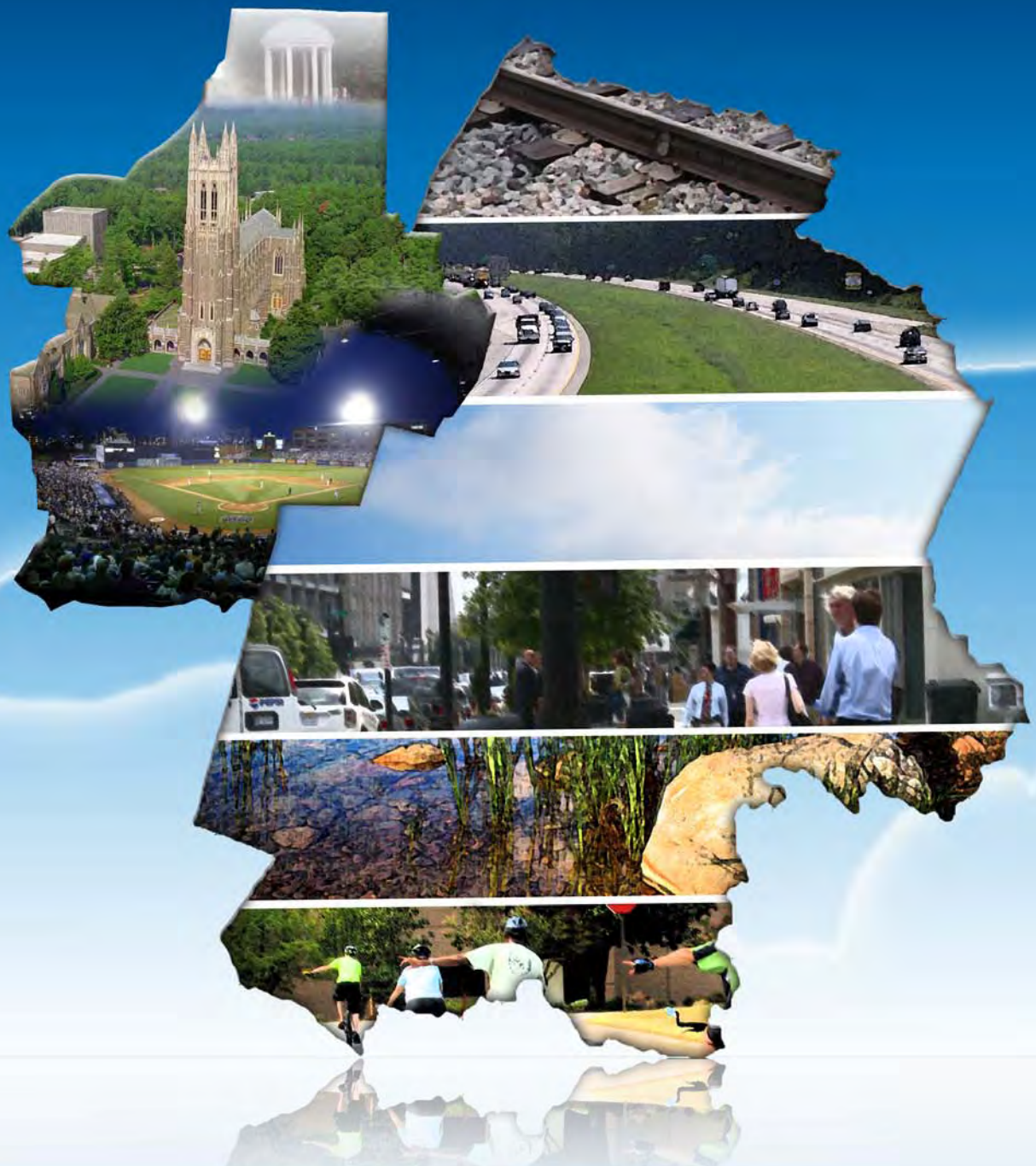
2035 Long Range Transportation Plans

May 13, 2009



Capital Area Metropolitan Planning Organization
And
Durham-Chapel Hill-Carrboro Metropolitan Planning Organization

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More Maps and Information Available:

Many of the maps and much of the information presented in this report is intended to help the reader understand general trends occurring in the larger Triangle Region. Therefore, multiple maps are often placed on a single page to facilitate comparisons, and generally the project maps for the entire Triangle Region are displayed on a single-page map. Larger maps for the highway, bus transit, rail transit, and bicycle projects, for the socioeconomic data trends, for the Environmental Justice analysis, for the congestion analysis and for other report topics are available at:

See approved 2035 LRTP section of ➔ www.dchcmpo.org

CAPITAL AREA METROPOLITAN PLANNING ORGANIZATION

RESOLUTION ADOPTING THE CAPITAL AREA METROPOLITAN PLANNING ORGANIZATION 2035 LONG RANGE TRANSPORTATION PLAN

A motion was made by **Mayor Sears** and seconded by **Mayor Faulkner** for the adoption of the following resolution; and upon being put to a vote was duly adopted.

WHEREAS, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users require all Metropolitan Planning Organizations to develop and maintain a Long Range Transportation Plan; and

WHEREAS, the Long Range Transportation Plan must address all modes of transportation in an urban area, have a horizon year of at least 20 years, and be fiscally constrained; and

WHEREAS, the Capital Area Metropolitan Planning Organization recognizes that the 2035 Long Range Transportation Plan must be in conformance with the North Carolina State Implementation Plan for maintenance of the National Ambient Air Quality Standards adopted for ozone in accordance with 40 CFR, part 51 and part 93 as of July 1, 2004; and carbon monoxide on September 18, 1995 as mandated by the Clean Air Act Amendments of 1990; and

WHEREAS, the Transportation Advisory Committee has solicited public and private transportation provider comments throughout the planning process, providing for a 42-day public comment period for the proposed Long Range Transportation Plan in accordance with the Public Involvement Procedures adopted by the Capital Area Metropolitan Planning Organization on May 21, 2008; and

WHEREAS, the Transportation Advisory Committee has found the transportation planning process to be in full compliance with Title VI of the Civil Rights Act of 1964 and the Title VI Assurance executed by each State under 23 U.S.C. 324 and 29 U.S.C. 794; and

WHEREAS, the Transportation Advisory Committee has considered how the Long-Range Transportation Plan will affect the involvement of Disadvantaged Business Enterprises in the FHWA and the FTA funded planning projects (Sec. 105(f), Pub. L. 97-424, 96 State 2100, 49 CFR part 23); and

WHEREAS, the Transportation Advisory Committee has considered how the Transportation Planning Process will affect the elderly and the disabled per the provision of the Americans With Disabilities Act of 1990 (Pub.L. 101-336, 104 Stat. 327, as amended) and the U.S. DOT implementing regulations.

NOW, THEREFORE BE IT RESOLVED, by the Capital Area Transportation Advisory Committee that the 2035 Long Range Transportation Plan, dated May 20, 2009 be adopted for the Capital Area Metropolitan Planning Organization on this the 20th day of May, 2009.

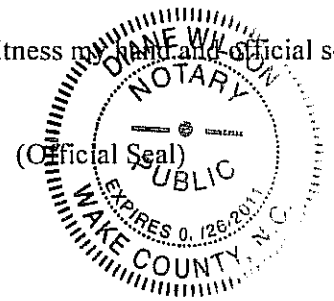
Joe Bryan, Chair
Transportation Advisory Committee

Ed Johnson, Capital Area MPO Director
Transportation Advisory Committee Clerk

County of Wake
State of North Carolina

I, Diane Wilson, a Notary Public for said County and State, do hereby certify that on this, the 20th day of May, 2009, personally appeared before me, Joe Bryan, known to me by his presence, and acknowledged the due execution of the foregoing RESOLUTION ADOPTING THE CAPITAL AREA METROPOLITAN PLANNING ORGANIZATION 2035 LONG RANGE TRANSPORTATION PLAN.

Witness my hand and official seal, this the 20th day of May, 2009.



(Official Seal)

Diane Wilson, Notary Public

My commission expires January 26, 2011.

RESOLUTION

FINDING THE CAPITAL AREA MPO 2035 LONG-RANGE TRANSPORTATION PLAN AND METROPOLITAN TRANSPORTATION IMPROVEMENT PROGRAM FOR FY 2009-2015 IN CONFORMITY WITH THE NORTHCAROLINA STATE IMPLEMENTATION PLAN

A motion was made by **Mayor Sears** and seconded by **Mayor Williams** for adoption of the following resolution, and upon being put to a vote was duly adopted.

WHEREAS, the Transportation Advisory Committee is the duly recognized transportation decision making body for the 3-C transportation planning process of the Capital Area Metropolitan Planning Organization as required by 23 CFR Part 134;

WHEREAS, the Capital Area MPO 2035 Long-Range Transportation Plan and the FY 2009-2015 Metropolitan Transportation Improvement Program meet the planning requirements of 23 CFR Part 134;

WHEREAS, the United States Environmental Protection Agency designated Wake, Franklin, Granville and Johnston Counties as non-attainment under the new 8-hour ozone standard on June 15, 2004, redesignated Wake, Franklin, Granville and Johnston Counties as a maintenance areas under the 8-hour ozone standard on December 26, 2007 and redesignated Wake County as a maintenance area for carbon monoxide on September 18, 1995;

WHEREAS, the conformity analysis report used the latest planning assumptions approved by the Capital Area Metropolitan Planning Organization for population, employment, travel and congestion as required in 40 CFR Part 93.110;

WHEREAS, the conformity determination used the latest emissions model approved by the United States Environmental Protection Agency;

WHEREAS, interagency consultation has been made in accordance with the established interagency consultation procedures for North Carolina and the Capital Area Metropolitan Planning Organization;

WHEREAS, there are no transportation control measures listed in North Carolina's State Implementation Plan;

WHEREAS, the programs and projects included in the 2035 Long-Range Transportation Plan are consistent with the North Carolina State Implementation Plan emissions budgets based on a regional emissions analysis;

WHEREAS, the programs and projects included in the Capital Area Metropolitan Transportation Improvement Program for FY 2009-2015 are financially constrained in accordance with State and Federal law; and

WHEREAS, the programs and projects included in the Capital Area Metropolitan Transportation Improvement Program for FY 2009-2015 are a direct subset of the 2035 Long-Range Transportation Plan.

NOW, THEREFORE BE IT RESOLVED that the Capital Area Metropolitan Planning Organization's 2035 Long-Range Transportation Plan Update and 2009-2015 Metropolitan Transportation Improvement Program conforms to the intent of the North Carolina State Implementation Plan in accordance with the Clean Air Act as Amended on this, the 20 th day of May, 2009; and

BE IT FURTHER RESOLVED that this conformity finding is made contingent pending all comments on the draft conformity determination report are addressed.

Joe Bryan, Chair
Transportation Advisory Committee

Ed Johnson, Capital Area MPO Director
Transportation Advisory Committee Cler

RESOLUTION

FINDING THE CAPITAL AREA MPO AND DURHAM-CHAPEL HILL-CARRBORO MPO 2035 LONG-RANGE TRANSPORTATION PLAN AND METROPOLITAN TRANSPORTATION IMPROVEMENT PROGRAM FOR FY 2009-2015 IN CONFORMITY WITH THE NORTHCAROLINA STATE IMPLEMENTATION PLAN

County of Wake
State of North Carolina

I, Diane Wilson, a Notary Public for said County and State, do hereby certify that Joe Breyon personally appeared before me this day and acknowledged the due execution of the foregoing instrument.

Witness my hand and official seal, this the 20th day of May, 2009.

DIANE WILSON NOTARY PUBLIC WAKE COUNTY, N.C. EXPIRES 0. 26 2011

(Official Seal)

Diane Wilson

Diane Wilson, Notary Public

My commission expires January 26, 2011.

DURHAM-CHAPEL HILL-CARRBORO METROPOLITAN PLANNING ORGANIZATION (DCHC MPO)

RESOLUTION ADOPTING THE DCHC MPO 2035 LONG RANGE TRANSPORTATION PLAN

A motion was made by Alice Gordon and seconded by Lydia Lavelle for the adoption of the following resolution; and upon being put to a vote was duly adopted.

WHEREAS, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users require all Metropolitan Planning Organizations to develop and maintain a Long Range Transportation Plan; and

WHEREAS, the Long Range Transportation Plan must address all modes of transportation in an urban area, have a horizon year of at least 20 years, and be fiscally constrained; and

WHEREAS, the DCHC MPO recognizes that the 2035 Long Range Transportation Plan must be in conformance with the North Carolina State Implementation Plan for maintenance of the National Ambient Air Quality Standards adopted for ozone in accordance with 40 CFR, part 51 and part 93 as of July 1, 2004; and carbon monoxide on September 18, 1995 as mandated by the Clean Air Act Amendments of 1990; and

WHEREAS, the Transportation Advisory Committee has solicited public and private transportation provider comments throughout the planning process, providing for a 42-day public comment period for the proposed Long Range Transportation Plan in accordance with the Public Involvement Policy adopted by the DCHC MPO adopted on October 11, 2006; and

WHEREAS, the Transportation Advisory Committee has found the transportation planning process to be in full compliance with Title VI of the Civil Rights Act of 1964 and the Title VI Assurance executed by each State under 23 U.S.C. 324 and 29 U.S.C. 794; and

WHEREAS, the Transportation Advisory Committee has considered how the Long-Range Transportation Plan will affect the involvement of Disadvantaged Business Enterprises in the FHWA and the FTA funded planning projects (Sec. 105(f), Pub. L. 97-424, 96 State 2100, 49 CFR part 23); and

WHEREAS, the Transportation Advisory Committee has considered how the Transportation Planning Process will affect the elderly and the disabled per the provision of the Americans With Disabilities Act of 1990 (Pub.L. 101-336, 104 Stat. 327, as amended) and the U.S. DOT implementing regulations.

NOW, THEREFORE BE IT RESOLVED, by the Transportation Advisory Committee (TAC) of the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (DCHC MPO) that the 2035 Long Range Transportation Plan, dated May 13, 2009 be adopted for the DCHC MPO on this the 13th day of May, 2009.

(Continued)

(Continued – Resolution Adopting DCHC 2035 LRTP)

TAC Chair

STATE of: North Carolina
COUNTY of: DURHAM

I, FREDERICK BRIAN RHODES, a Notary Public of DURHAM County, North Carolina do hereby certify that MIKE WOODARD personally appeared before me on the 13th day of May, 2009 to affix his signature to the foregoing document.

Notary Public for the State of NC
Residing at: DURHAM COUNTY, NC
My commission expires 5.10.10

(Seal)

OFFICIAL SEAL
Notary Public, North Carolina
Durham County
Frederick Brian Rhodes
My Commission Expires 5/10/2010

RESOLUTION FINDING THE DURHAM-CHAPEL HILL-CARRBORO METROPOLITAN PLANNIGN ORGANIZATION (DCHC MPO) 2035 LONG-RANGE TRANSPORTATION PLAN (2035 LRTP) AND METROPOLITAN TRANSPORTATION IMPROVEMENT PROGRAM (MTIP) FOR FY 2009-2015

IN CONFORMITY WITH THE NORTH CAROLINA STATE IMPLEMENTATION PLAN

A motion was made by Mike Gordon and seconded by Lydia Lavelle for adoption of the following resolution, and upon being put to a vote was duly adopted.

WHEREAS, the Transportation Advisory Committee is the duly recognized transportation decision making body for the 3-C transportation planning process of the DCHC MPO as required by 23 CFR Part 134;

WHEREAS, the DCHC MPO 2035 Long-Range Transportation Plan and the FY 2009-2015 Metropolitan Transportation Improvement Program meet the planning requirements of 23 CFR Part 134;

WHEREAS, the United States Environmental Protection Agency designated Durham County, Orange County and parts of Chatham County (Baldwin, Center, New hope and Williams Townships) as non-attainment under the new 8-hour ozone standard on June 15, 2004, and redesignated the same areas as attainment with a maintenance plan on December 26, 2007.

WHEREAS, the United States Environmental Protection Agency redesignated Durham County as a maintenance area for carbon monoxide on September 18, 1995;

WHEREAS, the conformity analysis report used the latest planning assumptions approved by the DCHC MPO for population, employment, travel and congestion as required in 40 CFR Part 93.110;

WHEREAS, the conformity determination used the latest emissions model approved by the United States Environmental Protection Agency;

WHEREAS, interagency consultation has been made in accordance with the established interagency consultation procedures for North Carolina and the DCHC MPO;

WHEREAS, there are no transportation control measures listed in North Carolina's State Implementation Plan;

WHEREAS, the programs and projects included in the 2035 Long-Range Transportation Plan are consistent with the North Carolina State Implementation Plan emissions budgets based on a regional emissions analysis.

(Continued)

(Continued – Resolution stating Air Quality Conformity)

WHEREAS, the programs and projects included in the DCHC MPO Transportation Improvement Program for FY 2009-2015 are financially constrained in accordance with State and Federal law; and

WHEREAS, the programs and projects included in the DCHC MPO Transportation Improvement Program for FY 2009-2015 are a direct subset of the 2035 Long-Range Transportation Plan.

NOW, THEREFORE BE IT RESOLVED that the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization's 2035 Long-Range Transportation Plan and 2009-2015 Metropolitan Transportation Improvement Program conforms to the intent of the North Carolina State Implementation Plan in accordance with the Clean Air Act as Amended on this, the 13th day of May, 2009; and

BE IT FURTHER RESOLVED that this conformity finding is made contingent pending all comments on the draft conformity determination report are addressed.

TAC Chair

STATE of: North Carolina
COUNTY of: DURHAM

I, FREDERICK BRIAN RHODES, a Notary Public of DURHAM County, North Carolina do hereby certify that MIKE WOODARD personally appeared before me on the 13th day of May, 2009 to affix his signature to the foregoing document.

Notary Public for the State of NC
Residing at: DURHAM COUNTY, NC
My commission expires 5.10.10

(Seal)

OFFICIAL SEAL
Notary Public, North Carolina
Durham County
Frederick Brian Rhodes
My Commission Expires 5/10/2010

1. Executive Summary

Transportation investments link people to the places where they work, learn, shop and recreate, and provide critical connections between businesses and their labor markets, suppliers and customers.

This document contains the 2035 Long-Range Transportation Plans for the two organizations charged with transportation decision-making in the Research Triangle Region: the Capital Area Metropolitan Planning Organization (CAMPO) and the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (DCHC MPO). These organizations, and the areas for which they are responsible, are commonly called "MPOs."

The Long-Range Transportation Plans are the guiding documents for future investments in roads, transit services, bicycle and pedestrian facilities and related transportation activities and services to match the growth expected in the Research Triangle Region.

The areas covered by this plan are part of a larger economic region. Transportation investments should consider the mobility needs of this larger region and links to the other large metro regions of North Carolina and throughout the Southeast. The Triangle Region is expected to accommodate a phenomenal amount of future growth; we need to plan for the region we will become, not just the region we are today.

Estimated 2005 and Forecast 2035 Population and Jobs	2005		2035	
	Population	Jobs	Population	Jobs
Capital Area MPO	880,000	440,000	1,950,000	910,000
Durham-Chapel Hill-Carrboro MPO	380,000	230,000	550,000	390,000
Areas outside MPO boundaries	60,000	20,000	150,000	40,000
Total for area covered by the region's transportation model	1,320,000	690,000	2,650,000	1,340,000

The Triangle is one of the nation's most sprawling regions and current forecasts project both continued outward growth and infill development in selected locations, most notably in the central parts of Raleigh, Durham and Chapel Hill. A key challenge for our transportation plans is to match our vision for how our communities should grow with the transportation investments to support this growth.

No region has been able to "build its way" out of congestion; an important challenge for our transportation plans is to provide travel choices that allow people to avoid congestion.

Our population is changing. The population is aging, more households will be composed of single-person and two-person households without children, the number of households without cars is increasing, and more people are interested in living in more compact neighborhoods with a mix of activities. Our plans must provide mobility choices for our changing needs.

Our MPOs are tied together by very strong travel patterns between them; our largest commute pattern and heaviest travel volumes occur at the intersection of the MPO boundaries. Our MPO plans should recognize the mobility needs of residents and businesses that transcend our MPO borders.

The region has a common vision of what it wants its transportation system to be:

> *a seamless integration of transportation services that offer a range of travel choices and are compatible with the character and development of our communities, sensitive to the environment, improve quality of life and are safe and accessible for all.*

Each MPO has adopted goals and objectives to accomplish this vision that reflect the unique characteristics and aspirations of the communities within the MPOs. The *2035 Transportation Plan* commits our region to transportation services and patterns of development that contribute to a more sustainable place where people can successfully pursue their daily activities.

In order to analyze the transportation investment choices we have, the MPOs followed a painstaking process involving significant public engagement. It began with an understanding of how our communities' comprehensive plans envision guiding future growth. The land use plans revealed that five regional activity centers centered on Raleigh, Durham, Cary, Chapel Hill and the Research Triangle Park are expected to contain large concentrations of employment and/or intense mixes of homes, workplaces, shops, medical centers, higher education institutions, visitor destinations and entertainment venues. Linking these activity centers to one another, and connecting them with communities throughout the region by a variety of travel modes can afford expanded opportunities for people to have choices about where they live, work, learn and play.

Next, local planners estimated the types, locations and amounts of future population and job growth based on market conditions and trends and community plans.

Based on these forecasts, we looked at future mobility trends and needs, and where our transportation system may become deficient in accommodating these trends and meeting these needs.

Working with a variety of partners and based on public input, we then developed different transportation system alternatives and analyzed their performance, comparing the performance of system alternatives against one another and to performance targets derived from our goals and objectives.

The result of this analysis and extensive public engagement was a set of planned investments, along with recommended land use development to match the investments and additional studies to ensure that the investments are carefully designed and effectively implemented. The core of the plan is the set of transportation investments described in Section 7, including:

- New and expanded roads;
- Transit facilities and services, including bus and rail;
- Bicycle and pedestrian facilities, both independent projects and in concert with road projects;
- Transportation Demand Management: marketing and outreach efforts that increase the use of alternatives to driving alone;
- Intelligent Transportation Services: the use of advanced technology to make transit and road investments more effective; and
- Transportation Systems Management: road projects that improve safety and traffic flow without adding new capacity.

In addition to these investments, the plan includes a focus on three issues where the ties between development and our transportation investments are most critical: 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 two MPOs will work with their member communities, the state of North Carolina and regional organizations on these three issues to match land use decisions with transportation investments.

The maps on the following pages show the roadway and transit investments that are planned; Section 7 of the Plan provides greater detail.

The plan anticipates that the region will begin to match its historic focus on roads with a sustained commitment to high-quality transit service as well, emphasizing three critical components:

- Greatly expanded local and regional bus service to provide service in and between communities throughout the region;
- Seamless electric light rail transit service to link our regional centers to one another and commuter rail service to connect Raleigh with towns to the east and north; and
- Frequent, high quality transit circulator service to extend the reach of regional bus and rail services within regional centers.

Although the plan includes a new emphasis on transit investment, it envisions significant additional roadway spending; major roadway projects included in the plan are shown below.

Durham Chapel Hill-Carrboro MPO		
2009-15	**2016-25**	**2026-35**
NC 147 extended and NC 540 completed as a toll road from Durham to Holly Springs	East End Connector completed linking US 70 to NC 147 (Durham Freeway)	HOV/HOT lanes added to I-40 from Wade Avenue (Wake County) to US 15-501 (Durham County)
	I-85 widening (I-40 to Durham County line)	I-40 widening (US 15-501 to I-85)
	I-85 widening (US 70 to Red Mill Road)	NC 147 widening (I-40 to East End Connector)
	US 70 freeway conversion (Lynn Road to Wake Co.)	Roxboro Road widening (Duke St. to Goodwin Rd.)
	Northern Durham Parkway	
Capital Area MPO		
2009-15	**2016-25**	**2026-35**
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 NC 98
US 401 widened from I-540 to Louisburg with a Rolesville bypass	US 401 widened south of Fuquay-Varina including eastern and western bypasses	I-540 (Northern Wake Expressway) widened from I-40 to US 64 bypass and converted to toll road
NC 147 extended and NC 540 completed as a toll road from Durham to Holly Springs	NC 540 completed as a toll Holly Springs to US 64 bypass	NC 42 (Johnston & Wake Co.)
	I-440 widened from Wade Avenue to Crossroads	US 401 widened from Garner to Fuquay-Varina
	NC 54 widened through Cary and Morrisville	HOV/HOT lanes added to I-40 from Wade Avenue (Wake County) to US 15-501 (Durham County)
	US 64/264 widened from the US 64 bypass to Zebulon	

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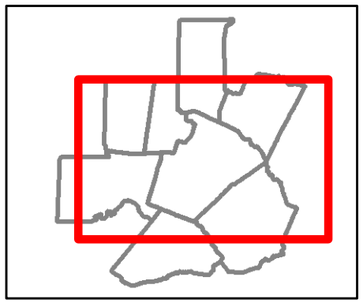
DCHC

DURHAM-CHAPEL HILL-CARRBORO METROPOLITAN PLANNING ORGANIZATION

2035 Long Range Transportation Plan

May 29, 2009



Interchanges and Grade Separations

Interchange

Grade Separation

*Color coded the same as roadways

AQ Year of Completion for Highway Projects

2015

2025

2035

HOT/HOV Lanes

N

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

Map created on May 29, 2009 by the Capital Area MPO.

Miles

0 2 4 8 12

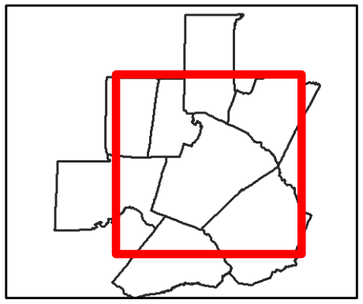
Capital Area Metropolitan Planning Organization

Hillsborough
Durham
Chapel Hill
Carrboro
RTP
RDU
Morrisville
Cary
Butner
Creedmoor
Youngsville
Wake Forest
Rolesville
Bunn
Zebulon
Raleigh
Knightdale
Wendell
Garner
Clayton
Apex
Holly Springs
Fuquay-Varina
Angier

DCHC
DURHAM-CHAPEL HILL-CARRBORO METROPOLITAN PLANNING ORGANIZATION

2035 Long Range Transportation Plan

April 21, 2009



Transit Service Plan

- * Light Rail Transit: 2025
- Light Rail Transit: 2035
- Commuter Rail: 2025

Local Bus Service

- Existing
- 2015
- 2025
- 2035
- Regular Bus
- Express Bus

* Light rail alignment subject to further study

N

Map created on April 21, 2009 by the Capital Area MPO.

Miles

0 2 4 8 12

Capital Area Metropolitan Planning Organization

To ensure that our plans will be realized, they need to be fiscally-constrained. This means that the cost of the various roadway, transit and other transportation facilities and services must be paid for by state, federal, local, private and other transportation revenues that can be reasonably expected to be available. The Financial Plan, summarized in the cost and revenue tables on this page and described in Section 8 of the Plan, provides a comparison of projected revenues and costs from 2009 through 2035 – a 27-year period – to demonstrate the balance between costs and revenues.

2035 LRTP Costs (in millions $)

-- Cost Category		DCHC	CAMPO
Roadways - Total		**$ 3,687**	**$ 9,171**
	Roadways	$ 2,020	$ 5,222
	Tolled roads (excluding I-40 HOT)	$ 157	$ 1,936
	Non-tolled trust fund urban loops	$ 684	$ -
	Maintenance	$ 827	$ 2,013
Light Rail and Commuter Rail - Total		**$ 1,913**	**$ 2,628**
Bus - Total		**$ 1,935**	**$ 1,459**
Other - Total		**$ 561**	**$ 326**
	Pedestrian/Bicycle	$ 368	$ 128
	Transportation Demand Management	$ 33	$ 73
	Intelligent Transportation Systems	$ 50	$ 96
	Transportation System Management	$ 111	$ 29
Total		**$ 8,096**	**$ 13,584**

Note: Total may differ slightly from sum of subtotals because subtotals are rounded to nearest million.

2035 LRTP Revenues (in millions $)

-- Revenue Category		DCHC	CAMPO
Roadways - Total		**$ 3,334**	**$ 6,343**
	Traditional Funding	$ 1,700	$ 2,623
	Tolled roads (excluding I-40 HOT)	$ 157	$ 1,936
	Non-tolled trust fund urban loops	$ 650	$ -
	Maintenance	$ 827	$ 1,784
Transit (Bus and Rail)		**$ 2,951**	**$ 1,825**
Total		**$ 6,284**	**$ 8,168**

Note: Total may differ slightly from sum of subtotals because subtotals are rounded to nearest million.

The current transportation funding programs will not produce enough revenue to finance the highway, bus transit, light rail transit and other transportation needs in the Triangle. Therefore, the MPOs have assumed new revenue sources to close this funding gap. The Financial Plan in Section 8 provides details on the expectations of generating and investing these new revenues.

2035 LRTP New Revenue Sources (in millions $)

New Revenue Source	CAMPO Assumptions	CAMPO Amount	DCHC Assumptions	DCHC Amount
Sales Tax #1 (or equivalent)	Level of effort equivalent to a 1/2 cent sales tax increase in 2011 for transit.	$ 1,576	1/2 cent sales tax increase in Durham and Orange counties, and 1/4 cent increase in Chatham County; starting 2011	$ 755
Sales Tax #2 (or equivalent)	Level of effort equivalent to a 1/2 cent sales tax increase in in 2016 for roads.	$ 1,140	Not applicable for DCHC MPO	$ -
Regional, Local, and Private support	Some municipalities have agreed to contribute to certain road projects.	$ 1,258	(Included in local highway revenue for DCHC MPO)	$ -
New State and/or Federal Infrastructure Programs	New state/federal funding for NC Strategic Highway Corridors .	$ 1,060	New state/federal funding program or change in allocation methodology.	$ 380
Financing Package for I-40 High Occupancy Vehicle/Toll Lanes	(Included in program above -- New State and/or Federal Infrastructure Programs)	$ -	Includes toll revenue, bonding based on future toll revenue, and State gap funding	$ 579
Car Registration Fee	$10 car registration fee increase in 2011.	$ 185	$10 car registration fee increase in 2011.	$ 107
Rail Bonds	Debt Financing to pay for initial rail construction.	$ 585	(Included in light rail transit revenues)	$ -
Total		**$ 5,804**		**$ 1,820**

Note: Total may differ slightly from sum of subtotals because subtotals are rounded to nearest million

2. What is the Plan?

This document contains the 2035 Long-Range Transportation Plans for the Capital Area Metropolitan Planning Organization and the Durham-Chapel Hill-Carrboro Planning Organization.

These plans are the guiding documents for future investments in roads, transit services, bicycle and pedestrian facilities and related transportation activities and services to match the growth expected in the Research Triangle Region.

2.1 Why Do We Need A Plan?

A transportation plan is essential for building an effective and efficient transportation system. The implementation of any transportation project, such as building a new road, adding lanes to a highway, purchasing transit buses, constructing a rail system, or building bicycle lanes with a road widening project, often requires several years to complete from concept to construction.

Once a community determines that a project is needed, there are many detailed steps to be completed: funding must be identified; analysis must be completed to minimize environmental and social impacts; engineering designs must be developed, evaluated, and selected; the public must be involved in project decisions; right-of-way may have to be purchased; and finally, the construction must be contracted and completed.

Raleigh, N.C. *(Darryl Morrow)*

Durham, N.C.

