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PARTNERS IN PROGRESS



**2010 UPDATE**



**REGIONAL  
TRANSPORTATION PLAN**

**RTP**

**JULY  
2010**



**MARICOPA  
ASSOCIATION of  
GOVERNMENTS**

# **REGIONAL TRANSPORTATION PLAN**

## **2010 UPDATE**

**JULY 2010**

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## INTRODUCTION

The Regional Transportation Plan (RTP) is a comprehensive, performance based, multi-modal and coordinated regional plan, covering the period through Fiscal Year (FY) 2031. The RTP covers all major modes of transportation from a regional perspective, including freeways/highways, streets, public mass transit, airports, bicycles and pedestrian facilities, goods movement and special needs transportation. In addition, key transportation related activities are addressed, such as transportation demand management, system management, safety, security and air quality conformity analysis. The RTP is prepared, updated and adopted by the Maricopa Association of Governments, which is the regional planning agency for the Maricopa County area. The RTP is developed through a cooperative effort among government, business and public interest groups, and includes an aggressive community outreach and public involvement program.

### **Maricopa Association of Governments**

The Maricopa Association of Governments (MAG) was formed in 1967 and is the designated Metropolitan Planning Organization (MPO) for transportation planning in the Maricopa County region. MAG has also been designated by the Governor of Arizona to serve as the principal planning agency for the region in a number of other areas, including air quality, water quality and solid waste management. In addition, MAG develops population estimates and projections for the region, and conducts human services planning. MAG strives to develop plans that are comprehensive, consistent and compatible with one another. For example, the RTP must be in conformance with the air quality plans for the metropolitan area. MAG is responsible for the air quality conformity analysis that shows whether the transportation plan complies with the provisions of air quality plans and other air quality standards.

MAG members include the region's 25 incorporated cities and towns, Maricopa County, the Gila River Indian Community, the Fort McDowell Indian Community, the Salt River Pima-Maricopa Indian Community, the Citizens Transportation Oversight Committee, and the Arizona Department of Transportation. The MAG Planning area includes all areas within Maricopa County, Arizona (see Figure I-1). The RTP is developed under the direction of the Transportation Policy Committee (TPC). The TPC is a public/private partnership established by MAG and charged with finding solutions to the region's transportation challenges. The Committee consists of 23 members, including a cross-section of MAG member agencies, community business representatives, and representatives from transit, freight, the Citizens Transportation Oversight Committee, and ADOT. The TPC is dedicated to transportation planning and decision-making that addresses diverse transportation needs throughout the region. The Committee makes its recommendations to the MAG Regional Council, which adopts the final RTP.

The MAG Regional Council is the final decision-making body of MAG. The Regional Council consists of elected officials from each member agency. The Chairman of Citizens Transportation Oversight Committee (COTC) and the Maricopa County representatives from the State Transportation Board also sit on the Regional Council, but only vote on transportation-related issues. Many policy and technical committees provide analysis and information to the MAG Regional Council. The MAG Regional Council is the ultimate approving body for the MAG RTP and MAG Transportation Improvement Program. Any changes to the MAG RTP, or the funded projects that affect the Transportation Improvement Program, including priorities, must be approved by the MAG Regional Council.

# 2010 Update Regional Transportation Plan

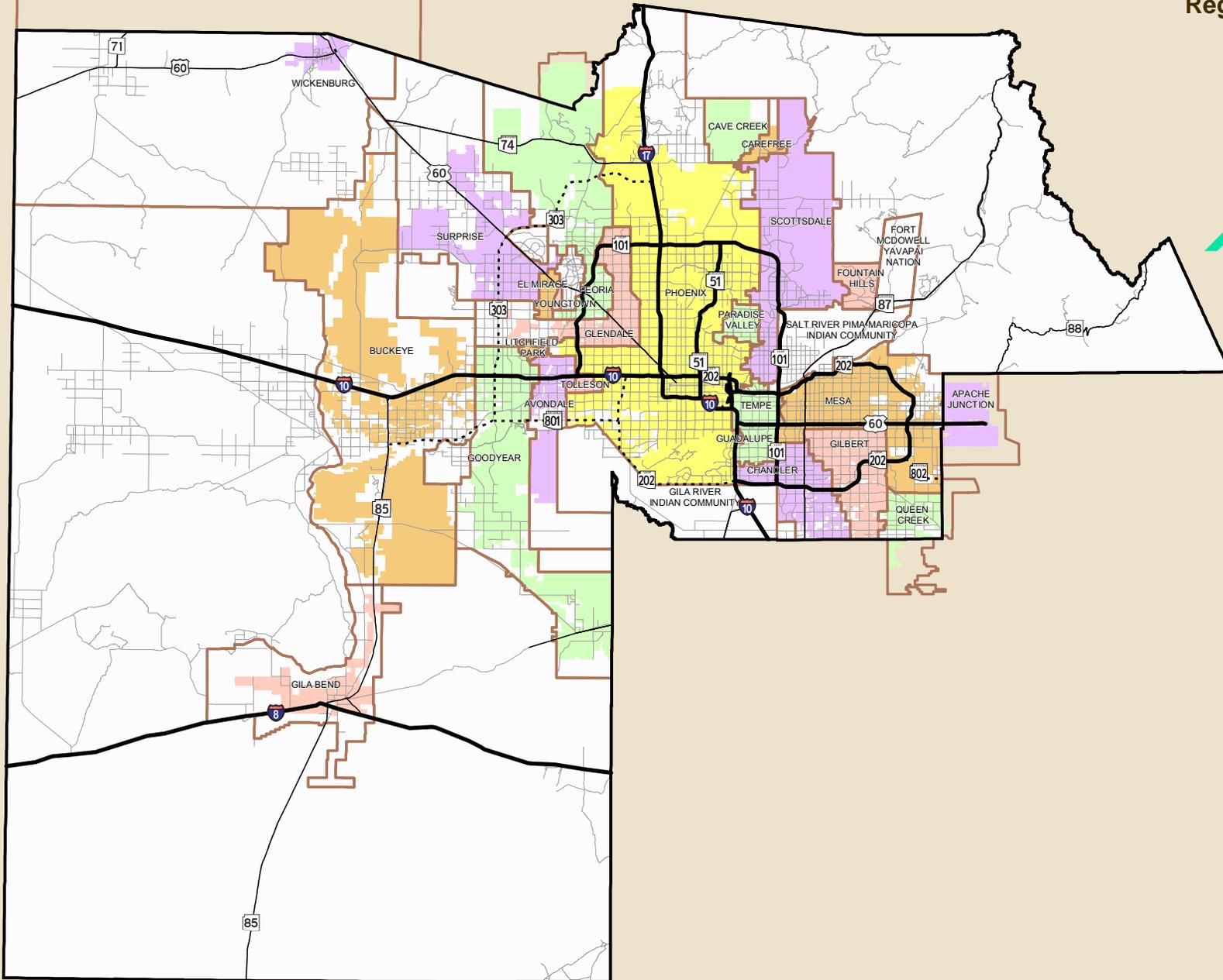
Fig. I-1



## MAG Region

-  Municipal Planning Area
-  Existing Freeway
-  Planned Freeway/Highway
-  Highways
-  Other Roads

## MAP AREA



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## **Recent RTP Updates**

The Maricopa Association of Governments generally adopts annual updates of the RTP. In addition, MAG periodically conducts comprehensive reviews of the Plan as part of the update process. The most recent major update of the RTP was adopted by the MAG Regional Council on November 25, 2003, which culminated a three-year planning effort. The in development of the Regional Transportation Plan was distinguished by the use of performance-based planning and the application of performance measures in the evaluation of alternatives. In a letter dated December 9, 2003, the U.S. Department of Transportation issued a finding of air quality conformity for the MAG RTP, as adopted by MAG on November 25, 2003.

Since its adoption in 2003, the RTP generally has been updated annually to reflect changing conditions and new information. On June 23, 2004, the MAG Regional Council took action to approve amendment of the RTP to reflect the light rail transit changes proposed by Valley Metro Rail, affecting the Minimum Operating Segment (MOS) and the Metrocenter Link. In a letter dated July 6, 2004, the U.S. Department of Transportation issued a finding of air quality conformity for the MAG RTP, as approved by MAG on June 23, 2004.

On July 27, 2005, the MAG Regional Council approved the MAG Regional Transportation Plan - 2005 Update. The modifications included within the 2005 RTP Update affected the phase in which certain highway and arterial projects were scheduled for construction. These changes were reflected, as appropriate, in the MAG FY 2006-2010 Transportation Improvement Program. In a letter dated August 31, 2005, the U.S. Department of Transportation issued a finding of air quality conformity for the MAG RTP, as approved by MAG on July 27, 2005.

On July 26, 2006, the MAG Regional Council approved the MAG Regional Transportation Plan - 2006 Update. The 2006 Update summarized the elements of the Regional Transportation Plan (as previously adopted), provided revised revenue estimates, and included life cycle programs for freeways/highways, arterial streets, and transit. Inclusion of the life cycle programs replaced the project phasing designations and funding levels originally identified in the RTP. In a letter dated August 17, 2006, the U.S. Department of Transportation issued a finding of air quality conformity for the MAG RTP, as approved by MAG on July 26, 2006.

On July 25, 2007, the MAG Regional Council approved the MAG Regional Transportation Plan - 2007 Update. The 2007 Update was structured to comply with the regional transportation planning requirements of the Federal Safe, Accountable, Flexible, Efficient, Transportation Equity Act - A legacy for Users (SAFETEA-LU). These requirements are effective for any plans adopted after July 1, 2007. To respond to SAFETEA-LU, the 2007 Update addressed several new topics, including consultation on environmental mitigation and resource conservation, transportation security, and an updated public participation process. In addition, it included revised transportation revenue estimates, and updated life cycle programs for freeways/highways, arterial streets, and transit. In a letter dated August 16, 2007, the U.S. Department of Transportation issued a finding of air quality conformity for the MAG RTP, as approved by MAG on July 25, 2007.

## **2010 RTP Update**

The 2010 Update of the RTP addresses both capital improvements and operational activities on the

regional transportation system in the MAG area. The 2010 Update, as well as and the regional transportation planning process in the MAG area, fully complies with SAFETEA-LU, Arizona House Bill 2292, and Arizona Revised Statute 28-6354. The major focus of the update process has been to maintain the balance between program costs and reasonably available revenues, expected over the period covered by the plan. During the past several years, the life cycle programming process in each of the key transportation modes - freeways, arterials and transit - has had to deal with major project cost increases, as well as falling revenue collections and significantly reduced revenue forecasts. In this economic environment, achieving a balance between costs and revenues has been particularly challenging.

