National Capital Region
Transportation Planning Board

MEMORANDUM

TO: Long-Range Plan Task Force
FROM: TPB and ICF Staff
SUBJECT: Responses to Questions and Comments Received
DATE: November 30, 2017

This memorandum contains a list of questions or comments that have been received following the presentation of draft analysis results that were shared with the TPB and Long-Range Plan Task Force (LRPTF) on November 15. A staff response is provided for each question. The questions and answers are arranged among 4 thematic groups:

- General Study/Process
- Technical Methods
- Land Activity
- Specific Initiatives

General Study/Process

Question/Comment 1: While the Long-Range Plan Task Force analysis focused on evaluating 10 initiatives at the regional level (TPB Planning Area), the impact of the initiatives may vary at the sub-regional or jurisdictional levels of analysis. Were sub-regional impacts considered as part of the analysis?

Response: Yes, the magnitude of impacts from most infrastructure based improvement initiatives will vary depending on the area for which the impact is being examined. Typically, impacts in an area that is closer to the improvement will be greater than regional-level impacts. Sub-regional impacts of each initiative were not assessed as part of the study. The primary objective of the analysis was to develop a relative, regional level assessment of initiatives with respect to the 2016 CLRP. The sketch planning nature of the analysis makes it very challenging to assess impact of the initiatives at the sub-regional or jurisdictional levels, because it lacks the necessary details to understand sub-regional impacts.

Question/Comment 2: The key objective of the LRPTF analysis was to understand how each of the 10 initiatives improve the performance of the CLRP. Will the baseline Measures of Effectiveness (MOEs) associated with the CLRP be provided?

Response: Regional (TPB Planning area) baseline (CLRP) MOE values were included in the November 15 presentation to the TPB and will be included in the technical report.

Question/Comment 3: While each individual initiative comprises a blending of projects, programs and/or policies, it is reasonable to expect that combinations of two or more initiatives will yield synergistic benefits. Have combinations of initiatives been studied as part of the analysis?

Response: No combinations of one or more of the 10 initiatives selected for analysis have not been studied at this time. The November 15 briefing to the TPB and the Task Force did acknowledge that certain combinations of initiatives could yield substantial benefits over and above any single initiative while other combinations may not.

Question/Comment 4: Are the travel time-related MOEs based on highway segment speeds only, or are they based on end-to-end travel times experienced by travelers?

Response: The travel time MOEs are developed based on end-to-end AM peak-hour travel times experienced by travelers. Travel time MOEs are developed by mode (SOV, HOV and transit).

Question/Comment 5: Technology advancements such as autonomous vehicles or connected vehicles are not reflected or considered in the analysis.

Response: Yes, autonomous vehicles or connected vehicles based concepts were not part of the 10 initiatives examined in this study. Autonomous vehicles (AVs) and Connected Vehicles (CVs) are now in development and will be realized perhaps sooner than many expect. The effect of AV/CV technologies on traffic congestion, land use and travel behavior is a subject of debate within the research community. The task force considered the potential for including emerging technologies such as AV/CV technologies as an initiative for study but decided not to do so given the high levels of uncertainty associated with the potential impacts. Some regions have begun to conduct scenario analyses to assess the potential effects of new technologies in the future, reflecting different assumptions about levels of technology adoption, changes in vehicle ownership and trip patterns, and changes in the effective capacity of roadways, among other factors. A separate regional study about the potential alternative technology scenarios, designed to assess the potential for technological advancements to impact system performance and to explore the role of regional policies and investments in advancing technology deployment, could provide interesting inputs to long range planning.

Question/Comment 6: Additional details regarding initiative assumptions are desired including full information on bicycle/pedestrian assumptions.

