

## 7. Our Long Range Transportation Plan

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 activities that promote an effective and efficient transportation system.

The transportation investments are summarized in the following categories:

- Roadways (with accompanying project list in Appendix 1)
- Public Transportation (project list in Appendices 2 & 3)
- Bicycle and pedestrian projects (Appendix 4)
- 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

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 1.6 million people here today and the additional 1.3 million expected to be added over the timeframe 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 interests and local land use decisions are most pronounced in three cases:

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

Transit Station Area Development. The MPO Metropolitan Transportation Plans include about \$3 billion in capital investments in rail service connecting our region's five largest activity centers and linking these centers to neighborhoods across the region (see transit investment details in section 7.3). Ensuring that well-designed, compact, mixed use development occurs within the first half mile around transit stations is a key element in determining how cost-effective major transit investments will be. Working with a range of local and regional partners, Triangle Transit and the Triangle J Council of Governments have created a Land Use-Community Infrastructure-Development (LUCID) effort to develop and share practices that can be used by local governments and other organizations to support fixed guideway investments such as rail and bus rapid transit. Continuing to build on this partnership is an important and cost-effective way to match local land use decisions with regional transportation investments.

Major Roadway Access Management. Roads serve two main purposes. One is mobility and the other is access. Mobility is the efficient movement of people and goods. Access is getting those people and goods to specific properties. A roadway designed to maximize mobility typically does so in part by managing access to adjacent properties. A good example is an Interstate Highway. While a motorist could expect to travel quite efficiently over a long distance using an Interstate Highway, the number of access points is restricted to only freeway interchanges every few miles. This type of roadway serves primarily a mobility function. At the other end of the spectrum, a local residential street would provide easy and plentiful access to all adjacent properties, but long distance travel on such a roadway would be time consuming and inconvenient. This type of roadway serves primarily an access function. Many costly road investments involve widening roads to provide additional travel capacity. Where these investments are made, the MPOs will work with the NCDOT and local communities to ensure that the new capacity is not inappropriately degraded by a pattern of “strip development” requiring numerous driveways and median cuts.

Complete Streets & Context-Sensitive Design. Roadways are the largest component of our communities’ public realm: the spaces all of us share with our neighbors and which provide access to the front doors of homes and businesses. Especially where roadways 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.

So in the three instances summarized above: transit station area 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 Triangle Transit and the Triangle J Council of Governments to coordinate land use decisions and transportation investments.

## **7.2 Roadways**

This section contains maps and a list of major road investments in the 2040 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 1.

Projects are separated into four categories based on anticipated date of completion. 2020 projects are projects already underway with full funding and an expected completion date by 2020, derived from the adopted Transportation Improvement Program (TIP). The 2030 and 2040 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 anticipated funding constraints, a fourth category includes projects that had merit but could not be completed by 2040 with anticipated revenue. These projects that are not part of our fiscally constrained plans are compiled separately. Each project in the fiscally-constrained plan has a project identifier that is shown on the 2040 MTP Road Project Map. The project listing in Appendix 1 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.

Figure 1.1 in the Executive Summary is a map of roadway projects by time period (2020, 2030, 2040, post-2040) and Figure 7.2.1 on the next page is a listing of the major highway projects by time period in each MPO. A larger version of the roadway map is available on the MPO web sites.

Figure 7.2.1. Major Highway Projects by MPO and Time Period

Durham Chapel Hill-Carrboro MPO		
2011-20	2021-30	2031-40
Triangle Expressway extension of the Durham Freeway (I-40 to NC 540)	Managed lanes added to I-40 from Wade Avenue (Wake County) to NC 147 (Durham Freeway)	Managed lanes added to I-40 from NC 147 (Durham Freeway) to US 15-501 (Durham County)
East End Connector completed linking US 70 to NC 147 (Durham Freeway)	I-85 widening (I-40 to Lawrence Rd)	I-85 widening (Lawrence Rd to Durham County)
I-40 widening (US 15-501 to I-85)	I-85 widening (US 70 to Red Mill Road)	US 15-501 freeway conversion (I-40 to US 15-501 bypass)
	US 70 freeway conversion (Lynn Road to Wake County line)	Northern Durham Parkway (Aviation Pkwy to US 501)
Capital Area MPO		
2011-20	2021-30	2031-40
I-40 widened from Wade Ave. to Lake Wheeler Road	I-40 widened from I-440 to NC 42 in Johnston County	NC 50 widened from I-540 to Dove Road
I-40 widening through Cary	US 1 upgrade to freeway from I-540 to NC 98	Managed lanes added to I-540 (Northern Wake Expressway) from I-40 to US 64 bypass
US 401 widened from I-540 to Louisburg with a Rolesville bypass	NC 540 completed as a toll road from Holly Springs to US 64 bypass	US 401 widened from Garner to Fuquay-Varina
NC 540 completed as a toll road from Apex to Holly Springs	I-440 widened from Wade Avenue to Crossroads	Managed lanes added to I-40 from MPO boundary in Johnston County to Cornwallis Road
Brier Creek & TW Alexander Drive Interchanges on US 70	NC 54 widened through Cary and Morrisville	US 1 widening south from US 64 to NC 540
NC 42 widening from US 70 to Rocky Branch Road	I-40 Managed lanes added from Durham County line to Cornwallis Rd.	

