



2010



CONFORMITY ANALYSIS

FOR THE FY 2011-2015 TRANSPORTATION IMPROVEMENT PROGRAM AND THE REGIONAL TRANSPORTATION PLAN 2010 UPDATE

**JULY
2010**



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**FY 2011-2015 MAG TRANSPORTATION IMPROVEMENT
PROGRAM**

AND THE

**MAG REGIONAL TRANSPORTATION PLAN
2010 UPDATE**

July 2010

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EXECUTIVE SUMMARY

This report presents the 2010 MAG Conformity Analysis for the FY 2011-2015 MAG Transportation Improvement Program (TIP) and the MAG Regional Transportation Plan 2010 Update (RTP). The Maricopa Association of Governments (MAG) is the designated Metropolitan Planning Organization (MPO) in Maricopa County, Arizona, and is responsible for regional transportation and air quality planning. The analysis demonstrates that the criteria specified in the federal transportation conformity rule for a conformity determination are satisfied by the TIP and RTP. A finding of conformity for the FY 2011-2015 MAG Transportation Improvement Program and MAG Regional Transportation Plan 2010 Update is therefore supported.

The 2010 MAG Conformity Analysis for the FY 2011-2015 MAG Transportation Improvement Program and the MAG Regional Transportation Plan 2010 Update includes results of the regional emissions analysis for carbon monoxide, eight-hour ozone, and PM-10. Summarized below are the applicable federal criteria or requirements for conformity determinations, the conformity tests applied, regional emissions analysis results, and an overview of the organization of this report. Figures presenting the conformity test results and transportation control measure funding in the FY 2011-2015 MAG Transportation Improvement Program are provided at the end of the Executive Summary.

CONFORMITY REQUIREMENTS

The federal transportation conformity rule (40 Code of Federal Regulations Parts 51 and 93) specifies criteria and procedures for conformity determinations for transportation plans, programs, and projects and their respective amendments. The federal transportation conformity rule was first promulgated in 1993 by EPA, following the passage of amendments to the federal Clean Air Act in 1990. The federal transportation conformity rule has been revised several times since its initial release to reflect both EPA rule changes and court opinions. The transportation conformity rule and court opinions are summarized in Chapter 1.

The conformity rule applies nationwide to “all nonattainment and maintenance areas for transportation-related criteria pollutants for which the area is designated nonattainment or has a maintenance plan” (40 CFR 93.102). At this time, portions of Maricopa County are designated as a nonattainment or maintenance area with respect to federal air quality standards for three criteria pollutants, carbon monoxide (CO), eight-hour ozone, and particulate matter less than or equal to ten microns in diameter (PM-10). Transportation plans and programs for the nonattainment or maintenance areas in the Maricopa County

area must satisfy the requirements of the federal transportation conformity rule. Under the federal transportation conformity rule, the principal criteria for a determination of conformity for transportation plans and programs are:

- (1) the TIP and Regional Transportation Plan must pass an emissions budget test with a budget that has been found to be adequate or approved by EPA for transportation conformity purposes, or interim emissions tests;
- (2) the latest planning assumptions and emission models in force at the time the conformity analysis begins must be employed;
- (3) the TIP and RTP must provide for the timely implementation of transportation control measures (TCMs) specified in the applicable air quality implementation plans; and,
- (4) consultation.

Consultation generally occurs at the beginning of the conformity analysis process, on the proposed models, associated methods, and assumptions for the upcoming analysis and the projects to be assessed, and at the end of the process, on the draft conformity analysis report. The final determination of conformity for the TIP and RTP is the responsibility of the Federal Highway Administration and the Federal Transit Administration.

CONFORMITY TESTS

The conformity tests specified in the federal transportation conformity rule are: (1) the emissions budget test, and (2) interim emissions tests. For the emissions budget test, predicted emissions for the TIP and RTP must be less than or equal to the motor vehicle emissions budget specified in the approved air quality implementation plan or the emissions budget found by EPA to be adequate for transportation conformity purposes. If there is no approved air quality plan for a pollutant for which the region is in nonattainment or no emissions budget found to be adequate for transportation conformity purposes, interim emissions tests apply.

On March 9, 2005, EPA published the final rule in the *Federal Register* approving the Carbon Monoxide Maintenance Plan, including the conformity budgets, effective April 8, 2005. On October 25, 2007, EPA published a notice in the *Federal Register* finding the VOC and NO_x emissions budgets in the MAG Eight-Hour Ozone Plan adequate, effective November 9, 2007. In addition, on June 16, 2008, EPA published a notice in the *Federal Register* finding the PM-10 emission budget in the MAG 2007 Five Percent Plan for PM-10 adequate, effective July 1, 2008.

Chapter 1 summarizes the applicable air quality implementation plans and conformity tests for carbon monoxide, eight-hour ozone, and PM-10. For the 2010 MAG Conformity Analysis for the FY 2011-2015 MAG TIP and RTP, the emissions budget test was applied using the approved conformity budgets from the Carbon Monoxide Maintenance Plan. For

eight-hour ozone, the emissions budget tests were performed for volatile organic compounds (VOC) and nitrogen oxides (NOx) using the adequate conformity budget from the MAG Eight-Hour Ozone Plan. For PM-10, the emissions budget test was applied using the adequate conformity budget from the MAG 2007 Five Percent Plan for PM-10.

RESULTS OF THE CONFORMITY ANALYSIS

For the 2010 MAG Conformity Analysis, a regional emissions analysis was conducted for carbon monoxide, for the eight-hour ozone precursors (volatile organic compounds and nitrogen oxides), and PM-10 for the years: 2010, 2015, 2025, and 2031. All analyses were conducted using the latest planning assumptions and emissions models in force at the time the conformity analysis started on April 26, 2010. The major conclusions of the 2010 MAG Conformity Analysis are:

- For carbon monoxide, the total vehicle-related emissions associated with implementation of the TIP and Regional Transportation Plan for the analysis year 2010 are projected to be less than the approved 2006 emissions budget, and the emissions associated with implementation of the TIP and Regional Transportation Plan for the analysis years 2015, 2025, and 2031 are projected to be less than the approved budget for 2015. The applicable conformity test for carbon monoxide is therefore satisfied. The results of the regional emissions analysis for carbon monoxide are presented in Figure ES-1.
- For eight-hour ozone, the total vehicle-related volatile organic compound and nitrogen oxide emissions associated with implementation of the TIP and Regional Transportation Plan for the analysis years of 2010, 2015, 2025, and 2031 are projected to be less than the adequate 2008 emissions budgets. The applicable conformity tests for eight-hour ozone are therefore satisfied. The results of the regional emissions analysis for eight-hour ozone are presented in Figures ES-2 and ES-3.
- For PM-10, the total vehicle-related emissions associated with implementation of the TIP and Regional Transportation Plan for the analysis years of 2010, 2015, 2025, and 2031 are projected to be less than the adequate 2010 emissions budget. The conformity test for PM-10 is therefore satisfied. The results of the regional emissions analysis for PM-10 are presented in Figure ES-4.
- A review of the implementation status of TCMs in applicable air quality plans has indicated that the TIP and Regional Transportation Plan will provide for the timely implementation of the TCMs and there are no obstacles to the implementation of any TCM. The current status of TCMs identified in applicable air quality implementation plans is documented in Chapter 5 of this report. Figure ES-5 presents the total funding programmed in the TIP for transportation projects and programs that implement transportation control measures and other air quality measures.

- Consultation has been conducted in accordance with federal requirements.

REPORT ORGANIZATION

The report is organized into six chapters. Chapter 1 provides an overview of the applicable federal and state conformity rules and requirements, air quality implementation plans, and conformity test requirements. Chapter 2 contains a discussion of the latest planning assumptions. Chapter 3 includes a summary of the transportation model characteristics, key socioeconomic data, and other data related to the land use and transportation system forecasts, and Chapter 4 describes the air quality modeling used to estimate emission factors and mobile source emissions. Chapter 5 contains the documentation required under the federal transportation conformity rule for transportation control measures. The results of the conformity analysis for the TIP and Regional Transportation Plan are provided in Chapter 6.

Excerpts from the applicable air quality plans, consultation documentation, and other related information are contained in the appendices. Appendix B includes copies of memoranda previously circulated for consultation. Appendix Q includes a transcript of the June 21, 2010 public hearing conducted on the Draft FY 2011-2015 MAG Transportation Improvement Program, Draft Regional Transportation Plan 2010 Update, and Draft 2010 MAG Conformity Analysis. Comments received on the conformity analysis and responses made as part of the public involvement process are included in Appendix R.

Figure ES-1: Carbon Monoxide Results for Conformity Budget Test

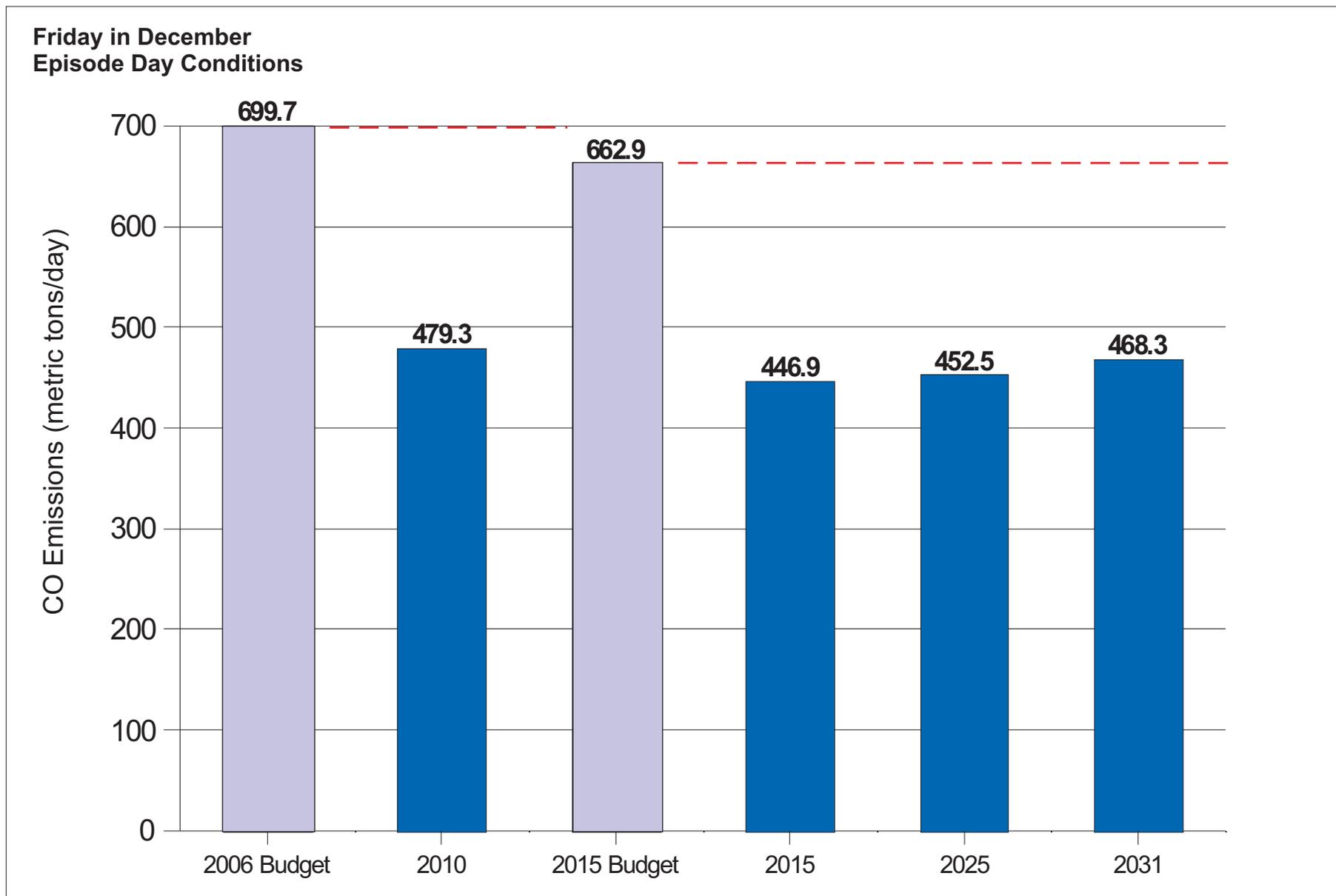


Figure ES-2: Eight-Hour Ozone: Volatile Organic Compounds (VOC) Results for Conformity Budget Test

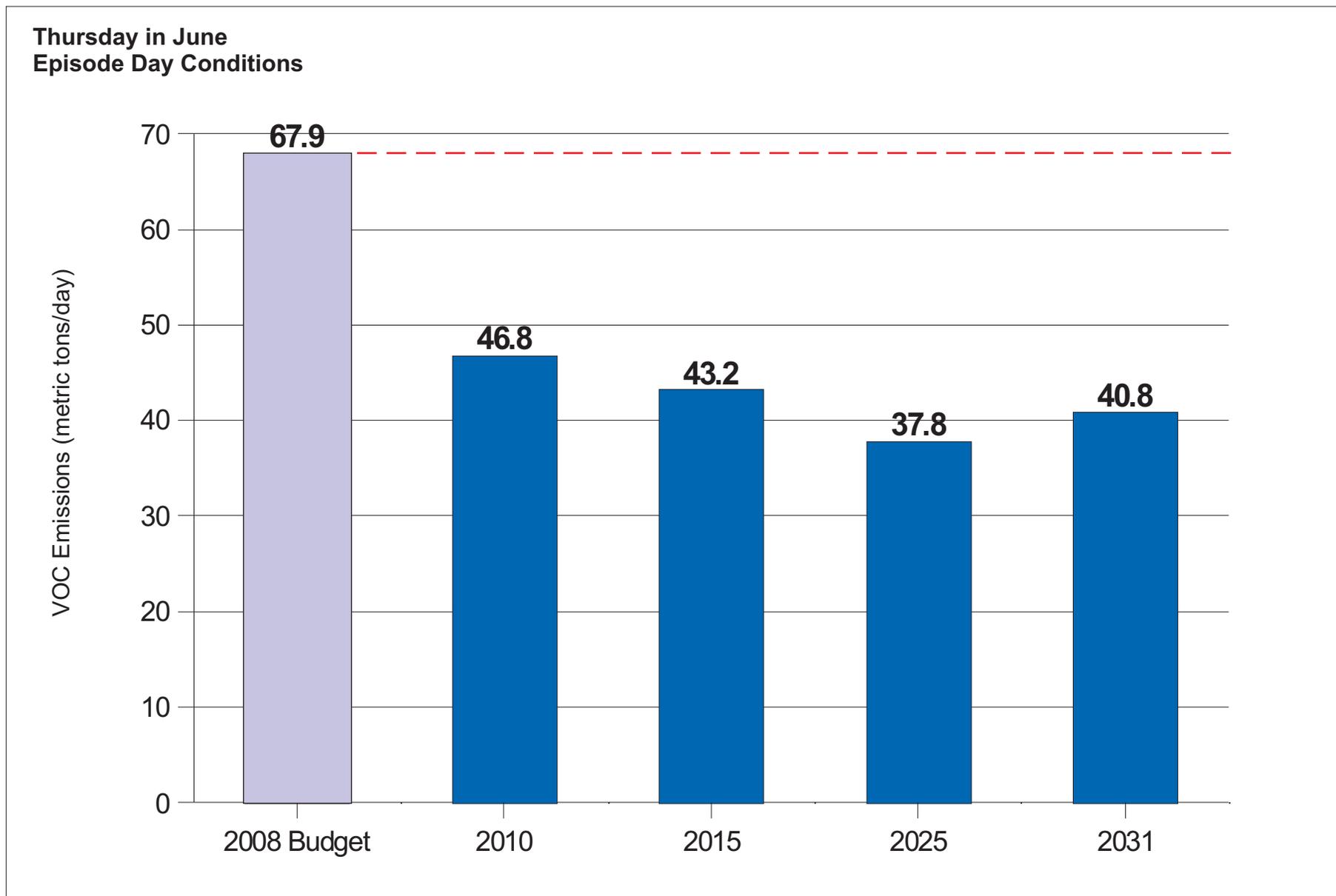
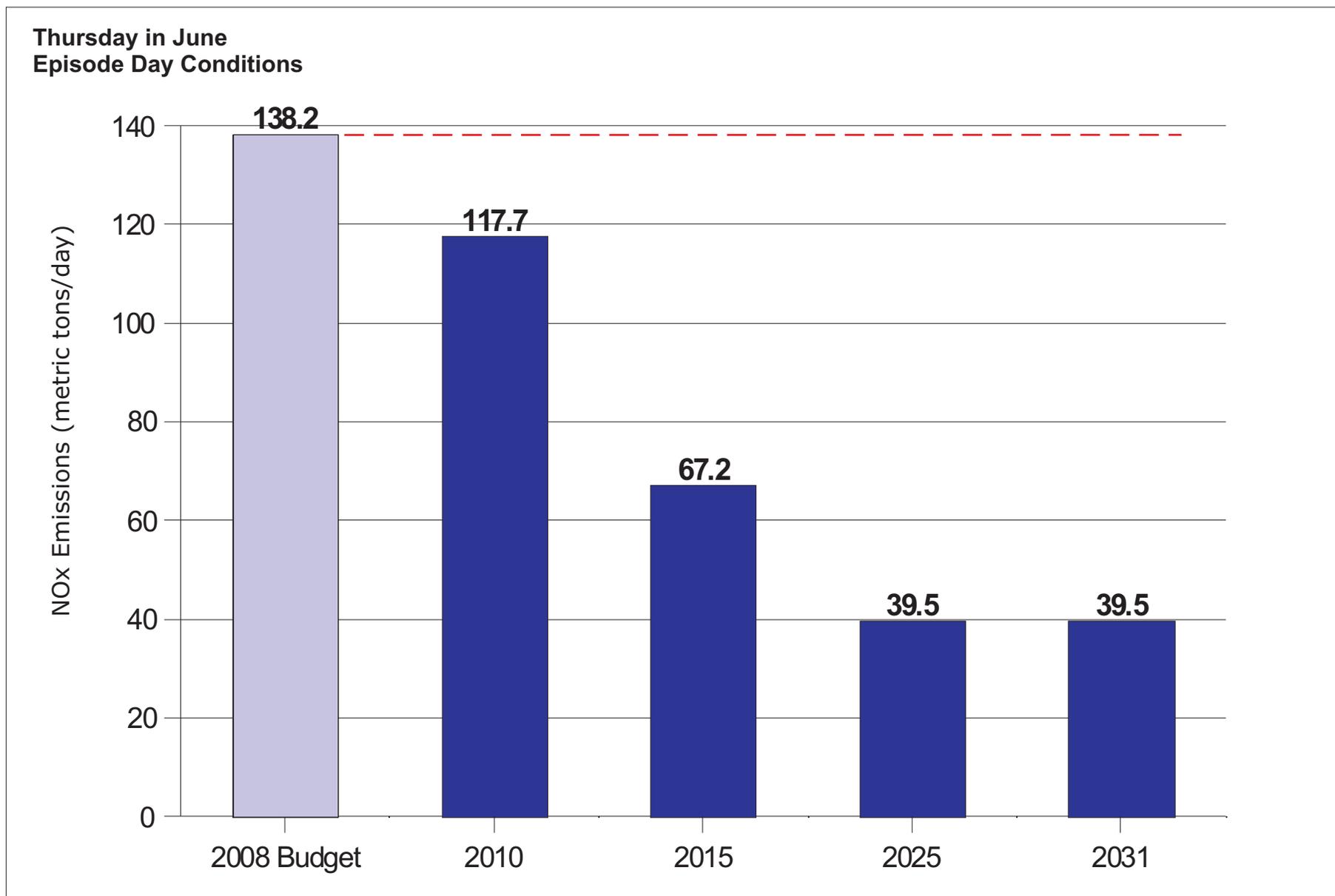
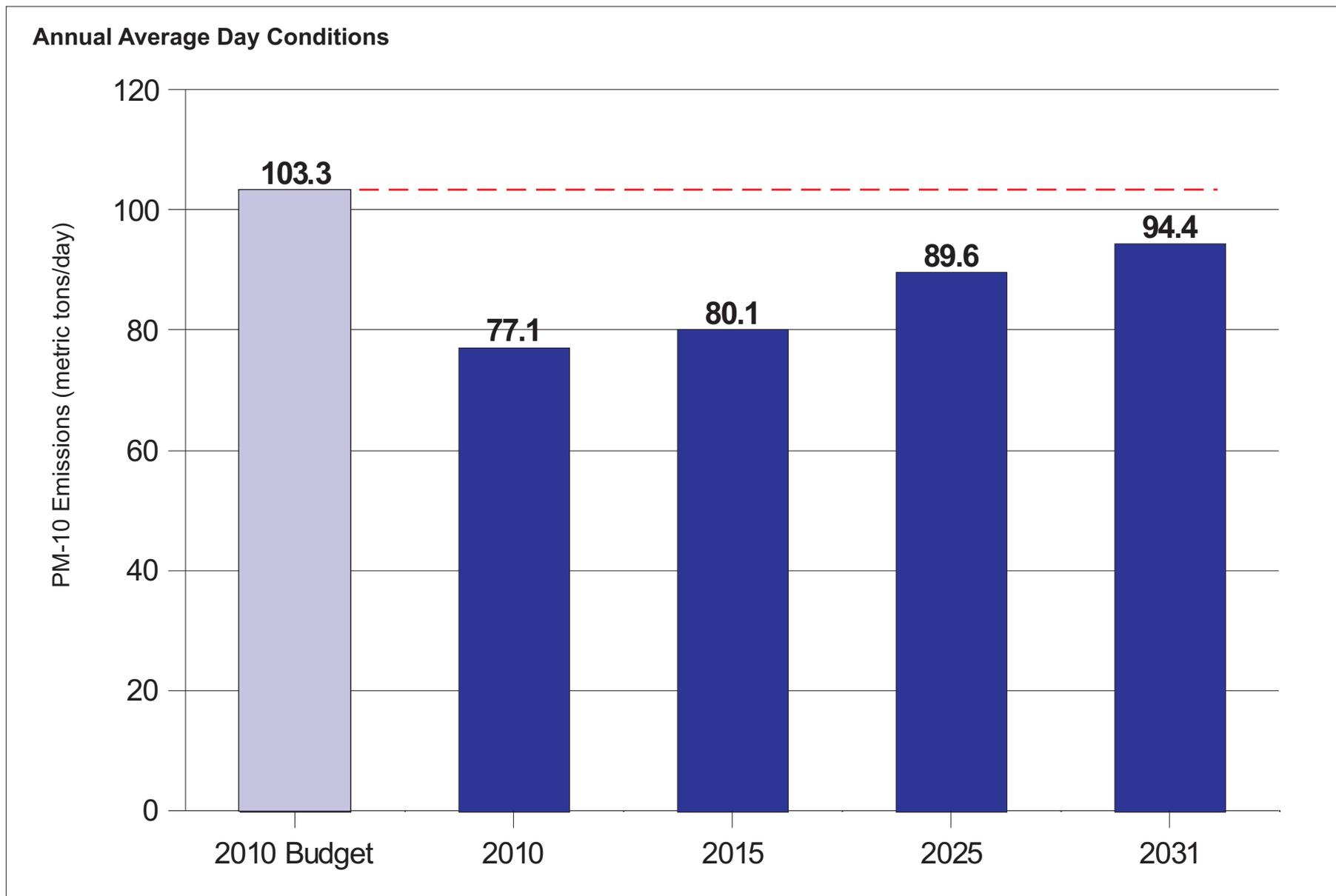


Figure ES-3: Eight-Hour Ozone: Nitrogen Oxides (NOx) Results for Conformity Budget Test



ES-7

Figure ES-4: PM-10 Results for Conformity Budget Test

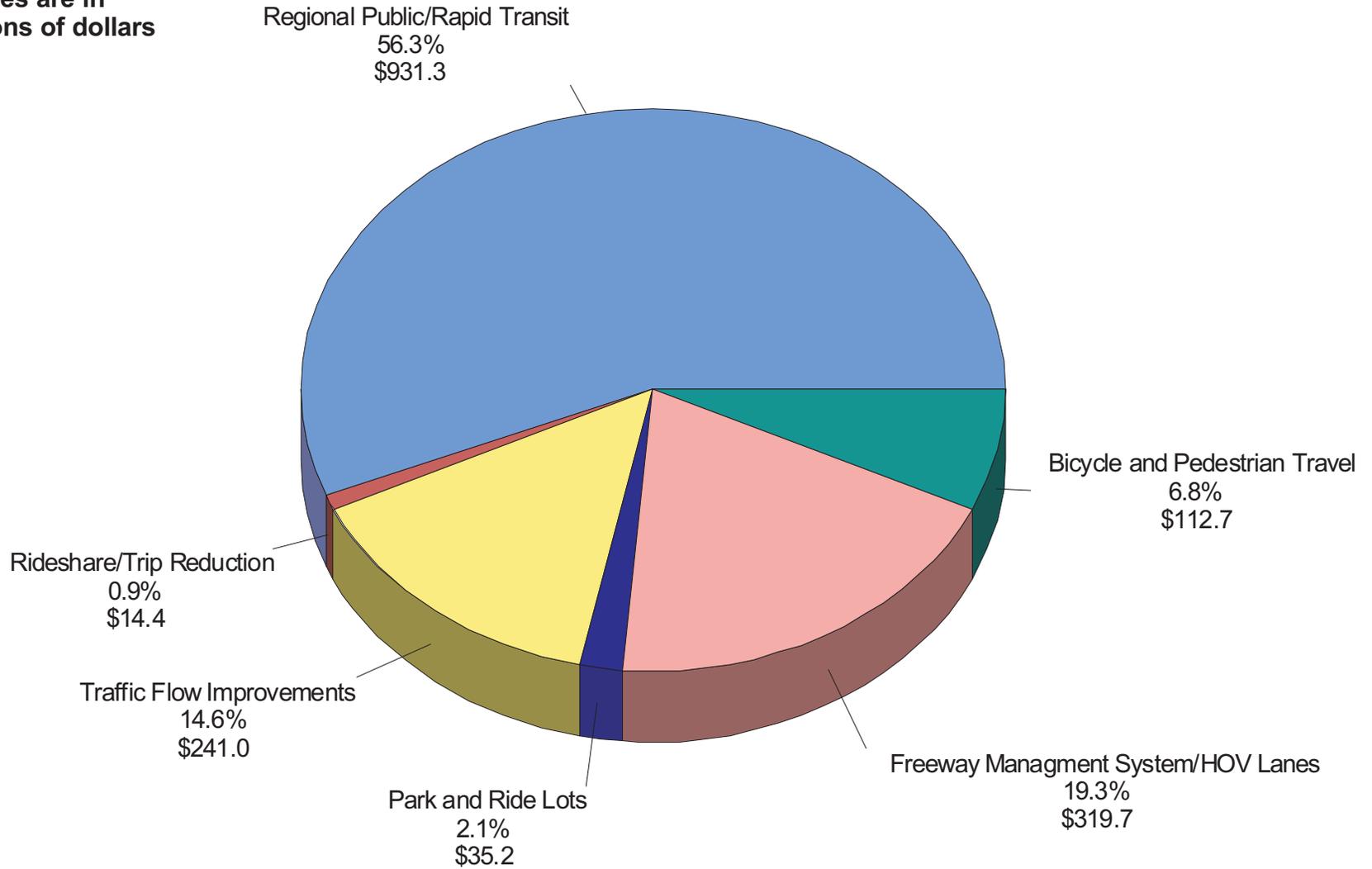


ES-8

Figure ES-5: Transportation Control Measure Funding in the FY 2011-2015 MAG Transportation Improvement Program

ES-9

Figures are in millions of dollars



Total Transportation Control Measure Funding in the TIP=\$1,654 million

An additional \$31 million is programmed for paving dirt streets and street sweepers.

1 FEDERAL AND STATE REGULATORY REQUIREMENTS

The criteria for determining conformity of transportation programs and plans under the federal transportation conformity rule (40 Code of Federal Regulations Parts 51 and 93) and the applicable conformity tests for the Maricopa County nonattainment and maintenance areas are summarized in this chapter. The 2010 MAG Conformity Analysis for the FY 2011-2015 MAG Transportation Improvement Program (TIP) and the MAG Regional Transportation Plan 2010 Update (RTP) was prepared based on these criteria and tests. Presented first is a review of the development of the applicable conformity rule and guidance procedures, followed by a summary of conformity rule requirements, air quality designation status, conformity test requirements, and analysis years.

The Maricopa Association of Governments is the designated Metropolitan Planning Organization (MPO) for the Maricopa County region in Arizona. As a result of this designation, MAG prepares the Transportation Improvement Program and Regional Transportation Plan, and the associated conformity analyses. The FY 2011-2015 MAG Transportation Improvement Program serves as a detailed guide for preservation, expansion, and management of public transportation services. The Regional Transportation Plan covers FY 2011 through FY 2031 providing the blueprint for future transportation investments in the region. The RTP includes funding for freeways and highways, streets, regional bus and high capacity transit, as well as bicycle and pedestrian facilities, commensurate with available funding.

