



# 2050 METROPOLITAN TRANSPORTATION PLAN

Adopted April 2022



Charlotte Regional  
Transportation Planning  
Organization

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# Acknowledgments

The Charlotte Regional Transportation Planning Organization (CRTPO) relies on staff from throughout the planning area to contribute to its transportation planning efforts, including the development of the Metropolitan Transportation Plan (MTP). Three committees were formed to provide guidance for the MTP update: the Advisory Committee, the Steering Committee, and the Roadway Ranking Review Committee. Committee members are representatives of the CRTPO's Technical Coordinating Committee (TCC), the North Carolina Department of Transportation (NCDOT), member jurisdictions, and other transportation planning agency partners. The CRTPO staff greatly appreciates the contributions of all participating committee members.

## Advisory Committee

Name	Position/Agency
Megan Green	Air Quality
Michelle Nance	Council of Governments
Loretta Barren	Federal Highway Administration
Will Washam	TCC Focus Area Representative, Bicycle
Gwen Cook	TCC Focus Area Representative, Greenway
Alex Riemony	TCC Focus Area Representative, Pedestrian
Kate Cavazza	TCC Focus Area Representative, Public Health
Dana Stoogenke	Jurisdiction Representative
Andrew Ventresca	Jurisdiction Representative
Bjorn Hansen	Jurisdiction Representative
Anna Gallup	Metrolina Regional Model
Stuart Basham	NCDOT
Dominique Boyd	NCDOT
Anil Panicker	NCDOT
Hannah Cook	NCDOT
Dennis LaCaria	School District Representative
David McDonald	Transit

Note: MTP Steering Committee members also participated on the Advisory Committee

## Steering Committee

Name	Position/Agency
Neil Burke	CRTPO
Robert Cook	CRTPO
Judy Dellert -O'Keef	CRTPO
Travis Johnson	CRTPO
Agustin Rodriguez	CRTPO
Anna Gallup	Metrolina Regional Model
Andy Grzymski	Jurisdiction Representative
Catherine Mahoney	Charlotte Planning, Design & Development

## Roadway Ranking Review Committee

Name	Position/Agency
Theo Ghitea	Jurisdiction Representative
Andy Grzymski	Jurisdiction Representative
Andrew Ventresca	Jurisdiction Representative
Erika Martin	Iredell County
Dave Hill	Mecklenburg County
Bjorn Hansen	Union County
Anna Gallup	Metrolina Regional Model
Stuart Basham	NCDOT
Neil Burke	CRTPO
Travis Johnson	CRTPO
Agustin Rodriguez	CRTPO

# List of Acronyms

<b>3-C</b>	Continuing, Cooperative, and Comprehensive
<b>AADT</b>	Annual Average Daily Traffic
<b>AC</b>	Advisory Committee
<b>ACS</b>	American Community Survey
<b>AEP</b>	Alignment Evaluation Program
<b>BA</b>	Bonus Allocation
<b>BEB</b>	Battery Electric Bus
<b>BLCE</b>	Blue Line Capacity Expansion
<b>BPWG</b>	Bicycle and Pedestrian Work Group
<b>BRT</b>	Bus Rapid Transit
<b>BUILD</b>	Better Utilizing Investments to Leverage Development
<b>CAA</b>	Clean Air Act
<b>CATS</b>	Charlotte Area Transit System
<b>CAV</b>	Connected and Autonomous Vehicles
<b>CDOT</b>	Charlotte Department of Transportation
<b>CMAQ</b>	Congestion Mitigation and Air Quality
<b>CMP</b>	Congestion Management Process
<b>CRA</b>	Civil Rights Act
<b>CRAFT</b>	Charlotte Regional Alliance for Transportation
<b>CRTPO</b>	Charlotte Regional Transportation Planning Organization
<b>CTC</b>	Community Transit Center

<b>CTP</b>	Comprehensive Transportation Plan
<b>DOT</b>	Department of Transportation
<b>EJ</b>	Environmental Justice
<b>EPA</b>	Environmental Protection Agency
<b>ETC</b>	Eastern Transportation Coalition
<b>ETC</b>	Employee Transportation Coordinator
<b>EV</b>	Electric Vehicles
<b>FAST</b>	Fixing America's Surface Transportation
<b>FHWA</b>	Federal Highway Administration
<b>FTA</b>	Federal Transit Administration
<b>HCT</b>	High Capacity Transit
<b>HOV</b>	High Occupancy Vehicle
<b>HSIP</b>	Highway Safety Improvement Program
<b>ICATS</b>	Iredell County Area Transportation System
<b>IIJA</b>	Infrastructure Investment and Jobs Act
<b>MCM</b>	Metrolina CommunityViz Model
<b>MPO</b>	Metropolitan Planning Organization
<b>MRM</b>	Metrolina Regional Model
<b>MTP</b>	Metropolitan Transportation Plan
<b>MTS</b>	Mecklenburg Transportation System
<b>NAAQS</b>	National Ambient Air Quality Standards

<b>NCDOT</b>	North Carolina Department of Transportation
<b>NCGA</b>	North Carolina General Assembly
<b>NCTA</b>	North Carolina Turnpike Authority
<b>NEPA</b>	National Environmental Policy Act
<b>NTD</b>	National Transit Database
<b>PHED</b>	Peak Hour Excessive Delay
<b>PIP</b>	Public Involvement Plan
<b>PTASP</b>	Public Transportation Agency Safety Plan
<b>RAISE</b>	Rebuilding American Infrastructure with Sustainability and Equity
<b>SC</b>	Steering Committee
<b>SOV</b>	Single-Occupancy Vehicle
<b>STBG-DA</b>	Surface Transportation Block Grant-Direct Attributable
<b>STI</b>	Strategic Transportation Investments
<b>STIP</b>	State Transportation Improvement Program
<b>TAM</b>	Transit Asset Management
<b>TAP</b>	Transportation Alternatives Program
<b>TAZ</b>	Traffic Analysis Zone
<b>TBT</b>	Thoroughbred Bulk Transfer
<b>TCC</b>	Technical Coordinating Committee
<b>TDM</b>	Transportation Demand Management

<b>TEI</b>	Transit Education Initiative
<b>TERM</b>	Transit Economic Requirements Model
<b>TIGER</b>	Transportation Investment Generating Economic Recovery
<b>TIP</b>	Transportation Improvement Program
<b>TMN</b>	Transformational Mobility Network
<b>TSMO</b>	Transportation Systems Management and Operations
<b>TTI</b>	Travel Time Index
<b>TTTR</b>	Truck Travel Time Reliability
<b>UCT</b>	Union County Transportation
<b>ULB</b>	Useful Life Benchmark
<b>UPWP</b>	Unified Planning Work Program
<b>UZA</b>	Urbanized Area
<b>V/C</b>	Volume to Capacity Ratio
<b>VMT</b>	Vehicle Miles Traveled

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## Chapter 01 Introduction

Transportation is a vital component of daily life and a key consideration for countless decisions. The presence of comfortable and convenient options that are safe and reliable is key in providing viable mobility choices. How people and goods move from place-to-place dictates economic well-being, impacts land use and the natural environment, and affects quality of life. Planning for a transportation system that will accommodate the needs of people living, working, and traveling within the region is both an important undertaking and significant challenge.

The Charlotte Regional Transportation Planning Organization (CRTPO) is responsible for transportation planning in the Charlotte region and one of its most important tasks is to maintain and update a Metropolitan Transportation Plan (MTP). The MTP is a long-range planning document that evaluates existing and future trends, identifies strategies and solutions, and recommends project investments.

Demographics and land use patterns are shifting, technology continues to evolve, and the demand for services to keep pace with these changes is growing. Transportation in the Charlotte region is not immune to these evolving dynamics. As a result, the CRTPO's approach to the 2050 MTP is to use this opportunity to improve upon past practices, develop new techniques and strategies, and coordinate with partners to identify resources and implement recommendations to enhance transportation.

## About CRTPO

The CRTPO is the federally designated Metropolitan Planning Organization (MPO) for the Charlotte urbanized area. It is also a designated Transportation Management Area (TMA) because its urbanized area includes a population of at least 200,000. Within its established three-county planning area, the CRTPO leads transportation planning efforts and supports 24 member jurisdictions through collaboration on various initiatives and the allocation of federal transportation funds. **Figure**

**1-1** shows the CRTPO planning area boundary and its member jurisdictions.



## What is an MPO?

An MPO is a federally designated transportation planning organization that sets policy and makes decisions about the allocation of federal transportation funds throughout its defined planning area. MPOs are established for urbanized areas with a population of 50,000 or more. Comprised of representatives from local governments and partner transportation agencies, MPOs facilitate regional collaboration to carry out metropolitan transportation planning activities.

## **Figure 1-1**

# **CRTPO Planning Area Boundary and Member Jurisdictions**

## LEGEND

- CRTPO Planning Area
  - Lake Norman
  - Member Jurisdiction
  - County Boundary (NC)
  - County Boundary (SC)

## **Member Jurisdictions:**

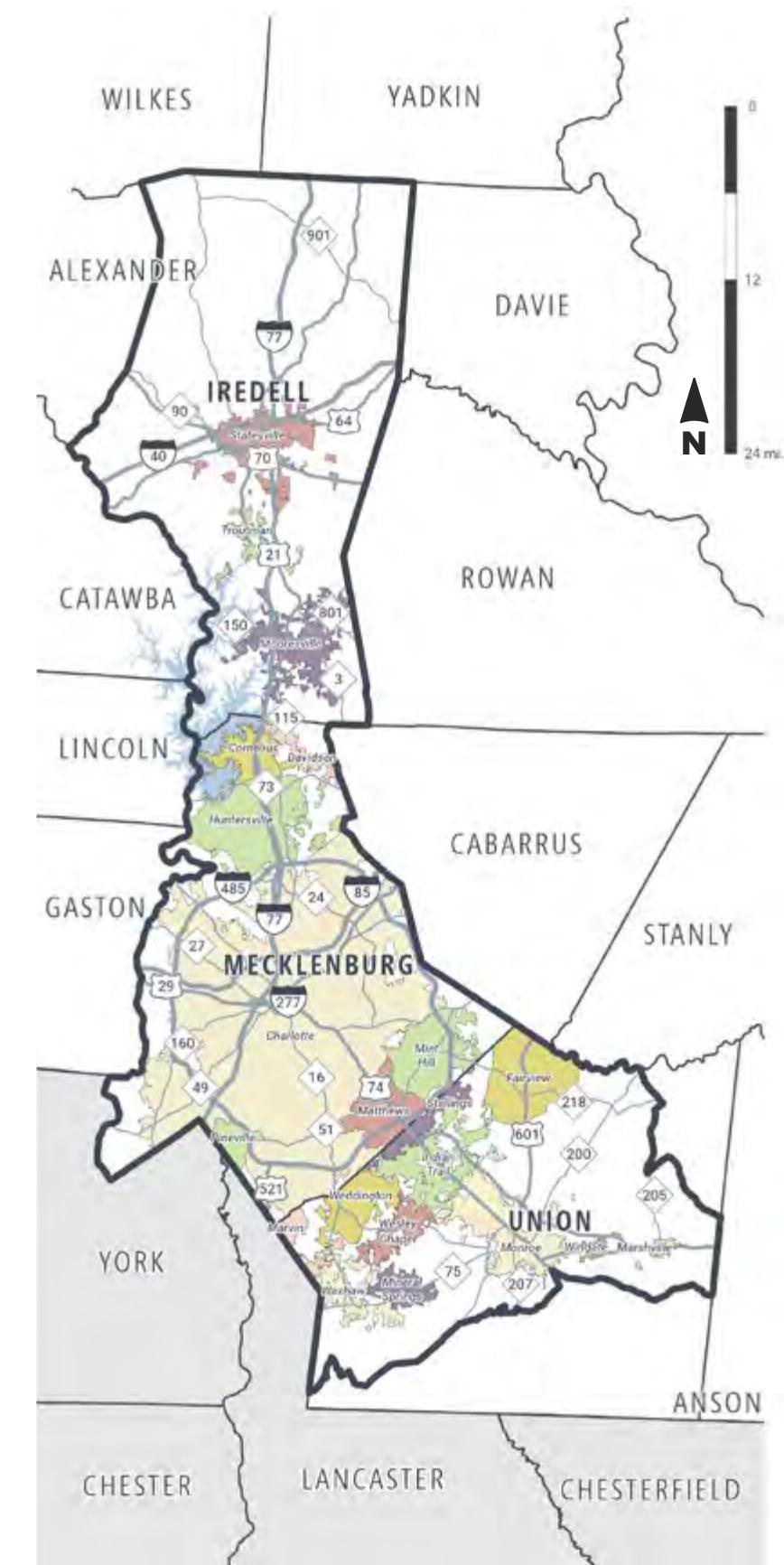
- **Iredell County**
  - City of Statesville
  - Towns of:
    - Mooresville
    - Troutman
  - **Mecklenburg County**
  - City of Charlotte
  - Towns of:

Cornelius	Matthews
Davidson	Mint Hill
Huntersville	Pineville
  - **Union County**
  - City of Monroe
  - Towns/Villages of:

Fairview	Stallings
Indian Trail	Waxhaw
Marshville	Weddington
Marvin	Wesley Chapel
Mineral Springs	Winquate

- \* Voting members also include the Metropolitan Transit Commission and the North Carolina Board of Transportation.

**\*\* Non-voting members include the Charlotte-Mecklenburg Planning Commission, the Iredell County Planning Board, the Union County Planning Board, the North Carolina Turnpike Authority, and the Federal Highway Administration.**



## CRTPO Organization



### CRTPO Board

The CRTPO Board is the decision-making body of the CRTPO and is responsible for considering transportation-related policies and planning initiatives, along with allocating federal transportation funds.

#### 32 CRTPO Board Members

- 27 Voting Members
- 5 Non-Voting Members



### Technical Coordinating Committee

The Technical Coordinating Committee (TCC) provides guidance related to the planning tasks and initiatives carried out by the CRTPO, and makes technical recommendations to the CRTPO Board.

#### 36 TCC Members

- Member Jurisdiction Staff
- Focus Area Representatives
- NCDOT



The CRTPO staff members support the CRTPO Board and TCC, coordinate with partner agencies, develop and maintain plans and programs, and engage the public in the planning process.

#### 11 Staff Members

## CRTPO Responsibilities

Key duties and responsibilities of the CRTPO include:

- Ensure meaningful participation in the federally mandated continuing, coordinated, and comprehensive (3-C) transportation planning process;
- Establish goals and objectives that represent and respond to the transportation needs throughout its planning area, and monitor outcomes of initiatives and recommendations to assess progress toward achieving them;
- Allocate federal funds and facilitate project solicitation, prioritization, and selection processes that provide opportunities for member jurisdictions to utilize those funds; and
- Develop, maintain, and update transportation plans and programs.

## About the Metropolitan Transportation Plan

The Metropolitan Transportation Plan, or MTP, is a multimodal plan that defines the transportation policies, programs, and projects to be implemented over the next 20-plus years. It serves as one of the primary means for the CRTPO to assess future transportation needs, document tools and strategies to help improve the existing transportation system, and engage stakeholders and the public to promote awareness and request input about proposed transportation investments.

Key components of the MTP include goals and objectives, an assessment of the existing transportation system, anticipated funding projections, recommended projects, and performance monitoring. The MTP is updated every four years, but the strategies and recommendations included in the plan are an integral part of the CRTPO's ongoing metropolitan transportation planning activities. Each time the MTP is developed, there are updates to existing tools and resources as well as new strategies and initiatives that warrant attention to meet changing conditions within the region. For the 2050 MTP, the following key updates and new elements are included:

- Scenario planning update
- Alternative funding research and analysis
- Active transportation corridor assessment tool
- Equitable Access criteria for project ranking
- Performance targets and assessment
- Planning initiatives (Beyond 77, CONNECT Beyond, CRTPO Strategic Plan)

The MTP is approved by the CRTPO Board and meets federal requirements, ensuring transportation funds continue to be distributed within the planning area.

The CRTPO's MTP is updated every four years.



Plaza/Central Cycle Track Intersection

## Goals and Objectives

The goals and objectives established for the 2050 MTP guide the development of this plan as well as the CRTPO's overall planning initiatives throughout the next four years. The CRTPO conducted extensive review of previously adopted goals and objectives, coordinated with stakeholders, and requested public input prior to adopting the 2050 MTP goals and objectives. For this MTP, the CRTPO was intentional about concentrating on goals and objectives it could influence, consolidating the goals and respective objectives to focus on specific aspects of enhancing transportation, and crafting measurable objectives it could use to assess progress towards achieving the goals.

The CRTPO was also deliberate about its process to review and receive input on the goals and objectives prior to incorporating them into the MTP, conducting multiple meetings with the MTP Advisory Committee (AC) and providing an opportunity for public comments to request feedback.

Through these efforts, six goals each supported by several objectives, were adopted for the 2050 MTP and are listed in **Table 1-1**.



Town of  
Davidson

**Table 1-1 2050 MTP Goals and Objectives**

Goal No.	Description
<b>Goal 1</b>	Provide, manage, and maintain a <b>safe, efficient, and sustainable transportation</b> system.
1.1	Designate resources to maintain the existing transportation system and support efforts to maintain transportation assets in good condition.
1.2	Endorse and pursue projects and strategies designed to manage or reduce congestion.
1.3	Encourage design features that minimize crash potential, severity, and frequency and support efforts to eliminate transportation-related fatalities and serious injuries.
1.4	Develop policies, plans, and programs that promote a sustainable and resilient transportation system.
1.5	Accommodate the implementation of new transportation technologies and logistics practices.
1.6	Support project development and public awareness programs that promote pedestrian and bicycle safety.
1.7	Increase access to sustainable and zero carbon transportation modes and mobility options.
<b>Goal 2</b>	Promote an <b>integrated, accessible, multimodal transportation</b> system.
2.1	Develop a multimodal transportation system that strives to minimize delay and increase travel time reliability.
2.2	Increase transportation network connectivity by minimizing barriers, completing links between nodes, and improving access to and increasing multimodal density at activity/employment centers.
2.3	Pursue roadways that utilize design standards consistent with NCDOT's and/or local complete streets policies.
2.4	Support transit agency efforts to provide affordable and convenient public transportation services.
2.5	Endorse and pursue projects that provide linkages for pedestrians and bicyclists between neighborhoods and activity/employment centers.
2.6	Promote future opportunities for inter-regional mobility through enhancements to inter-city rail service and the provision of high-speed rail service.
2.7	Participate in regional transit initiatives including CONNECT Beyond and the Transit Initiative Task Force.
<b>Goal 3</b>	Develop transportation plans and policies that <b>improve quality of life</b> for residents, are <b>sensitive to significant features of the natural and human environment</b> , and encourage <b>linkages between transportation and land use</b> .
3.1	Plan transportation facilities and support context sensitive design standards to promote a transportation system that is compatible with community needs and the natural and built environment.
3.2	Foster the development of transportation facilities that minimize neighborhood impacts, promote active living and healthy communities.
3.3	Integrate transportation and land use policies, particularly related to density, mixed use, parking, and transit-oriented development.

**Table 1-1 2050 MTP Goals and Objectives (continued)**

Goal No.	Description
<b>Goal 4</b>	Promote <b>equitable transportation</b> options for the economically disadvantaged, minority, aging, and disabled populations.
4.1	Support opportunities to serve transportation-disadvantaged populations with convenient transportation to employment, education, healthcare, fresh food options, and other essential services.
4.2	Develop strategies to engage and educate residents who have not been reached by the traditional transportation planning process.
4.3	Identify transportation projects in environmental justice communities.
<b>Goal 5</b>	Lead, participate in, and encourage <b>regional and statewide</b> collaboration.
5.1	Identify opportunities to develop joint goals and policies with other MPOs in the region and increase data sharing and coordination.
5.2	Participate in transportation-related planning efforts initiated by other agencies and organizations throughout the region (plans, studies, initiatives, etc.).
5.3	Lead and partner on planning efforts that cross multiple jurisdictions within CRTPO's planning area.
<b>Goal 6</b>	Support <b>economic competitiveness</b> by making transportation investment decisions that effectively utilize limited public resources, <b>enhance system performance</b> , and encourage opportunities for <b>freight movement</b> .
6.1	Explore opportunities to minimize implementation and operation costs of transportation projects.
6.2	Foster innovative financing and partnership opportunities for project development and implementation.
6.3	Promote strategies that increase vehicle occupancy and the use of alternate modes by utilizing a full range of transportation demand management options and strategies.
6.4	Support an integrated freight transportation system that facilitates the movement of goods.



These goals and objectives are tied to various elements of the MTP, including federal planning factors and performance measures, as well as performance indicators established as part of the scenario planning process. They also support the CRTPO's Strategic Plan goals.

*City of Statesville*

## Relationship to Other Plans

The MTP is one of several plans maintained by the CRTPO. While each is unique, they all have a common purpose to help the CRTPO identify and implement priority projects to improve the overall transportation system. **Figure 1-2** illustrates the plans that are part of this three-step project development process.

### Comprehensive Transportation Plan

The Comprehensive Transportation Plan (CTP) is an inventory of all envisioned transportation improvements in the planning area. The CRTPO works with the NCDOT to develop a CTP that identifies highway, bicycle and pedestrian, and transit and rail corridors that either need improvement or are recommended new facilities. Unlike the MTP, the CTP is not limited by anticipated revenue projections. The CTP identifies all potential improvements throughout the CRTPO planning area and serves as the basis for identifying specific project needs. It is amended based on changes to corridor designations or alignments, to reflect updated priorities. Projects identified to be evaluated for inclusion in the

MTP are a subset of proposed corridor improvements from the CTP.

### Transportation Improvement Program

The CRTPO is federally required to develop and adopt a Transportation Improvement Program (TIP). The TIP contains priority projects that have funding identified in the anticipated year of expenditure and it must be updated a minimum of every four years. In North Carolina, the NCDOT develops a 10-year State TIP, or STIP. The first six years of the STIP, referred to as the delivery portion of the program, includes projects with a greater certainty of being delivered as scheduled. The latter four years, or developmental program, identifies projects that may or may not be delivered within the 10-year window. The STIP is typically updated every two years and approved by the North Carolina Board of Transportation.

The CRTPO must adopt a TIP that contains the projects within its planning area. The TIP is incorporated directly, without change, into NCDOT's STIP. Projects identified with committed funding in the first six years of the CRTPO's TIP are also included in the MTP.

**Figure 1-2**  
**Three-Step Project Development Process**



## Relationship to Other Initiatives

In addition to other plans developed and maintained by the CRTPO, the following planning initiatives were conducted concurrent with the 2050 MTP:

- Beyond 77 Corridor Study
- CONNECT Beyond Regional Mobility Initiative
- CRTPO Strategic Plan

All three efforts are significant in that they are the first of their kind for the planning area and they include specific actions, recommendations, and implementation measures for the CRTPO to pursue. The MTP includes information about these initiatives, as well as the relevant outcomes and activities to be carried out by the CRTPO to implement the recommendations identified.

## Transportation Planning Regulations

The Fixing America's Surface Transportation (FAST) Act is the federal transportation legislation that outlines the regulations for the metropolitan transportation planning process, including development of the MTP. It was signed into law in 2015 as a five-year bill and was then extended one year until September 2021. In November 2021, the Infrastructure Investment and Jobs Act (IIJA) was signed into law. The new bill includes investing \$110 billion for roads, bridges, and major infrastructure projects over a five-year period, focusing on climate change mitigation, resilience, equity, and safety for all users (including bicyclists and pedestrians). It also invests \$39 billion to modernize public transportation, \$66 billion in passenger and freight rail, and \$25 billion for airports.

## Planning Factors

Federal transportation regulations identify 10 planning factors. The planning factors signify key considerations related to the transportation system to be addressed in the metropolitan transportation planning process. References are placed throughout the 2050 MTP to indicate a specific strategy or initiative that addresses these planning factors. Extensive coordination was conducted with the Steering Committee and Advisory Committee to ensure the CRTPO's goals and objectives align with the Federal planning factors.

### 10 Federal Planning Factors

	Support the <b>economic vitality</b> of the metropolitan area		Enhance the <b>integration and connectivity</b> of the transportation system, across and between modes, for people and freight
	Increase the <b>safety</b> of the transportation system for motorized and non-motorized users		Promote <b>efficient system</b> management and operations
	Increase the <b>security</b> of the transportation system for motorized and non-motorized users		Emphasize the <b>preservation</b> of the existing transportation system
	Increase the <b>accessibility</b> and mobility of people and for freight		Improve the <b>resiliency and reliability</b> of the transportation system and reduce or mitigate stormwater impacts of surface transportation
	Protect and enhance the <b>environment</b> , promote energy conservation, and improve the quality of life		Enhance <b>travel and tourism</b>

The CRTPO will monitor potential changes to the metropolitan transportation planning requirements that could be developed as part of the IIJA legislation, to ensure any new requirements are implemented for future MTP updates.

## **Performance-Based Planning and Programming**

Performance-based planning is now an integral part of the metropolitan transportation planning process. Federal regulations outline a framework that requires MPOs to establish and monitor performance targets that correspond to federally defined measures for a series of highway and transit metrics. This process intentionally requires coordination, to the maximum extent possible, among the state, MPO, and transit providers. The CRTPO has integrated performance-based planning into various aspects of the 2050 MTP, and has established performance targets for each of the required performance categories (see **Chapter 8**). In addition, performance metrics have been established for other planning initiatives (scenario planning, congestion management process, public health) not defined in the federal legislation.

## **Clean Air Act**

The Clean Air Act (CAA) is a federal law passed in 1970 to protect public health and welfare from different types of air pollution caused by various sources, including ozone and carbon monoxide. A significant amendment to the CAA in 1990 is the requirement to demonstrate transportation conformity, meaning the projects included in the MTP will not cause new air quality violations, worsen existing violations, or delay timely attainment of the established air quality standards before federal funding and approval are granted.

The CRTPO conducted an Air Quality Conformity Determination as a part of the 2050 MTP and has demonstrated that total emissions projections for projects included in the plan are within established limits. The [Air Quality Conformity Determination](#) report is available on the CRTPO website.

Air quality standards also dictate how often an MPO must update its MTP, based on the region's designated status of attainment (meeting standards), nonattainment (not meeting at least one of the standards), or maintenance (previously not meeting standards, but now consistently meeting standards).<sup>1</sup> The CRTPO is in a maintenance area and must therefore update its MTP a minimum of every four years until attainment status is achieved.

<sup>1</sup> The United States Environmental Protection Agency (EPA) sets National Ambient Air Quality Standards (NAAQS) or limits on the atmospheric concentration of six pollutants that cause smog, acid rain, and other health hazards. Pollutants include ozone, atmospheric particulate matter, lead, carbon monoxide, sulfur oxides, and nitrogen oxides.

## **Civil Rights Act of 1964**

Title VI of the Civil Rights Act (CRA) of 1964 prohibits discriminatory practices in programs and activities receiving federal funds. The transportation planning regulations, issued in October 1993, require that metropolitan transportation planning processes be consistent with Title VI. Examples of how the CRTPO complies with Title VI and recommendations to improve compliance are documented in the CRTPO Title VI Compliance: Status Report. Activities include ensuring plans for public engagement have a broad reach throughout the region and regular reporting on Title VI efforts.

Environmental Justice (EJ) amplifies the provisions found in Title VI of the CRA. The CRTPO is proactive in its approach to identify and address the potential effects of transportation on minority and low-income populations. Doing so includes full, fair, and meaningful participation in all phases of transportation decision making.

Examples of the CRTPO's efforts to comply with Title VI and EJ requirements can be found throughout the 2050 MTP. In particular, EJ impacts and equitable access were considerations for evaluating roadway projects and a quantitative analysis was conducted to assess how project investments impact EJ communities. During the development of the MTP, the CRTPO was strategic in engaging communities that have historically been underrepresented in local and regional planning efforts.

## **MTP Amendments**

While the CRTPO updates its MTP every four years, it often makes amendments during interim years to ensure the document is up to date as needs and conditions change. Items that may trigger an MTP amendment include adding projects to the MTP (due to the allocation of additional funds to the CRTPO), a shift in schedule of anticipated project completion, substantial changes to project limits for existing MTP projects, or consolidation of projects. Amendments to the MTP require public engagement and the plan must continue to demonstrate fiscal constraint as a result of project updates. Changes to the project list could also require an updated transportation emissions analysis to ensure air quality conformity.

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## Chapter 02

# Stakeholder and Public Engagement

All metropolitan transportation planning activities are based on a federally required continuing, cooperative, and comprehensive (3-C) process. Stakeholder and public engagement are critical to the success of the Metropolitan Transportation Plan (MTP) update process to inform and educate, as well as obtain input. The CRTPO is also focused on developing and implementing plans and processes to reach minority and low-income populations, who traditionally are less involved in the transportation planning process, as well as those with limited ability to read, write, speak, or understand English.

Before the MTP update process began, restrictions related to COVID-19 were instituted. As a result, outreach efforts were nearly all conducted virtually, utilizing a variety of online tools and techniques to raise awareness and gather input. Despite these limitations, the CRTPO was able to effectively, and successfully, engage stakeholders and the public throughout the 2050 MTP update process.

# Stakeholder Coordination

Stakeholder coordination is a crucial element of developing the MTP. The emphasis on stakeholder engagement is highlighted by the CRTPO's formation of two committees to guide the MTP development process: the Steering Committee (SC) and the Advisory Committee (AC). Each committee included specific membership and responsibilities. These committees made recommendations that were presented to the CRTPO's Technical Coordinating Committee (TCC) and CRTPO Board to consider and act upon. In addition, active transportation stakeholders, transit providers, and environmental resource agencies were consulted.

*Little Sugar Creek Greenway  
(Sharon Road West)*



Input from these stakeholder groups ensured the recommendations and approvals required to complete the MTP had been thoroughly assessed from a variety of perspectives.

## Steering Committee

The 2050 MTP SC provided guidance and oversight related to all aspects of the 2050 MTP development process. The SC routinely met (approximately twice a month) between July 2020 and November 2021 and its members also served on the MTP AC.

The SC was composed of select members of the CRTPO staff, Metrolina Regional Model (MRM) staff, and transportation planning staff.

## Advisory Committee

The 2050 MTP AC consisted of a broad array of stakeholders including representatives from CRTPO member jurisdictions, the North Carolina Department of Transportation (NCDOT), the Federal Highway Administration (FHWA), the school system, public transportation agencies, transportation planning focus areas, and members of the SC. The AC provided guidance and direction and made recommendations to the TCC on the following components of the MTP:

- Goals and objectives
- Financial plan
- Revisions to the MTP's roadway ranking criteria
- Results of the project ranking process
- Scenario planning
- Public outreach methods and techniques
- Document and materials review

## Advisory Committee Membership



Note: AC members are listed in the Acknowledgments section at the beginning of this MTP.

The AC provided guidance and direction on the MTP.

## Technical Coordinating Committee and CRTPO Board

The CRTPO staff provided regular status updates on MTP activities and requested action on specific items at the TCC and CRTPO Board meetings throughout the development of the plan. Based on input provided by the AC and the CRTPO staff, the TCC made recommendations to the CRTPO Board at key milestones during the MTP update process to approve items such as the goals and objectives, financial plan, fiscally constrained project list, and the final plan document. Another significant role of the TCC and CRTPO Board during the 2050 MTP development process was to initiate opportunities for public input.

## Charlotte Regional Alliance for Transportation

The Charlotte Regional Alliance for Transportation (CRAFT) is made up of four MPOs and two rural planning organizations (RPOs) in the Charlotte region and was created to facilitate regional transportation planning. CRAFT provides a forum to discuss the MTP development process. The CRTPO also coordinated with neighboring MPOs to discuss projects (limits and horizon year) that extend across MPO boundaries to ensure the projects are consistent across MTPs. The Cabarrus Rowan MPO and Gaston Cleveland Lincoln MPO develop MTPs for their respective planning areas concurrent with the CRTPO.



4th Street  
Uptown Charlotte

## Bicycle and Pedestrian Work Group

The CRTPO's [Bicycle and Pedestrian Work Group \(BPWG\)](#) is a committee that oversees ongoing planning efforts to ensure bicycle and pedestrian stakeholders and advocates throughout the planning area have a voice in the planning process. Several BPWG members served on the MTP AC and are TCC members. The BPWG provided feedback on the active transportation elements of the 2050 MTP, specifically related to the development of a new active transportation corridors tool (see [Chapter 5](#)).

## Public Transportation Agencies

The 2019 Staffing and Resources Study highlighted the need for the CRTPO to integrate transit planning into the metropolitan transportation planning process. As a result, the CRTPO regularly coordinates with the four public transportation agencies in its planning area to ensure transit is well represented in the metropolitan transportation planning process. Details about these agencies and the services they provide are included in [Chapter 3](#). In addition, developing anticipated financial projections for future public transportation ([Chapter 6](#)) and the associated capital transit projects to invest those funds ([Chapter 7](#)) are key elements of the MTP. A representative for public transportation was a member of the MTP AC and collaboration related to transit-focused items was ongoing throughout the development of the plan.



## Resource Agencies

Engagement with resource agencies is an important component of the metropolitan transportation planning process. Consultation with agencies responsible for land use management, natural resources, environmental protection, conservation, and historic preservation concerning applicable components of the MTP ensures adequate oversight and consideration of environmental resources. Resource agencies were notified of all MTP public engagement activities and agency representatives completed an independent review of projects proposed for inclusion in the 2050 MTP, as well as the criteria used to evaluate candidate MTP projects.

Planning Factor Addressed



Environment

## Resource Agency Consultation

The CRTPO staff led a webinar with resource agencies on June 10, 2021 to provide information and receive input on the 2050 MTP roadway ranking methodology and resulting project list. Participants discussed potential areas of project impacts related to the following resources:

- Historic
- Community
- Natural Environment
- Environmental Justice

The comments submitted by resource agencies and corresponding responses are included in [Appendix A](#).



Farm Pasture in Union County

## Public Engagement

Public engagement is a critical component of the MTP update process. It helps the CRTPO understand what is important to those who live and work in the region and contributes to more informed decision-making.

The CRTPO adapted its approach to public participation for the 2050 MTP in response to COVID-19, conducting engagement activities almost exclusively in a virtual environment. Public engagement procedures and techniques were guided by the CRTPO's [Public Involvement Plan \(PIP\)](#). The PIP highlights significant opportunities for public involvement during the development of the MTP as well as recommended techniques to inform residents and stakeholders and gather input.

In addition, specific tools and techniques were identified for the 2050 MTP public outreach effort, along with a timeline for requesting input during the plan update process, as illustrated in **Figure 2-1**.

Figure 2-1 Public Engagement Opportunities, Techniques, and Timeline

Techniques	Opportunities				
	Goals and Objectives	Candidate Projects	Fiscally Constrained Project List	Ongoing Education	Draft 2050 MTP/Air Quality Conformity
Handouts	●	●	●	●	
Electronic Newsletter	●	●	●	●	●
Website	●	●	●	●	●
Social Media	●	●	●	●	●
Geofencing		●	●		
Multi-language Hotline	●	●	●	●	●
Radio Interviews			●	●	
Informational Videos	●	●	●	●	
AC/TCC Member Outreach Assistance	●	●	●	●	●
Media Release	●		●		●
E-blasts	●	●	●	●	●
Public Workshops	●	●	●	●	
Pop-Up Events	●		●	●	●
Small Group Meetings	●	●	●	●	●
Surveys	●		●	●	
Online Interactive Mapping		●	●		
Webinars	●	●		●	

Timeline					
2020	2021				2022
Q4	Q1	Q2	Q3	Q4	Q1
Goals and Objectives/Candidate Projects	Virtual Kickoff Meeting	Ongoing Education	Fiscally Constrained Project List	Ongoing Education	Draft 2050 MTP/Air Quality Conformity

## Opportunities for Engagement

The CRTPO encouraged general comments and questions throughout the MTP development process through online resources and a toll-free hotline. Focused public engagement activities were also conducted to kickoff the MTP development process and collect input on specific plan components including the goals and objectives, candidate projects, project list, and the 2050 MTP document and air quality conformity determination. All the comments received and responses provided by the CRTPO staff are included in **Appendix A**.

### Kickoff Meeting

The CRTPO held a virtual kickoff meeting on December 17, 2020, to provide an introduction and overview of the 2050 MTP development process. A panel of professionals and policy makers discussed a variety of transportation topics and challenges facing the region. Over 115 people attended the kickoff meeting and it was recorded and posted on the 2050 MTP website for further viewing.

#### 2050 MTP VIRTUAL KICKOFF MEETING

**4**    
Panelists

**115+**    
Attendees

Moderated by  
Geraldine Gardner  
(Centralina Regional Council)

Sustain Charlotte  
Eric Zaverl

NC Board of Transportation  
Tony Lathrop

Iredell County Economic  
Development Corporation  
Jenn Bosser

NCDOT Chief Deputy Secretary  
David Howard



## Tools and Techniques

A variety of tools and techniques were used throughout the MTP development process to request input at specific milestones, provide information and updates about the plan, and engage as many people as possible. Due to the limitations of in-person engagement associated with COVID-19, providing information and awareness about the 2050 MTP was largely accomplished through the use of a dedicated website, social media, email, electronic newsletters, and conducting numerous virtual meetings. The following tools and techniques were utilized to request input and educate stakeholders and the public about the 2050 MTP:

### WEBSITE

The CRTPO created a website dedicated solely to the 2050 MTP – [www.2050mtp.org](http://www.2050mtp.org). The website provided education materials and up-to-date information specific to key elements of the 2050 MTP as it was being developed. It also served as the central location to post links for engagement opportunities and providing a platform for the CRTPO to respond to questions and comments received. Additionally, the website included links to related resources to inform visitors about other planning efforts and initiatives related to the MTP.



**6,655**    
TOTAL  
Visitors

**18,565**    
TOTAL  
Visits

## Public Engagement Toolkit

The CRTPO developed an online [2050 MTP Public Engagement Toolkit](#) for its member jurisdictions that included resources for spreading awareness about the MTP through their respective websites, email distribution lists, and social media platforms.

## SOCIAL MEDIA

Social media is a far-reaching and cost-efficient tool to circulate information and the CRTPO made a deliberate effort to effectively utilize this technique throughout its public engagement for the 2050 MTP. The CRTPO made strategic posts on its Facebook page and through Twitter to distribute information and updates about opportunities to provide comments and the status of the plan's progress. Geofencing is a feature of social media that the CRTPO used to ensure the posts were focused on reaching people within the CRTPO planning area boundary. NextDoor, a more localized form of social media, was also utilized to send updates about the MTP and encourage participation in the plan development process.



**141.7K**  
TOTAL  
People Reached

**38.4K**  
TOTAL  
Views

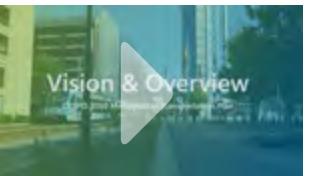
**5.2K**  
TOTAL  
Link Clicks



**36 TOTAL**  
Social Media Posts  
English and Spanish

## VIDEOS

A series of videos were created and released in four separate installments during the plan development process, to coincide with public engagement and bring attention to the MTP. The videos were posted on the website, edited to shorter clips for use in social media posts, and incorporated into presentations given by the CRTPO staff.



**Release Date:**  
November 11, 2020

**Total Number of Views:**  
2,874



**Release Date:**  
November 11, 2020

**Total Number of Views:**  
2,861



**Release Date:**  
January 22, 2021

**Total Number of Views:**  
1,564



**Release Date:**  
January 22, 2021

**Total Number of Views:**  
312

## SURVEYS

Two surveys were created to request feedback on goals and objectives, projects, and key elements of the transportation planning decision-making process (such as transportation behaviors and preferences related to investing funds). Each survey was posted on the 2050 MTP website during the respective comment period. Survey responses were reviewed and considered prior to adopting the 2050 MTP goals and objectives and project list. Survey results are included in **Appendix A**.



**342**  
Participants

**1,057**  
Responses

**329**  
Comments

## Total Visits

 **1,833**

## Widening/New Location

 **117 Likes on 53 Projects**

## Interchange/Intersection

 **72 Likes on 21 Projects**

 **4 New Projects Recommended**

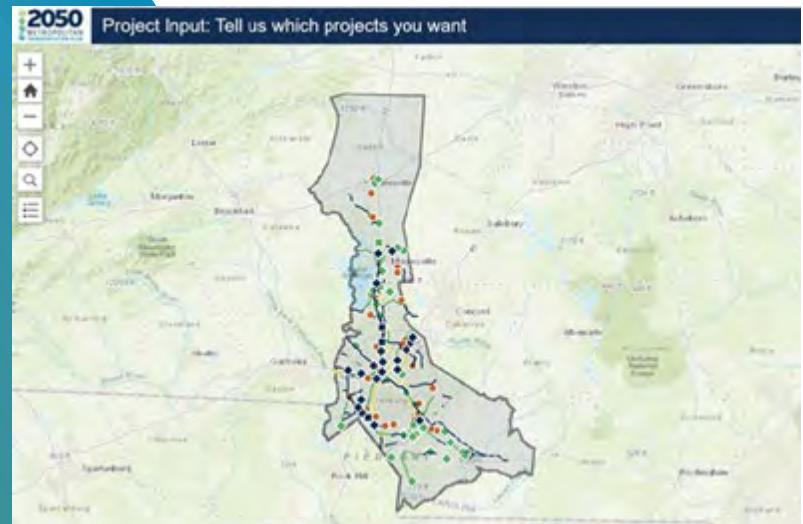
## Bicycle/Pedestrian/Transit

 **10 New Projects Recommended**

## Comments

 **55 Roadway Comments**

 **15 Bike/Ped Comments**



## INTERACTIVE MAPS

Two interactive ArcGIS StoryMaps were developed to receive input on MTP projects. Each StoryMap was posted on the MTP website and allowed users to easily view and comment on projects directly in the mapping application.

One map requested general feedback about which projects to consider for evaluation in the 2050 MTP.

Responses were provided to member jurisdictions, for reference, when considering which candidate MTP projects to submit. The other mapping application provided an opportunity to comment on the proposed fiscally constrained projects, and the input received was considered by the TCC and CRTPO Board prior to approving the MTP project list.

## PRESENTATIONS TO COMMUNITY ORGANIZATIONS

The CRTPO staff conducted approximately 30 virtual and in-person presentations to a variety of organizations in the planning area including business organizations, planning boards, chambers of commerce, and rotary clubs to promote the MTP and request input. A full list of these organizations is included in **Appendix A**.

## NEWSLETTERS, FLYERS, AND E-BLAST NOTIFICATIONS

Four special edition newsletters were created for the MTP, distributed to those on the CRTPO's email distribution list, posted on social media, and included on the 2050 MTP website. Each newsletter focused on specific items pertinent to the MTP development process and highlighted opportunities for input. In addition, the CRTPO included MTP updates in its recurring quarterly newsletter.

Flyers and e-blast notifications were also prepared and sent to recipients on the CRTPO's email distribution list.



## Youth Outreach

The CRTPO created a transportation planning activity for 5th graders within its planning area. Students were given a budget and asked to identify specific locations to add transportation improvements within a fictitious town.

## PARTICIPATION

**8 Charlotte Area Classrooms**

**125+ Charlotte Area 5th Graders**



Displayed is one example of this virtual activity completed by students, in which they added a new road to their friend's neighborhood, a bike path/sidewalk to get to school, and a bus stop at the music store.

## Environmental Justice Outreach

Environmental Justice (EJ) communities refer to populations that are traditionally underrepresented in the planning process, including low income and minority groups. The CRTPO was intentional about ensuring outreach opportunities were provided for EJ communities during the development of the 2050 MTP. A list of EJ communities engaged by the CRTPO during the development of the MTP is included in [Appendix A](#).

Several EJ strategies supplemented the tools and techniques previously described in this chapter, highlighted by the following:

- The website included a feature to translate content in 12 different languages to accommodate users who do not speak English as a primary language
- The MTP videos included options for English and Spanish subtitles
- Social media posts were translated to Spanish (and the videos included with each social media post included the option of English or Spanish subtitles)
- Surveys were available in English and Spanish
- Presentations were given to EJ groups
- Newsletters and flyers were translated to Spanish
- The CRTPO's email distribution list includes organizations that represent EJ communities

In addition, the CRTPO established a toll-free hotline offering 10 different languages for people with limited ability to read, write, speak, or understand English to inquire about the MTP or leave comments.



**Figure 2-2** provides a summary of the participation for each respective public engagement opportunity.

**Figure 2-2 Public Engagement Summary**

Activity	Description and Participation	
Virtual Kickoff Meeting	<b>115+</b> Attendees	<b>4</b> Panelists
Resource Agency Webinar	<b>50</b> Attendees	<b>30</b> Federal, State, Regional & Local Agencies
Website *	<b>18.6K</b> Total Visits	<b>6.7K</b> Total Visitors
Social Media *	<b>141.7K</b> Total People Reached	<b>36</b> Total Posts
Surveys *	<b>1.1K</b> Responses	<b>342</b> Participants
Interactive Maps	<b>1.8K</b> Total Visits	
Presentations to Community Organizations	<b>31</b> Total Presentations	<b>5</b> EJ Presentations
Newsletters, Flyers, and E-Blast Notifications *	<b>4</b> Newsletters	<b>8</b> Flyers and E-Blast Notifications
Youth Outreach	<b>125+</b> Charlotte Area 5th Graders	<b>8</b> Charlotte Area Classrooms
Toll-Free Hotline *	<b>10</b> Languages	

\* Included translation to Spanish

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## Chapter 03

### Planning Area Assessment

The CRTPO is responsible for planning for the multimodal transportation network within the Charlotte region. To adequately plan for the region, an understanding of the existing conditions as well as the future trends is critical. This chapter describes characteristics of the planning area related to population, employment, land use, the economy, and the environment and provides an overview of the transportation system and associated trends.

#### CRTPO Planning Area

The planning area encompasses approximately 1,560 square miles and includes all of Iredell

and Mecklenburg counties as well as a substantial portion of Union County. It is home to over 1.5 million residents and supports over 1.1 million jobs and is expected to surpass 2.5 million residents and 1.7 million jobs by the year 2050. Communities within the planning area range from large metropolitan centers to developing suburbs and rural farmland. Nine Fortune 500 companies are located in the planning area, along with multiple higher education institutions and the largest man-made body of fresh water in North Carolina. Numerous tourist attractions, parks, and historic sites are also located throughout the region.

Metropolitan Planning Organization (MPO) planning area boundaries, at a minimum, must include the existing urbanized area (UZA) as defined by the US Census. After each decennial census, the urbanized area boundaries are updated based on census results, and subsequently the MPO boundaries are adjusted. The CRTPO planning area has expanded numerous times over the past 50 years, as illustrated in **Figure 3-1**, including its expansion into Iredell County as a result of the 2010 census. The process to analyze and define the UZA based on results from the 2020 census was not complete at the time the 2050 Metropolitan Transportation Plan (MTP) was adopted, but the CRTPO monitors changes to the Charlotte UZA to respond to potential impacts to its planning area.

<b>1965</b>	<b>1970</b>
Charlotte Transportation Study Planning Area	
<b>1980</b>	
Charlotte Mecklenburg Metropolitan Planning Organization	
<b>1990</b>	<b>2000</b>
Mecklenburg Union Metropolitan Planning Organization	
<b>2010</b>	<b>2015</b>
Charlotte Regional Transportation Planning Organization	

**Figure 3-1 Planning Area Expansion**



The CRTPO planning area has expanded numerous times over the past 50 years.

## Population and Employment Trends

The Charlotte metropolitan area, a census-defined geography that includes the CRTPO planning area, is one of the fastest growing metropolitan areas in the country. Population and employment are increasing substantially in all three of the CRTPO's member counties. As a part of the planning process, the CRTPO relies on the Metrolina Regional Model (MRM), which is a vital tool that utilizes population and employment data as inputs. The data specific to the planning area are available by traffic analysis zone (TAZ)<sup>1</sup> derived from the MRM.<sup>2</sup> Monitoring current and future trends related to population and employment contribute to a successful planning process by being able to forecast anticipated demands placed on the transportation system.

### Population

The population within the CRTPO planning area is largely concentrated in Mecklenburg County, with much of it located in or directly surrounding the City of Charlotte. However, the rate of growth in Union County has been outpacing Mecklenburg County in recent years and is anticipated to continue through 2050. Iredell County is also expected to experience substantial growth, but at a slower anticipated rate than Mecklenburg and Union counties.

While all three counties within the CRTPO planning area are projected to grow overall, the majority of growth is likely to be concentrated in municipalities and within proximity to major transportation corridors. In addition to the three counties included in the CRTPO planning area, the neighboring cities of Concord, Gastonia, and Rock Hill are also experiencing rapid growth. Although these cities are not members of the CRTPO, the four areas combined represent the 9th fastest growing metropolitan area in the country.

1 A TAZ is the unit of geography used in the MRM to measure population and employment growth.

2 The MRM is the primary tool for evaluating existing and future travel demand in the greater Charlotte area. It is managed by the Charlotte Department of Transportation (CDOT).

3 [Charlotte Regional Business Alliance](#)



**Table 3-1** shows anticipated population growth by county between 2018 and 2050 and **Figure 3-2** shows the anticipated percent of population growth over the same time period by TAZ. Union County is expected to experience the highest growth rate of the CRTPO's three counties and higher than the overall planning area (70% compared to 64%) as well. Mecklenburg County is expected to grow 65%, which is consistent with the planning area growth, and Iredell County is also anticipated to have substantial growth of 51%.

**Table 3-1 CRTPO Population Projections**

Location	2018	2050	Absolute Growth (2018-2050)	% Growth (2018-2050)
CRTPO Planning Area*	1,530,900	2,516,600	<b>985,700</b>	<b>64%</b>
Iredell County	182,300	274,500	<b>92,200</b>	<b>51%</b>
Mecklenburg County	1,117,600	1,849,500	<b>731,900</b>	<b>65%</b>
Union County*	231,000	392,600	<b>161,600</b>	<b>70%</b>

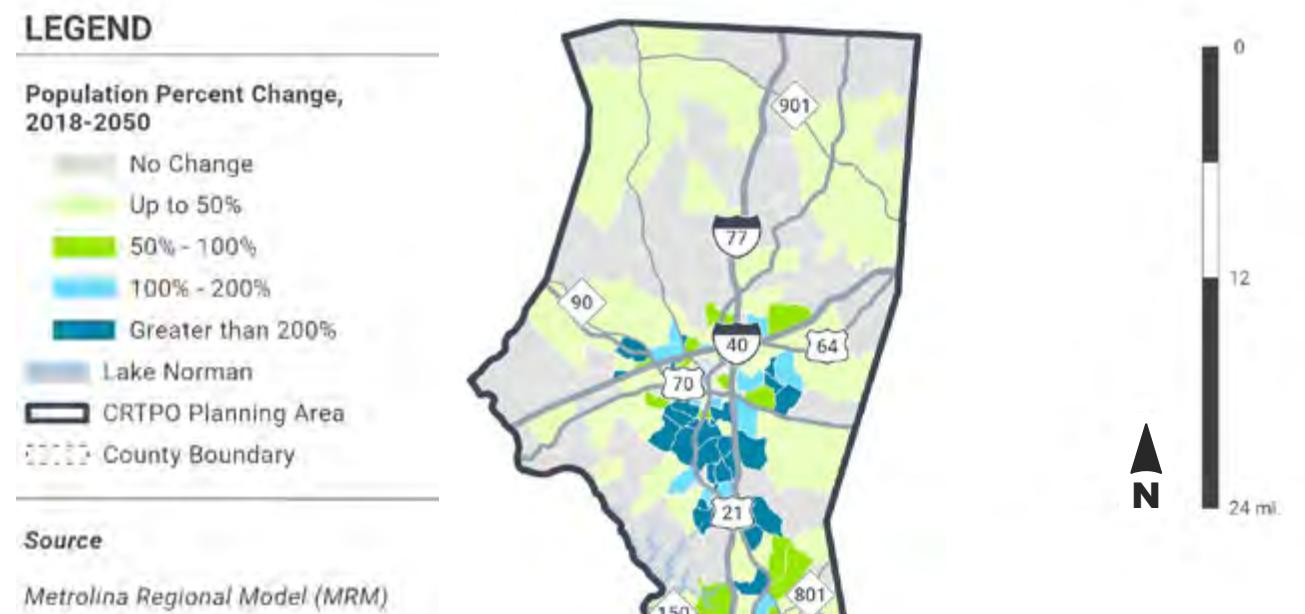
Source: MRM

Note: The numbers in this table are rounded to the nearest 100s.

\*Includes all of Union County



**Figure 3-2 CRTPO Population Growth (2018–2050)**



## Employment

Combined with population, the employment within the region is also an important consideration. The employment (number of employees) in the CRTPO planning area is projected to grow by 54%, which is lower than the projected population growth of 64%. Like population, employment is largely concentrated in Mecklenburg County, with much of it located in the City of Charlotte.

Anticipated employment growth by county between 2018 and 2050 is displayed in **Table 3-2. Figure 3-3** shows the anticipated percent of employment growth by TAZ for the same time period. As with population, the percent of employment growth is highest in Union County, which also significantly exceeds the overall planning area growth (83% compared with 54%). In addition, anticipated employment growth of 64% in Iredell County exceeds the planning area overall. While absolute employment numbers are highest in Mecklenburg County, growth is expected to be 49%, the least of the three counties and less than the planning area.

**Table 3-2 CRTPO Employment Projections**

Location	2018	2050	Absolute Growth (2018-2050)	% Growth (2018-2050)
CRTPO Planning Area*	1,119,800	1,718,900	<b>599,100</b>	<b>54%</b>
Iredell County	102,700	168,800	<b>66,100</b>	<b>64%</b>
Mecklenburg County	916,700	1,366,700	<b>450,000</b>	<b>49%</b>
Union County*	100,400	183,400	<b>83,000</b>	<b>83%</b>

Source: MRM

Note: The numbers in this table are rounded to the nearest 100s.

\*Includes all of Union County

The rapid growth of population and employment in the Charlotte region impacts transportation and creates challenges that must be addressed as part of the planning process. **Chapter 4** highlights challenges associated with growth in the planning area and **Chapter 5** identifies strategies to adapt and respond to changing conditions.

### Planning Factor Addressed



Economic Vitality

**Figure 3-3 CRTPO Employment Growth (2018–2050)**

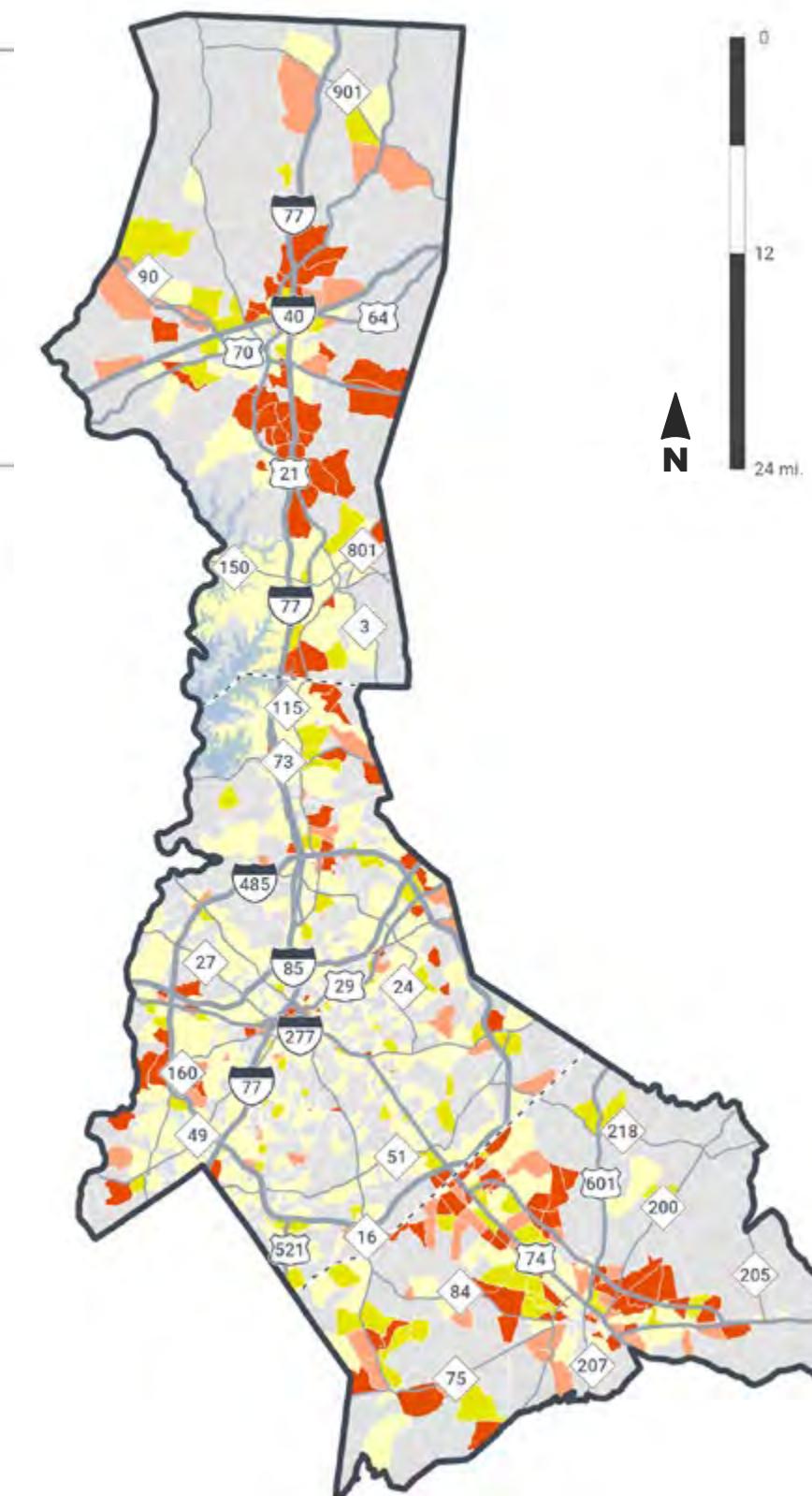
#### LEGEND

Employment Percent Change,  
2018-2050

- No Change
- Up to 50%
- 50% - 100%
- 100% - 200%
- Greater than 200%
- Lake Norman
- CRTPO Planning Area
- County Boundary

#### Source

Metrolina Regional Model (MRM)



## Land Use and Development

Land use and transportation are closely interconnected. Distribution, density, and various types of land uses affect travel patterns and influence decisions related to transportation investments. Zoning and land use practices in the region support single-use, low-density development patterns, especially in Iredell and Union counties, as well as mixed-use and transit oriented development in the urban centers and along strategic corridors. Most residents in the region live in single-family detached homes, with farms and open space in rural areas transitioning to a suburban development pattern. Other housing types and most jobs are concentrated in activity centers or along transportation corridors.



Land use planning processes in the CRTPO planning area are the responsibility of local governments that maintain comprehensive plans, zoning ordinances, or small area plans to guide future growth and development decisions. These plans and ordinances are created independent of the CRTPO, and land use interests of its member jurisdictions are conveyed by representatives on the Technical Coordinating Committee (TCC), CRTPO Board, or other project-specific committees. The CRTPO staff collects land use and development data from local governments in the planning area once every four years to update socioeconomic data for the MRM.

In 2014, the CRTPO participated in CONNECT Our Future, a 14-county planning initiative to identify community priorities and select a preferred growth concept for the region. Priorities identified through the CONNECT Our Future initiative included increasing transportation choices, reducing commuting costs, and increasing the number of jobs located within a convenient distance of housing.

The preferred regional growth concept, shown in **Figure 3-4**, was a result of CONNECT Our Future and is intended to create new mixed-use/walkable developments, increase housing choices, and preserve working farms and open space.

Building on the foundation of CONNECT Our Future, a new initiative, CONNECT Beyond, was completed in 2021. CONNECT Beyond is a significant planning effort that focused on the integration and optimization of transit networks to enhance mobility and access in the region. **Chapter 5** describes CONNECT Beyond in more detail.

