STATE CAPITOL
P.O. BOX 942849
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# California Legislature

June 8, 2017

Mr. Bob Alvarado, Chairman
California Transportation Commission
1120 N Street, Room 2221, MS-52
Sacramento, CA 95814

RE: **Intent of the Local Partnership Program through Senate Bill 1, the Road Repair and Accountability Act of 2017**

Dear Chair Alvarado:

We would like to thank the California Transportation Commission (CTC) for being a key partner in supporting the passage of SB 1 (Beall), Chapter 5, Statutes of 2017, the Road Repair and Accountability Act of 2017. This support was extremely helpful in making this bill a reality. Over the next few months, the CTC is charged with developing guidelines for a host of the programs enacted under SB 1 in order to ensure the funding generated from SB 1 can immediately begin to flow to needed transportation investments. We look forward to working closely with you on this guideline development.

It has come to our attention that there were questions raised at the May CTC meeting held in San Diego regarding the legislative intent of the Local Partnership Program. We are writing this letter in order to help bring clarity to this question. SB1 included the Local Partnership Program funding in order to reward existing self-help counties and agencies that have passed developer fee programs on their own, and encourage aspiring agencies to achieve the voter thresholds required to impose local sales tax and developer fees for transportation. Imposing a local tax is not an easy feat and these local dollars provide significant benefit to the State's transportation system.

Although not specifically prescribed in SB 1, it was our intent, as co-authors of the measure and drafters of the original language, that the Local Partnership Program be implemented much like the State-Local Partnership Program (SLPP) created pursuant to Proposition 1B of 2006.

The original SLPP funding was provided at a time when there was a severe recession, which decreased available state transportation funding. Despite this challenge California's self-help counties were able to use the $700 million in SLPP funding and

deliver over $10 billion in projects. In addition, simultaneously there was a large infusion of federal American Reinvestment and Recovery Act funds, which SLPP helped leverage. This success demonstrates the ability for self-help counties to effectively use this type of incentive funding to deliver high priority transportation projects in a timely manner and leverage outside funding opportunities.

Counties seeking to enact local sales tax measures and developer fees are able to present the opportunity to the voters to leverage state funds based on the success of SLPP. The local partnership program is meant to encourage voters that if they agree to tax themselves, the state will provide additional incentive to ensure that local priorities are met. By redirecting these funds back into a state competitive program, there is no guarantee for any voter that the funds would return to their district.

We understand that recently the CTC negotiated a compromise with the Self-Help Counties Coalition (SHCC) that would distribute 50% of the funding through a formula and 50% of the funding through a competitive process. It is also our understanding that the SHCC has requested the ability to revisit this agreement in two years to reconsider a higher proportion of funding be distributed through a formula program. We would encourage this future re-evaluation, as we do with all programs, to ensure the program objectives are being met.

Please let us know if you have any additional questions regarding this position.

Sincerely,

Assemblymember Jim Frazier , Chair
Assembly Transportation Committee

Senator Jim Beall, Chair
Senate Transportation & Housing Committee

cc: CTC Commissioners
Susan Bransen, Executive Director, CTC
Keith Dunn, Executive Director, Self Help Counties Coalition

# Comments from the Public

From: Fred J Geiger
Sent: Tuesday, June 13, 2017 8:12 PM
To: info@sccrtc.org
Subject: Unified Corridors Investment Study

Dear Commissioners,

We need to prioritize transit and active transportation investments over auto travel if we want to have a sustainable, reliable, and economical transportation system. Individual modalities should be studied independently to properly ascertain the actual effects of a given method transportation CRITICALLY important is the thorough understanding of induced demand from any spending on projected improvements. Please form a citizens review committee to enhance the accountability of the UCIS.

Thank you. Fred J. Geiger

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**From:** William Kingsley
**Sent:** Tuesday, June 13, 2017 8:53 PM
**To:** info@sccrtc.org
**Subject:** June 15 SCCRTC Meeting

William Kingsley
Santa Cruz, CA

June 13, 2017

Santa Cruz County
Regional Transportation Commission

RE: June 15, 2017 RTC Meeting

Dear Commissioners,

I've had an opportunity to review the agenda for the meeting on 6/15/2017 and would like to point-out some issues for your consideration:
1. Use of online surveys. Usually voluntary online surveys (verses random surveys) are considered "non-scientific." A Pew Research report from December 29, 2010 asks, "How accurate are online polls?" Some of their conclusions: ... most online polls that use participants who volunteer to take part do not have a proven record of accuracy. There are at least two reasons for this. One is that not everyone in the U.S. uses the internet, and those who do not are demographically different from the rest of the public. Another reason is that people who volunteer for polls may be different from other people in ways that could make the poll unrepresentative. At worst, online polls can be seriously biased if people who hold a particular point of view are more motivated to participate than those with a different point of view. The RTC staff, by using non-scientific polling methods, gave local activist groups the opportunity to create a significant bias in the survey results. South county residents were clearly underrepresented while Santa Cruz/Aptos

