



Conformity Analysis and Determination Report

2035 Long Range Transportation Plans:

- **Burlington-Graham Metropolitan Planning Organization (Guilford County)**
- **Greensboro Urban Area Metropolitan Planning Organization (Guilford County)**
- **High Point Urban Area Metropolitan Planning Organization (Guilford, Davidson and Forsyth Counties)**
- **Winston-Salem Urban Area Metropolitan Planning Organization (Forsyth, Davidson, and Davie Counties)**

**February 2009
Final Report
Adopted**

Prepared by:

The Piedmont Authority for Regional Transportation,

In Partnership with the:

**Burlington-Graham Metropolitan Planning Organization,
Greensboro Metropolitan Planning Organization,
High Point Metropolitan Planning Organization,
Winston-Salem Metropolitan Planning Organization,**

and

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

and

The North Carolina Department of Transportation - Transportation Planning Branch

Contact Information

Additional copies of this report can be obtained from the:

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1554 Mail Service Center
Raleigh, NC 27699-1554**

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Phone: 919-715-7647

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List of Acronyms

<i>Acronym</i>	<i>Full Term</i>
BGMPO	Burlington-Graham Metropolitan Planning Organization.
Conformity Analysis	Demonstration that when the projects planned in the TIP and LRTP are implemented the area will not exceed allowable motor vehicle emissions thresholds (emissions budgets).
Conformity Finding	Statement that the projects contained in the MTIP are essentially consistent with those listed in the LRTP and that no new Conformity Analysis is needed to account for noted differences.
CMS	Congestion Management System. A program of strategies for monitoring, evaluating, and addressing traffic congestion. Required for Transportation Management Areas.
CMAQ	Congestion Mitigation and Air Quality Program. A federal highway fund category for projects that will improve air quality.
DAQ	Division of Air Quality.
DENR	North Carolina Department of Environment and Natural Resources.
Emissions Budget	See Conformity Analysis.
EIS	Environmental Impact Statement. Federally required environmental study for projects with potentially significant environmental effects.
FHWA	Federal Highway Administration (USDOT)
FCEAD	Forsyth County Environmental Affairs Department.
FTA	Federal Transit Administration (US Department of Transportation)
GUAMPO	Greensboro Urban Area Metropolitan Planning Organization.
HPMPO	High Point Metropolitan Planning Organization.
LRTP	Long Range Transportation Plan: 25 year planning document identifying long and short term transportation investment needs.
MAB	Metropolitan Area Boundary. The boundary of the area within the transportation planning jurisdiction of an MPO.
MPO	Metropolitan Planning Organization.
MTIP	Metropolitan Transportation Improvement Program.
MVEB	Motor Vehicle Emission Budgets.

NCDOT	North Carolina Department of Transportation.
NEPA	National Environmental Policy Act. Federal law that requires consideration of environmental impacts for all major expenditures of federal funds.
NOx	Oxides of Nitrogen: key precursor to smog. According to NCDAQ, roadway sources produce around 31% of total NC NOx emissions.
PART	Piedmont Authority for Regional Transportation.
Prospectus	Document outlining responsibilities and procedures for carrying out the cooperative transportation planning process. Defines ongoing work tasks cited in the Planning Work Program.
Planning Work Program	Accounting document for use of planning grant funds; lists approved activities that these funds may reimburse. The PWP thus guides transportation planning activities for the year.
RPO	Rural Planning Organization. RPOs are partnerships among non-MPO counties, established to provide rural areas a greater voice in state transportation decisions affecting those areas.
Section 104(f) PL	Funds distributed through the Federal Highway Administration for transportation planning tasks.
SIP	State Implementation Plan. The modeling analysis and the state and federal regulations demonstrating that the air in an area will meet National Ambient Air Quality Standards.
STIP	State Transportation Improvement Program
TCM	Transportation Control Measures. Specific projects or programs enumerated in the SIP that are designed to improve air quality are implemented in a timely fashion.
TDM	Travel Demand Model.
TMA	Transportation Management Area: urbanized area over 200,000 in population.
PTRM	Piedmont Triad Regional Model.
US EPA	United States Environmental Protection Agency.
WSMPO	Winston-Salem Metropolitan Planning Organization.

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- **Winston-Salem Urban Area Metropolitan Planning Organization (Forsyth, Davidson and Davie Counties)**

Overview

Transportation Conformity ("conformity") ensures that Federal funding and approval is distributed to those transportation activities that are consistent with air quality goals. Conformity applies to Long Range Transportation Plans (LRTPs), 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 "nonattainment 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.

Conformity Determination

Regional emissions are estimated based on highway and transit usage according to LRTPs and TIPs. The projected emissions for the LRTPs and the TIPs must not exceed the emissions limits (or "budgets") established by the SIP (or less than baseline emissions where no SIP budgets have been approved or found adequate). Where TCMs are included, responsible Metropolitan Planning Organizations (MPOs) and the North Carolina Department of Transportation (NCDOT) are required to demonstrate that TCMs are implemented in a timely fashion to obtain conformity.

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, LRTPs, and in making conformity determinations. MPO policy boards make initial conformity determinations in metropolitan areas, while NCDOT makes this determination in areas outside of MPOs, in consultation with affected Rural Planning Organizations (RPOs).

Five organizations are responsible for making the conformity determinations in five distinct parts of the Triad Nonattainment/Maintenance Area:

- a. the Burlington-Graham Urban Area MPO (BGMPO) within its portion of the metropolitan area boundary in Guilford County;
- b. the Greensboro Urban Area MPO (GUAMPO) within the metropolitan area boundary of Guilford County;
- c. the High Point Urban Area MPO (HPMPO) within its metropolitan area boundary part in Guilford, Davidson and Forsyth Counties;
- d. the Winston-Salem Urban Area MPO (WSMPO) within its portion of the metropolitan area boundary in Forsyth, Davidson and Davie Counties
- e. the NCDOT in the rural (donut) areas that is comprised of those county portions of Davidson and Davie 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 and FTA. These determinations must be made at least every four years, or with the updating of LRTPs or TIPs, 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 LRTPs, 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 LRTPs 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 less than baseline emissions where no SIP budgets have been approved or found adequate). 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 Safe Accountable Flexible Efficient Transportation Equity Act-Legacy for Users (SAFETEA-LU) of 2005. This report demonstrates that the activities resulting from the implementation of the fiscally constrained long-range transportation plans (LRTPs) will not “cause or contribute to any new violation of any standard in any area, increase the frequency or severity of any existing violation of any standard in any area, or delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.” of the following jurisdictions:

- The portion of Guilford County within the Burlington-Graham Urban Area Metropolitan Planning Organization (BGMPO)
- The portions of Guilford County within the Greensboro Urban Area Metropolitan Planning Organization (GUAMPO)
- The portions of Guilford, Davidson and Forsyth Counties within the High Point Urban Area Metropolitan Planning Organization (HPMPO)
- The portions of Forsyth, Davidson and Davie Counties within the Winston-Salem Urban Area Metropolitan Planning Organization (WSMPO)
- The portions of Davidson and Davie Counties outside the MPO boundary that are in the Triad Non-Attainment Area/Maintenance.

This conformity determination is based on a regional emissions analysis that uses the transportation network approved by the above-named Metropolitan Planning Organizations (MPOs) for the 2035 LRTPs, VMT and Speed input data developed by NCDOT, and emissions factors developed by the North Carolina Division of Air Quality (NCDAQ).

Based on this analysis, the 2035 LRTPs for the Piedmont Triad Region (BGMPO, GUAMPO, HPMPO, WSMPO and the relevant county portions of Davidson and Davie) are consistent with the intent of conformity requirement. The conformity analysis for the relevant portion of the Piedmont Triad Rural Planning Organization (RPO) during the TIP years is specifically addressed by the North Carolina Department of Transportation (NCDOT). The NCDOT’s analysis also shows the TIPs conform to the purpose of the North Carolina SIP (or less than baseline emissions where no SIP budgets have been approved or found adequate).