## 7.3 Transit Services

Building on the prior work of a blue-ribbon Special Transit Advisory Committee (STAC) that completed its work in 2008, a complete transit system for the region focuses on three critical elements, Bus, Rail, and Circulators:

- **BUS:** A significant expansion of bus service throughout the Triangle, adding new routes to communities presently without service, and improvements to headways at existing transit agencies
- **RAIL:** Rail transit connecting the region's principal activity centers in Chapel Hill, Durham, Research Triangle Park, Cary and Raleigh
- **CIRCULATORS:** High-frequency, short-distance services linking nearby neighborhoods to major activity centers and the region's high capacity bus and rail corridors

While the STAC established the framework for the region’s transit vision, the recommendations on how to achieve this vision are being developed through the Triangle Regional Transit Programs composed of three county-level transit investment plans and three analyses of alternative investments in the region’s most promising transit corridors. These six inter-related efforts – and their current status – are:

1. Durham County Transit Plan (adopted)
2. Orange County Transit Plan (adopted)
3. Wake County Transit Plan (under consideration)
4. Wake-Durham Commuter Rail Service (recommended by Alternatives Analysis)
5. Durham-Orange Light Rail Service (adopted)
6. Wake County Light Rail Service (recommended by Alternatives Analysis)

For details on the current status of each of these six efforts, visit: [www.ourtransitfuture.com](http://www.ourtransitfuture.com)

These intensive planning efforts have led to Durham and Orange County voters approving ½ cent sales taxes for expanded transit service; and the submittal by Triangle Transit of a “New Starts” application to the Federal Transit Administration (FTA) for federal funding for a light rail line linking Chapel Hill and Durham.

Based on the three county-level transit investment plans and the three transit corridor alternatives analyses, new light rail transit, commuter rail transit, and bus rapid transit investments are included in the 2040 Capital Area MPO and Durham-Chapel Hill-Carrboro MPO Metropolitan Transportation Plans. Details on rail and BRT technology and services are contained in Appendix 2.

Light rail transit provides the opportunity for frequent, all-day passenger rail service to serve transit oriented development along growth corridors. With electric propulsion, light rail can save energy costs and operate without dependence on foreign oil.

Commuter rail service operates in existing mainline rail corridors, serves stations that are further apart than light rail transit, and emphasizes service during peak commuter hours, with the possibly of occasional mid-day and evening service.

Bus Rapid Transit can offer service characteristics similar to light rail, depending on the design of the system.

Proposed rail and bus rapid transit investments are summarized in Figure 7.3.1. Figure 1.2 in the Executive Summary displays a map of all the rail and bus transit services. The county-level transit plans and Alternatives Analysis documents for the Durham-Orange County Corridor, Wake County Corridor, and Durham-Wake County Corridor, which are available through the MPOs and Triangle Transit, provide additional detail on the investments anticipated by 2040.

*Figure 7.3.1 – Rail and BRT Projects by MTP Period (technical information in Appendix 2)*

<b>Rail or BRT Segment</b>	<b>Type of Service</b>	<b>MTP Period</b>
West Durham - Garner	Commuter Rail	by 2030
UNC Hospital - Durham Alston Avenue	Light Rail	by 2030
Durham Alston Avenue - Briggs Avenue	Light Rail	by 2040
N. Raleigh (Millbrook) - Cary CBD via Raleigh CBD & NCSU	Light Rail	by 2030
Chapel Hill MLK Corridor	Bus Rapid Transit	by 2030

A full listing of all bus transit projects including the implementation year and type of service is in Appendix 3. The bus transit investment includes extending current service areas, but also emphasizes service improvements to the current service areas, as outlined in the county transit plans.

Types of improvements include:

More frequent service, or improved headways. Current headways for buses in the Triangle are often one bus every 30 minutes during rush hour or every 60 minutes off-peak. This plan reduces many headways to once every 15 minutes or 20 minutes during rush hour.
Additional service hours to expand evening and weekend service on selected routes.
Bus routes will be re-aligned to connect with rail services wherever possible
New technology, such as satellite tracking of buses that allows for real-time information about buses to be relayed to the internet and cell phones, will be deployed.
Circulator service to provide a high quality “last mile” ride for transit patrons to reach their ultimate destinations.

## 7.4 Bicycle and Pedestrian Facilities

Bicycle and pedestrian transportation 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 and walking. Urban centers retain attractive, grid street patterns with retail and residential developments that lend well to biking and walking, and the scenery of the region's rural landscape provides opportunities for bicycle and pedestrian 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 2009, several important initiatives have been undertaken. In 2009, the North Carolina Department of Transportation adopted a Complete Streets Policy, which encourages streets to be designed and built to enable safe access for pedestrians, bicyclists, and public transportation users of all ages and abilities. Furthermore, communities have hosted various bicycle and pedestrian events, including many events during "Bike Month" in May. Finally, the number of motor vehicle crashes involving pedestrians and bicycles has motivated federal, state, and local officials to conduct training exercises and media campaigns concerning pedestrian safety.

In response to the increased popularity of bike and pedestrian travel, the DCHC and CAMPO MPOs are encouraging the creation of a pedestrian and bicycle system that provides an alternative means of transportation, allows greater access to public transit, and supports recreational opportunities. Regional and statewide facilities such as the East Coast Greenway, the Cross Triangle Greenway, and the American Tobacco Trail are heavily used as soon as segments are opened. Member governments coordinate planning efforts and strive toward the development of a safe, accessible and convenient network of regional bicycle and pedestrian routes. Many local governments in the region have prepared their own citywide and county bicycle and pedestrian plans and/or facility inventories. Granville County, for instance, has established a Greenway Technical Committee to develop a network of trails for local and regional use. The composite material from these plans and studies has contributed to bicycle/pedestrian corridor identification and facility proposals on a regional level, and guided the MTP 2040 Bicycle and Pedestrian Plan project components.