The 2010 Update is organized into three major sections: (1) Section One: Planning Process, (2) Section Two: Transportation Modes, and (3) Section Three: System Operations and Management. Section One contains Chapters One through Six, which address the approach taken in developing the Plan, including organizational relationships, Federal and State planning mandates, public involvement, Title VI and Environmental Justice considerations, consultation efforts, planning goals and objectives, and the regional development outlook. Section Two encompasses Chapters Seven through Sixteen, which cover modal investment strategies, including planned transportation facilities, capital investments by mode, programs such as special needs and enhancement activities, and a financial plan. Section Three consists of Chapters Seventeen through Twenty-Three, which describe programs that monitor and improve the performance of the existing system, including performance monitoring and assessment, demand and congestion management, and transportation safety and security. Air quality conformity is also covered in Section Three.

**SECTION ONE**

**PLANNING PROCESS**

## CHAPTER ONE

### REGIONAL TRANSPORTATION PLANNING APPROACH

The Maricopa Association of Governments Regional Transportation Plan (RTP) covers the period through Fiscal Year (FY) 2031, and addresses all major transportation modes and related activities of from a regional perspective. The RTP identifies future transportation facilities, discusses potential environmental mitigation activities, includes operational and capital investment strategies, provides a financial plan for implementation, coordinates with the development of air quality control measures, and has been developed using an extensive public participation process. The regional transportation planning approach has been designed to respond to Federal and State mandates directed at the metropolitan transportation planning process, including the requirements of the Federal Safe, Accountable, Flexible, and Efficient Transportation Equity Act – A Legacy for Users (SAFETEA-LU) and Arizona House Bill 2292. A number of different entities share responsibility for developing, implementing and monitoring the RTP, including preparation of long-range plans, identification of programs and projects, the construction of projects, and the provision of transportation services.

#### **Regional Roles and Responsibilities**

A number of regional and State agencies and committees have responsibilities related to the RTP, including coordination, management, planning, oversight and project implementation. A brief description of these agencies and committees, as well as their role in the RTP process, is provided below.

#### **Maricopa Association of Governments**

The Maricopa Association of Governments (MAG), formed in 1967, is a regional planning agency and serves as the designated Metropolitan Planning Organization (MPO) for Maricopa County, including the Phoenix urbanized area. MAG member agencies include the region's 25 incorporated cities and towns, Maricopa County, the Gila River Indian Community, the Fort McDowell Indian Community, the Salt River Pima-Maricopa Indian Community, the Citizens Transportation Oversight Committee, and the Arizona Department of Transportation.

MAG is responsible for the coordination of the following regional planning activities:

- Multi-modal Transportation Planning,
- Air Quality,
- Wastewater,
- Solid Waste,
- Human Services, and
- Socioeconomic Projections.

MAG strives to develop plans that are comprehensive, consistent, and compatible with one another. For example, the RTP must be in conformance with the air quality plans for the metropolitan area.

MAG is responsible for the air quality conformity analysis that shows whether the transportation plan complies with the provisions of air quality plans and other air quality standards. MAG is also responsible for the development of the Arterial Street Life Cycle Program. Individual projects in this program are constructed by the cities, towns and Maricopa County.

The MAG Regional Council is the decision-making body of MAG. The Regional Council consists of elected officials from each member agency. The Chairman of Citizens Transportation Oversight Committee (COTC) and the Maricopa County representatives from the State Transportation Board also sit on the Regional Council, but only vote on transportation-related issues. Many policy and technical committees provide analysis and information to the MAG Regional Council.

The MAG Regional Council is the ultimate approving body for the MAG RTP and MAG Transportation Improvement Program (TIP). Any change in the RTP or the projects funded that affect the TIP, including priorities, must be approved by the MAG Regional Council.

### **Transportation Policy Committee**

The MAG Transportation Policy Committee (TPC), which met for the first time in September 2002, was initially tasked with the responsibility of developing the Regional Transportation Plan (RTP) and recommending the plan for adoption by the MAG Regional Council. The TPC recommended a Plan in September 2003, which was unanimously approved and adopted by the MAG Regional Council on November 25, 2003. In addition to developing the RTP, the TPC has continuing responsibilities to advise the Regional Council on transportation issues, including, but not limited to recommendations regarding: the MAG Transportation Improvement Program; the freeway and highway, arterial, and transit Life Cycle Programs; and requested material changes and amendments to the RTP.

The TPC is comprised of 23 members and is a public/private partnership. Of the total membership, six are members representing business interests and 17 are from the membership of MAG. The MAG members include 13 representatives from a geographic cross-section of MAG cities and towns, as well as one representative each from the Citizens Transportation Oversight Committee, the ADOT State Transportation Board, the County Board of Supervisors and the Native American Indian Communities in the County. The business representatives are from businesses with region-wide interest, including one representing transit interests and a representative from the freight industry. Three of the business representatives are appointed by the Speaker of the Arizona House of Representatives and the other three are appointed by the President of the Arizona State Senate.

### **Arizona Department of Transportation**

The primary role of the Arizona Department of Transportation (ADOT) is to provide a transportation system that meets the needs of the citizens of Arizona. The transportation system includes the State Highway System, which is designed to provide safe and efficient highway travel around the State. The Governor of Arizona appoints the Director of ADOT. The MAG Regional Freeway/Highway Program is part of the State Highway System, and is the responsibility of ADOT. However, ADOT is not responsible for highways, streets, or roads that are not part of the State Highway System, which are owned and maintained by counties, or cities and towns in Arizona.

ADOT is responsible for the overall management of the Regional Freeway/Highway Program. This includes all design, engineering, right-of-way acquisition, and construction and maintenance activities. ADOT develops and maintains the Freeway/Highway Life Cycle Program, making projections of available revenues and developing financing strategies to fund projects.

ADOT also has a role for the arterial streets component of the MAG RTP. Although MAG is responsible for the development of the Arterial Life Cycle Program, in accordance with ARS 28-6303.D.2, ADOT maintains the arterial street fund and issues bonds on behalf of the MAG Arterial Life Cycle Program.

### **State Transportation Board**

The State Transportation Board has statutory authority over the State Highway System. The State Transportation Board also sets priorities for the State Highway System (except the MAG Regional Freeway/Highway Program), establishes a five-year construction program for individual airport and highway projects, awards construction contracts, issues bonds and sets policy. The Board consists of seven members appointed by the Governor representing six geographic regions of the State. Two members are appointed from Maricopa County. Each member serves a six-year term.

Each year, the Board approves the ADOT Five-Year Highway Construction Program for statewide projects and the Life Cycle Program for the MAG Freeway/Highway System. The Life Cycle Program incorporates the priorities set by the MAG Regional Council. ADOT and MAG cooperatively develop the program for the MAG Region. The State Transportation Board cannot approve projects within the MAG Region that are not consistent with the MAG RTP and the MAG TIP. This limitation provides for the participation of local governments in project selection and to ensure conformity with air quality standards.

The State Transportation Board adopts policies that affect the MAG Regional Freeway/Highway Program. The Board has the authority to issue bonds supported by both the Regional Area Road Fund and the Highway User Revenue Fund, and issue other forms of debt. Issuance of these bonds allows for significant acceleration of the MAG Regional Freeway/Highway Program, opposed to what would be possible on a “pay-as-you-go” basis.

### **Regional Public Transportation Authority/Valley Metro**

The Regional Public Transportation Authority (RPTA)/Valley Metro is a political subdivision of the State of Arizona, and is overseen by a board of elected officials. Membership is open to all municipalities in Maricopa County and to the county government. Currently, the 18 participating communities are Avondale, Chandler, El Mirage, Fountain Hills, Gilbert, Glendale, Goodyear, Guadalupe, Litchfield Park, Mesa, Paradise Valley, Peoria, Phoenix, Scottsdale, Sun City, Surprise, Tempe, and Tolleson. In 1993, the RPTA Board adopted Valley Metro as the identity for the regional transit system. The RPTA Board cannot approve projects and programs within the MAG Region that are not consistent with the MAG RTP and the MAG TIP.

The primary goal of RPTA/Valley Metro is to ensure that a viable public transportation system is provided for regional mobility, and to ease the traffic congestion and improve air quality. The RPTA is responsible for distributing public information for transit, for the management and operation of

regional bus and dial-a-ride services, the Regional Ridesharing program, a regional vanpool program, and elements of the countywide Trip Reduction Program and Clean Air Campaign. The RPTA is also responsible for maintaining the Transit Life Cycle Program.

In November of 2004, the passage of Proposition 400 increased the amount of funding for public transit from the current amount of approximately two percent of total half-cent sales tax revenues (\$5 million annually inflated), to a figure of over 33 percent, which began on January 1, 2006. Over the 20-year life of the half-cent sales tax as approved by Proposition 400, it is anticipated that over \$4.7 billion will be raised for public transit projects. These monies will be deposited in the Public Transportation Fund (PTF), which was created as part of the Proposition 400 legislation. The RPTA is charged with the responsibility of administering monies in the PTF for use on transit projects, including light rail transit projects, as identified in the MAG RTP. The RPTA Board must separately account for monies allocated to: 1) light rail transit, 2) capital costs for other transit, and 3) operation and maintenance costs for other transit. In addition to Proposition 400 funding, the RPTA will utilize major blocks of Federal transit funding for capital expenditures on transit in the region.

### **Valley Metro Rail**

Valley Metro Rail is a non-profit, public corporation overseeing the design, construction, and operation of the light rail starter segment, as well as extensions to the project. The four cities currently participating in the light rail system – Phoenix, Tempe, Mesa and Glendale – are the members of Valley Metro Rail. The Valley Metro Rail Board of Directors is composed of the mayors of each of the participating cities.

The Valley Metro Rail Board of Directors establishes procedures for the administration and oversight of the design, construction and operation of light rail, as well as receives and disburses funds and grants from Federal, State, local and other funding sources. The Valley Metro Rail Board has the authority to enter into contracts for light rail design and construction, hire or contract for staff for the Light Rail Project, and undertake extensions to the system. The Valley Metro Rail Board cannot approve projects and programs within the MAG Region that are not consistent with the MAG RTP and the MAG TIP.

