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May 29, 2018

Elaine M. Howle, CPA, California State Auditor
621 Capitol Mall, Suite 1200
Sacramento, CA 95814

Re: *Audit of California High Speed Rail*

Dear Inspector General:

I hereby submit comments regarding your audit of California High Speed Rail (CHSR).

DRAFT PLAN CHSR 2018 BUSINESS

1.1 I recently read the Draft 2018 Business Plan for CHSR which talked in generalities about doing future geotechnical reports to help CHSR make decisions. A copy of the 2018 Business Plan is attached as Exhibit 1. However, in fact a 60-page geotechnical report had already been prepared and completed by CHSR in March 2017, a copy of which is attached as Exhibit 2. This March 2017 Geotechnical Report was published about one year prior to the Draft Business Plan. Page 18 of the Business Plan speaks of core samples drilled as deep as 1,000 feet in some unspecified location. However, the March 2017 Geotechnical Report for tunneling through the Angeles National Forest (ANF) referenced core drilling as deep as 2,600 feet. The 2018 Draft Business Plan totally ignores its own March 2017 Geotechnical Report. The reasons why this is important are as follows:

1.2 A copy of the October 21, 2017 article in the LA Times entitled "A 13.5 Mile Tunnel Will Make or Break California's Bullet Train", by Ralph Vartabedian about the CHSR tunnel in Pacheco is attached as Exhibit 3. The March 2017 Geotechnical Report seems to describe conditions far worse than those described in the article on the Pacheco tunnel. These more severe conditions include, but are not limited to the following:

1.2.1 The total tunnel length of the Pacheco tunnel was about 13.5 miles. The tunnel from Palmdale to Burbank is about 22.6 miles, 18.79 miles of which goes through the Angeles National Forest in the E2 Route. (Table 6.9 of the March 2017 Geotechnical Report)

- 1.2.2 The Pacheco Tunnel has at most 1,000 feet of overburden. The tunnel through ANF has, depending on the route, between 2,000 and 2,650 feet of overburden. (Table 6.9 of the March 2017 Geotechnical Report). I do not have overburden figures for the portion of the tunnel that is not in the Angels National Forest.
- 1.2.3 The article on the Pacheco tunnel does not mention water pressure except to say that if water were to be encountered, the costs would increase. The March 2017 Geotechnical Report focuses substantially on this issue. Over 6 miles of the E1 and the E2 routes each have water pressure in excess of 25 bar which means that those tunnels will leak when completed. (Table 6.9 of March 2017 Geotechnical Report). No tunnel has yet been constructed to withstand pressures in excess of 25 bar. This is a substantial additional risk/cost not apparent in the Pacheco tunnel.
- 1.2.4 Because of the type of gravel/soil located in portions of the proposed tunnels, the March 2017 Geotechnical Report focuses on the need to be able to rescue the Tunnel Boring Machine (TBM) from the San Gabriel mountains. With overburden in excess of 2,000 to 2,650 feet, that would be an expensive and time-consuming process, especially since CHSR would have to excavate a shaft to total depth, in what in all likelihood would be close to an earthquake fault, since that is where the loose dirt is located and where it is more likely that the TBM would be stuck. It is instructive to look at the rescue efforts to extricate the Big Bertha (TBM) from the Seattle area at about 1,300 feet, video footage of which I found on the Tunnel Talk website. I believe that it took about one year to complete that rescue. I only half-joked in my testimony to the CHSRA Board on April 17, 2018 that the reason CHSRA hired the person who worked on the tunnel in Seattle was so that they would have a leg up on rescuing a frozen in place TBM.
- 1.2.5 An additional problem with water pressure is the surface and subsurface dewatering caused by the tunneling through high-pressure water areas. This was not mentioned in the article on the Pacheco tunnel.
- 1.2.6 The final matter involving water is the problem of removing water from an earthquake zone. A 2014 article in the Smithsonian on removing water from earthquake-prone areas suggests that this could actually cause earthquakes. The Smithsonian report talks about the removal of groundwater in portions of the central valley of California. In the case of CHSR, the removal of water would be at the point the TBM crosses the fault lines. That issue was not discussed with respect to the Pacheco tunnel, but it appears to make the Palmdale to Burbank tunnels more complicated.
- 1.2.7 The March 2017 Geotechnical report states that the material through which the TBM must travel is very abrasive which accelerates wear and tear on the TBM. Additionally, water leakage and constant contact will likely be corrosive and

