

7. Our Metropolitan Transportation Plan: What We Intend To Do

Section 7 is the heart of our region's Metropolitan Transportation Plan. This section describes the investments we plan to make, when we intend to make them, and the associated land use development strategies we aim to pursue to achieve an effective and efficient transportation system.

The transportation investments are summarized in the following categories:

- Roadways (with accompanying project list in Appendix 2)
- Public Transportation
- Active Transportation Projects serving bicyclists and pedestrians
- Freight Movement
- Aviation and Intercity Rail
- System Optimization including:
 - Programs to manage transportation demand
 - Intelligent transportation systems: technology investments
 - Transportation/congestion systems management: lower-cost roadway projects that do not add more travel lanes, but improve safety and/or operational efficiency.

7.1 Land Use & Development Strategies

Land use in the Triangle is the responsibility of each local government, not the MPOs. But few things influence the functionality and effectiveness of our transportation system as much as the locations, types, intensities and designs of existing and new developments in our region. If we are to successfully provide for the mobility needs of the 2 million people here today and the additional 1.2 million expected to be added over the life of this plan, we will need to do a top-notch job of matching our land use decisions with our transportation investments.

The ties between regional transportation actions and local land use decisions are significant in three cases:

1. Transit Corridor Development.
2. Major Roadway Access Management.
3. Complete Streets & Context-Sensitive Design.

Transit Corridor Development. *Connect2050* includes billions of dollars of bus and rail capital investments to connect our region's largest activity centers and link these centers to neighborhoods across the region. Ensuring that affordable, well-designed, compact, mixed-use development occurs within a half mile of frequent transit corridors is a key element in determining how cost-effective major transit investments will be. Working with a range of local and regional partners, the Triangle J Council of Governments and GoTriangle have been leading efforts to develop and share key land use and affordable housing practices that can be used by local governments and other organizations to support fixed guideway and frequent bus investments. Continuing to build on this collaborative approach is an important and cost-effective way to match local land use and affordable housing decisions with regional transportation investments. Strategy work will be built on a firm analysis foundation that focuses on (i) travel markets, (ii) land use plans and policies, and (iii) affordable housing inventories, programs and opportunity sites. Where applicable, leveraging joint development for affordable housing as part of major transit capital projects will be pursued.


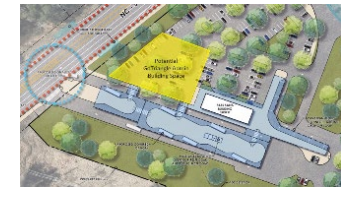
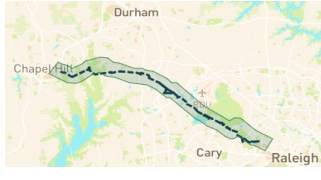





Major Roadway Access Management. Roads serve two main purposes: mobility and access. Mobility is the efficient movement of people and goods. Access is getting those people and goods to specific sites. A road designed to maximize mobility typically does so in part by managing access to adjacent properties. An example is an Interstate Highway. While long distance travel on an Interstate Highway is efficient, the number of access points is restricted to a limited number of interchanges. This type of road serves primarily a mobility function. At the other end of the spectrum, local streets provide easy and plentiful access to adjacent properties, but long distance travel would be time consuming. This type of road serves primarily an access function. Many costly road investments involve widenings to provide more capacity. Where these investments are made, the MPOs will work with the NCDOT and local communities so that new capacity is not inappropriately degraded by a pattern of “strip development” requiring numerous driveways and median cuts.

Complete Streets & Context-Sensitive Design. Street rights-of-way are the biggest share of our communities’ public realm: the spaces we share with our neighbors and which provide access to the front doors of homes and businesses. Where roads traverse town centers, walkable neighborhoods and important activity centers such as college campuses, the MPOs will work with the NCDOT and local communities to ensure that roads are appropriately designed to accommodate the full range of travel choices and that adjoining development is sited and designed to promote alternatives to auto travel. As the benefits of walking and cycling are better understood, creating safe and healthy streets is becoming a higher priority for MPO support.

For these three issues -- transit corridor development, major roadway access management and complete streets whose designs are sensitive to the neighborhoods of which they are a part -- the DCHC MPO and CAMPO are committed to work with their member communities and regional organizations such as the Triangle J Council of Governments and GoTriangle to coordinate land use decisions and transportation investments.

7.2 Shared Regional Investments

Shared Regional Investments are programs, projects or groups of related projects that transcend the boundary between the Durham-Chapel Hill-Carrboro MPO and the Capital Area MPO. Both MPOs include shared regional investments in their project lists and financial plans. For shared roadway projects especially, facility types and design details may differ between the MPOs, but each MPO’s component is intended to complement the investments made by the other MPO. The *Connect2050* Shared Regional Investments are:

<p>North Carolina Railroad Corridor Passenger Rail (1st phase from Durham to Garner or Clayton)</p>		<p>Regional Transit Center Relocation (serving regional buses, future BRT and future passenger rail)</p>	
<p>Triangle Bikeway along I-40 (NC 54 in Chapel Hill to I-440 in Raleigh)</p>		<p>Wake-Durham Bus Rapid Transit (extension of Wake Western Corridor BRT from Cary to RTP HUB)</p>	
<p>US 70 Durham: modernization Wake: freeway conversion</p>		<p>I-40 Durham: modernization Wake: managed freeway</p>	
<p>Aviation Parkway Durham: modernization Wake: new alignment</p>		<p>Triangle Transportation Demand Management Program</p>	

7.3 Complete Corridors

A central organizing principle for implementing the projects in this plan is a vision of a connected region composed of complete corridors. A complete corridor is:

- ➔ an equitable, sustainable and resilient set of transportation facilities and services ...
- ➔ ... that connects key neighborhoods and centers across boundaries ...
- ➔ ... to improve the flow of people, goods and information as the region continues to grow.

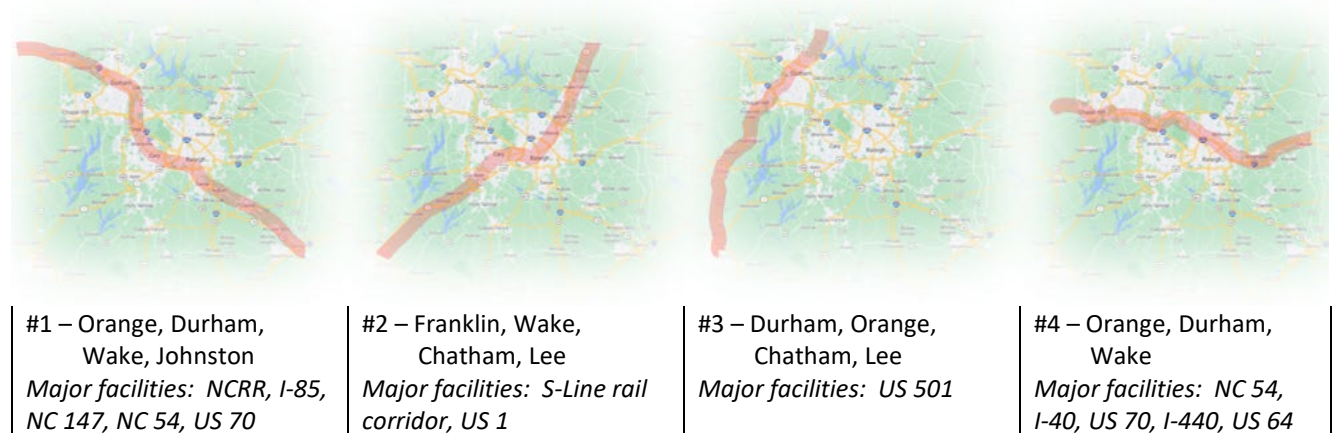
Complete corridors aren't separate and distinct projects – individual projects continue to be described in the remaining sections of this chapter and listed in the appendices. Rather, they are a way to show how sustained, mutually-reinforcing commitments to thoughtful projects can knit the region together in a way that best provides choices for travelers and supports equitable economic development for all.

A complete corridors approach includes:

- ❖ selected corridors that span at least 3 counties and involve more than one MPO or RPO
- ❖ showing how regional principles and priorities can be applied in each corridor context
- ❖ roadway, transitway and active transportation greenway elements
- ❖ depicting job hubs, key equity-centered neighborhoods and affordable housing opportunity sites
- ❖ corridor impact analysis, including measurable criteria related to travel, land use and affordable housing

Below are some examples of regionally significant, multi-county corridors that could become a focus for coordinated investments in transit, active transportation and complementary strategies for land use and housing affordability.

Figure 7.3.1 – Examples of Complete Corridors That Can Be Components of a Regional Vision



The MPOs and other regional partners are collaborating on developing and funding a project to create a guide for a connected region based on complete corridors.

7.4 Roadways

This section contains a list of major road investments in the 2050 Capital Area MPO and Durham-Chapel Hill-Carrboro MPO Metropolitan Transportation Plans. A full listing of all roadway projects, by time period is in Appendix 2, and detailed, navigable maps are on each MPO’s web site.

Projects are separated into four categories based on anticipated date of completion. 2030 projects are projects already underway with full funding and an expected completion date by 2030, derived from the adopted Transportation Improvement Program (TIP). The 2040 and 2050 projects are composed of projects selected through the alternatives analysis process described in Section 6.4 and that can be funded with existing revenue streams or reasonably foreseeable new revenue streams.

Due to funding constraints, a fourth category includes projects that had merit but could not be completed by 2050 with anticipated revenue. These projects that are not part of our fiscally constrained plans are included in the Comprehensive Transportation Plans (CTP) for each MPO. Each project in the fiscally-constrained plan has a project identifier that is shown on the 2050 MTP Road Project Map. The project listing in Appendix 2 includes information on each project’s limits, length, present and future lanes, funded completion year, cost estimation and whether it meets federal definitions for a regionally significant or exempt project.

Projects noted as “modernizations” do not add new general purpose travel lanes, although they can increase the capacity and reliability of roadways through improved intersection treatments and access management, including boulevard or “superstreet” designs with medians or parkway designs with grade-separations designed for slower speed travel. In urban areas, modernizations generally add bicycle, pedestrian, and transit facilities, add turn lanes at intersections, sometimes widen a narrow road, and sometimes improve curves and sight lines. In Rural areas, they typically widen a narrow road and shoulder, add turn lanes at intersections, and sometimes improve curve and sight lines.

Where new interchanges are indicated, they are often grouped with a highway project; if an independent interchange project, it will often involve roadway changes for some distance on either side of the interchange.

One clear message from both elected official discussion and public engagement during the development of the plan is that roadways need to be designed and engineered with much greater care than has been typical in the past, using more flexible and context-sensitive standards that have now been successfully implemented in many places. Especially in urban and urbanizing locations, designs should prioritize steady, safe, reliable, moderate-speed travel, rather than emphasize high-speed travel.



Parkway Design



Boulevard Design



Superstreet Design

Figures 7.4.1 and 7.4.2 list major highway projects by time period in each MPO. Larger, navigable versions of the roadway maps are available on the MPO web sites at the links provided.

