Review Draft

Conformity Analysis and Determination Report

2030 Long Range Transportation Plans:

- **Capital Area Metropolitan Planning Organization,**
- **Durham-Chapel Hill-Carrboro Metropolitan Planning Organization**
- **Burlington-Graham Metropolitan Planning Organization (Orange County portion)**

Projects from the FY 2004-2010 Transportation Improvement Program:

- **the portions of Chatham County, Franklin County, Granville County, Johnston County, Orange County and Person County that are within the Triangle Ozone Non-Attainment Area but Outside the Metropolitan Planning Organization Areas**

January 25, 2005 Draft for Review and Comment

Prepared by:

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Durham-Chapel Hill-Carrboro Metropolitan Planning Organization,
Burlington-Graham Metropolitan Planning Organization,
Triangle Area Rural Planning Organization,
Kerr-Tar Rural Planning Organization,
Upper Coastal Plain Rural Planning Organization
and
The NCDOT Transportation Planning Branch

In cooperation with:

The North Carolina Department of Environment and Natural Resources
Division of Air Quality

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Overview

Transportation conformity ("conformity") is a way to ensure that Federal funding and approval goes to those transportation activities that are consistent with air quality goals. Conformity applies to transportation plans, transportation improvement programs (TIPs), and 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 air quality plan or 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. Counties within the Triangle were designated nonattainment for the 8-hour ozone standard and the effective date of the designation was 6/15/04. The conformity rule (40 CFR Part 93) requires that a conformity determination must be made by 6/15/05.

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 (or the base year emissions, where no SIP has yet been adopted). Where TCMs are included, responsible MPOs and NCDOT are required to demonstrate that TCMs are implemented in a timely fashion.

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 NC Department of Transportation (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 Nonattainment Area:

a. the Capital Area MPO within the CAMPO metropolitan area boundary – currently all of Wake County, with expansion into parts of neighboring counties anticipated in 2005.
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.

Conformity determinations must also be made at the Federal level by FHWA/FTA. These determinations must be made at least every three years, or when transportation plans or TIPs are updated, or within one year of the effective date of a non-attainment designation.

Conformity analysis is made available to the public as part of the MPO and/or State DOT planning processes. MPOs are required to make transportation plans, TIPs, and conformity determinations available to the public, accept and respond to public comments, and provide adequate notice of relevant public meetings. Project sponsors of specific transportation projects within the transportation plans and TIPs must also include appropriate public involvement during project development.

Emissions Budget

The SIP places limits on emissions of each pollutant for each source type (mobile, stationary and area sources). Projected emissions from highway and transit usage must be less than or equal to the emissions limits for on-road mobile vehicles that are established by the SIP, or be less than baseline emissions where no SIP has yet been adopted. These emissions limits for motor vehicle emissions sources are called "budgets." Budgets are developed as part of the air quality planning process by State air quality/environmental agencies, and approved by EPA. Transportation agencies participate in this process.

Transportation Control Measures (TCMs)

Areas can include TCMs in their SIPs. TCMs are specific programs designed to reduce emissions from transportation sources by reducing vehicle use or changing traffic flow or congestion conditions. These programs can include:

- developing high occupancy vehicle (HOV) facilities
- ordinances to promote non-motor vehicle travel
- transit improvements
- signal timing
- bicycle and pedestrian facilities
- land use planning

Executive Summary

The purpose of this report is to comply with the provisions of the Clean Air Act Amendments of 1990 and the Transportation Equity Act for the 21st Century (TEA-21) of 1998. It demonstrates that the financially constrained long-range transportation plans (LRTPs) and the transportation improvement programs (TIPs) eliminate or reduce violation of the national ambient air quality standards (NAAQS) in the following areas:

- The Capital Area Metropolitan Planning Organization (CAMPO),
- The Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (DCHC MPO),
- The portion of Orange County within the Burlington-Graham Metropolitan Planning Organization (BG MPO).
- The portions of the Triangle Area Rural Planning Organization (TARPO) which are in the Triangle Ozone Non-Attainment Area (Orange County and four townships in Chatham County: Baldwin, Center, New Hope and Williams Townships),
- The portions of the Kerr-Tar Rural Planning Organization (Kerr-Tar RPO) which are in the Triangle Ozone Non-Attainment Area (Franklin, Granville and Person Counties), and
- Johnston County in the Upper Coastal Plain Rural Planning Organization.

The plan accomplishes the intent of the North Carolina State Implementation Plan (SIP). This conformity determination is based on a regional emissions analysis that uses the transportation networks approved by each of the above-named Metropolitan Planning Organizations (MPOs) and Rural Planning Organizations (RPOs) for the 2030 long-range transportation plans, and the emissions factors developed by the North Carolina Department of Environment and Natural Resources (DENR). The above-named MPOs and RPOs combine to form a region known as the Research Triangle, or "Triangle." Based on this analysis, 2030 Long-Range Transportation Plans for the CAMPO, the DCHC MPO, and the BGMPO, and their respective Transportation Improvement Programs conform to the purpose of the North Carolina SIP. The FY 2004-2010 TIP is a subset of the 2030 long-range transportation plan. The conformity analysis for the relevant portions of the RPOs during the TIP years is specifically addressed by the North Carolina Department of Transportation (NCDOT). The NCDOT analysis also showed the Transportation Improvement Programs conform to the purpose of the North Carolina SIP.

USEPA originally declared Durham County, Wake County and Dutchville Township in Granville County non-attainment for ozone (O_3) and Durham County and Wake County non-attainment for Carbon Monoxide (CO) on November 15, 1990. Durham County, Wake County and Dutchville Township were redesignated by USEPA to maintenance for ozone on June 17, 1994 and Durham County and Wake County were redesignated by USEPA to maintenance for CO on September 18, 1995.

In 1997 the NAAQS for ozone was reviewed and revised to reflect improved scientific understanding of the health impacts of this pollutant. When the standard was revised in 1997, an eight-hour ozone standard was established. The USEPA designated the entire Triangle area as a "basic" nonattainment area for eight-hour ozone with an effective date of June 15, 2004.

The non-attainment designation covers the following geographic areas:

- Durham County
- Wake County
- Orange County
- Johnston County
- Franklin County
- Granville County
- Person County
- Baldwin, Center, New Hope and Williams Townships in Chatham County

The conformity determination is based on the following Long Range Transportation Plans (LRTPs):

- *2030 Transportation Plan for the Capital Area MPO*
- *2030 Transportation Plan for the Durham-Chapel Hill-Carrboro MPO*
- *2030 Transportation Plan for the Burlington-Graham MPO*.

These three LRTPs, taken together, and with projects from the most recent TIP in the rural areas outside of the urban areas, form in effect a Triangle Regional Transportation plan. Each plan has three analysis years: 2010, 2020, and 2030. Each analysis year includes expected population and employment data and roadway and transit projects that should be open. The plans are fiscally constrained: funding sources for roadway and transit projects are identified.

DENR prepared base and future emission rates for the vehicle fleet using Mobile 6.2. These rates were applied to VMT or normalized VMT from the Triangle Regional Model (TRM). VMT normalization for CO was necessary to match the Triangle's VMT with the HPMS VMT that was used to develop the CO budgets. Only Durham and Wake Counties and Dutchville Township in Granville County had emissions budgets.

Table 1 summarizes the conformity requirements of 40 CFR Part 51 and 93 and gives the status of each long range transportation plan in relation to each of these requirements. Tables 2 through 4 contain results from the budget comparisons for Durham County, Wake County and Dutchville Township in Granville County. Tables 5 through 10 provide the summary for the remaining areas that do not have emissions budgets. Details are included in Section 5 of the report. In every horizon year for every pollutant in each geographic area, the emissions expected from the implementation of the long-range plans and TIPs are less than the emissions budgets established in the SIP or the baseline emissions where no SIP budget is available. Table 11 contains a cross-reference index for the report.

