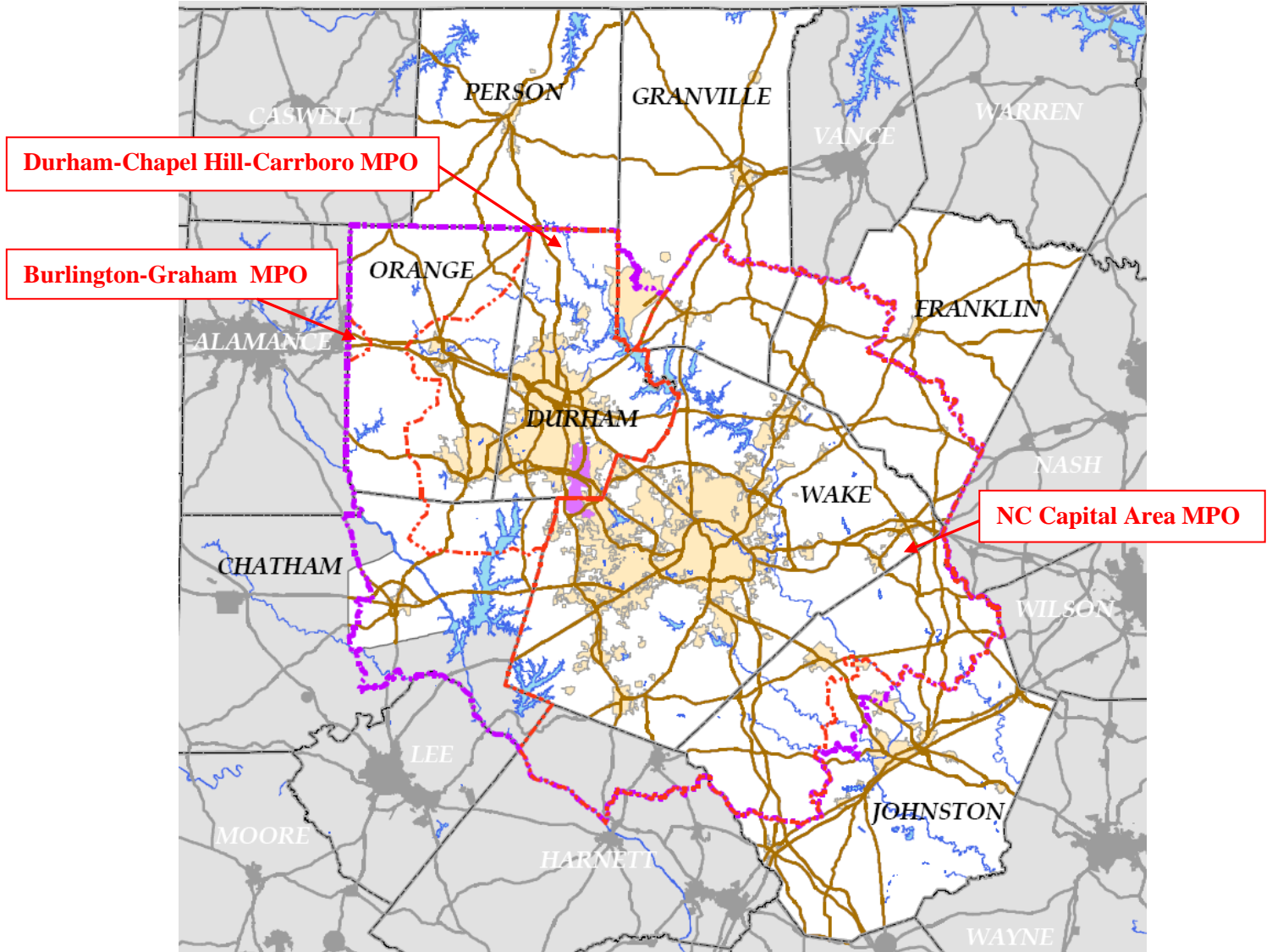


RESEARCH TRIANGLE REGION
Conformity Determination Report

Amended 2035 Long Range Transportation Plan
2012–2018 Transportation Improvement Program



Legend

- Triangle Ozone Maintenance Area
- TRM Modelled Area
- MPO Boundary
- Major Road Or Highway
- RTP
- Municipal Limit
- County Boundaries

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www.triangleair.org

TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
1. INTRODUCTION	2
2. AIR QUALITY PLANNING	6
2.1 EMISSIONS BUDGETS.....	6
3. LONG-RANGE TRANSPORTATION PLANS	7
3.1 CONSULTATION.....	8
3.2 FINANCIAL CONSTRAINT ASSUMPTIONS.....	8
3.3 LATEST PLANNING ASSUMPTIONS	8
3.4 FUTURE YEAR ROADWAY PROJECTS.....	8
3.5 TRANSIT NETWORKS.....	9
3.6 CONGESTION MITIGATION/AIR QUALITY (CMAQ) PROJECTS	9
4. REGIONAL EMISSION ANALYSIS	10
4.0.1. <i>Sub-area emission budgets</i>	10
4.0.2 <i>Emissions analysis source</i>	10
4.0.3 <i>Emissions comparison years (ozone)</i>	10
4.0.4 <i>Emission comparison years (CO)</i>	11
4.1 EMISSIONS MODEL	12
4.1.1 <i>Development of Emissions Factors</i>	12
4.1.2 <i>Development of VMT Mix by Vehicle Type</i>	13
4.1.3 <i>Vehicle Age Distributions</i>	13
4.2 TRANSPORTATION CONTROL MEASURES	13
4.3 ESTIMATION OF VEHICLE STARTS.....	13
4.4 OFF-MODEL ANALYSIS.....	13
4.5 EMISSIONS COMPARISON TESTS BY LOCATION AND POLLUTANT	14
5. PUBLIC INVOLVEMENT AND INTERAGENCY CONSULTATION	18
6. CONCLUSION	19

