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Lessons Learned on Performance-based Planning

CHATTANOOGA 2040 RTP PERFORMANCE-FRAMEWORK: BALANCING REGIONAL AND COMMUNITY NEEDS

Melissa Taylor
Chattanooga-Hamilton County/North Georgia TPO
1250 Market Street, Suite 2000
Chattanooga, TN 37402, USA
423.643.5944
taylor_melissa@chattanooga.gov

Tracy Selin
Cambridge Systematics, Inc.
730 Peachtree Street, Suite 1050
Atlanta, GA 30308, USA
404-460-2603
tselin@camsys.com

As part of 2040 RTP development, the Chattanooga TPO worked with stakeholders to create a comprehensive performance-based planning framework to guide plan development. Transportation investment needs defined during outreach efforts were frequently voiced by groups approaching the RTP from two different perspectives - one which advocated a more local, community-oriented investment approach and another that championed "big-ticket" investments needed to advance the economic competitiveness of the region. These two perspectives are often seen as being in opposition to one another, but both are critical to success of the plan. Rather than place them at odds, or prioritize the needs of one over another, the Chattanooga 2040 RTP is founded on a long-range vision that balances consideration of investment needs across both community and regional impacts.

In keeping with the vision to balance consideration of community and regional needs, goals and objectives for the 2040 RTP were organized within a "Community to Region" performance framework which presents goals/objectives across three geographic scales:

- Within Community – Goals and objectives that emphasize safe, multimodal connections and access to community resources and advance livability and quality of life principles;
- Community to Region – Goals and objectives that support strategic multimodal connections between individual communities and regional activity and economic centers; and
- Region to Region – Goals and objectives that emphasize mobility and intermodal improvements to ensure the region is well connected within the state and nation to advance economic growth.

A set of three, succinct goals were defined to reflect the long-term direction for investment across each geographic scale. Objectives were defined accordingly to address the unique needs and considerations within each scale.

A critical aspect of this approach – varying goals and objectives by geographic scale – is that it enabled project evaluation to vary across each scale as well. To operationalize this, a set of performance measures were defined and weighted by the level of significance of each measure for each scale. As an example, Delay Reduction is not as significant a factor in determining project benefits Within Community, as transportation needs within this scale often focus on slower, safer, multimodal trips. This factor is of great significance (and therefore of greater weight) within the Regional scale, as the efficient movement of people and goods is vital to the regional economy. The different weighting system allowed projects to be scored and ranked according to unique needs of each scale. All performance measures were mode-neutral and aligned with both regional goals and national transportation goals established in MAP-21. This proved to be a highly flexible approach which infused context in the project evaluation process and supported more targeted investment decisions yielding a truly balanced investment package:

- A doubling of funding for bike/ped improvements;
- Transit capacity investment at 25% of plan;
- A reduction in roadway capacity investment from 51% to 31% of plan; and
- Systems preservation funding at 39% of plan.

The presentation will focus on development of the performance framework and project calculator, and the transferrable policy and technical methods for other small/medium-sized MPOs.

CHATTANOOGA 2040 RTP PERFORMANCE-FRAMEWORK: BALANCING REGIONAL AND COMMUNITY NEEDS

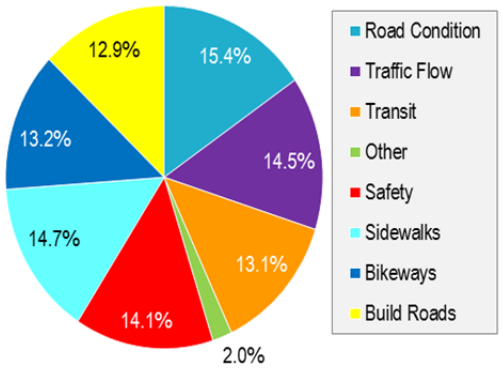
Introduction

Under the 2005 Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), there were no requirements for performance measurement related to statewide or metropolitan transportation plan development. However, many metropolitan planning organizations (MPO) and state transportation agencies had already recognized the importance of performance evaluation and were utilizing performance measures to evaluate and score projects and document performance impacts of transportation investment. The Chattanooga-Hamilton County/North Georgia Transportation Planning Organization (CHCNGA TPO) adopted its first performance-based plan in 2008 during the development of the 2035 Long-Range Transportation Plan (LRTP) which became effective in 2010.

