of course much of this traffic is headed elsewhere. Northbound traffic may be traveling locally or to Fresno or headed to Sacramento or further points north and it may have originated in San Diego or be from out of state. The same discussion can be made about southbound traffic. But for the sake of argument, the assumption will be made that all these automobiles and light trucks have endpoints of only San Francisco or Los Angeles. The Parsons Brinkerhoff cited occupancy of 1.4 persons per car is also assumed. This equates to, at most, approximately 6 million persons traveling annually each direction or 12 million traveling annually between San Francisco and Los Angeles along I- 5.

The Parsons Brinkerhoff report made the following assumptions for estimated highway capacity at any location:⁸

1,817 cars per lane per hour

1.4 passengers per car

Using 6 such lanes 16 hours a day 365 days per year for travel between Los Angeles and San Francisco equates to the 90 million annual highway people carrying capacity of the Phase 1 Blended high-speed rail system. Assuming that automobile and light truck traffic along I-5 between its junctions with Hwy 41 and Hwy 165 is essentially nil between midnight and 8am, the Caltrans data indicates the current lane usage of 5800 automobiles and light trucks/day equates to 363 per hour. Yet Parsons Brinkerhoff, on behalf of the Authority, spent taxpayer money to prepare a report outlining a rationale for building three new lanes in each direction and each capable of accommodating more than 1800 cars per hour.

Clearly 6 new lanes are not necessary along I-5 and they will not be needed for the foreseeable future. Constructing the 120 million annual people moving capacity of Phase 1 Blended might be preferable to building alternative infrastructure with the same capacity, but this is a false choice. Even the Authority's annual ridership projections show only 26 million riders in 2040⁹, roughly 1/5 of the people moving capacity of the Phase 1 Blended. Moreover, California's Department of Finance Demographic Research Unit currently predicts there will be only a 20% increase in the state's population between now and 2040.¹⁰ This implies there would be about 21 million in ridership if the train were in service today. These 21 million potential riders are making due with today's infrastructure of highways and airports. By 2040 the state's highway and airport infrastructure needs to accommodate only 5 million more travelers between San Francisco and Los Angeles, not 120 million!

Part II Claims Made in the Authority's 2005 *California High-Speed Train Final Program EIR/EIS*:

Following the issuance of its 2000 Business Plan the Authority embarked on the first step in the environmental planning process, the development of the 2005 *California High-Speed Train Final Program EIR/EIS* (HST Program EIR) meeting the requirements of the federal NEPA and California's CEQA environmental regulations. Here the protection of the environment is paramount and state agencies are to regulate activities affecting the environment "so that major consideration is given to preventing environmental damage while providing a decent home and satisfying living environment for every Californian."¹¹ In attempting to strike a balance between protecting the environment and necessary economic development CEQA "declares that it is the policy of the state that public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects".¹²

The Authority complied with these requirements when their HST Program EIR compared the environmental impacts and benefits of a statewide HST System to a No Project Alternative (no extraordinary transportation infrastructure construction efforts) and a Modal Alternative (construction of more than 2970 freeway lane miles, 90 new airport gates, and 5 new runways, most of which was projected to be needed and in service by January 1, 2016^{13 14}) and judged the Statewide HST System Alternative as preferable. Projected population growth made the No Project Alternative "neither a viable nor realistic alternative"¹⁵ and the Modal Alternative was judged to be environmentally and structurally inferior to the HST system while costing more than twice as much to build.¹⁶

The Authority's Modal Alternative as it relates to highways is illustrated on the following page by the Figure 2-D-1 taken from Appendix 2-D of the Authority's HST Program EIR. Table 2-D-1 accompanied the figure and listed each segment of highway and the lanes to be added. (Attachment 2)