### Pedestrian Facilities

Pedestrian facilities in the Triangle region vary in type, condition and level of service. Urban areas within the MPO boundary are often outfitted with 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-residential areas. Also, many areas once classified as rural are seeing increases in development, and citizens are demanding pedestrian access from their neighborhoods to adjacent commercial or institutional uses. Local governments recognize these pedestrian needs, and are working toward filling the missing links in local sidewalk networks.



*Many thoroughfares lack sidewalks*

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 and business districts.

The MPOs rely on the “NCDOT Complete Streets Planning and Design Guidelines” and other guidelines to identify appropriate facility type, and depend on local plans for project identification. The MPOs rely on the “NCDOT Bridge Policy” and “NCDOT Pedestrian Policy” to ensure that new bridges in the urban area include sidewalks or have sufficient bridge deck width to accommodate future sidewalks. Projects are prioritized on a regional level for funding allocation. The following table presents recent local plans and inventories used for facility recommendations.

*Figure 7.4.1 – Local Plans and Inventories Used for Pedestrian Facility Recommendations*

• Carrboro Sidewalk Policy (1989)	• Durham DurhamWalks! Pedestrian Plan (2006)
• Chapel Hill Bicycle & Pedestrian Action Plan (2004)	• Hillsborough Vision 2020 Plan (1991, revised 1998)
• Apex Bicycle & Pedestrian Plan (2002)	• Knightdale Pedestrian Plan (2012)
• Cary Pedestrian Plan (2007)	• Raleigh Pedestrian Plan (2012)
• Creedmoor Pedestrian Plan (2011)	• Wake Forest Pedestrian Plan (2008)
• Garner Transportation Plan (1999)	• Zebulon Multimodal Transportation Plan (2001)
• Holly Springs Pedestrian Plan (2007)	

## **Bicycle Facilities**

The 2040 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 and wide shared roadways 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 2040 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.

The “NCDOT Complete Streets Planning and Design Guidelines” and AASHTO “Guide for Development of New Bicycle Facilities” act as construction standards for projects, and local agencies play a lead role in the implementation of new projects. The MPOs rely on the “NCDOT Bridge Policy” to ensure that new bridges have sufficient bridge deck width to accommodate planned bicycle facilities. Local plans supplement the MTP regional bicycle routes by identifying additional projects and development requirements to complete the regional bicycle transportation network. Figure 7.4.2 lists these local plans.



*Bicycle parking at a bus stop near the American Tobacco Trail.*

Figure 7.4.2 – Local Plans Used for Bicycle Facility Recommendations

• Carrboro Comprehensive Bicycle Transportation Plan (2009)	• Durham City and County Comprehensive Bicycle Transportation Plan (2006)
• Chapel Hill Bicycle & Pedestrian Action Plan (2004)	• Orange County Bicycle Transportation Plan (1999)
• Apex Bicycle & Pedestrian Plan (2002)	• Morrisville Land Use and Transportation Plan (2008)
• Cary Comprehensive Transportation Plan (2008)	• Raleigh Bicycle Transportation Plan (2009)
• Capital Area MPO Bicycle & Pedestrian Plan (2003)	• Rolesville Bicycle Plan (2010)
• Clayton Bicycle Plan (2005)	• Wake Forest Bicycle Plan (2006)
• Garner Transportation Plan (1999)	• Zebulon Multimodal Transportation Plan (2001)
• Holly Springs Bicycle Plan (2010)	

### **Education, Enforcement & Encouragement**

In addition to facility improvement projects included in the MTP, the DCHC and Capital Area MPOs devised a series of local education, enforcement 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**

- Institutionalize bicycle and pedestrian safety education within public schools.
- Provide bicycle instruction to adult cyclists.
- Provide educational messages to better inform drivers and pedestrians about pedestrian and bicycle safety laws and best practices.
- Educate motorists to share the road with cyclists.
- Establish a local fund for bicycle and motorist education.

#### **Enforcement**

- Update bicycle traffic laws.
- Develop an active enforcement program.
- Develop a bicycle registration program.
- Appoint a “Bicycle Liaison Officer”.
- Develop “Bicycle Patrol Units” within local police departments.

#### **Encouragement**

- Offer incentives to employers to encourage employee bicycle commuting.
- Conduct a well-publicized annual “Bike-to-Work” week with multiple events.
- Improve access to transit for pedestrians and bicyclists.
- Develop a publicity campaign to raise awareness of cycling issues.
- Conduct an annual Regional Bicycle Festival.
- Publicize the region as “bicycle-friendly.”
- Encourage community-based support for cycling.
- Develop cooperative relationships.
- Promote Safe Routes to Schools and walk/bike to school events.
- Participate in the Triangle Smart Commute Challenge.



The MPOs are also developing supplementary resources, such as bicycle maps, safety-education materials, and community action plans that provide a development strategy for the implementation of the five “E’s” – engineering, education, encouragement, enforcement, and evaluation. Many member jurisdictions are proceeding toward great accomplishments in the outreach sector, including the national recognition of Carrboro, Cary, Chapel Hill, Durham, and Raleigh as “Bicycle Friendly Communities” by the League of American Bicyclists. The MPOs continually seek funding for Safe Routes to School (SRTS) projects, and several school activities have been completed using this funding source. With such progress already being made, it is certain that the DCHC and Capital Area MPOs will continue to advance toward a sophisticated, well-integrated bicycle and pedestrian transportation system over the next three decades.



*Bicycle and pedestrian resource materials*

## Maps

The maps on the next two pages and in Appendix 4 illustrate both MPOs’ plans for a network of on-road and off-road bicycle and pedestrian facilities, but depict different approaches for communicating the networks to decision-makers and the public. The MPOs’ web sites provide larger versions of these maps.