Figure 7.4.1. DCHC MPO Major Roadway Projects List (estimated cost > \$100 million) and All Projects Map

Durham Chapel Hill-Carrboro MPO		
2021-30	2031-40	2041-50
East End Connector linking US 70 to NC 147 (Durham Freeway) to form I-885*	US 15-501 modernization (South Columbia in Chapel Hill to Cameron Blvd. in Durham)	
I-40 widening in Orange County (US 15-501 to I-85)	I-40/NC 54 Interchange and NC 54 modernization (TIP# U-5774)	
	US 70 modernization in Durham County (Lynn Road to Wake County)	
	I-85 widening in Orange County (Orange Grove Rd. to Sparger Road.)	
	US 15-501 Synchronized Street (Smith Level Road to US 64 in Chatham Co.)	
	I-40 managed roadway modernization (NC 54 to Wake County; links to CAMPO I-40 project)	
	NC147 modernization (I-40 to Swift Ave.)	

* funded in prior years but open to traffic in indicated time period

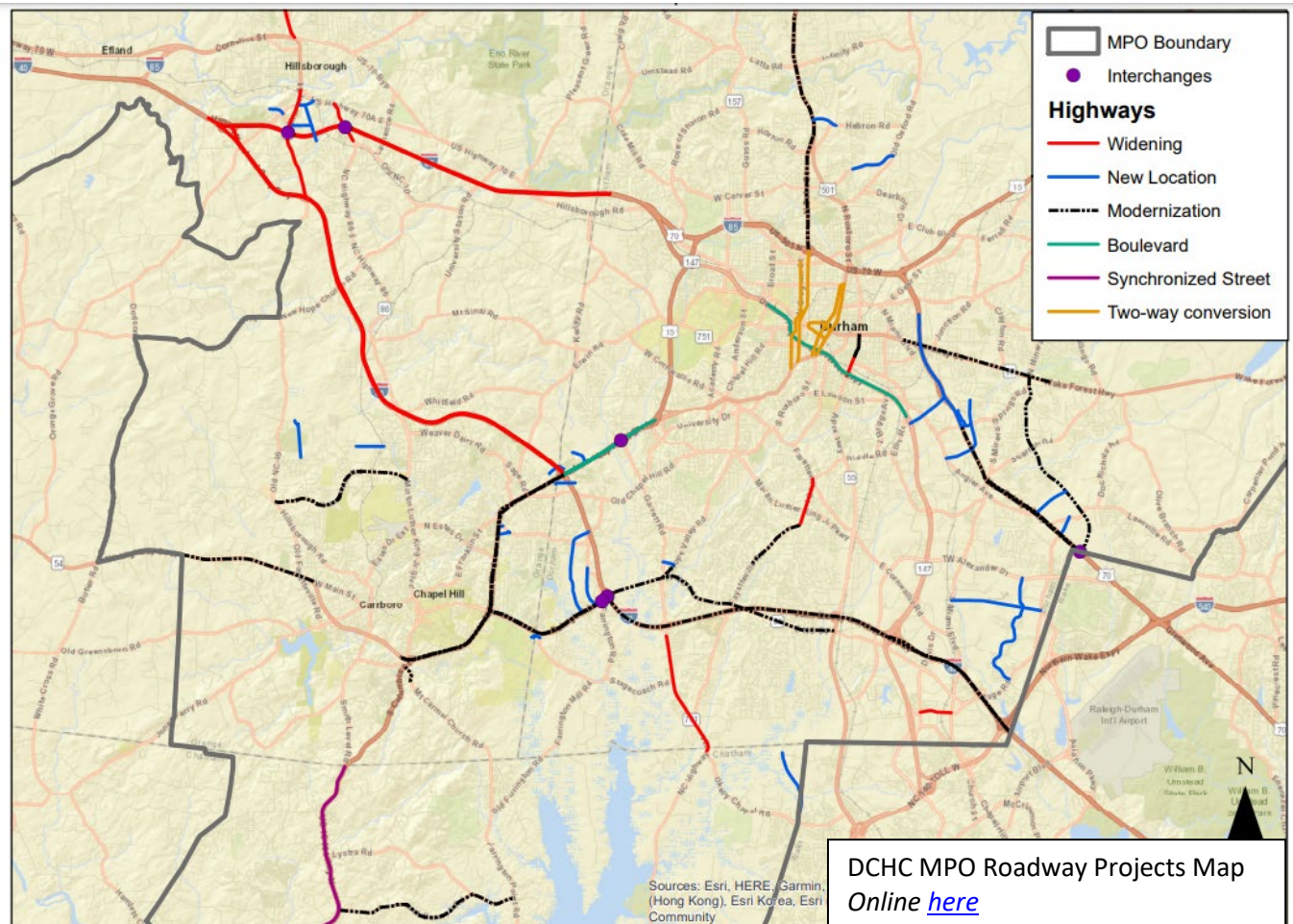
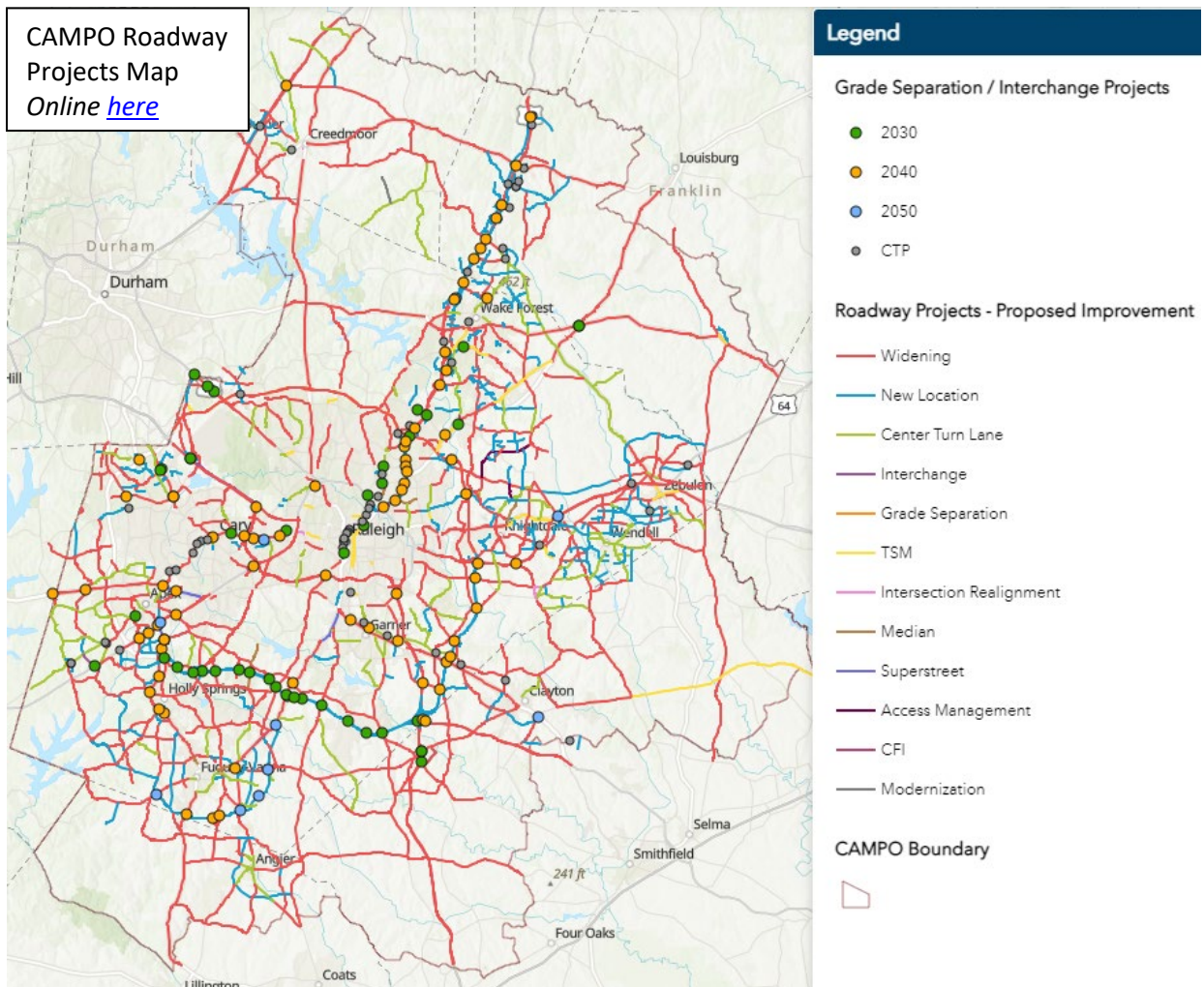


Figure 7.4.2. CAMPO Major Roadway Projects List and All Projects Map

Capital Area MPO		
2021-30	2031-40	2041-50
I-40 widened from Wade Ave. to Lake Wheeler Road	I-40 widened from I-440 to NC 42 in Johnston County	I-87 widened from US 64 Bus to US 264
I-440 widened from Wade Avenue to Crossroads	I-87 widened from I-440 to US 264	NC 210 widened from Angier to Lassiter Pond Rd.
I-40 widened from I-440 to NC 42 in Johnston County	US 1 widened south from US 64 to NC 540	NC 50 widened from NC 98 to Creedmoor
US 64 W corridor improvements from US 1 to Laura Duncan Rd.	Managed lanes added to I-540 (Northern Wake Expressway) from I-40 to US 1	US 401 widened from Fuquay-Varina to MPO boundary in Harnett County
NC 540 toll road extended from Holly Springs to I-40 south of Garner	NC 540 completed as a toll road from Holly Springs to I-87/US 64 bypass	NC 96 widened from US 1 to NC 98
US 70 widened and access management from I-540 to Durham/Wake Co. Line	Managed lanes added to I-40 from Durham County line to MPO boundary in Johnston County	NC 56 widened from I-85 to MPO boundary in Franklin County



7.5 Transit Facilities & Services

Extensive transit planning efforts have recently been completed or are underway, resulting in updated transit plans in Durham, Orange, and Wake Counties. The county plans provide dedicated revenues to finance transit improvements, including enhanced regular bus service, high-quality fixed-guideway projects, improved transit centers and stops, and services to connect job centers and equity-centered neighborhoods.

Among the projects identified in the county transit plans and included in this 2050 MTP are a variety of premium transit investments designed to provide faster, frequent, reliable service in major corridors. Two types of fixed-guideway transit investments are included in this 2050 MTP:

- **Bus rapid transit (BRT)** encompasses a variety of enhancements to regular bus service, such as large stations with off-board ticketing, dedicated lanes that allow buses to bypass congested automobile traffic and improve system reliability, priority treatment at traffic signals, and other improvements.
- **Commuter rail transit (CRT)** service operates in existing rail corridors, serving stations that generally are spaced farther apart than on light rail or bus rapid transit lines. Although originally oriented to conventional 9-to-5 commuters, most CRT systems in the US are increasingly expanding their focus to mid-day, evening, and weekend services to serve more diverse travel markets.

