Exhibit A

California High-Speed Train Project

Board of Directors

Project Implementation & Phasing Workshop

August 6th, 2009

Kent Riffey
Chief Engineer

Tony Daniels
Program Director

Introduction and Workshop Overview

- **Today's Workshop Objectives**
  - **Discussion of Bringing Phase 1 to Revenue Service**
  - **First Step in developing a Program Plan**
- **Format**
  - **Presentation of steps to Revenue Service**
  - **Discussion, questions, comments, opinions**

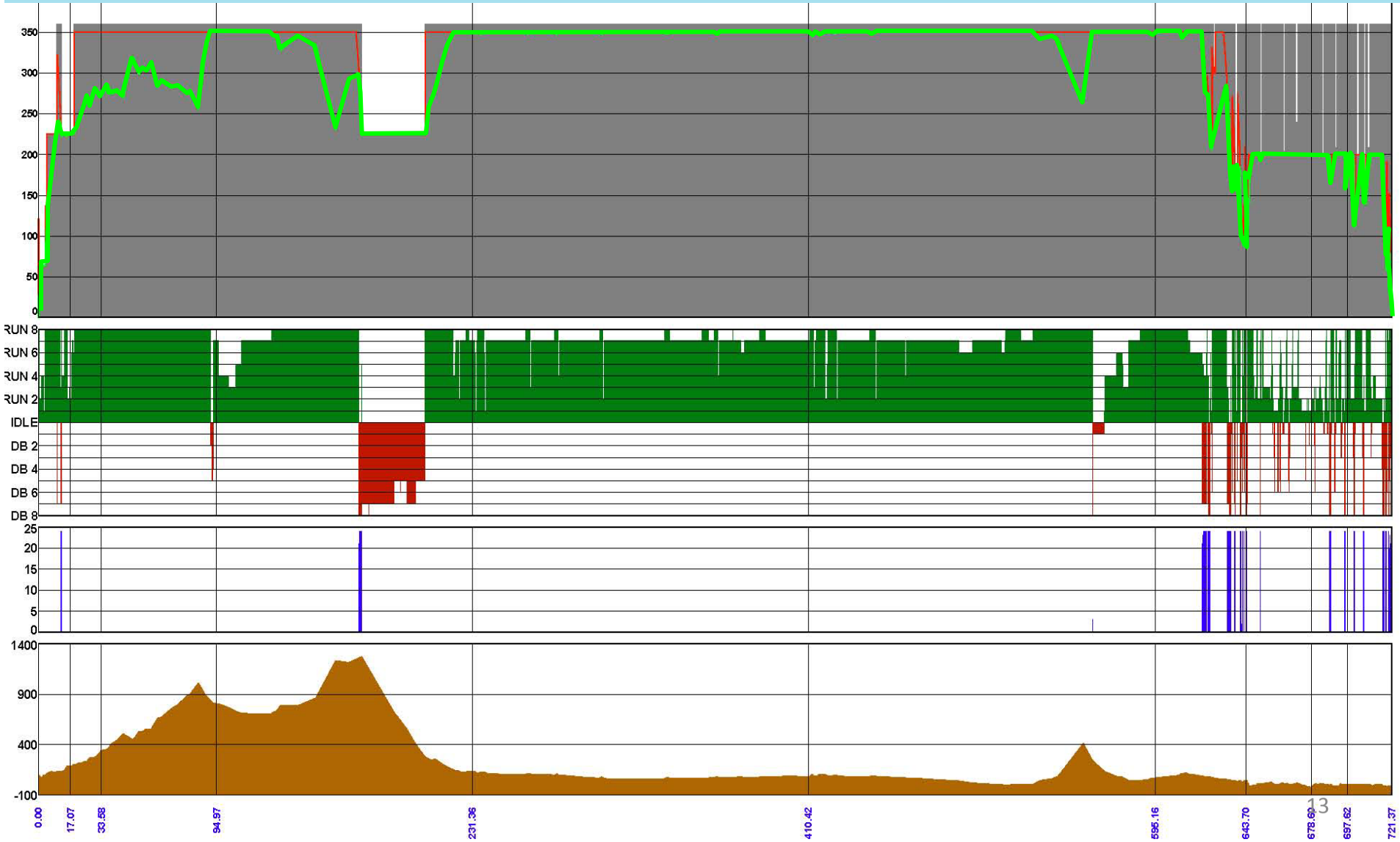
Program Management Responsibilities

- **System Level Design**

  - **System Performance / Trip Time**
    - **Train Performance Characteristics**
    - **Alignment Profile**
    - **Station Location**

Program Management Responsibilities

- **System Level Design** – System Performance/Trip Times



Program Management Responsibilities

- **System Level Design**

– Draft Timetable / Operating Pattern

		Direction →	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB
		Trainset →	T18	T19	T22	T9	T20	T21	M1	T23	T24	T25
		Train No. →	S010700	S290703	S020730	S150708	S280708	S040711	S210733	S180737	S140752	S010800
		Pattern →	1	29	2	15	28	4	21	18	14	1
Southbound		Service Type →	Limited Express	Limited	Express	Merced All Stop	Limited	All Stop	Limited	Limited	Merced All Stop	Limited Express
Station												
SFT	**S.F.-Transbay**	Dep	7:00	7:03	7:27		7:08	7:11	7:33	7:37	7:52	8:00
SFO	Millbrae	Dep	--	--			7:23	7:26	--	7:52	8:07	--
RWC	Redwood City	Dep	7:21	7:24			7:31	7:34	--	8:00	8:15	8:21
SJC	San Jose	Dep	7:35	7:38			7:45	7:48	8:05	8:14	8:29	8:35
GLY	Gilroy	Arr										
GLY	Gilroy	Dep	7:50	7:53			8:00	8:03	8:21	8:29	8:44	8:50
MCD	**Merced**	Dep.									9:19	
MCD	**Merced**	Dep				7:59						
FNO	Fresno	Arr						8:40				
FNO	Fresno	Dep				8:20	8:38	8:45		9:07		
BFD	Bakersfield	Arr				8:56						
BFD	Bakersfield	Dep				9:01	--	9:21	9:30	--		
PMD	Palmdale	Arr					9:40	9:52				
PMD	Palmdale	Dep		9:30		9:34	9:43	9:54	10:03	10:10		
SYL	Sylmar	Arr.										
SYL	Sylmar	Dep		9:46		9:50	--	10:10	10:18	--		
BUR	Burbank	Arr				9:56						
BUR	Burbank	Dep		--		9:59	--	10:17	10:25	10:29		
LAU	**L.A. Union Station**	**Arr**	9:47	9:58	10:05	10:08	10:10	10:26	10:34	10:38		10:47
LAU	**L.A. Union Station**	**Dep**	9:48	10:00	10:06	10:09	10:11	10:27	10:35	10:39		10:48
NSF	Norwalk	Arr	9:55		10:13	10:16	10:20	10:34				10:55
ANA	**Anaheim**	Arr	10:10		10:28	10:32	10:35	10:49				11:10