Table 1. Status of Conformity Requirements

Criteria (√ indicates the criterion is met)	**Burlington-Graham MPO**	**Durham-Chapel Hill-Carrboro MPO**	**Capital Area MPO**	**Rural Area of the Triangle**
Less Than Emissions Budget(s) or Baseline	√	√	√	√
TCM Implementation	The NC SIP includes no Transportation Control Measures in the Triangle Area			
Interagency Consultation	√	√	√	√
Latest Emissions Model	√	√	√	√
Latest Planning Assumptions	√	√	√	√
Fiscal Constraint	√	√	√	√

Table 2. Durham County Emissions Comparison Summary *(kg/day)*[1]

Year	NO_X		VOC		Carbon Monoxide		
	SIP Emissions	LRTP Emissions	SIP Emissions	LRTP Emissions	Current SIP Emissions	Proposed SIP Emissions	LRTP Emissions
2002[2]		19,494		9,120			
2005[3]	N/A	N/A	N/A	N/A	145,794	145,794	135,736
2007[3]	13,871	13,329	7,530	6,447	N/A	N/A	N/A
2009[3]	13,871	10,945	7,530	5,652	N/A	N/A	N/A
2010[3]	10,297	9,657	6,142	5,285	145,794	145,794	108,500
2012[3]	8,246	7,351	5,389	4,560	N/A	N/A	N/A
2015[3]	5,888	5,224	4,772	3,846	145,794	160,771	95,133
2020	5,888	3,318	4,772	3,189	145,794	160,771	89,982
2030[4]	5,888	2,665	4,772	3,070	145,794	160,771	103,540

Table 3. Wake County Emissions Comparison Summary *(kg/day)*[1]

Year	NO_X		VOC		Carbon Monoxide		
	SIP Emissions	LRTP Emissions	SIP Emissions	LRTP Emissions	Current SIP Emissions	Proposed SIP Emissions	LRTP Emissions
2002[2]		52,029		25,035			
2005[3]	N/A	N/A	N/A	N/A	347,570	347,570	296,260
2007[3]	37,539	35,370	18,180	17,834	N/A	N/A	N/A
2009[3]	37,539	29,456	18,180	15,799	N/A	N/A	N/A
2010[3]	27,125	26,295	15,749	14,894	347,570	347,570	296,734
2012[3]	22,144	20,863	14,188	13,187	N/A	N/A	N/A
2015[3]	16,239	15,071	13,018	11,509	347,570	348,604	286,647
2020	16,239	9,970	13,018	10,067	347,570	348,604	283,845
2030[4]	16,239	8,474	13,018	10,283	347,570	348,604	343,831

Table 4. Dutchville Township (Granville County) Emissions Comparison Summary *(kg/day)*[1]

Year	NO_X		VOC	
	SIP Emissions	Long Range Plan or TIP Emissions	SIP Emissions	Long Range Plan or TIP Emissions
2002[2]		2,372		615
2007[3]	1,324	1,310	499	426
2009[3]	1,324	1,137	417	390
2010[3]	1,025	1,005	417	370
2012[3]	807	771	372	324
2015[3]	562	530	336	279
2020	562	333	336	240
2030[4]	562	290	336	269

1. To obtain tons per day, divide kilograms per day by 908.
2. Baseline year.
3. Budget year.
4. Horizon year.

Table 5. Remainder of Granville County Emissions Comparison Summary *(kg/day)*

	NO_X		VOC	
Year	Baseline (2002) Emissions	Long Range Plan or TIP Emissions	Baseline (2002) Emissions	Long Range Plan or TIP Emissions
2010	3,924	2,064	1,848	1,082
2020	3,924	815	1,848	628
2030	3,924	501	1,848	528

Table 6. Franklin County Emissions Comparison Summary *(kg/day)*[1]

	NO_X		VOC	
Year	Baseline (2002) Emissions	Long Range Plan or TIP Emissions	Baseline (2002) Emissions	Long Range Plan or TIP Emissions
2010	2,773	1,623	2,201	1,382
2020	2,773	750	2,201	827
2030	2,773	541	2,201	736

Table 7. Johnston County Emissions Comparison Summary *(kg/day)*

	NO_X		VOC	
Year	Baseline (2002) Emissions	Long Range Plan or TIP Emissions	Baseline (2002) Emissions	Long Range Plan or TIP Emissions
2010	16,321	9,587	7,416	4,879
2020	16,321	3,864	7,416	3,005
2030	16,321	2,454	7,416	2,649

Table 8. Orange County Emissions Comparison Summary *(kg/day)*

	NO_X		VOC	
Year	Baseline (2002) Emissions	Long Range Plan or TIP Emissions	Baseline (2002) Emissions	Long Range Plan or TIP Emissions
2010	13,668	6,711	4,270	2,470
2020	13,668	2,100	4,270	1,507
2030	13,668	1,608	4,270	1,478

Table 9. Person County Emissions Comparison Summary *(kg/day)*

	NO_X		VOC	
Year	Baseline (2002) Emissions	Long Range Plan or TIP Emissions	Baseline (2002) Emissions	Long Range Plan or TIP Emissions
2010	1,840	1,103	1,610	1,023
2020	1,840	599	1,610	660
2030	1,840	484	1,610	592

Table 10. Chatham County (part) Emissions Comparison Summary *(kg/day)*

	NO_X		VOC	
Year	Baseline (2002) Emissions	Long Range Plan or TIP Emissions	Baseline (2002) Emissions	Long Range Plan or TIP Emissions
2010	729	503	612	444
2020	729	160	612	180
2030	729	142	612	194

Table 11. Cross-Reference Index Conformity Determination Report for the Long-Range Transportation Plans and TIPs in the Triangle Region Ozone Non-Attainment Area	
Conformity Requirement	Page # or Appendix
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1. Introduction

The Clean Air Act requires the United States Environmental Protection Agency (USEPA) to set limits on how much of a particular pollutant can be in the air anywhere in the United States. National Ambient Air Quality Standards (NAAQS) are the pollutant limits set by the USEPA; they define the allowable concentration of pollution in the air for six different pollutants – Carbon Monoxide, Lead, Nitrogen Dioxide, Particulate Matter, Ozone, and Sulfur Dioxide.

The Clean Air Act specifies how areas within the country are designated as either "attainment" or "nonattainment" of an air quality standard, and provides USEPA the authority to define the boundaries of nonattainment areas. For areas designated as nonattainment for one or more NAAQS, the Clean Air Act defines a specific timetable to attain the standard and requires that nonattainment areas demonstrate reasonable and steady progress in reducing air pollution emissions until such time that an area can demonstrate attainment. Each state must develop and submit a State Implementation Plan (SIP) that addresses each pollutant for which it fails to meet the NAAQS. Individual state air quality agencies are responsible for defining the overall regional plan to reduce air pollution emissions to levels that will enable attainment and maintenance of the NAAQS. This strategy is articulated through the SIP.

In North Carolina, the agency responsible for SIP development is the North Carolina Department of Environment and Natural Resources, Division of Air Quality (NC DENR/DAQ). The delineation and implementation of strategies to control emissions from on-road mobile sources is a significant element of the state plan to improve air quality, thereby creating a direct link between transportation and air quality planning activities within a nonattainment area. The process of ensuring that a region's transportation planning activities contribute to attainment of the NAAQS, or "conform" to the purposes of the SIP, is referred to as transportation conformity. In order to receive federal transportation funds within the nonattainment area, the area must demonstrate through a federally mandated conformity process that the transportation investments, strategies and programs, taken as a whole, contribute to the air quality goals defined in the state air quality plan.

In order to ensure the conformity requirements are met, Section 176 (c) of the Clean Air Act authorizes the USEPA Administrator to "promulgate criteria and procedures for demonstrating and assuring conformity in the case of transportation plans, programs, and projects." This is accomplished through the Transportation Conformity Rule, developed by the USEPA to outline all federal requirements associated with transportation conformity. The Transportation Conformity Rule in conjunction with the Metropolitan Planning Regulations direct transportation plan and program development as well as the conformity process.