### **Citizens Transportation Oversight Committee**

ARS 28-6356 provides for the establishment of a Citizens Transportation Oversight Committee (CTOC) in a county that has a transportation sales tax such as Maricopa County. CTOC consists of seven persons - one member appointed from each of the five supervisory districts in Maricopa County. The Governor appoints an at-large member and the Chair of the committee. Members serve three-year terms. ADOT designates a special assistant to provide staff support to the CTOC, and to assist in coordination among CTOC, ADOT, MAG, RPTA and local jurisdictions.

The CTOC plays a number of important roles in the regional transportation process. It reviews and advises MAG, RPTA and the State Transportation Board on matters relating to the RTP, the TIP, the ADOT 5-year Construction Program and the life cycle management programs. This includes making recommendations on any proposed major amendment of the RTP, on criteria for establishing priorities, and on the five-year performance audit of the RTP. The CTOC is charged

with annually contracting for a financial compliance audit of expenditures from the Regional Area Road Fund and the Public Transportation Fund, as well as setting parameters for periodic performance audits of the administration of those funds (life cycle programs).

The CTOC also holds public hearings and issues reports as appropriate, receives written complaints from citizens regarding adverse impacts of transportation projects funded in the RTP, receives complaints from citizens relating to regional planning agency responsibilities, and makes recommendations regarding transportation projects and public transportation systems funded in the RTP.

### **Regional Transportation Plan Partners**

Key agencies in the region have formed an ad hoc group, the “RTP Partners,” aimed at coordinating the effort to implement Proposition 400 and the projects in the MAG RTP. The agencies include the Maricopa Association of Governments; the Arizona Department of Transportation; the Regional Public Transportation Authority; and Valley Metro Rail. The RTP Partners hold periodic meetings to ensure overall coordination of planning and implementation activities. Specific goals of the group are to: prepare uniform revenue forecasts; to establish consistent life cycle programming procedures; to maintain an integrated approach to the long-term development of transportation corridors and services; and to provide clear, concise information to the public and receive their input on issues connected with the implementation of Proposition 400.

### **SAFETEA-LU**

On August 10, 2005, the President signed the Safe, Accountable, Flexible, and Efficient Transportation Equity Act – A Legacy for Users (SAFETEA-LU). Along with identifying Federal funding for a range of transportation programs and other transportation related regulations, SAFETEA-LU updated requirements for metropolitan transportation planning. In order to reflect SAFETEA-LU in their administrative regulations, the Federal Highway Administration and Federal Transit Administration jointly issued final rulemaking for “23 CFR Part 450” dated February 14, 2007, which, in part, addresses the development of metropolitan transportation plans. The 2010 RTP Update fully complies with the requirements of the final rule. The manner in which the MAG RTP responds to key elements of the final regulations is discussed below.

### **Federal Planning Factors**

In 23 CFR Part 450.306, it identifies a series of planning factors that need to be considered in the metropolitan transportation planning process. The approach of the RTP to these factors is described below.

- **Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency.** The RTP addresses this issue directly. Two of the major objectives identified for the Plan are as follows: 1) To maintain an acceptable Level Of Service (LOS) on transportation and mobility systems serving the region, taking into account performance by mode and facility type; and 2) To provide residents of the region with access to jobs, shopping, educational, cultural and recreational opportunities, and to provide employers with reasonable access to the workforce in the

region. In developing the RTP, the effectiveness of transportation system performance was analyzed under alternative transportation investment choices. This analysis included system efficiency factors such as travel times, peak period delay, speeds, and LOS. The RTP addresses economic vitality through projects and programs to reduce congestion and increase system efficiency increase transportation facility capacity manage system operations and to reduce congestion by the inclusion of capacity and operations improvements.

- **Increase the safety of the transportation system for motorized and non-motorized users.** Safety is a critical element of each mode of transportation and the RTP specifically addresses safety issues in a separate chapter. Safety has been identified as a major focus, with one of the Plan objectives being: provide a safe and secure environment for the traveling public, addressing roadway hazards, pedestrian and bicycle safety, and transit security. The RTP process includes a safety planning program that enables safety issues to be addressed as part of the regional transportation planning process. MAG has a standing committee for safety planning and pursues both safety planning and implementation issues. This includes efforts such as developing safety information management systems and conducting safety workshops.
- **Increase the ability of the transportation system to support security and to safeguard the personal security of all motorized and non-motorized users.** Transportation security is covered specifically in a separate chapter of the RTP. To address this issue, an inventory of ongoing security activities and programs in the MAG Region was conducted and documented. This information was assessed to gain insights into the type of role the metropolitan organization might play to advance and facilitate effective application of security measures to transportation systems in the region. MAG already participates in the area of security through its role in the implementation of 9-1-1 and the Community Emergency Notification System.
- **Increase the accessibility and mobility of people and freight.** The RTP identifies three objectives related to mobility options, which are as follows: 1) To maintain a reasonable and reliable travel time for moving freight into, through and within the region, as well as provide high-quality access between intercity freight transportation corridors and freight terminal locations, including intermodal facilities for air, rail and truck cargo; 2) Provide the people of the region with transportation modal options necessary to carry out their essential daily activities and support equitable access to the region's opportunities; and 3) Address the needs of the elderly and other population groups that may have special transportation needs, such as non-drivers or those with disabilities. The RTP increases accessibility and mobility options by calling for significant investments in freeways, highways, streets, bus service, high capacity transit facilities, bicycle and pedestrian facilities, and airports. The Plan also provides the planning foundations for freight and special needs transportation.
- **Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns.** Early in the RTP process, the need to sustain the environment was recognized as a major factor. RTP objectives related to this issue include the following: 1) To identify and encourage implementation of mitigation measures that will reduce noise, and visual and traffic impacts

of transportation projects on existing neighborhoods; 2) Encourage programs and land use planning that advance efficient trip-making patterns in the region; and 3) Make transportation decisions that are compatible with air quality conformity and water quality standards, the sustainable preservation of key regional ecosystems, and desired lifestyles.

The RTP includes a discussion of types of potential environmental mitigation activities that may have the greatest potential to address the environmental functions affected by the Plan. Air quality issues are extensively addressed in the separate conformity analysis document prepared for the RTP. Reductions in transportation energy use in the region are closely tied to air quality goals. In addition, the RTP identifies regional funding for environmental concerns such as noise mitigation and litter pickup.

The need to promote consistency between transportation improvements and State and local planned growth and economic development patterns was addressed in a number of ways in the planning process. As part of the development of the 2010 Update, MAG consulted with State and local agencies responsible for land use management, natural resources, environmental protection, conservation and historic preservation. Also, the process to develop long-range population and employment forecasts, which provides the foundation for the transportation planning effort, starts with local and State land use plans and forecasts.

- **Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight.** One of the major objectives of the RTP is to maintain a reasonable and reliable travel time for moving freight into, through, and within the region; as well as to provide high-quality access between intercity freight transportation corridors and freight terminal locations, including intermodal facilities for air, rail and truck cargo. The broad range of multi-modal improvements in the RTP will facilitate the movement of people and goods, as well as enhance system connectivity throughout the region. The inclusion of chapters on airports and freight in the RTP helps recognize the importance of developing an integrated approach to planning for passenger and freight movement. In addition, MAG employs a multi-modal, integrated process for forecasting and analyzing travel demand.
- **Promote efficient system management and operation.** Minimizing congestion and resulting delays is a central theme in all modal elements of the RTP. As one of its objectives, the RTP calls for maintaining an acceptable and reliable level of service on transportation and mobility systems serving the region, taking into account performance by mode and facility type. The analysis of traffic congestion is addressed throughout the MAG planning process, including use of the MAG transportation models to analyze future traffic demand and levels of service. Projects funded from regional sources are rated by an air quality rating system and a congestion management rating system. System operations and management are addressed specifically in the RTP, including chapters that identify strategies and describe ongoing planning efforts in the areas of: Intelligent Transportation System Planning, Demand Management, Congestion Management Process, Performance Monitoring and Assessment, Transportation Safety, and Transportation Security.
- **Emphasize the preservation of the existing transportation system.** The RTP process recognizes the high importance of maintaining the regional transportation infrastructure.

The RTP identifies maintenance as a critical Plan element, with the following objective: To provide for the continuing preservation and maintenance needs of transportation facilities and services in the region, eliminating maintenance backlogs. The high level of importance placed on preservation is reflected by the allocation of major blocks of regional-level funding in the RTP to improving the existing roadway network and conducting various aspects of the maintenance function. In addition, the RTP discusses ongoing pavement preservation efforts at the State and local levels.

## **Development and Content of the Metropolitan Transportation Plan**

In 23 CFR Part 450.322, specific elements of the metropolitan transportation planning process and transportation plan are identified. These elements are summarized below and the approach of the RTP to these subject areas is described.

- **The transportation planning process shall address at least a 20-year planning horizon.** The 2010 Update covers the period through FY 2031, which will represent at least a 20-year period from the effective date of the Plan. The effective date of the Plan is defined in 23 CFR Part 450.322 as the date of a conformity determination by the Federal Highway Administration and the Federal Transit Administration. This determination has typically been received within two months of the approval of the Plan by MAG, which is anticipated to occur in March 2010, resulting in a planning horizon of well over 20 years.
- **The transportation plan shall include both long-range and short-range strategies that lead to an integrated multimodal transportation system.** The RTP contains both long and short range concepts and covers the full range of transportation modes. For example, the RTP contains a project-specific listing of improvements for the entire period through FY 2031 for all the major transportation modes. This is used as a blueprint to develop the MAG five-year transportation improvement program, as well as a guide for the scheduling of longer range facility development studies, such as corridor, area and design concept reports. In addition to covering the major transportation modes, the RTP addresses bicycle/pedestrian facilities, airports, and special needs transportation, as well as transportation system operations and demand management.
- **The Metropolitan Planning Organization shall review and update the transportation plan at least every four years in nonattainment areas.** The most recent update of the RTP was conducted and approved by MAG in July 2007 and received a finding of air quality conformity from the Federal Highway Administration and the Federal Transit Administration in August 2007.
- **The Metropolitan Planning Organization shall coordinate the development of the regional transportation plan with the Transportation Control Measures (TCMs) in the State Implementation Plan (SIP).** As the regional air quality planning agency, MAG maintains an extensive air quality planning process through which TCMs are identified, selected and implemented as part of the SIP. The MAG regional air quality plans are developed through a cooperative effort among the Arizona Department of Environmental Quality, Arizona Department of Transportation, Maricopa County and MAG.

Collectively, these agencies generate information on emissions inventories, air quality modeling, and the description, assumptions and cost effectiveness of TCMs.