Program Management Responsibilities

- **System Level Design** – **Operations Plan**

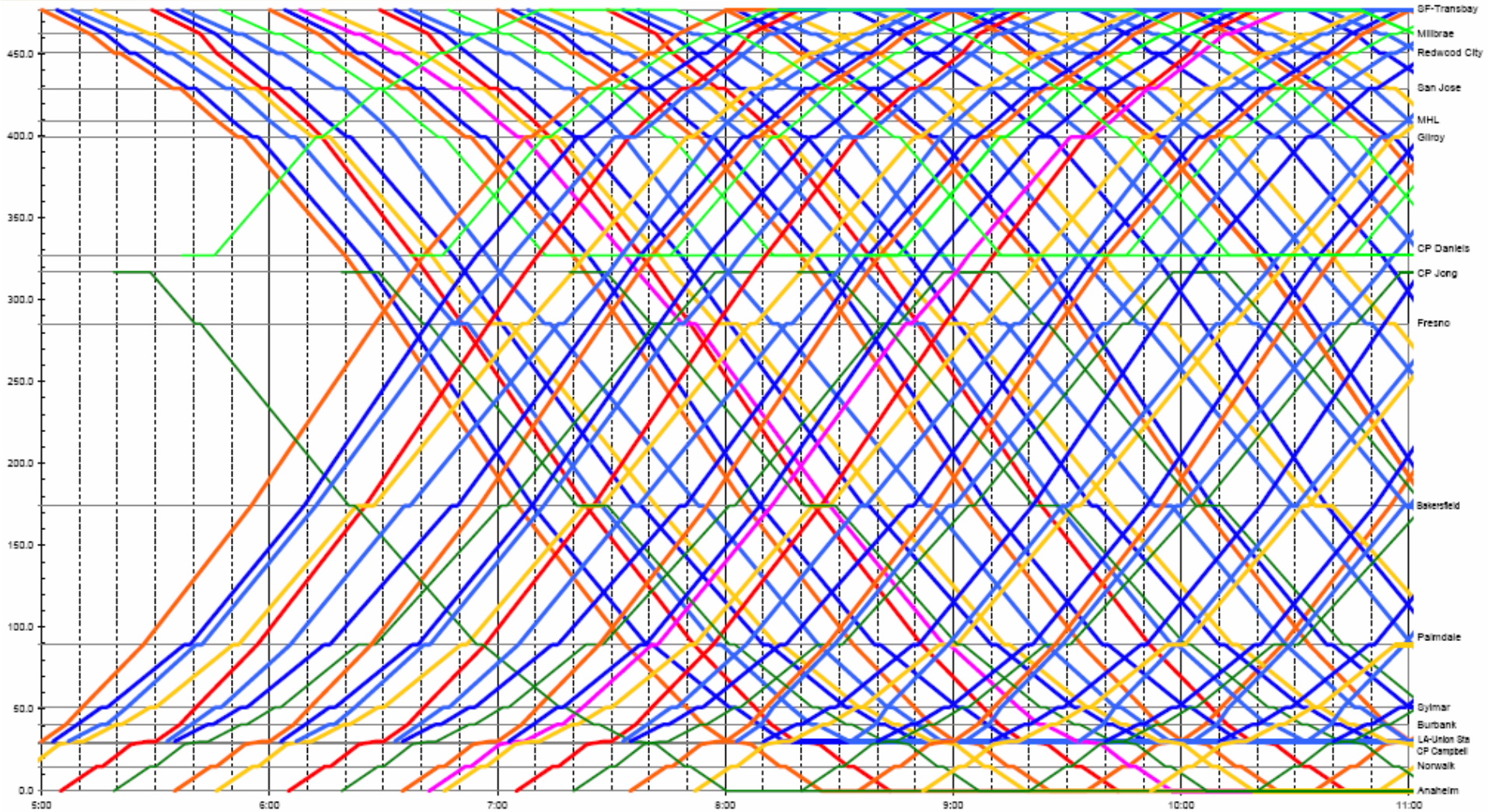


Exhibit B

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 model[1].

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 *(No Midline Overtake)*	2:02	32	2:34	30	2:32
Phase 1 Full *(Dedicated)*	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.

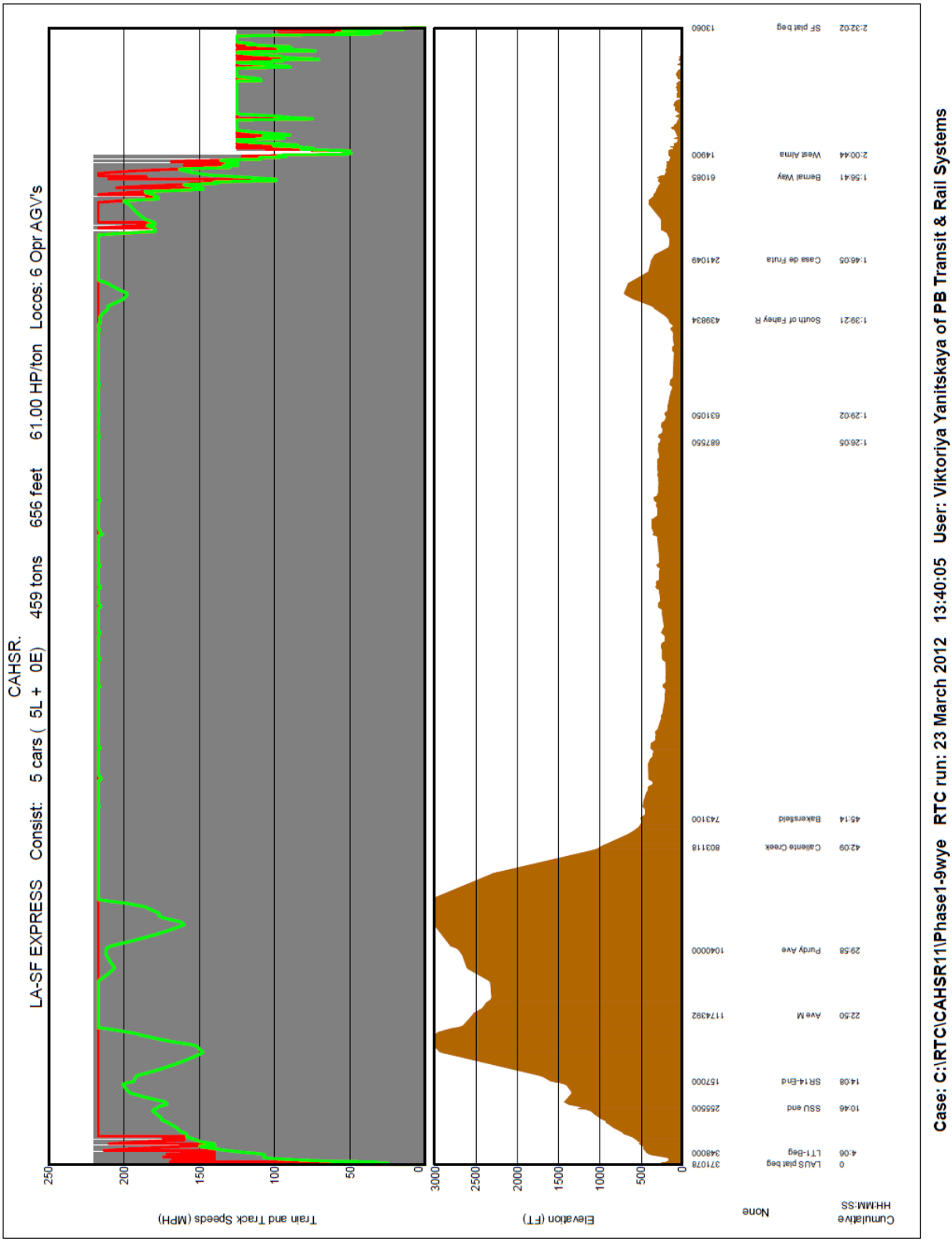
Conclusion

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.