List of Tables and Figures

Figure 1. Triangle Ozone Maintenance Area	4
Table 1. NO _x Budget for Triangle Counties	7
Table 2. CO Budget - Durham and Wake Counties	7
Table 3. Triangle Area Transportation Conformity Analysis Matrix (2035 LRTPs).....	11
Table 4. Percentage of Vehicles Subject to Inspection and Maintenance Programs	12
Table 5. Emissions Test and Responsibility for Conformity Findings.....	15
Table 6. Durham County Emissions Comparison Summary (<i>kg/day</i>)	17
Table 7. Wake County Emissions Comparison Summary (<i>kg/day</i>)	17
Table 8. Granville County Emissions Comparison Summary (<i>kg/day</i>)	17
Table 9. Franklin County Emissions Comparison Summary (<i>kg/day</i>)	17
Table 10. Johnston County Emissions Comparison Summary (<i>kg/day</i>)	17
Table 11. Orange County Emissions Comparison Summary (<i>kg/day</i>).....	18
Table 12. Person County Emissions Comparison Summary (<i>kg/day</i>).....	18
Table 13. Chatham County (part) Emissions Comparison Summary (<i>kg/day</i>)	18
Table 14: Summary of Conformity Status of Triangle Transportation Plans.....	19

List of Appendices

- Appendix A: Triangle CO SIP Federal Register Notices
- Appendix B: Triangle Ozone SIP Federal Register Notice
- Appendix C: Interagency Consultation, including Pre-Analysis Consensus Plan and Estimation of Vehicle Starts
- Appendix D: 2035 Long Range Transportation Plan Amendment #2 Project List
- Appendix E: Adoption and Endorsement Resolutions and Agency Determinations (to be included in final version)
- Appendix F: Mobile 6.2 Emission Factors
- Appendix G: Public and Agency Comments and Responses (to be included in final version)
- Appendix H: Off-Model Analysis
- Appendix I: Emissions Analysis
- Appendix J: VMT and Speeds

List of Acronyms

BG MPO:	Burlington-Graham Metropolitan Planning Organization
CAAA:	Clean Air Act Amendments of 1990 (United States)
CAMPO:	Capital Area Metropolitan Planning Organization
CFR:	Code of Federal Regulations
CMAQ:	Congestion Mitigation/Air Quality
CO:	Carbon Monoxide
DAQ:	Division of Air Quality (North Carolina)
DCHC MPO:	Durham-Chapel Hill –Carrboro Metropolitan Planning Organization
DENR:	Department of Environment and Natural Resources (North Carolina)
DMV:	Division of Motor Vehicles
DOT:	Department of Transportation (North Carolina)
EPA:	Environmental Protection Agency (United States)
FHWA:	Federal Highway Administration
FTA:	Federal Transit Administration
HBO:	Home Based Other (trip purpose)
HBS:	Home Based Shopping (trip purpose)
HBW:	Home Based Work (trip purpose)
HOV:	High Occupancy Vehicle
HPMS:	Highway Performance Management System
I/M:	Inspection/Maintenance
ISTEA:	Intermodal Surface Transportation Efficiency Act
ITRE:	Institute for Transportation Research and Education
KT RPO:	Kerr-Tar Rural Transportation Planning Organization
LRTP:	Long Range Transportation Plan
MPO:	Metropolitan Planning Organization
MTIP:	Metropolitan Transportation Improvement Program (regional equivalent of the STIP)
NAAQS:	National Ambient Air Quality Standards
NCDOT:	North Carolina Department of Transportation
NHB:	Non Home Based (trip purpose)
NO _x :	Nitrogen Oxides
RPO:	Rural Transportation Planning Organization
RTAC:	Rural Transportation Advisory Committee
RTCC:	Rural Technical Coordinating Committee
RVP:	Reid Vapor Pressure
SAFETEA-LU:	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SIP:	State Implementation Plan
STIP:	State Transportation Improvement Program (statewide equivalent of the MTIP)
TAC:	Transportation Advisory Committee
TAZ:	Traffic Analysis Zone
TARPO:	Triangle Area Rural Transportation Planning Organization
TCC:	Technical Coordination Committee
TCM:	Transportation Control Measure
TDM:	Transportation Demand Management
TEA-21:	Transportation Efficiency Act for the 21 st Century
TIP:	Transportation Improvement Program
TRM:	Triangle Regional Model
UCPRPO:	Upper Coastal Plain Rural Transportation Planning Organization
USEPA:	United States Environmental Protection Agency
VKT:	Vehicle Kilometers of Travel
VMT:	Vehicle Miles of Travel
VOC:	Volatile Organic Compound

Conformity Analysis and Determination Report

Amended 2035 Long Range Transportation Plans:

- Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (DCHC MPO)
- NC Capital Area Metropolitan Planning Organization (NC CAMPO)

FY 2012 – 2018 Transportation Improvement Programs

- NC Capital Area Metropolitan Planning Organization
- Durham-Chapel Hill-Carrboro Metropolitan Planning Organization
- Burlington-Graham Metropolitan Planning Organization (BG MPO)

Projects from the FY 2012-2018 State Transportation Improvement Program:

- the portions of Chatham, Franklin, Granville, Johnston, Orange and Person Counties that are within the Triangle Ozone Maintenance Area but Outside the NC Capital Area and Durham-Chapel Hill-Carrboro Metropolitan Planning Organization Areas