The initial performance framework focused on system wide performance in the context of long-range goals, but did not enable individual project ranking or a comparison of projects by mode. Due to the lack of comprehensive project-level evaluation metrics, smaller-scale projects intended to improve system operations, improve quality of life, support environmental sustainability, or create alternative transportation choices were unable to compete with more well-defined capital investments – primarily capacity-adding highway projects. In order to advance these projects in the 2035 LRTP, smaller pots of funding were set aside for system operations, safety and security, and bicycle and pedestrian improvements.

In 2011, a new transportation bill known as Moving Ahead for Progress in the 21st Century (MAP-21), was introduced to Congress and included proposed requirements for the development of performance targets and measures to be included in metropolitan and statewide plans, to advance a set of national transportation goals. Aware of this bill and the certainty that at some point in the next two years Congress would pass the bill or a version of it, the CHCNGA TPO initiated efforts to expand and refine the 2035 LRTP performance framework, to specifically include project-level measures, for the 2040 Regional Transportation Plan (RTP) process which began in 2012.

Figure 1 2040 Questionnaire: Prioritized Transportation Improvement Categories



Early in the 2040 RTP stakeholder engagement process, results from various community leadership meetings and public outreach activities indicated an almost even split between desired transportation improvements (Figure 1). Transportation challenges and investment needs defined during outreach efforts were frequently identified by stakeholders approaching plan development from two distinct perspectives - advocates for a more local, community-oriented investment approach and others that championed "big-ticket" investments to advance the region's economic competitiveness due in part to the region's expectation for moderate growth over the next 20-40 years. These two perspectives are often seen as being in opposition to one another, but both are critical to success of the Plan. Rather than place them at odds with one another, or prioritize the needs of one over another, the 2040 RTP was founded on a long-range vision that ***balances consideration of investment needs across both community and regional impacts***. The revised performance framework for the 2040 RTP stems from this long-range vision.

Objectives and Methodology

Transportation performance management, as defined by the MAP-21 legislation, "will transform the Federal-aid highway program and provide a means to the most efficient investment of Federal transportation funds by refocusing on national transportation goals, increasing the accountability and transparency of the Federal-aid highway program, and improving project decision-making through performance-based planning and programming". The legislation directs MPOs to establish performance measures and reestablishes previous mandates to consider public input. To meet these legislated responsibilities, as well as the regional vision to balance consideration of both community and regional investment needs, the TPO's 2040 RTP performance-based planning process needed to:

1. Reflect MAP-21 national goals as well as regional transportation goals;
2. Thoughtfully incorporate public opinion; and
3. Enable a project evaluation process where performance impacts were compared fairly across a variety of investment scales, ranging from community-oriented investments to more regionally focused investments.

After reviewing multiple project submittals for the 2040 RTP Call for Projects – an initial step of the plan development process - notable differences were identified across two key areas: (1) the degree of expected community or regional impact associated with the investment, and (2) the geographic service area of the proposed improvement type, in particular by project mode. The performance framework was designed to distinguish such differences within the project evaluation and plan development process. To do this, the performance framework was implemented as a parallel concept to the standard urban to rural transect often used as a tool by planners to illustrate the transitioning land use context across urban and rural geographies. In this case, however, the transition was not from urban to rural; rather from community impact to regional impact. A transect is an easy, effective means of conveying a progressive or graduated perspective across various geographic "scales" and was applied here as the primary organizing principle for the performance-based planning process. In keeping with this approach, goals and objectives for the 2040 RTP were organized within a "Community to Region" performance framework as illustrated in Figure 2.