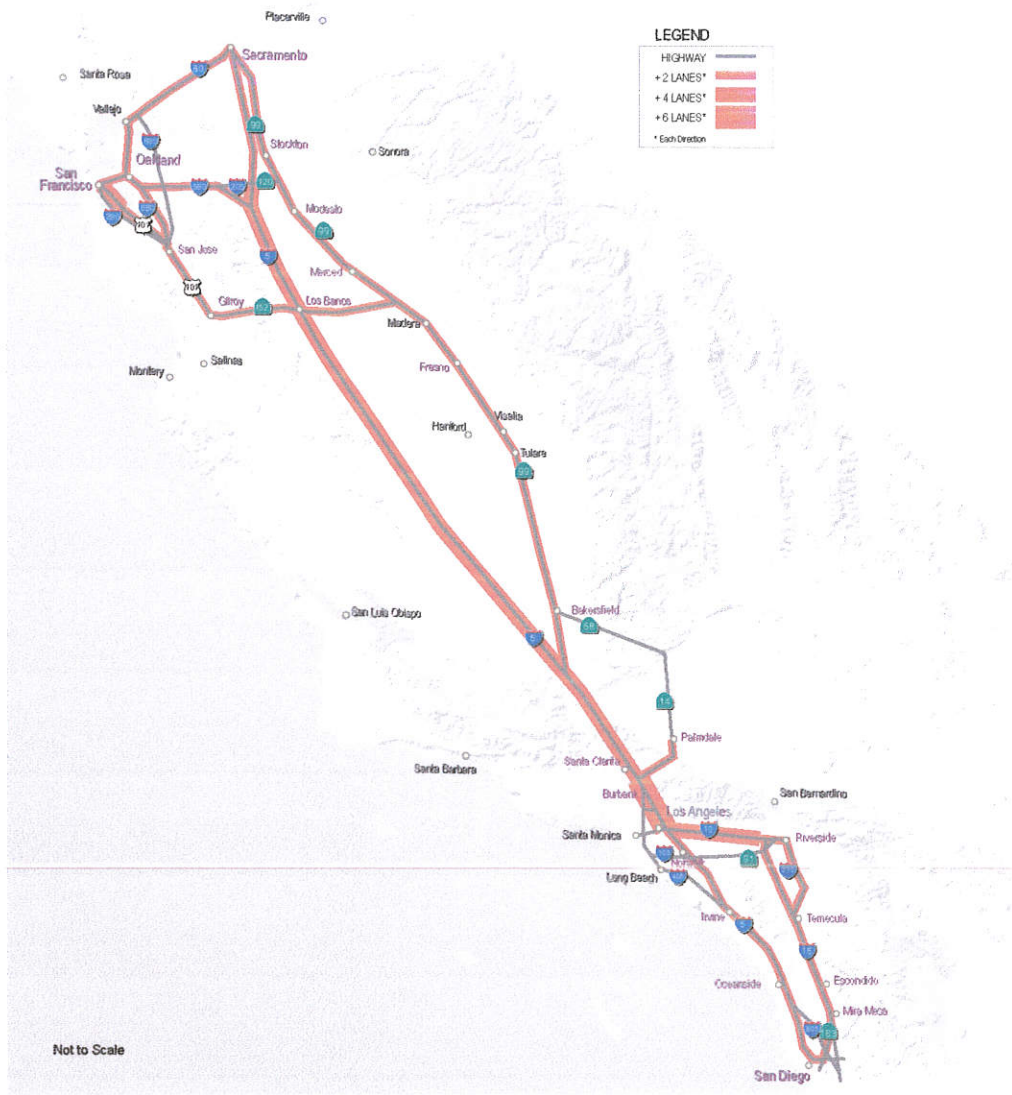


Figure 2-D-1
Highway Capacity Improvement Options—Year 2020
(2020 Intercity Travel Demand with Highway Expansion only)

The Modal Alternative was based on projected ridership on the high-speed train as opposed to the people carrying capacity of the train. Moreover, it was an alternative to the statewide high-speed rail system proposed in the HST Program EIR. As a result, the highway alternative shown in Figure 2-D-1 details routes south of Los Angeles and north of Stockton not included in the 4,300 miles of highway lanes currently being pushed by the Authority as an alternative to Phase 1 Blended. Ignoring these lane additions still leaves 2155 highway lane miles in Figure 2-D-1. These are itemized in Attachment 2. Focusing again on I-5 north of Los Angeles, the required additional lanes include 6 lanes running north to SR-14 and 4 additional lanes north from this point across the Tehachapis and through the Central Valley to I-580.

The decade between the development of the Authority's HST Program EIR and the issuance of its 2012 Revised Business Plan brought to light two important facts. First, Phase 1 Blended's costs would be at least twice that originally envisioned for the entire statewide system of high-speed rail. Second, I-5 had not been widened and traffic was still flowing over the Tehachapis and up the Central Valley at less than the highway's capacity.¹⁷ With 2016 rapidly approaching, the No Project Alternative could be viewed as quite feasible and even the Authority's consultants would have been hard pressed to make a convincing case that the Modal Alternative as described in the HST Program EIR was now necessary or feasible. With the environmental and economic justification outlined in the HST Program EIR quickly disappearing, the Authority stopped making comparisons between high-speed rail and alternative infrastructure based on ridership. Instead, it began making comparisons base on capacity, whether that capacity was needed or not. Quoting directly from the April 2012 Parsons Brinkerhoff report:¹⁸

"There are two fundamental changes to assumptions that make this a different study than the one conducted for the 2005 Program EIR/EIS.