No matter which step one might consider the most important in this long process, the project always begins with the regional transportation plan. In fact, this basic planning concept is so important, that federal regulations require that a project must be identified in a long-range transportation plan in order for it to receive federal funding and obtain federal approvals.

Federal regulations not only require a long-range plan, the regulations stipulate the contents of the plan and the process used in its development. The plan must have:

- A vision that meets community goals.
- A multi-modal approach that includes not only highway projects, but provides for other modes such as public transportation, walking, and bicycling.
- A minimum 20-year planning horizon.

- A financial plan that balances revenues and costs to demonstrate that the plan is financially responsible and constrained.
- An appropriate air quality analysis to show that forecasted emissions will not exceed air quality emissions limits.
- A public involvement process that meets federal guidelines, and is sensitive especially to those groups traditionally left out of the planning process.

Regions like the Research Triangle must develop these plans at least every four years, and must formally amend these plans if they wish to undertake regionally significant transportation investments that are not reflected in them.

2.2 What Is In The Plan

Metropolitan areas in North Carolina prepare two distinct, but related **types of transportation plans**:

1. Comprehensive Transportation Plans (CTPs) that show all the existing and new and expanded major roads, transit services, bicycle and pedestrian facilities and related transportation activities that we would like to have to meet the growth and mobility aspirations of our citizens as far out into the future as we can envision. The CTP has *no* defined future date by which the facilities and services would be provided, nor is it constrained by our ability to pay for facilities and services or the impacts of these facilities and services on our region's air quality.
2. Long-Range Transportation Plans (LRTPs) that show the new and expanded roads, transit services, bicycle and pedestrian facilities and related transportation activities that we believe we can pay for and build by the year 2035, and that will meet federal air quality standards.

This document addresses only the second of these two types of plans: the Long Range Transportation Plan that shows what we can achieve by 2035 with anticipated funding and that will preserve air quality. The two MPOs are expected to begin the process to develop and complete a Comprehensive Transportation Plan soon after the 2035 LRTP has been adopted.

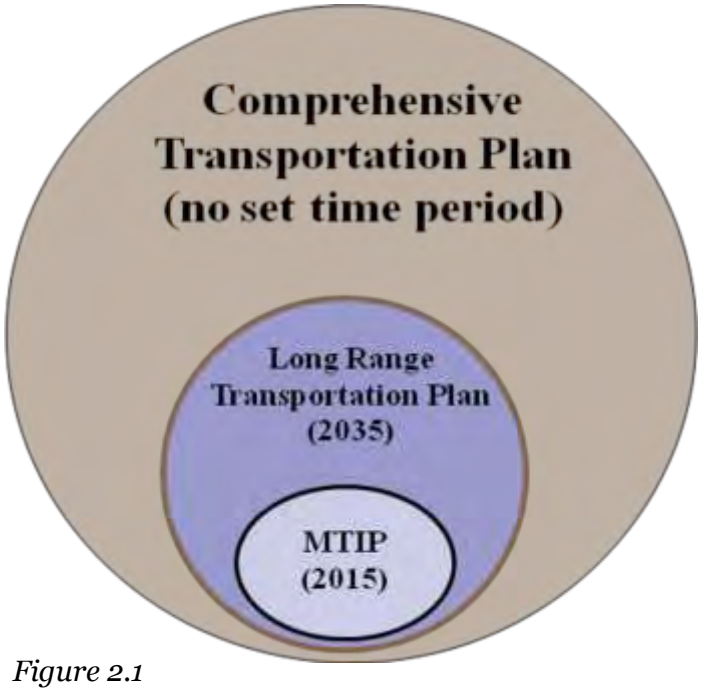


Figure 2.1

The facilities and services in a long range transportation plan are a subset of the facilities and services in a Comprehensive Transportation Plan. Figure 2.2.1 shows this relationship between the LRTP and CTP, and also the plans' relationship to the Metropolitan Transportation Improvement Program (MTIP), the seven-year program of projects that is also developed for metropolitan areas and that serves as the main implementing document of the LRTPs for those projects and services that use state and federal funding. The current MTIP covers fiscal years 2009-2015.

This document compiles the LRTPs for the two areas under the jurisdiction of the organizations with the main responsibility for

transportation planning in the Research Triangle Region:

1. The Capital Area Metropolitan Planning Organization (Capital Area MPO, or CAMPO) which covers all of Wake County and portions of Franklin, Granville, Harnett and Johnston Counties; and
2. The Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (Durham-Chapel Hill-Carrboro MPO, or DCHC MPO) which covers all of Durham County and parts of Orange and Chatham Counties.

Therefore, this is *one document*, so that those interested in transportation planning in the Research Triangle Region have a single, consistent reference to consult, but *two plans*, since there are state and federal requirements that each MPO be responsible for the plans, projects & services, funding, and air quality conformity within its jurisdiction.

This point merits emphasis: The selection of projects and allocation of funding to them is an *independent* decision by each MPO. This single document is a way to help these organizations make more consistent and complementary decisions within their spheres of authority, and to communicate these decisions to the citizens of the region.

To distinguish these lines of authority, this document is color-coded. Text and tables with a white background apply to both MPOs.

Text and tables highlighted in this green color apply only to the Durham-Chapel Hill-Carrboro MPO.

Text and tables highlighted in this yellow color apply only to the Capital Area MPO

Figure 2.2.2 summarizes key features of the two types of plans and different areas of authority, and indicates what is included in this version of the single regional document.

Figure 2.2.2

Authority	Capital Area MPO		Durham-Chapel Hill-Carrboro MPO	
Name of the Plan	CAMPO 2035 **Long-Range Transportation Plan**	CAMPO **Comprehensive Transportation Plan**	DCHC MPO 2035 **Long-Range Transportation Plan**	DCHC MPO **Comprehensive Transportation Plan**
Area Covered	Wake County and parts of Franklin, Granville, Harnett and Johnston Counties	Same as CAMPO Long Range Transportation Plan	All of Durham and parts of Orange and Chatham Counties	Same as DCHC MPO Long Range Transportation Plan
Who requires this plan?	Federal Government	State Government	Federal Government	State Government
Plan's Horizon Year	2035	No Set Year	2035	No set year
Is this plan fiscally constrained?	Yes	No	Yes	No
Must this plan meet air quality standards?	Yes	No	Yes	No

What officially constitutes the plan?	All LRTP maps, lists of projects, and the text of this document that applies either generally or specifically applies to the CAMPO area	Just the set of CTP maps that apply to the CAMPO area (no text, list of projects or written report)	All LRTP maps, lists of projects, and the text of this document that applies either generally or specifically applies to the DCHC MPO area	Just the set of CTP maps that apply to the DCHC MPO area (no text, list of projects or written report)
What projects are included in the plan?	New and expanded facilities and services	Existing, new and expanded facilities and services	New and expanded facilities and services	Existing, new and expanded facilities and services
Is the plan included in this version of the document	Yes	No	Yes	No

Figure 2.2.3 shows a map of the two MPO areas, as well as two other important geographic areas to consider as one consults this plan:

1. The Triangle Air Quality Region, shown in white, which consists of all of Wake, Durham, Orange, Franklin, Granville, Harnett and Johnston Counties, plus four townships in northeastern Chatham County; and

2. The Triangle Regional Model (TRM) "modeled area," outlined in purple, which indicates the area covered by the region's travel demand forecasting model: the tool that estimates future travel on existing and planned roads and transit services (see Section 5.3). Most of the data highlighted in this document represents travel within this modeled area.

The core of the plan is the set of transportation investments described in Section 7, including:

- New and expanded roads;
- Transit facilities and services, including bus and rail;
- Bicycle and pedestrian facilities, both independent projects and in concert with road projects;
- Transportation Demand Management: marketing and outreach efforts that increase the use of alternatives to driving alone;
- Intelligent Transportation Services: the use of advanced technology to make transit and road investments more effective; and
- Transportation Systems Management: road projects that improve safety and traffic flow without adding new capacity.

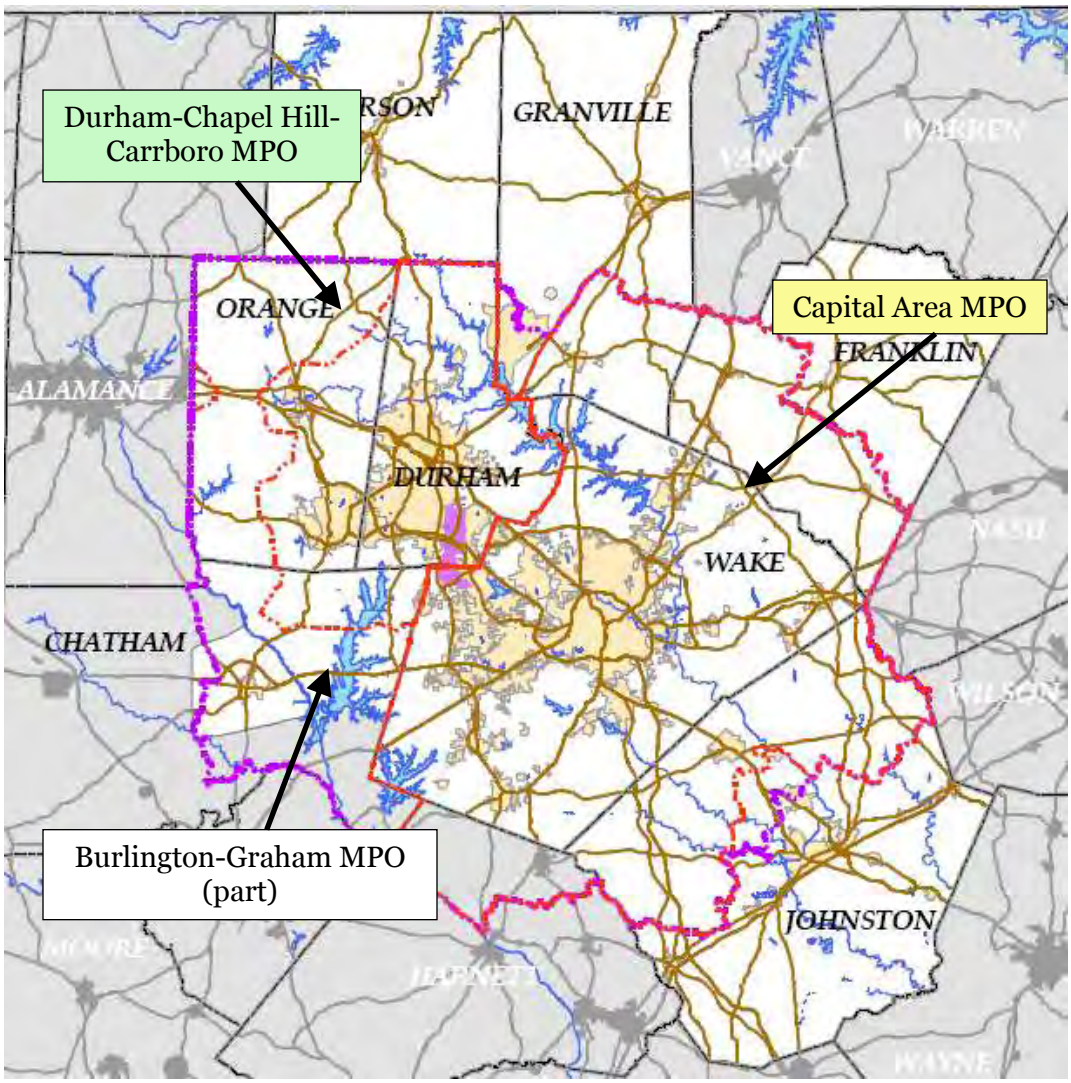
2.3 How Will The Plans Be Used?

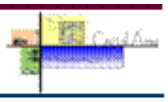
Long Range Transportation Plans are used for several important decisions, including:

Programming projects. Only projects that appear in a Long Range Transportation Plan may be included in the TIP for funding.

Preserving future rights-of-way for roads and transit facilities. The state and local governments use Long-Range Transportation Plans to identify land that may need to be acquired and to ensure that new development does not preclude the eventual construction of planned roads and transit routes.

Figure 2.2.3


Durham-Chapel Hill-Carrboro MPO
Capital Area MPO
Burlington-Graham MPO (part)
GRANVILLE
ORANGE
FRANKLIN
ALAMANCE
DURHAM
WAKE
CHATHAM
JOHNSTON
Legend
Triangle Ozone Maintenance Area
TRM Modelled Area
MPO Boundary
Major Road Or Highway
RTP
Municipal Limit
County Boundaries



Designing local road networks. Metropolitan Long-Range Transportation Plans chiefly address larger transportation facilities with regional impact. Communities can then use these "backbone" projects to plan the finer grain of local streets and local transit services that connect to these larger facilities.

Land use decisions. Communities use regional transportation plans to ensure that land use decisions will match the investments designed to support future growth and development.

Private investments decisions. Businesses, homeowners and developers use these plans to understand how their interests may be affected by future transportation investments.

Key points from this section:

- The Comprehensive Transportation Plan (CTP) shows everything we would eventually like to do. The Long-Range Transportation Plan (LRTP) shows everything we think we can afford to do by the Year 2035 that will pass air quality muster. And the Transportation Improvement Program (TIP) shows everything in the LRTP that we plan to do over the next seven years that involves state or federal funding. The first four of those years are financially constrained.
- This single document includes the 2035 Long-Range Transportation Plans for two planning areas: the Capital Area MPO and the Durham-Chapel Hill-Carrboro MPO. Each of these organizations retains independent authority within its area of jurisdiction.
- These plans will be used by local, state and federal agencies to allocate resources for specific road, transit, bicycle and pedestrian investments, to ensure that land is preserved for these investments and to match land use and development decisions with planned infrastructure investments.
- A subsequent version of this document will add the maps for the two MPO CTPs.

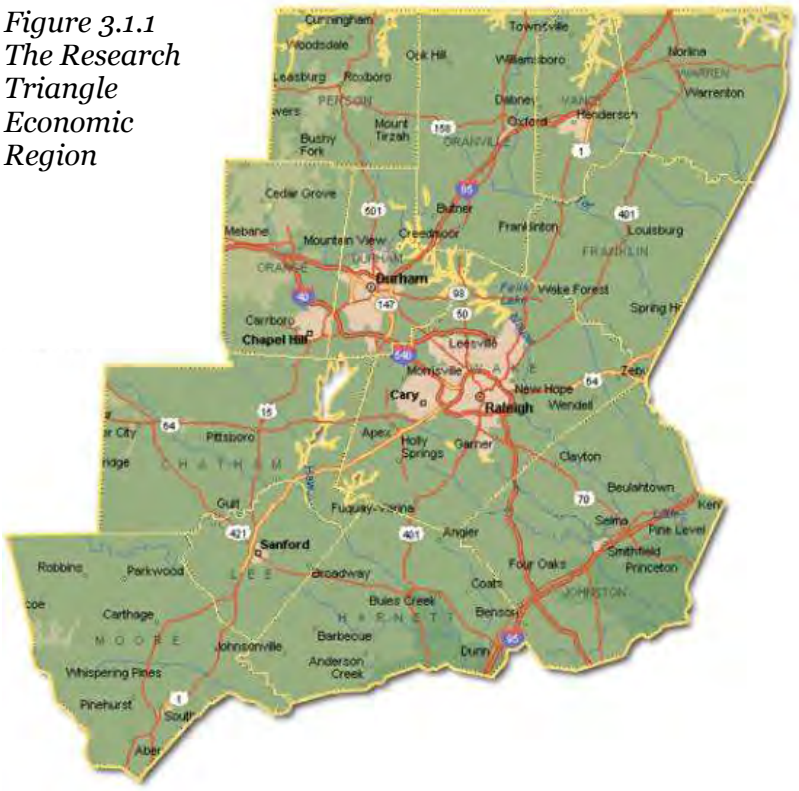
3. About Our Home

Transportation investments link people to the places where they work, learn, shop and recreate, and provide critical connections between businesses and their labor markets, suppliers and customers. So an important starting point for planning future investments is understanding the current state of our communities, and how they might change over the next generation.

3.1 Our Region

The Research Triangle is a burgeoning sunbelt metropolitan region. As defined by the census bureau, the region's metropolitan areas cover seven counties; six that are members of one or the other MPO plus Person County. More broadly, the economic region covers 13 counties, stretching from the Virginia border on the North to Harnett, Lee and Moore counties in the south. Today, the seven metropolitan counties are home to about 1.6 million people and the 13-county economic region is home to two million people.

Figure 3.1.1 The Research Triangle Economic Region



The Triangle Economic Region

Metropolitan Counties	
Chatham	DCHC
Durham	DCHC
Franklin	CAMPO
Johnston	CAMPO
Orange	DCHC
Person	
Wake	CAMPO
Nonmetropolitan Counties	
Granville	CAMPO
Harnett	CAMPO
Lee	
Moore	
Vance	
Warren	

As the MPOs plan their transportation networks, it is important to consider not only mobility within their boundaries, but also the connections to the wider economic region and other regions in North Carolina. The Triangle is one of three large, complex metro areas along North Carolina's Piedmont Crescent, along with the Triad and Charlotte. Each of these regions has more than 1.5 million people and together, these three regions account for 46% of the state's population, 52% of its jobs and 64% of the value of all goods and services produced in North Carolina.

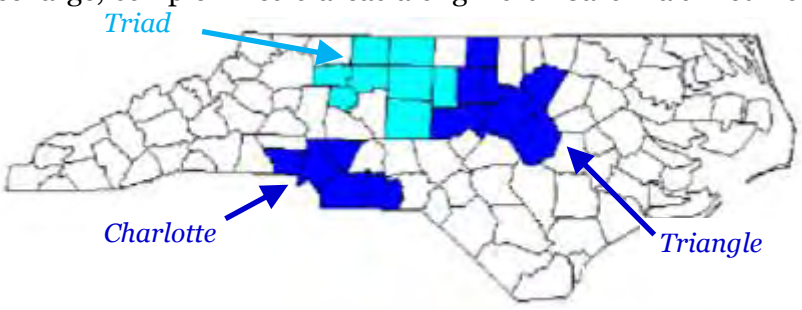
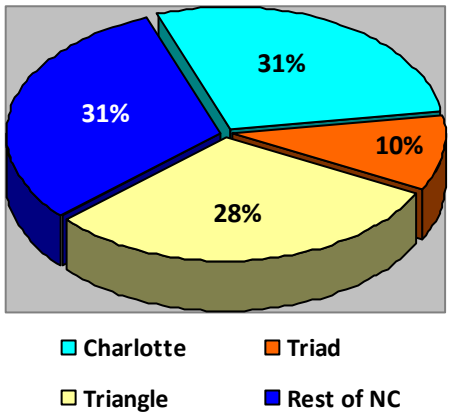


Figure 3.1.2 The "Big 3" Metro Regions

More importantly, as we consider future transportation investments, these three regions are expected to account for almost 70% of North Carolina's population growth over the next generation, with the Triangle accommodating more growth than any other region.

This rapid population growth is part of a larger national trend, where two-thirds of all population growth is expected to occur in a series of "megaregions," the fastest-growing of which are located in sunbelt areas like the Triangle. The Triangle, along with the Triad and Charlotte, are part of the Piedmont Atlantic Megaregion (PAM), stretching from Raleigh to Atlanta, and which is forecast to grow from 12.6 million people in 2000 to 19.1 million people by 2030.

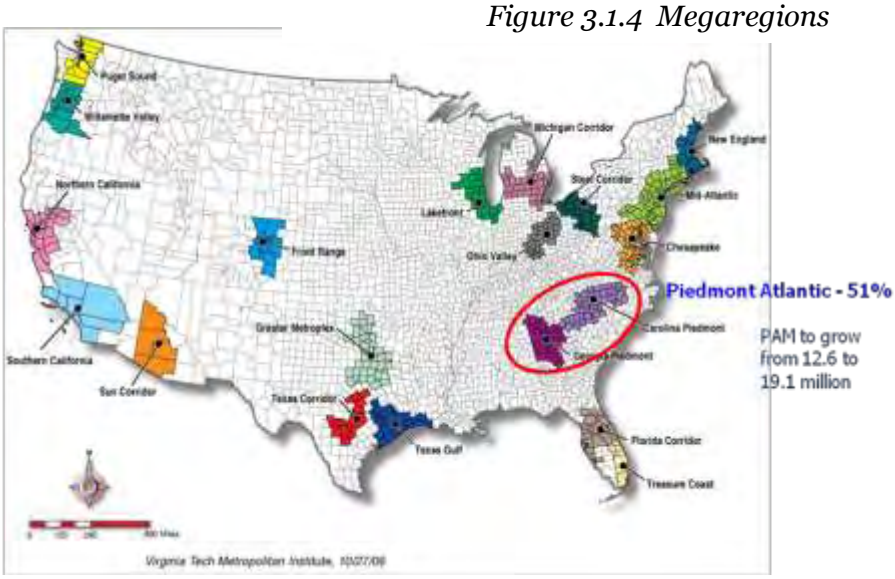
Figure 3.1.3 Where Future Population Will Locate in North Carolina (2000-2030)



3.2 Our People

As our region has grown and as we add 1.6 million new people over the next generation, the composition of our population is changing in ways that can influence the types of transportation investments we may choose to make:

Figure 3.1.4 Megaregions



- By 2030, 15% of Triangle residents will be 65 or older, up from 9.5% in 2000.
- 32,000 households in the Triangle have no vehicle available, up from 29,000 in 2000 and 27,000 in 1990.
- We are highly mobile: 10% of households lived in a different county a year ago and another 10% changed houses within their home county.
- 370,000 households – 62% of the total – are households with only one or two people, and another 51,000 people live in group quarters such as university dormitories.
- Surveys report that 20% to 30% of households today would prefer to live in a compact, walkable neighborhood with a mix of activities, the kinds of neighborhoods that can be effectively served by transit. This would suggest that by the Year 2035, between 500,000 and 800,000 Triangle residents would select a compact, walkable, mixed-use neighborhood if that option is available for them.

3.3 Our Economy

The cornerstones of the region's economy are the major universities and their associated medical centers, the technology firms exemplified by the companies in the Research Triangle Park and state government. Employment is concentrated in the three core Triangle Counties: Wake, Durham and Orange Counties have 700,000 jobs; the 8-county Census Combined Statistical Area has 800,000 jobs and the 13-county economic region has 900,000 jobs. Figure 3.3.1 lists the region's largest employers, while Figure 3.3.2 indicates the distribution of employment by industry type within the region. Figure 3.3.3 shows the geographical distribution of employment within the 13-county economic region.

Figure 3.3.1 Largest Employers in the Triangle Region (>5,000 employees)

State of North Carolina
Duke University & Medical Center
Wake County Public Schools
IBM
United States Government
UNC-Chapel Hill
North Carolina State University
GlaxoSmithKline
UNC Hospitals
Wake Medical Center
SAS Institute

Figure 3.3.2 Employment by Industry

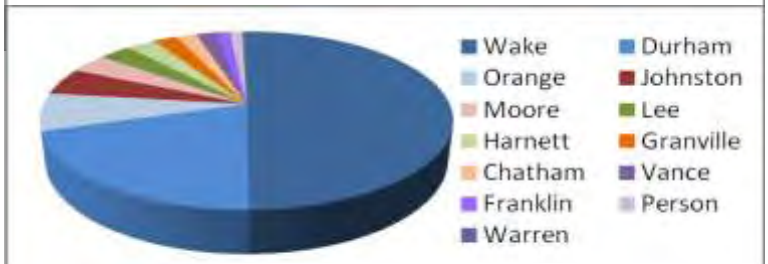


Figure 3.3.3 Employment by County

The Triangle's economy, mirroring the national situation, currently faces significant challenges. But the foundations of the region's economy have proven resilient in the past, and the size of the region's economy is substantial: the metropolitan region accounted for 17% of the value of goods and services produced in North Carolina in 2004, and at $57 billion, surpassed the economic

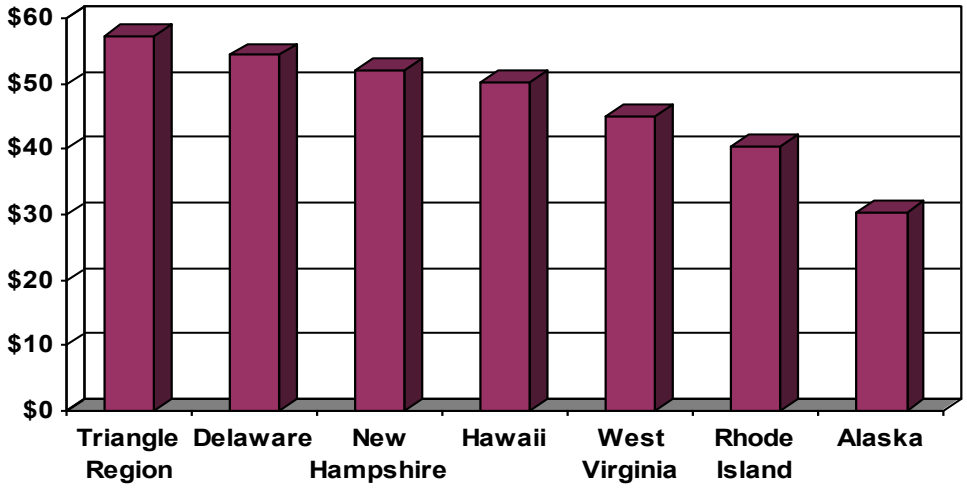
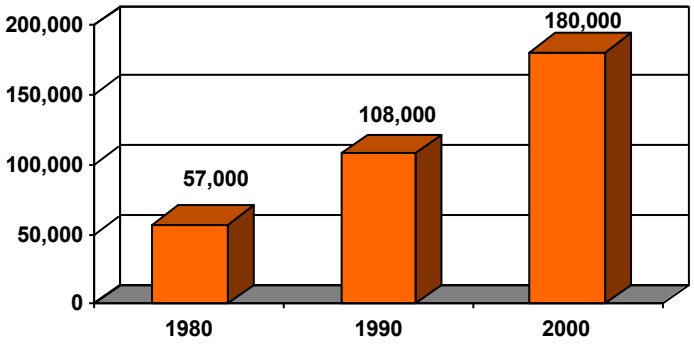


Figure 3.3.4 Gross Product: Value of Goods & Services Produced

value produced by 13 states (Figure 3.3.4).
The concentration of employment in several specific areas, most notably the downtowns of Raleigh and Durham, the Research Triangle Park area and the university/medical center areas associated with Duke University, UNC-Chapel Hill, NC State University and North Carolina Central University results in significant commuting across the MPO boundary. Figure 3.3.5 shows the growth in cross-county commuting in the region while Figure 3.3.6 shows commuting flows, with the largest flow consisting of 65,000 people who commute each day between Wake County on the one hand and Durham and Orange Counties on the other.

Figure 3.3.5 Cross-County Commuting



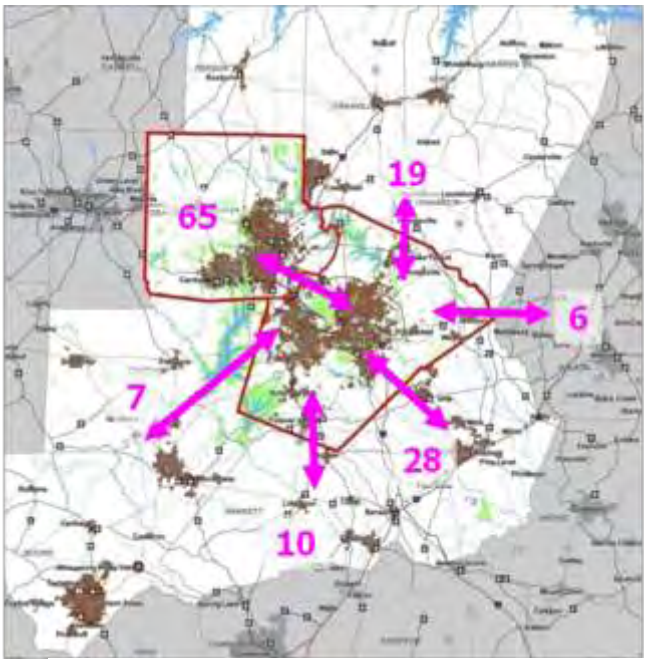


Figure 3.3.6 Daily Commuting Flows
(in thousands of coummuters)

3.4 Our Environment

Flowers blooming in Downtown Durham

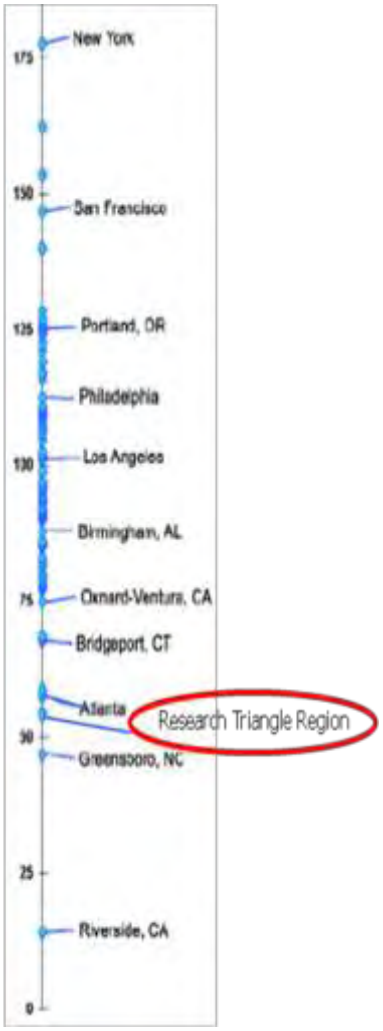
Among the many environmental concerns in our region, land use, air quality and water resources are three that have critical connections to transportation investments. Land use is a particularly critical issue in a fast-growing region like the Triangle, since the pattern of future land use can have significant influence on the efficiency and effectiveness of different transportation investments, especially transit services. Much of the Triangle Region is characterized by low-density development with different types of land uses, such as homes, offices and stores, separated from one another, a pattern commonly referred to as "sprawl."
According to a national study that carefully examined measures of density, land use mix, road connectivity and "centeredness," the Triangle area ranked as the 3rd most sprawling among the 83

regions studied. The same study examined the environmental and social impacts of sprawl, concluding that persons in the most sprawling areas add many more miles of travel each day to their schedule, suffer more traffic deaths, and tend to endure worse air quality.

Air quality is an increasingly important concern and is directly linked with the transportation system. Ozone is a strong oxidizer and irritant that has been shown to decrease lung function and trigger asthma attacks among the young, elderly, and adults who work or exercise outdoors.

Emissions from cars and trucks account for over one-half the emissions of nitrogen oxides (NOx) – the controlling pollutant in the formation of ground level ozone – in the Triangle Area. Given the serious health effects of ozone, the reduction of ozone emissions is an important goal of the MPO's long-range transportation system.

Figure 3.4.1 Regional Measures of Sprawl



The Environmental Protection Agency (EPA) has established standards for common air pollutants. A geographic area that meets or exceeds the standard for a particular air pollutant is called an "attainment area." Likewise, an area that does not meet the standard is called a "non-attainment area." Standards are set for a number of pollutants, including ozone, nitrous dioxide and carbon monoxide.