Downtown Statesville

**Figure 3-4 Preferred Regional Growth Concept**

County-Level Consortium Scenario #

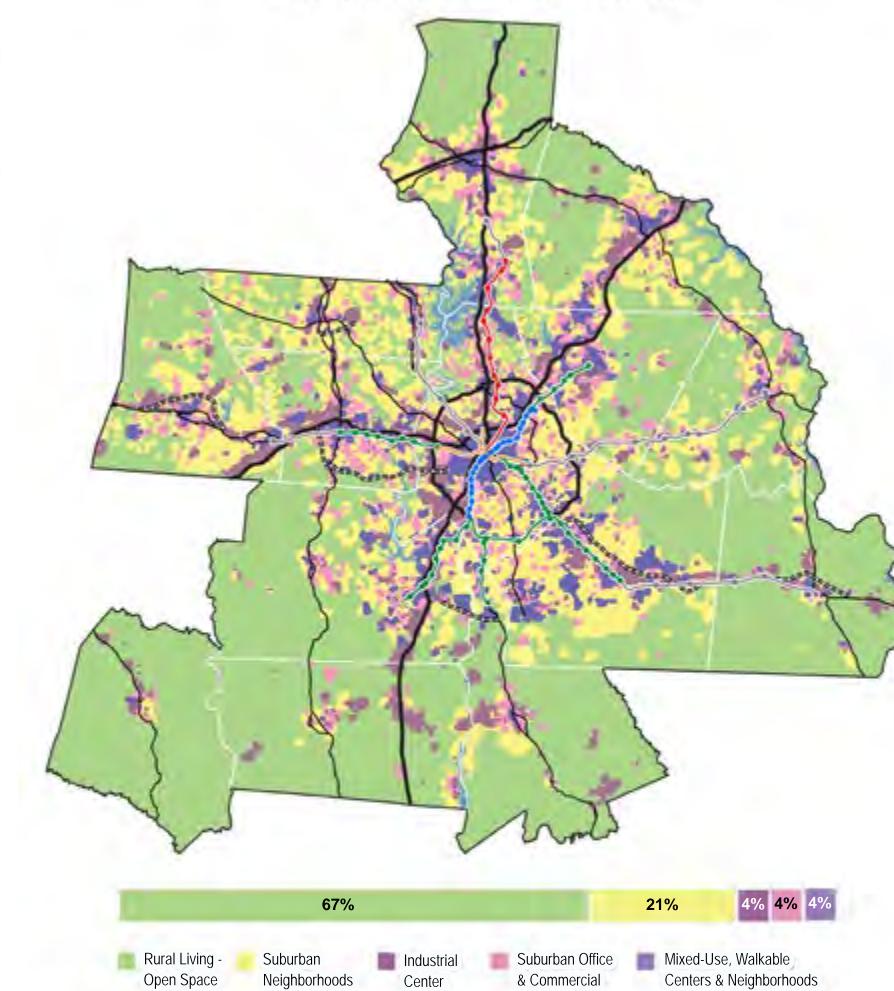
- Rural Living / Open Space
- Suburban Neighborhoods
- Industrial Center
- Suburban Office & Commercial
- Mixed-Use, Walkable Centers & Neighborhoods
- NC/SC or US Highways
- Interstates
- Commuter Rail Transit
- Light Rail Transit
- Bus Rapid Transit
- Streetcar Transit
- Transit Corridor (Post 2050, Technology TBD)
- Proposed Roads
- Potential Transit Stops (based on Community Types).

# = Artist's Illustration of Community Types in the CommunityViz Model, Last Updated June 21, 2014



### CONNECT Our Future Scenario Planning Initiative

#### Building a Preferred Growth Concept



#### Planning Factors Addressed

- Economic Vitality
- Accessibility

Regional activity centers were also defined as part of the CONNECT Our Future initiative. Regional activity centers are clusters of office, retail, and industrial employment uses. The CRTPO utilized these regional activity centers as part of its roadway ranking process for two different criteria<sup>4</sup> as well as for scenario planning and performance evaluation initiatives during the development of the 2050 MTP. **Figure 3-5** shows the 13 regional activity centers in the planning area.

<sup>4</sup> Accessibility to Employment and Equitable Access are quantitative roadway ranking criteria that use regional activity centers as an input. **Appendix H** includes details about the MTP roadway ranking methodology.

**Figure 3-5 Regional Activity Centers**

#### LEGEND

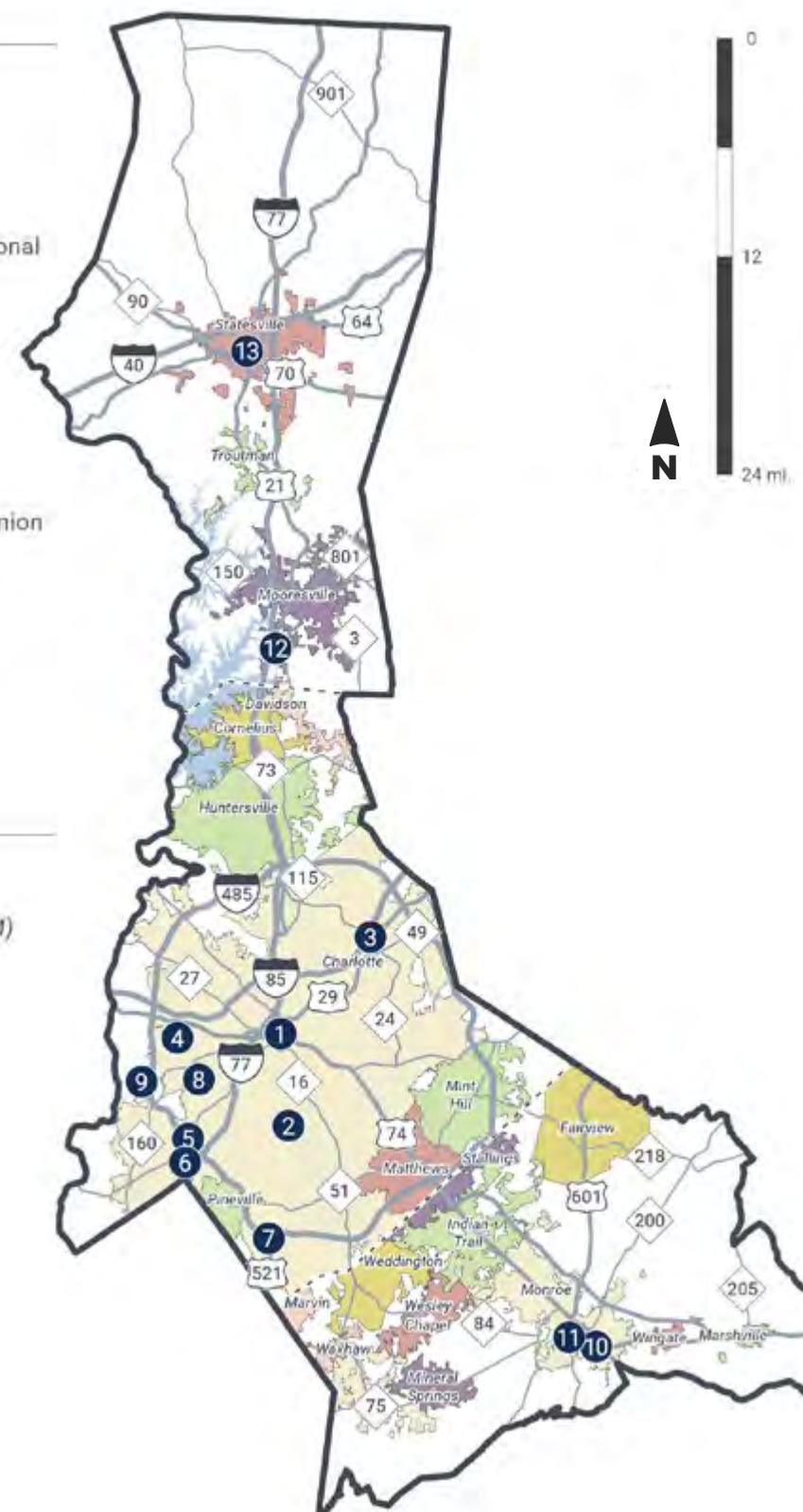
##### Regional Activity Center

- 1 Uptown Charlotte
- 2 South Park
- 3 University Research Park
- 4 Charlotte Douglas International Airport
- 5 Whitehall
- 6 Westinghouse Boulevard
- 7 Ballantyne
- 8 Old Coliseum
- 9 River District
- 10 Carolinas Medical Center Union
- 11 Downtown Monroe
- 12 Lowes Corporate Center
- 13 Downtown Statesville

- Lake Norman
- CRTPO Planning Area
- Municipal Boundary
- County Boundary

#### Source

Metrolina CommunityViz Model (MCM)



#### Housing and Transportation

With so many people moving to the Charlotte region, the inventory of available homes has shrunk, and when combined with other external economic factors, home prices have been rising.<sup>5</sup> According to the US Department of Transportation (DOT), housing costs are the single largest expense for most households. Long-standing metrics used to measure affordable housing do not consider the transportation costs associated with home locations.

Oftentimes, more affordable homes are located farther from jobs, amenities, and public transportation. While the home itself may be more affordable, the homeowner has increased auto dependency and faces higher transportation costs associated with automobile upkeep and fuel consumption. These household transportation costs and the available public transportation are equity considerations. Equity in transportation planning is an important issues, which is discussed in more detail in **Chapter 4**.

While housing affordability is outside of its control, the CRTPO works to help reduce transportation costs in the region by supporting planning initiatives and allocating funds to expand public transit and active transportation in the planning area. Providing more mode choices helps increase access to jobs and services.

The CRTPO monitors several performance measures that highlight efforts to increase access to jobs, public transportation, and active transportation in the planning area, including:

- Percent of households within 15 minutes of a regional activity center
- Percent of households and employees within  $\frac{1}{2}$ -mile of a fixed transit station
- Percent of households and employees within  $\frac{1}{4}$ -mile of a bus route
- Miles of sidewalk, on-road bicycle, and shared use facilities

<sup>5</sup> [http://marketstatsreports.showingtime.com/CRRA\\_kcoh/sst/202110/Charlotte-MSA.pdf](http://marketstatsreports.showingtime.com/CRRA_kcoh/sst/202110/Charlotte-MSA.pdf)

Cornelius Neighborhood



## Environmental Justice Areas

Environmental Justice (EJ) areas are census tracts with traditionally underserved populations. This is defined by tracts that exceed the planning area average for the following groups:

- American Indian and Alaskan Native
- Asian-American
- Black or African American
- Carless households
- Hispanic
- Households in poverty
- Limited English proficiency households

EJ areas were identified for the 2050 MTP using 2010 census tract geography and 2019 American Community Survey (ACS) 3-year estimates. Planning area averages were established by dividing the total number of persons or households in each group by the total population or households for the planning area. Census tracts with EJ populations exceeding the planning area average were placed into one of the following four categories:

- No Concentration (0 EJ groups)
- Slight Concentration (1-2 EJ groups)
- Moderate Concentration (3-4 EJ groups)
- High Concentration (5-7 EJ groups)

**Table 3-3** shows the percentage of census tracts for each EJ concentration category in the planning area.

**Table 3-3 Environmental Justice Concentrations within the CRTPO Planning Area**

Category	Number of Census Tracts	Percent of Census Tracts
No Concentration	64	20%
Slight Concentration	110	35%
Moderate Concentration	85	27%
High Concentration	59	18%

Source: 2019 American Community Survey, 3-year estimates

Note: Numbers are rounded for planning purposes.

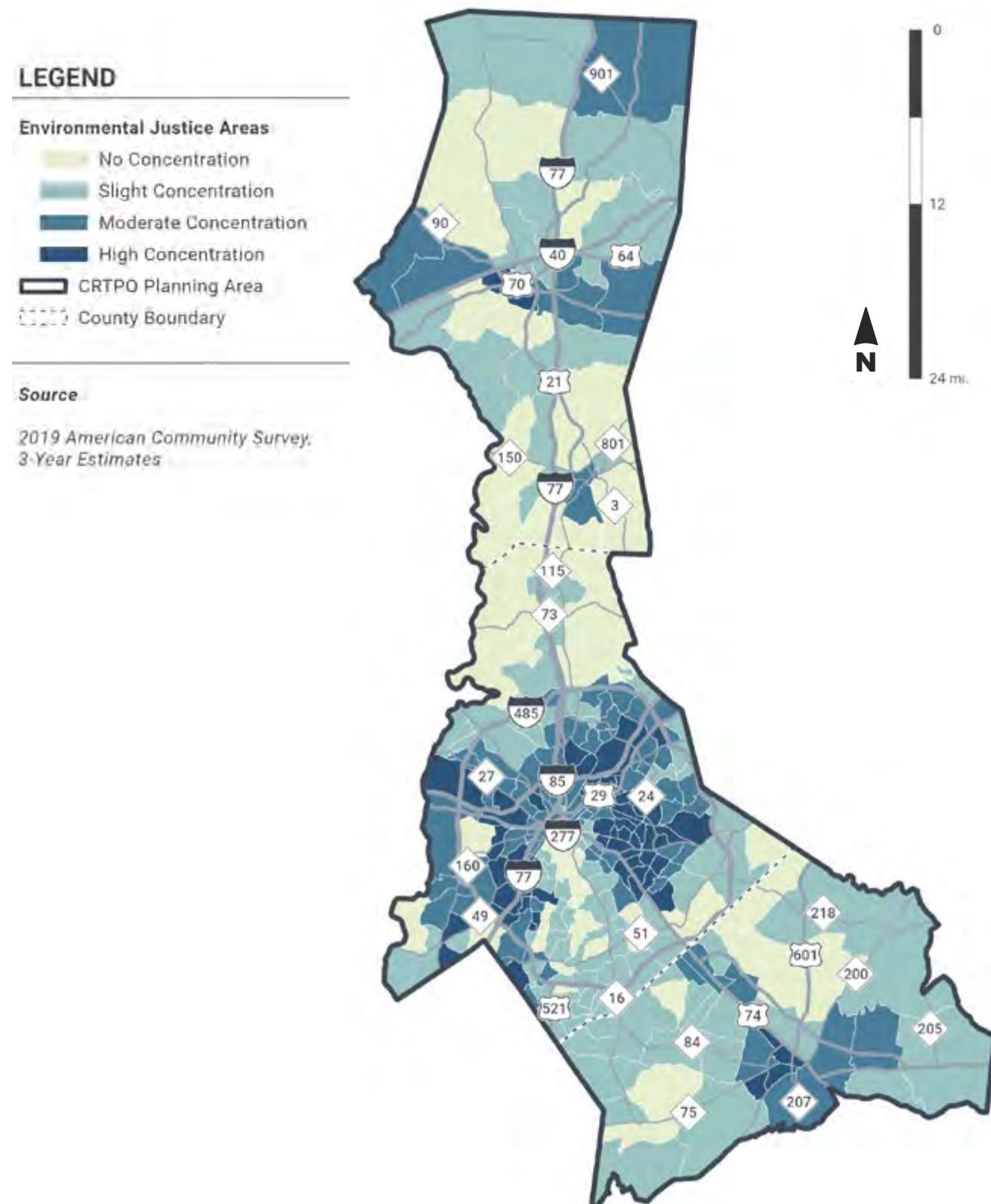
Thirty-five percent of the census tracts in the CRTPO planning area exhibit a Slight Concentration of EJ populations, and combined, 45% of the tracts contain a Moderate or High Concentration. As displayed in **Figure 3-6**, Moderate and High Concentration tracts of EJ populations are located in the eastern and western portions of Mecklenburg County, in southwest Statesville in Iredell County, and in downtown Monroe and the surrounding area in Union County.

EJ data was used as an input by the CRTPO for two criteria in the evaluation of candidate roadway projects for the 2050 MTP. The ranking methodology, described in **Appendix H**, includes a two-tiered process in which higher scoring projects advance from Tier I to Tier II. The EJ criteria consist of qualitative and quantitative evaluation techniques and are part of the Tier II assessment. One criterion awards points to projects with minimal impacts to right-of-way in EJ areas while the other awards points to projects that improve access between EJ areas and activity centers.

Once the fiscally constrained project list was finalized, the CRTPO conducted a planning area wide assessment to ensure projects will not have an undue burden and that investments are equally distributed to tracts with higher concentrations of EJ areas. The assessment and results are detailed in **Chapter 5**.

45% of the census tracts in the CRTPO planning area have a moderate or high concentration of EJ populations.

**Figure 3-6 Environmental Justice Areas**



## Economy

The transportation system plays a pivotal role in the regional economy. A safe, efficient, and sustainable network lowers the costs for the users of the system, improves travel times, increases reliability, and ensures access to markets and resources.

The intermodal transportation network, as well as the number of people and jobs, have contributed to the Charlotte region becoming a major shipping hub for freight and other goods. Additionally, the CRTPO planning area is strategically located on the East Coast between major ports and inland cities and has a number of transportation assets including the Charlotte-Douglas International Airport, four interstate highways, an inland terminal, and two intermodal rail facilities.

There are several key industries that continue to keep the regional economy stable, including banking, financial services, manufacturing, energy, automotive, health, technology, and retail. The condition and performance of the transportation system plays a key role in keeping the economy competitive. Delay, safety, and access issues raise costs for shippers, carriers, manufacturers, and consumers alike and threaten the attractiveness of the area.

The CRTPO has set goals and objectives to reduce congestion, minimize delay, increase travel time reliability, and encourage opportunities for freight movement. It also monitors federally established performance measures and sets performance targets, in coordination with the North Carolina Department of Transportation (NCDOT), related to travel time reliability and delay. The CRTPO is committed to leading and participating in planning efforts that improve transportation infrastructure such as the Greater Charlotte Regional Freight Mobility Plan, Beyond 77, and CONNECT Beyond. These initiatives help improve the efficiency of the transportation system, which supports the continued vitality of the region's economy.

**Planning Factor Addressed**



Economic Vitality

*Intermodal Facility at Charlotte-Douglas International Airport*



*Todd Sumlin/The Charlotte Observer*

Transportation conformity ensures that federal funding and approval are given to highway and transit projects that are consistent with (“conform to”) established air quality goals.

## Environment

Transportation improvement projects often impact the environment and surrounding communities. These impacts are especially true with the construction of new roadway and widening projects. Federal laws, including the National Environmental Policy Act (NEPA) and the Clean Air Act (CAA), require Federal and State agencies to conduct environmental reviews to consider the potential impacts of proposed transportation projects on the environment. An amendment to the CAA in 1990 requires MPOs to demonstrate transportation conformity, meaning the projects included in the MTP will not cause new air quality violations. Transportation conformity ensures that federal funding and approval are given to highway and transit projects that are consistent with (“conform to”) air quality goals established by the State Implementation Plan (SIP). A conformity determination is required to demonstrate that the MTP conforms to the SIP. The CRTPO is in a maintenance area for the 2008 National Ambient Air Quality Standards (NAAQS), meaning it previously exceeded air quality standards, but now consistently meets them. The region is in attainment for the 2015 NAAQS.

Motor vehicles cause the majority of air pollution. Vehicles that are moving or idling are burning fossil fuels and releasing pollutants into the air. The burning of fossil fuels increases greenhouse gas emissions, and subsequently contributes to global warming. The warmer atmosphere affects precipitation patterns, which influences the intensity and, in some cases, the frequency of extreme environmental events such as floods, droughts, and storms.<sup>6</sup> These events affect the life-cycle of transportation systems and threaten their resilience.

Noise pollution is also often a result of transportation-related infrastructure. One of the most significant sources of noise pollution is highway traffic noise from vehicle engines, exhaust, and the interaction of tires and pavement. Other forms of noise pollution include car horns and mufflers, sirens, airplanes, trucks, and trains. Many times, people are unable to avoid or control the sources of noise to which they are exposed.

Constructing additional lanes along existing corridors and building new roadways increase impervious surfaces which can adversely affect water quality due to faster rates of runoff, lower groundwater recharge rates, and increased erosion. An increase in impervious surface can also concentrate runoff and lead to flooding. In addition, vehicular pollutants can be introduced into nearby waterbodies during weather-related precipitation events. Transportation projects can also alter the hydrology of water (how it is collected and dispersed), which affects the health of wetlands and streams.

Additionally, transportation infrastructure can reduce and divide wildlife habitat, making it difficult for various species to move freely without being struck and killed by vehicles. Disruptions to habitat can also separate an animal population into smaller, less stable groups that may have difficulty surviving.

Several types of environmental features exist within the CRTPO planning area including waterbodies, creeks and streams, and wetlands which could be impacted by transportation projects. Environmental features within the planning area are shown in **Figure 3-7**.

Transportation improvements that provide positive environmental benefits include increased public transit options, which help reduce emissions, air pollution, and congestion. In addition, bicycle and pedestrian enhancements offer an environmental friendly alternative to vehicular travel.

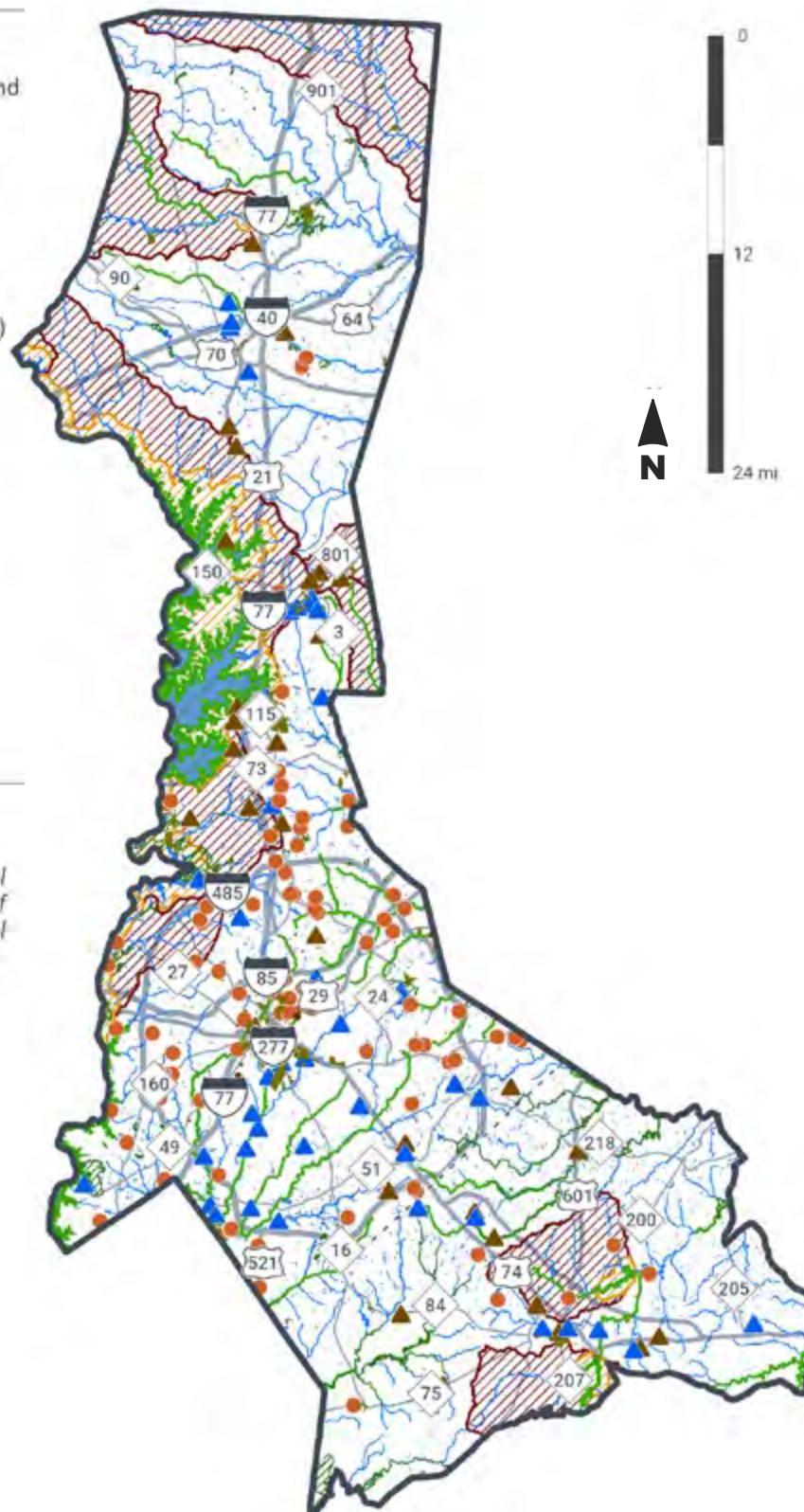
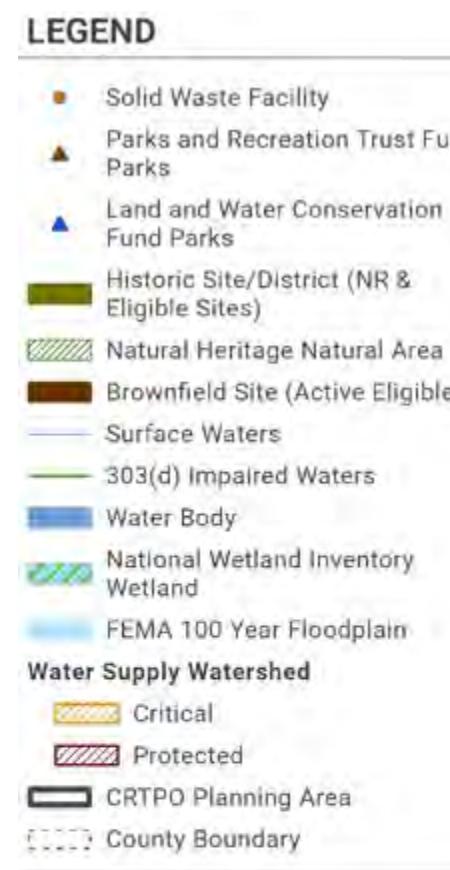
<sup>6</sup> <https://www.nationalgeographic.org/article/influence-climate-change-extreme-environmental-events/>



I-77 at I-40  
Interchange  
Reconstruction  
in Statesville



**Figure 3-7 Environmental Features**



**Source**

NC Department of Natural and Cultural Resources, NC Department of Environmental Quality, NC Natural Heritage Program, NC State University

## Public Health

Transportation systems have direct and indirect effects on several areas of health and well-being, including physical activity and obesity. Sidewalks, bike lanes, and trails that connect to destinations encourage people to exercise as a part of their daily routines. Pedestrian and bicycling facilities built for transportation purposes also provide health benefits when used for recreation.

Roadway safety treatments to accommodate all users help reduce crashes and injuries. The design also helps improve the perception of safety, which impacts the usage of bicycle and pedestrian infrastructure. Creating safe bicycling and walking access to key destinations provides increased access to jobs and services.

Offering more availability to public transit can help decrease traffic congestion and vehicle miles traveled (VMT), which can reduce air pollution known to cause health problems. Locat-

ing facilities like schools and trails away from high-volume roads reduces exposure to air pollution, which tends to be higher near roadways with heavy traffic. Expanding the availability of walking, bicycling, and public transit also provides an active option for more social and family time.<sup>7</sup>

The CRTPO recognizes the role the transportation system plays in building and maintaining healthy communities. It has incorporated health into its goals and objectives and established performance metrics to help gauge progress, as listed in **Table 3-4**. A health focus area representative is included on the CRTPO's TCC and a health equity metric has been developed to evaluate active transportation discretionary projects.<sup>8</sup>

<sup>7</sup> Source: Centers for Disease Control and Prevention

<sup>8</sup> [CRTPO Discretionary Bike-Ped Scoring Criteria](#)

**Table 3-4 CRTPO Health Metrics**

Metric Category	Metric
Air Quality	Percent of ozone-forming air pollution from mobile sources Compliance value annually as measured against compliance standard
Commuting Habits/Mode Split	Percent of workers that drive to work alone Percent of work trips using transit, bicycle, pedestrian/person-trips by mode Daily average VMT relative to population (average VMT/capita) Person-trips by mode
Municipal	Number of municipalities with one or more of the adopted policies: complete streets, bicycle plan, pedestrian plan, transit plan
Health/Death/Disease	Rates/cause of death for one or more diseases (asthma, stroke, heart disease, etc.)
Geo-Spatial/ Demographics	Number of jobs with < 30 minute commute OR average commute travel time Employment and dwellings (or population) within 1/2 mile of transit stops
Crash Data	Collision-related deaths and injuries/1,000 population Number of annual crash fatalities and disabling injuries/100 million miles traveled
Public Transit	Number of passengers served/hours operated (entire CRTPO or urbanized area) Number of passengers served/hours operated (specific sub-areas)

# Transportation Assessment

This section of the plan provides details about the existing transportation system in the CRTPO planning area for all modes of transportation. It is organized by mode and within each respective section, figures and data are presented to provide an overview of existing and projected conditions. The information presented in this transportation assessment serves as a foundation for the challenges (**Chapter 4**), tools and strategies (**Chapter 5**), and project investments (**Chapter 7**) identified in this MTP.

## Roadways

The roadway network within the CRTPO planning area includes a variety of corridor types, ranging from multi-lane freeways and expressways accommodating interstate and regional travel to local streets serving short trips and neighborhood needs. This network is the primary means by which people and goods travel within and through the region. It connects the Charlotte region with other major urban centers in the southeast, accommodates daily commutes for those who live and work in the region, and provides access to local businesses and activities within the CRTPO planning area's numerous member jurisdictions. Specific features of the roadway network and how it is performing, as well as data related to existing and future travel patterns, are described on the following pages.

### Functional Classification

Federal functional classifications identify a roadway's characteristics within the network and ensure that non-transportation factors, such as land use and development, are considered in the planning and design of streets and highways. It is also one determination of eligibility for federal transportation funding. The NCDOT is responsible for assigning and updating the federal functional classification for each roadway in the state.

Roadway facilities in the CRTPO planning area are classified into one of the following federally defined classes of roadway:

- Interstates and other freeways – highest classification of arterials designed and constructed with mobility and long-distance travel in mind
- Arterials – provide high degree of mobility, connectivity, and service for trips of moderate length
- Collector streets – distribute traffic between local roadways and the arterial system
- Local streets – all remaining roads

**Figure 3-8** shows the functional classification of roadways in the CRTPO planning area.

**Figure 3-8 Functional Classification of Roadways**

#### LEGEND

FHWA Functional Class
Interstate
Other Freeway
Other Principal Arterial
Minor Arterial
Major Collector
Minor Collector
Local
Lake Norman
CRTPO Planning Area
County Boundary

#### Source

NCDOT Road Characteristics Map Service



#### Planning Factor Addressed



Efficient System

## Traffic Conditions and Travel Patterns

The CRTPO planning area contains more than 10,000 lane miles, which is anticipated to exceed 11,000 by 2050 with the construction of additional lanes and new roadway facilities. In addition, the primary mode of transportation in the Charlotte region is single-occupancy vehicles (SOV) which contributes to the demands placed on the roadway network.

Nearly a quarter of the roadways in the CRTPO planning area are anticipated to experience a more than 100% increase in traffic volume growth from 2018 to 2050. These corridors are located around Statesville and in eastern Iredell County, concentrated around Charlotte's city center, and spread throughout Union County, as shown in **Table 3-5** and illustrated in **Figure 3-9**. Additional analyses related to traffic congestion in the planning area are conducted as part of the CRTPO's Congestion Management Process, which is included in **Chapter 5**.

## Metrolina Regional Model

The Metrolina Regional Model, or MRM, is an important tool used by the CRTPO to forecast future year demand on existing and planned transportation facilities using anticipated land use, demographic, and travel pattern information unique to the region. The MRM is utilized to evaluate existing and future conditions of the transportation network based on a variety of metrics, including:

**Table 3-5 Traffic Growth (2018 – 2050)**

2018-2050 Traffic Growth	Miles	Percent
No Change	251	8%
< 50% Increase	1,344	44%
50% to 100% Increase	710	23%
> 100% Increase	760	25%
<b>Total</b>	<b>3,065</b>	<b>100%</b>

Source: Metrolina Regional Model

Note: Numbers are rounded for planning purposes.

It is also important to recognize that the COVID-19 pandemic had significant impacts on travel patterns as many employees shifted to a work from home environment. At this time, it is unknown if these impacts will have an ongoing effect.

**Figure 3-9 Traffic Growth (2018 – 2050)**

### LEGEND

#### 2018-2050 Traffic Growth

- No Change
- < 50% Increase
- 50% to 100% Increase
- > 100% Increase

#### Lake Norman

#### CRTPO Planning Area

#### County Boundary



### Notes

Growth in traffic volume is showing overall growth between 2018 and 2050 (not annual growth).

This map shows the committed project network from the 2020-2029 STIP.

### Source

Metrolina Regional Model

## VEHICLE MILES TRAVELED

Vehicle miles traveled, or VMT, is the sum of all miles of vehicular trips made over all segments of the roadway system within the planning area. During the past several decades, VMT has increased with population and employment growth. Since most workers continue to commute by car, this trend is still observed. The significant amount of population and employment growth in the planning area is contributing to an increase in daily VMT. Between 2018 and 2050, VMT in the CRTPO planning area is projected to grow approximately 50%, as shown in **Table 3-6**. Union County is expected to experience approximately 75% of VMT growth by 2050, which is the highest among the CRTPO's three counties.

**Table 3-6 Daily Vehicle Miles Traveled**

LOCATION	2018 (MILLIONS)	2050 (MILLIONS)	GROWTH (MILLIONS)	% GROWTH
CRTPO Planning Area*	53.6	80.9	27.3	51%
Iredell County	7.1	10.1	3.0	42%
Mecklenburg County	40.1	59.6	19.5	49%
Union County*	6.4	11.2	4.8	75%

Source: MRM

\*Includes all of Union County

## TYPES OF TOURS

A tour is a complete round trip between the primary origin and the principal destination, including any and all stops in between. For person travel purposes, all travel except At-Work tours (ATW) is assumed to begin and end at the traveler's home. ATW tours begin and end at the traveler's workplace. Most trips that are not home-based are modeled as stops made as part of a tour. The travel purpose categories are defined as follows:

- Home-Based Work (HBW) – Direct tour between home and the primary workplace
- For the 2050 MTP, the following comprise other home-based tour types:
  - Home-Based School (SCH) – Direct tour between home and primary/secondary school (including kindergarten but not day care or other pre-school)
  - Home-Based University (HBU) – Direct tour between home and college/university (including vocational/technical schools and other professional education)
  - Home-Based Shop (HBS) – Direct tour between home and shopping
  - Home-Based Other (HBO) – All other home-based tours not classified above
- At-Work (ATW) – Tour that both begins and ends at the workplace; a typical example is going from work to lunch and back
- Internal-External (IE) – Tour that begins within the modeled region whose destination is outside of the modeled region

**Table 3-7** lists tour type by county in the CRTPO planning area.

**Table 3-7 Types of Tours**

Location	Year	Purpose			
		Home-Based Work	Home-Based Other	At-Work	Internal-External
CRTPO Planning Area*	2018	551,688	1,844,611	65,389	53,119
	2050	890,830	3,029,995	118,960	83,571
	% Change	61%	64%	82%	57%
Iredell County	2018	56,942	202,044	5,946	15,791
	2050	87,596	319,023	10,633	21,982
	% Change	54%	58%	79%	39%
Mecklenburg County	2018	418,906	1,379,951	53,743	23,862
	2050	674,005	2,249,945	96,214	38,229
	% Change	61%	63%	79%	60%
Union County*	2018	75,840	262,616	5,700	13,466
	2050	129,229	461,027	12,113	23,360
	% Change	70%	76%	113%	73%

Source: MRM

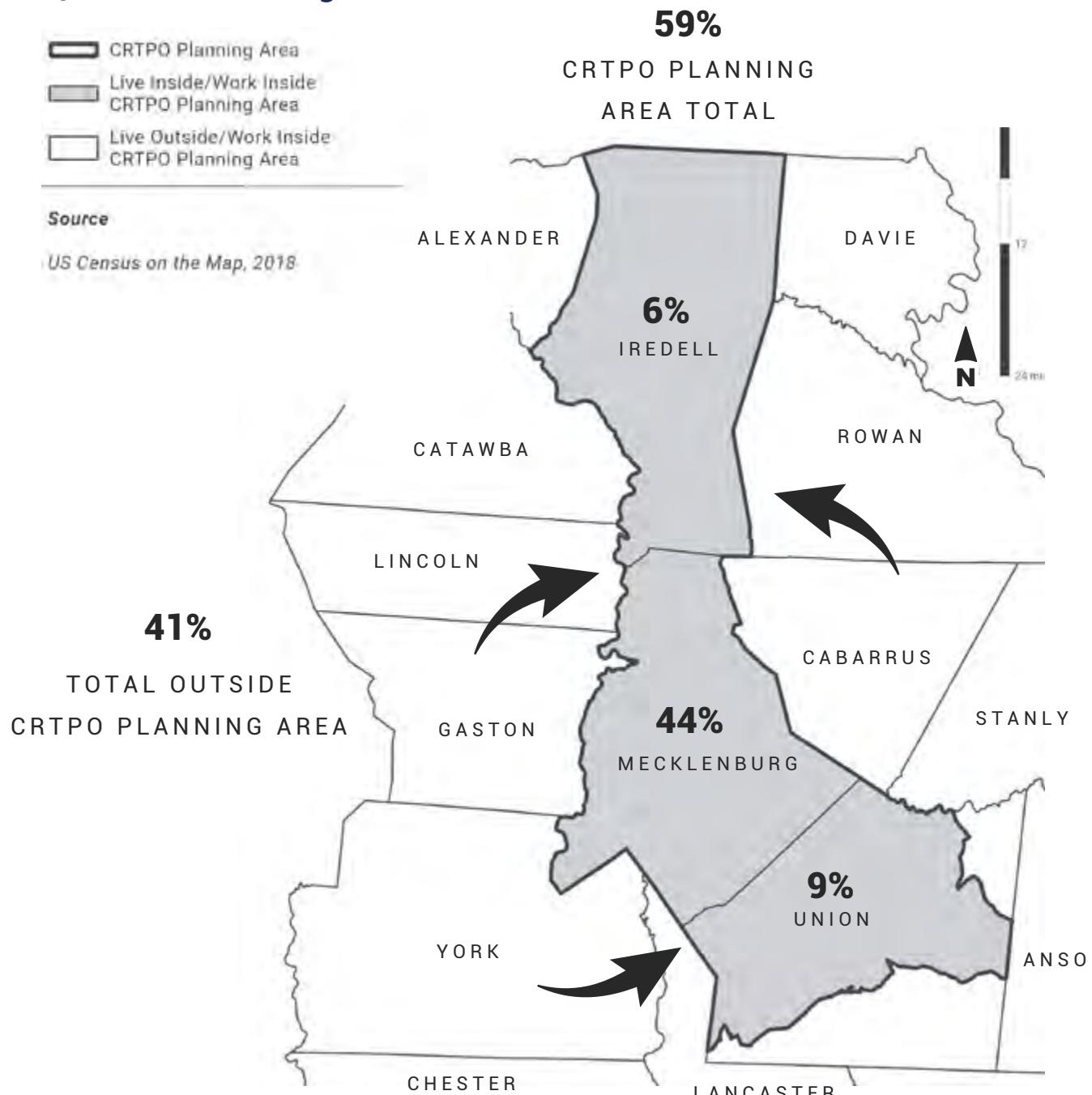
\*Includes all of Union County

## Commuting Behaviors

### HOME LOCATION OF WORKERS

As shown in **Figure 3-10**, the majority of those who work in the CRTPO planning area also live there (approximately 60%), with the most people living and working in Mecklenburg County (44%). Six percent of workers live in Iredell County and nine percent live in Union County. More than one-third of workers live outside the planning area.

**Figure 3-10 Commuting Behaviors**



### TRAVEL TO WORK

The majority of employees in the planning area are located in Mecklenburg County (82%), primarily in Charlotte (see **Table 3-2**). Most workers also live in Mecklenburg County, limiting the distances traveled to work. The roads utilized by workers experience the most congestion during peak periods, resulting in increased travel times. Commuters from Iredell and Union counties also experience long travel times as they typically travel farther between their home and work locations.

Workers who live in Union County have the longest travel time to work in the planning area (29.5 minutes), which exceeds national averages. Workers in all three counties experience longer travel times to work than state averages. **Table 3-8** provides travel time to work by county.

**Table 3-8 Mean Travel Time to Work (in Minutes)**

Location	2018
Iredell County	25.8
Mecklenburg County	26.2
Union County	29.5
NC	24.5
US	26.6

Source: 2014-2018 American Community Survey, 5-Year Estimate

The number of people in the planning area who drive alone to work also contributes to the longer commute times. An overwhelming majority of commute trips in all three counties (77% - 84%) are represented by SOVs, as displayed in **Table 3-9**. The rate of workers who walk or use public transportation to commute to work is highest in Mecklenburg County, where residents have more access to reliable transit and opportunities for walking and bicycling. While the region's commute mode share remains generally unchanged since 2010, Iredell and Mecklenburg counties have experienced a slight increase in the rate of people working from home (6% up from 4% and 7% up from 6% respectively).

**Table 3-9 Work Commuting Behavior by County**

Behavior Type	Iredell County	Mecklenburg County	Union County
<b>Drive Alone</b>	<b>84%</b>	<b>77%</b>	<b>82%</b>
Carpool	8%	9%	8%
Public Transportation	0%	3%	0%
Walk	1%	2%	1%
Work at Home	6%	7%	7%
Other	1%	1%	1%

Source: 2019 American Community Survey, 5-year estimates

#### Planning Factor Addressed



Safety

**Figure 3-11 Vehicle Crashes**

#### LEGEND

##### Fatal and Severe Injury Crash Density



Low

High

• Fatal Crash Location

CRTPO Planning Area

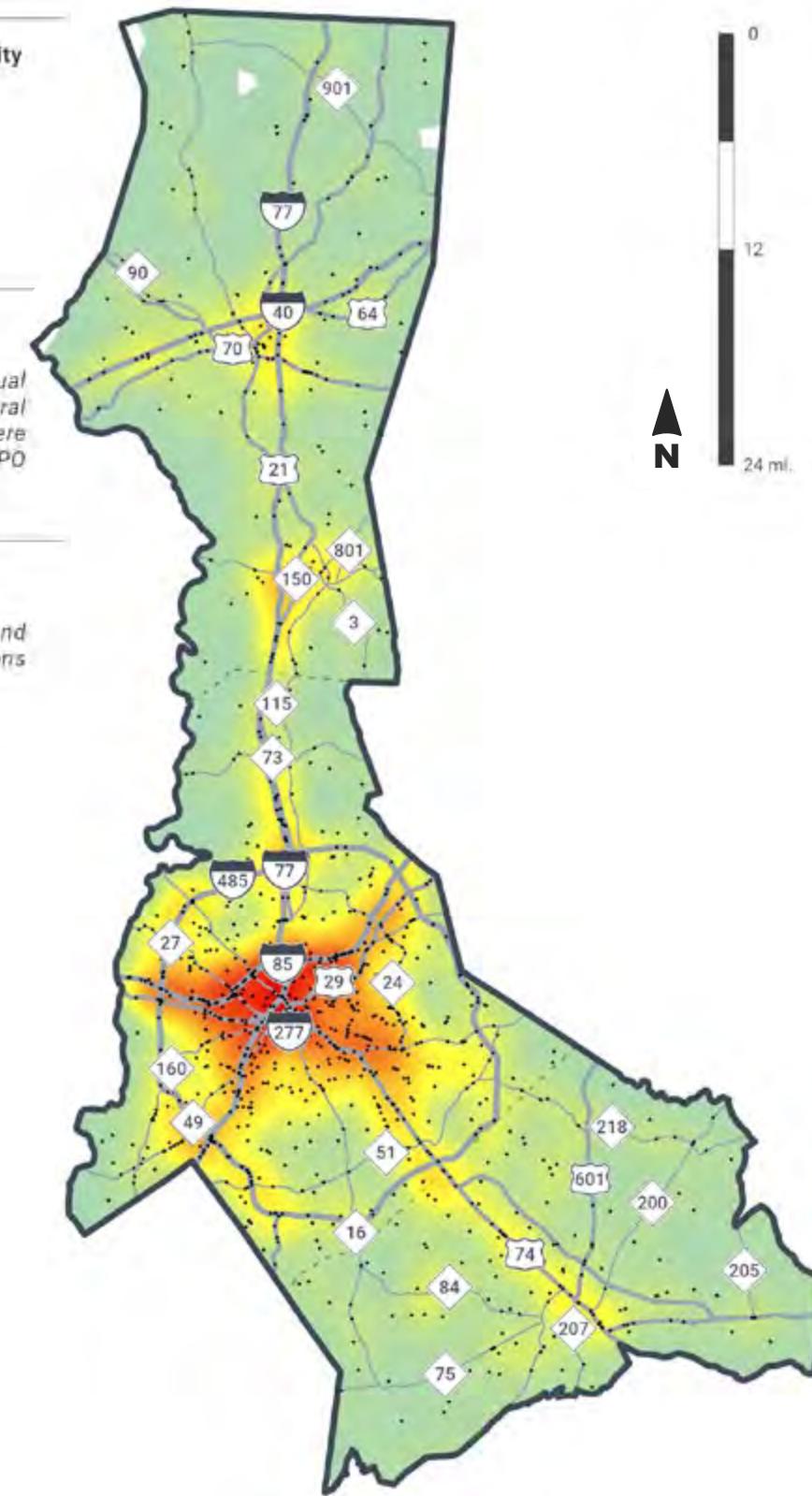
County Boundary

#### Notes

Data provided in this map is a visual representation of the general concentration of fatal and severe injury crashes within the CRTPO Planning Area.

#### Source

NCDOT Traffic Safety Unit, Fatal and Serious Injury Crash Locations (2011-2020) GIS Feature Service



## Active Transportation

Active transportation refers to sidewalks, on-street bicycle facilities, and shared-use paths and trails. The CRTPO's CTP includes a full inventory of these existing facilities, identifies those that need improvements, and delineates where future accommodations are recommended. Active transportation is an important component of the overall transportation network that provides an alternative to driving, especially for shorter trips or connecting to public transportation.

### Sidewalks

Existing sidewalks in the CRTPO planning area are primarily located within municipalities where population densities are higher. The densest pedestrian network is located in Mecklenburg County. Sidewalks in unincorporated areas are more limited, such as the areas in Iredell and Union counties outside of municipal boundaries.

NC 115 Shared-Use Path in Cornelius



Several municipalities and all three counties in the CRTPO planning area have adopted plans that include sidewalk recommendations, as listed in **Table 3-10**. The location of existing sidewalks, including whether they need improvement, as well as recommended new sidewalks proposed throughout the planning area are shown in **Figure 3-12**. The map also includes recommendations from local plans that have been incorporated into the CRTPO's CTP.

#### Planning Factors Addressed

- Accessibility
- Integration and Connectivity
- Travel and Tourism

Figure 3-12 Sidewalks

#### LEGEND

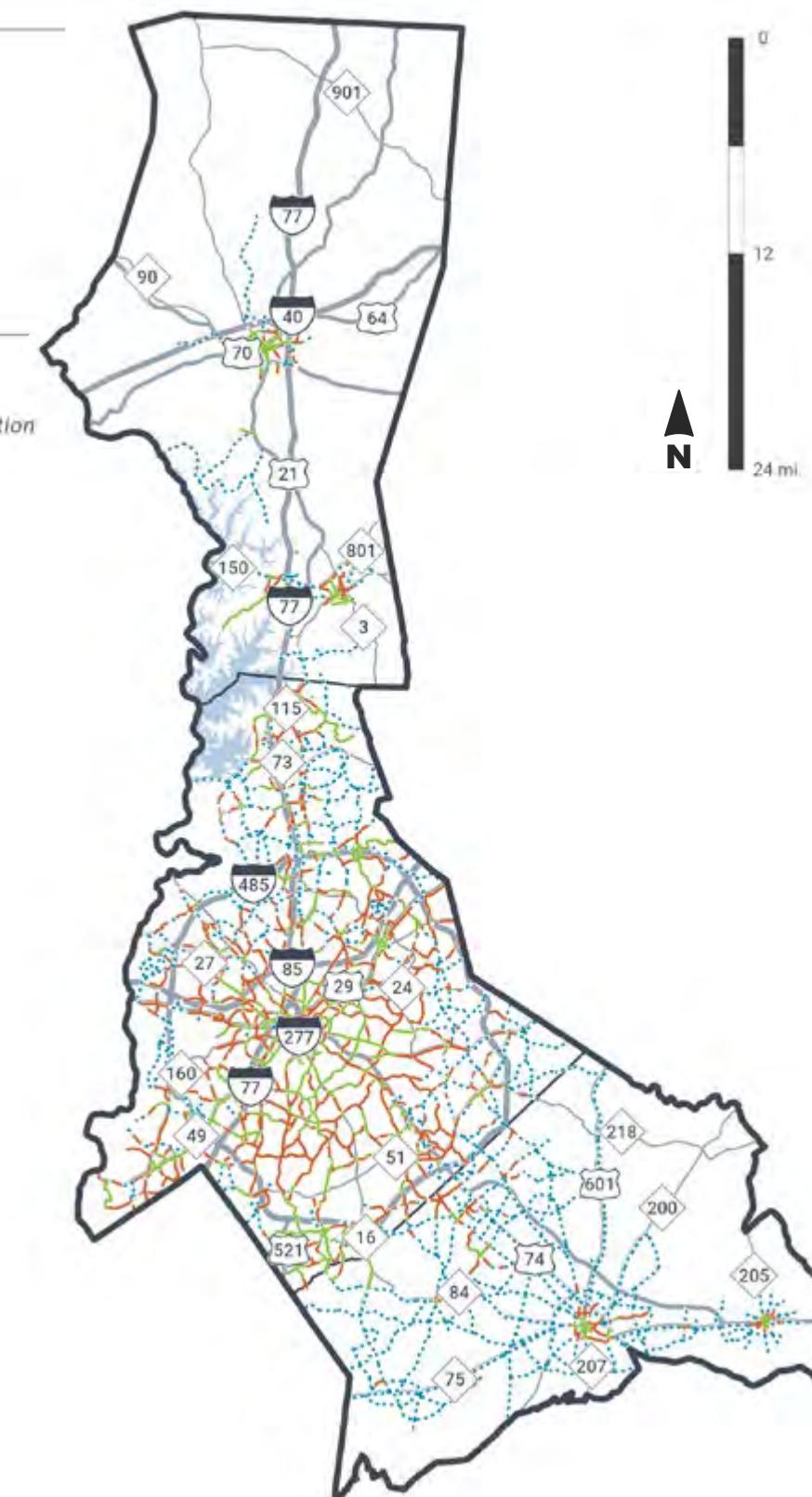
Sidewalks
Existing
Needs Improvement
Recommended

Lake Norman
CRTPO Planning Area
County Boundary

#### Source

CRTPO Comprehensive Transportation Plan, November 2020



## On-Road Bicycle Facilities

A wide range of existing bicycle facilities are present across both urban and suburban/rural localities. These facilities include dedicated bike lanes, state bicycle routes, unprotected bike lanes, and one and two-way cycle tracks. Many existing bicycle facilities throughout the CRTPO planning area have been identified as needs improvement. In addition, recommended facilities are focused on closing gaps in the existing bicycle infrastructure network to support shorter, localized trips across the region.

**Table 3-10** lists local, county, and regional plans that have been adopted or are underway by the CRTPO's member jurisdictions that include bicycle recommendations. **Figure 3-13** shows the location of on-street bicycle facilities in the planning area that are existing, recommended, or needs improvement.

Town of Davidson



Figure 3-13 On-Street Bicycle Facilities

### LEGEND

- On-Road Bicycle Facilities
- Existing
  - Needs Improvement
  - Recommended
- Uptown CycleLink
- Lake Norman
- CRTPO Planning Area
- County Boundary

### Source

City of Charlotte;  
CRTPO Comprehensive Transportation  
Plan, November 2020



## Active Transportation Initiatives in the CRTPO Planning Area

### Bicycle Suitability Map

The CRTPO developed a [Bicycle Suitability Map](#) to give commuting and recreational cyclists region-wide roadway suitability information for its planning area. Data used to determine roadway suitability includes:

- posted speed limit
- annual average daily traffic (AADT)
- number of travel lanes
- presence of paved shoulder or designated bike lane

This map was developed using roadway data from the NCDOT, the City of Charlotte, and Iredell, Mecklenburg, and Union counties. The CRTPO Bicycle and Pedestrian Work Group (BPWG), which includes representatives from the NCDOT and local planning staff throughout the area, worked collaboratively to provide local perspective during the development of the Bicycle Suitability Map. The map was adopted in 2016.

### Charlotte Shared Mobility Program

Starting in 2018, the City of Charlotte permitted the use of electric scooters as a means to create more transportation choices for residents. This Shared Mobility Program allows private operators (Bird, Lime, and Spin) to manage a fleet of electric scooters within the city.

### Planning Factor Addressed



Travel and  
Tourism

### Charlotte Joy Rides

In 2020, Charlotte B-cycle launched a new and improved bike share system called [Charlotte Joy Rides](#). The fleet of bikes is battery-powered, giving riders an electric assist up to 15 miles per hour when facing a hill or difficult riding situation. The system includes 343 e-assist bicycles and 34 stations. It is the first bike share system in North Carolina and one of the largest urban systems in the Southeast.



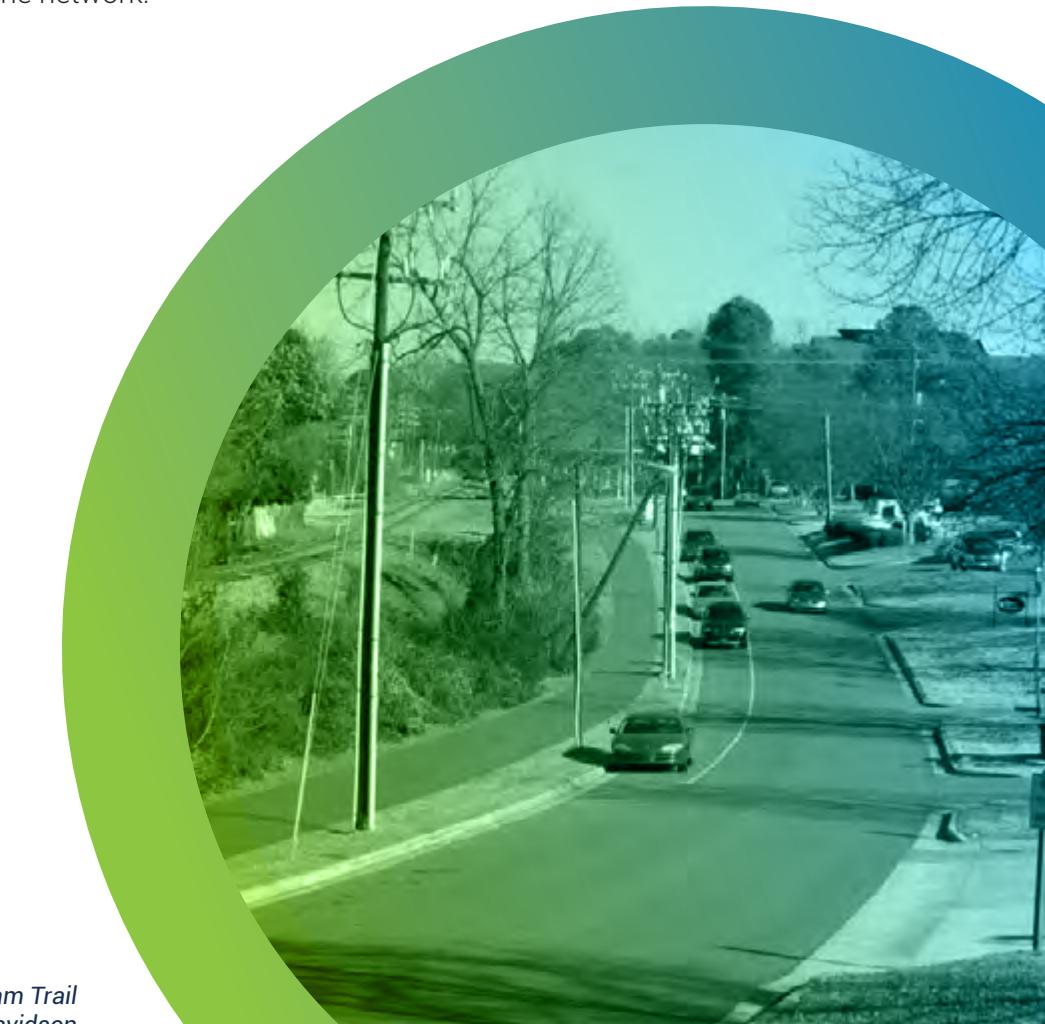
Photo Source: [facebook.com/CharlotteJoyRides](https://facebook.com/CharlotteJoyRides)

### Shared-Use Paths and Trails

The existing active transportation network includes shared-use paths and trails in all three counties and most municipalities in the CRTPO planning area, with the majority located in Mecklenburg County.

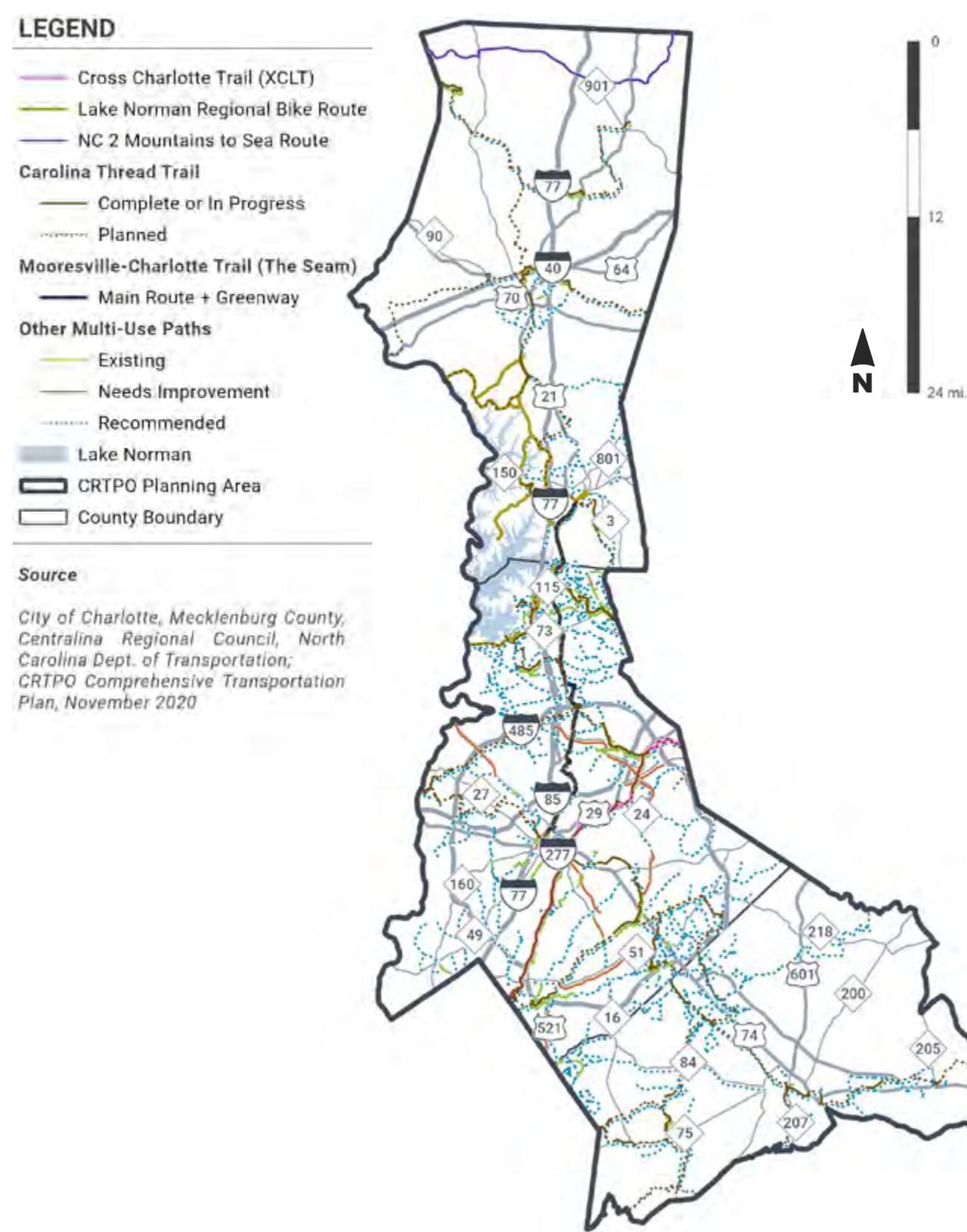
The Carolina Thread Trail (CTT) is the largest and most comprehensive shared-use trail plan in the region, which provides a connection through all three counties. Other significant regional shared-use path and trail projects overlap with the CTT, including the Seam (formerly Mooresville-Charlotte Trail), the Lake Norman Regional Bicycle Route, and the Cross Charlotte Trail.

