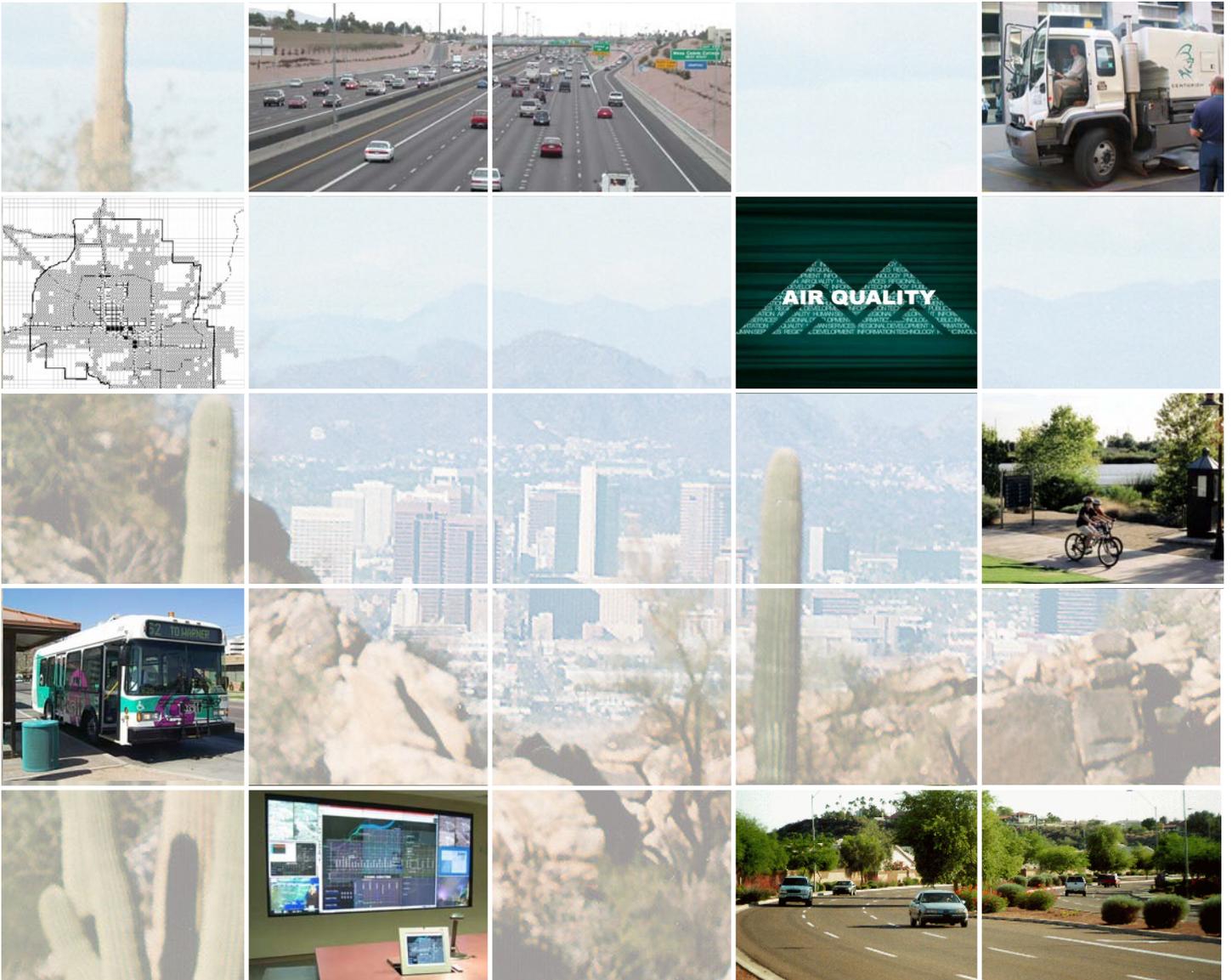


# 2006 MAG Conformity Analysis

for the FY 2007-2011 Transportation Improvement Program  
and Regional Transportation Plan—2006 Update



**2006 MAG CONFORMITY ANALYSIS**

**FOR THE**

**FY 2007-2011 MAG TRANSPORTATION IMPROVEMENT  
PROGRAM**

**AND THE**

**MAG REGIONAL TRANSPORTATION PLAN -  
2006 UPDATE**

July 2006

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## **EXECUTIVE SUMMARY**

This report presents the 2006 MAG Conformity Analysis for the FY 2007-2011 MAG Transportation Improvement Program (TIP) and the MAG Regional Transportation Plan - 2006 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 2007-2011 MAG Transportation Improvement Program and MAG Regional Transportation Plan - 2006 Update is therefore supported.

The 2006 MAG Conformity Analysis for the FY 2007-2011 MAG Transportation Improvement Program and the MAG Regional Transportation Plan - 2006 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, 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 2007-2011 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. For the 2006 MAG Conformity Analysis for the FY 2007-2011 MAG Transportation Improvement Program and the MAG Regional Transportation Plan - 2006 Update, two interim emissions tests were performed for the eight-hour ozone standard.

Motor vehicle emissions budgets established in the MAG Carbon Monoxide Redesignation Request and Maintenance Plan and the Revised 1999 MAG Serious Area PM-10 Plan must be used for conformity. In addition, adjusted budgets from the MAG One-Hour Ozone Redesignation Request and Maintenance Plan must be used for eight-hour ozone.

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. EPA published a final rule to approve the One-Hour Ozone Maintenance Plan, including the conformity budgets on June 14, 2005. EPA published the final rule

approving the Revised MAG 1999 Serious Area Particulate Plan for PM-10 and conformity budget on July 25, 2002.

Chapter 1 summarizes the applicable air quality implementation plans and conformity tests for carbon monoxide, eight-hour ozone, and PM-10. For the 2006 MAG Conformity Analysis for the FY 2007-2011 MAG TIP and RTP, the emissions budget test was applied for CO, since the CO conformity budgets have been approved by EPA. For eight-hour ozone, two interim emissions tests were performed for volatile organic compounds (VOC) and nitrogen oxides (NOx): an adjusted one-hour ozone budget test and a no-greater-than-2002 baseline emissions test. For PM-10, the emissions budget test was applied using the approved conformity budget from the Revised MAG 1999 Serious Area PM-10 Plan.

## **RESULTS OF THE CONFORMITY ANALYSIS**

A regional emissions analysis was conducted for the horizon years 2009, 2015, 2016, and 2026 for each criteria pollutant for which the area is designated nonattainment or maintenance. All analyses were conducted using the latest planning assumptions and emissions models in force at the time the conformity analysis started on April 28, 2006. On July 19, 2006, minor technical changes were made to the transportation networks for three park-and-ride lots. The revised regional emissions analysis for conformity purposes indicates that the emissions are slightly lower and even further below the conformity emissions limits. The major conclusions of the 2006 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 2009 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, 2016, and 2026 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 year 2009 are projected to be less than the 2006 emissions budgets for the adjusted one-hour ozone maintenance area. The VOC and NOx emissions associated with implementation of the TIP and Regional Transportation Plan for the analysis years 2015, 2016, and 2026 are projected to be less than the 2015 emissions budgets for the adjusted one-hour ozone maintenance area. In addition, the vehicle-related VOC and NOx emissions associated with implementation of the TIP and Regional Transportation Plan for all analysis years are projected to be less than the 2002 baseline emissions for the eight-hour ozone nonattainment area. 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, ES-3, ES-4, and ES-5.

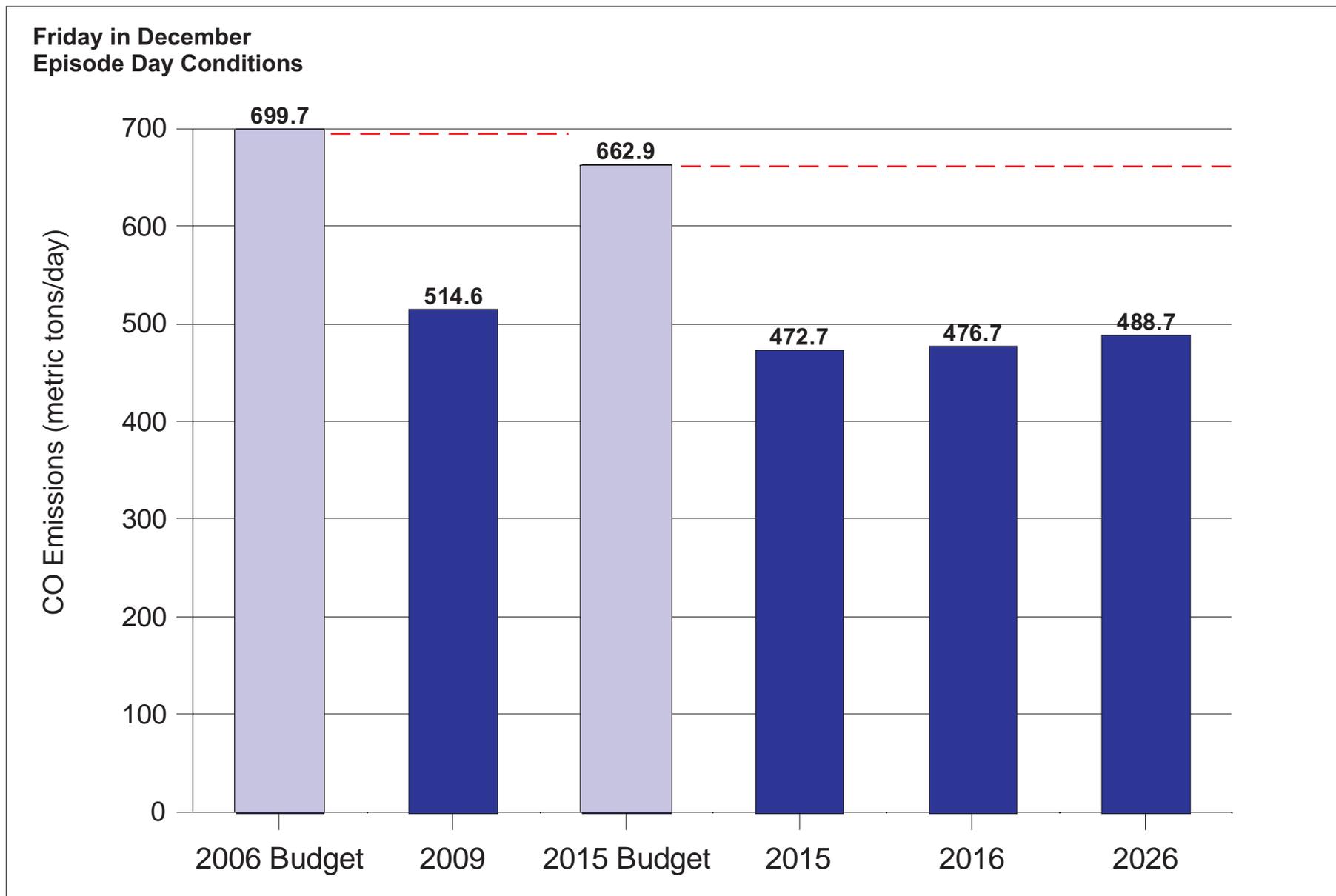
- For PM-10, the total vehicle-related emissions associated with implementation of the TIP and Regional Transportation Plan for all analysis years are projected to be less than the 2006 emissions budget approved for transportation conformity purposes in the Revised MAG 1999 Serious Area Particulate Plan for PM-10. The conformity test for PM-10 is therefore satisfied. The results of the regional emissions analysis for PM-10 are presented in Figure ES-6.
- 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-7 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 consultation correspondence. Appendix S includes a transcript of the June 15, 2006 public hearing conducted on the Draft FY 2007-2011 MAG Transportation Improvement Program, Draft MAG Regional Transportation Plan - 2006 Update, and the Draft 2006 MAG Conformity Analysis.

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



ES-5

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

ES-6

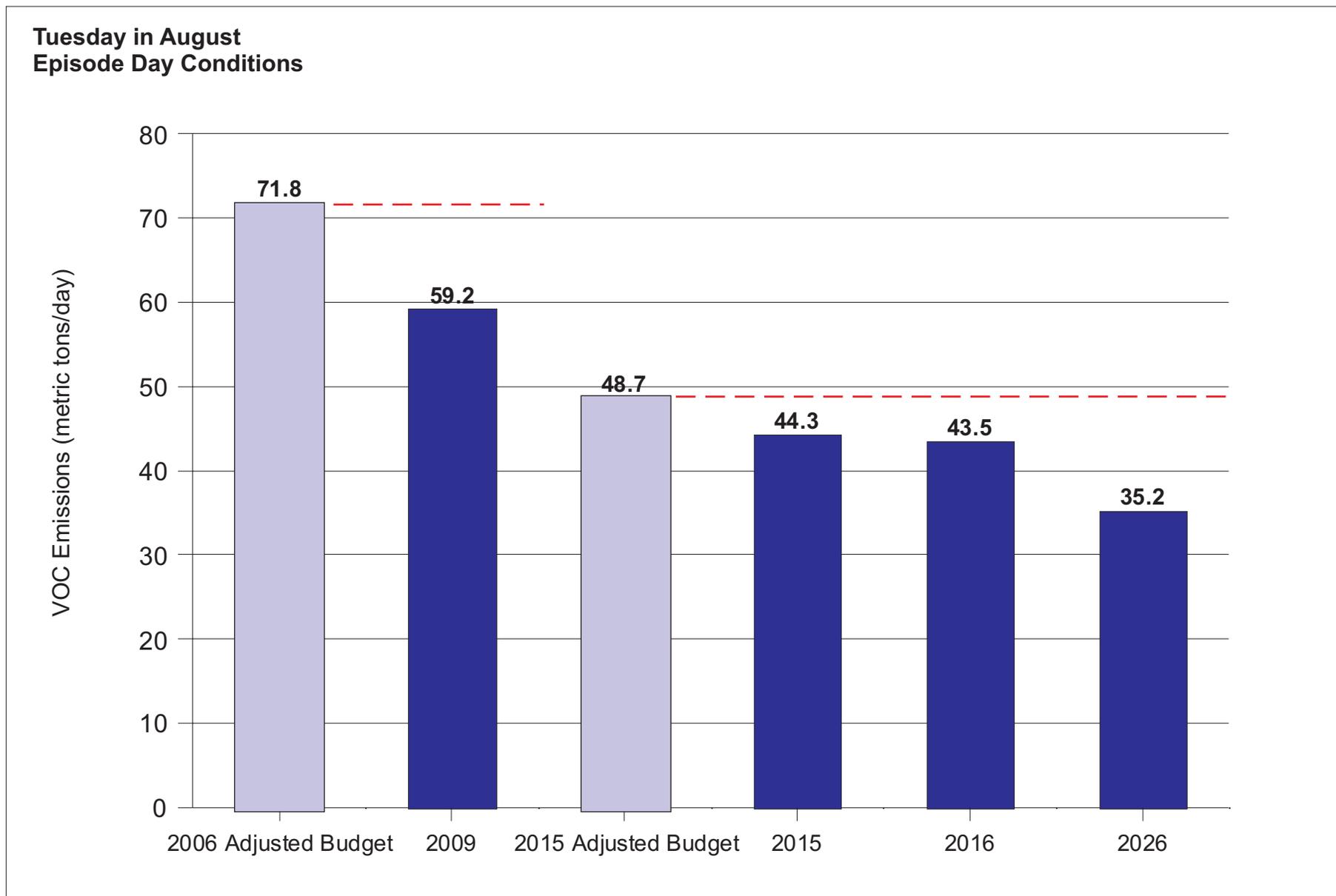
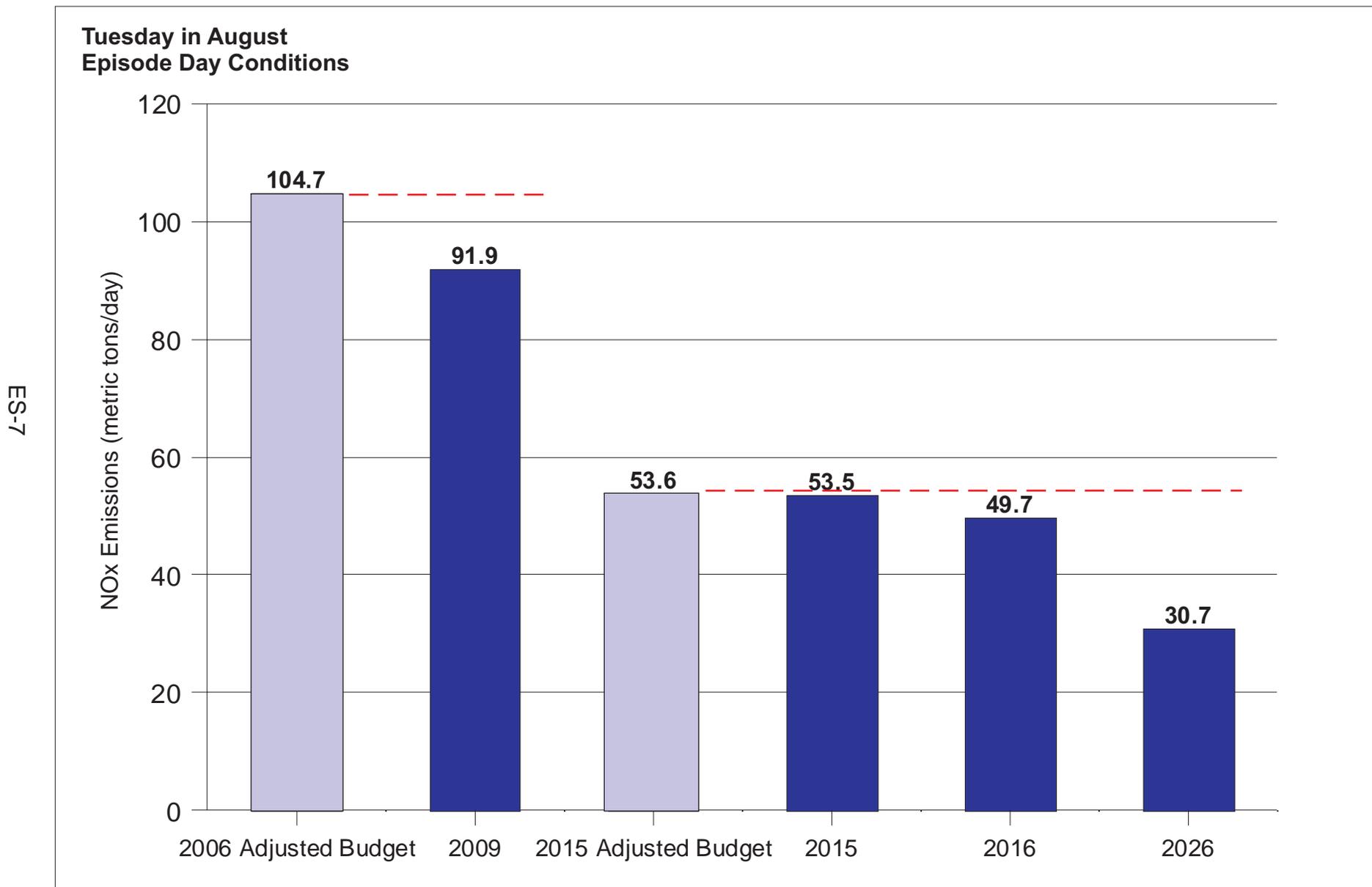
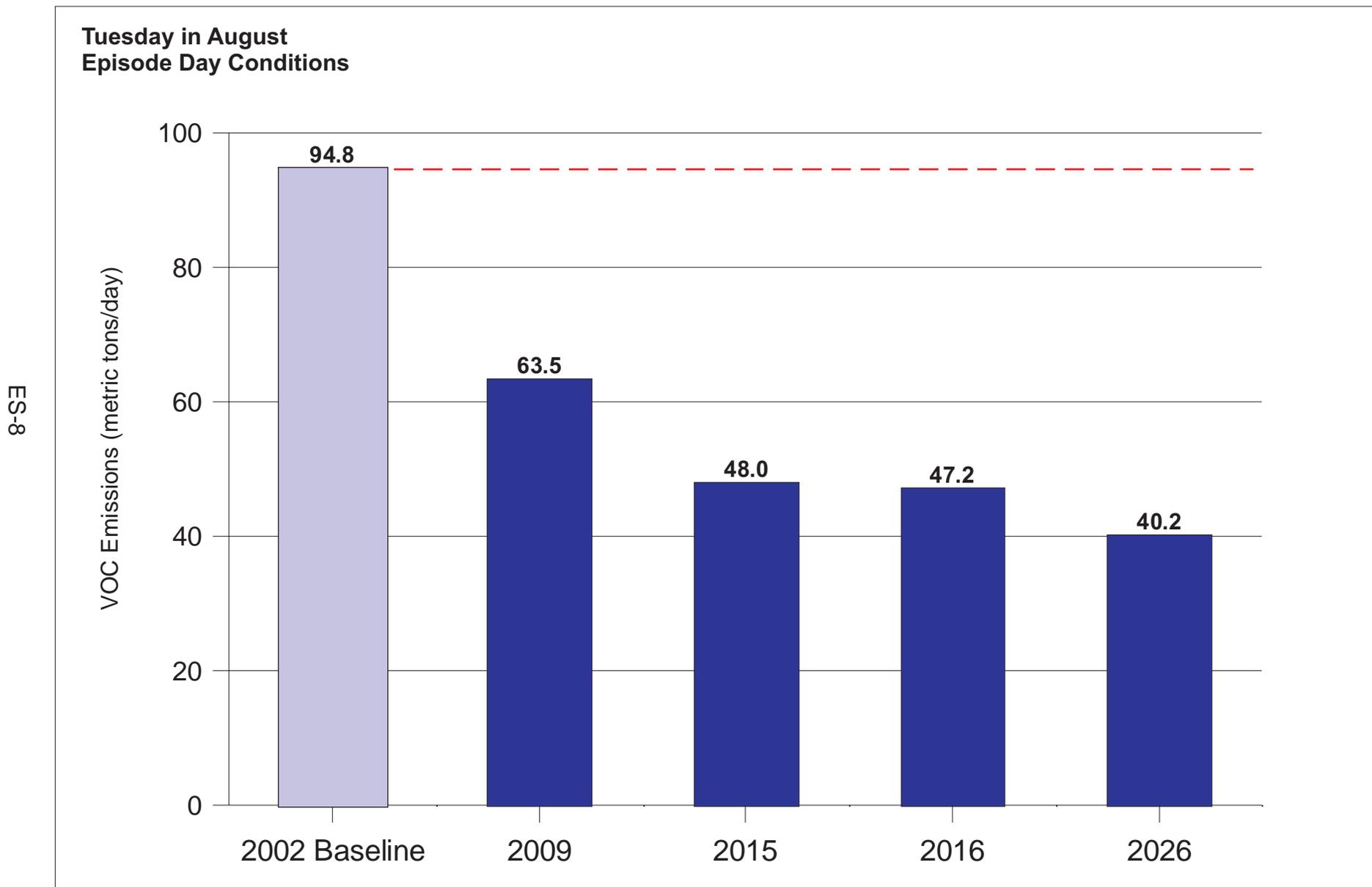


