

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

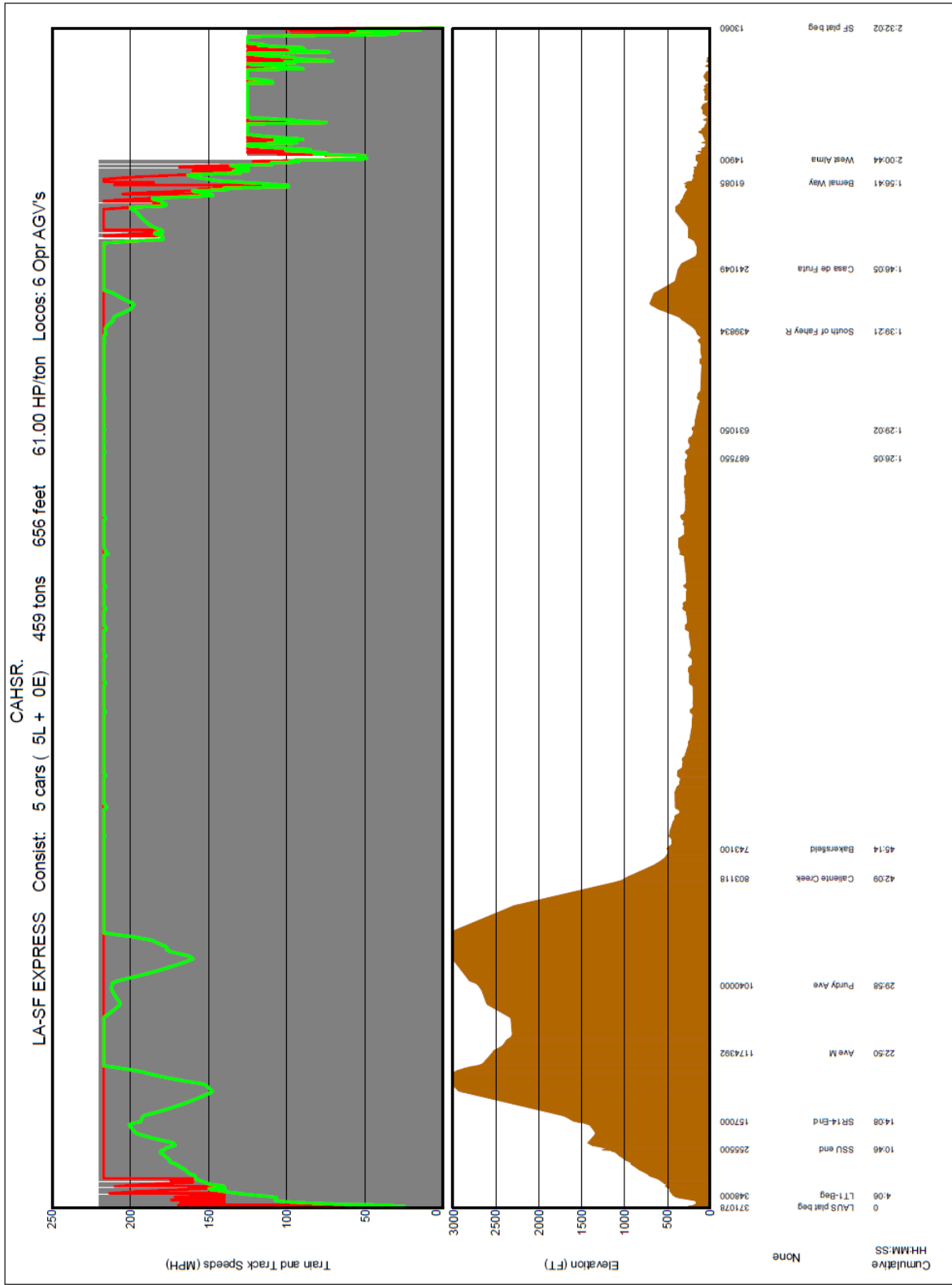
Based on the CHSTP computer model simulations and stated assumptions, a 2hr 40 min travel time between San Francisco and Los Angeles and 30-minute travel time between San Francisco and San Jose can be achieved for the Phase 1 Blended service.

