

Intro/Overview

The Charlotte Regional Transportation Planning Organization (CRTPO) has developed a process for determining project priorities to be included in the region's Metropolitan Transportation Plan (MTP). This process serves as a project evaluation system utilizing multiple criteria that reflect the region's transportation goals and objectives. Consistent with the North Carolina Department of Transportation's (NCDOT) Prioritization process, the evaluation process is used to determine if and to what extent potential roadway projects adequately address the region's roadway needs and goals.

These ranking criteria were originally developed as part of the CRTPO 2040 MTP, and have been updated and approved by CRTPO in February of 2017. Modest revisions to the 2040 MTP evaluation criteria were implemented to account for process modifications and the availability of new data since the previous criteria were selected. This includes efforts such as the Strategic Planning Office for Transportation (SPOT) Prioritization 4.0 (P4.0) process, CONNECT Study data, and the implementation of the Metrolina CommunityVIZ Model (MCM).

This document outlines the project ranking methodology approved by the CRTPO Board on February 15, 2017.

Ranking Procedure

The project evaluation process for the CRTPO MTP consists of two tiers: Tier I, in which all submitted projects are evaluated and filtered, and Tier II, in which a smaller number of projects advances from the Tier I filter for further evaluation using additional criteria. In both Tier I and Tier II, evaluation criteria are used to assign points to candidate projects according to how well the project meets CRTPO transportation priorities.

In the Tier I phase, criteria are used to evaluate the need for the project using the following quantitative measures:

- Congestion
- Safety
- Accessibility to Employment

Points are awarded for a possible total score of 200 points per project. All candidate projects are considered in this tier, and based on evaluation results and anticipated funding¹, a cutoff point is selected in order to identify the projects that will advance to be evaluated in Tier II. Projects with the highest scores, indicating that they best address transportation priorities, will advance to the Tier II evaluation. The remaining projects are dropped from consideration at this point.

The Tier II evaluation measures candidate projects' sustainability, and is a combination of both quantitative and qualitative analysis. Tier II criteria include:

¹ Financial assumptions for the 2045 MTP were approved by CRTPO on April 19, 2017.

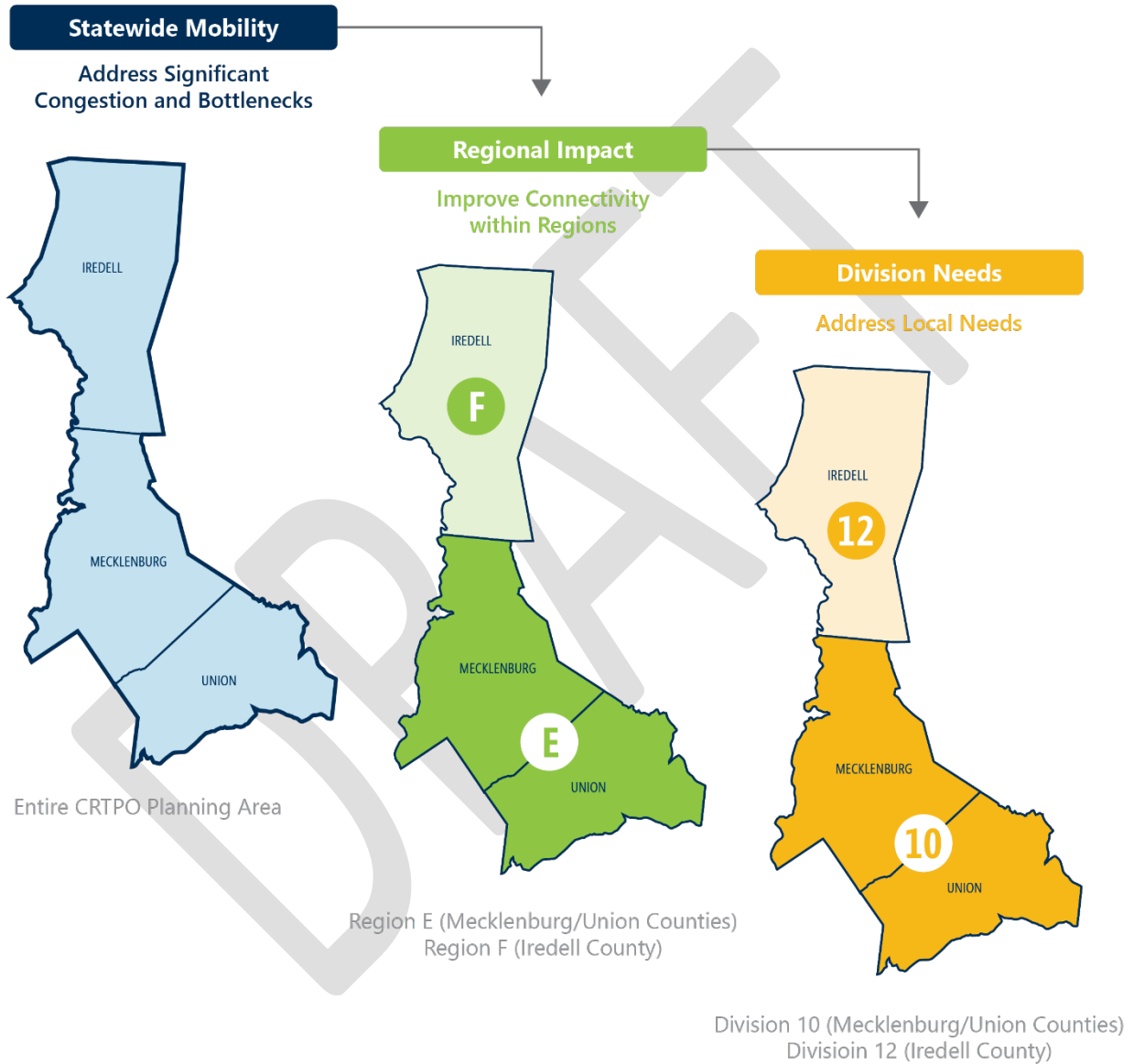
- Environmental Justice Impacts
- Natural Resource Impacts
- Historic Resource Impacts
- Community Resource Impacts
- System Connectivity
- Benefit Cost