Figure ES-3: Eight-Hour Ozone: Nitrogen Oxides (NOx) Results for Adjusted One-Hour Ozone Budget Test



**Figure ES-4: Eight-Hour Ozone: Volatile Organic Compounds (VOC) Results for the No-Greater-Than-2002 Baseline Emissions Test for the Eight-Hour Ozone Nonattainment Area**



**Figure ES-5: Eight-Hour Ozone: Nitrogen Oxides (NOx) Results for the No-Greater-Than-2002 Baseline Emissions Test for the Eight-Hour Ozone Nonattainment Area**

ES-9

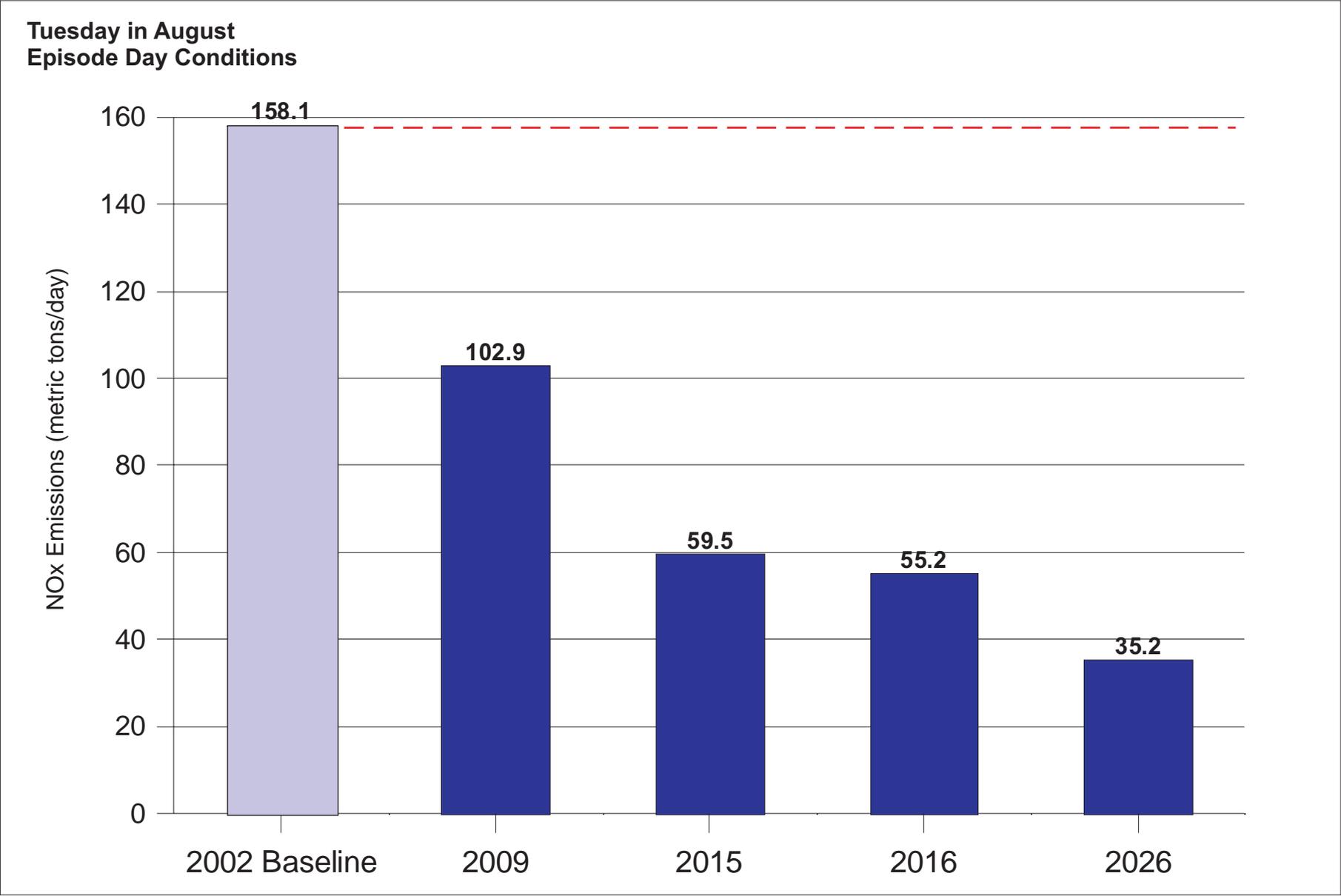


Figure ES-6: PM-10 Results for Conformity Budget Test

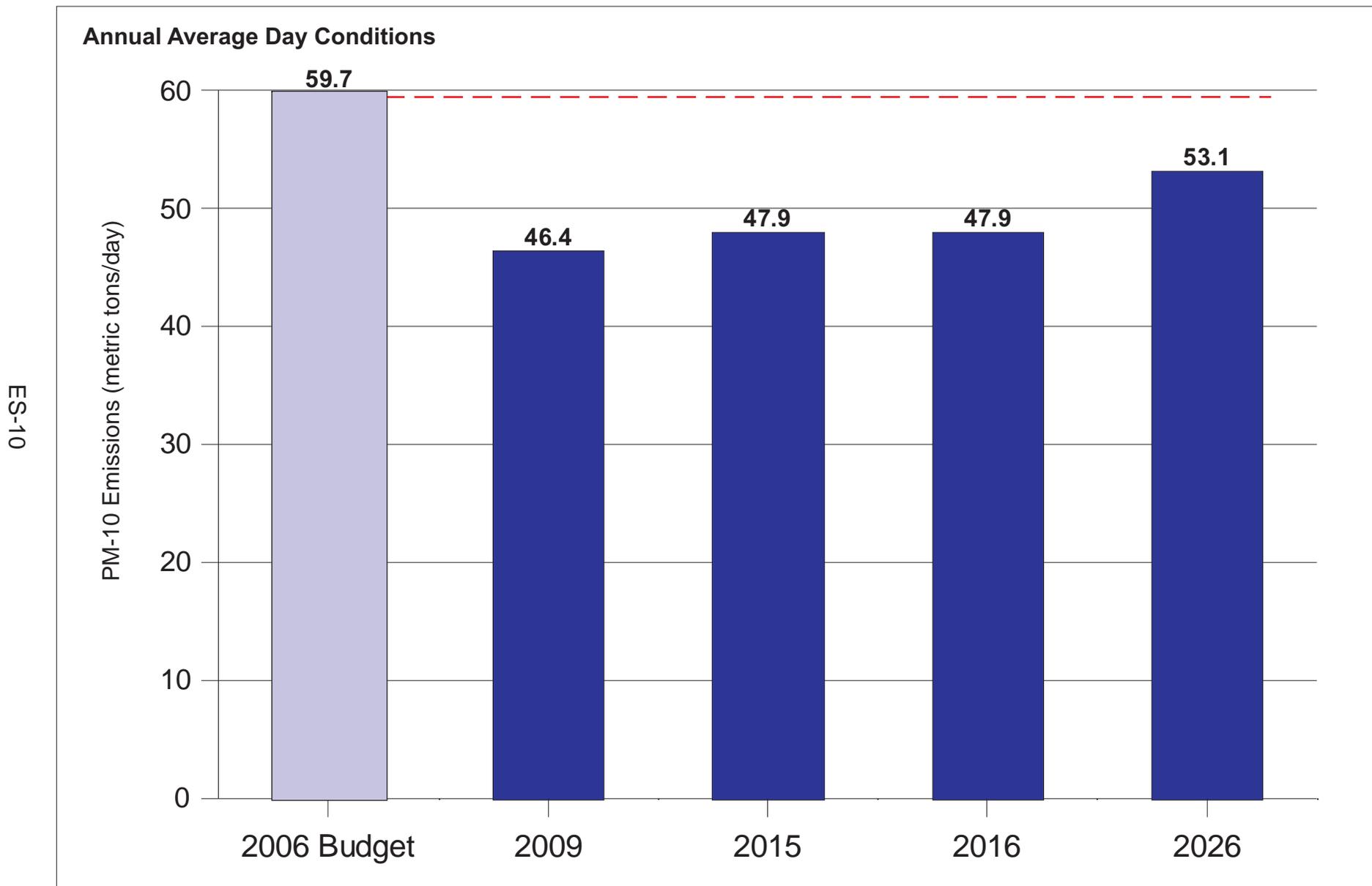
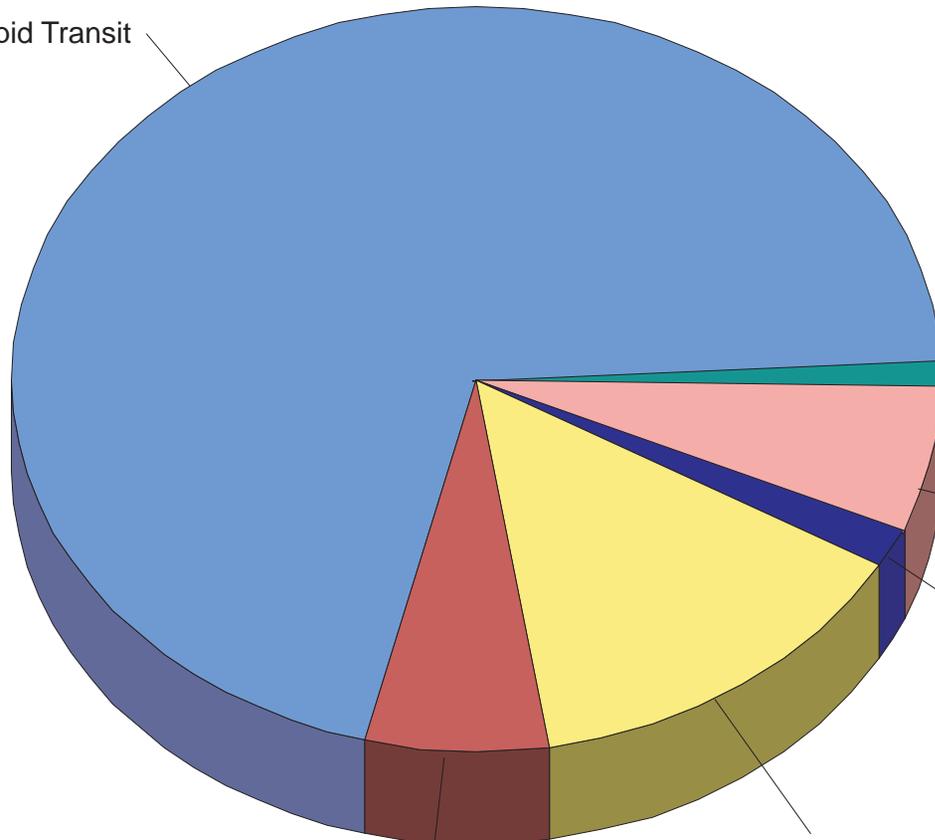


Figure ES-7: Transportation Control Measure Funding in the FY 2007-2011 MAG Transportation Improvement Program

Figures are in millions of dollars

Regional Public/Rapid Transit  
68.4%  
\$1,354.4



Rideshare/Trip Reduction  
0.9%  
\$17.3

Traffic Flow Improvements  
8.5%  
\$167.0

Park and Ride Lots  
1.6%  
\$31.0

Freeway Management System /HOV Lanes  
14.5%  
\$285.0

Bicycle and Pedestrian Travel  
6.2%  
\$122.6

**Total = \$1,968.3 million.**

An additional \$35.8 million is programmed for paving dirt streets, street sweepers, and other air quality projects.

# **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 2006 MAG Conformity Analysis for the FY 2007-2011 MAG Transportation Improvement Program (TIP) and the MAG Regional Transportation Plan - 2006 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 summaries 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 2007-2011 MAG Transportation Improvement Program serves as a detailed guide for preservation, expansion, and management of public transportation services. The Regional Transportation Plan covers the period FY 2007 through FY 2026 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/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 before which areas must determine conformity to a submitted control strategy SIP, and established a grace period before which transportation plan and program conformity must be determined 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,

2000b). 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 (USDOT) 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 USDOT 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. 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 2 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 from 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 2006 MAG Conformity Analysis are described later in this section, and include the last year of the regional transportation plan.

- 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.

### 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, 2000b). 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 USDOT 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 USDOT issued guidance on June 18, 1999 that incorporates all USDOT guidance in response to the court decision in a single document (USDOT, 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.

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 on July 1, 2004, 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, 2004a). All analyses were conducted using the latest planning assumptions and emissions models in force at the time the conformity analysis started on April 28, 2006. This section of the conformity rules also requires reasonable assumptions to be made with regard to transit service and changes in projected fares.

**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 new 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.

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, 1997a) and (EPA, 2004a), Section 93.109(b), "Table 1 - Conformity Criteria".

- 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 State air agencies, local air quality and transportation agencies, the USDOT and EPA (Section 93.105(a)(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 RTP 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), 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 TIP 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, 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 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, 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; and
- 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 boundaries of the nonattainment areas are identified below, followed by a summary of the attainment status for each pollutant for the Maricopa County region.

#### Nonattainment Boundaries

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

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.

On April 15, 2004, EPA designated a new 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.

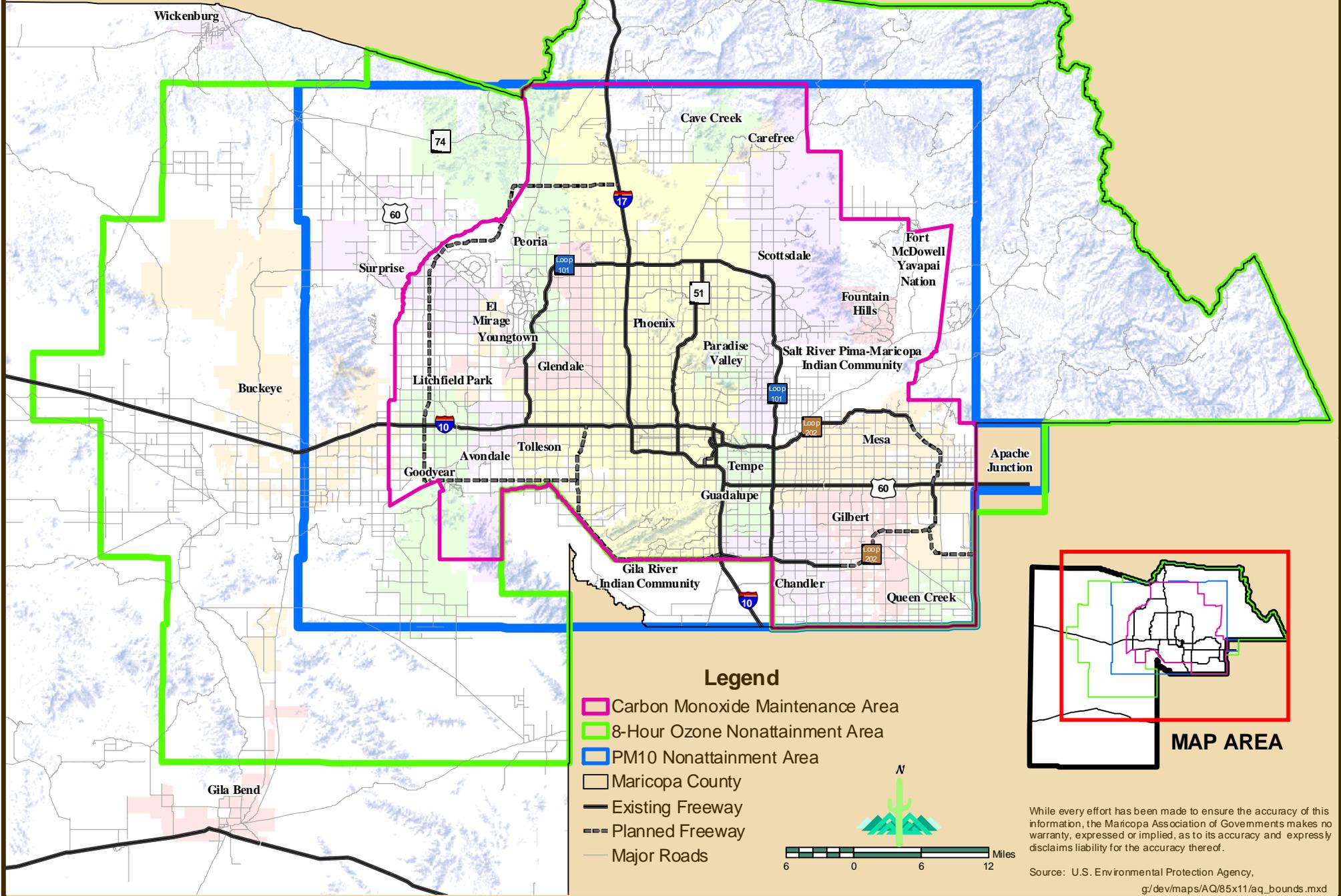
### Attainment Status

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 in July 1996, 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. In June 2003, the MAG Carbon Monoxide Redesignation Request and Maintenance Plan for the Maricopa County Nonattainment Area was submitted to EPA. This document demonstrates that all Clean Air Act requirements have been met and requests that EPA redesignate the area to attainment for carbon monoxide. On September 22, 2003, EPA published a final attainment determination for the carbon monoxide standard (EPA, 2003). 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).