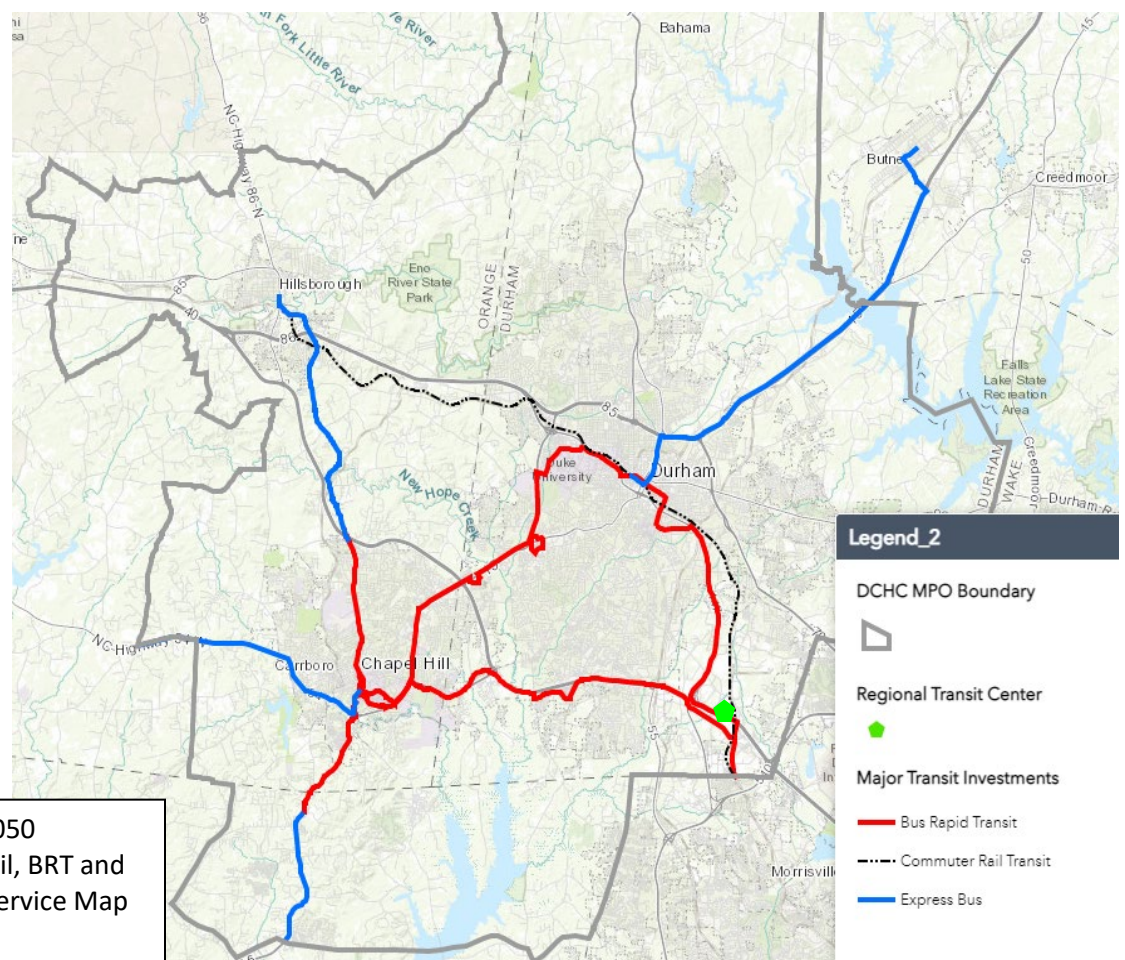
Figure 7.5.1 lists fixed guideway projects and Figures 7.5.2 and 7.5.3 depict interactive on-line transit maps.

Figure 7.5.1 Transit Fixed Guideway Projects

Project Title	Programming Description	MTP Horizon Year	MPO
Commuter Rail Transit (CRT)	CRT using the existing North Carolina Rail Company (NCRR) corridor. West Durham to Clayton by 2030, then extended to Hillsborough and Selma by 2050.	West Durham to Clayton, 2030 Hillsborough to Selma, 2050	DCHC CAMPO
Bus Rapid Transit – Chapel Hill North-South	BRT in Chapel Hill, from Eubanks Road, through the UNC Healthcare complex, and to Southern Village. Part on bus-only lanes and part in mixed traffic.	2030	DCHC
Bus Rapid Transit – Central Durham	BRT in central Durham, from the Duke University and Medical Center area, through downtown Durham and the central bus station, to the North Carolina Central University and Durham Tech area. Part on dedicated lanes and part in mixed-traffic.	2040	DCHC
Bus Rapid Transit – Durham/Chapel Hill	BRT between Durham and Chapel Hill, from UNC Health complex to the Duke University and Medical Center area, via US 15-501. Part on bus lanes or bus-on-shoulder-system (BOSS), part in mixed-traffic.	2050	DCHC
Bus Rapid Transit – Durham/RTP	BRT between central Durham and the Research Triangle Park (RTP), from the North Carolina Central University/Durham Tech area to the regional transfer center in the RTP, via NC 147. In mixed traffic, and part possibly on bus-on-shoulder-system (BOSS).	2050	DCHC
Bus Rapid Transit – Chapel Hill/RTP	BRT between Chapel Hill and the Research Triangle Park, from UNC Health complex to the regional transit center in the RTP, via NC 54 and I-40. Part in mixed traffic, and part bus-on-shoulder-system (BOSS).	2050	DCHC

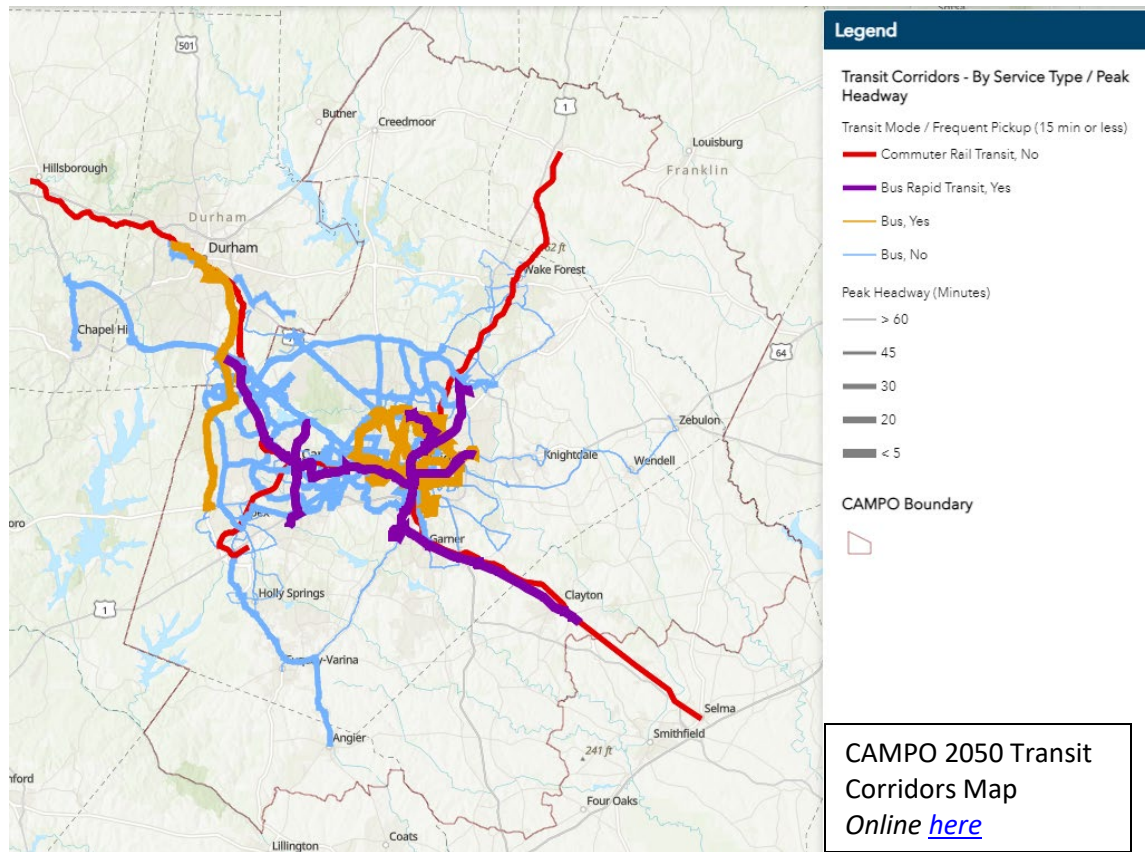
Project Title	Programming Description	MTP Horizon Year	MPO
Bus Rapid Transit – Wake New Bern	BRT - New Bern East - Downtown Raleigh to Stony Brook Rd - Fixed Guideway	2030	CAMPO
Bus Rapid Transit - Wake	BRT - New Bern East - Stonybrook Rd to New Hope Rd - Mixed Traffic	2030	CAMPO
Bus Rapid Transit - Wake	BRT – RTP Hub to Morrisville - Mixed Traffic	2030	CAMPO DCHC
Bus Rapid Transit - Wake	BRT - Morrisville to Downtown Cary - Mixed Traffic	2030	CAMPO
Bus Rapid Transit - Wake	BRT - Downtown Cary to Downtown Raleigh - Fixed Guideway	2030	CAMPO
Bus Rapid Transit - Wake	BRT - Downtown Raleigh to Midtown Raleigh/North Hills - Fixed Guideway	2040	CAMPO
Bus Rapid Transit - Wake	BRT – Harrison/Kildaire Farm, SAS Campus Dr. to and Regency Park, via Harrison Ave., Kildaire Farm Rd., and Regency Dr. - Fixed Guideway	2050	CAMPO
Commuter Rail – S-Line	CRT using the existing CSX S-Line corridor. Apex to Franklinton.	Apex to Franklinton, 2040	CAMPO

Figure 7.5.2
DCHC MPO
Major Transit
Project Maps



DCHC MPO 2050
Commuter Rail, BRT and
Express Bus Service Map
[Online here](#)

Figure 7.5.3
CAMPO
Transit
Projects
Map



Another type of fixed transit investment is a transit center – a place where multiple modes and routes come together to provide easy transfers between routes.

The MTP includes on-going and planned transit center development, including the Raleigh Union Station Bus Center, the relocation of the Regional Transit Center – a shared regional investment of both MPOs, improvements to the downtown Durham Transit Center and proposed additional centers that are anticipated to be part of the forthcoming Durham County Transit Plan update.



Figure 7.5.4 Transit Center Projects: Regional Transit Center Relocation (left) and RUS Bus (right)

Additional information related to transit capital projects is included in Appendix 3.

Although fixed guideway projects and transit centers may be some of the more visible transit investments, most transit use occurs in vehicles operating in “mixed traffic,” that is, on general purpose roadway lanes that are shared with cars and trucks.

