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Metropolitan Transportation Commission
Public Information Office
101 Eighth Street
Oakland, California 94607

Re: Comments on Transportation Related Analysis and Results of PLAN BAY AREA DRAFT ENVIRONMENTAL IMPACT REPORT—April 2013

Dear Sir/Madam:

This letter provides my comments on the transportation options and results presented in the Draft EIR referenced above. My comments are summarized starting on page 2. My qualifications, in brief, are provided below.

Dr. Panos Prevedouros, author of this submission, is professor of transportation engineering at the University of Hawaii at Manoa. Dr. Prevedouros earned his PhD in 1990 and his M.S. in 1987, both in Civil Engineering from Northwestern University, Evanston, IL (1987), and his Diploma in Engineering from Aristotle University, Greece (1986.) He is a registered Professional Engineer in the European Union.

Dr. Prevedouros is subcommittee chair of TRB in the area of traffic simulation (freeway operations) since 2006. Dr. Prevedouros was member of Oahu MPO Technical Advisory Committee in the late-1990s and is the principal investigator of several transportation research projects funded by Hawaii DOT, US DOT, OMPO and DOI.

Dr. Prevedouros has expertise in urban planning, traffic flow analysis and optimization, ITS, demand forecasting and evaluation of transportation alternatives, and sustainable infrastructure with emphasis on energy and impacts.

Dr. Prevedouros has published over 100 technical articles and reports, and co-authored the 2nd and 3rd editions of internationally adopted textbook Transportation Engineering and Planning (Prentice Hall, 1993 and 2001.)

Dr. Prevedouros has received several awards including Best Paper award on transportation noise, TRB, 1995 • Outstanding Faculty award, ASCE-Hawaii, 1996 • Van Wagoner award, ITE, 2005 • Freeway Operations Service award, TRB in 2009. • Honolulu Star Bulletin's one of the "10 People Who Made a Difference in Hawaii in 2008" • 2011 Sustainability Paper award, World Road Association • 2012 Honor Certificate for Public Service, Council of the City and County of Honolulu.

The Executive Summary of the Draft EIR states that "… the land use strategy is to enhance mobility and economic growth by linking housing/jobs with **transit**, thus offering a more efficient land use pattern around **transit** and a great return on existing and planned **transit** investments."

Based on this the reader should understand that this planning effort sought to establish a transit-based **"**environmentally superior" alternative instead of seeking the most cost-effective alternative or the alternative providing the fastest, most-economically productive set of systems that meet environmental limits. As a result, **Plan Bay Area** is the **10% Plan**.

The plan's disproportional reliance on transit has predictable consequences; it is expected to yield many significant and unavoidable impacts such as substantial increase on roadway facilities already operating at the worst level of service (LOS=F)[1] as in conclusion 2.1-3; loss of forest land to non-forest use, conversion of substantial amounts of important agricultural lands and open space to non-agricultural use as in conclusions 2.3-4 and 2.3-5; increase in the number of people residing within areas regularly inundated by sea level rise by mid-century, as in conclusion 2.5-6; noise levels from transit sources that exceed FTA exposure thresholds as in conclusion 2.6-3, etc.

In the following pages I highlight passages and exhibits in the Draft EIR that are cause for major concern. All text in "quotes" is excerpted from the EIR. **Bolded** words in the quotes are mine.

Table 1.2-1: The population and employment projections are likely overstated. Such demand balloons are common in pro-transit and pro-rail plans as various analyses by Oxford University professor Bent Flyvbjerg have discovered in the last two decades of his investigation of mega-project planning studies.[2] In addition Dr. Flyvbjerg's recent work has discovered the inertia of the US planning profession to acknowledge these biases and exaggerations. His data-supported criticisms are summarized in Appendix A.

In addition, the current enabling environment is much different than the past 30 years due to persistent low growth, large unemployment and huge city, state and national debts that will undoubtedly manifest themselves in increasingly heavier taxation. Indeed, Yogi Berra's "the future isn't what it used to be" must be the guiding principle for planners, executives and

[1] The quality of traffic flow on freeway, highways and other roadways is determined used the 2010 edition of the Highway Capacity Manual published by the Transportation Research Board (TRB). Based on scientific estimates of delay, density and other properties, the quality of traffic flow is ranked from A to F which, similar to school grades, depict excellent flow conditions at LOS=A and unacceptably poor flow conditions at LOS=F. For most US counties, the lowest acceptable LOS for permitting new development and similar purposes is D or E.