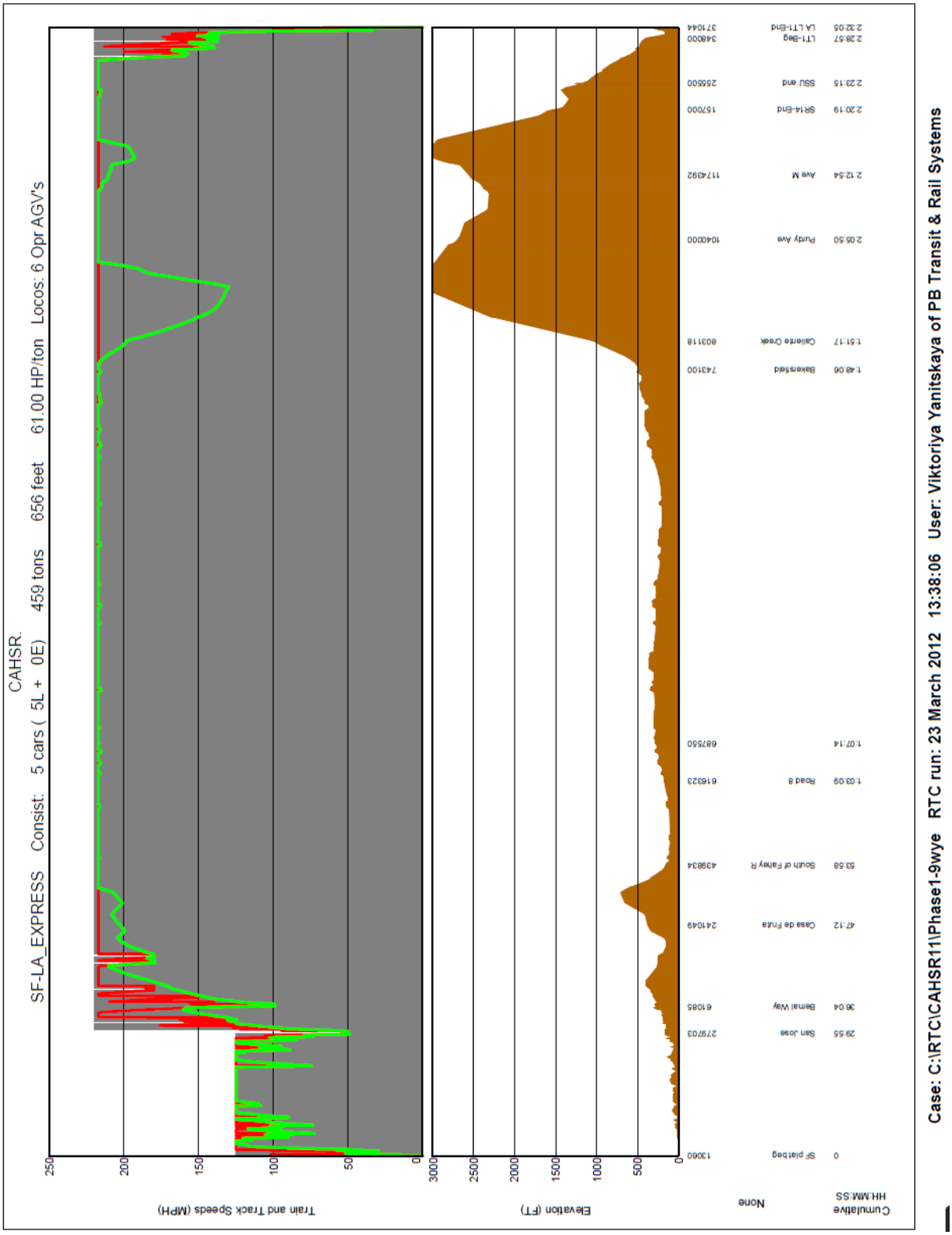
Attachments

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

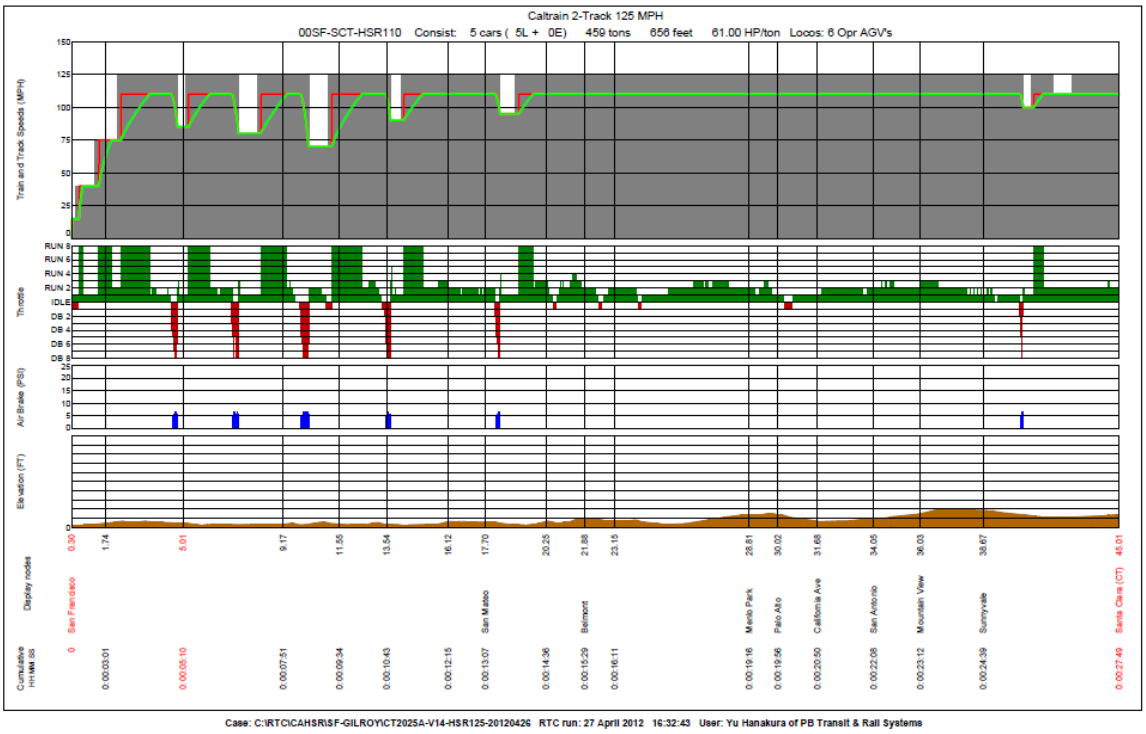
Train Performance Curve (CHSTP Model) – LA to SF – Phase 1 Full