These services range from frequent scheduled transit services in high-density, high ridership corridors to on-demand microtransit services and, by their very nature, can adapt to changing conditions. Figure 7.5.5 depicts rules of thumb for the deployment of different types of services. This section discusses the two bookends of mixed-traffic transit services: (i) frequent scheduled transit services and (ii) on-

LAND USE			TRANSIT	
Land Use Type	Residents per Acre	Jobs per Acre	Appropriate Types of Transit	Frequency of Service
Downtowns & High Density Corridors	>45	>25	Light Rail, BRT, Rapid Bus, Local Bus	10 mins or better
Urban Mixed-Use	30-45	15-25	BRT, Rapid Bus, Local Bus	10-15 minutes
Neighborhood & Suburban Mixed-Use	15-30	10-15	Local Bus	15-30 minutes
Mixed Neighborhoods	10-15	5-10	Local Bus, Micro-transit	30-60 minutes
Low Density	2-10	2-5	Micro-transit, Rideshare, Volunteer Driver Pgm	60 mins or less or On Demand
Rural	<2	<2	Rideshare, Volunteer Driver Pgm	On Demand

Figure 7.5.5 Land Use & Supported Types of Transit (credit: NelsonNygaard)

demand microtransit services. Where mixed-traffic transit services are deployed is determined by the County Transit Plans, which are incorporated in this MTP by reference and available at the websites below:

- 2021-2030 [Wake County Transit Plan](#)
- 2021-2040 [Durham County Transit Plan](#) (update to be completed in 2022; link is to plan website)
- 2021-2040 [Orange County Transit Plan](#) (update to be completed in 2022; link is to plan website)

The transit plans cover both local and regional transit operators; additional transit services are provided by the university-based Duke Transit and NC State University Wolfline systems. Based on these county transit plans, annual transit work programs are adopted each year detailing specific capital and operating funding. As part of the county plans, transit operators are placing an emphasis on alternatively fueled vehicles, such as electric, diesel/electric hybrid and compressed natural gas vehicles.

Transit investment is more than new buses; ensuring sound maintenance of transit assets and safe, inviting connections to transit facilities and services matter too. Both MPOs have transit asset performance targets, including for State-of-Good-Repair. First-mile, last-mile connections to transit services – such as sidewalks, bike lanes and street crossings -- are funded from both county transit tax revenues and other sources.

Frequent Scheduled Transit Services: A transit axiom is that “frequency is freedom.” As service improves from 2 buses every hour (30-minute frequency) to 3 buses per hour (20-minute frequency) to 4 buses per hour (15-minute frequency), transit begins to serve people’s lives rather than riders needing to plan their lives around transit. Frequent service is usually only cost-effective where densities are high and activity centers aligned along a route, so complementary land use policies are critical to success. Appendix 3, the MTP on-line maps and the County Transit Plans show transit frequency.

Demand-Responsive Microtransit Services: On the other end of the spectrum, where both land use density and conventional bus ridership is low, new app- and phone-based on-demand microtransit services can give users both more timely service and a wider range of destinations than is possible with fixed bus routes. In CAMPO, Morrisville recently launched its [SmartShuttle](#) service, and in DCHC MPO, Durham is piloting a micro-transit project and anticipates expanded microtransit services as part of the 2022 County Transit Plan update.

7.6 Active Transportation and Micro-Mobility Investments

Active transportation by walking and bicycling are becoming integral forms of travel in the Triangle Region. The land use characteristics of local universities, business districts, and major activity centers encourage short trips that can be easily served by biking, walking, scootering or other active and micro-mobility modes. Urban centers retain attractive, grid street patterns with retail and residential developments that lend themselves well to active forms of transportation, and the region's rural landscapes provide opportunities for tourism and recreational cycling. Additionally, the area's geography and mild year-round climate make these modes viable travel options.

Since the adoption of the region's previous long-range plan in 2018, several important initiatives have been undertaken, including the following:

- In 2021 the MPOs jointly adopted a policy priority entitled "Make North Carolina a Leader in Active Transportation," with a goal of surpassing peer states in funding economically beneficial and safety-focused bicycle & pedestrian projects.
- In 2020 the NCDOT released the Great Trails State Plan that focused on a network of shared-use paths in all 100 counties that can serve transportation purposes, providing connections between where people live, work and play.
- In 2019 the N.C. Board of Transportation adopted a revised Complete Streets Policy, which requires NCDOT planners and designers to consider and incorporate multimodal facilities in the design and improvement of all appropriate transportation projects in North Carolina. The policy is supported by the Complete Streets Implementation Guide and other guidance and training.
- During the COVID 19 pandemic beginning in 2020, communities in the Triangle implemented various initiatives to address the desire of residents to find safe, healthy ways to enjoy outdoor activities while supporting physical distancing during the COVID-19 pandemic. Examples included the Shared Streets pilot projects in Raleigh and Durham, reducing the number of travel lanes in favor of walkways in the street on Franklin Street in Chapel Hill, and the reallocation of parking for outdoor dining in several communities.
- The number of motor vehicle crashes involving pedestrians and bicycles has motivated NCDOT and local governments to adopt Vision Zero goals and programs. Vision Zero is a strategy to eliminate all traffic fatalities and severe injuries, while increasing safe, healthy, and equitable mobility for all.
- Communities in both MPOs have expanded Safe Routes to School programs that aim to educate students on how to walk and bicycle safely and encourage programs whereby students walk or bike to school or walk or bike at school during Walk and Bike to School Days.

In response to the increased demand for bike and pedestrian travel, CAMPO and DCHC MPO are promoting the creation of a pedestrian and bicycle system that provides greater access not only to schools but to parks, transit stops, job hubs, grocery stores, and other destinations. Regional and statewide facilities such as the East Coast Greenway, the Neuse River Greenway, and the American Tobacco Trail are heavily used. Many communities have prepared their own city and county bicycle and pedestrian plans and are working toward the development of a safe, accessible, and convenient network of regional bicycle and pedestrian routes.

Pedestrian Facilities

Pedestrian facilities in the region vary in type, condition and level of service. Urban areas in the MPOs often have suitable sidewalk facilities, however many thoroughfares lack any pedestrian accommodations or relegate pedestrians to one side of the roadway. Historically, suburban development has been inattentive to pedestrian needs, leading to incomplete pedestrian networks within highly populated commercial and residential areas. Also, many areas once classified as rural are seeing increases in development, and citizens are demanding pedestrian access from their neighborhoods to nearby destinations. Local governments recognize these pedestrian needs, and are working toward filling missing links in local sidewalk networks.

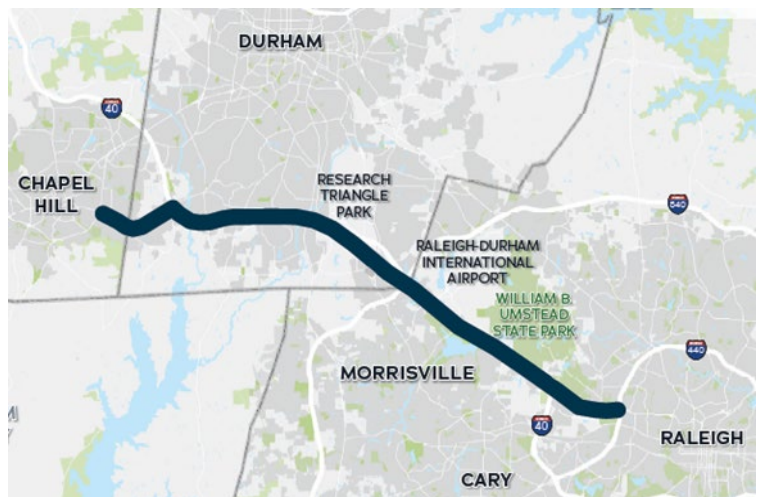
On a regional level, the MPOs encourage pedestrian projects. Most town and city governments have instituted sidewalk requirements for new development, and sidewalk upgrades are generally included in roadway construction projects. Most roadway projects in the 'Roadway Element' of the MTP are expected to provide appropriate accommodations for pedestrians, concurrent with roadway improvements. Missing links and gaps in the pedestrian networks will be constructed retroactively. Priority is generally given to areas with heavy pedestrian traffic generators, such as schools, parks, transit stops, and business districts, and to address historic inequities the provision of sidewalks.

Figure 7.5.1 – Local Plans and Inventories Used for Pedestrian Facility Recommendations

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|---|--|
| <ul style="list-style-type: none"> • Chapel Hill Mobility and Connectivity Plan (2020) • DurhamWalks! Pedestrian Plan (2006) | <ul style="list-style-type: none"> • Durham Bike+Walk Implementation Plan (2017) • Hillsborough Community Connectivity Plan (2009, revised 2014 & 2017) |
| <ul style="list-style-type: none"> • Angier Pedestrian Plan (2014) • Apex Pedestrian Plan (2019) • Archer Lodge Bicycle/Pedestrian Plan (2020) • Cary Pedestrian Plan (Imagine Cary) (2017) • Creedmoor Pedestrian Plan (2011) • Fuguay Varina Pedestrian Plan (2013) • Harnett County Bicycle, Pedestrian, and Greenway Plan (2021) • Wake County Greenways Master Plan (2017) | <ul style="list-style-type: none"> • Holly Springs CTP (2013) • Knightdale Comprehensive Pedestrian Plan (2013) • Raleigh Comprehensive Pedestrian Plan (2013) • Wendell Pedestrian Plan (2017) • Youngsville Bicycle/Pedestrian Plan (2015) • NCSU Transportation Master Plan (2017) • Center of the Region Bicycle and Pedestrian Plan (2016) |

Bicycle Facilities

The 2050 MTP recommends extensive integration of bicycle needs into the design and construction specification of new highways and other future or ongoing transportation projects. The bicycle projects include off-road shared-use bicycle paths, on-road bicycle lanes (including protected lanes), and bicycle boulevards in urban areas, as well as paved 4-foot shoulders on rural roads. Highway and transit project designs assume the provision of bicycle racks and other bicycle and pedestrian amenities at key locations such as park-and-ride lots, transit hubs, and major activity centers.



The Triangle Bikeway preferred alignment spans 23 miles from US-15/501 in Chapel Hill to I-440 in Raleigh

The 2050 MTP identifies statewide and regional bicycle routes in the Triangle region. Statewide routes include NCDOT-designated Bicycling Highways as well as the East Coast Greenway. Regional bicycle routes provide links between major destinations and between urban centers; facilitate primarily utilitarian bicycle trips, though the routes can also serve recreational cycling; and serve as a backbone to a finer grained system of local bicycle routes in each jurisdiction. Figure 7.5.2 lists these local plans.