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



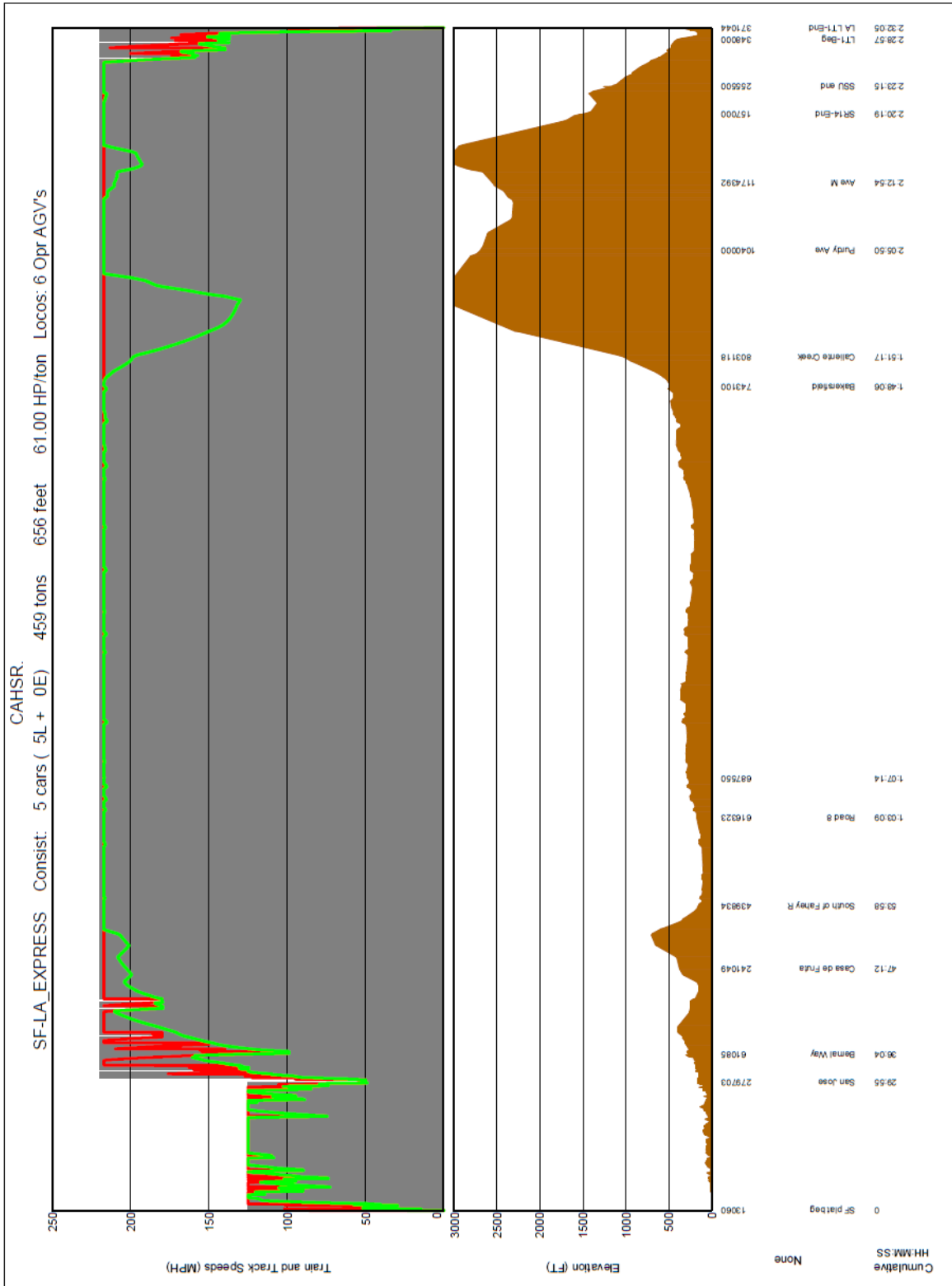
Train Performance Curve (CHSTP Model) – LA to SF – Phase 1 Full



Case: C:\RTC\CAHSR11\Phase1-9wye RTC run: 23 March 2012 13:40:05 User: Viktoriya Yanitskaya of PB Transit & Rail Systems



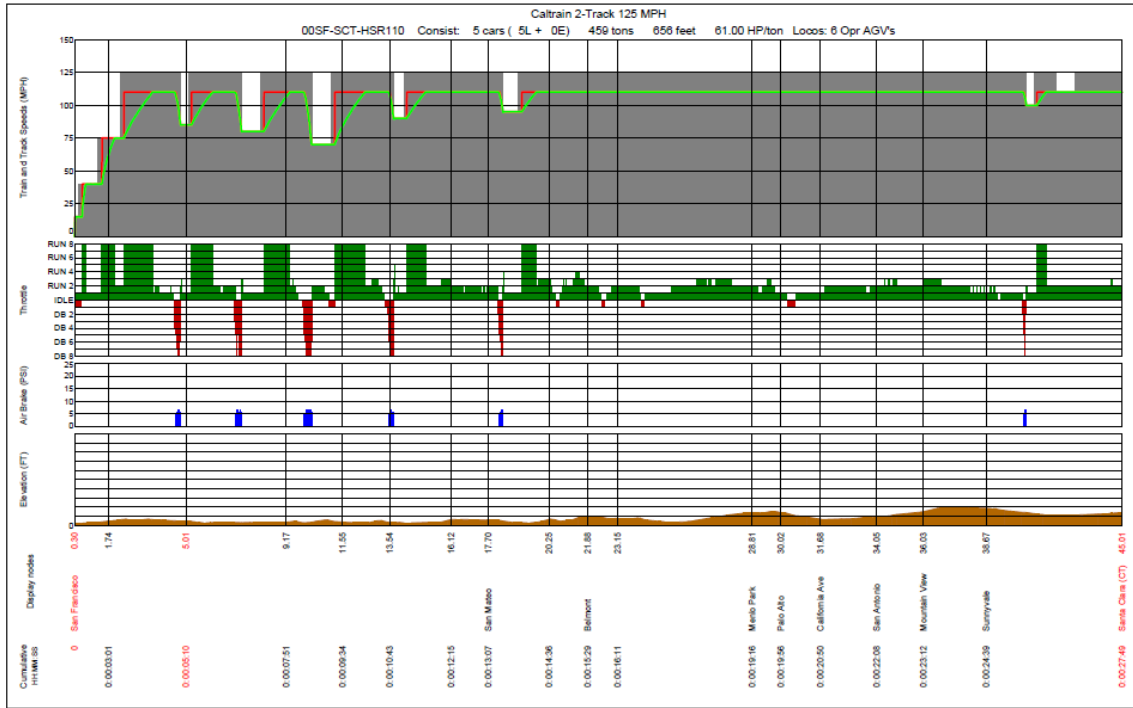
Train Performance Curve (CHSTP Model) –SF to LA – Phase 1 Full



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Train Performance Curve (CHSTP Model) –SF to SJ – 110 mph



Train Performance Curve (CHSTP Model) –SF to SJ – 125 mph