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



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



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

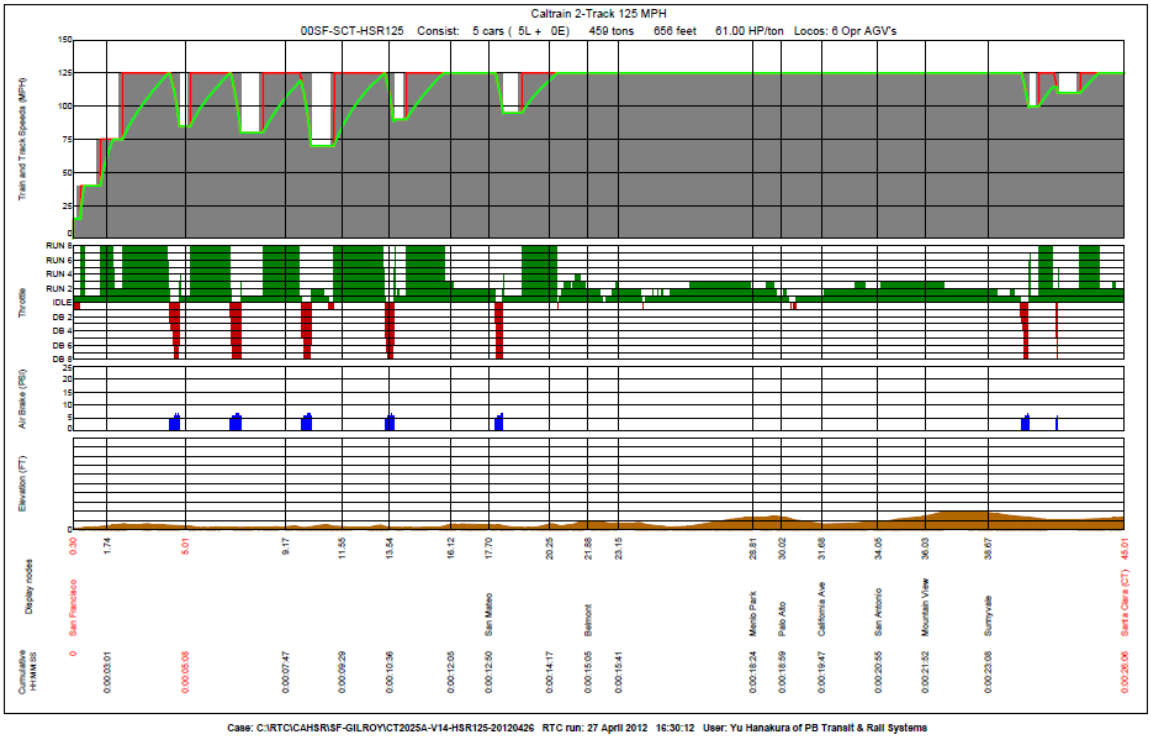


Exhibit C

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.

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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 *(No Midline Overtake)*	30	2:32
Phase 1 Full *(Dedicated)*	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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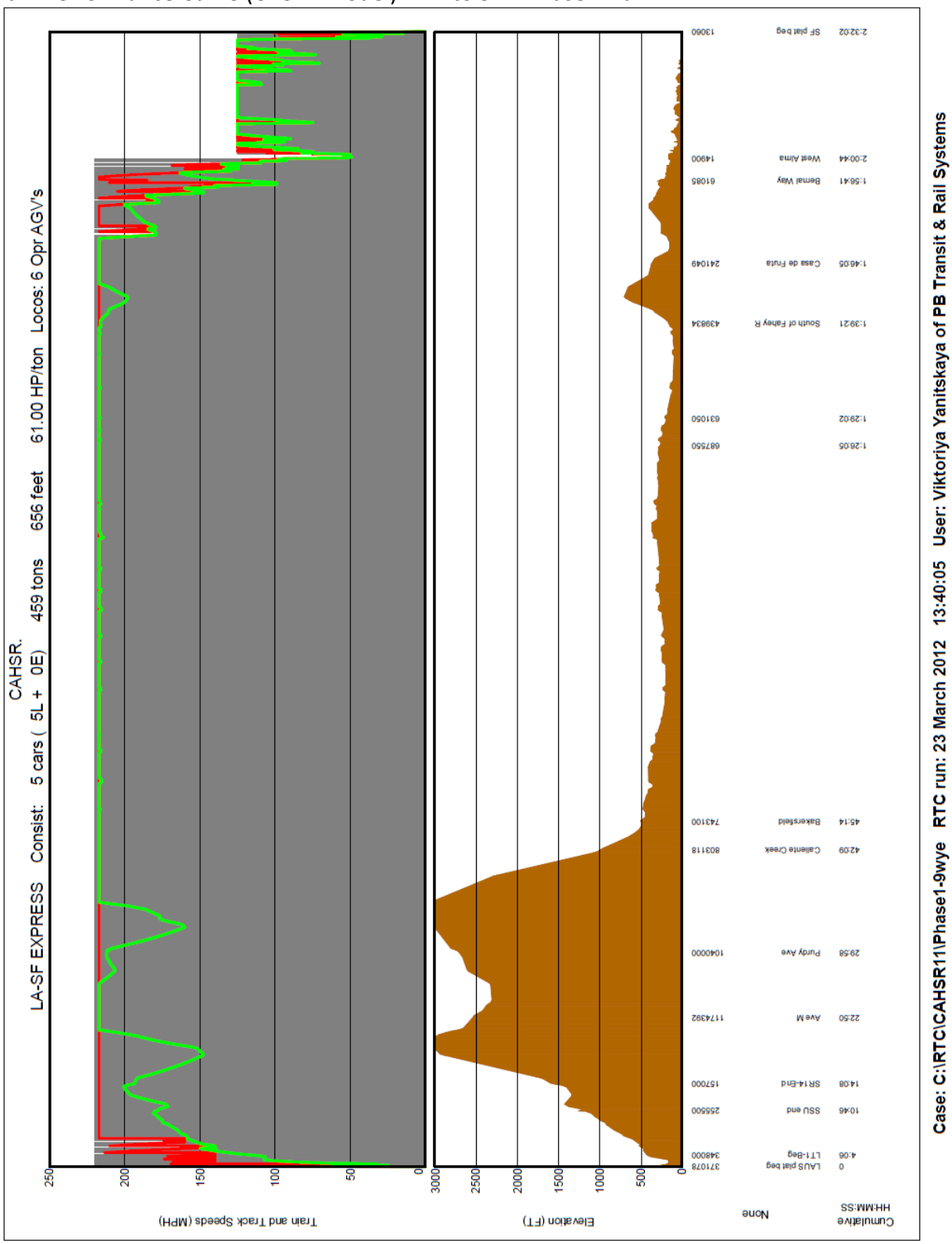
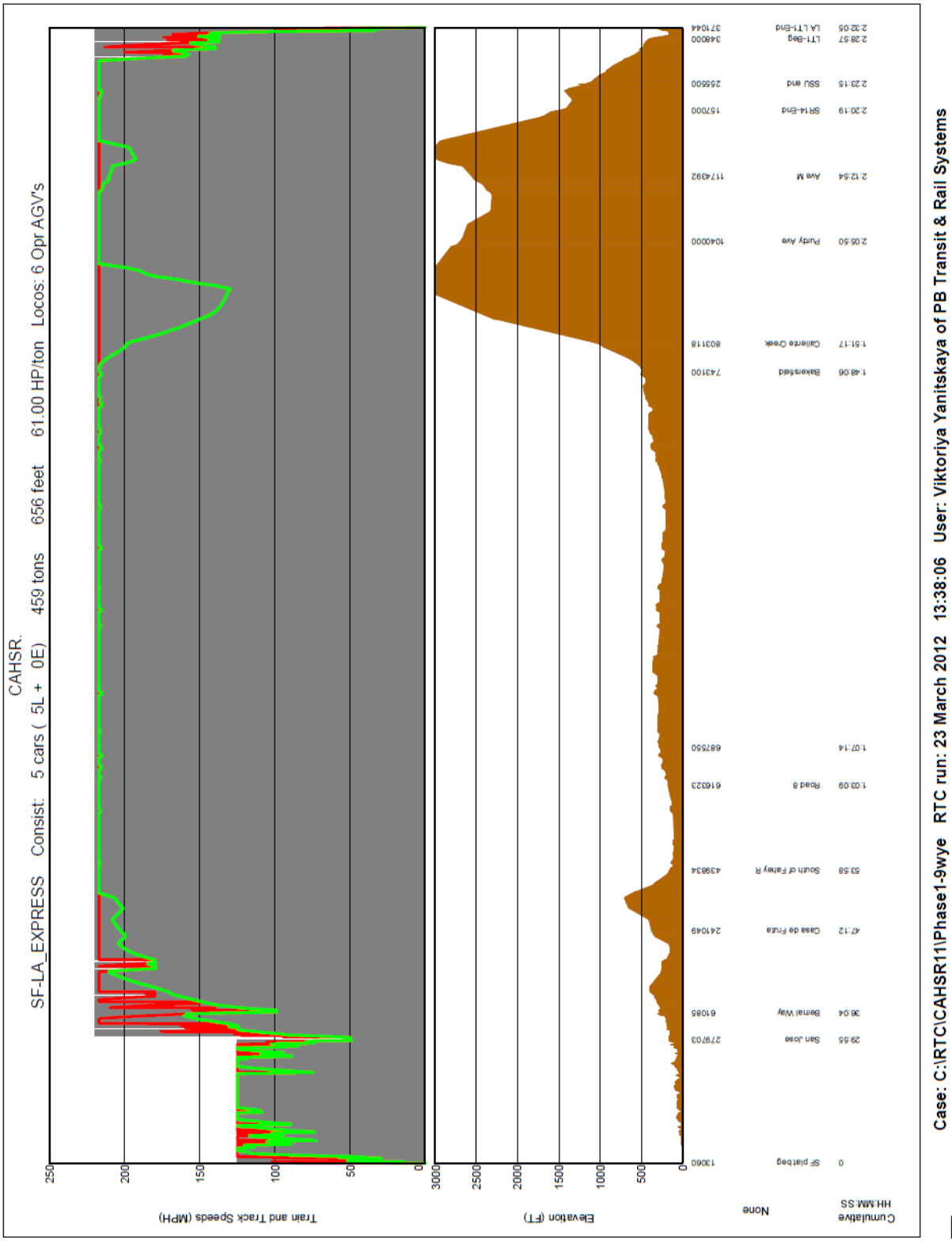