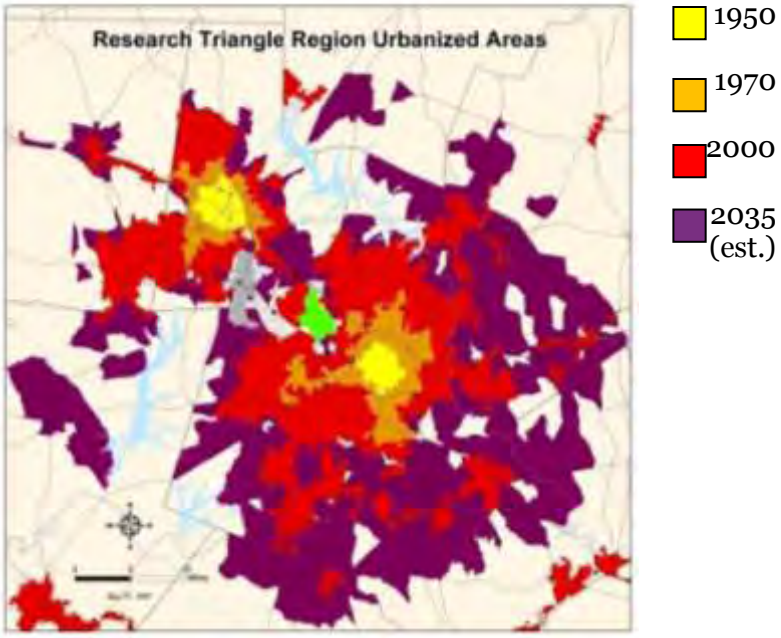
The non-attainment status can directly affect the community's economic development efforts, and federal funding for transportation improvements can be delayed if a plan is not adopted that is deemed to bring the Triangle back into conformity. New or expanded industrial developments proposing to emit air pollutants face stricter and more costly technology standards in non-attainment areas.

Water quality is a regional concern as well. The Triangle Region is divided into two major drainage basins, both of which supply water for the Region's drinking water reservoirs. The southern/westerm part of the Region drains into Jordan Reservoir and the Cape Fear River basin. The northern/eastern part of the Region drains into the Falls of the Neuse Reservoir and the Neuse River basin. All of the major watercourses in the Region drain to water supply reservoirs and affect the quality of their waters. The NC Division Water Quality (DWQ) classifies streams according to their best-intended uses. Surface waters, including streams and lakes, are rated as fully supporting, partially supporting or not supporting their intended uses. Intended uses could include water supply, aquatic life protection and swimming or other recreation. The DWQ has determined that several streams throughout the region do not support their intended uses. These streams include the New Hope, Third Fork and Northeast Creeks in the Cape Fear basin; and Ellerbe, Little Lick and Lick Creeks in the Neuse basin. All have impaired water quality.

The municipalities and counties in the region often apply special zoning regulations for the purposes of water supply watershed protection. These regulations often prohibit certain types of development in sensitive watershed areas, limit the intensity of development to minimize pollution from stormwater runoff, limit the amount of impervious surfaces allowed in new developments, and limit the disturbance of naturally vegetated areas on each side of most streams. Transportation plans must take into account the impact that new or widened roadways might directly have on water quality, and the indirect effects that transportation investments might have in spurring future development that could adversely impact water quality.

3.5 Our Future

Figure 3.5.1 Historic and Forecast Urban Growth



The metropolitan counties of the Research Triangle Region are forecast to add another million people over the next generation, more than the current *combined* population of our four largest cities and towns: Raleigh, Durham, Cary and Chapel Hill.

Current forecasts suggest that much of this future growth will continue to extend outwards from the urbanized area as it was most recently defined following the 2000 Census. Figure 3.5.1 shows how the urbanized areas around Durham and Raleigh have grown over the years and how they would be defined based on population forecasts made as part of this 2035 Long Range Transportation Plan. The Census defines urbanized areas as areas with more than 500 residents per square mile and strong commuting ties to a central city with more than 50,000 people.

3.6 Our Challenge

These characteristics of our home -- a rapidly growing population and economy, continuing risks to our environment and a propensity to disperse growth outwards, create many transportation challenges. More commuters are traveling longer distances, and the single-occupant automobile continues to dominate how we travel. And although we tend to focus on commuter travel, travel for such purposes as school, business, shopping, and social engagements constitute increasing shares of travel. These characteristics have produced increasing demands on our transportation network, which in terms of "vehicle miles traveled" and other demand measures is experiencing a growth rate that is much greater than that of our population. The consequences have been traffic congestion, increasing transportation infrastructure costs, and further pressure on our air, water, open space, and other environmental qualities. The quality of life, which attracts the professional and skilled workers and business investment to our region, may ultimately become threatened by the consequences of our growth and inadequate transportation infrastructure.

Congested traffic on I-40

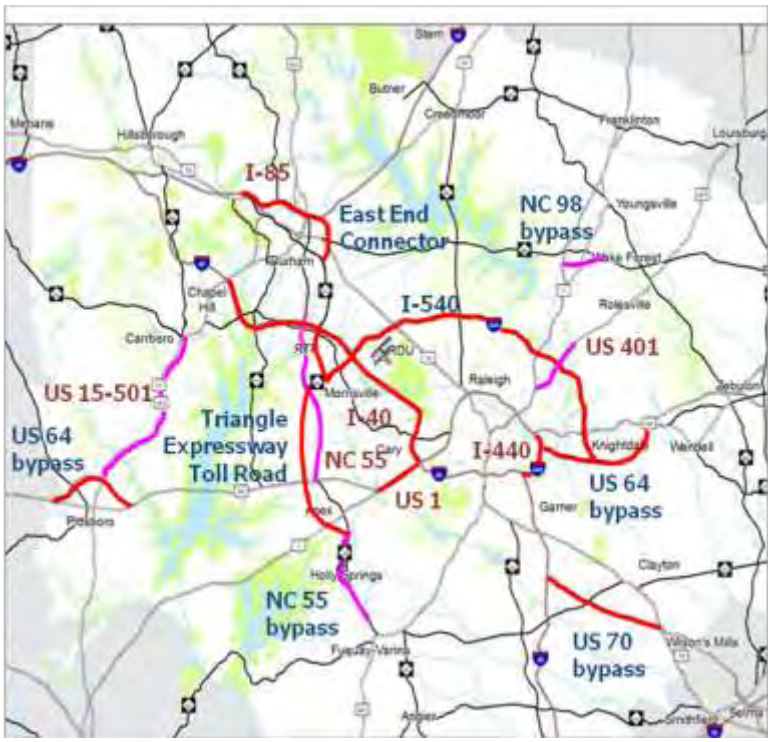
These consequences create many challenges for us, for example:

• How do we find the resources to invest in our transportation infrastructure, and to what extent does this demand for resources compete with other needs such as schools, water and waste treatment facilities, affordable housing, protection of green space and social services?

• As we expand our roadway network to meet growing travel demand, how can we minimize the negative impacts on our travel times, air and water quality, and open spaces?

• How do we design a transportation network that serves the needs of different types of places, from downtowns to small towns to suburban areas to rural communities, serves a range of socioeconomic groups and serves our economic and environmental goals?

Figure 3.6.1 Major Regional Road Projects



One of the most significant challenges facing our region is that despite large investments in major road projects, congestion levels are increasing due to extensive population growth, increased travel within the region and large amounts of "pass-through" traffic on our region's interstate highways.

Figure 3.6.1 shows $2.8 billion in major road projects that have been completed over the past dozen years or that are well-underway. Red lines are highways with interchanges, while purple lines are surface streets.

Figure 3.6.2 shows how levels of congested peak hour travel have increased in the Triangle and in many of the regions with which we compete. The figure indicates that economically successful, fast-growing regions are not able to "build their way out of congestion."

We are undertaking the update of our long-range transportation plan to help ensure that we are able to meet the significant challenges we face. We must plan now for the roadways, transit services, and bicycle and pedestrian facilities that will be needed in 2035, if we expect to meet the travel demands of the place we will become. Our communities have opportunities to create and maintain a strong, growing economy, high quality of life, affordable housing market, culturally diverse populace, and sustainable environment. Our ability to anticipate and meet the challenges in planning, designing, and building an efficient and effective transportation network is a key element for ensuring that we can make the most of these opportunities.

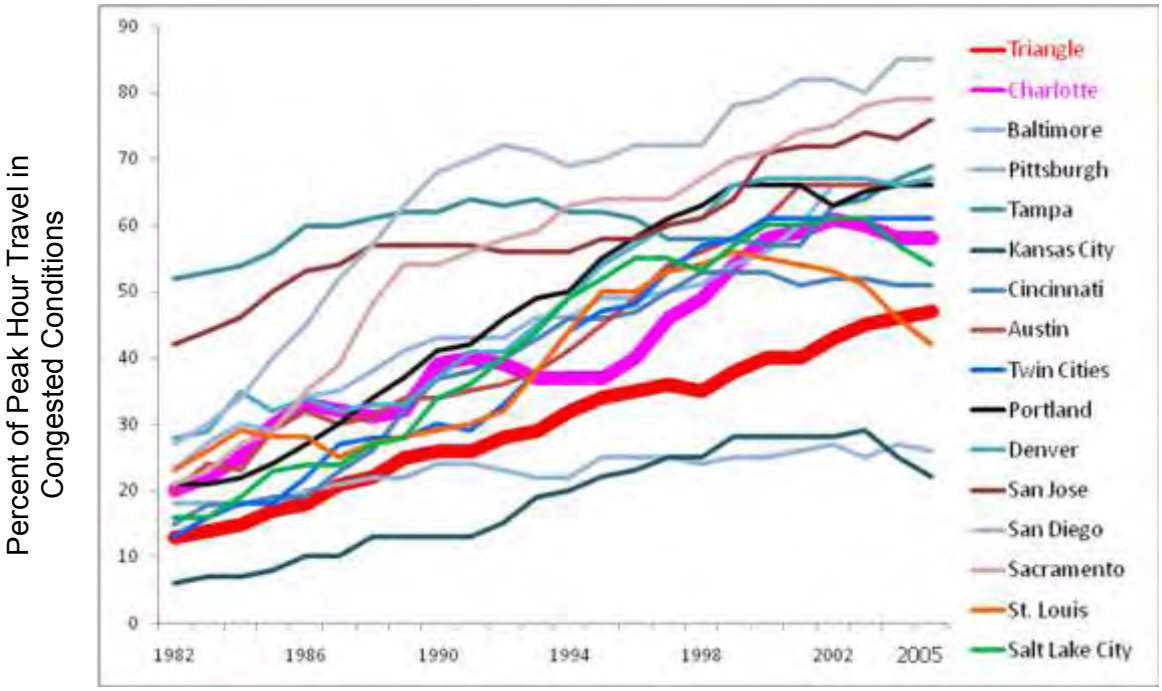


Figure 3.6.2 Congestion Trends (1982-2005)
-- Texas Transportation Institute

Key points from this section:

- The MPO areas covered by this plan are part of a larger economic region. Transportation investments should consider the mobility needs of this larger region and links to the other large metro regions of North Carolina and throughout the Southeast.
- The Triangle Region is expected to accommodate a phenomenal amount of future growth, part of a larger national trend of growth in sunbelt "megaregions;" we need to plan for the region we will become, not just the region we are today.
- The Triangle is one of the most sprawling regions in the nation and current forecasts project both continued outward growth and infill development in selected locations, most notably in the central parts of Raleigh, Durham and Chapel Hill. A key challenge for our transportation plans is to match our vision for how our communities should grow with the transportation investments to support this growth.
- No region has been able to "build its way" out of congestion; an important challenge for our transportation plans is to provide travel choices that allow people to avoid congestion.
- Our population is changing. The population is aging, more households will be composed of single-person households and two-person households without children, the number of households without cars is increasing, and more people are interested in living in more compact neighborhoods with a mix of activities. Our plans must provide mobility choices for our changing needs.
- Our MPOs are tied together by very strong travel patterns between them; our largest commute pattern and heaviest travel volumes occur at the intersection of the MPO boundaries. Our MPO plans should recognize the mobility needs of residents and businesses that transcend our MPO borders.

4. Our Vision And How We Will Achieve It

4.1 Our Vision.

The region has a common vision of what it wants its transportation system to be:

> a seamless integration of transportation services that offer a range of travel choices and are compatible with the character and development of our communities, sensitive to the environment, improve quality of life and are safe and accessible for all.

The *2035 Transportation Plan* commits our region to transportation services and patterns of development that contribute to a more sustainable place where people can successfully pursue their daily activities.

4.2 Goals and Objectives.

Each MPO has adopted goals and objectives that are designed to achieve the region's overall vision, given the particular characteristics and aspirations of the communities that make up each MPO.

The Capital Area MPO's goal is to develop a regional transportation network that is…

Sustainable

- Encourage state and local governments to manage growth by linking land use patterns, plans and policies with transportation networks, plans and policies through regional coordination.
- Encourage equitable funding from state and Federal sources by examining the distribution formulae and recommending changes to ensure transportation revenues collected locally are used to fund local projects.
- Identify new and alternative funding sources for constructing and maintaining transportation infrastructure to decrease reliance on state and Federal funds.

Efficient, Safe & Reliable

- Ensure maximum regional mobility through improvements to and maintenance of the road and highway network.
- Provide an interconnected transportation network by improving communication and cooperation between the metropolitan area governments, transportation agencies, freight carriers, law enforcement, emergency services and transportation users.
- Improve the process for identifying, evaluating and prioritizing critical transportation projects with more emphasis on public involvement and multi-modal equity.
- Maximize transportation system efficiency and safety by promoting alternative, new and innovative means other than adding general-purpose traffic lanes.

Affordable & Accessible

- Promote land use policies and infrastructure projects that support transit, walking and bicycling in local and regional plans.
- Promote the health and economic benefits of walking and bicycling as practical modes of transportation.
- Enhance and expand services for alternative modes of transportation including but not limited to transit, walking and bicycling through increased funding and cooperative regional planning.

The Durham-Chapel Hill-Carrboro Metropolitan Planning Organization' s goals and objectives are:

1. Overall Transportation System

Goal: A safe, sustainable, efficient, attractive, multi-modal transportation system that: supports local land use; accommodates trip-making choices; maintains mobility; protects the environment and neighborhoods; and improves the quality of life for urban area residents.

Objectives:

a) Establish performance standards that will measure the effectiveness of the urban area's overall transportation system in supporting access to goods, services, activities, and destinations.
b) Select and program transportation projects, which are consistent with community goals and are a cost-effective use of funds.
c) Develop and maintain a multi-modal regional transportation model that reflects travel patterns and incorporates innovative techniques for evaluating the impacts of proposed transportation investments on travel and land use patterns.
d) Promote non-automobile transportation alternatives and create efficient connections between all transportation modes.
e) Conserve natural resources and reduce the rate of energy consumption.
f) Develop cooperative strategies with employers to reduce congestion and increase the efficiency of the transportation system.
g) Use transportation funds based on the priority needs of the urban area, in keeping with community values.
h) Seek additional funding and funding sources to ensure implementation of the long range plan.
i) Monitor the implementation of the Plan and the targets through the biannual TIP process.
j) Ensure that the transportation needs are met for all populations, especially for the youth and elderly, the mobility impaired, and the economically disadvantaged.
k) Work cooperatively with the North Carolina Department of Transportation, neighboring Metropolitan Planning Organizations and Rural Planning Organizations and other transportation-related organizations to address the transportation issues of the broader region.

2. Multi-Modal Street and Highway System

Goal: An attractive multi-modal street and highway system that allows people and goods to be moved safely, conveniently, and efficiently.

Objectives:

a) Establish performance standards and report on the condition and effectiveness of the multi-modal street and highway system.
b) Create multi-modal street patterns that: encourage safe pedestrian, bicycle, and vehicular travel; provide access to public transportation; and ensure connectivity.
c) Develop and implement level of service (LOS) standards for the urban area that are based on a cooperative agreement between state and local agencies.
d) Preserve and enhance the traffic carrying capacity of arterial street systems, while minimizing traffic intrusion in residential neighborhoods.

e) Identify and recommend design standards that: establish safe speeds; increase pedestrian and bicycle usage of streets; and enhance the attractiveness and appeal of the street and highway system.

3. Public Transportation System

Goal: A convenient, accessible, and affordable public transportation system, provided by public and private operators, that enhances mobility and economic development.

Objectives:

a) Establish performance standards and report on the condition and effectiveness of the public transportation system.
b) Increase public transit ridership by enlarging the service area and increasing the frequency of service within the urban area.
c) Coordinate transit service within the urban area by promoting high quality, seamless, integrated, and customer-friendly service.
d) Expand ridesharing, carpool, and vanpool services and opportunities.
e) Develop and implement alternatives to the use of single occupant vehicles, including high occupancy vehicle (HOV) facilities and regional rail services.
f) Develop and implement the Regional Transit Plan.
g) Develop a regional park and ride system for cars and bicycles to support transit services and encourage ridesharing.

4. Pedestrian and Bicycle System

Goal: A pedestrian and bicycle system that: provides a safe alternative means of transportation; allows greater access to public transit; supports recreational opportunities; and includes off-road trails

Objectives:

a) Establish performance standards and report on the condition and effectiveness of the pedestrian and bicycle system.
b) Maintain and implement a Regional Pedestrian Plan and a Regional Bicycle Plan.
c) Identify and recommend ways that local governments may provide adequate staff and resources to meet the goals of their pedestrian and bicycle programs.
d) Develop a regional bicycle and pedestrian policy that establishes linkages between activity centers and provides for access to public transit.
e) Ensure that bicycle and pedestrian facilities are included in the planning, design, and construction of every roadway and development project, including the connection to external transportation facilities, in accordance with bicycle and pedestrian plans and local ordinances.
f) Increase education about the benefits of pedestrian and bicycle alternatives.
g) Support the enforcement of pedestrian and bicycle regulations.
h) Pursue strong funding commitment for building both pedestrian and bicycle facilities.
i) Provide greater safety for pedestrians and bicyclists of all levels of ability, and safer interaction with users of other modes of transportation.
j) Encourage the efforts and activities of citizen advocacy groups for pedestrian and bicycling by providing information and support for their programs.

5. Integration of Land Use and Transportation

Goal: A Transportation Plan that is integrated with local land use plans and development policies.

Objectives:

a) Establish performance standards and report on the integration and consistency of the Transportation Plan with local land use plans and development policies.
b) Create transportation systems that enhance the livability of all communities.
c) Identify the impacts of different land use patterns and site designs on travel behavior.
d) Evaluate the changes in land use brought about by the expansion of existing transportation facilities and the construction of new facilities.
e) Identify and recommend land use patterns, parking requirements and development policies that increase overall mobility and that improve and support transportation efficiency, and compact, mixed-use, transit-friendly, and walkable development

6. Protection of Natural Environment and Social Systems

Goal: A multi-modal transportation system which provides access and mobility to all residents, while protecting the public health, natural environment, cultural resources, and social systems.

Objectives:

a) Establish performance standards and report on transportation impacts on the public health, natural environment, cultural resources, and social systems.
b) Protect and preserve archaeological, historic, and culturally valuable areas.
c) Identify and protect environmentally sensitive areas early in the planning process.
d) Develop and implement modifications to the transportation system that reduce the rate of growth in vehicle miles traveled (VMT).
e) Modify the transportation system to reduce the pollutants in highway runoff and the vehicle emissions, in accordance with federal, state and local Clean Air and Water legislation.
f) Minimize the noise and dust generated by transportation facilities in neighborhoods and the urban area.
g) Ensure that transportation facilities do not negatively affect disadvantaged populations disproportionately.
h) Develop and implement a transportation system that supports the reduction of greenhouse gases and carbon production and is coordinated with local greenhouse gas and carbon reduction plans.

7. Public Involvement

Goal: An ongoing program to inform and involve citizens throughout all stages of the development, update, and implementation of the Transportation Plan.

Objective:

a) Establish performance standards and report on the effectiveness of the public involvement element of the Transportation Plan.
b) Encourage a broad cross section of citizens to take a proactive role in the transportation policy and planning process.
c) Educate the public and elected officials, in order to increase public understanding of both the options and the constraints of transportation alternatives.

d) Determine the public's knowledge of the metropolitan transportation system, and public values, attitudes and concerns regarding transportation.
e) Determine which elements of the Transportation Plan would support or diminish the public's desired lifestyle.

8. Safety and Security

Goal: Continue to improve transportation safety and ensure the security of the transportation system.

Objective:

a) Reduce fatality, injury, and crash/incident rates on all modes.
b) Reduce vulnerability of transportation facilities/users to terrorists, natural disasters and risks by implementing and monitoring an evacuation plan, and working with the regional emergency management team.
c) Reduce economic losses due to transportation crashes and incidents.
d) Improve the ability to identify high accident locations, and evaluate their impacts in TIP project prioritization.
e) Provide a safe environment for transportation users through the "3 Es" (Engineering, Enforcement and Education).
f) Increase transit safety and security for riders and employees.

9. Freight Transportation and Urban Goods Movement

Goal: Improve mobility and accessibility of freight and urban goods movement.

Objective:

a) Relieve congestion on heavily-traveled truck routes.
b) Improve mobility and access to intermodal operations and facilities.
c) Establish and designate truck routes consistent with federal, state and local regulations.

4.3 Performance Targets and Measures of Effectiveness.

As part of the same process for creating the Goals and Objectives, the DCHC MPO developed a set of Performance Targets to provide a set of broadly based quantitative measures that evaluated the transportation plan from several different perspectives. The Targets mostly use measurements from the Triangle Regional Model (the region's travel demand model), such as the miles traveled, trips taken, congestion levels, and mode split (between automobiles, transit, bicycling and walking).

These measures, and the targets the MPO seeks to achieve with its investments, are shown in Figure 4.3.1, which compares the adopted 2035 LRTP and Targets using the following format:

Comparison Data – this information provides contextual values for comparing the 2035 LRTP and Target values:

- 2005 – This is the current condition. It is the 2005 population and employment using the 2005 transportation network (e.g., highways and transit service).
- 2035 E+C – This is the no-build condition, or "Existing plus Committed" (E+C). It is the 2035 population and employment using the existing transportation network.
- 2035 Data – these are the values for the plan as adopted by the DCHC MPO.

Targets – There are three Target values, Good, Better and Best. The use of more than one Target value helps to set a range of values that can be used for comparison.

The comparison of the 2035 LRTP with the Performance Targets produces mixed results. In terms of congestion, the DCHC MPO fares well because the 2035 LRTP results match the Best Target levels for *Percent of Peak Period at Congestion* (#2) and the *Cost of Congestion* (#8). The *Percent of EJ* (Environmental Justice – minority and low income populations) *Population within a ¼ mile of Transit* (#9) is also at the Best Target Level. The mode mixes are substandard – the *Percent of SOV (Single Occupied Vehicle) Trip Share* (#5) and the *Percent Non-motorized Trip Share* fall well short of the Targets. The *VMT per Capita* does not meet any Target, either.

Figure 4.3.1

No.	Mobility Targets	Comparison Data		2035 LRTP	Targets		
		2005	2035 E+C		Good	Better	Best
1	VMT Per Capita (daily miles)	28.5	31.6	32.0	29.1	27.5	24.5
2	Percent of Peak Period VMT at Congestion (V/C > 1)	3.0%	10.4%	3.7%	12%	8%	4%
3	Average Travel Time: all peak trips (daily minutes)	16.6	20.5	18.3	19	17	15
4	Transit Mode Share: all trips	2.4%	2.3%	3.3%	3.0%	5.0%	8.0%
5	Percent SOV Trip Share: work trips	81.8%	82.3%	81.2%	78.4%	74.3%	66.0%
6	Percent Non-motorized Trip Share: all trips	7.1%	6.8%	6.8%	9%	11%	15%
7	Greenhouse Gas Change (community target)			+49%	-10%	-20%	-30%
8	Cost of Congestion (in million $)	$351	$1,211	$496	1,030	848	666
9	Percent of EJ Population within 1/4 mile of transit	58%	59%	85%	65%	75%	85%

It should be noted that this report presents a detailed analysis of EJ issues in section 9.2 – Critical Factors in Planning – Environmental Justice, and provides a comparison of the location of 2035 LRTP projects and EJ populations in Appendix 8 – Environmental Justice Project Tables.

Key points from this section:

- Our MPOs have a single vision for what our region's transportation system should achieve.
- Each MPO has adopted goals and objectives to accomplish this vision that reflect the unique characteristics and aspirations of the communities within the MPOs.

5. How We Developed Our Plan

This section describes the organizations and technical tools used to develop the plan, how the public was involved in the plan's development and review, and other recent and on-going studies and plans that relate to the Long-Range Transportation Plan.

5.1 Who is Responsible for the Plan?

Metropolitan Planning Organizations (MPOs) are the regional organizations responsible for transportation planning for urban areas, and therefore are charged with developing and implementing long-range transportation plans. The Research Triangle Region has two MPOs: The Durham-Chapel Hill-Carrboro (DCHC) MPO and the Capital Area MPO (CAMPO).

The CAMPO urbanized area covers all of Wake County and portions of Franklin, Granville, Harnett and Johnson Counties, along with 18 municipalities in these five counties. The DCHC urbanized area covers all of Durham County, a portion of Orange County including the Towns of Chapel Hill, Carrboro and Hillsborough, and northeast Chatham County. *Figure 2.2.3* in Chapter 2 shows a map of the MPO boundaries. DCHC MPO and CAMPO are also two of the seven urban areas in North Carolina designated as Transportation Management Areas (TMAs) by the principal federal transportation legislation called the *Safe, Accountable, Flexible, Efficient Transportation Equity Act -- a Legacy for Users (SAFETEA-LU)*. TMAs are urban areas with a population of over 200,000 people, and have additional planning responsibilities such as the development of a congestion management plan and direct allocation of certain federal revenues. Much of the MPO organizational structure and processes are designed to address state and federal legislation related to transportation.

Each MPO is comprised of the following two committees:

A Transportation Advisory Committee meeting

Transportation Advisory Committee (TAC) – The TAC is a policy body, which coordinates and makes decisions on transportation planning issues. The TAC is comprised of elected and appointed officials from each county and municipality within the MPO, and from the NCDOT.

For the Capital Area MPO, these officials are from the counties of Franklin, Granville, Harnett, Johnson and Wake, the municipalities of Angier, Apex, Bunn, Cary, Clayton, Creedmoor, Franklinton, Fuquay-Varina, Garner, Holly Springs, Knightdale, Morrisville, Raleigh, Roseville, Wake Forest, Wendell, Youngsville and Zebulon, and the North Carolina Department of Transportation. The TAC also has advisory (non-voting) members from Triangle Transit, The NC Turnpike Authority, the Federal Highway Administration and the Research Triangle Foundation of North Carolina.

For the DCHC MPO, these officials are from the City of Durham, the Town of Chapel Hill, the Town of Carrboro, the Town of Hillsborough, Durham County, Orange County, Chatham County and the North Carolina Department of Transportation. The TAC also has advisory (non-voting) members from Triangle Transit, the Federal Highway Administration and the Research Triangle Foundation of North Carolina.

Technical Coordinating Committee (TCC) – The TCC is composed of staff members from our local governments, Triangle Transit, Research Triangle Park, Triangle J Council of Governments, Raleigh-Durham Airport Authority, Carolina Trailways, the NC Turnpike Authority and the largest universities in the applicable MPO: North Carolina Central University, University of North Carolina and Duke University in the DCHC MPO, and North Carolina State University in CAMPO. The TCC staff, who provide technical recommendations to the TAC, are commonly transportation, land use, community, and facility planners and engineers. The final key organizational element of the MPO is the Lead Planning Agency (LPA). The LPA is responsible for the administration and oversight of the planning, project implementation, grant funding, and other MPO related activities. In the DCHC MPO, the LPA staff work for the Transportation Division of the City of Durham. In CAMPO, the staff are technically employees of the City of Raleigh, but only work on MPO tasks.

5.2 Stakeholder & Public Involvement Process

Extensive input and coordination activities were used to develop the 2035 LRTP. These activities included both regional coordination efforts between the two MPOs and involvement of the public and local elected officials by each MPO.

Regional Coordination

Several regional coordination activities were undertaken to ensure that the two MPO plans would be integrated and mutually supportive. The key coordination activities are described throughout the various sections of this report in detail. The following list provides a summary of key coordinated activities used to develop the Plan:

- The Special Transit Advisory Commission (STAC) – The STAC was composed of leaders from throughout the Triangle Region and produced a recommended, coordinated, region-wide transit vision plan. The 2035 LRTP for each MPO has incorporated the STAC recommendations for expanded bus service, high-quality transit circulators in major activity centers and rail transit linking the activity centers to one another and to communities throughout the region.

- Alternatives Development and Evaluation – The MPOs jointly: defined and evaluated the various highway, bus transit and light rail transit alternatives; selected the same alternative for development into the final Plan; and used the same socioeconomic data assumptions.

- Joint TAC Meeting – A joint meeting of the MPOs' TACs on October 29, 2008, produced a consensus for which alternative was to be developed into the draft 2035 LRTP.

- Financial Plan – The MPOs used the same cost and revenue framework and information sources for highways, bus transit, light rail transit, transportation demand management and new revenue sources.

- Triangle Regional Model (TRM) – The MPOs used the same principal planning tool for the 2035 LTTP, the TRM travel demand model.

- Air Quality Conformity Report – The two MPOs are developing a single conformity analysis and determination report covering not only the 2035 LRTP areas, but also the rural areas in the Triangle air quality region outside of the MPO boundaries.

Public Involvement

Decisions cannot be based solely on numbers and the interpretation of Goals and Objectives by staff and the TAC. The 2035 LRTP employed a comprehensive public involvement process to use citizen and stakeholder input for providing a critical evaluation of the products for each stage of developing the plan.

Not only have citizens and public officials been involved with each development stage, but they were offered and took advantage of a variety of planning and public input activities.
Figure 5.2.1, Summary of Public Involvement Activities, demonstrates the breadth and depth of this public involvement effort by summarizing the many activities that occurred in each stage of the LRTP's development for both CAMPO and DCHC MPO.

There are some notable details to the Figure 5.2.1 table. For example, the media effort was especially intensive and usually included:

- Draft documents and detailed supporting data available at public libraries, government offices and on the MPOs' Web sites;
- Notices in newspapers for workshops, hearings and other public involvement activities;
- Mailing lists to notify citizens who have participated or indicated an interest in related planning activities. Mailings provided information about public workshops and hearings; the DCHC MPO also developed newsletters featuring elements of the 2035 LRTP.
- Various formats for receiving public comments included email, paper feedback forms, public workshops and hearings, and in the case of the development of the DCHC MPO Goals and Objectives there was a Web-based survey.

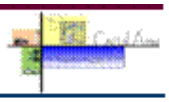
In addition, each public workshop cycle (except that for Goals and Objectives) included several workshops in the various member jurisdictions or multi-jurisdictional areas, and numerous presentations to local elected officials, boards and commissions. As a result of this extensive outreach effort, the elected bodies and locally-appointed boards and commissions provided considerable input through formal resolutions to the Transportation Advisory Committee (TAC).

This public involvement process met and exceeded the MPOs' public involvement policies for developing a transportation plan. Copies of those policies are available on the MPO's Web sites:

CAMPO -- www.campo-nc.us
DCHC MPO -- www.dchcmpo.org

It should be noted that the extent of the public involvement process to identify and choose projects for the 2035 LRTP go beyond the LRTP development process. Many 2035 LRTP projects have been incorporated from local and MPO plans identified in section "5.4 -- Related Plans and Studies" of this report and these plans and studies have commonly employed an extensive public involvement process.