In the Durham-Chapel Hill-Carrboro MPO, the on-road map shows roads where on-road bicycle facilities are planned; the map also illustrates statewide and regional bicycle routes. The off-road map shows planned off-road, shared-use bicycle and pedestrian trails. Note that some on-road facilities will be provided as an incidental part of roadway construction projects (safety or capacity expansion). Other on-road projects will specifically add bicycle and pedestrian accommodations.

The Capital Area MPO portions of the maps communicate 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.

*Figure 7.4.1 Bicycle & Pedestrian Investment*

2011-2040 Bicycle and Pedestrian Investment (\$2012)		
Total	CAMPO	DCHC MPO
\$500,000,000	\$320,000,000	\$180,000,000



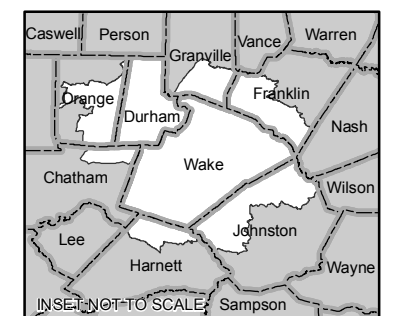
# 2040 Metropolitan Transportation Plan

February 28, 2013

## On-Road Facilities

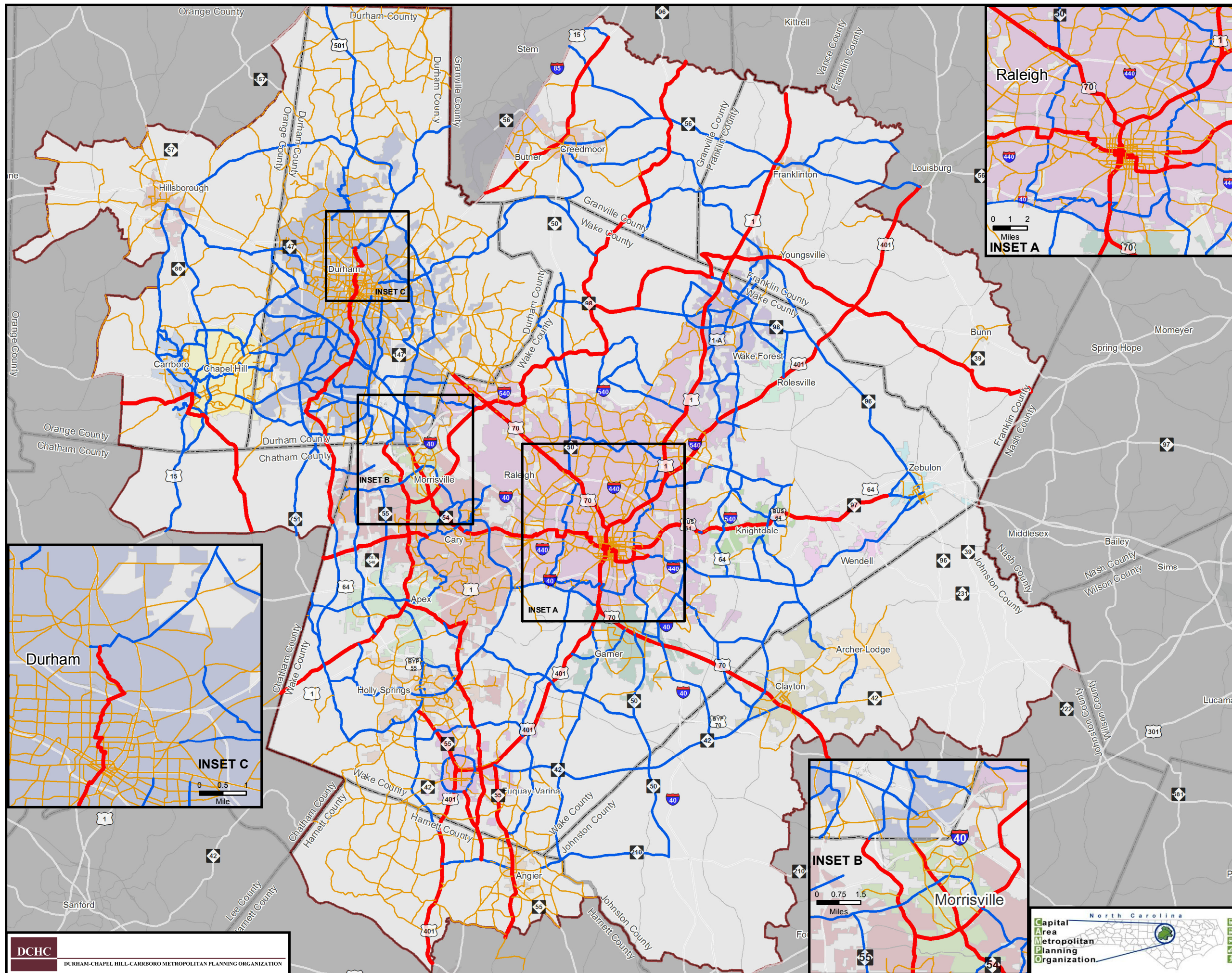
- State Bicycle Facilities
- Regional Bicycle Facilities
- Local Bicycle Facilities

\*DCHC MPO State and Regional routes are shown on the On-Road Facilities map. Appendix 4 provides a listing of the routes.



This map was compiled using the best available data, however, the Capital Area MPO is not responsible for errors, omissions, and/or misuse. Subject to change.