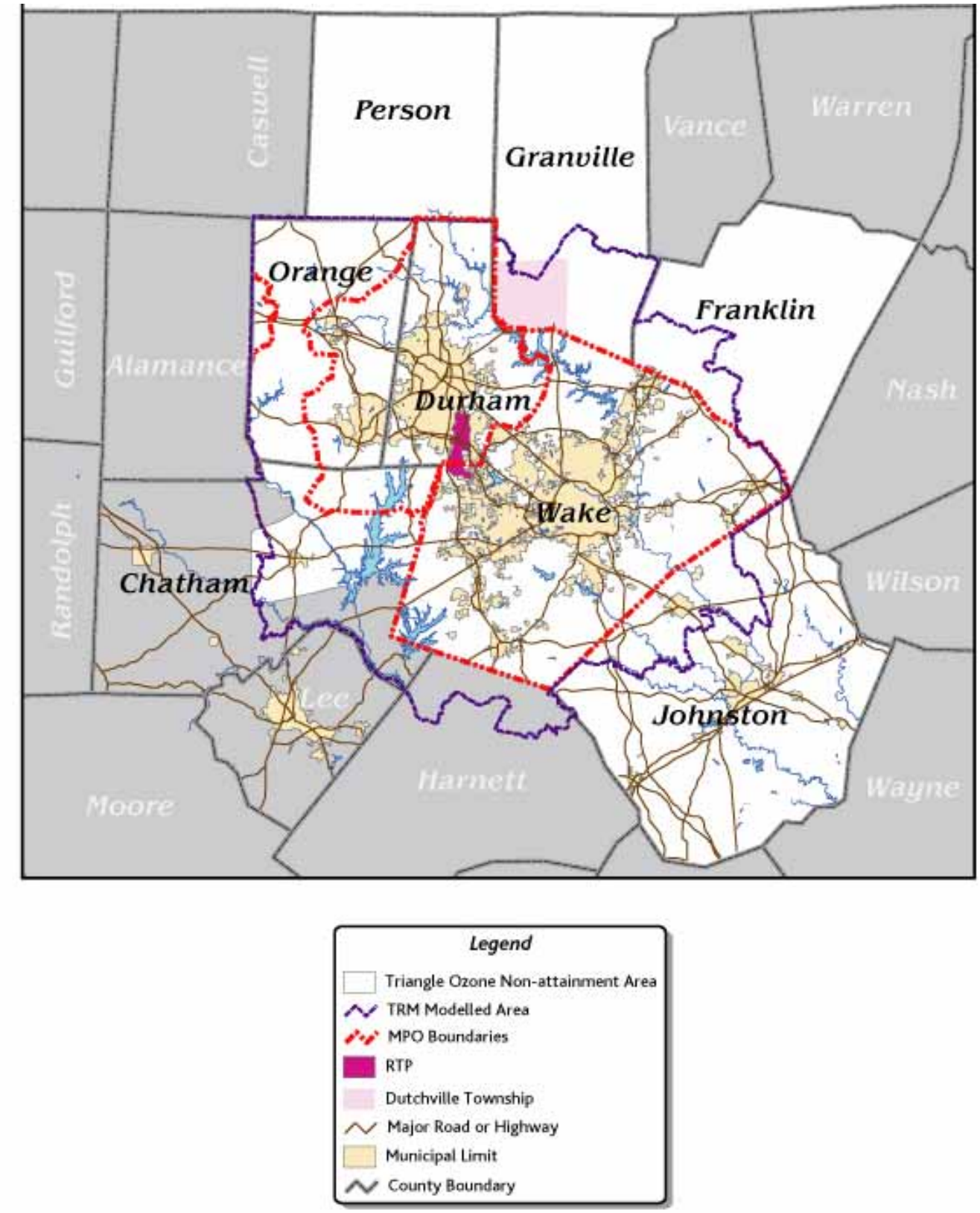
The purpose of this report is to comply with the provisions of the Clean Air Act Amendments of 1990 in concurrence with all conformity requirements as detailed in 40 CFR Parts 51 and 93 (the Transportation Conformity Rule) and 23 CFR Part 450 (the Metropolitan Planning Regulations as established in TEA-21). It demonstrates that the financially constrained long-range transportation plans and the transportation improvement programs (TIPs) eliminate or reduce future violation of the National Ambient Air Quality Standards (NAAQS) in the following jurisdictions:

- The Capital Area Metropolitan Planning Organization (CAMPO),
- The Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (DCHC MPO),
- The Burlington-Graham Metropolitan Planning Organization (BG MPO).
- The portions of the Triangle Area Rural Planning Organization (TARPO) which are in the Triangle Ozone Non-Attainment Area (Orange County and four townships in Chatham County),
- The portions of the Kerr-Tar Rural Planning Organization (Kerr-Tar RPO) which are in the Triangle Ozone Non-Attainment Area (Franklin, Granville and Person Counties), and
- Johnston County in the Upper Coastal Plain Rural Planning Organization.

The plan accomplishes the intent of the North Carolina State Implementation Plan (SIP). This conformity determination is based on a regional emissions analysis that uses the transportation network approved by each of the above-named Metropolitan Planning Organizations (MPOs) and Rural Planning Organizations (RPOs) for the 2030 long-range transportation plan, and the emissions factors developed in cooperation with the North Carolina Department of Environment and Natural Resources (DENR). The above-named MPOs and portions of RPOs combine to form a region known as the "Triangle." The entire Triangle nonattainment region is shown as a map on Figure 1.

All Federally funded projects in areas designated by the United States Environmental Protection Agency (USEPA) as air quality non-attainment or maintenance areas must come from a conforming long-range transportation plan and transportation improvement program (TIP). The Triangle region is required by 23 CFR 134 and 40 CFR 51 and 93 to make a conformity determination on any newly adopted or amended fiscally constrained long-range transportation plan and TIP. In addition, the United States Department of Transportation (USDOT), specifically, the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA), must make a conformity determination on the three MPO Plans in the Triangle region and the related TIPs in all non-attainment and maintenance areas.

Figure 1. Triangle Ozone Nonattainment Area



In order to assist the Triangle region in making a conformity determination on the adopted 2030 fiscally constrained long-range transportation plans, the following agencies shared leading roles composing substantial portions of this document pertaining to specific areas:

Agency	*Counties*
CAMPO	Wake
DCHC MPO	Durham, Orange (part), Chatham (part)
BG MPO	Orange (part)
NCDOT, with RPO input	Chatham (part), Franklin, Granville, Johnston, Orange (part), Person

These analyses are consistent with the set of amendments to 40 CFR Part 93, published in the July 1, 2004 **Federal Register**, *Transportation Conformity Rule Amendments for the New 8-hour Ozone and PM2.5 National Ambient Air Quality Standards and Miscellaneous Revisions for Existing Areas; Transportation Conformity Rule Amendments: Response to Court Decision and Additional Rule Changes; Final Rule*, effective on August 2, 2004. Based on the regional emissions budget tests and interim tests documented in this report, the following Transportation Plans conform to the purpose of the North Carolina SIP:

- Capital Area MPO 2030 LRTP
- Durham-Chapel Hill-Carrboro MPO 2030 LRTP
- Burlington-Graham MPO 2030 LRTP
- 2004-2010 TIP in the Non-attainment Area outside of MPOs

This report documents the regional emissions budget test, the interim emissions test, interagency consultation process, public involvement process, and analysis methodology used to demonstrate transportation conformity for each MPO and rural county and thus for the Triangle region.

40 CFR Part 93 requires that a conforming transportation plan satisfy five conditions:

- The transportation plan must be consistent with the motor vehicle emissions budget(s) in an area where the applicable implementation plan or implementation plan submission contains a budget (*40 CFR Part 93.118*).
- The transportation plan, TIP, or FHWA/FTA project not from a conforming plan must provide for the timely implementation of TCMs from the applicable implementation plan (*40 CFR Part 93.113b*).
- The MPO must make the conformity determination according to the consultation procedures of *40 CFR Part 93.105* and the implementation plan revision required by *40 CFR Part 93.390* (*40 CFR Part 416*).
- The conformity determination must be based on the latest emissions estimation model available (*40 CFR Part 93.111*).
- The conformity determination must be based on the latest planning assumptions (*40 CFR Part 93.110*).

This report shows that each MPO's 2030 Transportation Plan and the TIP in rural areas outside of MPOs meets each condition. Each condition is discussed in the following sections of this report.