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, 1998). The new ozone attainment date was November 19, 1999. Prior to EPA’s revocation of the 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. This document 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, 2005c). The EPA revoked the one-hour ozone standard on June 15, 2005.

**Figure 1-1.**

**AIR QUALITY NONATTAINMENT AND MAINTENANCE AREAS FOR THE MARICOPA COUNTY AREA, ARIZONA**



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 this 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 is December 31, 2001 for Serious areas; however the Revised MAG 1999 Serious Area Particulate Plan for PM-10 for the Maricopa County Nonattainment Area contains 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 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 Subpart 1, referred to as “Basic” nonattainment, with an attainment date of June 15, 2009. The boundary of the new eight-hour ozone nonattainment area is shown in Figure 1-1. 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 MAG nonattainment areas for carbon monoxide, ozone, and PM-10, 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 CO 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 conformity budgets, effective April 8, 2005. The One-Hour Ozone Redesignation Request and Maintenance Plan, submitted to EPA in May 2004, contained 2006 and 2015 emissions budgets for the ozone precursors, VOC and NOx. These budgets were found to be adequate by EPA, effective September 1, 2004.

On June 14, 2005, EPA published the final rule in the *Federal Register* approving the One-Hour Ozone Maintenance Plan, including the emissions budgets. On June 15, 2005, EPA revoked the one-hour ozone standard. According to EPA guidance, one-hour ozone emissions budgets that have been approved by EPA may be used for the eight-hour ozone conformity tests until eight-hour ozone budgets are found to be adequate or approved in a SIP. There are no adequate or approved conformity budgets for eight-hour ozone, since no attainment plan has been submitted to EPA. The eight-hour SIP is due by June 15, 2007.

EPA issued a notice of adequacy for the PM-10 motor vehicle emissions budget on April 21, 2000. In addition, EPA has approved the Revised MAG 1999 Serious Area

Particulate Plan for PM-10, including the motor vehicle emissions budget for 2006. The descriptions of the conformity tests that were performed for carbon monoxide, eight-hour ozone, and PM-10 as part of the 2006 MAG Conformity Analysis for the FY 2007-2011 TIP and RTP are described 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 used the required EPA emissions model to assess the emission reduction measures required to demonstrate attainment and 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, 2001a). The Revised Plan reflects 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 used the required EPA emissions model to assess the emission reduction measures required to demonstrate attainment and 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 used the EPA-approved MOBILE6 emissions model to develop 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 "Action" scenario 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 new conformity test requirements for the MAG nonattainment area for eight-hour ozone (EPA, 2004a). Ozone is a secondary pollutant, generated by chemical reactions in the atmosphere involving volatile organic compounds and nitrogen oxides. The MAG One-Hour Ozone Maintenance Plan contains 2006 and 2015 emissions budgets for volatile organic compounds and nitrogen oxides. On August 17, 2004, EPA determined that the budgets in the Ozone Maintenance Plan were adequate for transportation conformity purposes (EPA, 2004d). The EPA adequacy determination for the one-hour ozone budgets became effective on September 1, 2004. On June 14, 2005, EPA published a final rule approving the One-Hour Ozone Maintenance Plan including the conformity budgets. Adjusted versions of these budgets will be used for eight-hour ozone conformity analyses, until eight-hour ozone budgets are found to be adequate or approved in a SIP. The adjustments to the one-hour budgets are discussed below.

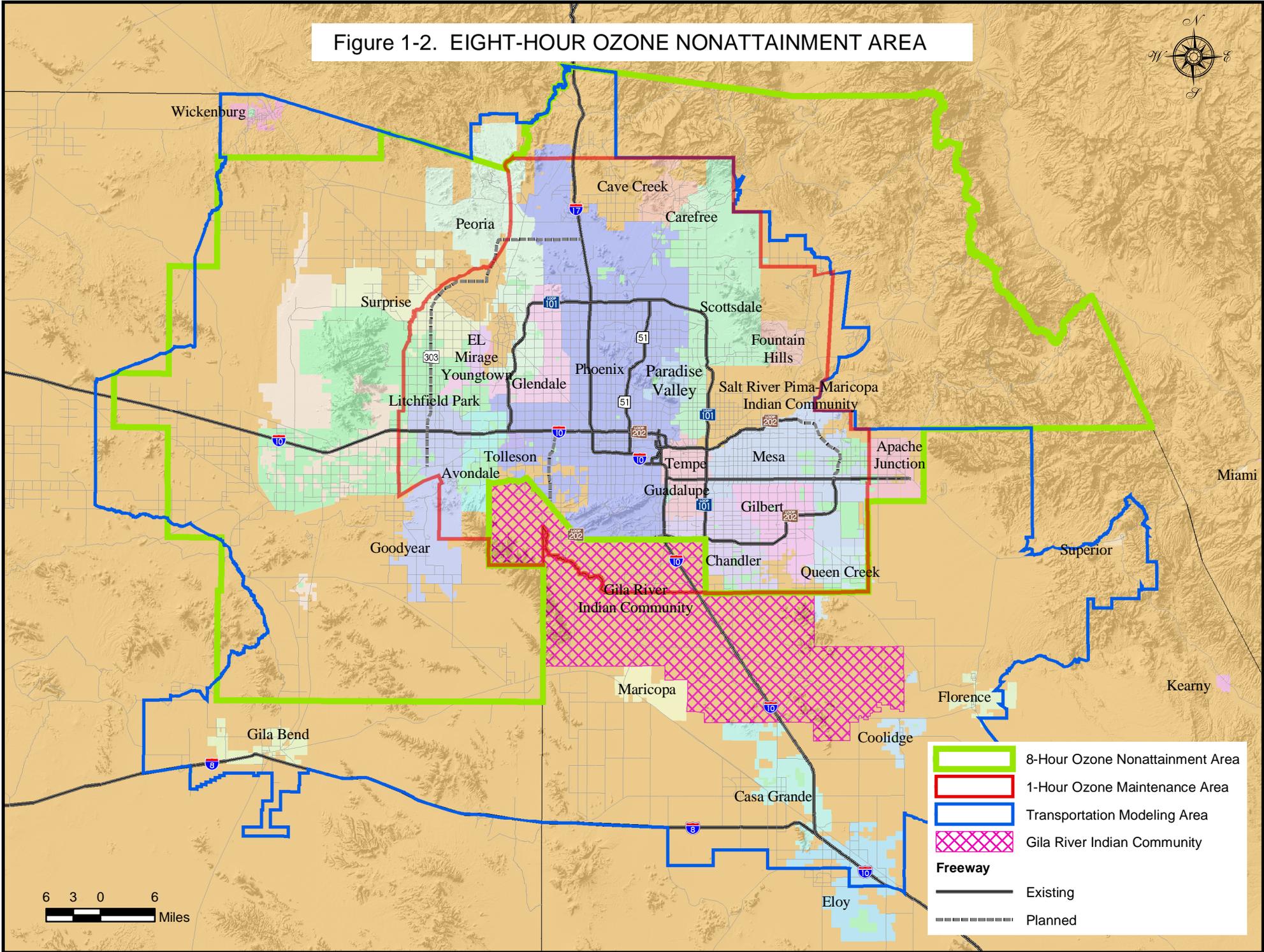
Recent amendments to the conformity rule (EPA, 2004a) indicate that appropriate interim emissions tests for the new Maricopa County eight-hour ozone nonattainment area, which is larger than the one-hour area, are: (1) a budget test, using adequate or approved VOC and NO<sub>x</sub> budgets, for the adjusted one-hour ozone maintenance area; and (2) a no-greater-than-2002 baseline emissions test, for either the area outside the one-hour ozone maintenance area, but inside the eight-hour ozone nonattainment area, or the entire eight-hour ozone nonattainment area. The eight-hour ozone nonattainment area and the one-hour ozone maintenance area are illustrated in Figure 1-2.

### *Eight-Hour Ozone Budget Test*

A complicating factor in applying the one-hour ozone budgets is that the eight-hour ozone nonattainment area does not include the Gila River Indian Community (GRIC), whereas the one-hour ozone maintenance area includes a portion of the GRIC. This situation is called Scenario Four in the latest EPA conformity rules (EPA, 2004a). For Scenario Four, the conformity rule recommends that emissions from the area outside the eight-hour boundary, the cross-hatched portion of the one-hour ozone maintenance area in Figure 1-2, be removed from the one-hour budgets, if possible.

To accomplish this, travel on roads not explicitly coded on the transportation network (called centroid connector or local VMT), that occurs in the portion of the Gila River Indian Community located inside the one-hour ozone maintenance area, has been removed. Table 1-2 shows the small reductions in the VOC and NO<sub>x</sub> budgets (0.1 metric ton per day in 2006; less than 0.1 metric ton per day in 2015) that result from removing this local travel on the Gila River Indian Community. The adjusted budgets in Table 1-2 will be used for the eight-hour ozone budget test until new conformity budgets are found to be adequate or approved in an eight-hour ozone State Implementation Plan. For each analysis year, projected local travel in a portion of the Gila River Indian Community is removed from the projected emissions, before comparison with the adjusted budgets.

Figure 1-2. EIGHT-HOUR OZONE NONATTAINMENT AREA



|                |                                 |
|----------------|---------------------------------|
|                | 8-Hour Ozone Nonattainment Area |
|                | 1-Hour Ozone Maintenance Area   |
|                | Transportation Modeling Area    |
|                | Gila River Indian Community     |
| <b>Freeway</b> |                                 |
|                | Existing                        |
|                | Planned                         |

TABLE 1-2.  
EIGHT-HOUR OZONE CONFORMITY TESTS

BUDGET TEST

|            | 2006  |                                   |   | 2015  |                                   |   |
|------------|---|-----------------------------------|---|---|-----------------------------------|---|
|            | Conformity Budget for One-Hour Ozone <sup>1</sup> | Local GRIC Emissions <sup>2</sup> | Adjusted Budget for Eight-Hour Ozone <sup>3</sup> | Conformity Budget for One-Hour Ozone <sup>1</sup> | Local GRIC Emissions <sup>2</sup> | Adjusted Budget for Eight-Hour Ozone <sup>3</sup> |
|            | mt/day  |                                   |   | mt/day  |                                   |   |
| <b>VOC</b> | 71.9  | 0.1                               | <b>71.8</b>                                       | 48.7  | < 0.1                             | <b>48.7</b>                                       |
| <b>NOx</b> | 104.8   | 0.1                               | <b>104.7</b>                                      | 53.6  | < 0.1                             | <b>53.6</b>                                       |

INTERIM EMISSIONS TEST

|            | 2002 Baseline Emissions in Eight-Hour Ozone Nonattainment Area <sup>4</sup> (mt/day) |
|------------|--|
| <b>VOC</b> | <b>94.8</b>  |
| <b>NOx</b> | <b>158.1</b>   |

<sup>1</sup> Budgets in the MAG One-Hour Ozone Maintenance Plan (MAG, 2004a) that have been determined to be adequate (EPA, 2004d), effective September 1, 2004.

<sup>2</sup> Onroad mobile source emissions attributable to local traffic in the portion of the Gila River Indian Community that EPA has removed from the eight-hour ozone nonattainment area.

<sup>3</sup> The adjusted one-hour ozone budgets to be used in performing the eight-hour ozone conformity budget test, until budgets for the eight-hour ozone nonattainment area are found to be adequate or approved in a SIP. Emissions from local traffic in a portion of the Gila River Indian Community have been removed from the budget, because this portion has been removed from the eight-hour ozone nonattainment area by EPA.

<sup>4</sup> The 2002 baseline emissions to be used in performing the interim emissions test for the eight-hour ozone nonattainment area were derived from the 2002 transportation model validation run, dated February 19, 2006.

### *Eight-Hour Ozone No-Greater-Than-2002 Baseline Emissions Test*

For areas classified under Subpart 1 that do not have adequate budgets from a submitted eight-hour ozone attainment plan, the conformity rule indicates that the interim emissions test can be either the “build/no-build” or the “no greater than baseline” tests. For Scenario Four, EPA guidance indicates that the selected test can be applied to the entire eight-hour ozone nonattainment area or the area outside the one-hour ozone maintenance area, but inside the eight-hour ozone nonattainment area. For the 2006 MAG Conformity Analysis, the “no-greater-than-2002 baseline” test is applied to the eight-hour ozone nonattainment area. The 2002 baseline emissions for the eight-hour ozone nonattainment area, shown in Table 1-2, were developed using MOBILE6.2, latest planning assumptions, and Geographic Information Systems (GIS).

It should be noted that the transportation modeling area boundary has been expanded to include all areas of the region that are expected to be populated during the next 25 years. The only regionally significant road outside the transportation modeling area boundary is State Route 87 in northeastern Maricopa County. The portion of S.R. 87 outside the modeling area has been added to the highway network, so that emissions on this segment are included in the eight-hour ozone nonattainment area. The 2002 emissions on this segment have been estimated using the 2002 modeled traffic volume on S.R. 87, as it leaves the transportation modeling area. For each analysis year, S.R. 87 emissions are also added to the eight-hour ozone nonattainment area, based on projected traffic volumes for S.R. 87, as it leaves the modeling area.

Other roads outside of the transportation modeling area, but inside the eight-hour ozone nonattainment area, carry much lower traffic volumes and these volumes are unlikely to increase significantly during the horizon of the Regional Transportation Plan. Therefore, only S.R. 87 is included in the interim emissions test. In the 2006 MAG Conformity Analysis for the FY 2007-2011 Transportation Improvement Program and Regional Transportation Plan - 2006 Update, the eight-hour ozone nonattainment area emissions, including S.R. 87, for each analysis year are compared with the total 2002 baseline emissions shown in Table 1-2.

### PM-10

The Revised MAG 1999 Serious Area Particulate Plan for PM-10 for the Maricopa County Nonattainment Area was submitted to the EPA in February 2000 (MAG, 2000a). The Clean Air Act attainment date is December 31, 2001 for Serious PM-10 Areas; however, the Revised MAG 1999 Serious Area Particulate Plan for PM-10 contains a request to extend the attainment date to December 31, 2006, as allowed in the Clean Air Act Amendments. The Revised MAG 1999 Serious Area Particulate Plan for PM-10 used the required EPA emission model to assess the emission reduction measures required to demonstrate attainment and established a PM-10 emissions budget of 59.7 metric tons per day applicable for both the annual average and 24-hour PM-10 standards in 2006 for the modeled area. The EPA issued a notice of adequacy, effective April 21, 2000 in the

*Federal Register* finding that the submitted PM-10 motor vehicle emissions budget contained in the Revised MAG 1999 Serious Area Particulate Plan for PM-10 was adequate for transportation conformity purposes (EPA, 2000a). In the July 25, 2002 *Federal Register*, EPA published the final approval of the Serious Area PM-10 Plan, including the extension of the attainment date until 2006 and the 2006 conformity budget. The regional emissions analysis projected for the “Action” scenario for the TIP and RTP must be less than or equal to this budget established by the Plan.

Section 93.122(d)(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 Revised MAG 1999 Serious Area Particulate Plan for PM-10 includes regional reentrained dust from travel on paved roads, vehicular exhaust, 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 the 2006 MAG Conformity Analysis, onroad mobile source emissions of carbon monoxide, ozone precursors (volatile organic compounds and nitrogen oxides) for the eight-hour ozone standard, and PM-10 were estimated for the analysis years: 2009, 2015, 2016, and 2026. In selecting analysis years, the conformity rule requires that: (1) if the attainment 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.

On March 8, 2005, the EPA issued guidance for eight-hour ozone and PM-2.5 nonattainment areas in selecting attainment years for use in transportation conformity determinations (EPA, 2005b). This guidance indicates that either 2008 or 2009 may be used as the eight-hour ozone attainment year for conformity analysis purposes. The year 2015 was modeled since conformity budgets have been approved for this year in the MAG Carbon Monoxide Redesignation Request and Maintenance Plan for the Maricopa County Nonattainment Area (MAG, 2003). The year 2009 was modeled since it is the attainment year for the eight-hour ozone standard. The year 2026 was modeled because it is the last year of the forecast period for the Regional Transportation Plan. The year 2016 is an intermediate year that meets the federal conformity rule requirement that horizon years be no more than ten years apart.

## 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 USDOT issued guidance developed jointly with EPA to provide additional clarification concerning the use of latest planning assumptions in conformity determinations (USDOT, 2001).

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 2006 MAG Conformity Analysis for the FY 2007-2011 Transportation Improvement Program and Regional Transportation Plan - 2006 Update are summarized in Table 2-1. The methodology and scheduled updates for the planning assumptions are discussed below.