affect the cement, the rails, and the electrical systems resulting in material fatigue and in the case of electrical systems, hazardous conditions. None of this was mentioned in the article on the Pacheco tunnel.

1.2.8 I am sure that there are other differences, but I would need more time or more knowledge or both. See Sections 7 and 8 of the March 2017 Geotechnical Report for a more detailed analysis.

1.2.9 In summary, tunneling through the Angels National Forest is not feasible at best and precarious at worst and as such should not be included as alternative alignments.

1.3 The article on the Pacheco tunnel indicated that experts in the area estimated the cost of the Pacheco tunneling at between \$5.6 billion and \$14.6 billion for the 13.5-mile long tunnel. That is between \$.41 billion and \$1.08 billion per mile. As set forth above, the Palmdale to Burbank tunnel seems much more complicated and risky, which I think would indicate that the higher end of the cost per mile figure is more appropriate. If the \$1.08 billion per mile figure is used, then the 22.6 miles of tunnel length for route E2 would equal \$24.41 billion. (It should be noted that the SR 14 route has 24.2 miles of tunnel which at 1.08 billion per mile equals \$26.36 billion). Since the 2018 Draft Business Plan states that the TOTAL base cost for the Palmdale to Burbank section is \$17.546 billion (Exhibit 3.13 of 2018 Draft Business Plan), CHSR is about \$7 to \$9 billion over budget just for the tunneling construction. At half a billion dollars per mile for the non-tunneling portion of the Palmdale to Burbank section, it is an additional \$8 to \$11 billion over budget for the remaining 16 to 22 miles of the Palmdale to Burbank route. Also, note that the E2 route would include a nearly one-mile bridge across both the 210 Freeway and the environmentally sensitive Big Tujunga Wash which is enormously expensive even if they could obtain a Clean Water Act permit from the Army Corp of Engineers. The total average cost for this one section between Palmdale and Burbank is between \$15 to \$20 billion, which, all by itself will inflate, the estimated \$77 billion “base” budget for Phase 1 to between \$92 to \$97 billion or more, depending on the year of expenditure (YOE) calculations. Tunneling through the ANF is a budget buster.

1.4 The most important question is why, during a period in which Mr. Kelley, CEO of CHSRA, says the CHRSA was going to be more transparent, was the March 2017 Geotechnical Report purposefully not referenced in the 2018 Draft Business Plan?

1.4.1 I think that there is a likelihood that the disclosure of the findings in the March 2017 Geotechnical Report would reveal costs which make this project even more expensive and infeasible. The second to last thing that CHRSA wants or needs is to have these problems come to light before the 2018 Business Plan is considered by the State Legislature.

- 1.4.2 Maybe even more important to CHRSA is that there is an initiative on the June 5, 2018 ballot (Proposition 70) which affects Cap and Trade and its use for CHSR. The very last thing that CHSR wants is for the cost of the project to mushroom prior to the election.
- 1.4.3 If CHRSA had acknowledged the existence of the March 2017 Geotechnical Report, then it would be forced to estimate those costs in the 2018 Draft Business Plan. Ignoring the report might give them plausible deniability when the March 2017 Geotechnical Report receives widespread circulation at a later date after the 2018 Business Plan is approved and after the election in June 2018, but that is non-transparent and is contrary to the purpose of preparing a business plan.

