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REVIEW OF THE MEMORANDUM "TRAVEL FORECASTS FOR THE ARBORWAY STREETCAR RESTORATION ANALYSIS" by Scott Peterson

By way of introduction, I am UPS Foundation Professor of Transportation Systems Engineering and City and Regional Planning at the University of Pennsylvania. I have been professor for 38 years, published 115 papers and over 30 technical reports, mostly on transit systems and urban transportation planning. My book "Urban Public Transportation Systems and Technology" was evaluated as the most comprehensive publication on that topic. A few days ago John Wiley published my latest book, "Urban Transit Operations, Planning and Economics," which covers most aspects concerning the planning, design and operation of bus and light rail systems, which are subject of the quoted Memorandum.

I have been consultant to many transit agencies in North America and overseas, including New York City Transit, Washington Metro, San Francisco BART, Naples - Italy, Toronto, Edmonton - Canada and many others. Many of my former students are now owners of consulting firms, general managers of transit agencies and other high-level transit experts. Several have worked for MBTA and other agencies in Boston.

In 2001 I volunteered, in cooperation with interested citizens' groups, to review the documents produced by MBTA to prove that restoration of the Green Line Light Rail Transit was "infeasible." I found MBTA's documents to be inaccurate, of unsatisfactory professional quality and highly distorted against the rail line. I submitted written comments which were taken into account when DEP issued on November 6, 2001 its final order that Green Line LRT service must be restored.

I have now obtained the report written by Mr. Scott Peterson of CTPS and I am asking representatives of the Arborway Committee to submit this statement at the hearing on this topic on the 16th of February 2005.

This is a summarized review of the CTPS Memorandum.

Memorandum Objective, Contents and Conclusions

Following the decision of DEP that the LRT service should be restored on the section from Heath Street to Forest Hills, the Arborway Rail restoration Project Advisory Committee (ARRPAC) was founded and Mr. William Lieberman, a very reputable LRT expert from San Diego, was hired as a consultant. MBTA General Manager, Mr. Mulhern, stated clearly that MBTA is committed to the restoration of LRT service on Arborway to Forest Hills.

It is not at all clear why the support to the work of ARRPAC was withdrawn and a major technical effort and investment were placed into this comprehensive study by Mr. Peterson. Review of the contents and quality of work in that study makes this development even more questionable.

In its first sentence, CTPS Memorandum states that its "principal objective is to conduct a travel demand analysis and produce ridership forecasts" for the LRT restoration. However, the memorandum goes far beyond this objective: it proceeds to analyze not only demand, but also air pollution impacts, costs, user benefits and feasibility of the project. Thus, the project objective is misstated. The quality of technical work is not professionally correct, and throughout the report an extreme bias against LRT and for the bus alternatives is consistently carried.

Methodology and Quality of Work

Already in the introductory paragraph the Memorandum uses one of the anti-rail propaganda tricks: divide the number of rail passengers by 2, converting the number of trips into "people" to decrease the number. The number of bus passengers or cars on streets is never divided by 2.

Similar biases against LRT are found throughout the Memorandum. In Table 22 vehicle lives are given 25 years for rail, 12 for buses. Realistic figures for corresponding policies of vehicle replacement are at least 2.5 longer for rail than for bus: 30 and 12, or 40 and 15 (FTA numbers in this respect are also incorrect).

Travel times for LRT are grossly exaggerated. One obvious distortion are the assumed boarding and alighting times. Very detailed surveys of boarding/alighting times on the Regional Rail system in Philadelphia performed by my team, then by SYSTRA consultants and reviewed by technical committee have resulted in the following values for time per passenger in seconds:

Boarding with 3 high steps	1.17 s;	Boarding at level, no steps	0.81 s
Alighting with 3 high steps	1.04 s;	Alighting at level, no steps	0.69 s

The CTPS study uses 4.6 s per passenger with fare collection, 3.2 s without fare collection. This is about four times greater than realistic values. Naturally, these values grossly inflate station dwell times and reduce the assumed travel speed, negatively affecting attraction of passengers in the modal split model.

It should be pointed out that the present operation of E line, with fare collection through one door on articulated cars with 6 door channels is most inefficient operation among all LRT systems in North America. Assuming that this practice will not be improved in the future is totally unrealistic.

Travel time on the Heath-Forest Hills section of E line, assumed by CTPS to be 14.4 minutes, is clearly unrealistically long (resulting in travel speed of about 8 mph),

particularly considering the forthcoming introduction of low-floor vehicles and simultaneous boarding/alighting via 12 door-channels on a two-car train when contemporary fare collection is introduced.

The LRT line is also "loaded" by many millions of dollars for "purchase of new cars" while, apparently, bus alternative does not have corresponding assumption and charge. First, it is questionable whether MBTA would need additional cars for this extension (the assumed reserve of 20 % of cars is in excess of industry standards for LRT). Second, even if the cars were needed, a realistic estimate would be additional travel time of 10 min/direction or a total of 20 minutes. Even with 5 min. headways and 2-car trains that would require 8 cars, rather than 16, or $18.5 million less than computed by CTPS. For 10-min. headways only 4 cars would be needed with a cost for rolling stock of only $9.25 million. The consistent bias against rail is again obvious.