All projects advancing from Tier I are considered in Tier II, and points are awarded for a possible total score of 100 points per project. After the Tier II evaluation is complete, each project's Tier I and Tier II scores are combined for the project's cumulative score, a maximum of 300 points per project.



Strategic Transportation Investments Categories

Prior to evaluating projects, they are divided according to defined NCDOT Strategic Transportation Investments (STI) categories in order to coincide with anticipated funding for candidate projects. The STI categories include Statewide Mobility, Regional Impact, and Division Needs, and specific to CRTPO, this represents five (5) separate categories shown in the graphic below.



For each of the five (5) categories, CRTPO approves financial assumptions to determine funding availability for candidate roadway projects for each MTP horizon year. In order to align project priorities with anticipated funding, the projects are also divided into the five (5) STI categories.

Roadway Ranking Review Committee

As part of MTP development, an ad hoc Roadway Ranking Review Committee (RRRC) was formed to facilitate the project ranking process and screen the results. Membership of the committee includes representatives from each county within CRTPO’s planning area as well as key stakeholders involved with the development of the MTP.

The RRRC meets throughout development of the MTP’s fiscally constrained roadway project list. The role of this committee is to:

- Review scores from the Tier I evaluation
- Determine the cutoff point for Tier I projects advancing to Tier II
- Review and assign scores for the Tier II evaluation
- Recommend fiscally constrained projects

Agency	Member
<i>Iredell County</i>	<i>Andrew Ventresca</i>
<i>Mecklenburg County</i>	<i>Stephen Trott</i>
<i>Union County</i>	<i>Dennis Rorie</i>
<i>Steering Committee</i>	<i>Andy Grzymiski</i>
<i>Metrolina Regional Model (MRM)</i>	<i>Anna Gallup</i>
<i>NCDOT</i>	<i>Stuart Basham</i>
<i>CRTPO</i>	<i>Neil Burke</i>

Ranking Criteria

The following section describes the criteria used for both the Tier I and Tier II evaluations.

TIER I

The Tier I evaluation consists of three criteria: Congestion, Safety, and Accessibility to Employment. These criteria were selected to assess the current conditions of the transportation system and measure how well each project responds to the system's needs. All criteria are quantitative, relying on data from the Metrolina Regional Model (MRM), the Metrolina CommunityVIZ Model (MCM), and historic traffic count and crash data from NCDOT. A total of 200 points are available in the Tier I evaluation. The following sections define these criteria and their respective point distributions in the Tier I evaluation.

Tier I Criteria	
CRITERIA	MAXIMUM POINTS
Congestion	100
Safety	50
Accessibility to Employment	50
TOTAL	200

Congestion

The total number of points available for the Congestion criterion is 100.

PURPOSE: To measure how well each facility currently functions, by measuring the most recent traffic volumes in relation to the existing roadway capacity.

DATA USED: 2015 Average Annual Daily Traffic (AADT) is obtained from NCDOT, and capacity is obtained from SPOT P4.0, using North Carolina Level of Service (LOS) based calculations.

APPLICATION: The following formula is utilized to calculate the score. Each of the two components for the formula are normalized individually, then the values are added together. The final step is to normalize the resulting sum to a maximum of 100 points.