The USEPA designated the counties of Guilford, Davidson, Forsyth and Davie for the one hour ozone (O₃) standard. The 1990 Clean Air Act Amendments (CAAA) designated these areas as moderate non-attainment area for the one hour O₃ standard. However, due to improved monitoring data, this area was redesignated as maintenance for the one hour O₃ standard on November 8, 1993.

On April 2, 2008, the USEPA revoked the one-hour standard for the Triad Area counties of Guilford, Davidson, Forsyth and Davie under rulemaking effective on April 15, 2008. As of April 15, 2009, the Triad Area will no longer have to demonstrate conformity for the one-hour ozone (O₃) standard.

The USEPA designated Forsyth County for carbon monoxide (CO) as defined by the EPA. The 1990 Clean Air Act Amendments (CAAA) designated these areas as moderate non-attainment

area for CO. However, due to improved monitoring data, this area was redesignated as maintenance for CO on November 7, 1994.

The USEPA designated Davidson and Guilford Counties, in their entirety, as a non-attainment area for the PM 2.5 Standard with an effective date of April 5, 2005.

The Triad Area LRTPs have the following horizon years: 2015, 2025 and 2035. Each analysis year includes anticipated population, employment data, and roadway projects that are expected open. The LRTPs are fiscally constrained meaning that funding sources for roadway projects are identified.

NCDAQ prepared base and future emission rates for the vehicle fleet using Mobile 6.2. These rates were applied to VMT from the Piedmont Triad Regional Model (PTRM) and the rural spreadsheet. There are State Implementation Plan (SIP) motor vehicle emission budgets (MVEB) for the 1-hour ozone and CO standards. MVEBs are currently proposed for the PM 2.5 standard.

Table 1 summarizes the conformity requirements of 40 CFR Part 51 and 93 and gives the status of the LRTPs in relation to each of these requirements. Table 2 contains results from the regional emissions analysis for the Triad Non-attainment/Maintenance Areas (Davidson, Guilford, Forsyth and Davie Counties). In every horizon year for every pollutant in each geographic area, the emissions expected from the implementation of the LRTP and TIP are less than the emissions budgets established in the SIP (or less than baseline emissions where no SIP budgets have been approved or found adequate). Table 4 contains a cross-reference index for the report.

Table 1. Status of Conformity Requirements

Criteria (√ indicates the criterion is met)	Burlington -Graham MPO	Greensboro MPO	Forsyth MPO	High Point MPO	Rural County Portion of Davidson and Davie
Less Than Emissions Budget(s) or Baseline	√	√	√	√	√
TCM Implementation	N/A	N/A	N/A	N/A	N/A
Interagency Consultation	√	√	√	√	√
Latest Emissions Model	√	√	√	√	**
Latest Planning Assumptions	√	√	√	√	√
Fiscal Constraint	√	√	√	√	√

** Rural spreadsheet was used

Table 2. Emissions Comparison Summary

Forsyth County Emissions Comparison Summary

Forsyth County Emissions Comparison (Tons/Day) ¹				
Analysis Year	NOX		VOC	
	L RTP Emissions (Tons/Day)	SIP Budget Amount (Tons/Day)	L RTP Emissions (Tons/Day)	SIP Budget Amount (Tons/Day)
2010	13.16	15.04	7.84	10.31
2012	10.72	12.72	7.13	9.36
2015	7.84	9.59	6.13	8.50
2025	3.94	9.59	3.76	8.50
2035	3.75	9.59	4.25	8.50

Forsyth County Emissions Comparison (Tons/Day) ¹		
Analysis Year	CO	
	L RTP Emissions (Tons/Day)	SIP Budget Amount (Tons/Day)
2015	115.95	247.64
2025	105.31	247.64
2035	119.83	247.64

Guilford County Emissions Comparison Summary

Guilford County Emissions Comparison (Tons/Day) ¹				
Analysis Year	NOX		VOC	
	L RTP Emissions (Tons/Day)	SIP Budget Amount (Tons/Day)	L RTP Emissions (Tons/Day)	SIP Budget Amount (Tons/Day)
2010	20.63	20.87	12.45	14.86
2012	16.81	17.66	11.41	13.46
2015	12.46	13.28	10.01	12.17
2025	6.53	13.28	6.34	12.17
2035	6.28	13.28	7.34	12.17

Guilford County Interim Test (Less than Baseline) Emissions Comparison (KG/Year)		
Analysis Year	PM2.5	
	L RTP Emissions (KG/Year)	2002 Baseline Emission (KG/Year)
2002	226,008	
2010	145,979	226,008
2015	110,036	226,008
2025	85,712	226,008
2035	101,175	226,008

Guilford County NOx (for PM 2.5)		
Analysis Year	L RTP Emissions (KG/Year)	2002 Baseline Emission (KG/Year)
	2002	14,142,913
2010	7,812,825	14,142,913
2015	4,436,572	14,142,913
2025	2,247,062	14,142,913
2035	2,157,763	14,142,913

Davidson County Emissions Comparison Summary

Davidson County Emissions Comparison (Tons/Day) ¹				
Analysis Year	NOX		VOC	
	L RTP Emissions (Tons/Day)	SIP Budget Amount (Tons/Day)	L RTP Emissions (Tons/Day)	SIP Budget Amount (Tons/Day)
2010	7.84	8.09	4.24	4.91
2012	6.48	6.83	3.87	4.50
2015	4.67	5.15	3.26	4.12
2025	2.15	5.15	1.86	4.12
2035	1.70	5.15	1.96	4.12

Davidson County Interim Test (Less than Baseline) Emissions Comparison (KG/Year)		
Analysis Year	PM2.5	
	L RTP Emissions (KG/Year)	2002 Baseline Emission (KG/Year)
2002	90,656	
2010	50,233	90,656
2015	37,225	90,656
2025	26,970	90,656
2035	28,058	90,656

Analysis Year	Davidson County NOx (for PM 2.5)	
	LRTP Emissions (KG/Year)	2002 Baseline Emission (KG/Year)
2002	5,638,248	
2010	2,915,785	5,638,248
2015	1,651,675	5,638,248
2025	747,256	5,638,248
2035	598,232	5,638,248

Davie County Emissions Comparison

Davie County Emissions Comparison (Tons/Day) ¹				
Analysis Year	NOX		VOC	
	LRTP Emissions (Tons/Day)	SIP Budget Amount (Tons/Day)	LRTP Emissions (Tons/Day)	SIP Budget Amount (Tons/Day)
2010	0.02	0.05	0.01	0.03
2012	0.02	0.05	0.01	0.03
2015	0.01	0.05	0.01	0.03
2025	0.01	0.05	0.01	0.03
2035	0.01	0.05	0.01	0.03

Table 4. Cross-reference Index	
Conformity Determination Report for the Long-Range Transportation Plan in the Triad Urban Area Non-Attainment/Maintenance Area	
Conformity Requirement – Federal Register	Appendix A
Formal findings of conformity.	to be added
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The purpose of this report is to comply with the requirements of the CAAA, TEA-21, and 40 CFR 51 and 93.	p. 4
The former and current classification of the air shed and the pollutants for which the air shed was classified as non-attainment.	p. 10
The date the region was designated non-Attainment under the PM 2.5 standard.	p. 16
The emissions expected from implementation of the long-range plan are equal to, or less than, the base year emissions generated	p. 16
The adopted long-range plan is fiscally constrained (§93.108).	p. 17
The latest planning assumptions were used in the conformity analysis (§93.110).	p. 18 Appendix B
The latest emissions model was used in the conformity analysis (§93.111).	p. 23
The list of federally funded T.C.M. activities included. (§93.113).	NA
Conformity determined according to §93.105 and the adopted public involvement procedures.	p. 33
Dates of the Technical Coordinating Committee reviews of the conformity determination and the recommendation.	to be added
SIP emissions budget test or baseline comparison demonstrates conformity of the adopted long-range transportation plan.	p. 29
Listing of projects in each analysis year (highway).	Appendix C
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Analysis of “rural area” projects.	Appendix G
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Significant comments of reviewing agencies addressed by the MPO, or a statement that no significant comments were received.	Appendix B
Emissions Calculations.	Appendix E
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Projects from the FY 2009-2015 Transportation Improvement Program:

- **The portions of Davidson and Davie County that are within the Triad Non-Attainment/Maintenance Area but outside the Metropolitan Planning Organization 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 provides USEPA the authority 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 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 Division of Air Quality (NCDAQ). 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 non-attainment 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 non-attainment 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 plans 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 and the Safe Accountable Flexible Efficient Transportation Equity Act-Legacy for Users (SAFETEA-LU) - 2005. This report demonstrates that the activities resulting from the implementation of the fiscally constrained LRTPs and the TIPs will not “cause or contribute to any new violation of any standard in any area, increase the frequency or severity of any existing violation of any standard in any area, or delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.” The following jurisdictions apply:

- The portion of Guilford County within the Burlington-Graham Urban Area Metropolitan Planning Organization (BGMPO)
- The portion of Guilford County within the Greensboro Urban Area Metropolitan Planning Organization (GUAMPO)
- The portions of Guilford, Davidson and Forsyth Counties within the High Point Urban Area Metropolitan Planning Organization (HPMPO)
- The portions of Forsyth, Davidson and Davie Counties within the Winston-Salem Urban Area Metropolitan Planning Organization (WSMPO)
- The county portions of Davidson and Davie outside the MPO boundary that are in the Triad Non-Attainment/Maintenance Areas.

This conformity determination is based on a regional emissions analysis that uses the transportation network approved by the above-named Metropolitan Planning Organizations (MPOs) for the 2035 LRTPs, VMT and Speed input data developed by NCDOT, and emissions factors developed by the Forsyth County Environmental Affairs Department (FCEAD) in cooperation with the North Carolina Division of Air Quality (NCDAQ). The Triad non-attainment areas for Guilford, Davidson Forsyth and Davie Counties for 1-hour ozone, CO and PM 2.5 are 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). Triad MPO non-attainment and maintenance areas are required by 23 CFR 134 and 40 CFR 51 and 93 to make a conformity determination on any adopted or amended fiscally constrained long-range transportation plan and related 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 four MPO Plans in the Triad region and the related TIPs for the non-attainment and maintenance areas.

Figure 1A. Triad Area PM 2.5 Non-attainment Areas

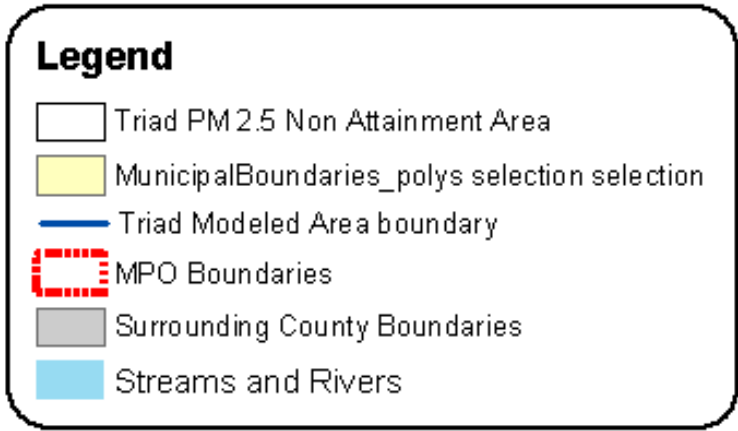
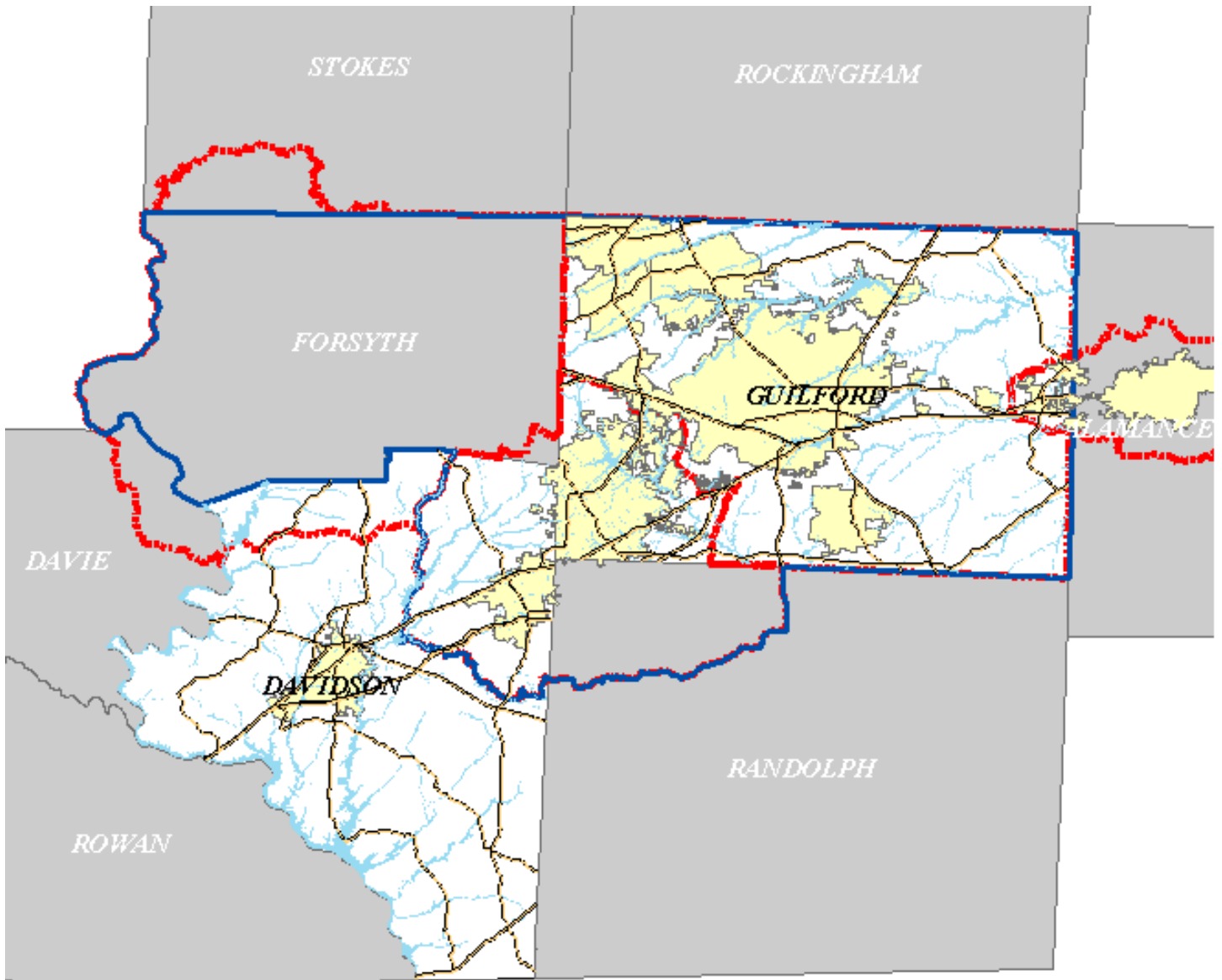
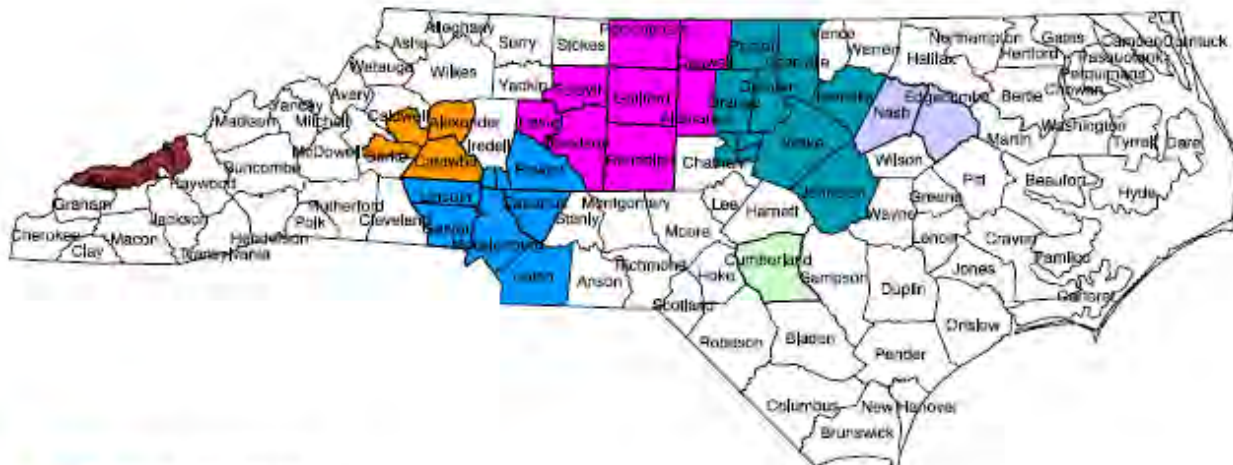