Recent amendments to the conformity rule (EPA, 2004a) indicate that “the conformity determination must satisfy the requirements...using the planning assumptions available 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 (i.e. 2009, 2015, 2016, or 2026) for the 2006 MAG Conformity Analysis has been submitted for computer processing. For this conformity analysis, “time that the conformity analysis begins” was April 28, 2006. Each network-based traffic assignment typically takes about 48 hours of

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              | Under Governor's Executive Order 95-2, official County projections are updated every five years by the Arizona Department of Economic Security (DES) after a census; projections must be used by all agencies for planning purposes; In the Spring of 2003, MAG prepared interim projections by traffic analysis zone since no population projections based on the 2000 Census had been prepared by DES. MAG used ASU projections with 2000 Census data and state-of-the-art land use models to develop interim socioeconomic projections; these were accepted by the MAG Regional Council in June 2003. | DRAM/<br>EMPAL;<br>SAM-IM | Official socioeconomic projections based on DES county projections may be approved by the MAG Regional Council in late 2006. |
| Employment              | County control totals are based on the official DES population projections; since these are not ready (see above), MAG used ASU projections with 2000 Employment Survey and state-of-the-art land use models to develop interim socioeconomic projections; these were accepted by the MAG Regional Council in June 2003.   | DRAM/<br>EMPAL;<br>SAM-IM | Official socioeconomic projections based on DES county projections may be approved by the MAG Regional Council in late 2006. |
| Traffic Counts          | Transportation models were revalidated in 2006 using approximately 3,000 traffic counts collected in 2002.   | EMME/2                    | Traffic counts are updated every three to four years, if funds are available.  |
| Vehicle Miles of Travel | Transportation models were recalibrated in 2005 based on a 2001 home interview survey and a 2001 on-board bus survey.  | EMME/2                    | The transportation models are improved continuously, as funds are available.   |
| Speeds                  | Transportation models were validated using survey data on peak and off-peak highway speeds collected in 2002-2003.   | EMME/2                    | A speed study will be conducted every five years, if adequate funds are available.   |
| Vehicle Registrations   | July 2002 and January 2006 vehicle registrations were provided by ADOT.  | MOBILE6                   | When newer data are available from ADOT in MOBILE6 model format.   |
| Implementation Measures | Latest implementation status of commitments in prior SIPs.   | N/A                       | Updated for every conformity analysis.   |

computer time to complete one forecast. The latest planning assumptions used in these traffic assignments and the emissions models are described in Table 2-1.

## **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 by the Arizona Department of Economic Security (DES) every five years after a decennial or mid-decennial census. In the Spring of 2003, MAG prepared interim projections by traffic analysis zone since no population projections based on the 2000 Census had been prepared by DES. For this conformity analysis, MAG will continue to use interim projections by traffic analysis zone (TAZ), based on Maricopa County projections developed by the Arizona State University Center for Business Research (ASU), and data from the 2000 U.S. Census, the 2000 MAG Employment Survey, and the MAG GIS and Database Enhancement Study. MAG allocated the ASU projections for Maricopa County to TAZs using the DRAM/EMPAL and Subarea Allocation Model-Information Manager (SAM-IM) land use models. These interim socioeconomic population and employment projections were accepted by the MAG Regional Council in June 2003. The travel and congestion estimates for the 2009, 2015, 2016, and 2026 "Action" scenarios in the 2006 MAG Conformity Analysis are based on these latest population and employment projections accepted by the MAG Regional Council.

Although DES approved official county control total projections on March 31, 2006, these projections are not in a format that can be used by MAG models. Before new population projection county control totals can be used in a regional emissions analysis, additional work is required by MAG staff to disaggregate the population and employment projections to traffic analysis zones. MAG is preparing socioeconomic projections by TAZ, based on the DES 2006 official county projections. This work typically takes six months to complete. It is expected that these TAZ projections may be approved by the MAG Regional Council in late 2006.

### Methodology

DES prepares the official Arizona population projections by county, using census data. However, since socioeconomic projections by traffic analysis zone using new DES county control totals are not available, MAG used ASU projections for Maricopa County, based on the 2000 Census. These population and employment projections for Maricopa County were "stepped down" 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 147 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. These interim socioeconomic projections were accepted by the MAG Regional Council in June 2003.

#### Next Scheduled Update

The next update of the TAZ population and employment projections will be based on the official DES county-level projections, required by Executive Order 95-2. DES approved official county control total projections on March 31, 2006. It is anticipated that MAG will allocate the Maricopa County projections to TAZs using the DRAM/EMPAL and SAM-IM land use models. This MAG modeling will take approximately six months to complete and the final TAZ projections may be available in late 2006.

## **TRAFFIC COUNTS**

Enhancements to the MAG transportation models have recently been completed. The new models were revalidated in 2006, using approximately 3,000 traffic counts collected in 2002. The validation demonstrated a good statistical fit between actual and estimated daily traffic volumes, as measured by a percent root mean square error of 36.3 percent. The transportation conformity rule Section 93.122(b)(1)(i) specifies that network-based transportation models need to be validated against observed counts for a base year that is not more than ten years prior to the date of the conformity determination.

#### Methodology

MAG uses EMME/2 software to perform traffic and transit assignments. 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 recently updated mode choice model determines the number of person trips allocated to each of the following modes: auto drivers, two person carpools, three or more person carpools, express bus, local bus, and rail. The mode choice model is sensitive to highway and transit travel times, as well as pricing variables such as automobile operating costs, parking costs, and transit fares. 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. A peak spreading model is applied to derive the AM and PM peak hour traffic volumes. The transportation models are documented in "Draft MAG Travel Demand Model Documentation" (MAG, 2006).

## Next Scheduled Update

The MAG FY 2006 Unified Planning Work Program includes \$57,000 for additional traffic counts.

## **VEHICLE MILES OF TRAVEL**

The MAG transportation models were recalibrated in 2005 based on a 2001 household travel survey and a 2001 on-board bus survey. The models, described above, simulate peak and daily traffic volumes on more than 30,000 highway links, as well as transit trips on bus and light rail routes. Transportation model estimates of vehicle miles of travel (VMT) are validated using actual traffic counts. In 2006, the MAG transportation models were validated against more than 3,000 traffic counts collected in 2002. Vehicle miles of travel by link, output by the highway assignment process, are input to the emissions models used in conformity. The methodology for reconciling modeled VMTs with the Highway Performance Monitoring System (HPMS) is described below.

### Methodology for Reconciling Transportation Model VMT with HPMS

For nonattainment areas classified as Serious or above, with an urbanized area population exceeding 200,000, the transportation conformity regulations in Section 93.122(b)(3), as amended August 15, 1997, state that:

Highway Performance Monitoring System estimates of vehicle miles traveled shall be considered the primary measure of VMT within the portion of the nonattainment or maintenance area and for the functional classes of roadways included in HPMS, for urban areas which are sampled on a separate urban area basis. For areas with network-based travel models, a factor (or factors) may be developed to reconcile and calibrate the network-based travel model estimates of VMT in the base year of its validation to the HPMS estimates for the same period. These factors may then be applied to model estimates of future VMT. In this factoring process, consideration will be given to differences between HPMS and network-based travel models, such as differences in the facility coverage of the HPMS and the modeling network description. (EPA, 1997a)

In conformity analyses prior to 2002, transportation model VMTs were not reconciled with HPMS, because the values were so similar. This similarity is evident in the annual VMT tracking reports submitted to EPA to satisfy a MAG commitment in the Revised MAG 1999 Serious Area Carbon Monoxide Plan. The final VMT tracking report was submitted to EPA in 2001 (MAG, 2001b). To ensure that the output of the updated MAG transportation models continues to track HPMS vehicle miles of travel and comply with the conformity rule, MAG reconciles estimates of VMT from the transportation models with HPMS whenever a model revalidation is performed. The first set of HPMS reconciliation factors

were developed for the 1998 transportation model validation year and were used in conformity analyses conducted in 2002 through 2004. MAG revalidated the transportation models in 2005 with 2002 traffic counts and a new set of HPMS reconciliation factors were developed and applied for the 2005 MAG Conformity Analyses. The transportation models were revalidated again in 2006; the results of the latest HPMS reconciliation are described below.

The reconciliation was performed by comparing 2002 HPMS VMT with 2002 VMT from the transportation models that has been validated against more than 3,000 traffic counts collected in 2002. The 2002 HPMS data was submitted to the Federal Highway Administration by the Arizona Department of Transportation (ADOT) in October, 2003. Appendix D provides the ADOT HPMS summary tables for urbanized and donut areas in 2002. Together, the Phoenix urbanized and donut areas represent the PM-10 nonattainment area in Maricopa and Pinal Counties. The 2002 HPMS VMT in the appendix and 2002 VMT from the validated transportation models for the PM-10 nonattainment area are compared in Table 2-2. The 2002 VMT from the transportation models is based on the validation run dated February 19, 2006.

After transportation model VMT is converted from average weekday traffic (AWDT) to annual average daily traffic (AADT), the total HPMS and modeled VMTs for the PM-10 nonattainment area are nearly identical. The arterial and collector facility types used in the transportation models are not consistent with the functional classifications used in HPMS. For example, some facilities functionally classified as collectors by HPMS are treated as arterials in the transportation models. Because of these inconsistencies, arterial and collector VMTs are summed in order to compare the transportation model output with HPMS. As Table 2-2 indicates, modeled VMT on freeways is 1.3 percent less than HPMS. Arterial and collector VMT from the models is 0.6 percent higher, and VMT on local streets is 1.4 percent higher, than HPMS.

Since there is virtually no difference between the total modeled and HPMS VMTs for the PM-10 nonattainment area and the differences by facility type are only one percent, HPMS factors are no longer needed. Until the next transportation model revalidation, HPMS reconciliation factors will not be used in air quality planning and conformity analyses.

As indicated above, Section 93.122(b)(3) of the conformity rule requires only those nonattainment areas classified as Serious (and above) to reconcile modeled VMTs with HPMS. The PM-10 nonattainment area has been used to reconcile with HPMS VMTs, because this is the largest Serious nonattainment area in the region. The new eight-hour ozone nonattainment area is larger than the PM-10 area, but the nonattainment area is classified as Basic for eight-hour ozone, rather than Serious.

TABLE 2-2.  
COMPARISON OF TRANSPORTATION MODEL AND HPMS VMT FOR 2002

**2002 HPMS VMT**

(in thousands per annual average day)

|                                   | <u>Freeways</u> | Other Principal + Minor<br><u>Arterials</u> | <u>Collectors</u> | <u>Locals</u> | <u>Total</u> |
|-----------------------------------|-----------------|---|-------------------|---------------|--------------|
| Urbanized Area                    | 22,528          | 17,890 + 10,309 = 28,199                    | 5,636             | 6,975         | 63,338       |
| Donut Area                        | 1,830           | 972 + 965 = 1,937                           | 2,384             | 543           | 6,694        |
| Total PM-10<br>Nonattainment Area | 24,358          | 18,862 + 11,274 = 30,136                    | 8,020             | 7,518         | 70,032       |
|                                   |                 | <u>Arterials + Collectors</u>               |                   |               |              |
|                                   |                 | 38,156                                      |                   |               |              |

**2002 TRANSPORTATION MODEL VMT**

(in thousands, adjusted from average weekday to annual average day)

|                                   | <u>Freeways</u> | <u>Arterials</u>              | <u>Collectors</u> | <u>Locals</u> | <u>Total</u> |
|-----------------------------------|-----------------|-------------------------------|-------------------|---------------|--------------|
| Total PM-10<br>Nonattainment Area | 24,049          | 36,122                        | 2,248             | 7,625         | 70,044       |
|                                   |                 | <u>Arterials + Collectors</u> |                   |               |              |
|                                   |                 | 38,370                        |                   |               |              |

**2002 TRANSPORTATION MODEL VS. HPMS VMT**

(Percent Difference)

|                                   | <u>Freeways</u> | <u>Arterials + Collectors</u> | <u>Locals</u> | <u>Total</u> |
|-----------------------------------|-----------------|-------------------------------|---------------|--------------|
| Total PM-10<br>Nonattainment Area | -1.27%          | +0.56%                        | +1.42%        | +0.02%       |

A comparison of 2002 VMT for the eight-hour ozone and PM-10 nonattainment areas reveals that vehicle miles of travel in the PM-10 nonattainment area are 98 percent of the vehicle miles of travel in the eight-hour ozone nonattainment area. Therefore, expansion to the new eight-hour ozone boundaries would have little impact on the HPMS reconciliation. It is important to note that the Apache Junction portion of Pinal County is included in the PM-10 nonattainment area and, as a result, VMT estimates for Apache Junction have been addressed in the HPMS reconciliation process.

#### Next Scheduled Update

MAG will revalidate the transportation models when a new set of region-wide traffic counts becomes available. The FY 2006 Unified Planning Work Program and Annual Budget includes \$110,000 for an Arterial Traffic Volume Survey and Traffic Count Map. The FY 2007 Unified Planning Work Program and Annual Budget also includes \$300,000 for an External Travel Survey.

## **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). A minimum of five iterations is required to achieve equilibrium. 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. AM peak, midday, PM peak, nighttime, and daily speeds by highway link are derived from the volume to capacity ratios estimated by the MAG transportation models.

Periodically, MAG conducts speed studies to compare model-estimated speeds with empirical data. The MAG FY 2002 Unified Planning Work Program programmed \$300,000 for a MAG Travel Speed Study. This study was conducted in 2002-2003 (MAG, 2004c). About 6,500 speed observations were collected during this study. The new speeds were used to validate speeds input to and output by the MAG transportation models.

#### Methodology

A comparison of 2002 transportation model-estimated and observed vehicle hours of travel (VHT) for the PM peak period (3-6 PM) is provided in Table 2-3. The observed VHTs were derived from the 2002-2003 Travel Speed Study.

Table 2-3 indicates that the total model-estimated VHT is 1.3 percent higher than the VHT observed in the 2002-2003 speed study. Since average speed is derived by dividing vehicle miles of travel by vehicle hours of travel, the values in Table 2-3 are inversely-proportional to average PM peak speeds. In other words, for the transportation modeling

area, model-estimated speeds are, on average, about one percent less than the observed speeds. The weighted average vehicle travel speeds for the PM peak period estimated by the transportation models are summarized in Table 2-4.

TABLE 2-3.  
RATIO OF ESTIMATED/OBSERVED VEHICLE HOURS OF TRAVEL<sup>1</sup>  
2002 PM PEAK PERIOD

| Facility Type  | Area Type <sup>2</sup> |       |       |       |       |       |
|----------------|------------------------|-------|-------|-------|-------|-------|
|                | 1                      | 2     | 3     | 4     | 5     | All   |
| Freeway        | 0.919                  | 1.112 | 1.097 | 1.030 | 0.942 | 1.060 |
| Expressway     | ----                   | 1.013 | 1.336 | 0.997 | 1.066 | 1.036 |
| Collector      | ----                   | 0.922 | 1.196 | 1.396 | ----  | 1.225 |
| 6-Leg Arterial | 0.754                  | 1.040 | 0.931 | 1.434 | ----  | 1.005 |
| Arterial       | 0.848                  | 0.985 | 0.989 | 1.108 | 1.217 | 1.012 |
| HOV Lanes      | 0.877                  | 0.812 | 0.959 | ----  | ----  | 0.846 |
| Total          | 0.847                  | 0.992 | 0.996 | 1.096 | 1.145 | 1.013 |

TABLE 2-4.  
AVERAGE ESTIMATED VEHICLE TRAVEL SPEEDS (MPH)  
2002 PM PEAK PERIOD

| Facility Type  | Area Type <sup>2</sup> |      |      |      |      |      |
|----------------|------------------------|------|------|------|------|------|
|                | 1                      | 2    | 3    | 4    | 5    | All  |
| Freeway        | 47.6                   | 41.4 | 55.8 | 62.8 | 51.7 | 50.6 |
| Expressway     | ----                   | 28.5 | 41.2 | 44.7 | 49.8 | 46.5 |
| Collector      | ----                   | 34.8 | 18.3 | 20.0 | ---- | 18.8 |
| 6-Leg Arterial | 20.0                   | 16.5 | 18.4 | 22.7 | ---- | 17.3 |
| Arterial       | 27.3                   | 28.0 | 30.9 | 32.2 | 32.8 | 30.1 |
| HOV Lanes      | 65.3                   | 67.7 | 68.0 | ---- | ---- | 67.6 |
| Total          | 29.8                   | 29.7 | 32.6 | 35.4 | 38.3 | 32.4 |

<sup>1</sup>Average Speed = Vehicle Miles of Travel (VMT)/Vehicle Hours of Travel (VHT)

<sup>2</sup>Area Types: 1 = CBD, 2 = Outlying, 3 = Mixed Urban, 4 = Suburban, 5 = Rural

### Next Scheduled Update

The FY 2007 Unified Planning Work Program and Annual Budget includes \$500,000 for a 2007 Regional Travel Speed Study.

### **VEHICLE REGISTRATIONS**

Vehicle registrations for July 2002 and January 2006 are the latest provided to MAG by the Arizona Department of Transportation, Motor Vehicle Division. In the 2006 MAG Conformity Analysis, the July 2002 registrations were used to estimate VOC, NOx, and PM-10 emissions, while the January 2006 registrations were used to estimate wintertime CO emissions. The vehicle registration distributions have 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 2006 MAG Conformity Analysis, emission reduction credit will be assumed for the committed control measures in the applicable air quality plans, including the measures shown in Table 2-5. The emission reductions assumed for these committed measures reflect the latest implementation status of all measures for which emissions reduction credits were assumed in the applicable SIP. 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. The equations, methods, and assumptions used in calculating emission reductions attributable to CMAQ projects are described in Methodologies for Evaluating Congestion Mitigation and Air Quality Improvement Funds (MAG, 2004b). In addition, emission reduction credit for the strengthening of existing control measures or implementation of new control measures, as identified in the TIP and RTP, was incorporated into the analysis, where appropriate.

TABLE 2-5.  
SIP MEASURES ASSUMED IN THE 2006 MAG CONFORMITY ANALYSIS

| SIP Measure | Reference   | Measure Description   | Pollutant(s)           |
|-------------|---|---|------------------------|
| 1           | CO Maintenance Plan <sup>1</sup><br>Ozone Maintenance Plan <sup>2</sup> | Phased-In I/M Cutpoints   | CO, VOC,<br>NOx, PM-10 |
| 3           | CO Maintenance Plan <sup>1</sup><br>Ozone Maintenance Plan <sup>2</sup> | One-Time I/M Waiver   | CO, VOC,<br>NOx, PM-10 |
| 9           | CO Maintenance Plan <sup>1</sup><br>Ozone Maintenance Plan <sup>2</sup> | Tougher Registration Enforcement  | CO, VOC,<br>NOx, PM-10 |
| 14          | CO Maintenance Plan <sup>1</sup><br>Ozone Maintenance Plan <sup>2</sup> | Clean Burning Gasoline  | CO, VOC,<br>NOx, PM-10 |
| 15          | Serious Area PM-10 Plan <sup>3</sup>                                    |   |                        |
| 25          | CO Maintenance Plan <sup>1</sup><br>Ozone Maintenance Plan <sup>2</sup> | Intelligent Transportation Systems  | CO, VOC,<br>NOx, PM-10 |
| 26          | Serious Area PM-10 Plan <sup>3</sup>                                    |   |                        |
| 34          | CO Maintenance Plan <sup>1</sup><br>Ozone Maintenance Plan <sup>2</sup> | Area A Expansion (SB 1427)  | CO, VOC,<br>NOx, PM-10 |
| 40          | CO Maintenance Plan <sup>1</sup><br>Ozone Maintenance Plan <sup>2</sup> | Traffic Signal Synchronization  | CO, VOC,<br>NOx, PM-10 |
| 58          | Serious Area PM-10 Plan <sup>3</sup>                                    |   |                        |
| 39          | Serious Area PM-10 Plan <sup>3</sup>                                    | Strengthening and Better Enforcement of Fugitive Dust Control Rules - Construction    | PM-10                  |
| 40          | Serious Area PM-10 Plan <sup>3</sup>                                    | Reduce Particulate Emissions from Unpaved Roads and Alleys                            | PM-10                  |
| 50          | Serious Area PM-10 Plan <sup>3</sup>                                    | PM-10 Efficient Street Sweepers   | PM-10                  |
| 69          | Serious Area PM-10 Plan <sup>3</sup>                                    | Paving, Vegetating, and Chemically Stabilizing Unpaved Access Points onto Paved Roads | PM-10                  |
| 70          | Serious Area PM-10 Plan <sup>3</sup>                                    | Curbing, Paving, or Stabilizing Shoulders on Paved Roads                              | PM-10                  |

Sources:

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

<sup>2</sup>One-Hour Ozone Redesignation Request and Maintenance Plan for the Maricopa County Nonattainment Area, March 2004 (MAG, 2004a).