Several local and county plans supplement these larger regional initiatives and are listed in **Table 3-10**. These plans are focused on providing shorter, more centralized connections and providing access to the larger regional trails. **Figure 3-14** shows the location of shared-use paths and trails in the planning area that are existing, proposed to be improved, or recommended to be added to the network.



The Seam Trail  
in Davidson

**Figure 3-14 Shared-Use Paths and Trails**



**Table 3-10 Bicycle and Pedestrian Plans**

Jurisdiction	Plan Name	Type of Plan			Year
		Sidewalk	Bicycle	Shared-Use/Trails	
Iredell County	Iredell County Transportation Master Plan	●	●	●	2021
Mooresville	Pedal Moore(sville)		●	●	2021
	One Mooresville	●	●	●	2019
Statesville	Mobility and Development Plan	●	●	●	2019
Troutman	Bicycle and Pedestrian Plan	●	●		Underway
Mecklenburg County	Meck Playbook			●	2020
Charlotte	Charlotte WALKS	●		●	2017
	Charlotte BIKES		●	●	2017
Cornelius	Bike!Cornelius		●		2017
	Comprehensive Pedestrian Plan	●			2012
	Parks and Greenways Master Plan			●	2015
Davidson	Davidson Mobility Plan	●	●	●	2019
Huntersville	Greenway and Bikeway Master Plan		●	●	2007
Matthews	Composite Bicycle & Pedestrian Plan	●	●	●	2015
Mint Hill	Pedestrian Master Plan	●		●	2011
Pineville	Pineville Mobility Plan	●	●	●	2021
Union County	Multimodal Transportation Plan	●	●	●	2014
Indian Trail	Bicycle Master Plan		●	●	2011
	Comprehensive Pedestrian Plan	●		●	2009
Marshallville	Pedestrian + Bicycle Master Plan	●	●		2019
Marvin	Parks and Greenways Master Plan			●	2020
Monroe	Forward Monroe Land Use and Transportation Plan	●	●	●	2018
Stallings	Pedestrian Plan	●		●	2008
Waxhaw	Comprehensive Pedestrian Plan	●		●	2012
Wingate	Comprehensive Pedestrian Plan	●			2013

## Short Trip Generators

Specific land use types, such as dense, walkable commercial business areas, community centers, medical centers, parks, and schools are considered key short trip generators because they have the highest potential to support walking and cycling. Short trip generators are defined as follows:

- Commercial/Business Areas – Downtowns and key shopping centers/areas
- Community/Sports Facilities – Community centers and sports fields
- Medical Centers/Offices – Hospitals and medical offices
- Parks /Recreation Areas – Public parks
- Schools and Institutions – All schools (K-12) and universities/colleges

**Figure 3-15** depicts short trip generators and their relation to existing and planned active transportation infrastructure in the CRTPO planning area.

Short trip generators are densely located in Mecklenburg County, southern Iredell County, and northwestern Union County, where there are larger population centers. They are less densely located in Iredell County and southern Union County where employment, commercial, recreational, and institutional facilities are more likely to be found in clusters within individual localities. Most short trip generators throughout the CRTPO planning area are along the route of an existing or planned pedestrian, bicycle, or shared-use path facility.

Four Mile Creek Greenway

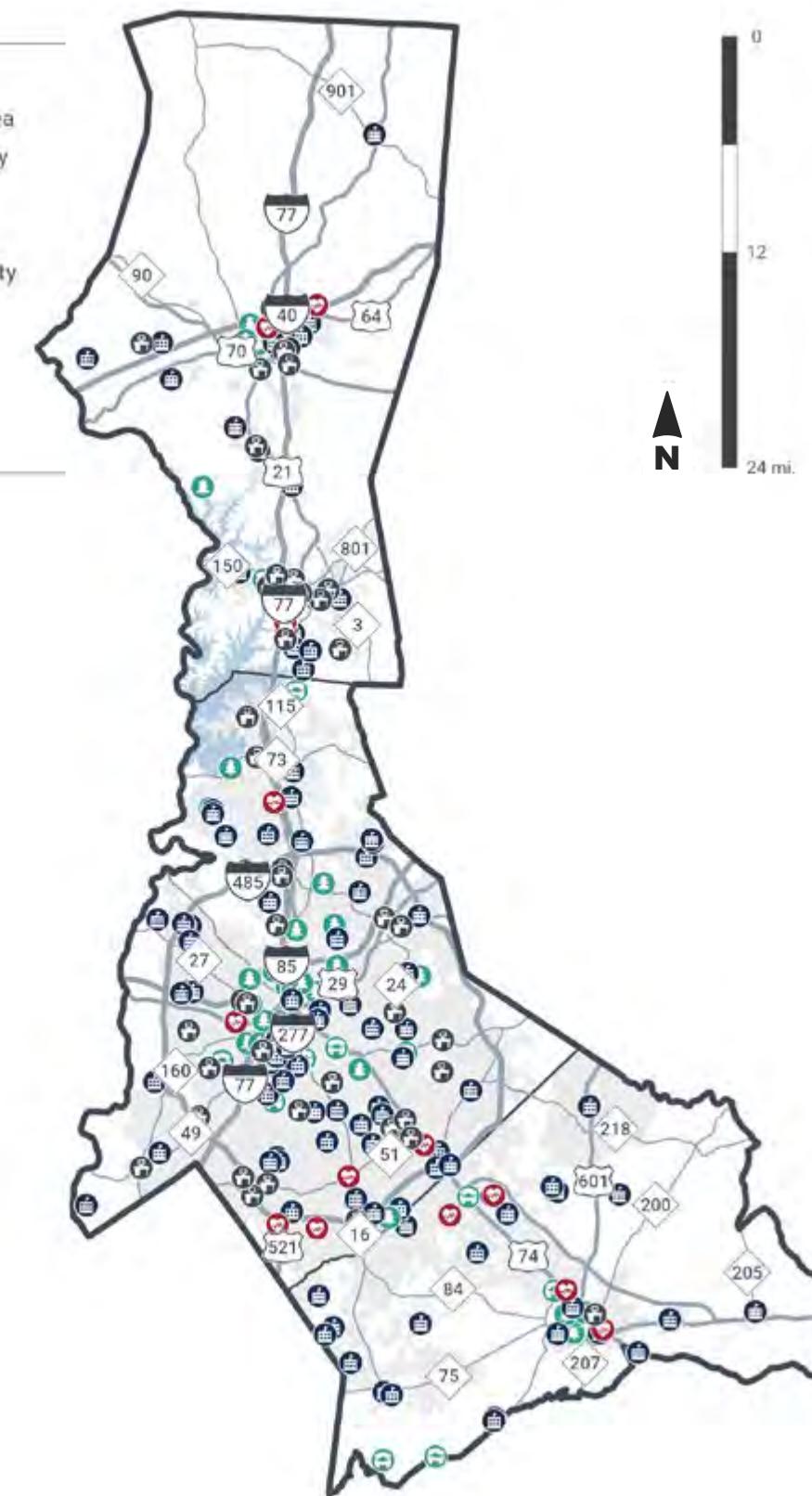
**Figure 3-15 Short Trip Generators**

### LEGEND

#### Short Trip Generators

- Commercial/Business Area
- Community/Sports Facility
- Medical Center/Office
- Park/Recreational Area
- School/Institutional Facility

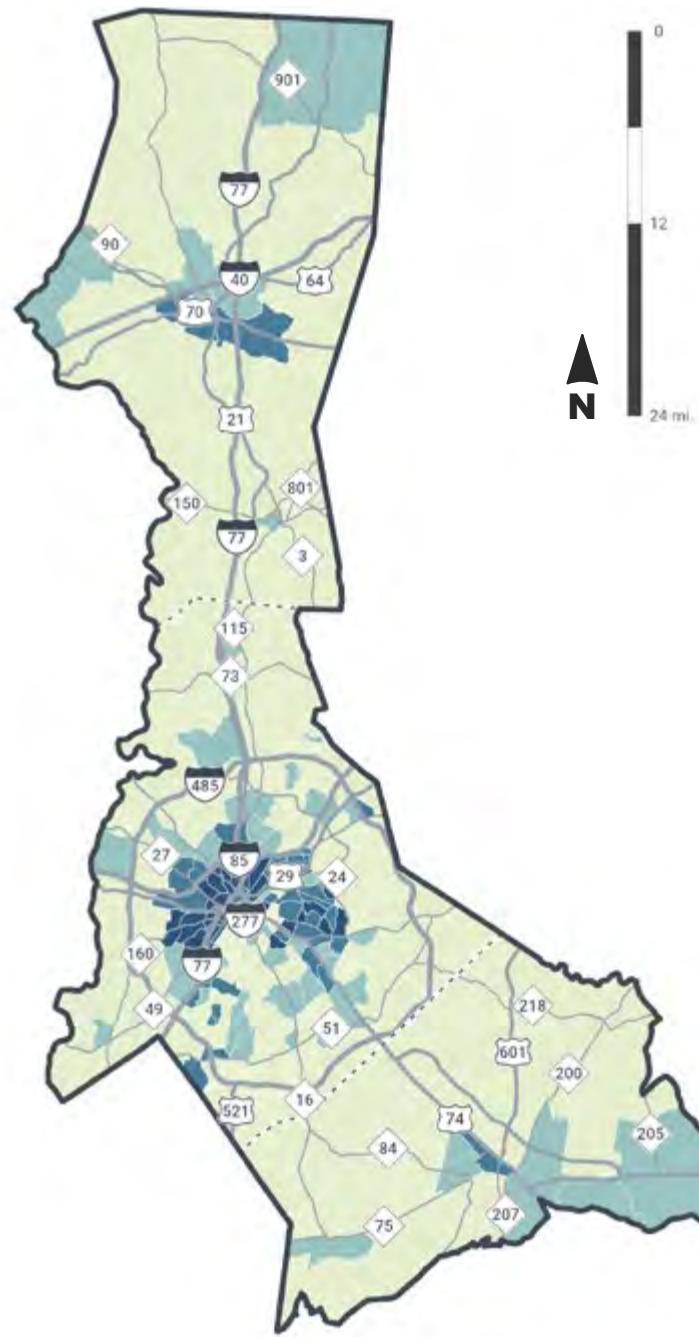
- Lake Norman
- CRTPO Planning Area
- Municipal Boundary
- County Boundary



## Zero-Vehicle Households

**Figure 3-16** shows the percentage of households with no vehicle at the census tract level. Throughout the CRTPO planning area, tracts with higher percentages of households with no vehicle are located around more urbanized areas, including the City of Statesville in Iredell County and the City of Charlotte in Mecklenburg County. Overall, the CRTPO planning area contains an estimated 31,000 households (approximately 5.5%) without a vehicle.

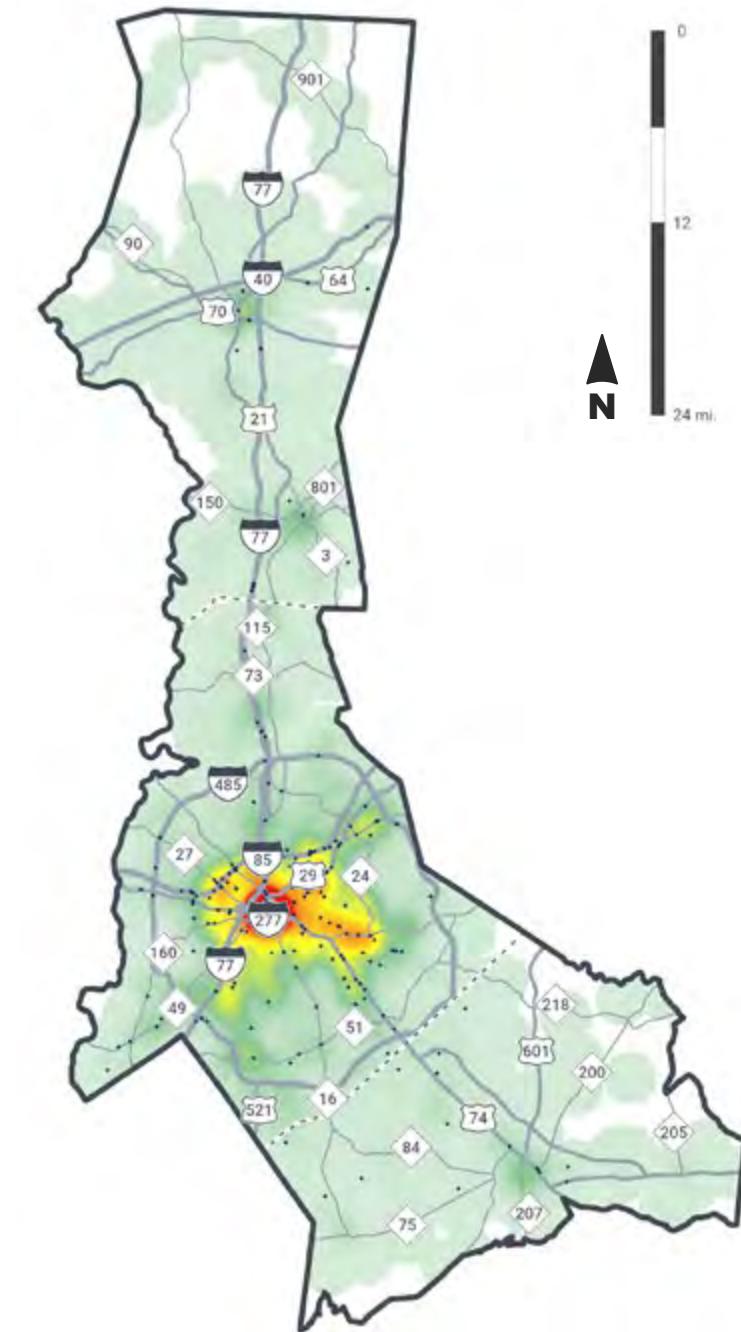
**Figure 3-16 Percentage of Zero-Vehicle Households**



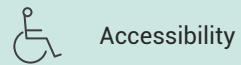
## Active Transportation Safety

The highest concentration of fatal and severe bicycle and pedestrian crashes between 2011-2020 occurred within and around Charlotte's city center, as illustrated in **Figure 3-17**. Bicycle and pedestrian fatalities in Mecklenburg County are mostly found along major roadway corridors. Outside of Mecklenburg County, fatal crashes have occurred predominantly within municipalities in areas with higher bicycle and pedestrian traffic.

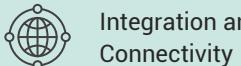
**Figure 3-17 Active Transportation Crashes**



## Planning Factors Addressed



Accessibility



Integration and Connectivity



Travel and Tourism

## Public Transportation

Public transportation in the CRTPO planning area is provided by four transit agencies:

- Charlotte Area Transit System (CATS)
- Iredell County Area Transportation System (ICATS)
- Mecklenburg Transportation System (MTS)
- Union County Transportation (UCT)

Each transit provider offers different services, which are described in more detail in this section. A regional mobility initiative, known as CONNECT Beyond, concluded in 2021 and provides recommendations to better integrate the transit systems in the region. More information about CONNECT Beyond is included in [Chapter 5](#).

### Service Types

A variety of public transportation services are provided within the CRTPO planning area, which fall into the following broad categories:

- Fixed route
- Demand response
- Vanpools

The services provided and the areas served are based on the respective transit agency, as shown in [Table 3-11](#).

**Table 3-11** **Transit Services Offered in CRTPO Planning Area**

Service Provider	Service Type	Service Location
ICATS	Fixed Route	Iredell County
	Demand Response	
CATS	Fixed Route	Mecklenburg and Union counties*
	Demand Response	
	Vanpools	
MTS	Demand Response	Mecklenburg County
UCT	Demand Response	Union County

\* CATS also provides limited express services for workers in Gaston and York counties who commute into the planning area

Each type of service is described in more detail on the following pages.

### FIXED ROUTE

Fixed route services in the CRTPO planning area include light rail, streetcar, bus, and cutaway bus, a smaller transit vehicle on a van or light/medium duty truck chassis. The fixed route services are offered by ICATS and CATS.

### Light Rail

CATS operates the LYNX Blue Line, offering light rail service for 19 miles from I-485 at South Boulevard to UNC Charlotte's main campus in University City. The route includes 26 stations and 11 park and ride locations. Service frequency was increased in February 2021 and operates seven days a week every 20 or 30 minutes, depending on time of day.

### Streetcar

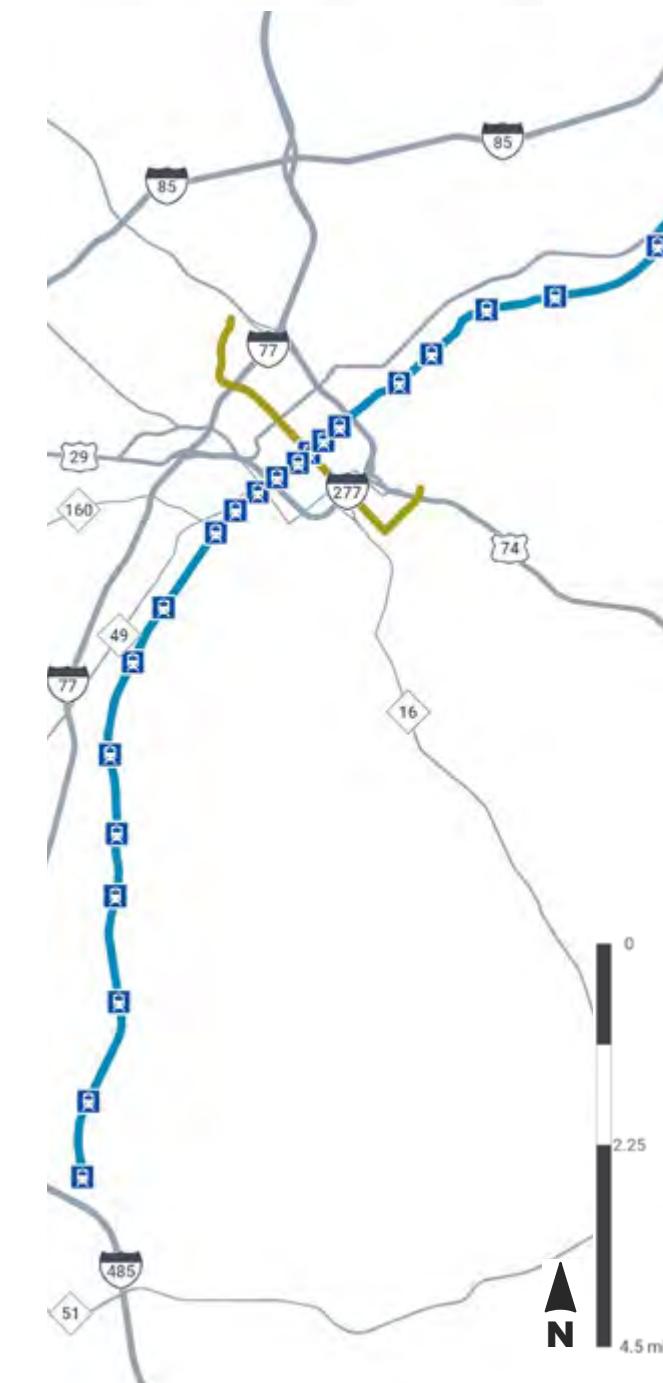
CATS operates a four-mile (17 stop) streetcar system, the CityLYNX Gold Line, from Charlotte's Historic West End east to Sunnyside Avenue. The Gold Line connects to the LYNX Blue Line light rail and a future phase of the streetcar is planned (see [Chapter 7](#)).

[Figure 3-18](#) shows the existing CATS Light Rail and Streetcar fixed route locations.

**Figure 3-18** **CATS Light Rail and Streetcar**

### LEGEND

- LYNX Blue Line Station
- LYNX Blue Line
- CityLYNX Gold Line



## Bus

CATS and ICATS are the two service providers that offer fixed-route bus service in the CRTPO planning area. CATS offers the following fixed-route bus services:

- Local
- Express
- MetroRAPID
- Community
- Neighborhood Shuttle

There are approximately 50 park and ride lots that provide access to fixed-route bus services in Mecklenburg County.

ICATS offers limited fixed route services in Statesville and Mooresville, including between the Mitchell Community College campuses in each respective municipality. It also operates the ICATS Express which provides connections between Iredell County municipalities and the CATS bus system. Additionally, ICATS operates a shuttle service one day per week between Statesville and the VA Hospital in Salisbury.

There are two park and ride lots in Iredell County to provide access to fixed route bus services in both Iredell and Mecklenburg counties.

The bus routes and park and ride lot locations of CATS and ICATS are included in [Appendix C](#).

## DEMAND RESPONSE

All four transit providers offer demand response services. These services are offered in each of the three counties in the CRTPO's planning area. Demand response services are available for the elderly, the disabled, veterans, welfare recipients and low-income persons seeking to obtain and maintain employment, Medicaid beneficiaries (to and from medical appointments), and residents with mobility needs (particularly in rural areas).

CATS also operates a pre-scheduled, shared-ride, origin to destination paratransit service through its Special Transportation Service (STS) program.

## VANPOOLS

CATS operates a multi-county vanpool program for work trip origins/destinations in Mecklenburg County. Approximately 90 vans serve the Charlotte-Mecklenburg area. The vanpools operate seven days a week and provide service to patrons working first through third shifts.

## Revenue Miles and Ridership

**Table 3-12** shows transit vehicle revenue miles and ridership for fiscal year 2020, which were tabulated prior to COVID-19, at which time there were just over 15 million transit revenue miles in the CRTPO planning area, accommodating approximately 24.5 million trips. CATS revenue miles and ridership accounts for the vast majority of transit activity in the planning area.

**Table 3-12 Transit Revenue Miles and Ridership**

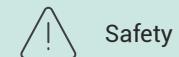
Agency	Vehicle Revenue Miles	Bus Equivalents	Ridership (Unlinked Trips)
CATS	15,189,359	343	24,370,178
ICATS	406,715	10	73,227
MTS	400,207	18	69,905
UCT	472,759	9	83,039
<b>Total</b>	<b>16,469,040</b>	<b>380</b>	<b>24,596,349</b>

Source: National Transit Database, fiscal year 2020

## Transit Safety

The Federal Transit Administration (FTA) guides transit agencies to more effectively and proactively manage safety risk in their systems. Transit agencies monitor safety performance data and measures and set annual targets, as described in [Chapter 8](#). Each public transportation agency also maintains a plan that is updated annually and includes goals, responsibilities, and strategies for monitoring and assessing safety. In the last five years (2017-2021), eight fatalities, 626 injuries, and 372 safety events related to transit were reported in the CRTPO planning area.

Planning Factor Addressed



Safety

## Planning Factor Addressed



Economic Vitality

## Freight

The large amount of population and employment growth in the region and state has resulted in increases in truck traffic and retail demands. According to the MRM, trips made by freight, delivery, and commercial vehicles are anticipated to increase by 65% between 2018 and 2050. According to the [Greater Charlotte Regional Freight Mobility Plan](#), approximately 77% of total freight in the Charlotte Region is transported by heavy-duty truck. A key element of the Greater Charlotte Regional Freight Mobility Plan was the establishment of a regional Strategic Freight Network (SFN). The SFN is a system of infrastructure critical to the successful movement of freight throughout the region, as shown in **Figure 3-19**.

The [North Carolina Statewide Multimodal Freight Plan](#) identifies I-40, I-85, and I-77 as the most utilized freight corridors in North Carolina based on truck volumes. Portions of all these corridors traverse the CRTPO planning area. Average annual daily truck traffic (AADTT) approached 17,000 trucks per day on the portion of I-85 within the planning area in 2019. Non-interstate daily truck volumes are highest in the state on US 70 and US 74, two corridors that also serve the CRTPO planning area.

The 2020 truck volumes for all roads in the CRTPO planning area are shown in **Figure 3-20**.

Truck congestion is highest along I-77 and I-85 through the core of the region and north of the I-485 loop, where truck traffic is co-mingled with significant commuter volumes. The southwest portion of I-485 (between US 74 and I-85) and the northern portion of I-85 (from I-485 to its interchange with US 52 in Salisbury) also exhibit heavy truck traffic. Three locations in the planning area are on the nation's top 100 truck bottleneck list: I-85 at I-485 (west), I-77 at I-485 (south), and I-77 near Lake Norman.<sup>9</sup>

The CRTPO planning area is home to significant amounts of freight intensive land uses. There are several industrial parks within the region that include manufacturing, warehousing, and distribution uses as well as new freight generating land uses such as fulfillment centers.

<sup>9</sup> Source: American Transportation Research Institute (ATRI): [ATRI 2020 Bottlenecks Brochure](#)

Figure 3-19 Strategic Freight Network

### LEGEND

- Strategic Freight Network
- Railroad
- Intermodal Rail Facility
- Airport
- Lake Norman
- CRTPO Planning Area
- County Boundary

### Source

Centralina Regional Council,  
Greater Charlotte Regional Freight  
Mobility Plan



### Planning Factors Addressed



Accessibility



Integration and Connectivity

**Figure 3-20 NCDOT 2020 AADT Truck Volumes**

#### LEGEND

##### NCDOT 2020 Truck AADT

- Less than 500
  - 500 - 2,500
  - 2,500 - 5,000
  - More than 5,000
- Lake Norman  
CRTPO Planning Area  
County Boundary

#### Source

NCDOT 2020 Traffic Segmentation GIS Feature Service



Intermodal facilities also play a vital role in connecting different modes of transportation to ensure timely delivery of goods to their final destination. There are two major intermodal rail facilities in the CRTPO planning area, including the Norfolk Southern intermodal facility at the Charlotte-Douglas International Airport and the CSX intermodal terminal in northwest Charlotte, located adjacent to Rozzelles Ferry Road.

#### Freight Rail

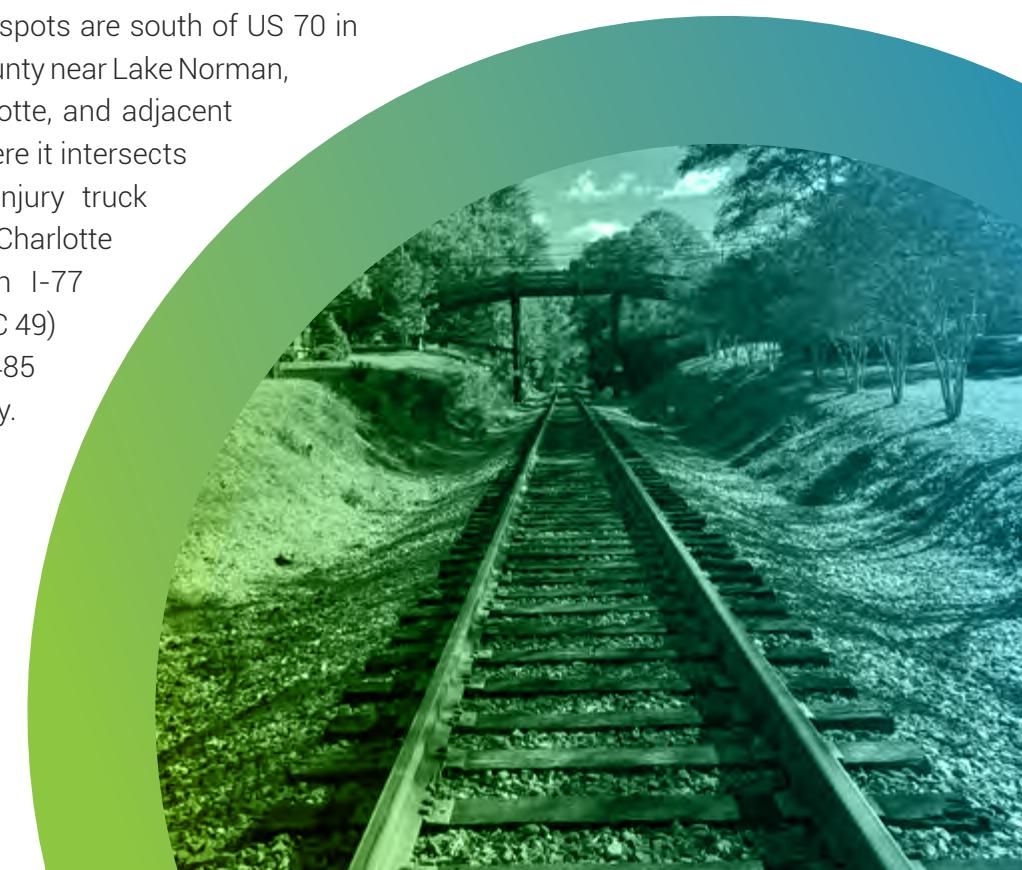
Major rail lines in the CRTPO planning area include the Norfolk Southern and CSX. In addition, the state-owned North Carolina Railroad extends from Charlotte to Morehead City, with portions leased by Norfolk Southern. The Aberdeen, Carolina, and Western Railroad is a regional rail line that runs between Charlotte and northwest of Sanford, connecting to both the Norfolk Southern and CSX rail networks. In Iredell County, the Alexander Railroad provides regional service between Statesville and Taylorsville, in adjacent Catawba County.

#### Freight Safety

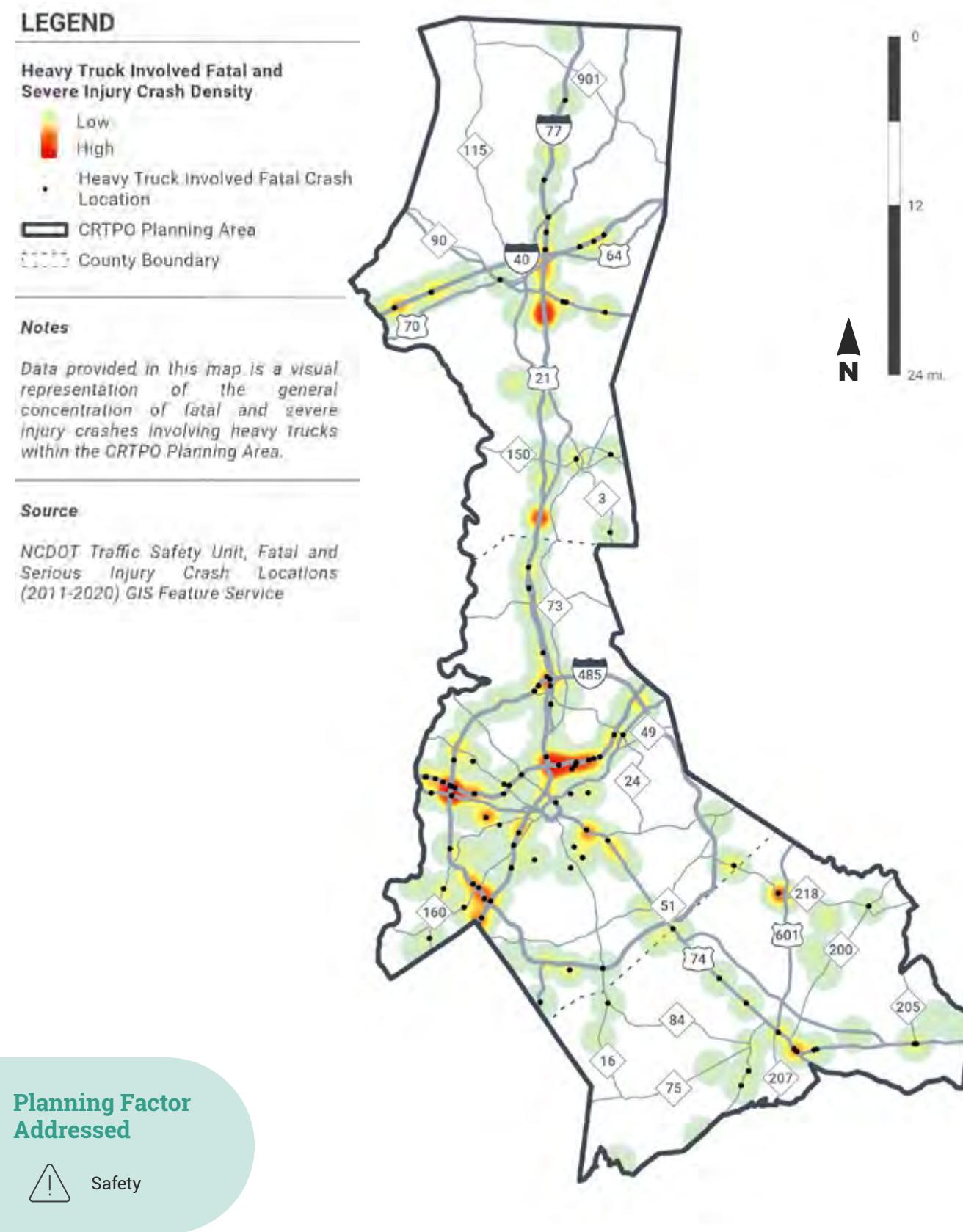
The highest concentration of fatal and severe injuries involving trucks between 2011-2020 in the CRTPO planning area occurred in specific locations along the I-77 and I-85 corridors, including where they intersect with I-485. For I-77, hot spots are south of US 70 in Statesville, in southern Iredell County near Lake Norman, at the I-85 interchange in Charlotte, and adjacent to the South Carolina border where it intersects with I-485. Fatal and severe injury truck crashes on I-85 are located in Charlotte between the interchanges with I-77 and University City Boulevard (NC 49) and where it intersects with I-485 in western Mecklenburg County.

**Figure 3-21** displays the fatal and severe truck crash density in the planning area.

CSX Railroad in Waxhaw



**Figure 3-21** **Truck Crashes**



## Other Transportation Modes

**Figure 3-22** displays airports, passenger rail, and intercity bus terminals in the CRTPO planning area, which are described in this section.

### Air

The CRTPO planning area is home to one of the busiest international airports in the world as well as two general aviation airports.

#### CHARLOTTE-DOUGLAS INTERNATIONAL AIRPORT

The Charlotte-Douglas International Airport (CLT) was ranked as the fifth busiest airport in the world in 2021, averaging 1,600 daily aircraft operations. It serves approximately 178 nonstop destinations worldwide and welcomes more than 50 million passengers annually. In May 2015, the airport kicked off a 10-year, approximately \$3 billion construction program called "Destination Charlotte," which includes terminal lobby expansion, expansion of multiple concourses, and a roadway relocation project to accommodate the north end taxiway. A new air traffic control tower on the south side of the airfield is also anticipated to be completed in 2022.<sup>10</sup>

#### STATESVILLE REGIONAL AIRPORT

The Statesville Regional Airport is a General Aviation airport owned by the City of Statesville, serving the residents of Iredell County and surrounding areas. In particular, the airport provides corporate aviation facilities for Lowe's as well as multiple NASCAR teams. Infrastructure includes a 7,000-foot runway, full parallel taxiway, and 2,000 square feet of hangar space.

#### CHARLOTTE-MONROE EXECUTIVE AIRPORT

The Charlotte-Monroe Executive Airport is a General Aviation airport owned by the City of Monroe. It is a designated primary reliever for CLT. The airport has a 7,000-foot runway and provides aircraft fueling and ground equipment service, overnight tie-downs/hangar rental (based on availability), catering, and car rental.

### Planning Factors Addressed



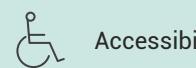
Economic Vitality



Travel and Tourism



Integration and Connectivity



Accessibility



<sup>10</sup> Source: <https://cltairport.mediaroom.com/destination-clt>

## Passenger Rail

Amtrak has a station located north of Uptown Charlotte in the CRTPO planning area. Passenger train service is available to several destinations including Raleigh, Washington, DC, New York City, New Orleans, Savannah, and Miami.

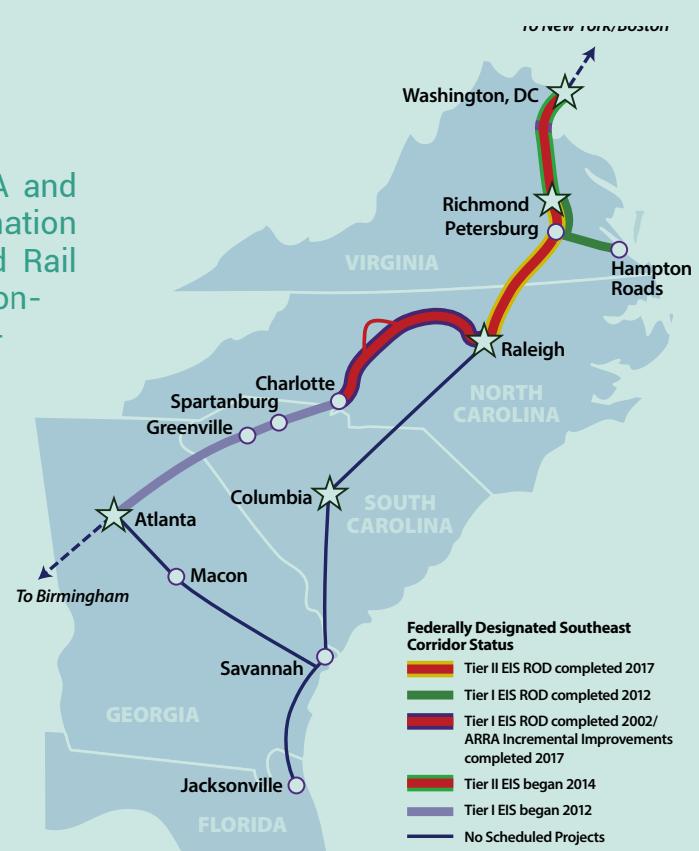
The City of Charlotte, NCDOT, and CSX are collaborating to construct rail improvements for the planned Charlotte Gateway Station (CGS). The planned CGS is a multimodal transportation facility in Uptown Charlotte, immediately west of the city center, which will house a new Amtrak train station and connect with intercity and local transit services. Additional information about construction efforts related to the CGS is provided in **Chapter 7**.

## Southeast High Speed Rail Corridor

Charlotte is located between Atlanta, GA and Washington, DC, making it a key destination for the proposed Southeast High Speed Rail Corridor (SEHSR). The rail line, when constructed, would utilize the Charlotte Gateway Station and provide an alternative mode for visitors to access Charlotte and its surrounding destinations and attractions.

### Planning Factors Addressed

-  Economic Vitality
-  Integration and Connectivity
-  Travel and Tourism



## Southeast Regional Rail Plan

In December 2020, the [Southeast Regional Rail Plan](#) was completed. The plan builds on the Southeast Corridor between Washington, DC, Virginia, North Carolina, South Carolina, Tennessee, Georgia, and Florida, as well as other ongoing state planning activities. It is intended to explore the potential for high-performance rail and create a vision for intercity connections over the next 40 years. The CRTPO staff participated in the development of the Southeast Regional Rail Plan and continues to stay engaged with regional efforts to study and implement high speed rail.

## Intercity Bus

Greyhound offers intercity bus service to and from its terminal in Uptown Charlotte. CATS bus routes also serve the Greyhound terminal, providing convenient passenger access to the Charlotte Transportation Center and other transportation terminals in the region. Iredell and Union counties are also served by Greyhound, in Statesville and Monroe, respectively. In addition

to Greyhound, Megabus and Panda NY provide service from/to the Charlotte area.

## Vehicle-for-Hire and Ride-Sharing Services

Passenger vehicle-for-hire and ride-sharing services are another mode of transportation serving the Charlotte region. Services include Uber, Lyft, taxicabs, limousines, shuttle vans, special needs vehicles, and executive cars.

Figure 3-22 Airports, Passenger Rail, and Intercity Bus Terminals

### LEGEND

-  Airport
-  Intercity Bus Station
-  Amtrak Station
-  Passenger Rail
-  Lake Norman
-  CRTPO Planning Area
-  County Boundary

### Source

Centralina Council of Governments,  
Greater Charlotte Regional Freight  
Mobility Plan



## Transportation Security

### Planning Factors Addressed

- Security
- Efficient System
- Safety
- Resiliency & Reliability

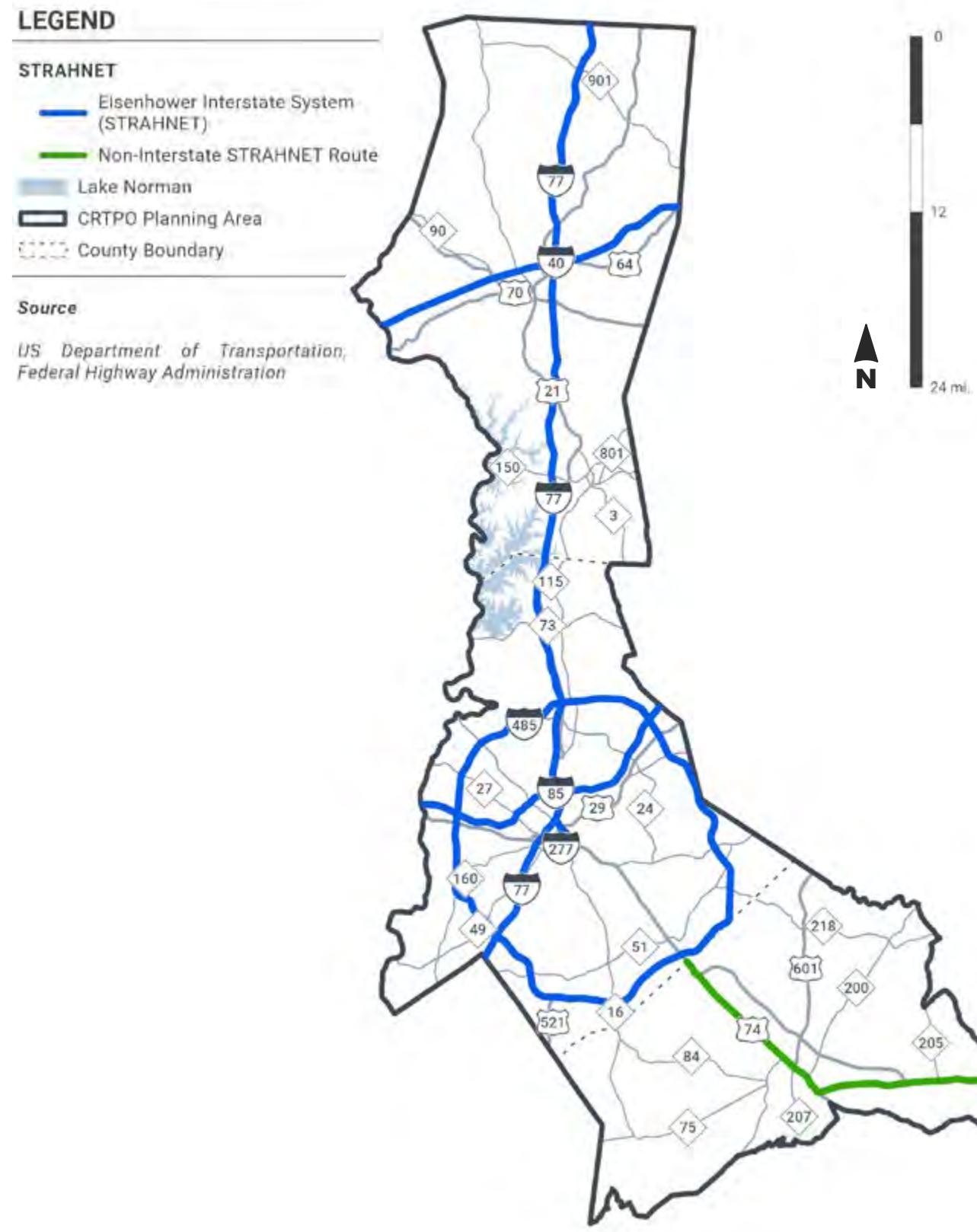
As previously indicated, the CRTPO planning area is a major inter-modal transportation hub, with over 10,000 miles of roadway, the fifth busiest airport in the world, two intermodal rail facilities, and two major rail lines. There are millions of residents, workers, and visitors who rely on this transportation system every day. Security and emergency management are essential considerations as the transportation system grows and evolves to improve safety and enhance resiliency. Coordination among federal, state, and local partners ensures adequate security planning and measures are in place for the Charlotte region, to account for substantial infrastructure, facilities, and population and employment centers.

The FHWA, in partnership with the Department of Defense, designated a system of roads deemed necessary to support US military operations called the Strategic Highway Network (STRAHNET). The network is comprised of almost 63,000 miles of interstates, defense highways, public highways, and connectors. The STRAHNET routes in the CRTPO's planning area are shown in **Figure 3-23**.

The North Carolina Department of Public Safety (DPS) is charged with protecting the state from a multitude of threats and hazards, related to security, recovery and resiliency, and emergency management. It also administers the [ReadyNC](#) program to help North Carolinians plan, prepare, and stay informed in case of an emergency situation. ReadyNC partners with Duke Energy to maintain an [emergency preparedness plan for the McGuire Nuclear Station](#) within the CRTPO planning area.

The NCDOT maintains a [Resilience Strategy Report](#) that outlines existing initiatives and future short-, medium-, and long-term steps to advance and deepen agency-wide resilience practices and capabilities, along with publishing studies and reports assessing the state's current level of resiliency. It also manages the Incident Management Assistance Patrol (IMAP) program, a safety service patrol that implements strategies and increased enforcement to reduce transportation impacts due to unexpected incidents.

Figure 3-23 Strategic Highway Network



Iredell, Mecklenburg, and Union counties each have Emergency Management Offices that maintain hazard mitigation plans to prepare these respective counties for possible major incidents that could severely interrupt daily operations. These plans are multi-jurisdictional, inter-departmental efforts that include input from transportation agencies, first responders, and local governments. Each county emergency management office, and the City of Charlotte, also maintain an emergency/evacuation plan.

The public transportation agencies in the CRTPO planning area are responsible for transit security planning, prevention, response, and recovery phases. Each transit agency also maintains a Safety Plan that contains a Safety Risk Management Component, outlining processes for hazard identification, risk assessment, and mitigation strategies.

All of these planning efforts and strategies contribute to the security and safety of the transportation system in the CRTPO planning area. County and transit agency representatives participate in the CRTPO's planning activities through membership on its TCC and CRTPO Board. The CRTPO also regularly engages its member jurisdictions and transit agencies to participate in various planning initiatives, ensuring there is ongoing coordination to consider and address safety and security issues related to transportation.

**NCDOT Incident  
Management Assistance  
Patrol Service**





## Chapter 04

# Challenges Facing the Region

Planning for a transportation system that supports millions of users across three counties is a complex undertaking with multiple challenges. As part of planning for the system, the CRTPO works with its partners to identify current and future conditions, and the tools, strategies, and projects to address identified needs. In addition, the CRTPO monitors performance to determine the most effective allocation of resources for transportation improvements. Some of the key issues facing the CRTPO's planning area include rapid growth, funding shortfalls, equity, and responding to unexpected events that impact

transportation in the region. This chapter describes how each of these issues affect the CRTPO planning area.

Tools, planning initiatives, and recommended strategies to address the respective issues are listed at the end of each section. **Chapter 5** provides additional detail about addressing transportation challenges in the region.

**Nearly  
1M More People  
by 2050**

*Population Growth*  
**65%** ↑  
(2018-2050)

**Nearly  
600K More Employees  
by 2050**

*Employment Growth*  
**54%** ↑  
(2018-2050)

  
**80%** of Commuters  
**DRIVE ALONE**  
to Work

  
**42%** of Roadways  
**AT OR ABOVE**  
Capacity by 2050

## Rapid Growth

As mentioned in **Chapter 3**, the Charlotte region is one of the fastest growing in the country. The CRTPO planning area population is expected to grow by nearly one million people by the year 2050. Employment is also anticipated to increase by 600,000 during the same time frame. With substantial growth of both population and employment, increased demands on the transportation system are inevitable.

As of 2019, approximately 80% of workers drove alone to get to work in the CRTPO planning area, suggesting there is an opportunity to expand the network to provide other mode choices. In addition, the roadways in the CRTPO planning area that are at or above capacity are anticipated to increase from 10% in 2018 to approximately 42% in 2050.<sup>1</sup> These indicators demonstrate the anticipated demands on the roadway network. Increased congestion leads to unreliable travel times that result in longer commutes.

The rapid growth in the region is also contributing to demographic changes, resulting in more diversity. The percentage of white, non-Hispanic population in the Charlotte metro area decreased from 2010 to 2019 and the percentage of all non-white racial groups combined increased. These changes have important implications for land use and the transportation system. Data shows that non-white households are less likely to own cars, meaning they are more dependent on alternative modes of transportation for routine travel.<sup>2</sup>

It is important that planning and investment activities account for the increased demands on the transportation network from the growing and changing population and the needs of an expanding workforce. Providing mode choices, such as transit and bicycle and pedestrian accommodations, is one of the CRTPO's 2050 Metropolitan Transportation Plan (MTP) goals and is a significant consideration when making transportation investment decisions. The high ridership of the LYNX Blue Line light rail and Express Bus Routes serving the planning area offer evidence that people with access to alternative travel options are willing to utilize them. The light

rail began service in 2007, was extended in 2017, and prior to the COVID-19 pandemic had exceeded anticipated ridership since it began operating. Continuing to focus on increased modal choices will improve quality of life for residents and enhance the economic vitality of the region.

Adequate maintenance of the transportation network with the increased demand is another challenge facing the region. Maintaining the existing system, along with expanding the network and offering more mode choices, are crucial elements in planning for the future.

### Tools, Planning Initiatives, and Strategies to Address **Rapid Growth**:

- Scenario Planning
- Congestion Management Process
- Beyond 77
- CONNECT Beyond
- Emerging Techniques and Technologies



1 See Congestion Management Process, **Chapter 5**.

2 [https://nationalequityatlas.org/indicators/Car\\_access/#/](https://nationalequityatlas.org/indicators/Car_access/#/)

**LYNX Blue Line  
Extension in Charlotte**

## Funding Shortfalls

While federal and state revenue sources are used to fund projects for future construction, they are not adequate to keep up with the transportation needs in the region. Revenue from sources such as gas taxes will be significantly impacted as vehicle efficiency increases and electric vehicles (EV) become more accessible and affordable. Transportation demands are increasing across the country, and competition for limited funding is greater than ever. These financial concerns can be viewed from the short-term and long-term.

In the short-term, the North Carolina Department of Transportation (NCDOT) spent more than expected on disaster relief and settlements related to right-of-way acquisition in 2018-2019, and experienced reduced revenue during the COVID-19 pandemic in 2020. During the height of the pandemic, fewer people were driving, resulting in less fuel purchases and tax payments, meaning lower revenues from motor fuel taxes. Revenue from motor fuel taxes comprises 54% of the transportation funding in North Carolina. These circumstances led to cash balance shortages, which caused numerous project suspensions for several months in the subsequent years 2019-2020.

In addition to the cash balance shortages and project suspensions, the NCDOT revised its cost estimating process to make it more accurate. This revised process revealed increased cost estimates for many projects in the planning and design phases in the 2020-2029 State Transportation Improvement Program (STIP). The combination of the above factors led to the 2020-2029 STIP being over programmed by more than \$11 billion in 2021, resulting in numerous project delivery delays.<sup>3</sup>

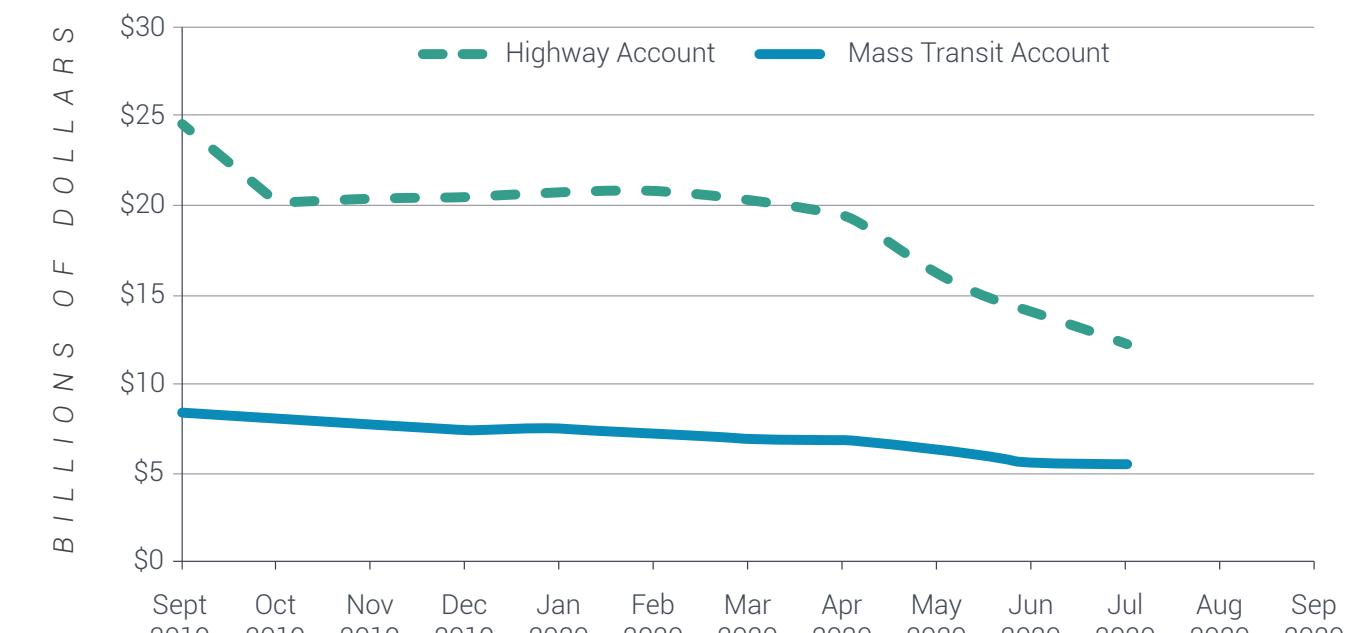
From a long-term perspective, a needs analysis was conducted as part of the NC Moves 2050 statewide strategic transportation plan. The needs analysis concluded that through the 2030 planning horizon, even though anticipated revenues will keep pace with population growth and vehicle ownership, the NCDOT will still need 3.5

times more funding to address transportation needs. There are over \$30 billion worth of transportation needs anticipated between 2020 and 2030 and only \$8 billion of revenue. Vehicle types and usage are anticipated to change while federal funding is expected to remain at similar levels. If federal funding is not expanded, the development of additional state or local funding sources will be necessary.

In March 2019, the NCDOT created the NC FIRST Commission to evaluate North Carolina's transportation funding needs and provide guidance on alternative financial resources. The Commission's findings are summarized as follows:<sup>4</sup>

- Transportation funding will need to increase by at least \$20 billion over the next ten years
- The fuel tax base is eroding, which is contributing to unpredictable federal revenues in the future, as displayed in **Figure 4-1**
- Construction costs are increasing
- Transportation construction supports over 110,000 jobs in North Carolina<sup>5</sup>

**Figure 4-1 Future Federal Revenues at Risk**



Source: Federal Highway Administration

<sup>3</sup> The MTP financial plan, provided in **Chapter 6**, referenced the August 2020 STIP as the baseline from which to develop future revenue projections and might not reflect the full extent of these short-term impacts to project funding.

<sup>4</sup> <https://www.ncdot.gov/about-us/how-we-operate/finance-budget/nc-first/Documents/2021-01-08-key-findings.pdf>

<sup>5</sup> ARTBA analysis, U.S. Bureau of Labor Statistics and U.S. Bureau of Economic Analysis



Matthews  
Town Hall

For the development of its 2050 MTP, the CRTPO conducted a gap analysis to calculate the funds needed to complete the projects identified in its 2045 MTP. The analysis concluded there is an estimated \$4.6 billion funding gap between the funds available for allocation and the estimated cost of unfunded project improvements. The 2050 MTP has identified more project needs and costs are anticipated to increase, further widening this funding gap. In response, the CRTPO conducted an alternative funding analysis to identify potential revenue sources to supplement federal and state funding. **Chapter 5** describes the alternative funding analysis, results, and next steps.

In November 2021, the Infrastructure Investment and Jobs Act (IIJA) legislation was enacted. This five year federal reauthorization identifies \$110 billion of additional funding to repair roads and bridges and support major transportation projects. Due to the timing of the transportation reauthorization, the funding impacts of the IIJA were not considered as part of the 2050 MTP financial analysis. While the IIJA is expected to lessen the funding gap, the identified needs in North Carolina and the lack of revenue increases to keep pace with transportation demands continue to be significant issues. The CRTPO will continue to pursue additional funding options to address these concerns through coordinated efforts to implement the MTP, Beyond 77, and CONNECT Beyond recommendations. In addition, one of the goals of the CRTPO's Strategic Plan is to expand regional transportation funding. A key strategy to achieve this goal is to identify funding opportunities through regional coordination and partnerships.

#### Tools, Planning Initiatives, and Strategies to Address **Funding Shortfalls**:

- Scenario Planning
- Beyond 77
- CONNECT Beyond
- CRTPO Strategic Plan
- Alternative Funding Sources
- Emerging Techniques and Technologies

## Equity

Equity is defined by the Federal Highway Administration (FHWA) as "a measure of fairness in terms of the distribution of costs and benefits among members of society."<sup>6</sup> Transportation planning and decision making applies to a broad range of equity issues, highlighted by the following:

- Transportation accessibility, including proximity to convenient and safe mode choices
- Distribution of funding for infrastructure and service improvements, both geographically and in terms of the populations that benefit or are impacted
- Property value increases or decreases based on transportation improvements
- Displacement due to infrastructure projects
- Household income spent on transportation
- Employment and economic development opportunities
- Health impacts

The CRTPO planning area population is becoming more diverse, as referenced in **Table 4-1**. Transportation policies that place more emphasis on highway development impact people who cannot afford a car or who do not drive, such as low-income, elderly, or disabled populations. Limiting the availability of convenient and safe mode choices reduces opportunities and impacts quality of life by making it more difficult to access jobs, schools, healthcare, and other services. In addition, access to alternative mobility options helps offset the financial burden of transportation costs for low-income households.



4th St Floating Bus  
Stop in Uptown  
Charlotte

<sup>6</sup> [https://ops.fhwa.dot.gov/publications/fhwahop13033/app\\_a.htm](https://ops.fhwa.dot.gov/publications/fhwahop13033/app_a.htm)

**Table 4-1 Racial Composition of Charlotte Metro Area Population**

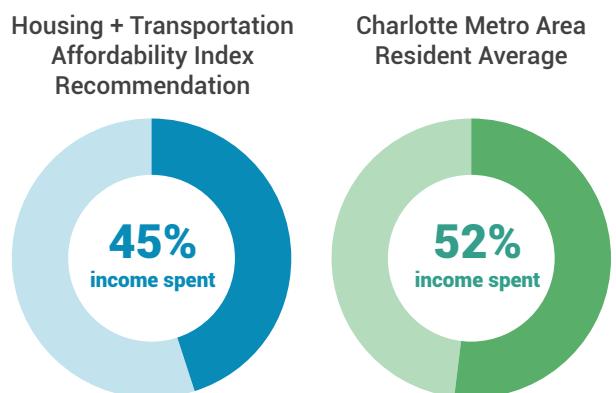
Race	2010	2019
American Indian and Alaska Native	1%	1%
Asian	3%	4%
Black	24%	22%
Hispanic or Latino (of any race)	10%	18%
Native Hawaiian and Other Pacific Islander	0%	0%
White	68%	60%
Some Other Race	3%	6%
Two or More Races	2%	7%

Source: 2010 and 2019 One-Year ACS Estimates

Note: Numbers are rounded for planning purposes.

Low-income and minority households also devote a large proportion of income to transportation-related expenses. The CONNECT Beyond mobility study, which encompasses 12 counties, and includes the CRTPO's three-county planning area, assessed equity. One of the indicators evaluated was housing affordability. Instead of using a traditional measure, the Center for Neighborhood Technology's Housing + Transportation Affordability Index was utilized, which also considers transportation costs related to a home's location, to calculate commuting and other daily travel needs. Results of the assessment indicated the average resident in the Charlotte metropolitan area spends approximately 52% of their income on housing and transportation costs, as shown in **Figure 4-2**, which is 7% more than the recommended amount of 45%.

## Figure 4-2 Housing + Transportation Affordability Comparison



Source: <https://htaindex.cnt.org/>

In addition to a diverse population, there is also geographic disparity between the densely developed urban areas and the rural portions of counties within the region. While the dense urban areas serve more people, accommodate more jobs, and generally are more congested, it is important for the CRTPO to recognize the needs of all member jurisdictions throughout its planning area. Balancing the needs of the member jurisdictions, as well as the potential conflicts between roadway improvements and the provision of modal choices, is a critical element in planning and decision-making. With limited funding availability, equity is a key component of the planning process.