FEDERAL AND STATE CONFORMITY RULES

Clean Air Act Amendments

Section 176(c) of the Clean Air Act (CAA, 1990) requires that Federal agencies and Metropolitan Planning Organizations (MPOs) not approve any transportation project, program, or plan which does not conform with the approved State Implementation Plan (SIP). The 1990 amendments to the Clean Air Act expanded Section 176(c) to more explicitly define conformity to an implementation plan to mean:

Conformity to the plan's purpose of eliminating or reducing the severity and number of violations of the national ambient air quality standards and achieving expeditious attainment of such standards; and that such activities will not (i) cause or contribute to any new violation of any standard in any area; (ii) increase the frequency or severity of any existing violation of any

standard in any area; or (iii) delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.

The expanded Section 176(c) also provided conditions for approval of transportation plans, programs, and projects; requirements that the Environmental Protection Agency (EPA) promulgate conformity determination criteria and procedures no later than November 15, 1991; and a requirement that States submit their conformity procedures to EPA by November 15, 1992. The initial November 15, 1991 deadline for conformity criteria and procedures was not met by EPA.

Federal Rule

Supplemental interim conformity guidance was issued on June 7, 1991 (EPA/U.S. DOT, 1991a and 1991b) for carbon monoxide, ozone, and particulate matter less than or equal to ten microns in diameter. The applicable period of this guidance was designated as Phase 1 of the interim period. EPA subsequently promulgated the Conformity Final Rule, in the November 24, 1993 *Federal Register* (EPA, 1993). The Rule became effective on December 27, 1993. The federal Transportation Conformity Final Rule has been revised several times since its initial release. The first set of amendments, finalized on August 7, 1995, (EPA, 1995a) aligned the dates of conformity lapses due to SIP failures with the application of Clean Air Act highway sanctions for certain ozone areas and all areas with disapproved SIPs with a protective finding.

The second set of amendments was finalized on November 14, 1995 (EPA, 1995b). This set allowed any transportation control measure (TCM) from an approved SIP to proceed during a conformity lapse, and aligned the date of conformity lapses with the date of application of Clean Air Act highway sanctions for any failure to submit or submissions of an incomplete control strategy SIP. The second set also corrected the nitrogen oxides provisions of the transportation conformity rule consistent with the Clean Air Act and previous commitments made by EPA. Finally, the amendments extended the grace period for areas to determine conformity to a submitted control strategy SIP, and established a grace period for determining conformity on transportation plans and programs in recently designated nonattainment areas. This grace period was later overturned in *Sierra Club v. EPA* in November 1997.

The third set of amendments was finalized August 15, 1997 (EPA, 1997a). These amendments streamlined the conformity process by eliminating the reliance on the classification system of “Phase II interim period,” “transitional period,” “control strategy period,” and “maintenance period” to determine whether the budget test and/or emission reduction tests apply. The amendments also changed the time periods during which the budget test and the “Build/No Build” test are required.

To incorporate provisions from the *Sierra Club v. EPA* court decision, EPA promulgated an amendment to the transportation conformity rule on April 10, 2000 that eliminated a one-year grace period for new nonattainment areas before conformity applies (EPA, 2000).

Then on August 6, 2002, the EPA promulgated an amendment to the transportation conformity rule which requires conformity to be determined within 18 months of the effective date of the EPA *Federal Register* notice on a budget adequacy finding in an initial SIP submission and established a one-year grace period before conformity is required in areas that are designated nonattainment for a given air quality standard for the first time (EPA, 2002b).

On July 1, 2004, EPA published the final rule, Transportation Conformity Rule Amendments for the New 8-hour Ozone and PM-2.5 National Ambient Air Quality Standards and Miscellaneous Revisions for Existing Areas; Transportation Conformity Rule Amendments - Response to Court Decision and Additional Rule Changes (EPA, 2004a). The rule describes transportation conformity requirements for the new eight-hour ozone and fine particulate matter (PM-2.5) standards. The rule also incorporates existing EPA and United States Department of Transportation (U.S. DOT) guidance that implements the March 2, 1999, court decision and provides revisions that clarify the existing regulation and improve its implementation. On July 20, 2004, EPA issued a *Federal Register* notice that corrects two errors in the preamble to the July 1, 2004 final rule.

On February 14, 2006, EPA and U.S. DOT jointly issued guidance on the implementation of the transportation conformity-related provisions from the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). The new transportation bill, which became law on August 10, 2005, made several changes to the transportation conformity provisions in Section 176(c) of the Clean Air Act. On January 24, 2008, EPA issued a final rule on the transportation conformity amendments to implement the conformity provisions contained in SAFETEA-LU (EPA, 2008a). A summary of the key conformity provisions are:

- Additional time is provided for areas to redetermine conformity of existing transportation plans and programs from 18 months to two years after the date that EPA finds a motor vehicle emissions budget to be adequate or approves an implementation plan that establishes a motor vehicle emissions budget, or when EPA promulgates an implementation plan that establishes or revises a motor vehicle emissions budget.
- The requirement for frequency of conformity determinations on updated transportation plans and programs is changed from three to four years, except when the MPO elects to update a transportation plan or program more frequently, or when the MPO is required to determine conformity after EPA finds a motor vehicle emissions budget to be adequate or approves an implementation plan that establishes a motor vehicle emissions budget, or when EPA promulgates an implementation plan that establishes or revises a motor vehicle emissions budget.
- Conformity determinations for transportation plans shall include the final year of the transportation plan as a horizon year, or optionally, after consultation with

the air pollution control agency and the public and consideration of comments, the MPO may elect the longest of the following periods: the first 10-year period of the transportation plan; the latest year in the implementation plan that contains a motor vehicle emissions budget; the year after the completion date of a regionally significant project if the project is included in the transportation improvement program or the project requires approval before the subsequent conformity determination.

In addition, if the MPO elects to determine conformity for a period less than the last horizon year of the transportation plan, the conformity determination must include a regional emissions analysis for the last year of the transportation plan and for any year shown to exceed emission budgets from a previous conformity determination, for information only. The analysis years selected for the 2010 MAG Conformity Analysis are described later in this section, and include the last year of the MAG Regional Transportation Plan 2010 Update.

- Allows the substitution of transportation control measures in an implementation plan that achieve equivalent or greater emissions reductions than the control measure to be replaced and that are consistent with the schedule provided for control measures in the plan. The substitution or addition of a transportation control measure shall not require a new conformity determination for the transportation plan or a revision of the implementation plan.
- An additional 12 month grace period is provided after a missed deadline before conformity lapses on a transportation plan or program. This provision applies to two types of conformity determination deadlines: the deadline resulting from the requirement to determine conformity for the transportation plan and program at regular intervals and the deadlines resulting from the requirement for a conformity redetermination within two years of an EPA action approving or finding a motor vehicle emissions budget adequate.
- Requires a conformity SIP amendment addressing requirements from Title 40 CFR sections 93.105, 93.122(a)(4)(ii), and 93.125(c) of the federal transportation conformity regulations.

In addition, on April 5, 2006 EPA rules became effective for establishing criteria for determining which transportation projects must be analyzed for particulate emissions impacts in PM-2.5 and PM-10 nonattainment and maintenance areas.

State Rule

State rules for transportation conformity were adopted on April 12, 1995, by the Arizona Department of Environmental Quality (ADEQ), in response to requirements in Section 176(c)(4)(C) of the Clean Air Act as amended in 1990 (ADEQ, 1995). These rules became effective upon their certification by the Arizona Attorney General on June 15, 1995 and, as

required by the federal conformity rule, were submitted to EPA as a revision to the State transportation conformity SIP.

To date, a State transportation conformity SIP has not received approval by EPA. Section 51.390(b) of the federal conformity rule states: "Following EPA approval of the State conformity provisions (or a portion thereof) in a revision to the applicable implementation plan, conformity determinations would be governed by the approved (or approved portion of the) State criteria and procedures." The federal transportation conformity rule therefore still governs, as a transportation conformity SIP has not yet been approved for this area.

The State rule specifies that MPOs (i.e., MAG, for this region) must develop specific conformity guidance and consultation procedures and processes. MAG has developed and adopted two conformity guidance documents to meet State requirements. MAG developed the "Transportation Conformity Guidance and Procedures" document, which was adopted initially on September 27, 1995 by the MAG Regional Council. The document was revised by the MAG Regional Council on March 27, 1996 (MAG, 1996b). This guidance document addresses both the determination of "regional significance" status for individual transportation projects, and the process by which regionally significant projects may be approved.

MAG also developed the "Conformity Consultation Processes" document, which was adopted on February 28, 1996 by the MAG Regional Council (MAG, 1996a). This guidance document details the public and interagency consultation processes to be used in the development of regional transportation plans, programs, and projects within the Maricopa County nonattainment area.

Case Law

On November 14, 1997, the U.S. Court of Appeals for the District of Columbia issued an opinion in *Sierra Club v. EPA* involving the 1995 transportation conformity amendment that allowed new nonattainment areas a one-year grace period. Under this ruling, conformity applied as soon as an area was designated nonattainment. The EPA issued a final rule on April 10, 2000 in the *Federal Register* deleting 40 CFR 93.102(d) that allowed the grace period for new nonattainment areas (EPA, 2000). Then, on October 27, 2000, the FY 2001 EPA Appropriations bill included an amendment to Section 176(c) of the Clean Air Act that adds the one-year grace period to the statutory language.

On March 2, 1999, the U.S. Court of Appeals for the District of Columbia issued an opinion in *Environmental Defense Fund v. EPA* involving the 1997 transportation conformity amendments. In general, the court struck down 40 CFR 93.120(a)(2) which permitted a 120-day grace period after disapproval of a SIP; determined that the EPA must approve a "safety margin" prior to its use for conformity in 40 CFR 93.124(b); concluded that a submitted SIP budget must be found by EPA to be adequate, based on criteria found in 40 CFR 93.118(e)(4) before it can be used in a conformity determination; and ended a provision that allowed "grandfathered" projects to proceed during a conformity lapse.

Following the court ruling, the EPA and U.S. DOT issued guidance to address implementation of conformity requirements based on the court findings. The EPA issued guidance contained in a May 14, 1999 memorandum (EPA, 1999c). In addition, the U.S. DOT issued guidance on June 18, 1999 that incorporates all U.S. DOT guidance in response to the court decision in a single document (U.S. DOT, 1999). On July 1, 2004, transportation conformity rule amendments were published in the *Federal Register* to incorporate provisions of the *Environmental Defense Fund v. EPA* court decision.

On October 20, 2006, the U.S. Court of Appeals for the District of Columbia filed an opinion vacating a provision of the transportation conformity rule at 40 CFR 93.109(e)(2)(v) that allowed areas to use the interim emission tests instead of the one-hour budgets. All other provisions regarding the use of the interim emissions tests remain unaffected by the court decision. Table 1-1 summarizes the criteria for conformity determinations for transportation projects, programs, and plans, as specified in amendments to the federal conformity rule.

CONFORMITY RULE REQUIREMENTS

The federal regulations identify general criteria and procedures that apply to all transportation conformity determinations, regardless of pollutant and implementation plan status. These include:

- 1) Conformity Tests — Sections 93.118 and 93.119 specify emission tests (budget and interim emissions) that the TIP and RTP must satisfy in order for a determination of conformity to be found. The final transportation conformity rule issued in March 2010 requires a submitted SIP motor vehicle emissions budget to be affirmed as adequate by EPA prior to use for making conformity determinations. The budget must be used on or after the effective date of EPA's finding of adequacy.
- 2) Methods / Modeling:

Latest Planning Assumptions — Section 93.110 specifies that conformity determinations must be based upon the most recent planning assumptions in force at the time the conformity analysis begins, which is “the point at which the MPO begins to model the impact of the proposed transportation plan or TIP on travel and/or emissions. New data that becomes available after an analysis begins is required to be used in the conformity determination only if a significant delay in the analysis has occurred, as determined through interagency consultation” (EPA, 2010). This section of the conformity rule also requires reasonable assumptions to be made regarding transit service and changes in projected fares. All analyses were conducted using the latest planning assumptions and emissions models in force at the time the conformity analysis started on April 26, 2010.

TABLE 1-1.
CONFORMITY CRITERIA FROM THE FINAL RULE

Applicability	Pollutant	Section	Requirement
All Actions at All Times	CO, Ozone, PM-10	93.110	Latest Planning Assumptions
		93.111	Latest Emissions Model
		93.112	Consultation
Transportation Plan (RTP)	CO, Ozone, PM-10	93.113(b)	TCMs
		93.118 and/or 93.119	Emissions Budget and/or Interim Emissions
TIP	CO, Ozone, PM-10	93.113(c)	TCMs
		93.118 and/or 93.119	Emissions Budget and/or Interim Emissions
Project (From a Conforming Plan and TIP)	CO, Ozone, PM-10	93.114	Currently Conforming Plan and TIP
		93.115	Project From a Conforming Plan and TIP
	CO and PM-10	93.116	CO, PM-10, and PM-2.5 Hot Spots
	PM-10	93.117	PM-10 and PM-2.5 Control Measures
Project (Not From a Conforming Plan or TIP)	CO, Ozone, PM-10	93.113(d)	TCMs
		93.114	Currently Conforming Plan and TIP
	CO and PM-10	93.116	CO, PM-10, and PM-2.5 Hot Spots
	PM-10	93.117	PM-10 and PM-2.5 Control Measures
	CO, Ozone, PM-10	93.118 and/or 93.119	Emissions Budget and/or Interim Emissions

Source: Adapted from (EPA, 2010), Section 93.109(b), "Table 1 - Conformity Criteria".

Latest Emissions Models — Section 93.111 requires that the latest emission estimation models specified for use in SIPs must be used for the conformity analysis.

- 3) Timely Implementation of TCMs — Section 93.113 provides a detailed description of the steps necessary to demonstrate that the TIP and RTP are providing for the timely implementation of TCMs, as well as demonstrate that the plan and/or program is not interfering with this implementation. TCM documentation is included in Chapter Five of the Conformity Analysis.
- 4) Consultation — Section 93.105 requires that the conformity determination be made in accordance with the consultation procedures outlined in the federal regulations. These include:
 - MAG is required to provide reasonable opportunity for consultation with local air quality and transportation agencies, state air and transportation agencies, the U.S. DOT and EPA (Section 93.105(b)(1)).
 - MAG is required to establish a proactive public involvement process which provides opportunity for public review and comment prior to taking formal action on a conformity determination (Section 93.105(e)).

Under the interagency consultation procedures, the Regional Transportation Plan is prepared by MAG staff with guidance from the MAG Transportation Policy Committee, the MAG Management Committee, and the MAG Regional Council. Copies of the final Draft RTP are provided to MAG member agencies and others, including the Federal Highway Administration (FHWA), Federal Transit Administration (FTA), EPA, Arizona Department of Transportation (ADOT), ADEQ, Maricopa County Air Quality Department (MCAQD), the Regional Public Transportation Authority (RPTA), Valley Metro Rail, City of Phoenix Public Transit Department, Central Arizona Association of Governments (CAAG), and Pinal County Air Quality Control District (PCAQCD). The RTP is required to be publicly available and an opportunity for public review and comment is provided.

The Transportation Improvement Program is prepared by MAG staff with the assistance of the MAG modal committees, Transportation Review Committee, and Transportation Policy Committee. Copies of the Draft TIP are provided to MAG member agencies and others, including FHWA, FTA, EPA, ADOT, ADEQ, MCAQD, RPTA, Valley Metro Rail, City of Phoenix Public Transit Department, CAAG, and PCAQCD for review. As with the RTP, the TIP is required to be publicly available and an opportunity for public review and comment is provided. The MAG consultation process for the conformity analysis includes a 30-day comment period followed by a public hearing that is conducted jointly for the TIP and RTP.

AIR QUALITY DESIGNATIONS

Portions of Maricopa County are currently designated as nonattainment or maintenance for the National Ambient Air Quality Standards (NAAQS) for carbon monoxide (CO), eight-hour ozone, and particulate matter less than or equal to ten microns in diameter (PM-10). Air quality plans have been prepared to address carbon monoxide, one-hour ozone, eight-hour ozone, and PM-10:

- The Revised MAG 1999 Serious Area Carbon Monoxide Plan, reflecting the repeal of the remote sensing program by the Arizona Legislature in 2000, was submitted to EPA in March 2001 and approved by EPA effective April 8, 2005;
- The Carbon Monoxide Redesignation Request and Maintenance Plan for the Maricopa County Nonattainment Area was submitted to EPA in June 2003 and approved by EPA effective April 8, 2005;
- The EPA approved and promulgated a Revised 1998 15 Percent Rate of Progress Plan for Ozone (Revised ROP FIP) for the Maricopa County nonattainment area, effective August 5, 1999;
- The Serious Area Ozone State Implementation Plan for Maricopa County was prepared by ADEQ and submitted to EPA in December 2000 to meet the Serious Area requirements. No budget is contained in the Serious Area Ozone Plan. EPA approved the Serious Area Ozone Plan, effective June 14, 2005;
- The One-Hour Ozone Redesignation Request and Maintenance Plan for the Maricopa County Nonattainment Area was submitted to EPA in May 2004 and approved by EPA effective June 14, 2005;
- The MAG Eight-Hour Ozone Plan for the Maricopa Nonattainment Area was submitted to EPA by June 15, 2007;
- The Revised MAG 1999 Serious Area Particulate Plan for PM-10 was submitted to EPA in February 2000 and approved by EPA effective August 26, 2002;
- The MAG 2007 Five Percent Plan for PM-10 for the Maricopa County Nonattainment Area was submitted to EPA by December 31, 2007; and,
- The MAG Eight-Hour Ozone Redesignation Request and Maintenance Plan for the Maricopa Nonattainment Area was submitted to EPA in March 2009.

The boundaries of the nonattainment and maintenance areas are identified below, followed by a summary of the attainment status for each pollutant for the Maricopa County region.

Nonattainment and Maintenance Boundaries

Nonattainment and maintenance areas in Maricopa County are shown in Figure 1-1. The carbon monoxide maintenance area boundary encompasses 1,814 square miles (approximately 20 percent) of the County. This boundary was originally defined in 1974.

On March 9, 2005, EPA published a final rule redesignating portions of Maricopa County to attainment for carbon monoxide and also removed the Gila River Indian Community from the Maricopa County carbon monoxide maintenance area, effective April 8, 2005 (EPA, 2005a).

Portions of the Maricopa County area, including the Gila River Indian Community, were designated nonattainment for one-hour ozone in September 1979. On June 14, 2005, EPA redesignated the area to attainment for one-hour ozone. The associated designations and classifications for the one-hour standard were revoked on June 15, 2005. On November 10, 2005, EPA published a direct final rule to correct the boundary of the Phoenix metropolitan one-hour ozone nonattainment area to exclude a portion of the Gila River Indian Community, effective January 9, 2006.

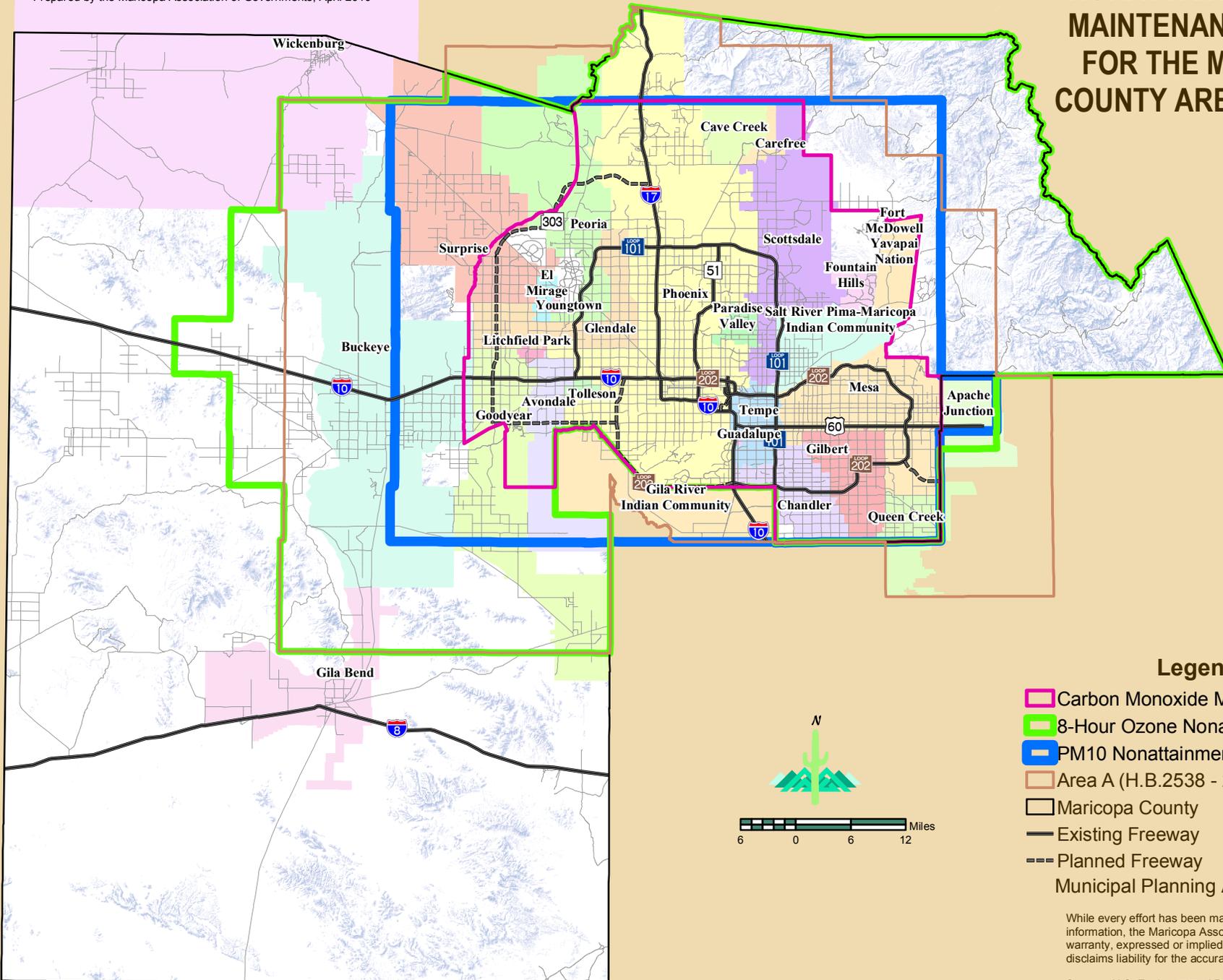
On April 15, 2004, EPA designated an eight-hour ozone nonattainment area located mainly in Maricopa County and Apache Junction in Pinal County. On April 30, 2004, EPA published the air quality designations and classifications for the eight-hour ozone standard that includes T1N, R8E and sections 1 through 12 of T1S, R8E in Pinal County (EPA, 2004b). As shown in Figure 1-1, the eight-hour boundary excludes the Gila River Indian Community. The eight-hour ozone nonattainment area covers approximately 4,880 square miles.

Following promulgation of the PM-10 standard in 1987, EPA identified a larger PM-10 nonattainment area in 1990. The PM-10 nonattainment area encompasses 2,916 square miles, consisting of a 48 by 60 mile rectangular grid encompassing eastern Maricopa County, plus a six by six mile section that includes a portion of the City of Apache Junction in Pinal County.

Attainment Status

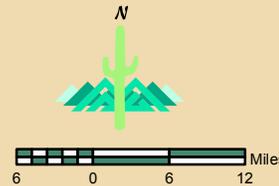
Following the requirements of the 1990 Clean Air Act Amendments, EPA initially identified the MAG region as a "Moderate" nonattainment area for the eight-hour CO standard, with a design value of 12.6 parts per million (ppm), exceeding the current NAAQS of 9.0 ppm. The standard was not achieved by the Clean Air Act deadline of December 31, 1995. The area was reclassified to "Serious" by operation of law with an effective date of August 28, 1996 (EPA, 1996b). The new carbon monoxide attainment date was December 31, 2000. No violations of the carbon monoxide standard have occurred since 1996. The State, in a July 23, 1999 letter, requested a carbon monoxide attainment determination from the EPA. On September 22, 2003, EPA published a final attainment determination for the carbon monoxide standard (EPA, 2003).

FIGURE 1-1: AIR QUALITY NONATTAINMENT AND MAINTENANCE AREAS FOR THE MARICOPA COUNTY AREA, ARIZONA



Legend

- Carbon Monoxide Maintenance Area
- 8-Hour Ozone Nonattainment Area
- PM10 Nonattainment Area
- Area A (H.B.2538 - 2001)
- Maricopa County
- Existing Freeway
- Planned Freeway
- Municipal Planning Areas shaded



While every effort has been made to ensure the accuracy of this information, the Maricopa Association of Governments makes no warranty, expressed or implied, as to its accuracy and expressly disclaims liability for the accuracy thereof.

In June 2003, the MAG Carbon Monoxide Redesignation Request and Maintenance Plan for the Maricopa County Nonattainment Area was submitted to EPA. The CO Maintenance Plan demonstrated that all Clean Air Act requirements have been met and requested that EPA redesignate the area to attainment for carbon monoxide. On March 9, 2005, EPA published the final rule in the *Federal Register* approving the Revised MAG 1999 Serious Area Carbon Monoxide Plan and the Carbon Monoxide Maintenance Plan and designating the carbon monoxide area to attainment, effective April 8, 2005 (EPA, 2005a).

Under the 1990 Clean Air Act Amendments, the Maricopa County nonattainment area was classified as “Moderate” for the one-hour ozone standard. The standard was not achieved by the deadline of November 19, 1996. On November 6, 1997, EPA reclassified the area to “Serious” for ozone (EPA, 1997b), effective February 13, 1998 (EPA, 1998a). The new ozone attainment date was November 19, 1999. Prior to EPA’s revocation of the one-hour ozone standard in 2005, no violations of the one-hour ozone standard had occurred since 1996. The State, in a February 21, 2000 letter, requested an ozone attainment determination. On May 30, 2001, the Environmental Protection Agency published a final attainment determination for the one-hour ozone standard (EPA, 2001a).

The MAG One-hour Ozone Redesignation Request and Maintenance Plan for the Maricopa County Nonattainment Area was submitted to EPA in May 2004. The MAG One-Hour Ozone Maintenance Plan demonstrated that all Clean Air Act requirements have been met and requested that EPA redesignate the area to attainment for one-hour ozone. On June 14, 2005, EPA published the final rule in the *Federal Register* approving the One-Hour Ozone Maintenance Plan and redesignating the one-hour ozone area to attainment (EPA, 2005b). EPA revoked the one-hour ozone standard on June 15, 2005.

On April 30, 2004, EPA published the final rule designating eight-hour ozone nonattainment areas, effective June 15, 2004. The eight-hour ozone nonattainment area in Maricopa and Pinal Counties is classified under Section D, Subpart 1, of the Clean Air Act, referred to as “Basic” nonattainment, with an attainment date of June 15, 2009. The boundary of the eight-hour ozone nonattainment area is shown in Figure 1-1. The MAG 2007 Eight-Hour Ozone Plan for the Maricopa Nonattainment Area was submitted to the EPA by June 15, 2007. The MAG Eight-Hour Ozone Redesignation Request and Maintenance Plan for the Maricopa Nonattainment Area was submitted to EPA in March 2009.

Under Section 107(d)(4) of the 1990 Clean Air Act Amendments, the PM-10 nonattainment area was initially classified as “Moderate,” with an attainment deadline of December 31, 1994. The standard was not achieved by that date. EPA reclassified the region to “Serious” in May 1996, with an effective date of June 10, 1996 (EPA, 1996a). The new attainment date for PM-10 was December 31, 2001 for Serious areas; however the Revised MAG 1999 Serious Area Particulate Plan for PM-10 for the Maricopa County Nonattainment Area contained a request to extend the attainment date to December 31, 2006, as allowed in the Clean Air Act Amendments (MAG, 2000a). In the July 25, 2002 *Federal Register*, the Environmental Protection Agency published the final

approval of the Revised MAG 1999 Serious Area Particulate Plan for PM-10, including the request to extend the attainment date to December 31, 2006.

On May 25, 2007, EPA issued a final rule finding that the Maricopa County nonattainment area did not attain the PM-10 standard by December 31, 2006. In accordance with Section 189(d) of the Clean Air Act, MAG prepared a Five Percent Plan for PM-10 that was submitted to EPA by December 31, 2007 (MAG, 2007b).

In addition, on July 18, 1997 EPA promulgated federal air quality standards for PM-2.5. On January 5, 2005, EPA published a notice designating the region as an attainment area for PM-2.5, effective April 5, 2005.

CONFORMITY TEST REQUIREMENTS

Specific conformity test requirements established for the carbon monoxide maintenance area and the eight-hour ozone and PM-10 nonattainment areas are summarized below. The Carbon Monoxide Redesignation Request and Maintenance Plan, submitted to EPA in June 2003, contained 2006 and 2015 emissions budgets for carbon monoxide. These carbon monoxide budgets were found to be adequate by EPA on September 29, 2003. On March 9, 2005, EPA published the final rule in the *Federal Register* approving the Carbon Monoxide Maintenance Plan, including the emissions budgets, effective April 8, 2005.

The MAG Eight-Hour Ozone Plan, submitted to EPA by June 15, 2007, contained 2008 conformity budgets for the ozone precursors, VOC and NOx. These emission budgets were found to be adequate by EPA, effective November 9, 2007.