Response: More detailed assumptions for each initiative were provided in the November 20, 2017 memorandum to the task force titled Initiatives' Assumptions. These assumptions will also be provided in the technical report. In regard to bicycle/pedestrian assumptions in particular, improved bicycle/pedestrian access to stations was analyzed for Initiatives 4, 5, 6, and 7 by adjusting the transit mode shares upward in the station areas to reflect increased nonmotorized access to transit. Additional nonmotorized trips are expected for nonwork trips (unlinked to transit), but these impacts are generally not reflected in the measure of effectiveness focusing on bicycle/pedestrian *commute* mode share since the measure reflects only work trips, but not additional bicycle/pedestrian trips for shopping, recreation, or other purposes.

Question/Comment 7: A single table showing initiative results is desired.

Response: A single table that combined the analysis findings for each initiative was provided to the task force members on November 20, 2017 and will be included in the technical report.

Question/Comment 8: Can staff share results which show the geographic distribution of benefits? For example, how does a given initiative change travel times to work for people on the eastern side of the region? How does a given initiative impact transit crowding on segments of the Metrorail system that are over-capacity?

Response: Given the varying sketch planning techniques that were used for each initiative, compiling this type of detailed information comprehensively for all initiatives with an equivalent level of confidence to support comparisons among the initiatives is not feasible. Additionally, it is unclear whether or not any partial information extracted on the basis of assumptions and post processing would provide for a meaningful comparative assessment.

Question/Comment 9: More detail on right-of-way requirements is desired to understand alignments, properties affected and environmental impacts.

Response: As this study was more conceptual in nature, without identifying specific alignments, no specific information on right-of-way or property impacts has been determined. These issues could be a focus for future study with more clearly defined alignment alternatives.

Question/Comment 10: In the midst of the LRPTF study, Governor Hogan announced a very significant highway project to expand capacity on I-495, I-270, and the BW Parkway. Is it possible to assess the impact of the Governor's planned highway expansion, both in isolation and in conjunction with any of the LRPTF initiatives?

Response: Some elements of the governor's proposal are included within Initiative 1, including the addition of two new express lanes in each direction on the American Legion Bridge, and introduction of variably priced lanes on the Capital Beltway in Maryland. However, there were some differences in the limits and scope of the improvements. The State of Maryland is currently embarking on a NEPA study to evaluate the project. A detailed analysis and comparison of the Governor's proposal independent of and in conjunction with any of the LRPTF initiatives would have been a separate study.

Technical Methods

Question/Comment 11: If two or more initiatives are combined, will the resulting vehicle hours of delay (VHD) reductions equal the sum of the VHD reductions shown for each initiative in isolation?

Response: No, the VHD reductions shown for each initiative in isolation are not additive. While some degree of synergy could be realized when initiatives are combined, VHD reductions produced by combined initiatives would not be purely additive. This is the

case not only for VHD but also several other measures of effectiveness, such as vehicle miles traveled (VMT). The net impact of all 10 initiatives in VHD can only be assessed with additional analysis under a "combined initiatives" scenario.

Research suggests that combining some strategies can yield more than additive effects (for instance, combining new transit services, supportive land use, and transit incentives might generate more impact than the sum of individual elements in terms of encouraging mode shifts to transit). However, in many cases, the combined effects of strategies will yield less than additive effects due to overlapping or conflicting effects. As an example, a new transit service may encourage an individual to switch from driving alone to using transit, resulting in reduced VMT; a telework incentive may allow that employee to work from home one or two days per week, also reducing VMT. However, the combined effect of the transit investment and telework incentive will not result in a greater VMT reduction for this individual since the telework, in addition to the transit service, is not reducing additional vehicle trips but eliminating transit trips.

Question/Comment 12: What would it take to make future (2040) congestion levels less than the level of congestion observed today?