Figure 7.5.2 – Local Plans Used for Bicycle Facility and Trail Recommendations

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| <ul style="list-style-type: none"> • Carrboro Comprehensive Bicycle Transportation Plan (2020) • Chapel Hill Mobility and Connectivity Plan (2020) • Chapel Hill Mobility and Connectivity Plan (2020) • Chatham County Bicycle Plan (2011) • Durham Bike+Walk Implementation Plan (2017) • Durham City and County Comprehensive Bicycle Plan (2006) | <ul style="list-style-type: none"> • Durham Trails and Greenways Master Plan (2011) • Hillsborough Community Connectivity Plan (2009, revised 2014 & 2017) • Orange County Comprehensive Plan: Transportation Element (2008) • Research Triangle Park Bike/Ped Plan (2017) • Research Triangle Park Trails Study (2020) • Triangle Bikeway Study (2022) |
| <ul style="list-style-type: none"> • Apex Bicycle Plan (2019) • Archer Lodge Bicycle/Pedestrian Plan (2020) • Center of the Region Bicycle and Pedestrian Plan (2016) | <ul style="list-style-type: none"> • NCSU Transportation Master Plan (2017) • Harnett County Bicycle, Pedestrian, and Greenway Plan (2021) • Morrisville Transportation Plan (2008) |
| <ul style="list-style-type: none"> • Cary Imagine Cary Plan (2017) • Creedmoor Bicycle Plan (2011) | <ul style="list-style-type: none"> • Raleigh Bicycle Transportation Plan (2016) • Rollin' in Rolesville Bicycle Plan (2011) |
| <ul style="list-style-type: none"> • Fuquay-Varina Community Transportation Plan (2017) • Garner Forward Transportation Plan (2019) | <ul style="list-style-type: none"> • Triangle Bikeway Study (2022) • Wake County Greenways Master Plan (2017) • Youngsville Bicycle/Pedestrian Plan (2015) |
| <ul style="list-style-type: none"> • Holly Springs Comprehensive Transportation Plan (2013) | <ul style="list-style-type: none"> • Zebulon Multimodal Transportation Plan (2014) |

Note – Additional local bicycle and pedestrian plans are either beginning or in progress to completion by 2022.

Education & Encouragement

In addition to facility improvement projects included in the MTP, the DCHC and Capital Area MPOs devised a series of local education and encouragement programs. Outreach programs are essential elements of any bicycle and pedestrian friendly community, and complement the engineered components of a bicycle and/or pedestrian route network. The following recommendations are intended to increase bicycle and pedestrian safety and provide the incentive to get more people biking and walking in the region.

Education efforts include bicycle skills instruction for youth and adults, educational messages about laws and best practices and on cyclists' rights to use the road. Encouragement efforts include incentives for employee bicycle commuting, annual "Bike-to-Work" activities, and Safe Routes to Schools events. The MPOs and local jurisdictions also provide resources such as bicycle maps, safety and education materials, bicycle racks, and bicycle repair stations. The jurisdictions of Carrboro, Cary, Chapel Hill, Durham, and Raleigh have been recognized as "Bicycle Friendly Communities" by the League of American Bicyclists.

Summary

The 2050 MTP does not specifically list all planned bicycle and pedestrian projects in the region. Local municipalities and counties have identified and prioritized these projects, and have coordinated their interaction at the jurisdiction boundary areas. As a result, the 2050 MTP defers to local government plans.

The DCHC MPO bicycle and pedestrian policy basically expects any roadway or other transportation project, whether it is a new or improved facility, to include appropriate pedestrian and bicycle accommodations. That policy provides extensive integration of bicycle and pedestrian needs into the design and construction of all transportation projects. In addition, the "NCDOT Complete Streets Implementation Guide" and other guidance from the American Association of State Highway Transportation Officials (AASHTO), the National

Association of City Transportation Officials (NACTO), and the Federal Highway Administration (FHWA) provide planning and design guidance for use when building new projects or making changes to existing infrastructure. For bicycle facilities, the Durham-Chapel Hill-Carrboro MPO adopted a [Comprehensive Transportation Plan \(CTP\)](#) in May 2017 that lists all the local bicycle projects from the jurisdiction and county plans in the MPO area as shown on the Bike-Ped-Multiuse map and the tables in the CTP. Also, Appendix 4 lists statewide and regional bicycle routes in the MPO region.

Although the 2050 MTP does not list the individual bicycle, pedestrian and multiuse path projects, the 2050 MTP requires an estimate of the level of investment for purposes of the financial plan. The DCHC MPO reviewed local plans and made the following estimates of infrastructure in those plans: 175 miles of sidewalk per decade; 70 miles of shared use paths per decade; 80 miles of protected bike lanes per decade; and, 20 miles of bicycle boulevards per decade. A total of approximately 20 miles of the shared use path and 30 miles of the sidewalk/bike lane will be constructed as part of roadway modernization projects. Thus, a total \$2.679 billion is required to complete the projects in the local plans. See the table below.

	Length (mi)	Unit Cost (ft)	Total Cost (\$millions)
Sidewalk	495	\$ 250	\$ 653
Shared Use Path/Sidepath	190	\$ 500	\$ 502
Protected bike lane (both sides)	240	\$ 1,200	\$ 1,521
Bicycle Boulevard	60	\$ 10	\$ 3
Total			\$ 2,679

The Capital Area MPO map in Appendix 4 communicates an extensive regional layout of off-road bicycle and pedestrian facilities in conjunction with on-road facilities that will receive bicycle-pedestrian accommodations only. This on-road/off-road network is congruent in scope, and communicates opportunities for multiple forms of access throughout the region. Note that many roadway projects will incorporate bicycle and pedestrian accommodations in conjunction with capacity improvements; which is consistent with the principle of “universal access” as addressed in the Capital Area MPO Bicycle and Pedestrian Plan adopted in 2003. Roads that will receive bicycle and pedestrian accommodations only are those roads that did not meet strict criteria for capacity improvements; but in practicing good transportation system management would qualify as candidates for bicycle and pedestrian accommodations.

Statewide bicycle and pedestrian corridors are those designated at the national or state level. These corridors are at the highest functional classification level and serve as the backbone and trunk lines for the bicycle and pedestrian network. These corridors typically serve an inter-regional purpose and span multiple regions and/or states. Regional bicycle and pedestrian corridors are those that serve an intra-regional purpose. These corridors are the mid-level functional classification and may have several characteristics: (1) - Provide links between jurisdictions; (2) Facilitate primarily utilitarian trips, though the corridors can also serve recreational purpose; (3) Serve as the main branches of the bicycle/pedestrian network that provide intra-connectivity for the finer grained system of local jurisdiction corridors; and (4) Provide connectivity between other regional corridors and connect between local and intra-regional corridors.

Figure 7.5.3 - Bicycle & Pedestrian Investment

2021-2050 Bicycle and Pedestrian Investment (\$2020)		
Total	CAMPO	DCHC MPO
\$7,634,000,000	\$4,955,000,000	\$2, 679,000,000

* excludes bike/ped elements of complete streets projects

7.7 Strategies to Manage Transportation Demand

Each year, hundreds of millions of dollars are spent in the region on the supply side of mobility: building and maintaining roads, buying and operating buses, building sidewalks and bicycle facilities. Some of the most cost-effective mobility investments we can make are on the demand side: spurring travelers to use our transportation facilities more efficiently by ridesharing, taking transit, telecommuting, walking or bicycling.

Marketing and outreach efforts targeted to commuters and the employers they work for are called Transportation Demand Management, or TDM. The Triangle TDM program – called the *Triangle Transportation Choices Program* – is active in Chapel Hill, Carrboro, Raleigh, Research Triangle Park, Durham County, Orange County, Wake County, Duke University, NC State University, UNC-Chapel Hill, and Wake Tech Community College. Because of its, cost-effectiveness, strengthening support for TDM is one of the joint MPO’s adopted transportation priorities.

Connect2050 calls for continuation and expansion of the TDM approach that combines funding from the two MPOs and NCDOT with significant matching funds from the local and regional service providers. This TDM approach has been shown to be very effective. In 2019, pre-COVID, 96,000 workers were employed at a designated *Best Workplace for Commuters*, places where employers offer commute benefits such as subsidized transit passes, vanpooling, bicycle facilities or telework. The following travel, air quality, and energy saving impacts were calculated due to the collective efforts of Triangle TDM service providers in FY19-20:

- 6.5 million vehicle trips avoided
- 2.9 million gallons of gas saved
- 70 million commute miles reduced
- 58 million pounds of carbon dioxide (CO₂) release prevented

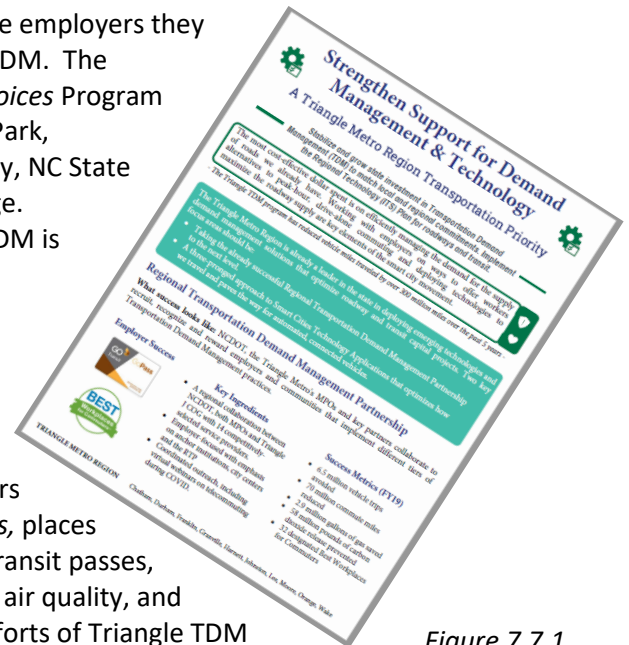


Figure 7.7.1 Triangle Transportation Priority Addressing TDM

The region's TDM program is based on the *Triangle Region Transportation Demand Management Plan*. First adopted in 2007, the TDM plan was revised in 2014. Goals for a major rewrite of the plan were developed in 2019 and the update will be completed in 2022. Implementing the plan is designed to support the goals of NCDOT’s 2018 Statewide TDM Plan Update: “achieve improved accessibility, connectivity, economic growth, environment, public health and safety through enhanced performance transportation demand management service provisions.” The [Triangle Transportation Choices](#) program provides a systematic framework for TDM coordination and a mechanism for more state and federal funding for TDM.

The TDM approach recognizes that the most effective TDM strategies are targeted to job hubs: places where employment is concentrated, especially sites where transit service is available and/or parking is costly or inconvenient, such as in downtowns and at university campuses. These hubs, based



Figure 7.7.2 TDM Coordinators tabling at Rex Hospital

on job density metrics, are updated periodically, and used to help service providers understand the evolving employment landscape, and to help funders understand where services are being targeted and how hubs align with existing transit services. In addition to the hubs, the TDM program has mapped the locations of equity-based *REINVEST Neighborhoods* so that TDM efforts can be targeted to link historically under-represented communities to job hubs.

Continuing to implement and extend this TDM Plan is included in the *Connect2050* Plan. Implementation includes a recommendation for more stable, multi-year funding for the TDM program and:

- aggregating funding from the sponsors: state funds from NCDOT and federal funds allocated by the Capital Area MPO and Durham-Chapel Hill-Carrboro MPO,
- issuing a competitive call for projects from providers of TDM services, and
- working with an Oversight Committee of state and MPO staff that works with applicants to refine their proposals and makes recommendations for funding.