The MAG Eight-Hour Ozone Redesignation Request and Maintenance Plan was submitted to EPA in March 2009. The maintenance plan established 2025 conformity budgets for VOC and NOx. The EPA has not yet found these budgets adequate for transportation conformity purposes.

The MAG 2007 Five Percent Plan for PM-10 was submitted to EPA by December 31, 2007. This plan established a PM-10 conformity budget for the attainment year of 2010. The conformity budget was found to be adequate by EPA on July 1, 2008.

The descriptions of the conformity tests that will be performed for carbon monoxide, eight-hour ozone, and PM-10, as part of the 2010 MAG Conformity Analysis, are detailed below.

Carbon Monoxide

The MAG 1999 Serious Area Carbon Monoxide Plan for the Maricopa County Nonattainment Area was submitted to the EPA in July 1999 (MAG, 1999). The MAG 1999 Serious Area Carbon Monoxide Plan established a CO emissions budget of 411.6 metric tons per day for 2000 for the modeled area. The EPA issued a notice of adequacy

effective December 14, 1999 in the *Federal Register* finding that the submitted CO motor vehicle emissions budget contained in the MAG 1999 Serious Area Carbon Monoxide Plan for the Maricopa County Nonattainment Area was adequate for transportation conformity purposes (EPA, 1999b).

The Revised MAG 1999 Serious Area Carbon Monoxide Plan for the Maricopa County Nonattainment Area was submitted to the EPA in March 2001 (MAG, 2001). The Revised Plan reflected the repeal of the Random Onroad Testing Requirements (Remote Sensing Program) from the Vehicle Emissions Inspection Program by the Arizona Legislature in 2000. The Revised Plan established a CO emissions budget of 412.2 metric tons per day for 2000 for the modeled area. The EPA issued a notice of adequacy in the *Federal Register* on October 17, 2001, finding that the submitted CO motor vehicle emissions budget contained in the Revised MAG 1999 Serious Area Carbon Monoxide Plan for the Maricopa County Nonattainment Area was adequate for transportation conformity purposes (EPA, 2001b). The new conformity budget for CO of 412.2 metric tons per day replaced the previous budget of 411.6 metric tons per day.

In June 2003, the Carbon Monoxide Redesignation Request and Maintenance Plan was submitted to EPA (MAG, 2003). The CO Maintenance Plan established a 2006 emissions budget for carbon monoxide of 699.7 metric tons per day and a 2015 budget of 662.9 metric tons per day. EPA found the 2006 and 2015 budgets to be adequate for conformity purposes, effective October 14, 2003. The 2006 budget applies to horizon years from 2006 through 2014 and the 2015 budget, to horizon years after 2014. The regional emissions analysis projected for the TIP and RTP must be less than or equal to these budgets.

On September 22, 2003, EPA published a final attainment determination for the carbon monoxide standard (EPA, 2003). In addition, on March 9, 2005, EPA published the final rule in the *Federal Register* approving the Revised MAG 1999 Serious Area Carbon Monoxide Plan and the MAG Carbon Monoxide Redesignation Request and Maintenance Plan as part of the redesignation of Maricopa County to an attainment area for carbon monoxide, effective April 8, 2005 (EPA, 2005a).

Eight-Hour Ozone

This section discusses the conformity test requirements for the Maricopa nonattainment area for eight-hour ozone (EPA, 2010). Ozone is a secondary pollutant, generated by chemical reactions in the atmosphere involving volatile organic compounds (VOCs) and nitrogen oxides (NO_x). The Eight-Hour Ozone Plan for the Maricopa Nonattainment Area (MAG, 2007a) establishes conformity budgets for volatile organic compounds and nitrogen oxides in the modeled attainment year of 2008. The 2008 emissions budgets for the eight-hour ozone nonattainment area are 67.9 metric tons per day for VOC and 138.2 metric tons per day for NO_x. EPA published a *Federal Register* notice finding these budgets to be adequate, effective November 9, 2007.

PM-10

As required by Clean Air Act Section 189(d), the MAG 2007 Five Percent Plan for PM-10 was submitted to EPA by December 31, 2007. The Plan established a PM-10 emissions budget for onroad mobile sources in the modeled attainment year of 2010. The 2010 conformity budget for PM-10 in the Plan is 103.3 metric tons per day for the PM-10 nonattainment area. EPA published a *Federal Register* notice finding the PM-10 budget to be adequate, effective July 1, 2008.

Section 93.122(e)(2) of the federal conformity rule requires that PM-10 from construction-related fugitive dust be included in the regional PM-10 emissions analysis, if it is identified as a contributor to the nonattainment problem in a PM-10 implementation plan. The motor vehicle emissions budget established in the MAG 2007 Five Percent Plan for PM-10 includes vehicle exhaust, tire wear, brake wear, reentrained dust from travel on paved roads, travel on unpaved roads, and road construction. Therefore, emissions from road construction are included as part of the PM-10 estimates developed for this conformity analysis.

ANALYSIS YEARS

In selecting analysis years, the conformity rule requires that: (1) if the attainment or maintenance year is in the time span of the transportation plan, it must be modeled; (2) the last year forecast in the transportation plan must be an analysis year; and (3) analysis years may not be more than ten years apart. For the 2010 MAG Conformity Analysis, onroad mobile source emissions of carbon monoxide (CO), volatile organic compounds (VOC), nitrogen oxides (NO_x), and PM-10 were estimated for the analysis years 2010, 2015, 2025, and 2031.

The year 2010 was modeled for PM-10 since the attainment date of December 31, 2010 in the Five Percent Plan for PM-10 is within the time frame of the FY 2011-2015 Transportation Improvement Program. The year 2010 was also modeled for CO, VOC, and NO_x, since 2010 is less than ten years from the 2002 calibration year for the MAG transportation models.

The year 2015 was modeled for CO since there is an EPA-approved emissions budget for the maintenance year of 2015 in the Carbon Monoxide Redesignation Request and Maintenance Plan. The year 2015 was also modeled for VOC, NO_x, and PM-10 since 2015 is an intermediate year that meets the federal conformity requirement that analysis years be no more than ten years apart.

The year 2025 was modeled for CO, VOC, NO_x, and PM-10 since 2025 is an intermediate year that meets the federal conformity requirement that analysis years be no more than ten years apart. In addition, the year 2031 was modeled for all pollutants since 2031 is the last year of the Regional Transportation Plan 2010 Update.

2 LATEST PLANNING ASSUMPTIONS

The Clean Air Act states that “the determination of conformity shall be based on the most recent estimates of emissions, and such estimates shall be determined from the most recent population, employment, travel, and congestion estimates as determined by the MPO or other agency authorized to make such estimates.” On January 18, 2001, the U. S. DOT issued guidance developed jointly with EPA to provide additional clarification concerning the use of latest planning assumptions in conformity determinations (U.S. DOT, 2001). In December 2008, EPA published revisions to the 2001 guidance entitled, “Guidance for the Use of Latest Planning Assumptions in Transportation Conformity Determinations” (EPA, 2008b).

Key elements of this guidance are identified below:

- Areas are strongly encouraged to review and strive towards regular five-year updates of planning assumptions, especially population, employment, and vehicle registration assumptions.
- The latest planning assumptions must be derived from the population, employment, travel and congestion estimates that have been most recently developed by the MPO (or other agency authorized to make such estimates) and approved by the MPO.
- Conformity determinations that are based on information that is older than five years should include written justification for not using more recent information. For areas where updates are appropriate, the conformity determination should include an anticipated schedule for updating assumptions.

The latest planning assumptions used in the 2010 MAG Conformity Analysis for the FY 2011-2015 Transportation Improvement Program and Regional Transportation Plan 2010 Update are summarized in Table 2-1. The methodology and scheduled updates for the planning assumptions are discussed below.

The conformity regulations (EPA, 2010) indicate that “the conformity determination...must be based upon the most recent planning assumptions in force at the time the conformity analysis begins...as determined through the interagency consultation process.” It has been determined through the consultation process that the “time that the conformity analysis begins” will be the day that the first traffic assignment is submitted for travel demand modeling for the 2010 MAG Conformity Analysis. For this conformity analysis, “time that the conformity analysis begins” was April 26, 2010.

TABLE 2-1. LATEST PLANNING ASSUMPTIONS FOR MAG CONFORMITY DETERMINATIONS

<u>Assumption</u>	<u>Source</u>	<u>MAG Models</u>	<u>Next Scheduled Update</u>
Population and Employment	Under Governor's Executive Order 95-2, official County projections are updated every five years after a census. These official projections must be used by all agencies for planning purposes. Following the release of 2005 U.S. Census Survey data in June 2006, the Arizona Department of Economic Security (DES) prepared a new set of Maricopa County projections. MAG has also developed a set of employment projections for Maricopa County that are consistent with the DES population projections. The MAG Regional Council approved subcounty socioeconomic projections consistent with the 2005 Census Survey in May 2007.	DRAM/ EMPAL; SAM-IM	Official Maricopa County socioeconomic projections based on Arizona Department of Commerce (DOC) county projections may be approved by the MAG Regional Council after the 2010 U.S. Census.
Traffic Counts	Transportation models were validated in 2010 using approximately 2,200 traffic counts collected in 2006-2008.	TransCAD	Region-wide traffic counts are typically collected by MAG every 2-4 years, if funds are available.
Vehicle Miles of Travel	The highway models were calibrated in 2006 using the 2001 home interview survey. The base year for the calibration was 2002. The transit models were re-calibrated in 2008-2009 based on data from the 2007 on-board bus survey.	TransCAD	The FY 2008 Unified Planning Work Program and Annual Budget contained \$300,000 for an External Travel Survey and \$750,000 for a Household Travel Survey. MAG received this data in early 2010 and will re-calibrate the highway models by 2011.
Speeds	The highway models were validated in 2010 using travel time survey data collected in 2007.	TransCAD	Travel speed studies are conducted periodically to validate the transportation models.
Vehicle Registrations	July 2009 vehicle registrations were provided by ADOT.	MOBILE6.2	When newer data become available from ADOT in MOBILE6 format.
Implementation Measures	Latest implementation status of commitments in prior SIPs.	N/A	Updated for every conformity analysis.

POPULATION AND EMPLOYMENT

In accordance with the Arizona Governor's Executive Order 95-2, the population projections used for all State agency planning purposes are updated every five years after a decennial or mid-decennial census. Following the release of 2005 Census Survey data in June 2006, the Arizona Department of Economic Security (DES) prepared a new set of Maricopa County population projections. MAG allocated the DES projections for Maricopa County to traffic analysis zones (TAZs) using the DRAM/EMPAL and Subarea Allocation Model-Information Manager (SAM-IM) land use models. MAG has also used the DRAM/EMPAL and SAM-IM models to develop a set of employment projections for Maricopa County that are consistent with the DES population projections.

The travel and speed estimates for the analysis years in the 2010 MAG Conformity Analysis are based on the Maricopa County subcounty population and employment projections that are consistent with the 2005 U.S. Census Survey data. These subcounty socioeconomic projections were approved by the MAG Regional Council in May 2007.

Methodology

DES prepared the official Arizona population projections by county, using census data as the base. MAG used official DES population projections consistent with the 2005 U.S. Census Survey for Maricopa County. These population and employment projections for Maricopa County were distributed to smaller geographic areas by MAG using the latest available data and state-of-the-art land use models. The nationally-recognized DRAM/EMPAL model was used to allocate county projections of households and employment to regional analysis zones (RAZs) based upon the pre-existing location of these activities, land consumption, and transportation system accessibility. The allocation of population and employment from RAZs to one-acre grids was accomplished with a GIS-based model called SAM-IM which assesses the suitability of each grid for development based on measures such as adjacent land use, highway access, and proximity to other development.

Population and employment at the one-acre level is aggregated to TAZs using SAM-IM. The Maricopa County population and employment control totals were approved by the MAG Regional Council in 2006. The subcounty socioeconomic projections developed with the DRAM/EMPAL and SAM-IM models were approved by the MAG Regional Council in May 2007.

Next Scheduled Update

In December 2007, the DES Population Statistics Unit was transferred to the Arizona Department of Commerce (DOC). The next update of the TAZ socioeconomic projections will be based on the official Arizona Department of Commerce county-level projections, required by Executive Order 95-2. It is anticipated that the next set of DOC projections will occur after the 2010 U.S. Census.

TRAFFIC COUNTS

The highway traffic volumes estimated by the travel demand models were validated in 2010, using approximately 2,200 traffic counts collected in 2006-2008. Use of the most recent traffic counts to validate the models is consistent with the federal conformity guidance which strongly encourages areas to update the planning assumptions for network-based travel models at least every five years (EPA, 2008b).

Methodology

MAG uses TransCAD software to perform travel demand modeling. TransCAD provides a geographic information systems (GIS) interface that facilitates transportation modeling. The MAG transportation models follow a traditional four-step process: trip generation, trip distribution, mode choice, and traffic/transit assignment. Trip generation determines the number of person trips produced and attracted by traffic analysis zone. Trip distribution links the productions and attractions by TAZ. The nested logit mode choice model determines the number of person trips allocated to automobile and transit modes. The mode choice model is sensitive to highway and transit travel times, as well as pricing variables. Highway and transit route choice is determined in the assignment step, based on operating costs, travel times, and distances. Capacity-restrained traffic assignments are performed for the AM peak period, midday, the PM peak period, and nighttime. A feedback loop between traffic assignment and trip distribution is utilized to achieve near-equilibrium highway speeds. The transportation models are documented in the MAG Travel Demand Model Documentation (MAG, 2010).

Next Scheduled Update

Comprehensive traffic counts are typically collected by MAG every 2-4 years, if funding is available.

VEHICLE MILES OF TRAVEL

The MAG transportation models that estimate highway traffic were re-calibrated in 2006 based on a 2001 household travel survey. The base year for the model calibration was 2002. The models that estimate transit ridership were re-calibrated in 2008-2009, based on a 2007 on-board bus survey. The transportation models simulate peak and daily traffic volumes on more than 30,000 highway links, as well as the transit trips on bus and light rail routes. Vehicle miles of travel (VMT) by link, output by the highway assignment process, are input to the emissions models used in conformity.

Transportation model estimates of vehicle volumes are validated using actual traffic counts. In early 2010, the MAG transportation models were validated against approximately 2,200 traffic counts collected in 2006-2008. Table 2-2 summarizes the validation results by area type for freeways and arterials. Both the R-squared (R^2) and

Root Mean Square Error (RMSE) statistics indicate that there is a good fit between transportation model-estimated 2008 weekday traffic volumes and traffic count data collected in 2006-2008.

TABLE 2-2
AGGREGATED MODEL VALIDATION RESULTS
MODEL-ESTIMATED 2008 WEEKDAY VOLUMES VS. 2006-2008 TRAFFIC COUNTS

	Freeways and Arterials	
Area Type	R²	% RMSE
CBD	0.985	19.3%
Outlying CBD	0.970	28.0%
Mixed Use	0.928	39.8%
Suburban	0.922	42.2%
Rural	0.963	46.9%
All	0.958	35.5%

In previous MAG conformity analyses, transportation model estimates of VMT were reconciled with the VMT reported by the Highway Performance Monitoring System (HPMS) in order to comply with Section 93.122(b) of the Transportation Conformity Regulations (EPA, 2010). These regulations require that regional emissions analyses in serious, severe, and extreme ozone nonattainment areas and serious carbon monoxide nonattainment areas, with urbanized area populations over 200,000, meet certain network-based modeling requirements, including reconciliation of modeled VMT with HPMS.

Due to EPA approval of the MAG Carbon Monoxide and One-Hour Ozone Redesignation Request and Maintenance Plans in 2005, the Maricopa area is no longer a Serious nonattainment area for carbon monoxide or one-hour ozone. In addition, the area is not currently classified as a serious, severe or extreme nonattainment area for the 1997 eight-hour ozone standard and has not violated this standard since 2005. In the future, if the Maricopa area is classified as serious, severe or extreme for a more stringent eight-hour ozone standard, the VMT estimated by the transportation models will be reconciled against HPMS VMT for the most recent model calibration year.

As indicated above, the requirements of Section 93.122(b) no longer apply to the Maricopa area and reconciliation of modeled VMT with HPMS is not required for the 2010 MAG Conformity Analysis. However, it is important to note that the most recent comparison of

model-estimated and HPMS VMT for the travel demand model calibration year of 2002 concluded that the model and HPMS VMT estimates for the PM-10 nonattainment area were nearly identical and factoring of the model outputs was not necessary (MAG, 2007c).

Next Scheduled Update

The MAG FY 2008 Unified Planning Work Program programmed \$300,000 for an External Travel Survey and \$750,000 to conduct a Household Travel Survey. This survey data became available in early 2010 and will be utilized to re-calibrate the transportation models by 2011.

SPEEDS

Speeds obtained from the capacity-restrained traffic assignments are “fed-back” in the travel demand modeling chain. The trip distribution, mode choice, and traffic assignment steps of the chain are executed until AM peak period trip tables and link volumes are in equilibrium (root mean square error of five percent or less). In addition to vehicle miles of travel, the MAG transportation models calculate system performance measures such as vehicle hours of travel and volume to capacity ratios.

Periodically, MAG conducts speed studies to compare model-estimated speeds with empirical data. The FY 2007 MAG Unified Planning Work Program contained \$500,000 to conduct a Regional Travel Speed Study. Data from this 2007 speed study were used to update the speeds estimated by the MAG transportation models in 2010, as discussed below.

Methodology

MAG used the 2007 Travel Speed Study and ADOT freeway detector data to improve the speed estimates produced by the transportation models. Comparisons of 2008 transportation model-estimated speeds with speeds obtained from the MAG 2007 Regional Travel Time and Speed Study (MAG, 2008) are illustrated in Figures 2-1 through 2-4. Estimated versus observed speeds by area type for the A.M. peak period (6 A.M. to 9 A.M.) are shown in Figures 2-1 and 2-2 for arterials and freeways, respectively. A similar comparison during the off-peak period (9 A.M. to 3 P.M.) is provided in Figures 2-3 and 2-4.

In the transportation modeling area, the TransCAD-estimated speeds for arterials and freeways are within thirteen percent of the observed peak and off-peak speeds for all area types, with the exception of the freeway speed in the Outlying CBD during the off-peak period, where the modeled speed is 19 percent below the observed speed. Overall, the model-estimated A.M. peak speed is three miles per hour higher than the observed speed on arterials and one mile per hour higher on freeways. During the off-peak period, the average model-estimated speed is one mile per hour higher than the observed speed for arterials and four miles per hour lower for freeways. These figures indicate that the model-

estimated speeds are in reasonable agreement with observed arterial and freeway speeds during the peak and off-peak periods.

Next Scheduled Update

Travel speed studies are conducted periodically to validate the transportation models.

VEHICLE REGISTRATIONS

Vehicle registrations for July 2009 are the latest provided to MAG by the Motor Vehicle Division of the Arizona Department of Transportation (ADOT). In the 2010 MAG Conformity Analysis, the July 2009 registrations were input to MOBILE6.2 to estimate VOC, NOx, and PM-10 emissions. MOBILE6 derived the registrations for estimating wintertime CO emissions from the July 2009 registrations. The vehicle registration data provided by ADOT has been converted to MOBILE6 format. MAG will use newer vehicle registration data when provided by ADOT in the format required by the MOBILE6 emissions model.

IMPLEMENTATION MEASURES

In the 2010 MAG Conformity Analysis, emissions reduction credit was assumed for the committed measures in the applicable SIPs, including the measures shown in Table 2-3. The emission reductions assumed for these committed measures will reflect the latest implementation status of all measures for which emission reduction credits were assumed in the applicable SIPs. As required by the conformity rule, the applicable transportation control measures (TCMs) are fully documented in Chapter Five.

Emission reduction credit was also applied for Congestion Mitigation and Air Quality Improvement (CMAQ) projects in the Transportation Improvement Programs and prior TIPs, if credit for these measures was not quantified in the applicable air quality plans.

FIGURE 2-1
ESTIMATED VS. OBSERVED A.M. PEAK SPEEDS ON ARTERIALS

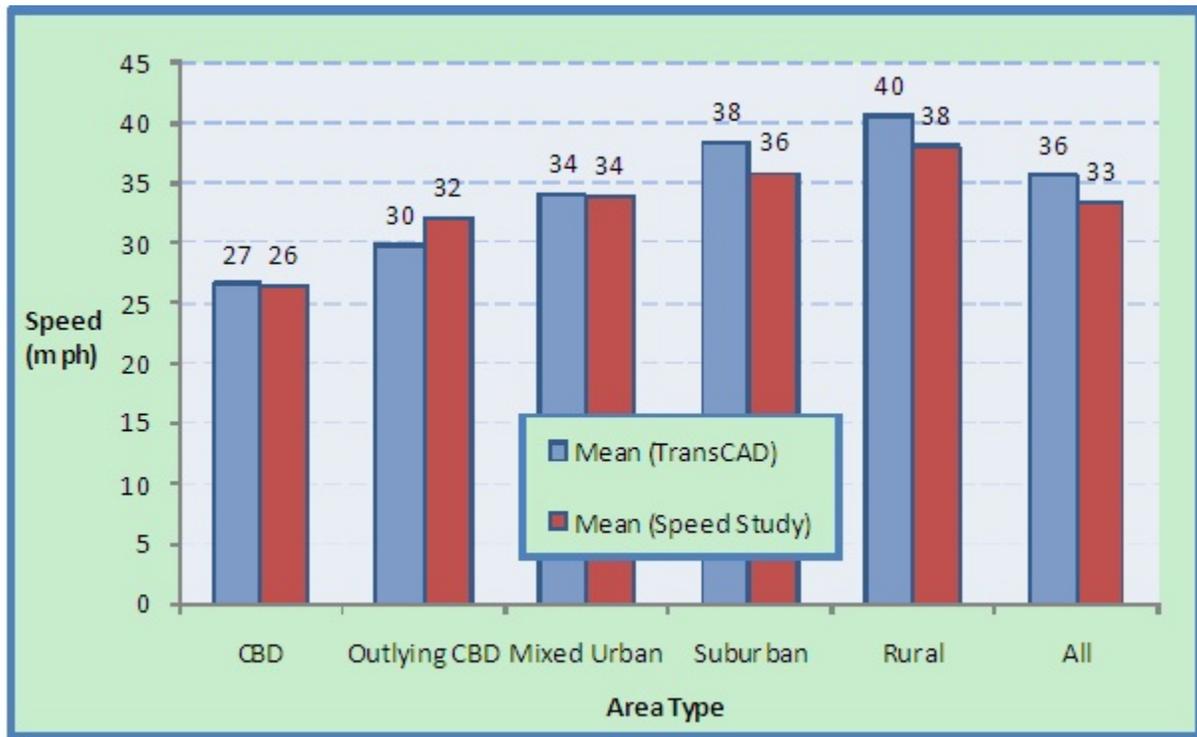


FIGURE 2-2
ESTIMATED VS. OBSERVED A.M. PEAK SPEEDS ON FREEWAYS

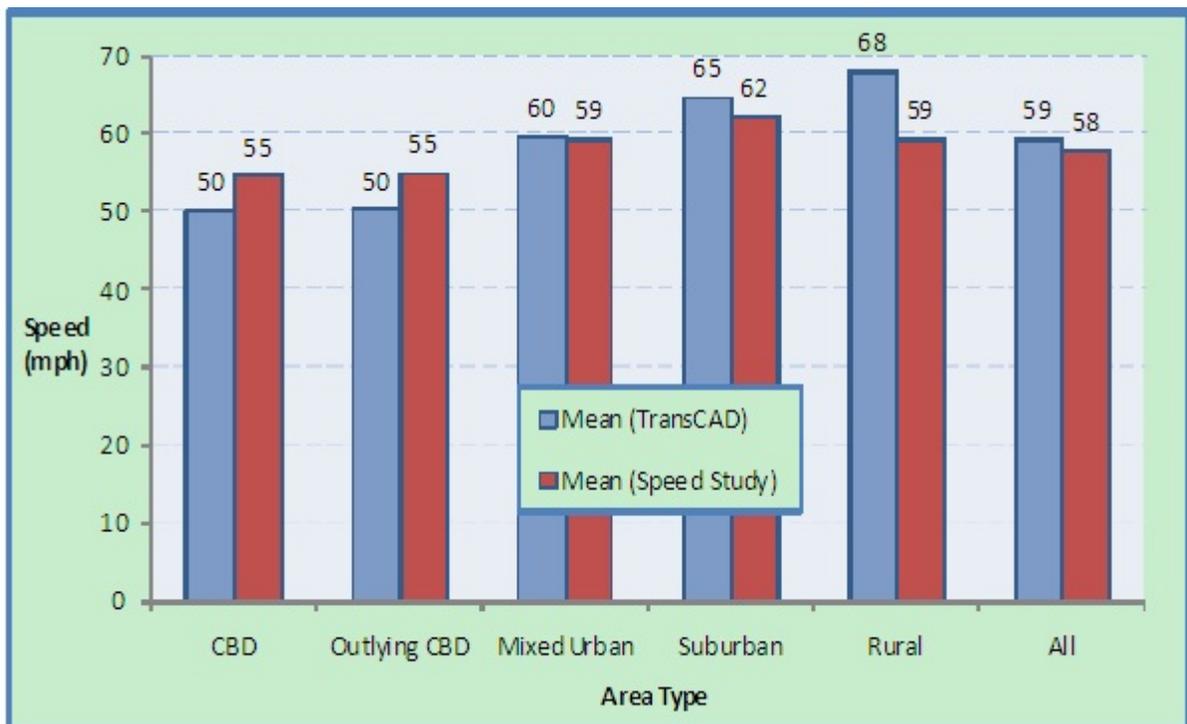


FIGURE 2-3
ESTIMATED VS. OBSERVED OFF-PEAK SPEEDS ON ARTERIALS

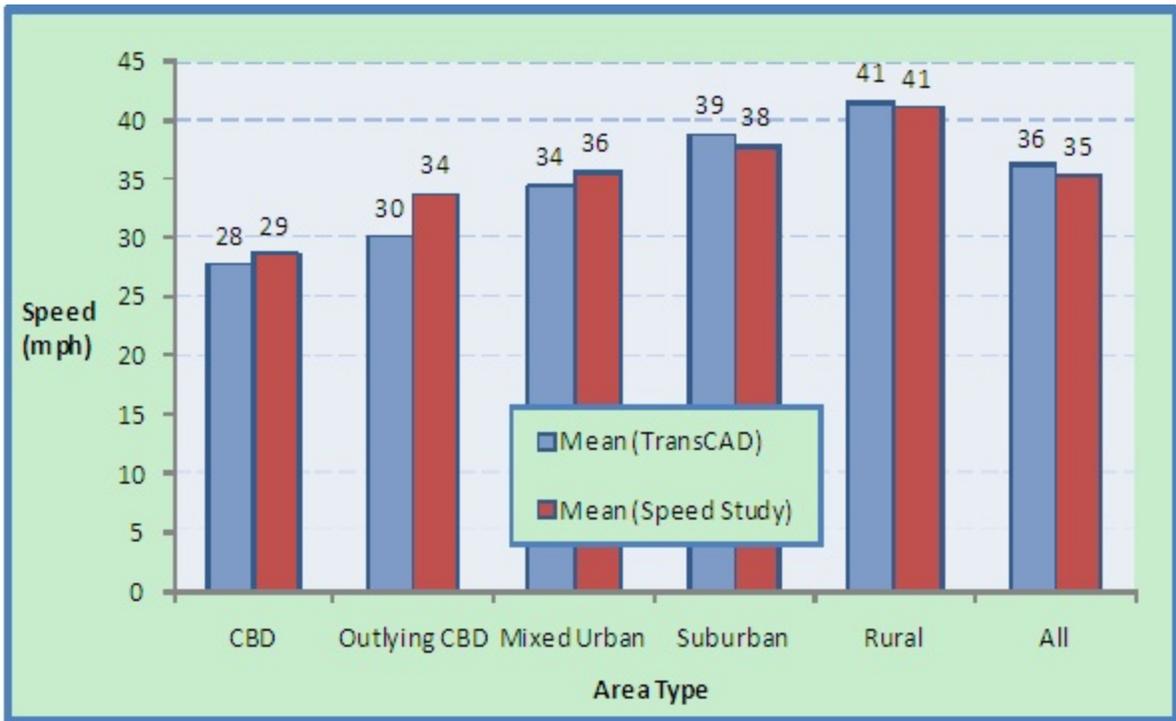
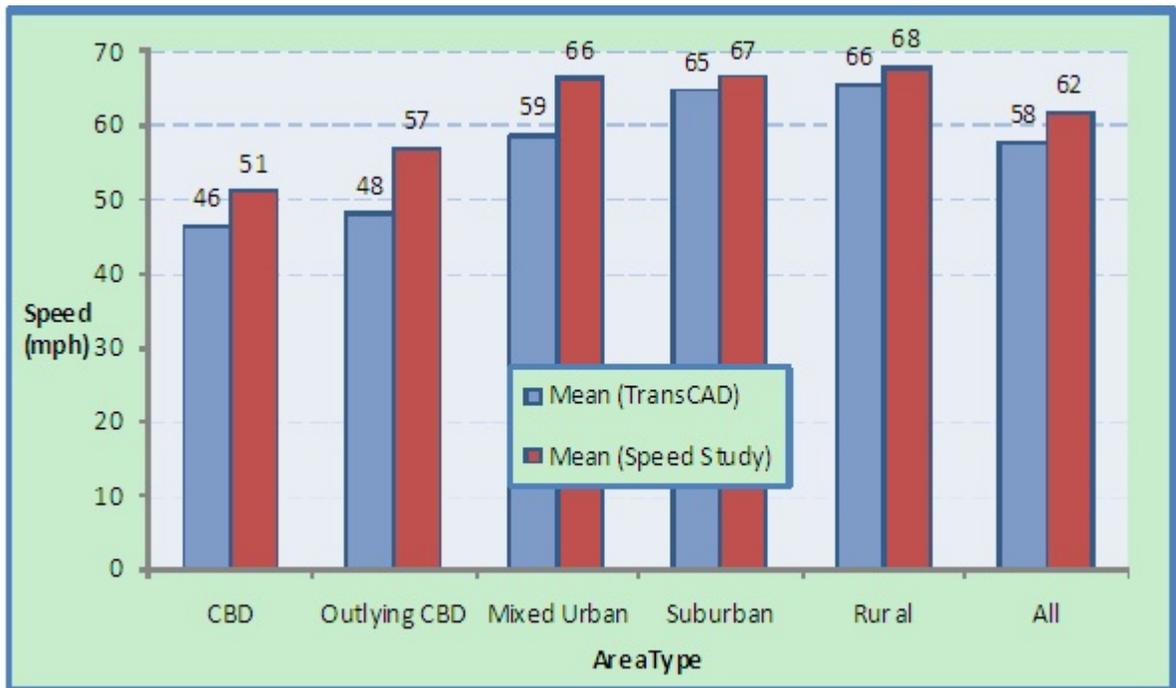


FIGURE 2-4
ESTIMATED VS. OBSERVED OFF-PEAK SPEEDS ON FREEWAYS



**TABLE 2-3
COMMITTED MEASURES ASSUMED IN THE 2010 MAG CONFORMITY ANALYSIS**

Measure #	Reference	Measure Description	Pollutant(s)
1	CO Maintenance Plan ¹	CARB Phase 2 with 3.5 Percent Oxygenate in Winter	CO
1	Eight-Hour Ozone Maintenance Plan ²	Summer Fuel Reformulation with 7 psi from May 1 through September 30	VOC, NOx
2 2	CO Maintenance Plan Eight-Hour Ozone Maintenance Plan	Phased-In Emission Test Cutpoints	CO, VOC, NOx
3 3	CO Maintenance Plan Eight-Hour Ozone Maintenance Plan	One-Time Waiver from Vehicle Emissions Test	CO, VOC, NOx
5 4C 16	CO Maintenance Plan Eight-Hour Ozone Maintenance Plan Serious Area PM-10 Plan ³	Coordinate Traffic Signal Systems	CO, VOC, NOx, PM-10
6 5C	CO Maintenance Plan Eight-Hour Ozone Maintenance Plan	Develop Intelligent Transportation Systems	CO, VOC, NOx
7 4	CO Maintenance Plan Eight-Hour Ozone Maintenance Plan	Tougher Enforcement of Vehicle Registration and Emission Test Compliance	CO, VOC, NOx
1C 6	CO Maintenance Plan Eight-Hour Ozone Maintenance Plan	Expansion of Area A Boundaries (HB 2538)	CO, VOC, NOx
2C 1C	CO Maintenance Plan Eight-Hour Ozone Maintenance Plan	Gross Polluter Option for I/M Program Waivers	CO, VOC, NOx
3C 2C	CO Maintenance Plan Eight-Hour Ozone Maintenance Plan	Increase Waiver Repair Limit Options	CO, VOC, NOx
3C	Eight-Hour Ozone Maintenance Plan	Federal Heavy Duty Diesel Vehicle Emissions Standards	VOC, NOx
6C	Eight-Hour Ozone Maintenance Plan	Liquid Leaker Test as Part of VEI Program	VOC, NOx

¹Carbon Monoxide Redesignation Request and Maintenance Plan for the Maricopa County Nonattainment Area, May 2003 (MAG, 2003).