Visioning Tools



The SAFETEU-LU (Safe, Accountable, Flexible and Efficient Transportation Equity Act: A Legacy for Users) requires public agencies to use visioning tools in their interaction with the public. The 2035 LRTP process has met, and exceeded, this requirement in the many workshops and presentations completed over the last two years to get public review and feedback for the various milestones, including Goals and Objectives, Socioeconomic Data, Deficiency Analysis, Alternatives Analysis and Draft 2035 LRTP. In fact, many of the maps and tables presented throughout this report are the same ones that the MPO used, and these visioning tools continue to be available on the MPOs' Web sites for each of the milestones. Examples of the visioning tools that were used include:

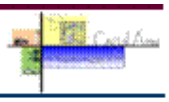
- Poster-sized maps showing proposed roadway, bus transit, fixed-guideway transit, bicycle, and pedestrian facilities.
- Poster-sized maps showing alternatives for bus and fixed-guideway transit.
- Poster-sized maps with development constraints such as wetlands and U.S. Army Corps of Engineers property.
- Poster-sized maps and bar charts showing population and employment growth through the year 2035.
- Maps and tables showing the travel time between major destinations, travel time isochrones and roadway congestion for the current year, for the year 2035 with a no-build scenario, and for the year 2035 with the 2035 LRTP transportation network.
- Tables showing performance, mode share, mobility, transit ridership and demographic measures for a variety of alternatives, including the final 2035 LRTP.
- Visual presentations that summarized the data through graphics and maps – these presentations were made available to the public.
- Visual presentations showing graphs and bar charts of cost and revenue forecasts through each horizon year of the 2035 LRTP.

Visual presentations showing proposed roadway and transit projects with associated costs and year of completion dates.

Figure 5.2.1 – Summary of Public Involvement Activities

	Activity				
Decision	**TAC Approval**	**Public Hearing**	**Public Work-shops**	**Draft Available for Public**	**Media Notification**
Goals and Objectives					
CAMPO	05/21/08	04/16/08	02/07/08	03/19/08	✓
DCHC	10/10/07	09/12/07	Aug/Sep	08/01/07	✓
Socio-economic Forecasts					
CAMPO	08/15/07	08/15/07	--	06/22/07	✓
DCHC	09/12/07	03/14/07	Feb/Mar	01/31/07	✓
Model Adoption	(version TCV4-2008)				
CAMPO	--	--	--	--	--
DCHC	08/13/08	--	--	--	--
Deficiency Analysis					
CAMPO	--	--	--	--	--
DCHC	03/12/08	--	--	--	--
Performance Measures					
CAMPO	--	--	--	--	--
DCHC	02/13/08	--	--	--	--
Alternatives Evaluation					
CAMPO	--	--	--	08/20/08	--
DCHC	--	09/10/08	Aug/Sep	08/20/08	✓
Draft 2035 LRTP					
CAMPO	02/18/09	01/28/09	Dec/Jan	10/15/08	✓
DCHC	02/11/09	11/12/08	Oct/Dec	10/22/08	✓
2035 LRTP and AQ Conformity Report					
CAMPO	05/20/09?	04/15/09?	--	03/18/09?	✓
DCHC	05/13/09?	04/08/09?	--	03/25/09?	✓

Dashed lines, "-- ", indicate that the activity was not carried out because it is not part of the long range transportation plan or the MPO's public involvement policy.



5.3 Triangle Region Transportation Model

The Triangle Regional Model (TRM) is a tool that was developed for understanding how future growth in the region impacts transportation facilities and services. The TRM can help identify the location and scale of future transportation problems, and proposed solutions to those problems can be tested using the TRM. The TRM is developed and maintained by the TRM Service Bureau housed at the Institute for Transportation Research and Education on behalf of the Durham-Chapel Hill-Carrboro MPO, Capital Area MPO, North Carolina Department of Transportation, and Triangle Transit, the four organizations that fund the modeling effort and guide its development and use.

The modeled area covers approximately 2,600 square miles, and includes all of Wake, Orange and Durham counties and part of Chatham, Franklin, Granville, Harnett, and Johnston counties. This area is divided into approximately 2,300 geographic areas (traffic analysis zones) for which detailed population and employment information is maintained. The highway system is represented by about 15,000 roadway links in 2005 and about 16,000 roadway links in 2035. The roadway links are described by detailed characteristics including: length, number of lanes by direction, speed, and traffic carrying capacity. Transit services are represented in 2005 by about 180 transit lines (430 in 2035) operated by Capital Area Transit, Durham Area Transit Authority, Chapel Hill Transit, Triangle Transit, C-Tran, Wolfline, and Duke University Transit. Transit services are described by detailed characteristics including: length, stop locations, speed, frequency of service, and cost or fare paid.

The model produces summary statistics including: vehicle miles of travel, vehicle hours traveled, degree of traffic congestion, number of trips taken by travel mode, and transit riders. The model also computes trip statistics for each of the approximately 2,300 traffic analysis zones, categorized by mode, general trip purposes, and origin or destination zone. These statistics are shown elsewhere in the report in tables and maps. Statistics on speed and vehicle miles of travel by type of roadway are used to make air quality conformity determinations for the plan.

The model is an advanced four step travel demand forecasting model. Models like the TRM forecast travel using the following sub-models, or steps:

- Trip Generation – based on population and employment data for each traffic analysis zone, calculate the number of trips people will make for various trip purposes, and the number of trips likely to go to destinations throughout the region.
- Trip Distribution – based on the number of trips generated for each trip purpose, the cost to travel from zone to zone, and the characteristics of the zones, calculate the trips from each zone to all other zones.
- Mode Choice – based on the trips calculated in trip distribution, characteristics of the traveler, transit service characteristics, highway congestion, and other service characteristics, calculate for trip purpose the number of trips made by automobile, carpooling, and transit.
- Trip Assignment – based on highway speeds and transit speed, find a route that takes the shortest time to get from one zone to another zone and sum the trips on that roadway or transit route. The model includes feedback to allow the travel times to include the effects of traffic congestion on the calculation of the shortest time on roadway links or transit services.

Model relationships were developed using 1995 household survey data, 2000 census data, transit survey data, traffic counts taken throughout the Triangle, and a survey of travelers entering from outside or leaving the modeled area. The model was validated to 2005 traffic count and transit rider data. The model version used for this analysis was adopted for use in April, 2008 by the Durham-Chapel Hill-Carrboro MPO, Capital Area MPO, North Carolina Department of Transportation and Triangle Transit and is referred to as TransCAD v4-2008.

5.4 Related Plans and Studies

Although the Long-Range Transportation Plans serve as the main guiding documents for regional transportation investments, many related transportation plans and studies are undertaken both to feed into the development of Long-Range Transportation Plan and to provide a more detailed look at issues raised in or related to LRTPs.

This section highlights past and current plans and studies that have been used to inform the development of the 2035 LRTPs. Section 7.10 later in this document indicates plans and studies moving forward that can be undertaken to help detail and/or implement recommended activities.

These plans include *corridor* plans addressing specific major corridors, *small area* plans that look at transportation and related development issues in a particular part of the region, plans that guide investments in individual transportation *functions,* such as bicycle & pedestrian travel, Transportation Demand Management or Intelligent Transportation Systems, and *transit plans* that range from broad regional vision plans to short-range investment plans for specific transit providers. Between the adoption of the 2030 Long-Range Transportation Plans in 2005 and the adoption of these plans in 2009 , the following major studies and plans will have been completed; those that apply specifically to one MPO or the other are color coded; projects with no background color apply to both MPOs, CAMPO projects have this yellow background and DCHC MPO projects have this green background:

	Plan or Study	*Type*
1	*Special Transit Advisory Commission.* A broad regional vision plan for transit services that recommends expanded local and regional bus services, high-quality transit circulators serving 5 regional activity centers and rail transit linking the activity centers to each other and to communities throughout the region. www.transitblueprint.org	Transit Plan
2	*North Carolina Railroad Commuter Rail Capacity Study.* Identifies the capital costs needed for track improvements, stations and vehicles to provide peak-period, peak-direction commuter rail services between Goldsboro and Greensboro. www.ncrr.com/capacity-study.html	Transit Plan
3	*CORE Bicycle-Pedestrian-Greenspace Plan.* A linked network of pedestrian, bicycle and greenspace facilities within the jurisdiction of 7 local governments and several regional agencies in the Center Of the Region. www.tjcog.dst.nc.us/regplan/core.shtml	Functional Plan Small Area Plan
4	*Triangle Region Long Range Transportation Demand Management Plan.* Recommended 7-year investment strategy to provide regional TDM services, local TDM services in specified "hot spots" and an administrative structure to fund, manage, monitor and evaluate TDM services across both MPOs. www.triangletdmplan.com	Functional Plan
5	*Triangle Transit Short Range Transit Plan.* Five-year operating plan and capital program for transit and ridesharing. Provides an overview of the regional services in Wake, Durham, and Orange Counties and a guide for improvements in current services and expansions to new corridors. www.triangletransit.org/srtp	Transit Plan
6	*US 1 Corridor Study.* Recommended facility improvements for roadways and transit services in Wake and Franklin Counties. www.ncdot.org/doh/PRECONSTRUCT/tpb/shc/studies/US1/	Corridor Study

	Plan or Study	*Type*
7	*Southwest Durham/Southeast Chapel Hill Collector Street Plan.* Small area plan recommending location of future collector streets and street designs to ensure future connectivity and multimodal street functioning. www.dchcmpo.org	Small Area Plan Functional Plan
8	*Durham Walks Pedestrian Plan*. Based on complete and detailed inventory of current sidewalk and hard-surfaced public trails. Recommends, prioritizes and provides costs for corridor, maintenance, and intersection pedestrian projects, and proposes design standards and policies. http://www.durhamnc.gov/durhamwalks/final_plan.cfm	Functional Plan
9	*Durham Comprehensive Bicycle Transportation Plan*. Indentifies an integrated bicycle network that is composed of several types of bicycle facilities, and prioritizes the projects by short-, medium-, and long- term and opportunity-based implementation. http://www.durhamnc.gov/departments/works/bike_plan.cfm	Functional Plan
10	*Carrboro Comprehensive Bicycle Transportation Plan.* Identifies existing and future bicycle needs and deficiencies, a route network to address those deficiencies, a method to examine optimal design and policy improve-ments, and implementation strategies for the development of bicycle facilities and programs. http://www.ci.carrboro.nc.us/pzi/planning.htm	Functional Plan

In addition, several major studies and plans are either underway or are programmed to begin shortly:

	Plan or Study	*Type*
1	*Durham Area Transit Authority (DATA) Short Range Transit Development Plan*. Identifies current, new and enhanced routes, services and amenities to be implemented by DATA from 2010 through 2015, and the funding and resources needed. http://DATA.durhamnc.gov	Transit Plan
2	*Chapel Hill Long Range Transit Master Plan*. Evaluates a range of transit strategies to improve mobility in Chapel Hill, Carrboro, and UNC main campus and future Carolina North campus. Includes service implementation schedule, financial plan, and land use, community and air quality impacts. http://www.ci.chapel-hill.nc.us/index.asp?NID=345	Transit Plan
3	*Farrington Road Corridor Study*. Uses transportation and land use trends and modeling to develop future scenarios, especially for roadway congestion. Recommends specific short- and long-term roadway and intersection improvements, and more compact land development. www.dchcmpo.org	Small Area Study

4	*Congestion Management Plan (CMP*). Collects travel time, and vehicle, pedestrian, bicycle and transit passenger counts to indentify current and short-term trend congestion levels. Defines congestion, identifies specific mitigation measures for congestion and provides a state of the system report to meet federal requirements. At this time, the DCHC MPO has finished all components of the CMP except the State of the System report. The Capital Area MPO currently has a CMS document incorporated within the 2030 LRTP. However, the federal level has elevated the importance of congestion management planning and therefore a more thorough CMP is required. The MPOs will complete a more thorough CMP in the Fall of 2009 that will comply with the federal requirements and reflect concerns received from recent federal certification reviews. www.dchcmpo.org www.campo-nc.us	Functional Plan
5	*ITS Strategic Deployment Plan Update*. Update to Triangle Regional Intelligent Transportation Systems Strategic Deployment Plan (developed in 2000) using current versions of the National ITS Architecture. Includes procedures for updating and maintaining regional ITS architecture and template for integrating data with related agencies such as MPOs. www.dchcmpo.org	Functional Plan

In addition, many plans that informed the development of earlier Long-Range Transportation Plans continue to be used in the development of the 2035 LRTP, including:

- NC 54/I-40 Transit Corridor Feasibility Study (February 2003)
- US 15-501 Major Investment Study, Phase II Report (December 2001)
- I-40 High Occupancy Vehicle/Congestion Management Study – Final Report (March 2003)
- Town of Carrboro Connector Roads Policy (August 2005)
- Town of Carrboro Bicycle and Sidewalk Policy (March 1989)
- Chapel Hill and Carrboro 2005 Mobility Report Card (March 2007)
- A Bicycle Transportation Plan – Orange County, NC (April 1999)
- Center Of the Region Enterprise (CORE) Workshop Report (April 2002)

Key points from this section:

- Metropolitan Planning Organizations, or MPOs, are the organizations charged with creating and adopting Long-Range Transportation Plans. MPOs are made up of all the local governments in the area, the NC Department of Transportation, plus other organizations with transportation responsibilities. This document includes the plans for the two MPOs in the Research Triangle Region: the Capital Area MPO and the Durham-Chapel Hill-Carrboro MPO.
- MPOs have 3 main organizational components: (i) the Transportation Advisory Committee, or TAC, which is the policy body made up of local elected officials and an NC Department of Transportation board member; (ii) the Transportation Technical Committee, or TCC, made up of technical staff from local, state and regional organizations that provide technical input; and (iii) the Lead Planning Agency, or LPA, which provides the staff support to carry out the MPO's responsibilities.
- Each MPO has an explicit, written Public Involvement Policy, which was used to garner public input into the plan and provide opportunities for public review and comment.
- One of the key tools used to understand the region's transportation challenges and the impacts of investments to address these challenges is the Triangle Regional Travel Demand Model, which covers both MPOs. A new and improved version of the model was used for the first time in the development of the 2035 Long Range Transportation Plans.

- Many related transportation plans and studies are undertaken both to feed into the development of Long-Range Transportation Plans and to provide a more detailed look at issues raised in or related to LRTPs.

6. Analyzing Our Choices

This section explains what we did to better understand the choices facing our region, develop growth forecasts that reflect market trends and community plans, create and test alternative transportation scenarios, and compare these alternatives to one another and to performance measures that reflect the MPO's adopted goals and objectives.

6.1 Land Use Plans and Policies

Every community in the Triangle develops a comprehensive plan to outline its vision for the future and set policies for how it will guide future development to support that vision. So an important starting point for transportation plans is to understand these plans and reflect them in the future growth forecasts used to analyze transportation choices.

Local planners from communities throughout the region were brought together to translate their community plans into the parameters used by the region's transportation model to generate travel forecasts: households and jobs by industry. (See Section 5.3 for a more detailed explanation of the transportation model).

The land use plans revealed that five regional activity centers, depicted in Figure 6.1.1 are expected to contain large concentrations of employment and/or intense mixes of homes, workplaces, shops, medical centers, higher education institutions, visitor destinations and entertainment venues:

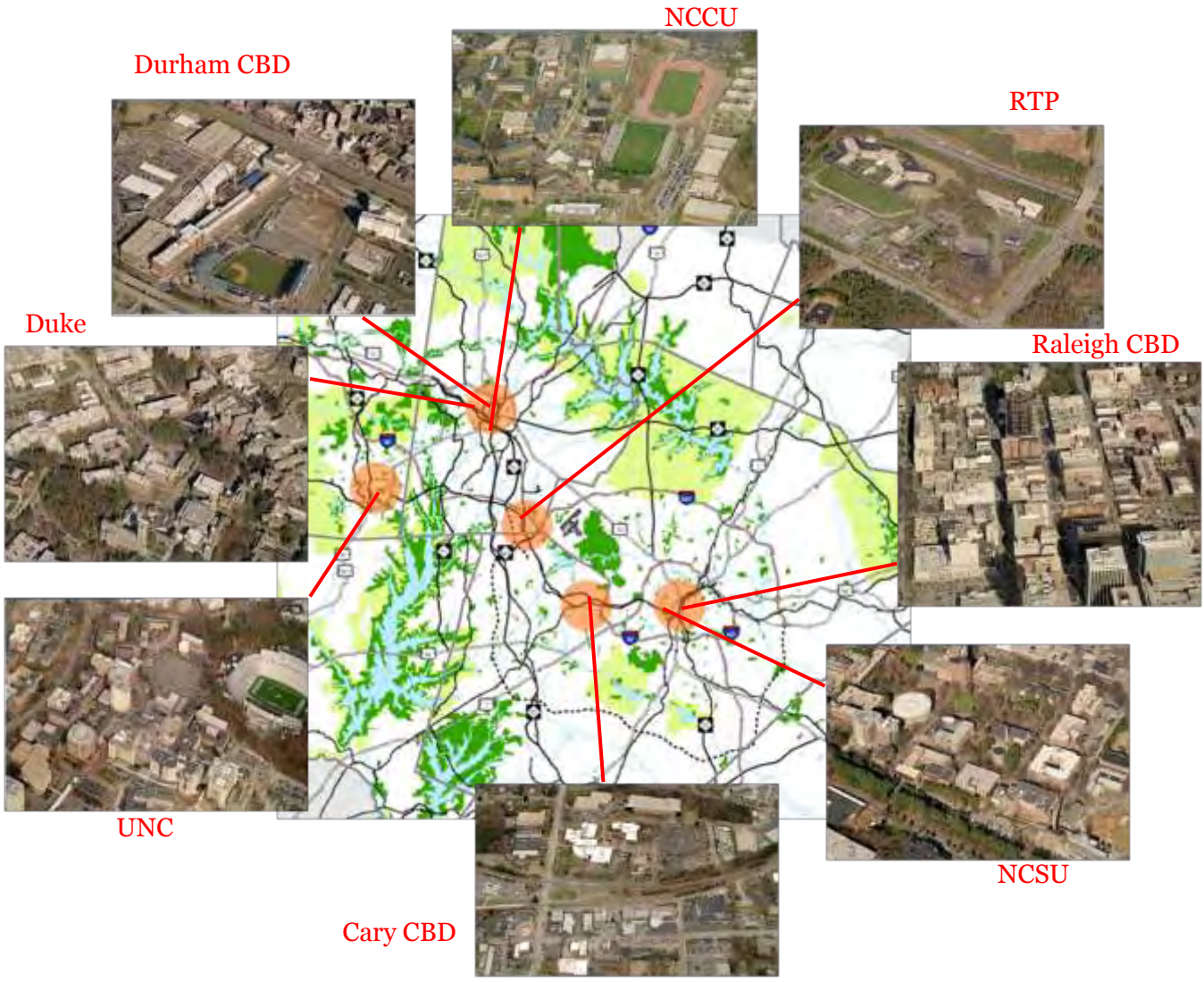
- Central Raleigh, including NC State University;
- Central Durham, including Duke University, North Carolina Central University and the Duke and Veterans Administration medical complexes;
- Central Chapel Hill & Carrboro, including UNC-Chapel Hill and UNC Hospitals;
- The Research Triangle Park and RDU Airport; and
- Central Cary.

Linking these activity centers to one another, and connecting them with communities throughout the region by a variety of travel modes can afford expanded opportunities for people to have choices about where they live, work, learn and play.

In some cases, such as in central Cary, Durham and Chapel Hill & Carrboro, existing plans and the ordinances that implement the plans promote increased development of the activity centers. In Raleigh, a new comprehensive plan is close to completion that will target development in the downtown and in other in-town areas that can serve as mixed use nodes. And the Research Triangle Park is engaged in planning efforts that may lead to more compact, mixed use development in selected locations.

In addition to these activity centers, the review of community plans identified areas of the region that are most environmentally sensitive, including water supply watersheds, and places where existing neighborhoods warrant protection. Understanding the unique roles that different areas and different communities will play in the region as it grows established the framework for forecasting growth and designing transportation choices to serve this growth.

Figure 6.1.1 Regional Activity Centers



6.2 Socio-economic Forecasts

One of the initial critical steps in developing a Long Range Transportation Plan is to forecast the amount, type and location of population and jobs for the time frame of the plan. Based on an understanding of community plans and data from local planning departments, the Office of State Planning, the US Census Bureau and independent forecasters, estimates of "base year" (2005) and "plan year" (2035) population and jobs were developed by local planners for each of the 2,300 small zones (called Traffic Analysis Zones or TAZs) that make up the area covered by the region's transportation model.

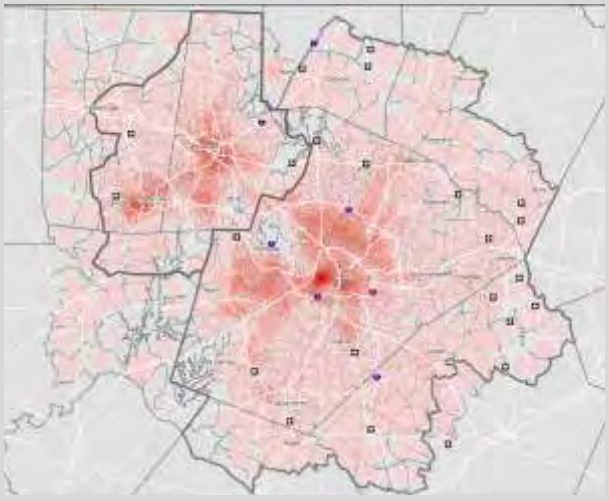
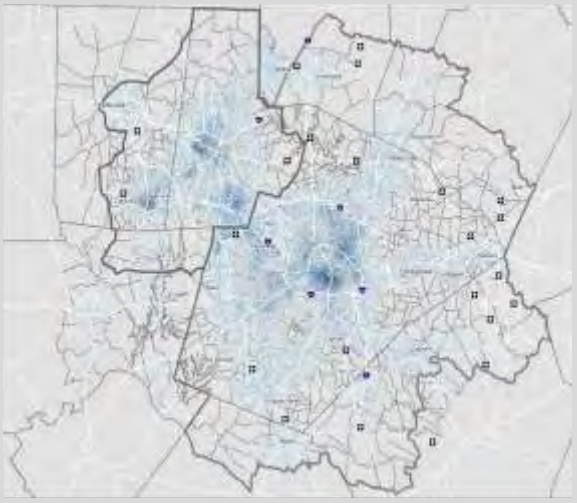
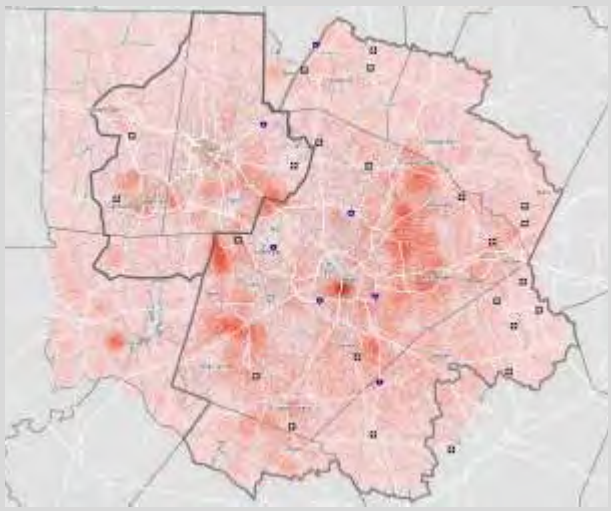
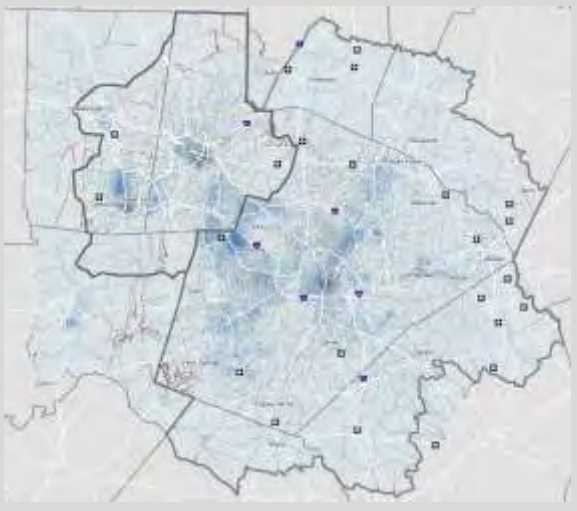
Figure 6.2.1 summarizes the major elements of the socioeconomic forecasts for different portions of the area covered by the region's transportation model, both the areas within the MPO boundaries and areas beyond the MPO boundaries (refer to Figure 2.2.3 for a map of the MPOs and the modeled

area). More detailed information on a range of socioeconomic data for each TAZ is available from the Capital Area MPO and the Durham-Chapel Hill-Carrboro MPO.

Figure 6.2.1 Estimated 2005 and Forecast 2035 Jobs, Population and Households	2005			2035		
	Population	Households	Jobs	Population	Households	Jobs
Capital Area MPO	880,490	337,377	439,715	1,951,817	762,025	906,523
Franklin County (part)	36,259	13,737	7,242	88,422	33,346	14,740
Granville County (part)	15,704	6,090	3,640	49,143	18,920	7,504
Harnett County (part)	13,869	5,209	2,784	62,089	22,857	7,522
Johnston County (part)	67,877	25,305	14,930	174,595	65,697	27,258
Wake County	746,781	287,036	411,119	1,577,568	621,205	849,499
Durham-Chapel Hill-Carrboro MPO	375,052	163,150	227,208	549,753	236,734	388,647
Chatham County (part)	15,083	6,608	2,271	33,362	14,412	5,389
Durham County	248,398	106,663	175,999	360,651	151,712	286,790
Orange County (part)	111,571	49,879	48,938	155,740	70,610	96,468
Areas outside MPO boundaries	56,023	21,758	16,216	145,552	58,015	36,739
Chatham County (part)	18,984	8,168	5,928	83,768	35,752	18,474
Granville County (part)	7,830	2,237	7,741	13,005	3,704	10,656
Johnston County (part)	8,617	3,060	936	22,216	7,858	2,646
Orange County (part)	20,592	8,293	1,611	26,563	10,701	4,963
Total for modeled area	1,311,565	522,285	683,139	2,647,122	1,056,774	1,331,909

The maps on the following page depict the distribution of population and jobs within the boundaries of the two MPOs for the 2005 "base year," the 2035 "horizon year" of this plan and where the net new population and jobs are forecast to locate between 2005 and 2035. Larger versions of these maps are available from the staffs of the Capital Area and Durham-Chapel Hill-Carrboro MPOs, and from the approved 2035 LRTP section of the MPO's web sites.

In addition, the detailed socioeconomic analysis, maps and tables that are the basis for the presentation in this report are available on the MPO's web sites.

	Population	Employment
2005		
2005 to 2035 growth		
2035		

Each population dot represents 100 people and each employment dot represents 50 jobs.

6.3 Trends, Deficiencies, and Needs

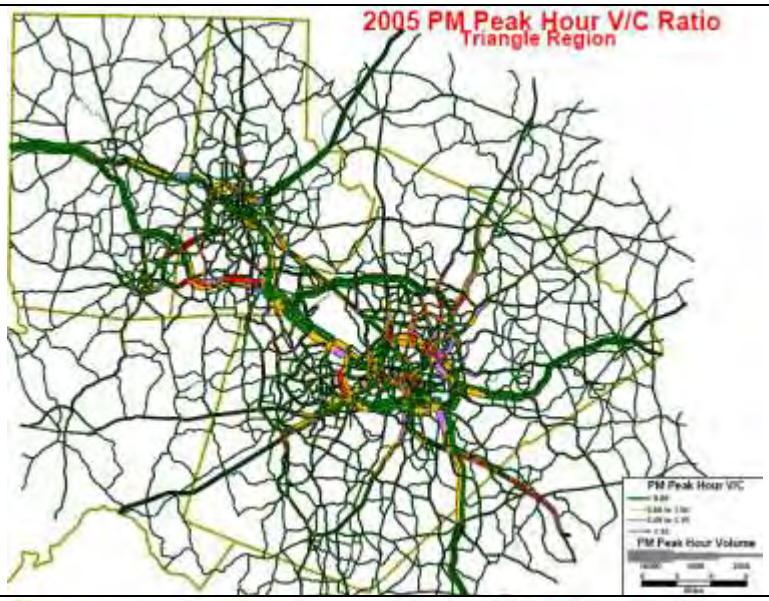
With the number of people and jobs in the region expected to roughly double over the 30-year period between 2005 and 2035, the amount of travel -- often measured in Vehicle Miles Traveled (VMT) -- in the Triangle is expected to similarly grow by well over 100%. Future stress on the regional transportation network is exemplified by the high levels of congestion predicted in 2035.

Figure 6.3.1: I-40 near US 1 Interchange

The congestion maps on the next page show the average volumes during the afternoon peak hour as predicted by the Triangle Regional Model. The 2005 map indicates travel conditions in the year 2005, whereas the 2035 "Existing plus Committed" (E+C) map forecasts travel conditions in the year 2035 using the current highway, transit and other transportation facilities and any facilities that are well on their way to being completed. This "Existing plus Committed" network is often called the "no build" scenario, since it typically is the result of past decisions, not ones that still need to be made. The final map is the 2035 LRTP congestion map, showing levels of congestion if we provide all the transportation facilities and services included in the MPO Long Range Transportation Plans.

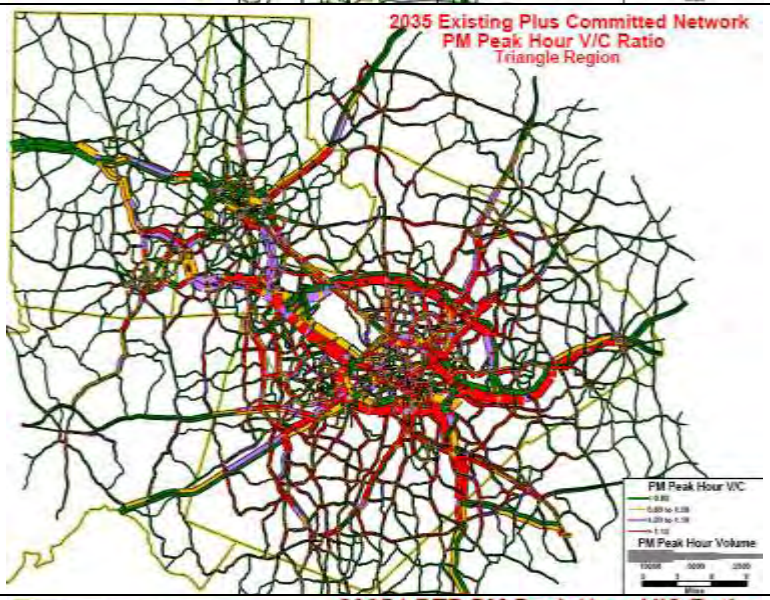
A larger version of these maps is available on the MPOs' web sites.

The roadway networks depicted on the next page are simplified and taken directly from the Triangle Regional Model. Thicker lines depict roadways with higher traffic volumes; thinner lines represent segments carrying lesser volumes. The colors of the segments correspond with Volume/Capacity ratios (this is the volume of vehicles divided by the vehicle carrying capacity of the road segment) thus, greater Volume/Capacity ratios correspond with more congestion. A Volume/Capacity ratio below 1.0 is indicative of a relatively free flowing roadway with little or no congestion. Once the Volume/Capacity, or V/C ratio, rises over 1.0, motorists will experience periods of congestion. Volume/Capacity ratios greater than 1.1 represent roadways which are consistently congested throughout and beyond the peak hours of travel. The 2035 E+C map shows that without significant new investments, chronic congestion will occur on major arterials and freeways throughout the region, and particularly within Wake County.