0 2.5 5 10  
Miles





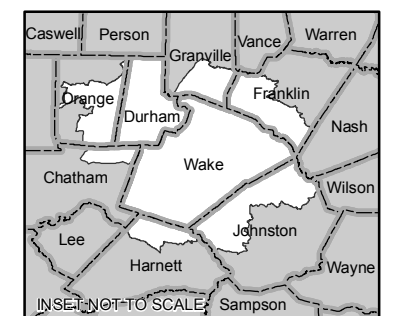
# 2040 Metropolitan Transportation Plan

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## Off-Road Facilities

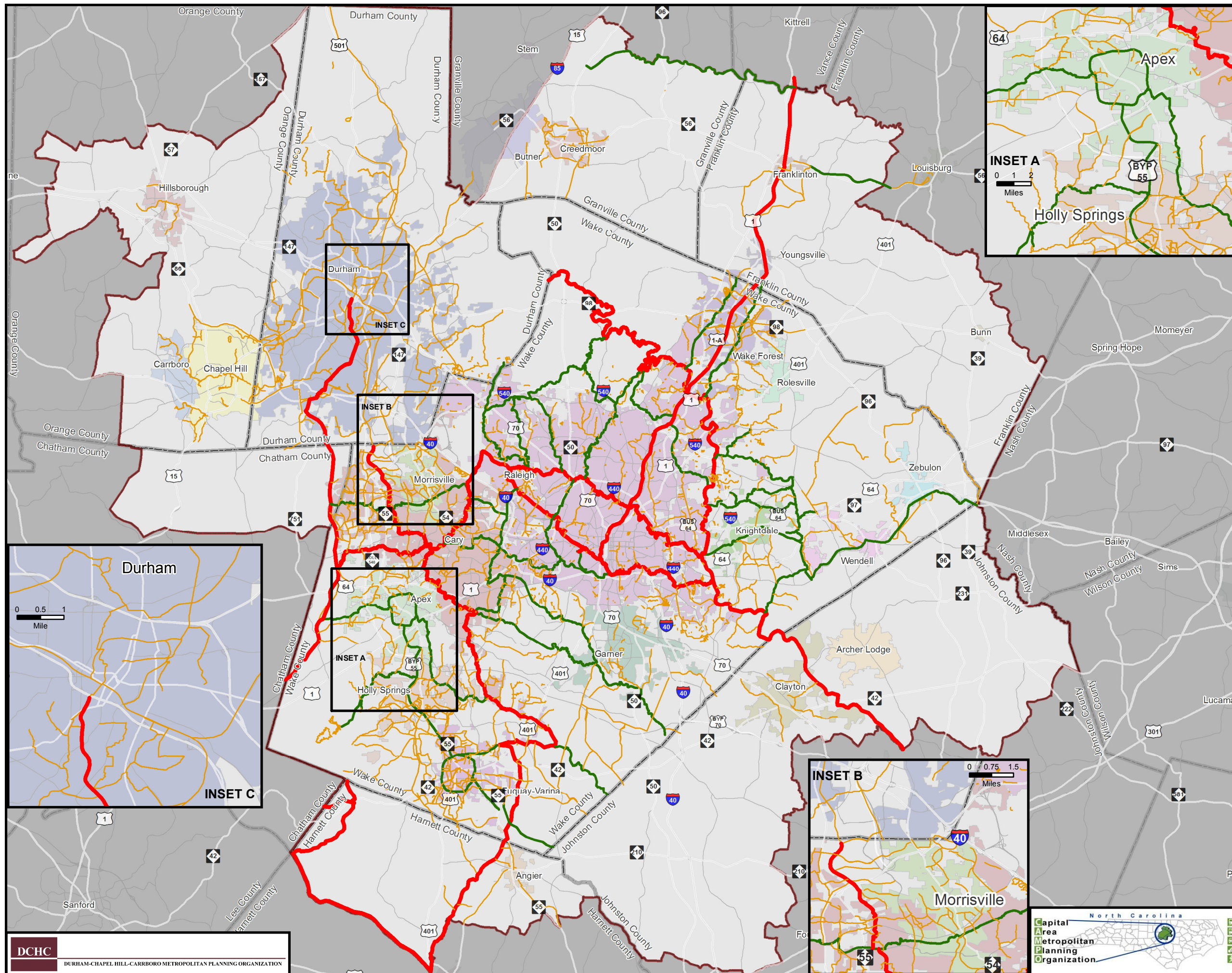
- Local
- Regional
- Statewide

\*DCHC MPO State and Regional routes are shown on the On-Road Facilities map. Appendix 4 provides a listing of the routes.



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0 2.5 5 10 Miles





## 7.5 Freight Movement

Metropolitan Planning Organizations are being encouraged to effectively address freight transportation issues in accordance with policies outlined with Moving Ahead for Progress in the 21st Century (MAP-21). MAP-21 has created a new core program called, the “National Freight Network Program” which consolidates certain programs into a focused effort to improve the movement of goods. The program provides funding to states by formula for projects to improve regional and national freight movements on roadways, including freight intermodal connectors. This dedicated program and funding source may increase freight mobility improvement projects, particularly in freight rail and truck parking, to receive funding since these types of projects will have a funding source that recognizes the priorities of the national freight network.

Since the previous Metropolitan Transportation Plan update, the Capital Area MPO and Durham-Chapel Hill-Carrboro MPO have taken significant steps to address freight movement in the region. In cooperation with NCDOT, North Carolina Emergency Management (NCEM), and the private sector, our region has developed visualization and analysis tools for designated truck routes and hazardous material transportation corridors throughout the region. These maps are included in Appendix 10.

The Capital Area MPO and the Durham-Chapel Hill-Carrboro MPO have partnered with NCDOT and Triangle Transit to have the Triangle Model Service Bureau conduct a commercial vehicle survey designed to collect origin and destination data that is used to better inform the regional travel demand model. Regional distribution centers were identified and commercial truck volumes were collected and analyzed.