²Eight-Hour Ozone Redesignation Request and Maintenance Plan for the Maricopa Nonattainment Area, February 2009 (MAG, 2009).

³Revised MAG 1999 Serious Area Particulate Plan for PM-10 for the Maricopa County Nonattainment Area, February 2000 (MAG, 2000a).

TABLE 2-3 (Cont.)
COMMITTED MEASURES ASSUMED IN THE 2010 MAG CONFORMITY ANALYSIS

Measure #	Reference	Measure Description	Pollutant(s)
1C	Five Percent Plan for PM-10 ⁴	Public Education and Outreach	PM-10
2	Five Percent Plan for PM-10	Extensive Dust Control Training Program ⁵	PM-10
3,16	Five Percent Plan for PM-10	Dust Managers at Construction Sites of 50 Acres and Greater; Require Dust Coordinators at Earthmoving Sites of 5-50 Acres ⁵	PM-10
5C	Five Percent Plan for PM-10	Certification Program for Dust Free Developments ⁵	PM-10
8	Five Percent Plan for PM-10	Conduct Nighttime and Weekend Inspections ⁵	PM-10
9,10,44	Five Percent Plan for PM-10	Increase the Number of Proactive Rule 310 and Rule 316 Inspections ⁵	PM-10
24C	Five Percent Plan for PM-10	Sweep Streets with PM-10 Certified Street Sweepers	PM-10
26C	Five Percent Plan for PM-10	Pave or Stabilize Existing Public Dirt Roads and Alleys	PM-10
27C	Five Percent Plan for PM-10	Limit Speeds to 15 mph on High Traffic Dirt Roads	PM-10
28	Five Percent Plan for PM-10	Pave or Stabilize Unpaved Shoulders	PM-10
36, 37, 38	Five Percent Plan for PM-10	Strengthen Rule 310 to Promote Continuous Compliance ⁵	PM-10
43C	Five Percent Plan for PM-10	Additional \$5M in FY07 MAG TIP for Paving Dirt Roads and Shoulders	PM-10
53	Five Percent Plan for PM-10	Repave or Overlay Paved Roads with Rubberized Asphalt	PM-10
14C, 15C, 17C	Five Percent Plan for PM-10	Reduce Trackout onto Paved Roads	PM-10

Notes:

(1) The Carbon Monoxide and Eight-Hour Ozone Maintenance Plans also rely on commitments to implement measures in the Revised MAG 1999 Serious Area Carbon Monoxide Plan (MAG, 2001).

(2) A “C” next to a Measure number indicates that it is a Contingency Measure in the applicable Plan. The contingency measures are legally-binding commitments that have already been implemented. Therefore, credit for these measures is also taken in the conformity analysis.

⁴MAG 2007 Five Percent Plan for PM-10 for the Maricopa County Nonattainment Area, December 2007 (MAG, 2007b).

⁵These measures reduce road construction emissions that are included in the conformity budget for PM-10.

3 TRANSPORTATION MODELING

The transportation modeling performed for the 2010 MAG Conformity Analysis for the FY 2011-2015 MAG Transportation Improvement Program and Regional Transportation Plan 2010 Update is based on the latest planning assumptions, as required in the federal conformity rule (40 CFR 93.110) and documented in Chapter 2. A summary of the transportation model characteristics, key socioeconomic data, and other data related to the land use and transportation system forecasts is provided in this chapter.

TRANSPORTATION MODELS

MAG regional transportation modeling is performed using TransCAD software for both highway and transit network assignments. The transportation models forecast AM peak period, midday, PM peak period, and nighttime vehicle traffic, as well as daily transit ridership, for the MAG transportation modeling area. The transportation modeling area currently contains 1,995 traffic analysis zones and covers an area of approximately 6,500 square miles. The latest calibration of the highway models was completed in 2006, using data from the 2001 household travel survey. The base year for the calibration was 2002. The latest validation of the highway models was completed in 2010, using 2007 speeds and 2006-2008 traffic counts. The transit models were re-calibrated in 2008-2009 based on data from the 2007 on-board bus survey. In addition, the truck models were updated and calibrated in 2009-2010 based on a 2008 external travel study and 2007 internal truck survey. The volume-delay functions were updated and calibrated in 2008 based on the 2007 travel time and speed study.

The MAG transportation models exhibit the following characteristics, which are consistent with the federal transportation conformity rule (Section 93.122(b)):

- The traffic volumes simulated by the MAG transportation models have been recently validated against approximately 2,200 traffic counts collected in 2006-2008. This validation demonstrated a good statistical fit between actual and model-estimated daily traffic volumes, as measured by an overall percent root mean square error of 35.5 percent. The transportation models are documented in the latest MAG Travel Demand Model Documentation (MAG, 2010).
- The population, households, and employment inputs to the travel demand models are based on DES population projections consistent with the 2005 U.S. Census Survey. Official Maricopa County socioeconomic projections based on

DES county projections were approved by the MAG Regional Council in May 2007. These projections were prepared using the DRAM/EMPAL land use model and the MAG Subarea Allocation Model-Information Manager (SAM-IM).

- The population and employment projections used in the conformity analysis are consistent with the transportation system alternatives considered. In the MAG land use models, transportation system accessibility influences the allocation of population and employment to smaller geographic areas. The DRAM/EMPAL model distributes County-level projections of households and employment to regional analysis zones (RAZs) based upon the pre-existing location of these activities, land use consumption rates, and transportation system accessibility, expressed in terms of PM peak travel times. These congested travel times are derived from an appropriate capacity-restrained traffic assignment for each forecast year. The allocation of population, households and employment from RAZs to one-acre grid cells is accomplished with SAM-IM. SAM-IM uses transportation system accessibility measures, such as proximity to the closest highway, in determining the likelihood that a one-acre grid will develop during a given forecast interval. SAM also aggregates population, households, and employment projections by one-acre grid to the TAZ-level for input to the transportation models. Congested travel times output by the transportation models are “fed-back” into the land use models to ensure that there is consistency between the transportation system assumptions and the land use projections.
- The transportation models perform capacity-restrained traffic assignments. Restrained assignments are produced for the AM peak period, midday, PM peak period, and nighttime, with volumes and congestion estimated for each period.
- Speeds obtained from the capacity-restrained traffic assignments are “fed-back” in the travel demand modeling chain. The trip distribution, mode choice, and traffic assignment steps of the chain are executed until AM peak period trip tables and link volumes are in equilibrium (root mean square error of five percent or less). The travel impedances used in the mode choice model include travel times and costs associated with each of the following modes: auto-drivers, carpools (2 and 3+ persons), and transit, i.e. shuttle bus, local bus, express bus, and light rail.
- The travel impedances used in the trip distribution and traffic assignment steps of the MAG travel demand modeling are a composite function of highway travel times and costs. The nested logit mode choice model is sensitive to highway and transit travel times, as well as pricing variables.
- As a result of the feedback loop in the MAG travel demand modeling process, the final peak and off-peak speeds are sensitive to the capacity-restrained volumes on each highway segment represented in the network. Data from the

MAG 2007 Regional Travel Time and Speed Study (MAG, 2008) were used to ensure that the capacity-restrained speeds and delays output by the transportation models are consistent with empirical data. Figures 2-1 through 2-4 provide a comparison of observed and model-estimated speeds for the peak and off-peak periods. For both freeways and arterials, the TransCAD-estimated speeds are within thirteen percent of the observed speeds for all area types except one and the difference in overall speeds is four miles per hour or less. This indicates that the capacity-restrained speeds produced by the transportation models are in reasonable agreement with the most recently-collected empirical data.

SOCIOECONOMIC PROJECTIONS

Section 93.110 of the federal conformity rule requires that the population and employment projections used in the conformity analysis be the most recent estimates that have been officially approved by the Metropolitan Planning Organization (i.e., MAG for this region). The 2010 MAG Conformity Analysis will be based on socioeconomic projections that were approved by the MAG Regional Council in May 2007.

The TAZ population, households and employment projections take into account the transportation improvements contained in the conforming TIP (FY 2007-2011) and RTP (2006 Update) in effect at the time the projections were approved. For the 2010 MAG Conformity Analysis, the projections of population, households, and employment by TAZ will be input to the MAG transportation models to estimate auto and transit trips, VMT, and congestion for each analysis year.

TRAFFIC ESTIMATES

This section describes the development of the highway and transit networks that will be used to perform the 2010 MAG Conformity Analysis for the FY 2011-2015 Transportation Improvement Program and Regional Transportation Plan 2010 Update. A summary of the population, employment, and travel characteristics for the MAG transportation modeling area for each scenario in the 2010 MAG Conformity Analysis is presented in Table 3-1. The vehicle miles of travel forecasts for each of the pollutant specific modeling areas and episodes are presented in Appendix C.

Transportation Network Assumptions

Not all of the street and freeway projects included in the TIP qualify for inclusion in the highway network. Projects which call for study, design, right-of-way acquisition, or non-capacity improvements are not included in the networks. When these projects result in actual facility construction projects, the associated capacity changes are coded into the network, as appropriate. Since the networks define capacity in terms of the number of

through traffic lanes, only construction projects that increase the lane-miles of through traffic are included. Generally, MAG highway networks include only the one-mile grid system of streets, plus freeways. This includes all streets classified as arterials, as well as some collectors.

Traffic on collectors and local streets not explicitly coded on the highway network are simulated in the models by use of abstract links called “centroid connectors”. These represent collectors, local streets and driveways which connect a neighborhood to a regionally significant roadway. Centroid connectors also include travel occurring on public and private unpaved roads.

**TABLE 3-1.
TRAFFIC NETWORK COMPARISON FOR SCENARIOS EVALUATED FOR
2010 MAG CONFORMITY ANALYSIS FOR THE FY 2011-2015 TIP AND RTP**

Year	Total Population ^a (thousands)	Total Employment ^a (thousands)	Average Weekday VMT ^b (millions)	Average P.M. Peak Period Speed ^c	Freeway Lane Miles ^d
2010	4,584	2,258	112.8	34.62	2,928
2015	5,289	2,612	134.2	31.97	3,094
2025	6,569	3,284	169.6	34.60	3,888
2031	7,216	3,638	187.4	34.86	4,238

^a Population and employment estimates are for the 6,500 square mile transportation modeling area in Maricopa and Pinal Counties. Total population includes resident population in households and group quarters. Total employment includes work-at-home and construction employees.

^b Vehicle miles of travel (VMT) from the 24-hour traffic assignment for the transportation modeling area.

^c Average speed on freeways, expressways, and arterials in the transportation modeling area during the P.M. peak period.

^d Ramps, HOV lanes, and collector-distributor roads are included in the lane miles reported for freeways in the transportation modeling area.

Highway Networks

The 2010 base network will include all qualifying facilities, including freeways, which will be open to traffic by December 31, 2010. The 2015 network will assume implementation of all qualifying highway projects scheduled in the FY 2011-2015 MAG Transportation Improvement Program (TIP). The 2025 network will assume implementation of all projects in the Regional Transportation Plan 2010 Update (RTP) through the year 2025, as well as all qualifying highway projects in the TIP. The 2031 network will assume implementation of all projects in the RTP, as well as all qualifying projects in the TIP. It is important to note that regionally significant projects in the Apache Junction portion of Pinal County are included in the TIP.

Coding Conventions

Specific coding conventions or criteria are applied to determine whether a project qualifies for highway network coding. This results in coding of all arterial streets and some collectors. The coding conventions are:

- (1) Capacity-related projects on existing links or extensions of existing links on the base highway network are coded in future networks. This includes projects on freeways, the mile-street grid, and half-mile streets already on the base network.
- (2) Capacity-related projects which are not on links or extensions of links in the base network are coded, if the street is considered a logical part of the one-mile street grid system. If the project is on a half-mile street, it is considered for inclusion on a case-by-case basis. The key factors considered in making this assessment include:
 - the density of current and future development and travel in the area of the project;
 - whether the change may be accommodated without increasing the number of zones; and
 - whether the change is consistent with standard network coding practices.

Transit Networks and Operations

Transit networks are input to the mode choice step of the MAG transportation models to determine the number of person trips made by transit, which in turn, removes vehicle trips from the highways. For all analysis years, the bus and rail networks reflect the latest assumptions provided to MAG by the Regional Public Transportation Authority.

The most recent information on transit ridership and operating policies is provided from the Regional Public Transportation Authority (RPTA, 2010a). Information on current transit fares is provided in Table 3-2 (RPTA, 2010b). The information on fares and transit operations in this section of the conformity analysis is provided to address federal transportation conformity requirements.

Current Fixed Route Service

Valley Metro fixed route scheduled service is provided to an area of approximately 266 square miles within the MAG region by Avondale, Chandler, Gilbert, Glendale, Goodyear, Guadalupe, Litchfield Park, Mesa, Peoria, Phoenix, RPTA, Scottsdale, Tempe, Tolleson, and the Sun City area of Maricopa County. In addition, the METRO 20-mile light rail system connects the cities of Phoenix, Tempe, and Mesa. Based on the Annual Ridership Report for FY 2008-2009, there were 60 local routes providing fixed route service, 24 express bus routes, one limited stop route, four RAPID commuter express routes, and circulator routes located in Glendale, Mesa, Phoenix, Scottsdale, and Tempe. There were 65,551,812 fixed route boardings in FY 2009. Summary statistics for the fixed route services are provided below for the fiscal year ending June 2009.

- Phoenix recorded 47,814,236 boardings in 20,638,606 revenue miles and 1,339,636 revenue hours of service.
- Regional Public Transportation Authority recorded 8,470,586 passengers in the past year with a total of 8,157,022 revenue miles in 378,335 revenue hours of service.
- Tempe recorded 9,153,608 passenger boardings in 6,858,438 revenue miles and 578,409 revenue hours of service.
- Glendale boarded 113,382 passengers in the past year with a total of 98,760 revenue miles in 8,735 revenue hours of service.

Other Existing Transit Services

Ten paratransit systems operate within Maricopa County, including East Valley Dial-A-Ride, El Mirage Dial-A-Ride, Glendale Dial-A-Ride, Maricopa County Special Transportation Services, Paradise Valley ADA Service, Peoria Dial-A-Ride, Phoenix Dial-A-Ride, Southwest Valley ADA, Sun Cities Area Transit System, and Surprise Dial-A-Ride. These services generally operate within the area with fixed route bus service. The total number of boarding passengers in FY 2009 was 874,132 with 6,906,584 revenue miles.

TABLE 3-2. TRANSIT FARES IN EFFECT AT THE TIME OF COMPLETION OF THE 2010 MAG CONFORMITY ANALYSIS FOR THE FY 2011-2015 TIP AND RTP

Valley Metro Service	Fares
Bus/LINK/Light Rail	
1-Ride	\$1.75
All Day Pass	\$3.50
All Day Pass (on-board bus)	\$5.25
31-Day	\$55.00
Semester Pass	\$195.00
Express/Rapid Bus	
1-Ride	\$2.75
All Day Pass	\$5.50
All Day Pass (on-board bus)	\$7.25
31-Day	\$85.00

Note: Reduced fares are available to persons with disabilities, seniors age 65 and older, Medicare card holders, and youths ages 6 through 18. Youths age 5 and under ride for free when accompanied by a fare-paying caretaker or guardian age 18 or older.

Source: Regional Public Transportation Authority (2010b).

The Maricopa County Special Transportation Services department operates prescheduled service. Transportation is provided for eligible persons, which includes seniors, persons with disabilities, and low income individuals, for specific trip purposes in portions of Maricopa County unserved by other systems. This service provides public transportation to individuals in outlying areas of the region. Vanpool service operated by Valley Metro is discussed in Chapter 5, which reviews transportation control measures that have been implemented in the region.

In addition, several shuttle and circulator transit services have been implemented across the region with different operating schedules, including: Tempe Free Local Area Shuttle (FLASH) and Tempe Orbit serving various neighborhoods in the city including the Arizona State University campus area; Phoenix Downtown Area Shuttle (DASH) serving the Downtown Phoenix-Copper Square area; Ahwatukee Local Explorer (ALEX) serving Ahwatukee and west Chandler areas; Phoenix Maryvale Area Ride for You (MARY) serving the Maryvale area of Phoenix; Glendale Urban Shuttle (GUS) providing transit in the

Glendale Central Corridor; and the Scottsdale Neighborhood Connector which serves neighborhoods and points of interest in an area south of Indian School Road and the Scottsdale Trolley which provides transit service in Downtown Scottsdale. In FY 2009, shuttle and circulator transit service provided a total of 6,672,955 boardings, with 4,665,212 revenue miles and 388,274 revenue hours.

Recent Transit Service Changes

The Regional Public Transportation Authority has reported a list of transit service changes that became effective January 25, 2010 (RPTA, 2010b). The changes are as follows:

- Grand Avenue Limited evening extension suspended from Peoria Park-and-Ride to Surprise Park-and-Ride.
- Route 29A schedule changes to coordinate with Route 131 at Avondale Civic Center.
- Route 30 travels east and west on University Drive and no longer diverts onto 52nd Street.
- Route 41 has been extended to 107th Avenue to cover portions of Indian School previously served by Route 41A. Route 41A has been eliminated.
- Route 48 (48th Street/Rio Salado) new route travels along 48th Street to downtown Tempe.
- Route 62 travels from Tempe Market Place via University Drive to Tempe Transportation Center, then on Hardy to Guadalupe. East on Guadalupe to Price.
- Route 65 late evening and weekend service operates on an hourly schedule.
- Route 66 late evening and weekend service operates on an hourly schedule and now travels on Kyrene from Baseline to Frye Road, replacing Chandler portion of Route 65.
- Route 72 selected trips have been extended to Thompson Peak Parkway to serve Scottsdale Healthcare's Thompson Peak campus. Remaining trips travel north to Thunderbird Road.
- Route 76 service has been eliminated in Tempe, but will continue to operate in Scottsdale.

- Route 77 now runs every 30 minutes during morning and evening rush hours and only select weekday trips will travel into South Mountain Community College. Weekend service to the college is no longer offered.
- Route 81 trips between Chandler Fashion Center and Raintree Drive at Northsight Boulevard no longer travel through ASU Research Park. Short trips will continue to serve ASU Research Park.
- Route 92 has been eliminated, but portions of the route are now served by Routes 48, 62, and 65.
- Route 106 east end of route travels north on 132nd Street and east on Via Linda to Mayo Clinic Scottsdale.
- Route 114 has been eliminated.
- Route 131 service has been eliminated east of Avondale Civic Center and now operates on an hourly schedule.
- Route 3 extended to Dysart Road in Avondale.

The MAG transportation models and the highway and transit networks described above are utilized to estimate daily vehicle travel and transit ridership in the MAG transportation modeling area. The primary input to the air quality modeling process is transportation model estimates of daily vehicle traffic and speeds on each highway link, along with the attendant link lengths and coordinate data. A detailed description of the MAG emissions models is provided in Chapter 4.

4 AIR QUALITY MODELING

For the 2010 MAG Conformity Analysis, the models which have been used to estimate carbon monoxide (CO), volatile organic compounds (VOC), nitrogen oxides (NO_x), and PM-10 are: MOBILE6.2, for motor vehicle emission factors for CO, VOC, NO_x, and PM-10 (exhaust, brake wear, and tire wear) (EPA, 2002a); AP-42, for emission factors for reentrained PM-10 from paved and unpaved roads; and M6Link, for the calculation of spatially and temporally allocated onroad mobile emissions using the emission factors from the above models and travel and speed data from the transportation model.

Model inputs not dependent on the TIP or Regional Transportation Plan were generally derived from the Carbon Monoxide Redesignation Request and Maintenance Plan for the Maricopa County Nonattainment Area (MAG, 2003) for CO; the Eight-Hour Ozone Plan (MAG, 2007a) for VOC and NO_x; and the MAG 2007 Five Percent Plan for PM-10 (MAG, 2007b) for PM-10. The modeling efforts have been kept as consistent as possible among the four pollutants modeled. Some differences in the modeling assumptions are necessary due to the different time periods modeled (e.g. different temperatures, fuel properties) and emission models used.

On January 18, 2001, the U.S. DOT issued guidance developed jointly with EPA to provide additional clarification concerning the use of latest planning assumptions in conformity determinations. In December 2008, EPA published revisions to the 2001 guidance entitled "Guidance for the Use of Latest Planning Assumptions in Transportation Conformity Determinations" (EPA, 2008b). The guidance indicates that periodic inventory updates may be used as a source for recent modeling data. The most recent periodic inventory available for CO is the 2002 Periodic Emissions Inventory for Carbon Monoxide for the Maricopa County, Arizona, Nonattainment Area (MCESD, 2004). This inventory represents an annual average day rather than the episode days used in the CO attainment and maintenance plans. Since the conformity budgets were established using these episode days, it is more appropriate to use CO plan assumptions.

The most recent periodic inventory available for ozone is the 2005 Periodic Emissions Inventory for Ozone Precursors for the Maricopa County, Arizona, Nonattainment Area (MCAQD, 2008b). The periodic inventory provides VOC and NO_x emissions estimates for the eight-hour ozone nonattainment area. In addition, the periodic inventory represents an annual average day rather than the episode days used in the Eight-Hour Ozone Plan. Since the conformity budgets were established using these episode days, it is more appropriate to use the Eight-Hour Ozone Plan modeling assumptions.

The most recent periodic inventory available for PM-10 is the 2005 Periodic Emissions Inventory for PM-10 for the Maricopa County, Arizona, Nonattainment Area (MCAQD, 2007). This inventory was used in developing the 2007 base case emissions for the MAG 2007 Five Percent Plan for PM-10. The assumptions used in developing PM-10 emissions for the 2010 MAG Conformity Analysis are consistent with those used in the MAG 2007 Five Percent Plan.

In the 2010 MAG Conformity Analysis, latest planning assumptions have been substituted for Plan assumptions, as appropriate. Regional emissions have been estimated for the horizon years 2010, 2015, 2025, and 2031. The conformity rule requirements for the selection of the horizon years are summarized in Chapter 1. MAG conducted interagency consultation in March 2010 on the transportation conformity processes, including the models, associated methods, and assumptions to be applied in the 2010 MAG Conformity Analysis. Appendix B contains copies of consultation correspondence.

In December 2009, the EPA issued policy guidance on the use of MOVES2010 for transportation conformity, indicating that there would be a two-year grace period before MOVES2010 would be required for new conformity determinations (EPA, 2009). In the March 2, 2010 *Federal Register*, EPA announced the release of MOVES2010, which triggered the start of a two-year grace period which will end on March 2, 2012. MOBILE6.2 was used for the 2010 MAG Conformity Analysis. MAG anticipates using the MOVES2010 emissions model for the next conformity analysis within the two-year grace period.

CARBON MONOXIDE

For the 2010 MAG Conformity Analysis, the applicable test for carbon monoxide consists of the emissions budget test, as discussed in Chapter 1. The Carbon Monoxide Maintenance Plan includes 2006 and 2015 budgets, which represent the motor vehicle emissions for carbon monoxide based on episode day conditions. On September 29, 2003, EPA found the motor vehicle emissions budgets contained in the Carbon Monoxide Maintenance Plan adequate for conformity purposes, effective October 14, 2003. On March 9, 2005, EPA published the final rule in the *Federal Register* approving the Carbon Monoxide Maintenance Plan, including the conformity budgets, effective April 8, 2005.

The overall modeling approach used in this analysis is consistent with that used to develop the emissions budgets. More specifically, onroad mobile source emissions were estimated using the TransCAD (traffic) and MOBILE6.2 (emission factor) and M6Link (emissions allocation) models. Temperature and various adjustment factors from the Carbon Monoxide Maintenance Plan were also used for consistency.

Modeling Tools

The MOBILE6.2 model was used to estimate carbon monoxide emission factors for the regional emissions analysis. Traffic data (vehicle miles of travel and speeds by link) were generated by the TransCAD transportation model. The M6Link program was used to derive VMT by link for the CO nonattainment area from the TransCAD transportation model output, and to calculate emissions using MOBILE6.2 emission factors and the traffic data. Committed control measures from the Carbon Monoxide Maintenance Plan were included in the conformity analysis, as appropriate. These measures are listed in Table 2-3 and detailed descriptions may be found in the Carbon Monoxide Maintenance Plan.

MOBILE6.2

MOBILE6.2 is a model developed by EPA for the purpose of estimating motor vehicle emission factors, in units of grams per mile, for specified vehicle fleet, fuel, temperature, and speed conditions. This model estimates carbon monoxide, ozone precursor, and PM-10 (exhaust, tire wear, and brake wear), motor vehicle emission factors.

The MOBILE6.2 model generates estimates of motor vehicle emission factors in units of grams of pollutant emitted per vehicle mile of travel. MOBILE6.2 uses a locally-derived motor vehicle registration distribution (by model year) of 25 years. For the 2010 MAG Conformity Analysis, July 2009 vehicle registration data from the Arizona Department of Transportation was used as input to MOBILE6.2 to derive the January data to obtain wintertime emission rates for CO. MOBILE6.2 also incorporates fleet turnover to newer, cleaner vehicles over time, which counters the increase in regional emissions that could occur with growth in vehicle miles of travel. Other factors, such as fuel quality and vehicle speed, are also important.

Inspection and maintenance (I/M) program benefits were assumed in the modeling. The I/M runs reflect the provisions of the enhanced inspection program which was implemented in January 1995 and “Phased-in I/M Cutpoints” (Measure 1), implemented in January 2000. It was assumed that for the four horizon years modeled in this analysis, the onboard diagnostic (OBD) test would be used for the model year 1996 and newer vehicles with an exemption for all vehicles of the current + 4 model years. The cutpoint values used are the Phase 2 cutpoints provided by ADEQ.

