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Memorandum

To: Todd Hoffman, Town Manager – Town of Chevy Chase, Maryland

From: Harris Schechtman, Principal+National Transit Director

Date: September 11, 2014

Re: MTA Purple Line Follow-Up Issues and Questions

The Town of Chevy Chase -- in response to a request of MTA for additional information to allow it to validate ridership forecasts for the Purple Line -- received three reports and two DVDs with a cover letter dated July 30, 2014 from Henry Kay, Executive Director for Transit. The Town subsequently requested Sam Schwartz Engineering (SSE) to review these materials, focusing on five specific areas that it presented in question form. Specific responses are provided below.

1) What are you able to use from the information on the disks?

None of the information on the disks was readable without proprietary software.

2) What would be the time and cost to evaluate the ridership models?

SSE does not have or have access to the proprietary modeling software, nor the in-house staff capability for such modeling, even if it were purchased. Involving an additional outside firm in a complete re-evaluation of the ridership model would not be feasible in the current time frame and would be exceedingly expensive. Unless one has familiarity with the WMCOG 8.0 model and the amended model used for the FEIS, there would be a significant learning curve. Then, the current model would have to be compared against the original to determine what changes were made. Then questions would first have to be formulated on the *reasons* for and assumptions behind such changes. That would likely yield more, or more detailed questions than SSE has raised, but at a large cost in time and money.

3) Are assumptions discussed in the technical reports that were submitted?

Assumptions are discussed in various places in the provided reports, sometimes generally and sometimes specifically. The bigger question in assessing the validity of ridership projections is whether the applied assumptions are objective or reasonable, because once input to the model, they have both direct and ripple effects. For instance, while running times are provided in great detail, their derivation is somewhat of a black box. SSE has raised questions, such as those below, that are meant to determine the reasonableness of employed assumptions, if answers to them are provided and can be verified. The example below of the modelers not being able to get the modal split by income of passengers to come out right until they created and applied a fare discount that "worked" is an example of a clearly stated assumption that really is about making the foot fit the shoe when an actual answer is elusive. Adopting for the model an across-the-board time factor of two minutes for all LRT/Metro transfers, and then applying it to transfers between the Purple and Red Lines at Bethesda – where actual walking

distances, required escalators and elevators, and average wait time do not reflect the assumption used for the model – is a case of a stated assumption that is inaccurate by at least a factor of three being applied to a location where the inaccurate assumption can have an impact on ridership projections (the market for Riders to use Purple Line to access Walter Reed/NIH). Many assumptions are stated in the provided reports; finding out whether they are correct when applied to the Purple Line is the challenge.

4) **What were you able to ascertain from a cursory comparison of the travel forecasting reports?**

SSE found basis to question two elements in particular: ridership projections and LRT running times. But before detailing these, some important considerations on comparability:

Direct comparisons between the FEIS and all previous reports are not fully possible. All prior reports evaluated six alternatives, among them Medium Investment LRT (MILRT) and High Investment LRT (HILRT). The Preferred Alternative, selected in 2009, was neither of these. It was described as MILRT with some features of HILRT added. Once that decision was made, the 2013 FEIS was only required to evaluate the selected Preferred Alternative and the No Build scenario, not any of the previously considered alternatives. Since the Preferred Alternative does not match any of the original six alternatives, exact comparisons are not possible. However, based on the description of the Preferred Alternative, its characteristics should be closer to MILRT (and its associated statistics) than HILRT. Here, comparison raises questions.

In 2008, MILRT was projected to generate 62,600 daily rides, vs. 68,100 for HILRT. One year later, the announcement of the hybrid Preferred Alternative predicted 64,800. For the New Starts funding application one year after that, the estimate rose to 69,300 (this was explained by use of a newer version [8.0] MWCOG model, whose key impact was inclusion of BRAC impacts at Jones Bridge Road, addition of another model, MDAAII, and a ten-year extension of the horizon year to 2040). Application of newer models cannot be faulted; had MTA failed to do so, they would have been open to criticism for using outdated models. On the other hand, addition of ten years worth of population growth is not specific to Purple Line; it is a rising tide that would lift all boats, including each of the five rejected alternatives. And it is of note that in 2007, when data on the increased employment and visitors due to BRAC was available to be applied to all six alternatives, MTA, allowed BRAC visitor/employee projections to be excluded from ridership projections at a time when the subsequently-selected Preferred Alternative would likely have been unfavorably reflected in comparison with other alternatives being evaluated. The overarching point is that the application of new models makes scrutiny even more difficult, since many questions asked four years ago about the prior models remain unanswered. In 2013, MTA made another upward revision in projected ridership to 74,160, described as "UMD student, special event and special generator trips". Whatever these may be, they raise questions, such as:

- Why were these not a factor for the past seven years?

- How do irregularly occurring events get quantified as a daily occurrence?