Train Performance Curve (CHSTP Model) –SF to LA – Phase 1 Full



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

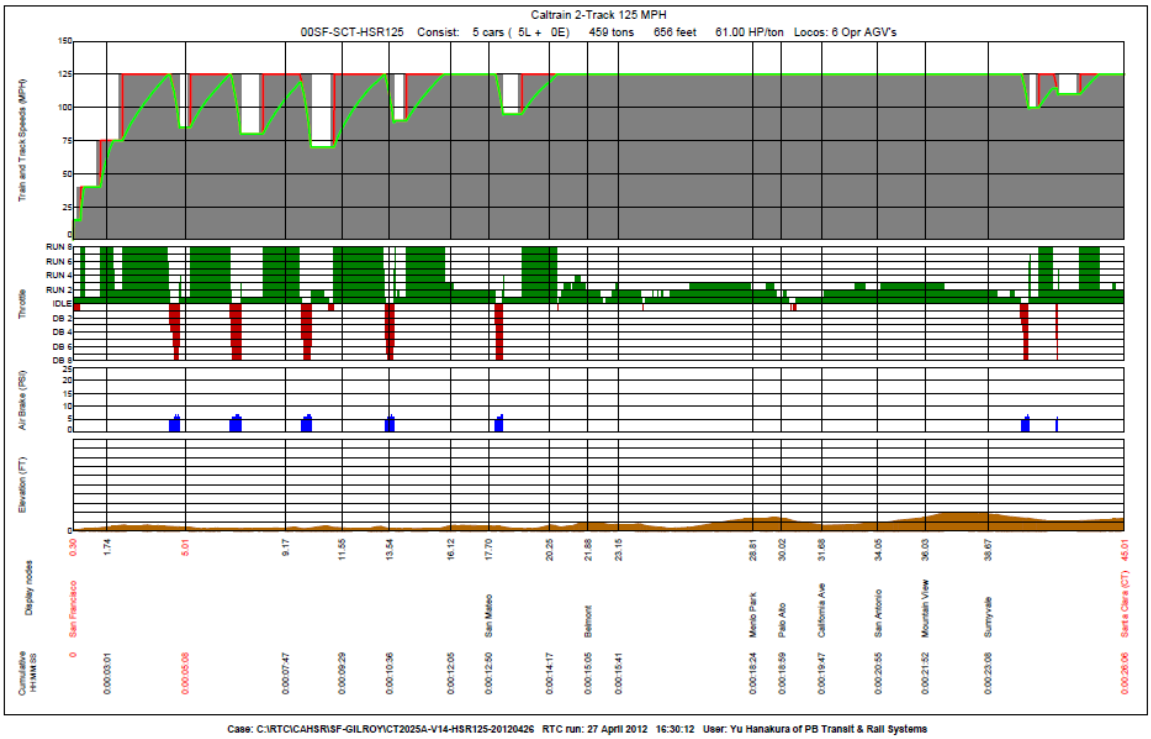


Exhibit D

Parker, Annie@HSR

From: Chirco, John
Sent: Friday, February 08, 2013 5:43 PM
To: Vacca, Frank@HSR
Cc: Felker, Brent R.; Metzler, Joseph
Subject: RE: TPC Runs
Attachments: PMT Memo Ph1 Blended Trip Time 130207.pdf

Memo is attached.

From: Metzler, Joseph
Sent: Friday, February 08, 2013 4:29 PM
To: Frank Vacca
Cc: Felker, Brent R.; Chirco, John
Subject: RE: TPC Runs

Frank
I have attached the latest RTC run from SF to San Jose. John will be attaching to the memo which will follow shortly.

From: Frank Vacca [mailto:frank.vacca@hsr.ca.gov]
Sent: Friday, February 08, 2013 12:58 PM
To: Metzler, Joseph
Subject: RE: TPC Runs

Thank you

From: Metzler, Joseph [mailto:Metzler@pbworld.com]
Sent: Friday, February 08, 2013 12:57 PM
To: Frank Vacca
Subject: TPC Runs

Frank,
I haven't forgotten. We ran into some trouble calibrating the Caltrain material. It's rectified now. Shouldn't be too much longer.

Joseph J. Metzler
Assistant Vice President/
Operations Manager PMT CHSTP
Parsons Brinckerhoff
303 Second Street, Suite 700N
San Francisco, CA 94107
415-284-4264 (direct)
631-804-9724 (mobile)

metzler@pbworld.com

www.pbworld.com

7 February 2013

Phase 1 Blended Travel Time Assessment

Purpose

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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.