MOBILE6.2 runs were weighted to account for vehicles driving in the modeling area that do not participate in the I/M program. Therefore, each modeled scenario required runs with and without the I/M program benefits. For this analysis, it was assumed that 91.6 percent of eligible onroad vehicles participate in the I/M program. This fraction reflects an increase in the participation in the I/M program due to implementation of Measure 9, “Tougher Registration Enforcement”. For all scenarios modeled for this analysis, the inputs for each run included oxygenated gasoline with an assumed market share of 100 percent ethanol, consistent with Measure 14, “Clean Burning Gasoline”. The gasoline volatility assumed

was nine pounds per square inch. The average oxygen content of the ethanol blend gasoline was 3.5 percent by weight.

The MOBILE6.2 runs that reflected the I/M program assumed vehicle waiver rates of 1.3 percent or 1.0 percent, dependent upon model year. These fractions reflected the lower waiver rates resulting from the implementation of Measure 3, "One Time I/M Waiver". The output from the MOBILE6.2 model includes emission factors by hour, roadway facility type, pollutant, and area type. These emission factors were used by the M6Link program to estimate the motor vehicle emissions for the MAG region.

M6Link

M6Link processes link data files output by the MAG transportation model, TransCAD. The program calculates emissions for roadway links in the MAG highway networks. Traffic volumes for four time periods (AM peak, midday, PM peak, and nighttime) for each link are converted into hourly volumes based upon local survey data (MAG, 2000b). Hourly emission factors are developed by running MOBILE6.2 for each facility type, area type, and vehicle class using link speeds by time of day. Emissions for each hour are distributed geographically in the modeling domain based on the grid in which each link is located.

The transportation models are designed to model average weekday traffic patterns, which typically do not represent conditions on the specific episode day used to demonstrate attainment or maintenance and establish the conformity budget. As a result, M6Link applies day of the week and month of the year conversion factors that are consistent with the Carbon Monoxide Maintenance Plan for CO, the Eight-Hour Ozone Plan for VOC and NOx, and the Five Percent Plan for PM-10.

The transportation model inputs to M6Link consist of database formatted files that contain link-specific data and a node coordinate definitions file. M6Link also requires as input:

- A table containing adjustment factors used to allocate traffic volumes for four time periods to hourly traffic volumes.
- A matrix of emission factors for a range of hours, facility types, area types, vehicle classes, and vehicle ages (generated by the MOBILE6.2 model).
- The ratio of vehicles participating in the I/M program.
- The year being modeled.

The CO outputs from M6Link include an hourly, gridded onroad mobile source emissions file and several summary files containing emissions and traffic data in the modeling domain. The CO analysis reflects a Friday in December, consistent with the analysis used to set the CO budgets.

EIGHT-HOUR OZONE

For the 2010 MAG Conformity Analysis, the applicable test for eight-hour ozone consists of the emissions budget tests for volatile organic compounds (VOC) and nitrogen oxides (NOx), as discussed in Chapter 1. The Eight-Hour Ozone Plan for the Maricopa Nonattainment Area (MAG, 2007a) establishes conformity budgets for VOC and NOx in the modeled attainment year of 2008. The 2008 emissions budgets for the eight-hour ozone nonattainment area are 67.9 metric tons per day for VOC and 138.2 metric tons per day for NOx. EPA published a *Federal Register* notice finding these budgets to be adequate, effective November 9, 2007.

Vehicle registration data from July 2009 obtained from the Arizona Department of Transportation were used as input to MOBILE6.2 for VOC and NOx. Regional onroad emissions were modeled using the TransCAD (traffic), MOBILE6.2 (emission factor), and M6Link (emissions allocation) models. Temperature and various adjustment factors from the Eight-Hour Ozone Plan were also used for consistency.

Modeling Tools

The MOBILE6.2 model was used to estimate emission factors for the ozone precursors volatile organic compounds (VOC) and nitrogen oxides (NOx). Traffic data (vehicle miles of travel and speeds by link) were generated with the TransCAD transportation model. The M6Link program was used to derive VMT by link for the Eight-Hour Ozone nonattainment area from the TransCAD transportation model output, and to calculate emissions using MOBILE6.2 emission factors and the traffic data.

MOBILE6.2

The MOBILE6.2 model was executed for both the I/M program and non-I/M program vehicles. The model runs which include the I/M program incorporated an OBD test for 1996 and newer vehicles with an exemption for all vehicles of the current + 4 model years. Again, it was assumed that 91.6 percent of eligible onroad vehicles participate in the I/M program.

The MOBILE6.2 runs performed for the ozone analysis were very similar to those performed for the CO analysis, except that conditions were changed to reflect the summer of the given year rather than winter. Differences included temperature, fuel data, and the season modeled.

The output from the MOBILE6.2 model includes emission factors specific to hour of the day, area type, facility type, and domain temperatures. VOC and NOx emissions were also output by MOBILE6.2 separately depending upon source type such as exhaust running, evaporative resting, crankcase evaporative emissions, etc. These emission factors were used by the M6Link program to estimate the motor vehicle emissions for the MAG region.

M6Link

M6Link processes link data files output by the MAG transportation model, TransCAD. The program calculates emissions for roadway links in the MAG highway networks. Traffic volumes for four time periods (AM peak, midday, PM peak, and nighttime) for each link are converted into hourly volumes based upon local survey data (MAG, 2000b). Hourly emission factors are developed by running MOBILE6.2 for each facility type, area type, and vehicle class using link speeds by time of day. Emissions for each hour are distributed geographically in the modeling domain based on the grid in which each link is located. Other inputs to M6Link include the ratios for weighting the I/M and non-I/M emission factors and optional flags to apply control measure effects. M6Link produces several files containing emissions and traffic data. The VOC and NOx analysis reflects a Thursday in June, consistent with the analysis used to set the Eight-Hour Ozone Plan budgets.

PM-10

For the 2010 MAG Conformity Analysis, the applicable conformity tests for PM-10 are the emissions budget test, as discussed in Chapter 1. The MAG 2007 Five Percent Plan for PM-10 establishes a 2010 motor vehicle emissions budget of 103.3 metric tons per day for the PM-10 nonattainment area. EPA published a *Federal Register* notice finding the PM-10 budget to be adequate, effective July 1, 2008. The motor vehicle emissions budget also includes PM-10 emissions from roadway construction.

The modeling approach used in this analysis is consistent with that used to develop the emissions budget. Vehicle registration data from July 2009 obtained from the Arizona Department of Transportation was used as input to MOBILE6.2 for PM-10. AP-42 and M6Link were applied to estimate reentrained dust from travel on paved and unpaved roads, and MOBILE6.2 and M6Link were applied to estimate vehicle exhaust, tire wear, and brake wear emissions. In addition, fugitive dust from road construction was calculated and added to the emissions for each analysis year; assumptions used in estimating PM-10 emissions from road construction are documented later in this chapter.

Modeling Tools

On May 19, 2004, EPA issued a *Federal Register* notice requiring the use of AP-42 in SIPs and conformity determinations that start on or after the two-year grace period of May 19, 2006 (EPA, 2004c). AP-42 was used to estimate PM-10 emissions due to reentrainment from paved and unpaved roads for the 2010 MAG Conformity Analysis. The MOBILE6.2 model was used to estimate PM-10 emission factors from exhaust, brake wear, and tire wear. Traffic data (vehicle miles traveled and speeds by link) were generated with the TransCAD transportation model. GIS was used to derive VMT by link for the PM-10 nonattainment area. The M6Link model was used to calculate regional emissions using AP-42 and MOBILE6.2 emission factors and the traffic data. Committed measures from the MAG 2007 Five Percent Plan for PM-10 were included in the conformity analysis, as appropriate. These measures are listed in Table 2-3; detailed descriptions may also be found in the Five Percent Plan for PM-10 (MAG, 2007b). Emission reduction

credit for measures in the Five Percent Plan has been updated to reflect the implementation status of the measures through calendar year 2008. In addition, credit is taken for paving 10 miles of unpaved road per year, as described in Chapter 9 of the Regional Transportation Plan 2010 Update. It is assumed that 10 miles of road paving each year will begin in 2016.

The AP-42 equation that calculates PM-10 emission factors for unpaved road fugitive dust requires as input: the road surface material silt content (11.9%), soil moisture content (0.5%), fleet average vehicle weight (3 tons), and mean vehicle speed (25 mph). These inputs to the AP-42 equations for unpaved roads are consistent with those used in the MAG 2007 Five Percent Plan for PM-10 (MAG, 2007b).

The AP-42 equation that calculates PM-10 emission factors for reentrained paved road dust requires as input: the fleet average vehicle weight (3.18 tons), the number of days with at least 0.01 inch of precipitation (36 days in 2007), and the road surface silt loading. For the silt loadings, paved roads are split into three classes: freeways, with a silt loading of 0.02 grams per square meter; high traffic arterials (i.e., non-freeways carrying 10,000 vehicles or more per average weekday), with a silt loading of 0.067 grams per square meter; and low traffic arterials (i.e., non-freeways carrying less than 10,000 vehicles per average weekday), with a silt loading of 0.23 grams per square meter. These silt loadings and other input assumptions to the AP-42 equations for estimating paved road fugitive dust emissions are consistent with the MAG 2007 Five Percent Plan for PM-10 (MAG, 2007b).

MOBILE6.2

The MOBILE6.2 model is the current EPA model for estimating exhaust, brake wear, and tire wear PM-10 emissions from onroad vehicles. The model generates estimates of particulate emissions for vehicle exhaust, brake wear, and tire wear from onroad motor vehicles (both gasoline and diesel powered) in units of grams per vehicle mile traveled.

M6Link

The M6Link system processes emissions for the PM-10 modeling domain by combining the link and node data (e.g. volumes, speeds, link locations, facility type, area type) from the TransCAD regional transportation model with the emission factors (specific to facility type, hour, etc...) generated by the MOBILE6.2 model (in the case of exhaust PM-10, brake wear, and tire wear) and AP-42 (in the case of fugitive dust from paved and unpaved roads). Other inputs to M6Link include the ratios for weighting the I/M and non-I/M emission factors, a file containing the location and number of miles of unpaved road in the PM-10 nonattainment area, and optional flags to apply control measure effects. In addition to producing a gridded motor vehicle emissions output file, M6Link produces several files containing emissions and traffic data. The PM-10 analysis reflects an annual average day, consistent with the analysis performed to establish the 2010 PM-10 budget in the Five Percent Plan for PM-10.

Calculation of Emission Reduction Credit for PM-10 Certified Street Sweepers

In the MAG 2007 Five Percent Plan for PM-10, the emission reduction credit taken for the committed contingency Measure #24 - "Sweep Streets with PM-10 Certified Street Sweepers" is the sum of the benefits from: (1) sweeping commitments made by four local jurisdictions, (2) an Arizona Department of Transportation (ADOT) commitment to sweep all state highways in the PM-10 nonattainment area with PM-10 certified units, (3) a SB 1552 requirement that contractors sweeping city streets use PM-10 certified units, and (4) funding for 31 new PM-10 certified street sweepers in fiscal years 2007, 2008 and 2009 in the MAG Transportation Improvement Program.

In the Five Percent Plan, the emission reductions for (1) and (3) are calculated as a percentage of paved road fugitive dust emissions. For the 2010 Conformity Analysis, these percentages from the Five Percent Plan were applied to paved road emissions in the PM-10 nonattainment area that represent the latest vehicle miles of travel (VMT) estimates output by the MAG TransCAD model.

In the Five Percent Plan, emission reduction credit for (2), the ADOT commitment to sweep all state highways in the PM-10 nonattainment area with PM-10 certified sweepers, was based on limited data provided by ADOT. A new ADOT sweeping contract, that became effective on February 20, 2010, identifies the specific roads in the PM-10 nonattainment area to be swept with PM-10 certified street sweepers and the required sweeping frequency. In the Five Percent Plan, ADOT indicated that 80 percent of the roads were being swept with PM-10 certified units before execution of the new contract. Therefore, the PM-10 reduction for the 2010 MAG Conformity Analysis represents the benefit of sweeping 20 percent of the VMT on the roads identified in the new ADOT contract. In 2010, the credit is reduced by 13.7 percent to reflect the contract start date of February 20, 2010. In future conformity analysis years, credit is increased proportionally to the growth in VMT on the state highways in the PM-10 nonattainment area that are being swept by the ADOT contractor.

The Five Percent Plan assumed emission reduction credit for 103 PM-10 certified street sweepers purchased with MAG CMAQ funds in FY 2001-2006. This credit was applied to the base case 2007-2010 emissions in the Plan. For committed contingency Measure #24 (4), the Five Percent Plan assumed that 31 additional PM-10 certified street sweepers would be purchased in FY 2007-2009 with \$3.76 million in Congestion Mitigation and Air Quality Improvement (CMAQ) funds programmed in the MAG Transportation Improvement Program. In the May 2010 Conformity Analysis, emission reduction credit for (4) is based on the 123 sweepers that were actually purchased by December 31, 2009. In addition, an ADOT inventory, dated April 2, 2010, provides the disposition of PM-10 certified street sweepers that have been purchased with MAG CMAQ funds since FY 2001. The ADOT inventory indicates that eighteen of the 123 sweepers are no longer in service. For the May 2010 Conformity Analysis, emission reduction credit for these eighteen sweepers has been eliminated from the credit taken for (4) in the year 2010. In future conformity analysis

years, the 2010 benefit is increased in direct proportion to the growth in VMT on roads in the PM-10 nonattainment area that are not freeways.

Unpaved Roads and Alleys

For the 2010 MAG Conformity Analysis, the PM-10 emissions for unpaved roads are based on data collected for the MAG 2009 Unpaved Road Inventory (URI). According to the URI, there were 613.4 miles of public unpaved road and 1,270.6 miles of private unpaved roads in the PM-10 nonattainment area in 2009. MAG utilized traffic counts on unpaved roads, supplemented by GIS image recognition techniques, to estimate the daily vehicle miles of travel (VMT) on public and private unpaved roads. Using GIS, MAG also determined the historical rate at which new unpaved roads have been created due to lot splits, which is 1.46 percent per year. For all conformity analysis years, the 2009 VMT on private unpaved roads is increased by 1.46 percent per year, while the VMT on public unpaved roads is held constant.

MAG also used GIS to estimate that there were 650 miles of unpaved alleys in the PM-10 nonattainment area in 2009. The VMT on unpaved alleys was obtained by multiplying the miles of unpaved alleys by the estimated annual average daily traffic (i.e., 9 vehicle trips per day). The resultant VMT on unpaved alleys is held constant for all conformity analysis years.

The PM-10 emission rates for vehicles traveling on unpaved roads and alleys were derived from AP-42. The AP-42 emission rates were multiplied by the annual average daily VMT to estimate the uncontrolled PM-10 emissions on unpaved private roads, public roads, and alleys. For the 2010 MAG Conformity Analysis, reductions due to the implementation of committed measures in the MAG 2007 Five Percent Plan were applied to obtain the controlled PM-10 emissions from paving unpaved roads and alleys.

In addition, the 2010 MAG Conformity Analysis takes credit for paving projects programmed in fiscal years 2010 through 2013 of the FY 2011-2015 MAG Transportation Improvement Program that were not included in any committed measure in the MAG 2007 Five Percent Plan. These additional TIP paving projects, scheduled to be open to traffic between 2011 and 2015, will pave 34.2 miles of unpaved roads, 135.6 miles of unpaved alleys, and 11.8 miles of unpaved shoulders. Credit for these TIP paving projects is taken in 2015 and held constant in all subsequent conformity analysis years.

Chapter 9 of the Regional Transportation Plan 2010 Update (RTP) indicates that ten miles of unpaved roads will be paved each year. The 2010 MAG Conformity Analysis assumes that ten miles will be paved each year beginning in 2016 (the year after the TIP) and continuing through 2031, the last year of the RTP.

Calculation of PM-10 Emissions from Road Construction

As required by Section 93.122(e) of the federal transportation conformity rule, PM-10 emissions from road construction were estimated for each conformity analysis year. In the MAG 2007 Five Percent Plan, future road construction emissions were estimated on the basis of earthmoving permits issued by Maricopa County for road construction in 2004-2007. The average annual permitted acreage for road construction over this four year period was divided by the 2005 permitted acreage for road construction to obtain the growth factor to project 2005 road construction emissions (MCAQD, 2007) to 2010 base case road construction emissions. Implementation of the committed control measures in the Five Percent Plan is expected to reduce the 2010 base case road construction emissions by 48.2 percent.

For the 2010 MAG Conformity Analysis, the data used to estimate road construction emissions has been updated to include acreage from the earthmoving permits issued by Maricopa County in the years 2008 and 2009. Due to the severe economic downturn since mid-2008, road construction emissions in 2010 are based on the earthmoving permit acreage in 2009. It was assumed that the local economy will recover by 2015 and therefore road construction emissions for 2015, 2025 and 2031 were based on the average earthmoving permit acreage for the five-year period 2005-2009, divided by the acreage in 2008. For all conformity analysis years, credit was taken for the committed control measures that reduce road construction emissions in the MAG 2007 Five Percent Plan for PM-10.

5 TRANSPORTATION CONTROL MEASURES

This chapter provides an update of the current status of transportation control measures identified in applicable implementation plans. Requirements of the federal conformity rule relating to transportation control measures (TCMs) are presented first, followed by a review of the applicable air quality implementation plans and TCM findings for the FY 2011-2015 MAG Transportation Improvement Program (TIP) and Regional Transportation Plan 2010 Update. A review of the funding and current status of TCM implementation is presented. The chapter concludes with a measure-by-measure assessment of the current status of each transportation control measure.

FEDERAL CONFORMITY RULE REQUIREMENTS FOR TCMs

The federal conformity rule (40 CFR 93.113) requires that the TIP and Regional Transportation Plan “must provide for the timely implementation of TCMs in the applicable implementation plan.” The federal definition for the term “transportation control measure” is provided in 40 CFR 93.101:

“any measure that is specifically identified and committed to in the applicable implementation plan that is either one of the types listed in Section 108 of the CAA [Clean Air Act], or any other measure for the purpose of reducing emissions or concentrations of air pollutants from transportation sources by reducing vehicle use or changing traffic flow or congestion conditions. Notwithstanding the first sentence of this definition, vehicle technology-based, fuel-based, and maintenance-based measures which control the emissions from vehicles under fixed traffic conditions are not TCMs for the purposes of this subpart.”

In the federal conformity rule, the definition provided for the term “applicable implementation plan” is:

“Applicable implementation plan is defined in section 302(q) of the CAA and means the portion (or portions) of the implementation plan, or most recent revision thereof, which has been approved under section 110, or promulgated under section 110(c), or promulgated or approved pursuant to regulations promulgated under section 301(d) and which implements the relevant requirements of the CAA.”

Section 108(f)(1) of the Clean Air Act as amended in 1990 lists the following transportation control measures and technology-based measures:

- (i) programs for improved public transit;
- (ii) restriction of certain roads or lanes to, or construction of such roads or lanes for use by, passenger buses or high occupancy vehicles;
- (iii) employer-based transportation management plans, including incentives;
- (iv) trip-reduction ordinances;
- (v) traffic flow improvement programs that achieve emission reductions;
- (vi) fringe and transportation corridor parking facilities serving multiple occupancy vehicle programs or transit service;
- (vii) programs to limit or restrict vehicle use in downtown areas or other areas of emission concentration particularly during periods of peak use;
- (viii) programs for the provision of all forms of high-occupancy, shared-ride services;
- (ix) programs to limit portions of road surfaces or certain sections of the metropolitan area to the use of non-motorized vehicles or pedestrian use, both as to time and place;
- (x) programs for secure bicycle storage facilities and other facilities, including bicycle lanes, for the convenience and protection of bicyclists, in both public and private areas;
- (xi) programs to control extended idling of vehicles;
- (xii) programs to reduce motor vehicle emissions, consistent with title II, which are caused by extreme cold start conditions;
- (xiii) employer-sponsored programs to permit flexible work schedules;
- (xiv) programs and ordinances to facilitate non-automobile travel, provision and utilization of mass transit, and to generally reduce the need for single-occupant vehicle travel, as part of transportation planning and development efforts of a locality, including programs and ordinances applicable to new shopping centers, special events, and other centers of vehicle activity;
- (xv) programs for new construction and major reconstructions of paths, tracks or areas solely for the use by pedestrian or other non-motorized means of transportation when economically feasible and in the public interest. For purposes of this clause, the Administrator shall also consult with the Secretary of the Interior; and
- (xvi) program to encourage the voluntary removal from use and the marketplace of pre-1980 model year light duty vehicles and pre-1980 model light duty trucks.

TCM Requirements For A Transportation Plan

The EPA regulations in 40 CFR 93.113(b) indicate that transportation control measure requirements for transportation plans are satisfied if two criteria are met:

- “(1) The transportation plan, in describing the envisioned future transportation system, provides for the timely completion or implementation of all TCMs in the applicable implementation plan which are eligible for funding under Title 23 U.S.C. or the Federal Transit Laws, consistent with schedules included in the applicable implementation plan.
- (2) Nothing in the transportation plan interferes with the implementation of any TCM in the applicable implementation plan.”

TCM Requirements For A Transportation Improvement Program

Similarly, in 40 CFR Section 93.113(c), EPA specifies three TCM criteria applicable to a transportation improvement program:

- “(1) An examination of the specific steps and funding source(s) needed to fully implement each TCM indicates that TCMs which are eligible for funding under title 23 U.S.C. or the Federal Transit Laws are on or ahead of the schedule established in the applicable implementation plan, or, if such TCMs are behind the schedule established in the applicable implementation plan, the MPO and DOT have determined that past obstacles to implementation of the TCMs have been identified and have been or are being overcome, and that all state and local agencies with influence over approvals or funding for TCMs are giving maximum priority to approval or funding of TCMs over other projects within their control, including projects in locations outside the nonattainment or maintenance area;
- (2) If TCMs in the applicable implementation plan have previously been programmed for federal funding but the funds have not been obligated and the TCMs are behind the schedule in the implementation plan, then the TIP cannot be found to conform:
 - if the funds intended for those TCMs are reallocated to projects in the TIP other than TCMs, or
 - if there are no other TCMs in the TIP, if the funds are reallocated to projects in the TIP other than projects which are eligible for federal funding intended for air quality improvement projects, e.g., the Congestion Mitigation and Air Quality Improvement Program; and
- (3) Nothing in the TIP may interfere with the implementation of any TCM in the applicable implementation plan.”

APPLICABLE AIR QUALITY IMPLEMENTATION PLANS

Only transportation control measures from applicable implementation plans for the MAG region are required to be updated for this analysis. For the 2010 MAG Conformity Analysis, the applicable implementation plans, according to the definition provided at the start of this chapter, are the Revised 1999 MAG Serious Area Particulate Plan for PM-10, the Revised MAG 1999 Serious Area Carbon Monoxide Plan, the Carbon Monoxide Redesignation Request and Maintenance Plan, and the One-Hour Ozone Redesignation Request and Maintenance Plan. The Environmental Protection Agency took final action on July 25, 2002 to approve the Revised 1999 Serious Area Particulate Plan for PM-10. On March 9, 2005, EPA published the final rule in the *Federal Register* approving the Revised MAG 1999 Serious Area Carbon Monoxide Plan and the Carbon Monoxide Maintenance Plan, effective April 8, 2005 (EPA, 2005a). EPA approved the One-Hour Ozone Maintenance Plan, effective June 14, 2005.

In addition, the Revised 1998 15 Percent Rate of Progress (ROP) Federal Implementation Plan (FIP) for ozone and the Moderate Area Federal Implementation Plan for PM-10 are applicable plans. However, neither of these plans contained TCMs.

Although not approved and therefore not applicable by definition, TCMs in previous air quality plans submitted to EPA are discussed in this chapter for informational purposes. A summary of the commitments from the submitted plans are also included for informational purposes.

Applicable Implementation Plans for Carbon Monoxide

Since EPA has approved the Revised MAG 1999 Serious Area Carbon Monoxide Plan, this plan is applicable and the transportation control measures contained in the plan are discussed. The TCMs in the Serious Area Carbon Monoxide Plan are the same as those in the approved Serious Area PM-10 Plan. The Revised MAG 1999 Serious Area CO Plan provides a comprehensive implementation schedule for all of the control measures in Chapter Eight (pages 8-1 through 8-146). An assessment of the expected effectiveness of each measure is located in Chapter V of the Technical Support Document (TSD) of the Revised MAG 1999 Serious Area CO Plan. These chapters are contained in Appendix G of the conformity analysis. All TCMs for which emission reduction credit was taken in the Serious Area CO Plan have been implemented and are incorporated into the base year traffic assignment for the conformity analysis.

In addition, the EPA approved the Carbon Monoxide Redesignation Request and Maintenance Plan for the Maricopa County Nonattainment Area, effective April 8, 2005. The Carbon Monoxide Maintenance Plan does not introduce any new TCMs; however, two TCMs, "Coordinate Traffic Signal Systems" and "Develop Intelligent Transportation Systems", will continue to be implemented through the maintenance year of 2015.

Submitted Implementation Plans for Carbon Monoxide

Two other submitted carbon monoxide plans provide information on additional transportation control measures. All TCMs for which emission reduction credit was taken in submitted carbon monoxide plans have been incorporated into the base year traffic assignment for the conformity analysis.

The MAG 1987 Carbon Monoxide Plan, provides a comprehensive implementation schedule in Chapter Seven (pages 7-1 through 7-84) for all of the control measures of that Plan. Chapter Eight of the MAG 1987 CO Plan assessed the expected effectiveness of each measure. These chapters are located in Appendix D of the conformity analysis.

In the MAG 1993 Carbon Monoxide Plan, the control measures and implementation schedule are contained in Chapter Eight (pages 8-1 through 8-68). Chapter Nine of the MAG 1993 CO Plan presents an assessment of the expected effectiveness of each measure. These chapters are located in Appendix E. Similarly, Chapter Two of the MAG 1993 Carbon Monoxide Plan Addendum contains a description of additional measures provided under Arizona House Bill 2001 (see Appendix F).

Applicable Implementation Plan for Ozone

The MAG One-Hour Ozone Redesignation Request and Maintenance Plan, approved by EPA in June 2005, contains measures from the Revised MAG 1999 Serious Area Carbon Monoxide Plan and Carbon Monoxide Redesignation Request and Maintenance Plan, since most of those measures also reduce ozone. Therefore, no new TCMs are introduced. The other applicable ozone plan is the 15 Percent Rate of Progress (ROP) Federal Implementation Plan (FIP) promulgated by EPA on May 27, 1998 for the Maricopa County nonattainment area, effective June 26, 1998. On July 6, 1999, EPA issued the Final Rule for changes to the control strategy used in developing the Revised ROP FIP (EPA, 1999a). However, the Revised ROP FIP did not introduce any TCMs.

Submitted Implementation Plans for Ozone

Although there is no applicable implementation plan for ozone that specifies TCMs for this region, measures included in submitted plans for ozone are reviewed for informational purposes in this report. These measures have been implemented and any resulting creditable emission reduction benefits have been incorporated into the base year traffic assignment for the conformity analysis.

The selected control strategies in the 1978 Nonattainment Area Plan for CO and Photochemical Oxidants in the Maricopa County Urban Planning Area (BAQC, 1978) are contained in Chapter Four (pages 4-1 through 4-18) of that document. Chapter Five of that Plan addressed the expected impact of the selected control strategies. These chapters are provided in Appendix H. The 1978 Plan contained five transportation-related

measures, of which only two would be considered TCMs under the EPA definition: Carpooling - Voluntary Program; and Modified Work Schedules - Voluntary Program.

TCMs from the 1987 MAG Ozone Plan for the Maricopa County Area have been documented in Appendix I of the conformity analysis. The MAG 1993 Ozone Plan and 1993 Ozone Plan Addendum contain additional TCMs that would reduce ozone related emissions, and these measures are documented in Appendices K and L.

The Serious Area Ozone State Implementation Plan for Maricopa County was submitted to EPA in December 2000 by the Arizona Department of Environmental Quality (ADEQ, 2000). This Plan contains a list of control measures; however no new TCMs are introduced on this list.

In addition, the MAG 2007 Eight-Hour Ozone Plan for the Maricopa Nonattainment Area was submitted to the EPA by June 15, 2007. The MAG Eight-Hour Ozone Redesignation Request and Maintenance Plan for the Maricopa Nonattainment Area was submitted to EPA in March 2009. These Plans do not introduce any new TCMs; however, two TCMs, "Coordinate Traffic Signal Systems" and "Develop Intelligent Transportation Systems", will continue to be implemented through the maintenance year of 2025.

Applicable Implementation Plan for PM-10

On July 25, 2002, the EPA took final action to approve the Revised MAG 1999 Serious Area Particulate Plan for PM-10. A measure-by-measure review of TCMs contained in the Revised MAG 1999 Serious Area PM-10 Plan is provided later in this chapter. A comprehensive implementation schedule for all of the transportation control measures is provided in Chapter Seven (pages 7-1 through 7-285) of the Revised MAG 1999 Serious Area PM-10 Plan. An assessment of the expected effectiveness of each measure is located in Chapter V of the Technical Support Document of the Revised MAG 1999 Serious Area Particulate Plan for PM-10. These chapters are contained in Appendix M. The only TCM for which emission reduction credit was taken in the Serious Area PM-10 Plan was "Coordinate Traffic Signal Systems".