### Tools, Planning Initiatives, and Strategies to Address **Equity**:

- Scenario Planning
- Degree of Impact Analysis
- Active Transportation Screening
- Beyond 77
- CONNECT Beyond
- Alternative Funding Sources
- Emerging Techniques and Technologies
- MTP Roadway Ranking Methodology



## Maintaining a Resilient and Sustainable System

Lake Norman is an example of a geographic constraint that limits north-south connections between Iredell and Mecklenburg counties.



Climate change, severe weather, natural disasters, and other unexpected events, such as the COVID-19 pandemic, significantly impact transportation. Resiliency and sustainability have become key elements of transportation planning to help address the challenges that coincide with these threats to the transportation system. Resilience refers to the ability to anticipate and prepare for unexpected events, absorb impacts, then adapt and respond quickly to recover. Sustainability is focused on durability and balancing current needs without jeopardizing the future well-being of the transportation system. Resilient and sustainable transportation infrastructure provides access to jobs and services with minimal economic and environmental impacts and is able to adapt to changing conditions without disruptions.

The CRTPO planning area is located in the Piedmont region of North Carolina, between the coast and the mountains.

While it is not often directly impacted by severe weather events such as hurricanes or rockslides that have struck other areas of the state, the Charlotte region experiences and is susceptible to a variety of disruptions, such as flooding, storms, and drought.

As shown in **Table 4-2**, the City of Charlotte has the highest number of properties at risk of flooding in the state.<sup>7</sup> The CRTPO planning area is also susceptible to other types of disruptions, including cyber-attacks, system and service failures, and geographic constraints. Lake Norman is an example of a geographic constraint that limits north-south connections between Iredell and Mecklenburg counties and east-west connections that overload routes such as NC 73 and NC 150.

<sup>7</sup> This is mostly due to the fact that Charlotte is the largest city in the state and has more properties than other municipalities. Municipalities in North Carolina near the Atlantic Ocean, with a fewer number of overall properties, have a greater proportion of their total properties at risk.

**Table 4-2 Cities and Towns in NC with the Highest Number of Properties at Risk of Flooding**

Rank	City/Town	No. of Properties (2020)
1	Charlotte	17,545
2	Wilmington	11,184
3	Raleigh	8,469
4	Fayetteville	7,957
5	New Bern	7,940
6	Durham	5,958
7	Elizabeth City	5,510
8	Winston-Salem	5,494
9	Oak Island	5,141
10	Greensboro	5,121

Source: [https://assets.firststreet.org/uploads/2020/06/first\\_street\\_foundation\\_first\\_national\\_flood\\_risk\\_assessment.pdf](https://assets.firststreet.org/uploads/2020/06/first_street_foundation_first_national_flood_risk_assessment.pdf)

North Carolina is also one of only five states that owns more than 50% of its roadways. As displayed in **Table 4-3**, the NCDOT maintains over 80,000 miles of roadway, more than any state except Texas. The average state Department of Transportation owns and maintains approximately 15,600 miles, or about 20% of its public roads. The NCDOT is responsible for nearly 75% of the road miles in the state. In addition, North Carolina's comparative spending on transportation is low. The state's transportation budget is inadequate to accommodate the needs of its growing population and unusually large state-owned and maintained roadway network. **Table 4-4** illustrates that North Carolina spends significantly less per state-owned mile than nearly all of its peer states and would need to invest an additional \$7.4 billion per year to bring its spending to the national average of \$142,461 per mile.<sup>8</sup>

<sup>8</sup> Source: <https://www.ncdot.gov/about-us/how-we-operate/finance-budget/nc-first/Documents/2021-01-08-final-report.pdf>

**Table 4-3 State System Comparisons**

State	Total State Owned Mileage, 2018	% of DOT Ownership, 2018	State Owned Bridge Structures, 2019	VMT per capita (in millions), 2018
Texas	80,455	25.6%	54,432	11,216
<b>North Carolina</b>	<b>80,011</b>	<b>74.5%</b>	<b>18,407</b>	<b>12,703</b>
Virginia	59,020	78.3%	13,933	10,666
South Carolina	41,296	52.9%	9,419	12,280
Ohio	19,249	15.6%	27,167	9,923
Georgia	17,946	14.0%	14,940	13,569
Illinois	15,900	10.9%	26,825	8,414
Tennessee	13,920	14.5%	20,226	12,814
Florida	12,104	9.8%	12,518	11,798

Source: NC FIRST Commission

**Table 4-4 State Spending Comparisons**

State	Transportation Fund Revenue Sources (in millions), FY 2019	Transportation Expenditures as % of Total State Expenditures, FY 2019	Highway Spending Per Capita, FY 2017	Transportation Spending Per VMT, FY 2019	Transportation Spending Per State Owned Mile, FY 2019
Florida	\$ 8,889	12.1%	\$ 537	\$ 0.04	\$ 734,404
Illinois	\$ 4,142	6.5%	\$ 731	\$ 0.08	\$ 260,510
Ohio	\$ 3,231	4.8%	\$ 520	\$ 0.08	\$ 167,851
Texas	\$ 10,515	11.1%	\$ 554	\$ 0.03	\$ 130,693
Georgia	\$ 2,086	7.1%	\$ 418	\$ 0.07	\$ 116,238
Tennessee	\$ 963	6.1%	\$ 334	\$ 0.11	\$ 69,182
Virginia	\$ 3,555	12.6%	\$ 582	\$ 0.10	\$ 60,234
<b>North Carolina</b>	<b>\$ 3,942</b>	<b>13.3%</b>	<b>\$ 474</b>	<b>\$ 0.07</b>	<b>\$ 49,268</b>
South Carolina	\$ 1,996	8.6%	\$ 457	\$ 0.16	\$ 48,334

Source: NC FIRST Commission

North Carolina's high rate of roadway ownership, coupled with lower than average spending, will hinder the state's ability to maintain and upgrade the roadway network to implement improvements for long-term sustainability.

Disruptions to the resiliency and sustainability of the transportation system contribute to safety concerns, reduced reliability, impediments to emergency response, and reductions in economic productivity. Additionally, weather events and natural hazards alter the lifecycle of the transportation system, which increases costs in the long-term. Limited transportation resources are often diverted from other needed projects

to repair damages sustained after unexpected events such as natural disasters. The NCDOT has seen its disaster-related costs rise sharply in the past decade, increasing from an average of \$54 million per year from 2009 to 2013 to approximately \$165 million per year on average from 2014 to 2019.<sup>9</sup> These additional and unanticipated expenses also adversely impact the resources for regular maintenance and improvement projects, further complicating the funding scenarios.

<sup>9</sup> NCDOT: <https://www.ncdot.gov/about-us/how-we-operate/finance-budget/nc-first/Documents/2021-01-08-final-report.pdf>

#### Tools, Planning Initiatives, and Strategies for Maintaining a Resilient and Sustainable System:

- Scenario Planning
- Congestion Management Process
- Beyond 77
- CONNECT Beyond
- Alternative Funding Sources
- Emerging Techniques and Technologies
- Environmental Mitigation Activities



Cattlemans Road Bridge Washout in Iredell County

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## Chapter 05

# Addressing Transportation Challenges

To address the challenges that lie ahead, it is important for the CRTPO to utilize new and existing tools, continue to coordinate with stakeholders, and pursue strategies to respond to changing conditions. The CRTPO has several existing tools that it maintains and updates and is continually exploring options to improve on those and develop new ones. Coordination with its partners and contributing to various planning initiatives is also a critical aspect of responding to transportation challenges. In addition, researching and evaluating new and innova-

tive strategies provides an opportunity to discover new resources and best practices to help advance transportation initiatives in the CRTPO planning area.

This chapter highlights various tools, coordination efforts, and new strategies that helped the CRTPO develop recommendations included in the Metropolitan Transportation Plan (MTP) to utilize available resources wisely for the betterment of the transportation system.



Freedom Park  
in Charlotte

## Planning Factors Addressed

- |   |                              |
|---|------------------------------|
|  | Economic Vitality            |
|  | Efficient System             |
|  | Integration and Connectivity |
|  | Accessibility                |

## Tools

Several tools are utilized by the CRTPO as part of its planning efforts. They help inform decision-makers, assess impacts of project investments, and assist with project identification. Four of the tools are highlighted in this MTP, including three that have been updated from previous efforts and one that was created during the plan's development, as follows:

- Scenario Planning
- Congestion Management Process
- Degree of Impact Analysis
- Active Transportation Corridors

Each tool is described in more detail on the following pages, including its purpose, how it contributes to the planning process, and the outcomes it provides.

## Scenario Planning

Scenario planning is a tool the CRTPO uses to evaluate different factors, such as land use or telecommuting, to help make informed and coordinated decisions. The goal of scenario planning for the 2050 MTP was to develop a framework for measuring the impacts and evaluating the trade-offs of different external forces, such as land use development patterns, that might influence future travel behavior in the region.

The Federal Highway Administration (FHWA) actively promotes scenario planning by state departments of transportation and Metropolitan Planning Organizations (MPO) through its performance-based planning and programming initiative to better integrate transportation, land use, environment, and technology decisions. For the 2050 MTP, several scenarios were studied to determine how the CRTPO planning area might grow or transform in the future and then measured and evaluated the trade-offs of each scenario.

The scenarios considered the impacts of the following change factors on travel behavior and future investments in the regional transportation system:

- Connected and autonomous vehicles (CAV)

- Changing growth and development patterns
- Trends toward working-from-home

Ultimately, the scenarios themselves are not specific forecasts or predictions, but possible outcomes based on existing conditions, emerg-

ing trends, or the region's desire to change course for the future. The results of this scenario planning effort were provided to the CRTPO's member jurisdictions as a resource to identify potential projects to be considered for inclusion in the MTP.

## Planning Models

The scenario planning initiative utilized two models for evaluating alternative growth scenarios and measuring their impacts:

- Metrolina CommunityViz Model (MCM)
- Metrolina Regional Model (MRM)

### Metrolina CommunityViz Model

The MCM is the product of region-wide initiatives in 2016 and 2020 to develop more consistent and replicable methods for allocating socioeconomic data to be used in the MRM. It streamlines the process and provides a standardized methodology for translating local plans, socioeconomic data, and land use trends into growth projections throughout the planning area and allows the impact of physical development or policy decisions to be compared side-by-side. As an example, an increase in housing units will show immediate impacts to the area's future population, travel demand, employment base, and demand for city services.

By providing more efficient methods and tools, and recognizing the inherent relationships between land use, transportation, and urban design, the MCM allows users to study the fundamental components of a more efficient and sustainable transportation system. Socioeconomic data allocated

in the MCM streamlines the workflow for running alternative growth scenarios in the MRM.

### Metrolina Regional Model

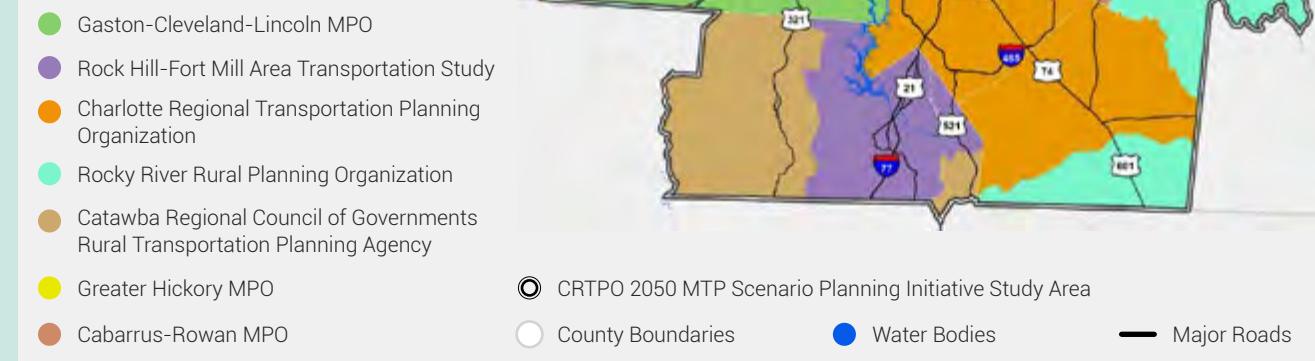
The MRM forecasts future year demand on existing and planned transportation facilities using anticipated land use, demographic, and travel pattern information unique to the region. Approximating future year conditions on the transportation system helps transportation officials assess the implications of growth, compare alternative transportation solutions, and measure the impacts of policy decisions.

The MRM uses socioeconomic data and surveyed travel characteristics, including trip purpose, to determine future demand on the transportation system. Vehicle trips estimated in the travel demand model are assigned to the road network using specific volume capacity and free flow speed values for individual links in the network. Together, the values for each link help determine the entire system's efficiency for moving vehicles between origins and destinations in the region. Increasing capacity or travel speed along one or more corridors in the study area generally improves the performance of the road network.

**Figure 5-1 Connected and Autonomous Vehicles Possible Future Conditions**

## Scenario Planning Study Area

The scenario planning initiative for the 2050 MTP expands the CRTPO planning area to a study area that matches the region represented in the MRM, including two states, five MPOs, two rural planning organizations (RPO), 12 counties, and 77 municipalities.



## Change Factors

Existing conditions and the three change factors for the scenario planning initiative provided a range of possible future conditions for developing alternative scenarios. Outlining the range of possible future conditions for each factor in the different scenarios assumed an array of conservative-moderate-aggressive movements or actions away from existing conditions, as follows:

### CONNECTED AND AUTONOMOUS VEHICLES

The range of possible future conditions for CAVs evaluated for the 2050 MTP focused on the size, location, and connectivity of different transportation investment scenarios, which are displayed in **Figure 5-1**.



**Status Quo Condition**

- No CAV Technology



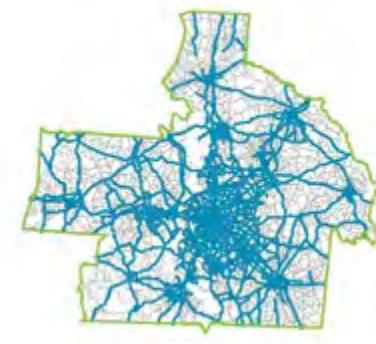
**Moderate Investment**

- Conservative CAV Network Plus Managed Lanes for Freeways Converted to CAV Only Lanes & Expressways



**Conservative Investment**

- Freeway General Purpose Lanes, Managed Lanes for Freeways & Managed Lanes for US 74



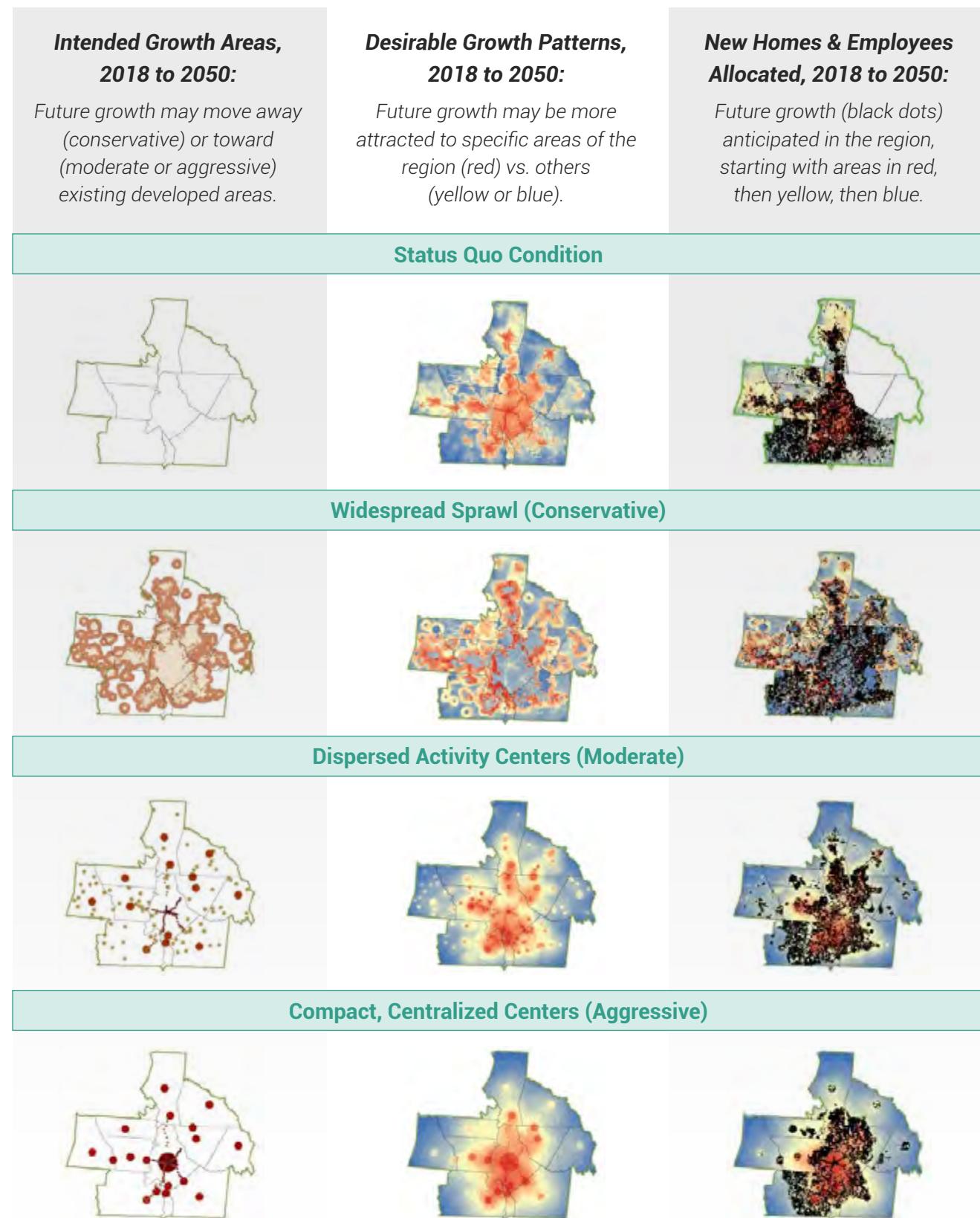
**Aggressive Investment**

- Moderate CAV Network Plus Select Thoroughfares

### CHANGING GROWTH AND DEVELOPMENT PATTERNS

For changing growth and development patterns, the range of possible future conditions in the region focused on different “intended growth areas” that might be influenced by local government plans and policies, market or demographic trends, and developer/builder interests for different product types. **Figure 5-2** shows these scenarios.

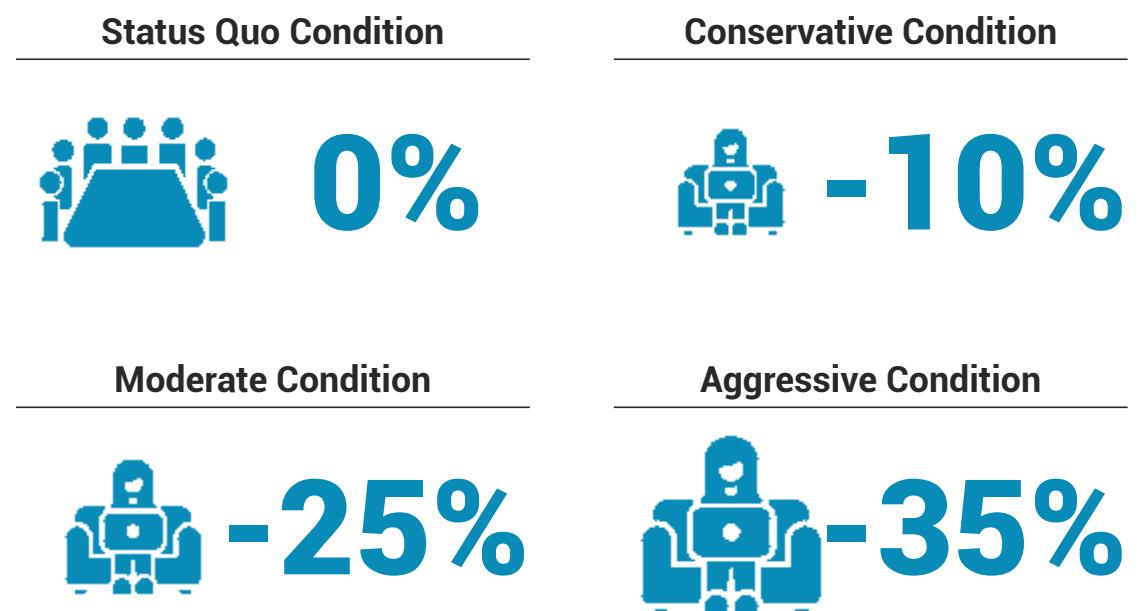
**Figure 5-2 Changing Growth and Development Patterns Possible Future Conditions**



#### TRENDS TOWARD WORKING FROM HOME

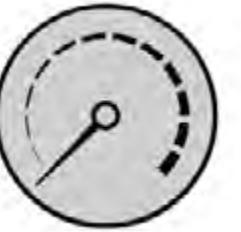
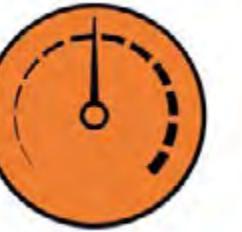
The range of possible future conditions for telecommuting are provided in **Figure 5-3**. These focused on the reduction of home-to-work (and work-to-home) trips for office and government employees.

**Figure 5-3 Trends Toward Working from Home Possible Future Conditions**



**Figure 5-4** summarizes the range of possibilities for each of the three change factors considered for this scenario planning initiative.

**Figure 5-4 Summary of Possible Future Conditions**

			
<b>Status Quo</b>	<b>Conservative</b>	<b>Moderate</b>	<b>Aggressive</b>
 <ul style="list-style-type: none"><li>No CAV Technology</li></ul>	 <ul style="list-style-type: none"><li>Freeway General Purpose Lanes, Managed Lanes for Freeways &amp; Managed Lanes for US 74</li></ul>	 <ul style="list-style-type: none"><li>Conservative CAV Network Plus Managed Lanes for Freeways Converted to CAV Only Lanes &amp; Expressways</li></ul>	 <ul style="list-style-type: none"><li>Moderate CAV Network Plus Select Thoroughfares</li></ul>
 <ul style="list-style-type: none"><li>Adopted Community Plans</li></ul>	 <ul style="list-style-type: none"><li>Widespread Sprawl Patterns</li></ul>	 <ul style="list-style-type: none"><li>Dispersed Activity Centers</li></ul>	 <ul style="list-style-type: none"><li>Compact, Centralized Centers</li></ul>
 <ul style="list-style-type: none"><li>No Shift in Telecommuting for Office (Non-Retail/ Non-Industrial) Oriented Jobs</li></ul>	 <ul style="list-style-type: none"><li>10% Shift in Telecommuting for Office (Non-Retail/ Non-Industrial) Oriented Jobs</li></ul>	 <ul style="list-style-type: none"><li>25% Shift in Telecommuting for Office (Non-Retail/ Non-Industrial) Oriented Jobs</li></ul>	 <ul style="list-style-type: none"><li>35% Shift in Telecommuting for Office (Non-Retail/ Non-Industrial) Oriented Jobs</li></ul>



Little Sugar Creek Greenway in Charlotte

### Growth Scenarios

The combination of different factors considered for this scenario planning initiative guided the creation of 10 growth scenarios that were tested in the MCM and the MRM. One scenario provided a baseline (status quo) for comparing the type and magnitude of change expected for each future alternative. The nine other scenarios assumed different combinations of the change factors previously described. Future year growth projections for population, employment, and students in 2050 remained constant for all 10 scenarios, summarized as follows:

Baseline Scenario	Scenario 4	Scenario 5	Scenario 6
<ul style="list-style-type: none"> <li> • <b>No</b> CAV Technology</li> </ul>	<ul style="list-style-type: none"> <li> • <b>Moderate</b> CAV Network Plus Select Thoroughfares</li> </ul>	<ul style="list-style-type: none"> <li> • <b>Adopted</b> Community Plans</li> </ul>	<ul style="list-style-type: none"> <li> • <b>Freeway</b> General Purpose Lanes, Managed Lanes for Freeways &amp; Managed Lanes for US 74</li> </ul>
<ul style="list-style-type: none"> <li> • <b>No</b> Shift in Telecommuting for Office (Non-Retail/ Non-Industrial) Oriented Jobs</li> </ul>	<ul style="list-style-type: none"> <li> • <b>Dispersed</b> Activity Centers</li> </ul>	<ul style="list-style-type: none"> <li> • <b>Dispersed</b> Activity Centers</li> </ul>	<ul style="list-style-type: none"> <li> • <b>Dispersed</b> Activity Centers</li> </ul>
	<ul style="list-style-type: none"> <li> • <b>10%</b> Shift in Telecommuting for Office (Non-Retail/ Non-Industrial) Oriented Jobs</li> </ul>	<ul style="list-style-type: none"> <li> • <b>25%</b> Shift in Telecommuting for Office (Non-Retail/ Non-Industrial) Oriented Jobs</li> </ul>	<ul style="list-style-type: none"> <li> • <b>35%</b> Shift in Telecommuting for Office (Non-Retail/ Non-Industrial) Oriented Jobs</li> </ul>

Scenario 1	Scenario 2	Scenario 3	Scenario 7	Scenario 8	Scenario 9
<ul style="list-style-type: none"> <li> • <b>Moderate</b> CAV Network Plus Select Thoroughfares</li> </ul>	<ul style="list-style-type: none"> <li> • <b>Conservative</b> CAV Network Plus Managed Lanes for Freeways Converted to CAV Only Lanes &amp; Expressways</li> </ul>	<ul style="list-style-type: none"> <li> • <b>Freeway</b> General Purpose Lanes, Managed Lanes for Freeways &amp; Managed Lanes for US 74</li> </ul>	<ul style="list-style-type: none"> <li> • <b>Moderate</b> CAV Network Plus Select Thoroughfares</li> </ul>	<ul style="list-style-type: none"> <li> • <b>Conservative</b> CAV Network Plus Managed Lanes for Freeways Converted to CAV Only Lanes &amp; Expressways</li> </ul>	<ul style="list-style-type: none"> <li> • <b>Freeway</b> General Purpose Lanes, Managed Lanes for Freeways &amp; Managed Lanes for US 74</li> </ul>
<ul style="list-style-type: none"> <li> • <b>Widespread</b> Sprawl Patterns</li> </ul>	<ul style="list-style-type: none"> <li> • <b>Widespread</b> Sprawl Patterns</li> </ul>	<ul style="list-style-type: none"> <li> • <b>Widespread</b> Sprawl Patterns</li> </ul>	<ul style="list-style-type: none"> <li> • <b>Compact</b>, Centralized Centers</li> </ul>	<ul style="list-style-type: none"> <li> • <b>Compact</b>, Centralized Centers</li> </ul>	<ul style="list-style-type: none"> <li> • <b>Compact</b>, Centralized Centers</li> </ul>
<ul style="list-style-type: none"> <li> • <b>10%</b> Shift in Telecommuting for Office (Non-Retail/ Non-Industrial) Oriented Jobs</li> </ul>	<ul style="list-style-type: none"> <li> • <b>25%</b> Shift in Telecommuting for Office (Non-Retail/ Non-Industrial) Oriented Jobs</li> </ul>	<ul style="list-style-type: none"> <li> • <b>35%</b> Shift in Telecommuting for Office (Non-Retail/ Non-Industrial) Oriented Jobs</li> </ul>	<ul style="list-style-type: none"> <li> • <b>10%</b> Shift in Telecommuting for Office (Non-Retail/ Non-Industrial) Oriented Jobs</li> </ul>	<ul style="list-style-type: none"> <li> • <b>25%</b> Shift in Telecommuting for Office (Non-Retail/ Non-Industrial) Oriented Jobs</li> </ul>	<ul style="list-style-type: none"> <li> • <b>35%</b> Shift in Telecommuting for Office (Non-Retail/ Non-Industrial) Oriented Jobs</li> </ul>

## Scenario Performance Indicators

Twelve performance indicators were created for the scenario planning initiative, to quantify and explain the differences between the status quo and nine alternative growth scenarios. The indicators also provide information and insights specific to the six 2050 MTP goals and influence the recommendations included in **Chapter 9** (as described in Next Steps).

**Table 5-1** lists the 12 performance indicators and illustrates how they align with each of the 2050 MTP goals. Performance indicator results for the three-county CRTPO planning area, as well as each individual county, are provided in **Appendix D**.



## Next Steps

The CRTPO is committed to the long-term viability of scenario planning in the region and supports further coordination to develop the data, tools, and processes necessary to effectively integrate scenario planning into other plans and studies. **Chapter 9** outlines recommendations the CRTPO will pursue to maintain momentum and continue to expand its scenario planning efforts to help validate the planning process and provide additional information for member jurisdictions.

**Table 5-1 Relationship of Scenario Planning Performance Indicators to MTP Goals**

2050 MTP Goals	Scenario Planning Performance Indicators
1. Safe, efficient, sustainable transportation	Proximity to Regional Activity Centers, 15-Minute Travel Sheds, New Homes (2018-2050)
	Proximity to Regional Activity Centers, 15-Minute Travel Sheds, New Employees (2018-2050)
	Vehicle Miles Traveled on the Highway System in 2050
	Vehicle Hours Traveled on the Highway System in 2050
2. Integrated, accessible, multimodal transportation	Proximity to Premium Transit Stations, New Homes (2018-2050)
	Proximity to Premium Transit Stations, New Employees (2018-2050)
	Proximity to High Capacity Transit Corridors, CONNECT Beyond Candidate Routes, New Homes (2018-2050)
	Proximity to High Capacity Transit Corridors, CONNECT Beyond Candidate Routes, New Employees (2018-2050)
3. Improve quality of life	Land Consumed for Future Development (2018-2050)
	Average Home Density, New Construction (2018-2050)
	Average Employment Density, New Construction (2018-2050)
4. Equitable transportation options	Proximity to Premium Transit Stations, New Homes (2018-2050)
	Proximity to Premium Transit Stations, New Employees (2018-2050)
	Proximity to High Capacity Transit Corridors, CONNECT Beyond Candidate Routes, New Homes (2018-2050)
	Proximity to High Capacity Transit Corridors, CONNECT Beyond Candidate Routes, New Employees (2018-2050)
5. Regional and statewide collaboration	Share Performance Measure Results with CRAFT, MCM Plus Study Area
6. Economic competitiveness	Percent of New Industrial Employees in Freight Corridors and Clusters

Note: Some performance indicators are listed multiple times because they align with more than one goal.

### Terms Defined:

15-Minute Travel Sheds - within a 15-minute drive

CRAFT - Charlotte Regional Alliance for Transportation

Freight Corridors and Clusters - as defined in the Greater Charlotte Regional Freight Mobility Plan (discussed in **Chapter 3**)

High Capacity Transit Corridors - as defined in CONNECT Beyond (discussed on page 146)

Premium Transit - light rail, streetcar, or bus rapid transit service

## Congestion Management Process

The Congestion Management Process (CMP) is described by the FHWA as a systematic and regionally-accepted approach for managing congestion. It provides accurate, up-to-date information on transportation system performance and assesses alternative strategies for congestion management that meet state and local needs. Federal regulations require MPOs with a population over 200,000 to establish a process for managing congestion.<sup>1</sup> This tool provides recommendations for the effective management of congested facilities to ensure all potential alternatives to address congestion have been examined for identified projects that include additional roadway capacity.

In 2018, the CRTPO coordinated with stakeholders and member jurisdictions to develop its CMP, and a report was produced that describes the process, strategies, and results in detail. The CMP was updated by collecting and analyzing recent data. The updates documented in this MTP are intended to inform investment decisions and project development within the planning area.

<sup>1</sup> Source: Code of Federal Regulations: Title 23, Part 450.322 Congestion Management Process in transportation management areas.

**Figure 5-5** **CMP Development Process**



In consultation with FHWA, the CRTPO decided to extend the CMP study area to include the entirety of Union County. Portions of southern and eastern Union County are not included in the current CRTPO planning area; however, including them in the CMP had no adverse impact on those areas and ensured a comprehensive assessment was conducted.

The CMP features a process to filter roadway segments through a series of identified congestion management strategies in relation to highway improvement needs. The purpose of the CMP is to assess strategies that are not traditional single-occupancy vehicle (SOV) expansion, such as construction of new general purpose travel lanes, before programming roadway projects in the MTP and Transportation Improvement Program (TIP) that add capacity. Key components for development of the CMP are displayed in **Figure 5-5**.



## CMP Goals, Objectives, and Performance Measures

The goal of the CMP is to manage congestion within the CRTPO planning area. This goal is supported by four objectives, along with performance measures that have been established to quantify the objectives. The objectives may continue to evolve over time to address the changing national, statewide, regional, or local context of congestion. **Table 5-2** displays the CRTPO CMP goal, objectives, and performance measures. The use of performance measures is critical in the analysis and assessment of congestion within the study area, as described in the *Summary of Data and Performance*.

**Table 5-2** **CMP Goal, Objectives, and Performance Measures**

### Goal: Manage Congestion

Objectives:	Performance Measures:
Develop congestion management measures	% of Roadway Miles at a Travel Time Index (TTI)/Volume-to-Capacity Ratio
Reduce non-recurring congestion duration	Number of crashes related to the statewide average
Consider full range of congestion management strategies	Were all reasonable techniques/strategies considered (yes/no?)
Improve the resiliency, redundancy, and reliability of the transportation network	Extract data from HERE – Planning Time Index (PTI) or other indices

## Summary of Data and Performance

### DATA COLLECTION

The Global Positioning System (GPS) based HERE travel time data acquired by the NCDOT was identified as the most appropriate dataset available to measure and identify the facilities with existing congestion. HERE is a technology company that provides existing and historical traffic information by collecting and analyzing anonymous vehicle and smartphone location data.



US 74 in Charlotte

## TRAVEL TIME INDEX

Using HERE data, a Travel Time Index (TTI) is derived, which is a ratio of peak period travel time<sup>2</sup> to the time required to make the same trip during free-flow traffic conditions. Based on the 2019 HERE data acquired, a TTI was calculated for the CRTPO planning area to classify the facilities with existing congestion, as follow:

- < 1.1 minimally congested
- 1.1 to 1.5 moderately congested
- > 1.5 heavily congested

Based on the analysis of TTI, 56% of the roadway segments (1,744 miles of roadway) in the CRTPO CMP study area are currently experiencing either moderate or heavy congestion (a TTI of 1.1 or more). These results are shown in **Table 5-3**.

**Table 5-3 Percent Roadway Miles of Travel Time Index**

Measure	Corridor Congestion Condition			
	No Data	Minimal Congestion	Moderate Congestion	Heavy Congestion
No. of Miles (%)	25 (1%)	1,342 (43%)	1,178 (38%)	566 (18%)

Source: Here TTI Data (2019), accessed via <https://pda.ritis.org> (Total length - 3,111 miles)

Note: Due to limitations of the available HERE data, TTI is not provided for 1% of miles.

Note: Miles represent bi-directional miles.

In addition, **Figure 5-6** displays congestion along those corridors using a peak hour TTI. This analysis provides an indicator of where congestion is located throughout the study area.

2 The TTI ratio of peak period travel time to free-flow travel time is computed for the AM (6:00 AM to 9:00 AM) and PM (4:00 PM to 7:00 PM) peak periods on weekdays.

**Figure 5-6 Travel Time Index**

## LEGEND

- Peak Hour Travel Time Index**
- < 1.1 (Minimal Congestion)
  - 1.1 - 1.5 (Moderate Congestion)
  - > 1.5 (Heavy Congestion)
- Lake Norman  
CRTPO Planning Area  
County Boundary

## Notes

The TTI displayed on this map is derived from hourly HERE data for all available Traffic Message Channels (TMC) in Iredell, Mecklenburg, and Union counties for Tuesday, Wednesday, Thursday from January through December 2019.

## Source

HERE Data





## VOLUME TO CAPACITY RATIO ANALYSIS

To identify future congestion conditions, a peak period volume to capacity ratio (v/c) was calculated from the MRM. Using v/c from the MRM, the CRTPO planning area facilities are classified as follows:

- 0.85 or less is below capacity
- > 0.85 to 1.1 is at capacity
- > 1.1 to 1.5 is above capacity (acceptable in some urban areas)
- >1.5 is above capacity (issue for all areas)

Based on the MRM v/c analysis, 10% (271 miles) of roadways in 2018 were at or above capacity. By 2050, at or above capacity roadways increase to 42% (1,116 miles).

These results are shown in **Table 5-4**.

If transportation funding levels are insufficient to construct all MTP projects by 2050, it is possible that congestion levels may be worse than what is described in this report.

**Table 5-4 Roadway Capacity Conditions**

Year of Congestion	Measure	Below Capacity (v/c ≤ 0.85)	At Capacity (0.85 < v/c ≤ 1.1)	Above Capacity (1.1 < v/c ≤ 1.5)	Above Capacity (1.5 < v/c)
2018	No. of Miles (%)	2,400 (90%)	218 (8%)	50 (2%)	3 (0%)
2050		1,554 (58%)	639 (24%)	323 (12%)	154 (6%)

Source: Metrolina Regional Travel Demand Model (Total Length - approx. 2,671 miles)

Note: Miles represent bi-directional miles.

## CRASH DATA

Crash data utilized for the CMP was obtained from the NCDOT for the years 2018 through 2020. Historical crash data was used to assess non-recurring congestion, which causes temporary disruptions that reduce roadway capacity and reliability. Non-recurring congestion is typically unanticipated. Examples include crashes, disabled vehicles, work zones, and adverse weather.

County-wide crash rates for Iredell, Mecklenburg, and Union counties were used for comparison with statewide averages to evaluate systemwide non-recurring congestion. Segment crash data obtained from the NCDOT Traffic Safety online mapping was used to identify roadway segments with the highest number of crashes to evaluate non-recurring congestion at the corridor level across the CMP study area.

## CRASH ANALYSIS

**Table 5-5** illustrates results from the analysis of the NCDOT crash data. The evaluation of total crash rates indicate Mecklenburg and Union counties (334.3 and 348.7, respectively) have total crash rates higher than the statewide average (295.1), while Iredell County (249.5) has a lower total crash rate. For fatal crash rates, Iredell and Mecklenburg counties (1.1 and 0.7, respectively) have lower crash rates than the statewide average (1.2), while Union County's crash rate (1.2) is comparable to the statewide average.

**Table 5-5 Three-Year Crash Averages**

	Statewide	Iredell County	Mecklenburg County	Union County
Total Crash Rate	295.1	249.5	334.3	348.7
Fatal Crash Rate	1.2	1.1	0.7	1.2
Crash Frequency (hours)	0.0 <sup>1</sup>	1.5	0.2	1.3
Fatality Frequency (hours)	5.6	312.9	76.8	365.0

Source: 2018-2020 NCDOT crash data

Note: Crash rate is the number of crashes per 100 million vehicle miles of travel (MVMT).

Note: Numbers are rounded.

1- Statewide crash frequency is less than 0.05 hours, or less than three minutes, which is rounded to 0.0.

## **Identification of Congested Corridors**

The CMP congested corridors identified in the CRTPO planning area are displayed in **Figure 5-7** and listed in **Table 5-6**. A total of 61 corridors in Iredell, Mecklenburg, and Union counties are included in the updated CMP. HERE data and stakeholder input were the primary factors used to determine which congested corridors were selected. This is not to suggest that congestion is not present along other corridors in the planning area, which could be reassessed for future CMP updates.

Another component of corridor selection involved a review of the 2050 MTP projects, to ensure corridors with anticipated widening projects are evaluated as part of the CMP.



**Figure 5-7 CMP Congested Corridors**

### **LEGEND**

- CMP Congested Corridor
- Lake Norman
- CRTPO Planning Area
- County Boundary



**Table 5-6 CMP Congested Corridors**

No.	Name	Limits
1	I-77	River Hwy/Plaza Dr (NC 150) to Mecklenburg County Line
2	I-77	I-77 Exit 42 (US 21) to Mecklenburg County Line to River Hwy/Plaza Dr (NC 150)
3	River Hwy (NC 150)	Catawba County Line to Statesville Hwy/N Broad St (NC 115)
4	Charlotte Hwy (US 21)	Statesville Hwy (NC 115) to I-77 Exit 33 (Williamson Rd)
5	Cornelius Rd/Connector Rd/Mazeppa Rd	Perth Rd to W Park Ave (NC 801)
6	Oakridge Farm Hwy (NC 150)	Statesville Hwy/N Broad St (NC 115) to Landis Hwy (NC 152)
7	Langtree Rd	Mecklenburg Hwy (NC 115) to Alcove Rd/Mecklynn Rd
8	Brawley School Rd	I-77 to Charlotte Hwy (US 21)
9	Williamson Rd	River Hwy (NC 150) to I-77
10	E Broad St	Vine St to Toria Dr
11	S Main St/Mecklenburg Hwy (NC 115)	McLellan Ave to Mecklenburg County Line
12	Sullivan Rd (US 21)	Carolina Ave to Fort Dobbs Rd
13	US 21/NC 115	Old Wilkesboro Rd to Cedar Ln
14	I-77	Iredell County Line to Exit 11 (Brookshire Fwy)
15	I-77	Exit 11 (Brookshire Fwy) to South Carolina State Line
16	Old Statesville Rd (NC 115)	Catawba Ave to W.T. Harris Blvd (NC 24)
17	Gilead Rd	Wynfield Creek Pkwy to Old Statesville Rd (NC 115)
18	I-485	Mt. Holly Rd (NC 27) to I-77 (South)
19	I-485	I-77 (South) to US 74 (East)
20	I-485	US 74 (East) to Albemarle Rd (NC 27)
21	I-85	Gaston County Line to I-77
22	I-85	I-77 to Cabarrus County Line
23	Albemarle Rd (NC 27)	Independence Blvd (US 74) to Blair Rd (NC 51)
24	Independence Blvd (US 74)	I-277 to Union County Line
25	Sugar Creek Rd	Eastway Dr to Nevin Rd
26	W.T. Harris Blvd (NC 24)	Mount Holly-Huntersville Rd to The Plaza
27	North Tryon St (US 29/NC 49)	Sugar Creek Rd to Mallard Creek Church Rd
28	University City Blvd (NC 49)	I-85 to Cabarrus County Line
29	Providence Rd (NC 16)	Queens Rd to Mecklenburg County Line
30	I-277	I-77 (North) to I-77 (South)
31	Steele Creek Rd (NC 160)	Douglas Dr to South Carolina State Line
32	Brookshire Fwy/Blvd (NC 16)	I-77 to Gaston County Line

**Table 5-6 CMP Congested Corridors (continued)**

No.	Name	Limits
33	Pineville-Matthews Rd (NC 51)	I-485 to Providence Rd (NC 16)
34	Billy Graham Pkwy/Woodlawn Rd	I-85 to South Blvd
35	S Tryon St (NC 49)	I-77 to South Carolina State Line
36	Johnston Road (US 521)	I-485 to South Carolina State Line
37	Freedom Dr/Mt Holly Rd (NC 27)	Gaston County Line to Toddville Rd
38	Trade St/Weddington Rd	E John St to Union County Line
39	John St/Old Monroe Rd	Sardis Rd to Union County Line
40	Matthews Township Pkwy (NC 51)	Sardis Rd to Lawyers Rd
41	Polk St	I-485 to Dorman Rd
42	NC 73	Lincoln County Line to I-77
43	NC 73	I-77 to Cabarrus County Line
44	Mallard Creek Rd	Mallard Creek Church Rd to Concord Mills Blvd
45	Poplar Tent Rd	Mecklenburg County Line to Davidson-Concord Rd (NC 73)
46	Ballantyne Commons Pkwy	Williams Pond Ln to Annalex Ln
47	Statesville Rd (US 21)	Sunset Rd to Catawba Ave
48	Westinghouse Blvd	S Tryon St (NC 49) to Nations Ford Rd
49	Rea Rd	Johnston Rd to Pineville-Matthews Rd (NC 51)
50	Idlewild Rd	Jetton Rd to Sam Furr Rd (NC 73)
51	Lawyers Rd	Mecklenburg County Line to Providence Rd (NC 16)
52	Weddington Rd	Mecklenburg County Line to NC 75
53	Wesley Chapel Rd	Old Monroe Rd/Old Charlotte Hwy
54	Pleasant Plains Rd	Mecklenburg County Line to NC 75
55	Monroe-Weddington Rd (NC 84)	Mecklenburg County Line to Anson County Line
56	Charlotte Ave	Idlewild Rd to Indian Trail-Fairview Rd
57	Charlotte Ave	Lawyers Rd to Indian Trail-Fairview Rd
58	Roosevelt Blvd (US 74) to Monroe-Weddington Rd (NC 84)	Weddington Rd to Monroe-Weddington Rd (NC 84)
59	Monroe-Weddington Rd (NC 84)	Roosevelt Blvd (US 74) to Monroe-Weddington Rd (NC 84)
60	McKee Rd to Old Monroe Rd	Wesley Chapel Rd to Monroe-Weddington Rd (NC 84)
61	Rocky River Rd	Pleasant Plains Rd to Monroe-Weddington Rd (NC 84)
62	Seymour St to Dickerson Blvd (NC 200)	Monroe-Weddington Rd (NC 84) to Rocky River Rd

## Congestion Management Strategies

A comprehensive inventory of congestion management strategies has been identified for the planning area. Specific strategies apply to fully controlled access facilities and others are identified for limited/partially controlled access facilities. In addition, there are general strategies that could be applied throughout the planning area. The strategies address demand management, alternative mode promotion, traffic operations, and land use. They are also intended to assess term effectiveness (short, mid, long), congestion type (recurring, non-recurring, or both), and public acceptance (low, medium, high). The strategies are listed in **Table 5-7**, **Table 5-8**, and **Table 5-9** and more details are included in **Appendix E**. Many of these strategies are either currently being used or are anticipated to be used within the CRTPO planning area.

## Corridor Analysis

The CMP corridors identified by the CRTPO were assessed to determine which congestion management strategies are applicable. Strategies were identified for each of the 61 corridors and member jurisdictions were consulted to review and revise the strategies applied to each respective corridor. The corridor-specific strategies are provided in **Appendix E**. This process allows the CRTPO to determine if all reasonable techniques and possible strategies for improving a facility, in lieu of widening, were considered for the identified CMP corridors.

**Table 5-7 Strategies for Fully Controlled Access Facilities**

Demand Management
HOV Lanes
Variable Priced Lanes
Congestion Pricing (HOT)
Bridge Tolling
Electronic Payment Systems
Alternative Mode Promotion
Park-and-Ride Lot Improvements
Shoulder Use for Transit During Peak Periods
Improvements/Added Capacity to Rail and Bus Transit
Service Coordination (Buses/Trains Sharing Real-Time Information)
Traffic Operations
Reversible Lanes or Movable Medians
Spot Safety Improvements
Freeway Ramp Metering
Variable Speed Limits
Land Use
Transportation-Land Use Plans with Local Governments

**Table 5-8 Strategies for Limited/Partially Controlled Access Facilities**

Demand Management
Access Management Program
HOV Lanes
Congestion Pricing
Bridge Tolling
Alternative Mode Promotion
Transit Signal Priority Systems
Park-and-Ride Lot Improvements
Addition of Bicycle Racks at Public Transit Stations/Stops
Bicycle/Pedestrian Access to Transit Improvement
Sidewalk Gap Closure Program
Improve Pedestrian Facilities at Intersections
Creation of New Bicycle and Pedestrian Facilities
Bike Sharing Programs
Enhance Transit Amenities
Shoulder Use for Transit During Peak Periods
Safe Routes to School Initiatives
Bicycle and/or Pedestrian Corridor Safety Studies and Implementation
Traffic Operations
Imaging for Surveillance and Detection
Traffic Signal Timing
Red-Light Camera Enforcement
Dynamic Traffic Signal Systems
Service Patrols (e.g. IMAP)
Emergency Management Systems (EMS)
Turn Lane Construction and Extension
Roundabout Construction
Reversible Lanes or Movable Medians
SPOT Safety Improvements
Variable Speed Limits
Variable Message Signs (VMS)
Land Use
Transportation-Land Use Plans with Local Governments
Develop Overlay Districts to Manage Development Densities and Form

**Table 5-9 Strategies Applied on a Regional Level**

Demand Management
Ridematching Services
Vanpooling
Parking Cash-Out or Carpool Parking Incentives
Alternative Commute Subsidy Program
Telecommuting Promotion
Compressed/Flexible Workweeks
Employer Outreach/Mass Marketing
Cordon Pricing
Alternative Mode Promotion
Improvements/Added Capacity to Regional Rail and Bus Transit
Service Coordination (Buses/Trains Sharing Real-Time Information)
Bicycle / Pedestrian Education Program
Traffic Operations
Imaging for Surveillance and Detection
Service Patrols (e.g. IMAP)
Traffic Management Centers (TMC)
Parking Management and Information Systems
511 Traveler Information
Highway Advisory Radio (HAR)
Transit Information Systems
Work Zone Management
Variable Message Signs (VMS)
Land Use
Encourage Regional Activity Centers
Live-Work Proximity Incentives
Require MPO Review for Regional Scale Developments
Growth Management Restrictions

## Planning Factors Addressed



Accessibility



Environment

## Degree of Impact Analysis

The Degree of Impact Analysis (DOI) is used by the CRTPO to assess the impact of the 2050 fiscally constrained projects on Environmental Justice (EJ) communities in the planning area. The DOI is calculated by overlaying the 2050 MTP projects (see **Chapter 7**) on the identified concentrations of EJ populations (see **Chapter 3**) within the CRTPO planning area, as displayed in **Figure 5-8**.

### Framework For Degree of Impact Analysis

Degree of Impact is quantified by transportation expenditures averaged across the total land area within each EJ category.

Transportation expenditures account for all fiscally constrained MTP projects impacting census tracts with EJ populations exceeding the planning area average, defined as:

- No Concentration (0 EJ groups)
- Slight Concentration (1-2 EJ groups)
- Moderate Concentration (3-4 EJ groups)
- High Concentration (5-7 EJ groups)

Figure 5-8 Degree of Impact Analysis

### LEGEND

#### 2050 MTP Fiscally Constrained Projects

- Interchange/Intersection Roadway Project
- Widening/New Location Roadway Project
- Active Transportation Project

#### Environmental Justice Areas

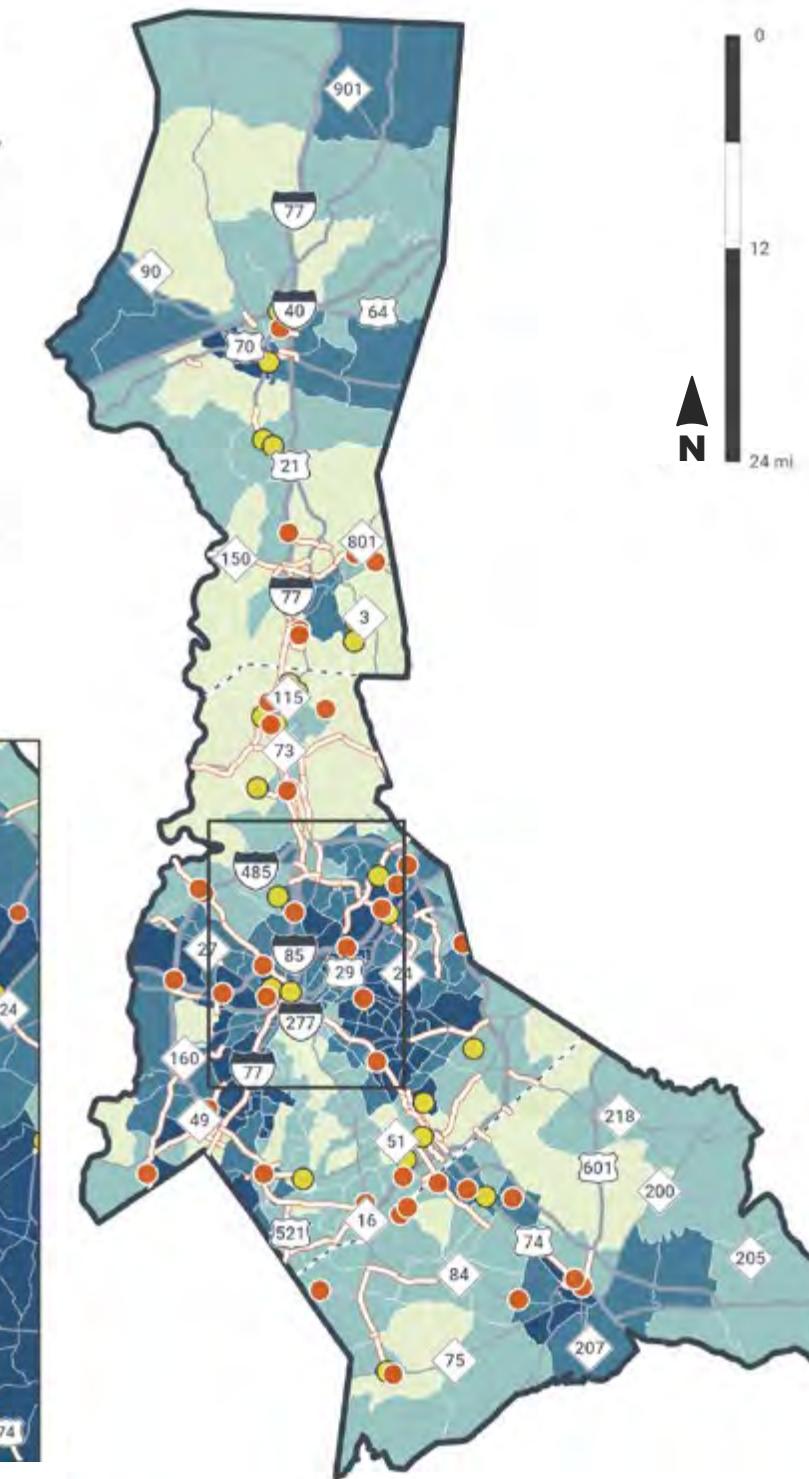
- Light Green: No Concentration
- Medium Green: Slight Concentration
- Dark Green: Moderate Concentration
- Very Dark Green: High Concentration

#### CRTPO Planning Area

#### County Boundary

#### Source

2019 American Community Survey



Project expenditures in High Concentration census tracts are more than seven times the average expenditure per mile.

Farm Pasture in Union County



## Analysis Findings

The DOI methodology and accompanying analysis has revealed that expenditures on fiscally constrained projects are seven times higher in High Concentration census tracts than average expenditures per mile across the planning area. The CRTPO's project selection process does not proactively focus on High Concentration tracts for projects; this circumstance is the result of multiple historical, cultural, and geographic factors.

The CRTPO planning area is comprised of 318 census tracts, identified as follows based on the EJ concentration assessment:

- 64 No Concentration;
- 110 Slight Concentration;
- 85 Moderate Concentration; and
- 59 High Concentration.

These metrics indicate that concentrations of EJ populations exist in the planning area, but those areas (particularly the High Concentration tracts) represent a relatively small portion of the overall CRTPO geography – High and Moderate concentration areas represent 113 square miles and 327 square miles respectively, compared to the roughly 1,783 square miles of quantifiable census tracts.<sup>3</sup>

When considering shares of population, as opposed to geographic size, Slight Concentration tracts contain the largest share with roughly 37% (541,700) of the total planning area population. Moderate Concentration tracts comprise roughly 25% (359,600), and High Concentration and No Concentration tracts each account for approximately 20% (291,300 and 288,400 respectively). From the population perspective, the High and Moderate concentration census tracts have a significantly higher share of the population than their geographic size would suggest. This is consistent with much higher population densities in census tracts which are closer to the city center(s).

The urban form of the CRTPO region lends itself toward higher and more frequent expenditures in and adjacent to specific tracts for multiple reasons. As is typically the case across the nation, the road network is denser closer to city centers of larger municipalities such as Statesville, Monroe, and Charlotte, and “disperses” as it transitions to more suburban and rural geographies. As such, many of the transportation expenditures are located in census tracts closer to city centers.

From a historical perspective, redlining and other social policies relegated many EJ populations. As is the case nationally, many of the region's major highway and roadway corridors were routed through EJ and racial minority neighborhoods. These neighborhoods and respective census tracts then saw lower land values, and typically had less voice in the planning and construction processes. Public and private entities have subsequently taken advantage of the resulting lower right-of-way costs in EJ neighborhoods and census tracts. In the past, construction of projects such as I-77 typically bisected these communities while many of the same populations have remained in place today. That being the case, current projects and expenditures aimed at widening, tolling, and maintaining highways, such as I-77, tend to geographically impact populations and census tracts with higher-than-average EJ concentrations.

Today, living closer to center city areas allows for easier walking, bicycling, and commuting distances for those without personal vehicles. This location pattern coincides with city center-focused transportation investments such that some transportation projects are located adjacent to higher EJ population concentrations.

<sup>3</sup> The total area of census tracts (1,783 square miles) quantified for the purpose of the DOI analysis is slightly larger than the CRTPO planning area (1,559 square miles), due primarily to the inclusion of complete Census tracts in Union County, which in several instances extend beyond the CRTPO planning area boundary.



While urban form has lent itself to more investment in city centers, the opposite is true for suburban and rural geographies. Many of these No Concentration and Slight Concentration tracts see smaller and more infrequent investments in roadway or transit construction.

Suburban and rural areas are often characterized by larger parcels and property sizes. There also tends to be greater separation between land uses in these areas, resulting in roadway networks that are typically less dense. The outcome of this is fewer transportation expenditures per square mile in both construction and maintenance.

**Table 5-10** includes the results of the analysis. The average transportation investments for No Concentration and Slight Concentration tracts in the CRTPO planning area are roughly \$6.1 million/square mile and \$5.8 million/square mile, respectively. As many No Concentration and Slight Concentration tracts are located in suburban and rural geographies, the project expenditures are spread across larger census tracts. These averages are notably higher than the average \$3.9 million/square mile investment for the entire CRTPO planning area.

The average transportation investments for Moderate and High concentration tracts in the region are roughly \$9.3 million/square mile and \$28.7 million/square mile, respectively. These averages are significantly higher than the average \$3.9 million/square mile average investment for the planning area.

**Table 5-10 Degree of Impact Analysis Overview**

EJ Category	# of Census Tracts	Square Miles	% of Total Area	Average Investment Per Square Mile
No Concentration	64	568	31.9	\$6.1M
Slight Concentration	110	775	43.5	\$5.8M
Moderate Concentration	85	327	18.3	\$9.3M
High Concentration	59	113	6.3	\$28.7M
<b>CRTPO Planning Area</b>	<b>318</b>	<b>1,783</b>	<b>100.0</b>	<b>\$3.9M</b>

It is important to note that the method of calculation impacts the high average investment reported for each of the identified DOI tracts. For this analysis, the full cost of each transportation project was allocated to each DOI census tract which it intersects. This is in contrast to apportioning a share of each project's cost to each individual census tract which it intersects. This method reinforces the theory that users receive the full benefit of transportation facilities, rather than just a share of the benefit.

## Quantitative Versus Qualitative Analysis

The CRTPO's existing DOI methodology is solely a quantitative analysis of census tract demographic data and geographic project data. In this case the geographic project data is taken directly from the approved fiscally constrained MTP project list.

While a quantitative analysis is effective in providing metrics to evaluate/compare expenditures in census tracts with varying concentrations of EJ populations, it does not answer the question of the "benefit" of those expenditures. Some planning professionals may argue that a transportation project is a benefit to a community; however, many would argue that the benefit is subjective and dependent on the type, capacity, and design of the project (e.g. does it bisect a neighborhood or is it only located adjacent to it).

Because each transportation project is different and each neighborhood/community is unique, a qualitative analysis would be more effective in determining the benefit (or detriment) of MTP projects. Such a qualitative analysis would need to be clearly conceptualized and developed with the input of community stakeholders, which would require a more in-depth planning process than has previously been undertaken by the CRTPO.

In addition to the existing conceptual challenges associated with a qualitative analysis, the census reporting changes anticipated with the 2020 Decennial Census (anticipated in Fall 2022) will likely impact both quantitative and potential qualitative analyses. Census staff have preliminarily indicated a reduction in both the type and specificity of demographic data released at the census block and tract levels. A reduced level of geographic precision may fundamentally alter the way the CRTPO conducts its DOI analysis, as well as the future evaluation of MTP fiscally constrained projects. The CRTPO will continue to monitor the potential impacts of the proposed census changes as additional information becomes available.