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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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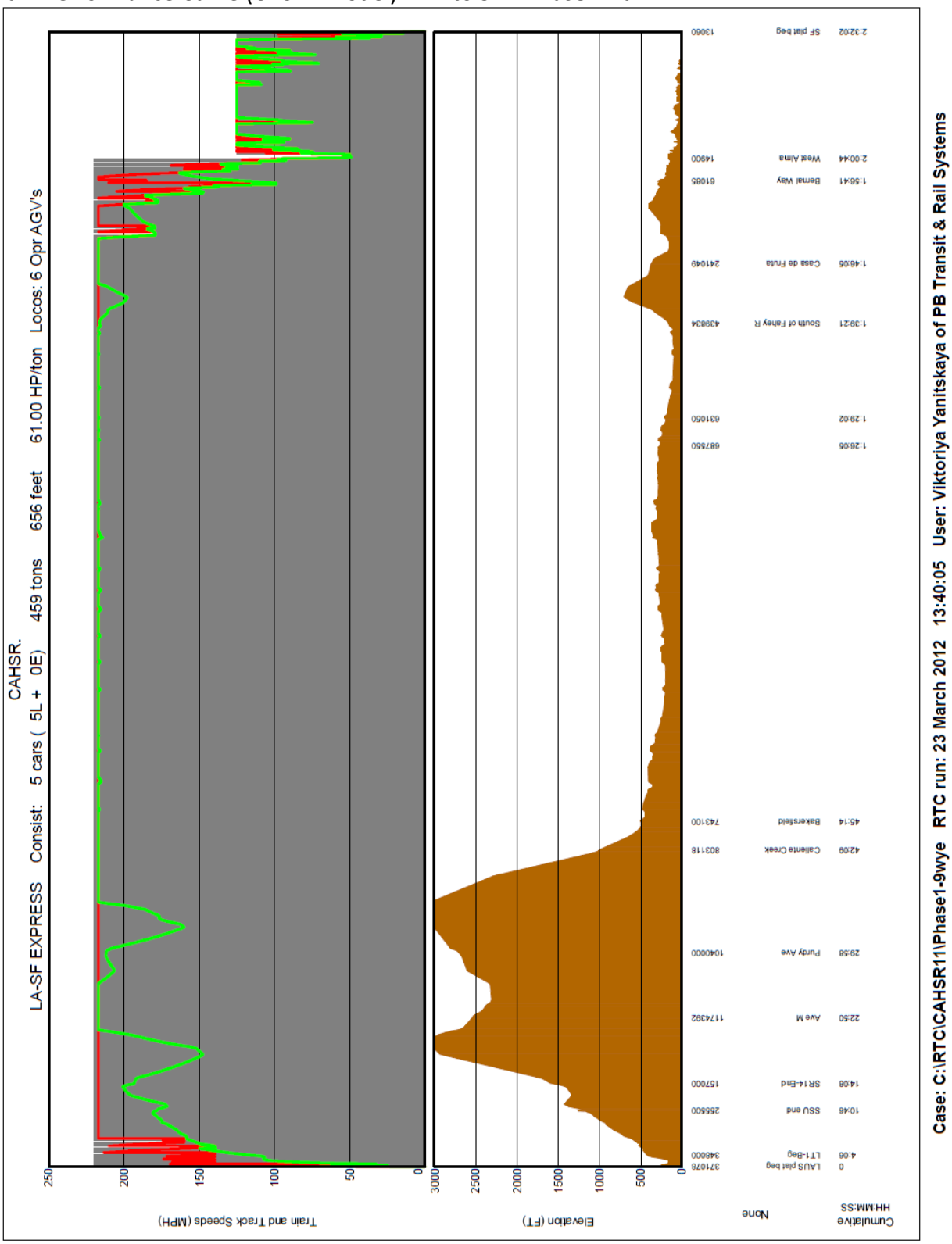
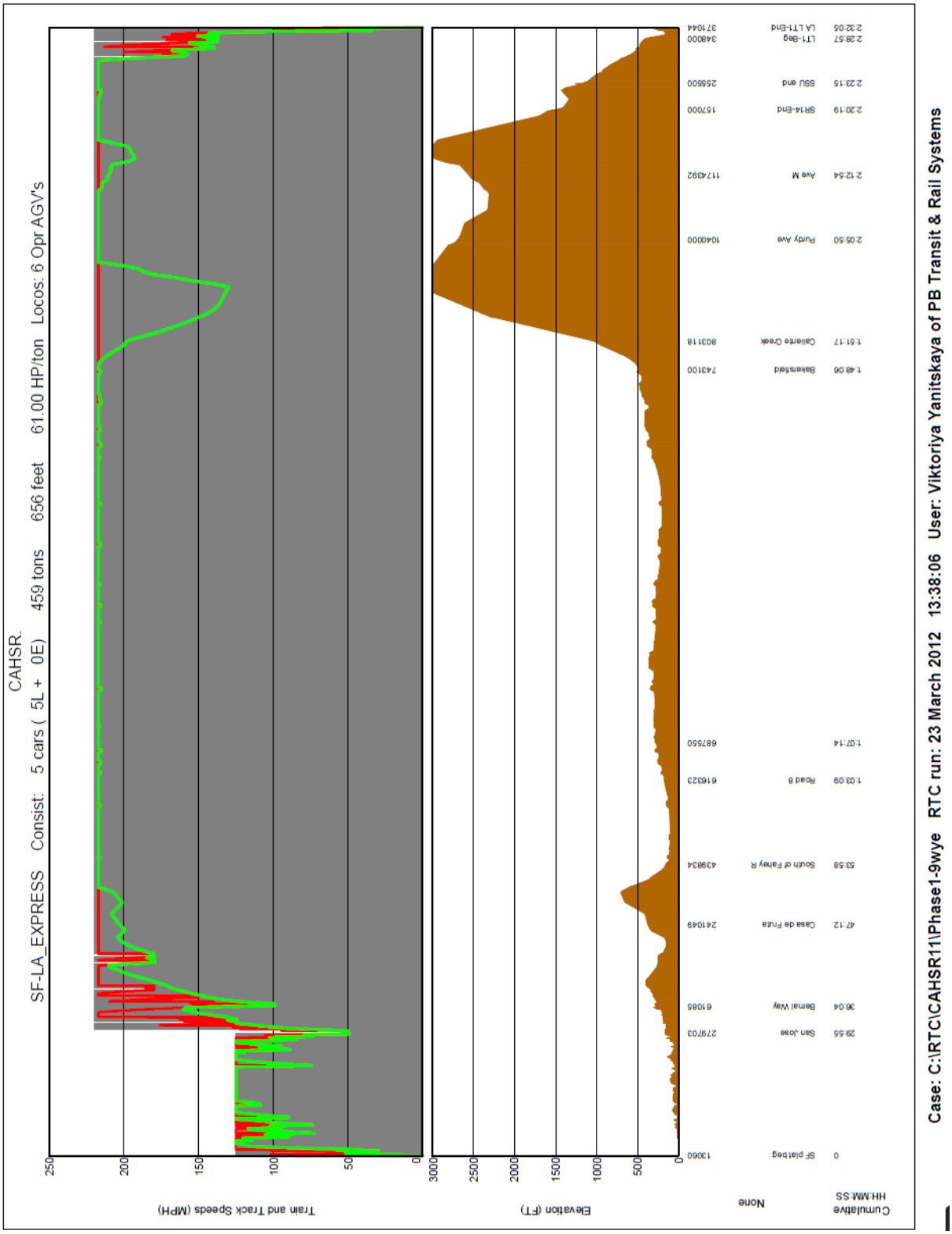
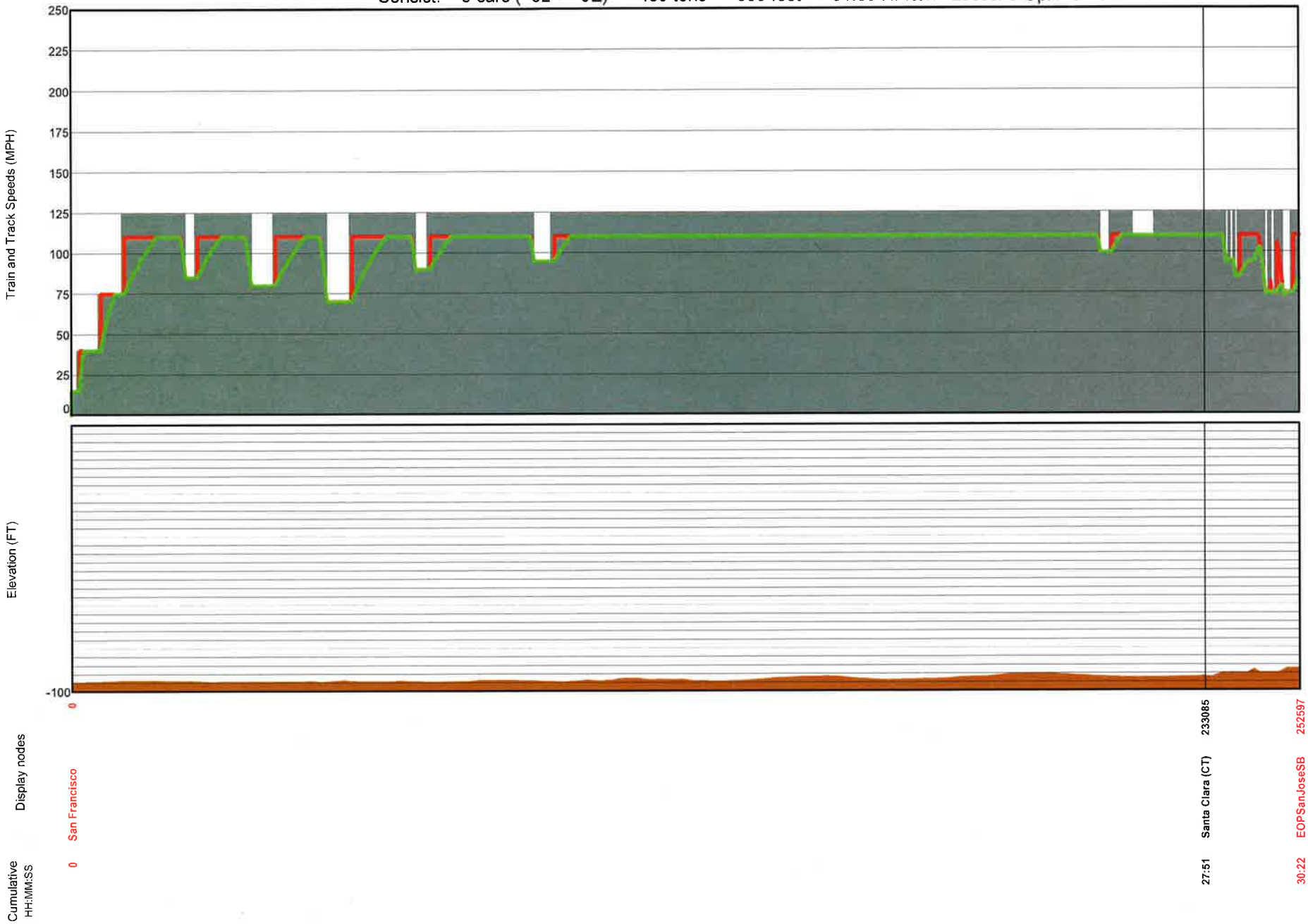