Submitted Implementation Plans for PM-10

In addition, three submitted plans for PM-10, described below, are reviewed for information on transportation control measures. All TCMs in the submitted and applicable PM-10 plans have been implemented and any resulting creditable emissions reduction benefits have been incorporated into the base year traffic assignment for the conformity analysis.

On August 3, 1998, EPA promulgated a PM-10 Moderate Area Federal Implementation Plan (EPA, 1998b), effective September 2, 1998, but this Plan did not introduce any TCMs. The MAG 1988 Particulate Plan For PM-10, provides a comprehensive implementation schedule in Chapter Seven (pages 7-1 through 7-108) for all of the control measures of that Plan. Chapter Eight of the MAG 1988 PM-10 Plan assessed the expected

effectiveness of each measure. These chapters are located in Appendix N. In the MAG 1991 Particulate Plan for PM-10 for the Maricopa County Area and 1993 Revisions, the control measures and implementation schedule are contained in Chapter Seven (see Appendix O).

In accordance with Section 189(d) of the Clean Air Act, the MAG 2007 Five Percent Plan for PM-10 was submitted to EPA by December 31, 2007. The Five Percent Plan for PM-10 includes fifty-three committed control measures from the State, Maricopa County, and local governments. The Five Percent Plan is required to reduce PM-10 emissions by at least five percent per year until the standard is attained. This Plan contains the control measure, "Coordinate public transit service with Pinal County". A comprehensive implementation schedule for all of the control measures is provided in Chapter Six (pages 6-1 through 6-196) of the MAG 2007 Five Percent Plan for PM-10. The evaluation of the expected effectiveness of each measure is located in Chapter III of the Technical Support Document of the Five Percent Plan for PM-10. These chapters are contained in Appendix L.

TCM FINDINGS FOR THE TIP AND REGIONAL TRANSPORTATION PLAN

Based on a review of the transportation control measures contained in the applicable air quality plans, the required TCM conformity findings are made below:

In December 2004 through January 2005, MAG contacted agencies with TCM commitments in applicable SIPs. Each agency reported to MAG that all TCMs in the applicable SIPs are on schedule and there are no obstacles to implementation of the TCMs. Therefore, the TIP and Regional Transportation Plan provide for the timely implementation of the TCMs in the applicable air quality plans and nothing in the TIP or RTP interferes with the implementation of any TCM in an applicable implementation plan.

A measure-by-measure assessment of individual transportation control measures in the applicable and other submitted plans is provided below. Some of the TCMs in the plans were implemented in the short term and have been fully implemented for several years. Their completed implementation is therefore assumed in the base year set of assumptions in the traffic assignments for the TIP and Regional Transportation Plan 2010 Update. The TIP provides continued funding for many such TCMs (e.g. trip reduction, transit, bikeway improvements, ridesharing, and freeway management systems), which now have been implemented to a significantly greater degree than committed originally.

In addition, the transportation plan assumes or specifically calls for TCM implementation at current or expanded levels, consistent with adopted TCM commitments. The plan specifically addresses transit service, high occupancy vehicle lanes, demand management

**TABLE 5-1. PROGRAMMED TRANSPORTATION PROJECTS THAT IMPLEMENT TCMS
AND OTHER AIR QUALITY MEASURES**

SIP CATEGORY	FY 2011 FUNDING (\$ MILLIONS)	FY 2011-2015 FUNDING (\$ MILLIONS)	MEASURE DESCRIPTION
Regional Public/Rapid Transit	Capital \$232.4 Operating \$0.9*	Capital \$858.5 Operating \$72.8*	FY 2011 includes 17 proposed capital transit projects. The entire TIP includes 130 proposed capital transit projects.
Areawide Ridesharing, Travel Reduction, Education and Outreach Programs, and Vanpools	3.2	14.4	Rideshare and Trip Reduction programs are funded for each year of the FY 2011 - 2015 TIP including: a MAG Regional Rideshare and Telework Program, MAG Trip Reduction Program, and the state Travel Reduction Program. The TIP also funds 300 new and replacement vehicles for vanpools.
Park and Ride Lots	0.0	35.2	Site identification, design and construction for 4 park and ride lots.
Freeway Management System and HOV Lanes	13.9	319.7	The TIP contains 17 ADOT Freeway Management System projects; new HOV lanes are being designed or constructed on 40 miles of freeways.
Traffic Flow Improvements	44.8	241.0	The TIP includes 77 traffic signal synchronization and Intelligent Transportation System (ITS) projects and 68 intersection improvement projects.
Bicycle and Pedestrian Travel	21.4	112.7	The TIP includes 70 bicycle, pedestrian, and multiuse path projects.
Paving of Streets, Shoulders, and Alleys	14.6	27.2	The TIP includes 61 projects for the design and paving of dirt roadways, shoulders, alleys, and access points.
PM-10 Efficient Street Sweepers	0.9	3.8	The TIP includes \$3.8 million in FY 2011-2014 to purchase PM-10 Efficient Street Sweepers to reduce dust on paved roads. In addition, FY 2015 includes a lump sum for MAG Air Quality and Travel Demand Management Programs.

* This amount includes only the funding for transit operation projects listed in the FY 2011-2015 MAG Transportation Improvement Program.

programs, and bicycle and pedestrian facility needs. Moreover, continued reliance on alternative modes of travel is reflected in the projected levels of vehicle traffic used in the determination of facility needs and funding priorities.

A listing of projects and programs from the TIP which implement transportation control measures and other air quality measures is provided in Table 5-1. It should be noted that not all of the projects listed in the table correspond to specific implementation commitments, because additional TCM implementation over and above SIP committed levels will be taking place.

Throughout the process of preparing the 2010 MAG Conformity Analysis for the FY 2011-2015 TIP and RTP, no impediments to the timely implementation of adopted TCMs have been identified. With respect to funding, the MAG region obligates approximately 90 percent of its available federal Congestion Mitigation and Air Quality (CMAQ) Improvement budget. In addition, the information provided in Table 5-1 provides an indication that considerable resources are being allocated to TCMs and other measures that will result in significant air quality benefits, beyond those represented by TCM commitments in applicable Plans.

MEASURE-BY-MEASURE TCM ASSESSMENT

Transportation control measure documentation used in conjunction with the conformity assessment of the TIP and Regional Transportation Plan is provided below. The numbering system used to identify control measures is consistent with the list of TCMs in Section 108 of the Clean Air Act.

(i) Programs for Improved Public Transit

Submitted Plans and Measures:

1987 Carbon Monoxide Plan, measures 3, 4, and 10
1993 Carbon Monoxide Plan*, measures 1a, 1b, and 1c
1993 Carbon Monoxide Plan Addendum*, measure I-1
Revised 1999 Serious Area Carbon Monoxide Plan, measure 24
Carbon Monoxide Maintenance Plan

1987 Ozone Plan*, measures 3, 4, and 10
1993 Ozone Plan*, measures 1a, 1b, and 1c
1993 Ozone Plan Addendum*, measure I-1
One-Hour Ozone Maintenance Plan
Eight-Hour Ozone Plan*
Eight-Hour Ozone Maintenance Plan*

1988 PM-10 Plan, measures 18, 19, and 25

1991 PM-10 Plan with 1993 Revisions, measures 18, 19, and 25
Revised 1999 Serious Area PM-10 Plan, measure 25
Five Percent Plan for PM-10*

* = EPA approval pending

Measure Status:

Local commitments in the MAG 1987 CO Plan and 1987 Ozone Plan demonstrated widespread support for short- and long-range transit improvements, including park and ride lot improvements coordinated through the RPTA. The MAG 1993 CO Plan and 1993 Ozone Plan includes commitments for programs for improved public transit and local commitments for an expansion of public transportation services. New funding sources for transit improvements represented approximately a seven percent increase to base service levels. In addition, several jurisdictions advocated park-and-ride lots to support the public transit network.

The commitments from local governments for the Serious Area plans include initiatives addressing mass transit alternatives. For example, a number of cities worked in a cooperative effort with MAG, RPTA, and FTA to conduct feasibility studies for high capacity transit corridors within the metropolitan area. The studies evaluated the feasibility of options such as light rail, bus ways, and commuter rail.

Several local governments have made public transit improvements beyond commitments made in air quality plans. For example, in September 1996, Tempe voters approved a sales tax referendum to fund improved transit service. In 2000, the Phoenix voters approved the Transit 2000 Plan increasing the local sales tax by .4 percent over 20-years. The Transit 2000 Plan provides for light rail rapid transit, extended hours of local bus service, increased dial-a-ride service, additional express bus service, and other transit improvements. In November 2001, Glendale voters approved a half-cent sales tax for transportation improvements including increased bus service, light rail transit, and dial-a-ride. Also, in September 2005, Peoria voters approved a sales tax increase of 0.3 percent that will be dedicated to transportation improvements, including the addition of fixed route bus lines.

On November 2, 2004, voters approved Proposition 400 that extends the half-cent sales tax for transportation improvements. The Regional Transportation Plan provides the blueprint for the implementation of Proposition 400, including future public transit improvements.

In addition, for the Conformity Analysis, MAG reports on the recent changes to the transit system. In December 2008, the 20-mile Light Rail Transit (LRT) Minimum Operating Segment was completed from Bethany Home Road and 19th Avenue into downtown Phoenix and from downtown Phoenix to downtown Tempe and Arizona State University, and continuing to the intersection of Main Street and Sycamore in

Mesa. Chapter 3 provides a list of transit service changes reported by the Regional Public Transportation Authority, effective January 25, 2010.

Impact of TIP and RTP:

The FY 2011-2015 MAG Transportation Improvement Program contains a listing of 130 proposed capital transit projects estimated to cost a total of \$858.5 million. The funding for proposed capital transit projects programmed for FY 2011 is approximately \$232.4 million. Also, for the period covered in the TIP, 36 transit projects for operations are programmed at \$72.8 million. It is concluded that implementation of the TIP will directly support transit improvements. The RTP contains a range of transit facilities and services throughout the region, including: local fixed-route bus, regional bus, rural/nonfixed route transit, commuter vanpools, paratransit, light rail transit, and commuter rail. The Regional Transportation Plan also provides details on Light Rail Transit Route Extensions of an additional 37.7 miles.

(ii) Restriction of Certain Roads or Lanes to, or Construction of Such Roads or Lanes for Use by, Passenger Buses or High Occupancy Vehicles

Submitted Plans and Measures:

1987 Carbon Monoxide Plan, measures 5, 14, 15, and 16
1993 Carbon Monoxide Plan*, measures 2a, 2b, and 2c
1993 Carbon Monoxide Plan Addendum*, measure I-17
Revised 1999 Serious Area Carbon Monoxide Plan, measure 55
Carbon Monoxide Maintenance Plan

1987 Ozone Plan*, measures 5, 14, 15, and 16
1993 Ozone Plan*, measures 2a, 2b, and 2c
1993 Ozone Plan Addendum*, measure I-20
One-Hour Ozone Maintenance Plan
Eight-Hour Ozone Plan*
Eight-Hour Ozone Maintenance Plan*

1988 PM-10 Plan, measures 20, 29, 30, and 31
1991 PM-10 Plan with 1993 Revisions, measures 20, 29, 30, and 31
Revised 1999 Serious Area PM-10 Plan, measure 76
Five Percent Plan for PM*

* = EPA approval pending

Measure Status:

The Arizona Department of Transportation, in cooperation with local jurisdictions, is responsible for the construction of the planned MAG Freeway System. An implementation schedule for High Occupancy Vehicle (HOV) lanes and ramps on freeways was specified in the MAG 1987 CO Plan and 1987 Ozone Plan. The MAG 1993 CO Plan and 1993 Ozone Plan identified additional HOV lanes and ramps programmed by ADOT.

The 1993 CO Plan and the 1993 Ozone Plan both indicate that State and local governments will analyze traffic projections and bus frequency on a periodic basis to determine the feasibility of the restriction of certain roads or lanes to or the construction of roads or lanes for use by passenger buses or high occupancy vehicles. This measure could include fixed lanes for buses and carpools, fixed lanes for buses and carpools on freeways, and high occupancy vehicle ramps which by-pass freeway ramp meter signals.

In the Serious Area plans, the commitments from the State and local governments include the promotion of high occupancy vehicle lanes and by-pass ramps through rideshare activities. The Regional Public Transportation Authority indicated that as new facilities open, rideshare activities will be coordinated with employers affected by the Maricopa County Trip Reduction Program and the general public.

High occupancy vehicle lane improvements continue to be implemented beyond the commitments made in air quality plans. As of 2009, approximately 138 centerline miles of High Occupancy Vehicle facilities on regional freeways. As new HOV facilities open, RPTA continues to coordinate the promotion of park-and-ride and rideshare activities.

Impact of TIP and RTP:

The FY 2011-2015 MAG Transportation Improvement Program directly contributes to the implementation of this measure by providing funds for the construction of HOV lanes. Chapter 8 of the Regional Transportation Plan contains specific HOV policies and priorities that have been adopted to support this measure.

(iii) Employer-Based Transportation Management Plans, Including Incentives

Submitted Plans and Measures:

1987 Carbon Monoxide Plan, measures 12 and 13
1993 Carbon Monoxide Plan*, measures 3a, 3b, 3c, 3d, 3e, 3f and 3g
Revised 1999 Serious Area Carbon Monoxide Plan, measures 38 and 52
Carbon Monoxide Maintenance Plan

1987 Ozone Plan*, measures 12 and 13

1993 Ozone Plan*, measures 3a, 3b, 3c, 3d, 3e, 3f and 3g
One-Hour Ozone Maintenance Plan
Eight-Hour Ozone Plan*
Eight-Hour Ozone Maintenance Plan*

1988 PM-10 Plan, measures 27 and 28
1991 PM-10 Plan with 1993 Revisions, measure 22
Revised 1999 Serious Area PM-10 Plan, measures 56 and 73
Five Percent Plan for PM*

* = EPA approval pending

Measure Status:

For the MAG 1987 CO Plan and 1987 Ozone Plan, several local governments made commitments to either review the results, consider, or support preferential parking for carpools and vanpools from the MAG Model Trip Reduction Study.

In the MAG 1993 CO Plan and 1993 Ozone Plan, several jurisdictions indicated an ongoing commitment to employer rideshare incentives including passage of ordinances and expanded training at employer sites. Several cities indicated an ongoing commitment to mandatory employee parking fees and preferential parking for carpools and vanpools. Maricopa County and the Arizona Department of Transportation provide preferential parking for carpools and vanpools. Commitments also included the encouragement of vanpools for County and State employees.

In the Serious Area plans, the commitments from the State and local governments include measures supporting employer rideshare program incentives and trip reduction program. To encourage municipal employees to use alternative modes of transportation, several local governments indicated that they would be offering incentives such as preferential parking, gift drawings, and subsidized bus passes, and emergency ride home service, and telecommuting options. In addition, the Regional Public Transportation Authority (RPTA) indicated that the agency would provide formal training, employer assistance, facilitate transportation coordinator associations, and provide information to Trip Reduction Program employers.

The Trip Reduction Program was mandated by Arizona legislation in 1988 and is administered by Maricopa County. All employers with 50 or more employees are required to participate in the Trip Reduction Program. Elements of the Trip Reduction Program include employer training and facilitation of Transportation Coordinators Associations conducted by the Regional Public Transportation Authority. MAG increased the annual allocation of federal funding for the program from \$250,000 in FY 1988 to \$420,000 in FY 1991, and to \$460,000 annually beginning in FY 1993. Then, beginning in FY 2000, an additional \$200,000 was

added for an expanded Regional Rideshare and Telework Program of \$660,000. In fiscal years 2011 through 2014 of the TIP, the amount programmed for Regional Rideshare is \$660,000.

In the most recent Maricopa County Trip Reduction Program Annual Report for the fiscal year ending June 30, 2008, the Trip Reduction Program applied to 1,139 companies with over 650,000 employees and students participating in the survey at 2,949 sites across Maricopa County. RPTA staff have played an important role in the success of the Maricopa County Trip Reduction Program through the training of employer transportation coordinators. As of FY 2008, there are ten Transportation Coordinators Associations in the region. In addition, the RPTA administers the Regional Rideshare and Telework Program that provides an internet-based service for instant carpool matching for the general public. The Arizona Department of Administration conducts the Travel Reduction Program to approximately 23,000 non-university state employees in Maricopa County.

Impact of TIP and RTP:

A major portion of funding for this TCM is through the FY 2011-2014 MAG Transportation Improvement Program that includes an annual amount of \$910,000 for the Trip Reduction Program and \$135,000 for the state Travel Reduction Program. In fiscal years 2011 through 2014 of the TIP, the Regional Rideshare and Telework Program amount is \$660,000. In addition, FY 2015 includes a lump sum for MAG Air Quality and Travel Demand Management Programs. The amounts indicated above include only monies specified in the TIP and not funds that the programs may receive from other sources. Chapter 18 of the Regional Transportation Plan provides for continued consideration of demand management programs. A copy the latest Maricopa County Regional Trip Reduction Program Annual Report Executive Summary for the period July 1, 2007 - June 30, 2008 (MCAQD, 2008a) and the 2009 Transportation Demand Management Survey Executive Summary (WestGroup Research, 2009) are attached in Appendix P.

(iv) Trip Reduction Ordinances

Submitted Plans and Measures:

1987 Carbon Monoxide Plan, measure 7
1993 Carbon Monoxide Plan*, measure 4
1993 Carbon Monoxide Plan Addendum*, measure I-3
Revised 1999 Serious Area Carbon Monoxide Plan, measures 38 and 52
Carbon Monoxide Maintenance Plan

1987 Ozone Plan*, measure 7
1993 Ozone Plan*, measure 4

1993 Ozone Plan Addendum*, measure I-3
One-Hour Ozone Maintenance Plan
Eight-Hour Ozone Plan*
Eight-Hour Ozone Maintenance Plan*

1988 PM-10 Plan, measure 22
1991 PM-10 Plan with 1993 Revisions, measure 22
Revised 1999 Serious Area PM-10 Plan, measures 56 and 73
Five Percent Plan for PM*

* = EPA approval pending

Measure Status:

The Maricopa County Travel Reduction Program was established by the Arizona Legislature in 1988, with the goal of reducing the number of single occupant vehicle trips by five percent annually. Originally, the program affected employers with 100 or more employees at a work site. In 1992, the program was expanded to include employers with 75 or more employees at a site. Arizona House Bill 2001, enacted in November 1993, required Maricopa County to adopt and enforce a strengthened Travel Reduction Program Ordinance by May 31, 1994. The strengthened ordinance applies to all employers with 50 or more employees at a single worksite throughout the Maricopa County area. The annual goals are increased from a five percent to a ten percent reduction in employee single occupant vehicle trips or commuter vehicle miles of travel. The ordinance contains annual goals for five years. More recently, the ordinance has been modified to provide employers with opportunities to accomplish equivalent reductions through alternative means.

The commitments from the State and local governments for the Serious Area plans include measures supporting employer rideshare program incentives and the trip reduction program. Several commitments indicate incentives and promotional activities to increase awareness and participation in alternative modes of transportation and work schedules. The Regional Public Transportation Authority indicated efforts to provide training and promotional materials to employers required to participate in the Maricopa County Trip Reduction Program.

According to the latest annual report available, in FY 2008 the Trip Reduction Program applied to 1,139 companies with over 650,000 employees and students participating in the survey at 2,949 sites across Maricopa County.

Impact of TIP and RTP:

This TCM receives strong support through funding in the FY 2011-2015 MAG Transportation Improvement Program for the Regional Rideshare and Telework Program, the Maricopa County Trip Reduction Program, and the state Travel

Reduction Program. Combined, the programs have been allocated funds totaling \$6.8 million over the period of the TIP. This total only includes monies specified in the TIP and not funds that the programs may receive from other sources. Chapter 18 of the Regional Transportation Plan provides for continued consideration of demand management programs.

(v) Traffic Flow Improvement Programs That Achieve Emission Reductions

Submitted Plans and Measures:

1987 Carbon Monoxide Plan, measures 17, 18, 19, 20, 21, 22, 24, 25 and 26
1993 Carbon Monoxide Plan*, measures 5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j and 5k
1993 Carbon Monoxide Plan Addendum*, measures I-2, I-16, and I-18
Revised 1999 Serious Area Carbon Monoxide Plan, measures 25, 40, and 41
Carbon Monoxide Maintenance Plan

1987 Ozone Plan*, measures 17, 18, 19, 20, 21, 22, 24, 25 and 26
1993 Ozone Plan*, measures 5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j and 5k
1993 Ozone Plan Addendum*, measures I-2 and I-19
One-Hour Ozone Maintenance Plan
Eight-Hour Ozone Plan*
Eight-Hour Ozone Maintenance Plan*

1988 PM-10 Plan, measures 32, 33, 34, 35, 36, 37, 38, 39, 40, and 41
1991 PM-10 Plan with 1993 Revisions, measures 33, 34, 35, 39, and 40
Revised 1999 Serious Area PM-10 Plan, measures 26, 58, and 59
Five Percent Plan for PM*

* = EPA approval pending

Measure Status:

This TCM includes a number of measures that were identified in previous air quality plans including the 1987 CO and Ozone Plans and the 1993 CO and Ozone Plans which contained measures for mitigation of freeway construction impacts; freeway surveillance; ramp metering, and signage; computerized synchronization of traffic signals; reversible lanes on arterials; one way streets; truck restrictions during peak periods; intersection improvements; on-street parking restrictions; and bus pullouts.

In April 2001, MAG approved the first comprehensive ITS Strategic Plan and ITS Architecture for the region. This Plan has provided direction for ITS implementation within the region. The Regional ITS Architecture, which is part of the Plan, played a direct role in the identification of ITS projects for programming in the five-year Transportation Improvement Program.

This measure is supported by several jurisdictions in the Serious Area plans. Commitments include the development of Intelligent Transportation Systems (ITS), the coordination of traffic signal systems, and other intersection improvements to reduce traffic congestion. A general summary of the commitments for this measure is provided below.

ITS Projects and Freeway Management System Improvements

Several municipalities mentioned the effort to coordinate local traffic signals with the Freeway Management System (FMS) implemented by ADOT, the responsible agency for traffic management on MAG-area freeways. The FMS consists of electronic variable message signs, signals for metering traffic flow at ramps, closed circuit television cameras, vehicle detectors, and a telecommunication network that links all these devices to a Traffic Operations Center. The coverage of the regional FMS, as of mid-2009, is approximately 100 miles. It is estimated that by 2023 the total FMS coverage of regional freeways will be approximately 225 miles.

Traffic Signal System Coordination

Effective December 31, 1988, traffic signal synchronization has been required by Arizona law for municipalities and for ADOT roadways with traffic volumes exceeding 15,000 vehicles per day. Approximately 89 percent of all traffic signals in the region are coordinated with adjacent traffic signals. This is an ongoing measure for every jurisdiction, as signal synchronization requires annual adjustments to account for varying traffic volumes and patterns. AzTech, a federally funded ITS project launched by the region in 1996, has integrated a number of local traffic management systems. Regional corridors that cover nearly 198 miles of urban arterials have been fully instrumented to facilitate seamless traffic management across jurisdictional boundaries. Significant improvements have resulted in traffic signal synchronization across jurisdictional boundaries. The AzTech project partners have established a regional traveler information system that has resulted in more efficient dissemination of accident and traffic congestion information to the public via television, radio, and internet.

Intersection Improvements

Implementation of intersection improvements have continued at major intersections as a method to reduce traffic congestion and improve traffic flow. Some jurisdictions reported other traffic control techniques such as bus pull-outs to reduce congestion at major intersections.

Impact of TIP and RTP:

Implementation of this measure is strongly supported through the FY 2011-2015 MAG Transportation Improvement Program. For FY 2011, a total of \$44.8 million

for traffic flow improvements is included in the TIP. For the period covered by the TIP, a total of \$241.0 million is programmed for these projects. In addition, the TIP includes funds totaling \$13.9 million in FY 2011 and \$319.7 million over the next five years for traffic flow improvements on freeways, including FMS projects and HOV lanes. Chapter 17 of the Regional Transportation Plan provides for continued consideration of transportation systems and operations management programs. On November 2, 2004, voters approved Proposition 400 that extends the half-cent sales tax for improvements identified in the Regional Transportation Plan, including arterial and freeway operation improvements.

(vi) Fringe and Corridor Parking Facilities Serving Multiple Occupancy Vehicle Programs or Transit Service

Submitted Plans and Measures:

1987 Carbon Monoxide Plan, measure 10
1993 Carbon Monoxide Plan*, measure 6
Revised 1999 Serious Area Carbon Monoxide Plan, measure 53
Carbon Monoxide Maintenance Plan

1987 Ozone Plan*, measure 10
1993 Ozone Plan*, measure 6
One-Hour Ozone Maintenance Plan
Eight-Hour Ozone Plan*
Eight-Hour Ozone Maintenance Plan*

1988 PM-10 Plan, measure 25
1991 PM-10 Plan with 1993 Revisions, measure 25
Revised 1999 Serious Area PM-10 Plan, measure 74
Five Percent Plan for PM*

* = EPA approval pending

Measure Status:

The 1987 CO and Ozone Plans contain commitments from many jurisdictions agreeing to assist and cooperate in the location of park-and-ride lots. Similarly, in the 1993 CO and Ozone Plans, State and several local jurisdictions committed to promote and expand park-and-ride lots and to seek out agreements with owners of major facilities such as shopping centers and institutions for the placement of park-and-ride lots.

The commitments from the State and local governments for the Serious Area CO and PM-10 plans include measures in which the RPTA will continue to work with

member jurisdictions, private entities, and employers in the development, design, and implementation of new park-and-ride facilities.

A large number of park-and-ride lots are already operational in the Maricopa County area. There are approximately 50 publicly-owned and joint use park-and-ride facilities. The RPTA works with employers and Transportation Management Associations to promote park-and-ride lots as a means to encourage ridesharing and use of public transit.

In addition, implementation of park-and-ride lots continues to occur beyond commitments made in the air quality plans. In January 2001, MAG completed the MAG Park and Ride Site Selection Study to identify a regional system of park-and-ride lots to support the regional express bus system, carpooling, and vanpooling. The recommended system includes ten sites for near-term development and ten sites for long-term development. Additional recommendations address design guidelines and criteria for lot development, a management and operations plan for the lots, and programming and implementation strategies.

Impact of TIP and RTP:

The FY 2011-2015 MAG Transportation Improvement Program has programmed \$35.2 million for the implementation of four park-and-ride lots. In support of park-and-ride facilities, Chapter 10 of the Regional Transportation Plan provides for continued consideration of public transit, including planned bus facilities and service improvements.

(vii) Programs to Limit or Restrict Vehicle Use in Downtown Areas or Other Areas of Emission Concentrations, Particularly During Periods of Peak Use

Submitted Plans and Measures:

1987 Carbon Monoxide Plan, measure 23
1993 Carbon Monoxide Plan*, measures 7a and 7b

1987 Ozone Plan*, measure 23
1993 Ozone Plan*, measures 7a and 7b

1988 PM-10 Plan, measure 38

* = EPA approval pending

Measure Status:

In the 1987 CO Plan, 1988 PM-10 Plan, and MAG 1993 CO and Ozone Plans, several jurisdictions in the MAG region indicated they would agree to consider the implementation of truck restrictions during peak periods. In the 1993 CO Plan, a jurisdiction indicated that it restricted truck loading operations on downtown streets during peak hours would continue to enforce its existing restrictions on deliveries into the downtown area during peak hours (7:00 to 9:00 am, and 4:00 to 6:00 pm). Also, another jurisdiction indicated that it currently has an ordinance in place to restrict truck deliveries by place. There are approximately 16 miles of city streets with truck use restrictions in cities in Maricopa County.

Impact of TIP and RTP:

The construction of transportation facilities and provisions of transportation services which are programmed in the FY 2011-2015 MAG Transportation Improvement Program will not affect the schedule or effectiveness of this measure. Chapters 17 and 18 of the Regional Transportation Plan provide for continued consideration of Systems Management and Operations and Demand Management, respectively.

(viii) Programs for the Provision of All Forms of High-Occupancy, Shared Ride Services

Submitted Plans and Measures:

1987 Carbon Monoxide Plan, measures 6 and 11
1993 Carbon Monoxide Plan*, measures 8a, 8b, and 8c
1993 Carbon Monoxide Plan Addendum*, measure II-9
Revised 1999 Serious Area Carbon Monoxide Plan, measures 39 and 51
Carbon Monoxide Maintenance Plan

1987 Ozone Plan*, measures 6 and 11
1993 Ozone Plan*, measures 8a, 8b, and 8c
1993 Ozone Plan Addendum*, measure II-9
One-Hour Ozone Maintenance Plan
Eight-Hour Ozone Plan*
Eight-Hour Ozone Maintenance Plan*

1988 PM-10 Plan, measures 21 and 26
Revised 1999 Serious Area PM-10 Plan, measures 57 and 72
Five Percent Plan for PM*

* = EPA approval pending

Measure Status:

The MAG 1987 CO Plan and the MAG 1993 CO and Ozone Plans contain commitments requiring the expansion of the MAG Regional Rideshare Program, Park-and-Ride Programs, and Financial Incentives Including Zero Bus Fares. Several jurisdictions indicated that park-and-ride lots would be coordinated with the Arizona Department of Transportation, Regional Public Transportation Authority, and local businesses. The 1993 CO Plan Addendum includes a measure to pay for the administrative cost associated with the public transportation subsidy program for state employees. A description of Park-and-Ride Programs are reviewed in Transportation Control Measure number "vi". A description of each measure is provided below.