## Active Transportation Corridors

For the 2050 MTP, a tool was developed to assist the CRTPO staff organize and pre-screen active transportation corridors and provide a resource for member jurisdictions to help define specific projects to consider for future funding opportunities. The 2050 MTP update includes the first iteration of this active transportation corridor screening tool. This tool is not intended to replace existing funding and prioritization policies and processes, but to augment the CRTPO's current Discretionary Funds Policy Guide by aligning community desires and goals with the bicycle and pedestrian scoring criteria included in the funding evaluation process. Additionally, there was coordination with the Bicycle and Pedestrian Work Group (BPWG) to present proposed ideas and request input as the tool was being developed and refined.

The existing active transportation network (facilities accommodating bicycling and walking) and its importance to the overall transportation system is described and highlighted in **Chapter 3**.

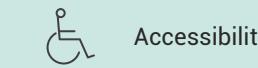
### Planning Factors Addressed



Economic Vitality



Safety



Accessibility



Environment



Travel and Tourism

## Active Transportation Corridor Tool Goals

The CRTPO recognizes the importance of active transportation facilities to provide additional transportation options and promotes efforts to plan and fund projects associated with these modes. Stakeholders and member jurisdictions have also expressed a desire to enhance the active transportation planning element of the MTP. The goals for the active transportation corridor screening tool include:

- Develop a screening methodology to gather and screen bicycle and pedestrian projects currently in regional and local plans.
- Organize potential active transportation corridors for the CRTPO staff to include in the MTP.

- Augment, but not replace, existing criteria for funding or ranking active transportation projects.
- Align with Transportation Alternatives Program (TAP) and Congestion Mitigation and Air Quality (CMAQ) funding criteria to better inform the decision-making process for the CRTPO staff and member jurisdictions for project advancement.
- Enhance the amount of data available to the CRTPO staff during the discretionary funding review and project selection processes for active transportation.

## Approach to Corridor Screening

To develop a candidate active transportation corridor list as part of the screening tool, a comprehensive inventory of sidewalks, on-street bicycle facilities, and shared-use path corridors that need improvement or are recommended in the CRTPO's CTP and local plans was compiled. The list of corridors included for consideration in the screening tool was then evaluated using the following six criteria flags:

- Short Trip Opportunity
- Safety
- Transit
- Conflicts
- Environmental Justice
- Regional Significance

Any corridor that met one of these criteria received a flag within the screening tool, for a total of six flags. A seventh Jurisdiction Priority Flag is also included, to encourage coordination and ensure the priorities of the CRTPO's member jurisdictions were considered. The flags are described to the right and maps associated with each are included in **Appendix F**, along with a table of the results.

## Corridor Screening Evaluation

An evaluation of the corridors that received the highest number of flags within each CRTPO jurisdiction was completed. Corridors that received a priority jurisdiction comment, regardless of whether they received the highest number of flags in that jurisdiction, were also included. The most flagged corridors by jurisdiction ranged from 40 corridors in Charlotte (with a maximum of five or six flags) to one corridor in Love Valley (with one flag).

## Active Transportation Corridor Flags

### Short Trip Opportunity Flag

This flag was developed to screen corridors that have the highest potential to generate short trips that could be made by bicycling or walking.

Data Point	Score
Population Density	<ul style="list-style-type: none"><li>• 5-200 people/square mile = 1 point</li><li>• 200-1,000 people/square mile = 2 points</li><li>• &gt;1,000 people/square mile = 3 points</li></ul>
Employment Density	<ul style="list-style-type: none"><li>• 10-15 jobs/acre = 1 point</li><li>• 15-20 jobs/acre = 2 points</li><li>• &gt; 20 jobs/acre = 3 points</li></ul>
Vehicle Access	<ul style="list-style-type: none"><li>• 10-20% zero-car households = 1 point</li><li>• &gt;20% zero-car households = 2 points</li></ul>
Activity Center	<ul style="list-style-type: none"><li>• Within 1 mile of an Activity Center = 1 point</li></ul>

Population density, employment density, and vehicle access were evaluated at the census tract level, and previously defined regional activity centers within the CRTPO planning area were used (see Chapter 3). Corridors received 0 to 6 points as part of the criteria. A corridor with 4 points or more received the short trip opportunity flag.

### Safety Flag

This flag identifies corridors along roadways where safety has been a key concern. A corridor received the safety flag if it intersected or was along a roadway where a crash involving a bicyclist and/or pedestrian had taken place between 2015 and 2019 that resulted in a fatality or serious injury.

### Transit Flag

This flag identifies corridors that could connect to light rail, streetcar, and high ridership transit stations and stops. A corridor received this flag if it was within half a mile of an existing or planned light rail or streetcar station, or within a quarter mile of a high bus ridership stop (defined as the top 5% of ridership within the region). The stations and stops that met these definitions are as follows:

- LYNX Blue Line stations (existing)
- CityLYNX Gold Line stations (existing and planned)
- LYNX Silver Line stations (planned)
- Charlotte Area Transit System (CATS) high ridership bus stops (top 5%)

### Conflicts Flag

Corridors that had the highest potential to reduce conflicts between bicyclists/pedestrians and vehicles, based on roadways with high annual average daily traffic (AADT) volumes were identified by this flag. A corridor received this flag if it intersected with roads that carried an AADT of 10,000 vehicles or more.

### Environmental Justice Flag

This flag aims to identify corridors within communities of highest degree of impact, as defined by the CRTPO (see *Degree of Impact Analysis*). A corridor that intersected with a census tract with a High Concentration of EJ received this flag.

### Regional Significance Flag

The goal of this flag is to screen corridors that could provide the greatest regional connectivity. A corridor received this flag if it traversed multiple jurisdictions (towns, cities, or counties) or was part of a larger regional network, such as the Carolina Thread Trail.

### Jurisdiction Priority Flag

The CRTPO member jurisdictions were given an opportunity to identify corridors of importance and an explanation why those respective corridors are a priority. Corridors identified by member jurisdictions received this flag.

Little Sugar Creek Greenway

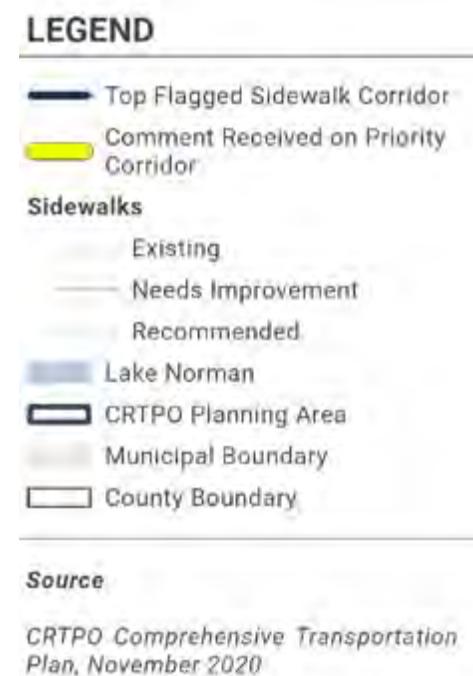


Public input was also part of the evaluation process. The second phase of public engagement of the MTP provided residents with an opportunity to review and provide comments on active transportation corridors. The comment period began on June 17, 2021 and ended on July 14, 2021. A summary of the comments received are provided in **Appendix A**. The CRTPO reviewed the comments and determined that

the input received did not warrant changes to the recommendations of the corridor screening process.

**Figure 5-9** and **Figure 5-10** display the most flagged corridors within each jurisdiction and corridors identified as jurisdictional priorities are highlighted.

**Figure 5-9 Composite Sidewalk Corridors (by Jurisdiction)**



## **Figure 5-10 Composite On-Street Bicycle Facility/Shared-Use Path Corridors (by Jurisdiction)**

## LEGEND

- Top Flagged Bike or Shared-Use Path Corridor
  - Comment Received on Priority Corridor

**On-Road Bicycle Facilities**

  - Existing
  - Needs Improvement
  - Recommended
  - Uptown CycleLink
  - Lake Norman
  - CRTPO Planning Area
  - Member Jurisdiction
  - County Boundary

### **Source**

*CRTPO Comprehensive Transportation Plan, November 2020*



## **Using the Corridor Screening Tool**

This corridor screening tool represents the initial iteration of what the CRTPO hopes will be a valuable resource to help identify candidate bicycle and pedestrian projects. The tool is intended to be used by member jurisdictions to evaluate candidate projects for their communities and advance them toward implementation through activities such as concept development, environ-

mental screening and permitting, grant applications, and preliminary engineering. It is expected that as the tool is used, member jurisdictions will identify areas for improvement. The CRTPO staff will facilitate coordination efforts to receive input to enhance the corridor screening tool and the BPWG will review and recommend revisions. Updates to the tool are not restricted to the MTP development cycle.

# Coordination

Planning for the transportation system requires coordination among numerous agencies and organizations. The establishment of recurring coordination efforts is necessary to carry out the responsibilities of the metropolitan transportation planning process. Cultivating strong partnerships helps optimize resources, leverage funding, more efficiently react to unexpected circumstances, and expedite implementation.

The CRTPO acknowledges the importance of coordination in all its planning activities. This is demonstrated by the MTP goal to lead, participate in, and encourage collaboration, as well as the Strategic Plan's goals to not only foster a culture of collaboration, but also to encourage member jurisdictions to participate in the CRTPO's planning and decision-making processes. Coordination starts with transparency and a willingness to engage with partner organizations, whether to discuss strategies, lead studies, adopt policies, or approve project funding.

The MTP highlights key planning partners and initiatives that demonstrate the CRTPO's commitment and contributions to coordination as it relates to decision-making, identifying priorities, and implementing recommendations.

## Transportation Partners

The CRTPO regularly coordinates with numerous planning partners on transportation plans, projects, and initiatives of importance to the region. Collaboration is conducted frequently with other MPOs in the region, the NCDOT, transit providers, and its member jurisdictions.

### Metropolitan Planning Organizations

There are four MPOs in the Charlotte region that border the CRTPO planning area boundary:

- Cabarrus Rowan MPO
- Gaston Cleveland Lincoln MPO
- Greater Hickory MPO
- Rock Hill Fort Mill Area Transportation Study

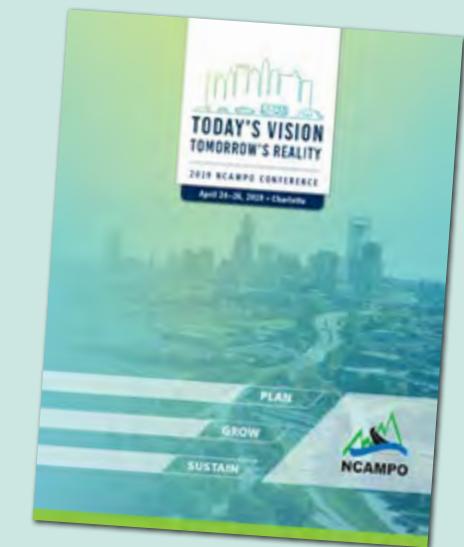
Coordinating with adjacent MPOs is important to implement transportation initiatives and projects that cross MPO boundaries.

The CRTPO coordinates with neighboring MPOs through participation in the Charlotte Regional Alliance for Transportation (CRAFT), which was created to facilitate regional transportation planning in the greater Charlotte area. CRAFT is comprised of the MPOs in the region and provides a forum to accommodate regionwide discussions on a variety of topics and to ensure that regional coordination occurs among the planning organizations to avoid conflicting efforts. In addition, the MRM produces data outputs for the areas covered by the CRAFT member organizations. Participation in CRAFT has also led to funding partnerships for specific initiatives that provide benefits across boundaries, such as the Greater Charlotte Regional Freight Mobility Plan (2016) and the creation of a regionwide CommunityViz model (2016 and 2020).

A project specific example of MPO coordination is the Catawba Crossings Feasibility Study. The CRTPO is partnering with the Gaston Cleveland Lincoln MPO to evaluate the feasibility of a roadway on new alignment with regional significance between NC 279 (S. New Hope Road) in southeastern Gaston County to NC 160 (Steele Creek Road) in western Mecklenburg County. Because portions of this project are in both

### North Carolina Association of MPOs

The CRTPO is a member of the North Carolina Association of MPOs (NCAMPO), which includes all the MPOs in the state and meets quarterly. Discussion topics are focused on statewide policy, funding, and project programming. NCAMPO holds an annual conference which was hosted by the CRTPO in 2019 and drew record attendance of over 700 transportation professionals.



MPOs, coordination will also be necessary when determining how and when to program this project for future MTP updates or amendments.

### North Carolina Department of Transportation

The CRTPO regularly communicates with the NCDOT during the TIP development and amendment process, which is incorporated directly into the state's TIP. Since the NCDOT owns and maintains most roads in the state and is responsible for determining how a significant portion of capital transportation funding is allocated, the agencies often collaborate to identify and program projects.

A member of the CRTPO's staff participates on the NCDOT Prioritization Work Group, a committee that meets regularly to provide recommendations to the NC Board of Transportation regarding enhancements to the NCDOT Prioritization process. The CRTPO and NCDOT also coordinate to complete federally required perfor-

mance management activities and share data associated with setting targets. The CRTPO and NCDOT coordinate on amendments and revisions to the CTP.

### Member Jurisdictions

The CRTPO coordinates with its local member jurisdictions on the development of plans and policies, land use and transportation planning, and public engagement. Regular monitoring and updates of these efforts helps the CRTPO stay informed about local planning initiatives, such as development of Comprehensive Plans, Bicycle/Pedestrian/Greenway Plans, and Transportation Master Plans, so it can incorporate recommendations into relevant CRTPO plans and ensure consistency. In addition, the CRTPO's Technical Coordinating Committee (TCC), which is largely composed of member jurisdiction representatives, meets monthly to make policy and project funding recommendations to the CRTPO Board.



Stallings  
Town Hall

#### Planning Factors Addressed

	Economic Vitality
	Efficient System
	Accessibility
	Travel and Tourism
	Integration and Connectivity
	Safety
	Preservation
	Security
	Resiliency and Reliability

#### Public Transportation Agencies

In 2019, the CRTPO completed a Staffing and Resources Study that recommended integration of transit planning into its ongoing responsibilities. With the addition of a transit planner in 2019, the CRTPO has increased its efforts to conduct and integrate regional transit planning into its metropolitan transportation planning processes. An example is the creation of a Transit Education Initiative (TEI) Task Force in June 2020 to understand transit needs and to research and recommend an updated formula to equitably distribute federal transit funding to the four public transportation providers in the CRTPO planning area. The CRTPO collaborates with transit agencies to develop financial projections and identify capital projects to be programmed in the MTP and TIP. In addition, the CRTPO coordinates with the public transportation providers and NCDOT to evaluate and establish federally required performance targets related to transit assets and safety.

#### Environmental Agencies

Interagency consultation with federal and state environmental agencies, the NCDOT, and local representatives is an important element of transportation planning and project development. The CRTPO coordinates with various agencies to ensure plan recommendations and proposed projects will not adversely impact environmental resources.

**Chapter 2** highlights the resource agency consultation process that was conducted for the MTP. Environmental mitigation activities associated with the CRTPO's transportation planning process are described later in this chapter.

#### Key Planning Initiatives

Along with ongoing coordination with its partners, the CRTPO often leads and participates in initiatives specific to its planning area or at a regional level involving multiple MPOs. The following three unprecedented initiatives were conducted concurrent with the 2050 MTP.

- CRTPO Strategic Plan
- Beyond 77
- CONNECT Beyond

These efforts each identify implementation strategies and recommendations to enhance transportation. The MTP is one of the primary funding mechanisms available to the CRTPO to program the proposed improvements; therefore, continued coordination among these initiatives during the implementation phases will be a crucial element of the CRTPO's future planning efforts. An overview of each initiative, its significance, and the CRTPO's role in implementation are provided on the following pages.

#### CRTPO Strategic Plan

The CRTPO adopted its first ever Strategic Plan in November 2021, to guide the CRTPO's activities for the next 10 years. It shapes the annual work program, serves as an organizational management tool, and will provide continuity as leadership changes. The Strategic Plan also identifies a mission and vision for the CRTPO, as follows:

- **Mission:** Provide leadership and collaboration with member communities and partners in developing the region's transportation system.

- **Vision:** A connected and equitable transportation system that provides mobility choices for the region.

The plan includes six goal areas, each with a corresponding goal, as shown in **Table 5-11**.

In addition, 34 Strategic Plan strategies are identified to meet the goals. The CRTPO is responsible for implementing the strategies identified in this plan and to periodically monitor progress.

#### CRTPO'S IMPLEMENTATION ROLE:

Several Strategic Plan strategies relate to the development of the MTP and identifying projects to be implemented from other planning studies, which could potentially be submitted for inclusion in future MTPs. As tasks related to the strategies are completed, recommended outcomes can be incorporated into future MTP updates or the 2050 MTP can be amended.

**Table 5-11 Strategic Plan Goals**

Goal Area	Goal
<b>Leadership</b>	1. Lead on regional mobility issues
<b>Communication</b>	2. Proactively engage the public to increase awareness of regional transportation issues
<b>Collaboration</b>	3. Foster a culture of collaboration with partners
<b>Membership</b>	4. Encourage members' participation in CRTPO's planning and decision-making process
<b>Operations</b>	5. Continuously improve internal operations to fulfill CRTPO's Mission and Vision
<b>Funding</b>	6. Expand regional transportation funding



## Beyond 77

Beyond 77 is a comprehensive evaluation of the long-term mobility vision for a 68-mile stretch of I-77 between Statesville, NC and Rock Hill, SC, including a study area that spans three miles on each side of I-77 (including the interstate) and considers all forms of transportation. This was the first initiative of its kind for the CRTPO planning area and will influence future project and funding priorities in the region.

The vision for the study evolved into a comprehensive set of strategies and solutions to help guide decision-making, financing, and implementation of major transportation projects and programs to enhance mobility along and around the I-77 corridor. Six areas of emphasis were established to guide the study objectives:

- Congestion management
- Connectivity within the parallel network
- Funding strategies
- Technology
- Multimodal recommendations
- Land use coordination

A series of recommendations, presented as a series of strategies and solutions (S&S), were prioritized into short, mid, and long term implementation timeframes between 2022 and 2050. Proposed alternative funding sources and an implementation plan were also developed for this study, which are included in the [Beyond 77 Corridor Study Report](#) (January 2022).

## Beyond 77 Goals and Guiding Principles

### Goal Statements

Supply safe and equitable mobility options for people and businesses to efficiently access jobs, essential goods and services, and activity centers

Provide transportation corridor improvement strategies that enhance safety for all users, respond to resiliency issues such as weather events or security emergencies, and adapt effectively to ongoing climate change

Consider technology applications in all multimodal strategies to assist the public in making mobility decisions

Maximize opportunities to enhance freight connectivity and access to distribution hubs to improve the movement of goods

Integrate equitable and safe options for walking, bicycling, transit, motor vehicles, and other personal mobility modes throughout the region

Ensure recommended transportation policies and programs are sensitive to features of the built and natural environments, improve the quality of life for residents, and promote healthy living

### Guiding Principles

Provide a range of local and regional mobility choices that are safe and equitable

Respect the natural and built environment

Strengthen the economic prosperity and resiliency of the region

Incorporate innovative improvements into the existing system

Improve integration of the multimodal system with adopted land use policies

## STRATEGIC USERS IMPLEMENTATION TOOL

The Beyond 77 efforts produced an interactive [Strategic Users Implementation Tool \(SUIT\)](#) that offers the ability to view the following:

- Set of S&Ss with ties to a city, town, or county
- Relationships across all S&Ss, with a suggested sequence of implementation over time
- Which modes are expected to benefit from each of the S&Ss
- Tailored details for each S&S that provide comprehensive perspectives for all aspects of implementation

Use of all the details listed above can create custom bundles of S&Ss (personalized Work Plans) to help foster further dialogue as well as the implementation of chosen S&Ss over a certain timeframe.

The screenshot shows the SUIT website interface. At the top, there's a header with the 'BEYOND 77' logo and navigation links for 'Export to PDF', 'Add to Worksheet', and 'Go Back'. Below the header, the main content area has a title 'Key Area: Programming' and 'Umbrella Category: Public-Private Partnership'. It includes sections for 'Timeline: Immediate (2021-2023)', 'Level of Effect', 'Modes' (listing various transport modes), 'Description' (text about leadership from jurisdictions), 'Complexity Factors' (list of factors like 'Policy to create the Beyond 77 Coalition'), 'Suggested Coordinating Agencies' (list including NCDOT, SCDDOT, etc.), 'Jurisdictions' (list of entities), 'Key Considerations' (list of considerations), and 'Scenario Comparison' (a bar chart). On the left side, there's a sidebar with 'Post Recommendation' and a long list of recommendations.

The interactive [SUIT](#) website allows planners, decision-makers, and members of the public to get involved with the overall planning and implementation associated with this initiative.

Completing this study reinforces the CRTPO's commitment to strengthen coordination among organizations and lead innovative studies to enhance transportation.

## CRTPO'S IMPLEMENTATION ROLE:

The MTP is a critical means for implementing the recommendations identified by Beyond 77. Ongoing coordination among planning efforts is important to define next steps and funding opportunities for programming projects. Strategies identified in the MTP, and other transportation planning studies, should also be considered for incorporation into the interactive Beyond 77 website ([SUIT](#)) to expand the toolkit for member jurisdictions and decision-makers.

## CONNECT Beyond

CONNECT Beyond will guide and coordinate future mobility investments for the next two decades and serve as a blueprint for implementing an integrated public transportation network that will combine high capacity transit lines, enhanced bus services, local mobility options, and innovative technologies. The vision for CONNECT Beyond is to create a total mobility network for the region, including the CRTPO planning area, that focuses on enhancing infrastructure and improving the multimodal transit network to increase transportation choices for all area users, both residents and visitors. With this shared regional transit vision, the CRTPO and its partners will be able to plan, coordinate, and implement innovative transportation projects that will boost regional mobility, promote equitable access, encourage sustainable growth patterns, inspire community placemaking, and enhance economic competitiveness.



## CONNECT Beyond

A Regional Mobility Initiative

## CONNECT Beyond Priorities

The recommendations included in the CONNECT Beyond regional mobility plan are focused on and aim to help address these key project priorities.



Key elements of this effort include:

- Set the foundation for a unified public transportation network that allows residents and visitors to seamlessly cross municipal, county, and state lines using public transportation options
- Elevate public transportation as a preferred mobility choice and community asset
- Grow national and global competitiveness as a region, including attracting industry, growing businesses, and retaining jobs
- Promote upward social mobility by providing better access to jobs, workforce housing services, medical facilities, educational resources, and other destinations to those that may not have access to other means of transportation

## STRATEGIC MOBILITY CORRIDORS

A major component of the CONNECT Beyond initiative is the identification of Strategic Mobility Corridors, which include the following within the CRTPO planning area:

- Twelve (12) High Capacity Transit (HCT) corridors – currently ready for HCT investments
- Seventeen (17) Emerging Mobility Corridors – good candidates for HCT in the future, but currently better suited for other types of transit investments
- Three (3) Long-Term Commuter Rail Corridors – lines focused on long-distance commuter trips that occur during the peak morning and evening travel times when traffic congestion is worst

**Figure 5-11** shows the Strategic Mobility Corridors identified through the CONNECT Beyond study.

The proposed network presented by the plan requires incremental steps to build the ridership, adopt the policies, and transform the communities around mobility corridors into transit-friendly environments that support a productive transportation system. The recommended steps for implementing mobility corridors include general service improvements and line expansions for existing transit, changes in land use strategies to support denser and more walkable environments along transit corridors, and implementing mobility hubs. **Chapter 9** provides more details about the CONNECT Beyond recommendations and implementation steps.

### CRTPO'S IMPLEMENTATION ROLE:

The CRTPO will be responsible for the following implementation activities:

- Amending its CTP to include the Strategic Mobility Corridors
- Promoting awareness, participating in the funding and partnership work group, engaging in funding efforts, and collaborating with stakeholders to implement recommendations
- Coordinating efforts between Beyond 77 and CONNECT Beyond implementation phases to identify future funding and projects to be programmed in the MTP

**Figure 5-11 CONNECT Beyond Strategic Mobility Corridors**

### LEGEND

#### CONNECT Beyond Strategic Mobility Corridors

- Emerging Mobility Corridor
- High-Capacity Transit Corridor
- Commuter Rail Corridor

- Lake Norman
- CRTPO Planning Area
- County Boundary

#### Source

Centralina Regional Council,  
CONNECT Beyond: A Regional Mobility Initiative



## Strategies

In addition to the various tools and coordination efforts presented, the CRTPO also recognizes it will be important to utilize a variety of strategies to meet the needs and address challenges identified in the planning area. For this MTP, the CRTPO has focused on strategies to identify alternative funding, pursue innovative/emerging techniques and technologies for project development and delivery, and mitigate anticipated impacts to the environment. Each strategy has been selected because it helps the CRTPO respond to distinct circumstances within its planning that effect transportation. Pursuing these strategies will provide additional information and resources for the CRTPO to consider as it makes policy and investment decisions and explores viable solutions for the future.

### Alternative Funding Sources

As highlighted in **Chapter 4**, transportation needs in the region are out-pacing available funding. The CRTPO identified a \$4.6 billion funding gap associated with implementing the projects identified in the MTP. NCDOT, other regional planning initiatives, and other groups inside and outside of North Carolina have identified similar funding gaps. Recently, the CRTPO Board acknowledged alternative funding sources will be necessary to reduce the funding gap in transportation needs and recommended that the CRTPO staff conduct research to evaluate this further.

The CRTPO is committed to further exploration of potential alternative funding sources and their associated benefit to the region, as demonstrated by its Strategic Plan goal to expand regional transportation funding and the initiation of alternative funding research as a part of its 2050 MTP update. This review and analysis of alternative funding is intended to be a first step that leads to additional research and coordination; therefore, the 2050 MTP financial plan (**Chapter 6**) does not include projections for these sources.

As part of this analysis, a review of peer agencies and initiatives was conducted to determine alternative funding sources that could be applied to the CRTPO planning area. These agencies and initiatives were organized by those in North Carolina, listed in **Table 5-12**, and those outside the state, shown in **Table 5-13**. For those in the state, similar laws and governmental requirements would be in effect, representing research that would be most applicable to the CRTPO. The identification of other initiatives and agencies enhanced the understanding of possibilities and successes of similar efforts across the nation.

#### Planning Factor Addressed

 Economic Vitality

**Table 5-12 North Carolina Agencies and Initiatives**

Agency or Initiative	Funding Considerations
Mecklenburg County	Existing transit sales tax review
NC FIRST Commission	Suggested modifications to taxes and fees at the state level
NC Moves 2050	Planning effort to determine funding needs
North Carolina Department of Transportation (NCDOT)	Existing taxes and fees
Beyond 77	Multi-county analysis along the I-77 corridor
Cape Fear Moving Forward – Wilmington Metropolitan Planning Organization (WMPO), Metropolitan Transportation Plan (MTP)	Considered additional and modified funding sources (Cape Fear Crossing tolling was considered as a revenue source and included in the fiscally constrained project list)
Charlotte Moves Task Force, and the Transformational Mobility Network (TMN)	Modification of the transit sales tax within Mecklenburg County

**Table 5-13 Agencies and Initiatives Outside of North Carolina**

Agency or Initiative	Funding Considerations
York County – South Carolina	Pennies for Progress
Eastern Transportation Coalition (ETC) – Includes 17 states along the eastern United States	Mileage based user fee pilot programs
Georgia Department of Transportation (GDOT)	Transportation funding adjustments
Greater Nashville Regional Council – Tennessee	Review of the draft Regional Transportation Plan
Broward County MPO – Florida	Review of the Metropolitan Transportation Plan
Capital Area Metropolitan Planning Organization (CAMPO) – Austin, Texas	Review of the transportation development process



## Identification of Applicable Sources

Through research, review, and coordination with peer agencies and other ongoing initiatives, a series of 24 possible revenue sources were identified for potential consideration. Many of these transportation funding sources are already in use within North Carolina and/or the CRTPO planning area. These existing sources have been included within the analysis to determine the potential revenues through marginal increases.

For each suggested funding alternative, the process for implementation would require varying levels of changes either at the state or local level. Many proposed changes would require voter endorsement, specific referendums, and North Carolina General Assembly (NCGA) approval to enact. Additionally, the initiatives deemed applicable to the CRTPO would likely be implemented at the county level, due to the county's ability to levy taxes and fees upon its residents, a power that the CRTPO does not possess under state statute.

Cities, towns, and counties in North Carolina have the ability to apply taxes and fees within their jurisdictions; however, many potential fees and taxes are limited by state statute.

For example, when considering local option sales taxes, each county is limited to the specific guidelines. Within [State Statute Chapter 105 Article 43](#), Mecklenburg County is permitted to assess a 0.5% tax after referendum, while other counties may be limited to 0.25%.<sup>4</sup> This example is representative of each of the fees and taxes identified as part of this analysis, meaning state statutes are subject to change and should be consulted to ensure compliance.

**Table 5-14** depicts the revenue sources that were considered in this analysis.

<sup>4</sup> [https://www.ncleg.net/EnactedLegislation/Statutes/HTML/ByArticle/Chapter\\_105/Article\\_43.html](https://www.ncleg.net/EnactedLegislation/Statutes/HTML/ByArticle/Chapter_105/Article_43.html)

**Table 5-14 Transportation Revenue Sources Considered**

### Alternative Funding Sources Considered

Local Option Sales Tax	Promote Public Private Partnerships	Increased Number of Tolted Express Lanes/Highways
Regional Vehicle Fee and Property Tax	Local Infrastructure Bank	Modify State Sales Tax
Additional Vehicle Rental Tax	Transportation Development Credits	Mileage Based User Fees
License Tax	Increase MPO Membership Fees (Per Capita)	Increased/Modified Toll Pricing
Additional Vehicle Registration Fees	Regional Business Improvement District	State Infrastructure Bank
Road Impact Fees (EV, E Commerce, Commercial Vehicle Etc.)	Modify Highway Use Tax	Congestion Pricing
Fuel Tax Modification	Transportation Bond	Cordon Pricing
Bicycle Fee/Tax	Regionally Established Transportation as a Utility	Toll Agreements (One-off agreements to shift funding)

Once identified, the 24 potential funding sources were compiled in a decision matrix for comparison. The decision matrix allowed for the identification of alternatives to advance for further analysis. The matrix was developed with eight scoring criteria divided into Pros and Cons. The selection criteria are intended to identify the most applicable funding alternatives for the CRTPO region. Each Pros column adds to the overall score of the potential revenue sources while the Cons removes points from the overall score. This analysis is intended to be high level, utilizing a series of qualitative assessments to determine the overall applicability to the region. The quantification of the Pros and Cons for each of the alternatives resulted in scores that were later used to identify the most applicable revenue sources, along with those to be further analyzed, as displayed in **Table 5-15**.

Using the criteria and results from the scoring matrix, the list of 24 alternative funding sources was reduced to six regional sources, and one statewide source:

- Local Option Sales Tax
- Property Tax
- Vehicle Purchase Tax
- Vehicle Rental Tax
- License Tax
- Vehicle Registration Fee
- Fuels Tax (Statewide)

While the intent of this analysis was to identify sources of feasible revenue that could be applied to the three-county CRTPO planning area, the fuel tax was included due to peer states' ability to generate additional revenue for infrastructure projects by increasing the percentage. Due to the nature of a fuel tax, this implementation is likely to be carried out at the state level.

**Table 5-15 Applicable Alternative Revenue Sources Matrix**

Alternative Funding Source	Pros (Add)					Cons (Subtract)			Sum
	Similar or Existing Tax/Fee – Yes/No	Ability to Use Existing Tax/Fee Infrastructure	Research Shows Favorable Outcome	Ability of MPO/Counties to Implement	Input from Nonresidents (Travelers, Conventions etc.)	Likely Impacted by Inflation	Possibly a Regressive Tax	Susceptible to General Market Trends	
Local Option Sales Tax	1	1	2	2	1	0	-0.5	-0.5	<b>6</b>
Property Tax	1	1	2	2	0	0	-0.5	0	<b>5.5</b>
Additional Vehicle Purchase / Rental Tax	1	1	2	2	1	-1	-0.5	-0.5	<b>5</b>
License Fee	1	1	2	2	0	0	-1	0	<b>5</b>
Vehicle Registration Fee	1	1	2	2	0	-1	-0.5	0	<b>4.5</b>
Fuel Tax Modification*	1	1	2	0	1	0	-1	-0.5	<b>3.5</b>

Note: The full alternative funding scoring matrix is included in **Appendix G**.

### Anticipated Revenues

Once identified, the applicable alternative revenue sources were further analyzed to estimate their impact within the region. The first step in this analysis was the identification of source data that could be applied at the county level, then marginal tax and fee increases were applied to each funding source. The modification of taxes or fees collected within the region would likely require referendums at the county level and potentially require changes through the NCGA. This analysis considered the entirety of Union County and did not distinguish values based on the CRTPO planning area boundary, due to the assessment of taxes at the county level. Each of the funding sources identified within this analysis would require separate action for approval; however, this evaluation is not recommending the implementation of additional taxes or fees. This data is being provided for informational purposes only.



**Table 5-16** outlines the anticipated revenues to be collected if the taxes and fees within the region are modified. Each of the modified alternative revenue sources is assumed to represent an increase of the taxes and fees already in place. Therefore, the proposed revenues are expressed as a marginal change per revenue source. The single year, Low to Highest funding estimates represent one year of income based on the respective base year of the data source.

**Table 5-16 Anticipated Revenues – Comparison of Totals**

Funding Source	Low (\$M)	Medium (\$M)	High (\$M)	Highest (\$M)
Local Option Sales Tax	\$71	\$143	\$214	\$285
Regional Property Tax	\$24	\$121	\$242	-
Additional Vehicle Purchase Tax	\$19	\$38	\$188	-
Fuel Tax Modification	\$8	\$45	\$83	-
License Tax	\$6	\$12	\$17	\$23
Additional Vehicle Registration Fees	\$1	\$5	\$7	\$10
Additional Vehicle Rental Tax	\$1	\$1	\$2	\$6

Note: Numbers are rounded for planning purposes.

In addition to the single year estimates, a 30-year anticipated revenue projection was calculated for the seven applicable sources, as shown in **Table 5-17**. Future year projections were developed at a high level with a recognized volatility due to unforeseen factors and varying methodologies used in their creation, meaning no growth factors have been applied. If consistent growth is experienced within the region over the 30-year period, these revenues could be substantially higher; however, growth is uncertain and is not included in this documentation.

**Table 5-17 30-Year Anticipated Revenues**

Funding Source	Low over 30 Years (\$M)	High/Highest over 30 Years (\$M)
Local Option Sales Tax	\$2,140	\$8,561
Regional Property Tax	\$724	\$7,244
Additional Vehicle Purchase Tax	\$563	\$5,625
Fuel Tax Modification	\$19	\$188
License Tax	\$349	\$697
Additional Vehicle Registration Fees	\$29	\$294
Additional Vehicle Rental Tax	\$248	\$2,484

Note: Numbers are rounded for planning purposes.

## Next Steps

This analysis has shown that even minor modifications to existing taxes and fees within the region could have a significant impact on transportation funding. Given the highly variable nature of this analysis, the funding alternatives anticipated to generate the most significant revenue are the following:

- Local Option Sales Taxes
- Regional Property Tax Adjustments
- Additional Vehicle Purchase Taxes

The intent of pursuing these alternatives is the creation of additional transportation funding for the CRTPO planning area. Though the CRTPO may take an advocacy stance for their future implementation, the ability to assess taxes will be reliant on its member counties and municipalities. If adopted, each tax/fee would need to

be written into law with specific wording which could greatly impact how it is assessed and its general purpose. Given the unique nature of each tax and fee, the implementation of any strategy depends on the existing laws and regulations at the state and county level.

The CRTPO conducted this alternative funding analysis as part of its 2050 MTP process to develop a high-level understanding of potential revenue sources and their benefit to the region.

The analysis was not intended to promote or suggest that a new tax or fee be implemented, but instead was conducted to determine applicable revenue sources and their potential impacts. The 2050 MTP financial plan and anticipated funding over the planning horizon was not modified as a result of this analysis.

## Emerging Techniques and Technologies

### Planning Factors Addressed

-  Economic Vitality
-  Resiliency and Reliability
-  Preservation
-  Accessibility
-  Environment
-  Travel and Tourism

### Transportation Demand Management

Transportation Demand Management (TDM) is a broad set of strategies to address transportation congestion and mobility issues by influencing demand as opposed to supply. TDM strategies focus on user behavior within the constraints of existing infrastructure as opposed to adding roadway capacity. Strategies are designed to incentivize or promote non-SOV commuting methods or to shift trips out of peak periods. Strategies include carpools or vanpools, rideshare and bikeshare, high occupancy vehicle (HOV) lanes, off-peak driving, teleworking, flex-time work schedules, and improving public transportation and active transportation infrastructure.

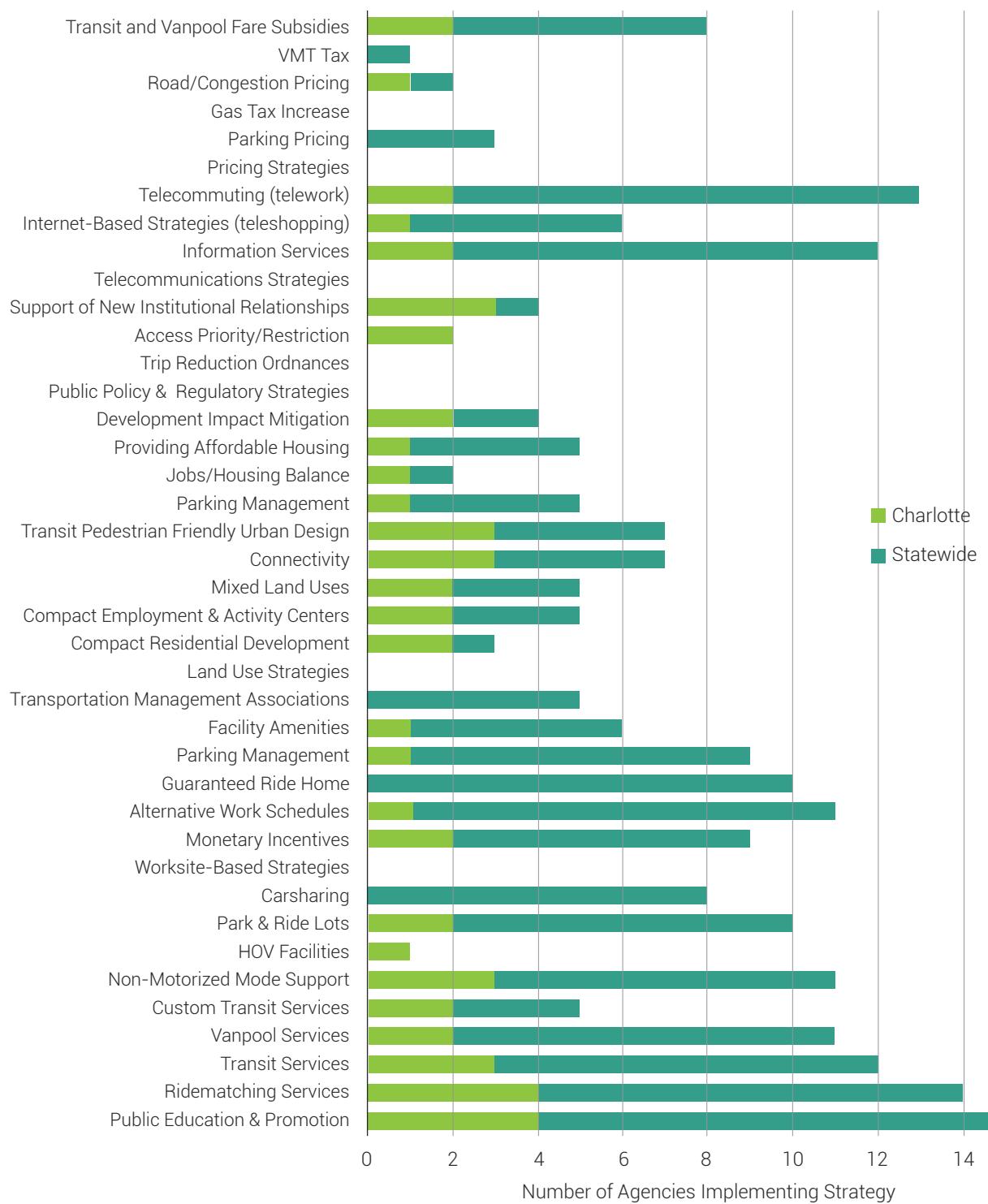
The CRTPO does not have a comprehensive, regional TDM program, but TDM is gaining traction in the region and many agencies have taken steps to integrate TDM into future plans. In 2017, the CRTPO funded a study to evaluate best practices as they relate to the coordination of TDM services. Several TDM strategies are also included in the congestion management strategies for the CRTPO's CMP and are being employed in the region.

The CONNECT Beyond initiative, completed in September 2021, identifies several TDM and mobility strategies as key recommendations to be implemented throughout the region, including the development of a Regional TDM Plan and a Commuter Choice Program. More details about these CONNECT Beyond strategies are provided in [Chapter 9](#).

CATS, the largest transit provider in the Charlotte region, is one of five NC State TDM Partners recognized by the NCDOT for its Employee Transportation Coordinator (ETC) Program. The ETC program is a resource for local employers to assist organizations in offering transit information and benefits to their employees and allows employers to sell transit passes to employees with a 10% discount off standard rates. CATS also participates in Share the Ride NC, a statewide website created to help form carpools and vanpools, and adopted the Way2Go CLT program, initiated to help reduce SOV commutes.

In addition, the City of Charlotte approved its first TDM plan in September 2021, which includes strategies identified in [Figure 5-12](#).

**Figure 5-12 TDM Strategies Implemented in Charlotte**



Source: [North Carolina Statewide Transportation Demand Management \(TDM\) Strategic plan Update - January 2018.pdf \(ncdot.gov\)](http://www.ncdot.gov/programs/transportation-demand-management/tdm-strategic-plan)

## Intelligent Transportation Systems

Intelligent Transportation Systems, or ITS, is a program focused on using technology and communications to improve transportation operating capabilities. ITS improves safety and mobility by integrating advanced communications-based information and electronic technologies into the transportation infrastructure and vehicles.

Examples of ITS technologies include coordinated signal systems, dynamic and portable changeable message signs, ramp meter signals on freeways, traffic cameras that monitor traffic flow and incidents, and transit-related systems that help determine the real-time location of public fleet vehicles.

The Managed Motorways concept is an example of utilizing a collection of strategies and technologies that work together to provide a holistic approach to managing the traffic operations of a freeway. Integrating these systems with ITS enhances safety, improves reliability, and reduces congestion while providing traveler information and enhancing lane utilization.

The Greater Charlotte region's Strategic ITS Plan was adopted in 2001. Both CONNECT Our Future and the Greater Charlotte Regional Freight Mobility Plan recommended updates to this plan to improve the safety, efficiency, and reliability of the transportation system. The CRTPO is coordinating with partner agencies to identify funding opportunities to develop an updated regional ITS plan.

## Transportation Asset Management

Transportation Asset Management is a strategic approach that links data, goals, investment strategies, programs, and projects into a systemic process to achieve a desired outcome. NCDOT has a Transportation Asset Management Plan that describes current bridge and pavement asset management processes for improving and preserving their condition. Additionally, NCDOT and the CRTPO set performance targets for infrastructure and bridge condition to monitor these assets over time.

Transit asset management is also conducted by NCDOT and public transportation providers within the CRTPO's planning area in order to inventory and monitor assets over time. Performance targets for transit asset management have also been established by the CRTPO.

Performance management, including for asset management, is described in **Chapter 8**.

### Planning Factors Addressed

-  Safety
-  Integration and Connectivity
-  Efficient System

### Planning Factors Addressed

-  Economic Vitality
-  Preservation

## Connected and Autonomous Vehicles

Connected vehicles are equipped with advanced technology for communication with other vehicles and roadside infrastructure. Autonomous vehicles are self-driving, meaning they are equipped with a combination of sensors, cameras, and other technology that allow them to travel between destinations without a human operator. While there are many technical challenges to overcome, as well as user and data safety concerns, connected and autonomous vehicles (CAV) have the potential to reduce crashes, save time and money, and offer more independence or mobility options, especially for people with impairments or disabilities.

A series of CAV workshops were hosted in the Charlotte region by the Centralina Regional Council in 2017 to raise awareness of these new technologies and their impact on the economy, land use, transportation, and equity. The workshops culminated in a CAV Regional Roadmap to guide communities on how to prepare for this new technology through near and long-term priority actions. As an ongoing extension of this work, the CAV Task Force, a regional coalition of public and private sector leaders, meets quarterly to advance local knowledge on this issue and determine how to coordinate emerging transportation technologies into local and regional initiatives. The CRTPO is also reviewing the CAV Regional Roadmap to determine if updates are warranted and is preparing a work plan for the CAV Task Force.

### Planning Factors Addressed

-  Economic Vitality
-  Safety
-  Accessibility
-  Integration and Connectivity



## Express Lanes

### Planning Factors Addressed

- Economic Vitality
- Efficient System
- Accessibility
- Travel and Tourism



I-77 Construction at Brookshire

## Environmental Mitigation Activities

Protecting and enhancing the environment is a key element of the transportation planning process, to help utilize resources efficiently and minimize impacts. Transportation affects the environment in a variety of ways, including major infrastructure construction, air quality impacts, and stormwater runoff due to impervious roadway surfaces. In addition, weather, climate change, and unexpected events such as natural disasters can have impacts on the transportation system. Planning for future transportation requires consideration of potential environmental impacts, as well as developing strategies to increase resiliency and reliability.

### Planning Factors Addressed

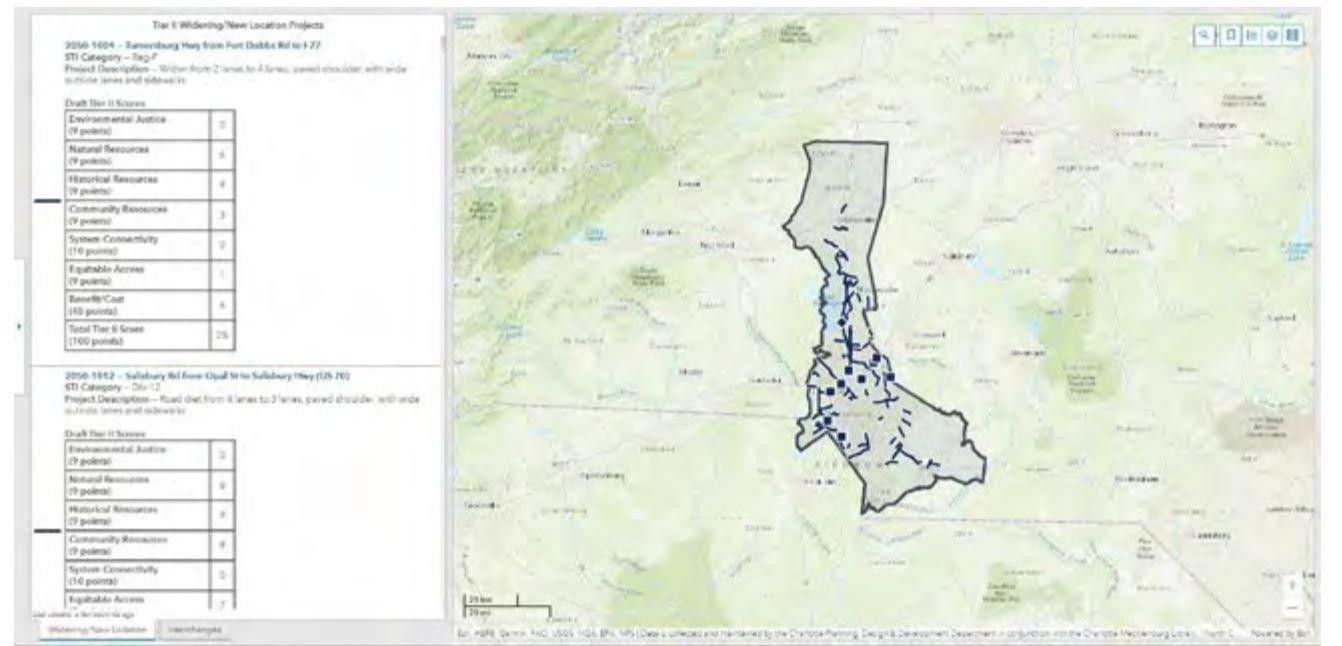
- Environment
- Resiliency and Reliability
- Security

### Mitigation Measures

Environmental mitigation activities help minimize the negative impacts of transportation projects on the natural and built environments. This not only protects the environment but makes the transportation system more resilient. Some transportation projects, such as new roadway connections and widening to add capacity, involve major construction and considerable constraints. Other projects, like intersection improvements or resurfacing that can be accomplished within the existing right-of-way, typically have fewer impacts. Mitigation efforts are commensurate with the severity of the impacts.

The CRTPO employs a variety of strategies to identify potential environmental constraints early in the process so actions can be taken to avoid impacts when possible, including:

- Assess the impact of candidate MTP projects on the natural environment, cultural and historic resources, as well as areas with high concentrations of EJ populations
- Seek resource agency input on the MTP project list and host virtual meetings to demonstrate how the project evaluation application considers impacts to environmental resources
- Conduct analyses of corridors included in the CTP to determine the viability of proposed alignments that include environmental screening
- Review feasibility studies and environmental documents and inform NCDOT about potential environmental constraints associated with potential projects



The CRTPO developed an [interactive application](#) to evaluate the impact of candidate roadway projects to various environmental resources.

- Includes a natural resources impact criterion in its roadway ranking methodology that seeks to assess the environmental impact of candidate MTP projects by deducting points from projects that impact streams and wetlands
- Developed an Alignment Evaluation Program (AEP) for member jurisdictions to enhance planning and engineering needs at the local level, in part by refining parameters associated with the built environment and natural constraints early in the project development process
- Evaluate strategies to improve congested facilities instead of widening (see *Congestion Management Process*)
- Participate in studies and support partner efforts to increase transit accessibility and pursue emerging technologies

**Table 5-18** lists mitigation measures supported by the CRTPO when environmental impacts are unavoidable.

**Table 5-18 Potential Mitigation Strategies**

Environmental Feature	Potential Mitigation Strategy
Archaeological	<p>Conduct archaeological excavations to ensure artifacts are not lost</p> <p>Realign and/or relocate the project to avoid the affected resource</p>
Community Impacts	<p>Construct a bridge to help maintain community cohesiveness</p> <p>Construct sidewalks and bike lanes</p> <p>Install traffic calming devices</p> <p>Construct sound barriers</p>
Farmland	<p>Work with local land conservancies or the North Carolina Agricultural Department</p> <p>Farmland Preservation Trust Fund to determine ways to preserve the resource</p>
Fragmented Animal Habitats	<p>Build overpasses with vegetation or underpasses to allow animals to cross safely</p> <p>Realign and/or relocate projects to avoid impacted habitats</p>
Historic Sites	<p>Realign and/or relocate the project to avoid the affected site</p> <p>Install landscaping to reduce visual impacts</p> <p>Relocation</p>
Noise	<p>Erect noise barriers</p> <p>Depress the facility</p> <p>Install landscaping to reduce impacts</p>
Threatened and Endangered Species	<p>Realign and/or relocate the project to avoid the affected species</p> <p>Enhance or restore degraded habitat</p> <p>Create new, off-site habitats</p>
Stream and Lake Buffers	<p>Re-vegetate disturbed areas with native planting</p> <p>Ensure diffuse stormwater flow provided through the buffer from storm drain pipes</p> <p>Install stormwater treatment structures as mitigation either on-site or off-site</p> <p>Pay impact fees to jurisdictions</p>

## AIR QUALITY

Air quality is one aspect of the environment that is particularly impacted by transportation. The CRTPO addresses air quality issues in multiple ways. As described in **Chapter 3**, National Ambient Air Quality Standards (NAAQS) for harmful pollutants are established and the CRTPO must demonstrate that the projects programmed in the MTP will not degrade air quality. The CRTPO also applies the following strategies to focus on reducing air quality impacts:

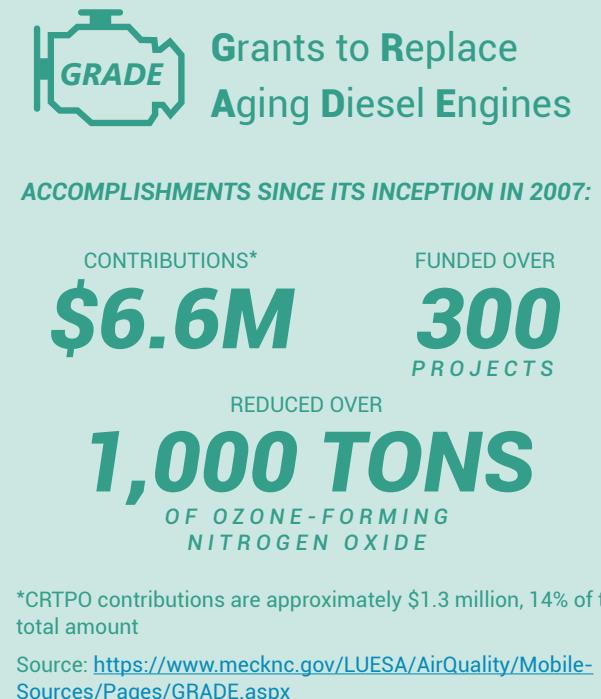
- Adopted a policy to allocate 20% of available discretionary funds to bicycle, pedestrian, and transit projects
- Incorporate Complete Streets principles when allocating funds for the construction of new projects or improvements to existing infrastructure

- Review, prioritize, and allocate CMAQ funds to a variety of project types
- Encourage vehicle miles traveled (VMT) reductions through implementation of rapid transit, expansion of local and express transit services, express lanes, and continued integration of land use and transportation planning
- Includes an air quality expert on its TCC to ensure there is adequate consideration of potential impacts as policies and projects are deliberated

Many of these same strategies also contribute to reducing greenhouse gases, which is a significant cause of climate change. Climate change, along with other unexpected events, threaten the resiliency and reliability of the transportation network.

## CMAQ Projects Funded by the CRTPO

- Intersection improvements to help reduce congestion and idling
- Street connectivity plans designed to reduce trip length
- Bus replacement to purchase fuel efficient vehicles
- Traffic signal priority system for mass transit to decrease travel time for buses
- Diesel engine retrofits designed to eliminate old, highly polluting engines from off-road construction vehicles
- Bicycle and pedestrian facilities to promote an alternate form of transportation



## RESILIENCY AND RELIABILITY

A more resilient transportation system can be achieved by addressing existing infrastructure (to make decisions about replacement or abandonment), new infrastructure (with a focus on design and durability), and the overall transportation system (to understand interdependencies and how they impact users).

The CRTPO continues to partner with the NCDOT and regional MPOs to identify tools, conduct studies, and collect data to supplement future planning efforts related to resiliency and reliability. Examples of these efforts include a series of tools being developed by the NCDOT to evaluate the resiliency of the transportation system, as well as a risk and resiliency vulnerability study that is underway for US 74 in the CRTPO planning area.

The NCDOT has also developed a [Resilience Strategy Report](#) that is updated annually to help cooperatively plan, construct, operate, and maintain a safe, efficient, and resilient transportation network. As a part of the plan, the NCDOT assesses the vulnerability and risk of key infrastructure, identifies and pilots risk profiles to guide resilience efforts, and identifies opportunities for coordination. Resiliency efforts at the state level are critical to the transportation network in North Carolina in part because the NCDOT maintains over 75% of the state's roads, including the majority of roads in Iredell and Union counties.

Through continued coordination with the NCDOT, the CRTPO will monitor the outcomes of these efforts and develop strategies to help maintain and improve the transportation network.

The CRTPO is committed to ongoing leadership and participation in studies that will contribute to enhancing transportation resiliency and reliability. Examples, such as Beyond 77, CONNECT Beyond, the CMP, and exploring alternative funding for transportation have been described in this chapter. Through this MTP update process and future plan updates and amendments, the CRTPO will implement recommendations from those efforts to enhance transportation infrastructure, technologies, and operations.

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## Chapter 06

# Financial Plan

One of the CRTPO's primary functions is to guide investment decisions for the allocation of federal funds. The Metropolitan Transportation Plan (MTP) serves as a primary means for the CRTPO to identify funding strategies and program projects of all modes – roadway, bicycle, pedestrian, transit, rail – for the next 20-plus years.

Federal regulations require the MTP to demonstrate fiscal constraint, meaning the proposed project investments will not exceed projected future funding over the life of the plan. To accomplish this, the CRTPO conducts an analysis of anticipated funding from a variety of revenue sources eligible for capital roadway projects,

transit operations and capital improvements, bicycle and pedestrian facilities, rail, freight, and maintenance activities.

This financial plan describes the process for developing funding projections, the revenue sources available for allocation to transportation improvement projects, and anticipated expenditures proposed in the CRTPO's MTP through 2050.

## Funding Considerations

Federal and state sources represent the primary funding for transportation in the CRTPO planning area and, in North Carolina, the Strategic Transportation Investments (STI) law mandates how a significant portion of those funds are allocated to priority projects.

Due to the significant influence of the STI relative to the distribution of transportation funds in the state, the CRTPO uses the designated STI categories as a foundation for its funding projections. The STI defines three specific project categories, each of which represents a defined geography within the state. A percentage of the total funding is assigned to each category.

**Figure 6-1** provides an overview of the STI categories and **Figure 6-2** displays the corresponding geographic boundaries.

The financial plan is organized based on which types of projects are eligible for each respective revenue source. While all projects identified as fiscally constrained in the MTP are eligible for federal and state funding, there are policies in place (by the NCDOT and the CRTPO) that dictate how the funds are spent. For example, the STI regulations make a distinction between roadway and non-roadway projects, and there are different eligibility requirements for each STI category. The CRTPO also has a policy in place to ensure funding is allocated to non-roadway projects.

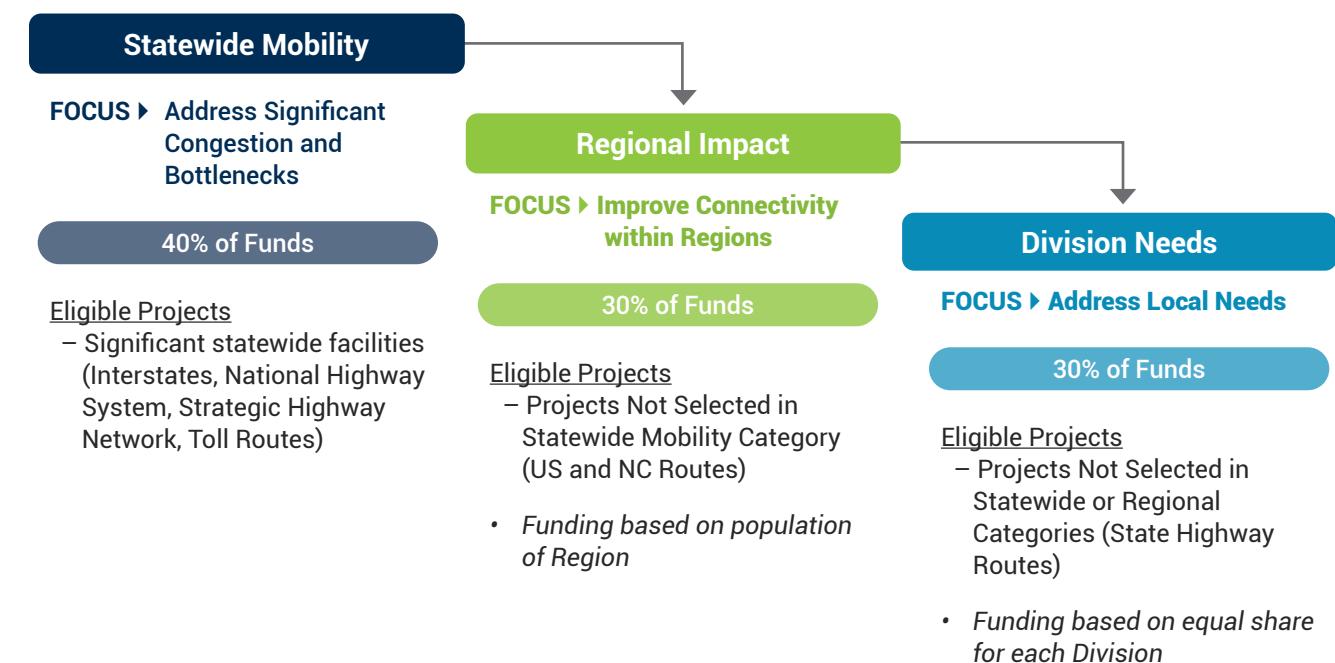
### MTP Horizon Years

The MTP is divided into horizon years. Each horizon year must not be more than 10 years long. Projects are programmed in a designated horizon year based on when they are anticipated to be completed and open to traffic, which complies with air quality conformity analysis regulations.