2. 2018 CHSR BUSINESS PLAN ADOPTED BY CHSRA MAY 15, 2018

2.1 The California High Speed Rail Authority officially adopted the 2018 Business Plan at its meeting on May 15, 2018. The adopted 2018 Business Plan made some revisions to the Draft 2018 Business Plan but did NOT acknowledge the existence of or findings contained in the March 2017 Geotechnical Plan as detailed above. Instead CHSRA deleted the language about boring depths on page 19 of the 2018 Draft Report and inserted new language and expanding the section entitled “Drawing Upon International Tunneling Expertise” and added sections entitled “How We Enlist International Experience Today” and “Enlisting Even Greater International Expertise as we Move Forward”. These can be found on page 22 and 23 of the adopted 2018 Business Plan and are included collectively as Exhibit 4.

2.2 Because of the devastating March 2017 Geotechnical Report, which was prepared by the Internationally acclaimed engineering firm of Kleinfelder, Inc., CHSRA has attempted to bury its finding and conclusions. The defects noted in the 2018 Draft Business Plan remain. CHSRA can say that it has or intends to hire international experts, but it has already hired and paid international experts, CHSRA just didn’t like the results.

2.3 In its Adopted 2018 Business Plan CHSRA asserts as follows:

“In summary, although our tunnel sections are among the most challenging elements of the system, they are buildable. We are taking early and on-going actions to ensure that they are delivered successfully, just as they have been in other parts of the world.”

This is an absurd conclusion from a entity the states that it will be engaging experts in the future and whose only geotechnical report from international experts is to the contrary. There is no

other such high-speed rail tunnel that exists at these depths with the geological challenges of earthquake faults as described in the March 2017 Geotechnical Report. In the 2016 Supplement Alternative Analysis (SAA) CHSRA eliminated the E-3 route through the Angeles National Forest because the “overburden” of 2,700 feet was too much to build the tunnel. However, the E-1 and E-2 routes have “overburden” of 2,000 to 2,600 feet, but for some undisclosed reason are disqualified. There may be international tunnels for Trains through granite at a depth greater than 2,600 feet, but as CHSRA has already concluded, this is tunneling through earthquake faults and tunneling at a depth of 2,700 feet is not acceptable.

2.4 Ironically, in an effort to prove its point CHSRA shows a photograph of a tunnel provided by the State of Washington. This is undoubtedly the tunnel through Seattle which was 1,300 feet below ground and in which the tunnel boring machine (TBM) named “Big Bertha” was stuck underground for about a year and had to be rescued by excavating a shaft 1,300 feet deep and about 50 feet in diameter. In the Angeles National Forest that shaft might have to be 2,600 feet deep and 60 feet in diameter into areas with possible earthquake faults. The Seattle Tunnel proves the point that this is not feasible.

2.5 The Adopted 2018 Business Plan also stated as part of the plan going forward that

“We would also involve the panel in outreach to other experts at major tunneling conferences “Pg 23 (Exhibit 4)”

This would be a departure from past practices. The existence of the March 2017 Geotechnical Report was NOT disclosed to the Tunnel Talk conference at which CHSRA made a presentation. (See April 2018 video: Tunneltalk.com/TunnelEast.php) When I contacted Tunnel Talk they said they were unaware of the already existing March 2017 Geotechnical Report, but they said they would look into it. Attached as Exhibit 5 is a copy of that e-mail exchange.

CONCLUSION

On April 17, 2018 I testified at the CHSR Authority Board meeting and made the Board aware of the March 2017 Geotechnical Report, because I thought there was a possibility that the Board members and Brian Kelley, the new CEO, were unaware of its existence. Instead, on May 15, 2018 they adopted 2018 Business Plan full of the same deception and obfuscation. Given the opportunity to set the record straight they continued down the same path, afraid to confront inevitable conclusions of their own studies.

Very truly yours,

William E. Eick



Enclosures as Stated

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cc: Jeff Denham, Congressman

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