areas provided five times the input. This bias pushed the most poorly defined and least effective transportation improvement scenario to the top of the agenda, The North Coast Rail Trail Segment of the Monterrey Bay Sanctuary Scenic Trail (MBSST) Network - Environmental Impact Report while ignoring the 96% of the county's automobile owners (from SSCRTC Survey Demographics). Also since there is demographic input, it might be revealing to see how each area in the county voted and whether South county voters are in fact more supportive of HWY 1 improvements. I would like to point out another interesting 'quirk' in the pool. Why did the HWY 1 section have eight items and the others only five? In particular, rail transit on HWY 1, buses on shoulder and my all time favorite - self-driving cars. Was this a survey or a brainstorming session? I can't recall any of these items mentioned in the Measure D proposal. The effect of the increased number of choices flattens out the distribution with approximately 1700 votes cast on these three obscure issues. That in turn brings down the average shown in the final comparison of the average number of votes cast. A cynical person, like myself, might conclude that the additional HWY 1 choices were used to deflate the apparent support for the Measure D HWY 1 widening proposal. Or, a logical person with a math/science background might notice this and presume the staff or whoever created this survey is not too bright.
2. Measure D requires an Independent Oversight Committee. When is that going to be addressed? 3. Considering that 96% of the survey participants drive automobiles and probably will continue to do so, wouldn't it be prudent to work with City and County Planners to encourage new construction along corridors accommodate additional room for bicyclists with deeper setbacks instead of decreasing lanes for motorists and thereby producing more traffic problems. The trend currently is to reduce lanes and parking, why not make the roadways wide enough for autos, bicycles and pedestrians. Of course, the developers might not make as much money. How is this our problem? 4. I haven't heard this issue come up often. What is the plan for the 'motorized' bicycles? Are they legal on shared pedestrian walkways and bicycle paths? I've almost gotten into collisions with riders on these devices when walking my granddaughter on the paths in Arana Gulch. Will they be allowed on the Rail Trail?
5. I would like to request the commission consider a fourth item to their 'triple bottom line goal' - the big E's, environment, equity and economy. How about efficiency. What good is a transportation system that doesn't work?

William Kingsley

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**From:** Stanley Sokolow
**Sent:** Wednesday, June 14, 2017 8:55 AM
**To:** info@sccrtc.org; Jacques Bertrand; Sandy Brown; Randy Johnson; Oscar Rios; greg.caput; Ryan Coonerty; Zach Friend; John Leopold; Bruce McPherson; Cynthia Chase; Ed Bottorff; Norm Hagen
**Cc:** Tim Gubbins; Barrow Emerson
**Subject:** My letter for the SCC RTC Transportation Policy Workshop meeting June 15, 2017

Attached here are my comments regarding the Unified Corridors Investment Study scenario modeling.

Sincerely,
Stanley Sokolow, Santa Cruz

**Stanley M. Sokolow**

Santa Cruz, CA 95060
Phone & Fax:
Email: stanleysokolow

TO: Santa Cruz County Regional Transportation Commission members of the TPW

FOR: Agenda of June 15, 2017, Transportation Policy Workshop

REGARDING: Projects and scenarios for the UCIS modeling

Dear Commissioners:

I have written this to provide my input into your decision today on the staff recommendations for selection of projects to be included in scenarios for computer modeling in the Unified Corridors Investment Study (UCIS). I apologize for the length of this letter, but there is much to say.

Executive Summary

- Transportation project modeling has a history of greatly over-estimating rail ridership and mis-estimating road traffic by ±20%. Faulty estimates would expose the county to the risk that very expensive projects will under-perform. The widening of I-405 in L.A. is an example.
- The published validity test result of the modeling tool developed for this study shows a lot of deviation between the prediction and the actual real world measurements, with a bias to under-estimate traffic. This seems to show that it will not be immune to the historical trend. Perhaps the model can be re-calibrated.
- The best way to deal with that uncertainty is to have the model produce the distribution of likely outcomes; that is, not just a forecast but also a measure of the range of uncertainty around it. Please ask the staff to provide you with confidence intervals around the metrics produced.
- The scenario chart only has titles of projects without any description of what they entail. In particular, the “bus rapid transit” project is not defined. I provide here in Part IV a suggested plan for cost-effective bus rapid transit that I would like to be the modeled BRT project.
- I feel that each project should have had a preliminary rough evaluation for financial feasibility and potential for achieving the goals before the projects were combined into scenarios.
- As the scenarios are currently proposed, there is the risk that beneficial projects combined with infeasible or poor performing ones will be thrown out together, “throwing the baby out with the bath water” so to speak. Please be sure that there will be an opportunity to re-constitute the scenarios with the projects that show benefits and feasibility after deleting the poor and infeasible ones.
- The project “self-driving cars” is not something the RTC can control, nor can staff provide reasonable estimates of the rate at which self-driving cars will be very prevalent on our roads. The technology is still too new and uncertain to be modeled. It should be deleted, but the staff could comment on the potential effect of self-driving cars.
- The following were omitted from the modeling but should be included: bike-to-transit, parking demand, the impact of train on Metro bus to service the train stops, and induced travel.

On Tuesday, June 13, a small group of interested citizens, including myself, met for about 50 minutes with Mr. Dondero and Ms. Dykaar, who had kindly agreed to hear our concerns and answer our questions. I appreciate their openness, sincerity, and cooperation. This letter reflects my remaining thoughts.

## Part I: Understanding the Uncertainty in Scenario Modeling

In Phase I of the UCIS, computer tools were created for modeling the various scenarios under your consideration today. I want to bring to your attention briefly the history and limitations of computer modeling in transportation planning.

Fehr & Peers, the consultants who created your Rail Transit Feasibility Study in 2015 and your Travel Model for the UCIS in 2016, speak about transportation modeling on their website:

> For the first 40 of the last 50 years, vehicle miles traveled (VMT) in the US grew at 3 times the rate of population growth, and transit ridership declined. Few transportation forecasts got that right. A 2005 study by Flyvbjerg of 25 international rail projects found that passenger forecasts were overestimated by an average of more than 100%, and that 84% of the rail projects had actual ridership more than 20% below forecasts. Forecasting travel has become even more complicated over the last ten years.