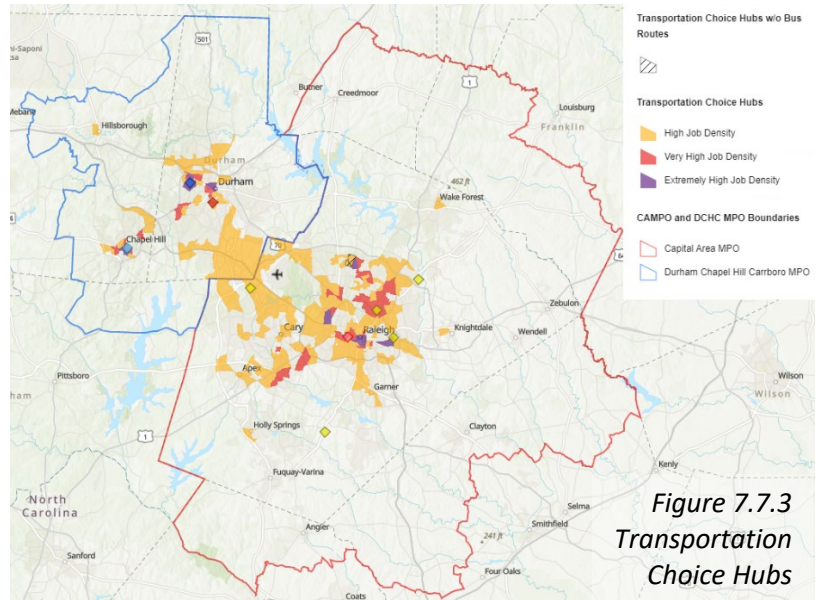


Figure 7.7.3
Transportation Choice Hubs

Based on this plan and the current level of the region’s comprehensive, coordinated TDM program, the 2050 Metropolitan Transportation Plans include continued funding for TDM services and will follow the existing model where service providers supply a significant cost share to match federal and state funds.

The key Transportation Demand Management strategies in the 2050 Metropolitan Transportation Plan are:

1. Continue to invest in a collaborative regional program between the two MPOs and NCDOT through a single coordinating agency providing administrative, fiscal and measurement services.
2. Periodically review and update the regional TDM plan to serve as the guidance document for regional TDM collaboration roles and responsibilities.
4. Continue and strengthen the regional collaboration’s “three-legged stool” of services:
 - a. “foundational” services provided throughout the region by a designated regional service provider,
 - b. local services in selected hubs provided through a competitive process involving local service provider funding matches, and
 - c. support and recognition programs for measurable “best practice” employers
5. Review and modify “transportation choice hubs” locations where TDM efforts can be most effective.
6. Continue to examine the use of new technologies and innovative demand management techniques such as parking cash-out programs or TDM-based land use criteria.
7. Refine the measurement of TDM program impacts by adding more evidence-based techniques, such as the new FHWA-funded TDM Return-On-Investment (ROI) calculator.
8. Contribute to NCDOT’s Vehicle Miles Traveled (VMT) Reduction Task Force and seek opportunities to implement TDM strategies arising from the Task Force’s work.

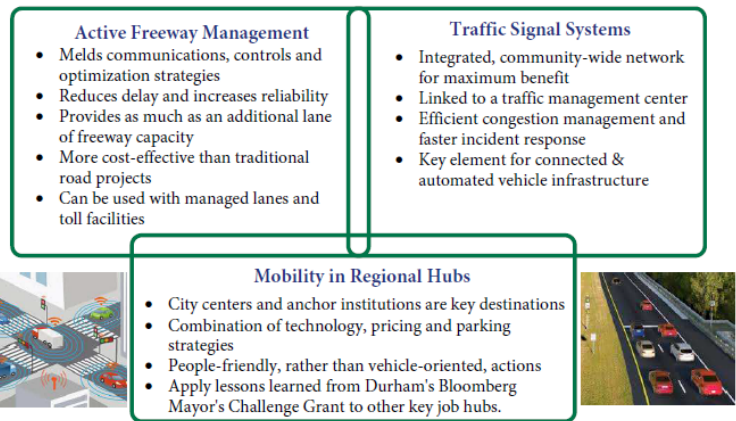
The TDM program can be a crucial component of the overall transportation system, spurring employers to encourage the use of alternatives to driving alone and helping commuters understand and use alternatives.

7.8 Transportation Technologies

Technology has long been an important part of the transportation system, from safety features on private vehicles to traffic information and traffic control signals and devices in public investments. This section of the plan addresses both vehicle technologies and public facility and service investments. Strengthening support for transportation technologies was chosen by the MPOs as one of their top transportation priorities, with an emphasis on active freeway management, traffic signal system integration and mobility in regional hubs.

Smart City Technologies

What success looks like: Technology applications that overcome uncertainty and take evidence-based steps to better manage freeways, local streets and travel in our region's hubs.



Technological advancement is anticipated to significantly affect mobility over the span of this plan. Much of this advancement is expected to be vehicle-oriented, with the continued introduction of connected and autonomous vehicles. Levels of vehicle automation lie along a spectrum:

0	1	2	3	4	5
No Automation	Driver Assistance	Partial Automation	Conditional Automation	High Automation	Full Automation
A human driver is in control of all driving functions.	An advanced driver assistance system (ADAS) can assist the human driver in either steering or braking/accelerating, but never at the same time.	ADAS can control both steering and braking/accelerating simultaneously, but requires the human driver to continue to pay full attention at all times and assume control outside of those two functions.	All driving functions are performed by an automated driving system (ADS) in some circumstances, but the human driver must be able to respond when requested by the ADS. The driver assumes control in environments unmanageable by the ADS.	All driving functions are performed by an ADS in some circumstances, during which the driver does not need to pay attention. The driver assumes control in environments unmanageable by the ADS.	All driving functions are performed by an ADS in all circumstances. Human occupants are now passengers as opposed to drivers.

Although autonomous vehicle technology continues to make in-roads, its market penetration may not result in substantial changes in public infrastructure investment decisions until the long-term period of this plan (post-2040). Forecasts of market penetration vary widely, but Level 4 and Level 5 vehicles may only become a large enough share of the market to affect infrastructure design and capacity in the long-term future. Nevertheless, it may be worthwhile to explicitly consider impacts of faster or slower market penetration in decisions about fixed, costly and long-lived assets, such as parking garages or freeway widenings, especially if assets would be difficult to repurpose for a society with extensive automated and connected vehicles.

Significant market penetration may occur soonest for fleet vehicles such as trucks, buses and other vehicles where vehicle operators are a significant part of the cost of a service and where operator rest time (and thus vehicle down time) is important for safe operation. The MPOs and their regional partners will continue to track and report on information and sources on autonomous and connected vehicles. Appendix 5 lists resources on autonomous and connected vehicles.

In this plan, public investments in technology are grouped under the term "Intelligent Transportation Systems (ITS)," a set of diverse technologies designed to make existing transportation infrastructure, facilities and services more efficient and safer. The MPOs and NCDOT jointly completed the most recent [Triangle](#)

[Regional ITS Strategic Deployment Plan](#) (SDP) update in 2020. The update covers both MPOs and provides a roadmap for near-term, mid-term and long-term deployment of ITS technologies to enhance efficiency and sustainability by pursuing 42 action items and 30 projects:

Triangle ITS Projects		
Unified Transit Farebox System	AVL Technology for Transit	Transit Signal Priority/Bus Rapid Transit
Complete Regional Fiber Network	Corridor Traffic Signal Timing	Adaptive Traffic Signal System
New/Updated Traffic Signal Systems (10 project communities)	Regional Standards: Software, Hardware, Communications	Software/Hardware Platforms for Connected and Autonomous Vehicles
Expand Travel Information Coverage	Current Deployments Inventory	Integrated Corridor Management
Emergency Pre-emption	Managed Motorways	Parking Deck Occupancy Detection
Sub-Region Transportation Management Center	Incident Response Training	ITS Equipment Operation and Maintenance Training
Consolidated Municipal Signal Systems Management	Centralized Data Warehousing and Distribution	System Consolidation and Management Agreements

To accomplish this work, the two MPOs have created a regional ITS working group that is being facilitated by the Triangle J Council of Governments.

The Strategic Deployment Plan is designed to “mainstream” ITS projects into the overall transportation planning process for both MPOs and NCDOT. This is being accomplished in a variety of ways. CAMPO’s Locally Administered Projects Program (LAPP) has funded ITS projects annually using STP-DA funding, including investments in several strategic corridors such as US-64 and I-40. ITS projects are also incorporated through Transportation Improvement Program updates.

7.9 Investments for Safe, Effective Transportation System Management (TSM)

Transportation System Management (TSM) solutions increase efficiency and safety by allowing the current transportation network to operate with fewer travel delays. TSM projects are less costly than building or widening roadways and making new public transit capital investments. They can provide cost effective solutions that are implemented quickly or in phases, and with comparatively few environmental impacts.

Like TDM investments, TSM investments are treated as “programmatic” in this plan: sources and amounts of funding are designated in this Plan for TSM projects, but the individual projects aren’t listed, as they will be selected as needs arise; the nature of the projects will depend on project-specific design characteristics.

The following list provides examples of the types of TSM projects that are expected to be implemented through the 2050 MTP period. This list is not exhaustive because solutions will be designed for the unique challenges of a particular intersection or corridor, and the types of TSM solutions will continue to evolve.

- Widening of approach widths for key intersections;
- Installation and/or adjustment of traffic signals, including dynamic signal timing coordination and signal preemption;
- Provision and lengthening of turn lanes;
- Limitation or prohibition of driveways, turning movements, trucks, and on-street parking;
- Construction of median U-turn, Quadrant, continuous flow and other unique intersection and interchange designs;
- Fixing horizontal/vertical curves, insufficient ramp lengths, weaving sections and other geometric deficiencies;
- Implementing Bus on Shoulder System (BOSS) for transit buses and express shoulder lanes for all vehicles.
- Installation of traffic calming devices for residential neighborhoods; and,
- Traffic circles and roundabouts at appropriate intersections.

7.10 Specialized Investments: Railroads and Airports

Railroads

The region is traversed by several key rail corridors, most notably the state-owned North Carolina Railroad Company (NCR) right-of-way that stretches from Morehead City to Charlotte. Other major lines are owned by the region's two Class I railroads: Norfolk-Southern and CSX. The NCR corridor carries both freight and intercity passenger rail traffic; existing passenger rail stations within the MPO boundaries include Raleigh, Cary and Durham.

The CSX "S" line heading north from central Raleigh and south from central Cary intersects the NCR corridor along a section carrying freight and passenger traffic. The CSX "S" line from Richmond to Raleigh and the NCR from Raleigh to Charlotte is also part of the Federally-designated Southeast High Speed Rail (SEHSR) Corridor.

This *Rail Investments* section of the plan focuses on freight rail and intercity passenger rail that links the Triangle to other regions. Rail services within the region – such as Commuter Rail -- are addressed in *Section 7.5 Transit Services*. General freight issues--including freight carried by rail--are addressed in *Section 7.11 Freight Movement & Logistics*. The recently completed regional freight plan notes that the volume of rail freight carried in and through the Triangle is expected to decrease slightly during the time frame of this MTP, due in part to declines in coal shipments as the region's energy mix changes.

