

13 January 2013

To: Jeff Morales, CEO, California High-Speed Rail Authority
 Frank Vacca, Chief Program Manager, California High-Speed Rail Authority

Fr: Joe Metzler, PMT Operations and Maintenance Manager
 John Chirco, PMT Engineering Manager
 Ken Jong, PMT Program Development Manager
 Brent Felker, PMT Program Director

Re: Phase 1 Blended Travel Time

Purpose

The purpose of this memo is to present a technical assessment of the travel times and assumptions for a Phase 1 Blended service between San Francisco and San Jose and between San Francisco and Los Angeles. This assessment is based on the results of computer model simulations that demonstrate the “pure run time” of the modeled trains operating on a blended system can meet the Prop 1A mandates of design for a maximum 30 minutes of travel time for a non-stop SF-SJ and a 2hr 40min for non-stop San Francisco – Los Angeles service.

Assessment of Phase 1 Blended Modeling

Phase 1 Blended infrastructure consists of proposed full high-speed rail only improvements between San Jose and Los Angeles combined with blended service alignments on the Caltrain Corridor between San Francisco and San Jose. Travel times are generated from the California High-Speed Train Project (CHSTP) computer simulation model¹.

The travel times generated from the computer model account for the physical characteristics of the proposed route geometry and the times are considered “pure” travel time, or best time that might be achieved.

Travel times between San Francisco and Los Angeles follow for options for the blended service between San Francisco and San Jose, including differing maximum speeds.

		SF-SJ (110 mph)	SF-LA	SF-SJ (125 mph)	SF-LA
Phase 1 Blended <i>(No Midline Overtake)</i>	2:02	32	2:34	30	2:32
Phase 1 Full <i>(Dedicated)</i>	2:02	Not applicable		30	2:32

The travel times indicate two possible conditions where the Phase 1 Blended options can provide for a travel time of 2hr 40min or less between SF and LA are from CHSTP model which include:

- 110 mph SF-SJ corridor maximum speed with an unimpeded path for a non-stop HST service
- 125 mph SF-SJ corridor maximum speed with an unimpeded path for a non-stop HST service

¹ Berkeley Simulation Software (BSS) Rail Traffic Controller (RTC) railroad operations simulation model software was used to produce the San Francisco – Los Angeles travel time in this analysis. The Train Performance Calculator (TPC) feature in the RTC model is capable of accurately representing the train movements over alignments with different complexity, such as grades, curves, and speed limits, based on the available tractive and braking effort specified for the train set technology taking into account the high-speed rail vehicle rolling resistance coefficients.



Assumptions

Following are the assumptions made in CHSTP model for calculating these travel times:

- These simulations may not reflect actual operating conditions.
- Pure run time is calculated based on modeled trainset performance over a given segment of the alignment geometry.
- Pad is not included. It is common to anticipate a range of 3% to 7%, based on operational characteristics when planning service times.
- Travel times are for representative alignments based on alternatives included in the environmental documents. Alternative alignment may alter travel time.
- Advancement in train technology would allow train to operate safely at 220 mph on sustained steep grades. For example, the grade between Bakersfield and the Tehachapi Mountains requires a sustained average grade ranging of 2.5%-2.8% of approximately 20 miles. A speed restriction to approximately 150 mph may be required to mitigate a safety issue related to wheel adhesion in the downhill direction at very high-speeds. If required, this speed reduction would increase the northbound travel time by approximately two to three minutes.
- FRA strategies and regulations are in place to support mixed fleet traffic (freight, conventional passenger, high-speed passenger) to operate at speeds up to 125 mph. The proposed strategies and regulations are under review and require additional operational and railway safety improvements to qualify. These requirements will need to meet Federal regulations for the Phase 1 Blended service.
- CPUC approval for increased speeds (greater than 79 mph) and increased train service when high-speed rail services are operated in the Caltrain corridor.
- Caltrain train service will allow for a high-speed express train to run unimpeded between SF and SJ.
- Caltrain tracks will be upgraded to Track Class 6 (110 mph) or Track Class 7 (125 mph) as required.
- Existing infrastructure in Caltrain corridor will be upgraded, as required, to accommodate increases in maximum operating speeds to 110 mph or 125 mph.
- Grade crossings in Caltrain corridor will be upgraded, as required, to meet FRA requirements for quad-gates for speeds up to 110 mph and for vehicle arresting barriers for speeds up to 125 mph.
- Train speed approaching the terminal station at Transbay Transit Center (TTC) is reduced to 25 mph due to constraints of existing infrastructure.

Conclusion

Based on the CHSTP computer model simulations and stated assumptions, a 2hr 40 min travel time between San Francisco and Los Angeles and 30-minute travel time between San Francisco and San Jose can be achieved for the Phase 1 Blended service.

Attachments

1. Train Performance Curve – LA to SF – Phase 1 Full
2. Train Performance Curve – SF to LA – Phase 1 Full
3. Train Performance Curve –SF to SJ – 110 mph
4. Train Performance Curve –SF to SJ – 125 mph



5 February 2013

Phase 1 Blended Travel Time Assessment

Purpose

The purpose of this memo is to present a technical assessment of the travel times and assumptions for a Phase 1 Blended service between San Francisco and San Jose and between San Francisco and Los Angeles. This assessment is based on the results of computer model simulations that demonstrate the “pure run time” of the modeled trains operating on a blended system can meet the Prop 1A mandates to design for a maximum 30 minutes of travel time for a non-stop SF-SJ and a 2hr 40min for non-stop San Francisco – Los Angeles service.