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

Note: The Carbon Monoxide Redesignation Request and Maintenance Plan and the One-Hour Ozone Redesignation Request and Maintenance Plan rely on commitments to implement control measures in the Revised MAG 1999 Serious Area Carbon Monoxide Plan.

### **3 TRANSPORTATION MODELING**

The transportation modeling performed for the 2006 MAG Conformity Analysis for the FY 2007-2011 MAG Transportation Improvement Program and Regional Transportation Plan - 2006 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 EMME/2 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 transportation modeling boundary is illustrated in Figure 1-2. The part of the MAG transportation modeling area located in Pinal County is considerably larger than the eight-hour ozone nonattainment area in Pinal County.

The latest calibration of the transportation models was completed in 2005, using data from the 2001 household travel survey and the 2001 on-board bus survey. The latest validation of the transportation models was completed in February 2006 using 2002 traffic counts.

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

- The 2002 traffic volumes simulated by the MAG transportation models have been validated against approximately 3,000 traffic counts. This validation demonstrated a good statistical fit between actual and estimated 24-hour 2002 traffic volumes, as measured by a percent root mean square error of 36.3 percent. The MAG transportation models are documented in "Draft MAG Travel Demand Model Documentation" (MAG, 2006).
- The population, households, and employment inputs to the travel demand models are based on the latest interim socioeconomic projections accepted by the MAG Regional Council in June 2003. These projections were prepared

using the DRAM/EMPAL land use model and the MAG Subarea Allocation Model-Information Manager (SAM-IM), as well as data from the ASU Center for Business Research, the 2000 Census, and the 2000 MAG Employment Survey for Maricopa County.

- 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 147 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 EMME/2 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 EMME/2. Congested travel times output by the EMME/2 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 EMME/2 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. A peak spreading model is used to derive AM and PM peak hour traffic volumes.
- 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). A minimum of five iterations are required to achieve equilibrium. 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. express bus, local bus, and rail).
- The travel impedances used in the trip distribution and traffic assignment steps of the MAG travel demand models are a composite function of highway travel times and costs. The MAG nested logit mode choice model is sensitive to highway and transit travel times, as well as pricing variables, such as automobile operating costs, parking costs, and transit fares.

- 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. MAG conducted a new speed study in 2002-2003 in order to validate the vehicle hours of travel, speeds, and other performance measures output by the latest transportation models. The transportation models were recalibrated and validated using this new speed data. Data from this new Travel Speed Study has been used to ensure that the capacity-restrained speeds and delays output by the transportation models are consistent with empirical data. Table 2-3 provides a comparison of model-estimated and observed vehicle hours of travel (VHT) for the same period. Overall, the estimated VHT for 2002 is within one percent of the VHT derived from the 2002-2003 speed survey. This indicates that assigned speeds used in conformity analysis are in reasonable agreement with speed data collected in the 2002-2003 MAG Travel Speed Study (MAG, 2004b)
- The MAG travel demand models estimate average *weekday* traffic, while the Arizona Highway Performance Monitoring System (HPMS) reports *annual average daily* traffic. In addition, HPMS VMT is reported for the PM-10 nonattainment area, which is smaller than the transportation modeling area. In accordance with conformity guidance in Section 93.122(b)(3), MAG has compared transportation model VMT by facility type with HPMS VMT by functional class. For the 3,000 square mile PM-10 nonattainment area, total modeled and HPMS VMTs for 2002, the latest transportation model validation year, are virtually identical. In addition, the differences by facility type are no more than one percent. Therefore, no HPMS reconciliation factors are used in the 2006 MAG Conformity Analysis.

## **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 2006 MAG Conformity Analysis is based on interim socioeconomic population projections accepted by the MAG Regional Council in June 2003.

In accordance with the Arizona Governor's Executive Order 95-2, the population projections used for all State agency planning purposes are updated by the Arizona Department of Economic Security (DES) every five years after a decennial or mid-decennial census. In the Spring of 2003, MAG prepared interim projections by traffic analysis zone since no population projections based on the 2000 Census had been prepared by DES. For this conformity analysis, MAG used interim socioeconomic projections by traffic analysis zone (TAZ), based on Maricopa County projections developed by the Arizona State University Center for Business Research (ASU), as well

as data from the 2000 U.S. Census, the 2000 MAG Employment Survey and the MAG GIS and Database Enhancement Study. MAG allocated the ASU projections for Maricopa County to TAZs using the DRAM/EMPAL and Subarea Allocation Model - Information Manager (SAM-IM) land use models. These interim socioeconomic population and employment projections were accepted by the MAG Regional Council in June 2003.

The interim TAZ population, households and employment projections take into account the transportation improvements contained in the conforming TIP (FY 2003-2007) and RTP (2002 Update) in effect at the time the projections were accepted. For the 2006 MAG Conformity Analysis, the interim projections of population, households, and employment by TAZ were input to the MAG transportation models to estimate auto and transit trips, VMT, and congestion for each "Action" scenario.

Although DES approved official county control total projections on March 31, 2006, these projections are not in a format that can be used by MAG models. Before new population projection county control totals can be used in a regional emissions analysis, additional work is required by MAG staff to disaggregate the population and employment projections to traffic analysis zones. MAG is preparing socioeconomic projections by TAZ, based on the DES 2006 official county projections. This work typically takes six months to complete. It is expected that these TAZ projections may be approved by the MAG Regional Council in late 2006.

## **TRAFFIC ESTIMATES**

A summary of the population, employment, and travel characteristics for the MAG transportation modeling area for each scenario in the 2006 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 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. Half-mile streets are not generally coded on the network, because their inclusion would increase computer processing time to unacceptable levels (i.e. multiple weeks per scenario). For similar reasons, local street improvements contained in the TIP are not coded on the highway network.

TABLE 3-1.  
TRAFFIC NETWORK COMPARISON FOR SCENARIOS EVALUATED FOR  
2006 MAG CONFORMITY ANALYSIS FOR THE FY 2007-2011 TIP AND RTP

| Year | Scenario                          | Total Population <sup>a</sup><br>(thousands) | Total Employment <sup>a</sup><br>(thousands) | Average Weekday VMT <sup>b</sup><br>(millions) | Average P.M. Peak Speed <sup>c</sup> | Freeway Lane Miles <sup>d</sup> |
|------|-----------------------------------|--|--|--|--------------------------------------|---------------------------------|
| 2002 | Validation<br>(February 19, 2006) | 3,455  | 1,726  | 85.7   | 32.1                                 | 2,224                           |
| 2009 | Action                            | 4,331  | 2,148  | 110.4  | 25.9                                 | 2,690                           |
| 2015 | Action                            | 5,157  | 2,543  | 135.4  | 31.8                                 | 3,290                           |
| 2016 | Action                            | 5,297  | 2,608  | 140.1  | 31.3                                 | 3,505                           |
| 2026 | Action                            | 6,625  | 3,279  | 182.1  | 28.7                                 | 4,198                           |

<sup>a</sup> 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.

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

<sup>c</sup> Average speed on freeways, expressways, and arterials in the transportation modeling area during the P.M. peak hour.

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

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.

### Highway Networks

The 2009 “Action” highway network includes all qualifying facilities currently open to traffic plus qualifying street projects through FY 2009 in the FY 2007-2011 TIP, freeways that will be open to traffic by December 31, 2009, and the first twenty miles of the light rail system minimum operating segment, scheduled to open in 2008. The 2015 and 2016 “Action” networks assume implementation of qualifying highway and transit projects scheduled in the MAG Regional Transportation Plan - 2006 Update, through the year 2015 and 2016, respectively, as well as all qualifying projects scheduled in the TIP. The 2026 “Action” network assumes implementation of the entire MAG Regional Transportation Plan - 2006 Update, as well as qualifying projects scheduled in the FY 2007-2011 TIP. It is important to note that regionally significant projects in the Apache Junction portion of Pinal County are included in the MAG Transportation Improvement Program.

### 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 2006 highway network are coded in future “Action” networks. This includes projects on freeways, the mile-street grid, and half-mile streets already on the 2006 network.
- (2) Capacity-related projects which are not on links or extensions of links in the 2006 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 (bus and rail) and, concurrently, the number of auto trips removed from the highway. For the 2009, 2015, 2016, and 2026 “Action” scenarios, the bus service and rail networks reflect the latest assumptions provided by the Regional Public Transportation Authority.

The most recent information on transit ridership and operating policies is provided in the Draft Annual Transit Performance Report FY 2004/05 from the Regional Public Transportation Authority (RPTA, 2006a). Information on current transit fares is provided in Table 3-2 (RPTA, 2006b). 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 653 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. Effective June 2005, there were 61 local routes providing fixed route service, 14 express bus routes, one limited stop route, four RAPID commuter express routes, and six shuttle/circulator routes. There were 59,070,596 total boardings in FY 2004/05, which is an increase of approximately 4.75 percent over the previous fiscal year. Summary statistics for the fixed route services are provided below for the past fiscal year (FY 2004/05).

- Phoenix recorded 42,909,890 boardings in 17,420,722 revenue miles and 1,146,819 revenue hours of service.
- Regional Public Transportation Authority recorded 6,203,696 passengers in the past year with a total of 4,379,307 revenue miles in 276,517 revenue miles of service.
- Tempe recorded 4,805,598 passenger boardings in 3,797,053 revenue miles and 311,852 revenue hours of service.
- Glendale boarded 93,024 passengers in the past year with a total of 139,789 revenue miles in 7,962 revenue hours of service.

TABLE 3-2. TRANSIT FARES IN EFFECT AT THE TIME OF COMPLETION OF THE 2006 MAG CONFORMITY ANALYSIS FOR THE FY 2007-2011 TIP AND RTP

| Type of Service   |                               | Full Fares |
|-------------------|-------------------------------|------------|
| Cash Fare         | Express                       | \$1.75     |
|                   | Local                         | \$1.25     |
| Passes and Tokens | 10-Ride Ticket Book - Express | \$18.00    |
|                   | Monthly Pass - Express        | \$51.00    |
|                   | 10-Ride Ticket Book - Local   | \$12.00    |
|                   | All Day Pass - Local          | \$3.60     |
|                   | Monthly Pass -Local           | \$34.00    |
|                   | Semester Pass -Local          | \$120.00   |
|                   | Tokens (20)                   | \$12.00    |

Note: Discounted fares are available to senior citizens (age 65 or older), persons with disabilities and Medicare card holders, and youth age 6 through 18. Children under age 6 accompanied by a responsible fare paying adult are not charged a fare on local or express bus service.

Source: Regional Public Transportation Authority (2006b).

### Other Existing Transit Services

Nine 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, Phoenix Reserve-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 2004/05 was 1,063,600 with 7,623,118 revenue miles.

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: Free Local Area Shuttle (FLASH) serving the Arizona State University campus area; Downtown Area Shuttle (DASH) serving the Downtown Phoenix-Copper Square area; Ahwatukee Local Explorer (ALEX) serving Ahwatukee and west Chandler areas; Glendale Urban Shuttle (GUS) providing transit in the Glendale Central Corridor; and Scottsdale Trolley which provides transit services in Old Downtown Scottsdale. In FY 2004/05, shuttle and circulator transit service provided a total of 2,969,448 boardings, with 1,177,451 revenue miles and 86,288 revenue hours.

### Recent Transit Improvements

The Annual Transit Performance Report provides a listing of transit accomplishments for FY2004/05. Several major service improvements made during the most recent fiscal year are highlighted below (RPTA, 2006a):

- Route 16 modified on 16<sup>th</sup> Street by adding two-way service on south end.
- Route 43 modified on Roeser by reversing turnaround at west end.
- Route 56 modified on Priest by restructuring north end of route between Priest and Mill Avenue.
- Route 62 modified on Hardy by extending south end to IKEA.
- Route 120 modified on Mesa Drive by restructuring south end loop.
- Route 131 START modified by restructuring northwest end loop and by serving Avondale Civic Center in Avondale.
- Route 3 modified on Van Buren by adding two school trips.
- Route 50 modified on Camelback by eliminating school trips.
- Green Line added hourly weekday and Saturday service and added service between Desert Sky Mall and Avondale Civic Center.

- Route 41A added service between Desert Sky Mall and Estrella Mountain Community College.
- Express Route 502 discontinued on a trial basis.
- Route 685-Gila Bend/Ajo Connector service was implemented.

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 2006 MAG Conformity Analysis, the methods which have been used to estimate carbon monoxide (CO), volatile organic compounds (VOC), nitrogen oxides (NO<sub>x</sub>), and PM-10 are: MOBILE6.2, for motor vehicle emission factors for CO, VOC, NO<sub>x</sub>, and PM-10 (exhaust, brake wear, and tire wear); 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. Emission factors from the 1994 Regional PM-10 Emission Inventory for the Maricopa County Nonattainment Area (MAG, 1997) were used for the calculation of PM-10 from road construction; the methodology for this calculation is also summarized in this chapter.

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 One-Hour Ozone Redesignation Request and Maintenance Plan for the Maricopa County Nonattainment Area (MAG, 2004a) for VOC and NO<sub>x</sub>; and the Revised 1999 MAG Serious Area Particulate Plan for PM-10 for the Maricopa County Nonattainment Area (MAG, 2000a) 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.

The USDOT guidance memo, "Use of Latest Planning Assumptions in Conformity Determinations," dated January 18, 2001, recommends that periodic inventory updates may be used as a source for recent modeling data (USDOT, 2001). 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, 2004a). 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 2002 Periodic Emissions Inventory for Ozone Precursors for the Maricopa County, Arizona, Nonattainment Area (MCESD, 2004b). The periodic inventory provides VOC and NO<sub>x</sub> emissions estimates for Maricopa County and the one-hour ozone nonattainment area, but not the eight-hour ozone nonattainment area required for the eight-hour ozone interim emissions test. To be consistent with the EPA conformity rule, Geographic Information Systems (GIS) were used

to develop the interim emissions estimates for the new eight-hour ozone nonattainment area. In addition, the periodic inventory represents an annual average day rather than the episode days used in the Ozone Maintenance Plan. Since the conformity budgets were established using these episode days, it is more appropriate to use the Ozone Maintenance Plan assumptions.

The most recent periodic inventory developed for PM-10 is the 2002 Periodic Emissions Inventory for PM-10 for the Maricopa County, Arizona, Nonattainment Area (MCESD, 2004c). The assumptions used in developing this inventory are consistent with those used in developing PM-10 emissions for the 2006 MAG Conformity Analysis.

Regional emissions have been estimated for the horizon years 2009, 2015, 2016, and 2026. The conformity rule requirements for the selection of the horizon years are summarized in Chapter 1. MAG conducted interagency consultation in March 2006 on the transportation conformity processes, including the models, associated methods, and assumptions to be applied in the 2006 MAG Conformity Analysis. Appendix B contains copies of consultation correspondence.

## **CARBON MONOXIDE**

For the 2006 MAG Conformity Analysis, the applicable test for carbon monoxide consists of the “Action” scenario versus emissions budget test, as discussed in Chapter 1. The modeling maintenance demonstration in the Carbon Monoxide Maintenance Plan includes 2006 and 2015 budgets, which represent the motor vehicle emissions budgets 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 budget. More specifically, onroad mobile source emissions were estimated using the EMME/2 (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 throughout the conformity analysis for consistency. GIS is used to derive VMT by link from the EMME/2 output for the CO modeling domain.

### **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 EMME/2-based transportation model. GIS was used to derive VMT by link for EMME/2 for the CO modeling domain. The M6Link program was used to calculate

emissions using MOBILE6.2 emission factors and the traffic data. Committed control measures from the Revised MAG 1999 Serious Area CO Plan and Carbon Monoxide Maintenance Plan were included in the conformity analysis, as appropriate. These measures are listed in Table 2-5 and detailed descriptions may be found in the Revised MAG 1999 Serious Area Carbon Monoxide Plan and Carbon Monoxide Maintenance Plan.

## MOBILE6

MOBILE6 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 calculates carbon monoxide, PM-10 (excluding reentrained dust), and ozone precursor motor vehicle emission factors.

On January 18, 2002, EPA issued policy guidance on the use of MOBILE6 for transportation conformity, indicating that there would be a two-year grace period before MOBILE6 would be required for new conformity determinations (EPA, 2002a). In the January 29, 2002 *Federal Register*, EPA announced the release of MOBILE6, which triggered the start of a two-year grace period that ended on January 29, 2004. On May 19, 2004, EPA issued a *Federal Register* notice recommending the use of MOBILE6.2 in SIPs and conformity determinations (EPA, 2004c). The latest version of MOBILE6.2 was used in the 2006 MAG Conformity Analysis, because it is the latest emissions model available from EPA.

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 2006 MAG Conformity Analysis, January 2006 vehicle registration data from the Arizona Department of Transportation was used as input to MOBILE6.2 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.

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 specific to hour of the day, area type, facility type, and domain temperatures. These emission factors were used by the M6Link program to estimate the motor vehicle emissions for the conformity analysis.

### M6Link

M6Link is a set of computer programs developed by MAG to process link data files output by transportation models, in this case, EMME/2. These programs calculate emissions for roadway links in the MAG transportation networks. Traffic volumes and speeds for four time periods of the day (AM peak, midday, PM peak, and nighttime) and from four vehicle classes (non-commercial, light duty commercial, medium duty commercial, and heavy duty commercial) for each link are converted into hourly volumes based upon historical data for representative links. These are used to calculate hourly emissions, using emission factors for the appropriate link type, area type, hour, etc. Emission factors are calculated using the MOBILE6.2 model. Emissions for each hour are distributed geographically in the modeling domain based on the location of each link.

Transportation models are designed to model "average weekday" traffic patterns, which do not necessarily correspond to episode days for which vehicle emissions are modeled. As a result, day of the week and month of the year factors are included in the pre-processor consistent with the methodology used in the applicable air quality plans for carbon monoxide and ozone. The CO analysis reflects a Friday in December, consistent with the day used to set the CO conformity budgets.

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

- An adjustment factor table containing factors used to allocate four time periods (AM peak, midday, PM peak, and nighttime) traffic volumes into 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).
- Factors for the appropriate weighting of vehicles that do and do not participate in the inspection/maintenance program.