Executive Summary

- This report addresses 2035 Long Range Transportation Plan amendments and projects in the FY2012-18 TIP to accommodate the following project changes; Appendix D gives project details:

DCHC MPO (LRTP ID#)	83,84,85	Northern Durham Parkway: 3 segments between US70 East and Roxboro Road
	49	I-85 between US 70 and Red Mill Road
	44	I-40 between NC86 and I-85
	9	Carver Street Extension between Armfield Street and Old Oxford Highway
	56,56.1	Louis Stephens Dr. between Hopson Rd. and the Wake County Line (2 phases)
NC CAMPO (LRTP ID#)	A46	Tryon Road between Norfolk Southern RR and S. Wilmington Street
	F43	I-40 between US1/64 and Lake Wheeler Road
	A380	US64 between US1 and Laura Duncan Rd with interchange at Laura Duncan Rd
	A90d	US401 between NC39 and the Franklin County Line
	A2222a	NC54 between Cary Parkway to Weston Parkway
	A235b	US1A between Forbes Road and Rogers Road

- This effort also clarifies that Bus On Shoulder Systems (BOSS) is a Transportation System Management activity, and corrects East End Connector ramp configurations in the regional model.
- A regional emissions analysis is required (1-14-11 interagency consultation meeting).
- The following actions will be taken by the DCHC MPO, NC CAMPO, BG MPO and NCDOT:
 - a. DCHC MPO: adopt a 2035 LRTP amendment
 - b. DCHC MPO: adopt a 2012-18 MTIP
 - c. DCHC MPO: conformity determination on the 2035 LRTP amendment and 2012-18 MTIP
 - d. NC CAMPO: adopt a 2035 LRTP amendment
 - e. NC CAMPO: adopt a 2012-18 MTIP
 - f. NC CAMPO: conformity determination on the 2035 LRTP amendment and 2012-18 MTIP
 - g. BG MPO: adopt a 2012-18 MTIP
 - h. BG MPO: conformity determination on the 2012-18 MTIP
 - i. NCDOT: adopt a 2012-18 STIP
 - j. NCDOT: conformity determination for the Donut (rural) areas

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 “non-attainment” of an air quality standard, and authorizes USEPA to define the boundaries of non-attainment areas. For areas designated as non-attainment for one or more NAAQS, the Clean Air Act defines a specific timetable to attain the standard and requires that non-attainment 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 violates 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, which links transportation and air quality planning activities within a non-attainment or maintenance 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 a non-attainment or maintenance 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). It demonstrates that amendments to 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 NC Capital Area Metropolitan Planning Organization (CAMPO) – **2035 LRTP amendment and 2012-18 MTIP**,
- The Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (DCHC MPO) – **2035 LRTP amendment and 2012-18 MTIP**,
- The Burlington-Graham Metropolitan Planning Organization (BG MPO) – **2012-18 MTIP**, and
- The rural “donut” portions of the Triangle Ozone Maintenance Area outside of the MPOs in four townships in Chatham County and Orange, Franklin, Granville, Johnston and Person Counties – **2012-18 STIP**.

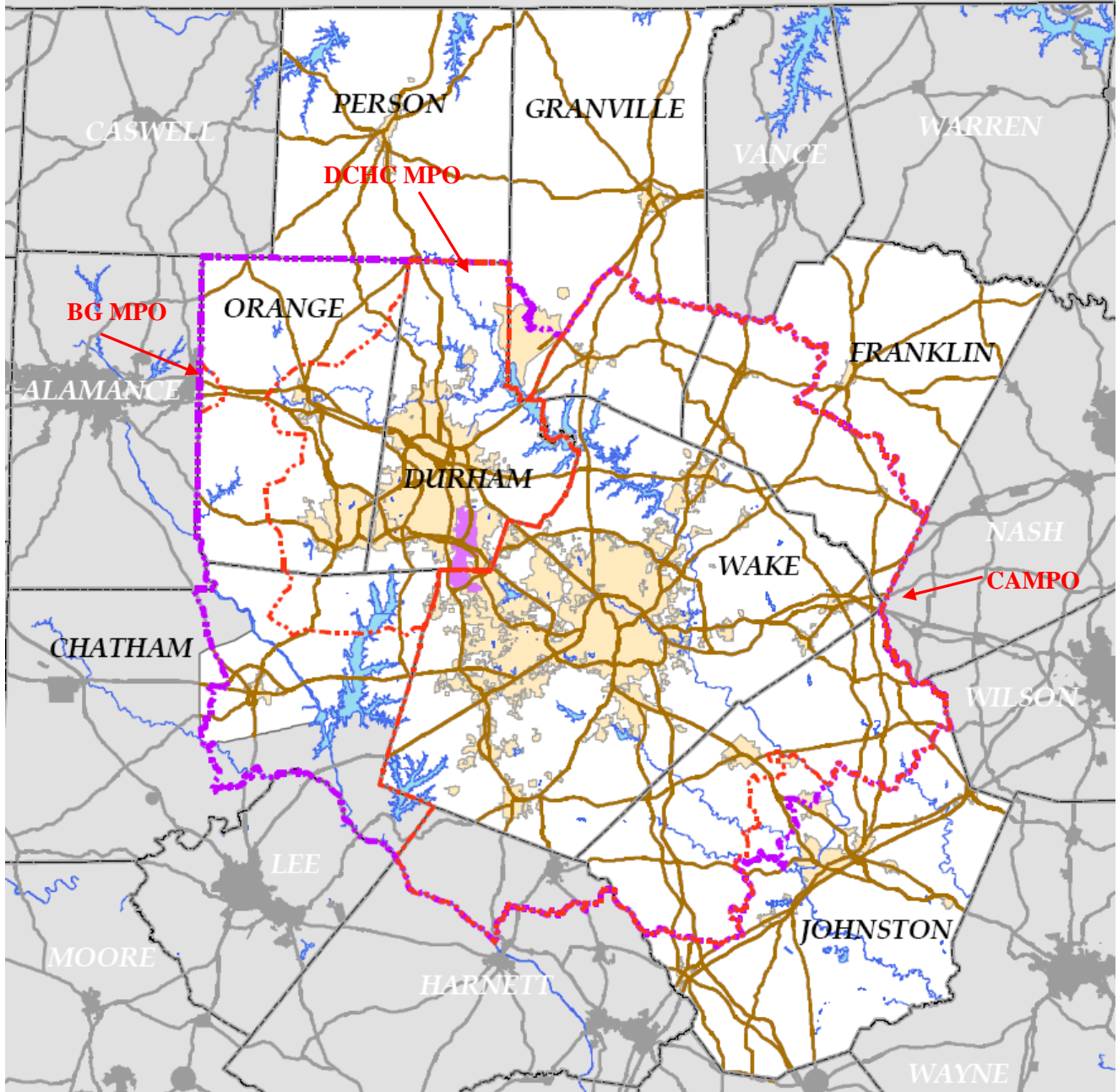
Conformity Determinations for the 2035 Long Range Transportation Plans in the Triangle, along with their currently conforming FY2009-15 TIP subset, were most recently approved as follows:

- NC Capital Area MPO: July 6, 2010
- Durham-Chapel Hill-Carrboro MPO: July 6, 2010
- The NCDOT (for the rural portions of Chatham, Franklin, Granville, Johnston, Person and Orange Counties in the Triangle Ozone Maintenance Area): July 6, 2010
- Burlington-Graham MPO: June 15, 2009

The above-named MPOs and portions of RPOs combine to form a region known as the “Triangle.” The entire Triangle maintenance region is shown as a map in Figure 1.

All Federally funded projects and regionally significant projects, regardless of funding source, 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 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 MPO Plans in the Triangle region and the related TIPs in all non-attainment and maintenance areas.

Figure 1. Triangle Ozone Maintenance Area



Legend

- Triangle Ozone Maintenance Area
- TRM Modelled Area
- MPO Boundary
- Major Road Or Highway
- RTP
- Municipal Limit
- County Boundaries

BG MPO is Burlington-Graham MPO (small part of Orange County in the maintenance area).

CAMPO is Capital Area MPO (all of Wake County and parts of Franklin, Granville, Harnett and Johnston Counties)

DCHC MPO is Durham-Chapel Hill-Carrboro MPO (all of Durham and parts of Orange and Chatham Counties)

40 CFR Part 93 requires that a conforming transportation plan satisfy six 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*.
- 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*).
- The Transportation Plan, TIP, or FHWA/FTA project must meet the interim emissions tests where applicable (*40 CFR Part 93.119*).

This report shows that each MPO's 2035 Transportation Plan, the 2012-18 MTIPs and projects from the 2012-18 STIP in the donut areas meets each condition. Each condition is discussed in subsequent sections of this report. This report documents the interagency consultation process, public involvement process, and analysis used to demonstrate transportation conformity for amendments to the 2035 LRTP and 2012-18 TIP.

These analyses are consistent with the Transportation Conformity Regulation (40 CFR Parts 51 and 93). Based on the analysis documented in this report, the following Long Range Transportation Plans and TIPs conform to the purpose of the Triangle Area SIP:

- NC Capital Area MPO amended 2035 LRTP and the 2012-18 MTIP
- Durham-Chapel Hill-Carrboro MPO amended 2035 LRTP and the 2012-18 MTIP
- Burlington-Graham MPO 2035 LRTP and the 2012-18 MTIP
- Projects from the 2012-2018 STIP in the donut areas of the Triangle Maintenance Area

The amended 2035 Long Range Transportation Plan and 2012-18 TIP accomplish the intent of the North Carolina State Implementation Plan (SIP). This conformity determination is based on the regional emissions analysis that uses the transportation network approved by each of the above-named Metropolitan Planning Organizations (MPOs) and NCDOT, in coordination with the affected Rural Planning Organizations (RPOs), for the 2035 long-range transportation plan, and the emissions factors developed in cooperation with the North Carolina Department of Environment and Natural Resources (DENR).

2. Air Quality Planning

USEPA originally declared Durham County, Wake County and Dutchville Township in Granville County non-attainment for ozone (O₃) 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. NO_x and VOC are referred to as ozone “precursors.” Durham County, Wake County and Dutchville Township were redesignated by USEPA to attainment with a maintenance plan for ozone under the 1-hour standard on June 17, 1994 and Durham County and Wake County were redesignated by USEPA to attainment with a maintenance plan 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 that was designed to replace the one-hour standard. The USEPA designated the entire Triangle area as a “basic” non-attainment area for ozone under the eight-hour standard with an effective date of June 15, 2004; the designation covered 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

On December 26, 2007, the Triangle Area was redesignated as attainment with a maintenance plan for ozone under the eight-hour standard. 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

DENR prepared emissions budgets as part of their CO and 8-hour ozone maintenance plans for those areas subject to budgets. Each of the eight counties or portions of counties in the bulleted list above is part of the Triangle ozone maintenance area under the 8-hour ozone standard and has emissions budgets for NO_x. Emissions budgets were established for 2008 and 2017. The 2008 budgets apply for years up to and including 2016, while the 2017 budgets apply for 2017 and all subsequent years. The December 26, 2007 Federal Register notice establishing the NO_x budgets deemed VOCs insignificant, hence no VOC budgets apply to the region.