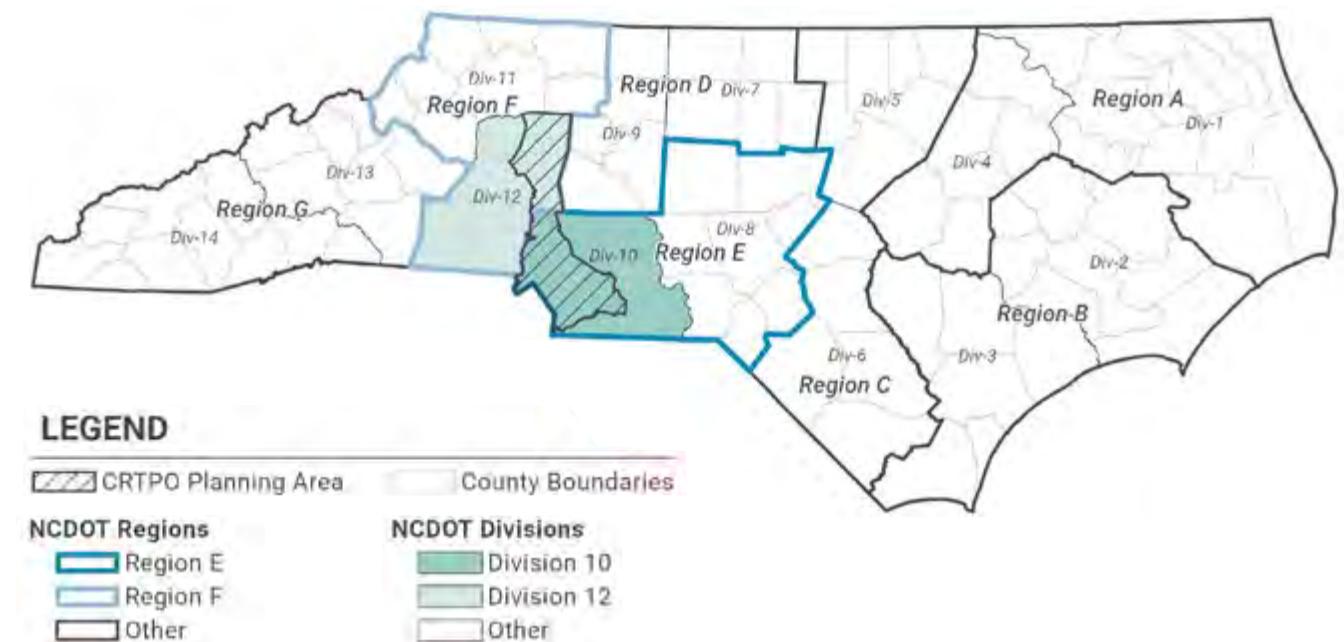
#### 2050 MTP Horizon Years:

- 2022–2025      • 2036–2045
- 2026–2035      • 2046–2050

**Figure 6-1 STI Categories**



**Figure 6-2 STI Geographic Boundaries**



Along with the Statewide category that covers the entire state, North Carolina is divided into seven funding regions and 14 divisions. The CRTPO planning area encompasses two regions and two divisions. Iredell County is in Region F and Division 12, while Mecklenburg and Union counties are in Region E and Division 10.

## Revenue Sources and Financial Projections

The CRTPO's financial plan is organized according to major revenue sources available and the types of projects eligible for each, as follows:

- Strategic Transportation Investments
- Discretionary
- Transit
- Maintenance
- Other (Local, Toll, Private)

Financial projections for each revenue source were developed based on methodologies reviewed and agreed upon by stakeholders to determine the anticipated funding available for transportation investments in each respective horizon year of the MTP.

### Strategic Transportation Investments

#### Roadway

The projected STI roadway funding was calculated using funds programmed for roadway projects within the CRTPO planning area in NCDOT's State Transportation Improvement Program (STIP). A two percent annual escalation rate was applied to estimate revenues beyond the years included in the STIP, through 2050. The two percent escalation rate was chosen based on coordination with NCDOT and because it is consistent with the approach used for previous MTP updates. To estimate the portion of funds anticipated to be distributed within its planning area, the CRTPO used percent of population relative to the STI funding geography. This method has also proven to be reliable for previous MTP updates and the CRTPO considers population a fair representation for anticipating where transportation improvements are needed. For the 2050 MTP, 2018 population estimates were used.<sup>1</sup>

The total STI funding projections for roadway projects are listed in **Table 6-1**.

<sup>1</sup> Source: American Community Survey



**Table 6-1 STI Roadway Funding Projections**

STI Category	2022-2025 Funding (\$M)	2026-2035 Funding (\$M)	2036-2045 Funding (\$M)	2046-2050 Funding (\$M)	Total (\$M)
Statewide	\$ 506	\$ 593	\$ 2,384	\$ 839	\$ 4,321
Region E	\$ 13	\$ 1,200	\$ 1,089	\$ 549	\$ 2,851
Region F	\$ 27	\$ 381	\$ 130	\$ 75	\$ 613
Division 10	\$ 126	\$ 274	\$ 256	\$ 148	\$ 804
Division 12	\$ 11	\$ 184	\$ 73	\$ 42	\$ 310
Exempt + Transition	\$ 105	\$ ---	\$ ---	\$ ---	\$ 105
<b>TOTAL</b>	<b>\$ 787</b>	<b>\$ 2,632</b>	<b>\$ 3,931</b>	<b>\$ 1,653</b>	<b>\$ 9,003</b>

Note: Funding for Exempt + Transition is allocated to projects not required to be evaluated in the designated STI categories.

Note: Numbers in the table are rounded for planning purposes, which is why some totals are not exact.

Although approximately \$9 billion is projected for roadway projects, a portion of these funds (\$5.1 billion) is already allocated to projects in the STIP. Those funds are included in the 2050 MTP, but they are subtracted from the anticipated future year revenues in the financial plan because they are committed to those projects. As a result, roughly \$3.9 billion remains to program additional roadway projects in the 2050 MTP, as shown in **Table 6-2**. The MTP financial projections are revisited during each four-year plan update to account for external factors that may affect revenues, such as motor fuel tax fluctuations.

**Table 6-2 STI Roadway Funding Available for Allocation**

STI Category	2022-2025 Funding (\$M)	2026-2035 Funding (\$M)	2036-2045 Funding (\$M)	2046-2050 Funding (\$M)	Total (\$M)
Statewide	\$ ---	\$ 348	\$ 390	\$ 839	\$ 1,577
Region E	\$ ---	\$ 142	\$ 838	\$ 549	\$ 1,529
Region F	\$ ---	\$ 15	\$ 130	\$ 75	\$ 220
Division 10	\$ ---	\$ 46	\$ 256	\$ 148	\$ 450
Division 12	\$ ---	\$ ---	\$ 73	\$ 42	\$ 115
<b>TOTAL</b>	<b>\$ ---</b>	<b>\$ 552</b>	<b>\$ 1,686</b>	<b>\$ 1,653</b>	<b>\$ 3,891</b>

Note: Numbers in the table are rounded for planning purposes, which is why some totals are not exact.



Davidson Greenway

### Non-Roadway

In addition to the STI roadway funds, approximately \$348 million of non-roadway funds are either programmed or available to be programmed in the MTP, as listed in **Table 6-3**. These revenues are also based on programmed funds in the NCDOT's STIP, defined as STI non-roadway funding. A two percent annual inflation factor was then applied to determine the revenue amounts for each year beyond the funds programmed, through the year 2050. Of the total STI non-roadway funds, approximately \$107 million are allocated to projects with committed funding, leaving roughly \$241 million to be programmed in the future years as priorities are identified.

For non-roadway STI funding, the NCDOT has recommended a normalization approach based on historical spending to balance modal competition and guide programming decisions since the scoring criteria is not the same across modes. Normalization establishes minimum budget commitments to roadway and non-roadway modes. The minimum target has remained 4% for non-roadway and 90% for roadway over multiple prioritization cycles. The 6% difference is a direct competition between roadway and non-roadway modes.<sup>2</sup>

<sup>2</sup> [https://www.tarpo.org/wp-content/uploads/2019/12/HQ\\_NCDOT\\_STI\\_Oct2019\\_FINAL.pdf](https://www.tarpo.org/wp-content/uploads/2019/12/HQ_NCDOT_STI_Oct2019_FINAL.pdf)

**Table 6-3 STI Non-Roadway Funding Projections**

Funding Type	2022-2025 Funding (\$M)	2026-2035 Funding (\$M)	2036-2045 Funding (\$M)	2046-2050 Funding (\$M)	Total (\$M)
Non-Roadway STI Funds Already Programmed	\$ 42	\$ 65	\$ 0	\$ 0	\$ 107
Non-Roadway STI Funds Available to be Programmed	\$ 0	\$ 52	\$ 120	\$ 69	\$ 241
<b>TOTAL</b>	<b>\$ 42</b>	<b>\$ 116</b>	<b>\$ 120</b>	<b>\$ 69</b>	<b>\$ 348</b>

Note: Numbers in the table are rounded for planning purposes, which is why some totals are not exact.

### Discretionary

Federal discretionary funding is a flexible source of revenue that is distributed directly to the CRTPO. The most common discretionary funding sources include:

- Surface Transportation Block Grant-Direct Attributable (STBG-DA)
- Congestion Mitigation and Air Quality (CMAQ)
- Transportation Alternatives Program (TAP)

Each type of discretionary revenue source has specific allocation guidelines; however, they are generally available for roadway and non-roadway projects. The CRTPO receives discretionary funds on an annual basis. Similar to the method for calculating STI funds, the CRTPO used the

programmed 2020-2032 STIP funding amounts for each respective discretionary funding type as a starting point for determining the MTP projections. A two percent annual inflation rate was applied for funds beyond those programmed in the STIP. **Table 6-4** includes the 2050 MTP discretionary funding projections.

The CRTPO also maintains a Discretionary Funds Policy Guide that designates modal investment targets for roadway (80%) and non-roadway (20%) projects,<sup>3</sup> to ensure these funds are utilized for a variety of transportation modes. These funds are typically allocated in the near term as they become available.

<sup>3</sup> The annual modal mix recommendation is based upon the assumptions made within the CRTPO's MTP, and the funding structure of the STI legislation with regard to the percentage of total funding for the non-roadway modes.

**Table 6-4 Discretionary Funding Projections**

Funding Type	2022-2025 Funding (\$M)	2026-2035 Funding (\$M)	2036-2045 Funding (\$M)	2046-2050 Funding (\$M)	Total (\$M)
STBG-DA	\$ 35	\$ 193	\$ 238	\$ 138	\$ 604
CMAQ	\$ 32	\$ 91	\$ 110	\$ 64	\$ 297
TAP	\$ 0	\$ 14	\$ 17	\$ 10	\$ 41
<b>Total Discretionary Funds</b>	<b>\$ 67</b>	<b>\$ 298</b>	<b>\$ 365</b>	<b>\$ 212</b>	<b>\$ 942</b>
Roadway (80% Funding Target)	\$ 53	\$ 238	\$ 292	\$ 169	\$ 753
Non-Roadway (20% Funding Target)	\$ 13	\$ 60	\$ 73	\$ 42	\$ 188

Note: Numbers in the table are rounded for planning purposes, which is why some totals are not exact.

## Transit

The CRTPO planning area is served by the following four public transportation providers (as described in **Chapter 3**):

- Charlotte Area Transit System (CATS)
- Iredell County Area Transportation System (ICATS)
- Mecklenburg Transportation System (MTS)
- Union County Transportation (UCT)

These providers utilize funding from a variety of sources to fund transit capital projects and operating and maintenance activities. The primary revenue sources for capital transit projects are a combination of federal and state grants in addition to local matching funds from the half-percent sales and use tax (dedicated to transit within Mecklenburg County). Service reimbursements, advertising, public private partnerships, and other miscellaneous revenues also help advance transit planning and support ongoing operations and maintenance expenses.

For the 2050 MTP, the transit financial projections provide an overview of total anticipated

revenues for the entire planning area. The projections for capital and operating funding are based on a financial model (maintained by CATS) and projections of historic National Transit Database (NTD) operating and capital expenditures for the other public transportation providers (ICATS, MTS, and UCT). A four percent growth rate is assumed for capital revenue.

In addition, the following assumptions have been made for the MTP transit financial projections:

- CATS financial projections include the fund balance and adjustments based on expenditures for each MTP horizon year.
- Revenues and expenditures of other transit agencies (ICATS, MTS, UCT) are assumed to increase by the same growth rate (based on the projections of historical NTD data) over the life of the MTP.

**Table 6-5** provides transit funding projections for the MTP through the year 2050. For the 2050 MTP, only committed transit projects have been identified for funding. Additional funds will be programmed as future transit projects are defined and approved.

**Table 6-5** **Transit Funding Projections**

Funding Type	2022-2025 Funding (\$M)	2026-2035 Funding (\$M)	2036-2045 Funding (\$M)	2046-2050 Funding (\$M)
Beginning Balance <sup>1</sup>	\$ 191	\$ 146	\$ 307	\$ 746
Interest Earnings on Fund Balances	\$ 1	\$ 21	\$ 67	\$ 73
Capital Balance	\$ (46)	\$ 141	\$ 372	\$ 487
<b>Cumulative Balance</b>	<b>\$ 146</b>	<b>\$ 307</b>	<b>\$ 746</b>	<b>\$ 1,306</b>

Note: Numbers in the table are rounded for planning purposes, which is why some totals are not exact.

1 - Includes CATS Control Account, Revenue Reserve, and Unrestricted Fund Balance at the beginning of the period.

## Maintenance

Maintenance budgets were obtained from NCDOT Division 10 and Division 12 for fiscal year 2021. To determine the maintenance funding projections for the MTP, a two percent annual inflation factor was applied to the base year maintenance budget amounts and projected through the year 2050. This provided the total maintenance budget for each respective NCDOT Division within the planning area. Population

was again used to estimate the CRTPO's share of maintenance revenues within each Division. **Table 6-6** shows the maintenance funding projections for the 2050 MTP.

The CRTPO's share of Division 10 maintenance funds is 81%, corresponding with its percent of population. For Division 12, the CRTPO's share of maintenance funds is 23%, also representative of its percent of population.

**Table 6-6** **Maintenance Funding Projections**

Funding Type	2022-2025 Funding (\$M)	2026-2035 Funding (\$M)	2036-2045 Funding (\$M)	2046-2050 Funding (\$M)	Total (\$M)
CRTPO Share from Division 10	\$ 194	\$ 451	\$ 550	\$ 318	\$ 1,513
CRTPO Share from Division 12	\$ 49	\$ 113	\$ 137	\$ 80	\$ 378
<b>Cumulative Balance</b>	<b>\$ 243</b>	<b>\$ 564</b>	<b>\$ 687</b>	<b>\$ 398</b>	<b>\$ 1,891</b>

*Note: Numbers are rounded for planning purposes.*

*Bridge replacement projects are an example of how maintenance funding is allocated.*



A summary of the MTP revenue projections presented in this chapter is provided in **Table 6-7**.

**Table 6-7 Summary of 2050 MTP Financial Projections**

Category	Total Available Funding (\$M)	Programmed/Committed in STIP (\$M)	Programmed for Additional Fiscally Constrained Projects (\$M)	Total Programmed (\$M)	Remaining Funds (\$M)
STI Roadway Funding	\$ 9,003	\$ 5,112	\$ 3,887	\$ 8,999	\$ 4
STI Non-Roadway Funding	\$ 348	\$ 107	\$ ---	\$ 107	\$ 241
Discretionary Roadway Funding <sup>1</sup>	\$ 753	\$ ---	\$ ---	\$ ---	\$ 753
Discretionary Non-Roadway Funding	\$ 253	\$ 65	\$ ---	\$ 65	\$ 188
Roadway Maintenance Funding	\$ 1,891	\$ ---	\$ ---	\$ ---	\$ 1,891
Transit Capital and Maintenance Funding	\$ 1,306	\$ ---	\$ ---	\$ ---	\$ 1,306
<b>Total</b>	<b>\$ 13,554</b>	<b>\$ 5,284</b>	<b>\$ 3,887</b>	<b>\$ 9,171</b>	<b>\$ 4,383</b>

1 - Discretionary funding Programmed/Committed in STIP is not shown in this row because it is included as part of STI Roadway Funding Programmed/Committed in STIP (\$5,112M).

## Other Revenue Sources



### Local Revenues

Local member jurisdictions of the CRTPO also contribute to funding transportation projects. For example, a minimum 20% local match is required when federal discretionary funds are awarded for a project. Other examples include local contributions above and beyond what is required for a given STI funded project or voter-approved bond referendums for transportation projects.

While local funds may contribute to projects in the MTP, specific amounts are not identified because they fluctuate often and are unpredictable in the long term.



### Toll Revenues

The Monroe Expressway and I-77 Express Lanes are two facilities with a tolling component that are open to traffic in the CRTPO planning area and several more are planned to be operating before 2050. The STI legislation in North Carolina designates funding, referred to as Bonus Allocation (BA), which represents additional budget allocation to an MPO that is based on the reduction in cost to NCDOT for a project funded under STI Prioritization that comes from toll bond revenue. The North Carolina Turnpike Authority (NCTA) is tasked with planning and operating toll facilities throughout the state. As potential toll projects are identified in its planning area, the CRTPO coordinates with the NCTA to evaluate potential revenues. For future MTP updates, these revenues will continue to be analyzed and considered when developing the financial plan.



### Private Revenues

Public private partnerships are agreements between a public agency and private company to decrease the reliance on federal and state funding and to potentially deliver a project quickly. In the CRTPO planning area, these partnerships are being utilized for several capital transportation projects, as described in **Chapter 7**. This is another revenue source that is difficult to predict; therefore, projections for anticipated private funding are not included in the 2050 MTP.



## Demonstrating Fiscal Constraint

A revenue source has been identified for each project in the 2050 MTP. The MTP is required to be fiscally constrained, by demonstrating that the projected funds are adequate to cover the cost of the programmed projects.

A substantial amount of the funding in the MTP is for roadway improvements, in part due to the required 90% minimum budget commitment for roadway projects established by the STI law.

**Table 6-8** displays the projected roadway funds, as well as the estimated amount of which is programmed by STI category and horizon year. Fiscal constraint is applied based on total available revenues to determine how many projects can be programmed. Roadway projects already included in the STIP account for all the funding in the 2025 horizon year.

## Cost Estimates

Project cost estimates are another key element of demonstrating fiscal constraint to ensure the total cost of the projects programmed in the MTP does not exceed the anticipated funding projections developed for the plan.

For the 2050 MTP, cost estimates were developed for all 240 candidate roadway projects submitted and an escalation factor was applied to the original cost estimate, depending on which MTP horizon year the project is programmed. Based on the data available when the MTP project cost estimates were developed, the CRTPO used 2019 as the base year. A four percent annual increase was then applied for three years, to establish cost estimates for the year of MTP adoption (2022). To escalate cost estimates to year of expenditure, a four percent increase was applied to the mid-point of each respective horizon year in which a project is programmed (for example, cost was adjusted to the year 2030 for the 2035 horizon year, which spans 2026-2035).

Bicycle, pedestrian, transit, and rail projects included in the MTP already have funding committed; therefore, cost estimates were not developed for these project modes.

**Table 6-8 Roadway Funding Projections and Estimated Funds Programmed**

STI Category	Horizon Year (HY)	Available Funds (\$M)	Programmed Funds (\$M)	No. of Projects Fiscally Constrained
<b>Committed Projects</b>	<b>Total for HY 2025, 2035, 2045</b>	\$ 5,112	\$ 5,112	104
Statewide	HY 2035	\$ 348	\$ 347	10
	HY 2045	\$ 390	\$ 59	2
	HY 2050	\$ 839	\$ 1,187	2
	<b>Subtotal</b>	\$ 1,577	\$ 1,592	14
Region E	HY 2035	\$ 142	\$ 144	7
	HY 2045	\$ 838	\$ 823	10
	HY 2050	\$ 549	\$ 551	7
	<b>Subtotal</b>	\$ 1,529	\$ 1,518	24
Region F	HY 2035	\$ 15	\$ -	0
	HY 2045	\$ 130	\$ 112	1
	HY 2050	\$ 75	\$ 112	1
	<b>Subtotal</b>	\$ 220	\$ 224	2
Division 10	HY 2035	\$ 46	\$ 37	1
	HY 2045	\$ 256	\$ 243	6
	HY 2050	\$ 148	\$ 160	2
	<b>Subtotal</b>	\$ 450	\$ 439	9
Division 12	HY 2035	\$ 0	\$ -	0
	HY 2045	\$ 73	\$ 37	2
	HY 2050	\$ 42	\$ 76	1
	<b>Subtotal</b>	\$ 115	\$ 114	3
<b>Subtotal</b>		\$ 3,891	\$ 3,887	52
<b>TOTAL</b>		\$ 9,003	\$ 8,999	156

Note: Project costs are based on year of expenditure, or horizon year, dollars. Committed projects are based on STIP costs and other fiscally constrained projects are based on escalated dollars from this worksheet.

Note: Numbers in the table are rounded for planning purposes, which is why some totals are not exact.

## Alternative Funding

The funding identified in the financial plan of the 2050 MTP comes from federal and state revenue sources that have historically been available for capital transportation infrastructure investments. Notably, the funding projections were based on the NCDOT's STIP funding trends; however, as discussed in **Chapter 4**, there were many unknowns related to funding as this MTP was being developed. In addition, the federal Infrastructure Investment and Jobs Act (IIJA) was in the process of being authorized as this plan was developed, so those revenues were not accounted for in this financial plan.

A goal of the CRTPO's Strategic Plan is to expand regional transportation funding. As part of the 2050 MTP development process, an alternative funding analysis was completed (see **Chapter 5**), which serves as an initial step for gathering data, evaluating potential revenue sources, and providing that information to decision makers as next steps are assessed. Although more coordination and time are needed before potential alternative sources are pursued for transportation investments, the CRTPO acknowledges the need to explore opportunities for additional funding. There are numerous initiatives underway in the Charlotte region, such as Beyond 77, CONNECT Beyond, and Charlotte MOVES, for which alternative funding is a consideration. Ongoing collaboration will be necessary to refine and adopt new funding strategies for the region, at which time the MTP financial plan could be expanded to include additional revenues as part of the future projections.



## Chapter 07

# Projects



Identifying and evaluating projects to determine the priorities that can feasibly be funded is one of the most significant components of the Metropolitan Transportation Plan (MTP). The strategies and recommendations described in **Chapter 5**, along with the financial plan included in **Chapter 6**, provide the framework for improving transportation infrastructure and mobility. The capital investments identified in the project list are the tangible results of the technical and policy analysis.

As documented in **Chapter 4** of this MTP, there are not enough funds to complete the needed

projects. Because of this funding shortfall, the CRTPO must prioritize projects to maximize the available funding. Maintenance, system expansion, mode choice, connectivity, and equitable allocation of funding throughout the planning area must also be considered in the plan development.

The various types of investments, project identification and evaluation processes, and programmed 2050 MTP projects, which contribute to addressing challenges and meeting future demand for transportation, are described in this chapter.

## Types of Investments

The financial plan for the MTP outlines the various revenue sources and projected funds available to invest in MTP projects. The types of investments included are roadway, active transportation (bicycle and pedestrian), transit, rail/freight, and maintenance projects. **Table 7-1** lists the various revenue sources and the associated types of project investments.

**Table 7-1 Types of MTP Project Investments**

Funding Sources <sup>1</sup>	Types of Project Investments <sup>2</sup>
Strategic Transportation Investments 	<ul style="list-style-type: none"><li>Roadway (major widening, realignment, and new construction for interstates, interchanges, and thoroughfares; express lanes for select limited access facilities)</li><li>Non-Roadway (bicycle, pedestrian, rail, and transit)</li></ul>
Discretionary 	<ul style="list-style-type: none"><li>Roadway (widening, realignment, new construction, and other improvements for various roadway types, as well as intersections)</li><li>Non-Roadway (bicycle, pedestrian, and transit)</li></ul>
Transit 	<ul style="list-style-type: none"><li>Vehicle Replacement</li><li>Fleet/Service Expansion</li><li>Capital Improvements (infrastructure and facilities)</li><li>Maintenance and Operations</li></ul>
Maintenance 	<ul style="list-style-type: none"><li>Pavement Resurfacing</li><li>Bridge Maintenance/Replacement</li><li>Other General Maintenance</li></ul>
Other (Local, Toll, Private) <sup>3</sup> 	<ul style="list-style-type: none"><li>Local Match for Discretionary Projects and other Federally Funded Projects</li><li>Maintenance and Operations</li><li>Capital Improvements (infrastructure and facilities)</li></ul>

<sup>1</sup> Funding sources are described in detail in **Chapter 6**.

<sup>2</sup> Project investments listed are the most common for each funding source and not a comprehensive inventory.

<sup>3</sup> A variety of investments are eligible based on funding requirements and a few investment types are listed that could apply to one or more funding source.

## Identifying and Evaluating Projects

The MTP contains projects that already have committed funding, along with candidate projects that are considered for inclusion through an evaluation process. Active transportation, rail, and transit projects have historically been identified through processes outside the development of the CRTPO's MTP and are included in the plan because funding has already been committed. The fiscally constrained roadway projects include both "existing and committed" and high priority projects identified through the two-tiered MTP ranking process. The highest scoring projects are then programmed based on the anticipated funding available in each respective horizon year. All projects receiving federal funds are included in the MTP.

I-40 at I-77 Interchange Reconstruction in Statesville



## Complete Streets Policy

The CRTPO and NCDOT are committed to ensuring active transportation improvements identified by cities, towns, and communities along roadways are evaluated as part of roadway projects. The NCDOT adopted a Complete Streets Policy in 2019 that requires planners and engineers to consider and incorporate multimodal facilities in the design and improvement of all appropriate transportation projects in North Carolina. The CRTPO's Comprehensive Transportation Plan (CTP) and other locally adopted plans identify the non-motorized facilities to evaluate as part of roadway projects. Bicycle and pedestrian improvements recommended in plans and identified as a need in the project development process are paid for by NCDOT (if certain conditions are met).

This policy helps expand active transportation infrastructure in the CRTPO planning area, especially on major roadways where these facilities are often most needed.

## Committed Projects

Projects that have funding identified and have been evaluated in previous planning and prioritization processes are considered committed.<sup>1</sup> An example of committed projects are those included in the previous MTP that are programmed in the first six years of the Transportation Improvement Program (TIP). These projects scored well in both the CRTPO MTP ranking process as well as the North Carolina Department of Transportation's (NCDOT) Prioritization process, and are typically ready for construction in the short-term.

Other committed projects included in the MTP are those previously submitted for evaluation and awarded funding through the CRTPO's discretionary projects process (outlined in the [Discretionary Funds Policy Guide](#)). Numerous types of projects are eligible for federal discretionary funding and the CRTPO has the authority to decide how they are allocated. The Discretionary Funds Policy Guide defines scoring methodologies based on funding source and project type. It also establishes targets to ensure the funding is applied to roadway and non-roadway projects. The CRTPO facilitates a call for projects twice a year for its member jurisdictions to submit projects for evaluation and discretionary funds allocation. For the CRTPO, the majority of discretionary funds are allocated to roadway projects (approximately 80%) and the remaining 20% is used to fund bicycle, pedestrian, and transit improvements. Nearly all roadway projects that receive discretionary funding have complete streets components to accommodate bicyclists and/or pedestrians as part of the improvements. These projects are then included in the MTP as committed with funding.

Other transportation investments that fall into this category include transit projects funded with Federal Transit Administration (FTA) grants or direct allocations. Transit agencies then determine priorities through their respective evaluation processes. Rail projects are typically initiated at the state level and then are further defined and programmed through coordination with the CRTPO. Similarly, maintenance projects are identified through coordination between the respective NCDOT division office and the CRTPO.

<sup>1</sup> "Committed" projects have funding programmed in the first six years of the 2020-2029 TIP.

## Candidate Projects

The 2050 MTP candidate projects consist exclusively of roadway projects. Priorities for active transportation projects tend to fluctuate and revenue sources to fund these projects is not as consistent in the long-term. These factors make it more challenging to identify and program active transportation in the same manner as roadway projects. Transit projects are not submitted for evaluation in the MTP development process. The public transportation providers identify funding and approve projects through their respective governing boards. Smaller-scale projects that are eligible for discretionary funding are submitted through the CRTPO's discretionary evaluation and endorsement process.

Candidate roadway projects are identified and submitted by CRTPO member jurisdictions, and then evaluated using the adopted MTP roadway ranking methodology. To maintain a consistent approach among its planning efforts, the CRTPO requires that candidate project submissions for the MTP come from the CTP, which identifies facilities that are existing, need improvement, or are recommended new roadways. In addition, the CRTPO provides resources from its scenario planning, Congestion Management Process (CMP), and existing conditions assessment for member jurisdictions to consider prior to submitting candidate projects (as documented previously in this MTP). Stakeholder coordination and public input are also significant elements of evaluating candidate projects, as described in **Chapter 2**.

The CRTPO member jurisdictions submitted a total of 240 candidate roadway projects for consideration in the 2050 MTP during a designated call for projects (January - February 2021). As a result of the MTP roadway ranking process (March - June 2021), 106 projects advanced to Tier II and 52 of those have been programmed in the MTP as fiscally constrained projects.



## MTP Roadway Ranking Methodology

The CRTPO has adopted a two-tier roadway ranking methodology that utilizes a series of quantitative and qualitative criteria to assign scores to candidate roadway projects. Projects that score well in Tier I advance to Tier II. Projects with the highest overall scores are programmed in priority order, by MTP horizon year, until the anticipated funding is expended. The roadway ranking methodology was originally developed for the CRTPO's 2040 MTP, was refined during the 2045 and 2050 MTP updates, and aligns with the NCDOT's Prioritization process.



Tier I Criteria	Points
Congestion	100
Safety	50
Accessibility to Employment	50
<b>TOTAL</b>	<b>200</b>

Tier II Criteria	Points
Environmental Justice Impacts	9
Natural Resource Impacts	9
Historic Resource Impacts	9
Community Resource Impacts	9
Equitable Access	9
Connectivity	10
Benefit-Cost	45
<b>TOTAL</b>	<b>100</b>

A Roadway Ranking Review Committee of local stakeholders helps guide the roadway ranking process, confirms all project scores, and gives consensus on the final list of projects prior to approval by the CRTPO Board. The horizon years are used as a guide for calculating projected funds and programming projects. A detailed description of the MTP roadway ranking methodology, along with the project scores for all 240 candidate projects, are included in Appendix H.

## 2050 MTP Projects

The CRTPO's 2050 MTP consists of roadway, active transportation, transit, and passenger and freight rail projects. Maintenance activities that have committed funding, but are not clearly defined, are not listed in the MTP. In addition, because the CRTPO's planning efforts are focused on surface transportation, the MTP does not include aviation-related improvement projects. The CRTPO recognizes that the 2050 MTP projects do not represent all the improve-

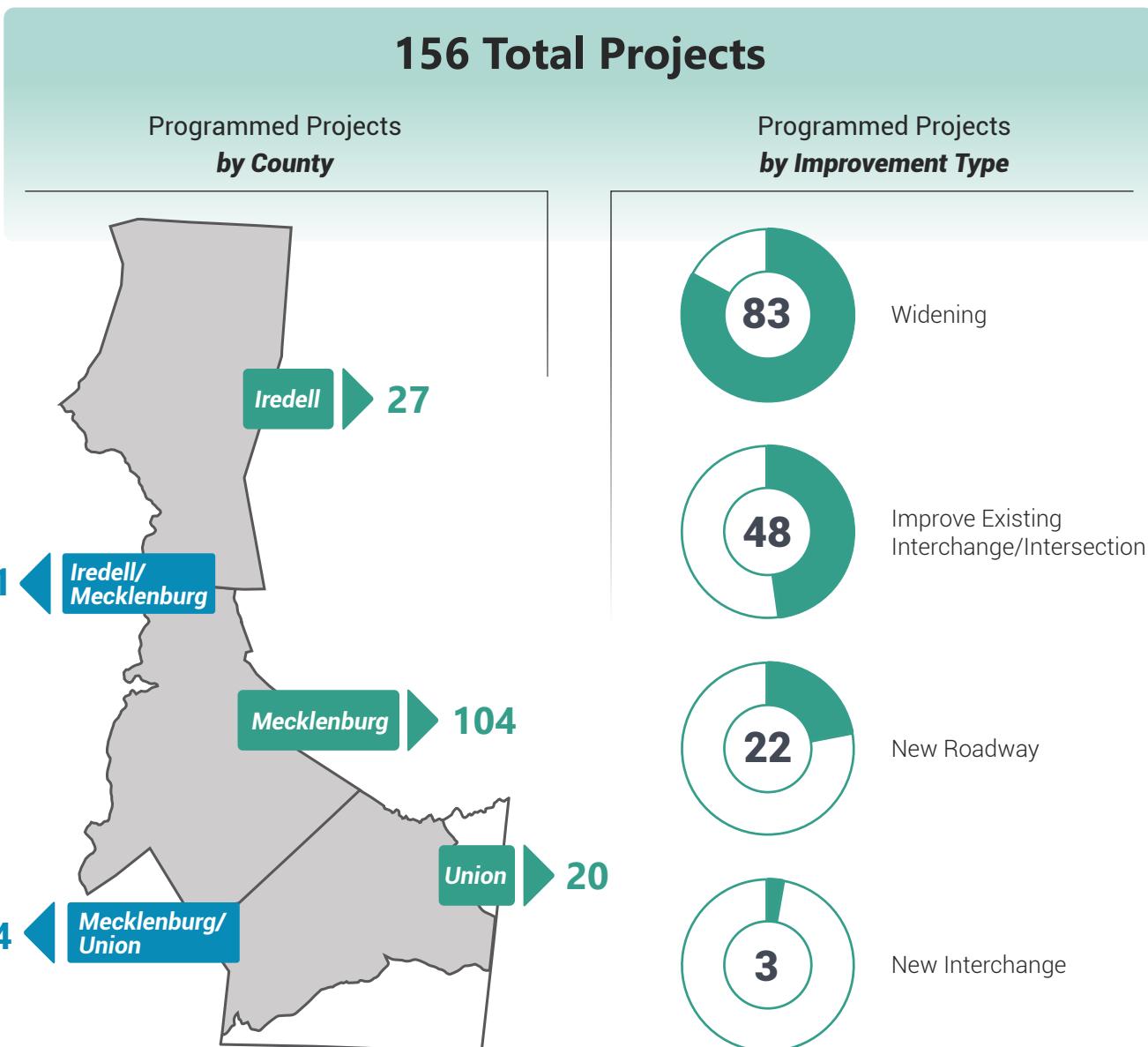
ments needed to address the transportation challenges in its planning area and continues to respond to increasing demands by pursuing other strategies and exploring new technologies. The MTP is a continually evolving plan that will be updated as these new strategies and technologies are assessed and endorsed.

## Fiscally Constrained Roadway Projects

Fiscally constrained roadway projects are identified, evaluated, and presented to the CRTPO Board for approval prior to inclusion in the MTP. For the 2050 MTP, 104 committed and 52 candidate roadway projects (156 total projects) are programmed throughout the planning area, representing a variety of improvement types, as shown in **Figure 7-1**. The CRTPO Board approved the fiscally constrained roadway project list on August 18, 2021.

**Table 7-2** lists the 2050 MTP roadway projects and they are displayed, by county, in **Figure 7-2**, **Figure 7-3**, and **Figure 7-4**.

**Figure 7-1 2050 MTP Fiscally Constrained Roadway Project Summary**



**Table 7-2 2050 MTP Fiscally Constrained Roadway Projects**

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Project Name	Jurisdiction <sup>1</sup>	Imp Type <sup>2</sup>	Project Description <sup>3</sup>	Project Cost Estimate (\$M) <sup>4</sup>	Start of Project	End of Project	Project Length (miles)	Functional Class	Regional Significance	Exempt Status	2050 MTP ID	TIP No	Horizon Year
<b>IREDELL COUNTY</b>													
Connector Rd	Ird Co		Widen from 2 lanes to 4 lanes, with median and shared-use path	\$22.73	Statesville Hwy (NC 115)	Charlotte Hwy (US 21)	0.9	Minor Collector	Yes	No	2050-1032	--	2045
Mecklenburg Hwy (NC 115) at Langtree Rd	Ird Co		Construct intersection improvements	\$4.05	--	--	--	Minor Arterial	No	Yes**	2050-E120	U-6249	2025
Charlotte Hwy (US 21)	Ird Co & Mor		Widen from 2 lanes to 4 lanes, with median, and construct intersection improvements	\$35.10	W Plaza Dr (NC 150)	Medical Park Rd	2.5	Minor Arterial	No	No	2050-E117	U-6037	2035
Cornelius Rd	Ird Co & Mor		Widen from 2 lanes to 4 lanes, with median and shared-use path	\$76.45	Bluefield Rd	US 21	1.9	Minor Collector	No	No	2050-1029	--	2050
I-77 at Cornelius Rd	Ird Co & Mor		Convert grade separation to interchange	\$25.06	--	--	--	Interstate	Yes	No	2050-E109	I-5962	2035
Mecklenburg Hwy (NC 115) at Faith Rd / Campus Ln	Ird Co & Mor		Realign roadway and construct intersection improvements	\$0.00 <sup>5</sup>	--	--	--	Minor Arterial	No	Yes**	2050-E119	C-5529	2025
Oakridge Farm Hwy (NC 150)	Ird Co & Mor		Widen from 2/4 lanes to 4/6 lanes, with median, wide outside lanes and sidewalks	\$28.70	Statesville Hwy (NC 115)	Park Ave / Mt Ulla Hwy (NC 801)	1.3	Principal Arterial - Other	Yes	No	2050-E111	U-5960	2035
River Hwy / W Plaza Dr (NC 150)	Ird Co & Mor		Widen from 2/4 lanes to 6 lanes, with median, wide outside lanes and sidewalks	\$290.01	Catawba River	I-77	6.2	Principal Arterial - Other	No	No	2050-E113	R-2307	2035
Silicon Shores East-West Connector Rd	Ird Co & Mor		New 4 lane roadway, with median, bike lanes and sidewalks	\$13.60	Langtree Rd	Mecklenburg Hwy (NC 115)	0.8	Minor Collector	No	No	2050-E121	U-6239	2025
I-40 at I-77	Ird Co & Sta		Interchange reconstruction	\$197.71	--	--	--	Interstate	No	No	2050-E101	I-3819B	2025
Wilkesboro Hwy (NC 115)	Ird Co & Sta		Widen to multi-lanes	\$13.70	Old Wilkesboro Rd	Hartness Rd	0.9	Minor Arterial	No	No	2050-E103	U-5779	2035
Brawley School Rd	Mor		Widen from 2 lanes to 4 lanes, with median, bike lanes and sidewalks	\$25.84	Talbert Rd	Charlotte Hwy (US 21)	0.8	Major Collector	No	No	2050-E115	R-3833C	2035

**1 Jurisdiction Key**

Cab Co - Cabarrus County  
Mar - Marvin  
Sta - Statesville

Clt - Charlotte  
Mat - Matthews  
Stg - Stallings

Cor - Cornelius  
Mck Co - Mecklenburg County  
Tro - Troutman

Dav - Davidson  
Mnt - Mint Hill  
Un Co - Union County

Hnt - Huntersville  
Mon - Monroe  
Wax - Waxhaw

Ind - Indian Trail  
Mor - Mooresville  
Wed - Weddington

Ird Co - Iredell County  
Pin - Pineville  
Wes - Wesley Chapel

**3 Project Description Key**

Bicycle Improvements    Pedestrian Improvements

**2 Improvement Type (Imp. Type) Key**

Widening

Improve Existing Interchange

Improve Existing Intersection

New Roadway

New Interchange

**4 Project Cost Estimate**

Escalated based on anticipated horizon year  
**5** No funding is identified because it has been expended and the project is under construction

\*\* 40 CFR 93.127, Project exempt from regional emissions analyses

Table 7-2 2050 MTP Fiscally Constrained Roadway Projects (continued)

Project Name	Jurisdiction <sup>1</sup>	Imp Type <sup>2</sup>	Project Description <sup>3</sup>	Project Cost Estimate (\$M) <sup>4</sup>	Start of Project	End of Project	Project Length (miles)	Functional Class	Regional Significance	Exempt Status	2050 MTP ID	TIP No	Horizon Year
<b>IREDELL COUNTY (continued)</b>													
Fairview Rd / I-77 Overpass	Mor		New grade separated overpass	\$23.48	Fairview Rd	Alcove Rd	0.1	Minor Collector	No	Yes**	2050-E118	U-5817	2035
NC 801 at Oakridge Farm Hwy (NC 150)	Mor		Construct intersection improvements	\$2.98	--	--	--	Principal Arterial - Other	No	Yes**	2050-E110	C-5701	2025
Oakridge Farm Hwy (NC 150) at Wiggins Rd	Mor		Realign intersection	\$1.30	--	--	--	Principal Arterial - Other	No	Yes**	2050-E112	U-5780	2025
Oates Rd / Midnight Ln	Mor		New 3 lane roadway, including grade separation over I-77, with bike lanes and sidewalks	\$41.30	Charlotte Hwy (US 21)	Bluefield Rd	1.5	Minor Collector	No	No	2050-E114	U-5816	2035
Plaza Dr (NC 150)	Mor		Widen from 5 lanes to 6 lanes, with bike lanes and sidewalks	\$111.93	Charlotte Hwy (US 21)	Statesville Hwy (NC 115)	1.8	Principal Arterial - Other	No	No	2050-1037	--	2045
Williamson Rd	Mor		Widen to multi-lanes	\$58.28	I-77	River Hwy / W Plaza Dr (NC 150)	3.2	Major Collector	No	No	2050-E116	R-5100	2035
Bethlehem Rd	Sta		Relocate roadway adjacent to Statesville Regional Airport	\$2.55	Aviation Dr	Bethlehem Rd / Lowes Aviation DR	0.8	Local	No	Yes**	2050-E106	U-6153	2025
Brookdale Dr / US 21 Connector	Sta		New 2 lane roadway	\$2.93	Brookdale Dr	Sullivan Rd (US 21)	0.1	Unclassified	No	No	2050-E102	U-6054	2025
East Broad St	Sta		Improve roadway and implement access management solutions	\$5.35	Vine St	Signal Hill Dr	0.7	Minor Arterial	No	No	2050-E105	U-6039	2025
Garner Bagnal Blvd (US 70)	Sta		Widen from 2 to 4 lanes, with median, bike lanes, sidewalks, and/or shared-use path	\$112.34	Buffalo Shoals Rd	I-77	2.5	Principal Arterial - Other	No	No	2050-1013	--	2050
Salisbury Rd	Sta		Road diet from 4 lanes to 3 lanes, paved shoulder, with wide outside lanes and sidewalks	\$14.40	Opal St	Salisbury Hwy (US 70)	1.2	Minor Arterial	No	N/A	2050-1012	--	2045
Sullivan Rd (US 21) at Davie Ave (US 64)	Sta		Convert intersection to roundabout	\$1.10	--	--	--	Minor Arterial	No	Yes**	2050-E104	U-5964	2035

**1 Jurisdiction Key**

Cab Co - Cabarrus County  
Mar - Marvin  
Sta - Statesville

Clt - Charlotte  
Mat - Matthews  
Stg - Stallings

Cor - Cornelius  
Mck Co - Mecklenburg County  
Tro - Troutman

Dav - Davidson  
Mnt - Mint Hill  
Un Co - Union County

Hnt - Huntersville  
Mon - Monroe  
Wax - Waxhaw

Ind - Indian Trail  
Mor - Mooresville  
Wed - Weddington

Ird Co - Iredell County  
Pin - Pineville  
Wes - Wesley Chapel

**3 Project Description Key**

Bicycle Improvements

Pedestrian Improvements

**4 Project Cost Estimate**

No funding is identified because it has been expended and the project is under construction

\*\* 40 CFR 93.127, Project exempt from regional emissions analyses

**2 Improvement Type (Imp. Type) Key**

Widening

Improve Existing Interchange

Improve Existing Intersection

New Roadway

New Interchange

Table 7-2 2050 MTP Fiscally Constrained Roadway Projects (continued)

Project Name	Jurisdiction <sup>1</sup>	Imp Type <sup>2</sup>	Project Description <sup>3</sup>	Project Cost Estimate (\$M) <sup>4</sup>	Start of Project	End of Project	Project Length (miles)	Functional Class	Regional Significance	Exempt Status	2050 MTP ID	TIP No	Horizon Year
<b>IREDELL COUNTY (continued)</b>													
Turnersburg Hwy (US 21)	Sta		Widen roadway to multi-lanes and realign intersection	\$23.05	Pump Station Rd	Fort Dobbs Rd	0.8	Minor Arterial	Yes	No	2050-E100	U-5799	2025
Main St / Shelton Ave (US 21 / NC 115)	Tro		Widen from 2 lanes to 4 lanes, with median, bike lanes and sidewalks	\$32.15	Cedar Ln	Moose Club Rd	2.2	Minor Arterial	Yes	No	2050-E107	R-2522	2035
S Main St (US 21 / NC 115) at Houston Rd / Flower House Loop	Tro		Realign and signalize intersection	\$2.95	--	--	--	Minor Arterial	No	Yes**	2050-E108	R-5711	2025

**1 Jurisdiction Key**

Cab Co - Cabarrus County  
Mar - Marvin  
Sta - Statesville

Clt - Charlotte  
Mat - Matthews  
Stg - Stallings

Cor - Cornelius  
Mck Co - Mecklenburg County  
Tro - Troutman

Dav - Davidson  
Mnt - Mint Hill  
Un Co - Union County

Hnt - Huntersville  
Mon - Monroe  
Wax - Waxhaw

Ind - Indian Trail  
Mor - Mooresville  
Wed - Weddington

Ird Co - Iredell County  
Pin - Pineville  
Wes - Wesley Chapel

**3 Project Description Key**

Bicycle Improvements

Pedestrian Improvements

**4 Project Cost Estimate**

No funding is identified because it has been expended and the project is under construction

\*\* 40 CFR 93.127, Project exempt from regional emissions analyses

**2 Improvement Type (Imp. Type) Key**

Widening

Improve Existing Interchange

Improve Existing Intersection

New Roadway

New Interchange

\*\* 40 CFR 93.127, Project exempt from regional emissions analyses

Table 7-2 2050 MTP Fiscally Constrained Roadway Projects (continued)

Project Name	Jurisdiction <sup>1</sup>	Imp Type <sup>2</sup>	Project Description <sup>3</sup>	Project Cost Estimate (\$M) <sup>4</sup>	Start of Project	End of Project	Project Length (miles)	Functional Class	Regional Significance	Exempt Status	2050 MTP ID	TIP No	Horizon Year	
MECKLENBURG COUNTY														
Albemarle Rd (NC 24 / NC 27)	Clt		Widen from 4 lanes to 6 lanes, with median and shared-use path		\$63.45	WT Harris Blvd (NC 24)	Eastern Circumferential Rd	2.1	Principal Arterial - Other	Yes	No	2050-3086	--	2045
Ardrey Kell Rd	Clt		Widen from 2 lanes to 6 lanes, with median and shared-use path		\$109.44	Rea Rd	Providence Rd (NC 16)	2.6	Major Collector	No	No	2050-3132	--	2050
Arequipa Dr / Northeast Pkwy	Clt		New 2 lane roadway, with bike lanes and sidewalks		Included with U-2509	Margaret Wallace Rd	Sam Newell Rd	1.3	Minor Collector	No	No	2050-E344	--	2045
Billy Graham Pkwy	Clt		Widen from 4 lanes to 6 lanes, with median, curb and gutter, and shared-use path		\$17.38	Josh Birmingham Pkwy	I-85	1.2	Principal Arterial - Other	Yes	No	2050-3081	--	2035
Brookshire Blvd (NC 16)	Clt		Widen from 4 lanes to 6 lanes, with median and shared-use path		\$112.51	I-85	Bellhaven Blvd	3.5	Principal Arterial - Other	Yes	No	2050-3067	--	2045
Brookshire Blvd (NC 16)	Clt		Widen from 4 lanes to 6 lanes, with bicycle and pedestrian accommodations		\$9.50	Idaho Dr	I-85	0.4	Principal Arterial - Other	Yes	No	2050-E334	U-5955	2035
Brookshire Blvd (NC 16) at Mount Holly-Huntersville Rd	Clt		Convert intersection to continuous flow intersection, with bicycle and pedestrian accommodations		\$1.96	--	--	--	Principal Arterial - Other	Yes	No	2050-E326	U-6084	2025
Brookshire Fwy (NC 16)	Clt		Widen from 4 lanes to 6 lanes, with median and paved shoulders		\$75.75	I-77	Idaho Drive	1.8	Principal Arterial - Other - Freeway	Yes	No	2050-3074	--	2045
Eastway Dr	Clt		Widen from 4 lanes to 6 lanes, with median and shared-use path		\$29.68	Kilborne Dr	Sugar Creek Rd	1.1	Principal Arterial - Other	Yes	No	2050-3079	--	2045
Eastway Dr at Shamrock Dr	Clt		Construct intersection improvements, with bicycle and pedestrian accommodations		\$8.00	--	--	--	Principal Arterial - Other	Yes	Yes**	2050-E337	U-5803	2035

1 Jurisdiction Key	Cab Co - Cabarrus County Mar - Marvin Sta - Statesville	Clt - Charlotte Mat - Matthews Stg - Stallings	Cor - Cornelius Mck Co - Mecklenburg County Tro - Troutman	Dav - Davidson Mnt - Mint Hill Un Co - Union County	Hnt - Huntersville Mon - Monroe Wax - Waxhaw	Ind - Indian Trail Mor - Mooresville Wed - Weddington	Ird Co - Iredell County Pin - Pineville Wes - Wesley Chapel	3 Project Description Key	Bicycle Improvements	Pedestrian Improvements
2 Improvement Type (Imp. Type) Key	Widening	Improve Existing Interchange	Improve Existing Intersection	New Roadway	New Interchange			4 Project Cost Estimate	5 No funding is identified because it has been expended and the project is under construction	** 40 CFR 93.127, Project exempt from regional emissions analyses
1 Jurisdiction Key	Cab Co - Cabarrus County Mar - Marvin Sta - Statesville	Clt - Charlotte Mat - Matthews Stg - Stallings	Cor - Cornelius Mck Co - Mecklenburg County Tro - Troutman	Dav - Davidson Mnt - Mint Hill Un Co - Union County	Hnt - Huntersville Mon - Monroe Wax - Waxhaw	Ind - Indian Trail Mor - Mooresville Wed - Weddington	Ird Co - Iredell County Pin - Pineville Wes - Wesley Chapel	3 Project Description Key	Bicycle Improvements	Pedestrian Improvements
2 Improvement Type (Imp. Type) Key	Widening	Improve Existing Interchange	Improve Existing Intersection	New Roadway	New Interchange			4 Project Cost Estimate	5 No funding is identified because it has been expended and the project is under construction	* 40 CFR 93.126, Exempt projects ** 40 CFR 93.127, Project exempt from regional emissions analyses

Table 7-2 2050 MTP Fiscally Constrained Roadway Projects (continued)

Project Name	Jurisdiction <sup>1</sup>	Imp Type <sup>2</sup>	Project Description <sup>3</sup>	Project Cost Estimate (\$M) <sup>4</sup>	Start of Project	End of Project	Project Length (miles)	Functional Class	Regional Significance	Exempt Status	2050 MTP ID	TIP No	Horizon Year	
MECKLENBURG COUNTY (continued)														
Freedom Dr (NC 27)	Clt		Widen from 2 lanes to 4 lanes, with bike lanes and sidewalks		\$17.10	Moores Chapel Rd	Toddville Rd	1.2	Principal Arterial - Other	Yes	No	2050-E333	U-5957	2035
I-277	Clt		Upgrade interchanges along corridor to improve operations		\$558.38	Kenilworth Ave	N Davidson St	2	Interstate	Yes	No	2050-3082	I-6022A	2050
I-277 (John Belk Fwy)	Clt		Improve interchanges along corridor to improve operations		\$32.96	South Blvd	Kenilworth Ave	0.6	Interstate	Yes	No	2050-3083	--	2035
I-485 at Brookshire Blvd (NC 16)	Clt		Construct interchange improvements, with bicycle and pedestrian accommodations		\$12.00	--	--	--	Interstate	No	No	2050-E327	I-5973	2025
I-485 at S Tryon St (NC 49)	Clt		Interchange improvements, with shared-use path		\$67.76	--	--	--	Interstate	No	No	2050-3108	I-6019	2035
I-485 at Providence Rd (NC 16)	Clt		Construct interchange improvements, with bicycle and pedestrian accommodations		\$41.30	--	--	--	Interstate	Yes	Yes*	2050-E358	I-5963	2035
I-77	Clt		Widen from 8 lanes to 10 lanes, interchange improvements, and installation of a collector-distributor road		\$628.22	I-277 (John Belk Fwy)	I-277 (Brookshire Fwy)	1.8	Interstate	Yes	No	2050-3078	I-5718B	2050
I-77	Clt		Widen from 6 lanes to 10 lanes, including express lanes and median improvements		\$790.50	South Carolina State Line	I-277 (John Belk Fwy) (Exit 9)	9.4	Interstate	Yes	No	2050-E340	I-5718A	2045
I-77 at I-85	Clt		Construct interchange improvements		\$82.10	--	--	--	Interstate	Yes	No	2050-E332	I-6014	2035
I-77 at Sunset Rd (US 21)	Clt		Convert to diverging diamond interchange, with shared-use path		\$56.11	--	--	--	Interstate	Yes	Yes**	2050-3061	I-6056	2035
I-85 at Billy Graham Pkwy	Clt		Convert to diverging diamond interchange, with shared-use path		\$19.34	--	--	--	Interstate	Yes	Yes**	2050-3075	--	2035
I-85 at Brookshire Blvd (NC 16)	Clt		Convert to diverging diamond interchange, with shared-use path		\$41.85	--	--	--	Interstate	No	Yes**	2050-3072	I-6020	2035
I-85 at I-485 (NE of Charlotte)	Clt		Construct interchange improvements		\$13.50	--	--	--	Interstate	No	No	2050-E324	I-6012	2035

1 Jurisdiction Key	Cab Co - Cabarrus County Mar - Marvin Sta - Statesville	Clt - Charlotte Mat - Matthews Stg - Stallings	Cor - Cornelius Mck Co - Mecklenburg County Tro - Troutman	Dav - Davidson Mnt - Mint Hill Un Co - Union County	Hnt - Huntersville Mon - Monroe Wax - Waxhaw	Ind - Indian Trail Mor - Mooresville Wed - Weddington	Ird Co - Iredell County Pin - Pineville Wes - Wesley Chapel	3 Project Description Key	Bicycle Improvements	Pedestrian Improvements
2 Improvement Type (Imp. Type) Key	Widening	Improve Existing Interchange	Improve Existing Intersection	New Roadway	New Interchange			4 Project Cost Estimate	5 No funding is identified because it has been expended and the project is under construction	* 40 CFR 93.126, Exempt projects ** 40 CFR 93.127, Project exempt from regional emissions analyses
1 Jurisdiction Key	Cab Co - Cabarrus County Mar - Marvin Sta - Statesville	Clt - Charlotte Mat - Matthews Stg - Stallings	Cor - Cornelius Mck Co - Mecklenburg County Tro - Troutman	Dav - Davidson Mnt - Mint Hill Un Co - Union County	Hnt - Huntersville Mon - Monroe Wax - Waxhaw	Ind - Indian Trail Mor - Mooresville Wed - Weddington	Ird Co - Iredell County Pin - Pineville Wes - Wesley Chapel	3 Project Description Key	Bicycle Improvements	Pedestrian Improvements
2 Improvement Type (Imp. Type) Key	Widening	Improve Existing Interchange	Improve Existing Intersection	New Roadway	New Interchange			4 Project Cost Estimate	5 No funding is identified because it has been expended and the project is under construction	* 40 CFR 93.126, Exempt projects ** 40 CFR 93.127, Project exempt from regional emissions analyses

Table 7-2 2050 MTP Fiscally Constrained Roadway Projects (continued)

Project Name	Jurisdiction <sup>1</sup>	Imp Type <sup>2</sup>	Project Description <sup>3</sup>	Project Cost Estimate (\$M) <sup>4</sup>	Start of Project	End of Project	Project Length (miles)	Functional Class	Regional Significance	Exempt Status	2050 MTP ID	TIP No	Horizon Year	
MECKLENBURG COUNTY (continued)														
I-85 at I-485 (W of Charlotte)	Clt		Construct interchange improvements	\$4.30	--	--	--	Interstate	No	No	2050-E335	I-6016	2035	
I-85 at Mallard Creek Church Rd	Clt		Interchange improvements, with shared-use path		\$19.34	--	--	Interstate	No	No	2050-3057	I-6017	2035	
I-85 at WT Harris Blvd (NC 24)	Clt		Construct interchange improvements	\$16.40	--	--	--	Interstate	Yes	Yes**	2050-E330	I-6013	2035	
I-85 at Sugar Creek Rd	Clt		Convert to diverging diamond interchange, with shared-use path		\$20.62	--	--	Interstate	Yes	Yes**	2050-3068	I-6053	2035	
Independence Blvd (US 74)	Clt		Widen from 4/6 to 6/8 lanes, with express lanes	\$1,203.20	Idlewild Rd	I-485	6.4	Principal Arterial - Other	No	No	2050-E342	U-2509	2045	
Independence Blvd (US 74)	Clt		Widen roadway to allow for two-way express lanes	Included with U-2509	I-277	West of Idlewild Rd	4.9	Principal Arterial - Other - Freeway	Yes	No	2050-E338	--	2045	
Johnston Rd (US 521)	Clt		Upgrade roadway to improve operations	\$8.59	I-485	Ballantyne Commons Pkwy	0.8	Principal Arterial - Other	No	No	2050-3130	--	2035	
Krefeld Dr / Independence Pointe Pkwy	Clt		New 2 lane roadway, with bike lanes and sidewalks		Included with U-2509	Crownpoint Executive Dr	Sam Newell Rd	0.9	Minor Collector	No	No	2050-E345	--	2045
Krefeld Dr Ext	Clt		New 2 lane roadway, with bike lanes and sidewalks		Included with U-2509	Krefeld Dr	Sardis Rd N	0.8	Minor Collector	No	No	2050-E343	--	2045
Lakeview Rd	Clt		Construct roadway improvements, with bike lanes and sidewalks		\$11.82	Reames Rd	Old Statesville Rd (NC 115)	1.7	Minor Collector	Yes	No	2050-E325	U-5905	2025
Lancaster Hwy / Johnston Rd (US 521)	Clt		Widen to multi-lanes	\$43.70	SC State Line	Ballantyne Commons Pkwy	3	Principal Arterial - Other	No	No	2050-E359	U-6109	2035	
Mallard Creek Rd	Clt		Widen from 2/3 lanes to 4 lanes, with bike lanes and sidewalks		\$22.39	Mallard Creek Church Rd	Breezewood Dr	1.5	Minor Arterial	Yes	No	2050-E323	U-6028	2035

**1 Jurisdiction Key** Cab Co - Cabarrus County Clt - Charlotte Cor - Cornelius Dav - Davidson Hnt - Huntersville Ind - Indian Trail Ird Co - Iredell County 3 Project Description Key Bicycle Improvements Pedestrian Improvements  
Mar - Marvin Mat - Matthews Sta - Statesville Mck Co - Mecklenburg County Stg - Stallings Tro - Troutman Mnt - Mint Hill Un Co - Union County Mon - Monroe Wax - Waxhaw Mor - Mooresville Pin - Pineville Wed - Weddington Wes - Wesley Chapel

**2 Improvement Type (Imp. Type) Key** Widening Improve Existing Interchange Improve Existing Intersection New Roadway New Interchange