The Flyvbjerg study[1] says:

> "This article presents results from the first statistically significant study of traffic forecasts in transportation infrastructure projects. The sample used is the largest of its kind, covering 210 projects in 14 nations worth U.S.$59 billion. The study shows with very high statistical significance that forecasters generally do a poor job of estimating the demand for transportation infrastructure projects. **For 9 out of 10 rail projects, passenger forecasts are overestimated; the average overestimation is 106%. For half of all road projects, the difference between actual and forecasted traffic is more than ±20%. The result is substantial financial risks**, which are typically ignored or downplayed by planners and decision makers to the detriment of social and economic welfare. **Our data also show that forecasts have not become more accurate over the 30-year period studied, despite claims to the contrary by forecasters.** The causes of inaccuracy in forecasts are different for rail and road projects, with **political causes playing a larger role for rail than for road**. The cure is transparency, accountability, and new forecasting methods. The challenge is to change the governance structures for forecasting and project development. Our article shows how planners may help achieve this.
> …
> "According to the experiences gained with the accuracy of demand forecasting in the transportation sector, covering traffic volumes, spatial traffic distribution, and distribution between transportation modes, there is evidence that **demand forecasting—like cost forecasting,** and despite all scientific progress in modeling—**is a major source of uncertainty and risk** in the appraisal of transportation infrastructure projects.
> …

1https://www.researchgate.net/publication/263747176_How_Inaccurate_Are_Demand_Forecasts_in_Public_Works_Projects_The_Case_of_Transportation

> "On this background, planners and decision makers are well advised to **take with a grain of salt any traffic forecast that does not explicitly take into account the uncertainty of predicting future traffic. For rail passenger forecasts, a grain of salt may not be enough**."[2]

As an example of the potential impact of faulty predictions, I call your attention to the $1.1 billion 5-year project that attempted to alleviate severe congestion through the Sepulveda Pass on the Interstate 405 freeway in Los Angeles by widening the freeway. The LA Weekly tells the story:[3]

> This past May the project known as the I-405 Sepulveda Pass Improvement Project came to official completion, with resulting new on-ramps and off-ramps, bridges and a northbound 405 carpool lane stretching 10 miles between the 10 and 101 Freeways.
> …
> But the $1.1 billion question hangs in the air: Is the 405 any more relieved of congestion …? The answer is no.
>
> A traffic study by Seattle-based traffic analytics firm Inrix has shown that auto speeds during the afternoon crawl on the northbound 405 are now the same or slightly slower — the maddening 35-minute tangle between the 10 and the 101 is actually a minute longer.
>
> More worrisome is the morning southbound logjam. It's so bad, post-improvements, that when Caltrans issues its "worst bottleneck" rankings in August, unofficial data suggest that the 10-mile stretch of the 405 between the Valley and the Westside could be the worst freeway segment in California.
>
> Those who endured five years of disruption were assumed to be sacrificing in large part to give L.A.'s workforce a needed carpool lane. … But longtime statistics had already shown that not many people would form carpools.
>
> "Conceptually, there's little reason to think that just adding another lane, even a carpool [lane], is going to noticeably reduce traffic," says Michael Manville, assistant professor of city and regional planning at Cornell University. "This is a project that has very high and very certain costs. But the benefits are much less certain."

Looking locally, here's an observation that I made about the validity test results shown in your Phase I modeling report. I wrote to Ginger Dykaar about this, but haven't yet received a response. I noticed a graph showing a comparison of the model's forecast of Average Daily Travel counts in a large number of road segments scattered around the county versus the actual counts taken on those segments. Here's the graph:

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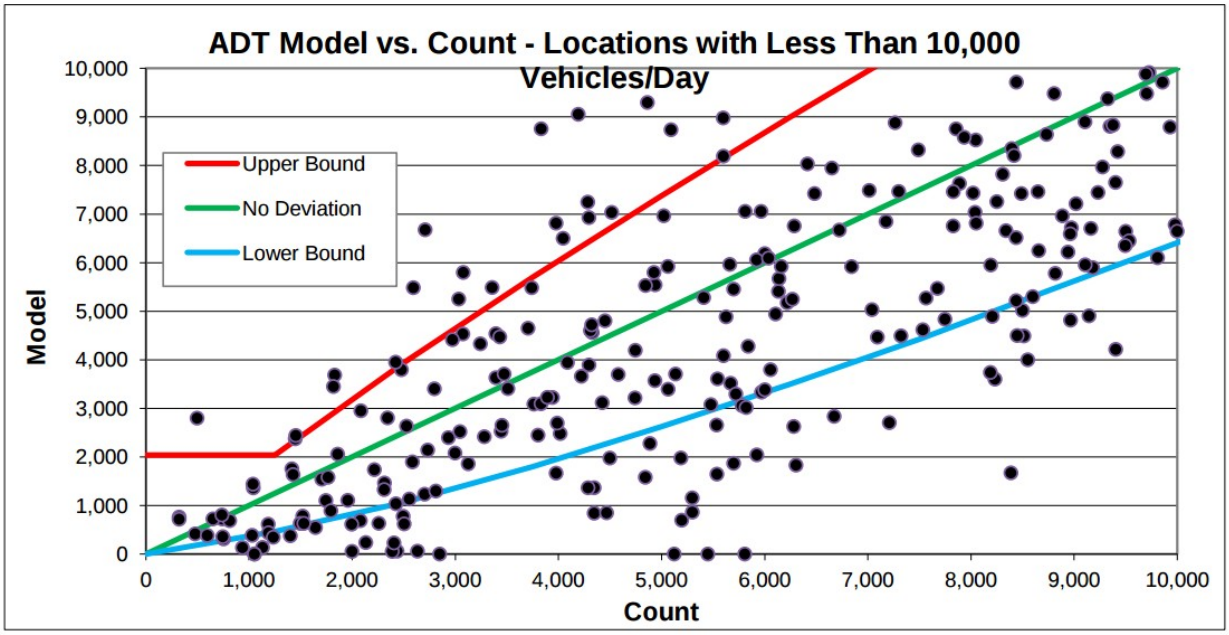
2 In contrast with these studies, a 2003 report by MaryPRIG Foundation cites 9 US cities where ridership exceeded projections. However, that report seems to be a strong political statement promoting a train for Baltimore, which could be biased by cherry-picking the best cases and ignoring the rest. I trust the study of Flyvbjerg as impartial.