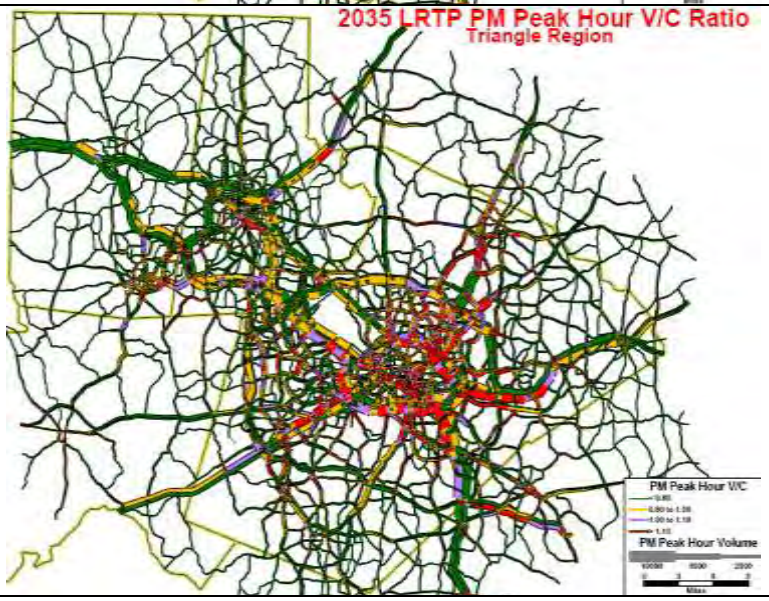


The top map shows levels of congestion during the 2005 "base year." The afternoon rush hour (the "PM Peak Hour") is used since it is the heaviest travel period of the day. Congestion is calculated using a "volume to capacity ratio," or v/c ratio, which indicates the volume of traffic using each roadway segment divided by the capacity of vehicles that can use each segment before it breaks down. These v/c ratios are color coded as follows:

- < 0.80
- 0.80 to 1.00
- 1.00 to 1.10
- > 1.10



The middle map shows the same type of information, but it is for the population and job levels we forecast in the Year 2035 but only those new road and transit facilities that are already well-underway, which is called the "existing plus committed" transportation network.



The bottom map is based on the same growth assumptions as the previous map: Year 2035 population and jobs, but this time with all the new road and transit facilities included in this 2035 Long Range Transportation Plan.

Conditions will be better than if we only build what is already in the pipeline, but congestion is forecast to exceed the levels in our 2005 base year. Larger versions of all three maps are available from the DCHC MPO and CAMPO staffs.

6.4 Alternatives Analysis

In order to address the statement as expressed in the Goals and Objectives, the Capital Area MPO, in conjunction with the Durham-Chapel Hill-Carrboro MPO developed and evaluated several alternatives in the process to create the 2035 Long Range Transportation Plan. Each alternative was a combination of a transportation system, which includes a set of highway, transit and other transportation improvements; and a land use scenario that distributes the forecasted population and employment for the Year 2035. These alternatives were run on the Triangle Regional Model (TRM) to produce a set of transportation performance measures that described how the transportation system will handle the travel demand generated by a particular population and employment distribution in the year 2035. These performance measures, such as the level of roadway congestion, average travel time, and transit ridership, were used to evaluate and compare the various alternatives. No alternative in its entirety was advanced as the "Preferred Option." The alternatives were designed to emphasize a particular mode in meeting the future travel demands so that the technical staff and public can understand how well that specific mode addresses travel demand and can choose various projects to create the final 2035 LRTP. Figure 6.4.1 is a list of the combinations of transportation systems and land used to create the Alternatives that were analyzed for the developing the final 2035 LRTP. In some cases, the examination extended beyond this set of alternatives – the DCHC MPO analyzed fifteen alternatives during its Alternatives Analysis phase.

Figure 6.4.1: Alternatives Evaluated

No.	Transportation System	Land Use Assumption
1	**Adopted 2030 LRTP** – Includes abundant highway improvements such as I-40 HOV; rail transit between Chapel Hill, Durham, RTP and Raleigh; and, major bus expansion and improvements.	**Baseline** – Population and employment growth occurs based on current land use plans and policies of the jurisdictions and counties.
2	**Intensive Highway** – Includes abundant highway improvements such as I-40 HOV and interstate and freeway widenings; no rail transit; moderate bus transit improvements.	**Baseline** – Population and employment growth occurs based on current land use plans and policies of the jurisdictions and counties.
3	**Intensive Highway** – Includes abundant highway improvements such as I-40 HOV and interstate and freeway widenings; no rail transit; moderate bus transit improvements.	**Constrained** – New requirements in development ordinances constrains current growth pattern, resulting in less population and employment growth than Baseline.
4	**Intensive Fixed Guideway** – Includes moderate highway improvements; light rail transit between Chapel Hill, Durham, RTP and Raleigh; and, major bus transit improvements, including feeder service to light rail stations.	**Transit Node** – Changes in development ordinances and policies encourages more population and employment development adjacent to future rail transit stations than Baseline, but overall regional growth is same as Baseline.
5	**Intensive Bus Transit** – Includes moderate highway improvements; no rail transit; major bus transit expansion and improvements.	**Travel Corridor** – Changes in development ordinances and policies encourages more population and employment development along major arterial roadways than Baseline, but overall regional growth is same as Baseline.
6	**Moderate Multimodal** – Includes moderate highway improvements; commuter rail between Burlington, Durham, RTP and Raleigh; moderate bus transit improvements.	**Transit Node** – Changes in development ordinances and policies encourages more population and employment development adjacent to future rail transit stations than Baseline, but overall regional growth is same as Baseline.

#1 = Benchmark alternative depicting a continuation of current land use and transportation patterns and planning.

#2 though #6 = Change alternatives depicting changes to current design of the transportation system and current growth patterns.

The MPO staffs in conjunction with staff from the Triangle Regional Model Service Bureau worked together to create and run the model scenarios during the fall of 2008. These options were further reduced to a "preferred option" that incorporated a road network, a transit network, and light rail transit. A series of modifications to the road network were made from December, 2008 through February, 2009. The resulting road, transit, and rail networks were endorsed by the TACs of both MPOs, and modeled by the Triangle Regional Model Service Bureau.

6.5 Performance Evaluation Measures

The evaluation measures provide a comparative set of statistical analyses between transportation systems and land use scenarios. Comparisons between transportation systems and land use scenarios can be performed in a number of variations. The comparisons as shown in each evaluation measure table on the next two pages also validate the usefulness of the Triangle Regional Model as a tool to perform travel forecasts and create output necessary for staff, elected officials, and the public to determine the best approach to invest in the regional transportation system. Figure 6.5.1 compares the transportation network performance from a regional, Capital Area MPO, and Durham-Chapel Hill-Carrboro MPO perspective for the Year 2005, Year 2035 using only an "Existing plus Committed" network, and the 2035 network as recently endorsed by both MPOs. The 2035 E+C congestion map (V/C map) presented in the previous section (section 6.4) illustrates a high degree of regional congestion as compared to the 2005 V/C map; but the performance measure values for the 2035 E+C also validates the illustration by comparing daily "Vehicle Hours Traveled" (VHT daily – Row 1.2). Vehicle Hours Traveled is highest for the 2035 E+C highway network as compared to the 2005 base year and 2035 LRTP networks.

Key points from this section:

- The starting point for analyzing our choices is to understand how our communities' comprehensive plans envision guiding future growth.
- The next step is to make our best estimates of the types, locations and amounts of future population and job growth based on market conditions and trends and community plans.
- Based on these forecasts, we can look at future mobility trends and needs, and where our transportation system may become deficient in accommodating these trends and meeting these needs.
- Working with a variety of partners and based on public input, we then develop different transportation system alternatives and analyze their performance.
- We can compare the performance of system alternative s against one another and to performance targets derived from our goals and objectives.

Figure 6.5.1 Evaluation Measures

TRM LRTP Evaluation Measures										
Comparison of Performance Measures		**2005 Baseline**			**2035 Existing plus Committed**			**Endorsed 2035 LRTP**		
Measures		**Region**	**CAMPO**	**DCHC**	**Region**	**CAMPO**	**DCHC**	**Region**	**CAMPO**	**DCHC**
1	**Performance Measures**									
1.1	Total VMT (daily)	37,898,756	25,012,126	10,673,559	73,245,842	50,861,790	17,397,077	73,861,276	51,472,776	17,603,017
1.2	Total VHT (daily)	814,486	537,890	234,968	2,218,639	1,644,052	459,072	1,826,903	1,317,244	406,044
1.3	Average Speed by Facility (miles/hour)									
1.3.1	Freeway	62.9	63.8	60.4	54.5	52.1	57.1	59.2	57.8	60.6
1.3.2	Arterial	44.5	45.1	40.1	38.1	37.5	35.5	42.7	42.6	39.2
1.3.3	All Facility	50.7	50.5	49.9	42.3	40.6	44.6	46.9	45.5	49.5
1.4	Peak Average Speed by Facility (miles/hour)									
1.4.1	Freeway	61.6	62.5	59.0	49.2	45.3	54.2	56.8	54.8	59.1
1.4.2	Arterial	43.5	44.0	39.1	35.1	33.9	33.6	41.1	40.7	38.2
1.4.3	All Facility	49.6	49.5	48.8	38.5	36.2	42.2	45.0	43.4	48.1
1.5	Average Travel Time - All Trips	14.04	14.65	14.78	16.72	17.72	17.15	15.42	16.13	15.94
1.6	Average Travel Time - Work Trips	18.45	19.38	19.39	25.76	27.85	25.79	21.93	23.21	22.45
1.7	Peak Average Travel Time - All Trips	15.55	16.30	16.60	19.86	21.28	20.50	17.52	18.43	18.28
1.8	Hours of Delay (daily)	92,958	62,923	28,474	781,421	646,383	112,862	407,045	323,917	66,791
1.8.1	CV Hours of Delay (daily)	3,503	2,247	1,200	23,637	18,494	4,580	13,336	10,016	2,865
1.9	Percent of VMT experiencing congestion - All Day									
1.9.1	Freeway	1.4%	1.0%	2.3%	13.4%	18.2%	5.8%	5.5%	7.7%	2.3%
1.9.2	Arterial	2.3%	2.5%	1.9%	15.1%	17.9%	9.2%	6.4%	7.6%	3.0%
1.9.3	All Facility	1.5%	1.5%	1.8%	13.0%	16.2%	6.4%	5.3%	6.5%	2.5%
1.1	Percent of VMT experiencing congestion - Peak									
1.10.1	Freeway	2.5%	1.7%	4.1%	23.5%	31.7%	10.5%	9.0%	12.4%	3.6%
1.10.2	Arterial	3.5%	3.9%	3.1%	23.5%	28.2%	13.8%	9.8%	11.6%	4.5%
1.10.3	All Facility	2.4%	2.4%	3.0%	21.0%	26.1%	10.4%	8.2%	10.2%	3.7%
1.10.4	Degree of congestion (V/C>1) on designated truck routes	2.6%	2.8%	2.7%	14.4%	17.5%	8.4%	7.1%	8.8%	3.9%
1.10.5	Degree of congestion (V/C>1) on facilities w/ bus routes	2.6%	2.0%	3.2%	15.4%	19.8%	8.7%	6.8%	8.7%	2.8%
2	**Mode Share Measures**									
2.1	Number Mode Choice - All Trips									
2.1.1	Drive alone (single occupant vehicle - SOV)	2,973,888	2,086,422	1,012,202	6,048,183	4,597,094	1,660,787	6,040,374	4,604,838	1,666,243
2.1.2	Carpool (share ride)	2,054,835	1,453,868	685,476	4,067,176	3,105,362	1,095,943	4,109,989	3,146,850	1,104,137
2.1.3	Bus	66,563	24,530	44,441	103,988	39,665	69,664	125,208	44,268	87,234
2.1.4	Rail	0	0	0	0	0	0	16,233	11,705	9,076
2.2.5	Non-Motorized (Bike and Walk)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2.3	Number Mode Choice - Non-Work Trips									

TRM LRTP Evaluation Measures										
Comparison of Performance Measures		**2005 Baseline**			**2035 Existing plus Committed**			**Endorsed 2035 LRTP**		
Measures		**Region**	**CAMPO**	**DCHC**	**Region**	**CAMPO**	**DCHC**	**Region**	**CAMPO**	**DCHC**
2.2.5	Non-Motorized (Bike and Walk)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2.3	Number Mode Choice - Non-Work Trips									
2.3.1	Drive alone (single occupant vehicle - SOV)	2,038,311	1,398,900	671,996	4,211,854	3,154,639	1,098,746	4,199,906	3,146,564	1,099,902
2.3.2	Carpool (share ride)	1,896,367	1,340,851	626,238	3,757,494	2,867,576	998,378	3,804,046	2,908,406	1,009,078
2.3.3	Bus	47,985	17,190	32,176	79,608	30,602	53,261	88,439	30,671	61,834
2.3.4	Rail	0	0	0	0	0	0	21,851	15,837	11,508
2.3.5	Non-Motorized (Bike and Walk)	392,503	249,805	128,939	822,259	586,303	199,646	835,531	598,151	201,231
2.4	Daily Bicycle and Pedestrian Trips	406,779	259,179	133,302	852,248	608,028	206,552	866,118	620,407	208,207
3	**Transit Measures**									
3.1	Average Weekday Transit Ridership									
3.1.1	TTA (including Rail)	3,449			4,900			37,046		
3.1.2	CAT	12,998			22,874			35,760		
3.1.3	CHT	29,536			44,990			65,864		
3.1.4	DATA	13,801			23,312			47,590		
3.1.5	NCSU	12,599			20,080			14,042		
3.1.6	DUKE	8,924			14,642			11,546		
3.1.7	OPT									
3.1.8	CARY	N/A			1,557			5,824		
3.1.9	Total	81,309			132,358			217,672		
3.2	Ridership by Routes									
3.2.1	Selma-Wake Forest NB (ID: 439)							748		
3.2.2	Selma-Wake Forest SB (ID: 440)	1,311,565						837		
3.2.3	Apex-Cary Light Rail NB (ID: 441)	683,139						1,638		
3.2.4	Apex-Cary Light Rail SB (ID: 442)	5,502,066						1,573		
4	**Demographics Measures**									
4.1	Population	1,311,565	880,490	375,052	2,646,987	1,949,831	551,362	2,647,122	1,951,817	549,763
4.2	Employment	683,139	439,715	227,208	1,332,378	905,568	389,249	1,331,909	906,523	388,647
4.3	Total Daily Trips	5,502,066	3,824,000	1,875,413	11,069,597	8,350,150	3,032,947	11,169,946	8,436,503	3,081,072
4.4	Total Daily Work Trips	1,126,898	817,252	416,063	2,198,381	1,711,029	682,913	2,220,171	1,736,872	697,516
4.5	Total Daily Non-Work Trips	4,375,167	3,006,747	1,459,350	8,871,215	6,639,120	2,350,033	8,949,775	6,699,631	2,383,556

7. Our Long Range Transportation Plan

Section 7 is the heart of our Long Range Transportation Plans, describing 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)
- Fixed Guideway and premium transit services (project list in Appendix 2)
- Bus transit projects and services (project list in Appendix 3)
- Bicycle and pedestrian projects (project list in Appendix 4)
- Freight movement
- Programs to manage transportation demand
- Intelligent transportation systems: technology investments
- Transportation 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 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 million that will 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 Long Range Transportation Plans include over $2 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 sections 7.3 and 7.4). 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 published a set of Station Area Development Guidelines. The following table shows the intensity of development needed around transit stops; note that Activity Level 1 is not intense enough to support fixed guideway investments such as rail.

	Residential Gross Density (units/acre)			Non-Residential Intensity (Floor Area Ratio)		
Activity Level	First ¼ mile	Next ¼ mile	Average for ½ mile	First ¼ mile	Next ¼ mile	Average jobs/acre for ½ mile
1*	10	4	7	0.3	0.15	24
2	15	7	11	0.5	0.20	35
3	22	10	16	0.7	0.25	52
4	45	15	30	1.0	0.30	113

** Activity level 1 residential and non-residential intensities are too low for regional transit station areas*

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 extreme, 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 Solutions. 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. In fact, the DCHC MPO has recently conducted a series of meetings with the NCDOT to discuss design issues that will help ensure roadway projects are appropriately designed for the area in which they traverse.

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 will work with their member communities and regional organizations such as Triangle Transit and the Triangle J Council of Governments to match land use decisions with transportation investments.

7.2 Roadways

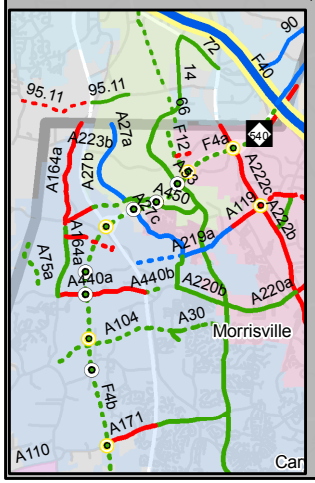
This section contains maps and a list of major road investments in the 2035 Capital Area MPO and Durham-Chapel Hill-Carrboro MPO Long Range Transportation Plans. A full listing of all roadway projects, by time period is in Appendix 1; these projects were compiled in coordination with the help of local planning departments within Capital Area MPO and the Durham-Chapel Hill-Carrboro MPO.

Projects are separated into three categories based on anticipated date of completion. 2015 projects are projects already underway with full funding and an expected completion date by 2015. The 2025 and 2035 projects are composed of projects supported by municipalities through TIP requests or sections of roads forecasted by the Triangle Regional Model to be beyond capacity by 2035 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 in the coming twenty-seven years with forecasted revenue. These projects that are not part of our fiscally constrained plans are compiled separately. Each project in the fiscally-constrained plan has a segment identifier that is shown on the 2035 LRTP Road Project Map. The project listing in Appendix 1 includes information on each project's extent, length, present and future lanes, funded completion year, cost estimation and whether it meets federal definitions for a regionally significant or exempt project.

Figure 7.2.1 is a map of highway projects by LRTP time period (2015, 2025, 2035) and Figure 7.2.2 is a listing of the major highway projects by time period in each MPO.

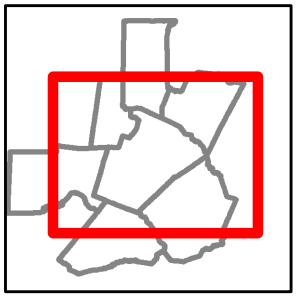
Figure 7.3.2
Highway Projects
by LRTP Time Period



DCHC
DURHAM-CHAPEL HILL-CARRBORO METROPOLITAN PLANNING ORGANIZATION

2035 Long Range Transportation Plan

March 2, 2009



Interchanges and Grade Separations

Interchange

Grade Separation

*Color coded the same as roadways

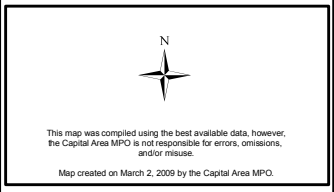
AQ Year of Completion for Highway Projects

2015

2025

2035

HOT/HOV Lanes



Miles

0 1.5 3 6 9

Capital Area Metropolitan Planning Organization

Figure 7.2.2 – Major Roadway Projects by Time Period (full listing in Appendix 1)

Durham Chapel Hill-Carrboro MPO		
2009-15	**2016-25**	**2026-35**
NC 147 extended and NC 540 completed as a toll road from Durham to Holly Spring	East End Connector completed linking US 70 to NC 147 (Durham Freeway)	HOV/HOT lanes added to I-40 from Wade Avenue (Wake County) to US 15-501 (Durham County)
	I-85 widening (I-40 to Durham County line)	I-40 widening (US 15-501 to I-85)
	I-85 widening (US 70 to Red Mill Road)	NC 147 widening (I-40 to East End Connector)
	US 70 freeway conversion (Lynn Road to Wake Co.)	Roxboro Road widening (Duke St. to Goodwin Rd.)
	Northern Durham Parkway	
Capital Area MPO		
2009-15	**2016-25**	**2026-35**
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 NC 98
US 401 widened from I-540 to Louisburg with a Rolesville bypass	US 401 widened south of Fuquay-Varina including eastern and western bypasses	I-540 (Northern Wake Expressway) widened from I-40 to US 64 bypass and converted to toll road
NC 147 extended and NC 540 completed as a toll road from Durham to Holly Springs	NC 540 completed as a toll Holly Springs to US 64 bypass	NC 42 (Johnston & Wake Co.)
	I-440 widened from Wade Avenue to Crossroads	US 401 widened from Garner to Fuquay-Varina
	NC 54 widened through Cary and Morrisville	HOV/HOT lanes added to I-40 from Wade Avenue (Wake County) to US 15-501 (Durham County)
	US 64/264 widened from the US 64 bypass to Zebulon (?)	

7.3 Fixed Guideway and Premium Transit Services

The transit plans for the Triangle region are heavily informed by the recommendations of the Special Transit Advisory Commission, (STAC) a group of 29 citizens and 9 ex-officio members convened by the two MPOs to develop a Regional Transit Vision Plan. The STAC completed its work in May 2008 with a report that recommended a complete transit system with 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:** 56 miles of light rail transit connecting Chapel Hill, Durham, Research Triangle Park, Morrisville, Cary, Raleigh and North Raleigh

- **CIRCULATORS:** High-frequency (every 10 minutes) short-distance services linking major activity centers to regional and intercity rail services

The STAC emphasized a rapidly expanded bus network in the first years of any transit plan in order to demonstrate quick results to citizens and to link all the municipalities in the Triangle with transit within the first years of expansion.

STAC members also noted that rail service will provide the opportunity to shape the growth that the Triangle will receive in the future. Charlotte has experienced over $1.9 billion in private sector development along the South Light Rail corridor while carrying several thousand riders more than projected, providing significant mobility benefits in one of the region's most congested corridors. Light rail can provide the similar opportunities in the Triangle.

The STAC developed the circulator concept to form the vital links binding together local and regional transit, major activity centers such as universities, downtowns, hospitals, and the Research Triangle Park and RDU airport. Circulator services will arrive so frequently that schedules will not be needed.

This section and the following section describe the bus and rail components of the LRTPs. There are many similarities to the STAC recommendations, and some differences based on recent information. Additional information on the STAC process and the final report and recommendations are available at the following Web site -- www.transitblueprint.org.

The major components of the fixed-guideway investment are presented in Figure 7.3.1, and Figure 7.3.2 is a map of all the fixed-guideway and bus transit services.

Fixed-Guideway and Premium Transit Services

New light rail transit and commuter rail transit investments are included in the 2035 Capital Area MPO and Durham-Chapel Hill-Carrboro MPO Long Range Transportation Plans. Details on rail technology and services are contained in Appendix 2.

Light rail transit is a departure from past long range plans that focused on passenger rail that had service using Diesel Mobile Units (DMU) technology, which could not be operated outside existing rail corridors because of safety issues.

Light rail transit provides the opportunity for the passenger rail service to depart from rail corridors and operate closer to transit oriented development along roadways. With electric propulsion, light rail can save energy costs and operate without dependence on foreign oil.

Commuter rail service tends to operate at relatively higher speeds in mainline rail corridors, serves stations that are further apart than light rail transit, and only provides service during the peak and noon hours. Thus, commuter rail service allows service to be targeted to transit markets that don't warrant service during the off-peak hours.

The major components of the fixed-guideway investment are presented in Figure 7.3.1. The exact alignment (route) and timing of fixed guideway investments will be decided with more detailed studies. But for transportation modeling and financial planning purposes, the 2035 LRTP assumes light rail service and commuter rail service will be implemented in the phases summarized in Figure 7.3.1, and that the light rail service between Durham , Raleigh and North Raleigh will operate within the existing railroad rights-of-way. Actual implementation phasing and routing might be modified based on the more detailed studies that will be required to secure financing and design the system. Routing light rail transit service outside of the railroad rights-of-way that have been studied previously could result in a longer time needed to design and build the system.

Figure 7.3.1 – Fixed-Guideway Projects by LRTP Period (technical information in Appendix 2)

Rail Segment	Type of Service	LRTP Period
Northwest Cary Station to Spring Forest	Light Rail	by 2025
UNC Hospital to Durham Multimodal Center	Light Rail	by 2025
Triangle Metro Center to Northwest Cary	Light Rail	by 2025
Spring Forest to Triangle Town Center	Light Rail	by 2025
Durham Multimodal Center to Triangle Metro Center	Light Rail	by 2025
Apex to Cary	Light Rail	by 2035
Wake Forest to Downtown Raleigh	Commuter Rail	by 2035
Clayton to Raleigh	Commuter Rail	by 2035

Rail Corridor Protection and Support

There are additional passenger rail services and assets in the Triangle Region. Currently, Amtrak operates rail service in the Triangle Region to destinations such as Raleigh, Cary, Durham and Hillsborough, and a high speed rail corridor (from Atlanta to Washington, D.C.) is being developed in part of the Triangle Region. The 2035 LRTP assumes support for any passenger rail initiatives that the MPO might designate in the future. As an example, the Town of Hillsborough will likely propose that a train station (platform and station building) be constructed on the current Amtrak line in that Town. In addition, there are several dormant rail corridors that the MPOs have designated for preservation and purchase, should the opportunity present itself. The rail corridors, which represent an invaluable assemblage of right-of-way, can be used for future bicycle paths, commuter rail service, or other transportation facilities. These rail corridors include, but are not limited to, the following:

Rail Corridor Protection		
No.	**Service Type**	**Route Name (Description)**
1	Rail protection	NC 55/Apex
2	Rail protection	Durham - Treyburn
3	Rail protection	Durham - Hillsborough/Mebane
4	Rail protection	Chapel Hill (Eubanks) - Hillsborough
5	Rail protection	Durham Beltline

7.4 Bus Transit Services

This section summarizes investments in bus transit services in the 2035 Capital Area MPO and Durham-Chapel Hill-Carrboro MPO Long Range Transportation Plans. A full listing of all transit projects including the implementation year and type of service is in Appendix 3. The bus transit investment includes extending current service areas but emphasizes service improvements to the current service areas, which are the core transit markets.

Bus service in Downtown Durham

Circulator bus service in Downtown Raleigh

Locations receiving improvements include:

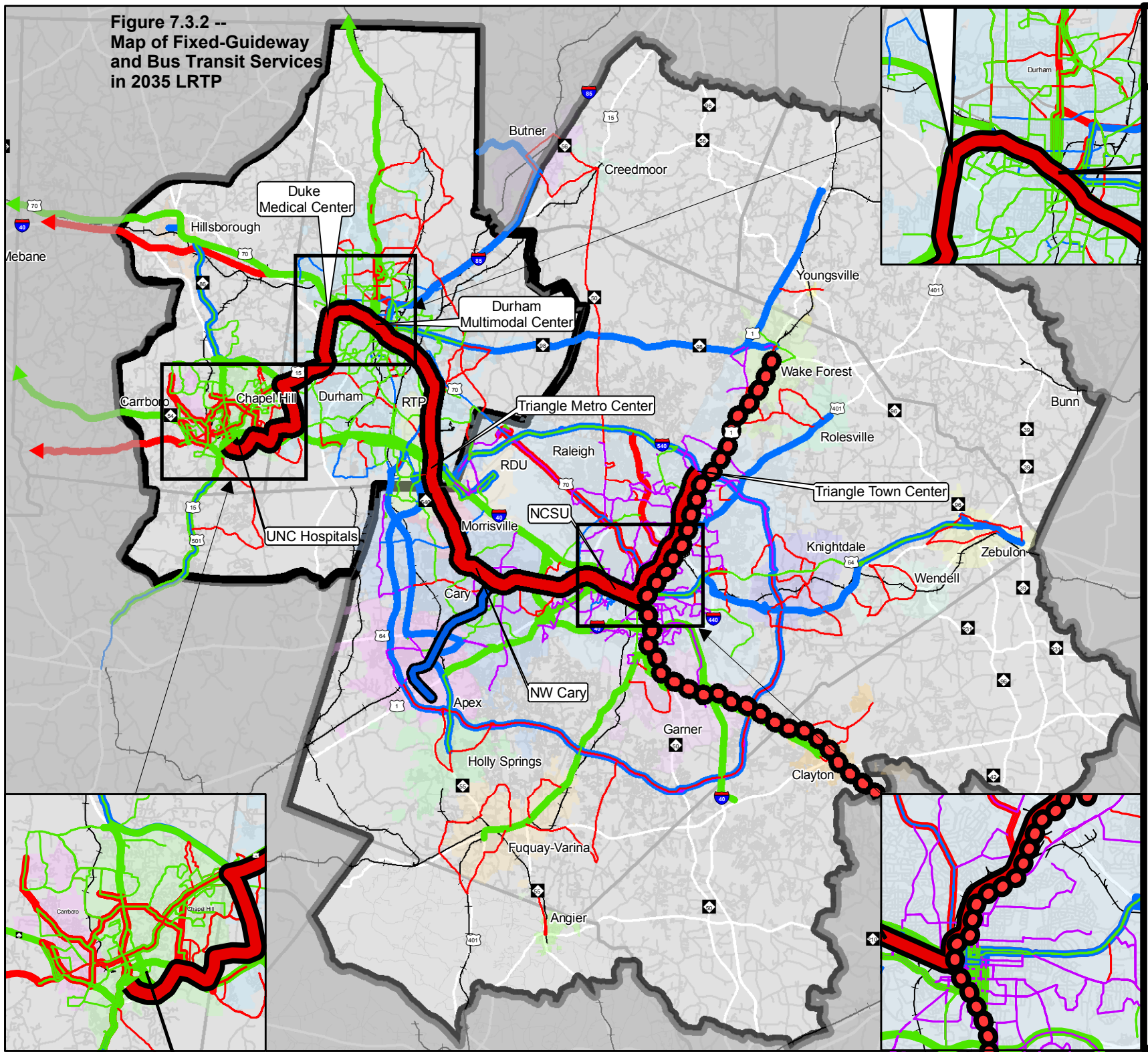
- Service expansion to several presently unserved towns, including Zebulon, Knightdale, Wendell, Rolesville, Fuquay-Varina, and Holly Springs, as well as bus stops in unincorporated portions of Wake, Durham, and Orange counties
- Enhanced service in Raleigh, Cary, Morrisville, Wake Forest, Garner, Apex, Durham, Chapel Hill, Carrboro and Hillsborough

Types of improvements include:

More frequent service -- 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.
Expanded service -- Additional service hours to expand evening and weekend service on selected routes.
Rail Coordination -- Bus routes will be re-aligned to connect with passenger rail services wherever possible.
Enhanced MLK corridor in Chapel Hill -- The MLK corridor project will provide very frequent service and will provide buses a dedicated travel lane for part of the journey from the Eubanks Rd park and ride to downtown Chapel Hill.
New technology – There will be technology applications such as satellite tracking of buses that allow for real-time bus schedule information to be relayed to users through the internet and cell phones.
Circulator service – Intensive bus service every 10 minutes, or even more often, connection destinations inside employment centers such as central Raleigh, central Durham and Chapel Hill, as well as more frequent service to Cary, Research Triangle Park and RDU airport.

Figure 7.3.2 is a map depicting the bus transit and rail transit routes and improvements in the 2035 LRTP. The MPOs' web sites have a larger version of this map for display and download.

