DRAFT Recommendations for the Boston Region MPO's TIP criteria

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Transportation for America (T4America) and the State Smart Transportation Initiative (SSTI) are providing technical assistance to the Boston Region MPO to expand the region's current performance measurement and project prioritization processes. This memo provides brief recommendations to the MPO on potential changes to the MPO's existing Transportation Improvement Program (TIP) criteria.

This memo contains the following sections:

Background

The Boston Region MPO has launched an update of the MPO's TIP evaluation criteria to support the Federal Fiscal Years (FFYs) 2021–25 TIP development process. Rather than simply making marginal adjustments to the existing criteria, the MPO has chosen to move away from using a single set of criteria across LRTP investment programs toward a distinct set of criteria for each program within the same six goal areas. This change provides a valuable opportunity to evaluate and potentially make other changes to the structure of the TIP criteria in the process.

Staff have identified a number of goals and principles for creating distinct criteria for each investment program based on feedback from stakeholders, including:

- Accommodating the new Transit Modernization program
- More closely aligning criteria with specific project elements
- Emphasizing MPO goals associated with different project types
- Creating balance across investment programs and eliminating score disparities.
- Allowing for each project type to achieve full points
- Keeping criteria manageable to implement
- Making use of best available data and methods
- Being both realistic and aspirational
- Making criteria clear to project proponents and other stakeholders

T4America referenced these goals and principles in developing the recommendations below.

Current strengths

The Boston Area MPO is already a leader in using performance criteria to score projects for inclusion in its TIP. While this memo includes some recommended areas for improvement, it is worth noting that there are a number of best practices in the MPO's existing TIP criteria and process that other MPOs could adopt.

For example:

- Boston's six LRTP goal areas are clear, distinct, and easy to remember.
- The MPO has clearly sought to balance priorities across modes of travel rather than relying primarily on criteria that measure of vehicle delay, state of good repair, and safety.
- The MPO has also included some measures focused on outcomes rather than outputs where possible—for example, assessing qualitatively whether the current design of the project area is hindering pedestrian safety issue and to what extent the proposed investment addresses that issue, versus exclusively using output-focused criteria like "project adds a sidewalk."

General recommendations

The following recommendations apply broadly to the structure of the existing TIP criteria.

Divide scores by project cost: T4America recommends dividing the total score each project receives by the cost of the project to assess the cost-effectiveness of projects. This would mean calculating a numeric benefit score based on the sum of all the benefits of a project (as the MPO currently does), and dividing that number by the project cost to produce a new numeric score for each project. In this framework, if Project A produces twice the benefit of Project B, but also costs twice as much, the two projects receive the same final score. The Virginia Department of Transportation (VDOT) currently implements this approach in their statewide Smart Scale project prioritization program.[1] While VDOT reports both the "benefit" score and the "benefit/cost" score for all projects, VDOT ranks and prioritizes projects based on the benefit/cost score.

This approach has several advantages over other approaches like making "cost effectiveness" its own criteria within the overall score. Larger projects with multiple elements will naturally tend to meet more of the criteria and receive higher scores. Dividing by cost puts those benefits in the context of whether the project is producing a high value for the scale of the investment, allowing the MPO to compare across projects relatively objectively.

The major drawback of this approach is that the MPO evaluates projects in the early stages of design when costs are still uncertain and likely to change. This might produce inaccurate comparisons across projects. It also potentially provides an incentive for project proponents to underestimate costs, and the MPO currently typically covers cost overruns when they occur. VDOT addressed this by setting a cost increase threshold above which VDOT would rescore a project after awarding it funding, which could theoretically result in the project losing funding if the score fell too low. Boston MPO staff have indicated that this practice would be at odds with

[1] See page 36 for more information about how VDOT integrates cost-effectiveness into project scores: http://www.smartscale.org/documents/2018documents/ss_technical_guide_nov13_2017_revised_feb2018_for_posting.pdf

the existing culture in the region and state (if the project proponents do the significant upfront work to submit a project, the MPO makes an effort to keep it in the TIP). In practice, however, VDOT staff have found that they rarely need to rescore projects. The opposite is far more common: project sponsors overestimate initially for fear of receiving and then losing funding.