Rail planning and investments are frequently a cooperative effort between owners and operators of rail assets and partner agencies. For example, a project to straighten curves and replace an at-grade crossing with a bridge may involve funding and other contributions from the North Carolina Railroad, Norfolk-Southern and NCDOT's Rail Division. Funding from NCDOT is from state and federal sources, including Federal Railroad Administration competitive grants. Rail-related investments that involve roadway improvements and are included in the Transportation Improvement Program are included in the fiscal constraint analysis and transportation modeling that are part of this 2050 Plan.

Investments that do not affect track capacity or cross streets are not specified in 2050 MTP project lists. Examples include safety improvements at highway-rail crossings or short sidings that serve adjacent properties.

Several projects and studies have been recently completed, are underway, or are planned to improve the performance of rail services within the region. Many were part of NCDOT's Piedmont Improvement Program that received \$520 million in Recovery Act funding targeted specifically for passenger rail improvements. Recent, on-going and planned Triangle rail projects and studies include:

1. Cary Depot (\$2.3 million project completed in 2011)*
2. Raleigh Union Station (completed)
3. Hillsborough Passenger Rail Station (\$7,860,000 in FY22-23)
4. Raleigh West Street Grade Separation
5. NCDOT Capital Yard Railroad Maintenance in Raleigh (\$6.1 million project completed in 2012)*
6. Hopson Road Grade Separation and Nelson to Clegg passing siding (completed in 2015)*
7. Morrisville Parkway Grade Separation (completed in 2016)*



North Carolina Railroad Company/Nick D'Amato

8. "NC 54 and More" Corridor Feasibility Study (road project in Morrisville along the NCRR right-of-way, including proposed grade separations of connecting roads and the railroad)
9. East Durham Siding Project (Ellis/Glover) (\$42,500,000 in F22-29)
10. Cornwallis Road Grade Separation (\$27,478,000 in FY22-24)
11. Piedmont Service Expansion rail car purchases and Piedmont/Carolinian operations funding (statewide projects)
12. Raleigh East 2nd Main Track (study completed in 2013)
13. Morrisville to Cary 2nd Main Track (study completed in 2011)
14. Blue Ridge Road Grade Separation
15. Boylan Junction Improvements
16. Churton Street bridge widening over NCRR
17. NCRR Bridge over NC 54 Replacement (\$5.5 million project completed in 2006)

(* asterisk denotes part of Piedmont Improvement Program)

Current North Carolina intercity passenger rail service consists of four trains in each direction each day operated by Amtrak and serving the Durham, Cary and Raleigh stations. Three of the trains travel between Charlotte and Raleigh, while the fourth continues north from Raleigh to Washington, DC and New York City via a route heading east to Selma in Johnston County, then north along the CSX "A" line that roughly parallels I-95. Pre-COVID, ridership had increased steadily on the service; during the seven months of October 2018-April 2019, ridership on the trains was 274,000. During April 2019, 25,700 passengers boarded or alighted from the trains at the three Triangle stations: Raleigh, Durham and Cary. One additional Raleigh-Charlotte Piedmont daily train is planned to be added.

Planning for Southeast High Speed Rail envisions high performing rail operating within the region along the NCRR corridor east to Raleigh at speeds up to 90 mph, then north along the CSX "S" line at speeds up to 110 mph. The NCDOT Rail Division is leading efforts to provide a "sealed corridor" for higher speeds and additional trains, closing or bridging existing at-grade crossings where feasible to improve both safety and operations. The NCRR has led commuter rail capacity and ridership studies to better understand the interplay of freight and passenger rail operations within the region and the range of track investments that might be needed to accommodate increased shared use.

Due to the complexity of rail investments and the myriad of interested organizations, the MPOs have in the past periodically brought together public and private sector owners and operators of critical rail assets along with the communities and anchor institutions adjacent to the rail lines. These forums can help stakeholders: i) better understand projects affecting the region's main rail corridors, ii) identify interests of primary importance to the stakeholders, and iii) generate collaborative efforts to advance shared interests.

Ensuring that any investments affecting our rail corridors are done with detailed attention to longer term impacts on forecast freight movement, inter-city passenger rail, regional rail connections contained in this MTP, and opportunities for High Speed Rail is a key strategy for the two MPOs in this plan. Ensuring that near term decisions do not constrain choices or drive up costs for mid-term and long-term services is an important consideration for the MPOs. As both in-region rail connections are implemented, and intercity rail services connecting the Triangle to other regions are expanded, taking steps to make sure that service is fast and reliable will be important to attract and retain ridership. For the first half of federal fiscal year 2019, only 64% of Carolinian and 62% of Piedmont intercity passenger trains arrived on time, defined as within 20 minutes of scheduled time for the Carolinian and 10 minutes of schedule time for the Piedmont.

Airports

Raleigh-Durham International Airport (RDU) serves both MPOs with passenger and air cargo services. The airport is located on 5,000 acres near the boundary between the two MPOs in Wake County, and is governed as an authority with board members appointed by the largest jurisdictions in the two MPOs: Wake County, Durham County, Raleigh and Durham City.

Pre-COVID, 2019 was RDU's busiest year on record, with RDU serving 14.2 million passengers, over 80,000 tons of enplaned cargo and 220,000 aircraft operations.



Over the past decade, RDU has undertaken major projects designed to improve aviation services:

- Terminal 2 was completed in 2011; this \$573 million, 920,000 square foot project included 37 boarding gates
- Terminal 1 reconstruction was completed in 2014; this \$68 million project rebuilt the oldest terminal at RDU.

RDU completed a new master plan – [Vision2040](#) – in 2017. Vision 2040's baseline forecast, used for *Connect2050*, envisioned growth in enplaned passengers (those boarding at RDU) from 5.5 million in 2016 to about 8.5 million (RDU reached 7 million enplaned passengers in 2019). Growth was tracking about a decade faster than *Vision2040* projected pre-COVID, but it remains unclear what long-term effect COVID may have on air travel, and especially business travel as employers and workers have become more familiar and comfortable with remote meeting technology. No additional terminal gates are planned in the first ten years of Vision2040 plan. General aviation operations are expected to grow modestly.

Regardless of longer-term passenger volumes, RDU continues to pursue other critical capital projects:

1. The first phase of the Terminal 2 security checkpoint expansion was completed in 2019, adding two lanes.
2. Replacement of the primary runway near Terminal 2, referred to as 5L-23R, which is nearing the end of its useful life.

A [2021 report](#) from a business-led task force on RDU considered the issues of funding and financing of future improvements, given an estimated \$500 million funding gap by 2030 -- after utilizing additional debt capacity -- and additional \$1 billion funding gap by 2040 for recommended improvements. The final report noted the importance of new funding and authorizations for increased passenger facility charges from federal sources and increased authority from the state to attain the vision, but also highlighted strategies that the airport and its local partners could take, including increasing the current municipal and county contributions to the airport, raising parking fees and instituting an airport access fee, monetizing some of the extensive non-airfield land at RDU and devoting some hospitality tax revenues for airport investments.

One other publicly owned general airport is located within the MPO boundaries: the Triangle North Executive Airport in Franklin County, with a 5,500-foot long asphalt runway. About 120 airplanes and six helicopters are based at the airport. The airport has more than 75 tenants, including on-site businesses that provide maintenance and flying lessons, among other services. The airport has recently completed an airfield lighting project and received a \$12 million grant to rehabilitate the airfield and expand the apron to add more tiedown spaces; the current spaces are at capacity.

7.11 Freight Movement and Logistics

Successful economic development depends on the fast and reliable movement of people, goods and information. For the 2050 Metropolitan Transportation Plan, the two MPOs engaged in an extensive and systematic examination of freight trends and opportunities through a new Triangle Regional Freight Plan to ensure that goods movement is a key component of long-term transportation investment decisions. The MPOs formally adopted recommendations in the latter half of 2018, that included some key freight movement forecasts and principles to guide MPO transportation investment decisions.

Also, the two MPOs at a statewide level contain a total of nine (seven highway and two rail) corridors that form the core network of multimodal passageways that are identified as North Carolina's Strategic Transportation Corridors. The state of North Carolina considers these strategic transportation corridors the highest priority when analyzed within the framework of regional or local transportation plans.

The growing regional attention to freight movement has been matched at the state and federal levels. The recently adopted federal *Infrastructure Investment and Jobs Act* (IIJA), along with North Carolina's Strategic Transportation Investments (STI) law places increased emphasis on freight planning and investment. Leveraging state and federal interest is a driving force in the MPO's approach to freight movement.

An examination of trends and forecasts for the regional freight plan found that:

1. The highway system is and will remain the principal freight mode in the region: 80% of both freight tonnage and freight value in the region moves by truck. By 2050, the amount of freight moved by truck is expected to grow by a third. Because of its advantage in moving heavy commodities, rail carries 16% of the region's freight tonnage, but only 2% of its freight value, and is not forecast to grow significantly.
2. "Truck tonnages are expected to increase considerably out to 2050, especially for shipments to and from the Triangle Region."
3. "Projects are needed to ensure that the roadway network keeps up with the rapid increase expected of inbound and outbound shipments....improving the routes that are already congested that provide regional connection to Interstates and the rest of the State."
4. "Total freight rail volumes are forecasted to have minimal growth in the Triangle Region over the coming decades...chiefly due to the decline in coal, which offsets growth in other areas...total tonnage is expected to remain roughly constant out to 2050."

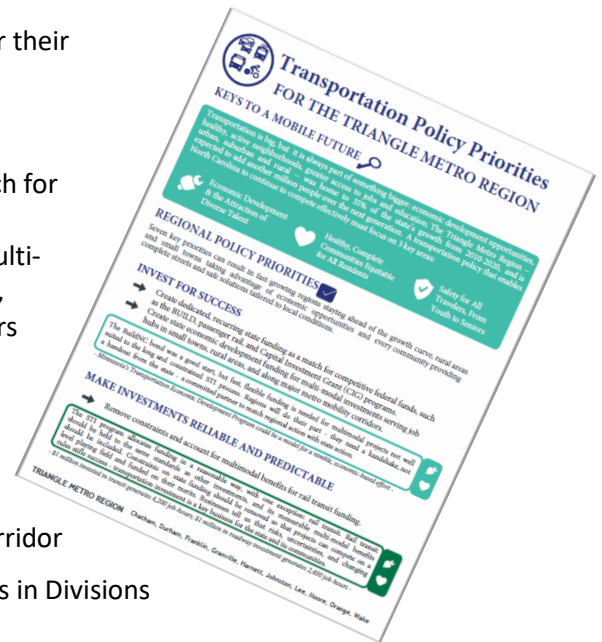
Key freight movement principles that the MPOs will use to inform investment decisions include:

1. As with the movement of passengers, paying close attention to the location of major freight facilities and destinations relative to the transportation network is important; linking industrial land use decisions to the careful design of road and rail access can yield cost-effective solutions. Just as Transit-Oriented Development (TOD) has become a principal tool in regional land use planning to support transit corridor investments, Freight-Oriented Development can help inform industrial land use planning and supply chain logistics along strategic freight corridors and in freight industry clusters.
2. Logistics and supply chain performance expectations change rapidly. In particular, supply chains designed for home deliveries continue to grow in importance with the acceleration of e-commerce.
3. On the road system, freight bottlenecks with significant truck volumes are key priorities, with a tiered approach to address (i) routes that connect the Triangle to other regions, (ii) distribution routes that link freight industry clusters with activity centers, and (iii) critical access routes serving industrial sites.
4. On the rail system, network reliability and speed will be important considerations for goods movement as bulk commodities like coal become less important, with the added benefit that reliability and speed are also important to passenger rail that shares tracks with freight trains.