[2] Bent Flyvbjerg, Nils Bruzelius and Werner Rothengatter, Megaprojects and Risk: An Anatomy of Ambition, Cambridge University Press, 2003. ["Megaprojects" are infrastructure projects costing over one billion dollars.]

decision makers. However, this study does not even provide lip service to these important population and employment retardants.

Page 1.2-9: "The analysis for the most recent regional transportation plan, Transportation 2035, suggested that the region's transit system is not sustainable based on current projections of transit costs and reasonably anticipated revenues. **Transportation 2035 identified a region-wide transit capital deficit of $17 billion and operating budget deficits of $8 billion over the next 25 years**."

These are staggering deficits for a transportation mode used by 10% of commuters and less than that by non-commuters. Planners acknowledge that these deficits are not sustainable for the community. Yet Plan Bay Area calls for more deficit-making transit. Of all transportation expenditures in the plan, 62% is allocated to fund the mode that provides 10% or less of the transportation in the area.

Page 1.2-17: "The MTC travel demand model, Travel Model One, is a regional activity-based travel model for the San Francisco Bay Area. This model is actually a set of individual models that perform different functions, leading to projections of future Bay Area travel. The models were developed from a database that consists of the MTC 2000 Bay Area Household Travel Survey (BATS 2000) and traffic and transit counts that are used to validate the model results. The model was re-validated using available American Community Survey 2005 data to reflect updated demographics; **since 2010 Census data was not yet available at the beginning of this planning and modeling cycle**, the model was used to forecast transportation trends to the baseline year of 2010."

There have been several concerns with ACS and its limited sampling nature to such extent that Hawaii paid for this data but does not use it. Not using Census 2010 data is a major missed opportunity. Nowhere in this report is clearly stated whether actual, finalized U.S. Census 2010 population, employment and related data by tract or block were used in the projections and the models. It is my understanding that the analysts of the EIR developed projections to 2010. Then these projections were used as the basis to develop projections to 2040. One of the results of this projection-upon-projection methodology is that error propagation renders long term projections practically useless. It comes as no surprise that the EIR does not provide variances and confidence intervals for the forecast outputs.

Page 2.1-1: "Together, these roadway facilities accommodate nearly **17 million vehicle trips** a day." At a typical occupancy of about 1.2, this translates into 20.4 people trips. Page 2.1-5: "Transit in the Bay Area accommodates almost **1.6 million boardings** a day, primarily through

four major operators (Muni, BART, AC Transit, and VTA)." Putting these two together allow for some informative comparisons, as follows.

- 1.6 million boardings are about 1.23 million person trips assuming that one transit trip needs 1.3 transit boardings.[3]
- The **road-to-transit** ratio of person trips is 20.4 to 1.23 or approximately **17:1**. In other words for every **18** trips made in the 9-county Bay Area only 1 is by transit. Based on the plan's allocation, "1" or "transit" gets 62% of the funds, and "17" or "the roads" gets 38% of the funds and shoulders the burden of accommodating road-going transit such as bus, express bus, BRT and streetcars!
- This ratio, 17:1, is flattering to transit because the length of transit trips is shorter than the length of road trips. On a passenger-mile basis this ratio is over 20:1.
- The roads also carry all the freight, services and emergency response. Therefore this proposed allocation causes roadway overburdening which delays people, goods, services and emergency response.
- In general the report is ignorant of freight flows, emergency response and other non-commuter uses of roadways.

Page 2.1-10, Table 2.1-3: The table calculates delays thanks to well established highway flow models that keep highway performance accountable. Nothing similar is attempted for transit. A trip that is 40 minutes long by transit is delay-free. A similar trip by car is 20 minutes long (including all congestion delays) and it is recorded as delayed by 4.6 minutes. (Approximate travel times quoted from Table 2.1-14.) Apparently transit travels on ether and its users experience no delays. The table is oblivious to the fact that people not vehicles suffer the delays.

Page 2.1-15, Table 2.1-6: The manifested travel behavior is that between 1970 and 2010 the transit share has been stuck at 10% despite the dozens of billions of dollars invested in Bay Area transit. This suggests that many more billions will be needed just to maintain the 10% share in commuting trips, and that there is no basis for expecting any growth.