- **The Metropolitan Planning Organization shall base updates on the latest available estimates for population, land use, travel, employment, congestion, and economic activity.** The 2010 Update is based on the most recently available set of population and employment projections for the region. A set of Maricopa County population projections consistent with the 2005 Census Survey was prepared by the Arizona Department of Economic Security, subsequent to the release of the 2005 MAG Area Census Survey in June 2006. MAG has also developed a set of employment projections for Maricopa County that are consistent with the DES population projections. These county-level population and employment projections were approved by the MAG Regional Council in December 2006. Using these figures as control totals, MAG developed a set of subregional population and employment projections. These subregional projections were approved by the MAG Regional Council in May 2007. These projections made use of the latest land use data available at the time of their preparation. The MAG travel modeling process is also based on the latest available travel data collection efforts.
- **The transportation plan shall include projected transportation demand of persons and goods in the metropolitan planning area over the period of the transportation plan.** The MAG transportation planning process includes an extensive travel modeling component that provides estimates of future vehicular travel, associated with the demand for person and goods movement in the region. This covers travel by all the major modes including autos, trucks, bus transit, and light rail transit for the full period covered by the RTP. The travel modeling process is based on the most recently available population and employment forecasts, which are consistent with the horizon year of the Plan. A separate chapter on performance monitoring and assessment, which addresses current and future travel demand, is included in the RTP.
- **The transportation plan shall include existing and proposed transportation facilities that should function as an integrated system.** The RTP identifies the network of existing and planned transportation facilities that function as an integrated system to serve the travel demand of the region. This includes the major modal components represented by the freeway/highway system, the arterial street network, and public transit operations and facilities. In addition, other modal programs are addressed in the RTP, such as airports, bicycle and pedestrian facilities, freight, and special needs programs. The RTP depicts the location and connectivity of regional transportation networks by mode, as well as the phasing of future improvements to the transportation system. The major modal systems are inventoried and analyzed using an integrated travel demand modeling system.
- **The transportation plan shall include operational and management strategies to improve the performance of existing transportation facilities.** The RTP addresses operational and management strategies to improve transportation system performance, relieve congestion, and enhance safety and mobility through a wide range of planning efforts. An entire section of the RTP is dedicated to system operations and management.

This section includes chapters that identify strategies and describe ongoing planning efforts in the areas of: Intelligent Transportation System Planning, Demand Management,

Congestion Management Process, Performance Monitoring and Assessment, Transportation Safety, and Transportation Security.

- **The transportation plan shall consider the results of the congestion management process.** The MAG transportation planning process includes significant demand management and intelligent transportation systems (ITS) elements, which are specifically addressed in the RTP. As part of this effort, MAG maintains an ITS Committee that coordinates transportation system management and operations activities in the region. In addition, periodic facility congestion and level of service surveys are conducted, providing an assessment of current congestion issues and a basis for modeling future congestion. MAG has also established an ongoing performance monitoring program, which is a key component of the congestion management process. The performance monitoring program formalizes the data collection effort and refines the process for periodic assessment of the effectiveness of congestion management strategies. Both the congestion management process and the performance monitoring program are addressed in individual chapters in the RTP.
- **The transportation plan shall include an assessment of capital investment and other strategies to preserve the existing system and provide for multimodal capacity increases.** The RTP covers capital investment strategies to preserve existing transportation infrastructure and provide for multi-modal capacity increases based on regional priorities. For the major modal components, the RTP includes detailed twenty-year programs for improvements to the existing system, as well as the development of new facilities. In addition, capital investments for other modal programs, such as airports, bicycle and pedestrian facilities, freight, and special needs programs are addressed in the RTP. The RTP process recognizes the high importance of maintaining the regional transportation infrastructure, which is reflected by the allocation of major blocks of regional-level funding in the RTP to improving the existing roadway network and conducting various aspects of the maintenance function.
- **The transportation plan shall include descriptions of all existing and proposed transportation facilities insufficient detail for conformity determinations.** As part of its regional travel demand modeling process, MAG maintains multimodal transportation networks of existing and proposed facilities that are described in sufficient detail to be utilized as input to the air quality conformity process required by 40 CFR 93 (EPA's transportation conformity rule). The scope and cost of these networks is described in the RTP, including all facilities regardless of funding source.
- **The transportation plan shall include a discussion of potential environmental mitigation activities to restore and maintain environmental functions affected by the transportation plan.** The RTP includes a discussion of types of potential environmental mitigation activities that may have the greatest potential to address the environmental functions affected by the Plan. This effort was approached by consulting with a broad range of Federal, State, and tribal agencies that deal with wildlife, land management and regulatory

matters. The transportation planning process and its future environmental implications were addressed in a series of discussions with these agencies, and concepts for potential environmental mitigation activities were identified. The primary goal of the RTP consultation effort was to gain insights regarding environmental concerns that may potentially involve future planning efforts and future Plan elements.

- **The transportation plan shall include pedestrian walkway and bicycle transportation facilities.** MAG has maintained an active role in promoting the establishment of improved travel opportunities for bicyclists and pedestrians for many years. The MAG Regional Bicycle Task Force, which was responsible for assisting in the development of the original MAG Bicycle Plan in 1992, has maintained an active role in promoting improved travel opportunities for bicyclists. In 1994, MAG formed the Pedestrian Working Group to promote increased awareness of walking as an alternative mode of travel and to improve facilities for people who walk. The RTP includes the MAG Bicycle Plan and Regional Off-Street System (ROSS) Plan. MAG has also developed a plan that identified policies to encourage walking, and suggested areas where these policies might be best implemented.
- **The transportation plan shall include transportation and transit enhancement activities.** The RTP describes the ongoing transportation enhancement program in which MAG participates. This program is administered by the ADOT and involves the development of project proposals by the councils of governments and metropolitan planning organizations around the State. The RTP discusses the MAG process for preparing and prioritizing enhancement project proposals and provides information on past and ongoing projects.
- **The transportation plan shall include a financial plan that demonstrates how the adopted transportation plan can be implemented.** The RTP provides a financial plan by mode that identifies specific funding to carry out the improvements and programs included under that transportation mode. All funding sources are considered to be reasonably available throughout the planning period, having had a long history of providing funding for the RTP. This includes sources such as the half-cent sales tax, which was originally approved in 1985 and extended in 2003; the State Highway Revenue Fund, which has been a major and continuing funding source for transportation in Arizona since 1974; Federal highway and transit funding programs, which represent a national commitment to transportation; and local government and private funding, which proceed in parallel with the residential and commercial development process. Estimates of future Federal, State and regional funds that would be available to the region were developed cooperatively by MAG, RPTA and ADOT. In addition, Arizona State Statutes require the major transportation implementing agencies in the MAG Region to develop and maintain life cycle programs that ensure transportation program costs can be met by future revenues. These life cycle programs have also been made a part of the RTP.
- **The metropolitan planning organization shall consult with State and local agencies responsible for land use management, natural resources, environmental protection, conservation, and historic preservation regarding development of the transportation plan.** As part of the development of the 2010 Update of the RTP, MAG consulted with State and local agencies responsible for land use management, natural resources,

environmental protection, conservation and historic preservation. An important part of this process included the identification of key databases, conservation maps, inventories of natural or historic resources, and other information sources to utilize in the regional transportation planning process. As noted under mitigation activities, since previously adopted projects in the RTP undergo extensive environmental and resource assessment by the implementing agencies, the primary goal of the consultation effort was to gain insights regarding concerns that may potentially involve future planning efforts and future Plan elements.

- **The transportation plan shall include a safety element, as well as disaster preparedness plans that support homeland security and personal security of users.** The RTP addresses safety in a separate chapter the safety chapter of the RTP addresses the MAG safety planning program which enables safety issues to be addressed as part of the regional transportation planning process. MAG has a standing committee for safety planning, has developed a safety information management system, and conducts safety workshops. The RTP also has a separate chapter on security. To address this issue, an inventory of ongoing security activities and programs in the MAG Region was conducted and documented. This information was assessed to gain insights into the type of role the metropolitan organization might play to advance and facilitate effective application of security measures to transportation systems in the region.
- **The Metropolitan Planning Organization shall provide interested parties with a reasonable opportunity to comment on the transportation plan.** Throughout the RTP process, interested parties are provided extensive opportunity to comment on any and all aspects of the RTP, as well as potential future additions to the transportation plan. This is accomplished through a specific participation plan that was closely adhered to and was structured to maximize input opportunities for all interested individuals and groups. The development of the participation plan, itself, also included extensive consultation with interested citizens, citizen interest groups, public agencies, and private transportation providers. In addition, MAG recognizes the significance of transportation to all residents of the metropolitan area and the importance of Title VI/Environmental considerations in the transportation planning process. As a result, an environmental justice analysis of the RTP has been prepared.
- **The metropolitan transportation plan shall be published or otherwise made readily available for public review.** The RTP is made available for public review through both printed and electronic media. In addition, a variety of methods are employed to promote public education and obtain comments on the RTP, including outreach efforts, accessible meetings and workshops, graphical visualization techniques, and “World Wide Web” postings. The “World Wide Web” is employed extensively as a means of providing the public with broad access to planning information for review and input. The Web is employed, not only for the posting of the RTP and other planning reports, but also is utilized for the dissemination of preliminary planning information, progress reports, and meeting and workshop notices.
- **The Metropolitan Planning Organization shall not be required to select any project from the illustrative list of additional projects included in the financial plan.** The

2010 Update identifies illustrative projects in Chapter 16 -Extended Regional Transportation Planning Outlook.

- **The Metropolitan Planning Organization must make a conformity determination on any updated or amended transportation plan in accordance with transportation conformity regulations.** MAG conducts appropriate air quality conformity analyses of the RTP to comply with air quality conformity regulations. Any approvals of updates or amendments to the by MAG Plan first undergo this conformity analysis and are contingent upon a finding of conformity by the Federal Highway Administration and the Federal Transit Administration.

### **Arizona House Bill 2292**

Arizona House Bill 2292, which was passed in the Spring 2003 Session of the Arizona State Legislature, establishes guidelines for the MAG RTP, such as the impact of growth on transportation systems and the use of a performance-based planning approach. It identifies key features required in the final Plan, including a twenty-year planning horizon, allocation of funds between highways and transit, and priorities for expenditures. The response of the RTP to these requirements is described below.