- The scope of the analysis is the 520-mile Phase 1 system, unlike the original analysis, which looked at the Full 800-mile System, including both Phase 1 and Phase 2. Although the Full System remains the complete plan for the HST program, the updated cost estimates in the Business Plan are for the Phase 1 system. This analysis was designed to provide a more direct comparison with the Phase 1 system and its costs.
- The second major change in assumptions was a switch from estimating the needed capacity based on ridership to estimating it based on equivalent "people-carrying" capacity of the HSR system whereas the 2005 analysis was prepared based on a ridership projection."

This change in assumptions allowed the Authority to make the claim that Phase 1 Blended, costing twice what the statewide system was estimated to cost in the HST Program EIR, would cost only half what alternative highways and airport infrastructure of the same capacity would cost. It went unstated that this was a false choice in that alternative infrastructure of the same capacity was not necessary.

Part III - Earlier Attempts at Estimating Avoided Infrastructure Costs Related to Highways:
California High-Speed Rail Authority 2000 Business Plan:

The Authority's 2000 Business Plan showed capital costs of \$25 billion (in 1999 dollars) for the entire statewide system.¹⁹ The plan also laid out a sixteen-year project development and construction schedule for the statewide system.²⁰

The 2000 Business Plan did not identify any highway infrastructure construction costs that would be avoided due to the construction of high-speed rail. However, it found urban and rural highway benefits associated with the construction of the statewide high-speed rail system in the form of fewer automobile accidents, fewer road delays, and less air pollution.²¹

Intercity High-Speed Rail Commission (1993-1996)

Formed in 1993, a time when the state's population was expected to increase from its current 32.7 million to 48.8 million by 2020, the Authority's predecessor agency, the Intercity High-Speed Rail Commission, worked through 1996 to develop a 20 year plan for implementing a statewide high-speed rail plan and to determine if such a plan was economically feasible. The Commission's findings were detailed in their *High-Speed Rail Summary Report and Action Plan* published in December 1996. The Commission determined the route of the statewide system, later adopted by the Authority, and found the statewide system to be economically feasible at a cost of 18.2 billion (1996 dollars) because the net present value of the benefits of the system over the 50 year period from 2000 to 2050 exceeded the net present value of its costs. Of some importance today is the fact that the Commission, for the same reason, found the "trunk line" connecting only San Francisco and Los Angeles to be not feasible.²²

However, the Commission found zero benefits associated with the avoidance of highway infrastructure costs out to the year 2034 for the statewide high speed rail system. The Commission found that even though diverted highway trips would account for between 30% and 50% of all high-speed rail travel, the Los Angeles to Bay Area System would divert only 2.3% of trips to rail. With extensions to Sacramento and San Diego the system would divert 5.0% of intercity automobile trips. The Commission then looked at all the highway segments impacted by drivers diverting to a statewide high-speed rail system and determined that the construction of the statewide system would result in the avoidance or postponement of highway construction by more than one year in only two cases. The future need to widen by two lanes I-5 between Los Angeles and Bakersfield would be postponed from 2034 to 2038 and the widening of I-5 between Bakersfield and Stockton could be put off indefinitely.²³

Attachment 3 provides some of the Commission's data showing HSR's minimal effect on highway volume to capacity ratios projected for the year 2020 associated with merely a Los Angeles to San Francisco system and with a system of high-speed rail including extensions to Sacramento and San Diego. A comparison of the two tables in Attachment 3 indicates that while the statewide high-speed rail system may put off widening of I-5 between Los Angeles and Bakersfield from 2034 to 2038, high-speed rail connecting only Los Angeles and San Francisco is of less benefit and pushes the need for expansion out to only 2036.

The Commission did identify less tangible benefits associated with the system connecting only Los Angeles and San Francisco amounting to \$226 million²⁴ (in 1995 dollars) in the form of fewer automobile accidents, fewer road delays, and less air pollution for highway users in the year 2020. (Attachment 4)

Current State of Highway Travel Between Los Angeles and San Francisco

As it was with the Commission in 1996, the primary interest today to Californians relates to Phase 1 Blended's impact on travel along I-5 between the north end of the San Fernando Valley and the intersection of I-5 and I-580 south of Stockton. Caltrans Districts 7, 6, and 10 are involved with this route. Only Districts 6 and 10 are referenced in this paper because these two include portions of I-5 crossing the Tehachapis as well as representative portions of I-5 in the Central Valley north of the I-5/SR-99 junction where travel significantly decreases.