The second key item is running times. These are a key element in determining ridership projections, with a very direct relationship: the faster the vehicle goes, the more rides it attracts. You may recall that during the AA phase, all BRT options were rated as generating fewer riders, because MTA determined they could not travel as fast as LRT. In the paragraph above, we have detailed a 14.4% rise in MTA's projection of LRT

ridership between 2009 and 2013. One would normally expect to find a corresponding decrease in running times (faster speeds), or at least no change in running time if other powerful influences were at work. But that is not the case here. The September 2008 Travel Demand Forecasting Technical Report, upon which the selection of the Preferred Alternative was based, showed 59 minutes running time for MILRT, and 50 minutes for HILRT. Interpolating these for the hybrid Preferred Alternative, we assume 56 minutes running time, equivalent to 17.3 mph average speed. But the FEIS has recalculated the running time to 63 minutes (longer than even the earlier version of MILRT), yielding a slower 15.5 mph average speed. This 10.8% reduction in speed would be expected to reduce ridership, not increase it by 14.4%.

There are facts contained elsewhere in MTA reports to suggest that this most recent, longer running time may still be optimistically low. The FEIS Traffic Analysis report indicates that 15 intersections through which Purple Line must pass will be operating at LOS F, the worst traffic condition, in which vehicles may have to wait through more than one signal phase to pass through. The report suggests that the number of failing intersections can be reduced to nine through mitigations, but the FEIS executive summary says it is actually 14. Wouldn't either number have a significant impact? The ability to reduce the number of problem intersections to either nine or 14 is questioned by MTA's prior criteria. In response to 2006 proposals for transit priorities to ease congestion at Connecticut/Jones Bridge, MTA said that transit priority treatments would not be allowed where they would negatively impact general traffic. Another factor is that the FEIS report indicates that 18 currently unsignaled intersections may have to be signalized after LRT begins operation. Even with priority treatments, these are likely to further increase LRT running time beyond 63 minutes.

Elsewhere, the reports seem to avoid LRT comparisons where running time results are not favorable. If this thinking was carried over into the modeling, it may have introduced bias. Some examples:

- While end-to-end LRT running times are shown to be as much as 45 minutes faster than local bus in 2040, the fact that making the same trip by Metro is 8 minutes *faster* than LRT is written off as making riders have to travel into, then out of the DC Core. What difference does the routing make in passenger choice, as long as both options are for a one-seat ride? The shorter ride on Metro should result in diversion of riders from LRT, but the text does not make that a certainty.

- A similar condition exists at College Park, where running times are within one minute of each other, removing any clear edge to either mode.

- Ridership projections for Purple Line were increased by incorporating plans to eliminate most competing bus routes, and to redirect them to Purple Line stations. It is not clear whether the agencies that operate these bus routes have agreed to these changes. For some segment of riders, the imposition of transfers, costs, and both actual and perceived increased travel time by restructuring the local bus network is likely to have current riders not make the trip, or find alternatives to the Purple Line. Was this reflected in the model?

The common thread here is that if running times inputted to the model are not realistic, the outputs may not be realistic. If the model is not properly calibrated to reflect the

whole range of changes contemplated for the implementation of Purple Line, are its ridership projections accurate?

5) What questions would be most relevant to pose to MTA to determine if the applied assumptions and practices are appropriate?

- Ridership has an inverse relationship to fares, the exact amount a function of local elasticity history and the availability of lower-cost alternatives, and should be a key component of ridership projections. With no decision on fare levels for Purple Line, and no agreements in place on transfer policies, the model is supposed to use existing tariffs. Has this been applied to the models used? There is evidence on p. 26 of the November 2010 New Starts travel Forecasting Model of an "intractable challenge to satisfactorily calibrating the mode choice model" that was resolved by a decision to apply income-based discounts of 25 or 75%. Was not one effect of this to blunt the negative impact of additional fares that will have to be paid by the 43% of Purple Line riders projected to transfer to/from Metro, and thereby inflate ridership projections? What would ridership projections be without these artificially cheaper fares?

- Running times, while increased from earlier projections, still seem not to be including certain factors, such as:

  o the practical possibility that MTA will not be able to apply LRT priority to LOS F intersections because of further negative impact on general traffic

  o the possibility that up to 18 additional intersections will have to be signalized

  o the possibility that off-board fare payment and/or honor system may not be adopted, increasing dwell times,

  o that other factors impacting customer trip time may have been omitted, such as the model applying fixed intermodal transfer times that are, in cases, significantly less than the actual customer experience at some stations. Has this more accurate and worse scenario been calculated and applied to the model, and how does that impact ridership, equipment, and operating cost projections?

- How have ridership projections been continually increasing in the face of slower running times and relatively anemic projections for population growth in the Purple Line corridor vis a vis the rest of the region, as articulated in MTA's August 2013Travel Forecasts technical report?

Prepared for Town of Chevy Chase, MD by:

Sam Schwartz Engineering   September 11, 2014