- The year being modeled.
- A table appropriate for condensing the 28 vehicle classes modeled by the MOBILE6.2 model to the four vehicle classes produced by the EMME/2 model.
- The ratio of vehicles participating in the I/M program.

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. Carbon Monoxide Maintenance Plan Measure 40 (refer to Table 2-5) was also accounted for through adjustments to the M6Link output for 2009, 2015, 2016, and 2026.

## **EIGHT-HOUR OZONE**

For the 2006 MAG Conformity Analysis, the applicable tests for eight-hour ozone consist of two interim emissions tests: a budget test and a no-greater-than-2002 baseline emissions test. The budget test compares “Action” scenario emissions with adjusted budgets for volatile organic compounds and nitrogen oxides for the one-hour ozone maintenance area. The adjusted budgets are based on adequate one-hour ozone budgets for volatile organic compounds and nitrogen oxides in the One-Hour Ozone Maintenance Plan, that have been adjusted to remove the Gila River Indian Community. The second test is the no-greater-than-2002 baseline emissions test that compares each “Action” scenario with 2002 emissions for the eight-hour ozone nonattainment area. A description of how the budget and baseline emissions were derived is provided in Chapter 1.

Vehicle registration data from July 2002 obtained from the Arizona Department of Transportation were used as input to MOBILE6 for VOC and NOx. Regional onroad emissions were modeled using the EMME/2 (traffic), MOBILE6.2 (emission factor), and M6Link (emissions allocation) models. Temperature and various adjustment factors from the One-Hour Ozone Maintenance Plan were also used throughout the conformity analysis for consistency. GIS is used to derive VMT by link from EMME/2 output for the adjusted one-hour ozone maintenance area and the eight-hour ozone nonattainment area.

### **Modeling Tools**

The MOBILE6.2 model was used to estimate emission factors for ozone in the form of volatile organic compounds (VOC) and nitrogen oxides (NOx) for the regional emissions analysis. Traffic data (vehicle miles of travel and speeds by link) were generated with the EMME/2 transportation model. GIS was used to derive VMT by link for the adjusted one-hour ozone maintenance area and the eight-hour ozone nonattainment area. The M6Link program was used 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

The M6Link computer program calculates emissions for the adjusted one-hour ozone maintenance area and eight-hour ozone nonattainment area by combining the link and node data (e.g. volumes, speeds, link locations, facility type, area type) from the EMME/2 regional transportation model with the emission factors (specific to facility type, hour, etc.) generated by the MOBILE6.2 model. 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 Tuesday in August, consistent with the analysis used to set the One-Hour Ozone Maintenance Plan budgets. Ozone Maintenance Plan Measure 40 (refer to Table 2-5) was also accounted for through adjustments to the M6Link output for 2009, 2015, 2016, and 2026.

## **PM-10**

For the 2006 MAG Conformity Analysis, the applicable conformity tests for PM-10 are the "Action" versus emissions budget test, as discussed in Chapter 1. The modeling attainment demonstration in the Revised MAG 1999 Serious Area Particulate Plan for PM-10 includes a 2006 motor vehicle emissions budget. EPA approved the Revised MAG 1999 Serious Area Particulate Plan for PM-10 and the conformity budget on July 25, 2002. 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 2002 obtained from the Arizona Department of Transportation was used as input to MOBILE6 for PM-10. Regional onroad emissions were modeled using AP-42 and M6Link to estimate reentrained dust from travel on paved and unpaved roads, and MOBILE6.2 and M6Link to estimate vehicle exhaust, tire wear, and brake wear emissions. In addition, fugitive dust from road construction was calculated; 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). The February 24, 2004 EPA guidance indicates that “the conformity rule provides some flexibility for analyses that are started before the end of the grace period. Regional PM-10 conformity analyses that begin before or during the grace period may continue to rely on PART5 as determined through the interagency consultation process.” Although the start date for the 2006 MAG Conformity Analysis was April 28, 2006, which is prior to the required transition date, MAG has used reentrained road dust emission factors from AP-42.

AP-42 was used to estimate PM-10 emissions due to reentrainment from paved and unpaved roads for the regional emissions 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 EMME/2 transportation model. GIS was used to derive VMT by link for the PM-10 modeling domain. 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 Revised Serious Area PM-10 Plan were included in the conformity analysis, as appropriate. These measures are listed in Table 2-5; detailed descriptions may also be found in the Revised MAG 1999 Serious Area PM-10 Plan.

### 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 computer program calculates 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 EMME/2 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) or AP-42 (in the case of fugitive dust). 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 roads in the modeling domain, 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 average annual day, consistent with the analysis performed to set the PM-10 budget.

The unpaved road file used in M6Link was adjusted to reflect implementation of Measure 40 in the Serious Area PM-10 Plan, "Reduce Particulate Emissions from Unpaved Roads and Alleys." In addition, continued paving of ten miles of unpaved roads per year through implementation of the Regional Transportation Plan (RTP) was assumed, beginning in FY 2007 (see Chapter 7 of the Regional Transportation Plan - 2006 Update). The impact of these continued paving efforts was applied to the M6Link output. Revised MAG 1999 Serious Area PM-10 Plan Measures 15, 39, 40, 50, 58, 69, and 70 (refer to Table 2-5) were also accounted for through adjustments to the M6Link output for 2009, 2015, 2016, and 2026. A more detailed discussion of the emissions reduction credit assumed for Measure 50 is provided in the next section.

#### Calculation of Emissions Reduction Credit for PM-10 Certified Street Sweepers

In the Serious Area PM-10 Plan, the emissions reduction credit taken for measure 50, "PM-10 Efficient Street Sweepers," assumes that one-half of the fleet (i.e., 48 sweepers) will be converted to PM-10 certified units by December 31, 2006. The Plan also assumes that PM-10 certified replacements will sweep the same area and frequency as the conventional sweepers they replace. Therefore, the Serious Area Plan does not take credit for PM-10 certified units that are purchased to expand the area swept or increase sweeping frequency. The 2006 MAG Conformity Analysis takes emissions reduction credit for funding additional PM-10 certified sweepers to replace conventional units, beyond the 48 assumed in the PM-10 Plan. In addition, the Conformity Analysis assumes credit for PM-10 certified units that expand the area and increase the frequency of sweeping.

In FY 2001-2003, MAG allocated \$6.7 million in Congestion Mitigation and Air Quality Improvement (CMAQ) funds to purchase 52 PM-10 certified sweepers. These 52 sweepers were purchased by local jurisdictions to replace conventional sweepers, expand the area of sweeping, and increase the frequency of sweeping. In FY 2004, MAG allocated \$2.3 million in CMAQ funds to purchase 16 additional sweepers. In FY 2005 an additional \$3.9 million in CMAQ funds was programmed to purchase 24 PM-10 certified street sweepers. For the 2006 MAG Conformity Analysis, emission reduction credit for the 92 sweepers funded in FY 2001-2005 was calculated using sweeping schedule and traffic data (i.e., lane miles swept, sweeping cycle length, and annual average daily traffic per lane mile on streets swept) provided by the local jurisdictions that purchased the units. Emissions reduction credit for PM-10 certified sweepers to be funded in the future were quantified using data from these 92 funded units.

In fiscal year 2006, an additional \$960,000 in CMAQ funds is programmed to purchase six PM-10 certified sweepers. As shown in Table 4-1, the total number of PM-10 certified sweepers funded through FY 2006 is 98, which is 50 more than the PM-10 Plan assumed for 2006.

In FY 2007-2010, the TIP provides funding for 41 additional PM-10 certified sweepers to replace older conventional units, expand the area swept, and increase the frequency of sweeping. After 2010, it is anticipated that all conventional sweepers in the PM-10 nonattainment area will be replaced with PM-10 certified units. In FY 2011, the TIP has funding for seven additional sweepers to replace older PM-10 efficient units, increase the frequency of sweeping, and clean new streets in developing areas of the rapidly-growing region. Additional PM-10 emission reduction credit for street sweepers purchased after FY 2011 will be taken as additional funds for these units are programmed in the TIP.

In 2009, the 2006 MAG Conformity Analysis takes emissions reduction credit for the 129 PM-10 certified sweepers that will be funded through 2009, as shown in Table 4-1. In 2015, 2016, and 2026, the 2006 MAG Conformity Analysis takes emissions reduction credit for 146 PM-10 certified street sweepers that are funded through FY 2011, the last year of the TIP. The credit for PM-10 certified street sweepers is applied to each of the "Action" scenarios in the conformity analysis years.

TABLE 4-1.  
PM-10 CERTIFIED STREET SWEEPERS  
ASSUMED IN 2006 MAG CONFORMITY ANALYSIS

|                            | <u># of PM-10 Certified Sweepers</u> |     |
|----------------------------|--------------------------------------|-----|
| FY 2001-2004 <sup>1</sup>  | 68                                   |     |
| FY 2005 <sup>2</sup>       | 24                                   |     |
| FY 2006 <sup>3</sup>       | 6                                    |     |
| Subtotal in 2006           |                                      | 98  |
| FY 2007 <sup>4</sup>       | 12                                   |     |
| FY 2008 <sup>4</sup>       | 9                                    |     |
| FY 2009 <sup>4</sup>       | 10                                   |     |
| Subtotal in 2009           |                                      | 129 |
| FY 2010 <sup>4</sup>       | 10                                   |     |
| FY 2011 <sup>4</sup>       | 7                                    |     |
| Total in 2011 <sup>5</sup> |                                      | 146 |

<sup>1</sup> Purchased with MAG Congestion Mitigation and Air Quality Improvement funds

<sup>2</sup> Programmed in FY 2005 of the FY 2004-2007 Transportation Improvement Program

<sup>3</sup> Programmed in FY 2006 of the FY 2006-2010 Transportation Improvement Program

<sup>4</sup> Programmed in each fiscal year of the FY 2007-2011 TIP

<sup>5</sup> Assumed in 2015, 2016, and 2026 for the 2006 MAG Conformity Analysis

## Calculation of PM-10 Emissions from Road Construction

PM-10 emissions from road construction were estimated based on the size (acres) and duration (months) of the road construction projects in the TIP and Regional Transportation Plan. Specifically, the number of lane miles of road constructed per year was developed using data from the TIP and RTP. Assuming that each lane is twelve feet wide, the number of lane miles of road to be constructed was converted to the number of acres constructed per year. The number of acres constructed per year was combined with an estimate of average project duration to produce an estimate of acre-months of disturbed soil. The acre-months of disturbed soil were combined with an emission factor to produce total emissions from road construction per month. The monthly estimate of total emissions was reduced by a factor of 30 to produce an average daily PM-10 emissions estimate for road construction.

To calculate emissions for road construction, the 2006 MAG Conformity Analysis used emission factors from AP-42 and control measures from the Revised MAG 1999 Serious Area Particulate Plan for PM-10 for the Maricopa County Nonattainment Area, Appendices, Volume Two (MAG, 2000b). As required in Section 93.122(d), the control measures for fugitive dust from construction listed in the Revised MAG 1999 Serious Area Particulate Plan were applied to reduce emissions to expected levels under the applicable measures. The control level for road construction assumed in the Revised MAG 1999 Serious Area Particulate Plan for 2006 is 72 percent, a fraction that represents the implementation of Measure 39, "Strengthening and Better Enforcement of Fugitive Dust Control Rules - Construction Dust". For the 2006 MAG Conformity Analysis, this control level was applied to reduce road construction emissions for 2009, 2015, 2016, and 2026.

## **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 2007-2011 MAG Transportation Improvement Program (TIP) and Regional Transportation Plan - 2006 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 2006 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 H 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 E 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 F. 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 G).

### 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 I. 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 J 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.

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

#### 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". Although not TCMs by definition, the implementation and funding levels of the measures, "Reduce Particulate Emissions from Unpaved Roads and Alleys", Reduce Particulate Emissions from Unpaved Shoulders on Targeted Arterials", and "PM-10 Efficient Street Sweepers" from the FY 2007-2011 Transportation Improvement Program are described in Table 5-1. The latest implementation status of these measures is contained in the 2004 PM-10 Milestone Report Chart and Summary submitted to EPA by ADEQ for the Salt River PM-10 SIP (see Appendix P).

#### 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).

## **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. 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 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 2006 MAG Conformity Analysis for the FY 2007-2011 TIP and RTP, no impediments to the timely implementation of adopted TCMs have

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

| SIP CATEGORY  | FY 2007<br>FUNDING<br>(\$ MILLIONS)  | FY 2007-2011<br>FUNDING<br>(\$ MILLIONS) | MEASURE DESCRIPTION   |
|---|--------------------------------------|--|---|
| Regional Public/Rapid Transit   | Capital \$130.8<br>Operating \$10.6* | Capital \$1,345.4<br>Operating \$37.3*   | FY 2007 includes 49 proposed capital transit projects. The entire TIP includes 212 proposed capital transit projects.   |
| Areawide Ridesharing, Travel Reduction, Education and Outreach Programs, and Vanpools | 9.1                                  | 17.3                                     | Rideshare and Trip Reduction programs are funded for each year of the FY 2007 through FY 2011 TIP including: an expanded MAG Rideshare Program, MAG Trip Reduction Program, and the state Travel Reduction Program. Bicycle Safety Education and Telework Outreach and Ozone Education programs are also funded in the TIP. The TIP also funds 205 new and replacement vehicles for vanpools. |
| Park and Ride Lots  | 18.5                                 | 31.0                                     | Site identification, design and construction for 6 park and ride lots.  |
| Freeway Management System and HOV Lanes   | 149.8                                | 285.0                                    | The TIP contains 19 ADOT Freeway Management System projects; new HOV lanes are being designed or constructed on 40 miles of freeways.   |
| Traffic Flow Improvements   | 54.0                                 | 167.0                                    | The TIP includes 48 traffic signal synchronization and Intelligent Transportation System (ITS) projects and 73 intersection improvement projects.   |
| Bicycle and Pedestrian Travel   | 32.6                                 | 122.6                                    | The TIP includes 95 bicycle, pedestrian, and multiuse path projects.  |
| Paving of Streets, Shoulders, and Alleys  | 8.5                                  | 28.6                                     | The TIP includes 19 projects to pave dirt roadways, shoulders, alleys, and access points.   |
| PM-10 Efficient Street Sweepers   | 1.5                                  | 6.3                                      | The TIP includes \$6.3 million in FY 2007-2011 to purchase PM-10 Efficient Street Sweepers to reduce dust on paved roads.   |
| Other Air Quality Projects  | 0.8                                  | 0.8                                      | The TIP also includes a Diesel retrofit pilot project and a parking management system design project.   |

\* This amount includes only the funding for transit operation projects listed in the FY 2007-2011 MAG Transportation Improvement Program.

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

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

\* = 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. Also, 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.

Regional Public Transportation Authority reported many improvements that occurred to the region's public transportation system in the Annual Transit Performance Report FY 2004/05. Several major service improvements resulting in expanded regional transit service are highlighted in Chapter 3. For example, several local bus routes were modified by restructuring the route.

Additional funding for transit was established in 1998 by HB 2565 that provides funding to cities, towns, and counties for transit by distributing a share of the Vehicle License Tax (VLT) and certain lottery proceeds to the Local Transportation Assistance Fund II. In 2000, HB 2565 was amended by SB 1556 requiring funds to be used for transit for jurisdictions receiving more than \$2,500. LTAF II can be used for planning, training, capital and operating expenses, and marketing. In FY 2001, \$9.1 million was available to cities, towns, and the county in Maricopa County. The Arizona Legislature authorized LTAF II to be in effect until September 30, 2003. Due to state budget cuts, LTAF II was eliminated in FY 2002.

#### Impact of TIP and RTP:

The FY 2007-2011 MAG Transportation Improvement Program contains a listing of 178 capital transit projects estimated to cost a total of \$1,345.4 million. The total funding for capital transit projects programmed for FY 2007 is \$130.8 million. Also, over the period covered in the TIP, 34 transit projects for operations are programmed at \$37.3 million. It is concluded that implementation of the TIP will directly support transit improvements. An initial 20-mile minimum-operating segment for the light rail transit system is scheduled to be operational in December 2008. 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, includes an additional 37.7 miles of light rail transit to be constructed by 2026. On November 2, 2004, voters approved Proposition 400 that extends the half-cent sales tax for improvements identified in the Regional Transportation Plan, including 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

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

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

\* = 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/Expressway 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.

For 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 through the Clean Air Campaign.

High occupancy vehicle lane improvements continue to be implemented beyond the commitments made in air quality plans. As of FY 2004, these measures have contributed to approximately 144 lane 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 2007-2011 MAG Transportation Improvement Program directly contributes to the implementation of this measure by providing funds for the construction of HOV lanes. As part of the Regional Transportation Plan, specific HOV policies and priorities 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

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

\* = 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.

For 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 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. In addition, the Regional Rideshare Program provides partial funding to conduct the Clean Air Campaign that emphasizes the need to reduce emissions through using alternative transportation modes and alternative work schedules. 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 Program. In FY 2007-2010, the Regional Rideshare programmed amount is \$594,000; for FY 2011 the amount increases to \$655,000.

During the fiscal year ending June 30, 2005, the Trip Reduction Program applied to 1,117 companies with over 624,000 employees and students participating in the survey at 2,773 sites across Maricopa County. RPTA staff have played an important role in the success of the Clean Air Campaign and the Maricopa County Trip Reduction Program through the training of employer transportation coordinators. As of FY 2005, there are ten Transportation Coordinators Associations in the region. In addition, the RPTA administers the Regional Rideshare 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 21,500 non-university state employees in Maricopa County.

## Impact of TIP and RTP:

A major portion of funding for this TCM is through the FY 2007-2011 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 FY 2007-2010 the Regional Rideshare Program amount is \$594,000 and for FY 2011 the amount increases to \$655,000. The amounts indicated above include only monies specified in the TIP and not funds that the programs may receive from other sources. Chapter 12 of the Regional Transportation Plan provides for continued consideration of demand management programs. A copy the Maricopa County Regional Trip Reduction Program 2005 Annual Report Executive Summary for the period July 1, 2004 - June 30, 2005 (MCAQD, 2005) and the 2005 TDM Annual Survey Executive Summary (WestGroup Research, 2005) are attached in Appendix Q.

### (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

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

\* = 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.

In FY 2005, the Trip Reduction Program applied to 1,117 companies with over 624,000 employees and students participating in the survey at 2,773 sites across Maricopa County.

#### Impact of TIP and RTP:

This TCM receives strong support through funding in the FY 2007-2011 MAG Transportation Improvement Program for the Regional Rideshare Program, the Maricopa County Trip Reduction Program, and the state Travel Reduction Program. Combined, the programs have been allocated funds totaling \$8.1 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 12 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

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

\* = 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.

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. Approximately 87 miles of the approximately 234 mile freeway system is covered by the FMS. In addition, ITS projects aimed to manage traffic better and reduce congestion.