2. Air Quality Planning

USEPA originally declared Durham County, Wake County and Dutchville Township in Granville County non-attainment for ozone (O_3) under the 1-hour ozone standard and Durham County and Wake County non-attainment for Carbon Monoxide (CO) on November 15, 1990. Ozone, the primary component of smog, is a compound formed when volatile organic compounds (VOC) and oxides of nitrogen (NO_x) mix together in the atmosphere with sunlight. NOx and VOC are referred to as ozone "precursors." Durham County, Wake County and Dutchville Township were redesignated by USEPA to maintenance for ozone under the 1-hour standard on June 17, 1994 and Durham County and Wake County were redesignated by USEPA to maintenance for CO on September 18, 1995. The ozone redesignations were based on monitoring data from 1990 through 1992 and a demonstration of maintenance of the standard until 2004. The CO redesignations were based on monitoring data from 1991 through 1994 and a demonstration of maintenance of the standard until 2005.

In 1997 the NAAQS for ozone was reviewed and revised to reflect improved scientific understanding of the health impacts of this pollutant. When the standard was revised in 1997, an eight-hour ozone standard was established that is designed to replace the one-hour standard. The USEPA designated the entire Triangle area as a "basic" nonattainment area for ozone under the eight-hour standard with an effective date of June 15, 2004; the designation covers the following geographic areas:

- Durham County
- Wake County
- Orange County
- Johnston County
- Franklin County
- Granville County
- Person County
- Baldwin, Center, New Hope and Williams Townships in Chatham County

As a "Basic" non-attainment area, the Triangle is subject to Subpart I standards of the Clean Air Act. The USEPA direct final rule from the Federal Register for CO is found in Appendix A. The USEPA direct final rule for ozone is provided in Appendix B.

2.1 Emissions Budgets and Baseline Emissions

DENR prepared emissions budgets as part of their CO and 1-hour ozone maintenance plans for those areas subject to budgets. All of Durham and Wake Counties, and Dutchville Township in southwest Granville County, are maintenance areas under the former 1-hour ozone standard and have emission budgets.

SIPs for the 8-hour ozone standard have not yet been prepared and adopted. Therefore, in the remaining areas of the Triangle ozone non-attainment area (outside of Durham and Wake Counties, and Dutchville Township in southwest Granville County), future long range transportation plan and TIP emissions can not be compared to a budget, but are instead compared to emissions estimated from travel during the 2002 baseline year. Section 4 of this report provides these comparisons.

Durham and Wake Counties have CO maintenance requirements under an existing SIP; a proposed SIP update has also been prepared and is undergoing review. The proposed update would

supplement the existing 2005 CO budgets with a 2015 budget for each county. Under the existing SIP, the 2005 budgets would apply to all subsequent years. Under the update, the existing 2005 budgets would apply between 2005 and 2014 and the new 2015 budgets would apply from 2015 onwards.

These emissions budgets are listed on a county-by-county basis in the Federal Register (appendices A & B).

Tables 12, 13 and 14 list the current and proposed emission budgets for those portions of the Triangle subject to existing and proposed SIP budgets.

Table 12. VOC Budget for Durham and Wake Counties and Dutchville Township

VOC				
Area	motor vehicle emissions budget (tons/day)			
	2007	2010	2012	2015*
Durham	8.30	6.77	5.94	5.26
Wake	20.04	17.36	15.64	14.35
Granville (Dutchville Twp.)	0.55	0.46	0.41	0.37

* emission budgets have not been established beyond 2015; all subsequent years are compared to the 2015 budget.

Table 13. NOx Budget for Durham and Wake Counties and Dutchville Township

NOx				
Area	motor vehicle emissions budget (tons/day)			
	2007	2010	2012	2015*
Durham	15.29	11.35	9.09	6.49
Wake	41.38	29.90	24.41	17.90
Granville (Dutchville Twp.)	1.46	1.13	0.89	0.62

* emission budgets have not been established beyond 2015; all subsequent years are compared to the 2015 budget.

Table 14. Existing and Proposed CO Budget for Durham and Wake Counties

CO: from existing and proposed update to State Implementation Plan (SIP)		
Area	motor vehicle emissions budget (tons/day)	
	existing 2005*	proposed 2015*
Durham	160.71	177.22
Wake	383.13	384.27

* existing SIP emission budgets are not established beyond 2005; all subsequent years would be compared to the 2005 budget; proposed SIP would establish a new budget for 2015; all subsequent years would be compared to the 2015 budget.

3. Long-Range Transportation Plans

The *2030* Transportation Plans were developed between 2003 and 2004. Federal law *40 CFR part 93.104(b)(3)* requires a conformity determination of transportation plans no less frequently than

every three years. As required in *40 CFR 93.106*, the horizon years for the transportation plans are no more than ten years apart.

The CAMPO area includes all of Wake County. The DCHC MPO area includes all of Durham and parts of Orange and Chatham Counties. The BGMPO area includes a small portion of Orange County within the 8-hour nonattainment area for ozone. The remaining portions of the non-attainment area are rural areas within the Triangle Area, Kerr-Tar and Upper Coastal Plain RPOs.

3.1 Consultation

The 2030 Transportation Plans are consistent with consultation requirements discussed in *40 CFR 93.105*.

Consultation on the development of this conformity determination was accomplished through interagency consultation meetings held on July 1, 2004, October 1, 2004 and December 20, 2004. A copy of the agenda, summary of the topics discussed, and a list of the attendees at each of these meetings is included in Appendix C.

3.2 Financial Constraint Assumptions

The Transportation Plans are fiscally constrained as discussed in *40 CFR 93.108*. The DCHC MPO, Capital Area MPO and Burlington-Graham Long Range Transportation Plans are fiscally constrained to the year 2030. All projects included in the current 2004-2010 TIP and those anticipated in the draft 2006-2012 TIP are fiscally constrained, and funding sources have been identified for construction and operation. The estimates of available funds are based on historic funding availability and include federal, state, private, and local funding sources. Additional detail on fiscal constraint is included in each MPO long range transportation plan. It is assumed that the projects listed for each horizon year will be completed and providing service by the end of the indicated calendar year (December 31). These transportation networks are described in the respective 2030 Long-Range Transportation Plans. They are also described in greater detail in Appendix D.

3.3 Latest Planning Assumptions

The 2030 Transportation Plans were developed with the latest planning assumptions as discussed in *40 CFR 93.110*. A single travel demand model was developed for the urbanized portion of the Triangle nonattainment area. A single set of population, housing and employment projections was developed. And a set of highway and transit projects that was consistent across jurisdictional boundaries was developed and refined through MPO cooperation. This collection of socioeconomic data, highway and transit networks and travel forecast tools, representing the latest planning assumptions, was finalized through the adoption of the draft Long Range Transportation Plans by the Capital Area MPO and Durham-Chapel Hill-Carrboro MPO in September 2004. October 1, 2004 marked the date that the conformity analysis began. Additional detail on these planning assumptions is provided below.

Land use and demographic data were collected by regional planning agencies and staff members of DCHC MPO and CAMPO. A regional methodology was agreed upon that included updating residential and employment data to the end of 2002, and preparing growth forecasts to 2030.

Residential data included population, dwelling units, households, median income and university-related group quarters population (dormitories, fraternities and sororities). Residential data was based on Census 2000 data from Summary File 1, except that median income data was based on the Census Transportation Planning Package part 1. Housing and Population data were updated to 2002 by collecting new certificates of occupancy from local jurisdictions and applying household size and occupancy rates from Census 2000 to new housing units. University-related population was corrected to 2002 with information supplied by area universities. Median income was interpolated for missing zones based on nearby zones with similar residential development patterns. Residential data were checked for consistency against tax maps and were reviewed by local planning department staff.

Employment data was collected from Employment Security Commission records and data maintained by InfoUSA. These lists were merged, and large employers were contacted directly to verify work location and number of employees. The results were verified for each county against employment benchmark totals obtained from the Bureau of Economic Analysis and from Woods and Poole. Zonal employment data were checked for consistency against existing land use maps and were reviewed by local planning department staff.

Forecasts were prepared by local planning department staff with guidance from staff at the two MPO's. A regional methodology was applied to maintain consistency between residential and employment forecasts and adopted land use plans. Data and forecasts were submitted for public review by each MPO, and adopted for use in developing travel demand and air quality forecasts by each MPO's Transportation Advisory Committee.

The Triangle Regional Travel Demand Model (TRM) uses the basic four-step process (trip generation, trip distribution, mode choice and assignment). All four steps of the process are discussed in greater detail in the sections below.