House Bill 2292 sets forth the factors to be considered during the development of the RTP. This legislation applies federally identified planning concepts to state level issues, and addresses a range of planning considerations. Among other issues, House Bill 2292 calls for the Plan to:

- **Cover a twenty-year term.** The RTP covers the period through FY 2031. In addition, the Plan addresses some issues that extend beyond this planning period.
- **Be comprehensive, performance based, multimodal and coordinated.** The RTP is comprehensive in scope, taking into account future land uses and growth throughout the region. It is multi-modal, including freeways, highways, streets, bus service, high capacity transit, and other transit services, as well as modes such as airports, bicycles and pedestrians. The approach used in developing the RTP is distinguished by the use of performance-based planning and the application of performance measures in the evaluation of alternatives. The methodology includes six major components: 1) Goals and Objectives, 2) Needs Assessment, 3) Evaluation Methodologies, 4) Alternatives Evaluation, 5) Alternatives Refinement, and 6) Phasing and Funding. The RTP closely coordinates the functions of each mode through regional modeling, construction phasing, and financial planning.
- **Consider growth and transportation system impacts in contiguous counties, cities, towns and Indian Communities.** The transportation analysis area used to develop the RTP covers the Indian Communities, and the portions of contiguous counties that are forecasted to develop during the planning period. This means that the growth projected for these areas and its impacts on transportation demand are taken into account in the planning process.
- **Include a transportation corridor prioritization and construction schedule.** The RTP includes modal life cycle project program schedules, identifying when projects are

programmed for construction during the planning period. This schedule is based on a number of factors, including traffic volumes and level of service, project readiness and cash flow availability.

- **Include an allocation of revenues between the regional area road fund and the public transportation fund.** The RTP includes a financial plan element that allocates funding among and across modes by funding source.
- **Achieve a balance between project costs and available revenues.** The estimated cost of the projects in the RTP equals the total revenues projected for the planning period. The planning process includes the annual review of modal life cycle programs to provide the opportunity to adjust programs, as appropriate, to maintain a cost/revenue balance.

### **Costs and Revenue Estimates**

Throughout the transportation planning process, it has been recognized that periodic adjustments and updating of the RTP will be needed to respond to changing conditions and new information. In particular, project cost estimates are subject to inflation in the price of materials and construction work, as well as changes in design requirements. In addition, revenue collections in the near-term, as well as the outlook for long-term revenue receipts, are affected by changes in local and national economic conditions.

Proposition 400 legislation acknowledged the necessity of responding to changing conditions and new information during the course of implementing a long-range plan. The legislation calls for five-year performance audits of the RTP; specifies consultation steps for any major amendments to the RTP; and requires life cycle programs for highways, streets, and transit to ensure that the cost of projects programmed for construction can be completed within available revenues.

### **Recent Cost and Revenue Trends**

During the past several years, the life cycle programming process in each of the key transportation modes - freeways, arterials and transit - has had to deal with major project cost increases, as well as significantly reduced forecasts of future revenues. Maintaining a balance between program costs and revenues under these circumstances has been the prime focus of the 2010 Update of the RTP.

As an example of the decline in revenues, receipts from the Proposition 400 half-cent sales for FY 2008 were 3.0 percent lower than those for FY 2007, while those for FY 2009 were 13.6 percent lower than FY 2008, and 16.4 percent lower than those in FY 2007. The decline between FY 2007 and FY 2008 was the first year-over-year revenue decline in the history of the half-cent sales tax since its inception in 1985. The further, more significant, decline in FY 2009 testifies to the severe effects of the economic recession, which has been experienced since the fall of 2007. In addition, the twenty-year forecasts of future half-cent revenues are in the range of \$3.0 billion, or 22.5 percent, lower than the previous forecast.

In contrast to the decline in revenues, construction costs have faced marked increases. For the five-year period between 2003, when the RTP was first adopted, and 2008, the Highway Construction Cost Index experienced a price increase of approximately 52 percent. For this same period, it was

estimated that, right-of-way costs increased in the range of 82 percent, while the Consumer Price Index increased 16 percent. The overall inflation factor for the Freeway/Highway Life Cycle Program was estimated to be in the range of 40 to 45 percent. In addition to the effects of price inflation, the refinement and, in some cases, enhancement of project design features also resulted in cost increases.

The economic recession that began in late 2007 has lessened the pressure on construction costs and recent bids have been quite favorable. Cost estimates in the 2010 RTP Update have been adjusted to recognize the mitigating effects of these recent trends. However, the long term outlook regarding construction and right-of-way costs remains highly uncertain, and an attempt was made to avoid over reacting to recent trends. Continued adjustments in cost and revenue estimates may be expected in the future.

### **Use of Year of Expenditure Dollars**

The Federal Highway Administration and Federal Transit Administration jointly issued final rulemaking for “23 CFR Part 450” dated February 14, 2007, which implements the metropolitan transportation planning requirements in the Safe, Accountable, Flexible, and Efficient Transportation Equity Act - A Legacy for Users (SAFETEA-LU). As part of these regulations, section 23CFR450.322(f)(10)(iv) requires that: “ Starting December 11, 2007, revenue and cost estimates that support the metropolitan transportation plan must use inflation rate(s) to reflect ‘year of expenditure dollars’, based on reasonable financial principles and information...”.

In response to this requirement, in the body of the RTP report, costs and revenues are expressed in “Year of Expenditure” (YOE) dollars. Therefore, revenue and funding forecasts reflect the actual number of dollars projected to be available, while project cost estimates incorporate the potential effects of future price inflation and represent the actual number of dollars that would be expended. The detailed project listings in the appendix of the report are expressed in 2010 dollars.

### **Planning Period Phases**

The planning period for the RTP, which runs through fiscal year (FY) 2031, generally has been divided into five-year phases, to facilitate the discussion of plan concepts and project priorities. The phases have been adjusted slightly from the original RTP planning effort conducted in 2003, and include the past five-year period from FY 2006 through FY 2010. The plan phases are indicated below, with fiscal years ending on June 30<sup>th</sup>.

Phase I:	FY 2006 through FY 2010
Phase II:	FY 2011 through FY 2015
Phase III:	FY 2016 through FY 2020
Phase IV:	FY 2021 through FY 2025
Phase V:	FY 2026 through FY 2031

In discussing corridor and project priorities, the phases are used to indicate the period in which funds are programmed for actual construction of facilities, or initiation of service. For example, a project labeled as a “Phase IV” project will be funded for construction in Phase IV, but may have funding for design activities and right-of-way acquisition in earlier phases.

## CHAPTER TWO

### GOALS, OBJECTIVES AND PRIORITY CRITERIA

Regional goals and objectives provide the planning process with a basis for identifying options, evaluating alternatives and making decisions on future transportation investments. The MAG Transportation Policy Committee has identified a total of four goals and 15 objectives, which were approved on February 19, 2003. In addition, Arizona Revised Statute 28-6354.B directs MAG to develop criteria to establish the priority of corridors, corridor segments, and other transportation projects. As part of the regional transportation planning process, MAG applied various priority criteria for the development of the Regional Transportation Plan (RTP).

#### Goals and Objectives

A goal is a general statement of purpose that represents a long-term desired end to a specific state of affairs. It is generally measurable by qualitative means. By identifying broad goals that are both visionary and practical, and which respond to the values of the region, the focus of the planning process can be more readily communicated to the public. The goals, in turn, can be defined in greater detail by specifying multiple objectives for each goal.

An objective is very similar to a goal, as it represents a desired end to a specific state of affairs. However, an objective is an intermediate result that must be realized to reach a goal. The definition of an objective is usually more focused than that of a goal and is typically more subject to being measured. Objectives can be further assessed through performance measures that are identified for each objective.

Certain goals and objectives are related to the way in which the regional transportation system is performing overall. Others may be used to evaluate individual components of the overall transportation system or to evaluate proposed projects. They can also serve as the basis to monitor how the transportation system performs as the RTP is implemented. In addition, goals and objectives relate to the planning process, and the importance of accountability during the development and implementation of the plan. Individual goals with their supporting objectives are listed below.

#### **Goal 1: System Preservation and Safety**

Transportation infrastructure that is properly maintained and safe, preserving past investments for the future.

- **Objective 1A:** Provide for the continuing preservation and maintenance needs of transportation facilities and services in the region, eliminating maintenance backlogs.
- **Objective 1B:** Provide a safe and secure environment for the traveling public, addressing roadway hazards, pedestrian and bicycle safety, and transit security.

## Goal 2: Access and Mobility

Transportation systems and services that provide accessibility, mobility and modal choices for residents, businesses and the economic development of the region.

- **Objective 2A:** Maintain an acceptable and reliable level of service on transportation and mobility systems serving the region, taking into account performance by mode and facility type.
- **Objective 2B:** Provide residents of the region with access to jobs, shopping, educational, cultural, and recreational opportunities and provide employers with reasonable access to the workforce in the region.
- **Objective 2C:** Maintain a reasonable and reliable travel time for moving freight into, through and within the region, as well as provide high-quality access between intercity freight transportation corridors and freight terminal locations, including intermodal facilities for air, rail and truck cargo.
- **Objective 2D:** Provide the people of the region with transportation modal options necessary to carry out their essential daily activities and support equitable access to the region's opportunities.
- **Objective 2E:** Address the needs of the elderly and other population groups that may have special transportation needs, such as non-drivers or those with disabilities.

## Goal 3: Sustaining the Environment

Transportation improvements that help sustain our environment and quality of life.

- **Objective 3A:** Identify and encourage implementation of mitigation measures that will reduce noise, visual and traffic impacts of transportation projects on existing neighborhoods.
- **Objective 3B:** Encourage programs and land use planning that advance efficient trip-making patterns in the region.
- **Objective 3C:** Make transportation decisions that are compatible with air quality conformity and water quality standards, the sustainable preservation of key regional ecosystems and desired lifestyles.

## Goal 4: Accountability and Planning

Transportation decisions that result in effective and efficient use of public resources and strong public support.

- **Objective 4A:** Make transportation investment decisions that use public resources effectively and efficiently, using performance-based planning.
- **Objective 4B:** Establish revenue sources and mechanisms that provide consistent funding for regional transportation and mobility needs.
- **Objective 4C:** Develop a regionally balanced plan that provides geographic equity in the distribution of investments.
- **Objective 4D:** Recognize previously authorized corridors that are currently in the adopted MAG Long-Range Transportation Plan; i.e., Loop 303 and the South Mountain Corridor.

- **Objective 4E:** Achieve broad public support for needed investments in transportation infrastructure and resources for continuing operations of transportation and mobility services.

## **Priority Criteria**

Arizona Revised Statute 28-6354.B directs MAG to develop criteria to establish the priority of corridors, corridor segments, and other transportation projects. These criteria include public and private funding participation; the consideration of social and community impacts; the establishment of a complete transportation system for the region; the construction of projects to serve regional transportation needs; the construction of segments to provide connectivity on the regional system; and other relevant criteria for regional transportation.