#### 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.

Several local governments have made traffic signal system improvements beyond commitments made in air quality plans. In 2003, Chandler, Glendale, Mesa, and Phoenix implemented projects to improve traffic signal system coordination. In addition, several local governments have made intersection improvements beyond commitments made in air quality plans. For example, the Arizona Department of Transportation has completed construction of overpass improvements on Grand Avenue. In addition, the MAG Intelligent Transportation Systems Committee completed an update of the ITS Strategic Plan first developed in 1995. Regional ITS planning efforts are currently led by MAG. The final report updated plan documents, existing and planned ITS systems, and provided a “roadmap” for addressing regional needs through future ITS implementation. The MAG Intelligent Transportation Systems Strategic Plan Update was approved by the MAG Regional Council in February, 2001.

### Impact of TIP and RTP:

Implementation of this measure is strongly supported through the FY 2007-2011 MAG Transportation Improvement Program. For FY 2007, a total of \$54.0 million for traffic flow improvements is included in the TIP. For the period covered by the TIP, a total of \$167.0 million is programmed for these projects. In addition, the TIP includes funds totaling \$149.8 million in FY 2007 and \$285.0 million over the next five years for traffic flow improvements on freeways, including FMS projects and HOV lanes. Chapter 13 of the Regional Transportation Plan provides for continued consideration of transportation system 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

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

\* = 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. The Annual Transit Performance Report FY 2004/05 prepared by the RPTA (RPTA, 2005a) indicated that there are 48 park-and-ride facilities that provide 2,948 automobile spaces in Maricopa County. 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. Appendix R contains a list of park-and-ride facilities in the region from the Annual Transit Performance Report FY 2004/05.

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 2007-2011 MAG Transportation Improvement Program has programmed \$31.0 million for the implementation of six park-and-ride lots. In support of park-and-ride facilities, Chapter 12 of the Regional Transportation Plan provides for continued consideration of demand management activities.

(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 about 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 2007-2011 MAG Transportation Improvement Program will not affect the schedule or effectiveness of this measure. Chapters 12 and 13 of the Regional Transportation Plan provide for continued consideration of demand management and transportation system management programs.

(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

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

\* = 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. 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 Program and Travel Reduction Program. The Regional Rideshare 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 provides partial funding to conduct the Clean Air Campaign that emphasizes the need to reduce emissions through using alternative transportation modes and alternative work schedules. 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. The 1993 CO Plan Addendum includes a measure to pay for the administrative cost associated with the public transportation subsidy program for state employees.

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.

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 1,117 companies and 2,773 sites (MCAQD, 2005). The RPTA also provides assistance to ten Transportation Coordinators Associations operating in the region. In addition, Maricopa County reported that approximately 82 employers in the Trip Reduction Program were subsidizing employee participation in vanpool programs for the fiscal year ending September 2005.

In the fiscal year ending September 2004, the ADOA provided a 65 percent public transit subsidy to approximately 6,594 state employees who participated in the Bus Card Plus program. The Arizona Department of Administration offered 100 percent bus subsidies during July and August 2004 as an incentive for employees to use alternative modes of transportation during the Ozone Education Campaign. 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 2007-2011 MAG Transportation Improvement Program provides federal Congestion Mitigation and Air Quality Improvement (CMAQ) funding for implementation of the Regional Rideshare and Travel Reduction programs. An amount of \$594,000 is contracted to RPTA for the Regional Rideshare Program in FY 2007-2010. In FY 2011, the amount for the Regional Rideshare Program increases to \$655,000. The Travel Reduction Program is programmed at \$135,000 annually in the TIP. In addition, the TIP includes projects to provide capital funding for vanpooling. Ride sharing is promoted by the provision of HOV lanes, implemented through the TIP. Chapter 12 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

1988 PM-10 Plan, measure 55

Revised 1999 Serious Area PM-10 Plan, measure 65

\* = 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.

Several local governments have made improvements beyond commitments made in air quality plans. In addition, the MAG Regional Off-Street System (ROSS) Plan was approved 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.

### Impact of TIP and RTP:

The construction of transportation facilities and provisions of transportation services which are programmed in the FY 2007-2011 MAG Transportation Improvement Program will not affect the schedule or effectiveness of this measure. Chapters 10 and 12 of the Regional Transportation Plan provide for continued consideration of this measure, including implementation of the MAG Regional Off-Street System Plan.

(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

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

\* = 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, expanded its bikeway system to approximately 495 miles as of August 2003.

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 2003. 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 2007-2011 MAG Transportation Improvement Program will directly support the goal of increased bicycle use. There are 26 bicycle specific projects programmed for the TIP. Funding for bicycle projects totals \$16.3 million in FY 2007 and \$28.4 million over the period of the TIP. Specific projects to be funded each year are recommended to the MAG Management Committee by the MAG Regional Bicycle Task Force, for approval by the MAG Regional Council.

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. In the TIP, bicycle facility additions have been programmed as part of 35 multiuse path projects totaling another \$49.6 million over the five year period. Chapter 10 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

1988 PM-10 Plan, measure 54  
1991 PM-10 Plan with 1993 Revisions, measure 54  
Revised 1999 Serious Area PM-10 Plan, measure 34

\* = 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 2007-2011 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

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

\* = 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 has taken the lead and 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 2007-2011 MAG Transportation Improvement Program contains funding for Trip Reduction and Rideshare Programs in the amount of \$8.1 million. In addition, the TIP includes the RPTA project, Telework Outreach and Ozone Education Program. 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 12 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

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

\* = 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 2007-2011 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

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

\* = 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 1997 to approximately 495 miles as of August 2003. 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 2007-2011 MAG Transportation Improvement

Program contains 34 specific pedestrian projects. Funding for pedestrian projects totals \$6.6 million in FY 2007 and \$37.9 million over the period of the TIP. In addition, pedestrian facilities have been programmed as part of 35 multiuse path projects, totaling another \$49.6 million over the five year period. Chapter 10 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

Revised 1999 Serious Area PM-10 Plan, measures 8 and 23

\*= 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 July 2000 through March 2006, a total of 5,417 vehicles have been repaired through the Maricopa County Voluntary Vehicle Repair and Retrofit Program. Approximately 205 of those vehicles had retrofit kits installed. According to Maricopa County, the program is very cost effective. For the current program, the cost to the County is \$874 per metric ton, annualized over two years.

### 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 2007-2011 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. Interagency consultation on the 2006 MAG Conformity Analysis for the FY 2007-2011 MAG Transportation Improvement Program and Regional Transportation Plan - 2006 Update is included in Appendix B. Public hearing process documentation is included in Appendix S.

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<sub>x</sub>), 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 6-6 present results for CO, VOC, NO<sub>x</sub>, 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 the "Action" scenario in 2009 are less than the 2006 emissions budget, and the CO emissions predicted for each of the "Action" scenarios in 2015, 2016, and 2026 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 interim emissions tests are the adjusted one-hour ozone budget test and a no-greater-than-2002 baseline test, as described by the July 1, 2004 transportation conformity rule amendments in 40 CFR 93.109(e)(2)(iv)(A) and (B). The one-hour ozone budget test is based on the 2006 and 2015 VOC and NO<sub>x</sub> budgets in the One-Hour Ozone Maintenance Plan that have been adjusted to remove local travel in the Gila River Indian Community. EPA approved the One-Hour Ozone Maintenance Plan and conformity budgets, effective June 14, 2005. Also, a second interim emissions test was performed comparing each "Action" scenario emissions with the 2002 baseline emissions for the eight-hour ozone nonattainment area. The derivation of the adjusted budgets and baseline emissions is discussed in Chapter 1.

The modeling results for the adjusted budget tests for eight-hour ozone indicate that for VOC and NO<sub>x</sub>, the emissions predicted for the "Action" scenario in 2009 are less than the 2006 adjusted budgets for VOC and NO<sub>x</sub>, respectively. Also, the VOC and NO<sub>x</sub> emissions predicted for the "Action" scenarios in 2015, 2016, and 2026 are less than the 2015 adjusted budgets for VOC and NO<sub>x</sub>, respectively. The modeling results for the no-greater-than-2002 baseline emissions test indicate that the VOC and NO<sub>x</sub> emissions predicted for all analysis years are less than the 2002 baseline emissions for volatile organic compounds and nitrogen oxides, respectively. 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 2006 conformity budget established in the Revised MAG 1999 Serious Area Particulate Plan for PM-10. EPA approved the Serious Area PM-10 Plan and conformity budget, effective August 26, 2002. The modeling results for all analysis years indicate that the PM-10 emissions predicted for the "Action" scenarios are less than the 2006 emissions budget. The TIP and Regional Transportation Plan therefore satisfy the conformity emissions tests for PM-10.

As all requirements of the federal conformity rule have been satisfied, a finding of conformity for the FY 2007-2011 MAG Transportation Improvement Program and MAG Regional Transportation Plan - 2006 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 “Action” scenario CO emissions for 2009 are 514.6 metric tons per day, which is less than the 2006 interim budget of 699.7 metric tons per day. The projected “Action” scenario CO emissions for 2015, 2016, and 2026 are 472.7, 476.7, and 488.7 metric tons per day, respectively, which are less than the maintenance 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 6-5. The volatile organic compound and nitrogen oxide emissions were calculated to reflect episode day conditions for a Tuesday in August. The projected “Action” scenario VOC emissions for the adjusted one-hour ozone maintenance area for 2009 are 59.2 metric tons per day, which is less than the adjusted budget of 71.8 metric tons per day. Also, the projected “Action” scenario VOC emissions for 2015, 2016, and 2026 are 44.3, 43.5, and 35.2 metric tons per day, respectively, which are less than the adjusted budget of 48.7 metric tons per day. In addition, the projected “Action” scenario NOx emissions for 2009 is 91.9 metric tons per day, which is less than the budget of 104.7 metric tons per day. Also, the projected “Action” scenario NOx emissions for 2015, 2016, and 2026 are 53.5, 49.7, and 30.7 metric tons per day, respectively, which are less than the budget of 53.6 metric tons per day.

The projected “Action” scenario VOC emissions for the eight-hour ozone nonattainment area in 2009, 2015, 2016, and 2026 are 63.5, 48.0, 47.2, and 40.2 metric tons per day, respectively, which are all less than the 2002 baseline emissions of 94.8 metric tons per day. Also the projected “Action” scenario NOx emissions in 2009, 2015, 2016, and 2026 are 102.9, 59.5, 55.2, and 35.2 metric tons per day, respectively, which are all less than the 2002 baseline emissions of 158.1 metric tons per day.

Since the projected VOC and NOx emissions for the TIP and Regional Transportation Plan are less than the adjusted one-hour ozone budgets and less than the no-greater-than-2002 baseline emissions for the eight-hour ozone nonattainment area, 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 6-6. The PM-10 emissions were calculated for the PM-10 modeling domain for an annual average day. The projected “Action” scenario PM-10 emissions in 2009, 2015, 2016, and 2026 are 46.4, 47.9, 47.9, and 53.1 metric tons per day, respectively, which are all less than the budget of 59.7 metric tons per day.

Since the projected PM-10 emissions for the TIP and Regional Transportation Plan are less than the approved budget established in the Revised MAG 1999 Serious Area Particulate Plan for PM-10, the results support a finding of conformity.

TABLE 6-1. CONFORMITY TEST RESULTS FOR CO, VOC, NO<sub>x</sub>, AND PM-10 (METRIC TONS/DAY)

| Pollutant             | Carbon Monoxide <sup>a</sup> |       | Eight-Hour Ozone <sup>b</sup>  |  |                       |                                   |                       |                                   | PM-10 <sup>c</sup> |                   |                  |
|-----------------------|------------------------------|-------|--------------------------------|--|-----------------------|-----------------------------------|-----------------------|-----------------------------------|--------------------|-------------------|------------------|
|                       | 2006                         | 2015  | 2002 Baseline VOC <sup>d</sup> | 2002 Baseline NO <sub>x</sub> <sup>d</sup> | 2006 <sup>e</sup> VOC | 2006 <sup>e</sup> NO <sub>x</sub> | 2015 <sup>e</sup> VOC | 2015 <sup>e</sup> NO <sub>x</sub> | Onroad Mobile      | Road Construction | 2006 Total PM-10 |
| <i>Budget or Test</i> | 699.7                        | 662.9 | 94.8                           | 158.1                                      | 71.8                  | 104.7                             | 48.7                  | 53.6                              | N/A                | N/A               | 59.7             |
| 2009                  |                              |       |                                |  |                       |                                   |                       |                                   |                    |                   |                  |
| — Action              | 514.6                        |       | 63.5                           | 102.9                                      | 59.2                  | 91.9                              |                       |                                   | 46.0               | 0.4               | 46.4             |
| 2015                  |                              |       |                                |  |                       |                                   |                       |                                   |                    |                   |                  |
| — Action              |                              | 472.7 | 48.0                           | 59.5                                       |                       |                                   | 44.3                  | 53.5                              | 47.5               | 0.4               | 47.9             |
| 2016                  |                              |       |                                |  |                       |                                   |                       |                                   |                    |                   |                  |
| — Action              |                              | 476.7 | 47.2                           | 55.2                                       |                       |                                   | 43.5                  | 49.7                              | 47.5               | 0.4               | 47.9             |
| 2026                  |                              |       |                                |  |                       |                                   |                       |                                   |                    |                   |                  |
| — Action              |                              | 488.7 | 40.2                           | 35.2                                       |                       |                                   | 35.2                  | 30.7                              | 52.7               | 0.4               | 53.1             |

- 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 conformity tests consist of 2002 baseline emissions for the eight-hour ozone nonattainment area and adjusted one-hour ozone emission budgets for 2006 and 2015. The onroad mobile source emissions correspond to a Tuesday in August episode day conditions.
- c** The Revised MAG 1999 Serious Area Particulate Plan for PM-10 established a 2006 emissions budget corresponding to an average annual day.
- d** No-greater-than-2002 baseline emissions test for the eight-hour ozone nonattainment area.
- e** Eight-hour ozone interim emissions budget tests for the one-hour ozone maintenance area, excluding the Gila River Indian Community. The 2006 and 2015 conformity budgets were established in the One-hour Ozone Maintenance Plan.

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

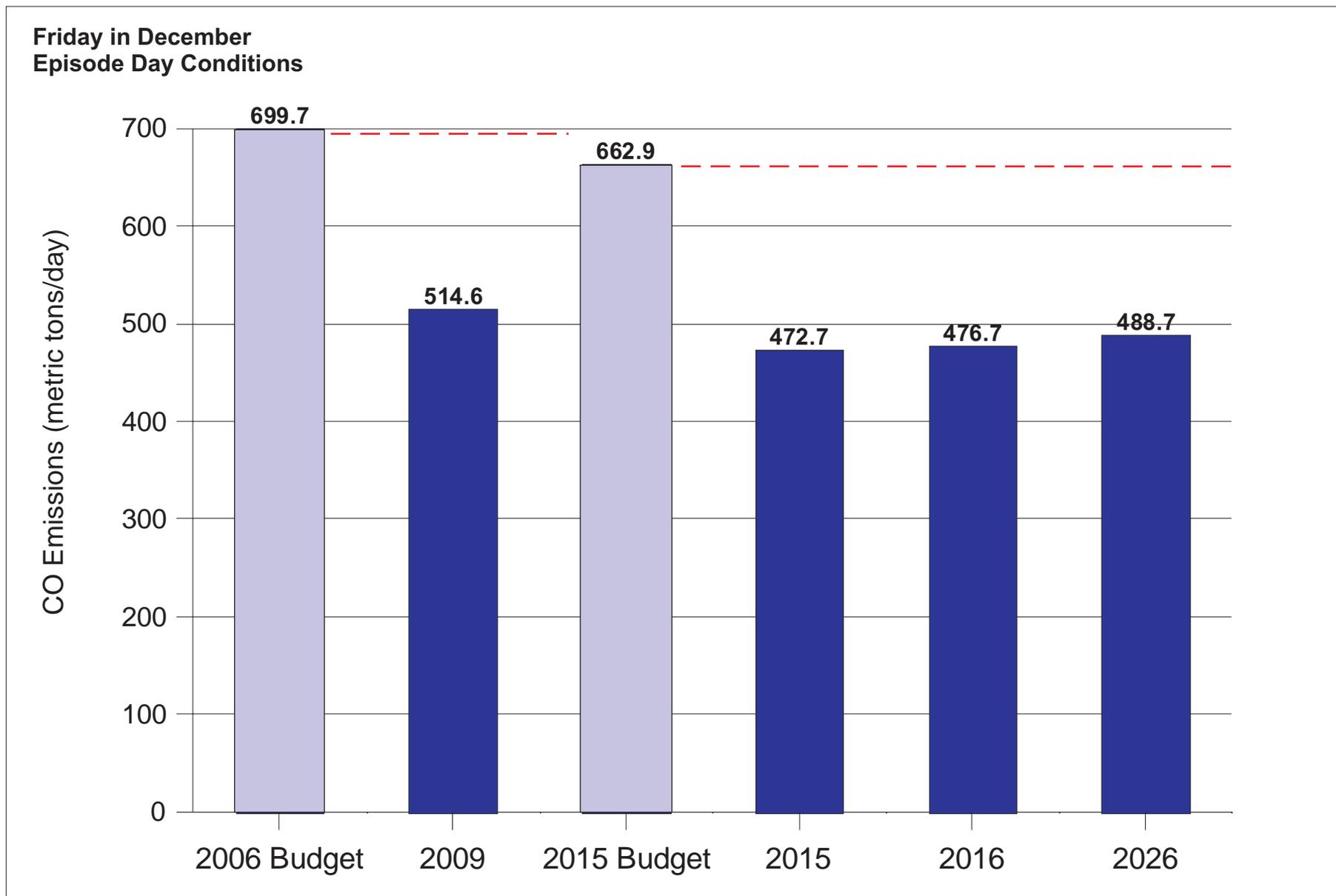


Figure 6-2: Eight-Hour Ozone: Volatile Organic Compounds (VOC) Results for Adjusted One-Hour Ozone Budget Test