Train Performance Curve (CHSTP Model) –SF to LA – Phase 1 Full



CAHSR.

Consist: 5 cars (5L + 0E) 459 tons 656 feet 61.00 HP/ton Locos: 6 Opr AGV's



Case: C:\RTC\CAHSR12\Phase1-12 RTC run: 08 February 2013 16:16:27

Exhibit E

CALIFORNIA High-Speed Rail Authority

EDMUND G. BROWN JR.
GOVERNOR

Memorandum

DATE: 02/11/13

TO: Jeff Morales

FROM: Frank Vacca

SUBJECT: Phase 1 Blended Travel Time

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

Phase 1 Blended Travel Time Assessment

Purpose

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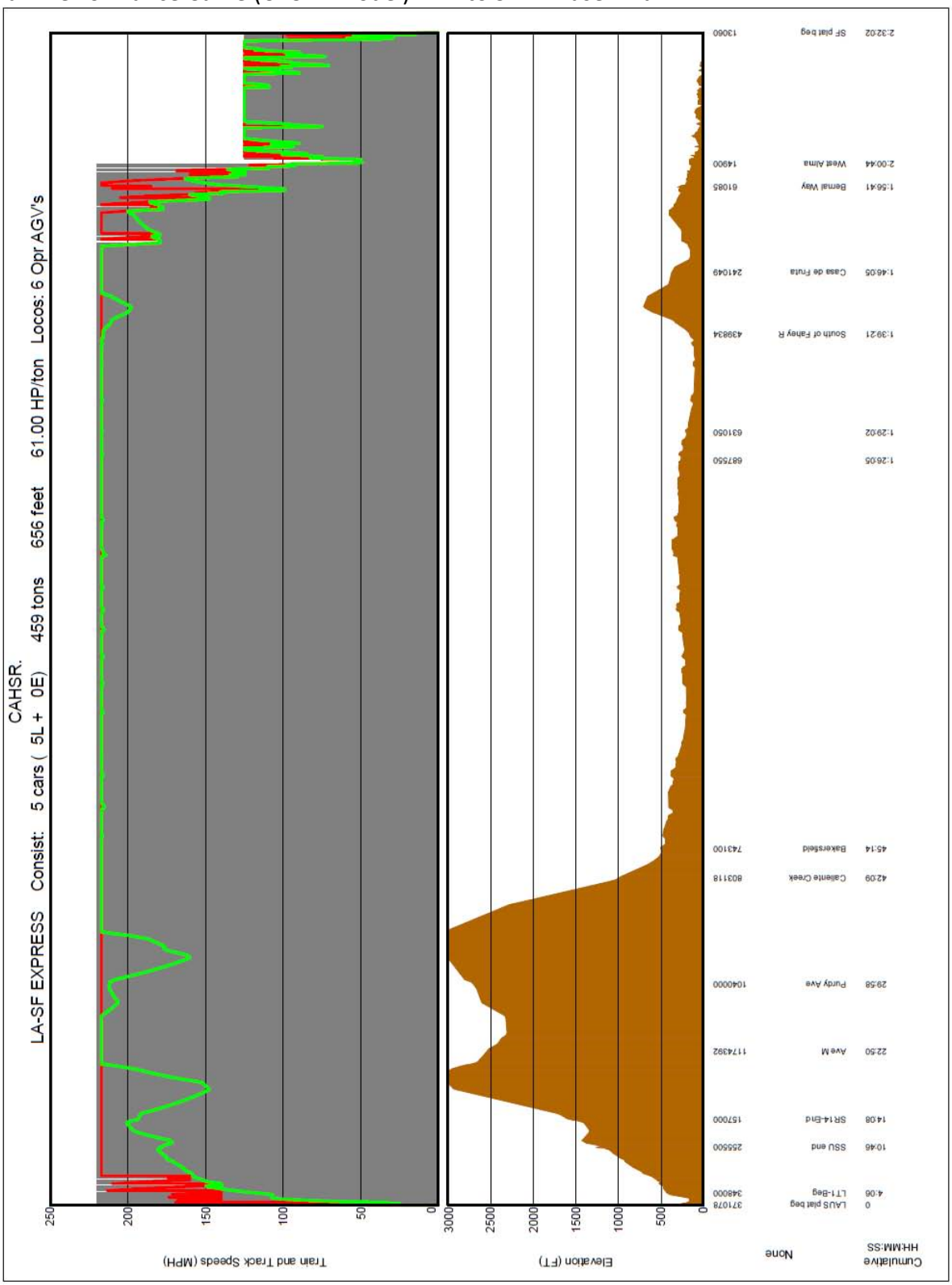
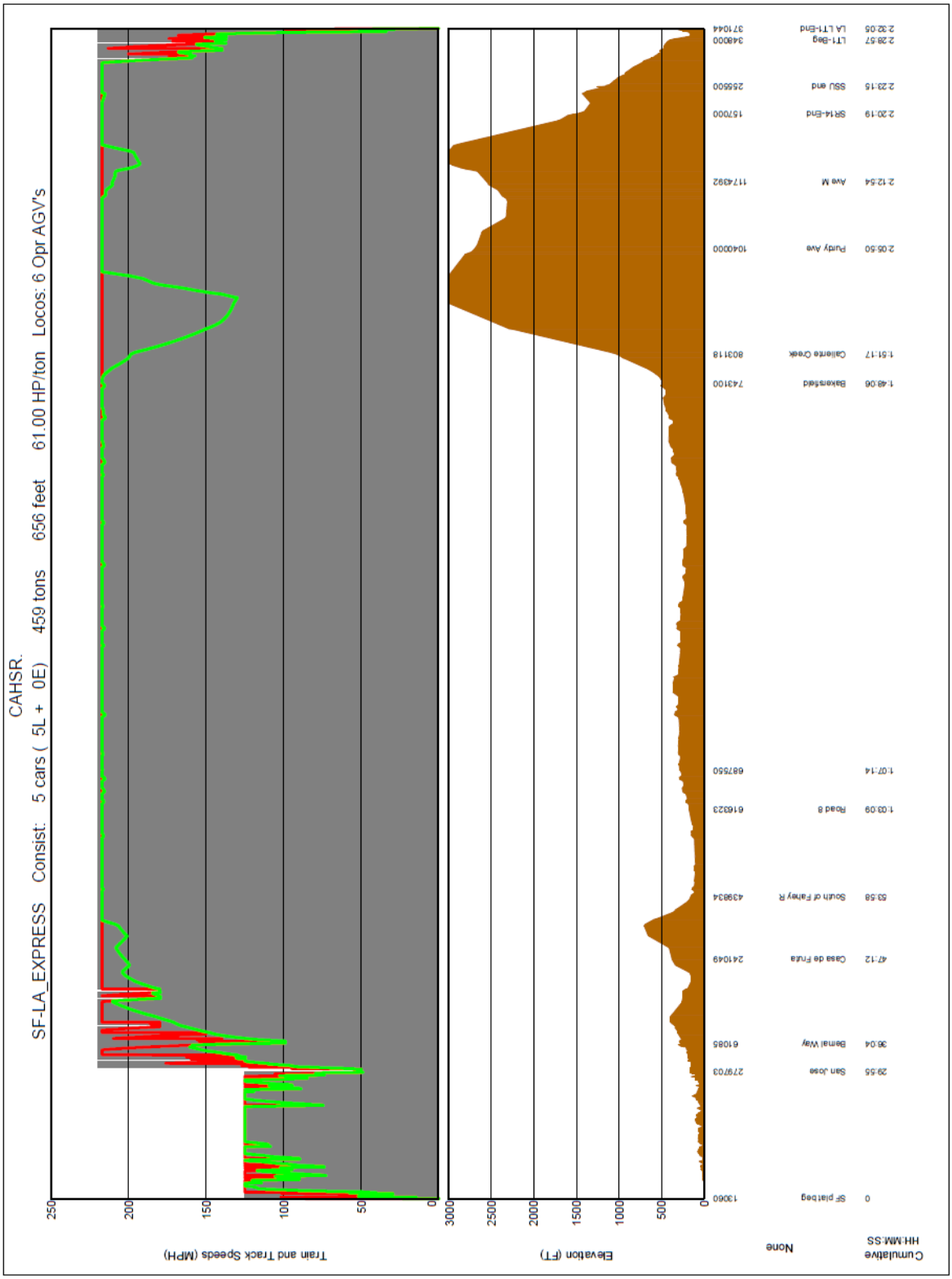