Figure 2 Chattanooga 2040 RTP Community to Region Performance Framework

A set of three, succinct goals were defined to reflect the desired, long-term direction for investment across each geographic scale. Objectives were defined accordingly, to address the unique needs and considerations within each scale[1].

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- **Within Community** – (Goal) Build and Maintain Healthy Communities
  Emphasize safe, multimodal connections and access to community resources and advance livability and quality of life principles;
- **Community to Region** – (Goal) Connect Communities in the Region by Providing Travel Options to Activity and Economic Centers
  Support strategic multimodal connections between individual communities and regional activity and economic centers; and
- **Region to Region** – (Goal) Grow Economic Opportunity through Strategic Investment in Critical Regional Infrastructure
  Emphasize mobility and intermodal improvements to ensure the region is well connected within the state and the nation to advance economic growth.

A critical aspect of this approach – varying goals and objectives by geographic scale – is that it enabled project evaluation to vary across each scale as well. This breaks the traditional, linear performance-based planning approach where performance measures are often aligned one-to-one with a broad set of regional goals and objectives. With this approach, all projects must be "all things to all people". There is usually a blending of many competing needs and perspectives through one regional set of performance measures. This makes it difficult for planners and engineers to effectively test and compare projects to one another (especially projects of different type and mode), because much of the project context has been stripped out of the evaluation. This often results in different project types being evaluated in isolation of one-another, producing unproductive "modal wars". It also does not often lend itself to a fair representation of project impacts at the community or local scale.

To operationalize the performance framework, a set of performance measures were defined with weights that varied by the level of significance of each measure for each scale. As an example, Delay Reduction is not as significant a factor in determining project benefits Within Community, as transportation needs within this scale often focus on slower, safer, multimodal trips. This factor is of great significance (and therefore of greater weight) within the Regional scale, as the efficient movement of people and goods is vital to the regional economy. The different weighting system allowed projects to be scored and ranked according to unique needs of each scale, providing more context for project-level performance assessment. All performance measures were mode-neutral to support objective evaluation of projects, regardless of type. Performance measures aligned with both regional goals and national transportation goals established in MAP-21 (Table 1).

[1] http://www.chcrpa.org/2040RTP.htm

Table 1 Performance Measures for Chattanooga 2040 RTP

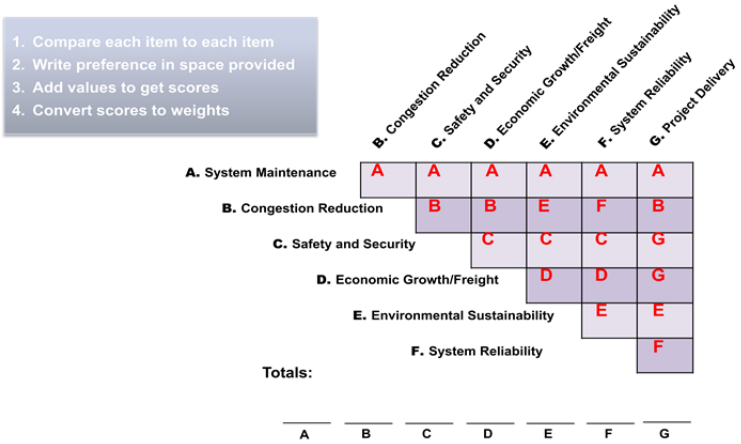
Performance Measure Category[a]	2040 RTP Objectives[b]	Systems-Level Measure	Project-Level Measure	Scale 1 Weight Within Community	Scale 2 Weight Community to Region	Scale 3 Weight Region to Region
System Maintenance	Preserve, maintain and improve existing infrastructure	Pavement: Percent Lane Miles in Good/Fair Condition	Project Addresses Pavement Deficiency	15	15	15
		Bridge: Average Health Index	Project Addresses Bridge Deficiency			
Congestion Reduction	Reduce delay on critical regional thoroughfares	Average Commute Trip Time, Auto and Transit	Project Reduces Delay • Interstate/Expressway • Corridor Connection to Key Center	10	15	20
Safety and Security	Improve operations, maintenance, and ADA compliance	Number of Projects (and Total Funding) Addressing RTP Safety Areas	Project Includes Countermeasure(s) to address RTP Safety Emphasis Areas	15	15	15
			Project Addresses Security or Emergency Response Need			
Economic Growth/ Freight Movement	Improve intermodal connections Reduce delay on critical freight corridors	Annual Congestion Costs, Truck and Auto	Project Reduces Delay • Intermodal Connection • Freight Corridor	5	10	20
Environmental Sustainability	Incentive complete streets projects Support desired community character Support healthy, safe communities Promote safe connections to community resources	VMT per Capita	Project Reduces VMT	30	20	10
			Project Promotes Nonmotorized Access to Community Resources			
			Project is in Keeping with Community Character			
System Reliability	Expand set of travel options Encourage connected, multimodal network Improve system operations Incentivize corridor protection plans	Mode Split	Project Located on Facility with Corridor Protection Plan	15	15	10
			Project Fills Gap in Existing System			
			Project Improves Efficiency through ITS			
Project Delivery			Project Supported by TDOT and Local Jurisdiction	10	10	10