Page 2.1-21: "Senate Bill 375 (SB 375) requires MPOs to prepare a Sustainable Communities Strategy (SCS) that demonstrates how the region will meet its greenhouse gas (GHG) reduction targets through integrated land use, housing and transportation planning." Unlike Plan Bay

[3] Unlinked Passenger Trips is the number of times passengers board public transportation vehicles. Passengers are counted each time they board vehicles no matter how many vehicles they use to travel from their origin to their destination and regardless of whether they pay a fare, use a pass or transfer, ride for free, or pay in some other way. Also called boardings. [http://www.apta.com/resources/statistics/Pages/glossary.aspx]

Area, SB 375 does not have a pro-transit bias. The specific pollution reductions can be achieved with technological improvements[4] rather than mode shifts[5].

Page 2.1-21: "Each of the nine Bay Area counties has a Congestion Management Agency (CMA) designated to manage traffic congestion through implementation of multimodal transportation projects." While this sounds reasonable, the intent of Plan Bay Area is to offer longer, less convenient trips by investing heavily in transit. How does heavy investment in transit mitigate congestion given a track record of failure to deliver?

Page 2.1-22: "This EIR does not explicitly identify localized traffic issues that might be the focus of a city's general plan; rather, it will deal with issues of overall system performance from a regional perspective." Given the size of the 9-county area one may safely assume that there were several dozen intersections operating at or near LOS=F in 2010. The plan adds significantly to the number of LOS=F intersections, but this impact is largely absent in the EIR. The type of modeling involved may not control for overly congested intersections. For example, by 2020 a critical intersection in the area becomes overly congested, i.e., its average delay is about two minutes per vehicle. However, the models may continue to route traffic and transit through this intersection to 2040, although real world motorists will likely be avoiding the route.

Page 2.1-23: The plan includes a criterion that makes transit look busy and in need for more funding: For roads it uses a criterion that demand is well over 100% of the capacity, but the transit criterion is that demand is barely over 80% of capacity. This is contrary to the typical operation of large metro systems which are designed for and allowed to operate at the so called "crash load." This allows for the loading of trains with very little personal space for each rider and is necessary because of the disproportionally high loads of passengers in the peak hours compared to the rest of the day. Defining transit capacity at 80% is quite odd. By doing so, this criterion provides estimates of "very busy transit conditions" when the actual conditions are roughly half of the crash load conditions.

Page 2.1-25 and Table 2.1-11: "This investment strategy reflects the relatively mature state of the Bay Area's roadway and transit systems. The proposed Plan also includes a set of major transit capital improvements, including BART to San José, Caltrain electrification, and bus rapid transit lines in the region's urban core. These transit investments were identified as a result of a rigorous performance assessment process and align closely with the proposed land use pattern

[4] Many technological changes were observed since the turn of the century such as the demise of guzzling SUVs, common rail and direct fuel injection for gasoline engines, hybrids and plug-in hybrids, EVs, diesel hypermilers, etc. The very recent headline that *Consumer Reports* believes that the EV Tesla S may be the best vehicle they ever tested may have significant impacts in the future popularity of vehicles of this type.

[5] MTC's regional statistics indicate that unlinked passenger trips changed from 504,442,000 in 2000 to 484,202,000 in 2010, a decline of 4%.

emphasizing focused growth in the region's locally-identified Priority Development Areas. Finally, the proposed Plan includes a limited amount of funding for targeted roadway capacity increases, including bottleneck relief at congested interchanges and the development of a Regional Express Lane Network."

Clearly this is a biased pro-transit plan to expend billions on the mode of transportation used by 10% of the commuters. On page 4, I provided estimations that in terms of trips the road-to-transit ratio is 17 to 1. The proposed investment strategy improves "17" by 3% and "1" by 27%. In other words, the Plan provides generous funding to Transit (that serves 1 out of 18 trips) and a disproportionally low funding allocation to Road (that serves 17 out of 18 trips.) As a result: "Overall, total vehicle hours of delay are forecasted to increase through year 2040 under the proposed Plan. Arterials and expressways will experience a larger increase in recurrent vehicle hours of delay relative to freeways (79 percent increase compared to a 48 percent increase). Non-recurrent delay on freeways will increase by 36 percent over existing conditions assuming implementation of the proposed Plan." (Page 2.1-27)

The plan's data in Table 2.1-16 allow me to estimate that congestion on the area's roadways will worsen by 20%. I based this by looking at all trips in a day conducted under LOS=D,E,F which may be expressed as road conditions ranging from "very busy to very congested." Roads do most of the transportation work in the Bay Area but receive only 38% of the funding, so they will operate poorly, and worsen over time.