3 http://www.laweekly.com/news/11-billion-and-five-years-later-the-405-congestion-relief-project-is-a-fail-5415772




FEHR PEERS

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I wrote on June 7 about that graph:

> I found this graph in the model documentation which gives me some concern. ... I notice that there is a very large amount of discrepancy between the model and the real-world counts. If the model were absolutely perfect (unattainable, I know, but ideally speaking), the black dots would all lie on the green line indicating perfect equality of the model and the actual counts, but there is a lot of scatter here. Moreover, there are more dots below the green line than above it, indicating a systematic bias in the model.
>
> The model doesn't appear to be very reliable with that much uncertainty. Has that been fixed? If so, do you have a new graph of the validity testing? **Will the model produce not only a metric output but also the range of likely real-world metrics and a confidence interval around the metric?** Without those statistical outputs, the Commission will not know how much uncertainty there is in the metric. Just because one scenario has greater metrics than another may not be significant if the confidence intervals overlap a lot, meaning that one or the other scenario could actually be the better choice but that is masked by the uncertainty of the model output.

There are two types of models. One uses averages of real world data as inputs into a scheme which relates the data to the scenarios based on how they interact, producing forecasts. This is a deterministic model. The other type recognizes that there is randomness and uncertainty, so it uses distributions of real world data as inputs, makes random variations in the internal parameters by selecting from those distributions, and produces an output prediction, but doesn't stop there. It repeats the internal randomization and runs the model over and over many times, which produces a range of output

predictions for each metric. The spread and distribution of the output values gives a way to judge the degree of uncertainty in the prediction. This is known as stochastic modeling. From what I've read in the Phase I modeling report, I think your model is deterministic, not stochastic. Therefore, I don't know how the staff will be able to answer my question: Will the model produce not only a metric output but also the range of likely real world metrics and a confidence interval around the metric?

My point in telling this is that you are charged with a difficult task to determine how our taxpayer dollars would best be spent to improve traffic here, but scenario modeling still leaves you with a huge amount of uncertainty. It is easy to be lulled into a feeling of confidence when the numbers point you in a certain direction, and the numbers can look very precise and scientific. The mathematical models themselves are complex beyond the comprehension of ordinary citizens who are not highly trained in the field. But even though our planners, like all planners, do their very best with the tools available to make accurate forecasts to aid your decisions, the results may be far from accurate. The best way to deal with that uncertainty is to have a rough idea of the distribution of likely real-world outcomes.

Part II: Descriptions of projects

Looking at Attachment 1 of your agenda packet ("Draft Scenarios for Analysis"), I see the titles of various projects in the left column, but there is no description of those projects accompanying the spreadsheet. At the recent RTC Bicycle Advisory Committee meeting, I asked Ginger Dykaar for an explanation of "self driving cars" as a Highway 1 project. Just what does that project entail? What improvement spending is contained in that project? She answered that there is no spending, just the consideration of **future impacts caused by self-driving cars on Highway 1.** One of the committee members took issue with that, saying that self-driving car prevalence is beyond the county's control, so he thought it should be present in all of the modeling scenarios, not just Scenario D. It will impact all of the scenarios he said. So he felt it should be in all of them or none. The committee voted to remove it from all scenarios.

At our meeting on Tuesday, Ms. Dykaar was again asked why self-driving cars still are in Scenario D and only that scenario. She said that the RTC has heard from certain members of the public who have strongly held opinions about the impact of self-driving cars on our transportation system, especially on the capacity of the Highway 1 freeway. She and Mr. Dondero defended the inclusion of it in only one scenario, although they acknowledged that to the extent that self-driving cars become significant within the time horizon of the UCIS study, they would most likely affect all scenarios. I agree with the Bicycle Advisory Committee that self-driving cars should either be considered in all scenarios or removed from all and just remain as an unpredictable consequence of technological advancements.

Mr. Dondero said there is a lot of industry "hype" about how soon self-driving cars will become significant on our roads, but he personally hasn't heard any credible explanation of how the transition from the current situation will occur and how fast they will take over our freeways and roads. The California Air Resources Board estimates that the average life of a car in California is 20 years. Knowing that, it seems that human-driven cars will be on our roads for a very long time, and the way that they will intermingle with autonomous cars and cars with intelligent adaptive cruise control on our freeway is not clear and not currently amenable to reasonable forecasts. Therefore, **I recommend that self-driving cars not be included within any scenario but the staff and consultants should comment on the potential effects of them after the scenario analysis has been completed.**

The project **"bus rapid transit" in the rail corridor** needs further specification. Director Dondero described two types of bus rapid transit (BRT) in his December 8, 2016, report. He described and illustrated a 2-lane busway on the rail corridor, which he said would be too wide in many locations to allow for the scenic coastal bike/pedestrian trail within the existing right-of-way width. This implies that additional right of way would need to be purchased in those locations. (The passenger train study also said that additional right-of-way width may be needed in certain locations for 30-minute headways.) He then said that a 1-lane busway with pullouts could be considered but additional analysis would be needed. At our meeting Tuesday, I asked whether that analysis is going to be part of the UCIS modeling now. Mr. Dondero said yes, but only to a very limited extent.