Ridesharing programs in the Maricopa County area include the Regional Rideshare and Telework Program and Travel Reduction Program. The Regional Rideshare and Telework Program, conducted by the Regional Public Transportation Authority, maintains an internet-based service for instant carpool matching for the general public and for employers required to participate in the Trip Reduction Program. In addition, the Regional Rideshare Program emphasizes the need to reduce emissions through using alternative transportation modes and alternative work schedules.

The commitments from State and local governments for the Revised Serious Area CO and PM-10 Plans include measures supporting preferential parking for carpools and vanpools and encouraging the use of vanpooling.

MAG increased the annual allocation of federal funding for the program from \$250,000 in FY 1988 to \$420,000 in FY 1991, and to \$460,000 annually beginning in FY 1993. Beginning in FY 2000, an additional \$200,000 was added for expansion of the Regional Rideshare Program. RPTA has also expanded program marketing to employers as part of the existing Trip Reduction Program administered by Maricopa County. This involves organizations with 50 or more employees or students, affecting an estimated 1,139 companies and 2,949 sites (MCAQD, 2008a). The RPTA also provides assistance to ten Transportation Coordinators Associations operating in the region. In addition, Maricopa County has reported that approximately 61 employers in the Trip Reduction Program were subsidizing employee participation in vanpool programs for the year ending September 2009.

As of April 2010, the ADOA provides a 50 percent public transit subsidy to approximately 6,934 state employees who participated in the Platinum Plus Bus Card Program. In addition, through the Travel Reduction Program, the Arizona Department of Administration encourages all non-university state employees in Maricopa County to use carpools, vanpools, public transit, and alternative work schedules.

Impact of TIP and RTP:

The FY 2011-2015 MAG Transportation Improvement Program provides federal Congestion Mitigation and Air Quality Improvement (CMAQ) funding for implementation of the Regional Rideshare and Telework Program and the Travel Reduction Program. An amount of \$660,000 is programmed for the Regional Rideshare and Telework Program in FY 2011-2014. In addition, FY 2015 includes a lump sum for MAG Air Quality and Travel Demand Management Programs. The Travel Reduction Program is programmed at \$135,000 annually in the TIP. In addition, the TIP includes \$10.8 million to provide capital funding for vanpooling. Ride sharing is promoted by the provision of HOV lanes, implemented through the TIP. Chapter 18 of the Regional Transportation Plan provides for continued consideration of demand management programs.

(ix) Programs to Limit Portions of Road Surfaces or Certain Sections of the Metropolitan Area to the Use of Non-Motorized Vehicles or Pedestrian Use, Both as to Time and Place

Submitted Plans and Measures:

1987 Carbon Monoxide Plan, measure 42
1993 Carbon Monoxide Plan*, measure 9
Revised 1999 Serious Area Carbon Monoxide Plan, measure 47
Carbon Monoxide Maintenance Plan

1987 Ozone Plan*, measure 42
1993 Ozone Plan*, measure 9
One-Hour Ozone Maintenance Plan
Eight-Hour Ozone Plan*
Eight-Hour Ozone Maintenance Plan*

1988 PM-10 Plan, measure 55
Revised 1999 Serious Area PM-10 Plan, measure 65
Five Percent Plan for PM*

* = EPA approval pending

Measure Status:

The 1987 CO and Ozone Plan as well as the 1993 CO Plan indicated that pedestrian malls were being considered in the downtown plans for various cities and towns in the MAG area. Auto free zones and pedestrian malls can be used to reduce traffic congestion and air pollution on a localized basis. The successful establishment of auto free zones and pedestrian malls is dependent upon high

transit accessibility, good circulation design of adjacent arterials, and parking management.

The commitments from the state and local governments for the Revised Serious Area CO and PM-10 Plans include strengthening of initiatives to encourage pedestrian travel. Several jurisdictions have supported this measure through: linkage of activity centers with sidewalks; establishing pedestrian routes in residential areas, and creating links between subdivisions and commercial development.

The MAG Regional Off-Street System (ROSS) Plan was adopted by the MAG Regional Council in February 2001. The ROSS Plan provides guidance to MAG member agencies in creating an off-street non-motorized transportation system utilizing an extensive number of canal banks, utility line easements, and flood control channels.

In 2007, MAG developed the MAG Regional Bikeway Master Plan, which incorporates a 1999 MAG Regional Bicycle Plan, Alternative Solutions to Pedestrian Mid-block Crossings at Canals, and the 2001 ROSS Plan. With these planning efforts, many improvements have taken place beyond commitments made in air quality plans.

Impact of TIP and RTP:

The construction of transportation facilities and provisions of transportation services which are programmed in the FY 2011-2015 MAG Transportation Improvement Program will not affect the schedule or effectiveness of this measure. Chapter 12 of the Regional Transportation Plan, Bicycles and Pedestrians, provides for continued consideration of this measure.

- (x) Programs for Secure Bicycle Storage Facilities and Other Facilities Including Bicycle Lanes, for the Convenience and Protection of Bicyclists, in Both Public and Private Areas

Submitted Plans and Measures:

1987 Carbon Monoxide Plan, measures 27 and 28
1993 Carbon Monoxide Plan*, measures 10a and 10b
1993 Carbon Monoxide Plan Addendum*, measure II-7
Revised 1999 Serious Area Carbon Monoxide Plan, measures 43 and 44
Carbon Monoxide Maintenance Plan

1987 Ozone Plan*, measures 27 and 28
1993 Ozone Plan*, measures 10a and 10b

1993 Ozone Plan Addendum*, measure II-7
One-Hour Ozone Maintenance Plan
Eight-Hour Ozone Plan*
Eight-Hour Ozone Maintenance Plan*

1988 PM-10 Plan, measures 42 and 43
1991 PM-10 Plan with 1993 Revisions, measures 42 and 43
Revised 1999 Serious Area PM-10 Plan, measures 61 and 62
Five Percent Plan for PM*

* = EPA approval pending

Measure Status:

In the 1993 CO and Ozone Plans, a number of jurisdictions indicated a commitment to improve bicycle facilities through the construction of additional miles of bike paths, striping of bike lanes on arterial and collector streets, and installation of additional bike racks and lockers to encourage bicycle use.

The commitments from the state and local governments for the Serious Area CO and PM-10 Plans include initiatives by most cities and towns in the region to encourage bicycle travel and develop bicycle travel facilities. Several jurisdictions indicated that bicycle travel would be encouraged through establishing bike lanes with new road development and by signing and striping bikeway routes along arterials, collectors, and local routes, by promoting bicycle use newsletters and Bike-to-Work Weeks, by encouraging private developers and businesses to include bike racks, lockers, and showers at work sites and other facilities.

The general level of planning and commitment for encouraging bicycle use and providing bicycle support facilities has increased substantially beyond the commitments made in the air quality plans. Phoenix, for example, has expanded its bikeway system to approximately 500 miles in 2007.

At the regional level, MAG established a Regional Bicycle Task Force in 1990. This task force guided the development of the Regional Bicycle Plan, which was adopted as part of the MAG Long Range Regional Transportation Plan in July 1992. The *MAG Regional Bicycle Plan* was updated in 1999. Creating a regional off-street multi-use path/trail plan was identified as an important future planning activity during the Regional Bicycle Plan Update in 1999. The MAG Regional Off-Street System (ROSS) Plan reveals a region-wide system of off-street paths/trails for non-motorized transportation along existing rights-of-ways and easements, such as canal banks, utility line easements and flood control channels. These types of rights-of-way and easements intersect numerous arterial streets where local daily destinations are typically located. The goal of the ROSS Plan is to help make

bicycling and walking viable options for daily travel trips using off-street opportunities.

To further encourage safe bicycling, the Regional Bicycle Task Force oversees the update of the Regional Bikeways Map. Updated in alternating years, the map shows existing, locally-designated bicycling facilities, and is provided for free distribution. The first map was created in 1994, and updated in 1997. Several hundred thousand maps have been distributed. The map includes bicycle lanes and paths, designated bicycle routes on roadways, popular undesignated routes, and off-street transportation trails. The most recent update of the map was completed in 2008. Of the approximately 21,000 miles of roadway in the region, the map shows 815 miles of bicycle lanes, 394 miles of bicycle routes, and 330 miles of paved and unpaved transportation trails. The *MAG Regional Bicycle Plan* also encourages the development of bicycle parking and shower facilities at appropriate daily trip destinations.

Impact of TIP and RTP:

The implementation of the FY 2011-2015 MAG Transportation Improvement Program will directly support the goal of increased bicycle use. Funding for bicycle and multiuse path projects totals \$21.4 million in FY 2011 and \$112.7 million over the period of the TIP. Specific projects to be funded each year are recommended to the MAG Management Committee by the MAG Bicycle and Pedestrian Committee, for approval by the MAG Regional Council.

In addition, the provision of new bicycle lanes or facilities is often included as part of various road improvement projects, rather than being implemented and programmed separately as a bicycle project. Chapter 12 of the Regional Transportation Plan provides an overview of bicycle transportation and the continued development of bicycle facilities.

(xi) Programs to Control Extended Idling of Vehicles

Submitted Plans and Measures:

1987 Carbon Monoxide Plan, measure 41
1993 Carbon Monoxide Plan*, measure 11
Revised 1999 Serious Area Carbon Monoxide Plan, measure 33
Carbon Monoxide Maintenance Plan

1987 Ozone Plan*, measure 41
1993 Ozone Plan*, measure 11
One-Hour Ozone Maintenance Plan
Eight-Hour Ozone Plan*
Eight-Hour Ozone Maintenance Plan*

1988 PM-10 Plan, measure 54

1991 PM-10 Plan with 1993 Revisions, measure 54
Revised 1999 Serious Area PM-10 Plan, measure 34
Five Percent Plan for PM*

* = EPA approval pending

Measure Status:

In the MAG 1993 CO Plan, Carefree and Tolleson indicated that they would take steps to address emissions from idling at drive-up window facilities. Information provided to MAG by Sierra Research, a leading consultant in the field of vehicular emissions, indicates that vehicles with catalytic converters may produce more emissions during engine start-up than engine idling for brief periods. The Sierra Research report concluded that banning the use of drive-up window facilities would not significantly increase or decrease emissions of CO or oxides of nitrogen, and would potentially increase emissions of volatile organic compounds. It is important to note that the report was completed in 1991, based upon emission data from vehicles in Southern California.

The commitments from the state and local governments for the Serious Area CO and PM-10 Plans include an initiative by RPTA to follow guidelines developed by that agency in June 1996 to reduce idling of engines. The guideline specifies that, for temperatures below 90 degrees Fahrenheit and over three minutes layover, the operator should turn the engine off. If the vehicle is located within 100 yards of any residence, for temperatures below 90 degrees Fahrenheit, the engine is to be turned off regardless of layover time. Further, RPTA will continue to work with member jurisdictions to promote environmentally sensitive transit operations practices and policies.

Impact of TIP and RTP:

The construction of transportation facilities and provisions of transportation services which are programmed in the FY 2011-2015 MAG Transportation Improvement Program will not affect the schedule or effectiveness of this measure. In addition, the Regional Transportation Plan will not affect this measure.

(xii) Programs to Reduce Motor Vehicle Emissions, Consistent with Title II, Which Are Caused by Extreme Cold Start Conditions

This measure is not applicable in the MAG region.

(xiii) Employer-Sponsored Programs to Permit Flexible Work Schedules

Submitted Plans and Measures:

1987 Carbon Monoxide Plan, measures 35 and 36
1993 Carbon Monoxide Plan*, measures 13a, 13b, 13c, and 13d
1993 Carbon Monoxide Plan Addendum*, measure I-12
Revised 1999 Serious Area Carbon Monoxide Plan*, measure 45
Carbon Monoxide Maintenance Plan

1978 Ozone Plan, measure "Modified Work Schedules"
1987 Ozone Plan*, measures 35 and 36
1993 Ozone Plan*, measures 13a, 13b, 13c, and 13d
One-Hour Ozone Maintenance Plan
Eight-Hour Ozone Plan*
Eight-Hour Ozone Maintenance Plan*

1988 PM-10 Plan, measures 48 and 49
1991 PM-10 Plan with 1993 Revisions, measure 48
Revised 1999 Serious Area PM-10 Plan, measure 63
Five Percent Plan for PM*

* = EPA approval pending

Measure Status:

The 1978 Ozone Plan indicated that modified work schedules were to be implemented on a voluntary basis with emphasis on the winter period of maximum temperature inversions. The effect of this measure in reducing ozone was not calculated in the 1978 Ozone Plan.

In the 1987 CO and Ozone Plans, a number of jurisdictions supported the use of alternative work hours and work weeks for their employees. Since 1987, this measure has been implemented on a formal basis as mandated by Arizona legislation. SB 1360 established requirements for the use of adjusted work hours by at least 85 percent of State employees with offices located in a nonattainment area. Beginning in 1987, this requirement became applicable for the period between October 1 and March 31 of each year. Beginning in 1989, the requirement was also applied to county employees and to the employees of cities and towns which have a population of 50,000 or more. The 1987 legislation also required businesses with 500 or more employees at one site within a nonattainment area to prepare an adjusted work hour proposal for submission to ADEQ by October 1 of each year.

In the MAG 1993 CO Plan and 1993 Ozone Plan, numerous MAG member agencies indicated that this measure was ongoing through the use of compressed or staggered work schedules to lessen the number of commuting trips. Also,

several agencies indicated that telecommuting and teleconferencing options would be investigated and/or expanded. MAG initiated a telecommuting and teleconferencing program for its member agencies, with planning for the program initiated in FY 1998.

As specified in the 1993 CO Plan Addendum, measure I-12 “Air Pollution Emergency”, enacted by Arizona HB 2001 in November 1993, authorized the Governor of Arizona to declare air emergencies on days when the National Ambient Air Quality Standards are likely to be exceeded. The Governor will prohibit, restrict, or condition the employment schedules for employees of the state and its political subdivisions (includes the county and local governments) in order to reduce vehicle emissions during air pollution emergencies. The Governor has developed a plan for implementation of this measure. Under these provisions, state employees were sent home early due to elevated carbon monoxide concentrations on one occasion in late 1994.

In 1996, the Governor issued a proclamation which requires the cities, towns and county meet a 75 percent employee compliance of three options to reduce hydrocarbon emissions from mobile sources during June 1 to September 30, 1996. The options are: work schedules that avoid workday start and ending in the peak traffic hours; compressed work week schedules; travel to and from work by alternate mode including bus, carpool, vanpool, bicycle, or walking.

This measure also responds to Clean Air Act Section 108(f)(1)(B): Additional methods or strategies that will contribute to the reduction of mobile source related pollutants during periods in which any primary air quality standard will be exceeded and during episodes for which an air pollution alert, warning, or emergency has been declared.

The commitments from the state and local governments for the Serious Area CO and PM-10 Plans include initiatives supporting alternative work schedules and the use of off-peak driving, ridesharing, and the use of transit. As part of the Trip Reduction Program, RPTA facilitates formal training on compressed or alternative work schedules and provides onsite assistance to individual employers on an as-needed basis.

Impact of TIP and RTP:

The FY 2011-2015 MAG Transportation Improvement Program contains funding for Trip Reduction Program and Regional Rideshare and Telework Program in the amount of \$6.2 million. In addition, FY 2015 includes a lump sum for MAG Air Quality and Travel Demand Management Programs. The construction of other transportation or related facilities and other provisions of transportation services that are programmed in the TIP will not affect the schedule or effectiveness of this

measure. Chapter 18 of the Regional Transportation Plan includes a description of demand management programs in support of this measure.

- (xiv) Programs and Ordinances to Facilitate Non-Automobile Travel, Provision and Utilization of Mass Transit, and to Generally Reduce the Need for Single-Occupant Vehicle Travel, as Part of Transportation Planning and Development Efforts of a Locality, Including Programs and Ordinances Applicable to New Shopping Centers, Special Events, and Other Centers of Vehicle Activity

Submitted Plans and Measures:

1987 Carbon Monoxide Plan, measures 8, 9, 39, and 40
1993 Carbon Monoxide Plan*, measures 14a, 14b, 14c, and 14d
Revised 1999 Serious Area Carbon Monoxide Plan, measures 46, 50, and 54
Carbon Monoxide Maintenance Plan

1987 Ozone Plan*, measures 8, 9, 39, and 40
1993 Ozone Plan*, measures 14a, 14b, 14c, and 14d
One-Hour Ozone Maintenance Plan
Eight-Hour Ozone Plan*
Eight-Hour Ozone Maintenance Plan*

1988 PM-10 Plan, measures 23, 24, 52, and 53
1991 PM-10 Plan with 1993 Revisions, measures 23 and 24
Revised 1999 Serious Area PM-10 Plan, measures 64, 68, and 75
Five Percent Plan for PM*

* = EPA approval pending

Measure Status:

In the MAG 1993 CO Plan, numerous MAG member jurisdictions indicated that new developments are encouraged through their General Plan to support alternative modes of transportation. In 1995, the Maricopa Association of Governments completed an Urban Form Study which examines the transportation and air quality impacts of land use development within the region.

Arizona legislation enacted in 1987 requires every State agency, board, and commission to submit an air quality impact report to ADEQ on any State-funded transportation related project that it determines may impact air quality. In 1988, the Arizona Legislature required Maricopa County to establish a Voluntary No Drive Days Program. The Clean Air Campaign urges the public not to drive on a given day each week, as well as on alert days when severe pollution concentrations are

expected. The program is in effect from October through March when atmospheric conditions may lead to increased carbon monoxide levels.

The commitments from the State and local governments for the Serious Area CO and PM-10 plans include initiatives from a number of municipalities in support of Land Use/Development Alternatives. For example, some municipalities implement general land use planning and development administration to improve the quality of life, promote land use compatibility, reduce infrastructure costs, promote accessibility, and reduce traffic congestion. Promotion of air quality is an integral part of these efforts and a natural by-product. Another example of general plan support of this measure is through the promotion of land development that integrates multiple modes of transportation, including transit, pedestrians, and bicycles, and the creation of ordinances, policies, or design guidelines that encourage mixed-use development and promote non-polluting modes of travel into urban design.

Impact of TIP and RTP:

The construction of transportation facilities and provision of transportation services as programmed in the FY 2011-2015 MAG Transportation Improvement Program will not affect the schedule or effectiveness of this measure.

(xv) Programs for New Construction and Major Reconstruction of Paths, Tracks or Areas Solely for Use by Pedestrian or Other Non-motorized Means of Transportation When Economically Feasible and in the Public Interest

Submitted Plans and Measures:

1987 Carbon Monoxide Plan, measures 29 and 30
1993 Carbon Monoxide Plan*, measures 15a and 15b
1993 Carbon Monoxide Plan Addendum*, measure II-7
Revised 1999 Serious Area Carbon Monoxide Plan, measures 43 and 44
Carbon Monoxide Maintenance Plan

1987 Ozone Plan, measures 29 and 30
1993 Ozone Plan*, measures 15a and 15b
1993 Ozone Plan Addendum*, measure II-7
One-Hour Ozone Maintenance Plan
Eight-Hour Ozone Plan*
Eight-Hour Ozone Maintenance Plan*

1988 PM-10 Plan, measures 44 and 45
1991 PM-10 Plan with 1993 Revisions, measures 44 and 45
Revised 1999 Serious Area PM-10 Plan, measures 61 and 62

Five Percent Plan for PM*

* = EPA approval pending

Measure Status:

In the 1987 CO and Ozone Plans and the 1993 CO Plan, a number of jurisdictions indicated that encouragement of pedestrian travel is an ongoing measure. In November 1993, House Bill 2001 authorized ADOT to make grants from its portion of the State Air Quality Fund for intermodal transportation, pedestrian, and bicycle projects and activities.

The commitments from the state and local governments for the Serious Area CO and PM-10 plans include initiatives by most cities and towns in the region to encourage bicycle travel and development of bicycle travel facilities. Several municipalities have encouraging the construction of bike lanes and the installation of bike facilities at activity centers. Demonstration programs will also be explored to promote bicycle use. A pilot program to provide free bikes (Purple People Movers) was identified for use in the downtown area. Over 100 purple bikes and 30 purple bike racks were made available. After implementation of this demonstration project, the Program was ended.

Several local governments have made public transit improvements beyond commitments made in air quality plans. Phoenix, for example, expanded its bikeway system from approximately 75 miles in 1990 to approximately 500 miles 2007. Additional bikeways are being planned for Phoenix. Scottsdale has adopted a Bicycle/Pedestrian Transportation Plan. Scottsdale continues to install and maintain bike facilities at City parks, and encourages private developers and businesses to include bike racks, lockers, and showers at work sites and other facilities. Tempe facilitates and promotes bicycle travel through a variety of programs. More than 150 miles of bikeways currently exist in Tempe with more than half of all collector and arterial streets having a dedicated bicycle facility. In 1997, Tempe was recognized as a "Bicycle Friendly Community" by the League of American Bicyclists" and received a Silver Spoke award from the Governor's Task Force on Bicycles for outstanding contributions to bicycle facilities planning and engineering. In Tempe, bicycle racks are installed with new development. Mesa and Chandler have also developed bicycle plans.

Impact of TIP and RTP:

The provision of new sidewalks (and supporting amenities such as lighting and landscaping) is often included as part of various road improvement projects, rather than being implemented and programmed separately. It should also be noted that sidewalk provisions are often required of the private sector as a condition for property development. The FY 2011-2015 MAG Transportation Improvement

Program contains 15 pedestrian projects. Funding for pedestrian projects totals \$4.6 million in FY 2011 and \$12.0 million over the period of the TIP. Chapter 12 of the Regional Transportation Plan provides an overview on pedestrian travel in support of these measures.

(xvi) Program to Encourage Voluntary Removal from Use and the Marketplace of Pre-1980 Model Year Light Duty Vehicles and Pre-1980 Model Light Duty Trucks

Submitted Plans and Measures:

Revised 1999 Serious Area Carbon Monoxide Plan, measures 8 and 22
Carbon Monoxide Maintenance Plan

One-Hour Ozone Maintenance Plan
Eight-Hour Ozone Plan*
Eight-Hour Ozone Maintenance Plan*

Revised 1999 Serious Area PM-10 Plan, measures 8 and 23
Five Percent Plan for PM*

*= EPA approval pending

Measure Status:

This Transportation Control Measure is a committed measure in the Serious Area CO and PM-10 Plans. This measure includes the Voluntary Vehicle Repair and Retrofit Program and the Voluntary Gasoline Vehicle Retirement Program/Maricopa County Travel Reduction Program as described below.

Voluntary Vehicle Repair and Retrofit Program

According to the Arizona Revised Statutes 49-474.03, Maricopa County is required to operate and administer a Voluntary Vehicle Repair and Retrofit Program. Beginning in January 1999, the program is designed to provide for real and quantifiable emissions reductions based on actual emissions testing performed on the vehicle before repair or retrofit. The County is also required to coordinate the program with the Arizona Department of Environmental Quality and Arizona Department of Transportation.

A vehicle owner may participate in the program if all of the following criteria are met:

- The owner is willing to participate in the program.
- The vehicle is functionally operational.

- The vehicle is titled in this state, has taken the emissions inspection test, has been registered during the immediately preceding twelve months and has not been unregistered for more than sixty days.
- The vehicle is at least twelve years older than the current calendar year.
- The vehicle is required to take the emissions inspection test and the vehicle fails the emissions test in the emissions inspection results portion of the test. The vehicle owner is required to apply to the program not more than sixty days after failing the test.
- The emissions control system has not been tampered with.
- The emissions control system has not been removed or disabled, in whole or in part.
- The vehicle is taken to a participating repair facility. Any repairs performed at an unauthorized repair facility are not eligible for payment.
- Participation in the program is limited to one vehicle per owner.
- Motor homes, motorcycles, salvage vehicles and fleet vehicles are not eligible to participate in the program.

In addition, the Voluntary Vehicle Repair and Retrofit Program provides that:

- Vehicle owners who qualify for the repair and retrofit program pay the first \$150 as a copayment.
- Vehicles that require more than \$700 in repair costs are not eligible unless the vehicle owner chooses to pay additional costs.
- A vehicle that is able to accept a retrofit kit is required to have the retrofit kit installed. A vehicle that requires more than \$800 in aggregated retrofit parts and labor costs is not eligible for the program unless the vehicle owner pays the additional costs.

From its introduction in January 1999 through June 2009, the Voluntary Vehicle Repair and Retrofit Program has helped over 10,500 vehicles meet Arizona emissions standards, resulting in the reduction of over 2,900 tons of pollution. According to Maricopa County, the program is very cost effective. For the FY 2009 program, the cost to Maricopa County was \$1,651 per metric ton, annualized over two years. According to the Maricopa County Voluntary Vehicle Repair and Retrofit

Program Annual Report, in FY 2009 the program resulted in a reduction of 147 metric tons per year in hydrocarbons, carbon monoxide, and nitrogen oxides.

Voluntary Gasoline Vehicle Retirement Program/Maricopa County Travel Reduction Program

This measure was also included as part of an initiative entitled “Voluntary Gasoline Vehicle Retirement Program/Maricopa County Travel Reduction Program”. Maricopa County indicates that the implementation of this measure involves a program to purchase and retire vehicles that produce excessive emissions, particularly pre-1980 model year light duty automobiles and trucks. Maricopa County revised its Trip Reduction Ordinance to include flexibility provisions, also called Equivalent Emission Reduction Credit, authorized under A.R.S. Section 49-588 which includes voluntary vehicle trade-outs. This revision will allow trade-outs completed after October 16, 1996 to be used to achieve the emission reduction goals established under the ordinance.

Impact of TIP and RTP:

The transportation projects in the FY 2011-2015 MAG Transportation Improvement Program and Regional Transportation Plan are not anticipated to impact the schedule or effectiveness of this measure.

6 TIP AND REGIONAL TRANSPORTATION PLAN CONFORMITY

The principal requirements of the federal transportation conformity rule for TIP and Regional Transportation Plan assessments are: (1) the TIP and Regional Transportation Plan (RTP) must pass an emissions budget test with a budget that has been found to be adequate or approved by EPA for transportation conformity purposes, or interim emissions tests; (2) the latest planning assumptions and emission models in force at the time the conformity analysis begins must be employed; (3) the TIP and RTP must provide for the timely implementation of transportation control measures (TCMs) specified in the applicable air quality implementation plans; and (4) consultation. Consultation generally occurs both at the beginning of the process of preparing the conformity analysis, on the proposed models, associated methods, and assumptions for the upcoming analysis and the projects to be assessed, and at the end of the process, on the draft conformity analysis report. The final determination of conformity for the TIP and Regional Transportation Plan is the responsibility of the Federal Highway Administration and the Federal Transit Administration.

The previous chapters and the appendices present the documentation for all of the requirements listed above for conformity determinations, except for the conformity test results. Prior chapters have also addressed the updated documentation required under the federal transportation conformity rule for the latest planning assumptions and the implementation of transportation control measures specified in the applicable air quality implementation plans. Consultation correspondence on the 2010 MAG Conformity Analysis is included in Appendix B. Appendix Q includes the public hearing notice and a transcript of the public hearing. Comments received on the conformity analysis and responses made as part of the public involvement process are included in Appendix R.

This chapter presents the results of the conformity tests, satisfying the remaining requirement of the federal transportation conformity rule. Separate tests were conducted for carbon monoxide (CO), volatile organic compounds (VOC), nitrogen oxides (NO_x), and particulate matter less than or equal to ten microns in diameter (PM-10). For each test, the required emissions estimates were developed using the transportation and emission modeling approaches required under the federal transportation conformity rule and summarized in Chapters 3 and 4. The applicable conformity tests were reviewed in Chapter 1. The results are summarized below, followed by a more detailed discussion of the findings for each pollutant. Table 6-1 and Figures 6-1 through 6-4 present results for CO, VOC, NO_x, and PM-10, respectively, in metric tons per day for each of the analysis years tested.

For carbon monoxide, the applicable conformity test is the emissions budget test, using the 2006 and 2015 conformity budgets established in the MAG Carbon Monoxide Redesignation Request and Maintenance Plan. EPA approved the Carbon Monoxide Maintenance Plan and conformity budgets, effective April 8, 2005. The modeling results indicated that the CO emissions predicted for 2010 are less than the 2006 emissions budget, and the CO emissions predicted for 2015, 2025, and 2031 are less than the 2015 emissions budget. The TIP and Regional Transportation Plan therefore satisfy the conformity emissions test for carbon monoxide.

For volatile organic compounds and nitrogen oxides for the eight-hour ozone standard, the applicable conformity test is the emissions budget test, using the 2008 conformity budgets for VOCs and NOx established in the MAG Eight-Hour Ozone Plan. EPA found the conformity budgets in the MAG Eight-Hour Ozone Plan adequate, effective November 9, 2007. The modeling results indicated that the VOC emissions predicted for 2010, 2015, 2025, and 2031 are less than the 2008 VOC emissions budget. Also, the modeling results indicated that the NOx emissions predicted for 2010, 2015, 2025, and 2031 are less than the 2008 NOx emissions budget. The TIP and Regional Transportation Plan therefore satisfy the conformity emissions tests for eight-hour ozone.