Response: The current CLRP study findings clearly point to the challenges faced when attempting to address future congestion considering the *added* households and jobs that are projected in the future. The "All-Build" test that staff investigated in Phase I of the Task Force's activities in 2016 suggested that while the increase in future (2040) vehicle hours of delay would be less than that from the CLRP, it would still increase by over 30% relative to today's conditions. This means that even when hundreds of unfunded transit and highway projects are added to the TPB's Long Range Plan (CLRP) in 2040, congestion will continue to worsen. The increase in delay between today and 2040 would primarily result from travel generated by the additional 1.3 million residents (24% increase) in the region. The CLRP and the All Build analysis findings suggest that reducing congestion levels in 2040 to below current levels, in the face of a 24% increase in the number of residents on top of the high levels of congestion that currently exists, is practically unattainable without extreme changes in travel demand, travel pattern and cost of travel.

Question/Comment 13: Please clarify the definition of the reliability measure used as an MOE. Can an alternate measure of reliability be considered, putting emphasis on travel reliability and travel time? Reliability can be viewed in terms of system redundancy. Should Initiative 2 and Initiative 3 score higher on the reliability measure?

Response: The reliability measure used in our analysis is defined as the percentage of person miles traveled on preferential highway facilities (HOT lanes, HOV lanes and the Dulles Airport Access Road), on premium transit modes (fixed-guideway modes such as bus rapid transit, Metrorail, light-rail, and commuter rail), and via bicycle and pedestrian modes. These modes of travel are assumed to be more reliable in their daily operations due to very low instances of non-recurring incidents/events affecting travel time. The study team recognizes that this measure has a lot of limitations for assessing the scope of reliability but this was the best measure that could be calculated within the constraints of the sketch planning tools. This measure of reliability does not address

system redundancy, nor does it address the question of travel time "volatility" due to weather conditions, major incidents, or workzones. Recognizing that researchers have estimated that nearly half of overall delay experienced by travelers nationally is associated with non-recurring events, the TPB may want to explore other measures of reliability in future studies.

The team's qualitative assessment scores for the challenges of "Reliable Access to Intercity Hubs" and "Roadway Congestion" attempted to account for travel time reliability. Even though many factors were taken into account, putting a greater emphasis on travel time reliability could alter the ratings. System redundancy does not necessarily ensure travel time reliability (it would not ensure consistent travel times), but could be another consideration that supports reliability and resiliency of the system. Note that in addition to I3 (Northern Bridge Crossing), several other initiatives add system redundancy such as I6 (Metrorail Core Capacity Enhancements, which adds another core line) and I5 (which includes run-through Commuter Rail Service and creates some redundancy for Metrorail).

Question/Comment 14: Does the regional travel demand model account for special disruptive (emergency) events which are high impact but rare?

Response: No, the travel demand model is designed to reflect average weekday conditions. Special model scenarios may be analyzed, in which capacity on a network link is compromised or a key link in the highway network is disallowed. These types of tests were not evaluated.

Question/Comment 15: Can staff present results for congested VMT?

Response: Staff has learned over time that congested VMT is highly correlated with VHD, which is reported as an MOE. VHD results will tell the congested VMT "story", and VHD figures generally provide more value as they reflect a measure of intensity of congestion and time spent by travelers (i.e., not just miles).

Land Activity

Question/Comment 16: What are the assumptions and how were land activity forecasts altered in the "Optimize Land Use Balance" initiative (Initiative 8)?

Response: The focus of Initiative 8 was to achieve improved jobs-to-households ratios regionally and for jurisdictions throughout the TPB Planning Area. This objective was achieved by: 1) adding 130,000 households to the regional household totals in 2040 to reduce long distance in-commuting from travel from external areas outside the region, and 2) reallocating future job and household growth occurring between 2025 and 2040 from areas outside the region's Activity Centers to underutilized Metrorail station areas and Activity Centers served by high-capacity transit service. Differences between jurisdictional 2040 household and job totals assumed for Initiative 8 compared to the Constrained Long Range Plan (CLRP) are shown in the September 14, 2017 memorandum to the LRPTF titled Technical Assumptions and Analysis Methods for

Long-Range Plan Task Force Study. The reallocation of jobs did, therefore, include some inter-jurisdictional shifting from western side of the region to eastern side.