Further, while scoring projects based on early cost estimates would present some challenges for the MPO and project proponents, the results would likely be an improvement over the status quo: judging projects only on the benefits and accepting any increases in cost as they occur. The MPO could also make adjustments to its program to address some of these challenges—for example, by setting aside a pot of funding to support project development before projects get scored, or providing assistance to localities in developing their cost estimates, as VDOT does.

Revisit the weighting of the six goal areas in the overall score: The MPO's current TIP criteria update presents an opportunity to assess and potentially convene a discussion with the MPO's board and other stakeholders about whether the weighting of each of the six goal areas within the overall score still match the region's priorities. For example, the MPO's Transportation Equity goal area is worth 12 out of 134 points, less than half of the emphasis given to Safety, System Preservation, and Capacity Management/Mobility. Should equity be given greater weight?

Currently, the goal areas that account for more points in the overall score generally have more criteria embedded within them. If the MPO has not done so recently, T4America suggests first revisiting how much emphasis each goal area should receive within the total score, and then assigning point values per criteria based on the results. The emphasis per goal area could also vary between LRTP investment programs.

Staff should also evaluate the weighting of criteria within each goal area. For example, safety improvements to at-grade rail crossings currently receive the same maximum points as crash rates. Improvements to substandard traffic signals receive twice the emphasis of improved transit assets. These allocations may already align with the MPO's priorities, but would be worth evaluating.

Reduce the number of criteria (as previously recommended by T4America): The MPO currently has 26 criteria within its six goal areas. While this is fewer than some MPOs, simplifying the criteria further where possible would reduce the burden on project proponents and staff and make the criteria easier to understand. The MPO's current effort to develop more tailored criteria for each funding program provides an opportunity to focus on the most important outcomes each program should achieve and remove criteria that are important, but may not be as high a priority for that funding category.

In particular, integrating accessibility criteria into the TIP could allow the MPO to consolidate and collapse a number of the existing criteria into one or two accessibility criteria. For example, the criteria within the Capacity Management/Mobility goal area could be consolidated into a "destination access" criterion and/or "multimodal accessibility" criterion (see options 5 and 6 in the discussion of accessibility in the following section below). The MPO could then give these criteria greater weight in the overall score.

For investment programs with fewer current criteria, adjust weightings rather than adding more criteria: MPO staff analyzed which existing criteria apply to each LRTP investment program and identified some disparities; while most criteria apply to Complete Streets, Intersection

Improvements, and Major Infrastructure projects, significantly fewer apply to Bicycle/Pedestrian and the new Transit Modernization program. Staff have suggested a potential need to fill those gaps. While the MPO should add targeted criteria if true gaps exist, in general it is reasonable for these programs to have fewer criteria because their scopes are narrower and their share of overall funding is significantly smaller. Instead of adding criteria to match the number of criteria for other investment programs, T4America suggests reweighting the existing criteria so that they add up to the same total across programs.

Remove criteria for which very few projects receive points: The MPO may have some criteria that address a desired outcome in theory, but do not actually help differentiate between projects in practice. T4America recommends removing any criteria for which most or all projects within a given investment program score low or zero points. For example, while intersection improvements and Complete Streets projects could theoretically improve a substandard bridge, in practice only major infrastructure projects typically appear to receive points in this category. T4A suggests removing this criterion from the other investment programs to emphasize other criteria that are more helpful in differentiating between projects for those programs.

Don't reward projects for avoiding something negative: Projects should not be able to receive points simply because they do not cause harm to natural or cultural resources. The MPO already uses negative points for projects that create a burden for Title VI/non-discrimination populations and projects that increase emissions, which is a great practice. T4America suggests using this same approach for the "Addresses environmental impacts" criterion: assign negative points to projects that impact wildlife, wetlands, habitats, and cultural resources.

Shift to quantitative criteria where possible: Integrating accessibility measures would allow the MPO to convert a number of the existing qualitative criteria into quantitative criteria (discussed in the following section). T4America recommends doing so wherever possible to reduce the reliance on project proponent and staff judgment.