For PM-10, the applicable conformity test is the emissions budget test, using the 2010 emissions budget established in the MAG 2007 Five Percent Plan for PM-10. EPA found the 2010 PM-10 motor vehicle emissions budget in the Five Percent Plan to be adequate, effective July 1, 2008. The modeling results indicated that the PM-10 emissions predicted for 2010, 2015, 2025, and 2031 are less than the 2010 PM-10 emissions budget. The TIP and Regional Transportation Plan therefore satisfy the conformity tests for PM-10.

As all requirements of the federal conformity rule have been satisfied, a finding of conformity for the FY 2011-2015 MAG Transportation Improvement Program and MAG Regional Transportation Plan 2010 Update is supported.

CONFORMITY TEST RESULTS FOR CARBON MONOXIDE

The conformity modeling results for carbon monoxide are presented in Table 6-1 and graphed in Figure 6-1. Emissions were calculated for the carbon monoxide modeling domain for a 24-hour period based on episode day conditions for a Friday in December. The projected CO emissions for 2010 are 479.3 metric tons per day, which is less than the 2006 CO budget of 699.7 metric tons per day. The projected CO emissions for 2015, 2025, and 2031 are 446.9, 452.5, and 468.3 metric tons per day, respectively, which are less than the CO budget of 662.9 metric tons per day.

Since the projected carbon monoxide emissions for the TIP and Regional Transportation Plan are less than the approved budgets in the MAG Carbon Monoxide Redesignation Request and Maintenance Plan, the results support a finding of conformity.

CONFORMITY TEST RESULTS FOR EIGHT-HOUR OZONE

The conformity modeling results for eight-hour ozone are presented in Table 6-1 and graphed in Figures 6-2 through 6-3. The volatile organic compound and nitrogen oxides emissions were calculated to reflect episode day conditions for a Thursday in June. Emissions were calculated for the eight-hour ozone nonattainment area. The projected VOC emissions in 2010, 2015, 2025, and 2031 are 46.8, 43.2, 37.8, and 40.8 metric tons per day, respectively, which are all less than the VOC budget of 67.9 metric tons per day and the projected NOx emissions in 2010, 2015, 2025, and 2031 are 117.7, 67.2, 39.5, and 39.5 metric tons per day, respectively, which are all less than the NOx budget of 138.2 metric tons per day.

Since the projected VOC and NOx emissions for the TIP and Regional Transportation Plan are less than the adequate eight-hour ozone budgets, the results support a finding of conformity.

CONFORMITY TEST RESULTS FOR PARTICULATE MATTER

The conformity modeling results for PM-10 are listed in Table 6-1 and graphed in Figure 6-4. The PM-10 emissions were calculated for the PM-10 nonattainment area for an annual average day. The projected PM-10 emissions in 2010, 2015, 2025, and 2031 are 77.1, 80.1, 89.6, and 94.4 metric tons per day, respectively, which are all less than the budget of 103.3 metric tons per day.

Since the projected PM-10 emissions for the TIP and Regional Transportation Plan are less than the adequate budget established in the MAG 2007 Five Percent Plan for PM-10, the results support a finding of conformity.

TABLE 6-1. CONFORMITY TEST RESULTS FOR CO, VOC, NO_x, AND PM-10
(METRIC TONS/DAY)

Pollutant	Carbon Monoxide ^a		Eight-Hour Ozone ^b		PM-10 ^c		
	2006	2015	2008 VOC	2008 NO _x	Onroad Mobile	Road Construction	2010 Total PM-10
<i>Budget Test</i>	699.7	662.9	67.9	138.2	N/A	N/A	103.3
2010	479.3		46.8	117.7	71.8	5.3	77.1
2015		446.9	43.2	67.2	72.7	7.4	80.1
2025		452.5	37.8	39.5	82.2	7.4	89.6
2031		468.3	40.8	39.5	87.0	7.4	94.4

- a** The Carbon Monoxide Maintenance Plan established a 2006 budget and a 2015 budget. The onroad mobile source emissions correspond to a Friday in December episode day conditions.
- b** The Eight-Hour Ozone Plan established 2008 budgets for volatile organic compounds (VOCs) and nitrogen oxides (NO_x). The onroad mobile source emissions correspond to a Thursday in June episode day conditions.
- c** The Five Percent Plan for PM-10 established a 2010 emissions budget corresponding to an average annual day.

Figure 6-1: Carbon Monoxide Results for Conformity Budget Test

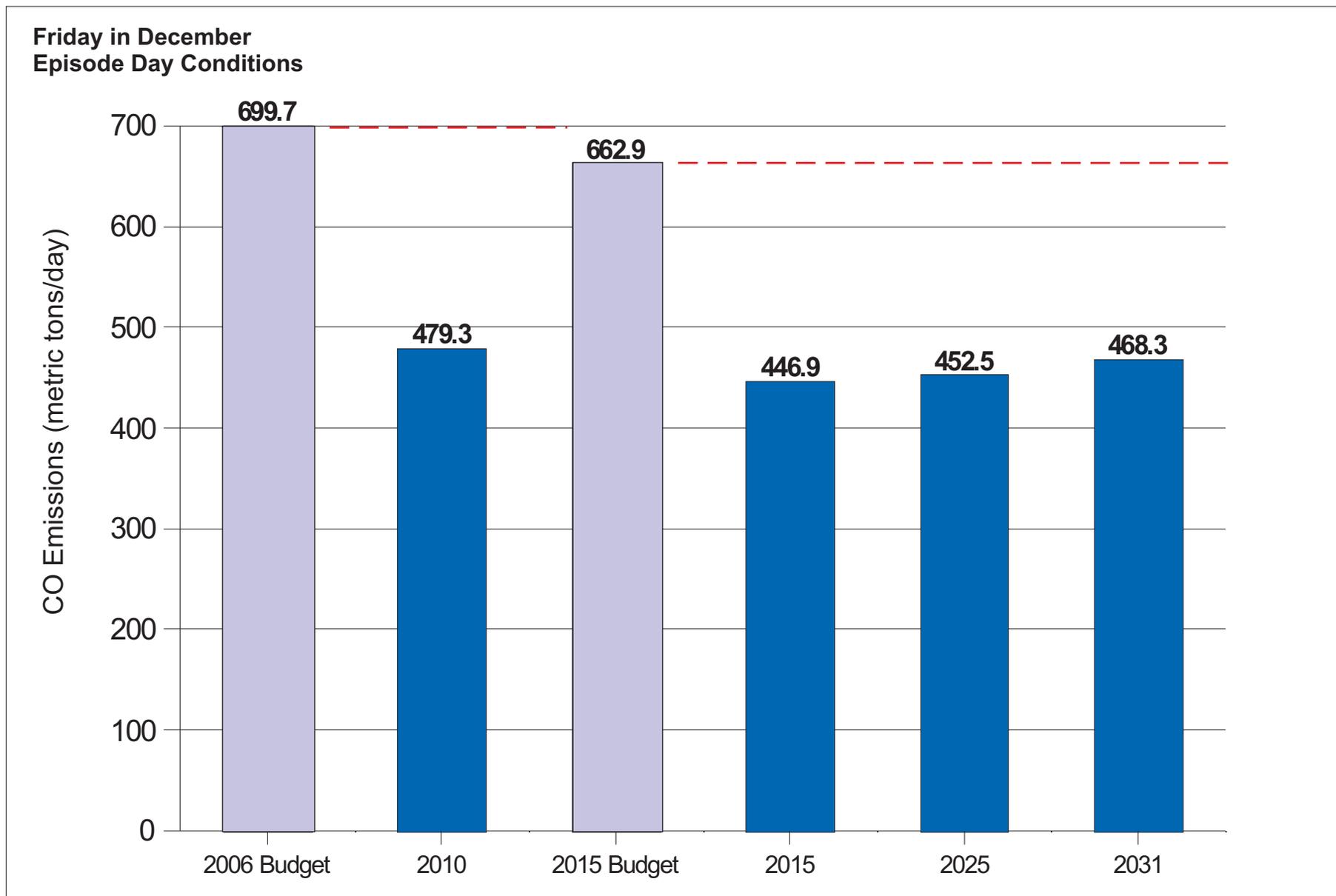


Figure 6-2: Eight-Hour Ozone: Volatile Organic Compounds (VOC) Results for Conformity Budget Test

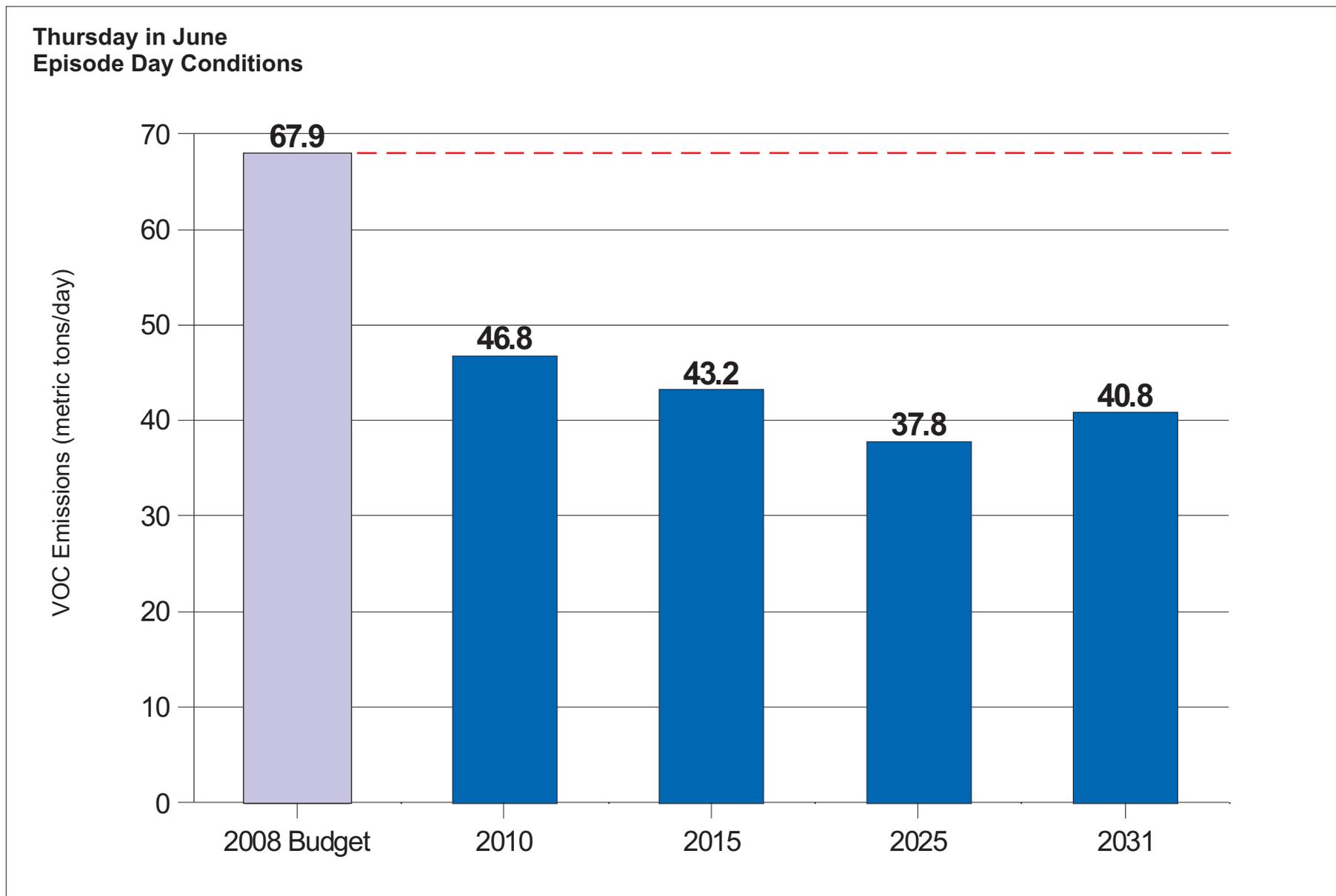


Figure 6-3: Eight-Hour Ozone: Nitrogen Oxides (NOx) Results for Conformity Budget Test

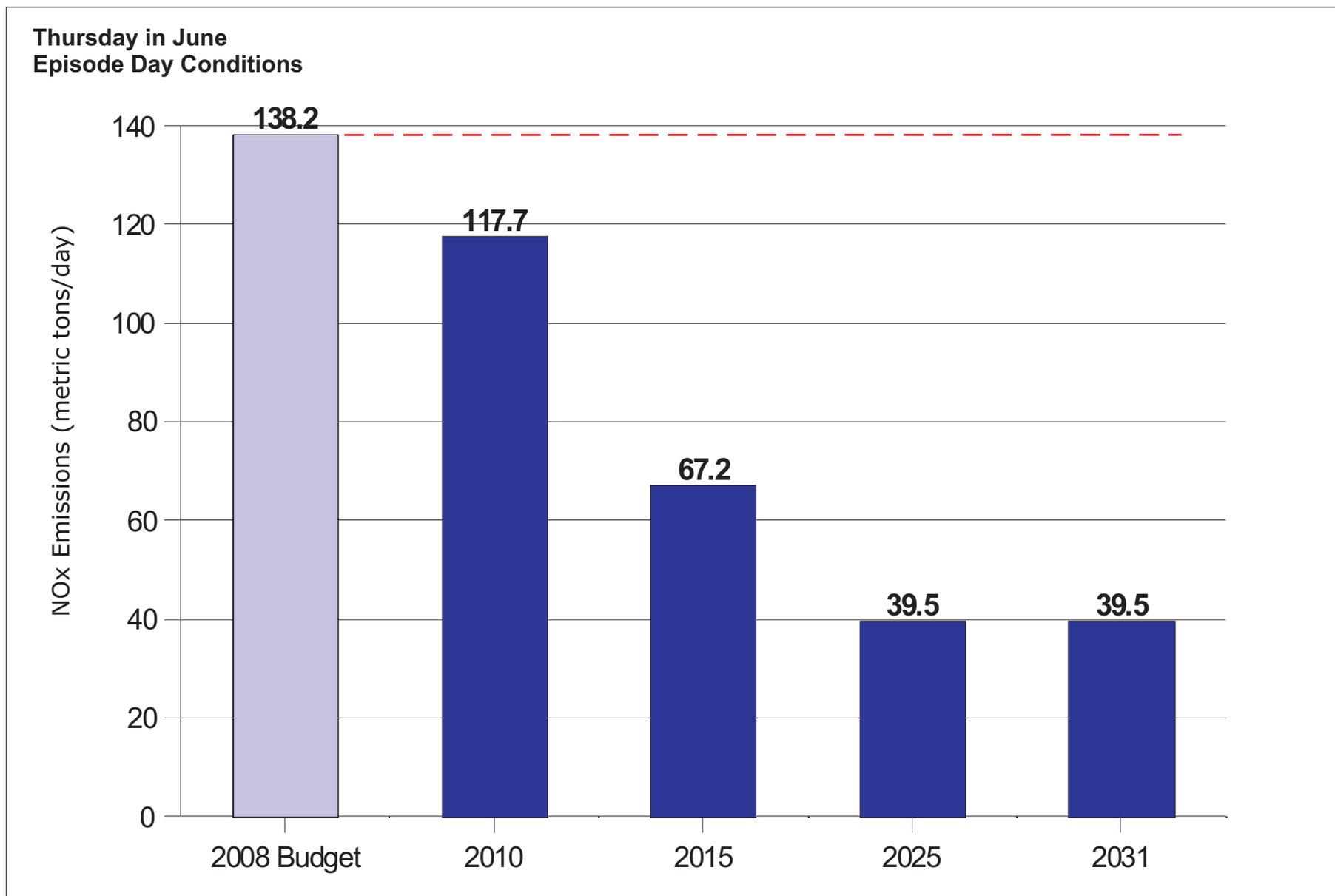
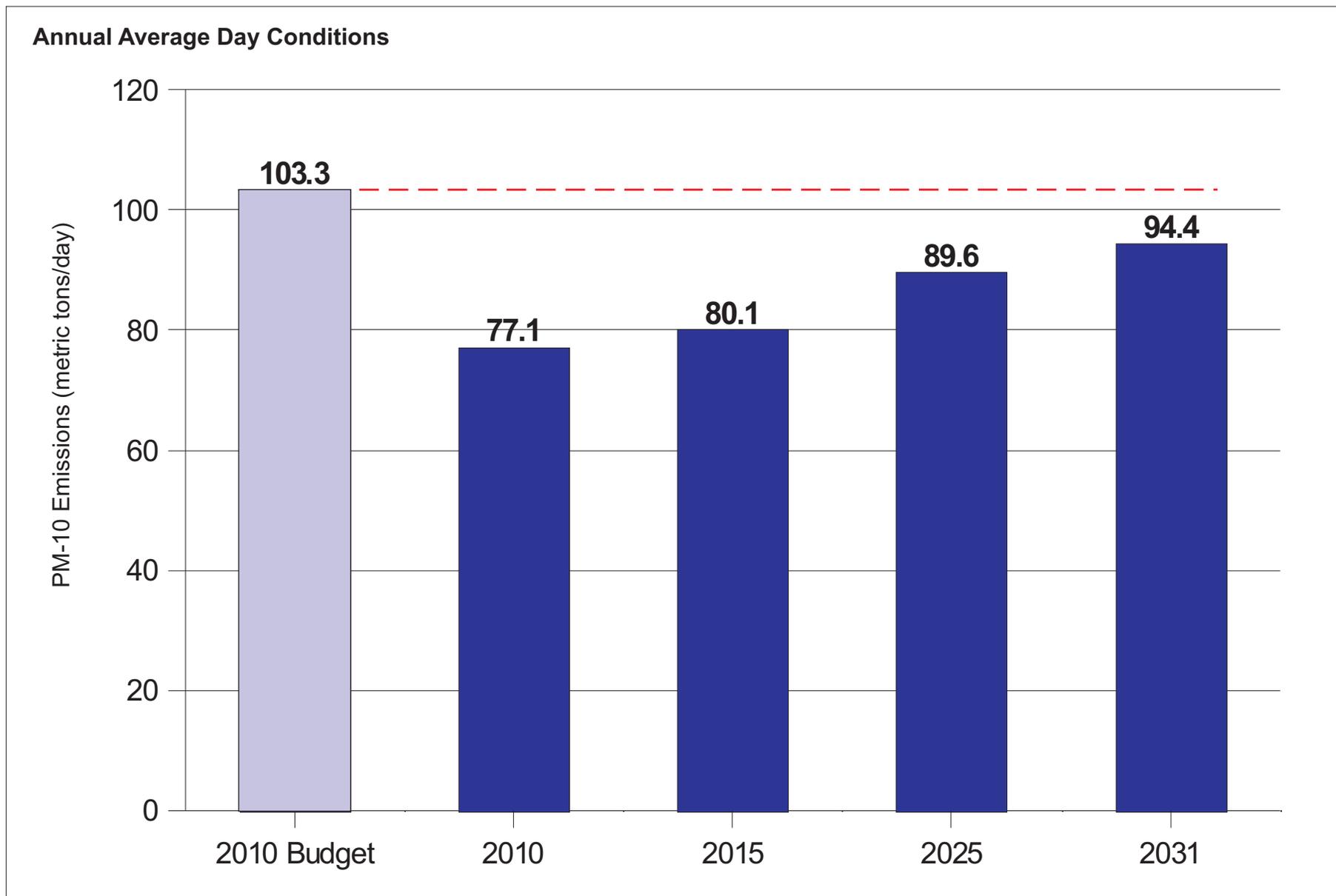


Figure 6-4: PM-10 Results for Conformity Budget Test



GLOSSARY

40 CFR Parts 51 and 93	Sections 51 and 93 from Title 40 of the Code of Federal Regulations describing the transportation conformity rule.
ADEQ	Arizona Department of Environmental Quality.
ADOT	Arizona Department of Transportation.
AP-42	AP-42, Fifth Edition, provides PM-10 emission factors. Common name for the EPA Compilation of Air Pollutant Emission Factors
Applicable Plan	The most recent air quality plan that has been approved by EPA for a specific air pollutant.
A.R.S.	Arizona Revised Statutes. The codified laws of the State of Arizona.
Arterial Roadway	A major urban street serving through traffic and also providing access to adjacent land.
Attainment	The status of having air quality that is below (i.e., cleaner air) the allowable national standard for a particular pollutant.
Build/No-Build	“Build” refers to the action scenario which assumes the “No-Build” scenario and the implementation of the proposed action (included in the TIP or RTP) for each of the years to be analyzed. “No-Build” refers to the baseline scenario which assumes the future transportation network without implementation of the proposed action (included in the TIP or RTP) for the years to be analyzed.
CAA	The U.S. Clean Air Act, referring to the Air Pollution Control Act of 1955, as subsequently amended in 1963, 1967, 1970, 1974, 1977, and 1990.

Capacity	The maximum number of vehicles that a roadway can carry in a given time period under prevailing roadway, traffic, and control conditions.
Centroid Connector	An abstract representation of the local street system, as used in MAG travel demand models. These links connect the centroids of zones, where trips begin or end, to arterial or collector roadways on the modeled road network.
CMAQ	Congestion Mitigation and Air Quality Improvement Program.
CO	Carbon monoxide. A colorless, odorless, poisonous gas that results from the incomplete combustion of carbon-based fuels, such as gasoline.
Collector Roadway	A minor urban street providing access to and from local streets and serving adjacent land use.
Concentration	The relative content of a pollutant in the air, expressed as a volume unit to volume unit often expressed as an average for a specified time interval. For example, the national standard for ambient carbon monoxide concentration is an eight-hour average of 9.0 parts per million.
Conformity	An analysis which demonstrates that a transportation plan, program, or project conforms with the State Implementation Plan purpose of eliminating or reducing the severity and number of violations of the national ambient air quality standards and achieving expeditious attainment of such standards; and that such activities 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.
Congestion	Traffic congestion is a condition in which vehicles experience undue delay. It is quantified in the MAG travel demand models by the ratio of traffic volume to capacity (V/C). A V/C ratio of 1.00 or more is considered severe congestion.

DRAM/EMPAL	Disaggregate Residential Allocation Model/Employment Allocation Model. The MAG land use model used to allocate regional households and employment projections to subregional areas.
Emission Factor	The rate at which a pollutant is emitted from a given source (example: grams per mile) for given conditions (e.g., vehicle type and model year, vehicle speed, fuel type, and ambient air temperature).
Episode Day	A day selected to represent conditions (meteorology, etc.) under which violations of the air quality standard for a particular pollutant are likely to occur.
EPA	United States Environmental Protection Agency.
Exceedance	A term used to refer to an episode during which ambient concentrations of an air pollutant in a region are higher than the allowable national standard.
FHWA	Federal Highway Administration.
FIP	Federal Implementation Plan.
FMS	Freeway Management System. Infrastructure such as cameras, variable message signs, and ramp metering systems to improve the flow of people and goods on limited access facilities.
FTA	Federal Transit Administration.
Freeway	A divided highway with two or more lanes for the exclusive use of traffic in each direction, and with full control of access and egress.
FY	Fiscal Year. The federal fiscal year extends from October 1 to September 30. For example, FY 2005 begins on October 1, 2004.
Hot Spot	Localized area with the potential to cause or contribute to a violation of an air quality standard. For example, a busy intersection where vehicular traffic may cause or contribute to increased emissions of carbon monoxide may attribute to a violation of the standard.

HOV	High Occupancy Vehicle. Multi-occupant vehicles such as a carpool, vanpool, or bus.
HOV Lane	A roadway lane available for use by High Occupancy Vehicles.
HPMS	Highway Performance Monitoring System. Summary information for urbanized areas provides detailed data for a sample of the arterial and collector functional systems to assess highway condition, performance, air quality trends, and future investment requirements.
I/M	Vehicle Inspection/Maintenance Program.
ITS	Intelligent Transportation System. The deployment of advanced electronics and information technologies to improve the performance of freeways and arterial roadways.
Link	A computer record describing a section of roadway in the MAG transportation models.
Local Roadway	A road, usually with low traffic volume, designed solely to serve adjacent development rather than through traffic.
M6Link	A MAG software program that combines emission factors (such as from MOBILE6) with link-level transportation data to produce onroad mobile emission inventories.
MAG	Maricopa Association of Governments. The Maricopa Association of Governments was designated the metropolitan planning agency for Maricopa County, Arizona, by Governor Jack Williams on December 14, 1973.
MCAQD	Maricopa County Air Quality Department.
Metric Ton	A unit of mass equal to 1000 kilograms, or approximately 2203 pounds.
Mode Choice Model	A computer model which determines mode choice, such as transit, auto driver, and auto passenger, based on variables such as travel times, costs, and income of travelers.

MOBILE6.2	MOBILE6 is a currently approved EPA model for estimating onroad vehicle emission factors. This model is used to estimate the emission factors for CO, VOC, NO _x , and PM-10 tailpipe emissions.
MPO	Metropolitan Planning Organization. A body of elected public officials responsible for regional transportation decision-making, as required under federal transportation planning regulations.
NAAQS, or National Standard	Refers to the National Ambient Air Quality Standards (NAAQS) which are the maximum pollutant levels which may not be exceeded in the ambient air to protect the public from adverse health effects.
Network	A computer readable representation of a specific urban street and highway system.
Nonattainment Area	An area designated by the U.S. Environmental Protection Agency as not being in attainment of the national standard for a specified pollutant.
Node	A point identifying one end of a link in the MAG transportation models.
NO _x	Nitrogen Oxides includes nitric oxide (NO) and nitrogen dioxide (NO ₂). These gaseous air pollutants combine with volatile organic compounds (i.e. hydrocarbons) in the presence of sunlight to produce ozone.
O ₃	Ozone is a secondary pollutant formed by the combination of VOCs and NO _x in the presence of sunlight.
OBD	On-Board Diagnostics. A computer based system built into all model year 1996 and newer light-duty cars and trucks. OBD monitors the performance of some of the engines' major components, including individual emission controls.
Phased in I/M Cutpoints	Cutpoints are the maximum emission level, by pollutant, used to determine if a vehicle passes or fails the emissions test administered through the vehicle inspection and maintenance program. The phased-in I/M cutpoints are the cutpoints currently enacted into legislation for vehicles subject to the enhanced emissions test.

PM-10	Particulate Matter less than or equal to ten microns in diameter.
ppm	Parts per million, a measure of pollution concentration.
psi	Pounds per square inch, a measure of pressure.
Reentrained Dust	Dust deposited on the roadway that is subsequently projected into the air by the passage of motor vehicles.
Regional Rideshare Program	The MAG sponsored program which provides free technical assistance to individuals, companies, and public sector entities interested in carpooling, vanpooling, or other transportation alternatives to drive-alone motor vehicle use.
Revised ROP FIP	1998 Ozone 15 Percent Rate of Progress Federal Implementation Plan as revised in 1999.
ROSS Plan	Regional Off-Street System Plan. A plan describing a region-wide system of off-street paths/trails for non-motorized transportation.
RPTA	Regional Public Transportation Authority. A political subdivision of the State of Arizona established in 1985 to conduct regional transit planning and to develop and operate a regional transit system in Maricopa County.
RTP	Regional Transportation Plan.
SIP	State Implementation Plan. Mandated by the Clean Air Act, SIPs contain details to monitor, control, maintain, and enforce compliance with National Ambient Air Quality Standards.
Socioeconomic Data	Data consists primarily of TAZ-level household projections of population and employment by type which are input to the MAG travel demand models.
TAZ	Traffic Analysis Zone. A small geographic area for which socioeconomic data is estimated in the MAG travel demand models.
TCM	Transportation Control Measure. A TCM as defined in CAA Section 108(f)(1)(A) includes any measure in an applicable implementation plan which is intended to reduce emissions

from transportation sources by reducing vehicle use or changing traffic flow or congestion conditions (e.g., transit improvements).

TIP	Transportation Improvement Program. An annual or biennial document listing transportation projects to be funded in upcoming years.
TMA	Transportation Management Association. A group comprised generally of businesses to identify and develop solutions to shared transportation problems.
TOG	Total Organic Gases. Gaseous emissions that lead to the formation of ozone.
TransCAD	Computer programs which are used to run the MAG travel demand model.
Travel Reduction Program (TRP)	A program administered by Maricopa County, pursuant to the provisions of Arizona House Bill 2206 (1988), as subsequently strengthened by adoption of the Maricopa County Trip Reduction Ordinance.
U.S. DOT	United States Department of Transportation.
V/C Ratio	Volume to Capacity Ratio. A parameter used to measure congestion. For a given roadway link, it is calculated as total traffic volume divided by capacity.
Violation	A term used to define the number of exceedances that result in noncompliance with the national standard.
VMT	Vehicle Miles of Travel. A measure of total vehicle travel within a specified area and time frame.
VOC	Volatile Organic Compounds. VOCs are emitted in the storage and use of fuel, solvents, and many industrial and consumer chemicals, as well as from vegetation. VOCs and nitrogen oxides, when emitted in the presence of sunlight, undergo chemical reactions which result in the formation of ozone.

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