In Part IV of this letter, **I describe a scheme for using a 1-lane busway on the coastal corridor combined with the freeway for Bus Rapid Transit (BRT).** Before our meeting on Tuesday, I had hoped that BRT would be given consideration equally detailed as has been given to the passenger rail option as reported in December 2015. That is, before it is modeled in scenarios, BRT should be modeled on its own to study the cost feasibility, possible headways, locations of passing lanes, bus stop locations, right-of-way acquisitions, and so on, as was done in the train study. However, Mr. Dondero has explained that due to budget and time constraints, that will not be possible. Nevertheless, **I hope and urge that staff will take my BRT proposal in Part IV and use it as the definition of "bus rapid transit" on the coastal corridor when modeling is performed.**

Part III: Assignment of projects to scenarios

I feel that the combining of the projects into scenarios has been done prematurely because you don't know how each one performs on its own. For example, the scenario modeling will look at the BRT on the coastal corridor in combination with other projects in Scenario C, and only in Scenario C, but before modeling how they all interact if implemented together, you should know how each one performs alone and how feasible it is, and then choose how to combine them. If all of the projects in Scenario C combine in a way that makes the cost/benefits come out poorly compared with other scenarios, how will you know which were the good and bad projects in Scenario C, that is, which to combine into other scenarios and which to discard, unless you know how each performs standing alone? For example, perhaps BRT on the corridor as I describe it could be combined with metering of on-ramps on Highway 1 since the metering could potentially reduce congestion on the non-commute side of the freeway being used by the BRT route as described. These two projects would be synergistic.

Another example: "Bike trail separate from pedestrian trail" is considered only in Scenario D which would put a train on Highway 1 and bus/bike lanes replacing the parking lanes on Soquel Ave/Drive. If the train on Highway 1 is too expensive for the benefit it confers, or if unacceptable parking loss precludes the bus/bike lane, why should that kill the project for a separated bike lane on the coastal corridor? As you probably are aware, there is a very well-funded and vocal special-interest group which is pushing hard for a "world-class trail" having separate lanes for pedestrians and bicycles.

**Therefore, I had hoped you would not approve the draft scenarios today, but instead would direct staff to operationally define each project and evaluate each one on its own to see how it performs, and report the results back to you. At that point, the staff, working with the consultants, would make a logical combination of the projects into scenarios, based on their estimated cost, stand-alone benefits, and potential synergy, for your approval to proceed with scenario modeling.** I realize that the effects of projects in isolation can't simply be added together since they may interact in

non-linear ways that may be additive or subtractive, which is why scenario modeling is still necessary before a final decision can be made. But by pre-testing the separate projects, I believe you would create better scenarios.

At our meeting on Tuesday, **Mr. Dondero indicated that due to budget and time constraints, that wouldn't be possible**, but Ms. Dykaar explained that the scenarios will be re-considered after Step 1 of the UCIS is done, and then infeasible projects may be removed and others recombined. Our group said we hoped the staff wouldn't "throw the baby out with the bath water," meaning that the **bad projects should not be a "poisoned pill" that kills the good projects in the same scenario.**

Part IV: The bus rapid transit (BRT) proposal

The proposed scenarios for the UCIS modeling presented to you today include "bus rapid transit." The scenario document doesn't define exactly what that would involve. Here is my proposal for an economical BRT system to study.

At the RTC's meeting on December 8, 2016, Executive Director Dondero presented his report on options for the uses of the coastal rail corridor. He wrote about the train option, a trail-only option, and a bus rapid transit (BRT) option. In part he said (emphasis added):

> "A typical BRT busway consists of two paved lanes, a separator/barrier and gutter, and outside shoulders.
> …
> "However, constructing the [2-lane] busway would conflict in many locations with the 12 - 16 foot average multi-use trail as the Monterey Bay Sanctuary Scenic Trail is currently envisioned and in development. A **one-way busway with pullouts could be considered but additional analysis would be needed** to determine feasibility, possible design options, current and future demand, signaling requirements and costs."

The RTC has already done a detailed feasibility study of the passenger train. The Great Santa Cruz Trail group (now apparently re-named Santa Cruz County Greenway) financed a professional study of the trail-only option. What is missing is a BRT feasibility study comparable with these two studies, which would provide staff and the Commission the information it needs to make a rational comparison of these 3 options.

When considering the scope of the BRT study, I recommend that the **one-lane busway** design be studied at the same level of detail as was done for the passenger train. The buses would be quiet battery-powered all-electric buses that emit zero greenhouse gases. These are currently available in standard 40' bus length and will soon be available in articulated 60' length with capacity for 120 passengers. To provide service comparable to the train, four articulated buses would be needed – two going northbound and two going southbound at the same time, plus one spare for rotation through maintenance. The Metro already has a bus maintenance center, whereas a train system would require building one for the trains. I posted on Facebook my calculations using data from the train study and from the Metro's comprehensive service study which shows that the bus system would require less capital cost and less operating and maintenance cost compared with trains, including amortization of bus and train replacements. Even if twice as many buses are needed, the cost still favors the bus versus the train.

My concept of the most economical and efficient BRT for Santa Cruz County is that it would utilize a **one-lane exclusive busway built alongside the scenic bikeway trail, in place of the tracks from Watsonville to the Seabright Avenue intersection.** Bus stops would be built in key locations similar to the stops for the train. Passing lanes could be built to allow express buses to pass limited buses where right-of-way width permits. Passing lanes would also allow buses traveling opposite directions to bypass each other where they meet on their scheduled travel if the busway is used bidirectionally, as was proposed for the trains, but at least **initially and perhaps for very many years, unidirectional travel on the busway would be the way they go, as I'll explain.** Buses could exit the busway at certain intersections, such as at 41st Avenue to reach the Capitola Mall Transit Center. Exits in strategic locations, such as to a bus stop along Sumner Avenue near Seascape Resort, would allow buses to pass without acquisition of more right-of-way for passing lanes.