Simplify or clarify redundancy within the scoring gradations for remaining qualitative criteria: T4America recommends making the scoring gradation methodologies for any remaining qualitative criteria simpler and more straightforward where possible. Several of the current qualitative criteria appear to have redundancy within the scoring methodologies. This may be creating confusion for project proponents.

For example, within the "Improves ability to respond to extreme conditions" criterion, projects can receive up to 6 points based the following:

+2 Addresses flooding problem and/or sea level rise and enables facility to function in such a condition
+1 Brings facility up to current seismic design standards
+1 Addresses critical transportation infrastructure
+1 Protects freight network elements
+1 Implements hazard mitigation or climate adaptation plans

However, the scoring guidance notes that projects can also receive +1 for "*Addresses critical transportation infrastructure*" and "*Protects freight network elements*" by addressing flooding problems/sea level rise or bringing the facility up to seismic standards—meaning that projects can actually receive up to 4 points for addressing flooding and up to 3 points for seismic improvements. Similar redundancy can be found within the "Addresses environmental impacts" criterion for stormwater benefits. T4America recommends simplifying the points structure: for

example, *"+3 Addresses flooding problems [etc.], +2 Brings facility up to current seismic design standards, +1 Implements hazard mitigation or climate adaptation plans."* The added clarity would likely make up for the loss in nuance.

Integrating accessibility into the TIP criteria

Accessibility, or destination access, measures the ability of travelers to reach destinations, based on travel time and other impedances (level of traffic stress for active transportation, tolls and fares for auto and transit modes, etc.).[2] As such, it is considered a more valid measure of the success of the transportation system than older mobility-only measures (level of service, vehicle throughput, etc.). However, multimodal accessibility has emerged as a viable metric in practice only in the last decade or so, and it lacks the sort of conventional nomenclature and standards that older measures enjoy. Nevertheless, metrics do exist and have been employed in practice, so it is well within the MPO's ability to begin to employ the concept in its revised TIP criteria. Accessibility measures can also be used to determine expected changes in mode share or vehicle miles traveled.

Accessibility could be employed in at least two ways: 1) to replace older, less-valid criteria, or 2) to provide greater rigor in scoring existing criteria.

What follows is a scan of 2020-24 TIP criteria as communicated to T4A, indicating potential replacements or amendments to incorporate destination access. T4America/SSTI have not listed criteria below that are not relevant to accessibility.

Safety

1. *Improves bicycle safety.* By analyzing this criterion within a destination access framework, the MPO could better optimize resources by deploying countermeasures where they would facilitate the greatest increase in cycling. In this context, bike safety measures would be considered as "level of traffic stress"[3] within an accessibility metric. Improvements such as bike lanes, buffering, bike signals, and other countermeasures would reduce impedance for cycling on those affected links. Reduced impedances in turn would improve accessibility scores to the extent that they help connect pedestrians to destinations.

2. *Improves pedestrian safety.* By analyzing this criterion within a destination access framework, the MPO could better optimize resources by deploying countermeasures where they would facilitate the greatest increase in walking. In this context, pedestrian safety measures would be considered as "level of traffic stress" within an accessibility metric. Improvements such as ADA ramps, pedestrian signals, raised crossings, and other countermeasures would reduce impedance for cycling on those affected links. Reduced impedances in turn would improve accessibility scores to the extent that they help connect pedestrians to destinations.

System preservation

3. *Improves substandard pavement.* Destination access should not trump access management schedules for pavement replacement. And for auto mode there is no need for destination

[2] Review *Accessibility in Practice: A guide for transportation and land use decision-making*, released by Virginia's Office of Intermodal Planning and Investment in partnership with SSTI, for guidance on how to operationalize accessibility measures, including within project selection: https://www.ssti.us/2017/07/accessiblity-in-practice/
[3] http://www.northeastern.edu/peter.furth/research/level-of-traffic-stress/

access to determine the most important links in the system for travelers – ADT can do that. However, the MPO could add more nuance to this criterion by considering the needs of cyclists, who are also affected by poor pavement. It could do so in a manner similar to No. 1, by evaluating the change in level of stress and determining the resulting accessibility improvement from the project.