Figure 1B. State of North Carolina Ozone Non-attainment Areas

EPA's Boundary Designations for 8-Hour Ozone Standards for North Carolina (4/15/04)



- Triangle_cty_415.shp
- ncco_meter.shp
- charlotte_cty_415.shp
- Charlotte_twn_1.shp
- Triad_cty_415.shp
- Triangle_twn.shp
- unifour_cty_415.shp
- Mpo_hickory
- Great Smoky Mtn.
- Fayetteville Area.shp
- Rockymount_cty_415.shp



Notes:
Charlotte area: Moderate, Max. attainment date: June 2010
Triad area (EAC): Marginal, Max. attainment date: Dec. 2007
Triangle area: Basic, Max. attainment date: June 2009
Unifour area(EAC): Basic, Max. attainment date: Dec 2007
Haywood & Swain cos: Basic, Max. attainment date: June 2009
Fayetteville area(EAC): Basic, Max. attainment date: Dec 2007
Rocky Mount area: Basic, Max. attainment date: June 2009

Figure 1C. State of North Carolina CO Non-attainment Areas

North Carolina CO Maintenance Areas



Forsyth County was Redesignated Nov, 1994
Redesignation was projected Sept. 18, 1995
for Mecklenburg, Durham and Wake Counties

Note: Not to Scale
April 6, 2004

In order to assist the Triad Area in making a conformity determination on the adopted 2035 fiscally constrained LRTPs, the following agencies shared leading roles composing substantial portions of this document:

Table 5.

<i>Agency</i>	<i>Counties</i>
BGMPO	Guilford (part)
Greensboro MPO	Guilford (part)
High Point MPO	Guilford (part) , Davidson (part) and Forsyth (part)
Winston-Salem MPO	Forsyth, Davidson (part) and Davie (part)
NCDOT	Forsyth, Davidson, Davie and Guilford

This analysis is consistent with the set of amendments to 40 CFR Part 93, published in the January 24, 2008 **Federal Register**, *Transportation Conformity Rule Amendments to Implement Provisions Contained in the 2005 Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A legacy for Users (SAFETEA-LU)*. Based on the regional emissions budget test and interim tests documented in this report, the following LRTPs conforms to the purpose of the North Carolina SIP (or less than baseline emissions where no SIP budgets have been approved or found adequate):

- Greensboro Urban Area MPO 2035 LRTP & 2009-2015 TIP Projects
- High Point Urban Area MPO 2035 LRTP & 2009-2015 TIP Projects
- Winston-Salem Urban Area MPO 2035 LRTP & 2009-2015 TIP Projects
- Burlington-Graham Urban Area MPO 2035 LRTP & 2009-2015 TIP Projects
- Rural County Portions of Davidson and Davie 2009-2015 TIP Projects outside of the MPO boundaries

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 the rural portion of each county outside the MPOs.

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*).
- 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 the MPOs 2035 LRTPs and the projects out of the 09-15 STIPs in rural areas outside of the MPO boundaries meets each condition. Each condition is discussed in the following sections of this report.

2 Air Quality Planning

The USEPA designated the counties of Guilford, Davidson, Forsyth and Davie for the one hour ozone (O₃) standard. The 1990 Clean Air Act Amendments (CAAA) designated these areas as moderate non-attainment area for the one hour O₃ standard. However, due to improved monitoring data, this area was redesignated as maintenance for the one hour O₃ standard on November 8, 1993.

On April 2, 2008, the USEPA revoked the one-hour standard for the Triad Area counties of Guilford, Davidson, Forsyth and Davie under rulemaking effective on April 15, 2008. As of April 15, 2009, the Triad Area will no longer have to demonstrate conformity for the one-hour ozone (O₃) standard.

The USEPA designated Forsyth County for carbon monoxide (CO) as defined by the EPA. The 1990 Clean Air Act Amendments (CAAA) designated these areas as moderate non-attainment area for CO. However, due to improved monitoring data, this area was redesignated as maintenance for CO on November 7, 1994.

The USEPA designated Davidson and Guilford Counties, in their entirety, as a non-attainment area for the PM 2.5 Standard with an effective date of April 5, 2005.

The Federal Register notices containing the SIP MVEBs for each designated pollutant for the Triad Area is provided in Appendix A.

2.1 Emissions Budget and Baseline Emissions

NCDOT performed the less than the base year (2002) analysis as the interim emissions tests for direct PM_{2.5} and NO_x. NCDAQ is currently working on the SIP for the Triad PM_{2.5} non-attainment area so it is not likely that the MVEBs will be found adequate or approved by the time this transportation conformity determination is completed. Therefore, the Triad PM_{2.5} non-attainment area (Davidson and Guilford Counties), future long range transportation plan and TIP emissions can not be compared to a budget, but are instead compared to emissions estimated from PTRM and Rural spreadsheet models for the 2002 baseline year. The following requirements have been addressed as part of this conformity determination.

For the 1-hour ozone and CO standard there are approved SIP MVEBs and comparisons will be made to the MVEBs to demonstrate conformity.

Section 4 of this report provides the regional emissions analysis using the interim emissions tests and comparisons to the MVEBs where applicable.

Table 6: Motor Vehicle Emission Budgets

Forsyth County is maintenance for the Carbon Monoxide (CO) standard. A MVEB was established for 2015 and emission limits based on the MVEB is indicated below:

CO: Current CO SIP (tons/day)						
Area	Comparison Year					
	2007	2010	2012	2015	2025**	2035**
Forsyth	NA	NA	NA	247.64	247.64	247.64

***The MVEB for 2015 will be used for the 2025 and 2035 comparison since 2015 is the last year that a MVEB is provided for VOC and NOx*

1-Hour Ozone (Safety Margin SIP revision):

VOC: Proposed 1-hour Ozone SIP (tons/day)						
Area	Comparison Year					
	2007	2010	2012	2015	2025**	2035**
Davidson	5.77	4.91	4.50	4.12	4.12	4.12
Davie*	0.01	0.03	0.03	0.03	0.03	0.03
Forsyth	12.06	10.31	9.36	8.50	8.50	8.50
Guilford	17.55	14.86	13.46	12.17	12.17	12.17

Vol. 73, No. 68, effective June 9, 2008

NOx: Proposed 1-hour Ozone SIP (tons/day)						
Area	Comparison Year					
	2007	2010	2012	2015	2025**	2035**
Davidson	10.49	8.09	6.83	5.15	5.15	5.15
Davie*	0.03	0.05	0.05	0.05	0.05	0.05
Forsyth	19.53	15.04	12.72	9.59	9.59	9.59
Guilford	27.28	20.87	17.66	13.28	13.28	13.28

Vol. 71, No. 57, effective May 23, 2006

**Davie County is a partial county*

***The MVEB for 2015 will be used for the 2025 and 2035 comparison since 2015 is the last year that a MVEB is provided for VOC and NOx*

3 Long Range Transportation Plans

Federal law *40 CFR part 93.104(b)(3)* requires a conformity determination on LRTPs no less frequently than every four years. As required in *40 CFR 93.106*, the horizon years for the LRTPs are no more than ten years apart.