Triangle Regional Freight Stakeholders		
Major freight operators	Major manufacturers	Regional economic development agencies
Land use planners	School transportation officials	Transit agencies
Emergency management/HAZMAT agencies	NCDOT	USDOT

Both the Capital Area MPO and Durham-Chapel Hill-Carrboro MPO will continue to evaluate opportunities to integrate freight planning into regional planning products. This may include identifying small scale improvements such as improved signal timing, intersection geometry or utility location as well as large scale improvements including identification of new freight corridors or opportunities for intermodal transfers. Our region has a diverse set of freight stakeholders that could be impacted by freight routing decisions. In addition to specific route changes, this update is envisioned to expand visualization and outreach techniques with the region’s public and freight stakeholders.

Coordination with public and private partners has been a key component in expanding the region’s freight planning capability. The MPOs have been major partners in developing the Triangle Mainline Collaboration. This program began in 2011 to improve freight and passenger rail service planning and coordination efforts in the North Carolina Railroad Corridor. Several Triangle Main Line Forums have been conducted to facilitate the partnerships necessary for effective use of this vital transportation corridor. This effort has also been developed to support implementation of the North Carolina Statewide Logistics Plan through better preparation for increased railroad access through the heart of the Triangle. Additionally, the North Carolina Trucking Association has been added to the Capital Area MPO’s Congestion Management Process Stakeholder Group and the current CMP will be updated to include freight planning elements.

## 7.6 Transportation Demand Management (TDM)

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: encouraging commuters to use our transportation facilities as efficiently as possible by carpooling, vanpooling, taking transit, telecommuting or walking or bicycling.

These marketing and outreach efforts targeted to commuters and the employers they work for are called Transportation Demand Management, or TDM. For the last few years, service providers in the region have undertaken a range of TDM projects, such as Triangle Transit's *SmartCommute Challenge*, Triangle J Council of Government's *Best Workplaces for Commuters* program and local programs at UNC-Chapel Hill, NC State University and the Research Triangle Park. These TDM efforts can be very effective: the 2008 *SmartCommute Challenge* encouraged 12,800 people to try an alternative commute mode. And tens of thousands of workers are employed at a *Best Workplace for Commuters*, where their employer offers commute benefits such as subsidized transit passes, vanpooling or telework.

During 2007, all of the TDM service providers and funding sponsors came together and crafted a 7-Year Triangle Region Transportation Demand Management Plan for the Triangle. Implementing the plan is designed to achieve a goal of reducing the *growth* in the amount of *commuter* travel by 25%. The plan provides both a more systematic framework for TDM coordination and significantly more state and federal funding for TDM. TDM Plan details are available at [www.triangletdmplan.com](http://www.triangletdmplan.com).

The 7-Year TDM Plan recognizes that the most effective TDM strategies are targeted to employment "hot spots:" places where employment is concentrated, including sites where transit service is available and/or parking is costly or inconvenient, such as in downtowns and at university campuses.

Implementing and extending this TDM Plan is included in the Metropolitan Transportation Plans. This implementation includes:

- 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 federal, state and MPO staff that works with applicants to refine their proposals and makes recommendations for funding.

Based on this plan and the current level of the region's comprehensive, coordinated TDM program, the 2040 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 region's transportation demand management program can be a crucial component of the overall transportation system, prompting employers to encourage the use of alternatives to driving alone and assisting commuters in understanding and using these alternatives.

## 7.7 Intelligent Transportation Systems (ITS)

Intelligent Transportation Systems (ITS) is a set of diverse technologies that make the existing transportation infrastructure more efficient and safer. The Capital Area MPO (CAMPO), Durham-Chapel Hill-Carrboro MPO (DCHC MPO), NCDOT, and private consultants have jointly developed a prioritized list of improvements and a coordinated framework for ITS solutions for the region.

The Triangle Regional ITS Strategic Deployment Plan (SDP) update took approximately one year (April, 2009 to March, 2010) to complete. The update followed a needs based approach to project development and created a comprehensive prioritization of regional project needs. The Triangle ITS SDP extends over a 25 year horizon period and includes 175 projects totaling \$315 million. The plan includes eight categories:

Triangle ITS Project Categories	
System Preservation	Highway
Emergency Management	Turnpike
Corridor Management	Transit
Regional Non-Infrastructure	Statewide Non-Infrastructure

The Triangle Region SDP contains a list of feasible ITS projects. The details of the solutions and technologies will likely continue to change as conditions change and transportation technologies advance. The list of ITS projects in the 2040 MTP and Triangle Regional ITS Plan is not intended to be exhaustive. As a result, it is possible that an ITS solution might be implemented that is not in these plans.

Following the completion of the SDP document in 2010, NCDOT has completed, or is in the process of completing ten Highway, System Preservation, Transit, and North Carolina Turnpike related ITS projects totaling \$13.5 million.

The major accomplishment of the SDP Update has been to “mainstream” ITS projects into the overall transportation planning process for both CAMPO and the DCHC MPO. This is being accomplished in a variety of ways. CAMPO’s Locally Administered Projects Program (LAPP) programs ITS projects annually using STP-DA funding. During the past three years this has included several strategic corridors such as US-64 and I-40. ITS projects are being incorporated biennially through Transportation Improvement Program updates.

## 7.8 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 and increased capacity. These projects are often relatively inexpensive compared to building and widening roadways and making new public transit capital investments. They often provide cost effective solutions that can be implemented relatively quickly and with comparatively few environmental impacts. Projects might be implemented in phases – they can be built as public funding becomes available, or as development occurs and partnerships with private firms are created.