Durham and Wake Counties have CO maintenance requirements under the most recent SIP Maintenance Plan update, which supplemented the pre-existing 2005 CO budgets with new

2015 budgets for each county. Under the update, the existing 2005 budgets from the prior SIP apply between 2005 and 2014 and the newer 2015 budgets apply from 2015 onwards.

Tables related to CO in this report reflect the motor vehicle emission budgets published in the March 24, 2006 Federal Register and effective May 23, 2006 (see Appendix A).

Tables 1 and 2 list the motor vehicle emission budgets for those portions of the Triangle subject to SIP budgets.

Table 1. NO_x Budget for Triangle Counties

NO _x : Redesignation SIP (kilograms/day)		
Area	SIP Budget year	
	2008	2017
Chatham	1,565	948
Durham	13,106	4,960
Franklin	2,048	1,139
Granville	4,649	1,714
Johnston	12,583	5,958
Orange	9,933	3,742
Person	1,359	791
Wake	36,615	16,352

* the last NO_x emission budgets are for 2017; all subsequent years are compared to the 2017 budget.

Table 2. CO Budget - Durham and Wake Counties

CO: from State Implementation Plan (SIP)	
Area	motor vehicle emissions budget (tons/day)
	March 24, 2006 Federal Register -- Maintenance Plan Update (2015 budget)
Durham County	177.22
Wake County	384.27

* the last CO emission budgets are for 2015; all subsequent years are compared to the 2017 budget.

3. Long-Range Transportation Plans

The 2035 Transportation Plans were developed between 2007 and 2009. Federal law *40 CFR part 93.104(b)(3)* requires a conformity determination of transportation plans no less frequently than every four years. As required in *40 CFR 93.106*, the analysis years for the transportation plans are no more than ten years apart.

The CAMPO area includes all of Wake County and parts of Franklin, Granville, Harnett and Johnston Counties. 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 maintenance area for ozone. The remaining portions of the non-attainment area are rural (donut) areas within the Triangle Area, Kerr-Tar and Upper Coastal Plain RPOs.

3.1 Consultation

The amendment to the 2035 Transportation Plan and the FY2012-18 TIP are consistent with consultation requirements discussed in *40 CFR 93.105*. Consultation on the development of this conformity determination was accomplished through an interagency consultation meeting held on January 14, 2011 and subsequent meetings and discussions. A summary of the topics discussed and decisions reached is included in Appendix C.

3.2 Financial Constraint Assumptions

The Transportation Plans remain 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 2035. All projects included in the 2012-18 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 2035 Long-Range Transportation Plans.

3.3 Latest Planning Assumptions

The 2035 Transportation Plans used the latest adopted planning assumptions as discussed in *40 CFR 93.110*, and were adopted as part of the Plans. No changes to these assumptions were made as part of the Plan amendment covered by this conformity report. A single travel demand model was developed for the urbanized portion of the Triangle non-attainment area. A single set of population, housing and employment projections was developed. In addition, 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 Long Range Transportation Plans by the Capital Area MPO and Durham-Chapel Hill-Carrboro MPO in May 2009. Additional detail on these planning assumptions is available in the 2035 Long Range Transportation Plans and the conformity determination report for those plans.

3.4 Future year roadway projects

Roadway improvements used for conformity modeling were developed in the 2035 Transportation Plan process in each MPO. Outside of the MPO boundaries, TIP projects from the 2012-2018 TIP served as the future year roadway projects. For the 2035 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 2015 and 2025 were performed to assist in prioritizing the 2035 roadway needs. The final 2015, 2025, and 2035 networks are fiscally constrained. Projects were added from MPO priority lists until estimated project costs equaled the expected funding available. The base network (2005) and the three future networks (2015, 2025, and 2035) used for the conformity determination were the same as the networks used for the 2035 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.

This amendment to the 2035 LRTP changes the proposed number of lanes, distance and/or air quality analysis year for the projects listed in Appendix D.

The interagency partners also jointly developed lists of regionally significant and exempt projects for the 2035 LRTPs. The checklist below was used to guide the identification of regionally significant projects. After the MPOs, RPOs and NCDOT generated initial lists, the lists were reviewed by DENR , EPA, FTA and FHWA.

<p><i>Regionally Significant Project Checklist</i></p> <ol style="list-style-type: none">1. The facility serves regional transportation needs (i.e. facilities that provide access to and from the region or that provide access to major destinations in the region).2. The facility is functionally classified higher than a minor arterial (minor arterials may be regionally significant if their main purpose is to provide access to major facilities in the region).3. The facility is a fixed guideway transit facility.4. The facility is included in the travel model for the region (in many cases collector streets are modeled and not regionally significant). <p>To be regionally significant a facility should meet one or more criteria in this checklist. 40 CFR Part 93.101</p>

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 2005. 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.

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 CMAQ funds is allocated to projects serving more than one non-attainment or maintenance area on a competitive basis. This amendment does not affect CMAQ projects in the Triangle region.

4. Regional Emission Analysis

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.

All parts of the Triangle Ozone Maintenance Area have emissions budgets. Table 3 shows what parts are covered by the Triangle Regional Model (TRM) and how each part was analyzed for each pollutant in each comparison year.

Three counties in the non-attainment area are completely within the Triangle Regional travel demand Model (TRM) boundary: Durham, Orange and Wake. Person County is completely outside of the TRM boundary. The other 4 counties, Granville, Franklin, Johnston and Chatham (Baldwin, Center, New Hope and Williams Townships only), have parts that are within the modeled area and parts that are outside of the modeled area.