Page 2.1-28, Table 2.1-12 is a quantified manifestation of the plan's both pro-transit bias and wishful expectations:

- For 2010 the vehicle trips are 16.9 million and the transit boardings are 1.6 million. When converted to person trips they have a ratio of 17:1.
- For 2040 the vehicle trips are 20.7 million and the transit boardings are 3.05 million. When converted to person trips they have a ratio of 11:1.
- Table 2.1-6 indicates that transit trips to work increased from 294,000 in 1990 to 333,000 in 2010, a 13.3% gain over 20 years or **less than 7% per decade**. This is a historical fact. This also agrees with the trend for transit usage in the LA metropolitan area. Based on 2011 to 2013 statistics, LA's projected growth of transit usage over a decade is 8.8%.[6]
- Table 2.1-12 indicates that transit boardings will increase by 93% in the 30 years from 2010 to 2040, or **31% per decade**. This is clearly a pro-transit exaggeration.
- This expectation for transit substitution is behaviorally and historically unsupportable.
- The fantasy of transit ridership continues in Table 2.1-18. Heavy rail utilization: 40% in 2010, 57% in 2040. Light rail utilization: 35% in 2010, also 57% in 2040.

[6] http://www.metro.net/news/ridership-statistics/

- Are these science-based estimations or faith-based guesses? Is there any evidence that any large metro area in the US had any appreciable increase in transit mode share? Is there any evidence that any large metro area in the US had a decadal increase in transit mode ridership of over 10% in the last 20 years, let alone 31%?

The result of the transit bias of the Plan is predictable, as follows.

Page 2.1-29: "Of the five significance criteria considered, **significant impacts are only forecast for one criterion: per capita vehicle miles traveled in extremely congested conditions**. The four other criteria—commute travel times, non-commute travel times, per capita vehicle miles traveled, and transit utilization—all have impacts that are forecasted to be less than significant." Clearly the plan fails to add transportation capacity to the roadway system where it is needed the most.

Despite the plan's best intentions for transit and providing it with a 62% share of the transportation funds, transit fails to deliver competitive travel times, as follows.

Page 2.1-31, Table 2.1-14: **Drive alone** time per trip changes from 18.7 minutes in 2010 to 18.0 minutes in 2040. **Carpool** time per trip changes from 14.2 minutes in 2010 to 13.7 minutes in 2040. Both largely due to the HOT lanes. **Bike and walk** trips remain largely the same at 13 and 19 minutes, respectively. However, **transit** travel time remains stagnant at an uncompetitive 44 minutes. Despite being disproportionally over-funded, **transit delivers double the travel time** of any other mode, or worse during commute times when roadways are congested. Table 2.1-15 displays the non-commute travel times. According to those, **transit delivers triple the travel time of any mode other than walking**.

Page 2.1-31: "Cleaner fuels and improved emission controls have substantially reduced emissions from mobile sources in recent decades. However, growth in motor vehicle use (as measured in VMT on both a per capita and an absolute basis) has offset some of the benefit of the improved emission controls."

The authors have ignored the fact that national VMT has been flat since 2005 and gasoline consumption was down 8% in 2012 from the high of 2005 as shown clearly in this EIA trend.[7] EPA's 2012 report Light-Duty Automotive Technology, Carbon Dioxide Emissions, and Fuel Economy Trends: 1975 Through 2012[8] states "Highlight #1: CO_2 emission rates and fuel economy values reflect a very favorable multi-year trend, beginning with MY 2005." And "Using a 5-year timeframe (2006 and 2007 are good base years since there was little market volatility), CO_2 emission rates have decreased by 10% and fuel economy values have increased by 11% from MY 2006-2011. Based on preliminary estimates, CO_2 emission rates have decreased by

[7] http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=C100000001&f=M
[8] http://www.epa.gov/otaq/fetrends.htm

13% and fuel economy values have increased by 16% from MY 2007-2012. The improvements have been even greater since the 'inflection point' year in 2004."