Caltrans uses six Level of Service (LOS) classifications ranging from A to F and Caltrans "endeavors to maintain a target LOS at the transition between C and D on State highway facilities, or whichever LOS is feasible to attain."²⁵ South of the I-5/SR-99 junction Caltrans currently rates the LOS along I-5 between C and D. North of the I-5/SR-99 junction and south of I-580 Caltrans rates the LOS along I-5 between B and D with most sections receiving a LOS of C. In other words, these sections of I-5 are currently operating within design capacity. Caltrans Traffic Count data along this route indicates that going back to 2002 there has been minimal change in overall traffic. Some locations show a slight increase and others a slight decrease. This is in line with Caltrans overall statewide traffic counts that indicate overall state highway traffic has risen at an annual rate of only .60%/year since 2002.

Thus the Commission's finding that high-speed rail would have little impact on infrastructure needs between Los Angeles and San Francisco by the year 2020 seems to be confirmed. In contrast, the Authority's forecast for an additional 4-6 lanes, reported in its HST Program EIR as being necessary by 2016, seems to be groundless. Finally, the Authority's more recent attempts to portray to the public that 4,300 miles of highway lanes are a reasonable alternative to Phase 1 Blended is at best a lie and at worst a criminal fraud being perpetrated on Californians.

Table 5 Summary of Highway Segments

(Source: Parsons Brinkerhoff, *Comparison of Providing the Equivalent Capacity to High-Speed Rail through Other Modes*, dated April 2012, page 17)

Highway Corridor	Segment (From-To)	Urban/Rural	Miles
Bay Area to Merced			
US-101	San Francisco to SFO	Urban	11.3
US-101	SFO to Redwood City	Urban	13.8
US-101	Redwood City to I-880	Urban	19.7
I-880	US-101 to San Jose	Urban	0.9
US-101	San Jose to Gilroy	Urban	31.2
US-101	Gilroy to SR-152	Urban	1.4
SR-152	US-101 to I-5	Rural	40.8
SR-152	I-5 to SR-99	Rural	42.8
I-80	San Francisco to I-880	Urban	9.2
I-880	I-80 to I-238	Urban	13.8
I-580	I-880 to I-5 (via I-238)	Rural	52.7
I-880	I-238 to Fremont/Newark	Urban	14.5
I-880	Fremont/Newark to US-101	Urban	12.4
Merced to Bakersfield			
I-5	SR-152 to SR-99	Rural	186
SR-99	Merced to SR-152	Rural	21.5
SR-99	SR-152 to Fresno	Urban	33.4
SR-99	Fresno to Tulare/Visalia	Urban	46.4
SR-99	Tulare/Visalia to SR-58	Urban	68.9
Bakersfield to Los Angeles			
I-5	SR-99 to SR-14	Rural	65
I-5	SR-14 to I-405	Urban	2.5
I-5	I-405 to Burbank	Urban	15.3
I-5	Burbank to Los Angeles	Urban	7.4
	Union Station (LAUS)		
SR-14	Palmdale to I-5	Urban	34.8
Los Angeles to Anaheim			
I-5	LAUS to I-10	Urban	0.8
I-5	I-10 to Norwalk	Urban	20.7
I-5	Norwalk to Anaheim	Urban	8.1

 775.3*

*Note included in original Table 5

**Table 2-D-1 Highway Capacity Improvement Options—Year 2020
(2020 Intercity Travel Demand with Highway Expansion only—Both Directions)**

