Legislative Testimony of Professor William Ibbs[1]

3/27/14

Thank you, Senator DeSaulnier. And I want to thank you again for speaking to my students at Berkeley two weeks ago, they were thrilled. It's a privilege to be here again and to offer some thoughts on the important questions you and your committee are facing. These thoughts have been formed by my 40+ years of large-scale construction project experience around the world, including the Big Dig, Panama Canal, and numerous rail systems including BART, LA MTA, Seattle's Central Link, Copenhagen's Comet system, and Johannesburg South Africa's Gautrain. My comments are also framed by my research work at Berkeley, where I have studied and quantified cost and schedule performance on over 2000 large-scale construction projects. That work's been published in various scholarly journals and mentioned in the background paper to this hearing.

I was asked to address three questions today:

1. What does a "world-class passenger rail system" in California look like? In megaproject parlance, what are the appropriate performance specifications, and have they been defined correctly in the high-speed rail project?
2. Does the HSRA's Draft 2014 Business Plan provide a roadmap to success according to the performance specifications defined for it, and does it demonstrate progress toward meeting them?
3. Are there alternative pathways, plans, and/or procedures toward a high-speed rail system that succeeds as a world-class passenger rail system?

I may be a party pooper, but let me first say that I would hope that somewhere along the way you and your committee revisit the question of whether we should be devoting billions of dollars to a high-speed, passenger-based rail system when we have pressing problems with our

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highways and airports. The American Society of Civil Engineers latest report card for California gives our highways a C- and calls for us to spend $10 billion per year to just maintain those roadways. There are many more people that will use our highways than will use this rail system, and I urge you and your committee to look at transportation investment across the board and to give us a world-class highway system that will serve the folks of Hayfork, Berkeley, and Los Angeles more often than this rail system that only goes between some fixed destinations.

However, if the decision is to look at how to spend money on rail systems, our research at Berkeley and my consulting work with rail systems around the world tells us there are grave financial and operational risks with large-scale public projects.

1. My research and that of other folks you are familiar with tells us that it's highly probably, I'd say 80% likely, that the costs of this project will come in at least 50% higher than currently projected. That's almost a given. You know the story with the Big Dig and the Bay Bridge. I can tell you that Copenhagen's Comet System and Johannesburg's Gautrain system are costing much, much more to build than the system advocates ever envisioned.
2. The second lesson that we've learned about such huge construction projects is that they take a long time to build, not so much because of the design and construction activities but more so because of the environmental permitting and right-of-way acquisition requirements. The Panama Canal, will be at least 1 year late and that project was only a 5-year project when it was launched. As the Sacramento judge reminded us last November, large expansive projects like this must meet strict environmental permitting requirements. Based on my Big Dig and the South African rail system experience, I suspect that the delay we're seeing associated with this first court ruling will not be the last such ruling and delay. Such delays add to the costs of the project and further jeopardize its financial viability. So in response to the second question I was asked to address "Does the HSRA's Draft 2014 Business Plan provide a roadmap to success according to the performance specifications defined for it, and does it demonstrate

progress toward meeting them?" I would say that it does not provide a realistic roadmap toward success because it does not sufficiently address the risks of such delays.

3. A third risk I'll offer right now is the risk of expensive operating and maintenance costs. Our discussions today have focused on the initial capital costs. No one has talked about what this system will cost once it's up and running. Decades of American experience has shown that the ridership fares only cover about 2/3 of the actual running costs; that would mean the State taxpayers would be on the hook for the other 1/3 which would amount to billions of dollars every year.

So what recommendations would I offer to try to manage this gargantuan beast?

1. Focus on the interplay between scope, schedule, and cost. My students quickly learn that the cost and time required to build any construction system, depend on the underlying characteristics of the project – that is its scope. So, develop a high speed rail system that goes 200 mph and it will cost $68 billion; instead develop a system that is just as luxurious but goes 72 mph, and it will cost much less. 200 mph means that the sight lines and braking distances are extremely long and frequently preclude at-grade crossings; that in turn leads to putting the train on elevated trackways or in underground tunnels, which dramatically raises costs. These high speeds also mean that the operating and maintenance costs – something that no one here today has yet talked about – will be extraordinarily high. To answer your third question – namely alternative pathways – I would strongly urge policymakers such as yourselves to revisit the decision to run this system at such high speeds. Take it down a notch and use existing, proven off-the-shelf concepts, not the latest shiny toy that's come to the marketplace.
2. My second recommendation is a network concern. When the rail systems of Europe, Johannesburg, and Japan are successful it's because they tie into a good local system, be it local rail (like BART) or bus. At this time, we're missing local distribution systems that

would appeal to the business or high-end residential traveler that HSR aims for. The typical business traveler will not want to ride on SF's MUNI system. UBER, probably, but not MUNI. We need to develop improvements that would serve these travelers.

3. The last point that I'll make turns on something that Bill Gates, the founder of Microsoft, has noted: "Over the course of three years things change slower that we think, and over the course of ten years they change much more than we imagine." This proposed rail system will take decades, some say 30 years, to build out. I think it's hazardous to think we can predict what riders will want and what technology will offer us. Just look at what Google is doing right now with driverless cars, and consider that technologies like Skype will probably reduce the need for in-person meetings. I know that my college students are much more comfortable communicating, dating, and interviewing over the internet than I and other folks of my generation are. Therefore, we need to build systems that can change and adapt to changing technologies, competition, user needs. Eat the pie in small slices, not all at one time. That is, build the segments today that make the most sense from an economic and public welfare perspective – not the segments that are the easiest to permit.

Thank you, Senator, and I'm now available to answer any questions you may have.

References

William Ibbs (1997). "Quantitative Impacts of Project Change: Size Issues." Journal of Construction Engineering and Management, ASCE, 123(3), September, 308-331.

William Ibbs (2005). "Quantitative Impacts of Project Change: Timing Issues." Journal of Construction Engineering and Management, ASCE, 131(11), November, 1219-1223.

Edward W. Merrow, Kenneth E. Phillips, and Christopher W. Myers (1981). Understanding Cost Growth and Performance Shortfalls in Pioneer Process Plants. Rand Corp. Study, R-2569-DOE, Sept.