4. *Improves substandard sidewalks.* Destination access should not trump access management schedules for sidewalk replacement (if these exist). However, the MPO could add more nuance to this criterion by considering the mobility needs of pedestrians, particularly those who cannot walk or have difficulty walking, who are affected by poor pavement. It could do so in a manner similar to No. 2, by evaluating the change in level of stress for pedestrians and determining the resulting accessibility improvement from the project.

Capacity management/mobility

5. *Destination access (new criterion).* This measure would take the total improvement in destination access, across modes and trip purposes, and rank projects accordingly. This is similar to the approach taken by Virginia DOT's Smart Scale.[4]

   Note: this would replace the other criteria in the Capacity Management/Mobility goal area, including 7-10 below. It could potentially replace criteria within other objectives as well.

6. *Multimodal accessibility (new criterion).* By comparing relative levels of accessibility by mode and trip purpose, we can predict outcomes such as mode split, VMT, emissions, and travel costs. In pursuit of the policy goal "Use existing facility capacity more efficiently and increase healthy transportation capacity" the MPO could reward projects that increase non-auto mode share and/or reduce VMT. This is similar to the approach taken by the Hawaii DOT's project selection process.[5]

   Note: this would replace the other criteria in the Capacity Management/Mobility goal area, including 7-10 below. It could potentially replace criteria within other objectives as well.

7. *Improves pedestrian network and ADA accessibility*. Similar to approaches described under Safety and System Preservation, an accessibility framework incorporating level of stress could help prioritize the most-effective improvements – those that afford the greatest increase in pedestrian access to destinations. This analysis could be run separately for ADA, if data is available, by eliminating links that do not meet ADA standards due to intact curbs, high cross-slopes or other defects.

8. *Improves bicycle network*. Similar to approaches described under Safety and System Preservation, an accessibility framework incorporating level of stress could help prioritize the most-effective improvements – those that afford the greatest increase in cycling access to destinations.

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[4] See page 63 for information on how VDOT implements this measure: http://www.smartscale.org/documents/2018documents/ss_technical_guide_nov13_2017_revised_feb2018_for_posting.pdf

[5] This webinar provides information about HDOT's SmarTrac program: https://www.ssti.us/Events/transportation-project-prioritization-hear-from-virginia-and-hawaii/

9. *Improves intermodal accommodations/connections to transit.* Destination access metrics would significantly improve this criterion, by taking into account complete trip times rather than treating all connections to a transit stop the same way. The analysis would focus on accessibility improvements provided by project; to the extent new connections reduce travel times and increase accessibility, they would be rewarded here. This more rigorous method would also remove or reduce the need for subjective judgment.

10. *Reduces vehicle congestion.* The current criterion focuses on moving cars faster through parts of the network. However, we know that gains from such capacity increases are short-lived, due to induced demand, and that fixing a bottleneck often simply moves traffic to the next bottleneck. We also know that moving cars faster through an intersection can degrade non-auto accessibility, e.g. by adding pedestrian delay at crossings. An alternative approach would be to employ No. 6 above and focus on demand reduction.

Clean air/clean communities

11. *Reduces CO2.* An accessibility analysis based on VMT could be used to determine the effects of a project on CO2.

12. *Reduces other transportation-related emissions.* An accessibility analysis based on VMT could be used to determine the effects of a project on CO2.

Transportation equity

13. *Serves Title VI/non-discrimination populations.* Destination access, or a destination-access-derived metric such as VMT or travel costs, can be calculated for any demographic group based on home locations. This would be a more valid way to assess the affect a project has than simply determining if the project is located near a Title VI community, because 1) such a method relies on actual new access provided rather than proximity of the project, and 2) relevant community members may live in various places around the region rather than in a cluster that passes a threshold. The description in the current criterion about burdens is very broad, but accessibility could address those related to travel impedances (unsafe conditions, lack of connections, etc.). Other burdens, such as noise, would be addressed outside of accessibility.