**4 Project Cost Estimate** Escalated based on anticipated horizon year **5** No funding is identified because it has been expended and the project is under construction **\*\*** 40 CFR 93.127, Project exempt from regional emissions analyses

Table 7-2 2050 MTP Fiscally Constrained Roadway Projects (continued)

Project Name	Jurisdiction <sup>1</sup>	Imp Type <sup>2</sup>	Project Description <sup>3</sup>	Project Cost Estimate (\$M) <sup>4</sup>	Start of Project	End of Project	Project Length (miles)	Functional Class	Regional Significance	Exempt Status	2050 MTP ID	TIP No	Horizon Year	
MECKLENBURG COUNTY (continued)														
Mallard Creek Rd Connector	Clt		Widen from 2 lanes to 4 lanes and construct new 4 lane roadway, with median, bike lanes and sidewalks		\$0.00 <sup>5</sup>	Sugar Creek Rd	Mallard Creek Church Rd	4.1	Minor Arterial	No	No	2050-E329	U-2507	2025
Mallard Creek Rd/ Odell School Rd	Clt		Widen from 2 lanes to 4 lanes, with median, bicycle and pedestrian accommodations		\$28.40	I-485	Concord Mills Blvd	1.4	Major Collector	Yes	No	2050-E321	U-6032	2035
Monroe Rd at Rama Rd / Idlewild Rd	Clt		Construct intersection improvements, with bicycle and pedestrian accommodations		\$7.13	--	--	--	Minor Arterial	No	Yes**	2050-E339	U-5805	2025
North University Research Park Bridge	Clt		New 2 lane roadway, with bike lanes and sidewalks		\$12.90	Louis Rose Pl	Doug Mayes Pl	0.3	Local	No	No	2050-E328	U-5874	2025
Old Statesville Rd (NC 115)	Clt		Widen from 2 lanes to 4 lanes, with bike lanes and sidewalks		\$70.70	WT Harris Blvd (NC 24)	I-485	2.2	Principal Arterial - Other	No	No	2050-E322	U-5772	2035
Providence Rd (NC 16)	Clt		Implement super street, with shared-use path		\$33.57	Providence Country Club Dr	Ballantyne Commons Pkwy / McKee Rd	1.2	Minor Arterial	No	No	2050-3131	--	2035
Providence Rd (NC 16) at Ballantyne Commons Pkwy / McKee Rd	Clt		Construct intersection improvements, with bicycle and pedestrian accommodations		\$0.64	--	--	--	Principal Arterial - Other	Yes	Yes**	2050-E356	C-5534	2025
S Tryon St (NC 49)	Clt		Widen from 4 lanes to 6 lanes, with median and shared-use path		\$23.62	Arrowood Rd	Shopton Rd	1.3	Principal Arterial - Other	Yes	No	2050-3103	--	2035
S Tryon St (NC 49)	Clt		Widen from 4 lanes to 6 lanes, with median and shared-use path		\$11.19	I-485	Arrowood Rd	0.5	Principal Arterial - Other	Yes	No	2050-3107	--	2035
S Tryon St (NC 49)	Clt		Widen from 4 lanes to 6 lanes, with median and shared-use path		\$152.48	I-485	Steele Creek Rd (NC 160)	4.4	Principal Arterial - Other	No	No	2050-3113	--	2045

**1 Jurisdiction Key** Cab Co - Cabarrus County Clt - Charlotte Cor - Cornelius Dav - Davidson Hnt - Huntersville Ind - Indian Trail Ird Co - Iredell County 3 Project Description Key Bicycle Improvements Pedestrian Improvements  
Mar - Marvin Mat - Matthews Sta - Statesville Mck Co - Mecklenburg County Stg - Stallings Tro - Troutman Mnt - Mint Hill Un Co - Union County Mon - Monroe Wax - Waxhaw Mor - Mooresville Pin - Pineville Wed - Weddington Wes - Wesley Chapel

**2 Improvement Type (Imp. Type) Key** Widening Improve Existing Interchange Improve Existing Intersection New Roadway New Interchange

**4 Project Cost Estimate** Escalated based on anticipated horizon year **5** No funding is identified because it has been expended and the project is under construction **\*\*** 40 CFR 93.127, Project exempt from regional emissions analyses

Table 7-2 2050 MTP Fiscally Constrained Roadway Projects (continued)

Project Name	Jurisdiction <sup>1</sup>	Imp Type <sup>2</sup>	Project Description <sup>3</sup>	Project Cost Estimate (\$M) <sup>4</sup>	Start of Project	End of Project	Project Length (miles)	Functional Class	Regional Significance	Exempt Status	2050 MTP ID	TIP No	Horizon Year	
MECKLENBURG COUNTY (continued)														
Steele Creek Rd (NC 160)	Clt		Widen from 2 lanes to 4 lanes, with bike lanes and sidewalks		\$161.81	I-485	South Carolina State Line	6.9	Principal Arterial - Other	No	No	2050-E349	U-5766	2035
Steele Creek Rd (NC 160) at Hamilton Rd	Clt		Construct intersection improvements, with bicycle and pedestrian accommodations		\$1.31	--	--	--	Principal Arterial - Other	No	Yes**	2050-E351	U-5762	2025
Tuckaseegee Rd at Thrift Rd and Berryhill Rd	Clt		Convert intersection to roundabout, with bicycle and pedestrian accommodations		\$2.85	--	--	--	Major Collector	No	Yes*	2050-E336	C-5538	2025
University City Blvd (NC 49) and Back Creek Church Rd	Clt		Widen from 4 lanes to 6 lanes, with bike lanes and sidewalks		\$90.88	John Kirk Dr	I-485	2.1	Principal Arterial - Other	Yes	No	2050-E331	U-5768	2035
Westinghouse Blvd	Clt		Widen from 4 lanes to 6 lanes, with median, shared-use path		\$36.65	S Tryon St (NC 49)	Nations Ford Rd	2.1	Minor Arterial	Yes	No	2050-3114	--	2035
Wilkinson Blvd (US 74 / US 29)	Clt		Widen from 4 lanes to 6 lanes, with median, shared-use path		\$49.23	Little Rock Rd	I-485	1.5	Principal Arterial - Other	Yes	No	2050-3076	--	2050
WT Harris Blvd (NC 24)	Clt		Widen from 4 lanes to 6 lanes, with median and shared-use path		\$61.54	I-77	Sugar Creek Rd	3.1	Principal Arterial - Other	Yes	No	2050-3053	--	2045
WT Harris Blvd (NC 24)	Clt		Widen from 4 lanes to 6 lanes, with median and shared-use path		\$43.76	Sugar Creek Rd	Research Dr / IBM Dr	2.7	Principal Arterial - Other	Yes	No	2050-3060	--	2045
WT Harris Blvd (NC 24)	Clt		Widen from 5 lanes to 6 lanes, with median and shared-use path		\$16.78	N Tryon St (US 29)	University City Blvd (NC 49)	0.8	Principal Arterial - Other	No	No	2050-3063	--	2035
WT Harris Blvd (NC 24)	Clt		Widen from 4 lanes to 6 lanes, with median and shared-use path		\$46.01	University City Blvd (NC 49)	The Plaza	3.3	Principal Arterial - Other	No	No	2050-3069	--	2035
I-485 at Weddington Rd	Clt & Mat		Construct new interchange, with bicycle and pedestrian accommodations		\$9.00	--	--	--	Interstate	No	No	2050-E354	R-0211EC	2025

**1 Jurisdiction Key** Cab Co - Cabarrus County  
Mar - Marvin Sta - Statesville Clt - Charlotte Mat - Matthews Cor - Cornelius Mck Co - Mecklenburg County Dav - Davidson Mnt - Mint Hill Hnt - Huntersville Ind - Indian Trail Mor - Mooresville Ird Co - Iredell County Pin - Pineville Wed - Weddington Wax - Waxhaw Wes - Wesley Chapel

**3 Project Description Key** Bicycle Improvements Pedestrian Improvements

**2 Improvement Type (Imp. Type) Key** Widening Improve Existing Interchange Improve Existing Intersection New Roadway New Interchange

**4 Project Cost Estimate** Escalated based on anticipated horizon year

**5** No funding is identified because it has been expended and the project is under construction

\* 40 CFR 93.126, Exempt projects  
\*\* 40 CFR 93.127, Project exempt from regional emissions analyses

Table 7-2 2050 MTP Fiscally Constrained Roadway Projects (continued)

Project Name	Jurisdiction <sup>1</sup>	Imp Type <sup>2</sup>	Project Description <sup>3</sup>	Project Cost Estimate (\$M) <sup>4</sup>	Start of Project	End of Project	Project Length (miles)	Functional Class	Regional Significance	Exempt Status	2050 MTP ID	TIP No	Horizon Year
MECKLENBURG COUNTY (continued)													
Pineville-Matthews Rd (NC 51)	Clt & Pin		Construct access management solutions	\$5.64	Park Rd	Carmel Rd	1.5	Principal Arterial - Other	Yes	Yes*	2050-E352	U-6086	2025
I-485	Clt, Mat & Pin		Widen from 4/6 lanes to 6/8 lanes including express lanes	\$306.76	I-77 (Exit 67)	Independence Blvd (US 74) (Exit 51)	10.7	Interstate	Yes	No	2050-E357	I-5507	2025
I-77 at Westmoreland Rd	Cor		Interchange improvements to convert 2 lane Westmoreland Road flyover into 4 lane single point interchange, with bike lanes and shared-use path	\$49.73	--	--	--	Interstate	Yes	No	2050-3012	--	2035
N Main St (NC 115) at Potts St	Cor		Construct intersection improvements, with bicycle and pedestrian accommodations	\$5.22	--	--	--	Minor Arterial	No	Yes*	2050-E301	U-5873	2025
Northcross Dr Ext	Cor		Improve existing roadway and construct new 3 lane roadway, with bike lanes and sidewalks	\$12.21	Sam Furr Rd (NC 73)	Westmoreland Rd	1.5	Local	No	No	2050-E309	U-5108	2025
Statesville Rd (US 21) at Catawba Ave	Cor		Convert intersection to roundabout, with bicycle and pedestrian accommodations	\$12.44	--	--	--	Principal Arterial - Other	No	Yes*	2050-E302	C-5621	2025
Torrence Chapel Rd at W Catawba Ave	Cor		Construct intersection improvements, with bicycle and pedestrian accommodations	\$13.84	--	--	--	Principal Arterial - Other	Yes	Yes**	2050-E303	U-5906	2025
W Catawba Ave	Cor		Widen from 2 lanes to 4 lanes, with 10 ft. shared-use path	\$22.37	Jetton Rd	Sam Furr Rd (NC 73)	2.4	Minor Arterial	No	No	2050-E306	R-2555B	2035
Statesville Rd (US 21)	Cor & Hnt		Widen from 2 lanes to 4 lanes, with median, wide outside lanes and sidewalks	\$23.20	Northcross Center Ct	Westmoreland Rd	1.2	Minor Arterial	Yes	No	2050-E307	U-5767	2035
Bailey Rd Ext	Cor & Mck Co		Construct roadway on new location	\$3.28	Poole Place Dr	US 21 (Statesville Rd)	0.4	Unclassified	No	No	2050-E308	U-6105	2025

**1 Jurisdiction Key** Cab Co - Cabarrus County  
Mar - Marvin Sta - Statesville Clt - Charlotte Mat - Matthews Cor - Cornelius Mck Co - Mecklenburg County Dav - Davidson Mnt - Mint Hill Hnt - Huntersville Ind - Indian Trail Mor - Mooresville Ird Co - Iredell County Pin - Pineville Wed - Weddington Wax - Waxhaw Wes - Wesley Chapel

**3 Project Description Key** Bicycle Improvements Pedestrian Improvements

**2 Improvement Type (Imp. Type) Key** Widening Improve Existing Interchange Improve Existing Intersection New Roadway New Interchange

**4 Project Cost Estimate** Escalated based on anticipated horizon year

**5** No funding is identified because it has been expended and the project is under construction

\* 40 CFR 93.126, Exempt projects  
\*\* 40 CFR 93.127, Project exempt from regional emissions analyses

Table 7-2 2050 MTP Fiscally Constrained Roadway Projects (continued)

Project Name	Jurisdiction <sup>1</sup>	Imp Type <sup>2</sup>	Project Description <sup>3</sup>	Project Cost Estimate (\$M) <sup>4</sup>	Start of Project	End of Project	Project Length (miles)	Functional Class	Regional Significance	Exempt Status	2050 MTP ID	TIP No	Horizon Year	
MECKLENBURG COUNTY (continued)														
Davidson-Concord Rd at Robert Walker Dr	Dav	<span style="color: #4F81BD;">IS</span>	Convert intersection to roundabout	\$1.21	--	--	--	Major Collector	No	Yes**	2050-E305	U-6092	2025	
Potts-Sloan-Beatty Connector	Dav	<span style="color: #C85A3D;">NR</span>	New 2 lane roadway, with bike lanes and sidewalks	<span style="color: #4F81BD;">B&amp;P</span>	\$4.50	Main St (NC 115)	Griffith St	0.8	Minor Collector	No	No	2050-E300	U-5907	2025
Davidson-Concord Rd (NC 73)	Dav & Hnt	<span style="color: #4F81BD;">W</span>	Widen from 2 lanes to 4 lanes, with median, wide outside lanes and sidewalks	<span style="color: #4F81BD;">B&amp;P</span>	\$251.20	Davidson-Concord Rd	Poplar Tent Rd	2.4	Principal Arterial - Other	Yes	No	2050-E311	R-5706A	2045
Gilead Rd	Hnt	<span style="color: #4F81BD;">W</span>	Widen from 3 lanes to 4 lanes, with bike lanes and sidewalks	<span style="color: #4F81BD;">B&amp;P</span>	\$12.80	Statesville Rd (US 21)	Old Statesville Rd (NC 115)	0.7	Major Collector	No	No	2050-E317	U-5807	2035
Gilead Rd	Hnt	<span style="color: #4F81BD;">W</span>	Widen roadway from 2 to 4 lanes, with a median		\$8.77	McCoy Rd	Wynfield Creek Pkwy	0.5	Minor Arterial	No	No	2050-E320	U-6106	2025
I-77 at Gilead Rd	Hnt	<span style="color: #4F81BD;">IC</span>	Convert existing interchange to diverging diamond interchange, with bicycle and pedestrian accommodations	<span style="color: #4F81BD;">B&amp;P</span>	\$0.00 <sup>5</sup>	--	--	--	Interstate	No	Yes**	2050-E319	I-5714	2025
I-77 at Sam Furr Rd (NC 73)	Hnt	<span style="color: #4F81BD;">IC</span>	Convert existing interchange to split diamond interchange, with bicycle and pedestrian accommodations	<span style="color: #4F81BD;">B&amp;P</span>	\$43.45	--	--	--	Interstate	Yes	Yes**	2050-E313	I-5715	2035
Main St	Hnt	<span style="color: #4F81BD;">W</span>	Widen and realign roadway, with bike lanes and sidewalks	<span style="color: #4F81BD;">B&amp;P</span>	\$9.63	Old Statesville Rd (NC 115) at Mt Holly-Huntersville Rd	Ramah Church Rd	1.2	Minor Collector	No	No	2050-E316	U-5908	2025
NC 73	Hnt	<span style="color: #4F81BD;">W</span>	Widen from 2 lanes to 4 lanes, with median, wide outside lanes and sidewalks	<span style="color: #4F81BD;">B&amp;P</span>	\$197.28	Vance Rd Ext	W Catawba Ave	7.8	Principal Arterial - Other	No	No	2050-E314	R-5721	2035
Old Statesville Rd (NC 115)	Hnt	<span style="color: #4F81BD;">W</span>	Widen from 2 lanes to 4 lanes, with median, bike lanes and sidewalks	<span style="color: #4F81BD;">B&amp;P</span>	\$70.23	Main St	Sam Furr Rd (NC 73)	1.5	Minor Arterial	No	No	2050-3023	--	2050
Sam Furr Rd (NC 73)	Hnt	<span style="color: #4F81BD;">W</span>	Widen to multi-lanes		\$40.34	Old Statesville Rd (NC 115)	Davidson-Concord Rd	2.7	Principal Arterial - Other	Yes	No	2050-E310	R-2632AB	2035

**1 Jurisdiction Key**

Cab Co - Cabarrus County  
Mar - Marvin  
Sta - Statesville

Clt - Charlotte  
Mat - Matthews  
Stg - Stallings

Cor - Cornelius  
Mck Co - Mecklenburg County  
Tro - Troutman

Dav - Davidson  
Mnt - Mint Hill  
Un Co - Union County

Hnt - Huntersville  
Mon - Monroe  
Wax - Waxhaw

Ind - Indian Trail  
Mor - Mooresville  
Wed - Weddington

Ird Co - Iredell County  
Pin - Pineville  
Wes - Wesley Chapel

**3 Project Description Key**

B&P Bicycle Improvements  
B&P Pedestrian Improvements

**2 Improvement Type (Imp. Type) Key**

W Widening  
IC Improve Existing Interchange  
IS Improve Existing Intersection  
NR New Roadway  
NIC New Interchange

**4 Project Cost Estimate**

Escalated based on anticipated horizon year

\* 40 CFR 93.127, Project exempt from regional emissions analyses

Table 7-2 2050 MTP Fiscally Constrained Roadway Projects (continued)

Project Name	Jurisdiction <sup>1</sup>	Imp Type <sup>2</sup>	Project Description <sup>3</sup>	Project Cost Estimate (\$M) <sup>4</sup>	Start of Project	End of Project	Project Length (miles)	Functional Class	Regional Significance	Exempt Status	2050 MTP ID	TIP No	Horizon Year	
MECKLENBURG COUNTY (continued)														
Sam Furr Rd (NC 73)	Hnt	<span style="color: #4F81BD;">W</span>	Widen from 3/4 lanes to 6 lanes, with median, wide outside lanes and sidewalks	<span style="color: #4F81BD;">B&amp;P</span>	\$56.38	W Catawba Ave	Northcross Dr	1.1	Principal Arterial - Other	No	No	2050-E312	U-5765	2035
Statesville Rd (US 21)	Hnt	<span style="color: #4F81BD;">W</span>	Widen from 2 lanes to 4 lanes, with median, shared-use path	<span style="color: #4F81BD;">B&amp;P</span>	\$74.57	Hambright Rd	Gilead Rd	2.4	Minor Arterial	Yes	No	2050-3037	--	2045
Statesville Rd (US 21)	Hnt	<span style="color: #4F81BD;">W</span>	Widen from 2 lanes to 4 lanes, with median, wide outside lanes and sidewalks	<span style="color: #4F81BD;">B&amp;P</span>	\$19.50	Gilead Rd	Holly Point Dr	2.2	Minor Arterial	No	No	2050-E315	U-5771	2035
Statesville Rd (US 21) at Gilead Rd	Hnt	<span style="color: #4F81BD;">IS</span>	Construct intersection improvements, with bicycle and pedestrian accommodations	<span style="color: #4F81BD;">B&amp;P</span>	\$0.00 <sup>5</sup>	--	--	--	Minor Arterial	No	Yes**	2050-E318	U-5114	2025
Independence Pointe Pkwy	Mat	<span style="color: #C85A3D;">NR</span>	New 2 lane roadway, with bike lanes and sidewalks	<span style="color: #4F81BD;">B&amp;P</span>	Included with U-2509	Sam Newell Rd	Matthews Township Pkwy (NC 51)	0.9	Minor Collector	No	No	2050-E347	--	2045
Independence Pointe Pkwy	Mat	<span style="color: #C85A3D;">NR</span>	New 2 lane roadway, with median, bike lanes and sidewalks	<span style="color: #4F81BD;">B&amp;P</span>	Included with U-2509	Matthews Township Pkwy (NC 51)	Campus Ridge Rd	1.9	Minor Collector	Yes	No	2050-E348	--	2045
Matthews Township Pkwy (NC 51)	Mat	<span style="color: #4F81BD;">W</span>	Widen from 4 lanes to 6 lanes, with median and shared-use path	<span style="color: #4F81BD;">B&amp;P</span>	\$47.90	Sardis Rd	Monroe Rd / W John St	0.7	Minor Arterial	No	No	2050-E350	U-5763	2035
McKee Rd Ext	Mat	<span style="color: #C85A3D;">NR</span>	New 2 lane roadway		\$9.44	Pleasant Plains Rd	E John St	0.8	Local	No	No	2050-E353	U-4713A	2035
Northeast Pkwy	Mat	<span style="color: #C85A3D;">NR</span>	New 2 lane roadway, with bike lanes and sidewalks	<span style="color: #4F81BD;">B&amp;P</span>	Included with U-2509	Overcash Dr	Matthews-Mint Hill Rd	0.4	Minor Collector	No	No	2050-E346	--	2045
Poplar Tent Rd	Mck Co & Cab Co	<span style="color: #4F81BD;">W</span>	Widen from 2 lanes to 4 lanes, with median, bike lanes and sidewalks	<span style="color: #4F81BD;">B&amp;P</span>	\$17.88	Davidson-Concord Rd / Davidson Hwy (NC 73)	Huntersville-Concord Rd	1.4	Minor Arterial	No	No	2050-3022	U-6029	2045
Ardrey Kell Rd	Mck Co & Clt	<span style="color: #4F81BD;">W</span>	Widen from 2 lanes to 4 lanes, with median and shared-use path	<span style="color: #4F81BD;">B&amp;P</span>	\$83.81	Lancaster Hwy (US 521)	Rea Rd	2.7	Major Collector	Yes	No	2050-3133	U-6167	2045

**1 Jurisdiction Key**

Cab Co - Cabarrus County  
Mar - Marvin  
Sta - Statesville

Clt - Charlotte  
Mat - Matthews  
Stg - Stallings

Cor - Cornelius  
Mck Co - Mecklenburg County  
Tro - Troutman

Dav - Davidson  
Mnt - Mint Hill  
Un Co - Union County

Hnt - Huntersville  
Mon - Monroe  
Wax - Waxhaw

Ind - Indian Trail  
Mor - Mooresville  
Wed - Weddington

Ird Co - Iredell County  
Pin - Pineville  
Wes - Wesley Chapel

**3 Project Description Key**

B&P Bicycle Improvements  
B&P Pedestrian Improvements

**2 Improvement Type (Imp. Type) Key**

W Widening  
IC Improve Existing Interchange  
IS Improve Existing Intersection  
NR New Roadway  
NIC New Interchange

**4 Project Cost Estimate**

Escalated based on anticipated horizon year

\* 40 CFR 93.127, Project exempt from regional emissions analyses

\*\* 40 CFR 93.127, Project exempt from regional emissions analyses

\*\* 40 CFR 93.127, Project exempt from regional emissions analyses

Table 7-2 2050 MTP Fiscally Constrained Roadway Projects (continued)

Project Name	Jurisdiction <sup>1</sup>	Imp Type <sup>2</sup>	Project Description <sup>3</sup>	Project Cost Estimate (\$M) <sup>4</sup>	Start of Project	End of Project	Project Length (miles)	Functional Class	Regional Significance	Exempt Status	2050 MTP ID	TIP No	Horizon Year	
MECKLENBURG COUNTY (continued)														
Brookshire Blvd (NC 16)	Mck Co & Clt		Widen from 4 lanes to 6 lanes, with median and shared-use path		\$152.71	Gaston County Line	Bellhaven Blvd	4.8	Principal Arterial - Other	Yes	No	2050-3059	--	2045
Eastern Circumferential Rd	Mck Co & Clt		Widen from 2 lanes to 4 lanes, with shared-use path		\$76.86	Rosemallow Rd	Rocky River Rd	1.8	Minor Arterial	Yes	No	2050-3064	--	2045
Eastern Circumferential Rd	Mck Co & Clt		New 4 lane roadway, with shared-use path		\$50.80	Rocky River Rd	Plaza Rd Ext	1.3	Minor Arterial	Yes	No	2050-3071	--	2050
I-485 at Rocky River Rd	Mck Co & Clt		Convert to diverging diamond interchange	--	--	--	--	Interstate	Yes	No	2050-3066	--	2045	
I-85 at I-485	Mck Co & Clt		Interchange improvements	--	--	--	--	Interstate	Yes	No	2050-3052	--	2045	
Mt Holly Rd (NC 27)	Mck Co & Clt		Widen from 2 lanes to 4 lanes, with median, shared-use path		\$50.28	Rhyne Rd	Belmeade Dr	1.6	Principal Arterial - Other	No	No	2050-3062	--	2045
Steele Creek Rd (NC 160)	Mck Co & Clt		Widen from 2 lanes to 4 lanes, with median, shared-use path		\$35.82	I-485	Western Pkwy	1.3	Principal Arterial - Other	Yes	No	2050-3095	--	2045
Western Pkwy	Mck Co & Clt		New 4 lane roadway, with median and shared-use path		\$148.97	Billy Graham Pkwy	Steele Creek Rd (NC 160)	3	Principal Arterial - Other	No	No	2050-3091	--	2050
Old Statesville Rd (NC 115)	Mck Co & Hnt		Widen from 2 lanes to 4 lanes, with median, bike lanes and sidewalks		\$69.17	Hambright Rd	Mt Holly-Huntersville Rd	2	Minor Arterial	No	No	2050-3040	--	2050
Statesville Rd (US 21)	Mck Co, Clt & Hnt		Widen from 2 lanes to 4 lanes, with median, shared-use path		\$77.48	WT Harris Blvd (NC 24)	Hambright Rd	2.1	Minor Arterial	No	No	2050-3049	--	2050
Albemarle Rd (NC 24 / NC 27)	Mck Co, Clt & Mnt		Widen from 4 lanes to 6 lanes, with median and shared-use path		\$75.79	Circumferential Rd	I-485	2.7	Principal Arterial - Other	Yes	No	2050-3085	--	2050
Fairview Rd (NC 218)	Mck Co, Un Co & Mnt		Widen from 2 lanes to 4 lanes, with median, bike lanes and sidewalks		\$60.45	Brief Rd	Rock Hill Church Rd	1.8	Minor Arterial	No	No	2050-3097	--	2050
Matthews-Mint Hill Rd (NC 51)	Mnt		Widen from 2 lanes to 4 lanes, with median and shared-use path		\$43.25	Matthews Township Pkwy (NC 51)	Lawyers Rd	4	Principal Arterial - Other	Yes	No	2050-E341	U-5007	2035

**1 Jurisdiction Key** Cab Co - Cabarrus County  
Mar - Marvin Sta - Statesville Clt - Charlotte Mat - Matthews Cor - Cornelius Mck Co - Mecklenburg County Dav - Davidson Mnt - Mint Hill Hnt - Huntersville Mon - Monroe Ind - Indian Trail Mor - Mooresville Ird Co - Iredell County Pin - Pineville Wed - Weddington Wax - Waxhaw Wes - Wesley Chapel

**2 Improvement Type (Imp. Type) Key** Widening Improve Existing Interchange Improve Existing Intersection New Roadway New Interchange

**3 Project Description Key** Bicycle Improvements Pedestrian Improvements

**4 Project Cost Estimate** Escalated based on anticipated horizon year

**5** No funding is identified because it has been expended and the project is under construction

Table 7-2 2050 MTP Fiscally Constrained Roadway Projects (continued)

Project Name	Jurisdiction <sup>1</sup>	Imp Type <sup>2</sup>	Project Description <sup>3</sup>	Project Cost Estimate (\$M) <sup>4</sup>	Start of Project	End of Project	Project Length (miles)	Functional Class	Regional Significance	Exempt Status	2050 MTP ID	TIP No	Horizon Year
MECKLENBURG COUNTY (continued)													
I-77	Mor, Cor, & Hnt		Construct peak period shoulder lanes	\$47.00	I-485	NC 150	16.4	Interstate	No	No	2050-E304	I-6065	2025
I-485 at Pineville-Matthews Rd (NC 51)	Pin		Interchange improvements, with bike lanes and sidewalks	\$21.64	--	--	--	Interstate	Yes	No	2050-3123	I-6015	2035
Main St (NC 51)	Pin		Realign existing roadway and construct access management measures	\$1.18	Johnson Dr	Church St	0.1	Minor Arterial	No	No	2050-E355	EB-5949	2025
Park Rd	Pin		Widen from 2 lanes to 4 lanes, with median, shared-use path	\$41.97	Johnston Rd	Pineville-Matthews Rd (NC 51)	0.9	Major Collector	No	No	2050-3121	U-6165	2045
Pineville-Matthews Rd (NC 51)	Pin		Widen from 6 lanes to 7 lanes, with bike lanes, sidewalks, and/or shared-use path	\$3.74	I-485	Park Rd	0.2	Principal Arterial - Other	Yes	No	2050-3122	--	2035

**1 Jurisdiction Key** Cab Co - Cabarrus County  
Mar - Marvin Sta - Statesville Clt - Charlotte Mat - Matthews Cor - Cornelius Mck Co - Mecklenburg County Dav - Davidson Mnt - Mint Hill Hnt - Huntersville Mon - Monroe Ind - Indian Trail Mor - Mooresville Ird Co - Iredell County Pin - Pineville Wed - Weddington Wax - Waxhaw Wes - Wesley Chapel

**2 Improvement Type (Imp. Type) Key** Widening Improve Existing Interchange Improve Existing Intersection New Roadway New Interchange

**3 Project Description Key** Bicycle Improvements Pedestrian Improvements

**4 Project Cost Estimate** Escalated based on anticipated horizon year

**5** No funding is identified because it has been expended and the project is under construction

Table 7-2 2050 MTP Fiscally Constrained Roadway Projects (continued)

Project Name	Jurisdiction <sup>1</sup>	Imp Type <sup>2</sup>	Project Description <sup>3</sup>	Project Cost Estimate (\$M) <sup>4</sup>	Start of Project	End of Project	Project Length (miles)	Functional Class	Regional Significance	Exempt Status	2050 MTP ID	TIP No	Horizon Year
UNION COUNTY													
Chestnut Ln Connector	Ind		New 2 lane roadway, with bike lanes and sidewalks	\$15.12	Matthews-Indian Trail Rd	Gribble Rd	0.4	Minor Collector	No	No	2050-E202	U-5808	2025
Indian Trail Rd N at Matthews-Indian Trail Rd	Ind		Construct intersection improvements, with bicycle and pedestrian accommodations	\$2.73	--	--	--	Major Collector	No	Yes**	2050-E203	U-6250	2025
Unionville-Indian Trail Rd at Sardis Church Rd	Ind		Construct intersection improvements	\$2.87	--	--	--	Major Collector	No	Yes**	2050-E205	U-5987	2025
New Town Rd at Marvin Rd	Mar		Convert intersection to roundabout	\$1.65	--	--	--	Major Collector	No	Yes**	2050-E217	U-6088	2025
Providence Rd S (NC 16)	Mar, Wax & Wed		Widen from 2 lanes to 4 lanes, with median, wide outside lanes and sidewalks	\$81.60	Rea Rd Ext	Waxhaw Pkwy	5.8	Minor Arterial	No	No	2050-E219	U-5769	2035
E John St / Old Monroe Rd	Mat & Stg		Widen from 2/3 lanes to 4 lanes, with median, bike lanes and sidewalks	\$89.68	S Trade St	Wesley Chapel-Stouts Rd	6.5	Major Collector	No	No	2050-E204	U-4714	2035
Idlewild Rd	Mat & Stg		Widen from 2/3 lanes to 4 lanes, with median, bike lanes and sidewalks	\$8.01	Stallings Rd	Stevens Mill Rd	1	Major Collector	No	No	2050-E200	U-4913	2035
Lawyers Rd	Mck Co, Un Co & Stg		Widen from 2 lanes to 4 lanes, with median, bike lanes and sidewalks	\$10.27	I-485	Stevens Mill Rd	0.4	Major Collector	No	No	2050-2001	U-6170	2045
Charlotte Ave	Mon		Widen from 2 lanes to 4 lanes, with median, bike lanes and sidewalks	\$26.80	Seymour St	Dickerson Blvd / N MLK Jr Blvd (NC 200)	0.4	Minor Arterial	No	No	2050-E215	U-6031	2035
Roosevelt Blvd (US 74)	Mon		Widen from 4 lanes to 6 lanes, with median, bike lanes and sidewalks	\$78.70	Dickerson Blvd (NC 200)	Rocky River Rd	3.2	Principal Arterial - Other	No	No	2050-E210	U-5764	2035
Roosevelt Blvd (US 74) at Rocky River Rd	Mon		Implement Super Street	\$1.15	--	--	--	Principal Arterial - Other	No	Yes**	2050-E208	U-5703	2025
Roosevelt Blvd (US 74) at Secrett Shortcut Rd	Mon		Construct intersection improvements	\$10.50	--	--	--	Principal Arterial - Other	No	Yes**	2050-E213	U-5931	2035

**1 Jurisdiction Key** Cab Co - Cabarrus County  
Mar - Marvin  
Sta - Statesville      Clt - Charlotte  
Mat - Matthews  
Stg - Stallings      Cor - Cornelius  
Mck Co - Mecklenburg County  
Tro - Troutman      Dav - Davidson  
Mnt - Mint Hill  
Un Co - Union County      Hnt - Huntersville  
Mon - Monroe  
Wax - Waxhaw      Ind - Indian Trail  
Mor - Mooresville  
Wed - Weddington      Ird Co - Iredell County  
Pin - Pineville  
Wes - Wesley Chapel

**2 Improvement Type (Imp. Type) Key** Widening      Improve Existing Interchange      Improve Existing Intersection      New Roadway      New Interchange

**3 Project Description Key** Bicycle Improvements      Pedestrian Improvements

**4 Project Cost Estimate** Escalated based on anticipated horizon year

**5** No funding is identified because it has been expended and the project is under construction

\*\* 40 CFR 93.127, Project exempt from regional emissions analyses

Table 7-2 2050 MTP Fiscally Constrained Roadway Projects (continued)

Project Name	Jurisdiction <sup>1</sup>	Imp Type <sup>2</sup>	Project Description <sup>3</sup>	Project Cost Estimate (\$M) <sup>4</sup>	Start of Project	End of Project	Project Length (miles)	Functional Class	Regional Significance	Exempt Status	2050 MTP ID	TIP No	Horizon Year
UNION COUNTY (continued)													
Roosevelt Blvd (US 74) at US 601	Mon		Construct intersection improvements	\$8.00	--	--	--	Principal Arterial - Other	N	Yes**	2050-E216	U-5723	2035
Weddington Rd (NC 84) at Rocky River Rd	Mon & Un Co		Construct intersection improvements	\$1.68	--	--	--	Minor Arterial	N	Yes**	2050-E218	U-6246	2025
Pleasant Plains Rd at Potter Rd	Stg		Construct intersection improvements	\$2.10	--	--	--	Major Collector	N	N	2050-E201	U-5112	2025
Weddington-Matthews Rd at Chestnut Ln	Stg & Un Co		Convert intersection to roundabout	\$2.37	--	--	--	Local	N	Yes**	2050-E206	U-6091	2025
Skyway Dr (US 601)	Un Co & Mon		Widen from 2 lanes to 4 lanes, with median, bike lanes and sidewalks	\$28.50	Roosevelt Blvd (US 74)	Monroe Expressway	2.1	Minor Arterial	Yes	N	2050-E209	U-4024	2035
Kensington Dr	Wax		Construct roadway improvements	\$3.17	Providence Rd (NC 16)	Sunset Hills Rd	0.2	Minor Collector	N	Yes**	2050-E220	EB-5950	2025
E South Main St (NC 75) at Old Providence Rd	Wax		Construct intersection improvements	\$2.72	--	--	--	Minor Arterial	N	Yes**	2050-E221	U-6248	2025
Rea Rd / Marvin School Rd / Weddington Rd (NC 84)	Wed		Improve existing roadway and construct new 4 lane roadway, with median, wide outside lanes and sidewalks	\$47.50	Providence Rd S (NC 16)	Waxhaw-Indian Trail Rd	4	Minor Arterial	N	N	2050-E214	U-3467	2035
Weddington-Matthews Rd at Tilley Morris Rd	Wed		Convert intersection to roundabout	\$2.46	--	--	--	Minor Arterial	N	Yes**	2050-E207	U-6090	2025
Potter Rd at Wesley Chapel Rd	Wes		Convert intersection to roundabout	\$1.43	--	--	--	Major Collector	N	Yes**	2050-E211	U-6087	2025
Weddington Rd (NC 84) at Potter Rd	Wes		Construct intersection improvements	\$2.23	--	--	--	Minor Arterial	N	Yes**	2050-E212	U-6247	2025

**1 Jurisdiction Key** Cab Co - Cabarrus County  
Mar - Marvin  
Sta - Statesville      Clt - Charlotte  
Mat - Matthews  
Stg - Stallings      Cor - Cornelius  
Mck Co - Mecklenburg County  
Tro - Troutman      Dav - Davidson  
Mnt - Mint Hill  
Un Co - Union County      Hnt - Huntersville  
Mon - Monroe  
Wax - Waxhaw      Ind - Indian Trail  
Mor - Mooresville  
Wed - Weddington      Ird Co - Iredell County  
Pin - Pineville  
Wes - Wesley Chapel

**2 Improvement Type (Imp. Type) Key** Widening      Improve Existing Interchange      Improve Existing Intersection      New Roadway      New Interchange

**3 Project Description Key** Bicycle Improvements      Pedestrian Improvements

**4 Project Cost Estimate** Escalated based on anticipated horizon year

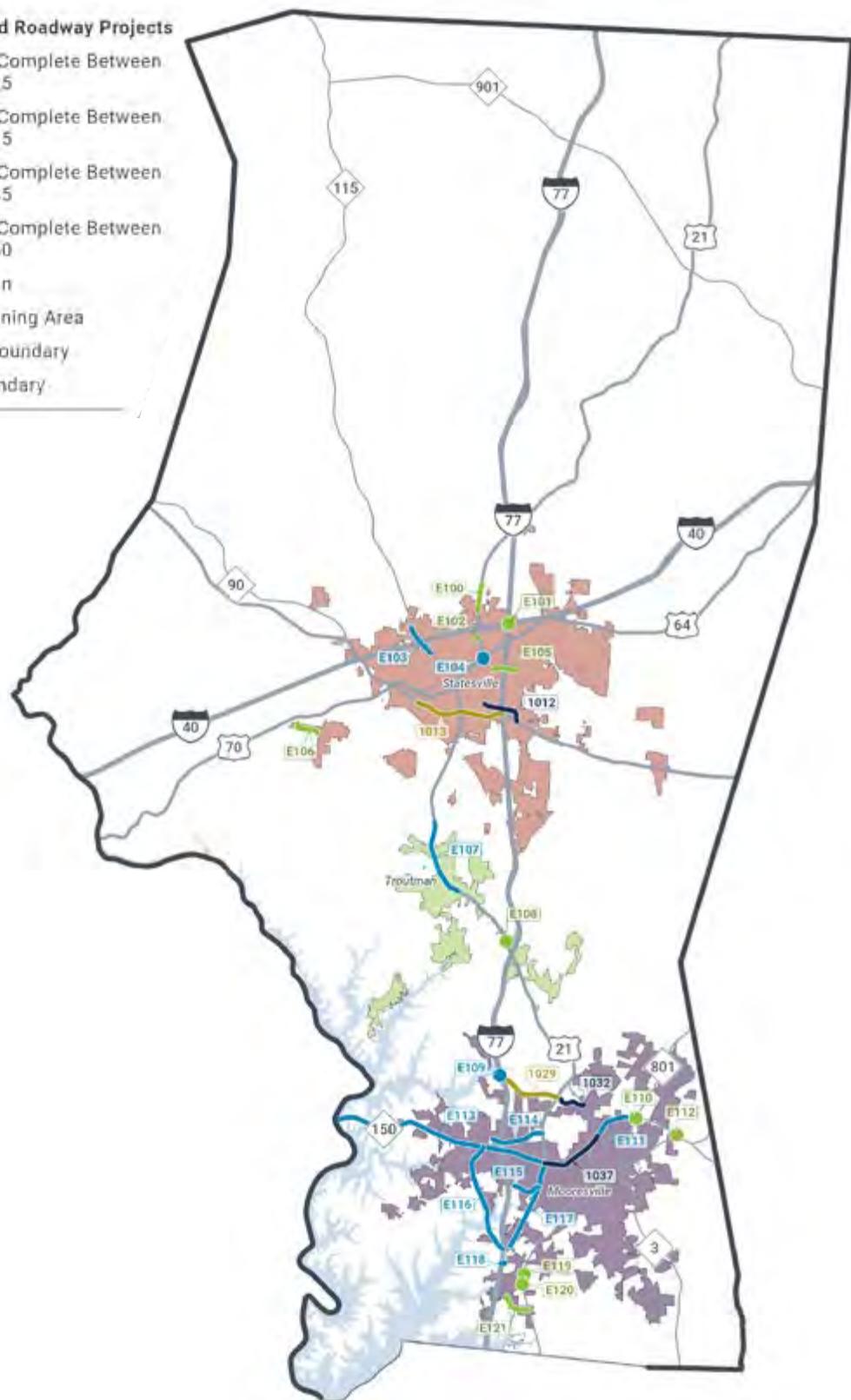
**5** No funding is identified because it has been expended and the project is under construction

\*\* 40 CFR 93.127, Project exempt from regional emissions analyses

Figure 7-2 Iredell County 2050 MTP Fiscally Constrained Roadway Projects

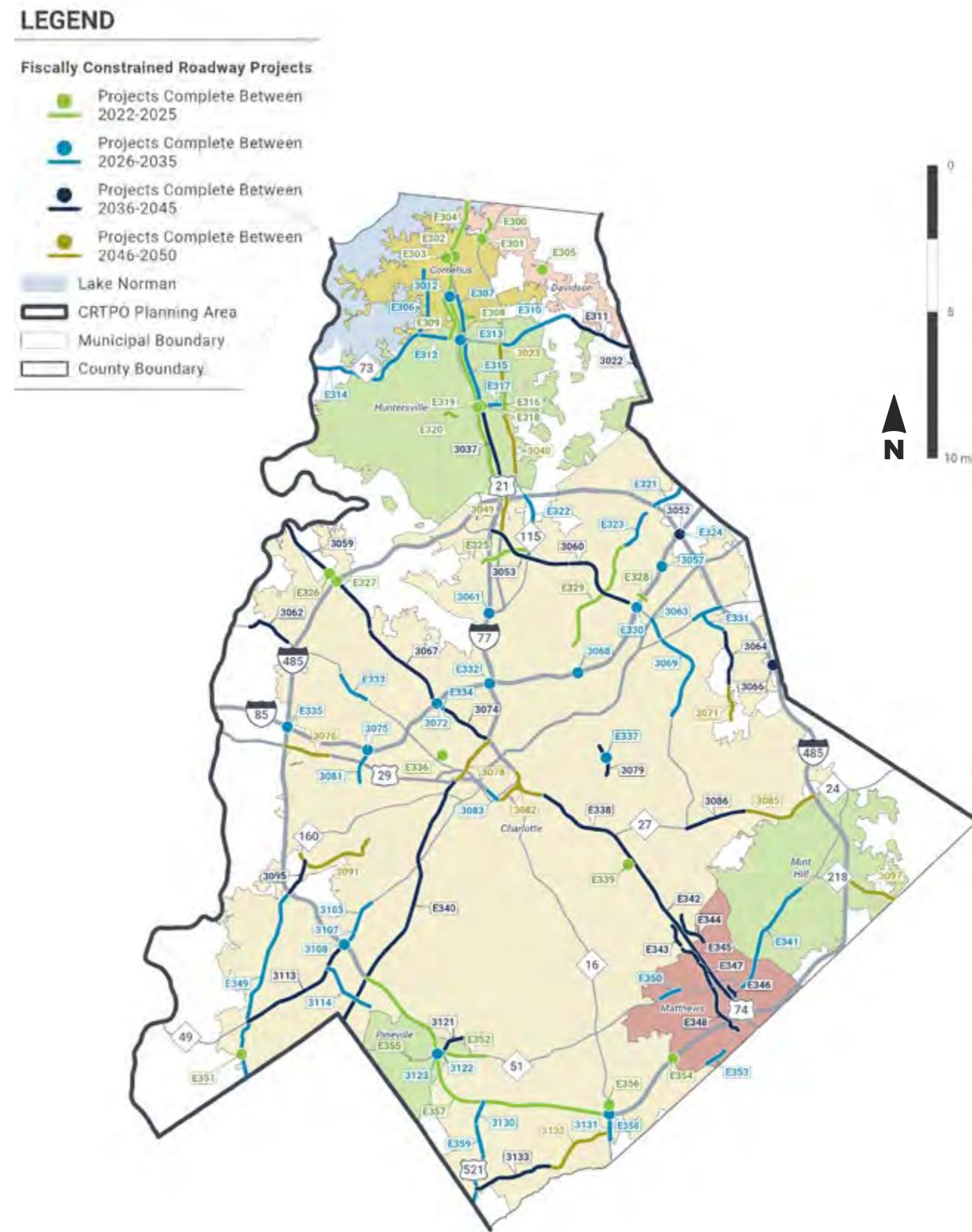
LEGEND

- Fiscally Constrained Roadway Projects
  - Projects Complete Between 2022-2025
  - Projects Complete Between 2026-2035
  - Projects Complete Between 2036-2045
  - Projects Complete Between 2046-2050
- Lake Norman
- CRTPO Planning Area
- Municipal Boundary
- County Boundary

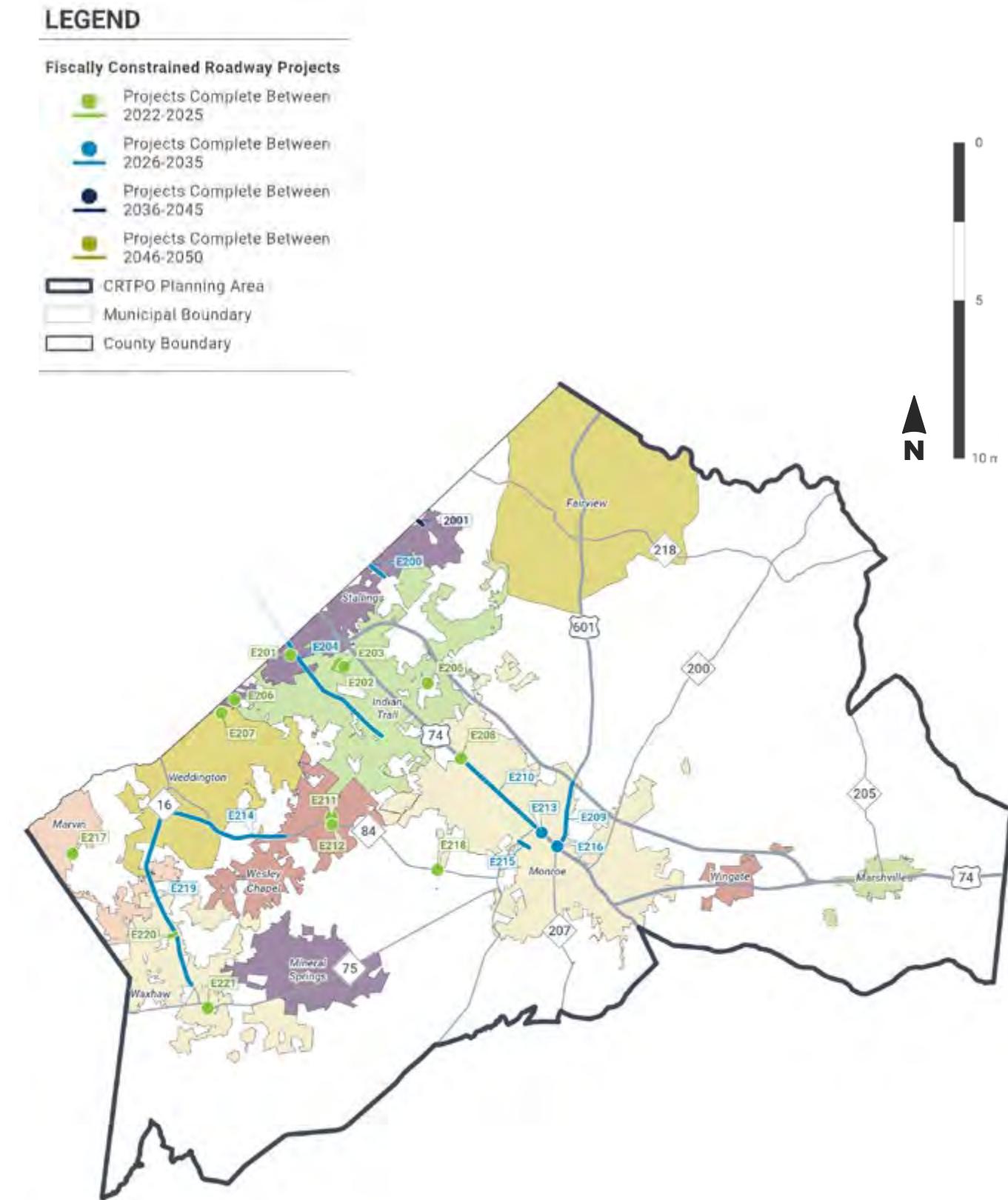


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**Figure 7-3 Mecklenburg County 2050 MTP Fiscally Constrained Roadway Projects**



## **Figure 7-4 Union County 2050 MTP Fiscally Constrained Roadway Projects**





## Active Transportation Projects

Active transportation projects are an important component of the transportation network. These projects provide additional mobility options and contribute to improved quality of life by offering a healthy transportation alternative. A total of 26 standalone active transportation projects are included in the MTP, which consist of sidewalk improvements, on-road bicycle facilities, shared-use paths, and greenways. These projects are limited to the first two MTP horizon years (2025 and 2035) because they are typically identified and funded in the short-term. Long-term bicycle and pedestrian priorities tend to change and evolve over time. Although the CTP identifies long-term active transportation corridors that need improvement or are recommended, the uncertainty of programming these projects far into the future limits their inclusion in the MTP. The CRTPO only includes active transportation improvements in the MTP that have funding committed.

The committed active transportation projects included in the 2050 MTP are shown in **Table 7-3** and **Figure 7-5**. In addition to these standalone projects, bicycle and pedestrian accommodations are a key element of many of the roadway improvements listed in **Table 7-2**, which is encouraged by NCDOT's Complete Streets Policy and is often a priority for member jurisdictions when they submit candidate MTP projects.

## Uptown CycleLink

A key ongoing bicycle infrastructure project is the development of the Uptown CycleLink in Charlotte. The Uptown CycleLink, which improves connectivity throughout the Uptown area, consists of both existing and planned on-street facilities that include protected cycle tracks, dedicated bicycle lanes, and shared-use path connections.



Davidson Street Cycle Track, Part of the Uptown CycleLink

**Table 7-3 2050 MTP Active Transportation Projects**

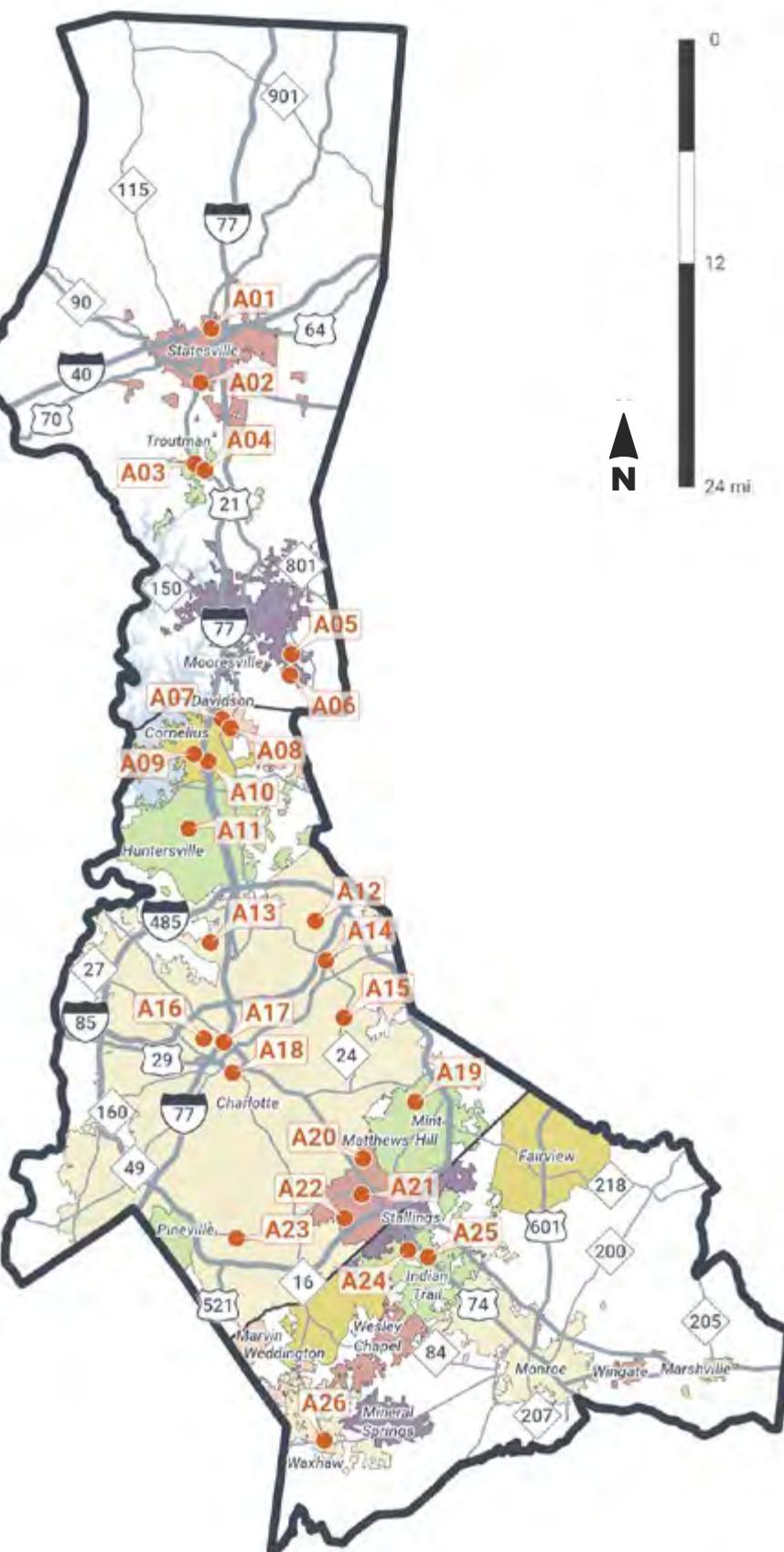
Project Name	Jurisdiction	Project Limits	Project Cost (\$M) (TIP \$s to be Spent)	2050 MTP ID	TIP No	Horizon Year
<b>IREDELL COUNTY</b>						
US 21 Greenway Connector	Statesville	Under US 21 (Turnersburg Hwy)	\$ 1.67	2050-A01	EB-5818	2025
Shelton Avenue Shared-use Path	Statesville	Garner Bagnal Blvd to Amity Hill Rd	\$ 0.25	2050-A02	EB-5788	2025
Downtown Troutman Sidewalk Improvements	Troutman	Rumple St from US 21/NC 115 to Thomas St; Wagner St from US 21/NC 115 to West Av; Talley St from US 21/NC 115 to West Av	\$ 2.13	2050-A03	EB-5930	2025
Richardson Greenway South	Troutman	Troutman Elementary to Jacobs Woods Subdivision	\$ 1.59	2050-A04	EB-5932	2025
Kistler Farm-Briarcliff-Bellingham-White Oak Sidewalk Network	Mooresville	N/A	\$ 0.80	2050-A05	C-5531	2025
Bellingham Park Greenway Extension	Mooresville	Existing Greenway to Johnson Dairy Rd	\$ 4.44	2050-A06	EB-5787	2025
<b>MECKLENBURG COUNTY</b>						
Jetton Street Sidewalk (south side)	Davidson	Griffith St to Potts St	\$ 0.29	2050-A07	EB-5971	2025
Kincaid Shared-use Path	Davidson	Eugenia St and Spring St to South Prong Rocky River Greenway near Davidson Elementary	\$ 0.88	2050-A08	EB-5933	2025
McDowell Creek Greenway	Cornelius	Magnolia Plaza to Westmoreland Rd	\$ 3.88	2050-A09	EB-5817	2025
McDowell Creek Tributary Greenway	Cornelius	Greenway on Smithville Park to JV Washam Elementary; Shared-use Path along Westmoreland Rd to Lake Pines Dr	\$ 3.00	2050-A10	EB-5777	2025
Upper McDowell Creek Greenway	Huntersville	Chilgrove Ln to NC 73	\$ 5.34	2050-A11	EB-5785	2025
Mallard Creek Church Rd Shared-use Trail (south side)	Charlotte	Mallard Creek Rd to Claude Freeman Dr	\$ 1.68	2050-A12	EB-5832	2025
Hornests Nest Park Access Improvements	Charlotte	N/A	\$ 1.88	2050-A13	EB-6036	2025
W.T. Harris Blvd Shared-Use Path	Charlotte	N Tryon St to JW Clay Blvd	\$ 1.66	2050-A14	EB-6052	2025
NC 24 (W.T. Harris Blvd) Sidewalk	Charlotte	Plaza Rd to Grier Rd	\$ 2.05	2050-A15	EB-6050	2025
Stewart Creek Greenway	Charlotte	State St to Rozzelles Ferry Rd	\$ 3.17	2050-A16	EB-5781	2025
Irwin Creek Greenway Eastern Extn	Charlotte	Existing Irwin Creek Greenway to Hamilton St	\$ 4.64	2050-A17	EB-5970	2035
Belk Greenway Connector (Phase 1)	Charlotte	E Stonewall St at S Davidson St to S Kings Dr	\$ 1.84	2050-A18	EB-5929	2025
Lawyers Rd Sidewalks	Mint Hill	Wilgrove-Mint Hill Rd	\$ 3.01	2050-A19	EB-6051	2025
Sam Newell Rd Shared-use Path	Matthews	Northeast Pkwy to Crown Point Elementary	\$ 2.09	2050-A20	EB-5783	2025
NC 51 Shared-use Path (south side)	Matthews	Trade St to Independence Pointe Pkwy	\$ 1.08	2050-A21	EB-5969	2025
Four Mile Creek Greenway Crossing	Matthews	Under S Trade St	\$ 1.92	2050-A22	EB-5829	2025
McAlpine Creek Greenway	Charlotte	Green Rea Rd to Four Mile Creek Greenway	\$ 7.88	2050-A23	EB-5782	2025
North Indian Trail Road Complete Street	Indian Trail	South Fork Rd to Liberty Ln	\$ 7.27	2050-A24	EB-5931	2025
<b>UNION COUNTY</b>						
Shared-use Path/Shared-use Greenway	Indian Trail	Shared-use Path on Indian Trail Fairview Rd to Unionville-Indian Trail Rd; Shared-use Greenway on Unionville-Indian Trail Rd to Oakwood Ln	\$ 4.06	2050-A25	EB-5723	2025
Downtown Waxhaw Pedestrian and Bicycle Facility Enhancements	Waxhaw	N/A	\$ 1.03	2050-A26	EB-5819	2025

Source: 2020-2029 Transportation Improvement Program (as of August 2020)

Figure 7-5 2050 MTP Active Transportation Projects

LEGEND

- Committed Active Transportation Projects
- Lake Norman
- CRTPO Planning Area
- Municipal Boundary
- County Boundary



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## Planning Factors Addressed

- Economic Vitality
- Safety
- Security
- Accessibility
- Environment
- Integration and Connectivity
- Efficient System
- Preservation
- Resiliency and Reliability
- Travel and Tourism

## Transit Projects

The CRTPO works closely with the public transportation providers in the planning area to identify opportunities to expand transit services, infrastructure, and operations. In addition, the CONNECT Beyond regional mobility study discussed in **Chapter 5** identifies transit strategies and recommendations for a 12-county area that includes the three CRTPO member counties. These recommendations are described in **Chapter 9** and found in **Appendix C**.

The 2050 MTP includes projects that are funded through FTA programs such as Section 5307 Urban Allocation and Section 5309 Capital Program, as well as discretionary and grant funds. Transit projects in various stages of planning and implementation are also documented in the MTP. These transit-related projects and activities are highlighted in the following categories:

- Vehicle Replacement and Fleet Expansion
- Operations Enhancements and Maintenance
- Infrastructure and Facilities Improvements
- Transit Corridor System Plan Updates



CATS Bus Passengers

## VEHICLE REPLACEMENT AND FLEET EXPANSION

**Bus Fleet:** Public transportation agencies continue to enhance and optimize fixed route bus transit service throughout the region. These efforts include the replacement of older buses that have reached the end of their useful life, as regulated by federal standards, and expanding service as needed to meet system demand.