4.0.1. Sub-area emission budgets

Each county or, in the case of Chatham County, county portion, have NO_x emission budgets. In addition, Durham and Wake Counties have CO emission budgets. These Motor Vehicle Emission 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 non-modell spreadsheet; VMT and speeds for the portions of Franklin, Granville and Johnston Counties outside the modeled area came from the NCDOT non-model spreadsheet factored by the percentage of each county's population in the non-model area, a method that has been used in prior analyses.

4.0.3 Emissions comparison years (ozone)

For *areas with budgets under the 8-hour standard* (Durham, Franklin, Granville, Johnston, Orange, Person and Wake Counties and the four townships in Chatham County), emissions must be analyzed for years where there is an 8-hour emissions budget, the attainment year (if a region is in non-attainment), the horizon year and intermediate years such that intervals do not exceed 10 years. The Triangle area is currently in attainment, so no attainment year analysis is required. The following years were analyzed to meet the requirements: 2015 (intermediate year), 2017 (8-hour budget year), 2025 (intermediate year), and 2035 (LRTP horizon year).

Also, in accordance with 40 CFR 93.118, since there was no budget for the required analysis years 2015, 2025 and 2035, the 2008 budgets were used for 2015 analysis and the 2017 budgets were used for 2025 and 2035.

Table 3. Triangle Area Transportation Conformity Analysis Matrix (2035 LRTPs)

County	Area model status	Area emissions budget status	Emissions analysis source	Emissions comparison years			
				2015 ¹	2017 ¹	2025	2035 horizon
Person	rural area (all)	emissions budget	Non-modeled Area Analysis Spreadsheet	O3	O3	O3	O3
Granville	modeled area	emissions budget	TRM	O3	O3	O3	O3
	rural area	emissions budget	Non-modeled Area Analysis Spreadsheet (factored) ²	O3	O3	O3	O3
Franklin	modeled area	emissions budget	TRM	O3	O3	O3	O3
	rural area	emissions budget	Non-modeled Area Analysis Spreadsheet t (factored) ²	O3	O3	O3	O3
Johnston	modeled area	emissions budget	TRM	O3	O3	O3	O3
	rural area	emissions budget	Non-modeled Area Analysis Spreadsheet (factored) ²	O3	O3	O3	O3
Chatham (part)	modeled area	emissions budget	TRM	O3	O3	O3	O3
	rural area	emissions budget	Non-modeled Area Analysis Spreadsheet (factored) ²	O3	O3	O3	O3
Orange	modeled (all)	emissions budget	TRM	O3	O3	O3	O3
Durham	modeled (all)	emissions budget	TRM	CO O3	O3	CO O3	CO O3
Wake	modeled (all)	emissions budget	TRM	CO O3	O3	CO O3	CO O3

TRM: Triangle Regional Model

O3: Ozone

CO: Carbon Monoxide

¹ 2015 is both an LRTP interim year and a CO budget year for Durham and Wake Counties; 2017 is an ozone budget year.

² where part of a county is covered by the regional model, the remainder of the county was analyzed using the NCDOT Non-Modeled Area Analysis Spreadsheet, factored by the percent of county population that lives outside of the modeled area.

4.0.4 Emission comparison years (CO)

Durham and Wake Counties have CO maintenance requirements under a 2006 updated SIP. This Maintenance Plan update supplements the pre-existing 2005 budgets with a 2015 budget for each county. Under the update, the pre-existing 2005 budgets apply between 2005 and 2014 and the new 2015 budgets apply from 2015 onwards. Both counties are entirely within the modeled area and have emissions budgets under the updated SIP; the TRM was used as the analysis tool. Listed below is specific CO budget and comparison year information:

- SIP Budget Years: 2005, 2015 (Durham and Wake Counties)
- Comparison Years for CO SIP – 2015, 2025, 2035 (Durham and Wake Counties)

For this LRTP amendment, three changes to the 2035 LRTP document will be made:

- An amended project list in Appendix 1 of the 2035 LRTP to include the project changes shown in Appendix D of this Conformity Determination Report;
- A clarification that Bus On Shoulder Systems (BOSS) is included as a Transportation System Management (TSM) action in section 7.9 of the 2035 LRTP; and
- An addition to the amendment page within the body of the document that tracks this and any future amendments to the 2035 LRTP.

4.1 Emissions Model

MOBILE 6.2 was used to develop the emissions factors. Motor vehicle emissions controls considered in the MOBILE6.2 model include the following:

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

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 MOBILE6.2 emissions factor model was used to develop the emissions factors in 2011 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 expanded to forty-eight counties by 2007. The percentage of vehicles in each county subject to the I/M program is shown in Table 4.

Table 4. Percentage of Vehicles Subject to Inspection and Maintenance Programs

Location	2007-2035
Wake County	95%
Durham County	92%
Johnston County	91%
Chatham County	96%
Granville County	83%
Orange County	89%
Franklin County	90%

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 in 2009 are used to determine the percentage of vehicles, by vehicle type, for various road types. Vehicle classification data was used in conjunction with MOBILE6.2 default vehicle mix to estimate fleet distribution by functional class. The classification data was iteratively adjusted to replicate MOBILE6.2's national classification default within the analysis area.

4.1.3 Vehicle Age Distributions

The vehicle age distribution is based on the North Carolina Department of Motor Vehicles' 2010 (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 Estimation of Vehicle Starts

A component of the emissions rates for each functional class is an estimate of the start-based emissions. This rate is based on an assumed number of starts per vehicle and is added to running emissions to produce a single rate to apply to vehicle miles traveled. Mobile 6 includes national default rates. However, the use of default rates isn't the best practice for heavily urbanized areas with an updated Travel Demand Model. Area-specific rates were calculated by dividing the total number of trips from the travel demand model by the total number of registered vehicles. Appendix C contains additional information. This methodology has been previously endorsed by USEPA and used in prior conformity analysis in the Triangle.