There is little reason to believe that this trend is not applicable in California which is well known for its high fuel pricing, heavy taxation and debt, all of which weigh heavily on VMT growth. Therefore one may argue that strict future targets for emissions will be easily attained in 2040 with technological innovation and fleet renewal alone. All of section 2.5 on air quality reads like much ado about very little indeed.

Section 2.6 on noise leaves a lot to be desired. It has a somewhat detailed but flawed analysis of highway noise and no analysis whatsoever of Fixed Guideway transit. The EIR gives FG transit a pass card because most of it is "electrified." This is contrary to local evidence as this quote from the Sept. 8, 2010 San Francisco Chronicle article suggests: "The Chronicle surveyed the BART system, sending a reporter on all 208 miles of rails - 104 in each direction - accompanied by a handheld sound-level meter. The survey found that noise levels can reach 100 decibels - the equivalent of a jackhammer - at points in the Transbay Tube. But the tube is not the only noisy part of the system, as many riders can attest. Trains produced noise levels of 90 decibels - as loud as a diesel truck - or higher at 23 locations."[9]

Page 2.6-13 and 14: "Figure 2.6-6 is a graphical representation of the FTA noise impact criteria. Please note that Categories 1 and 3 apply the L_{eq} for the noisiest hour of transit-related activity during hours of noise sensitivity. Category 2 applies the L_{dn} since these receivers may be impacted by nighttime (10 p.m.-7 a.m.) transit related events." The text and the actual figure are not in agreement regarding the metrics used for categories 1, 2 and 3.

Page 2.6-20: "Where such barriers exist, a **6 dB noise level reduction** can be assumed at receivers along those roadway segments." If the TNM software was actually used to model roadway segments, why weren't existing barriers with the correct height inserted to receive the correct noise level estimates? As the author of the State of Hawaii's current FHWA-compliant Highway Noise Policy I can attest to the fact that a 10 ft. concrete noise barrier at an expressway cross-section that produces 77 dB(A) without the barrier will reduce the noise level to about 66 dB(A); a 12 ft. barrier will reduce the noise level to 64 dB(A). The 6 dB(A) noise reduction assumed in the EIR is low and produces results that overstate the noise impact of expressways with noise barriers.

Section 3.1 is the Alternatives Analysis. It is quite clear that (1) the Plan was favored with special treatment, (2) Alt. 4 is superior to the Plan, in my view, (3) alternatives 3, 4 and 5 are penalized with a $8 toll on the Bay Bridge but the Plan is not, and (4) given the large uncertainly of model forecasts even for a 10 year horizon, let alone a 30 year horizon, largely no outcome

[9] http://www.sfgate.com/bayarea/article/Noise-on-BART-How-bad-is-it-and-is-it-harmful-3175757.php

of any of the examined alternatives is significantly superior or inferior to the Plan. **Also, none of the alternatives address mobility challenges and traffic congestion head-on.**

For example statements like "… Alternative 3 would have approximately **0.2 to 0.3 percent fewer vehicles in use**, VMT and engine starts compared to the proposed Plan" are scientifically absurd because in 2040 the variance of these estimates for each of these alternatives is at least one order of magnitude larger than the differences stated in the quoted text.

I assumed that business people who favor Alt. 4 know more about jobs and employment than planners, so I focused on Alt. 4 to develop some comparisons with the EIR's preferred Alt.

I observed that Alt. 4 was marginally inferior only on outputs that come with large forecasting uncertainties such as congestion, emissions and noise. When it comes to more controllable factors such as future land allocations, many of which were made at the present time, Alt. 4 does better than the chosen alternative, as summarized in Appendix B.

Furthermore, the list of limitations of UrbanSim as applied to the Plan includes this: "Boundary effects are ignored. Interactions with adjacent metropolitan areas are ignored." It is unclear how this limitation affects Alt. 4 which has interactions with the counties surrounding the 9-county area of the Plan.