Tier I: Congestion
$(V/C * 100 * 60\%) + (Volume/1000 * 40\%)$

Safety

The total number of points available for the Safety criterion is 50.

PURPOSE: To determine the historic safety deficiencies along the existing roadway facility using recent three-year history.

DATA USED: NCDOT crash data including density, severity, and crash rate

APPLICATION: The following formula is used to determine a safety score for roadways.

Tier I: Safety (Roadways)
Roadway score = $\frac{(\text{Crash Density} \times 33\%) + (\text{Crash Severity} \times 33\%) + (\text{Critical Crash Rate} \times 33\%)}{2}$

The following formula is used to determine a safety score for intersections.

Tier I: Safety (Intersections)
Intersection Score = $\frac{(\text{Crash Frequency} \times 50\%) + (\text{Severity Index} \times 50\%)}{2}$

Accessibility to Employment

The total number of points available for the Accessibility to Employment criterion is 50.

PURPOSE: To evaluate how well each facility currently serves the region’s employment by improving commuting via automobile to and from employment centers.

DATA USED: CONNECT Study and the Metrolina CommunityVIZ Model (MCM) data used to identify “centers”, and MRM data used to estimate traffic volumes.

APPLICATION: Centers of various types, including employment centers, activity centers, metropolitan centers, and town centers are identified using CONNECT data and the MCM. Traffic Analysis Zones (TAZ) with employment density of 1,250 or more² and an identified “center” are considered for this criteria. Points are assigned to projects on a 1-50 scale, based on traffic volumes. Facilities serving higher employment center traffic receive more points and those serving lower employment center traffic receive fewer points. The following steps outline how the criteria is applied:



² This includes TAZs within the CRTPO boundary, and those that are outside the boundary but could still influence trips to and/or from jobs within the CRTPO boundary.

TIER II

Tier II Criteria	
CRITERIA	MAXIMUM POINTS
Environmental Justice Impacts	9
Natural Resource Impacts	9
Historic Resource Impacts	9
Community Resource Impacts	9
System Connectivity	14
Benefit/Cost Ratio	50
TOTAL	100

The Tier II evaluation consists of six criteria:

These criteria were selected to evaluate how well each candidate project addresses the sustainability of the overall transportation system in the CRTPO region. Both qualitative and quantitative criteria were selected to effectively measure how candidate projects address and respond to the economic, social, and environmental pressures that are placed on the transportation system now and into the future. A total of 100 points are available in the Tier II evaluation. The following sections further define these criteria and their respective point distributions in the Tier II evaluation.

Environmental Justice

The total number of points available for the Environmental Justice criterion is 9.

PURPOSE: Using a degree of impact (DOI) analysis, to measure the level of impact that candidate projects have on identified Environmental Justice communities. Seven (7) groups have been identified:

- Black/African American
- Hispanic
- Asian-American
- American Indian/Alaska Native
- Households in Poverty
- Carless Households
- Limited English Proficiency (LEP) households

DATA USED: Environmental Justice data obtained from 2015 American Community Survey (ACS)

APPLICATION: Environmental Justice populations that exceed the planning area average are identified, and a four-level DOI assessment scale is applied as follows:

- 0 EJ groups: No concentration
- 1-2 EJ groups: Slight concentration
- 3-4 EJ groups: Moderate concentration
- 5-7 EJ groups: High concentration

Candidate projects are evaluated and the percent of each project, based on project length, located within or adjacent to the above concentration groups is calculated. If a project linearly straddles two concentration groups, 100 percent of the project is considered to be located within the higher concentration group. For interchange/intersection projects, 100 percent of the project is considered to be located within the higher concentration group. The following table provides guidance on how points are allocated:

Tier II: Environmental Justice			
PERCENT OF PROJECT	NO. OF GROUPS EXCEEDING REGIONAL AVERAGES FOR A GIVEN CENSUS TRACT		
	1 TO 2	3 TO 4	5 TO 7
0-25%	9 Points	6 Points	3 Points
26-50%	6 Points	3 Points	0 Points
51-75%	3 Points	0 Points	
76% or more	0 Points		

If no additional right-of-way is required for a given project, the project receives nine (9) points. All projects either receive 0, 3, 6, or 9 points; no other point variations are awarded.

Natural/Historic/Community Resource Impacts

The total number of points available for the Natural Resource Impacts criterion is 9.

PURPOSE: To determine the level of potential impact that candidate projects could have on surrounding natural/historic/community resources.

DATA USED: Geographic Information Systems (GIS) data from local, state, and federal sources. The following resources are included in the mapping.