As part of the regional transportation planning process, MAG has applied these kinds of criteria, both for the development and the implementation of the Regional Transportation Plan (RTP). The RTP was developed through a performance-base process that evaluated alternatives relative to a range of performance measures. Also, specific criteria were considered as part of the process to schedule the implementation of transportation projects throughout the duration of the planning period. The discussion below describes how the criteria applied in the RTP planning process correspond to the categories included in ARS 28-6354.B.

## **Extent of Local Public and Private Funding Participation**

A higher level of local public and private funding participation in the RTP benefits the region by leveraging regional revenues and helping ensure local government commitment to the success of the regional program. The extent of local public and private funding participation is addressed in a number of ways in the MAG transportation planning process.

- **Project Matching Requirements** - In developing funding allocations among the various RTP components and project types, local matching requirements have been established. The local matching requirements in the RTP are:
  - 30 percent major street projects, including ITS elements.
  - 30 percent bicycle and pedestrian projects.
  - For air quality and transit projects involving federal funds, minimum federal match requirements were assumed. Depending on the specific project funding mix, this match may be provided from regional revenue sources.
- **Private Funding Participation** - As part of the policies and procedures developed for the Arterial Street Life Cycle Program, private funding participation is recognized as applicable local match for half-cent funds for street and intersections projects. This policy helps free local monies that may then be applied to additional transportation improvements.
- **Local Government Incentives** - In the Arterial Street Life Cycle Program, incentives to make efficient use of regional funds have been established by ensuring that project savings by local governments may be applied to new projects in the jurisdiction that achieved those savings.

## Social and Community Impacts

Regional transportation improvements can have both beneficial and negative social and community impacts. It is important to conduct a thorough assessment of these impacts, to ensure that they are taken into account in the decision-making process. The MAG planning effort assesses social and community impacts at each key stage of the transportation planning and programming process. In addition, it should be noted that similar efforts are carried out by the agencies implementing specific transportation improvement projects.

- **Public Participation and Community Outreach** - An aggressive citizen participation and outreach program is conducted to obtain public views on the potential community and social impacts of transportation improvements. In particular, input is sought regarding the possible impacts of specific transportation alternatives on the community's social values and physical structure.
- **Social Impact Assessment** - The social impact of transportation options is evaluated as part of the Title VI/Environmental Justice assessment. In this assessment, potential transportation impacts are evaluated for key communities of concern, including minority populations, low-income populations, aged populations, mobility disability populations, and female head of household populations. In addition, community goals are taken into account by basing future travel demand estimates, on local land use plans.
- **Corridor and Community Impact Assessment** - Corridor-level analyses are conducted, which assess the possible social and community impacts of alternative facility alignments based on neighborhood factors such as noise, air quality and land use. Community impacts of transportation facilities are further analyzed by assessing air quality effects through the emissions analysis of plan alternatives, as well as conducting a federally required air quality conformity analysis of the RTP. In addition, the process for annually updating the Regional Transportation Improvement Program includes project air quality scores, which reflect the potential community impacts of the projects.

## Establishment of a Complete Transportation System for the Region

The RTP calls for major investments in all elements of the regional transportation system over the next several decades. It is critical that these expenditures result in a complete and integrated transportation network for the region. The MAG planning process responds directly to this need by conducting transportation planning at the system level, giving priority to segments that can lead to a complete transportation system as quickly as possible, and maintaining a life cycle programming process for all the major modes.

- **System Level Planning Approach** - The regional planning effort is conducted at the system level, taking into account all transportation modes in all parts of the MAG geographic area. This systems level approach is applied in identifying and analyzing alternatives, as well as specifying the final RTP. In this way, the complete transportation needs of the region, as a whole, are identified and addressed in the planning process.

- **Project Development Process and Project Readiness** - The implementation of regional transportation projects requires a complex development process. This process involves extensive corridor assessments, environmental studies, and engineering concept analyses. This is followed by right-of-way acquisition and final design work, before actual construction may begin. For a variety of reasons, certain projects may progress through this process more rapidly than others. By moving forward, where possible, on those projects with the highest level of readiness for construction, important transportation improvements can be delivered as quickly as possible.
- **Progress on Multiple Projects** - Major needs for transportation improvements exist throughout the MAG Region. The scheduling of projects is aimed at proceeding with improvements to the transportation network throughout the planning period in all areas of the region. This will lead toward a complete and functioning regional transportation system that benefits all parts of the MAG Region.
- **Revenues, Expenditures and Life Cycle Programming** - Cash flow patterns from revenue sources limit the amount of work that can be accomplished within a given period of time. Project expenditures need to be scheduled to accommodate these cash flows. Life cycle programs have been established that take these conditions into account and implement the projects in the RTP for the major transportation modes: freeways/highways, arterial streets, and transit. The life cycle programs provide a budget process that ensures that the estimated cost of the program of improvements does not exceed the total amount of revenues available. This ensures that a complete transportation system for the region will be developed within available revenues.

As part of the life cycle programming process, consideration is given to bonding a portion of cash flows to implement projects that provide critical connections earlier than might otherwise be possible. This has to be weighed against the reduction in total revenues available for constructing projects, which results from interest costs.

### **Construction of Projects to Serve Regional Transportation Needs**

The resources to implement the RTP are drawn from regional revenue sources and should address regional transportation needs. Transportation projects that serve broad regional needs should have a higher priority than those that primarily only serve a local area. At the same time, the nature of regional transportation needs varies across the MAG Region and the same type of transportation solution does not apply everywhere in the region. Enhancing the arterial network may represent the most pressing regional need in one part of the region, whereas adding new freeway corridors may be the key need in another; and expanding transit capacity may represent the best approach in yet another area. The process to develop the RTP recognized that this was the nature of regional transportation needs in the MAG Region. As a result, the RTP is structured to respond to different types of needs in different parts of the MAG Region.

Although the modal emphasis of the transportation improvements identified in the RTP varies from area to area, the effects of these improvements can be assessed using common measures of system performance and regional mobility. The measures that were utilized for this purpose are described below. These criteria were applied in the development of the RTP to evaluate alternatives and

establish implementation priorities. They can also be applied in the future to evaluate potential adjustments to the priority of corridors, corridor segments, and other transportation projects and services.

- **Facility/Service Performance Measures** - Facility performance measures focus on the amount of travel on specific facilities, the usage of transportation services, the degree of congestion, and other indicators of the level of service as provided:
  - Accident rate per million miles of passenger travel.
  - Travel time between selected origins and destinations.
  - Peak period delay by facility type and geographic location.
  - Peak hour speed by facility type and geographic location.
  - Number of major intersections at level of service “E” or worse.
  - Miles of freeways with level of service “E” or worse during peak period.
  - Average Daily Traffic on freeways/highways and arterials
  - Total transit ridership by route and transit mode.
  - Cost effectiveness: trips served per dollar invested.
  
- **Mobility Measures** - Mobility measures focus on the availability of transportation facilities and services, as well as the range of service options as provided:
  - Percentage of persons within 30 minutes travel time of employment by mode.
  - Jobs and housing within one-quarter mile distance of transit service.
  - Percentage of workforce that can reach their workplace by transit within one hour with no more than one transfer.
  - Per Capita Vehicle Miles of Travel (VMT) by facility type and mode.
  - Households within one-quarter mile of transit.
  - Transit share of travel (by transit sub-mode).
  - Households within five miles of park-and-ride lots or major transit centers

### **Construction of Segments that Provide Connectivity with other Elements of the Regional Transportation System**

The phasing of the development of the transportation network should be done in a logical sequence, so that maximum possible system continuity, connectivity and efficiency are maintained. In the RTP, Appropriately located transportation facilities around the region enhance the general mobility throughout the region. To the extent possible, facility construction and transportation service should be sequenced to result in a continuous and coherent network and to avoid gaps and isolated segments, bottlenecks and dead-end routes. Segments that allow for the connection of existing portions of the transportation system should be given a higher priority than segments that do not provide connectivity.

### **Other relevant criteria developed by the regional planning agency**

As part of the RTP, a series of objectives for the regional transportation network were identified. Two key objectives were to achieve broad public support for the needed investments, and to

develop a regionally balanced plan that provides geographic equity in the distribution of investments. Specific criteria related to these objectives are:

- Transportation decisions that result in effective and efficient use of public resources and strong public support.
- Geographic distribution of transportation investments.
- Inclusion of committed corridors.

# **CHAPTER THREE**

## **REGIONAL DEVELOPMENT OVERVIEW**

The MAG Region is geographically situated in the south-central region of the State of Arizona, and encompasses an area of 9,223 square miles. The MAG Region contains 25 incorporated cities and towns, five Native American Indian Communities and a large area of unincorporated land. The region is located in the Sonoran Desert with elevations generally ranging from 500 to 2,500 feet above sea level. In 2009, Maricopa County contained approximately 60 percent of the population in Arizona, as well as nine of the ten cities in Arizona with populations greater than 100,000 people.

According to data compiled by MAG in 2000, approximately 30 percent of all county lands were under private ownership; 29 percent of lands were under the direct ownership of the Bureau of Land Management; 12 percent of lands were under the jurisdiction of the U.S. Military; 11 percent of lands were held within State trust; 11 percent of lands were under the direct ownership of the U.S. Forest Service; 5 percent of land was comprised of Indian Communities; and the remaining 2 percent of lands in the county were classified as “other” public lands.

### **2005 Special Census Survey and 2009 Population Update**

In September 2005, the U.S. Census Bureau conducted a Special Survey of Maricopa County on behalf of the Maricopa Association of Governments (MAG). The purpose of the Survey was to capture the region's rapid population growth since the last decennial census, which was conducted in 2000. Approximately one in every 13 households in Maricopa County received the 2005 Census Survey. In addition to the survey of households, a combined full count of populations in group quarters and outdoor locations (homeless) was also conducted.

The Survey indicated a September 1, 2005 population for Maricopa County of 3,700,516 people. This represented an increase of 628,367 people, or about 20.5 percent since 2000. The Survey also determined the population for each city or town within Maricopa County. MAG has updated the Survey to provide population estimates that correspond to a mid-2009 timeframe. Table 3-1 lists the population numbers by jurisdiction for September 1, 2005 and July 1, 2009. During this time period, many of the fastest-growing cities in Maricopa County showed percentage increases greater than 20 percent. The Town of Buckeye had the highest percentage increase of 107.7 percent, followed by the Town of Queen Creek (56.6%), City of Goodyear (34.0%), the Town of Gilbert (25.7%), and the City of Surprise (24.0%) The City of Phoenix had the largest net increase in population, with the addition of 99,589 residents.