The arguments that buses would not have to be bought for this service represents a complete distortion of the economic comparison of these two modes. No economic analysis of alternative systems can include vehicles for one mode and not include them for the second mode.

The unrealistic and biased assumptions for this project are also obvious from the cost obtained for the LRT restoration alternative. An existing but non-functioning 5.8 miles long streetcar line has been restored involving a cost of $58.5M. That amounts to $7.1 M per mile. The CTPS report estimates that the restoration of line E to forest Hills would cost about $42.7 M – about six times higher cost!

Inappropriate Use of Regional Models

CTPS has obviously made a great effort in the analysis of transit travel demand and air pollution aspects to, supposedly, make a comprehensive evaluation of rail and bus alternatives along Arborway section of LRT network, which is only about 2.2 miles long. The text describing the models looks like a manual for urban travel forecasting models. Is this methodology correct?

Those of us working with models for demand estimation and transit mode comparison are familiar with usefulness of such models for long range planning, as well as with their limitations for detailed studies of individual sections of transit network. We are also familiar with inappropriate uses of such models: they provide appearance of comprehensive computer-based models which impresses laymen but produces results which are usually unreliable and often highly incorrect. Stating briefly, the use of comprehensive regional models for detailed analysis of local travel patterns is inappropriate for the following reasons:

- Regional models use average values of factors for the region which may not be valid in individual localities. The models are not sensitive to local conditions in individual areas.

To put it clearly for non-transportation professionals, let us describe a similar methodology applied to a different problem. Suppose that somebody wants to model trends of prices in a local supermarket. He would certainly not use the trend of GNP growth, nor would he use the values of Dow-Jones industrials for this purpose. Yet, the demand forecasting through a model covering Eastern Massachusetts represents such a case of "misleading overkill."

- Large models are easily conducive to "adjustments of factors" to achieve any politically desired results. The CTPS Memorandum shows that very clearly. Distortion of travel time values, costs, failure to consider the "rail factor" – greater passenger attraction by rail than by bus mode – has been obviously used in this case to bias the findings against the LRT.

Air Pollution Model

In my comments on similar air pollution analysis for Arborway corridor in 2001, I pointed out the absurdity of using a regional model which includes trucks on I-93 and ferryboats in Boston Harbor to examine the differences in air pollution between LRT and buses on this avenue. The fact is that the electrically-powered LRT vehicles produce no air pollution in the city, while buses emit exhaust gasses in areas of highest concentrations of pedestrians. The difference between the impacts of the two modes on breathing of people is enormous.

To further hide and downplay this major difference, CTPS Memorandum uses a classic technique known as one of the techniques defined in the book "How to Lie with Statistics:" Any difference between two scenarios can be decreased to negligible percent values if the denominator is increased. For example, if 3 children in a high-school class of 30 get a contagious disease, that is a serious problem affecting 10% of students. However, if that case is analyzed on the basis of all high-school children in Eastern Massachusetts, this event involves three children out of a total of 300,000 children, or it affects only 0.001% of high-school children, appearing as an insignificant event. The CTPS used this technique to produce its statement that bus alternative would change pollution by only 0.004% (for Eastern Massachusetts!). This is another obvious deceptive pseudo-scientific technique to pursue the anti-rail bias.

In conclusion, the CTPS Memorandum is a highly distorted study obviously developed to deceive the public. It is professionally indefensible.

If my remarks expressed here are disputed, I would be glad to have an open debate of these issues on professional basis, chaired by a neutral person.

Why Is the Nation's Largest LRT System a "Stepchild"?

These developments lead me to some remarks about MBTA's intermodal policies.

I was one of the leading professionals bringing LRT transit mode to North America in mid-1970s. My 1993 report to FTA, "Bus Transit System – Its Underutilized Potential" played a significant role in the development of the BRT as a transit mode. I have followed the development of both modes very closely. It is therefore inescapable to mention here the paradox and counterproductive policies of MBTA in this respect.

About 20 cities in this country have invested and upgraded old and built new LRT systems. San Diego, St. Louis, Sacramento Portland, Dallas, Denver and many other cities have invested billions of dollars in LRT and their mayors give speeches about economic, social and environmental improvements which LRT systems brought to their cities. On the other hand, Boston's LRT – the Green Line – the oldest, best conceived LRT with the greatest daily number of passengers on the continent has been allowed to shrink and decrease its service area. Truncating the Line E would be another step in that direction, obviously going against the interests of the public.

The line to Lechmere is another example of this policy. It is an obvious candidate for extension to improve services, decrease transfers, increase ridership and make train operations of trains more efficient: it would decrease the present imbalance between the four long lines to the west and a short stub line to Lechmere on the north. That project is also being "postponed" by MBTA.

It is time for MBTA to revise its policies toward LRT mode and follow the trend of utilizing modern version of this mode in the interest of its present and potential customers.

I appreciate this opportunity to present these comments on the important project of restoring and upgrading the Arborway transit line to a modern LRT system.

Respectfully submitted,

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