7.12 Policy Priorities, Special Plans, Projects, Studies & Performance Tracking

Both MPOs have adopted a set of policy priorities to make clear their common interests and focus joint efforts. The priorities are:

- ❖ Invest for Success
 - Create dedicated, recurring state funding as a match for competitive federal funds
 - Create state economic development funding for multi-modal investments serving job hubs in small towns, rural areas and along major metro mobility corridors
- ❖ Make Investments Reliable and Predictable
 - Remove constraints and account for multimodal benefits for rail transit funding
- ❖ Enable More Cost-Effective Critical Corridor Investments
 - Relax the cap on statewide tier funding within a corridor
- ❖ Remove Funding Barriers for Small Towns and Rural Areas in Divisions with Large MPOs
 - Exempt Surface Transportation Block Grant-Direct Allocation Funding from the STI Allocation
- ❖ Make NC a Leader in Active Transportation Investments
 - Surpass peer states in funding economically beneficial and safety-focused bicycle & pedestrian projects
- ❖ Strengthen Support for Demand-Management & Technology
 - Stabilize and grow NCDOT's investment in Transportation Demand Management (TDM) to match local and regional commitments.
 - Implement the Regional Technology (ITS) plan for roadways and transit
- ❖ Recognize Statewide Projects in All Modes, Not Solely Roadways and Freight Rail
 - Establish standards and scoring criteria for designated statewide passenger rail and trail investments



These priorities have been used in selecting investments and strategies included in this plan, and will be used for collaborating with federal, state and regional partners in pursuing funding, regulatory and programmatic changes that can be effective in implementing this plan.

Section 5.4 identified corridor studies, small area plans, feasibility studies, functional plans or similar efforts that have been completed and provided input into the development of the Metropolitan Transportation Plan.

This section outlines recommended plans or studies using the same format as the completed plans and studies described in Section 5.4. Although this section is not designed to list every plan or study that may be undertaken, it indicates some of the major efforts that the two MPOs and their partners anticipate pursuing through their annual Urban Planning Work Programs (UPWPs): the planning budgets that guide MPO activities each fiscal year. Also included are major efforts designed to improve the input data, accuracy and functionality of the region's principal analysis tool, the Triangle Region Travel Demand Model (TRM), and increased efforts to better track and report progress towards achieving this plan's vision, goals and objectives.

	Recommended Plan or Study (green cells are DCHC MPO; yellow cells are CAMPO)	Type
1	<i>US 15-501 Corridor Study.</i> An MPO study to further refine a corridor vision that was first completed in 2020 but will be studied additionally to address concerns regarding bicycle and pedestrian movement, transit accommodation, and ensuring the corridor is sensitive to the local urban fabric. The study will be based on public and stakeholder input, identify capacity and safety deficiencies, propose policies and projects, and create an implementation plan. 2025 expected completion.	Corridor Plan
2	<i>US 70 West.</i> An MPO and NCDOT study to evaluate solutions for the US 70 corridor from Mebane in Alamance County to eastern Orange County, including the Town of Hillsborough. It will conduct public and stakeholder outreach, develop improvement projects and strategies, and create an implementation plan. 2023 expected completion.	Corridor Plan
3	<i>US 70 East.</i> This MPO study, to be conducted with the City and County of Durham and NCDOT, will evaluate potential multi-modal solutions to address all transportation needs in the US 70 corridor in eastern Durham County. This study will look at a range of possibilities other than a limited access freeway to accommodate movement for all modes, while still addressing traffic congestion. 2023 expected completion.	Corridor Plan
4	<i>Downtown Durham Freeway Conversion Study.</i> An MPO and City of Durham study to explore in greater detail the 2020 Move Durham study. A recommendation from that study was to investigate converting the Durham Freeway (NC-147) into a boulevard to reconnect the community split in two when the freeway was constructed in the 1970s. This study will look at various alternatives for how the conversion to a boulevard could take place and propose a strategy and projects that allow the facility to balance the current and future operational needs of all users. 2023 expected completion.	Corridor Plan
5	<i>South Churton Street Corridor Study.</i> This engineering study conducted by the Town of Hillsborough will identify a preferred cross-section and project scope for U-5845, Widening of South Churton Street in Hillsborough. Completion is expected in 2024.	Corridor Plan
6	<i>Hillsborough Greenway Special Study.</i> A Town of Hillsborough study to collect data to identify a feasible and constructible greenway connecting the planned train station to housing and commercial developments, including development south of I-40. The study will identify constraints and alternatives, and develop a locally preferred alternative, implementation plan, and construction cost estimates. 2024 expected completion.	Greenway Plan
1	<i>Connected Region Guide.</i> The two MPOs and other public and private sector partners will continue to pursue grant funding to develop a regional-scale guide to align land use, transit investment and affordable housing decisions along key regional corridors.	Land Use, Transit and Housing Plan
2	<i>CommunityViz 4.0.</i> The 2050 MTP and its predecessors developed future growth scenarios based on a land use model called CommunityViz. The model provides population and job growth allocations in a format that can be imported into the Triangle Regional Model (TRM). The CommunityViz4.0 effort will include an update of socio-economic data for use in the next MTP as well as more seamless links to TRM methods and technical changes to improve accuracy and precision of the forecasts.	Transportation Model Improvement
3	<i>Triangle Regional Model Services Bureau Activities.</i> The Triangle Regional Model Services Bureau oversees major model updates as well as shorter term model improvements. Future work will include: (1) introduction of an entirely new G2 model, (2) improved links to CommunityViz, (3) updated parking and other pricing data, (4) continued progress on a regional STOPS (transit ridership) model, and (5) examining ways to better address the travel of visitors and account for special events.	Transportation Model Improvement

	Recommended Plan or Study (green cells are DCHC MPO; yellow cells are CAMPO)	Type
4	<i>MPO Metrics Tracking.</i> The MPOs and partners such as transit agencies will implement methods to support MTP performance measures, targets and project tracking.	Performance Measurement
5	<i>ITS Deployment Plan Update</i> – The regional ITS plan was updated in FY 2018, and recommended several ITS projects included in subsequent TIPs. The plan is anticipated to be updated every 4-5 years to examine technological changes and partnerships that have been developed since the original plan adoption.	Technology Plan
1	<i>Southwest Area Study Update.</i> The MPO completed the update of the Southwest Area Study during FY 2019, with recommendations from that update carried forward to inform the 2050 MTP. The study examined growth forecasts and developed a long-range and interim list of multi-modal transportation improvement priorities. This study is anticipated to be updated every 4-5 years.	Small Area Plan
2	<i>Northeast Area Study Update.</i> The MPO completed the update of the Northeast Area Study during FY 2020, with recommendations from that update carried forward to inform the 2050 MTP. This study included the municipalities Wake Forest, Rolesville, Knightdale, Wendell, Zebulon, Youngsville, Franklinton and Bunn, as well as the surrounding areas of Franklin and Wake Counties. The study examined growth forecasts and develop a long-range and interim list of multi-modal transportation improvement priorities. This study is anticipated to be updated every 4-5 years.	Small Area Plan
3	<i>Southeast Area Study Update.</i> The MPO anticipates beginning the update of the Southeast Area Study during FY 2022 to inform future MTP updates. This study will cover the municipalities of Archer Lodge, Clayton, and Garner. Surrounding areas in Johnston and Wake Counties will also be included. The study will examine growth forecasts in the area, and develop a long-range and interim list of multi-modal transportation improvement priorities for the subarea described. This study is anticipated to be updated every 4-5 years.	Small Area Plan
4	<i>Wake Transit Plan Update.</i> The Wake Transit Vision Plan is required to be regularly updated. This effort will develop the next update as well as serve as the foundation for the transit element of the Comprehensive Transportation Plan and MTP. It will identify, evaluate and prioritize future transit needs and will use a needs-based planning process and engage transit stakeholders, including local governments and the public, throughout the process. It will include a detailed analysis of current and future transit system needs and provide recommendations for a decision-making framework to guide future policy decisions. Results should be a prioritized set of infrastructure improvements necessary to implement the required Wake Transit Vision Plan update.	Transit Plan
5	<i>Major Corridors Study.</i> The MPO and NCDOT will create a transportation vision that will propose a strategy, projects, and programs that balance the current and future mobility needs, particularly in commuting corridors, for all users.	Corridor Study
6	<i>Raleigh-Fayetteville Passenger Rail Study</i> – Following an effort in FY 19 to examine opportunities for passenger rail between Raleigh and Fayetteville, this study is anticipated to act as a Phase II of that work. It is anticipated to begin in FY 22 in partnership with the NCDOT and Fayetteville Area MPO, and will conduct additional detailed study on the possibility of passenger rail, and will recommend possible operational scenarios, needed capital improvements, and cost estimates.	Corridor Study

	Recommended Plan or Study (green cells are DCHC MPO; yellow cells are CAMPO)	Type
7	<i>North-Central Area Study</i> – In prior fiscal years, CAMPO has conducted studies of NC 50, NC 56 and NC 98 in the north-central portion of the planning area. In lieu of updating those individual corridor studies, it is anticipated that an area study may be conducted to do a more comprehensive network and land use analysis in that area of the region. This study could start in FY 24.	Small Area Plan
8	<i>NC 751 Corridor Extension</i> – The 2018 Southwest Area Study update identified the need for additional NC Highway network connectivity between US Highway 64 and US 401 through a combination of existing roads (New Hill Olive Chapel/Holloman Rd) and new location roadways. <i>MTP Project A173, A190</i>	Future Route Designations
9	<i>NC 55 / NC 55 Business Corridors</i> – The 2011 Southwest Area Study and the 2018 update identified the benefits of re-routing a portion of the NC 55 corridor in Fuquay-Varina around the existing congested corridor and historic Varina business district. This would be accomplished using the northeast portion of Judd Parkway and a new location grade separation over US 401, connecting to existing NC 55 south of the existing NC 42/NC 55 intersection. The existing corridor would be designated as NC 55 business. <i>MTP Project A679ab</i>	Future Route Designations
10	<i>NC 42 / NC 42 Business Corridors</i> – The NC 42 corridor in Johnston County is co-located with US 70 business and Lombard Street corridors through the Town of Clayton. Analysis conducted during the 2016 Southeast Area Study identified the network benefits to re-locating a portion of NC 42 around the existing congested corridor using the Ranch Road and US 70/Clayton Bypass corridors. The existing corridor would be designated as NC 42 business. <i>MTP Project Jhns13abc</i>	Future Route Designations