### **Population Forecasting**

For the past several decades, the MAG Region has been one of the fastest growing metropolitan areas in the United States, among those with populations of more than one million people. In April of 2000, Maricopa County had a resident population of 3,072,149. This was a population growth of approximately 44 percent, or 950,000 people in the decade from 1990 to 2000. MAG Socioeconomic Projections indicate that this high growth rate is expected to continue. Historic and projected growth in population and employment is illustrated in Figure 3-1.

**TABLE 3-1  
TOTAL RESIDENT POPULATION BY JURISDICTION  
2005 CENSUS SURVEY and JULY 1, 2009**

Jurisdiction	Total Population			Percent Growth		Share	
	September 1, 2005 (Census Survey)	July 1, 2009	Change	Overall	Annual	Share of Growth	Share of County
Apache Junction *1 *2	275	276	1	0.4%	0.1%	0.0%	0.0%
Avondale	69,356	76,900	7,544	10.9%	2.7%	2.3%	1.9%
Buckeye	25,406	52,764	27,358	107.7%	21.0%	8.5%	1.3%
Carefree	3,684	3,958	274	7.4%	1.9%	0.1%	0.1%
Cave Creek	4,766	5,208	442	9.3%	2.3%	0.1%	0.1%
Chandler	230,845	245,087	14,242	6.2%	1.6%	4.4%	6.1%
El Mirage	32,061	33,610	1,549	4.8%	1.2%	0.5%	0.8%
Fort McDowell *1	824	824	0	0.0%	0.0%	0.0%	0.0%
Fountain Hills	24,492	26,107	1,615	6.6%	1.7%	0.5%	0.6%
Gila Bend	1,808	1,900	92	5.1%	1.3%	0.0%	0.0%
Gila River *1 *2	2,742	2,742	0	0.0%	0.0%	0.0%	0.1%
Gilbert	173,072	217,521	44,449	25.7%	6.1%	13.8%	5.4%
Glendale	242,369	249,197	6,828	2.8%	0.7%	2.1%	6.2%
Goodyear	46,213	61,916	15,703	34.0%	7.9%	4.9%	1.5%
Guadalupe	5,555	6,002	447	8.0%	2.0%	0.1%	0.1%
Litchfield Park	4,528	5,122	594	13.1%	3.3%	0.2%	0.1%
Mesa	448,096	461,102	13,006	2.9%	0.7%	4.0%	11.5%
Paradise Valley	13,863	14,686	823	5.9%	1.5%	0.3%	0.4%
Peoria *2	138,109	158,709	20,600	14.9%	3.7%	6.4%	3.9%
Phoenix	1,475,834	1,575,423	99,589	6.7%	1.7%	30.9%	39.2%
Queen Creek *2	15,916	24,926	9,010	56.6%	12.4%	2.8%	0.6%
Salt River *1	6,796	6,936	140	2.1%	0.5%	0.0%	0.2%
Scottsdale	234,752	243,501	8,749	3.7%	1.0%	2.7%	6.1%
Surprise	88,265	109,482	21,217	24.0%	5.8%	6.6%	2.7%
Tempe	165,796	174,833	9,037	5.5%	1.4%	2.8%	4.3%
Tolleson	6,498	6,923	425	6.5%	1.7%	0.1%	0.2%
Wickenburg	6,077	6,451	374	6.2%	1.6%	0.1%	0.2%
Youngtown	6,163	6,513	350	5.7%	1.5%	0.1%	0.2%
Balance of County	226,355	244,712	18,357	8.1%	2.1%	5.7%	6.1%
<b>Total</b>	<b>3,700,516</b>	<b>4,023,331</b>	<b>322,815</b>	<b>8.7%</b>	<b>2.2%</b>	<b>100.0%</b>	<b>100.0%</b>

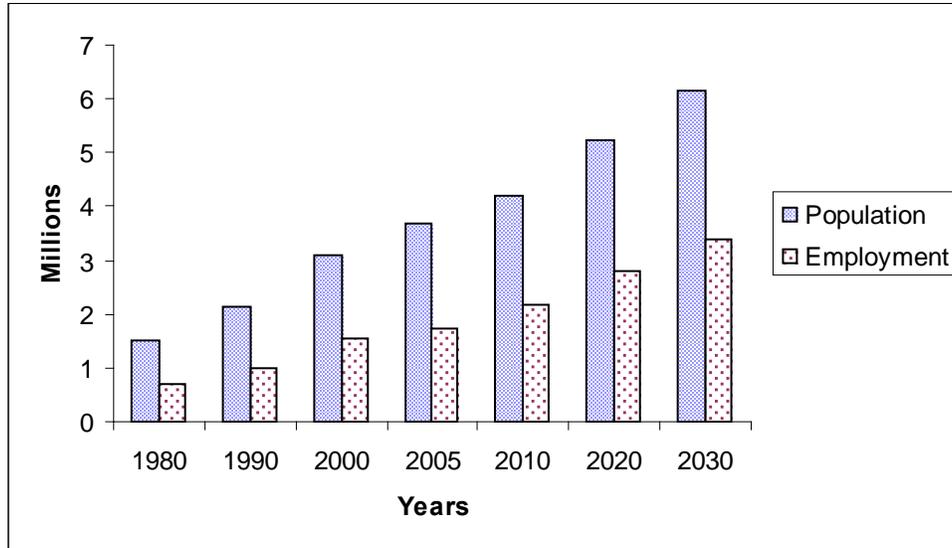
\*1 Included in "Balance of County" in 2005 Census Survey.

\*2 Maricopa County portion only.

Sources: U.S. Bureau of the Census Year 2005 Census Survey, Arizona Department of Commerce, Maricopa Association of Governments

Approved by the Maricopa Association of Governments Regional Council, December 9, 2009.

**FIGURE 3-1  
REGIONAL POPULATION AND EMPLOYMENT (1980-2030)**



**Population Forecasting Process**

As a part of the process of developing regional growth data, MAG has prepared a series of subregional population and employment forecasts. According to Executive Order 95-2, the Arizona Department of Economic Security (DES) is responsible for developing official State and County control total population projections, while MAG is responsible for preparing subregional projections consistent with these control totals.

Subsequent to the release of the 2005 MAG Area Census Survey in June 2006, DES prepared a set of Maricopa County population projections consistent with the 2005 Census Survey. MAG has also developed a set of employment projections for Maricopa County that are consistent with the DES population projections. These county-level population and employment projections were approved by the MAG Regional Council in December 2006. Using these figures as control totals, MAG developed a set of subregional population and employment projections. These subregional projections were approved by the MAG Regional Council in May 2007.

**Population Projections**

Maricopa County has grown from a population of 1.5 million persons in 1980, to a population of 3.7 million in 2005. By 2030, Maricopa County is projected to double in population over the 2000 base population, with an anticipated total of 6.1 million people. This means that the region will experience a growth of approximately one million people during each decade.

Table 3-2 shows the total resident population for Municipal Planning Areas (MPAs) from July 1, 2005, to July 1, 2030. Total resident population includes the resident population in households, and

**TABLE 3-2**  
**TOTAL RESIDENT POPULATION BY MPA**  
**JULY 1, 2005 and PROJECTIONS JULY 1, 2010 to JULY 1, 2030**

MPA	Total Resident Population 2005	Total Resident Population 2010	Total Resident Population 2020	Total Resident Population 2030
Avondale	70,160	83,856	105,989	123,265
Buckeye	32,735	74,906	218,591	419,146
Carefree	3,654	4,418	5,816	6,097
Cave Creek	4,845	5,781	7,815	9,656
Chandler	236,073	265,107	282,991	283,792
County Areas	80,661	87,434	107,441	159,312
El Mirage	31,935	34,819	38,620	38,717
Fountain Hills	24,347	27,166	33,331	33,810
Fort McDowell	824	839	1,037	1,239
Gila Bend	2,118	2,575	3,950	9,074
Gila River	2,742	2,790	2,941	3,410
Gilbert	178,708	218,009	285,819	300,295
Glendale	257,891	279,807	315,055	322,062
Goodyear	47,520	71,354	174,521	299,397
Guadalupe	5,555	5,790	5,982	5,983
Litchfield Park	6,787	8,587	10,305	10,510
Mesa	486,296	518,944	565,693	584,866
Paradise Valley	14,136	14,790	15,224	15,352
Peoria	141,441	172,793	236,154	306,070
Phoenix	1,510,177	1,695,549	1,990,450	2,201,843
Queen Creek	19,879	34,506	55,529	72,947
Salt River	6,822	7,087	7,308	7,425
Scottsdale	234,515	249,341	269,266	286,020
Surprise	93,356	146,890	268,359	401,458
Tempe	165,740	177,771	191,881	197,970
Tolleson	6,491	7,748	9,646	10,193
Wickenburg	9,606	11,022	13,311	17,732
Youngtown	6,011	6,820	7,275	7,359
<b>TOTAL</b>	<b>3,681,025</b>	<b>4,216,499</b>	<b>5,230,300</b>	<b>6,135,000</b>

**Notes:**

Total resident population includes resident population in households and resident population in group quarters (dorms, nursing homes, prisons and military establishments)

These projections include the Maricopa County portion of Peoria, Queen Creek and the Gila River Indian Community only.

The City of Apache Junction which became a MAG member in 2002, had a resident population of approximately 40,000 in the Year 2000. MAG has assembled databases and compiled placeholder projections based on their input for portions of Pinal County. Based upon their input, Apache Junctions population is projected to be: 78,000 in 2010; 122,000 in 2020; 142,000 in 2025; 157,000 in 2030.

For complete notation on this series please refer to Caveats for Socioeconomic Projections 2007.

the resident population in group quarters (dorms, nursing homes, prisons and military establishments). Over the 25-year period (2005-2030), seven MPAs are projected to grow by more than 100,000 persons. These areas include Phoenix, Buckeye, Surprise, Goodyear, Gilbert, Peoria, and Chandler. Another five MPAs are projected to experience population growth greater than 50,000 persons, which include Mesa, Avondale, Scottsdale, Glendale, and the Maricopa County portion of Queen Creek.