The BGMPO includes a small portion Guilford County. The GUAMPO includes the majority portion of Guilford County. The HPMPO includes portions of Guilford, Davidson, and Forsyth Counties. WSMPO includes Forsyth County and portions of Davidson and Davie Counties. The remaining portions of the non-attainment area are rural areas of Davidson and Davie Counties outside of the MPO boundaries.

3.1 Consultation

The 2035 LRTP is 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 October 30, 2007, November 29, 2007, January 4, 2008, February 8, 2008, March 14, 2008, April 18, 2008, May 19, 2008, May 22, 2008, June 12, 2008, June 19, 2008, June 27, 2008, July 3, 2008, August 26, 2008, and November 10, 2008. A summary of the topics discussed and a list of the attendees at each of these meetings is included in Appendix B.

3.2 Financial Constraint Assumptions

The LRTPs are fiscally constrained as discussed in *40 CFR 93.108*. The Greensboro Urban Area MPO, the High Point Urban Area MPO, the Winston-Salem Urban Area MPO and the Burlington-Graham LRTPs are fiscally constrained to the year 2035. All projects included in the 2009-2015 TIPs 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 LRTP. 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 LRTPs. They are also described in greater detail in Appendix C.

3.3 Latest Planning Assumptions

The 2035 LRTPs were developed with the latest planning assumptions as discussed in *40 CFR 93.110*. The Piedmont Travel Demand Model (PTRM) was developed by NCDOT, Triad MPOs, and PART for the urbanized portion of the Triad non-attainment area. The MPOs provided housing, employment, and population projections, and a set of highway and transit projects consistent across jurisdictional boundaries was developed through regional MPO coordination. Additional detail on these planning assumptions is provided below.

Land use and demographic data were collected by regional planning agencies and staff members of BGMPO, GUAMPO, HPMPO and WSMPO. A regional methodology was agreed upon that included updating residential and employment data to the end of 2002, and preparing growth forecasts to 2035.

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.

Forecasts were prepared by local planning department staff with guidance from staff at the four MPOs. 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 MPOs Transportation Advisory Committee. Additional detail of arriving at these planning assumptions can be found in Appendix B for the Triad Transportation Conformity Consensus Plan.

The Piedmont Triad Regional Model (PTRM) 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 PTRM TransCAD model was developed by the PTRM Model Team, and adopted by the Executive Committee, and is housed at PART. The PTRM TransCAD model covers the contiguous boundaries of Guilford and Forsyth Counties (including the portions within the BG MPO) and a portion of Davidson County (including the portion within the HPMPO, and WSMPO)

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 the county rural areas of Davidson and Davie and is factored based on population percentage for those portions of non-attainment counties not covered by the PTRM TransCAD 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 2035 LRTP process in each MPO. Outside of the MPO boundaries, TIP projects from the 2009-2015 TIP served as the future year roadway projects. For the 2035 LRTPs, lists of needed projects were developed based on modeled congestion and identified local needs. Improvements were coded into the TDM and analyzed. Intermediate analyses for the years 2015, and 2025 were performed to assist in prioritizing the 2035 roadway needs. The final 2009, 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 (2002) and the four future networks (2009, 2015, 2025, and 2035) used for the conformity determination are the same as the networks used for the 2035 LRTPs. 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.

Figure 2. Regional Significance

The following criteria is used to identify major existing and future regional roadway systems that may produce significant impacts to air quality emissions with respect to the Triad region.

Regional Significance Criteria

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; and
4. The facility is included in the travel model for the region (In many cases collector streets are modeled that are not regionally significant).

To be regionally significant a facility should meet one or more of the criteria in this checklist. 40 CFR Part 93.101

Appendix C includes lists of the future year roadway projects in the Triad area as indicated below, including indications of which projects are regionally significant and which projects are exempt.

Table 7.

Area	Roadway Project List Appendix C
Greensboro Urban Area MPO	2035 LRTP (Appendix C1) 2009-2015 TIP (Appendix C2)
High Point Urban Area MPO	2035 LRTP (Appendix C3) 2009-2015 TIP (Appendix C4)
Winston-Salem Urban Area MPO	2035 LRTP (Appendix C5) 2009-2015 TIP (Appendix C6)
Burlington-Graham MPO	2035 LRTP (Appendix C7) 2009-2015 TIP (Appendix C8)
NCDOT (Rural County portion of Davidson and Davie)	2009-2015 TIP (Appendix C9 and C10)

The exempt projects listed in Appendix C, both highway and transit, will serve as the LRTPs/TIPs 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 conformity lapse. This will allow exempt projects to receive federal funding. 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.

Table 8.

Area	Transit Project List Appendix C
Greensboro Urban Area MPO	2035 LRTP (Appendix C1)
High Point Urban Area MPO	2035 LRTP (Appendix C3)
Winston-Salem Urban Area MPO	2035 LRTP (Appendix C5)
Burlington-Graham MPO	2035 LRTP (Appendix C7)
NCDOT (Rural County portion of Davidson and Davie)	2009-2015 TIP (Appendix C9 and C10)

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 will be allocated to projects serving more than one non-attainment area on a competitive basis. MPO and RPO project priorities and project applications for statewide funding. This conformity report includes a listing of funded CMAQ projects in the Triad Area in Appendix D, for those projects within the non-attainment/maintenance areas.

3.7 Travel Demand Model:

Piedmont Triad Regional Model (PTRM) and the NCDOT Rural Spreadsheet. The PTRM is housed at PART and the rural spreadsheet is housed at NCDOT.

The PTRM completely covers the metropolitan area boundaries (MABs) for the WSMPO (Forsyth, Davidson and Davie), the HPMPO (Davidson, Guilford and Forsyth), the GUAMPO (Guilford) and the BGMPO (Guilford). Guilford and Forsyth counties are completely within the Piedmont Triad Regional Model (PTRM) boundary. Davidson and Davie counties are partially covered by the PTRM and the remainder of the county will be covered using the NCDOT rural spreadsheet. NCDOT utilizes a spreadsheet that incorporates the VMT universe file and historical trends to project the VMT to the horizon years at the county level. 1997-2006 VMT data is expressed as Daily Vehicle Miles of Travel (DVMT). This data is based upon the Annual Average Daily Traffic (AADT) in the universe file. The annual Highway Performance Monitoring System (HPMS) VMT reported to the Federal Highway Administration (FHWA) is derived from a subset of the universe file. North Carolina records AADT data for all roads in all functional classifications. However, only 73.8% of the local functionally classified road mileage was

covered by actual counts. For links without counts, an Average Daily Traffic (ADT) count of 400 vehicles per day was assumed.

The projection of VMT was based on a trend line using an ordinary least squares linear regression extrapolation of a 10-year period 1997-2006 for Davie and Davidson Counties. The total VMT, including rural and urban road types, was used to perform statistical analysis. This approach will compensate for the reclassification of VMT from year to year due to the expansion of urbanized boundaries or other reasons. Therefore, a regression analysis was performed to determine the correlation of data and predicted VMT values for the specific years of interest. Finally, 2006 VMT by functional classes (using the ratio of each functional class's VMT to the total VMT) was used to disaggregate projected VMTs. Results were evaluated for reasonable growth and consistency. This VMT projection methodology was based on the EPA document Section 187, VMT Forecasting and Tracking Guidance, January 1991.

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 MOBILE 6.2 emissions program. Then, emission factors developed by MOBILE 6.2 are imported into the spreadsheet and multiplied by forecasted VMT to generate emissions. The rural spreadsheet model will be used for parts of Davidson and Davie Counties and will be factored based on population percentages for those portions of non-attainment counties not covered by the PTRM. This methodology has been used to demonstrate conformity in other areas and received approval from the interagency partners.