The Plan provides a detailed breakdown of utilization of Transit (10% share) by Technology in 2040, Table 3.1-13; local bus, express bus, heavy rail, light rail, commuter rail, etc. However, the much needed table of highway transportation (over 70% share) for 2040 technology is absent. The missing table would include motorcycles, electric mopeds, light duty diesel vehicles, hybrids, EVs, plug-in hybrids, hypermilers (over 100 mpg vehicles), Euro 6[10] or lower truck emissions, etc. Projections of these technologies in the fleet are also critical for emissions and noise estimates. The 2040 plan is deficient in the important realm of highway vehicle technology and largely ignores the substantial changes that are likely by 2040.

On page 3.1-62 the EIR points the finger at the EMFAC emissions estimation model and says that it does not account for 2017-2025 manufacturer efficiency standards dictated by the EPA. The EIR needs to be updated and include technology forecasts for 2040 and emission estimates with EPA's MOVES emissions estimation program. This modeling limitation generates an additional penalty for Alt. 4 because it has a higher population and employment thus higher cumulative VMT.

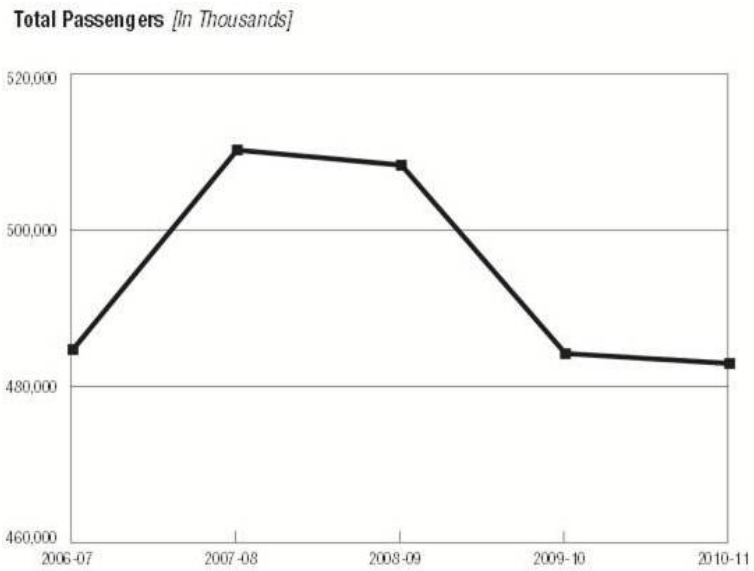
[10] http://www.mantruckandbus.com/com/en/products___solutions/current_topics/euro_6/EURO_6.html

Overall, it is worth repeating that this EIR appears to be ignorant of momentous negative (-) and some positive (+) underlying trends such as:

(-) persistent high unemployment
(-) lower birth rate
(-) increasingly expensive food and energy
(-) higher state and federal taxes, and poised to grow more to cover debts and liabilities
(-) higher health care cost, and poised to grow due to baby boomers and Obamacare
(-) forced spending in infrastructure which is now too far from a state of good repair
(+) low cost of capital
(+) growing share of work-at-home and car-sharing schemes

Most of the trends listed above were absent in 1990 and 2000. So, this time around, truly "the future isn't what it used to be" (Yogi Berra.)

The transit ridership predictions of the Plan are in conflict with recent system performance as indicated in the figure below; the figure was extracted from the most recent report of the MTC.[11] Downturns in economy combined with high fuel prices are allegedly incentives for switching to transit. Clearly this was not the case in the Bay Area during the 2008-2009 recession. Annual transit trips are at a 500 million plateau.



MTC Statistical Summary of Bay Area Transit Operators 7

[11] http://www.mtc.ca.gov/library/statsum/StatSumm_2011.pdf

This plan ignores that transit is not cost effective and provides only marginal relief to traffic congestion and pollution because of the small portion of the population that chooses it. The plan allocates over 60% of future transportation resources to transit to boost its capacity by 27% whereas roads used by over 80% of the commuters, including bus riders, are granted only a 3% capacity improvement. This plan assumes that past trends will continue into the future and its budget is boundless in terms of subsidies for TODs and other preferential development.

Both of these are fatal errors that ably represent both the disconnect of planning from reality and the mission of transit and planning agencies as government arms for effecting political priorities that have little intention to materially improve the quality of life of the citizens that they represent. None of the alternatives examined address mobility challenges and traffic congestion head-on, therefore none are acceptable.