[a] Performance Measure Categories align directly with MAP-21 national transportation goal areas.

[b] Objectives are abbreviated from adopted 2040 RTP goals/objectives. They are aligned with a performance measurement category that most closely represents intent of objective; however many objectives (and corresponding performance measures) support more than one performance category.

Initially, weight ranges were established through professional expertise and example project testing. The staff team then conducted a vetting process with the TPO's Technical Coordinating Committee, the recommending body to the TPO Executive Board, and the Plan's Technical and Community Advisory Committees using a pairwise survey (Figure 3) for each scale. The results aided staff in making the final decision on specific weights for each measure in each scale and provided useful insight into individuals' opinions on the level of importance of each measure in relationship to every other measure and whether those opinions varied by scale.

Figure 3 Pairwise Survey Worksheet



The pairwise exercise also allowed stakeholders and TPO members to fully understand how the measures would function in relation to the new scaled approach when implemented during the project evaluation and selection process. The results of the exercise were tallied and presented back to the group for discussion. This inclusionary participation and review enabled buy-in for the overall framework. However, the project ranking, itself, was expected to be the biggest hurdle.

Over 150 projects were considered in the project evaluation and selection process, across all project modes and types. Most were submitted through the membership Call for Projects; others were identified through the needs assessment and proposed by the staff team. All projects were first assigned to a scale, given the project's need and purpose, its location and proximity to community or environmental assets, and its functional classification. The scale of the project was needed to apply the appropriate performance measure weights, enabling the significance of various evaluation criteria to vary given the geographic scale of each project, and its role in the transportation system.

Within each scale, projects were then evaluated relative to one another (regardless of project type) for each of the 12 performance measures noted in Table 1. Weights were applied for each measure given the scale of project and points were summed across all measures to produce individual project scores up to 100 points. Projects were then combined into one scored list, across the three scales, based on project score. Note that the travel demand model was used to measure travel and delay-oriented impacts of traditional roadway capacity investments. An excel-based calculator was developed to capture the same travel and delay performance impacts for the following "off-model" project types: system operations, grade separation, bicycle/pedestrian, transit expansion, intersection improvements, various emission control programs, and travel demand management/commute strategies. Other measures related to safety, preservation, etc were evaluated using project sponsor input and/or individual windshield review of project. This process enabled all projects, *regardless of mode or type*, to be evaluated using the same set of performance metrics.