Figure 7.3.2 -- Map of Fixed-Guideway and Bus Transit Services in 2035 LRTP



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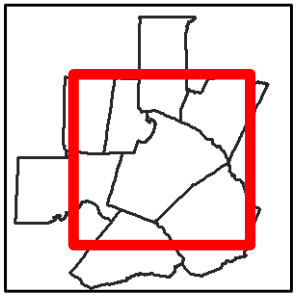
2035 Long Range Transportation Plan

April 24, 2009



Transit Service Plan

* Light Rail Transit: 2025
Light Rail Transit: 2035
Commuter Rail: 2025

Local Bus Service

Existing
2015
2025
2035
Regular Bus
Express Bus

* Light rail alignment subject to further study

N

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

Map created on April 24, 2009 by the Capital Area MPO.

Miles

0 1.5 3 6 9

Capital Area Metropolitan Planning Organization

7.5 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.

In response to the increased popularity of bike and pedestrian travel, the DCHC and CAMPO MPOs encourage 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. 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 bicycle and pedestrian plans and/or facility inventories. 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 LRTP 2035 Bicycle and Pedestrian Plan project components.

A bicyclist commuter

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 all of these pedestrian needs, and are working toward filling the missing links in our 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 LRTP 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 Planning and Designing Local Pedestrian Facilities" guide and local standards to identify appropriate facility type, and depend on local plans for project identification. The MPOs rely on the "NCDOT Bridge 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 include:

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

- Carrboro *Sidewalk Policy* (1989)
- Chapel Hill *Bicycle & Pedestrian Action Plan* (2004)
- Hillsborough *Vision 2020 Plan* (1991, revised 1998)
- Durham *DurhamWalks! Pedestrian Plan* (2006)
- Apex *Bicycle & Pedestrian Plan* (2002)
- Cary *Comprehensive Transportation Plan* (2008)
- Wake Forest *Pedestrian Plan* (2008)
- Garner Transportation Plan (1999)
- Zebulon Multimodal Transportation Plan (2001)

Bicycle Facilities

The 2035 LRTP 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.

A bicyclist on the American Tobacco Trail in Durham County

The 2035 LRTP identifies regional bicycle routes in the Triangle region. 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 "Bicycle Facilities, 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 LRTP regional bicycle routes by identifying additional projects and development requirements to complete the regional bicycle transportation network. These local plans include:

Figure 7.5.2 – Local Plans Used for Bicycle Facility Recommendations

- Carrboro *Comprehensive Bicycle Transportation Plan* (pending)
- Orange County *Bicycle Transportation Plan* (1999)
- Chapel Hill *Bicycle & Pedestrian Action Plan* (2004)
- Durham City and County *Comprehensive Bicycle Transportation Plan* (2006)
- Apex *Bicycle & Pedestrian Plan* (2002)
- Cary *Comprehensive Transportation Plan* (2008)
- Raleigh *Bicycle Transportation Plan* (pending)
- Capital Area MPO *Bicycle & Pedestrian Plan* (2003)
- Garner *Transportation Plan* (1999)
- Zebulon *Multimodal Transportation Plan* (2001)

Education, Enforcement & Encouragement

In addition to facility improvement projects included in the LRTP, the DCHC and Capital Area MPOs have devised a series 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 safety education within the public school system.
- Provide bicycle instruction to adult cyclists.
- 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 a "Cops on Bikes" program.

Police officers on bicycles in Durham, N.C.

Encouragement

- Offer incentives to employers to encourage employee bicycle commuting.
- Conduct a well-publicized annual "Bike-to-Work" week.
- Develop links between bicycle facilities and mass transit.
- 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 annual Triangle SmartCommute Challenge.

In addition, the MPOs are developing supplementary resources, such as bicycle maps, safety-education materials, and community action plans that provide a development strategy for the implementation of the four "E's" – engineering, education, encouragement and enforcement. Many member jurisdictions are proceeding toward great accomplishments in the outreach sector, including the national recognition of Carrboro and Cary as "Bicycle Friendly Communities" by the League of American Bicyclists. The MPOs continually seek projects to fund using the Safe Routes to School (SRTS) program, and several school activities have been completed using this funding source. New Freedom program funding will be used for senior citizen travel training that includes the pedestrian journey between the bus stop and their origin and destination. 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.

Maps

The maps on the following pages 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.

There are two maps for the Durham-Chapel Hill-Carrboro MPO. The first map displays roads where on-road bicycle facilities are planned, and also illustrates regional bicycle routes. The second 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 map shows an extensive regional network 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. Projects included on the "Roadway Element" 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 7.5.1 Bicycle & Pedestrian Investment

2009-2035 Bicycle and Pedestrian Investment ($2008)		
Total	CAMPO	DCHC MPO
$519,000,000	$151,000,000	$368,000,000

Figure 7.5.2 ***Capitol Area MPO*** *Regionally Significant Off-Road Facilities*

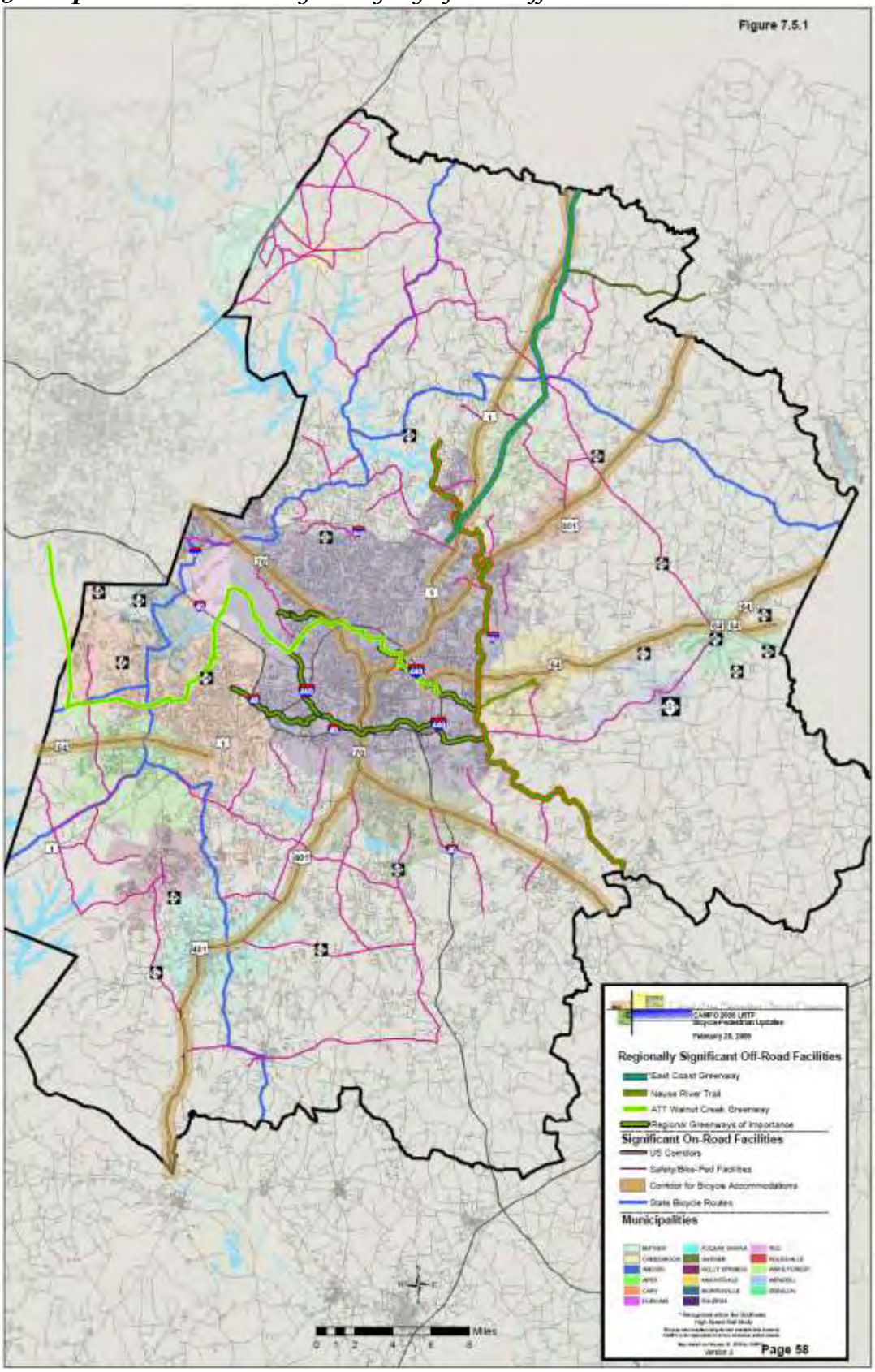


Figure 7.5.3 DCHC MPO On-Road Bicycle Facilities

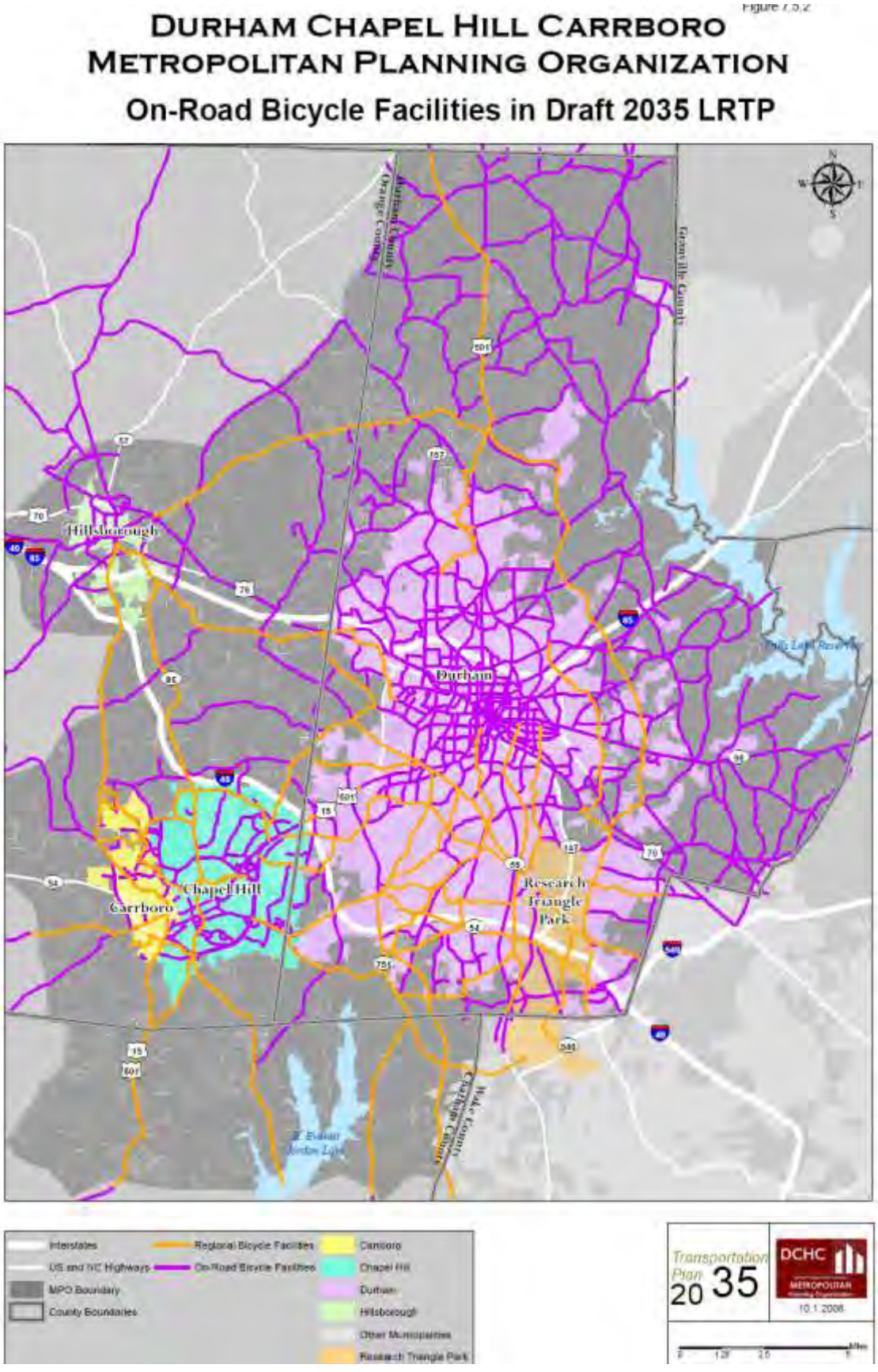
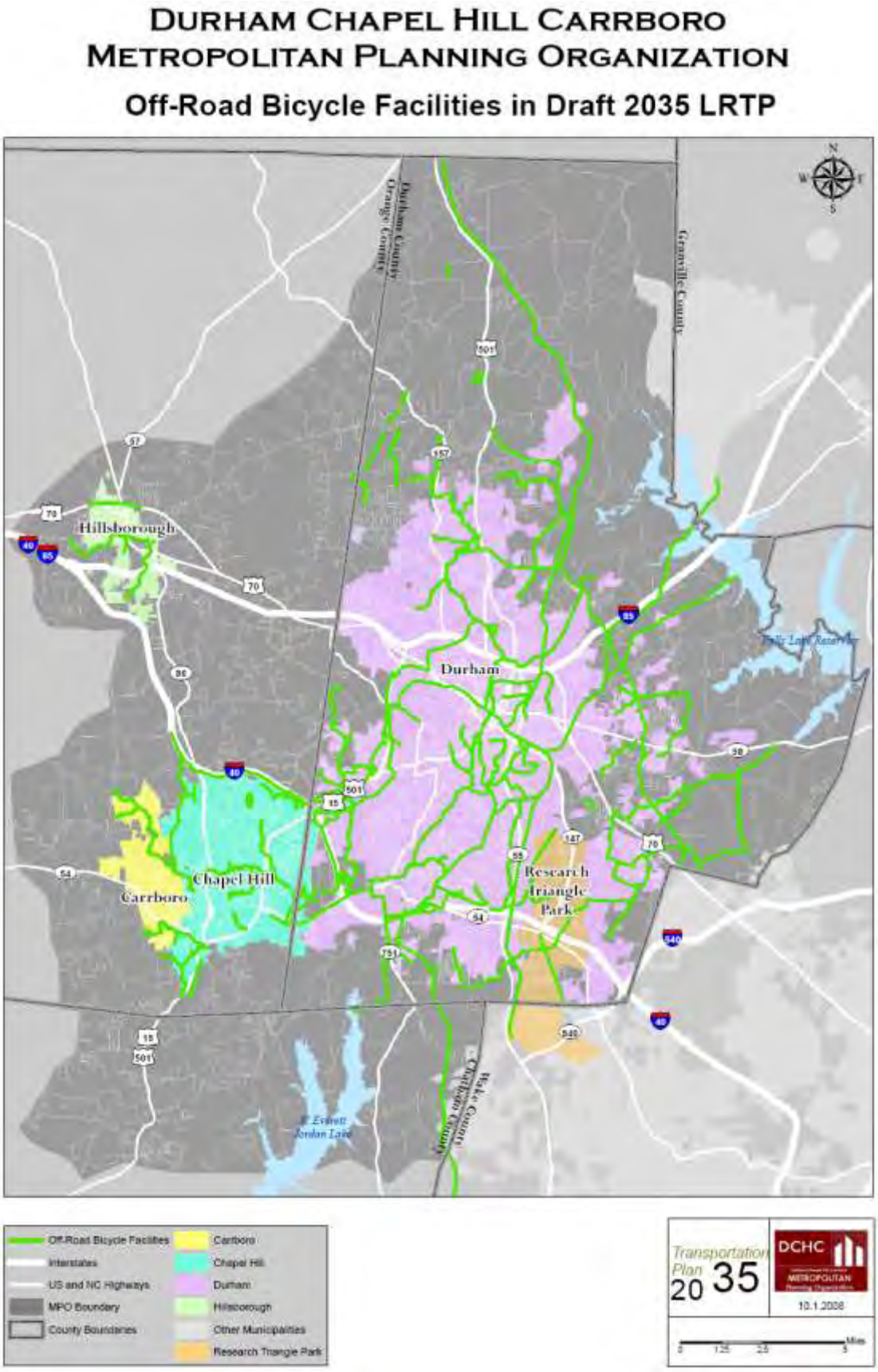


Figure 7.5.4 DCHC MPO Off-Road Bicycle Facilities



7.6 Freight Movement

Metropolitan Planning Organizations are being encouraged to effectively address freight transportation issues in accordance with policies outlined with the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU).

The Freight Industry has established five planning goals that are concurrent with most of the goals of MPOs as well. They are:

1. Economic Efficiency;
2. Congestion Mitigation;
3. Safety Improvement;
4. Air Quality Improvement; and
5. System Security.

Freight handlers have often believed that Metropolitan Planning Organizations may not understand that "time is money" for participants in the freight industry; while shippers and carriers may not understand the planning process, along with its value and jargon.

Communication between Metropolitan Planning Organizations and stakeholders in the freight industry can be difficult. This is due to the fact that desired planning data of interest to an MPO raises suspicions among freight industry stakeholders that the release of proprietary information may result in the loss of competitive position. Shippers/carriers are willing to participate in the MPO process to be "good corporate citizens"; yet members of the freight industry believe that it is good for planners to visit shipper/carrier facilities to learn and gain respect for the freight industry.

The Capital Area MPO has within the past two years sought for and received participation by the North Carolina Trucking Association in the US 1 Corridor Study. The Capital Area MPO has also been in contact with one of North Carolina's trucking industry liaisons; who also serves as a professor at North Carolina State University. The goal of the outreach process is to ensure that the North Carolina's Freight Industry and associated organizations are aware of ongoing developments concerning the transportation network, and to pursue their input and participation in future transportation development processes.

Furthermore, the Capital Area MPO and the Durham-Chapel Hill-Carrboro MPO will partner with NCDOT and Triangle Transit to have the Triangle Regional Model Service Bureau conduct a Commercial Vehicle data collection to support improvements to the Regional Travel Model. This project, which is funded in the 2009-2010 Unified Planning Work Program, will require that distribution centers throughout the region be identified and that commercial truck volumes are collected at the center locations. The two MPOs have also included a freight plan in the 2010-2011 Unified Planning Work Program.

7.7 Programs to Manage Transportation Demand (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 about 100,000 workers – 1 of every 7 workers in the region – 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.

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 Long Range 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.

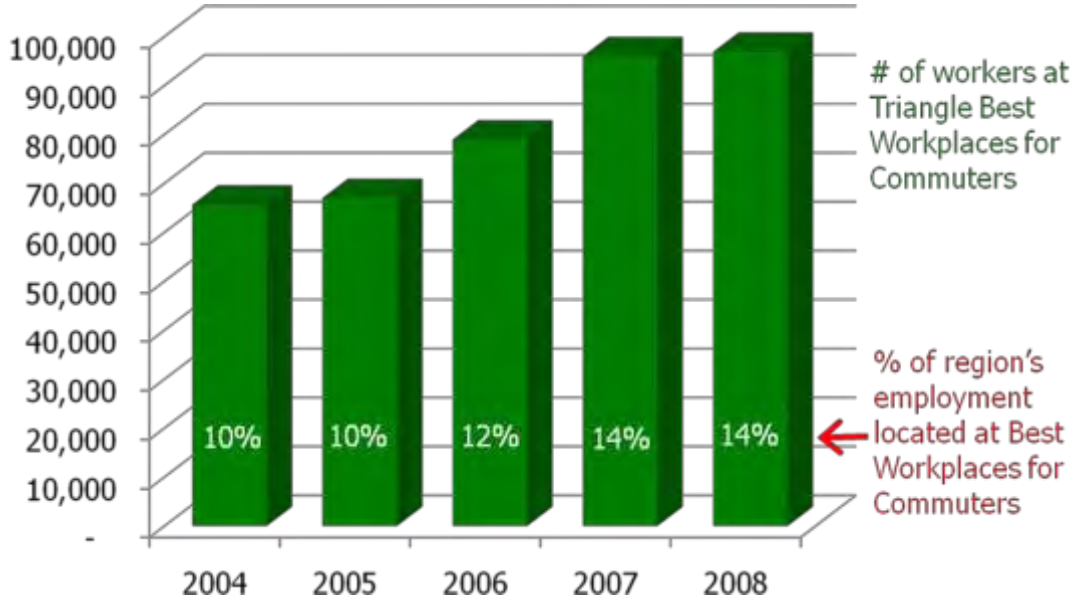
Based on this plan and the current level of the region's comprehensive, coordinated TDM program, the 2035 Long-Range Transportation Plans include funding for TDM services as shown in Figure 7.7.1, expressed in Year 2008 dollars; note that service providers supply a significant cost share to match federal and state funds:

Figure 7.7.1 – Transportation Demand Management Investment (Year 2008$)

Durham Chapel Hill-Carrboro MPO	**2009-15**	**2016-25**	**2026-35**	**Total 2009-35**
DCHC MPO Federal $	$ 2,380,000	$ 4,580,000	$ 4,580,000	$ 11,540,000
NCDOT funding	$ 2,668,500	$ 3,604,500	$ 3,604,500	$ 9,877,500
Service Provider funding	$ 2,439,000	$ 4,468,500	$ 4,468,500	$ 11,376,000
Total DCHC MPO	$ 7,487,500	$ 12,653,000	$12,653,000	$32,793,500
Capital Area MPO	**2009-15**	**2016-25**	**2026-35**	**Total 2009-35**
CAMPO federal $	$ 2,970,000	$ 5,720,000	$ 5,720,000	$14,410,000
NCDOT funding	$ 3,261,500	$ 4,405,500	$ 4,405,500	$12,072,500
Service Provider funding	$ 2,981,000	$ 5,461,500	$ 5,461,500	$13,904,000
Total CAMPO	$ 9,212,500	$ 15,587,000	$15,587,000	$40,386,500
Regional Total	$16,700,000	$28,240,000	$28,240,000	$73,180,000

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, as evidenced by Figure 7.7.2 which tracks the growth in employees who work for organizations that offer specific alternative commuting benefits and have committed to an alternative commuting target.

Figure 7.7.2 – Participation in the Best Workplaces for Commuters Program in Durham, Orange and Wake Counties



7.8 Intelligent Transportation Systems (ITS)

Intelligent Transportation Systems (ITS) is a set of diverse technologies that make the existing transportation infrastructure more efficient and safer. Indeed, efficiency and safety are among the principal goals of the 2035 LRTP. These technology systems tend to be region wide because of the interconnection among our road systems and our travel patterns, and subsequently require a high level of coordination that often demands new institutional arrangements.

The CAMPO, DCHC MPO, NCDOT and private consultants are working together to plan and implement a coordinated framework of ITS solutions for the region. A considerable ITS investment has already been made, as evidenced by the many closed circuit television, freeway management, incident management, traffic signal control and other ITS projects in operation throughout the region. Figure 7.8.1 – Intelligent Transportation Systems Investments shows the new systems proposed in the 2035 LRTP. This table breaks the ITS systems into ten different types, lists systems under each type, and forecasts the costs of each type for the two MPOs. This list is not expected to be exhaustive because the solutions and technologies will continue to evolve with the specific challenges of our transportation system and the advance of transportation technology.

Figure 7.8.1 – Intelligent Transportation Systems Investment

	2035 LRTP Costs		
Intelligent Transportation System (ITS)	**Total**	**CAMPO**	**DCHC**
Freeway Management (Interstates, US highways and other freeways)	$17,550,000	$ 11,583,000	$ 5,967,000
Electronic surveillance and traffic monitoring	Highway advisory radios		
Ramp metering	Closed circuit television (with public access)		
Dynamic message sign	Incident management assistance patrols (IMAP)		
Incident Management System	$7,450,000	$ 4,917,000	$ 2,533,000
Surveillance cameras	On-call service patrol/towing services		
Incident management algorithms	Road access and disruption management system		
Cell phone communication	Work zone safety monitoring		
Arterial Management (advanced signal/traffic control systems)	$79,740,000	$ 52,628,400	$ 27,111,600
Closed circuit television (with public access)	Traffic adaptive signals		
Dynamic message sign	Signal systems upgrade and enhancements		
Fibers/communications			
Public Transportation ITS (regional rail, fixed route, demand-responsive buses, BRT, circulators, and regional express.)	$21,000,000	$ 13,860,000	$ 7,140,000
Automated vehicle tracking-AVL/AVI	Web-based scheduling system and trip planner		
Electronic fare payment including smart card fare system	Transit corridor priority systems and multi-modal coordination		
Public transportation (transit center)	Transit security		
Real time bus information (bus stops and transfer centers)	Transit center		
Rail Operation Information Network	$2,300,000	$ 1,518,000	$ 782,000
Operation network	Rail crossing		
Advanced Traveler Information System	$4,000,000	$ 2,640,000	$ 1,360,000
Electronic Toll (toll roads and HOT)	$4,000,000	$ 2,640,000	$ 1,360,000
Electronic toll	Smart cards		
Transponders			
Emergency Management	$4,900,000	$ 3,234,000	$ 1,666,000
HAZMAT management	Weather Information Processing and Distribution		
Emergency routing			
ITS Data Warehouse and Archive	$2,800,000	$ 1,848,000	$ 952,000
Commercial Vehicle ITS	$2,700,000	$ 1,782,000	$ 918,000
Total ITS Investment	**$146,440,000**	**$96,650,400**	**$49,789,600**

7.9 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 operating public transportation, and often provide cost effective solutions that can be implemented relatively quick and with relatively fewer environmental impacts. Many of the projects can be implemented in small phases – they can be built as public funding becomes available, or as development occurs and partnerships with private developers are created.

The following list provides examples of the types of TSM projects that are expected to be implemented through the 2035 LRTP period. This list is not expected to be exhaustive because the solutions will continue to evolve with the specific challenges of our transportation system.

- Widening of approach widths for key intersections;
- Installation and/or adjustment of traffic signals, including dynamic signal timing coordination;
- Provision of left and/or right turn lanes;
- Limitation or prohibition of driveways, turning movements, trucks, and on-street parking;
- Installation of traffic calming devices for residential neighborhoods; and,
- Planning for traffic circles and roundabouts at appropriate intersections.

TSM projects in the Capital Area MPO. The Capital Area MPO includes funding for TSM in the overall roadway category. Appendix 1 of this report includes the list of highway projects included in this plan. In the CAMPO part of the list, several projects are listed which do not increase the number of travel lanes on a road, but instead make safety, intersection, or other TSM improvements.

TSM priorities in the DCHC MPO. The estimated costs for TSM projects from 2009 through 2035 are $111 million in the DCHC MPO. Many roadways and intersections in northeast Chatham County and southwest Durham County need capacity and safety improvements to address the expected traffic volume increases. Roadway widenings for this area were not specifically included in the Highway project list of the 2035 LRTP because of highway funding constraints and concerns about the environmental impacts that widenings might have on the surrounding wetlands. As a result, Figure 7.9.1 – TSM Projects in NE Chatham/SE Durham, specifically identifies possible TSM projects for the roadways and intersections in northeast Chatham County and southwest Durham County. These TSM projects have been drawn from the draft "Farrington Road Corridor Study."

Figure 7.9.1 – TSM Projects in NE Chatham/SE Durham

Road/Intersection	Short Term TSM	Long Term TSM
US 15/501 and Jack Bennett Road	Lengthen the existing westbound left-turn lane on Jack Bennett Road to provide 250 feet of full-width storage.	None
Old Farrington Point Road and Lystra Road	Construct an additional eastbound left-turn lane on Lystra Road with 425 feet of full-width storage.	Construct an exclusive southbound right-turn lane on Old Farrington Point Road with 300 feet of full-width storage, or Convert traffic signal to a roundabout

Road/Intersection	Short Term TSM	Long Term TSM
Farrington Point Road/Old Farrington Point Road and Mt. Carmel Church Road	None	Construct an exclusive westbound right-turn turn lane on Farrington Point Road with 100 feet of full-width storage, and, Construct an exclusive northbound right-turn lane on Old Farrington Point Road with 225 feet of full-width storage, and, Construct an exclusive southbound left-turn turn lane on Mt. Carmel Church Road with 125 feet of full-width storage, or, Install a roundabout or traffic signal when warranted.
Farrington Mill Road and Barbee-Chapel Road	None	Construct an exclusive eastbound right-turn turn lane on Barbee-Chapel Road with 125 feet of full-width storage, and, Construct an exclusive westbound left-turn lane on Farrington Point Road with 700 feet of full-width storage, and, Construct an exclusive northbound left-turn lane on Farrington Point Road to provide 225 feet of full-width storage, or, Install a roundabout or traffic signal when warranted.
Farrington Road and Stagecoach Road	Construct an exclusive northbound right-turn turn lane on Farrington Road with 200 feet of full-width storage.	Construct an exclusive southbound left-turn lane on Farrington Road with 100 feet of full-width storage, and, Construct an exclusive westbound left-turn lane on Stagecoach Road with 100 feet of full-width storage, or, Install a roundabout or traffic signal when warranted.
NC 751 Hope Valley Road and Stagecoach Road	Construct an additional eastbound left-turn lane on Stagecoach Road with 250 feet of full-width storage.	Construct an additional northbound and southbound through lane on Hope Valley Road, and, Construct an exclusive northbound left-turn lane on Hope Valley Road with 400 feet of full-width storage, and, Construct an exclusive southbound right-turn lane on Hope Valley Road with 200 feet of full-width storage.
NC 751 (US 64 to O'Kelly Chapel Rd.)	None	Install curb and gutter and other safety improvements

7.10 Recommended Special Plans, Projects and Studies

MPOs may choose to identify plans, projects or studies that may be undertaken to provide additional analysis or detail, or to clarify issues raised in the development of the Long Range Transportation Plans. These may include corridor studies, small area plans, financial analyses, functional plans or other efforts like those that have been conducted in the past and which 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. 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.

	Recommended Plan or Study	*Type*
1	*Regional Transit Financial Plan.* A detailed plan showing how proposed new regional revenue sources would be used to provide the first transit investments implementing the transit services contained in this Long Range Transportation Plan; this financial plan is expected to be a requirement for obtaining a new regional revenue source for transit based on legislation introduced in the 2009 General Assembly.	Transit Plan
2	*NC 50 Corridor Study.* Examine potential impacts of improvements to NC-50 on NC-56, a re-evaluation of alternative alignments for the Creedmoor Loop; and may include evaluation of impacts on other roads – i.e., SR 1700 Brassfield Road, etc. NC-50 is the primary commuting arterial between Granville County and Wake County. There is decreasing mobility along the roadway due to an increased population growth rate, rising average daily traffic (ADT), and freight traffic. NC-50 was Granville County's Number 1 priority project during the last prioritization process. The municipalities in Granville County, i.e., Creedmoor, Oxford, Stem, and the Town of Butner all have concerns about congestion, access management and mobility along NC-50	Corridor Study
3	*Capital Area Transit's Mid Range Transit Plan.* Capital Area Transit plans to develop a mid-range transit plan for counties and municipalities within the Capital Area MPO's Metropolitan Area Boundary. This plan will use existing plans and new projections to create a clear vision of transit services that would be implemented within the Capital Area MPO over a five to fifteen year period.	Transit Plan
4	*Triangle Regional Model Services Bureau Commercial Vehicle Survey.* The Triangle Regional Model Services Bureau will prepare for Major Model Update 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 Major Model Update	Transportation Model Improvement

	Recommended Plan or Study	*Type*
5	*UrbanSim Land Use Model.* A two-phased approach for the development and implementation of UrbanSim. Phase One involves the development and implementation of UrbanSim at the "neighborhood" level. This will include effective benchmarks, back-casting and visualization tools. Such a model would allow planners to explore land use-transport interactions on either an MPO or neighborhood/transit station-area basis. Phase Two will involve the development and implementation of a full blown model at the parcel level or in grid cells. A more comprehensive and complex modeling system can be developed over the longer term.	Transportation Model Improvement
6	*NC54/I-40 Corridor/Sub-Area Study.* Corridor/Sub-Area study designed to analyze and articulate the problems within the NC 54 corridor, evaluate mitigating measures and identify transportation and land-use strategies for alleviating and mitigating current and future transportation problems and land development demands.	Small Area Plan
7	*CORE Transit Connections Plan.* A detailed plan developed in cooperation with the Research Triangle Foundation and Raleigh-Durham Airport Authority showing how the Research Triangle Park, the Raleigh-Durham International Airport and nearby development will be linked to regional transit lines serving the center of the region.	Transit Plan Small Area Plan
NOTE: this list of plans and studies may be modified in the final report		

S.E. High Speed Rail Corridor
The Federal Rail Administration (FRA) is currently funding environmental work along the Southeast High Speed Rail Corridor. Completion of the Draft Tier II EIS (Environmental Impact Statement) from Richmond to Raleigh is expected in early 2010. The final Tier II EIS is expected to be completed by the end of 2010.