Assessment of Phase 1 Blended Modeling

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The travel times generated from the computer model account for the physical characteristics of the proposed route geometry and the times are considered “pure” travel time, or best time that might be achieved. Simulations may not reflect actual operating conditions.

Travel times between San Francisco and Los Angeles include the blended service between San Francisco and San Jose with a 125 mph maximum speed with an unimpeded path for a non-stop HST service options in the SF-SJ corridor.

Travel Time	SF-SJ	SF-LA
Phase 1 Blended <i>(No Midline Overtake)</i>	30	2:32
Phase 1 Full <i>(Dedicated)</i>	30	2:32

Assumptions

Following are the assumptions made in CHSTP model for calculating these travel times:

- Pure run time is calculated based on modeled trainset performance over a given segment of the alignment geometry.
- Travel times are for representative alignments based on alternatives included in the environmental documents. Alternative alignment may alter travel time.
- Advancement in train technology would allow train to operate safely at 220 mph on sustained steep grades. For example, the grade between Bakersfield and the Tehachapi Mountains requires a sustained average grade ranging of 2.5%-2.8% of approximately 20 miles. A speed restriction to approximately 150 mph may be required to mitigate a safety issue related to wheel adhesion in the

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downhill direction at very high-speeds. If required, this speed reduction would increase the northbound travel time by approximately two to three minutes.

- FRA strategies and regulations are in place to support mixed fleet traffic (freight, conventional passenger, high-speed passenger) to operate at speeds up to 125 mph.
- Caltrain train service will allow for a high-speed express train to run unimpeded between SF and SJ.
- Track infrastructure will be constructed or upgraded, as required, to achieve FRA/CPUC regulatory requirements and AREMA standards for the speeds modeled.
- Train speed approaching the terminal station at Transbay Transit Center (TTC) is reduced to 25 mph due to constraints of existing infrastructure.

Conclusion

Based on the CHSTP computer model simulations and stated assumptions, a 2hr 40 min travel time between San Francisco and Los Angeles and 30-minute travel time between San Francisco and San Jose can be achieved for the Phase 1 Blended service.

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Parker, Annie@HSR

From: Vacca, Frank@HSR
Sent: Wednesday, February 06, 2013 3:46 PM
To: Chirco, John
Cc: Felker, Brent R.
Subject: Phase I Blended Travel Time Assessment

John,

Reviewed The Trip Time assessment with staff and we have some edits suggestions –

1. We would prefer to use the 110mph run between SJ and SF rather than the 125. Although they both meet the Prop 1A requirement (30min between SJ and SF) the 110mph is a more practical approach to this section of railroad. That would trigger removing the last bullet assumption on page 2 before conclusions and removing all references to the 125mph run (such as first bullet on page 2 and attachment of the 125 Performance curve).
2. Page 1 – Under “Assessment of Phase 1 Blended Modeling” heading – second paragraph last sentence “ SimulationsConditions” we believe it would be better to remove that sentence and replace with “They are in accordance with the requirements of AB3034, relating to system design capability”

Let me know your thoughts on these suggestions.

Frank



CALIFORNIA High-Speed Rail Authority

EDMUND G. BROWN JR.
GOVERNOR



Memorandum

DATE: 02/11/13

TO: Jeff Morales

SUBJECT: Phase 1 Blended Travel Time

FROM: Frank Vacca

I have reviewed the analysis completed by our Program management Team of PB America, utilizing the Berkeley Simulation Software known as Rail Traffic Controller (RTC) and conclude that a trip time of 2hr and 40 min. between San Francisco and Los Angeles and 30 minutes between San Francisco and San Jose was shown to be achievable for the Phase 1 Blended Service with appropriate assumptions for train performance, operating characteristics and compliance with Federal and State regulations. The trip times comply with section 2704.09 of Proposition 1A.

Further improvements may be achievable through improved train performance, use of tilt technology, more aggressive alignments and higher maximum speeds. The engineering team will remain vigilant as we continue to refine proposed alignments and operating parameters to continue to reduce trip times where possible. Final environmental process, along with community preferences may alter or refine the proposed assumptions and alignment studied.

12 February 2013

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The travel times generated from the computer model account for the physical characteristics of the proposed route geometry and the times are considered “pure” travel time, or best time that might be achieved under the current proposed alignment and conditions. Actual travel times will be based on the final alignment in the approved environmental documents.

Travel times between San Francisco and Los Angeles include the blended service between San Francisco and San Jose with a 110 mph maximum speed with an unimpeded path for a non-stop HST service options in the SF-SJ corridor.

Travel Time	SF-SJ	SF-LA
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- Caltrain train service will allow for a high-speed express train to run unimpeded between SF and SJ.
- Track infrastructure will be constructed or upgraded, as required, to achieve FRA/CPUC regulatory requirements and AREMA standards for the speeds modeled.

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