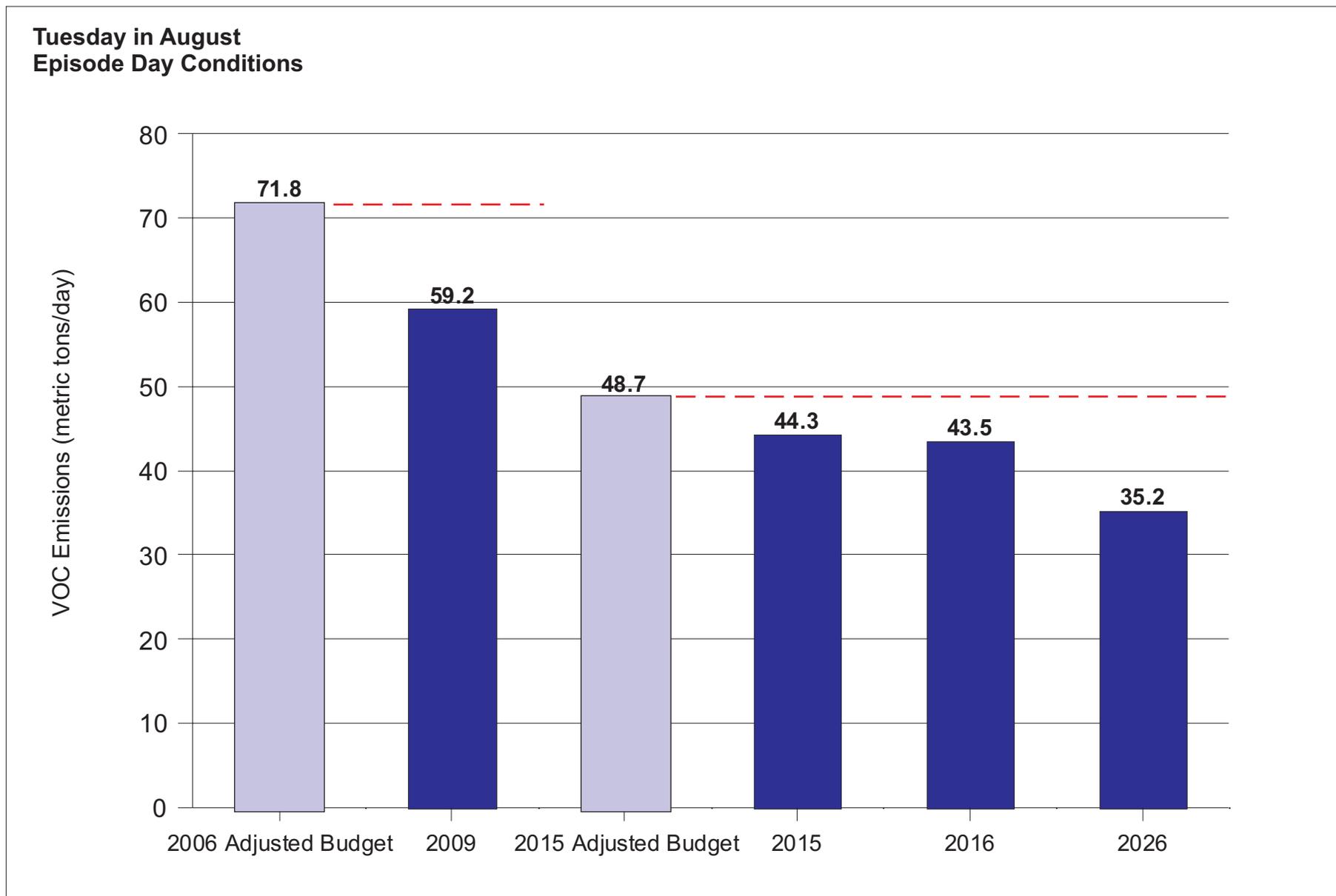
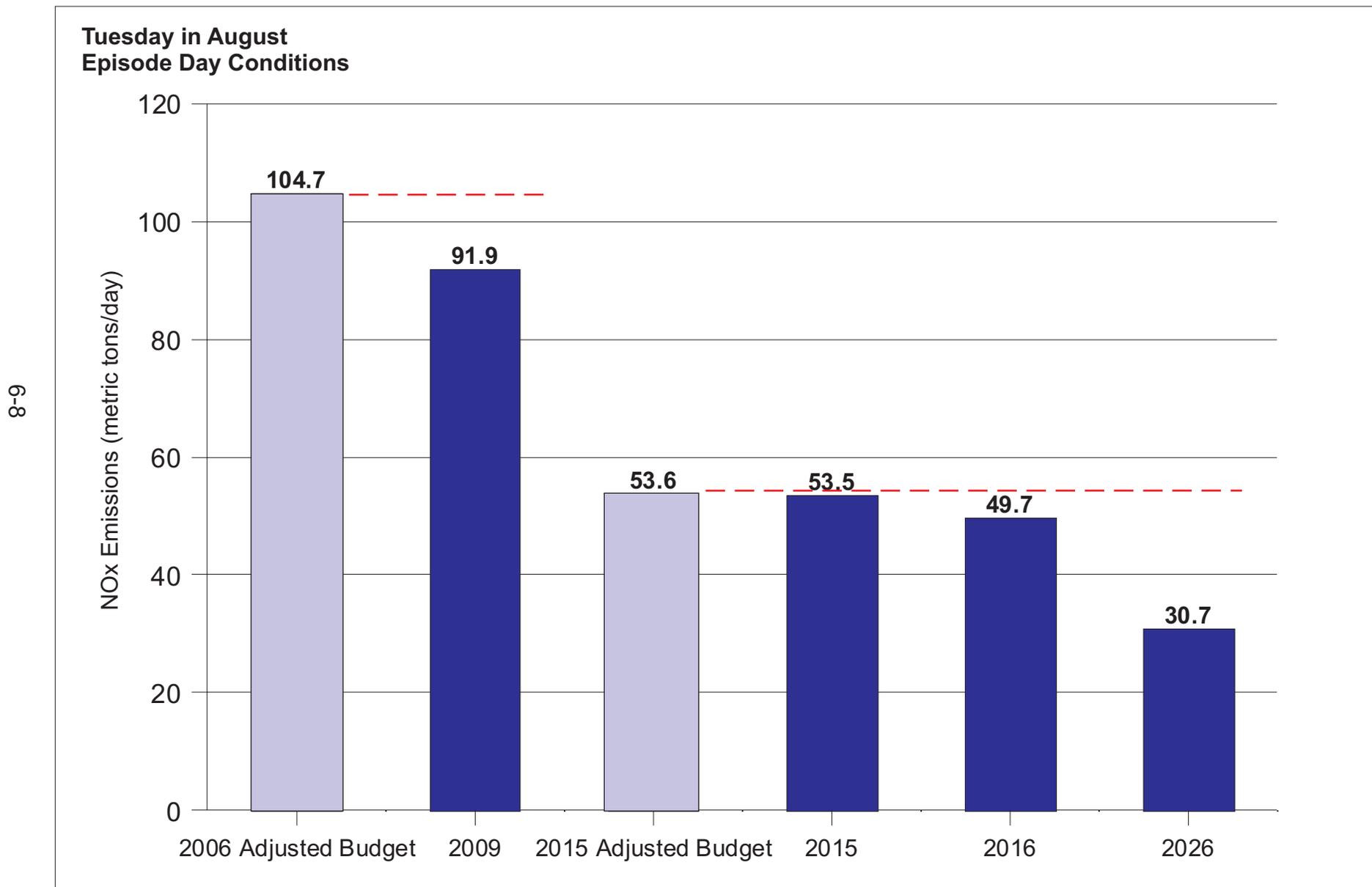
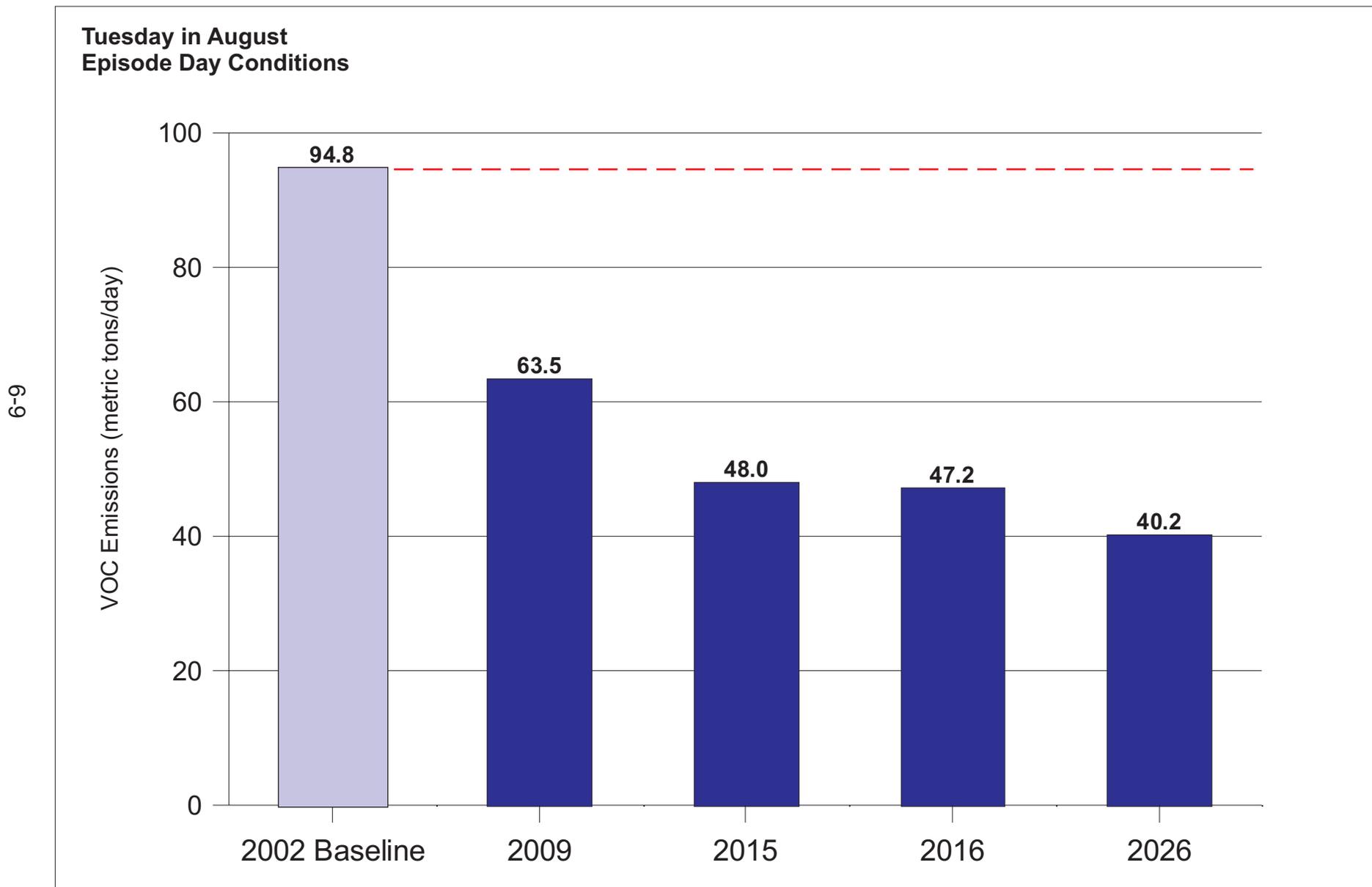


Figure 6-3: Eight-Hour Ozone: Nitrogen Oxides (NOx) Results for Adjusted One-Hour Ozone Budget Test



**Figure 6-4: Eight-Hour Ozone: Volatile Organic Compounds (VOC) Results for the No-Greater-Than-2002 Baseline Emissions Test for the Eight-Hour Ozone Nonattainment Area**



**Figure 6-5: Eight-Hour Ozone: Nitrogen Oxides (NOx) Results for the No-Greater-Than-2002 Baseline Emissions Test for the Eight-Hour Ozone Nonattainment Area**

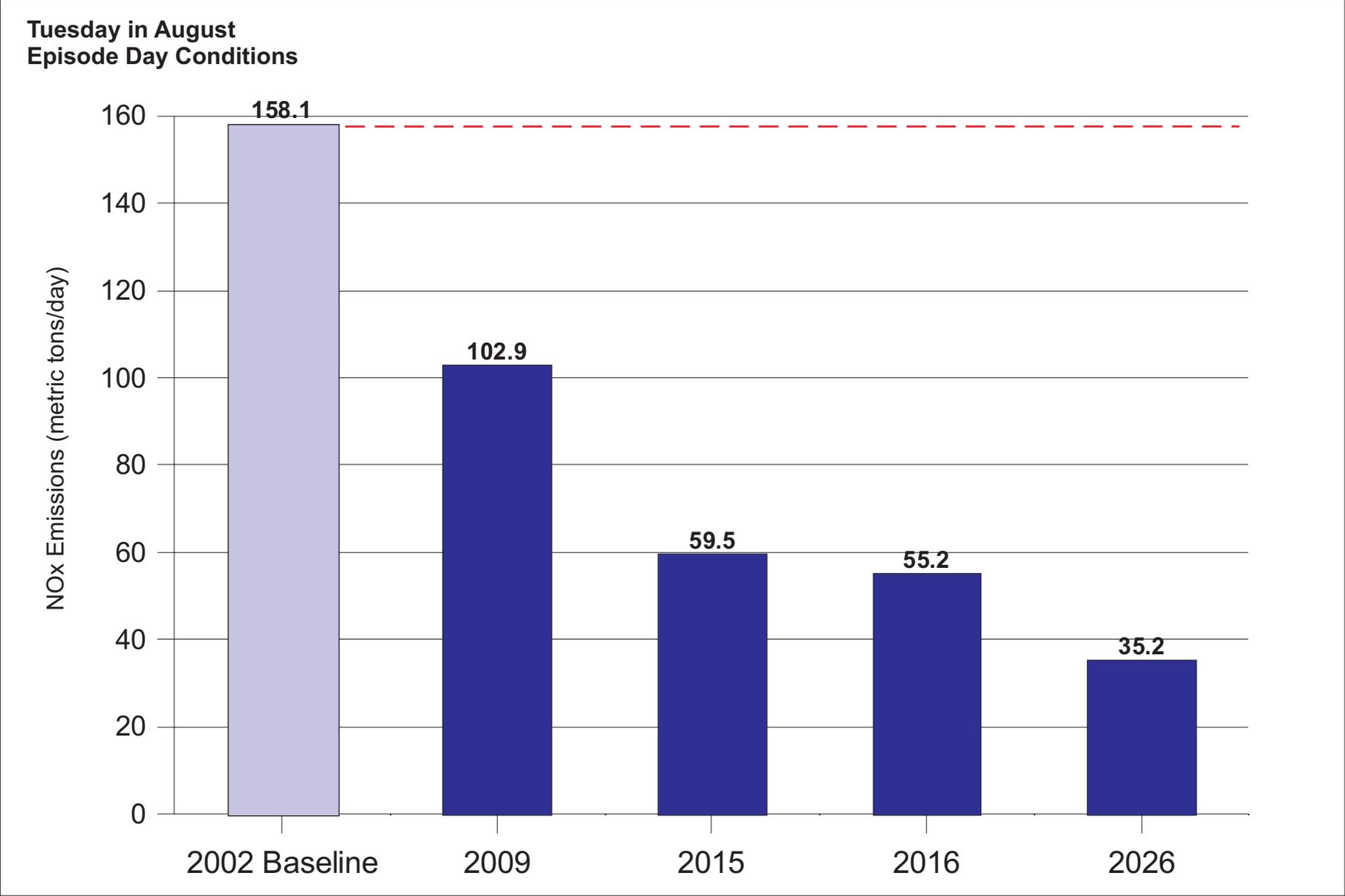
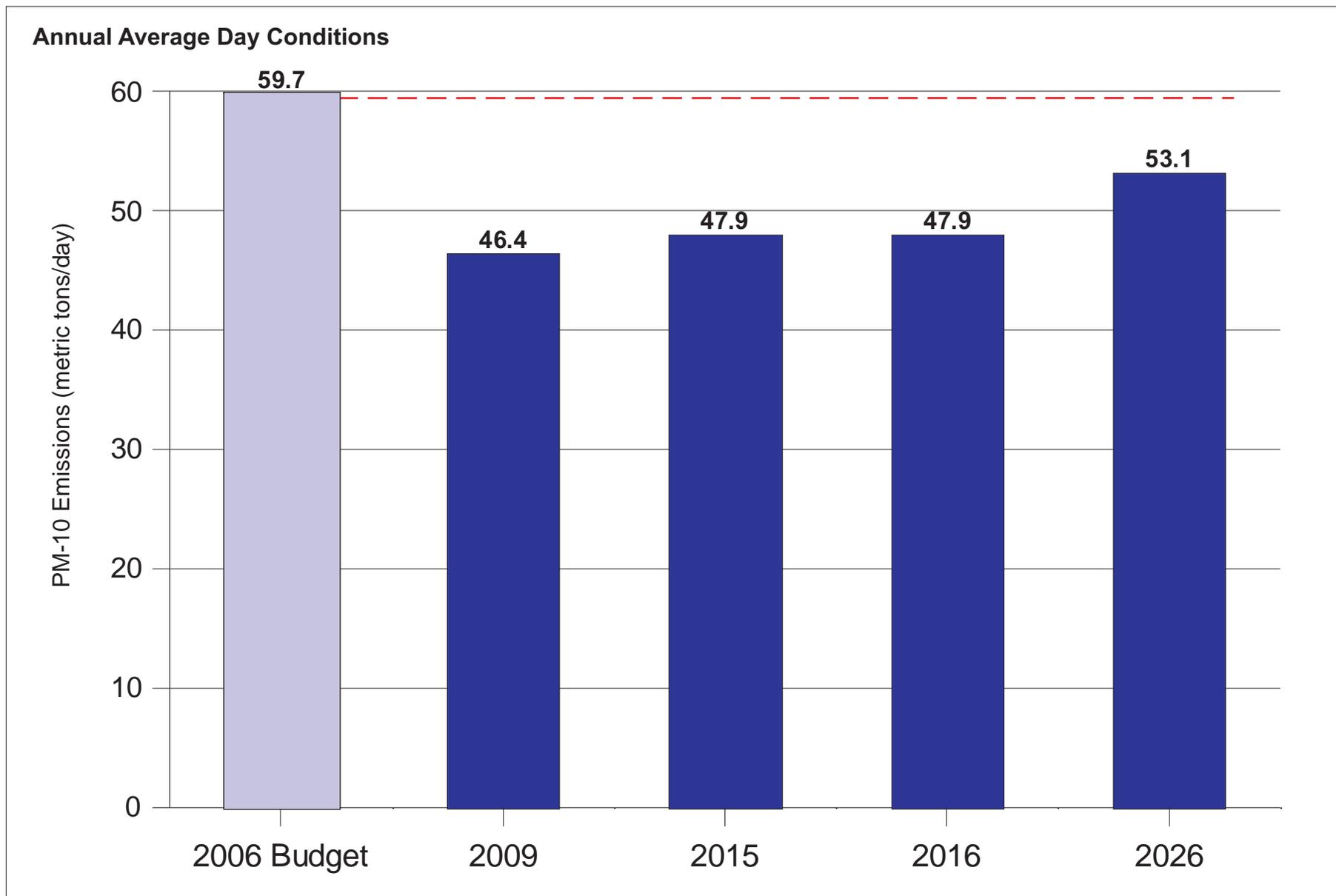


Figure 6-6: PM-10 Results for Conformity Budget Test



6-11

## **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.  |
| 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.  |

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| 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.   |

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| 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).  |
| EMME/2          | Equilibre Multimodal, Multimodal Equilibrium, version 2. A set of computer programs which are used to run the MAG travel demand models.  |
| 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. |

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| 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.  |
| MCESD             | Maricopa County Environmental Services 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.   |

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| 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 <sub>x</sub> , 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 <sub>x</sub>             | Nitrogen Oxides includes nitric oxide (NO) and nitrogen dioxide (NO <sub>2</sub> ). These gaseous air pollutants combine with volatile organic compounds (i.e. hydrocarbons) in the presence of sunlight to produce ozone.   |
| O <sub>3</sub>              | Ozone is a secondary pollutant formed by the combination of VOCs and NO <sub>x</sub> 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. |

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| PM-10                      | Particulate Matter with diameter of 10 microns or less.   |
| 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).

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| 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.   |
| 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.  |
| USDOT                          | 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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