In order to present a manageable set of scored projects to the TPO TCC and Board and avoid unproductive discussion on specific scores of one project versus another, the staff team broke the scored project list into four priority ranks - first, second, third, and fourth rank priorities. These rankings were reviewed by the TPO and at the request of the membership shifts between scales were made for a very small number of projects for a project reevaluation (two projects). Following endorsement of the list by the TPO Board, the staff team began aligning priority projects with funding sources. Enough revenues existed to cover all projects in the first and second priority ranks. Detailed discussions ensued with the TPO membership regarding which of the projects in the third set would make the financial cut. A final list

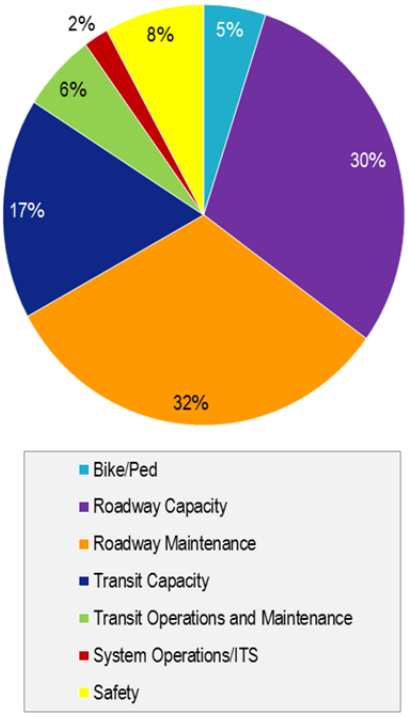
was constrained. It should be noted that the final constrained list also included system preservation, system operations, and safety funding set asides in addition to line-item projects.

Conclusions

The Community to Region Framework proved to be a highly flexible approach which infused context into the project evaluation process and supported more targeted investment decisions yielding a truly balanced investment package. The assumption that the best performers from each scale would float to the top, was confirmed. As an example, a high performing bicycle investment that scored 90 out of 100 points for Scale 1 was able to effectively compete with a high performing roadway capacity project that also scored 90 out of 100 for Scale 3. In addition, the TPO membership was fully engaged and integral to the implementation of the overall process. The performance-based planning process yielded a number of positive planning outcomes. These include:

- Blend of high ranking projects (by project type and across geographic scales) for the fiscally constrained 2040 RTP;
- Objective support for a variety of investments, given the mode-neutral performance evaluation;
- Focus on performance and priorities because the priorities were established *before* funding source entered stakeholder discussion.

Figure 4 2040 RTP Investment Package



The major investment outcomes are shown in Figure 4. They include:

- A doubling of funding for bike/ped improvements;
- Transit investment at 25% of plan, up from 18% from 2035 LRTP;
- A reduction in roadway capacity investment from 51% to 30% of plan; and
- Systems preservation funding at 39% of plan.

Takeaways and Lessons Learned

This approach is transferrable from both a policy and technical perspective, and not beyond basic staffing capabilities and resources of other small/medium-sized MPOs. Important aspects of the approach include:

- Appropriate weighting is critical; i.e., “watering down” this approach will not work.
- Must have a manageable number of projects; it takes time to understand project context.
- Need tools in place to evaluate off-model projects; spreadsheet or GIS methods suffice.
- Need to keep measures simple and mode-neutral to ensure objective, cross-”scale” analysis.
- A combination of qualitative and quantitative measures is OK; does not preclude an objective ranking.
- It is important to carry forward into TIP process.

Implementation

Although difficult to estimate a true cost of this approach due to the thorough integration of the performance framework with other components of the 2040 Regional Transportation Plan, consultant and staff costs, time, and resources are as representative as possible. Implementation of the overall performance based planning approach required approximately $75,000 (consultant dollars). This included funding to develop and vet the performance framework approach with staff and stakeholders (approximately $20K), to build the off-model benefits calculator (approximately $25K), to build an excel-based project scoring workbook (approximately $10K), and conduct project and plan evaluation (approximately $20K). This amount reflected about 7% of total consulting funds allocated for 2040 RTP development and associated air quality/transportation conformity analysis and documentation. Federal PL funds were used, matched by 20% of joint local funding through the Chattanooga-Hamilton County Regional Planning Agency (RPA) which provides staff to the TPO. Additional TPO staff time and resources included review and consideration of the importance of each performance measure and the relationship of each measure to the three different scales (approximately $2K). The RPA staff also considered support from existing neighborhood and community land use plans as well as other supporting documents such as the Climate Action Plan, Hazards Mitigation Plan, and specific sub-area or feasibility transportation studies for the project-level criteria (approximately $1K).