3.8 Mode Split / Mode Choice: Piedmont Triad Regional Model (PTRM)

The PTRM estimates the probability of selecting the entire range of travel modes (excluding freight) for each potential origin and destination in the region, as defined by the regional network and zone system. The mode split model uses a logit formulation to estimate the probability of choosing a particular mode. For the PTRM a total of 28 model alternatives (travel modes) are considered. While not all of these modes are allowed for each purpose, and some await data for calibration, the model structure is designed to accommodate a full range of potential alternatives. The primary or top level alternatives are auto, non-motorized, transit and school bus. Within each of the primary alternatives considered there are separate nest created for alternative travel patterns; thus creating a total of 28 alternatives.

The PTRM includes the following trip purposes: home-based work, home-based school, home-based shopping, home-based other, Non-home-based work, non-home-based other, home-based college/university, and airport traveler trips.

3.9 Method of Reporting VMT and Speed

The PTRM was developed in 2007 with 2004 ground counts and projected to 2008 model counts using an equilibrium loading method. This method assigns vehicle trips based on equalizing the capacity on the network links. After the vehicle trips are assigned, the PTRM must be separated by designated non-attainment region to be analyzed independently.

For each designated non-attainment area, the PTRM has the capability to provide daily VMT and Speed output for each fiscally constrained analysis year network corresponding to programmed

TIP construction projects and post year construction projects. VMT and average speeds by functional classification derived directly from model link data are essential inputs required to the run the MOBILE6.2 emissions model. The fiscally constrained year networks are used as inputs into a link analysis tool called "Truspeed". "Truspeed" is a post processor that calculates link travel speeds based on assigned traffic volume, number of through lanes, and number of signals per mile. "Truspeed" is based on Chapters 3 and 11 of The Highway Capacity Manual. Truspeed calculates and aggregates the vehicle miles traveled (VMT) and travel speeds by functional classification for each analysis year network.

Since the PTRM transportation networks are in NAD83 meters, the Truspeed travel units were in vehicle kilometers of travel (VKT), but then converted to vehicle miles of travel (VMT). All VMT and Speed data used in the conformity determination are from the last iteration of the PTRM. The VMT for each functional class is then multiplied by emissions factors from the MOBILE6.2 model (See Appendix E) to determine the total emissions for each fiscally constrained network year. The VMT and Speed data summary are found in Appendix F.

4. Regional Emission Tests

Baseline and action scenarios were developed to use in the emissions tests. The Baseline and action scenarios were agreed to through the interagency consultation process. The Baseline scenario is the set of highway, transit, pedestrian/bicycle and travel demand management facilities and services, and accompanying socioeconomic conditions, in place as of December 2002. The Baseline scenario includes the 2002 highway and transit networks as described in the previous section. The action scenarios include all of the Baseline scenario components, plus those facilities and services resulting from implementation of the transportation plans in each analysis year, including 2010, 2015 and 2025 interim years and the 2035 horizon year.

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 FCEAD and quality checked by NCDAQ.

Table 9 illustrates what parts of the Triad Ozone Non-Attainment Area have emissions budgets, what parts are covered by the Piedmont Triad Regional Model (PTRM) and how each part was analyzed for each pollutant in each comparison year.

Two counties in the non-attainment/maintenance area are completely within the TDM boundary (Guilford and Forsyth). Portions of Davidson and Davie County are outside of the TDM boundary.

4.0.1. Sub-area emission budgets

All of Guilford, Davidson, Forsyth and Davie County are maintenance areas under the 1-hour ozone standard and have motor vehicle emission budgets (MVEBs). Forsyth County is maintenance under the CO standard and also has MVEB. The 1-hour ozone and CO MVEBs were used in performing the emission budget test.

4.0.2 Emissions analysis source

Vehicle Miles of Travel (VMT) and speeds for the emissions analysis were derived from the PTRM where it is available. Davidson and Davie County VMT and speeds came from the NCDOT rural spreadsheet; VMT and speeds for the portions of Davidson and Davie 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 that has been used in prior analyses.

4.0.3 Emissions comparison years (ozone)

For areas with budgets under the 1-hour standard (Guilford, Davidson, Forsyth and Davie) emissions must be analyzed for years where there is a 1-hour emission budget, the attainment year (if applicable), the horizon year and intermediate years such that intervals do not exceed 10 years. The following years were analyzed to meet the requirements: 2010 (model run & 1-hour budget year), 2012 (model run & 1-hour budget year), 2015 (model run & 1-hour budget year), 2025 (model run & intermediate year), and 2035 (model run & LRTP horizon year).

In accordance with 40 CFR 93.118, since there was no budget for the required analysis years 2010, 2015, 2025 and 2035, the 2007 budget was used for 2010 comparison, the 2012 budget was used for the 2012 comparison and the 2015 budget was used for 2015, 2025 and 2035 comparisons.

Table 9. Triad Area Transportation Conformity Analysis Matrix

County	Area model status	Area emissions budget status	Emissions analysis source	2002 ¹ Baseline	2010	2012	2015	2025	2035 Horizon
Guilford	modeled all	03-Yes PM2.5-to EPA by 4.5.08	TDM	PM2.5	PM2.5 O3	O3	PM2.5 O3	PM2.5 O3	PM2.5 O3
Davidson	modeled area	03-Yes PM2.5-to EPA by 4.5.08	TDM	PM2.5	PM2.5 O3	O3	PM2.5 O3	PM2.5 O3	PM2.5 O3
	rural area	03-Yes PM2.5-to EPA by 4.5.08	rural spreadsheet	PM2.5	PM2.5 O3	O3	PM2.5 O3	PM2.5 O3	PM2.5 O3
Forsyth	modeled all	03-Yes PM2.5-to EPA by 4.5.08	TDM		O3	O3	CO O3	CO O3	CO O3
Davie	rural area	03-Yes	rural spreadsheet		O3	O3	O3	O3	O3

¹ **Footnotes for table:**

¹ Until the PM2.5 SIP MVEBs are found adequate or approved we will need to demonstrate conformity using the less than 2002 baseline test

² PM2.5 attainment date in the SIP that NCDAQ will submit to EPA by 4/5/08. Also need an analysis yr with 5 yrs of when a conformity determination is done for interim emissions test

County:

- ❑ 1- Hour Ozone: The Triad ozone maintenance area consists of 3 whole counties (Guilford, Davidson and Forsyth) plus one partial county (Davie). The ozone maintenance area includes two donut areas (Davidson and Davie) represented by the NCDOT in cooperation with the Piedmont Triad Rural Planning Organization (RPO) and the Northwest Piedmont RPO.
- ❑ CO: The Triad CO maintenance area consists of one whole county (Forsyth)
- ❑ PM 2.5: The Triad PM 2.5 non-attainment area consists of 2 counties (Guilford and Davidson) and one donut area (Davidson)

**Note: a donut area is an area outside the MPO boundary but within the non-attainment/maintenance area.*

4.0.4 Emission comparison years (CO)

Forsyth County has a CO maintenance SIP. This Maintenance Plan update provides a 2015 budget for Forsyth County which is applicable from 2015 onwards. Forsyth County is entirely within the modeled area and has emissions budgets under the SIP; the PTRM was used as the analysis tool. Listed below is specific CO budget and comparison year information:

- SIP Budget Years: 2015 (Forsyth County)
- Comparison Years for CO SIP – 2015, 2025, 2035 (Forsyth County)

4.0.5 Emission comparison years (PM 2.5)

Since there will not be a SIP that will be found adequate or approved before this conformity determination is completed an interim emissions budget test (40 CFR 93.119) must be done for this analysis. 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 (i.e. within 5 years of 2009), the horizon year (2035 in all cases), and intermediate years such that intervals do not exceed 10 years. In order to meet these conditions, the years 2002 (baseline), 2010, 2015, 2025 and 2035 (LRTP horizon) were analyzed.