Question/Comment 17: Is there any possibility that the projected households and jobs assumed in the 2040 forecasts may not be fully realized?

Response: It is possible that the projected 2040 households and jobs in the Round 9.0 COG Cooperative Forecasts may not be realized. It is also possible the that 2040 household and job totals could be higher than projected in the Round 9.0 Forecasts. The Round 9.0 Forecasts represent the "most likely" growth scenario for the region given current trends and policies. The process supporting the development of the COG Cooperative Forecasts ensures that forecasts are: 1) developed using the most recent macro-economic assumptions impacting development decisions, and 2) consistent with the most current local land development plans. The combination of a "top-down" and "bottom-up" reconciliation process provides a solid foundation for arriving at reasonable and defensible land activity forecasts. It is important to understand that the Cooperative Forecasts are continually updated over time. 2040 Forecasts are currently considered long-term forecasts, which are subject to higher levels of uncertainty. As the Cooperative Forecasts continue to be updated over time, and as the year 2040 draws closer, uncertainty is reduced with new and better information.

Specific Initiatives

Initiative 3

Question/Comment 18: Can more detailed information be given for initiative 3 (the Northern Potomac River Crossing)? For example, what is the volume of the new bridge and what effect does the new bridge have on the American Legion Bridge crossing and on other major interstates and arterials?

Response: It is important to understand that specific numbers from the analysis are very preliminary and are highly dependent on the technical assumptions (i.e., the facility design and operation). Based on the assumptions made for this analysis, our analysis indicates that a 6-lane, 14-mile long limited access facility that includes the bridge will carry about 100,000 vehicles per day. The assumption that no interchanges will exist between the VA 28/VA 7 interchange in Virginia and the I-270/I-370 interchange in Maryland is a notable feature of the facility. Of those 100,000 trips, approximately 30,000 will represent diverted trip crossings from the existing bridges, while roughly 70,000 trips will represent "new" (or induced) Potomac River crossers, mostly new trips between Montgomery and Loudoun Counties. The analysis indicates that the new Northern Bridge would remove about 20,000 trips per day from the American Legion Bridge (about a 6% reduction compared to the CLRP), a reduction of about 7,000 trips per day on the US 15 Bridge (-15% reduction) and a reduction of about 3,000 trips per day on Chain Bridge (-7%). During peak hours, highway volumes on the Northern crossing will approach capacity with peak period travel speeds of about 35 to 40mph. A peak period toll of $3.00, consistent with ICC toll rates, was also assumed for this Initiative.

Question/Comment 19: What other additional detailed data is available for all ten initiatives?

Response: The primary focus of the LRPTF study was to provide regional summaries that could be compared with 2040 conditions in the CLRP. Additional outputs, such as daily vehicle trips and daily vehicle hours of travel were produced, but generally do not provide much additional information beyond the MOEs and have been used for quality control purposes. As sketch modeling methods used for specific initiatives vary, developing additional technical data beyond the MOEs with consistent quality and comparability across all initiatives will not be possible.

Question/Comment 20: Why didn't Initiative 3 have a greater impact on access to regional intercity hubs? Is there more data available for sub-areas and specific trips from jurisdictions to Dulles or other specific hubs instead of using the average? The 81-minute intercity hub average travel time appears excessively large.

Response: This MOE represents the peak period average travel time for residents to all four of the intercity hubs (the three commercial airports and Union Station) using the best travel time among auto (SOV) and transit travel modes for each trip. The average base (CLRP) value is large because, no matter where the trip begins, the *average* time to *all* four locations will result in a large travel time. For example, a resident who lives in Ashburn, Virginia, will have a relatively short travel time to Dulles Airport but relatively long times to BWI, DCA, and Union Station, particularly during peak periods; a resident of Bowie, Maryland will have a relatively short travel time to BWI, but longer times to the other hubs. The overall average, therefore, will be quite large. As a result, even a substantial reduction in travel time to one of the hubs will be averaged across the four hubs, yielding a relatively modest overall travel time change using this metric.