Approximately 150 projects were evaluated using this approach requiring 60 man-hours for two consultant staff; i.e., a total of 120 hours across one week's time. RPA staff was needed to complete the review of the supporting plans requiring 10 additional man-hours. Given the close, individual project review it took approximately 30-45 minutes to evaluate each project and input results into the project scoring workbook. *Note that this time does not include the time to run the travel demand or off-model calculator to derive VMT and delay benefits for each project*.

While two critical performance measures (VMT reduced, delay reduced) relied on either the regional travel demand model or off-model calculator to be quantified, most performance measures were qualitatively scored given close review of project scope and input from project sponsor. Table 2, below, provides more detail related to the tools and resources applied for calculation of each project level performance measure.

Table 2 Project Evaluation Methods for Chattanooga 2040 RTP

Performance Measure Category	Project Level Performance Measures	Evaluation Tool / Approach
System Maintenance	Project Addresses Pavement Deficiency	Points awarded (Yes/No) based on review of project scope and input from project sponsor
	Project Addresses Bridge Deficiency	Points awarded (Yes/No) based on review of project scope and input from project sponsor; Additional cross-check of bridge(s) against National Bridge Inventory database to identify structural deficiency status
Congestion Reduction	Project Reduces Delay • Interstate/Expressway • Corridor Connection to Key Center	Travel demand model for roadway capacity projects. Off-model calculator for all other project types.
Safety and Security	Project Includes Countermeasure(s) to address RTP Safety Emphasis Areas	Points awarded (Yes/No) based on review of project scope to identify if countermeasures that address RTP safety emphasis areas (Roadway Departure, Aggressive Driving, Intersection Improvement) are included.
	Project Addresses Security or Emergency Response Need	Security points calculated (Yes/No) based on project scope, with cross-check to identify if project provides network redundancy or enhances mobility in relation to security-critical assets (e.g., airports, intermodal facilities, etc)
Economic Growth/ Freight Movement	Project Reduces Delay • Intermodal Connection • Freight Corridor	Travel demand model for roadway capacity projects. Off-model calculator for all other project types.
Environmental Sustainability	Project Reduces VMT	Travel demand model for roadway capacity projects. Off-model calculator for all other project types.
	Project Promotes Nonmotorized Access to Community Resources	Points will be calculated (Yes/No) based on review of project scope, along with cross-check to identify if project directly connects or serves: active transportation facility, healthy food location, health care facility, public/private school (K-12).
	Project is in Keeping with Community Character	Points will be calculated (Yes/No) based on review of applicable land use plan in place.
System Reliability	Project Located on Facility with Corridor Protection Plan	Points will be awarded (Yes/No) if corridor, access or other demand management plan in place for project facility.
	Project Fills Gap in Existing System	Points will be awarded (Yes/No) if project fills gap or provides connection within existing or planned bike, ped, or transit system as identified through GIS-based Bicycle Gap Analysis, Pedestrian Gap Analysis, and Transit Gap Analysis.
	Project Improves Efficiency through ITS	Points will be awarded (Yes/No) based on review of project scope.
Project Delivery	Project Supported by TDOT and Local Jurisdiction	Points will be awarded (Yes/No) based on project understanding and availability of local match

Melissa D. Taylor

Digitally signed by Melissa D. Taylor
DN: cn=Melissa D. Taylor, o=Regional Planning Agency & TPO, ou=Strategic Long Range Planning, email=taylor_melissa@chattanooga.gov, c=US
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