<u>The BRT route</u>

We know that the freeway commute traffic on Highway 1 is heavy northbound in the morning and flows freely southbound. In the afternoon, the commute reverses so that southbound is very congested while northbound flows more quickly. The Measure D auxiliary lanes are intended to improve that flow between the on- and off-ramps in 3 segments. Whether or not they actually improve flow, the current situation is that traffic congestion is light in the counter-commute direction, so buses can take that side of the freeway. The problem with the Metro bus routes between Watsonville and Santa Cruz is that the commute-direction congestion creates delay and unreliability for the buses. That's where the busway on the coastal corridor would improve service. The route would be as follows:

- **In the morning, the BRT buses would** leave the Watsonville Transit Center, travel on W. Beach St. to the entrance of the right-of-way corridor at Walker St., **take the busway northbound on the corridor**, making stops along the route. At 41st Avenue, the bus would turn off of the corridor, take 41st northbound for the few blocks to reach the transit center at Capitola Mall, then turn around and return to the busway to continue the journey northbound. At Seabright Avenue, the bus would turn northward onto Seabright and follow the existing Metro route #68 to Broadway westward, over the San Lorenzo River bridge onto Laurel Street, turn right and arrive at the Pacific Station Transit Center. After a short layover for passenger alighting and boarding and possibly a short break for the driver, the bus would leave the station and take Ocean Street northward and onto the freeway going southbound. **Using the non-congested southbound side of the freeway, the bus would return to the Watsonville Transit Center**, possibly making short side trips to serve Capitola Mall and Cabrillo College. The buses would **continue to circulate in this direction in the morning.**
- **In the afternoon, BRT buses would reverse direction.** The exact time of the reversal would depend upon traffic studies of congestion and would be re-evaluated periodically. Buses would depart the Pacific Station Transit Center in downtown Santa Cruz in the morning, get to the busway via route #68, take the busway at Seabright Avenue southbound making stops and the side trip to the Capitola Transit Center, and finally reach the Watsonville Transit Center, all the while **bypassing the southbound afternoon congestion on the arterial roads and freeway by using the corridor busway.** After a short layover at the Watsonville Transit Center, the buses would proceed to the freeway to return to Santa Cruz, again **bypassing the freeway congestion by using the non-congested northbound side.** (Electric buses can use the layover time at transit centers to partially recharge their batteries.)

- If the freeway congestion becomes too great all day in both directions (something that we would hope to avoid through transit and other management improvements), the **buses could use the BRT lane with passing sidings bidirectionally** as described for the train.
- A BRT bus could be designated as an **express bus to the UCSC campus.** That is, instead of stopping at the Pacific Station and returning to Watsonville, the UCSC Express bus would continue from Pacific Station to UCSC, perhaps taking Delaware Avenue to the UCSC building at 2300 Delaware Ave and the Marine Campus and then going up Western Drive to the main campus. This would create a "single-seat ride" for students and employees, which a train can't do. The Metro has already test-driven an articulated bus up to and through the campus, so it is known that the streets and bus stops would accommodate them.
- Likewise, a **Scotts Valley Express bus** could come from Watsonville along the busway and at the Pacific Station proceed as the Highway 17 Express bus does to the Metro's Cavallero Transit Center in Scotts Valley, where workers could transfer to their corporate buses. Single-seat rides are much preferred by commuters because they don't have the delay, inconvenience, and uncertainty of transferring from one bus (or train) to another. **The convenience and reliability of a single-seat ride helps to entice riders out of their single-occupancy cars onto transit.**

<u>This BRT route would allow shorter headways (more frequent buses) than the train would.</u>

Unidirectional flow has the advantage over bidirectional flow in that the buses can travel as closely together as necessary for frequency that meets the ridership demand, unlike the train. In the train study, the scenario with highest ridership and most stops was Scenario G (Santa Cruz – Watsonville, expanded local). The train study tried to achieve 30-minute headways (one train coming by a station every 30 minutes). While that is not generally considered to be a high-frequency service, it was the best that the study attempted. The complication is that since there would be trains going both directions on the single track, there must be a passing siding track where each train would meet head-on in their scheduled trips. The headways force the location of the passing sidings, but there are difficulties with right-of-way width and straight track lengths (tangent tracks) between bridges, which constrain the locations of the possible sidings. The **train study warned that train Scenario G with 30-minute headways might preclude the trail unless more width is purchased** where needed for the siding (emphasis added):

> "This option is not ideal for several reasons. **This siding location is based on transit schedules using 30 minute headways and the existing right-of-way might not be able to accommodate double tracking plus the envisioned trail.** … **If service between Santa Cruz and Watsonville is pursued, other schedule/headway options, additional right-of-way, or design changes would need to be evaluated to accommodate the trail."**

What the consultant is telling you there is that you can't have 30-minute headways without double tracks for passing in specific locations, and where the passing tracks are needed, the right of way isn't wide enough to allow for the bike/pedestrian trail to co-exist with the double tracks.

In contrast, **unidirectional buses don't need to pass, so they can travel closer together than every 30 minutes.** They could run every 10 minutes in peak demand hours, then every 30 minutes in lesser demand times. Frequency is known to be the most important quality factor in a transit system. This variability would be easy for the buses but virtually impossible for the trains to achieve without

purchasing more right of way width in several locations. Changing the frequency would change the locations where the sidings are needed for trains, but not for unidirectional buses. Trains lock you in; buses give you flexibility. This system will be with us for many decades, and we can't accurately forecast our future ridership demands, so flexibility is good; rigidity is not good.