In the case of Initiative 3, estimated travel times to Dulles airport will be significantly reduced for a portion of trips, particularly those originating in parts of Montgomery County near the new corridor end point at I-270/I-370, although some congestion is expected in the new corridor and on connecting roads. Yet, these residents will see limited benefits from the new corridor in accessing the other regional hubs. Many residents within the region will see limited or no time improvement to Dulles airport with the new bridge crossing/corridor. As a result, the average impact across the region looks relatively small. It is important to recognize that a small improvement in travel time for this metric can reflect a significant improvement in travel time for some residents to an individual hub.

Question/Comment 21: The 81-minute average for accessing regional hubs for the CLRP seems large. Task force members wanted more explanation and help to understand how this measure could be more useful.

Response: (See the response to Question 20.) This measure, as currently summarized, was intended to provide an average regional level assessment of impacts. The four intercity hubs in the region are in specific geographic locations and the choices that the residents make regarding which of these to use are not dependent solely on travel times. In general, average travel time measures for the region as large as ours are often challenging to use. Most notably, it is difficult to move the *regional* needle whether an

average commute time or an average time to other destinations is being assessed for *all* residents. More detailed analysis using the tools designed for specific corridor level studies could show more useful localized corridor-level impacts.

Question/Comment 22: Why are roadway repair needs negative for Initiative 3?

Response: Since the initiative represents a new 14-mile freeway facility that includes the bridge, the study team determined that additional resources will be needed to support maintenance needs of the new facility. Initiatives 1, 2, 6, and 7 performed negatively on repair needs for the same reason, recognizing that new highway and transit infrastructure will require additional maintenance and repair needs. It should be noted that the additional roadway repair needs for Initiative 3 may be paid for using the tolls generated on the new facility; similarly, roadway repair needs on the express travel network in Initiative 1 would be expected to be paid for through toll revenue. For purposes of assessment, implementation costs and revenues were identified as a separate factor for consideration. The technical report will note the expected contribution of toll revenue to cover additional repair needs, so that the reader can take this factor into account.

Question/Comment 23: Initiative 3 could have a positive effect on the environmental quality if the alignment did not cut through the Montgomery County agricultural reserve and if it included bicycle and pedestrian accommodations.

Response: The study did not assume that the alignment cut through the Montgomery County agricultural reserve, but the study team determined that Initiative 3 would have a negative environmental impact even without going through the agricultural reserve. The alignment would require some new right of way and disturbance of the riverine environment during construction, and the new bridge and roadway would increase impervious surface, which is detrimental to the region's water quality. Although environmental mitigation efforts would be implemented as a part of project development, it is anticipated that any new highway would result in some adverse environmental impacts through the area. However, localized impacts cannot be identified because an exact alignment was not delineated. Induced traffic and increased VMT are also expected to contribute to higher levels of mobile source emissions even with reductions in vehicle delay, although the extent of emissions effects is somewhat uncertain without more detailed emissions modeling. We agree that opportunities for the facility to accommodate bicycles can promote public health and recreational activity, which could be viewed as environmental benefits. However, the environmental quality challenge delineated by the task force was "Increasing amounts of vehicle travel resulting from population and job growth could threaten the quality of our region's air and water."

Question/Comment 24: Can staff clarify how the access to jobs measure is calculated? Could dynamic tolling be used as an assumption for Initiative 3? Can staff provide more clarification on the travel time over the bridge?