The following list provides examples of the types of TSM projects that are expected to be implemented through the 2040 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 superstreets and other unique intersection and interchange designs;
- Fixing horizontal/vertical curves, insufficient ramp lengths, weaving sections and other geometric deficiencies;
- Bus on Shoulder System (BOSS) for transit buses;
- Installation of traffic calming devices for residential neighborhoods; and,
- Planning for traffic circles and roundabouts at appropriate intersections.

Given the unique design characteristics and the often short planning-to-construction cycle of TSM, specific TSM projects are not typically listed in the 2040 MTP, although some projects may be included in project lists if they have been incorporated into a TIP or local CIP.

## 7.9 Rail Investments

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. Commuter rail and light rail services within the region that could be located within or adjacent to existing rail corridors are addressed in *Section 7.3 Transit Services*. General freight issues—including freight carried by rail—are addressed in *Section 7.5 Freight Movement*.

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 2040 Plan. Other types of investments, many of which fall under a category of "exempt" projects listed in Figure 7.12.1, are not specified in 2040 MTP project lists. Examples include safety improvements at highway-rail crossings, replacement of existing rail bridges or the expansion of track within rail corridors.

Several projects and studies have been recently completed, are underway, or are planned to improve the performance of rail services within the region. Many are included within NCDOT's Piedmont Improvement Program that received \$520 million in Recovery Act funding. Triangle rail projects and studies include:



North Carolina Railroad Company/Nick D'Amato

1. Cary Depot (\$2.3 million project completed in 2011)\*
2. Raleigh Union Station
3. Hillsborough Passenger Rail Station
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 (completion anticipated in 2015)\*
7. Morrisville Parkway Grade Separation (completion anticipated in 2016)\*
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. Raleigh-Cary Traffic Separation Study (phased approach)
10. Durham Traffic Separation Study
11. Hillsborough Traffic Separation Study
12. Raleigh East 2<sup>nd</sup> Main Track (study completed in 2013)
13. Morrisville to Cary 2<sup>nd</sup> 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; projects subject to funding availability)

(\*\* a Traffic Separation Study examines at-grade rail-highway crossings to determine short-, mid- and long-range opportunities for closure or bridges)

Current intercity passenger rail service consists of three trains in each direction each day operated by Amtrak and serving the Durham, Cary and Raleigh stations. Two of the trains travel between Charlotte and Raleigh, while the third 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. Ridership has increased steadily on the service; during 2011, more than 900,000 riders boarded a train in NC. Two additional Raleigh-Charlotte Piedmont daily trains are planned to be added upon completion of the Piedmont Improvement Program projects.

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 helped initiate a Triangle Main Lines Partnership in 2011 to bring together public and private sector owners and operators of critical rail assets along with the communities and anchor institutions adjacent to the rail lines. The partnership is designed to 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.

## 7.10 Air Transportation

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.

During 2012, RDU served 9.2 million passengers and over 80,000 tons of cargo. Eight carriers and their regional partners serve the airport with scheduled service making about 400 daily departures to more than 40 cities in the US and internationally.



Recent and under-construction major projects have been designed to improve aviation services:

- Terminal 2 was completed in 2011; this \$573 million, 920,000 square foot project includes 37 boarding gates
- Terminal 1 is scheduled for completion in 2014; this \$68 million project rebuilds the oldest terminal at RDU.

RDU is undertaking planning related to additional facilities, conducting a land use study to determine the best use for five major tracts, including a planned consolidated rental car facility along Pleasant Grove Church Road between Airport Boulevard and I-540. Development of the rental car facility and other tracts could include revisions to the adjacent roadway system and opportunities for new connections to regional transit services.

## 7.11 Recommended Special Plans, Projects & Studies

MPOs may choose to identify plans, projects or studies that may be undertaken to provide additional analysis, detail or to clarify issues raised in the development of the Metropolitan Transportation Plan. These may include corridor studies, small area plans, financial analyses, feasibility studies, functional plans or similar efforts that have been summarized 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 are anticipated to pursue through their annual Urban Planning Work Programs (UPWPs), the planning budget documents that guide MPO activities each fiscal year. This section outlines possible plans, projects or studies using the same format as the recent and existing plans and studies described in Section 5.4. 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.

	<i>Recommended Plan or Study</i>	<i>Type</i>
1	<i>US 15-501 Study.</i> Study land use, traffic congestion and trip origin/destinations in US 15-501 in Chatham and Orange counties, and recommend project alternatives and policies to address existing and future deficiencies.	Corridor Plan