The Triangle Regional Model's TRANPLAN model is housed at the Institute for Transportation Research and Education (ITRE) at NC State University and NCDOT. The TRANPLAN model covers all of Durham, Wake and Orange Counties (including the portions within the BG MPO and the Triangle Area RPO), all of the portion of Chatham County that is in the Triangle ozone non-attainment area, all of Dutchville Township in Granville County, and portions of Franklin, Granville and Johnston counties (which are non-attainment) along with a portion of Harnett County (which is in attainment).

Outside of the modeled area, NCDOT utilizes a spreadsheet that incorporates the vehicle-miles traveled (VMT) universe file and historical trends to project the VMT in future years at the county level. The spreadsheet calculates speed based on a model originally developed by the Texas Transportation Institute (TTI) but modified by NCDOT. Speeds generated by the spreadsheet are incorporated into the MOBILE6.2 emissions program. Then, emission factors developed by Mobile6.2 are imported into the spreadsheet and multiplied by forecasted VMT to generate

emissions. The rural spreadsheet model is used for all of Person County and is factored based on population percentage for those portions of non-attainment counties not covered by the TRANPLAN model. This methodology has been used to demonstrate conformity in other areas and has received approval from interagency partners.

There are no court orders or special agreements that apply to conformity (*40 CFR 93.109)*.

3.4 Future year roadway projects

Roadway improvements used for conformity modeling were developed in the 2030 Transportation Plan process in each MPO. Outside of the MPO boundaries, TIP projects from the 2004-2010 TIP served as the future year roadway projects. For the 2030 Plans, lists of needed projects were developed based on modeled congestion and identified local needs. Improvements were coded into the TRM and analyzed. Intermediate analysis for the years 2010, and 2020 were performed to assist in prioritizing the 2030 roadway needs. The final 2010, 2020, and 2030 networks are fiscally constrained. Projects were added from MPO priority lists until estimated project costs equaled the expected funding available. The base network (2002) and the three future networks (2010, 2020, and 2030) used for the conformity determination are the same as the networks used for the 2030 Transportation Plans. Throughout the process to develop the roadway networks, the MPOs and NCDOT identified any initial inconsistencies in project timing and characteristics (e.g. cross-section) for those projects crossing jurisdictional boundaries and reached consensus on consistent solutions.

Appendix D includes lists of the future year roadway projects in the Triangle area as indicated below, including indications of which projects are regionally significant and which projects are exempt. There are no future roadway projects within the portion of Orange County within the Burlington-Graham MPO, therefore no list of projects is included:

Area	Location of Roadway Project List in Appendix D
Durham-Chapel Hill-Carrboro MPO	2030 LRTP (Appendix D1) 2004-2010 TIP (Appendix D2)
Capital Area MPO	2030 LRTP (Appendix D3) 2004-2010 TIP (Appendix D4)
Burlington-Graham MPO	no future year projects in 2030 LRTP or it's TIP subset
Triangle Area RPO (portions of Chatham and Orange Counties in nonattainment area)	2004-2010 TIP (Appendix D5)
Kerr-Tarr RPO (Franklin, Person and Granville Counties)	2004-2010 TIP (Appendix D6)
Upper Coastal Plain RPO (Johnston County)	2004-2010 TIP (Appendix D7)

The exempt projects listed in Appendix D, both highway and transit, will serve as the Long Range Transportation Plans (LRTPs) for the region in the event of a conformity lapse. A ***conformity*** lapse is when an area develops a LRTP that does not pass the conformity test. The TAC must adopt a LRTP of exempt projects (40 CFR 93.126, 127 & 128) that will serve as the LRTP/TIP for the area in the event of a ***conformity*** lapse. This will allow exempt projects to receive federal

funding. A second and distinct type of lapse, a ***planning*** lapse, is when an area has missed their required LRTP update date. During a ***planning*** lapse new Federal aid funds are stopped for all projects **INCLUDING** exempt projects (40 CFR 93.126, 127 & 128).

3.5 Transit networks

As with the roadway projects, each MPO developed transit projects for its LRTP. The base year network was modeled from existing routes and fares for the transit systems in 2002. Future year networks were based on fiscally-constrained projected new or expanded services from regional transit plans, local bus system short range plans, corridor transit plans and other projected bus service expansion estimates, where available. As with the roadway networks, the MPOs and NCDOT identified and rectified any initial inconsistencies in project characteristics or implementation years where transit projects crossed jurisdictional boundaries.

Appendix D includes lists of the future year roadway projects in the Triangle area as indicated below, including indications of which projects are regionally significant and which projects are exempt. There are no future transit projects within the portion of Orange County within the Burlington-Graham MPO, therefore no list of projects is included:

Area	Location of Transit Project List in Appendix D
Durham-Chapel Hill-Carrboro MPO	2030 LRTP (Appendix D1) 2004-2010 TIP (Appendix D2)
Capital Area MPO	2030 LRTP (Appendix D3) 2004-2010 TIP (Appendix D4)
Burlington-Graham MPO	no future year projects in 2030 LRTP or it's TIP subset
Triangle Area RPO (portions of Chatham and Orange Counties in nonattainment area)	only projects are operations and maintenance for community transportation systems
Kerr-Tarr RPO (Franklin, Person and Granville Counties)	only projects are operations and maintenance for community transportation systems
Upper Coastal Plain RPO (Johnston County)	only projects are operations and maintenance for community transportation systems

3.6 Congestion Mitigation/Air Quality (CMAQ) Projects

The NC Department of Transportation has established an allocation and review process for CMAQ projects. Each MPO and RPO in a non-attainment or maintenance area receives an allocation of CMAQ funds based on population and air quality status. In addition, a statewide pool of CAMQ funds will be allocated to projects serving more than one nonattainment area on a competitive basis. MPO and RPO project priorities and project applications for statewide funding are due to

NC DOT by January 31, 2005. The final version of this conformity report will include a listing of funded CMAQ projects in the Triangle Area in Appendix E, if available.

3.7 Trip generation

The trip generation module of the Triangle Regional Model is a cross-classification model using household size and income group. In addition to being stratified by size and income, the trip rates were also stratified by area type and trip purpose The trip purposes used were home based work (HBW), home based other (HBO), and non-home-based (NHB). Due to a lack of data on school enrollment, home based school trips were included in the home based other category. Several employment types were identified as special generators for the Triangle Region. This classification was based on employment centers that exhibited unique trip attraction characteristics as demonstrated by the travel behavior survey data. Universities, regional shopping centers, regional hospitals and the RDU airport were all identified as special generators. Special generator rates were developed for those groups. Trip tables were also built for commercial vehicles, internal – external trips, and through trips.

The travel behavior survey was used to determine where the trips would be 'attracted to'. Regression coefficients were developed for industrial, retail, highway retail, office and service employment, as well as total dwelling units.

3.8 Trip distribution

The Triangle Regional Model uses a standard gravity model to distribute trips. The model builds zone-to-zone trip tables (by purpose) using a weighted sum of travel time and distance. For assignment purposes the individual trip tables are aggregated into a single trip table for each LRTP analysis year (2002, 2010, 2020, and 2030).

3.9 Mode choice and transit assignment

The mode choice for the Triangle Regional model is based on a nested LOGIT model. This approach creates a predictive model that is responsive to changes in mode service variables such as travel time and cost. The different 'nests' of the model reflect a traveler's choice between drive-to transit, walk-to transit, single occupancy vehicles, and multiple occupancy vehicles. The coefficients for the mode choice model were developed from the Triangle Travel Behavior survey and the Triangle On-Board transit survey. The constants were derived through the calibration process. A bike/walk zone walk element was also introduced into the Triangle Regional Model through the use of GIS tools and the Travel Behavior survey data. Bike/walk zone interchanges were removed from the trip tables by identifying high-density zones with a high degree of pedestrian friendly characteristics. The percentage of trips removed was determined from the travel behavior survey, and in no zone exceeded the percentage of bike/walk trips for the region.