7.11 Alternative Plan in Case of Plan Lapse

Two requirements of Long Range 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 7.11.1—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.

8. Financial Plan

Federal regulations require the 2035 LRTP to be fiscally-constrained. This requirements means that the cost of the various highway, transit and other transportation facilities must be covered by state, federal, local, private and other transportation revenues that can be reasonably expected to be available. The Financial Plan provides a comparison of projected revenues and costs from 2009 through 2035 – this is a 27-year period – to demonstrate the balance between costs and revenues.

This financial plan section presents a variety of cost and revenue tables that have been summarized to permit a unified presentation of financial data from both MPOs. Alternative presentations of this financial data are available on the MPOs' web sites.

8.1 Costs

The two MPOs used the same costs assumptions for the major parts of the plan, including:

- Highway: Used the 2009 highway estimates spreadsheet from the North Carolina Department of Transportation, and data from the I-40 HOV Study and North Carolina Turnpike Authority for projects related to those entities.
- Bus Transit: Used a spreadsheet model with standard hourly operating, maintenance and vehicle costs (by type of vehicle).
- Light Rail Transit: Used rail transit cost/revenue model maintained by the Triangle Transit.
- Travel Demand Management (TDM): Used costs estimates from the regional plan administered by the Triangle J Council of Governments.
- Intelligent Transportation Systems (ITS): Used cost estimates from a Triangle regional plan.

The costs are for the period 2009 through 2035, and are shown in dollar values for the year 2009. On the next page, Figure 8.1 presents the DCHC MPO and CAMPO costs. The CAMPO total is $13.5 billion and the DCHC MPO total is $8 billion, depicting a fairly even transportation investment between the two MPOs given the fact that the CAMPO planning area has a little more than a 50% greater population than the DCHC MPO.

Visit the approved 2035 LRTP sections of the DCHC MPO and CAMPO Web sites for alternative breakdowns of the 2035 LRTP costs.

8.2 Revenues

Traditional Revenues

The 2035 LRTP must identify revenue sources to pay for the proposed projects and there must be a reasonable expectation that these revenue sources will be realized. The MPOs used historical revenue data to project future revenues and also made informed assumptions as to how current revenue programs and trends might change in the future given state and federal proposals to change transportation financing. The revenues are calculated for the years 2009 through 2035. Cost inflation for highway, transit and other transportation projects and services is growing at a pace that is faster than the revenue stream, i.e., government budgets. Therefore, a 4% annual discount rate is applied to the revenues, as indicated, to account for the loss of purchasing power. The three tables, Figures 8.2.1 through 8.2.3 present the revenue assumptions for highways, bus transit and light rail transit.

Figure 8.2.4 presents the revenue for DCHC MPO and CAMPO.

Figure 8.1: DCHC MPO and CAMPO Costs

DCHC MPO -- Cost Category	Time Period 2009-15	2016-25	2026-35	Total
Roadways - Total	**$ 588**	**$ 1,534**	**$ 1,566**	**$ 3,687**
Roadways	$ 16	$ 699	$ 1,305	$ 2,020
Tolled roads (excluding I-40 HOT)	$ 157	$ -	$ -	$ 157
Non-tolled trust fund urban loops	$ 155	$ 487	$ 41	$ 684
Maintenance	$ 260	$ 347	$ 220	$ 827
Light Rail and Commuter Rail - Total	**$ 156**	**$ 1,280**	**$ 477**	**$ 1,913**
Bus - Total	**$ 330**	**$ 688**	**$ 917**	**$ 1,935**
Other - Total	**$ 68**	**$ 232**	**$ 261**	**$ 561**
Pedestrian/Bicycle	$ 42	$ 153	$ 173	$ 368
Transportation Demand Management	$ 7	$ 13	$ 13	$ 33
Intelligent Transportation Systems	$ 6	$ 21	$ 23	$ 50
Transportation System Management	$ 13	$ 46	$ 52	$ 111
Total	**$ 1,142**	**$ 3,733**	**$ 3,221**	**$ 8,096**

CAMPO -- Cost Category	Time Period 2009-15	2016-25	2026-35	Total
Roadways - Total	**$ 2,042**	**$ 3,308**	**$ 3,821**	**$ 9,171**
Roadways	$ 668	$ 1,939	$ 2,615	$ 5,222
Tolled roads (excluding I-40 HOT)	$ 925	$ 645	$ 366	$ 1,936
Non-tolled trust fund urban loops	$ -	$ -	$ -	$ -
Maintenance	$ 449	$ 724	$ 840	$ 2,013
Light Rail and Commuter Rail - Total	**$ 458**	**$ 1,560**	**$ 610**	**$ 2,628**
Bus - Total	**$ 356**	**$ 568**	**$ 535**	**$ 1,459**
Other - Total	**$ 80**	**$ 114**	**$ 132**	**$ 326**
Pedestrian/Bicycle	$ 30	$ 49	$ 49	$ 128
Transportation Demand Management	$ 17	$ 28	$ 28	$ 73
Intelligent Transportation Systems	$ 22	$ 37	$ 37	$ 96
Transportation System Management	$ 11	$ -	$ 18	$ 29
Total	**$ 2,936**	**$ 5,550**	**$ 5,098**	**$ 13,584**

Note: Totals in both tables might differ slightly from sum of subtotal because subtotals are rounded to nearest million

Figure 8.2.1: Highway Revenue Assumptions

Item	CAMPO Assumptions	DCHC Assumptions
Capital - Federal / State	NCDOT revenue model for gas taxes and fees (2008 to 2035). Uses 4% inflation factor	NCDOT revenue model for gas taxes and fees (2008 to 2035). Uses 4% inflation factor
Maintenance -- Federal/State/Other	Approximately 39% of all highway revenues	Approximately 39% of all highway revenues
Highway Trust Fund ("Loop" projects)	NCDOT revenue model for gas taxes and fees (2008 to 2035). Uses 4% inflation factor	Projects identified in legislation, thus revenues equal to costs.
Toll roadway	Tolls, bonds and state gap funding) are to finance; thus revenue equal to costs.	Tolls, bonds and state gap funding) are to finance; thus revenue equal to costs.
Local (Capital Improvement Program)	Staff forecast	Consultant revenue model
Private	Staff forecast	Revenue equals full cost of private roads and 20% of new roadway in which right-of-way is currently being reserved and dedicated.

Figure 8.2.2: Bus Transit Revenue Assumptions

Item	CAMPO Assumptions	DCHC Assumptions
Capital -- Federal & State	Computed trend for each transit system; Uses 4% inflation factor.	Computed trend for each transit system; Uses 4% inflation factor.
Operations, Maintenance, Planning -- Federal & State	Computed trend for each transit system; Uses 4% inflation factor.	Computed trend for each transit system; Uses 4% inflation factor.
Local	Computed trend for each transit system; Uses 4% inflation factor.	Computed trend for each transit system; Uses 4% inflation factor.
Fares	Computed trend for each transit system; Uses 4% inflation factor.	Current fares plus growth factor based on travel demand model
Private Capital – (university systems)	Computed trend for each transit system; Uses 4% inflation factor.	Private systems will cover own costs, thus revenues equal costs.
Private Operations – (university systems)	Computed trend for each transit system; Uses 4% inflation factor.	Private systems will cover own costs, thus revenues equal costs.

Bus Transit Revenue Notes:
1. Prior year data in the National Transit Database (NTD) was used to compute transit revenue trends.
2. Triangle Transit costs and revenues were apportioned at 60% for CAMPO and 40% for DCHC MPO.

Figure 8.2.3: Light Rail Transit Revenue Assumptions

Item	CAMPO Assumptions	DCHC Assumptions
Capital -- Federal & State	Federal is 33% and State is 25% of total capital costs	Federal is 33% and State is 25% of total capital costs
Operations, Maintenance, Planning -- Federal & State	Federal is 7.6% and State is 10% of total operations costs	Federal is 7.6% and State is 10% of total operations costs
Local & Private	Annual amount, starting in 2016, for special tax districts around rail transit stations and contributions from developers and universities	$5 million per year, starting in 2016, for special tax districts around rail transit stations and contributions from developers and universities
Fares	Farebox recovery equals 20% of operations costs	Farebox recovery equals 20% of operations costs
Bond Proceeds	Issue bonds for revenue to support system construction and capitalization. Transit system will net surplus (bond proceeds minus debt payment) before year 2035	Issue bonds for revenue to support system construction and capitalization. Transit system will net $21 million surplus (bond proceeds minus debt payment) before year 2035

Figure 8.2.4: DCHC MPO and CAMPO Revenues

DCHC MPO -- Revenue Category	Time Period 2009-15	2016-25	2026-35	Total
Roadways - Total	**$ 962**	**$ 1,479**	**$ 893**	**$ 3,334**
Traditional Funding	$ 424	$ 644	$ 632	$ 1,700
Tolled roads (excluding I-40 HOT)	$ 157	$ -	$ -	$ 157
Non-tolled trust fund urban loops	$ 122	$ 487	$ 41	$ 650
Maintenance	$ 260	$ 347	$ 220	$ 827
Light Rail - Total (1)	**$ 138**	**$ 907**	**$ 422**	**$ 1,467**
Bus - Total	**$ 359**	**$ 554**	**$ 571**	**$ 1,484**
Total	**$ 1,459**	**$ 2,939**	**$ 1,886**	**$ 6,284**

CAMPO -- Revenue Category	Time Period 2009-15	2016-25	2026-35	Total
Roadways - Total	**$ 1,747**	**$ 2,616**	**$ 1,980**	**$ 6,343**
Traditional Funding	$ 353	$ 1,225	$ 1,045	$ 2,623
Tolled roads (excluding I-40 HOT)	$ 925	$ 645	$ 366	$ 1,936
Non-tolled trust fund urban loops	$ -	$ -	$ -	$ -
Maintenance	$ 469	$ 746	$ 569	$ 1,784
Transit - Total (1)	**$ 410**	**$ 958**	**$ 457**	**$ 1,825**
Total	**$ 2,157**	**$ 3,574**	**$ 2,437**	**$ 8,168**

Note: Totals in both tables might differ slightly from sum of subtotal because subtotals are rounded to nearest million

(1) These revenue sources can include special tax districts around rail transit stations and contributions from developers and universities.

New Revenue Sources

The current transportation funding programs will not produce enough revenue to finance the highway, bus transit, light rail transit and other transportation needs in the Triangle. Therefore, the MPOs have assumed New Revenue Sources to close this funding gap and presented this information in a separate table. The MPOs have a reasonable expectation to realize these new revenue sources based on the many local and statewide commissions that have studied transportation financing and recommended new funding sources. In fact, many solid steps have already been taken:

- In April 2009, the North Carolina House passed the Congestion Relief and Intermodal 21st Century Transportation Fund (House Bill 148). The legislation permits a local voter referendum to increase the sales tax to raise revenues for transit systems. The half-cent sales tax increase permitted in Wake, Durham and Orange counties by this legislation is used to calculate new revenue sources in the 2035 LRTP.
- The Triangle Region has a rental car tax that produces approximately $7 million annually to fund Triangle Transit services and studies;
- Several municipalities, such as the City of Durham and Town of Chapel Hill, have pushed for and received increases in the vehicle registration fee;
- The North Carolina Turnpike Authority (NCTA) was created in 2004 and is currently working to build the Triangle Expressway; and,
- The Charlotte area has a sales tax that produces approximately $50 million annually, and the North Carolina Board of Transportation and General Assembly have ensured that the required state match has kept pace with this large revenue source.

It is important to note the following background information on the New Revenue Sources proposed in the 2035 LRTP:

- Many of these new revenue options would require legislation from the North Carolina General Assembly and/or the U.S. Congress. The MPOs are not empowered to invoke these tax and revenue program changes.
- The 2035 LRTP envisions a level of effort to increase revenue for highways and transit that is similar to that depicted in the Plan. The exact type and mechanism for increasing these revenues, e.g., sales tax, is not a certainty.

On the next page, Figure 8.2.5 presents the assumptions for New Revenue Sources.

Figure 8.2.5: New Revenue Sources

Item	CAMPO Assumptions	CAMPO Amount	DCHC Assumptions	DCHC Amount
Sales Tax #1 (or equivalent)	Level of effort equivalent to a 1/2 cent sales tax increase in 2011 for transit. Revenue increases commensurate with population. Requires legislation from N.C. General Assembly.	$ 1,576	1/2 cent sales tax increase in Durham and Orange counties, and 1/4 cent increase in Chatham County; from 2011 through 2035; and, revenue increases commensurate with population. Requires legislation from N.C. General Assembly.	$ 755
Sales Tax #2 (or equivalent)	Level of effort equivalent to a 1/2 cent sales tax increase in in 2016 for roads. Revenue increases commensurate with population. Requires legislation from N.C. General Assembly.	$ 1,140	Not applicable for DCHC MPO	$ -
Regional, Local, and Private support	In addition to the 1/2 cent level of effort, some municipalities have agreed to contribute to certain road projects considered vital to their area.	$ 1,258	(Included in local highway revenue for DCHC MPO)	$ -
New State and/or Federal Infrastructure Programs	New state/federal funding for NC Strategic Highway Corridors (may include toll revenue or a change in funding levels/distribution methodology). Average of $53M/year from 2016 to 2035.	$ 1,060	Average of $19 million per year, from 2016 through 2035. Requires new state/federal funding program, or change in funding levels or distribution methodology.	$ 380
Financing Package for I-40 High Occupancy Vehicle/Toll Lanes	(Included in program above -- New State and/or Federal Infrastructure Programs)	$ -	Includes toll revenue, bonding based on future toll revenue, and State gap funding	$ 579
Car Registration Fee	$10 car registration fee increase in 2011. Revenue increases commensurate with population. Requires legislation from N.C. General Assembly.	$ 185	$10 car registration fee increase in Chatham, Durham and Orange counties; from 2011 through 2035; and, revenue increases commensurate with population. Requires legislation from N.C. General Assembly.	$ 107
Rail Bonds	Debt Financing to pay for initial rail construction.	$ 585	(Included in light rail transit revenues)	$ -
Total		**$ 5,804**		**$ 1,820**

Note: Total may differ slightly from sum of subtotals because subtotals are rounded to nearest million

8.3 Reconciling Costs and Revenues

Finally, Figure 8.3.1 shows the funding deficit when comparing the current revenue sources with the expected costs for projects and services in the 2035 LRTP, and shows how the New Revenue Sources will eliminate the projected deficit to make the Plan fiscally-constrained.

Figure 8.3.1: Reconciling Costs and Revenues

Costs	CAMPO	DCHC
Total Highways and Other	$ 9,497	$ 4,248
Total Bus Transit	$ 1,459	$ 1,935
Total Rail Transit	$ 2,628	$ 1,913
Total Costs	**$ 13,584**	**$ 8,096**
Revenues		
Total Highways and Other	$ 6,343	$ 3,334
Total Bus Transit (DCHC MPO)		$ 1,484
Total Rail Transit (DCHC MPO)		$ 1,467
Total Combined Transit (CAMPO)	$ 1,825	
Total Revenues	**$ 8,168**	**$ 6,284**
Difference (Revenues minus Costs)	**$ (5,416)**	**$ (1,812)**
New Revenue Sources		
Highways	$ 3,458	
Transit	$ 2,346	
Total New Revenue	$ 5,804	$ 1,820
Difference (Revenues + New Revenue Sources) minus (Costs)	**$ 388**	**$ 8**

Note: Totals may differ slightly from sum of subtotals because subtotals are rounded to nearest million

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9. Critical Factors in the Planning Process

Our transportation investments influence more than just our ability to get from one place to another. How and where we develop roads, transit lines and other transportation services impact other things we value, including the natural environment and the health and well-being of our neighborhoods, and those who live in them. Federal law recognizes these important considerations by requiring that Long Range Transportation Plans specifically address eight planning factors:

1. Support economic vitality of the metropolitan areas, especially by enabling global competitiveness, productivity, and efficiency;
2. Increase the safety of the transportation system for motorized and non-motorized users;
3. Increase the security of the transportation system for motorized and non-motorized users;
4. Increase accessibility and mobility of people and freight;
5. Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns;
6. Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight;
7. Promote efficient system management and operation; and
8. Emphasize the preservation of the existing transportation system.

Each of these factors is addressed throughout this report. This section highlights the following critical factors:

- Air quality: demonstrating that transportation plans will further clean air goals and meet air pollutant standards;
- Environmental Justice: showing how transportation plans relate to communities that have been historically underserved or disproportionately impacted by transportation investments; and
- Safety and Security: addressing how the transportation plans and the organizations that implement them promote safer and more secure travel choices.

9.1 Transportation - Air Quality Conformity

A biodiesel school bus

Transportation-air quality conformity ("conformity") is a way to ensure that Federal funding and approval goes to transportation activities that are consistent with air quality goals. Conformity applies to long range transportation plans—such as this one, to transportation improvement programs (TIPs), and to projects funded or approved by the Federal Highway Administration (FHWA) or the Federal Transit Administration (FTA) in areas that do not meet or previously have not met air quality standards for ozone, carbon monoxide, particulate matter, or nitrogen dioxide. These areas are known as "non-attainment areas" or "maintenance areas," respectively.

A conformity determination demonstrates that the total emissions projected for a plan or program are within the emissions limits ("budgets") established by the State Implementation Plan (SIP) for air quality, and that transportation control measures (TCMs) – specific projects or programs enumerated in the SIP that are designed to improve air quality – are implemented in a timely fashion. All of the area within the Triangle covered by the two MPOs, except for Harnett County, is currently designated as a "maintenance area" for the 8-hour ozone standard; the effective date of this designation was December 26, 2007. In addition, Durham and Wake Counties are maintenance areas for carbon monoxide.

Determining Conformity

Regional emissions are estimated based on highway and transit usage according to transportation plans and TIPs. The projected emissions for the plan and TIP must not exceed the emissions limits (or "budgets") established by the SIP. Where TCMs are included, responsible MPOs and the North Carolina Department of Transportation (NCDOT) are required to demonstrate that TCMs are implemented in a timely fashion. In North Carolina there are currently no TCMs included in SIPs.

The Decision Process

A formal interagency consultation process involving the Environmental Protection Agency (EPA), FHWA, FTA and state and local transportation and air quality agencies is required in developing SIPs, TIPs, and transportation plans, and in making conformity determinations. Metropolitan Planning Organization (MPO) policy boards make initial conformity determinations in metropolitan areas, while the NCDOT does so in areas outside of MPOs, in consultation with affected Rural Planning Organizations (RPOs).

Four organizations are responsible for making the conformity determinations in four distinct parts of the Triangle Ozone Maintenance Area:

a. the Capital Area MPO within the CAMPO metropolitan area boundary – all of Wake County, and parts of Franklin, Granville, and Johnston counties.
b. the DCHC MPO within its metropolitan area boundary – all of Durham County and parts of Orange and Chatham counties.
c. the Burlington-Graham MPO within its portion of the metropolitan area boundary in western Orange County.
d. the NCDOT in a rural area that is comprised of those portions of Chatham, Orange, Person, Franklin, Granville and Johnston Counties that remain outside of any MPO metropolitan area boundary.

Each of these responsible organizations must make a conformity determination for its respective area in order for all of the areas to be designated in conformity.

The final conformity determination is made at the Federal level by FHWA/FTA. These determinations must be made at least every four years, or when transportation plans or TIPs are amended or updated, or within one year of the effective date of a non-attainment designation. Conformity determinations must also be made within two years after the approval of a State Implementation Plan (SIP) containing motor vehicle emission budgets or determination of adequacy of those budgets.

Appendix 6 includes the *Conformity Analysis and Determination Report* for the CAMPO and DCHC MPO 2035 Long Range Transportation Plans, along with the 2009-15 TIP.

9.2 Environmental Justice

The intent of Environmental Justice is to avoid, minimize, or mitigate disproportionately high and adverse effects on minority and low-income populations; and ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.

Environmental justice addresses fairness toward the disadvantaged and often addresses the possible exclusion of racial and ethnic minorities, low-income people, the elderly, and persons with disabilities from decision-making. The federal government has identified environmental justice as an important goal in transportation, and local and regional governments must incorporate environmental justice into transportation planning. Capital Area MPO and DCHC MPO goals that relate to the public transportation system, the protection of the natural environment and social systems, and the public involvement process each have objectives that support environmental justice. This support must be evident throughout the transportation planning process, including those processes for the long-range transportation plan, transportation improvement program, and specific project planning.

Even though the term "environmental justice" is not in federal legislation, the concept and its application have been developed through a succession of court cases, transportation regulations, agency memoranda, and Executive Orders. Much of the legal application is based on Title VI of the Civil Rights Act of 1964 that provides protection from discriminatory actions or results from federal, or federally assisted or approved, actions. In terms of transportation planning, environmental justice seeks to ensure that the disadvantaged:

1. Have access to the decision-making process;
2. Realize benefits from investments that are commensurate with the population as a whole;
3. Do not shoulder a disproportionate share of the negative effects and burden resulting from the implementation of transportation projects; and,
4. Do not incur a disproportionate share of the financial cost.

The Capital Area MPO and DCHC MPO have carried out a comprehensive and thorough set of activities to ensure that disadvantaged persons, as characterized in federal regulations, do not suffer discrimination in the transportation planning and implementation process. These activities have been in the area of both public participation and plan analysis. The following sections describe the environmental justice activities that occurred as part of the 2035 LRTP.

Access to the Decision-making Process

The Capital Area MPO and DCHC MPO ensured that all individuals, regardless of race, ethnicity, income, age, or disability, had access to the planning process. Throughout the plan's development, documents were available for public review several times.

In the DCHC MPO, documents were available online and at all local public libraries and planning departments. Notice of the public review periods was published in local newspapers and sent by email and post office mail. Environmental justice community organizations and neighborhoods are included on the DCHC MPO's email and mail lists.

In addition, the DCHC MPO held public workshops for review of the alternatives analysis and preferred option. The DCHC MPO held six public workshops for each review period. These workshops were held throughout the MPO: one in Hillsborough, one in Chapel Hill, one in Pittsboro, one in north Durham, one in central Durham, and one in south Durham. The Hillsborough, Chapel Hill and Durham workshops were held at locations along public transportation routes. The Pittsboro workshop was not because Pittsboro does not have bus service. Accommodations were made at public meeting and hearings for the disabled.

Plan Benefits

The investments in transportation infrastructure included in the 2035 LRTP will benefit the MPO's population in many ways including increased mobility, safety, time savings, economic development, and recreational opportunities. The investment in transit in particular will benefit low income populations that do not have access to personal vehicles and the disabled who may not be able to operate personal vehicles. Currently, 32,000 households in the Triangle do not have personal vehicles. The travel forecasts for the 2035 LRTP estimate that more than 60 percent of transit trips will be made by people from households that do not have cars or low-income households with cars.

For the plan analysis, the DCHC MPO included performance targets that measured some of the plan's benefits to environmental justice communities including the percentage of the environmental justice population that lives within a ¼ mile of transit. The 2035 LRTP results in the percentage of the environmental justice population within the DCHC MPO living within a ¼ mile of transit rising from just under 60% today to over 80% with implementation of the 2035 Plan.

The bicycle and pedestrian network in the 2035 LRTP is a composite of local government bicycle and pedestrian plans. Most of these local planning efforts included environmental justice criteria for project selection. Furthermore, the map of the bicycle network shows that the bicycle facilities are well distributed across the MPO – nearly all non-subdivision streets include on-road bicycle facilities in the plan. Therefore, the connectivity, safety, and recreational benefits that bicycle facilities provide are fairly distributed among the MPO's population.

In addition, the DCHC MPO held public workshops for review of the alternatives analysis and preferred option. The DCHC MPO held six public workshops for each review period. These workshops were held throughout the MPO: one in Hillsborough, one in Chapel Hill, one in Pittsboro, one in north Durham, one in central Durham, and one in south Durham. Where possible, workshops were held at locations along public transportation routes; thus the Hillsborough, Chapel Hill and Durham workshops had public transportation available. Special travel and communication accommodations were offered to citizens for public hearings and workshops. Additional details on the comprehensive public involvement efforts for the 2035 LRTP are presented in section 5.2, "Stakeholder and Public Involvement Process."

Negative Project Impacts

The investments in transportation infrastructure included in the 2035 LRTP will also have some negative impacts to some of the MPOs' population. While road widening projects may increase overall mobility, the residents near the project may be impacted negatively. Some of the negative impacts to nearby residents include increased traffic through their neighborhoods, increased vehicle speeds, land acquisition for necessary right-of-way, relocations of homes and businesses, a change in neighborhood character and land uses, etc. A project's net impact is not always clear and may be perceived differently by different residents. A project that increases property values, mobility, and economic development may also increase traffic, relocate homes and businesses, and change neighborhood character. Although it is difficult at this stage of project development to conclusively assess the overall impact of the highway projects included in the 2035 LRTP, the two MPOs did complete several analyses of the potential negative impacts the projects may have on environmental justice communities.

During the development of the 2035 LRTP, MPO staff often qualitatively evaluated individual projects for potential negative impacts and often eliminated projects that had significant potential negative impacts. Staff eliminated some projects based on factors such as limited right-of-way, neighborhood and community characteristics, and the historical impact of urban renewal.

The two MPOs analyzed the potential impact of the 2035 LRTP highway projects to ensure that the potential negative project impacts were not disproportionately impacting environmental justice communities. This analysis was completed for the plan as a whole. Individual projects in the 2035 LRTP may have significant negative impacts that will be studied more in depth during project development and design. These negative impacts are often able to be mitigated by context sensitive design.

For this analysis, the two MPOs used United States Census Bureau data to classify the MPOs' block groups by percent of minority population and the percent of households below poverty. The percent of minority population was determined by calculating the percent of the population that was not 'white and non-Hispanic'. It included both racial and ethnic minorities. Since the assessment of disproportionate impact must be relative to a baseline, the block groups were classified into five categories depending upon the population characteristics as compared to the county average of percent minority population and the county average of the percent of households below poverty. The county averages were selected as the baselines because the two MPOs are in eight counties with varying population demographics.

The county averages are displayed in the table below.

	Percent of Minority Population	Percent of Households Below Poverty
Chatham County	28%	10%
Durham County	52%	13%
Franklin County	36%	13%
Granville County	41%	12%
Harnett County	31%	16%
Johnston County	25%	13%
Orange County	24%	15%
Wake County	30%	7%

In the two MPOs, each roadway project was analyzed based on the population characteristics of the block group (or block groups) that the project was primarily located in. Figure 9.2.1 displays the location of roadway projects and minority population Census block groups, and Figure 9.2.2 displays the roadways with the low-income block groups. The detailed results of this analysis are shown in Appendix 8. The methodology used to generate Figure 9.2.1 sums all minority populations together. Figures 9.2.3, 9.2.4, 9.2.5, and 9.2.6 display the location of roadway projects and single minority populations, including Black or African-American Alone, Hispanic or Latino, Asian Alone, and Other Minorities.

The county averages for these individual minority groups are displayed in the table below:

	Percent of Black or African American Alone Population	Percent of Hispanic or Latino Population	Percent of Asian Alone Population	Percent of Other Minority Population*
Chatham County	17%	10%	0%	1%
Durham County	39%	8%	3%	2%
Franklin County	30%	4%	0%	1%
Granville County	34%	4%	0%	2%
Harnett County	22%	6%	1%	3%
Johnston County	16%	7%	0%	1%
Orange County	13%	5%	4%	2%
Wake County	20%	5%	3%	2%

All figures are rounded to the nearest percent.
*Other Minority includes Native Hawaiian and Other Pacific Islander Alone, American Indian or Alaskan Native Alone, Some Other Race Alone, and Two or More Races as defined by the U.S. Census Bureau.

The DCHC MPO's Web site – www.dchcmpo.org – has larger versions of the maps presented here.