Sincerely,

Panos D. Prevedouros, PhD
Professor of Civil Engineering

APPENDIX A

In his most recent assessment, renowned professor Bent Flyvbjerg of Oxford University places direct suspicion on the American Planning Association. Here are five passages from his assessment.[12]

- **When Planners Lie with Numbers**: Based on a sample of 258 transportation infrastructure projects worth US$90 billion and representing different project types, geographical regions, and historical periods, it is found with overwhelming statistical significance that the cost estimates used to decide whether such projects should be built are highly and systematically misleading.
- Dr. Flyvbjerg's study documents a **cost overrun of 45% for rail projects**, 34% for bridges and tunnels, and 20% for roads.
- The implications of these findings are that (1) **planners are doing an exceptionally poor job** at costing major public works projects, sometimes perhaps intentionally, (2) this results in large scale waste of public money and violations of basic principles of democracy, and, (3) APA, as the main professional body for planners, has a responsibility to help rectify this situation.
- **Several planners have written to support Dr. Flyvbjerg**: "After having been involved with APA for several decades he cannot recall a single example of a planner being expelled from APA for ethical violations" was said to Dr. Flyvbjerg by a former APA president. This is not because planners are uniformly well-behaved, but because APA is in denial about the possibility of bad planning and malpractice.
- The APA is found to employ two well-known strategies for dealing with uncomfortable knowledge such as the revelations by Dr. Flyvbjerg: Denial and Diversion.

To recap: When it comes to very large infrastructure projects, rail projects in particular, planners tend to lie or use subpar methodology to estimate project costs and forecasts. They are not accountable to anyone for their errors, and the public is hurt by having to support poor projects. In some cases, planners help the client to deny opposition and divert the public's attention from the facts and primary objectives.

[12] Bent Flyvbjerg, **How planners deal with uncomfortable knowledge: The dubious ethics of the American Planning Association**, Cities, Elsevier (in print.) Available online 8 February 2013.

APPENDIX B

Compared to the Plan Alt. 4 has the following advantages:

- Farmland conversions: 5,913 acres for the Plan, 5,338 acres for Alt. 4; a **>10% advantage** for Alt. 4.
- Acres of Williamson Act conversions: 724 acres for the Plan, 678 acres for Alt. 4; a **6% advantage** for Alt. 4.
- Acres of Open Space conversions: 2,395 acres for the Plan, 1,443 acres for Alt. 4; a **40% advantage** for Alt. 4.
- Acres of Forest and Timberland conversions: 1,395 acres for the Plan, 270 acres for Alt. 4; an **80% advantage** for Alt. 4.
- Residents located in PDAs and TPPs that are subject to sea-level rise inundation: 75,070 for the Plan, 47,400 for Alt. 4; a **17% advantage** for Alt. 4.
- Same as above for the entire 9-county area: **4% advantage** for Alt. 4 as stated in Table 3.1-34.
- Also **22% advantage** for Alt. 4 with respect to jobs in inundation areas as stated in Table 3.1-40.
- Residents in low lying areas in the entire 9-county area that are subject to higher probability for flooding or inundation: **43% advantage** for Alt. 4 as stated in Table 3.1-37.
- Also **32% advantage** for Alt. 4 with respect to jobs in low lying areas as stated in Table 3.1-43.
- Table 3.1-27 on Total Energy Use per Capita by Bay Area Alternative: Plan = 241,254, Alt. 4 =233,390; a **3% advantage** for Alt. 4.

In addition, Alt. 4 and the Plan compare as follows:

- Per capita[13] VMT is equal to 19.6 miles in 2040 for both Plan and Alt. 4.
- Per trip commute travel time is imperceptibly longer than the Plan and in Table 3.1-9 it is 0% worse than the Plan.
- Per trip non-commute travel time is imperceptibly longer than the Plan and in Table 3.1-10 it is only 1% worse than the Plan.
- Roadway with noise level over 66 dBA is 62.3% for Plan and 64.3% per Alt. 4, which is within the 3 dBA range of imperceptibility.[14] (Again Alt. 4 has +4% population and +1% jobs compared to the Plan.)

[13] Per capita comparisons must be used because Alt. 4 has a higher population and employment than all other alternatives.

[14] dBA is a somewhat cumbersome logarithmic scale. The EIR correctly states in its noise introduction that regardless of the source, noise differences less than 3 dBA are not perceivable by people.