4.1 Emissions Model

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

<u>Strategy</u>	<u>Methodology/Approach</u>
<i>I/M Program</i>	<i>Accounted for in MOBILE6.2 model</i>
<i>Tier 2 vehicle’s Emission Standards</i>	<i>Accounted for in MOBILE6.2 model</i>
<i>Low Sulfur Gasoline and Diesel fuels</i>	<i>Accounted for in MOBILE6.2 model</i>
<i>Heavy Duty Vehicle Rules 2004 and 2007</i>	<i>Accounted for in MOBILE6.2 model</i>
<i>Low RVP Gasoline</i>	<i>Accounted for in MOBILE6.2 model</i>
<i>On board vapor recovery</i>	<i>Accounted for in MOBILE6.2 model</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

The following MOBILE model-input parameters will be used in the conformity analysis.

- CO Maintenance Area: Forsyth County**
- 1-hr Ozone Maintenance Area: Davidson, Davie, Forsyth and Guilford Counties**
- PM_{2.5} Non-attainment Area: Davidson and Guilford Counties**

<u>Parameter</u>	<u>Details</u>	<u>Data Source</u>
a. <i>Emissions Model Version(s):</i>		Mobile 6.2
b. <i>Emission Model Runs:</i>		Typical Summer Weekday (VOC and NOx) Typical Winter Weekday (CO)

- c. **Time Periods:** Quarterly (NOx and Direct PM_{2.5})
Daily for VOC, NOx, CO
- d. **Pollutants Reported:** Quarterly for NOx and Direct PM_{2.5}
CO, VOC, NOx (both for PM_{2.5} and Ozone) and Direct PM_{2.5}
- e. **Emissions Budget Years:** 1 hr Ozone: 2007, 2010, 2012, 2015
CO: 2015
- f. **Emissions Analysis Years:** 2002, 2010, 2015, 2025, 2035
- g. **Vehicle Classes:** 16
- h. **Max/Min Temperatures for NOx & VOC Emissions:** Min: 66, Max: 89
- i. **Max/Min Temperature for CO Emissions:** Min/Max: 50.9
- j. **Quarterly Temperatures for PM_{2.5} & NOx Emissions:**
Based on the 57 year mean max/min temperatures from Greensboro (KGSO)

	Max (F)	Min (F)
1st quarter	53.2	31.9
2nd quarter	77.4	54.8
3rd quarter	84.4	64.4
4th quarter	60.2	38.4

- k. **VMT Mix:** Statewide mix based on 2006 data using the method
in the August 2004 USEPA Guidance.
- l. **Speeds:** From PTRM and Rural spreadsheet
- m. **Vehicle Age Distribution:** Based on 2005 vehicle registration data
provided by NCDOT.
- n. **I/M Program:** 2002: Idle test for Guilford County
2009, 2015, 2025, 2035: OBD-II for Davidson,
Forsyth and Guilford Counties.
- o. **Anti-tampering Applicability:** 1968-2050
- p. **RVP*:** 15.0 psi for CO emissions runs for Forsyth County;
7.8 psi for NOx & VOC runs for Davidson, Davie,
Forsyth and Guilford Counties.
Quarterly for Direct PM_{2.5} & NOx for Davidson and
Guilford Counties.

	4 RVP
1st quarter	14
2nd quarter	10.1
3rd quarter	7.8
4th quarter	14

*RVP - Reid Vapor Pressure is a measure of gasoline volatility

- q. **Strategies:** See item #12 above
- r. **I/M Fraction for Davidson:** 0.94 for 2009, 2010, 2015, 2025, and 2035.
- s. **I/M Fraction for Forsyth:** 0.91 for 2009, 2015, 2025, and 2035.

- t. *I/M Fraction for Guilford:* 0.76 for 2002; 0.94 for 2009, 2010, 2015, 2025, and 2035.
- u. *Evaluation Month:* Set evaluation month to “7” for NOx & VOC runs
Set evaluation month to “1” for CO runs
Set evaluation month to “1” for 1st and 2nd quarters & “7” for 3rd and 4th quarters for Direct PM_{2.5} and NOx.
- v. *VMT:* PTRM and rural spreadsheet
- w. *Diesel Sulfur Content:* Based on USEPA Technical Guidance on the Use of MOBILE6.2 for Emission Inventory Preparation (August 2004)

Diesel Sulfur (ppm)	2002	2009	2010	2015	2025	2035
1st quarter	340	43	43	11	11	11
2nd quarter	370	43	43	11	11	11
3rd quarter	400	43	11	11	11	11
4th quarter	370	43	11	11	11	11

x. *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 defaults are 7.28 starts for passenger cars and 8.06 starts for light duty trucks.

Mobile6 Defaults Vehicle type	# of starts
1(LDGV)	7.28
2(LDGT1)	8.06
3(LDGT2)	8.06
4(LDGT3)	8.06
5(LDGT4)	8.06
6(HDGV2B)	6.88
14(LDDV)	7.28
15(LDDT12)	8.06
24(MC)	1.35
28(LDDT34)	8.06

However, the use of default rates isn't the best practice for heavily urbanized area with an updated travel Demand model. Area specific rates could be calculated by dividing the total number of trips from the travel demand model by the total number of registered vehicles. Therefore:

- Step one: DMV Reg data were obtained for calendar years 2002-2007. According to DMV, data prior to 2002 weren't reliable. Reg data were received by veh type and for Forsyth and Guilford Counties separately. Projections to 2010 and other horizon years were done using the 2002-2007 data. HDDV and HDGV numbers were subtracted from total Reg numbers for Guilford and Forsyth Counties.

- Step two: Total Trips by year for each county are broken down by Base, Commercial vehicles and IX-XI (Internal /External and External/Internal). External-Internal or Internal –External travel is defined as having one trip end external to the study area. Therefore, only half of these trips need to be included as having a start in planning area. Truck numbers were subtracted from the total number of Trips.
- Step three- Result from Step two were divided by Step One to calculate Trips/ Veh numbers.

Number of trips/Start/Veh

Using DMV data

Year / Run	Forsyth	Guilford (used also for Davidson County)
2010	3.91	4.23
2012	4.08	4.48
2015	4.11	4.57
2025	4.18	4.82
2035	4.30	5.13

Additional text on External Trips:

Internal-External & External-Internal Trips Analysis

- External Station Analysis considers through trips, external-internal and internal-external trips.
- The IXXI trip production data utilized for REA (Regional Emission Analysis) contains no through-trip data. Only internal-external and external-internal trip productions are in the data.
- In general, trip productions and attractions must balance according to established modeling procedure. For example, every trip has exactly one production trip end and one attraction trip end; total area production and attraction trip ends for each purpose must be equal. This is true for IXXI trips as well, i.e. for every internal-external trip there is an external-internal trip. Therefore, since ½ of the IXXI trips originate internally, this is the quantity utilized for REA.

4.2 Transportation Control Measures

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

4.3 Emissions Comparison Tests by Location and Pollutant

The USEPA designated the counties of Guilford, Davidson, Forsyth and Davie for the one hour ozone (O₃) standard. The 1990 Clean Air Act Amendments (CAAA) designated these areas as moderate non-attainment area for the one hour O₃ standard. However, due to improved monitoring data, this area was redesignated as maintenance for the one hour O₃ standard on November 8, 1993.

On April 2, 2008, the USEPA revoked the one-hour standard for the Triad Area counties of Guilford, Davidson, Forsyth and Davie under rulemaking effective on April 15, 2008. As of April 15, 2009, the Triad Area will no longer have to demonstrate conformity for the one-hour ozone (O₃) standard.

The USEPA designated Forsyth County for carbon monoxide (CO) as defined by the EPA. The 1990 Clean Air Act Amendments (CAAA) designated these areas as moderate non-attainment area for CO. However, due to improved monitoring data, this area was redesignated as maintenance for CO on November 7, 1994.

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 Appendix A.

The USEPA designated Davidson and Guilford Counties, in their entirety, as a non-attainment area for the PM 2.5 Standard with an effective date of April 5, 2005.