Figure 9.2.1 Minority Population and 2035 LRTP Roadway Projects – DCHC MPO and Capital Area MPO

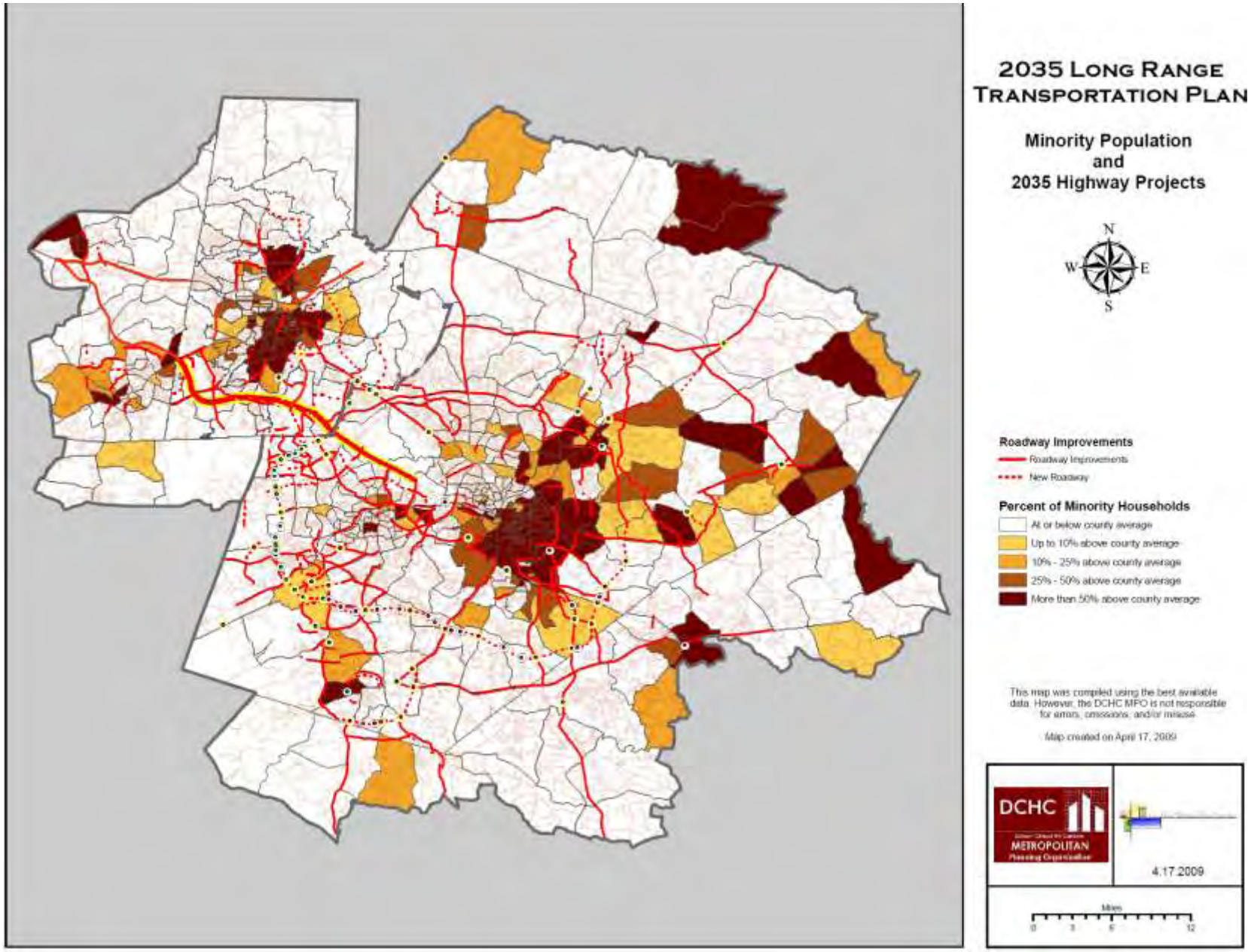


Figure 9.2.2 Low Income Population and 2035 LRTP Roadway Projects – DCHC MPO and Capital Area MPO

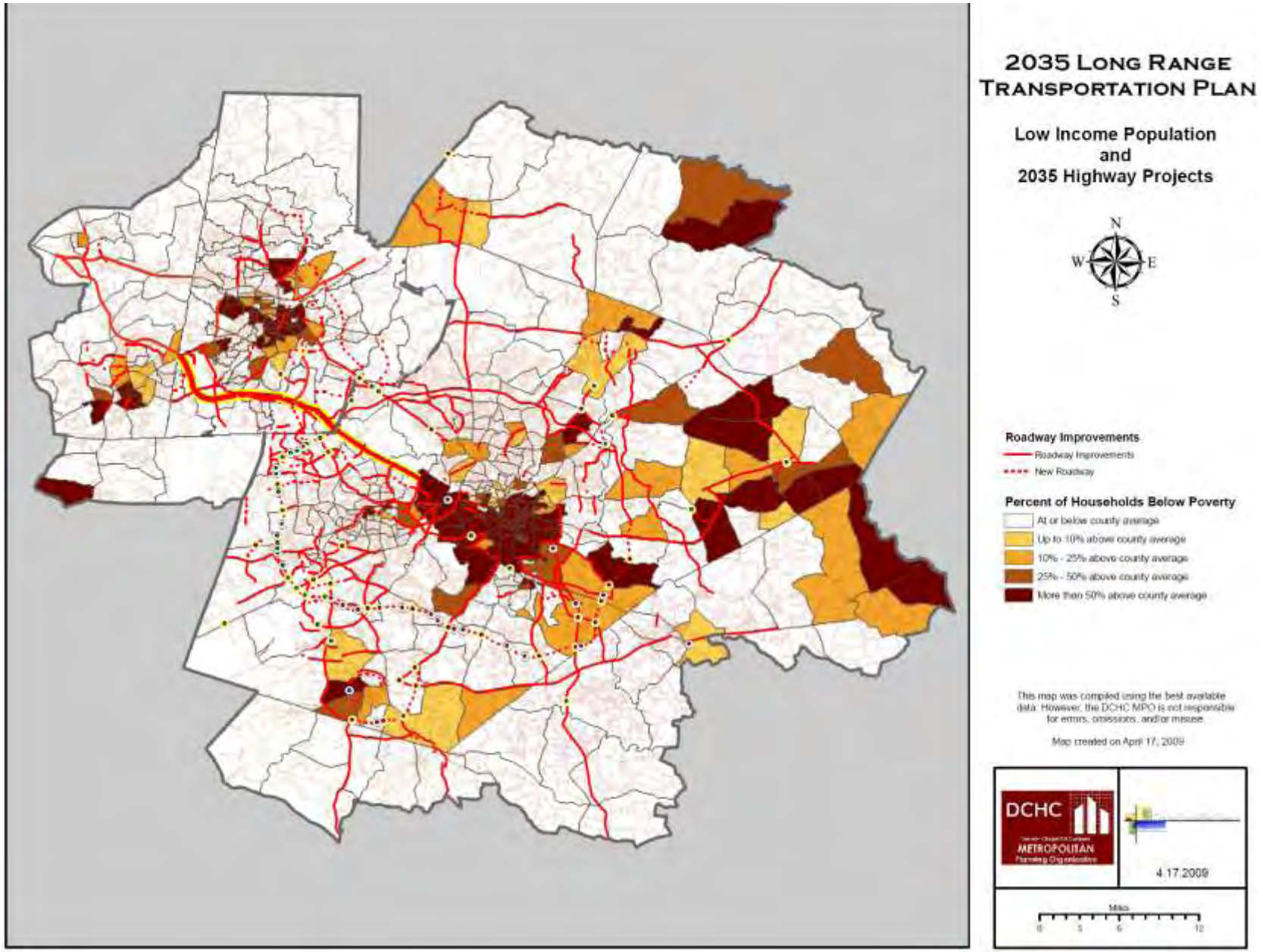


Figure 9.2.3 Black or African American Alone Population and 2035 LRTP Roadway Projects – DCHC MPO and Capital Area MPO

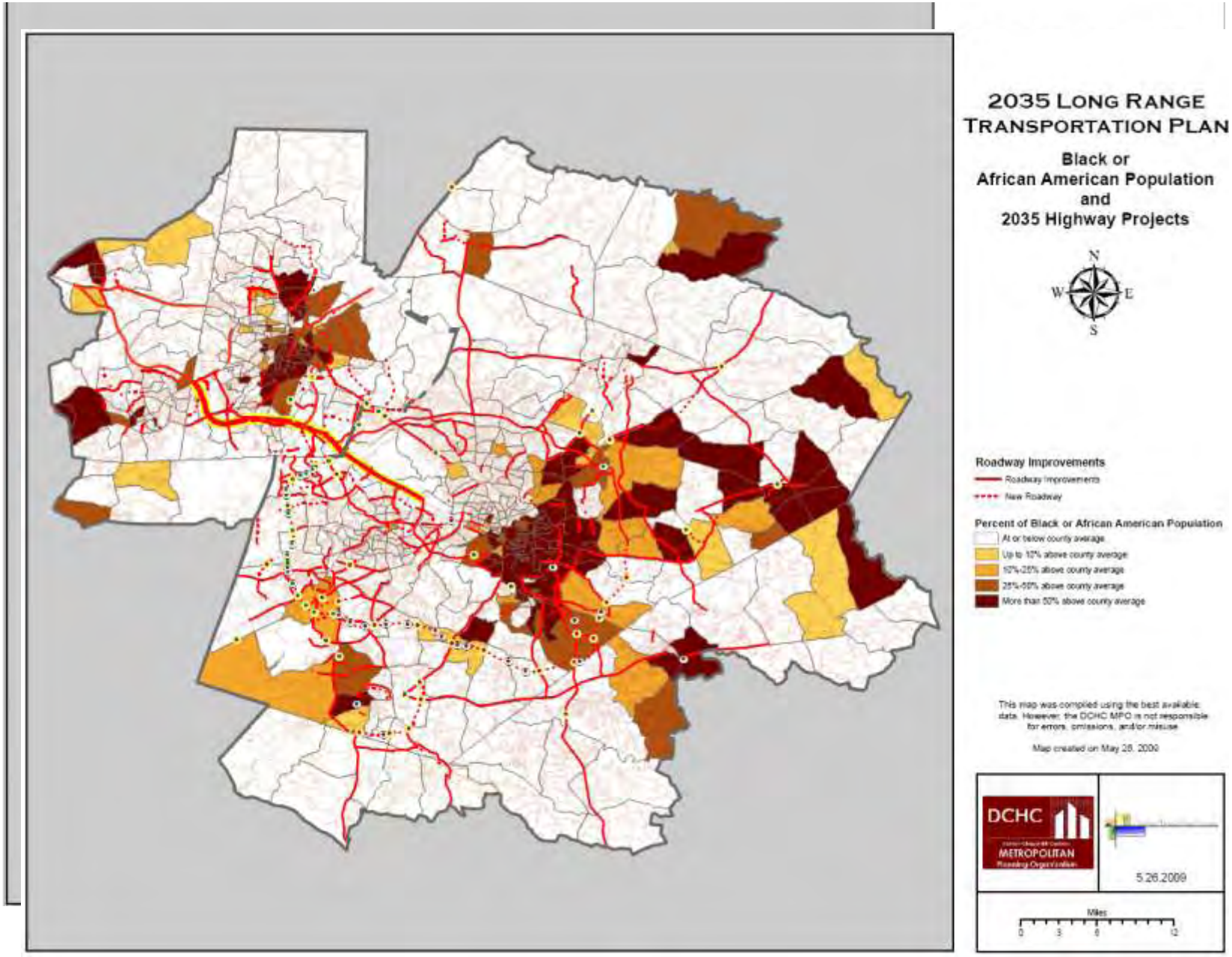


Figure 9.2.4 Hispanic or Latino Population and 2035 LRTP Roadway Projects – DCHC MPO and Capital Area MPO

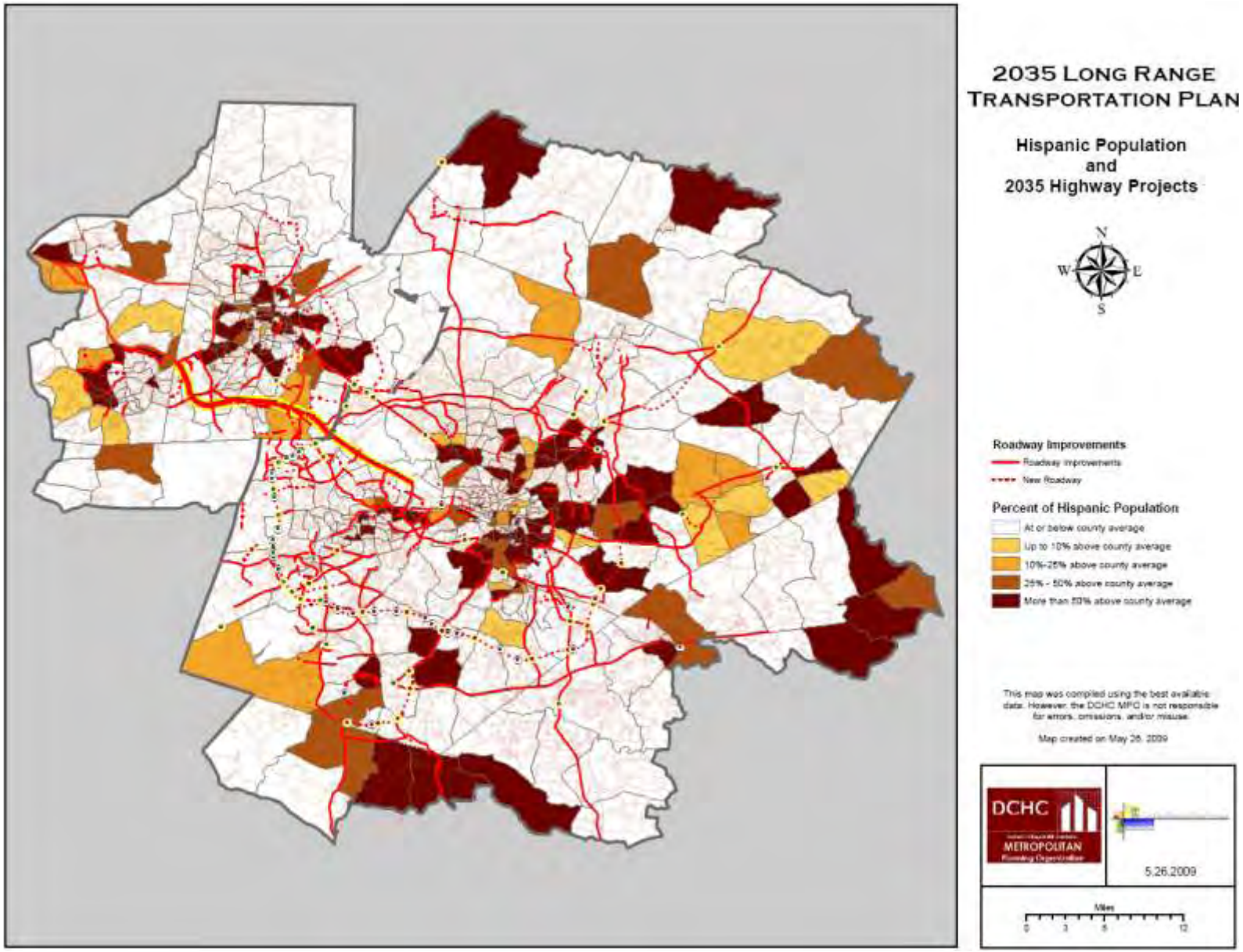


Figure 9.2.5 Asian Alone Population and 2035 LRTP Roadway Projects – DCHC MPO and Capital Area MPO

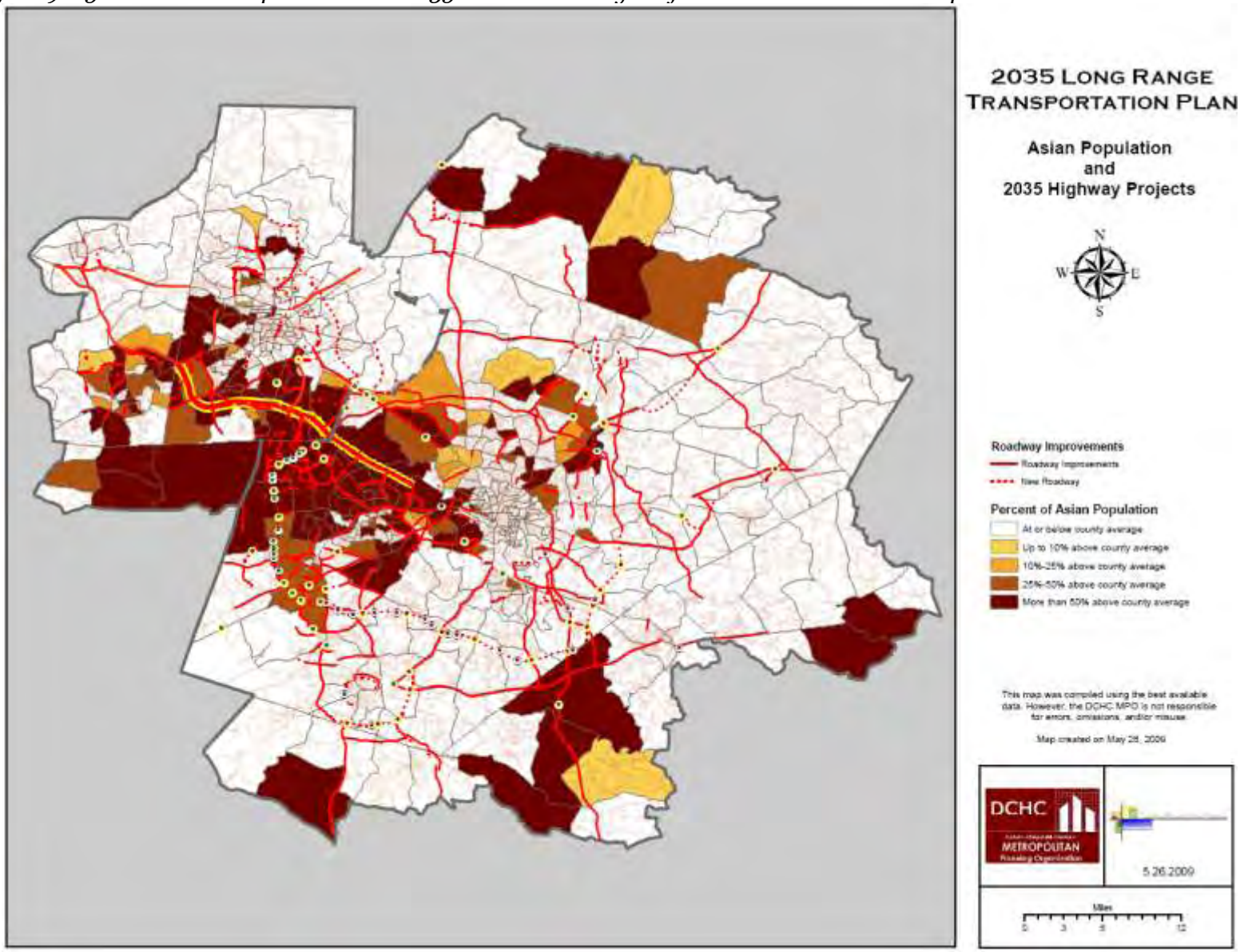
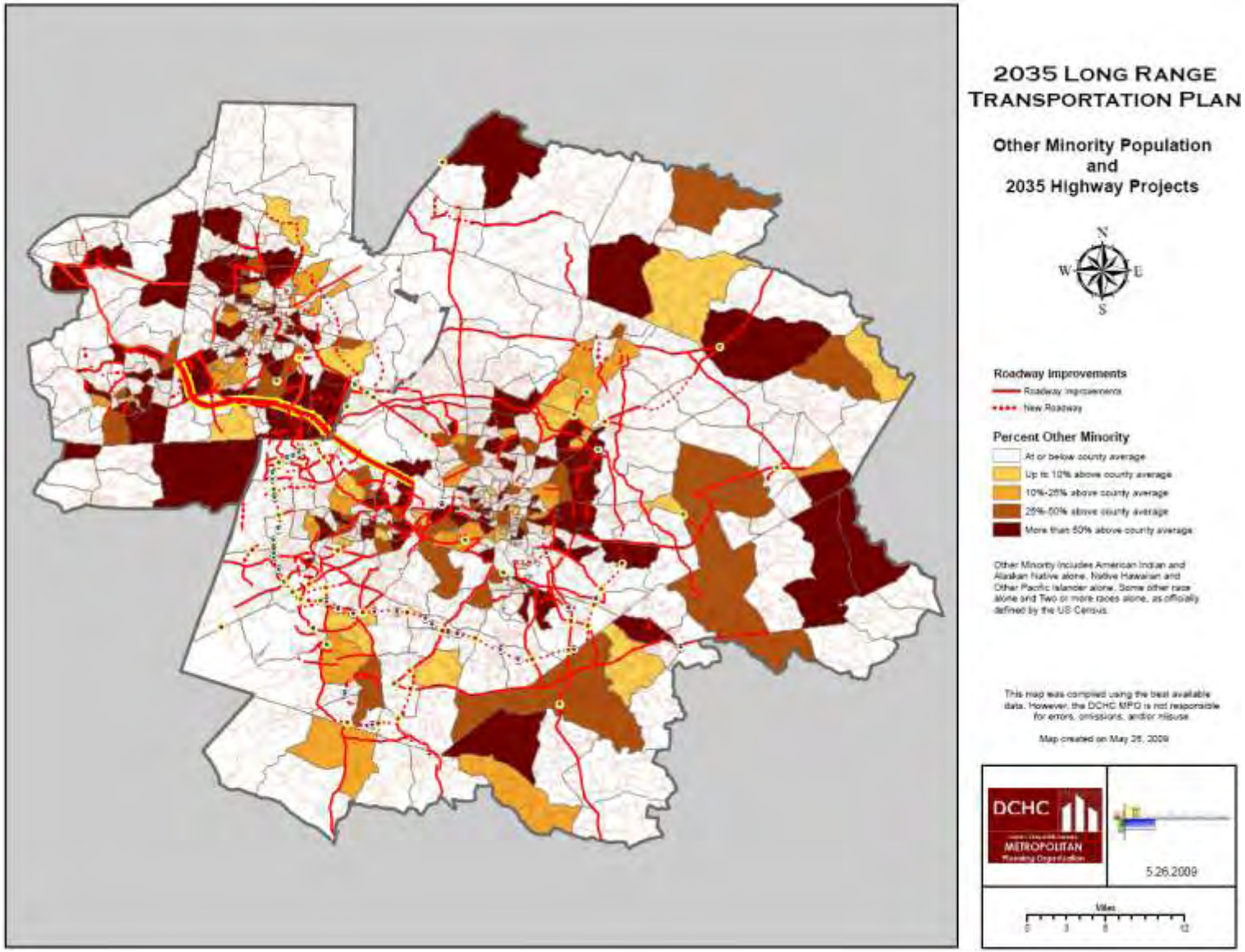


Figure 9.2.6 Other Minority Population and 2035 LRTP Roadway Projects – DCHC MPO and Capital Area MPO



The two MPOs summarized the detailed results in Appendix 8 to determine the percent of total 2035 LRTP highway project length and the percent of total 2035 LRTP cost that were in each environmental justice category. The results of this analysis are shown in the Figures 9.2.7, 9.2.8, 9.2.9, and 9.2.10 below. The percent of 2000 population that live in the block groups in each environmental justice category is also shown for comparison.

Figure 9.2.7 – DCHC MPO Roadway Investments in Minority Block Groups

Percent of Minority Population	Percent of Project Length in Block Groups	Percent of Project Cost in Block Groups	Percent of 2000 Population in Block Groups
At or below county average	53%	63%	58%
Up to 10% above county average	2%	1%	5%
10% - 25% above county average	24%	18%	11%
25% - 50% above county average	3%	7%	5%
More than 50% above county average	17%	12%	21%

Figure 9.2.8– Capital Area MPO Roadway Investments in Minority Block Groups

Percent of Minority Population	Percent of Project Length in Block Groups	Percent of Project Cost in Block Groups	Percent of 2000 Population in Block Groups
At or below county average	47%	40%	64%
Up to 10% above county average	16%	28%	8%
10% - 25% above county average	4%	3%	8%
25% - 50% above county average	9%	8%	4%
More than 50% above county average	24%	21%	16%

Figure 9.2.9– DCHC Roadway Investments in Low-Income Block Groups

Percent of Households Below Poverty	Percent of Project Length in Block Groups	Percent of Project Cost in Block Groups	Percent of 2000 Population in Block Groups
At or below county average	78%	79%	66%
Up to 10% above county average	0%	0%	3%
10% - 25% above county average	8%	9%	5%
25% - 50% above county average	5%	5%	4%
More than 50% above county average	10%	7%	22%

Figure 9.2.10 – Capital Area MPO Roadway Investments in Low-Income Block Groups

Percent of Households Below Poverty	Percent of Project Length in Block Groups	Percent of Project Cost in Block Groups	Percent of 2000 Population in Block Groups
At or below county average	48%	51%	67%
Up to 10% above county average	10%	9%	5%
10% - 25% above county average	10%	9%	7%
25% - 50% above county average	9%	9%	5%
More than 50% above county average	23%	23%	16%

The majority of DCHC MPO roadway projects, both in terms of total project length and project costs, are in block groups that are at or below the county average for percent of minority population and percent of households below poverty. This mirrors the distribution of the population - the majority of the MPOs' population lives in block groups at or below the county average in terms of minority population and households below poverty. A comparison of both the percent of project length and percent of project cost to the percent of 2005 population in each block group shows that the population that lives in block groups that are more than fifty percent above the county average for minority population and households below poverty are less likely to be impacted by a 2035 LRTP roadway project than the rest of the population.

The DCHC MPO concludes that the roadway projects in the 2035 LRTP do not disproportionately impact minority and low income populations. Again, this analysis does not substitute for the individual project level analyses that will be completed for each project during design and development.

The majority of the Capital Area MPO roadway projects, both in term of total project length and project costs, are in those block groups that are at or below the average for percent of minority population and percent of households below poverty in Franklin, Granville, Harnett, Johnston, and Wake counties. This mirrors the distribution of the population – the majority of the MPO's population lives in block groups at or below the county average in terms of minority populations and households below poverty. Statistical comparisons and area map comparisons verify that both the percent of project length and percent of project cost to the percent of 2005 population in each block groups show that the population living in block groups that are more than fifty percent above the county's average for minority population and household below poverty are less likely to be impacted by a 2035 LRTP roadway project than the rest of the population.

The Capital Area MPO concludes that the roadway projects in the 2035 LRTP do not have a disproportionately negative impact on minority and low income populations. It is important to note that this analysis does not substitute for the individual project level analyses that will be required for each project during their planning, development and design phases.

Financial Cost

Lastly, environmental justice also requires that the disadvantaged population does not bear a disproportionate share of the financial cost of the plan. The 2035 LRTP is financed by traditional revenue sources and new revenue sources. The 2035 LRTP does not propose a change to the traditional funding sources so this was not analyzed for environmental justice impacts. The new revenue source is uncertain.

The MPOs have focused on four most likely new sources of revenue:

1. Sales tax increase for public transit
2. Car registration fee increase
3. New state and federal transportation infrastructure program
4. I-40 HOT/HOV financing package

Typically, sales taxes are regressive, meaning that lower income households pay a higher percentage of their income in sales taxes than do higher income households (higher income households pay more in *actual* dollars in sales tax than lower income households, but these payments represent a smaller *proportion* of the total income of higher income households). Proposed legislation in NC seeks to mitigate the "who pays" side of the equation by excluding many necessities from the sales tax, including food, medicine, utilities and shelter. By excluding these items, a typical household in the lowest 20% income group would pay about $3 per month for the transit tax, based on analysis by the North Carolina Budget & Tax Center. Households in the top 1% income bracket would average $57 per month and those rounding out the top 5% income bracket would average $17 per month. Also, one financial analysis showed that the impact of a one dollar increase in the price of a gallon of gasoline is about ten times worse for low-income households than the impact of a ½ cent sales tax.

Moreover, looking at who pays is only half of the equation. Analysis should also consider who benefits. Transit service is disproportionately used by people with lower incomes and households that do not have access to cars. Currently, 32,000 households in the Research Triangle Region report having no vehicle available. Our region's travel forecasts estimate that more than 60% of transit trips after we invest in rail service and greatly expanded bus service will be made by people from households without cars and low-income households with cars. So looking at the whole equation, a sales tax that is spent entirely on transit would provide a net benefit to households most dependent on transit service to reach jobs and educational opportunities, different from if a sales tax were spent on services that were used equally by lower income and higher income households.

The details of the proposed new state and federal transportation infrastructure program are uncertain. The I-40 HOT/HOV project will require a detailed environmental review during project development. At that point, the project-level environmental justice impacts will be studied. The project would require the payment of tolls to use the new HOT/HOV lanes for single-occupancy vehicles. Low income populations will still have the option to use the facility for free by carpooling or use the parallel lanes non-HOT/HOV lanes free of charge. In addition, public transit vehicles will be able to use the facility free of charge. As a result, at this stage in project planning, the I-40 HOT/HOV financing package does not appear to disproportionately impact low income or minority populations.

9.3 Safety and Security

Metropolitan Planning Organizations are being encouraged to effectively address safety and security issues in accordance with policies outlined with the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU).

SAFETEA-LU established this new core Highway Safety Improvement Program; which is structured and funded to make significant progress in reducing fatalities on highways; as well as other modes that use highway, railroads, and other conduits within the transportation network. The Highway Safety Improvement Program creates a positive agenda for increased safety by increasing the funds for infrastructure safety and requiring strategic highway safety planning, focusing on results. Other programs target specific areas of concern, such as work zones, older drivers, and pedestrians, including children walking to school, further reflect SAFETEA-LU's focus on safety.

9.3.1 Safety

Both the Capital Area MPO and Durham-Chapel Hill-Carrboro MPO have been proactive in addressing safety as a component of our overall transportation processes by pursuing the following actions:

- Both MPOs have or are in the process of funding "Safe Routes to Schools" projects that will benefit elementary schools throughout the region.

- Both MPOs include an "Accident/Safety" variable when determining the technical scoring and prioritization of highway projects for their Metropolitan Transportation Improvement Programs.

- Both MPOs have adopted bicycle and pedestrian plans that either highlight or stress the "Four-Es" (i.e. education, engineering, enforcement, and encouragement); have stressed the importance of safety in various public service announcements in the local media. Furthermore, both MPOs will be pursuing a project this year to further encourage bicycle and pedestrian safety; and will use a template created by another MPO in the state. One of the goals of the project will be to not only increase public awareness about bicycle and pedestrian safety, but to impact the region's overall transportation culture by consciously having bicycle and pedestrian traffic and travel as a valuable asset of movement through the region.

- The DCHC MPO will promote the inclusion of the safety countermeasures identified in Appendix 5 of this report (cross-section and safety countermeasure guidelines) in the review and design of roadways in the planning area.

9.3.2 Security

Following the Capital Area MPO and Durham-Chapel Hill-Carrboro MPO have been proactive in addressing security as a component of our overall transportation processes by pursuing the following actions:

- The transit agencies in both MPOs (i.e. Capital Area Transit, Durham Area Transit Authority, Chapel Hill Transit, Cary Transit, Triangle Transit, and area human service providers) have or are in the process of meeting FTA security requirements such as: training employees and drivers how to handle situations that threaten human safety; providing on-board and transit station camera detection as a deterrent to crime, and, providing Mobile Data Computers/Automatic Vehicle Locators on their vehicles.

- Durham Area Transit Authority has also done extensive work in their security component for transit through increased law enforcement presence, requiring drivers to receive safety and security training as a part of their orientation program, and having a Safety and Security Committee that meets monthly. The Safety and Security Committee consists of consists of representatives of the Durham Police Department consists of representatives of the DPD, Wackenhut Special Police, DATA safety personnel, and City of Durham/DATA administrative staff, Wackenhut Special Police, DATA safety personnel, and City of Durham/DATA administrative staff.

- C-Trans, as operated by the Town of Cary have conducted their "Threat-Vulnerability" assessment with the Cary Police Department. C-Trans as of 2011 will require its future transit providers to install video surveillance cameras on its vehicles. Both Navtrak and Drive-Cam video recorders are currently installed on both door-to-door and fixed-route service vehicles.

- Capital Area Transit (CAT) has completed a System Security and Emergency Preparedness Plan. Through the System Security and Emergency Preparedness Plan, CAT has created and staffed a Security Committee made up of senior staff persons.

Key points from this section:

- Those adopting Long Range Transportation Plans consider several factors in deciding what investments to make.
- One critical factor is air quality: Plans must demonstrate that they will meet air quality standards or federal funding and project approvals will be withheld until plans are brought into compliance.
- Environmental justice is another critical factor, ensuring that investments avoid disproportionately adverse impacts on poor and minority neighborhoods and that traditionally-underserved neighborhoods receive appropriate transportation services and facilities.
- Safety and security considerations play a prominent role in planning and funding roadway, transit and pedestrian/bicycle facilities.

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Appendices

The appendices listed below are part of the 2035 Long Range Transportation Plans, but are contained in separate documents:

Appendix 1: Road Projects List

Appendix 2: Rail Technology and Service Briefs

Appendix 3: Bus Transit Service List

Appendix 4: Bicycle and Pedestrian Facilities Lists

Appendix 5: Cross-Sections and Safety Countermeasures Guidelines

Appendix 6: Air Quality Conformity Report

Appendix 7: Public Comments

Appendix 8: Environmental Justice Project Tables

Appendix 9: Acronyms

Appendix 10: Greenhouse Gas Emissions (Durham-Chapel Hill-Carrboro MPO)