	<i>Recommended Plan or Study</i>	<i>Type</i>
2	<i>Northeast Area Study.</i> The MPO successfully completed a comprehensive multi-modal study of the southwestern portion of the planning area in 2012. The recommendations from that study will carry forward to inform the 2040 MTP. In an effort to achieve this success elsewhere in the planning area, a Northeast Area Study began in FY 2013. This study will cover the municipalities of Wake Forest, Rolesville, Knightdale, Wendell, Zebulon, Youngsville, Franklinton and Bunn, as well as the surrounding areas of Franklin and Wake Counties. The study will examine land use and socioeconomic forecasts in the area, and develop a long-range and interim list of multi-modal transportation improvement priorities for the subarea described.	Small Area Plan
3	<i>Southeast Area Study.</i> The MPO successfully completed a comprehensive multi-modal study of the southwestern portion of the planning area in 2012. The recommendations from that study will carry forward to inform the 2040 MTP. In an effort to achieve this success elsewhere in the region, a Southeast Area Study is anticipated to begin in FY 2015. This study will cover the municipalities of Knightdale, Wendell, Zebulon, Archer Lodge, Clayton, and Garner. Surrounding areas in Johnston and Wake Counties will also be included. The study will examine land use and socioeconomic forecasts in the area, and develop a long-range and interim list of multi-modal transportation improvement priorities for the subarea described.	Small Area Plan
4	<i>Transit Systems Plan.</i> This study will assist in the development of the transit section of the Comprehensive Transportation Plan element of the MTP. This study will be conducted over multiple years, and will evaluate, identify and prioritize future transit needs for the region and will be incorporated into the next Metropolitan Transportation Plan. The study will utilize a needs-based planning process and engage transit stakeholders, including local governments and the public, throughout the study process. Specifically, the effort will include a detailed level of analysis of current and future transit system plans and needs, and provides recommendations for a regional decision-making framework to guide future transit policy decisions. The plan will identify priorities for transit and ancillary road, pedestrian, and bicycle improvements. The planning effort will also explore current demand-response service and make recommendations for improvements to meet future demand. Results of the planning effort should be a prioritized set of infrastructure improvements necessary to implement a fully-realized transit vision for the CAMPO area.	Transit Plan
5	<i>CommunityViz 2.0.</i> The Imagine 2040 process provided the Triangle with regional planning scenarios for this 2040 Metropolitan Transportation Plan. One of the principal outputs of the Imagine 2040 process was the development population and employment growth by Transportation Analysis Zones (TAZ) used to inform the Triangle Regional Model (TRM). The CommunityViz2.0 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
6	<i>Triangle Regional Model Services Bureau Activities.</i> The Triangle Regional Model Services Bureau will prepare for major model updates as well as shorter term model improvements. Proposed activities include: (1) gather MPO collected speed data; (2) obtain MPO collected parking inventory data and prepare for analysis, and (3) conduct Commercial Vehicle data collection to support model updates.	Transportation Model Improvement

## 7.12 Alternative Plan in Case of Plan Lapse

Two requirements of Metropolitan Transportation Plans are that they be updated at least every four years and that they demonstrate that they meet air quality standards. If either of these conditions is not met: if either the plan is older than four years or the motor vehicle emissions generated by the travel forecast with the plan's implementation would exceed allowable standards, then the plan is said to "lapse."

A plan lapse means that new projects in the plan cannot advance: federal funding and project approvals will be withheld until the plan is brought back into compliance. During a lapse, only projects deemed "exempt" under federal law are permitted to move forward. Generally, exempt projects are those that address safety concerns or provide specified operational and mobility improvements that do not add new capacity to the transportation system.

Therefore, the alternative plan in case of a plan lapse includes the set of exempt projects that are identified in the project lists in the appendices. The alternative plan in case of a plan lapse also includes the plan elements in this chapter related to land use and development, bicycle and pedestrian facilities, programs to manage transportation demand and bus transit services, since these are not regionally significant projects that add capacity. Only those roadway projects specifically identified as exempt in Appendix 1 would be part of the alternative plan in the case of a plan lapse. Figure 7.11.1 on the next page shows the types of projects that are exempt.

Figure 7.12.1—Types of Exempt Projects

*Safety*

- Railroad/highway crossing.
- Projects that correct, improve, or eliminate a hazardous location or feature.
- Safer non-Federal-aid system roads.
- Shoulder improvements.
- Increasing sight distance.
- Highway Safety Improvement Program implementation.
- Traffic control devices and operating assistance other than signalization projects.
- Railroad/highway crossing warning devices.
- Guardrails, median barriers, crash cushions.
- Pavement resurfacing and/or rehabilitation.
- Pavement marking.
- Emergency relief (23 U.S.C. 125).
- Fencing.
- Skid treatments.
- Safety roadside rest areas.
- Adding medians.
- Truck climbing lanes outside the urbanized area.
- Lighting improvements.
- Widening narrow pavements or reconstructing bridges (no additional travel lanes).
- Emergency truck pullovers.

*Mass Transit*

- Operating assistance to transit agencies.
- Purchase of support vehicles.
- Rehabilitation of transit vehicles.
- Purchase of office, shop, and operating equipment for existing facilities.
- Purchase of operating equipment for vehicles (e.g., radios, fareboxes, lifts, etc.).
- Construction or renovation of power, signal, and communications systems.
- Construction of small passenger shelters and information kiosks.
- Reconstruction or renovation of transit buildings and structures (e.g., rail or bus buildings, storage and maintenance facilities, stations, terminals, and ancillary structures).
- Rehabilitation or reconstruction of track structures, track, and trackbed in existing rights-of-way.
- Purchase of new buses and rail cars to replace existing vehicles or for minor expansions of the fleet.
- Construction of new bus or rail storage/maintenance facilities categorically excluded in 23 CFR part 771.

*Air Quality*

- Continuation of ride-sharing and van-pooling promotion activities at current levels.
- Bicycle and pedestrian facilities.

*Other*

- Specific activities which do not involve or lead directly to construction, such as:
  - Planning and technical studies.
  - Grants for training and research programs.
  - Planning activities conducted pursuant to titles 23 and 49 U.S.C.
  - Federal-aid systems revisions.
- Engineering to assess social, economic, and environmental effects of the proposed action or alternatives to that action.
- Noise attenuation.
- Emergency or hardship advance land acquisitions (23 CFR 710.503).
- Acquisition of scenic easements.
- Plantings, landscaping, etc.
- Sign removal.
- Directional and informational signs.
- Transportation enhancement activities (except rehabilitation and operation of historic transportation buildings, structures, or facilities).
- Repair of damage caused by natural disasters, civil unrest, or terrorist acts, except projects involving substantial functional, locational or capacity changes.