3.10 Highway assignment and vehicle miles traveled

Once the total number of trips has been determined, and the mode by which the trip is made has been chosen, the trips are assigned to the network. For the Triangle Regional Model, this is done using an equilibrium loading. In an equilibrium loading, trips are loaded in a series of 'all or nothing' loadings. After each 'all or nothing' loading, travel times are recalculated. This process continues until the network is in equilibrium. The network is considered to be in equilibrium when

further travel time reductions for an individual traveler cannot be achieved by changing the selected path. To better capture the effects of congestion, the Triangle model was loaded separately for the a.m., p.m. and off-peak time periods. Peak periods are 4-hour periods.

3.11 Method of reporting VMT and speed

The Triangle regional model has the capability to provide output by peak period in addition to daily output. Since the TRM can model peak period volumes and speeds, these must be used in the air quality analysis. The vehicle kilometers of travel (VKT), is converted to vehicle miles of travel (VMT). Vehicle miles traveled (VMT) used in the conformity determination are from the last iteration of the model. Each link in the roadway network carries a functional classification. The VMT for each functional class is multiplied by an emissions factor. The North Carolina Division of Air Quality (DAQ) provides the emissions factors based on MOBILE6.2 output.

The MOBILE6.2 model requires as an input the weighted speeds by functional classification. This information can be derived directly from the model link data output. This first requires the separation of the model link data into functional classification. The congested link speed in mph can then be determined by converting the link distance to miles and dividing by travel time. The congested speed is then weighted by the ratio of the link VMT to the system VMT for each of the functional classifications. This input is then used for MOBILE6.2.

Congested and uncongested speeds are calculated using the model output. The congested speeds are sent to DAQ to determine actual emissions factors.

4. Regional Emissions Budget Tests

In areas with an USEPA approved attainment demonstration or maintenance plan, an emissions budget comparison satisfies the emissions test requirement of *40 CFR Part 93.118*. For pollutants for which an emissions budget has been submitted, the estimated emissions from the transportation plan must be less than or equal to the emissions budget values. Emissions factors were provided by DENR.

Table 14 illustrates what parts of the Non-attainment area have emissions budgets, what parts are covered by the Triangle Regional Model (TRM) and how each part was analyzed for each pollutant in each comparison year.

Four counties in the non-attainment area are completely within the Triangle Regional travel demand Model (TRM) boundary: Chatham (Baldwin, Center, New Hope and Williams Townships which are designated nonattainment), Durham, Orange and Wake. Person County is completely outside of the TRM boundary. The other 3 counties, Granville, Franklin and Johnston, have parts that are within the modeled area and parts that are outside of the modeled area.

4.0.1. Sub-area emission budgets

All of Durham and Wake Counties, and Dutchville Township in SW Granville County, are maintenance areas under the former 1-hour ozone standard and have emission budgets. These budgets were used in performing the emissions analysis.

4.0.2 Emissions analysis source

Vehicle Miles of Travel (VMT) and speeds for the emissions analysis were derived from the TRM where it is available. Person County VMT and speeds came from the NCDOT rural spreadsheet; VMT and speeds for the portions of Franklin, Granville and Johnston outside the modeled area came from the NCDOT rural spreadsheet factored by the percentage of each county's population in the rural area, a method has used in prior analyses.

4.0.3 Emissions comparison years (ozone)

Emissions must be calculated for a baseline year (2002), an interim year not more than 5 years from the year in which conformity is determined *for areas without budgets* (i.e., within 5 years of 2005) and at further intervals not exceeding 10 years, including an LRTP's horizon year (2030 in all cases). In addition, where emissions budgets for specific analysis years were established under the former 1-hour ozone standard, these years must be analyzed for maintenance areas under the 1-hour standard; therefore Durham and Wake Counties and Dutchville Township in Granville County were analyzed for 2007, 2009, 2010, 2012 and 2015.

In summary, the entire area was analyzed for 2002 baseline, 2010 and 2030 (LRTP intermediate years), and 2030 (LRTP horizon year). As 2009 is the Triangle's attainment year under the new 8-hour standard, areas with budgets were analyzed for 2009 as well (Durham, Wake, Dutchville Township). Emissions analysis years that do not match LRTP model years do not require additional TRM model runs; interpolation was used to derive data for most of these non-matching years (2007, 2012, 2015), although a TRM model run was required for the Triangle's 2009 attainment year.

Table 15. Triangle Area Transportation Conformity Analysis Matrix

County	Area model status	Area emissions budget status	Emissions analysis source	Emissions comparison years								
				2002 baseline	2005	2007[1]	2009[1]	2010[1]	2012[1]	2015[1]	2020	2030 horizon
Person	rural area (all)	no emissions budget	rural spreadsheet	O3				O3			O3	O3
Granville	modeled area	emissions budget[2]	TRM	O3		O3	O3	O3	O3	O3	O3	O3
	rural area	no emissions budget	rural spreadsheet (factored)[3]	O3				O3			O3	O3
Franklin	modeled area	no emissions budget	TRM	O3				O3			O3	O3
	rural area	no emissions budget	rural spreadsheet (factored)[3]	O3				O3			O3	O3
Johnston	modeled area	no emissions budget	TRM	O3				O3			O3	O3
	rural area	no emissions budget	rural spreadsheet (factored)[3]	O3				O3			O3	O3
Chatham (part)	modeled (all)[4]	no emissions budget	TRM	O3				O3			O3	O3
Orange	modeled (all)	no emissions budget	TRM	O3				O3			O3	O3
Durham	modeled (all)	emissions budget	TRM	O3	CO	O3	O3	CO O3	O3	CO O3	CO O3	CO O3
Wake	modeled (all)	emissions budget	TRM	O3	CO	O3	O3	CO O3	O3	CO O3	CO O3	CO O3

TRM: Triangle Regional Model
O3: Ozone
CO: Carbon Monoxide

[1] Areas with emissions budgets from the 1-hour ozone SIP are required to do comparisons for 2007, 2009, 2010, 2012 and 2015; interpolation, rather than model runs, was used for 2007, 2012 and 2015.

[2] Dutchville Township in Granville County has an emissions budget under the former 1-hour ozone standard.

[3] where part of a county is covered by the regional model, the remainder of the county was analyzed using the NCDOT rural spreadsheet, factored by the percentage of county's population that lives outside of the modeled area.

[4] a sensitivity analysis was performed to clarify the effect of the small portion of the non-attainment area in Chatham County that is outside of the current TRM boundary; it was determined to be insignificant.

4.0.4 Emission comparison years (CO)

Durham and Wake Counties have CO maintenance requirements under an existing SIP; a proposed SIP update has also been prepared and is undergoing review. The proposed update would supplement the existing 2005 budgets with a 2015 budget for each county. The 2015 budget number is proposed in the CO SIP Maintenance Plan update that will be submitted to the USEPA for review and adequacy. Under the existing SIP, the 2005 budgets would apply to all subsequent years. Under the update, the existing 2005 budgets would apply between 2005 and 2014 and the new 2015 budgets would apply from 2015 onwards. Both counties are entirely within the modeled area and have emissions budgets under the existing SIP and proposed update; the TRM was used as the analysis tool. Listed below is specific CO budget and comparison year information:

- Existing CO SIP Budget Year: 2005 (Durham and Wake Counties)
- Proposed CO SIP Budget Years: 2005, 2015 (Durham and Wake Counties)
- Comparison Years for Existing CO SIP – 2005, 2010, 2020, 2030 (Durham and Wake Counties)
- Comparison Years for Proposed CO SIP – 2005, 2010, 2015, 2020, 2030 (Durham and Wake Counties)

The use of different analysis methods in different parts of the nonattainment area does not preclude future unified conformity efforts in the region.

4.1 Emissions Model

MOBILE 6.2 was used to develop the emissions factors. Motor vehicle emissions controls considered in the Mobile model include the following:

Strategy	**Methodology/Approach**
I/M Program (per NC SIP)	*Ran Model in Place*
Tier 2 vehicle's Emission Standards	*Ran Model in Place*
Low Sulfur Gasoline and Diesel fuels	*Ran Model in Place*
Heavy Duty Vehicle Rules 2004 and 2007	*Ran Model in Place*
Low RVP Gasoline	*Ran Model in Place*
On board vapor recovery	*Ran Model in Place*

Also, area specific information is used for such items as vehicle age distribution and vehicle type distribution rather than national default values, as documented below.