Natural – streams and wetlands

Historic – properties/sites listed on the national registry and eligible for listing on the national registry

Community – schools (public, private, and charter), churches, cemeteries, libraries, hospitals, and parks

APPLICATION: This assessment is GIS-based, in which natural/historic/community resources are mapped, and candidate projects are assessed for their proximity to these resources. Each project is mapped with a one-quarter mile buffer in order to identify where resources are located within proximity to each project. Higher point values are allocated to those projects with the least amount of potential impact, as shown in the respective tables below. Each project is reviewed by the RRRC to verify resource locations and allocate points.

Tier II: Natural Resource Impacts		
NATURAL RESOURCE PROXIMITY	NUMBER OF POINTS	
	WIDENING/INTERCHANGE IMPROVEMENTS	NEW LOCATION ROADWAY/NEW INTERCHANGE
Resources Beyond ¼ Mile	9	9
Within ¼ Mile of Resource	6	3
Single Stream Crossing	6	3
Along a Stream	6	0
Through a Resource	3	0
Multiple Stream Crossings	3	0

Tier II: Historic Resource Impacts		
HISTORIC RESOURCE PROXIMITY	NUMBER OF POINTS	
	WIDENING/INTERCHANGE IMPROVEMENTS	NEW LOCATION ROADWAY/NEW INTERCHANGE
Resources Beyond ¼ Mile	9	9
Within ¼ Mile of Resource	6	3
Through a Resource	3	0

Tier II: Community Resource Impacts		
COMMUNITY RESOURCE PROXIMITY	NUMBER OF POINTS	
	WIDENING/INTERCHANGE IMPROVEMENTS	NEW LOCATION ROADWAY/NEW INTERCHANGE
Resources Beyond ¼ Mile	9	9
Within ¼ Mile of Resource	6	3
Through a Resource	3	0

All projects either receive 0, 3, 6, or 9 points; no other point variations are awarded.

System Connectivity

The total number of points available for the System Connectivity criterion is 14.

PURPOSE: To assess how candidate projects will impact the overall continuity of the transportation network.

DATA USED: No data is used for this criterion, other than mapping of candidate projects.

APPLICATION: This evaluation for System Connectivity is largely qualitative, with an assessment by the RRRRC. Projects are mapped and then evaluated based on four (4) category types, as described in the table below. In many cases, this requires engineering judgment by the RRRRC.

Tier II: System Connectivity		
PROJECT TYPE	CATEGORY	NUMBER OF POINTS
New Location	Project Closes a Full Segment Gap*	14
	Project Connects Two CTP-Designated "Needs Improvement" Roadways	14
	New Interchange	14
Road Widening/ Functionality Improvement	Project Closes a Full Lane Gap	7
	Project Continues or Connects the Roadway Functionality	7

**E+C projects are considered existing facilities for the Full Segment Gap category*

If a project does not meet any of these categories, no points are awarded. All projects either receive 0, 7, or 14 points; no other point variations are awarded.

Benefit/Cost Ratio

The total number of points available for the Benefit/Cost Ratio criterion is 50, which accounts for half of a project's potential Tier II score.

PURPOSE: To measure the value of the benefits that each candidate project provides, and how this benefit compares to its cost. The benefit is measured as a reduction in travel time converted to the cost of the savings, and the monetary benefit of crash reduction. This criterion is consistent with NCDOT's SPOT P4.0.

DATA USED: Planning-level construction and right-of-way costs generated by CRTPO, average weekday vehicle hours saved (for autos and trucks) from MRM, NCDOT's Safety Benefit Factor

APPLICATION: The assessment for Benefit/Cost Ratio is purely quantitative. First, reductions in travel time are converted to a dollar amount in annual savings provided. Using NCDOT's Safety Benefit Factor, the monetary benefit of crash reduction are also determined. Using the formula below, the benefits of candidate projects measured in dollars are compared to the cost of the project. The result is then normalized to 50 to account for half of the potential Tier II score for each

Tier II: Benefit/Cost Ratio	
$\frac{\text{Value of Travel Time Savings} + \text{Value of Safety Benefit}}{\text{Project Cost to NCDOT}}$	$+ \frac{\text{Other Funds}}{\text{Total Project Cost}}$

Notes:

- o Value of time for autos = \$12.75; trucks = \$50.00³
- o Safety Benefit Factor is based on categories defined by NCDOT⁴
- o Project cost to NCDOT is equal to the cost estimate prepared by CRTPO⁵

³ Source: NCDOT Strategic Planning Office of Transportation

⁴ Source: NCDOT Traffic Safety Unit

⁵ One exception is for express lanes projects – NCDOT Turnpike Authority provided Other Funds calculations for express lanes projects, which could result in modifications to the Project Cost to NCDOT.