The shorter length of BRT buses versus trains is an advantage in our case

Another advantage of BRT buses over the light-rail trains on our particular corridor is their shorter length. Because the light-rail articulated units are longer than an articulated bus, trains require a longer section of straight track at the station and longer passing sidings, which the train study found to be a problem. The train modeled in the study is the Stadler GTW, which is 100 to 128 feet long. A single-articulated bus is 60 feet long. This shorter bus length allows more choices for passing lane locations, can fit in shorter sidings, and station platforms can be shorter too.

This BRT solution leaves room for other uses of the tracks and right-of-way west of Seabright Ave.

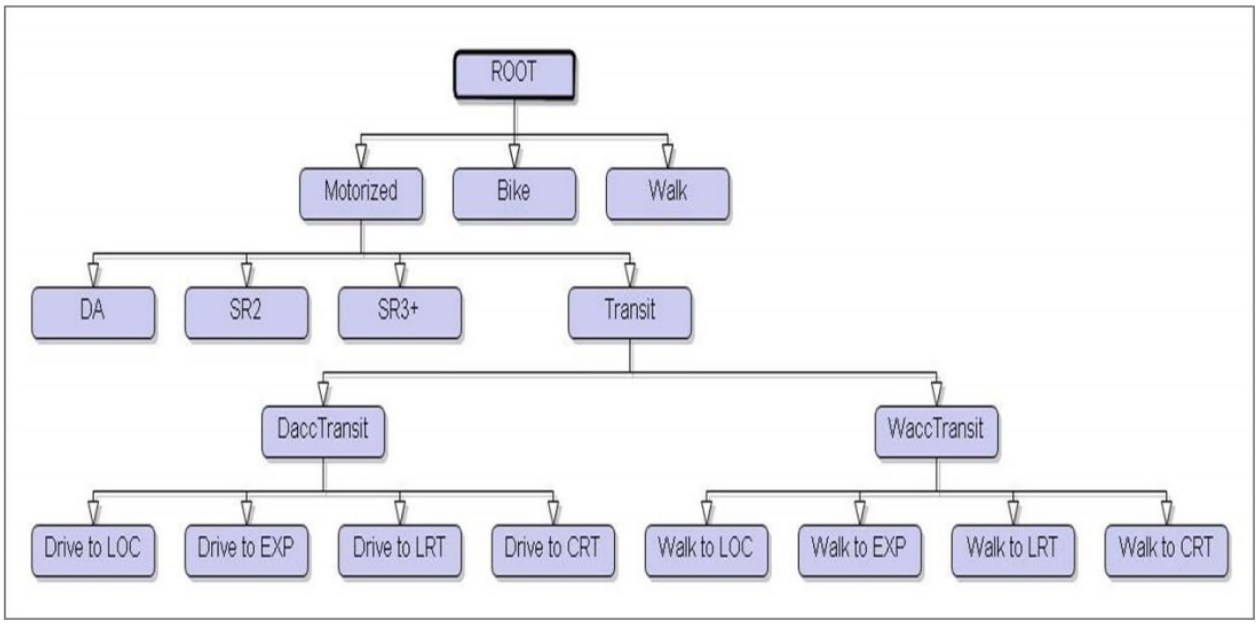
Notice that my suggested BRT route does not use the railroad bridge at the Boardwalk, does not interfere with the current use of the tracks and wye by the Big Trees Railroad for tourist excursions, does not involve conflicts with Beach Street traffic nor go through the roundabout at the Wharf, and would not require a stop on Beach Street (which the train study found to be problematic). The BRT buses would not use the railroad corridor west of Seabright Avenue all the way to Davenport, so that section could be used for a wider bicycle trail, such as for an ebike fast lane from west Santa Cruz to Seabright Avenue. The BRT buses would not use the rail corridor in the Natural-Bridges-to-Davenport segment, so the farmers there wouldn't have to worry as they now do about conflicts between farming practices and buses or trains passing through farmland. The railroad bridge over the San Lorenzo River could be paved for the bicycle/pedestrian trail without requiring a cantilevered addition as has been suggested to accommodate both a train and the trail on that bridge.

In the first 4 miles of the railroad from Pajaro, the train study says that freight is still being shipped on the rails. My proposed route would not go beyond the intersection of the right-of-way at West Beach Street and Walker Street, so trains can continue to use the rails from there to Pajaro and beyond. The short section where the tracks may still be used for freight from that intersection northward could be paved so the buses can straddle the train tracks, or the right of way may be wide enough to allow both to co-exist side-by-side. This would allow freight to continue as now. The scenic bikeway has an alternate route in the region which would avoid that section of track if necessary.

**I urge you to study and model this BRT scheme as I've described it for an economical but high-capacity/high-quality transit system that integrates into our existing Metro system.**

## Part V: Omissions

I have noticed some omissions from the UCIS models. Looking at the model description document on the UCIS project website, I found this mode-choice decision tree:




I don't see a choice for **bike-to-transit**, just walk-to-transit and drive-to-transit. It seems to me that some of the bike infrastructure projects proposed in your scenarios most likely will affect people's decisions on biking to the bus or train, but that metric is not available in the model. In our meeting on Tuesday, June 13, Ginger Dykaar said that bike-to-transit is difficult to include in the model but they have a stand-alone bicycle model. Somehow, bike-to-transit will be included in the modeling, she said.