4.1.1 Development of Emissions Factors

A critical element of any emissions analysis or estimate is the development and utilization of the emissions factors applied to the travel estimates. In order to assure that the emissions factors used in the conformity analysis were compatible with those used in the development of the North Carolina SIP, DENR provides emission factors and model inputs for each non-attainment and maintenance area in North Carolina. The MOBILE 6.2 emissions factor model was used to develop the emissions factors in December 2004 for the Triangle. These factors are shown in Appendix F.

NCDENR provides motor vehicle emissions factors by federal functional classification of the roadway system. In addition the percentage of motor vehicles subject to the inspection and maintenance program is estimated from accident data. The scope of North Carolina's motor vehicle inspection and maintenance program is set to expand from nine counties to forty-eight counties by 2007. The phase-in of the I&M program is reflected in Table 16.

Table 16. Percentage of Vehicles Subject to Inspection and Maintenance Programs

Location	2002	2005	2007-2030
Wake County	81%	93%	96%
Durham County	83%	90%	93%
Johnston County	16%	78%	88%
Chatham County	15%	56%	97%
Granville County	13%	16%	83%
Orange County	72%	82%	89%
Person County	7%	8%	12%
Franklin County	14%	48%	89%

4.1.2 Development of VMT Mix by Vehicle Type

The North Carolina Department of Transportation (NCDOT) provides data on VMT for six urban and six rural road types; vehicle mix data are available for the same road types. Automatic traffic recording stations and selected Highway Performance Monitoring System (HPMS) locations were used and counts taken throughout 1999 - 2001 are used to determine the percentage of vehicles, by vehicle type, for various road types. Vehicle classification data was used in conjunction with Mobile6 default vehicle mix to estimate fleet distribution by functional class. The classification data was iteratively adjusted to replicate Mobile6's national classification default within the analysis area. The final numbers reflect the change in the mix (i.e. increase in the number of SUVs and pick-ups) for each year using Mobile6 projection and variation of mix across the different road type using NC data. This reflects 16 vehicle classes per road type.

4.1.3 Vehicle Age Distributions

The vehicle age distribution is based on the North Carolina Department of Motor Vehicles' 2002 (DMV) registration records for the in-use fleet in the Triangle area. DMV provided the information. The data was modified and arranged to comply with Mobile6.2

4.2 Transportation Control Measures

The North Carolina State Implementation Plan lists no transportation control measures pertaining to the Triangle.

4.3 CO VMT Normalization

Base year (2002) vehicle miles traveled from the Triangle travel demand model differ from the base year VMT calculated by NCDOT using the HPMS sample – the method used to develop the 2005 emission budgets in the current State Implementation Plan (SIP) for CO in Durham and Wake Counties. Differences between the Triangle Regional Model VMT and NCDOT VMT center around the extent of locally maintained thoroughfares in the Triangle for which NCDOT had insufficient data at the time the sample was taken. The difference is significant. The HPMS

VMT estimate for Wake County is 16.7 million miles per day. The Triangle Regional Model estimates 21.1 million miles daily (see Appendix G). This difference was significant enough in the comparison of the 2005 CO budget for Wake County to warrant VMT normalization.

Since future year comparisons used in the conformity determination are based on the Triangle model, results of the model are normalized to reflect differences between the modeled and HPMS measured VMT, in essence, using the same ruler to measure base and future emissions. Because the largest difference is miles of local streets, two normalization factors are calculated - one for local streets and another for non-local streets. To calculate these factors, the 2002 HPMS VMT is divided by the 2002 Model VMT to produce two factors for Wake County: 0.8496 for non-local streets and 0.4410 for local streets.

Conformity estimates for CO in the Year 2005 in Wake County under the existing SIP use Normalized VMT. Year 2005 TRM VMT is multiplied by these factors before applying the emission rates supplied by DENR. Appendix G contains the calculation of the factors. The VMT normalization technique was developed cooperatively by NCDOT and DENR with comment from FHWA and USEPA. This methodology has been accepted by USEPA, FHWA and FTA.

4.4 Off-model Analysis

The Triangle Regional Model (TRM) does not include algorithms that can calculate the effects on VMT and speeds (and hence air quality) of certain transportation related activities designed to influence people's travel modes or affect the supply of or demand for transportation services. Examples of such activities that currently exist in the Triangle include:

- Transportation Demand Management (TDM) programs such as the Triangle Best Workplaces for Commuters (TBWC) program and the SmartCommute@RTP program which cover approximately 10% of the region's workforce,
- Land use strategies, such as compact, mixed-use, pedestrian- and transit-oriented development and design initiatives, over and above those reflected in the Traffic Analysis Zone (TAZ) socioeconomic data,
- The provision of park-and-ride lots to facilitate the use of transit and ridesharing,
- Commuter Services Programs operated by the Triangle Transit Authority, such as the Guaranteed Ride Home program, rideshare matching software and the vanpool program, and
- Incident management programs conducted on the region's Interstate highways in Wake and Durham Counties, including surveillance cameras and the Motorist Assistance Patrols.

In order to accurately account for the impacts of such activities, they are reflected through "off-model" analyses. Although these and other programs are suitable for off-model analysis, this conformity determination included off-model analysis only for the last of these listed activities, the interstate incident management program. FHWA Region IV's *Off-Model Air Quality Analysis: A Compendium of Practice* provided guidance on estimating these emissions effects. Appendix H includes the calculations for this off-model analysis in Durham and Wake Counties.

4.5 Emissions Comparison Tests by Location and Pollutant

USEPA originally declared Durham County, Wake County and Dutchville Township in Granville County non-attainment under the 1-hour standard for ozone (O_3) and Durham County and Wake County non-attainment for Carbon Monoxide (CO) on November 15, 1990. Durham County, Wake County and Dutchville Township were redesignated by USEPA to maintenance for ozone on June 17, 1994 and Durham County and Wake County were redesignated by USEPA to maintenance for CO on September 18, 1995.

Both volatile organic compounds (VOCs) and oxides of nitrogen (NO_x) are precursors of ozone. In the approved maintenance plans for ozone for Durham County, Wake County, and Dutchville Township, the North Carolina Department of Environment and Natural Resources (DENR) prepared emissions budgets for both VOC and NO_x. USEPA approved the second ten-year update of these emissions budgets on September 20, 2004 with an effective date of November 19, 2004. The last year for VOC and NO_x emissions budgets is 2015; therefore, analysis years beyond 2015 were compared to the 2015 emissions budget. The USEPA approval and promulgation rulings for CO and ozone containing the budgets are in Appendices A and B.

In 1997 the NAAQS for ozone was reviewed and revised to reflect improved scientific understanding of the health impacts of this pollutant. When the standard was revised in 1997, an eight-hour ozone standard was established. The USEPA designated the entire Triangle area as a "basic" nonattainment area for eight-hour ozone with an effective date of June 15, 2004.

The non-attainment designation covers the following geographic areas:

- Durham County
- Wake County
- Orange County
- Johnston County
- Franklin County
- Granville County
- Person County
- Baldwin, Center, New Hope and Williams Townships in Chatham County

Four organizations are responsible for conformity determinations; each must make a conformity determination for its respective area in order for all of the areas to be designated in conformity:

- the Capital Area MPO within the CAMPO metropolitan area boundary – currently all of Wake County, with expansion into parts of neighboring counties anticipated in 2005.
- the DCHC MPO within its metropolitan area boundary – all of Durham County and parts of Orange and Chatham counties.
- the Burlington-Graham MPO within its portion of the metropolitan area boundary in western Orange County.
- 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.

For this report, emissions were calculated and reported at the County level, or for part of a county if only a part is in a non-attainment area (Chatham County) or where an emissions budget exists for part of a county (Dutchville Township in Granville County). 40 CFR Part 93.106 requires that transportation emissions be estimated at, minimum, ten-year intervals beginning with the base year of the travel demand model. Refer to Table 15 earlier in this section for details on emission budgets and comparison years. Table 17 summarizes the emissions test used and decision-making responsibility for conformity findings in each County.