Bay Area to Merced		Lanes	Miles**
US-101	San Francisco to San Francisco Airport (SFO)	2	11.3
US-101	SFO to Redwood City	2	13.8
US-101	Redwood City to I-880	2	19.7
I-880	US-101 to San Jose	2	.9
US-101	San Jose to Gilroy	2	31.2
US-101	Gilroy to SR-152	2	1.4
SR-152	US-101 to I-5	2	40.8
SR-152	I-5 to SR-99	2	42.8
I-80	San Francisco to I-880	2	9.2
I-80	I-880 to I-5 (Sacramento)	2	
I-880	I-80 to I-238	2	13.8
I-580	I-880 to I-5 (via I-238)	2	52.7
I-880	I-238 to Fremont/Newark	2	14.5
I-880	Fremont/Newark to US-101	2	12.4
Sacramento to Bakersfield			
I-5	I-80 to Stockton 2		
I-5	Stockton to I-580/SR-120	2	
I-5	I-580/SR-120 to SR-152	4	
I-5	SR-152 to SR-99	4	186
SR-99	I-5 to SR-58	2	
SR-99	Sacramento to SR-120	2	
SR-99	SR-120 to Modesto	2	
SR-99	Modesto to Merced	2	
SR-99	Merced to SR-152	2	21.5
SR-99	SR-152 to Fresno	2	33.4
SR-99	Fresno to Tulare/Visalia	2	46.4
SR-99	Tulare/Visalia to SR-58	2	68.9
Bakersfield to Los Angeles			
I-5	SR-99 to SR-14	4	65
I-5	SR-14 to I-405	6	2.5
I-5	I-405 to Burbank	6	15.3
I-5	Burbank to LA Union Station	6	7.4
SR-58/SR-14	SR-99 to Palmdale	0	
SR-14	Palmdale to I-5	2	34.8
Los Angeles-Orange County-San Diego			
I-5	Los Angeles Union Station to I-10	4	.8
I-5	I-10 to Norwalk	2	20.7
I-5	Norwalk to Anaheim	2	8.1
I-5	Anaheim to Irvine	2	
I-5	Irvine to I-405	2	
I-5	I-405 to SR-78	2	
I-5	SR-78 to University Town Center	2	
I-5	University Town Center to San Diego Airport	2	
I-8	SR-163 to I-5	2	

Notes:

US-101 = U.S. Highway 101

SR = State Route

I-5 = Interstate 5

* Represents the number of through lanes, in addition to the total number of lanes in the no-project highway network that approximate an equivalent level of capacity to serve the representative demand.

** Miles are shown for segments related to Phase 1 Blended and are the same as those shown in Attachment 1

Attachment 3

Source: Final Report – Economic Impact and Benefit/Cost of High Speed Rail²⁶

The projected impact on highway congestion of only a trunk line system connecting Los Angeles to San Francisco (now termed Phase 1 Blended) or the Statewide System with Extensions to Sacramento and San Diego was summarized as follows:

Table I-3

	I-5	SR-99	I-5	I-580
	Bakersfield*	Bakersfield	LA	
	to Stockton	to Stockton	to Bakersfield*	SF to I-5
No HSR	.75	1.20	.77	1.32
VHS LA to SF	.71	1.18	.74	1.30
Volume/ Capacity Ratios				
Los Angeles to Bay Area HSR---Year 2020				

Table I-4

	I-5	SR-99	I-5	I-580	I-5	I-5	SR-99	I-80
	Bakersfield*	Bakersfield*	LA		San Diego	Stockton to	Stockton to	SF to
	to Stockton	to Stockton	to Bakersfield*	SF to I-5	to LA	Sacramento	Sacramento	Sacramento
No HSR	.75	1.20	.77	1.32	1.18	1.14	1.39	1.39
VHS LA to SF	.68	1.18	.72	1.29	1.15	1.12	1.37	1.39
Plus Extensions								
Volume/ Capacity Ratios								
Los Angeles to Bay Area HSR + Extensions---Year 2020								

* Bakersfield is interpreted as the junction of I-5 and SR-99
VHS or Very High Speed was the term used by the Commission for what is now termed High-Speed Rail

Attachment 4

Source: Intercity High-Speed Rail Commission High-Speed Rail Summary Report and Action Plan, December 1996

Table 7-2

Basic System L.A. to S.F.

Highway User Delay
Automobile Operating Costs
Accidents
Air Pollution

Highway Savings

\$75
\$81
\$61
\$9
\$226

Highway Cost Savings Summary (Year 2020)
(Expressed in \$1995 Million)

Endnotes:

- ¹ California High-Speed Rail Authority brochure dated June 2015 entitled *California High-Speed Rail Big Picture* http://www.hsr.ca.gov/docs/newsroom/fact%20sheets/Big_Picture_FINAL_060515.pdf
- ² Revised 2012 Business Plan, Chapter 3 Capital Costs, page 3-15
http://www.hsr.ca.gov/docs/about/business_plans/BPlan_2012_rpt.pdf
- ³ Parsons Brinkerhoff report entitled *Comparison of Providing the Equivalent Capacity to High-Speed Rail through Other Modes*, dated April 2012, page 2
http://www.hsr.ca.gov/docs/about/business_plans/BPlan_2012CompareEquivalentCapacity.pdf
- ⁴ Parsons Brinkerhoff report entitled *Comparison of Providing the Equivalent Capacity to High-Speed Rail through Other Modes*, dated April 2012, page 6
- ⁵ Parsons Brinkerhoff report entitled *Comparison of Providing the Equivalent Capacity to High-Speed Rail through Other Modes*, dated April 2012, pages 7 and 9
- ⁶ Parsons Brinkerhoff report entitled *Comparison of Providing the Equivalent Capacity to High-Speed Rail through Other Modes*, dated April 2012, page 18
- ⁷ Caltrans 2013 Annual Average Truck Traffic on the California State Highway System, pages 19-20
This is the most current year for which truck and total traffic is available on the Caltrans website
http://traffic-counts.dot.ca.gov/docs/2013_aadt_truck.pdf
- ⁸ Parsons Brinkerhoff report entitled *Comparison of Providing the Equivalent Capacity to High-Speed Rail through Other Modes*, dated April 2012, pages 15
- ⁹ Revised 2012 Business Plan, Chapter 5, Exhibit 5-10. Ranges of ridership and revenue across all Business Plan Scenarios and phases, page 5-16
- ¹⁰ California Department of Finance Demographic Research Unit, Report P-1 (Total Population, State and County Population Projections, July 1 2010-2060 (5 year increments), dated Dec. 15, 2014
http://www.dof.ca.gov/research/demographic/reports/projections/P-1/documents/P-1_Total_CAProj_2010-2060_5-Year.xls
- ¹¹ California Environmental Quality Act as amended 2013, page 1
http://resources.ca.gov/ceqa/docs/2014_CEQA_Statutes_and_Guidelines.pdf
- ¹² California Environmental Quality Act as amended 2013, page 2
- ¹³ *California High-Speed Train Final Program EIR/EIS*, Summary section, page S-4
http://www.hsr.ca.gov/docs/programs/eir-eis/statewide_final_EIR_vol1summary.pdf
- ¹⁴ *California High-Speed Train Final Program EIR/EIS*, Economic Growth and Related Impacts section, page 5-5
http://www.hsr.ca.gov/docs/programs/eir-eis/statewide_final_EIR_vol1ch5.pdf
- ¹⁵ *California High-Speed Train Final Program EIR/EIS*, Summary section, page S-8
- ¹⁶ *California High-Speed Train Final Program EIR/EIS*, Summary section, page S-9
- ¹⁷ Caltrans Interstate 5 Transportation Concept Reports for Districts 6 and 10 dated February 2013 and September 2012 respectively
<http://www.dot.ca.gov/dist6/planning/tcrs/i5tcr/i5tcr.pdf>
<http://www.dot.ca.gov/dist10/divisions/Planning/advancedplanning/docs/TCR's/1-5webFinalsigned09182012.pdf>
- ¹⁸ Parsons Brinkerhoff report entitled *Comparison of Providing the Equivalent Capacity to High-Speed Rail through Other Modes*, dated April 2012, page 3
- ¹⁹ 2000 Business Plan, Section 2.3, Table 2.1, Capital Cost by Segment. See 2000 Business Plan
http://www.hsr.ca.gov/docs/about/business_plans/BPlan_2000_FullRpt.pdf
- ²⁰ 2000 Business Plan, Section 2.2, Figure 2.3, Implementation and Construction Schedule
- ²¹ 2000 Business Plan, Economic Benefits section
- ²² Intercity High-Speed Rail Commission *High-Speed Rail Summary Report and Action Plan*, December 1996, Section 7 Economic Impact of High-Speed Rail, Benefit Cost Methodology, pages 7-24 and page 7-27
http://www.hsr.ca.gov/docs/programs/eir-eis/Archives/statewide_EIR_vol2_attachD6_archive.pdf
- ²³ Intercity High-Speed Rail Commission *High-Speed Rail Summary Report and Action Plan*, December 1996, Section 7 Economic Impact of High-Speed Rail, Benefit Cost Methodology, page 7-5
- ²⁴ Intercity High-Speed Rail Commission *High-Speed Rail Summary Report and Action Plan*, December 1996, Section 7 Economic Impact of High-Speed Rail, Benefit Cost Methodology, page 7-4
- ²⁵ Caltrans District 6 Transportation Concept Report for I-5, February 2013
- ²⁶ Final Report Economic Impact and Benefit/Cost of High Speed Rail for Californian, Submitted to the Intercity High-Speed Rail Commission, Prepared by Economics Research Associates, Sept. 1996, page 34