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 either currently exist or are planned in the Triangle include:

- Transportation Demand Management (TDM) programs such as the Triangle Best Workplaces for Commuters 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,
- Certain rail modal benefits; as is typical for regional models, the TRM does not account for some benefits of rail over similar bus service, such as reliability, comfort and safety, which are termed "non-included attributes" by the Federal Transit Administration; any use of these attributes must be approved by the FTA.

- 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 and other freeways in Wake and Durham Counties, including surveillance cameras, the Motorist Assistance Patrols, and traveler information activities.

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 interstate incident management program. As more experience is gained in other activities, they may be reflected in future conformity analyses. 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 (O₃) 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 attainment with a maintenance plan for ozone on June 17, 1994 and Durham County and Wake County were redesignated by USEPA to attainment with a maintenance plan 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” non-attainment area for eight-hour ozone with an effective date of June 15, 2004. The Triangle Area was subsequently redesignated to a Maintenance Area for eight-hour ozone on December 26, 2007.

The current maintenance 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

Both volatile organic compounds (VOCs) and oxides of nitrogen (NO_x) are precursors of ozone. In the most recently approved maintenance plans for ozone for the areas listed above, the North Carolina Department of Environment and Natural Resources (DENR) prepared emissions budgets for only NO_x, as VOC was deemed insignificant. USEPA approved the most recent emissions budgets on December 26, 2007 with an effective date of the same day. The USEPA approval and promulgation rulings for CO and ozone containing the budgets are in Appendices A and B.

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, and portions of Franklin, Granville and Johnston Counties.
- 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 the rural “donut” 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 the maintenance area (Chatham County). Table 5 summarizes the emissions test used and decision-making responsibility for conformity findings in each County.

Table 5. 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	budget	NC DOT (consultation with Upper Coastal Plain RPO)
Chatham County <i>(Baldwin, Center, New Hope, Williams Townships)</i>	O3	budget	Durham-Chapel Hill-Carrboro MPO NC DOT (consultation with Triangle Area RPO)
Granville County	O3	budget	NC DOT (consultation with Kerr-Tar RPO)
Orange County	O3	budget	Durham-Chapel Hill-Carrboro MPO Burlington-Graham MPO NC DOT (consultation with Triangle Area RPO)
Person County	O3	budget	NC DOT (consultation with Kerr-Tar RPO)
Franklin County	O3	budget	NC DOT (consultation with Kerr-Tar RPO)

The results of the emission comparisons are summarized by County in Tables 6 through 13. Detailed emissions analysis results by county are contained in Appendix I.

Emissions from vehicles are expected to show dramatic decreases, even with continuing increases in vehicle miles of travel (VMT), for several reasons:

- Fleet turnover. Older, more polluting vehicles (gasoline and diesels) continue to be retired and replaced with newer, cleaner vehicles.
- Newer vehicles have gotten cleaner with each model year. The most recent Federal tailpipe standards are set at an average standard of 0.07 grams per mile for nitrogen oxides for all classes of passenger vehicles beginning in 2004. This includes all light-duty trucks, as well as the largest SUVs. For more detail, including phase-in by vehicle type, see USEPA's Tier 2 Vehicle Standard Final Rule at: <http://www.epa.gov/otaq/regs/ld-hwy/tier-2/finalrule.htm>
- Gasoline fuels are improving. Refiners and importers of gasoline were required to meet stricter sulfur content requirements by 2006. Low sulfur gasoline enables better emission controls, and can lead to further emission reductions from today's catalyst-equipped fleet. See USEPA's Gasoline Sulfur Program Final Rule at: <http://www.epa.gov/otaq/regs/ld-hwy/tier-2/finalrule.htm>
- Emissions from heavy-duty on-highway vehicles are expected to decrease due to USEPA's Heavy-Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements. Stricter NOx emission standards were phased in between 2007 and 2010 for diesel engines. New standards for on-road diesel fuel (15 ppm sulfur content) were phased in at the terminal level by July 15, 2006 and at the retail stations by September 1, 2006. See: <http://www.epa.gov/otaq/diesel.htm#hd2007>
- Expansion of vehicle inspection and maintenance programs to more counties in North Carolina so that more polluting vehicles are identified and repaired, thus lowering emissions.

The combination of the technology/fuel improvements/vehicle maintenance and resulting emission reductions exceeds the effect of increased VMT in the Triangle area. The trend in the Triangle area is not uncommon. On a national level this trend is also seen in data gathered by the Federal Highway Administration (FHWA). For additional detail, see the FHWA web site on vehicle miles traveled and vehicle emissions at: <http://www.fhwa.dot.gov/environment/vmtems.htm>

Table 6. Durham County Emissions Comparison Summary (kg/day)

Year	NO _x		CO ¹		
	SIP Budgets	LRTP Emissions	SIP Budgets (tons)	SIP Budgets (kg)	LRTP Emissions (kg)
2015 ²	13,106	5,526	177.22	160,771	97,417
2017 ²	4,960	4,412	177.22	160,771	N/A
2025 ³	4,960	2,685	177.22	160,771	91,431
2035 ⁴	4,960	2,567	177.22	160,771	99,434