Table 17. Emissions Test and Responsibility for Conformity Findings

Location	Pollutant(s)	Emissions Test	Conformity Finding Responsibility
Wake County	O3, CO	budget	Capital Area MPO
Durham County	O3, CO	budget	Durham-Chapel Hill-Carrboro MPO
Johnston County	O3	less-than-baseline	NC DOT (consultation with Upper Coastal Plain RPO)
Chatham County *(Baldwin, Center, New Hope, Williams Townships)*	O3	less-than-baseline	Durham-Chapel Hill-Carrboro MPO NC DOT (consultation with Triangle Area RPO)
Granville County	O3	budget (Dutchville Twp) less-than-baseline (elsewhere)	NC DOT (consultation with Kerr-Tar RPO)
Orange County	O3	less-than-baseline	Durham-Chapel Hill-Carrboro MPO Burlington-Graham MPO NC DOT (consultation with Triangle Area RPO)
Person County	O3	less-than-baseline	NC DOT (consultation with Kerr-Tar RPO)
Franklin County	O3	less-than-baseline	NC DOT (consultation with Kerr-Tar RPO)

The results of the emission comparisons are summarized by County in Tables 18 through 26. Detailed emissions analysis results by county are contained in Appendix I.

Table 18. Durham County Emissions Comparison *(kg/day)*[1]

Year	NO_X		VOC		Carbon Monoxide		
	SIP Emissions	LRTP Emissions	SIP Emissions	LRTP Emissions	Current SIP Emissions	Proposed SIP Emissions	LRTP Emissions
2002[2]		19,494		9,120			
2005[3]	N/A	N/A	N/A	N/A	145,794	145,794	135,736
2007[3]	13,871	13,329	7,530	6,447	N/A	N/A	N/A
2009[3]	13,871	10,945	7,530	5,652	N/A	N/A	N/A
2010[3]	10,297	9,657	6,142	5,285	145,794	145,794	108,500
2012[3]	8,246	7,351	5,389	4,560	N/A	N/A	N/A
2015[3]	5,888	5,224	4,772	3,846	145,794	160,771	95,133
2020	5,888	3,318	4,772	3,189	145,794	160,771	89,982
2030[4]	5,888	2,665	4,772	3,070	145,794	160,771	103,540

Table 19. Wake County Emissions Comparison *(kg/day)*[1]

Year	NO_X		VOC		Carbon Monoxide		
	SIP Emissions	LRTP Emissions	SIP Emissions	LRTP Emissions	Current SIP Emissions	Proposed SIP Emissions	LRTP Emissions
2002[2]		52,029		25,035			
2005[3]	N/A	N/A	N/A	N/A	347,570	347,570	296,260
2007[3]	37,539	35,370	18,180	17,834	N/A	N/A	N/A
2009[3]	37,539	29,456	18,180	15,799	N/A	N/A	N/A
2010[3]	27,125	26,295	15,749	14,894	347,570	347,570	296,734
2012[3]	22,144	20,863	14,188	13,187	N/A	N/A	N/A
2015[3]	16,239	15,071	13,018	11,509	347,570	348,604	286,647
2020	16,239	9,970	13,018	10,067	347,570	348,604	283,845
2030[4]	16,239	8,474	13,018	10,283	347,570	348,604	343,831

Table 20. Dutchville Township (Granville County) Emissions Comparison *(kg/day)*[1]

Year	NO_X		VOC	
	SIP Emissions	Long Range Plan or TIP Emissions	SIP Emissions	Long Range Plan or TIP Emissions
2002[2]		2,372		615
2007[3]	1,324	1,310	499	426
2009[3]	1,324	1,137	417	390
2010[3]	1,025	1,005	417	370
2012[3]	807	771	372	324
2015[3]	562	530	336	279
2020	562	333	336	240
2030[4]	562	290	336	269

1. To obtain tons per day, divide kilograms per day by 908.
2. Baseline year.
3. Budget year.
4. Horizon year.

Table 21. Remainder of Granville County Emissions Comparison *(kg/day)*

	NO_X		VOC	
Year	Baseline (2002) Emissions	Long Range Plan or TIP Emissions	Baseline (2002) Emissions	Long Range Plan or TIP Emissions
2010	3,924	2,064	1,848	1,082
2020	3,924	815	1,848	628
2030	3,924	501	1,848	528

Table 22. Franklin County Emissions Comparison *(kg/day)*[1]

	NO_X		VOC	
Year	Baseline (2002) Emissions	Long Range Plan or TIP Emissions	Baseline (2002) Emissions	Long Range Plan or TIP Emissions
2010	2,773	1,623	2,201	1,382
2020	2,773	750	2,201	827
2030	2,773	541	2,201	736

Table 23. Johnston County Emissions Comparison *(kg/day)*

	NO_X		VOC	
Year	Baseline (2002) Emissions	Long Range Plan or TIP Emissions	Baseline (2002) Emissions	Long Range Plan or TIP Emissions
2010	16,321	9,587	7,416	4,879
2020	16,321	3,864	7,416	3,005
2030	16,321	2,454	7,416	2,649

Table 24. Orange County Emissions Comparison *(kg/day)*

	NO_X		VOC	
Year	Baseline (2002) Emissions	Long Range Plan or TIP Emissions	Baseline (2002) Emissions	Long Range Plan or TIP Emissions
2010	13,668	6,711	4,270	2,470
2020	13,668	2,100	4,270	1,507
2030	13,668	1,608	4,270	1,478

Table 25. Person County Emissions Comparison *(kg/day)*

	NO_X		VOC	
Year	Baseline (2002) Emissions	Long Range Plan or TIP Emissions	Baseline (2002) Emissions	Long Range Plan or TIP Emissions
2010	1,840	1,103	1,610	1,023
2020	1,840	599	1,610	660
2030	1,840	484	1,610	592

Table 26. Chatham County (part) Emissions Comparison *(kg/day)*

	NO_X		VOC	
Year	Baseline (2002) Emissions	Long Range Plan or TIP Emissions	Baseline (2002) Emissions	Long Range Plan or TIP Emissions
2010	729	503	612	444
2020	729	160	612	180
2030	729	142	612	194

5. Public Involvement and Interagency Consultation

The 2030 Transportation Plans are consistent with consultation requirements discussed in *40 CFR 93.105*. Interagency consultation was a cooperative effort on the part of the Capital Area MPO, the Durham-Chapel Hill-Carrboro MPO, the Burlington-Graham MPO, the Triangle Area RPO, the Kerr-Tar RPO, the Upper Coastal Plain RPO, the North Carolina Department of Transportation and the Federal Highway Administration. The process was administered by the Triangle J Council of Governments on behalf of the partners and was organized according to the sections in the document titled *Triangle Region Transportation Conformity: Pre-Analysis Consensus Plan*, a document agreed to at the initial interagency consultation meeting on July 1, 2004 and updated periodically. Subsequent interagency consultation meetings were held on October 1, 2004, November 19, 2004, December 20, 2004 and January 7, 2005.

A copy of the latest version of the Consensus Plan, written agency comments and agendas and summaries of the interagency consultation meetings are included in Appendix C.

Public review of this report was handled in accordance with each MPO and RPO public participation policy for Transportation Plans. A copy of the public participation policies are included in Appendix J. Comments from the public participation process are incorporated into the final Conformity Analysis and Determination Report. Those comments that are written are included in Appendix K of the final report.

6. Conclusion

Based on the analysis and consultation discussed above the following transportation plans and TIPs conform to the purpose of the North Carolina State Implementation Plan. In every horizon year for every pollutant in each geographic area, the emissions expected from the implementation of the long-range plans and TIPs are less than the emissions budgets established in the SIP or the baseline emissions where no SIP budget is available.

Table 27: Summary of Conformity Status of Triangle Transportation Plans

Criteria (√ indicates the criterion is met)	**Burlington-Graham MPO 2030 LRTP & 2004-10 TIP***	**Durham-Chapel Hill-Carrboro MPO 2030 LRTP & 2004-10 TIP***	**Capital Area MPO 2030 LRTP & 2004-10 TIP***	**Rural Area of the Triangle 2004-10 TIP**
Less Than Emissions Budget(s) or Baseline	√	√	√	√
TCM Implementation	The NC SIP includes no Transportation Control Measures in the Triangle Area			
Interagency Consultation	√	√	√	√
Latest Emissions Model	√	√	√	√
Latest Planning Assumptions	√	√	√	√
Fiscal Constraint	√	√	√	√

* The 2004-10 TIPs are subsets of the 2030 LRTPs