Train Performance Curve (CHSTP Model) –SF to LA – Phase 1 Full



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

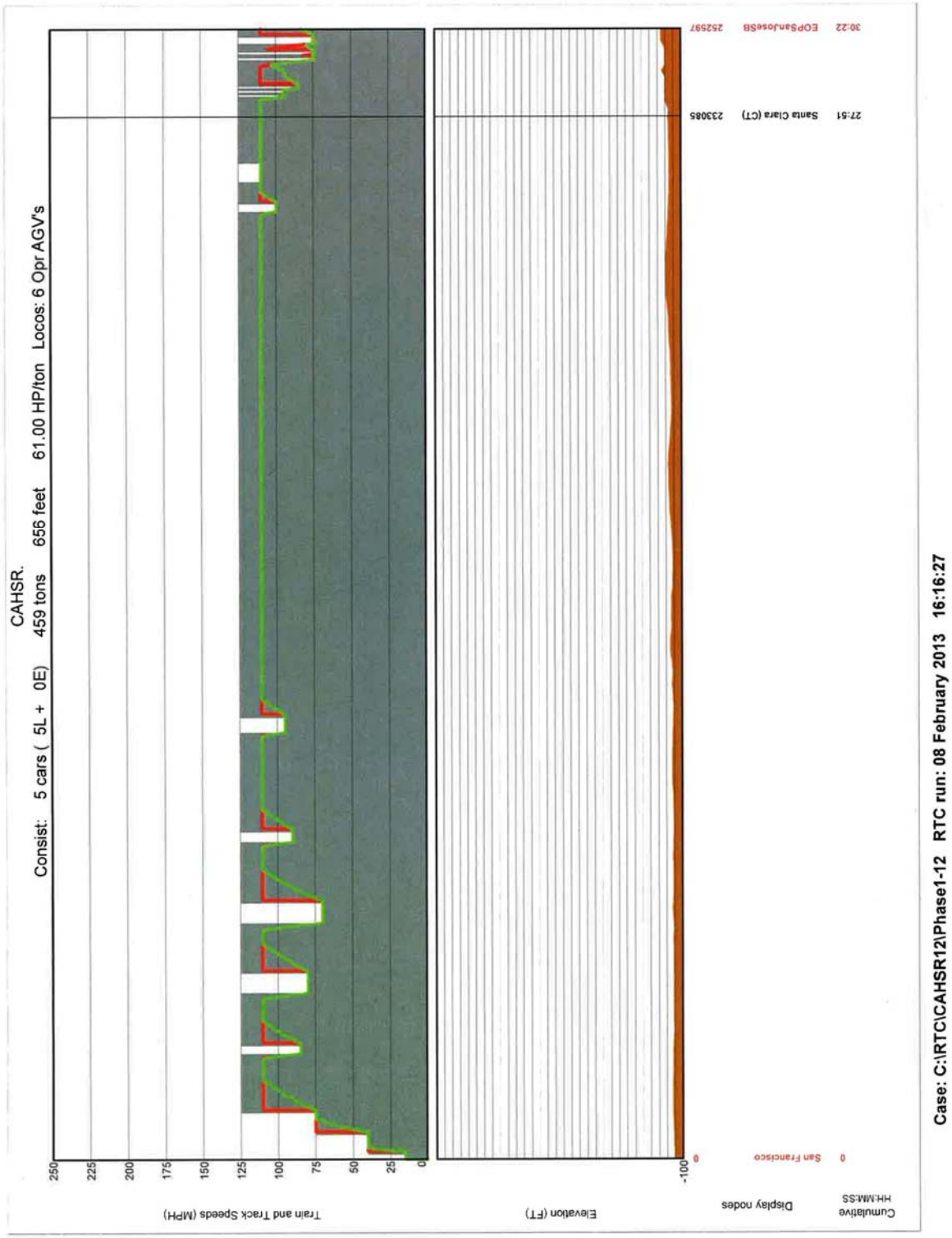


Exhibit F

These are screen snapshots from *Bakersfield to Palmdale: Bakersfield-Tehachapi Map,* part of the Bakersfield-Palmdale Project Section Library.

http://cahighspeedrail.ca.gov/WorkArea/DownloadAsset.aspx?id=7312