Another metric that is missing is a **measure of parking demand**. The goals and performance measures listed in Attachment 3 of your agenda report don't mention anything about the need for parking spaces. Some projects will displace parking, forcing the cars to park elsewhere. Some projects may decrease the need for parking spaces. Some may have no effect or cause an absolute increase in parking demand. Increasing the price for parking also increases the cost to drive because you have to park at the end of the trip. That tends to decrease vehicle trips and give an incentive to use transit. Will the model consider **parking demand and parking pricing**? Will park-and-ride lots be needed or can the local bus network mitigate that demand? Where is this being measured in the performance metrics?

By putting a train or BRT bus in the transportation network, you will be causing more work for the Metro buses to service the BRT or train stops. People need to get to and from the transit mainline. A BRT may better meet that need than the train since the BRT buses go directly to each transit center where people transfer to or from local buses, whereas the train needs to provide for transfers to the local bus routes at train stops. On the other hand, the BRT or train may relieve the bus network of some portions of routes now served on neighborhood streets. The busway may also improve local bus service by allowing local buses to enter and leave the busway at road intersections as part of their local routes. (This is known as direct service on the BRT line, which a railroad cannot do.) **The model should include the impact on existing Metro bus service resulting from the new train or BRT stops.**

Generated traffic and induced traveled

The final report on the Phase I **model does not mention anything about induced travel**. Traffic congestion tends to maintain equilibrium. Traffic volumes increase to the point that congestion delays discourage additional peak-period trips. If road capacity increases, peak-period trips also increase until congestion again limits further traffic growth. The additional travel is called "generated traffic."

Generated traffic consists of diverted traffic (trips shifted in time, route, and destination), and induced vehicle travel (shifts from other modes, longer trips, and new vehicle trips). Research indicates that generated traffic often fills a significant portion of capacity added to congested urban road. This phenomenon is most likely why the billion-dollar widening of I-405 did not reduce congestion.

Generated traffic has three implications for transport planning. First, it reduces the congestion reduction benefits of road capacity expansion. Second, it increases many external costs. Third, it provides relatively small user benefits because it consists of vehicle travel that consumers are most willing to forgo when their costs increase. It is important to account for these factors in analysis. The study *Generated Traffic and Induced Travel: Implications for Transport Planning; 20 April 2017*[4] defines types of generated traffic, discusses generated traffic impacts, recommends ways to incorporate generated traffic into evaluation, and describes alternatives to roadway capacity expansion:

- To predict generated traffic, transportation models must **incorporate "feedback" which reflects the impacts congestion has on travel behavior, and long-term changes in transportation and land use patterns.**
- "Current models recognize diverted traffic but do not account for most forms of long term induced vehicle travel, and thus underestimate the amount of traffic likely to be generated when congested roads are expanded."
- "By exaggerating the economic benefits of road capacity increase and underestimating its negative effects, omission of induced traffic can result in over-allocation of public money on road construction and correspondingly less focus on other ways of dealing with congestion and environmental problems in urban areas."
- **Ignoring generated traffic tends to skew planning decisions toward highway projects and away from No-Build and mobility-management alternatives such as [congestion-based tolls], transit improvements, and commute-trip reduction programs** (Boarnet 1995).

**The scenario modeling should incorporate induced travel impacts.**

## Part VI: Modeling for Decision Making – Other Factors

The Flyvbjerg study says:

> "We speculate further that rail patronage will be overestimated and road traffic underestimated in instances where there is a **strong political or ideological desire** to see passengers shifted from road to rail, for instance for reasons of congestion or protection of the environment.

4 http://www.vtpi.org/gentraf.pdf

> Forecasts here become part of the political rhetoric aimed at showing voters that something is being done—or will be done—about the problems at hand. **In such cases it may be difficult for forecasters and planners to argue for more realistic forecasts, because politicians may use forecasts to show political intent, not the most likely outcome."**

Jonathan Richmond, Ph.D., studied the decision to build the Los Angeles-to-Long Beach Blue Line light-rail. He found that the line was built in spite of the independent forecasting and academic studies saying that the transit authority should enhance the local bus service, not build the light-rail. Why was that build decision made? A variety of factors, including political ambitions, the belief that trains are "sexy" and buses are for the working poor, prestige, and myths. He warns that mythical beliefs around rail lead to uncritical adoption of a particular technology rather than to a discussion of the social problems to be addressed (such as jobs and housing). **Forecasting of the project was shown to be done not to *make* decisions but rather to *justify* decisions that had already been made on other grounds**.[5]

## Conclusion

1. For 9 out of 10 rail projects, passenger forecasts are overestimated; the average overestimation is 106%. For half of all road projects, the difference between actual and forecasted traffic is more than ±20%. Take this into account when interpreting the output of the modeling.
2. Ask for the range of likely real world metrics and a confidence interval around the metric so you can have an estimate of the uncertainty in the results.
3. Keep the good projects and discard the poor ones (the "poison pills") in each scenario after preliminary evaluation, the reconstitute the scenarios. Avoid throwing the baby out with the bath water.
4. Include the BRT system I've described in Part IV above (one lane on the corridor, used to bypass freeway congestion, returning on the non-congested side of the freeway, circulate in the opposite direction when the commute reverses, passing lanes if bidirectional use is necessary, express buses to UCSC sites and to Scotts Valley bus center).
5. Correct the omissions I've explained in Part V above. (Bike-to-transit, parking demand impacts, impacts on the Metro bus system due to new transit stops on the mainline corridor, induced travel.)
6. Don't let political pressure from within or outside of the RTC color your objectivity. Don't be swayed by myths.

Thank you for consideration of these suggestions,

Stanley Sokolow

5 http://jonathanrichmond.com/publications/transportofdelightthesis.pdf