The non-attainment/maintenance designations cover the following geographic areas:

- Guilford County
- Davidson County
- Forsyth County
- Davie 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 Burlington-Graham Urban Area MPO (BGMPO) within its portion of the metropolitan area boundary in Guilford County;
- the Greensboro Urban Area MPO (GUAMPO) within the metropolitan area boundary of Guilford County;
- the High Point Urban Area MPO (HPMPO) within its metropolitan area boundary in Guilford, Davidson and Forsyth Counties;
- the Winston-Salem Urban Area MPO (WSMPO) within its portion of the metropolitan area boundary in Forsyth, Davidson and Davie Counties;
- the NCDOT in the rural (donut) areas that is comprised of those county portions of Davidson and Davie that remain outside of any MPO metropolitan area boundary.

Table 11 summarizes the emissions test used and decision-making responsibility for conformity findings in each County.

Table 11. Emissions Test and Responsibility for Conformity Findings

Location	Pollutant(s)	Emissions Test	Conformity Finding Responsibility
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Guilford County	O3	Budget	Greensboro MPO, High Point MPO & Burlington Graham MPO
	PM 2.5	less-than-baseline	Greensboro MPO, High Point MPO & Burlington Graham MPO
Davidson County	O3	Budget	Winston Salem MPO, High Point MPO & NCDOT for donut Davidson County
	PM 2.5	less-than-baseline	Winston Salem MPO, High Point MPO & NCDOT for donut Davidson County
Forsyth County	O3	Budget	Winston Salem MPO & High Point MPO
	CO	Budget	Winston Salem MPO & High Point MPO
Davie County	O3	Budget	Winston Salem MPO and NCDOT for donut Davie County

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 G.

Table 18. Forsyth County Emissions Comparison Summary

Forsyth County Emissions Comparison (Tons/Day) ¹				
Analysis Year	NOX		VOC	
	L RTP Emissions (Tons/Day)	SIP Budget Amount (Tons/Day)	L RTP Emissions (Tons/Day)	SIP Budget Amount (Tons/Day)
2010	13.16	15.04	7.84	10.31
2012	10.72	12.72	7.13	9.36
2015	7.84	9.59	6.13	8.50
2025	3.94	9.59	3.76	8.50
2035	3.75	9.59	4.25	8.50

Forsyth County Emissions Comparison (Tons/Day) ¹		
Analysis Year	CO	
	L RTP Emissions (Tons/Day)	SIP Budget Amount (Tons/Day)
2015	115.95	247.64
2025	105.31	247.64
2035	119.83	247.64

Table 19. Guilford County Emissions Comparison Summary

Guilford County Emissions Comparison (Tons/Day) ¹				
Analysis Year	NOX		VOC	
	L RTP Emissions (Tons/Day)	SIP Budget Amount (Tons/Day)	L RTP Emissions (Tons/Day)	SIP Budget Amount (Tons/Day)
2010	20.63	20.87	12.45	14.86
2012	16.81	17.66	11.41	13.46
2015	12.46	13.28	10.01	12.17
2025	6.53	13.28	6.34	12.17
2035	6.28	13.28	7.34	12.17

Guilford County Interim Test (Less than Baseline) Emissions Comparison (KG/Year)		
Analysis Year	PM2.5	
	L RTP Emissions (KG/Year)	2002 Baseline Emission (KG/Year)
2002	226,008	
2010	145,979	226,008
2015	110,036	226,008
2025	85,712	226,008
2035	101,175	226,008

Analysis Year	Guilford County NOx (for PM 2.5)	
	L RTP Emissions (KG/Year)	2002 Baseline Emission (KG/Year)
2002	14,142,913	
2010	7,812,825	14,142,913
2015	4,436,572	14,142,913
2025	2,247,062	14,142,913
2035	2,157,763	14,142,913

Table 20. Davidson County Emissions Comparison Summary

Davidson County Emissions Comparison (Tons/Day)¹				
Analysis Year	NOX		VOC	
	L RTP Emissions (Tons/Day)	SIP Budget Amount (Tons/Day)	L RTP Emissions (Tons/Day)	SIP Budget Amount (Tons/Day)
2010	7.84	8.09	4.24	4.91
2012	6.48	6.83	3.87	4.50
2015	4.67	5.15	3.26	4.12
2025	2.15	5.15	1.86	4.12
2035	1.70	5.15	1.96	4.12

Davidson County Interim Test (Less than Baseline) Emissions Comparison (KG/Year)		
Analysis Year	PM2.5	
	L RTP Emissions (KG/Year)	2002 Baseline Emission (KG/Year)
2002	90,656	
2010	50,233	90,656
2015	37,225	90,656
2025	26,970	90,656
2035	28,058	90,656

Analysis Year	Davidson County NOx (for PM 2.5)	
	L RTP Emissions (KG/Year)	2002 Baseline Emission (KG/Year)
2002	5,638,248	
2010	2,915,785	5,638,248
2015	1,651,675	5,638,248
2025	747,256	5,638,248
2035	598,232	5,638,248

Table 21. Davie County Emissions Comparison

Davie County Emissions Comparison (Tons/Day)¹				
Analysis Year	NOX		VOC	
	L RTP Emissions (Tons/Day)	SIP Budget Amount (Tons/Day)	L RTP Emissions (Tons/Day)	SIP Budget Amount (Tons/Day)
2010	0.02	0.05	0.01	0.03
2012	0.02	0.05	0.01	0.03
2015	0.01	0.05	0.01	0.03
2025	0.01	0.05	0.01	0.03
2035	0.01	0.05	0.01	0.03

5. Public Involvement and Interagency Consultation

The 2035 Transportation Plans are consistent with consultation requirements discussed in *40 CFR 93.105*. Interagency consultation was a cooperative effort on the part of the Burlington-Graham MPO, the Greensboro Urban Area MPO, the High Point Urban Area MPO, the Winston-Salem Urban Area MPO, the Piedmont Triad Area RPO, the Northwest Piedmont RPO, the North Carolina Department of Transportation, the North Carolina Division of Air Quality, the Environmental Protection Agency, the Federal Transit Administration, and the Federal Highway Administration. The process was administered by the Piedmont Authority for Regional Transportation (PART) on behalf of the partners and was organized according to the sections in the document titled *Triad Region Transportation Conformity*:

Pre-Analysis Consensus Plan, a document agreed to at the initial interagency consultation meeting on October 30, 2007 and updated periodically. Subsequent interagency consultation meetings were held on November 29, 2007, January 4, 2008, February 8, 2008, March 14, 2008, April 18, 2008, May 19, 2008, May 22, 2008, June 12, 19, 27, 2008, July 3, 2008, August 26, 2008, September 12, 2008, and November 10, 2008. 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 B.

Public review of this report was handled in accordance with each MPO, PART and RPO public participation policy for the LRTPs. Copies of all public participation policies are included in Appendix H. Comments from the general public participation process and interagency review are incorporated into the final Conformity Analysis and Determination Report. All written comments on the draft report from the general public and interagency review are included in Appendices I and J 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 17: Summary of Conformity Status of Triad LRTPs

Criteria (√ indicates the criterion is met)	Burlington-Graham MPO 2035 LRTP	Greensboro Urban Area MPO 2035 LRTP	High Point Urban Area MPO 2035 LRTP	Winston-Salem Urban Area MPO 2035 LRTP	Davidson and Davie Counties Rural Area of the Triad 2009-15 TIP
Less Than Emissions Budget(s) or Baseline	√	√	√	√	√
TCM Implementation	The NC SIP includes no Transportation Control Measures in the Triad Area				
Interagency Consultation	√	√	√	√	√
Latest Emissions Model	√	√	√	√	√
Latest Planning Assumptions	√	√	√	√	√
Fiscal Constraint	√	√	√	√	√

In the final Air Quality Conformity Analysis and Determination Report, please refer to resolutions of conformity finding, approval, and/or endorsement by the metropolitan planning organizations of the Piedmont Triad region in Appendix K.