Economic vitality

14. *Serves targeted development site.* Destination access is often calculated as a many-to-many matrix, e.g. from all neighborhoods to all jobs. But it can also be used to assess access to a particular place. In this instance the MPO could calculate the accessibility benefits provided by a project, by trip purpose if needed, to targeted development site. This would be a much more valid scoring method than the current system, which is simply based on the proximity of the project to development sites.

15. *Provides for development consistent with the compact growth strategies of MetroFuture.* As with No. 14, destination access measures can better determine how a project serves a designated area

than a proximity measure can. In addition, destination access could be a way to indicate an area's compact growth. This is the approach taken by VDOT's land use criterion.[6]

16. *Provides multimodal access to an activity center.* As with the two previous criteria, destination access can better determine how a project serves a designated area than a proximity measure can.

Other recommendations for specific criteria

Move away from criteria based on LOS/delay (Capacity Management/Mobility): The MPO's existing "Reduces vehicle congestion" criterion evaluates delay at intersections within the proposed project boundaries and the reduction in delay the project is expected to achieve. This approach can lead to prioritization of projects that reduce delay at one intersection at the expense of others further along the corridor. T4America recommends replacing this measure with an accessibility measure (see discussion of accessibility above), which would capture that congestion at specific intersections within the context of its impact on the broader system.

Revise "Addresses Environmental Impacts" criterion (Clean Air/Clean Communities): As noted above, the MPO should give negative points for adversely impacting natural and cultural resources rather than rewarding projects that do not harm them. The MPO may want to streamline this criterion by only awarding positive points for reducing impervious surfaces or otherwise improving stormwater management and drainage, as stormwater benefits are currently integrated in several places throughout the points framework for this criterion.

Don't award points simply for being located in an EOEEA-certified "Green Community" (Clean Air/Clean Communities): A project could be located in a designated green community but increase emissions or harm natural resources. T4America suggests offering bonus points if a project is in a green community and has received points for other criteria within this goal area.

Provide a clearer definition of how a project might burden low-income and minority areas (Transportation Equity): The MPO currently awards -10 points to projects that creates a burden for Title VI/non-discrimination populations. However, the guidance provided to assess this simply states, "to determine whether the project creates burdens, read each functional design report and project descriptions. If it appears to impose burdens to any of the populations, assign -10 points." T4America suggests providing examples of how a project might impose a burden (such as by bisecting an existing neighborhood, increasing pollution or noise, etc.). Staff may also want to explore a more nuanced approach for future TIP cycles by including tiers of negative points and/or integrating criteria like "lack of community support for the project." The MPO could also develop a deeper understanding of disparities within the region beyond Title VI/non-discrimination populations (see example from Oakland below). The MPO would need to do community engagement to develop this more nuanced approach.

Expand resilience-focused criteria to future TIP cycles (System Preservation): The MPO is interested in incorporating resilience criteria into its TIP scoring. The MPO already has one

[6] See page 87 for information on VDOT's non-work accessibility/land use project scoring criterion. http://www.smartscale.org/documents/2018documents/ss_technical_guide_nov13_2017_revised_feb2018_for_posting.pdf

criterion within its System Preservation objective that addresses resilience issues: "Improves ability to respond to extreme conditions." Projects currently receive up to 6 points for addresses flooding problem and/or sea level rise and enabling the facility to function in flooded conditions, bringing the facility up to current seismic standards, protecting elements of the freight network, or implementing hazard mitigation or climate action plans. T4A recommends that the MPO also consider giving projects negative points if they work against resilience goals.

The MPO may also want to move away from this piecemeal approach. Other regions have chosen to conduct a resilience or flood hazard analysis, identify the most vulnerable areas, and prioritize projects that directly mitigate those risks (see the example below from Hillsborough County). If resilience is a priority for the region, MPO should develop a regional plan and award the points in this category to projects that directly implement that plan.

Examples

Virginia DOT uses accessibility measures in project prioritization: VDOT has pioneered the use of accessibility measures at a statewide level in project selection decisions through its Smart Scale Program.[7] In 2014, the Virginia legislature unanimously passed House Bill 2 requiring VDOT and the Commonwealth Transportation Board to develop a quantifiable and transparent prioritization process for making funding decisions for capacity enhancing projects within the state's six-year improvement program. The legislation explicitly established six factors to be used in the scoring process: congestion mitigation, economic development, accessibility, safety, environmental quality and (in areas over 200,000) coordination with land use.