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

Year	NO _x		CO ¹		
	SIP Budgets	LRTP Emissions	SIP Budgets (tons)	SIP Budgets (kg)	LRTP Emissions (kg)
2015 ²	36,615	17,183	384.27	348,604	299,741
2017 ²	16,352	13,911	384.27	348,604	N/A
2025 ³	16,352	9,139	384.27	348,604	301,682
2035 ⁴	16,352	8,510	384.27	348,604	314,604

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

Year	NO _x	
	SIP Budgets	Long Range Plan or TIP Emissions
2015 ²	4,649	1,998
2017 ²	1,714	1,619
2025 ³	1,714	845
2035 ⁴	1,714	629

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

Year	NO _x	
	SIP Budgets	Long Range Plan or TIP Emissions
2015 ²	2,048	1,298
2017 ²	1,139	1,072
2025 ³	1,139	584
2035 ⁴	1,139	496

Table 10. Johnston County Emissions Comparison Summary (kg/day)

Year	NO _x	
	SIP Budgets	Long Range Plan or TIP Emissions
2015 ²	12,583	4,800
2017 ²	5,958	3,806
2025 ³	5,958	1,896
2035 ⁴	5,958	1,508

Table 11. Orange County Emissions Comparison Summary (kg/day)

Year	NO _x	
	SIP Budgets	Long Range Plan or TIP Emissions
2015 ²	9,933	3,291
2017 ²	3,742	2,579
2025 ³	3,742	1,529
2035 ⁴	3,742	1,431

Table 12. Person County Emissions Comparison Summary (kg/day)

Year	NO _x	
	SIP Budgets	Long Range Plan or TIP Emissions
2015 ²	1,359	711
2017 ²	791	607
2025 ³	791	407
2035 ⁴	791	370

Table 13. Chatham County (part) Emissions Comparison Summary (kg/day)

Year	NO _x	
	SIP Budgets	Long Range Plan or TIP Emissions
2015 ²	1,565	1,001
2017 ²	948	859
2025 ³	948	512
2035 ⁴	948	454

1. To obtain kilograms per day, multiply tons per day by 907.18; SIP CO budgets are listed in tons/day
2. Budget year
3. LRTP interim year
4. LRTP Horizon year.

5. Public Involvement and Interagency Consultation

The amended 2035 Transportation Plan is 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 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 an interagency consultation meeting was held on January 14, 2011. Subsequent interagency consultation was conducted through teleconference calls; discussion summaries are included in Appendix C.

Public review of this report is being handled in accordance with each MPO's public participation policy. A copy of the public participation policies are available for review. Comments from the public participation process are incorporated into the final Conformity Analysis and Determination Report. Those comments are included in Appendix G 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.

Table 14: Summary of Conformity Status of Triangle Transportation Plans

Criteria (√ indicates the criterion is met)	Burlington-Graham MPO 2035 LRTP & 2012-18 TIP*	Durham-Chapel Hill-Carrboro MPO 2035 LRTP & 2012-18 TIP*	Capital Area MPO 2035 LRTP & 2012-18 TIP*	Rural (Donut) Area of the Triangle 2012-18 STIP
Less Than Emissions Budgets	√	√	√	√
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 2012-18 TIPs are direct subsets of the amended 2035 LRTPs

Yellow highlighting indicates LRTP amendments and TIPs covered by this conformity report.

Specific conformity findings for each of these areas are listed below:

Burlington-Graham MPO Ozone Conformity Finding for the 2012-2018 Transportation Improvement Program

Based on the analysis and consultation and involvement processes described in this report, the Burlington-Graham MPO 2012-2018 Transportation Improvement Program is found to conform to the purpose of the North Carolina State Implementation Plan. The emissions expected from the implementation of the Burlington-Graham 2012-18 Transportation Improvement Program are in conformity with the 8-hour ozone standard.

Capital Area MPO Ozone and Carbon Monoxide Conformity Finding for the 2035 Long-Range Transportation Plan and 2012-2018 Transportation Improvement Program

Based on the analysis and consultation and involvement processes described in this report, the Capital Area MPO 2035 Long-Range Transportation Plan and 2012-2018 Transportation Improvement Program are found to conform to the purpose of the North Carolina State Implementation Plan. The emissions expected from the implementation of the Capital Area MPO 2035 Long-Range Transportation Plan and 2012-2018 Transportation Improvement Program are less than the applicable budgets for NO_x and CO; therefore the LRTP and TIP are in conformity with the 8-hour ozone standard and the carbon monoxide standard.

Durham-Chapel Hill-Carrboro MPO Ozone and Carbon Monoxide Conformity Finding for the 2035 Long-Range Transportation Plan and 2012-2018 Transportation Improvement Program

Based on the analysis and consultation and involvement processes described in this report, the Durham-Chapel Hill-Carrboro MPO 2035 Long-Range Transportation Plan and 2012-2018 Transportation Improvement Program are found to conform to the purpose of the North Carolina State Implementation Plan. The emissions expected from the implementation of the Durham-Chapel Hill-Carrboro MPO 2035 Long-Range Transportation Plan and 2012-2018 Transportation Improvement Program are less than the applicable budgets for NO_x and CO; therefore the LRTP and TIP are in conformity with the 8-hour ozone standard and the carbon monoxide standard.

NCDOT Triangle Rural (Donut) Area Ozone Conformity Finding for the 2012-2018 State Transportation Improvement Program

Based on the analysis and consultation and involvement processes described in this report, the 2012-2018 State Transportation Improvement Programs for the rural areas of counties in the Triangle that are outside of the MPO boundaries are found to conform to the purpose of the North Carolina State Implementation Plan. The emissions expected from the implementation of the 2012-2018 State Transportation Improvement Program are less than the applicable budgets for NO_x in the SIP; therefore the TIP is in conformity with the 8-hour ozone standard.