**Light Rail Fleet:** The Charlotte Area Transit System (CATS) continues to enhance and optimize fixed rail transit service throughout the region. Current plans call for light rail vehicle overhaul and upgrades.

**Bus Electrification Pilot Program:** This public-private partnership between CATS and eTransEnergy, a subsidiary/affiliate of Duke Energy, will test the performance of battery electric bus (BEB) vehicles across the greater metropolitan Charlotte area. Beginning in early 2022, 18 BEB vehicles will be tested over a 12-to-18-month pilot program that will allow CATS to collect data and assess vehicle performance.



Union County  
Transportation Demand  
Response Vehicle

## Envision my Ride

CATS has undertaken the Envision my Ride initiative to redesign the current bus system. The bus route structure and frequency will be studied to determine the system improvements that will better serve the Charlotte region. Through this initiative, the number of bus routes that operate every 15-minutes or better will increase from five (as of 2018) to nearly 20 in total.



Higher Frequencies



Every Route, Every Day



Easier Transfers

## OPERATIONS ENHANCEMENTS AND MAINTENANCE

**Intelligent Transportation Systems:** CATS proposes the installation of various Intelligent Transportation System components, including automated interactive voice response systems, customer information technology at transit hubs, trip planning software, and other software licenses to improve the operating efficiency of the system.

**Fare System Upgrade & Radio Upgrade:** CATS is pursuing the purchase and installation of a new fare collection system and digital radio system upgrade for bus operations, as well as replacement of ticket vending machines at station locations along the LYNX line.

**State of Good Repair:** To keep both bus and rail operations at maximum operating efficiency, the public transportation agencies will maintain and expand infrastructure as needed using available federal funding sources.

## INFRASTRUCTURE AND FACILITIES IMPROVEMENTS

**General Facility Improvements:** CATS continues to invest in the planning, design, and construction of numerous bus facility improvements.

This work ranges from coordinating new stop and shelter installations through the land development/capital improvement process, to the installation of new signs, shelters and other passenger amenities through CATS' Transit Amenities program and the upgrade/expansion of maintenance facilities.

**Park and Ride Lot Improvements:** CATS monitors the travel demand and market to determine park and ride needs and locations. The goal is to implement park and ride lots at locations that provide a high capture rate for choice riders and minimize travel time and operational costs to the transit system.



Huntersville-Northcross  
Park and Ride

**Neighborhood Transit Centers:** Through this program, CATS monitors and assesses changing market demands and service needs for new Neighborhood Transit Centers. These centers, which serve as transfer points between a limited number of routes, are larger bus stop locations with more rider amenities. A primary example that is being planned is the East-West Station in South End. This ongoing program provides funding to continue the planning, design, and construction of these Neighborhood Transit Centers identified in the County-wide Transit Services Plan. Funding to continue implementation has been programmed.

**Charlotte Gateway Station:** This planned, full multimodal center will be located at Graham, Fourth, and W. Trade streets in Uptown Charlotte and will include a CATS bus transfer facility, along with accommodating Amtrak and intercity bus service. Construction of the station is a collaborative effort between the City of Charlotte and the NCDOT and will include public private partnership contributions to fully develop the site.

**Charlotte Transit Center Redevelopment:** CATS is in the process of redeveloping its Uptown Charlotte transit station, which is proposed to include a multistory office/hotel mixed-use development above the redesigned station. A \$15 million Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grant was awarded for this project in 2021. In addition, the City of Charlotte is exploring a public private partnership to help fund the vertical development associated with this project.



Rail Construction for Future  
Charlotte Gateway Station

## Transit Corridor System Plan Updates

- **Updates to the Corridor System Plan (2019):** The CATS Corridor System Plan, originally adopted in 2006, consists of multiple rapid transit improvements in five corridors, a series of Center City improvements, and bus service and facility improvements throughout the Charlotte region. The plan was updated in 2019 based on studies conducted for several of the identified corridors.

- **Blue Line Capacity Expansion:** The Blue Line Capacity Expansion (BLCE) project will upgrade the traction power for the existing LYNX Blue Line and lengthen platforms to accommodate three-car trains. This project is being funded with a Transportation Investment Generating Economic Recovery (TIGER) grant and is part of an ongoing program to expand the original LYNX Blue Line platforms to three-car capacity to handle the existing and future demand.



- **CityLYNX Gold Line Phase III:** With the completion of Phase II in 2021, design and environmental analyses for Phase III of the Gold Line are the next steps. Phase III completes the fully planned six-mile streetcar service from the western terminus at Rosa Parks Community Transit Center (CTC), through Uptown Charlotte, to the eastern terminus at Eastland CTC.

• **LYNX Silver Line:** The LYNX Silver Line is a 26-mile light rail line, with 27 stations and more than 10 park and ride locations, that will provide service from the Town of Matthews, through Uptown Charlotte, into the City of Belmont in Gaston County. Planning and design (\$50 million programmed to develop 15% design plans), transit-oriented development planning, and a study to define a rail trail are funded activities to be completed in the near-term.

• **MetroRAPID North Corridor Bus Rapid Transit:** The first step of the North Corridor Rapid Transit Strategy is the near-term implementation of more frequent service utilizing the I-77 express lanes. In February 2020, each of the four park and ride lots – Northlake in Charlotte, Huntersville Gateway, Huntersville Northcross, and Cornelius – were provided with direct 10-minute AM/PM peak service. Planning is underway to develop a capital program that will provide an enhanced bus rapid transit system with more park and ride lots, potential express lane direct connectors, and first-/last-mile solutions to the corridor.

• **Pineville-Ballantyne Expansion of Blue Line:** This proposed expansion of service to Pineville and Ballantyne is in the coordination phase to preserve future right-of-way for the new infrastructure required to construct this project. Bus Rapid Transit (BRT) level of service between Ballantyne and the existing Blue Line (by 2025) is an interim recommendation to provide expanded service in this area of southern Mecklenburg County.

## Other

In addition to roadway, active transportation, and transit projects, the CRTPO coordinates and allocates funding to other transportation modes as well. These projects are typically identified by outside agencies, member jurisdictions, or through planning studies, and generally include rail and freight-related improvements. The CRTPO plays an indirect role in identifying and allocating funds to aviation projects, as its focus is the surface transportation network.

### RAIL

There are several freight railways that traverse the CRTPO planning area, and Amtrak also has a station in the City of Charlotte. Coordination between the CRTPO and NCDOT helps identify and evaluate priority rail projects that are ultimately programmed for funding. **Table 7-4** lists rail projects with committed funding.

## Next Steps

Projects programmed in the MTP are one step closer to being implemented. However, because the MTP is a long-range plan, there are other steps necessary before funding is secured to construct a project, especially those programmed in the outer horizon years (2045 and 2050). **Chapter 9** describes implementation activities that help advance the MTP projects.



Freight Trucks  
in Iredell County

**Table 7-4 2050 MTP Rail Projects**

Project Name	Jurisdiction	Project Description	Project Cost (\$M) (TIP \$ to be Spent)	TIP No	Horizon Year
<b>IRDELL COUNTY</b>					
Mazeppa Rd Grade Separation	Mooresville	Grade separation at NC 115 over NS Railroad	\$ 9.00	RL-0001	2035
<b>MECKLENBURG COUNTY</b>					
Charlotte Gateway Station	Charlotte	Wye connection track at Charlotte junction	\$ 11.00	P-5705	2025
NS Main Line	Charlotte	Establish new thoroughbred bulk transfer (TBT) facility in Charlotte	\$ 0.98	P-5702	2025
Clanton Rd Rail Crossing	Charlotte	Extend Clanton Rd to US 29/74 with grade separation of NS Railroad and close the Donald Ross Rd crossing	\$ 21.10	P-5730	2035
Trailer Dr Rail Crossing	Charlotte	Improve at-grade crossing with NS Railroad	\$ 1.30	P-5754	2025
Piedmont and Northern Railroad	Gaston County & Mecklenburg County	Rail corridor between Gastonia and Mount Holly (Belmont Spur)	\$ 0.90	P-5200	2025
CSX SF Line Grade Separation	Indian Trail	Grade separation at Wesley Chapel Stouts Rd	\$ 13.70	P-5744	2035
<b>UNION COUNTY</b>					
CSX SF Line Siding	Monroe	Extension of Richardson Creek siding	\$ 15.70	P-5749	2035
CSX SF Line Siding	Indian Trail	Siding extension at Stouts in Union County	\$ 4.00	P-5704	2025
CSX SG Line Siding and Grade Separation	Waxhaw	Rail siding and grade separation, and close at-grade crossings, near Helms Rd	\$ 24.00	P-5748	2035

Source: 2020-2029 Transportation Improvement Program (as of August 2020)



## Chapter 08

### Evaluating Performance

A required performance-based planning and programming framework has been established at the federal level that applies to all State Departments of Transportation (DOT) and Metropolitan Planning Organizations (MPO). The intent of performance-based planning is to tie performance outcomes to investment decisions. The process is designed to ensure there is collaboration among State DOTs, MPOs, and transit agencies and different requirements are outlined for each respective entity.

The CRTPO has incorporated performance-based planning into its planning processes and activities, in cooperation with the North Carolina Department of Transportation (NCDOT) and transit providers, as described in this chapter

and documented in multiple [performance management reports](#). In addition, the Metropolitan Transportation Plan (MTP) serves as the primary source for highlighting the requirements, updates, integration activities, and outcomes associated with this performance-based planning process.

This chapter outlines the federally required process associated with highway and transit performance goals, rulemakings, measures, and targets, as well as non-federal measures and targets established by the CRTPO. It also highlights several other efforts by the CRTPO to incorporate performance-based planning into the metropolitan transportation planning process.

# Federal Performance-Based Planning Overview and Requirements

Federal transportation legislation Fixing America's Surface Transportation (FAST) Act requires State DOTs, MPOs, and transit operators to conduct performance-based planning by carrying out the following activities:

- Tracking performance measures
- Setting data-driven targets for the measures

- Selecting projects to help meet those targets
- Developing performance plans to monitor, evaluate, and report progress

Performance-based planning supplements other transportation planning activities of the CRTPO and provides the following benefits:

- Increases transparency of transportation investments
- Provides an ongoing, objective system for evaluating investment decisions
- Enhances collaboration and communication, along with aligning resources
- Contributes to more informed decision-making about how to invest limited funding

The federally defined measures and the established targets for each rulemaking are outlined on the pages that follow. **Appendix I** includes resources that contain more detailed explanations and information about the performance rules and specific measures.

## Performance-Based Planning National Goals and Rulemakings

The Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) have established a framework, which includes seven national goals and a set of rulemakings to help agencies implement performance-based planning. Each rulemaking pertains to a particular area of transportation, and defines the goals, measures, and data to be used in setting targets.

### National Goals

Safety

Infrastructure Condition

Congestion Reduction

System Reliability

Freight Movement and Economic Vitality

Environmental Sustainability

Reduce Project Delivery Delays

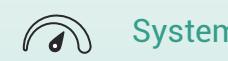
### Rulemakings



Safety



Infrastructure Condition



System Performance



Transit Asset Management



Transit Safety



## Highway Performance Rules

### Safety

The safety rule is intended to reduce fatalities and serious crashes on all public roads. Five safety measures have been defined at the federal level and performance targets are adopted annually, by calendar year, for each measure. The safety targets are based on five-year rolling averages and are documented in the State's annual [Highway Safety Improvement Program \(HSIP\)](#).

MPOs must set highway safety performance targets annually, within 180 days after the state establishes its targets, or no later than February of the following year. The MPO can either endorse the state targets or adopt its own. The NCDOT established the safety targets listed in **Table 8-1**, which were adopted by the CRTPO in February 2022. The CRTPO chose to adopt the state targets for safety, as the NCDOT maintains the majority of data for the defined measures and serves as the lead agency for establishing targets.

**Table 8-1 Safety Measures and Targets**

Performance Measure	NCDOT 2022 Target
Number of fatalities	1,254.9
Fatality rate (per 100 million vehicle miles traveled)	1.057
Number of serious injuries	3,537.6
Serious injury rate (per 100 million vehicle miles traveled)	2.962
Number of non-motorized fatalities and non-motorized serious injuries	486.0

Note: The CRTPO endorsed the NCDOT targets as its own in February 2022.

The FHWA makes an annual assessment to determine if the NCDOT has met or made significant progress towards achieving its targets. Significant progress means four of the five targets are performing better than the established baseline. If the NCDOT does not meet or make significant progress towards achieving its targets, there are funding implications and an HSIP Implementation Plan must be submitted to the FHWA. The federal regulations do not impose repercussions

if the CRTPO does not meet or make significant progress towards achieving its targets.

In early 2021, the FHWA completed an assessment of the NCDOT's progress towards achieving the safety targets it established in 2019, which is included in **Appendix I**.

### Infrastructure Condition

The intent of the infrastructure condition rule is to monitor and manage performance of interstate and non-interstate National Highway System (NHS) pavement and bridges. Six measures have been established to evaluate pavement and bridge condition. For infrastructure condition measures, the state and MPO are required to set 2-year and 4-year targets. The NCDOT set its initial infrastructure condition performance targets in 2018 for a 4-year period (until December 31, 2021). The CRTPO then set its initial infrastructure condition targets within the required 180-day period after the NCDOT's targets were set. The CRTPO endorsed the NCDOT's targets in October 2018. Similar to the safety targets, the state maintains pavement data for the infrastructure condition targets and serves as the lead agency for establishing targets, which is why the CRTPO adopted the NCDOT targets.

**Table 8-2** includes the performance measures and NCDOT targets for infrastructure condition. Monitoring and reporting are required every two years, at which time targets can be evaluated and updated.

**Table 8-2 Infrastructure Condition Measures and Targets**

Performance Measure	2-Year	4-Year
Percent of pavement on the interstate in good condition*	N/A	37.00%
Percent of pavement on the interstate in poor condition*	N/A	2.20%
Percent of pavement on the non-interstate NHS in good condition	27.00%	21.00%
Percent of pavement on the non-interstate NHS in poor condition	4.20%	4.70%
Percent of NHS bridges in good condition	33.00%	30.00%
Percent of NHS bridges in poor condition	8.00%	9.00%

Note: The CRTPO endorsed the NCDOT targets as its own in October 2018.

\* 2-Year targets are not required for interstate condition measures

The NCDOT assesses progress toward meeting the infrastructure condition targets every two years in a performance report, which the FHWA reviews. If targets are not met, or significant progress is not made, the NCDOT is required to

document the actions it will take to achieve their targets in the performance report. The CRTPO does not face repercussions if significant progress is not made toward meeting its targets.



## System Performance

The system performance rule includes six measures to assess the performance of the interstate and non-interstate NHS, freight movement on the interstate system, traffic congestion, and on-road mobile source emissions. As with infrastructure condition, the NCDOT and CRTPO are required to set 2-year and 4-year targets for system performance measures. The NCDOT set its initial system performance targets in 2018 for a 4-year period (until December 31, 2021). The CRTPO endorsed the NCDOT's targets in October 2018. A new performance period begins every four years.

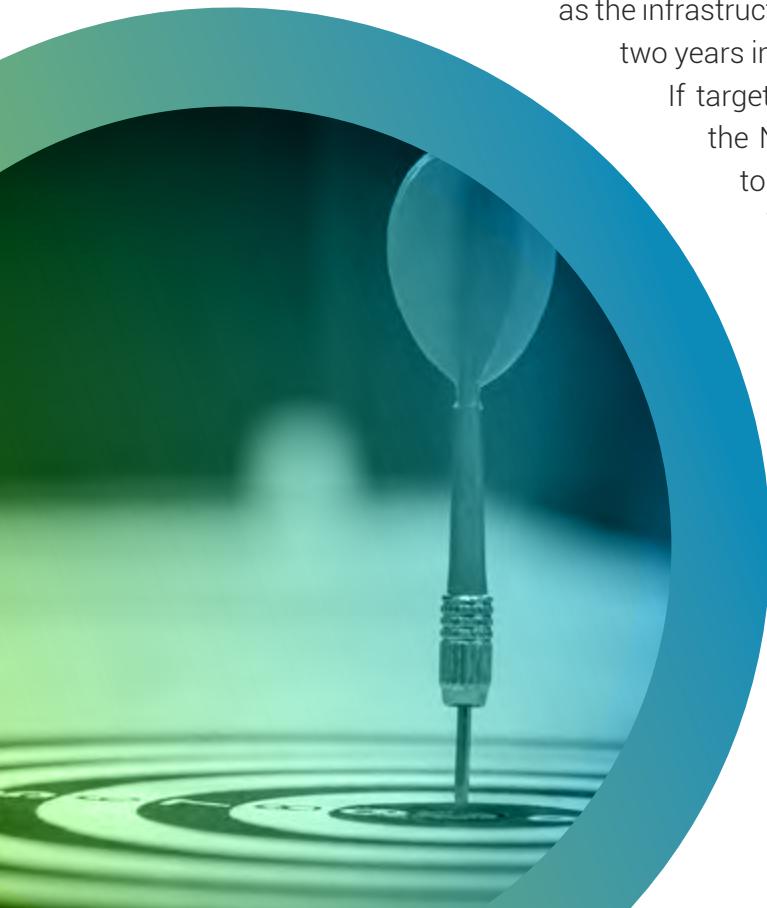
There are two exceptions to the NCDOT establishing targets for the system performance measures. Since the Charlotte Urbanized Area (UZA) has more than one million people, the NCDOT, South Carolina DOT (SCDOT), Cabarrus Rowan MPO, Gaston Cleveland Lincoln MPO, Rock Hill Fort Mill Area Transportation Study, and CRTPO are required to coordinate to adopt collective, single, unified 2-year and 4-year targets for annual hours of peak hour excessive delay (PHED) per capita and percent of non-single occupancy vehicle (SOV) travel. The agencies met twice, and joint targets were adopted by all respective agencies in May 2018.

The NCDOT system performance targets are displayed in **Table 8-3**. Monitoring and reporting are required every two years, at which time targets can be evaluated and updated.

The NCDOT monitors the system performance targets in a similar manner as the infrastructure condition targets and documents progress every two years in a performance report that is reviewed by the FHWA.

If targets are not met, or significant progress is not made, the NCDOT is required to utilize the performance report to document actions it will take to achieve the targets.

The CRTPO does not face repercussions if significant progress is not made toward meeting its targets.



**Table 8-3 System Performance Measures and Targets**

Performance Measure	NCDOT 2018 Target	
	2-Year	4-Year
Percent of person-miles traveled on the interstate that are reliable	80.00%	75.00%
Percent of person-miles traveled on the non-interstate NHS that are reliable	N/A	70.00%
Truck Travel Time Reliability (TTTR) Index	1.65%	1.70%
Total emissions reduction	CO: 11.522 kg/day VOC: 0.252 kg/day NOx: 2.360 kg/day	CO: 23.044 kg/day VOC: 0.504 kg/day NOx: 4.720 kg/day
Annual hours of Peak Hour Excessive Delay (PHED) per capita on the NHS	N/A	34 hours/capita, 3:00-7:00 pm peak*
Percent of non-single occupancy vehicle (SOV) travel	21.00%*	21.00%*

Note: The CRTPO endorsed the NCDOT targets as its own in October 2018.

\*Targets set jointly by the CRTPO, Cabarrus Rowan MPO, Gaston Cleveland Lincoln MPO, Rock Hill Fort Mill Area Transportation Study, NCDOT, and South Carolina DOT

In addition to establishing targets, the CRTPO is also required to develop a Congestion Mitigation and Air Quality (CMAQ) Performance Plan to support efforts to achieve air quality and congestion reduction targets. The plan includes the following:

- Description of the baseline level of condition and performance for the PHED and non-SOV measures and the baseline total on-road emissions reduction associated with CMAQ funded projects

- 2-year and 4-year performance targets for each CMAQ measure for the Charlotte UZA, established in collaboration with the Cabarrus Rowan MPO, Gaston Cleveland Lincoln MPO, Rock Hill Fort Mill Area Transportation Study, NCDOT, and SCDOT
- Projects identified for CMAQ funding and how they will contribute to achieving the CMAQ targets

The CRTPO adopted its initial CMAQ Performance Plan in September 2018 and reaffirmed the plan is meeting federal requirements in 2020.

## Transit Performance Rules



### Transit Assets

The Transit Asset Management (TAM) rule was established by the FTA to define the term "state of good repair" and to establish minimum requirements that apply to all recipients and subrecipients of federal transit funds that own, operate, or manage public transportation capital assets. Under this rule, public transportation providers are divided into two categories – Tier I and Tier II – based on fleet size.<sup>1</sup> In the CRTPO planning area, the Charlotte Area Transit System (CATS) is a Tier I agency and Iredell County Area Transportation System (ICATS), Mecklenburg Transportation System (MTS), and Union County Transportation (UCT) are Tier II providers.

Tier I agencies, such as CATS, are responsible for developing a TAM plan and setting performance targets. The Tier II agencies may also develop their own TAM plan and set targets or participate in the state's group

TAM plan. The three Tier II providers in the CRTPO planning area participate in the NCDOT's group TAM plan, which includes one set of performance targets for all Tier II providers in the state. The CRTPO is not required to maintain a TAM plan, but is responsible for coordinating with transit providers to develop performance targets.

CATS and the NCDOT developed TAM plans in 2018 and most recently updated its performance targets in 2021. The CRTPO endorsed these targets in January 2022, as shown in **Table 8-4**.

**CATS Paratransit Service**



<sup>1</sup> Tier 1 agencies are those with fixed rail and/or a fleet size of 101 vehicles or greater and Tier II agencies are those with a fleet size of 100 vehicles or less that do not operate fixed rail.

**Table 8-4 Transit Asset Management Measures and Targets**

Asset Category – Performance Measure	Asset Class	Useful Life Benchmark	2022 Target <sup>1</sup>	
			CATS	NCDOT
<b>Rolling Stock</b>				
	Over-the-road Bus (BR)	14 years	69%	N/A
	Bus (BU)	12 years (CATS) 14 years (NCDOT)	13%	20%
	Cutaway Bus (CU)	5 years (CATS) 10 years (NCDOT)	11%	20%
	Light Rail (LR)	30 years	6%	N/A
	Mini-van (MV)	8 years	0%	20%
	Streetcar (SR)	30 years	6%	N/A
<b>Equipment</b>				
	Van (VN)	5 years (CATS) 8 years (NCDOT)	48%	20%
	Automobile (non-revenue)	8 years	43%	20%
<b>Facilities</b>				
	Trucks and Other Rubber Tire Vehicles	14 years	43%	20%
	Steel Wheel Vehicles	25 years	50%	N/A
<b>Infrastructure</b>				
	Administrative and Maintenance	N/A	0%	20%
	Passenger and Parking	N/A	3%	20%
	Light Rail (LR)	N/A	8%	N/A
	Streetcar (SR)	N/A	5%	N/A

Note: The CRTPO endorsed the CATS and NCDOT targets as its own in January 2022.

1 – Targets are set for a fiscal year (July 1 - June 30).

Tier I and Tier II transit agencies are required to report annually to the FTA's National Transit Database (NTD). The information reported includes asset inventory data, condition assessments, performance results, projected targets for the next fiscal year, and a narrative report describing changes in the transit system conditions. The reporting also includes the progress made towards achieving the performance targets. There is no penalty for CATS, the NCDOT, or the CRTPO if targets are not met.



### Transit Safety

In addition to asset management, public transportation safety is a key component of the performance-based planning process as it relates to transit. The FTA established the Public Transportation Agency Safety Plan (PTASP) rule to emphasize a more effective and proactive approach to managing safety risks in public transit systems. For this rule, public transportation agencies are categorized by fleet size as large or small providers. Consistent with the TAM classifications, CATS is the sole large provider in the CRTPO planning area and ICATS, MTS, and UCT are designated as small providers.

CATS is required to develop a safety plan annually, that includes performance targets. The small providers have the option to draft their own safety plan and targets or allow the NCDOT to carry out these requirements on their behalf. The NCDOT provided a safety plan template to the small providers in the CRTPO planning area and each agency developed its own respective plan that includes performance targets.

**Table 8-5** lists the transit safety targets adopted by CATS, ICATS, MTS, and UCT, all of which were endorsed by the CRTPO in January 2022.

**Table 8-5 Transit Safety Measures and Targets**

Mode of Transit Service	Fatalities (Total)	Fatalities (Per 100,000 VRM)	Serious Injuries (Total)	Serious Injuries (Per 100,000 VRM)	Safety Events (Total)	Safety Events (Per 100,000 VRM)	System Reliability
<b>CATS<sup>1</sup></b>							
Demand Response	0	0.00	N/A	0.80	N/A	0.50	60,000
Bus	0	0.00	N/A	0.80	N/A	0.50	15,000
Rail	0	0.00	N/A	0.80	N/A	0.50	3,000
<b>ICATS<sup>2</sup></b>							
Demand Response	0	0.00	2	0.37	18	1.85	30,750
<b>MTS<sup>3</sup></b>							
Demand Response	0	0.00	6	0.20	2	0.07	100,000
<b>UCT<sup>4</sup></b>							
Demand Response	0	0.00	2	0.30	25	5.00	50,000

Note: The CRTPO endorsed the CATS and NCDOT targets as its own in January 2022.

1 – CATS targets are for calendar year 2021 (January 21 – December 21).

2 – ICATS targets are for fiscal year 2021 (July 20 – June 21).

3 – MTS targets are for fiscal year 2021 (July 20 – June 21).

4 – UCT targets are for fiscal year 2022 (July 21 – June 22).

The FTA requires that public transit agencies self-certify their safety plans and targets annually. There is no penalty for the transit agencies or the CRTPO if targets are not met.

## Performance Targets Resolutions

The CRTPO reports its performance targets in resolutions adopted by its Board. The various rulemakings include different deadlines for adopting and updating targets, as reflected in each of the following respective CRTPO resolutions:

- Highway Safety (adopted February 2022)
- Infrastructure Condition and System Performance (adopted October 2018)
- Transit Asset Management (adopted January 2022)
- Transit Safety (adopted January 2022)

The resolutions are included in [Appendix I](#).

## Performance-Based Planning Monitoring and Reporting

### Performance-Based Plans

The CRTPO and NCDOT incorporate goals, objectives, performance measures, and targets related to performance management into the following plans:

- Congestion Management Process (CMP)
- Congestion Mitigation and Air Quality (CMAQ) Performance Plan
- NCDOT Strategic Highway Safety Plan (SHSP)
- Public Transportation Agency Safety Plans (PTASP)
- Transit Asset Management Plans
- Transportation Asset Management Plan (for the NHS)

### Performance Management Agreement

MPOs, State DOTs, and transit providers jointly agree upon and draft specific written provisions for cooperatively developing and sharing information related to:

- Transportation performance data
- Establishing performance targets
- Reporting on performance targets and tracking progress toward attainment of critical outcomes
- Collecting data for the state's transportation asset management plan (for the NHS)

For the CRTPO, these provisions are documented in a Performance Management Agreement, which is included in [Appendix I](#).

## Incorporation of Performance-Based Planning

Along with establishing performance targets, MPOs are also required to integrate performance-based planning into other aspects of the metropolitan transportation planning process. The regulations stipulate that MPOs must integrate performance-based planning into the MTP and Transportation Improvement Program (TIP), but do not specify or advise how it can be accomplished. Similarly, incorporation into other metropolitan transportation planning processes is encouraged, but minimal guidance is provided to assist MPOs that wish to pursue performance-based planning integration activities.

The CRTPO has chosen to pursue specific performance-based planning activities that meet the minimum requirements, are applicable to its planning area, and also help strengthen the integration of performance measures and targets with other planning initiatives. Documentation of these activities and how they are being accomplished is included on the following pages.



South End  
Charlotte Rail Trail

## Metropolitan Transportation Plan and Transportation Improvement Program Compliance

Federal regulations require documentation of the CRTPO's performance-based planning activities in its MTP and TIP. The information in this MTP, along with a statement of compliance in the TIP, confirm the CRTPO's incorporation of performance management in its metropolitan transportation planning activities. **Appendix I** contains additional documentation about how the CRTPO is addressing specific elements of the federally-defined performance-based planning and programming process.

## Relationship to Goals and Objectives

As performance management has become a more integral component of the metropolitan transportation planning process, the CRTPO emphasized the importance of modifying its goals and objectives for the 2050 MTP so they are measurable. The CRTPO conducted extensive coordination with the MTP Advisory Committee to revise the MTP goals and objectives. **Figure 8-1** displays the relationship of the federal performance measures and the 2050 MTP goals and objectives.

**Figure 8-1 Relationship of Federal Performance Measures and 2050 MTP Goals**

Performance Measures	CRTPO 2050 MTP Goals					
	1 Safe, Efficient, Sustainable Transportation	2 Integrated, Accessible, Multimodal Transportation	3 Improve Quality of Life	4 Equitable Transportation Options	5 Regional and Statewide Collaboration	6 Economic Competitiveness
Safety	✓		✓		✓	
Infrastructure Condition	✓		✓		✓	✓
System Performance	✓	✓	✓		✓	✓
Transit Assets	✓	✓	✓	✓	✓	✓
Transit Safety	✓	✓	✓		✓	
Non-Federal	✓	✓	✓	✓	✓	✓

## Monitor and Evaluate Non-Federal Performance Measures and Targets

To make performance-based planning more relevant at the regional level, the CRTPO adopted local performance measures. These measures are not subject to federal requirements, but they allow CRTPO to measure performance of elements of the transportation system that are not covered by the federal performance measures. The CRTPO's non-federal performance measures were established in 2017 and included in its 2045 MTP. **Table 8-6** lists each measure, the established target, and progress made toward achieving each one.

**Table 8-6 CRTPO Non-Federal Performance Measures and Targets**

Performance Measure		2017–2021 Miles Added	Target Miles Added	Status
Miles of Sidewalk Facilities	64 miles	35 miles <sup>1</sup>	35 miles <sup>1</sup>	↑
Miles of On-Road Bicycle Facilities	23 miles	23 miles <sup>1</sup>	23 miles <sup>1</sup>	↔
Miles of Shared Use Facilities	25 miles	22 miles <sup>1</sup>	22 miles <sup>1</sup>	↑
Performance Measure	2015	2018	Target	Status
Percent of Households within 15 minutes of a Regional Activity Center	68%	69%	50% <sup>2</sup>	↑
Percent of Households within 1/2-Mile of a Fixed Route Transit Station	5%	12%	20% <sup>2</sup>	↑
Percent of Employees within 1/2-Mile of a Fixed Route Transit Station	16%	22%	35% <sup>2</sup>	↑
Percent of Households within 1/4-Mile of a Bus Route	55%	65%	50% <sup>2</sup>	↑
Percent of Employees within 1/4-Mile of a Bus Route	75%	79%	70% <sup>2</sup>	↑
Percent of Employees within a Strategic Freight Mobility Corridor	86%	86%	85% <sup>2</sup>	↔

Note: Numbers rounded for planning purposes.

1- Target was set to be achieved by 2022.

2- Target was set to be achieved by 2045.



Photo Credit Grant Baldwin Photography

Sustain Charlotte Cycle Track

## Assess How MTP Projects Support Federal Performance Targets

One of the key elements of the MTP is the development of a fiscally constrained project list, as described in [Chapter 7](#). In considering how to integrate performance-based planning into the MTP, the CRTPO explored options for assessing how the MTP's fiscally constrained projects contribute to achieving its established performance targets. To accomplish this, the CRTPO developed a method for analyzing each federally defined performance measure.

Due to the varying levels of data available to assess each measure, the CRTPO used three approaches for completing this evaluation:

- Project Level with Quantitative Data
- Planning Area Level with Quantitative Data
- Planning Area Level with Qualitative Data

[Figure 8-2](#) shows the performance measures considered and which assessment method was used for each.

[Figure 8-2 Performance Measures and Assessment Approach](#)

			
Safety	System Performance*	Infrastructure Condition	Transit
<ul style="list-style-type: none"> <li>● Number of fatalities</li> <li>● Fatality rate (per 100 million VMT)</li> <li>● Number of serious injuries</li> <li>● Serious injury rate (per 100 million VMT)</li> <li>● Number of non-motorized fatalities and serious injuries</li> </ul>	<ul style="list-style-type: none"> <li>● Percent of person-miles traveled on the interstate that are reliable</li> <li>● Percent of person-miles traveled on the non-interstate NHS that are reliable</li> <li>● Truck Travel Time Reliability (TTTR) Index</li> <li>● Total Emissions Reduction</li> <li>● Annual Hours of Peak Hour Excessive Delay (PHED) Per Capita on the NHS</li> </ul>	<ul style="list-style-type: none"> <li>● Percent of pavement on interstate in good condition</li> <li>● Percent of pavement on interstate in poor condition</li> <li>● Percent of pavement on non-interstate in good condition</li> <li>● Percent of pavement on non-interstate in poor condition</li> <li>● Percent of NHS bridges in good condition</li> <li>● Percent of NHS bridges in poor condition</li> </ul>	<ul style="list-style-type: none"> <li>● Asset Management <ul style="list-style-type: none"> <li>• Rolling Stock</li> <li>• Equipment</li> <li>• Facilities</li> <li>• Infrastructure</li> </ul> </li> <li>● Public Transportation Agency Safety Plan (PTASP) <ul style="list-style-type: none"> <li>• Fatalities</li> <li>• Injuries</li> <li>• Safety Events</li> <li>• System Reliability</li> </ul> </li> </ul>
<p> Performance Measures Assessed at Project Level with Quantitative Data</p> <p> Performance Measures Assessed at CRTPO Planning Area Level with Quantitative Data</p> <p> Performance Measures Assessed at CRTPO Planning Area Level with Qualitative Data</p>			

\* There is one additional System Performance measure, Percent of Non-Single Occupancy Vehicle (SOV) Travel, that is not considered in this MTP due to a lack of adequate data to assess performance.

## PROJECT LEVEL WITH QUANTITATIVE DATA

Each of the 52 fiscally constrained MTP projects<sup>2</sup> not committed in the TIP were assessed using quantitative data for Safety and System Performance measures.



Four Safety measures were assessed using the NCDOT's Safety Benefit Factor, which is also a consideration in the CRTPO's MTP roadway ranking criteria. If a project demonstrated a safety benefit greater than zero, it was assumed to contribute to achieving the respective safety targets. All fiscally constrained MTP projects that were assessed met this threshold and helped improve safety. This is not surprising due to the significance of safety in the CRTPO's project ranking process, meaning projects that have positive safety benefits are likely to be included in the fiscally constrained project list.

The safety measures, assessment method, and results are displayed in [Figure 8-3](#).

[Figure 8-3 Safety Project Level Assessment with Quantitative Data](#)

Performance Measures	Assessment Method	Results
<ul style="list-style-type: none"> <li>● Number of fatalities</li> <li>● Fatality rate (per 100 million VMT)</li> <li>● Number of serious injuries</li> <li>● Serious injury rate (per 100 million VMT)</li> </ul>	NCDOT Safety Benefit Factor > 0 contributes to achieving targets	52 fiscally constrained MTP Projects* support targets

\*The 104 roadway projects with committed funding in the TIP were not evaluated as part of this assessment



In addition to Safety measures, the fiscally constrained projects were also assessed based on three System Performance measures. The percent of reliable person-miles traveled on both interstate and non-interstate NHS facilities were assessed using auto travel time savings data from the Metrolina Regional Model (MRM), which was also a factor in the CRTPO's MTP roadway ranking process. If a project demonstrated a travel time savings, then it was assumed to improve reliability and contribute to achieving these System Performance targets. Of the 52 projects assessed, 51 had travel time savings. The one project that did not demonstrate an auto travel time savings is a road diet project that does not improve roadway capacity.

<sup>2</sup> See [Chapter 7](#) for more information about fiscally constrained MTP projects. This assessment focused on new projects added to the 2050 MTP (52 total) and did not consider projects with funding already committed in the TIP (104 total).

Truck travel time savings was also a component of the roadway ranking process and was used by the CRTPO to assess the truck travel time reliability performance measure. If a project exhibited a truck travel time savings, then it was assumed to contribute to improving reliability in support of the target. Three of the 52 projects assessed did not have a truck travel time savings. One of these three projects is the same road diet project that also did not demonstrate an auto travel time savings. The other two roadway segments carry relatively low truck volumes, according to the modeling effort conducted to calculate truck travel time savings. Due to the low volumes, truck travel time savings is not a relevant factor for these projects.

**Figure 8-4** provides an overview of this quantitative assessment of System Performance measures.

#### Figure 8-4 System Performance Project Level Assessment with Quantitative Data

Performance Measures	Assessment Method	Results
<ul style="list-style-type: none"> <li>● Percent of person-miles traveled on the interstate that are reliable</li> <li>● Percent of person-miles traveled on the non-interstate NHS that are reliable</li> </ul>	Auto Travel Time Savings from MTP Roadway Ranking Benefit-Cost Criteria > 0 contributes to achieving targets	51 of 52 fiscally constrained MTP Projects* support targets
<ul style="list-style-type: none"> <li>● Truck Travel Time Reliability (TTTR) Index</li> </ul>	Truck Travel Time Savings from MTP Roadway Ranking Benefit-Cost Criteria > 0 contributes to achieving targets	49 of 52 fiscally constrained MTP Projects* support targets
*The 104 roadway projects with committed funding in the TIP were not evaluated as part of this assessment		

**Appendix I** includes a full listing of the Safety and System Performance project level assessment results using quantitative data.

#### PLANNING AREA LEVEL WITH QUANTITATIVE DATA

##### System Performance

The assessment for this category involved two additional System Performance measures. Based on the data available, a system wide approach was utilized to assess progress towards achieving the targets for these measures.

For the emissions reduction measure, performance was assessed by comparing 2026 (baseline) and 2050 nitrogen oxides (NOx) and volatile organic compounds (VOC) emissions for the 2008 ozone maintenance area, within the CRTPO planning area.

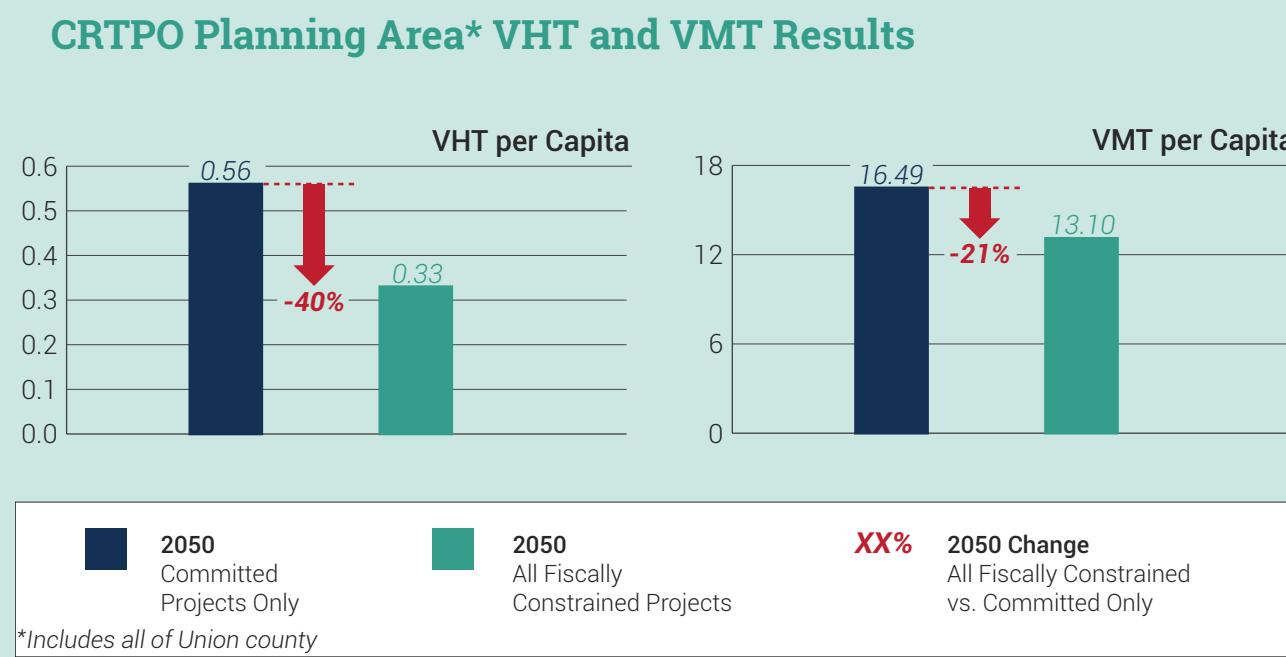
The 2026 (baseline) calculation includes all projects with committed funding anticipated to be completed by the end of 2025, while the 2050 conditions assume all fiscally constrained MTP projects are constructed. If emissions for these two pollutants are anticipated to decline from 2026 (baseline) to 2050, then the fiscally constrained projects within the 2050 MTP are presumed to be contributing to emissions reductions and helping meet the established target.

#### CRTPO Planning Area\* Emissions Results



Results of this analysis, provided in **Figure 8-5**, indicate a decline in both NOx and VOC with the implementation of the 2050 MTP projects.

To assess performance related to annual hours of peak hour excessive delay per capita on the NHS, the CRTPO explored several options based on available data. The intent of this measure is to evaluate how transportation investments on NHS facilities are improving travel conditions. While peak hour excessive delay is the federally required calculation, there is not a straightforward method for assessing future conditions using the MRM. Instead, the CRTPO elected to observe vehicle hours traveled (VHT) and vehicle miles traveled (VMT) per capita to analyze potential project benefits, as shown in **Figure 8-5**.



Based on the results, implementing the 2050 MTP projects supports the intent of the performance measures. VHT and VMT across the network would both be less, 40% and 21% respectively, compared with not implementing the 2050 MTP projects.

**Figure 8-5 System Performance Planning Area Level Assessment with Quantitative Data**

Performance Measures	Assessment Method	Results
● Total Emissions Reduction	NOx and VOC Emissions Reductions with the Implementation of 2050 MTP Projects <sup>1</sup> contribute to achieving targets	NOx Comparison to Emissions Budget: 2026 (-1,388 kg/day) to 2050 (-5,060 kg/day) VOC Comparison to Emissions Budget: 2026 (-2,077 kg/day) to 2050 (-4,080 kg/day) support targets
● Annual Hours of Peak Hour Excessive Delay (PHED) Per Capita on the NHS	VHT and VMT Reductions with the Implementation of 2050 MTP Projects <sup>2</sup> contributes to achieving targets	VHT 40% Less by 2050 with MTP Projects VMT 21% Less by 2050 with MTP Projects support targets

1 - The established 2008 ozone maintenance area within the CRTPO planning area boundary has emissions budgets for NOx and VOC, which are covered by the MRM; negative numbers indicate under budget.

2 - VHT and VMT were evaluated using the MRM, to assess the 2050 network with and without the fiscally constrained MTP projects.

## PLANNING AREA LEVEL WITH QUALITATIVE DATA

The remaining federally defined performance measures were assessed at the CRTPO planning area level using a qualitative approach. Project level quantitative data was either not available or not sufficient to draw an adequate conclusion about the impact of a proposed improvement relative to performance. The measures considered for this category include Safety, Infrastructure Condition, System Performance, and Transit.

### Safety

The CRTPO makes a focused effort to allocate funding to improve and add bicycle and pedestrian facilities throughout the planning area. These improvements are accomplished through the administration of its Discretionary Funds Policy, the NCDOT's Complete Streets Policy, and coordination with member jurisdictions to include active transportation accommodations as part of roadway projects. These types of investments contribute to improving safety by increasing access and connectivity and creating designated areas for non-motorized transportation, including facilities that separate bicyclists and pedestrians from vehicular traffic. A list of funded active transportation projects is included in **Chapter 7**.

The Safety measure, assessment method, and outcome are displayed in **Figure 8-6**.

**Figure 8-6 Safety Planning Area Level Assessment with Qualitative Data**

Performance Measures	Assessment Method	Results
● Number of non-motorized fatalities and serious injuries	Bicycle and Pedestrian Investments <i>contribute to achieving targets</i>	Funding for Bicycle and Pedestrian Improvements <i>support targets</i>

### Infrastructure Condition

The NCDOT owns and maintains the majority of roads throughout the state, including in the CRTPO planning area, and is largely responsible for infrastructure condition. To improve and maintain highway and bridge condition, the NCDOT and CRTPO collaborate to ensure funding is allocated to support infrastructure improvements for these facilities. The MTP includes approximately \$1.9 billion of project maintenance funding for projects in the CRTPO planning area through 2050, which are primarily allocated to improve roads and bridges in support of this performance measure.

**Figure 8-7** provides an overview of this qualitative assessment of Infrastructure Condition measures.

**Figure 8-7 Infrastructure Condition Planning Area Level Assessment with Qualitative Data**

Performance Measures	Assessment Method	Results
<ul style="list-style-type: none"> <li>● Percent of pavement on interstate in good condition</li> <li>● Percent of pavement on interstate in poor condition</li> <li>● Percent of pavement on non-interstate in good condition</li> <li>● Percent of pavement on non-interstate in poor condition</li> <li>● Percent of NHS bridges in good condition</li> <li>● Percent of NHS bridges in poor condition</li> </ul>	Maintenance Investments <i>contribute to achieving targets</i>	\$1.9 Billion Projected Maintenance Funds for the CRTPO Planning Area <i>support targets</i>

### Transit

The federal transit performance measures address asset management and safety. Through coordination with the transit providers in its planning area, the CRTPO has identified an estimated \$536 million transit operations budget through the year 2050. The transit operating budget contributes to projects such as vehicle replacement and safety enhancements, as described in **Chapter 7**. These investments support the transit measures and contribute to achieving the established performance targets.

The Transit performance measures, methodology, and results for this qualitative planning area assessment are displayed in **Figure 8-8**.

**Figure 8-8 Transit Planning Area Level Assessment with Qualitative Data**

Performance Measures	Assessment Method	Results
<ul style="list-style-type: none"> <li>● Asset Management <ul style="list-style-type: none"> <li>• Rolling Stock</li> <li>• Equipment</li> <li>• Facilities</li> <li>• Infrastructure</li> </ul> </li> <li>● Public Transportation Agency Safety Plan (PTASP) <ul style="list-style-type: none"> <li>• Fatalities</li> <li>• Injuries</li> <li>• Safety Events</li> <li>• System Reliability</li> </ul> </li> </ul>	Transit Investments <i>contribute to achieving targets</i>	\$536 Million Projected Transit Operating Funds for the CRTPO Planning Area <i>support targets</i>

## Ongoing Performance Management

The CRTPO has been proactive in its approach to incorporate performance-based planning into various aspects of its transportation planning activities. Along with the federally required and supplemental non-federal initiatives described in this chapter, the MTP also includes performance measures associated with scenario planning, the CMP, and health metrics established by the CRTPO. In addition, the CRTPO engaged stakeholders to revise its MTP goals and objectives to ensure they are measurable and related to performance rulemaking, so progress toward achieving them can be tracked.

Other activities related to performance management that the CRTPO is continuing to explore and implement include the following:

- Identify and evaluate new data and technology to improve how it tracks and monitors performance
- Coordinate with the NCDOT, transit providers, regional MPOs, and member jurisdictions to monitor, review, and update established performance measures and targets to determine if they are adequate or if any need to be modified, removed, or added
- Pursue additional integration initiatives as described in the CRTPO's [Performance-Based Planning: Integration Activities](#) report developed in April 2020

The MTP will be amended as needed to reflect changes to the evolving performance-based planning efforts of the CRTPO to remain in compliance with federal regulations and track how investments are impacting performance of the transportation system.



*Stakeholder and community engagement is a critical part of transportation planning.*



# Chapter 09

## Future Considerations

The Metropolitan Transportation Plan (MTP) is the principal policy document maintained by the CRTPO. It includes recommendations and projects to be implemented over the next 20-plus years, which requires coordination with other CRTPO planning activities and initiatives. In particular, a Strategic Plan was adopted by the CRTPO in November 2021 that outlines goals and key steps that coincide with implementing recommendations from the MTP. In addition, the Beyond 77 and CONNECT Beyond initiatives were completed in 2021 and provide numerous recommendations and strategies that will need to be coordinated with MTP implementation activities.

Adoption of the MTP is a significant milestone, but subsequent efforts are needed to ensure goals and objectives are met, performance metrics are monitored and updated, and strategies, recommendations, and projects are implemented. These tasks require data collection, process enhancements, coordination with stakeholders, and continued public engagement. Additionally, the CRTPO is continuously looking for ways to improve upon previous efforts and identify enhancements that can be applied to its MTP development process. This chapter outlines the key activities the CRTPO will undertake after the adoption of the 2050 MTP.

## Monitor Goals, Objectives, and Transportation Performance

Goals and objectives are included in the MTP to provide a framework for enhancing the transportation system. The MTP goals and objectives were thoroughly reviewed and refined prior to adoption, to ensure they are measurable and applicable to outcomes the CRTPO can influence.

**Chapter 8** demonstrates how the goals relate to federal performance-based planning guidelines associated with the metropolitan transportation planning process. In addition, defined performance metrics help the CRTPO monitor and report how project investments contribute to achieving established targets.

The CRTPO will monitor progress towards achieving its goals and objectives and performance targets. To accomplish this, the CRTPO will identify, collect, and track performance data that applies to the planning area and develop tools for communicating progress.

### DATA COLLECTION, MONITORING, AND REPORTING TECHNIQUES

- Utilization of Metrolina Regional Model (MRM) and Metrolina CommunityViz Model (MCM) outputs and analyses
- Coordination with the North Carolina Department of Transportation (NCDOT) to collect and review data specific to the CRTPO planning area
- Organization and facilitation of recurring meetings with the NCDOT, public transportation providers, and adjacent Metropolitan Planning Organizations (MPO) to ensure the process is collaborative and transparent
- Development and use of dashboards, dedicated webpages, and regular publications (such as the CRTPO's Annual Report) to provide updates and present results to member jurisdictions, elected officials, and the public

It is anticipated that performance-based planning will continue to be an integral part of the metropolitan transportation planning process. The CRTPO will continue to coordinate with the NCDOT and transit agency partners to collect data, update targets, monitor progress, and document results. In addition, the CRTPO will continue to identify, implement, and fund projects that contribute to meeting established performance targets.

## Implementation Activities

The MTP includes several tools, strategies, and project recommendations intended to address challenges associated with transportation. It is also a key element of the MTP to identify anticipated revenues and prioritize projects to be programmed for funding. The CRTPO has defined a number of next steps related to project identification and implementation in preparation for the next MTP update cycle, which are included as part of the following initiatives:

- Alternative Funding
- Beyond 77
- CONNECT Beyond
- Scenario Planning

As described in **Chapter 5**, the CRTPO also adopted a Strategic Plan in November 2021 to ensure planning efforts and outcomes keep pace with changes, serve as a guide to lead transportation planning in the region, and establish a more proactive planning approach. The Strategic Plan identifies goals that address specific focus areas, which are supported by numerous strategies to be accomplished in the short-, mid-, or long-term. Pursuing the strategies outlined in the Strategic Plan will contribute to implementing the recommendations defined in the initiatives above.

### Alternative Funding

The CRTPO conducted an alternative funding analysis as part of its 2050 MTP process to develop a high-level understanding of potential revenue sources and their benefit to the region, as documented in **Chapter 5**.

Though not intended to modify the results and findings of the 2050 MTP, the CRTPO intends to pursue these efforts as part of its Strategic Plan goal to expand regional transportation funding. North Carolina is also undergoing a review of its existing funding at the state level through efforts such as NC FIRST Commission and development of the NC Moves 2050 Plan.

The CRTPO's member counties and municipalities have the responsibility to assess taxes and/or fees and the opportunity to implement alternative funding sources. The use of the revenue and allowable expenses would be dependent upon the specificity of the referendum. Generally, these revenue sources are intended for the development of large capital projects, increasing local match, and for providing planning services. Some alternative revenue sources utilize specific project lists within their referendums, while other programs may be written for general categories like capital transit projects. This variability highlights the need for coordination within the region. Increased regional coordination or oversight of these alternative funding sources would allow for a focused funding strategy for major regional priorities.

Ongoing coordination with the NCDOT and its member jurisdictions regarding future strategies could lead to further analysis and the development of an advocacy stance to promote alternative funding. In addition, coordinated efforts to implement recommendations from Beyond 77 and CONNECT Beyond will contribute to identifying and pursuing potential alternative funding.

### Planning Factor Addressed



Economic Vitality

## Planning Factors Addressed

-  Economic Vitality
-  Efficient System
-  Accessibility
-  Environment
-  Integration and Connectivity
-  Preservation
-  Safety
-  Resiliency and Reliability



## Beyond 77

Completed in 2021, Beyond 77 was a multiyear initiative intended to strengthen the multimodal network surrounding the I-77 corridor by providing a strategic, innovative, equitable, and comprehensive toolbox of effective strategies, policies, and programs to guide future mobility for the CRTPO's diverse communities. The study included extensive public engagement, analysis of existing and future conditions, alternative funding strategies, a needs assessment, recommendations, and an implementation plan. To prepare for the successful implementation of Beyond 77 recommendations, the CRTPO must consider important next steps to maintain the momentum built from the study efforts.

### BEYOND 77 IMPLEMENTATION PLAN

During the first 18 to 24 months after completion of the study, the following eight steps are recommended for the CRTPO to initiate and begin to include partner jurisdictions, organizations, and agencies in the implementation activities:

1. CRTPO Board Action to Adopt Beyond 77
2. Internal Policy Assessment
3. Coordination with the 2050 MTP, CONNECT Beyond, and Other Initiatives
4. Continuous Public Engagement
5. Identifying and Assigning Advocates and Champions
6. Regional Discussion on Funding Alternative Strategies
7. Unified Planning Work Program (UPWP) Funding for Fiscal Year 2023
8. Policy Briefs Development

The [Beyond 77 Corridor Study Report](#) contains more information about the implementation plan.

The CRTPO plays an important role in implementing the recommendations identified by Beyond 77 and to partner with member jurisdictions to define projects for consideration in the next MTP update.

## CONNECT Beyond

CONNECT Beyond is a regional mobility plan that sets the vision for how to better connect the rural, suburban, and urban communities in 12 counties across two states. The vision for CONNECT Beyond is to create a comprehensive mobility network for the region, including the CRTPO planning area, that focuses on enhancing infrastructure and improving the multimodal transit network to increase transportation choices for all area users.

Transportation Demand Management (TDM), along with additional mobility strategies, are key elements of CONNECT Beyond that are directly related to efforts identified in the CRTPO's MTP.



MetroRAPID  
Enhanced Bus  
Service

## Planning Factors Addressed

-  Economic Vitality
-  Efficient System
-  Accessibility
-  Environment
-  Integration and Connectivity
-  Resiliency and Reliability
-  Travel and Tourism



## Transportation Demand Management

As described in **Chapter 5**, TDM is a set of strategies focused on changing how, when, and where people travel. The goal of TDM is to reduce the number of people driving single-occupancy vehicles (SOV), particularly during peak hours, through alternative mobility options, travel during off-peak hours, or reducing overall transportation demands. TDM strategies are either focused on increasing mobility options or changing travel behaviors. **Figure 9-1** provides examples of TDM strategies considered as part of the CONNECT Beyond initiative.

**Figure 9-1 Examples of Transportation Demand Management Strategies**



### TDM RECOMMENDATIONS

The following key recommendations for TDM in the region have been established by the CONNECT Beyond initiative, and are intended to be implemented through support and participation of the CRTPO with Centralina Regional Council and adjacent MPOs.

### Regional TDM Plan

CONNECT Beyond recommends regional partners work together to develop a Regional TDM Plan.

### Commuter Choice Program

CONNECT Beyond recommends the Centralina Regional Council and Charlotte Area Transit System (CATS) work together to develop and lead a Commuter Choice Program that incorporates a variety of different TDM strategies and serves residents in the region. This Commuter Choice Program is also charged with educating the region's residents about the benefits of TDM strategies, alternative mobility options, and available programs related to these efforts.

## Additional Mobility Strategies

The CONNECT Beyond initiative also focuses on strategies for how the region can work together to promote sustainable growth and mobility supportive land use. This collaboration will enhance connectivity and provide opportunities to implement creative mobility solutions. Some of these strategies are already in place within the region and the CRTPO is coordinating with partner agencies to reconvene the CONNECT Beyond's Funding & Partnership Work Group to continue implementation efforts for other recommendations.

The CONNECT Beyond Funding & Partnership Work Group is exploring potential regional structures to help guide the full implementation of the mobility plan, specifically mid-term and long-term recommendations, and help coordinate a cross-county funding strategy to pay for these programs and initiatives.

### MOBILITY STRATEGY RECOMMENDATIONS

#### Mobility Hubs

Mobility Hubs are places people can conveniently access multiple travel options. They provide a range of integrated mobility services and support amenities and technologies to facilitate connections between destinations and the use of mobility options, such as electric vehicle charging equipment. Examples include Neighborhood Node Hubs and Regional Connector Hubs.

#### Create Mobility-Friendly Places

Mobility-friendly places offer context-sensitive integration of multiple transportation modes and serve as one-stop environments where everyday destinations and resources are close by and easy to access. They are created by implementing mobility-supportive development, which is a compact, mixed-use, walkable development with multiple mobility options. The most effective application for mobility-friendly places is the  $\frac{1}{4}$ - to  $\frac{1}{2}$ -mile radius around a transit stop or station, transit corridor, or major activity center such as a downtown or other mixed-use destination.

#### Further the Customer Experience Culture

To encourage residents and visitors to use alternative mobility services, the CRTPO must work with regional partners to ensure these mobility services are easy and convenient to use. The customer experience can be enhanced by implementing technologies across different agencies which make it easier to plan trips and make payments. As the centrally located organization, the CRTPO's leadership in encouraging participation from all providers will be essential for successfully implementing the strategies and technologies aimed at enhancing the user experience.

#### Emerging Mobility Trends

New technologies, modes, and services make it easier and more efficient for people to get to their destination by providing more transportation choices. Examples of emerging mobility trends include:

- Autonomous vehicles and shuttles
- Connected vehicles
- Electric and alternative fuel vehicles
- Ridesharing and car sharing services

## Scenario Planning

### Planning Factors Addressed



Economic  
Vitality



Efficient  
System



Accessibility



Integration and  
Connectivity

### SCENARIO PLANNING RECOMMENDATIONS

- Plan and coordinate for an uncertain transportation future, starting with recommendations and actions presented in the CRTPO's Strategic Plan, Beyond 77, and CONNECT Beyond
- Work with the Federal Highway Administration (FHWA) and NCDOT to run parallel socioeconomic data sets for the MTP roadway project ranking process to account for some level of long-term telecommuting
- Identify priority connected and autonomous vehicle (CAV) corridors in the region and require that projects submitted include provisions to support a future CAV system, partnering and expanding on the work of the CAV Task Force and the Beyond 77 initiative
- Emphasize a need to study transportation and land use connections together when prioritizing funding for future projects
- Closely coordinate with municipal partners on land use-transportation planning issues, building on recommendations from the CRTPO Staffing and Resources Study
- Integrate performance measures from the scenario planning initiative in other CRTPO-related performance management activities
- Explore opportunities to include findings from the scenario planning initiative into future CRTPO plans, policies, and studies

## Evaluate and Pursue Effective Practices

Updating the MTP every four years is a significant undertaking and ensures federal funding will continue to be allocated to priority projects in the region. However, the CRTPO is constantly looking for ways to improve upon established practices and ensure its planning efforts add value to the member jurisdictions it serves. After the adoption of each MTP, the CRTPO evaluates where enhancements can be made to improve communication and transparency, as well as engage stakeholders and the public.

### INTERIM MTP DEVELOPMENT STEPS

- Establish data collection and monitoring protocols to conduct the following activities:
  - Ensure goals, objectives, and performance metrics are tracked and updated as needed, including established non-federal and health measures
  - Analyze existing conditions to educate member jurisdictions about needs and deficiencies
  - Review and update the Congestion Management Process (CMP)
- Explore the creation of a database to serve as an inventory of all potential projects to be considered for evaluation in the MTP

The MTP process does not end with the plan's adoption. It is an ongoing effort by the CRTPO to engage its partners, develop tools and strategies, and make recommendations that utilize funding and resources for the benefit of all those in the region who rely on the transportation system. As growth and change continue throughout the planning area, the CRTPO will continue to explore options to address key challenges and improve its policies and practices to accommodate future transportation demands.

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600 E Fourth Street, 8th Floor  
Charlotte, NC 28202

[crtpo.org](http://crtpo.org)