VDOT's new scoring approach applies to all new capacity projects that receive state funding across modes, which represent about half of VDOT's overall program (it does not apply to state of repair projects). Projects are scored to determine their cumulative benefits in the six factor areas based on a combination of state and locally submitted data. VDOT assigns up to 100 points to each project under each of the six scoring factors.

VDOT operationalized the accessibility score as access to jobs, with 60 percent of the total based on the change in accessible jobs. Another 20 percent of the score is an equity breakout, considering the change in jobs access specifically for disadvantaged populations. The final 20 percent is based on an assessment of the project support for connections between modes, and promotion of multiple transportation choices.

Virginia focused on accessibility to jobs in its initial round of scoring through Smart Scale. As of the third round of scoring, however, VDOT has also added a non-work accessibility measure as part of the Land Use scoring factor, replacing the measure previously used. Developing the non-work accessibility measure required additional consideration about what types of destinations are important to people. The team working on the measure examined the type and number of destinations accessible by walking from Census blocks throughout Virginia in order to determine how to weight each of their non-work destinations for the measure. They then created a scale of zero to 100 based on destinations accessible by walking.

[7] http://www.smartscale.org/about/default.asp

VDOT weights the six scoring categories differently based on the type of community where each project is located. For example, employment accessibility can account for 15 percent of the overall score in large urban areas, where congestion mitigation is the top priority, 15 percent in rural areas where economic development is the top priority, but 25 percent of the score in medium size areas like Richmond and small cities like Charlottesville.

Hillsborough County prioritizes projects to improve resilience to flooding: Hillsborough County, FL received a federal grant for one of 19 pilot studies across the country conducted under the Federal Highway Administration's second-round climate change vulnerability assessment program. The goal of the study was to identify cost-effective strategies to mitigate and manage the risks of coastal and inland inundation for incorporation into the Hillsborough County MPO's 2040 LRTP, the County's Post Disaster Redevelopment Plan, and broader decision-making.

The County performed a geospatial inundation exposure assessment of transportation facilities in the region due to storm surges, sea level rise, and inland flooding. The County then overlaid transportation facilities data, including location and elevation. The County used a batch geoprocessing technique developed by GeoPlan to compare the transportation facilities and various inundation scenarios.

Based on the results of the analysis, the County ranked transportation assets into one of three tiers for prioritization:[8]

- Tier 1: The most vulnerable facilities, those that help facilitate statewide evacuation, that carry the most traffic, and that are state managed.
- Tier 2: Very vulnerable assets that facilitate regional/sub-regional evacuations, are on transit route, and/or have no network redundancy.
- Tier 3: Less vulnerable facilities, including those that facilitate local evacuation, have no network redundancy, and are locally managed.

Oakland drives investments based on social equity considerations: The Oakland Department of Transportation (OakDOT) aligned its transportation investments more directly with a focus on equity, which is listed in a number of the city's policy documents but previously had little direct bearing on investment prioritization.

OakDOT started by refining its understanding of the relationship between disadvantaged populations and transportation in the region through GIS analysis. OakDOT mapped outcome disparities between different populations, including low-income areas, areas with a large population of people over 75 years of age, single parent families, populations with limited English proficiency, and areas with proportionately large disabled populations in the region. OakDOT looked at disparities in health outcomes like asthma and diabetes, access to jobs and other necessities, and safety.

Based on the analysis, OakDOT developed a geospatial "Disadvantage Index." OakDOT then integrated the new index with the city's pavement management model to increase the weight

8 http://www.planhillsborough.org/wp-content/uploads/2013/10/NoAppendix_Hillsborough-MPO_FHWA-Pilot-Final-Report1.pdf

given to these communities in the model and move projects in those areas up in the queue. OakDOT also uses the index to help prioritize expenditures in its other discretionary programs.[9]

[9] https://oakbec.s3.amazonaws.com/MapLanding/internal_index.html