Response: Job accessibility is defined as the average number of jobs that can be reached by highway or transit within 45 minutes in the AM peak, under congested conditions. The accessibility figure reflects the average number of jobs accessible within

this timeframe across all households within the region. The new northern bridge does improve job accessibility for some households on both sides of the river. However, the regional average number of jobs accessible within 45 minutes does not change materially due to several factors. First, the market impact area of the bridge is small in relation to the TPB Planning Area (many households in the region are not affected by the bridge). Second, considering access to/from jobs and households on both sides of the new corridor, many of the trips using the new corridor are estimated to exceed the 45 minute threshold (for instance, Rockville, MD to Sterling, VA is about a 22 mile trip with the new facility; while considerably shorter in distance and faster than using the American Legion Bridge, the average peak travel time is still anticipated to exceed 45 minutes). Third, due to some assumed shifts in jobs and housing to the end-points of the corridor (near Gaithersburg, MD and Sterling, VA), a small portion of jobs may become less accessible to some residents in the region. Consequently, the regional change in the number of jobs accessible within 45 minutes to the average resident of the region improves by about 1% (about 9,000 additional jobs), and that change is comparable to other initiatives involving traditional system enhancements. The technical team would expect that a dynamic tolling assumption for I3 would not yield substantially different results from the currently assumed ICC toll structure.

Other Initiatives

Question/Comment 25: Why are reductions in Vehicle Hours of Delay so minimal (about -2%) for the BRT and Transitway initiative (Initiative 4).

Response: As in the response to Question 20, the reductions in VHD are generally small at the regional scale in part due to the averaging over the entire region. While the BRT and Transitway initiative does provide a new means of reliable public transportation, the analysis indicates that the regional commute transit share increases by about 1%. Therefore, the BRT initiative does remove vehicle trips from the highway system, but not enough to produce a more significant reduction in highway delay. Based on this assessment, staff anticipated that many of the riders on the BRT otherwise would be using other bus or other transit services. Therefore, these riders benefit from faster and more reliable travel times, and this initiative increases the number of jobs accessible within a 45-minute transit commute regionally by about 4% (about 19,000 additional jobs); and in individual corridors the benefits would be much greater. However, the vehicle delay savings regionally are modest.

Question/Comment 26: Slide 18 in the presentation to the TPB indicates that Initiative 8 yields a 1% decrease in the daily miles traveled on a "reliable" mode. Is this correct? Also, why does the BRT and Transitways initiative (I4) show a very small increase in miles traveled on a reliable mode?

Response: The MOE is actually the “share” of daily person miles traveled on a reliable mode; this MOE measures the *proportion* of daily person miles traveled that occurs on transit modes or highways that are considered reliable. The optimization of job and household balance featured in this initiative will have the effect of reducing work trip lengths. The overall reduction in trip lengths and in vehicle miles traveled per capita will

result in fewer person miles in both "reliable" and "unreliable" modes of travel. It is also important to understand that the Initiative 8 brought substantial increases to the share of non-motorized trips. The shift from highway to non-motorized travel means that fewer long-distance travelers will use reliable highway modes (i.e., HOV and HOT lanes).

The BRT and Transitways initiative (I4) shows a 6% increase in the share of daily person miles traveled on reliable modes, which is one of the largest impacts of all of the initiatives, only exceeded by the Metrorail Core Capacity Improvement (I6) and the Express Travel Network (I1). It is important to note that this reflects the share of all passenger miles traveled across all trip types over a day.

Question/Comment 27: In the November 20th memorandum (page 11), the assumptions for Initiative 10 included Transit/Vanpool Subsidies of $50 per month for "80% of employees" while the TPB presentation (page 39) states "80% of employers." Please clarify whether the component is 80% of employees or 80% of employers.

Response: The component is 80% of employees. We apologize for that confusion.

Question/Comment 28: Is there any way to understand the fiscal impact of I10?

Response: The initiative likely will spur both positive and negative fiscal impacts to the public and private sectors, but effects are complex. For instance, some elements could increase local government revenues (such as parking fees) while others might decrease revenues (potentially less tax revenue from lunch-time meals in business locations due to significantly increased telework). This is an area that will need to be examined in terms of its fiscal implications, and how it will be implemented.