Currently, there are five MPAs within the MAG Region with populations of over 200,000 persons, which include Phoenix, Mesa, Glendale, Chandler and Scottsdale. By 2010, Gilbert will surpass 200,000 in population, and will be followed by Peoria, Buckeye and Surprise by 2020. By 2030, the largest Municipal Planning Area – Phoenix, will contain 2.2 million persons, followed by Mesa at 585,000, Buckeye at 419,000, and Surprise at 401,000. Figures 3-2 and 3-3 are maps that display the population concentrations for 2000 and 2030. By definition, the population concentration measures the average population within a one-mile radius. This analysis helps in smoothing out differences in geographies and in identifying underlying spatial patterns in the data. The pattern of population concentrations illustrates the shape of urban form as it is projected to evolve according to local land use plans and densities.

### **Employment Forecasting**

By 2030, Maricopa County is projected to more than double its reported 2000 employment total. This means that employment within the region will grow at a number of approximately 575,000 jobs each decade. Figure 3-1 depicts the employment growth trends projected in the MAG Region to 2030. It should be noted that the employment projections are by place of work, and not by place of residence as reported by the Census Bureau.

### **Community Job Centers**

Community Job Centers are areas that are comprised of an identifiable concentration of employment activities and land uses that are entirely, or predominantly of a non-residential nature. Delineated Community Job Centers consist of concentrated, or mixed areas of industrial, office, retail, airport, and government land uses and employment activities.

Job center information assists in the transportation planning process by providing valuable information on each of the following items: employment types at each job center; demographic data; existing and anticipated employment totals; floor area and total square footage of locations; existing acreage; and the total build out of each identified job center. Due to their significant commercial and industrial base, many of these areas have a tendency to generate a higher level of vehicular trips and trips associated with freight-related activities.

In 2007, MAG coordinated efforts with municipal planning and economic development directors throughout the region in an attempt to identify and effectively inventory existing and future job centers. A total of 173 job centers within the Maricopa County were identified. These particular job centers are categorized into the following four categories: Developed Centers, Revitalization Centers, Existing Centers with Expansion Potential, and Future Centers.

# 2010 Update Regional Transportation Plan

Fig. 3-2

REGIONAL  
TRANSPORTATION  
PLAN

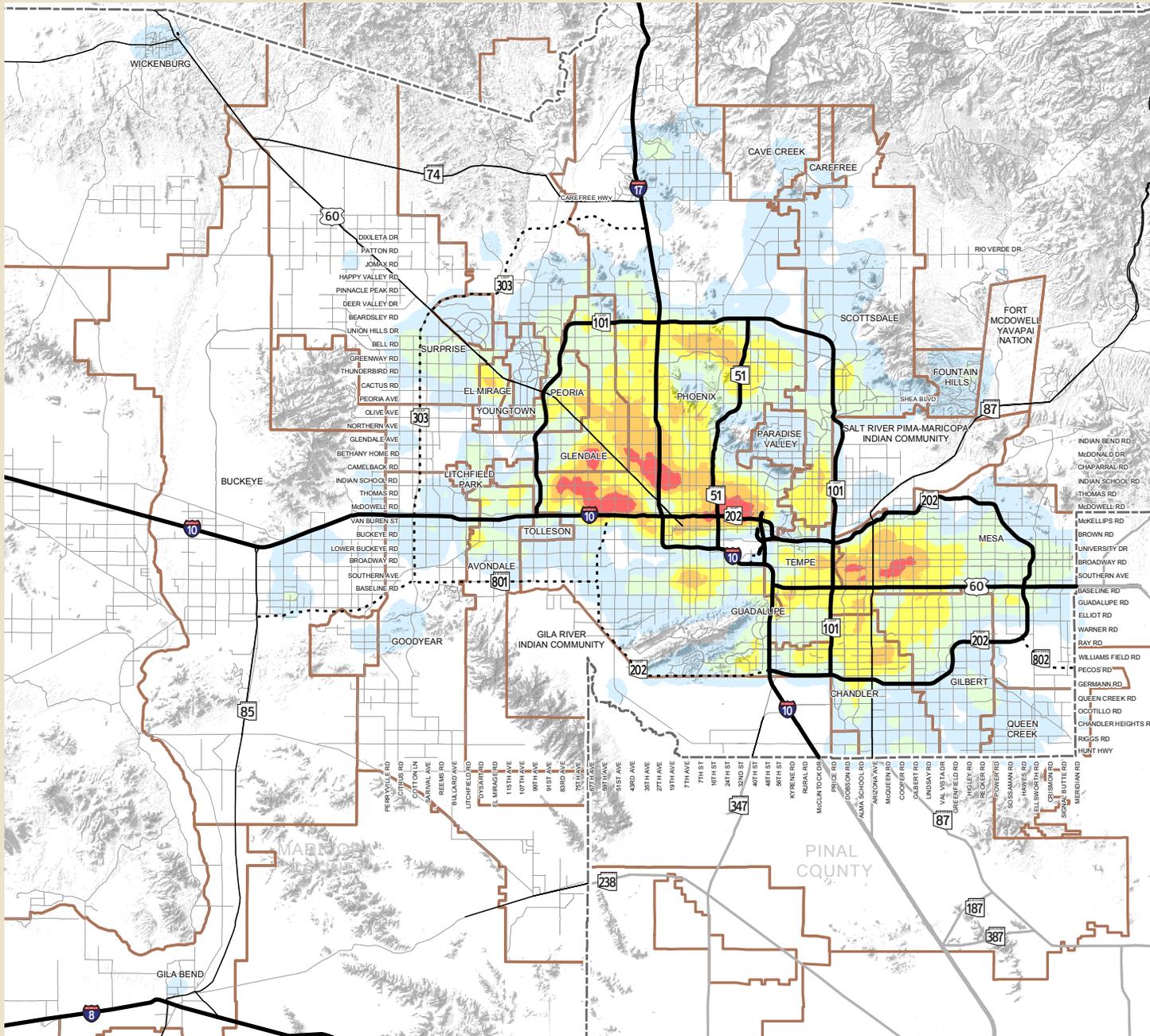


## 2005 Population Concentration

Persons Per Square Mile

(Maricopa County Average = 336)

- Less than 250
- 250 to 2,000
- 2,000 to 4,000
- 4,000 to 6,000
- 6,000 to 8,000
- More than 8,000
- Municipal Planning Area
- Existing Freeway
- Planned Freeway/Highway
- Highways
- Other Roads
- County Boundary



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# 2010 Update Regional Transportation Plan

Fig. 3-3

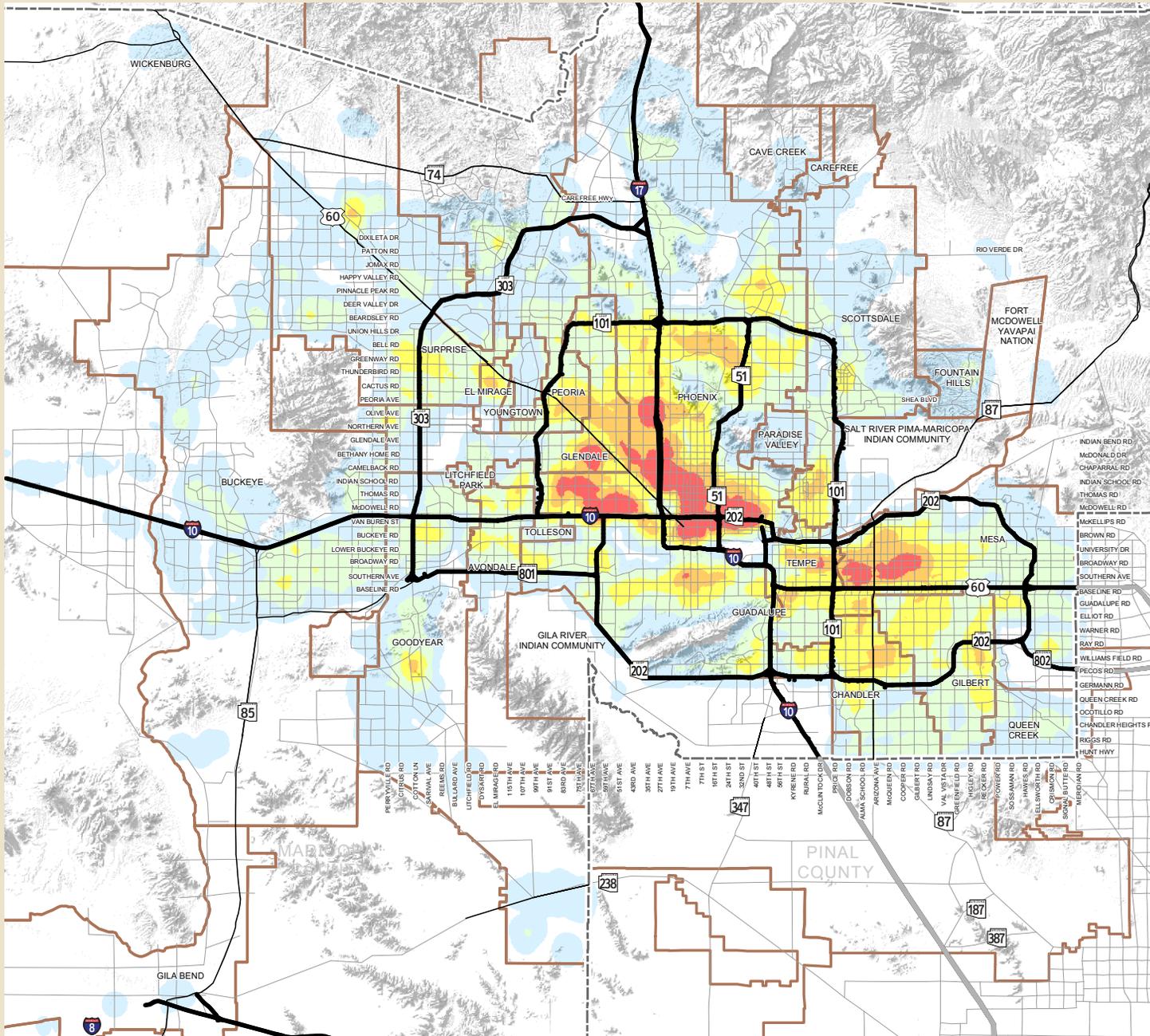
REGIONAL  
TRANSPORTATION  
PLAN



## 2030 Population Concentration

Persons per Square Mile  
(Maricopa County Average = 666)

- Less than 250
- 250 to 2,000
- 2,000 to 4,000
- 4,000 to 6,000
- 6,000 to 8,000
- More than 8,000
- Municipal Planning Area
- Freeways
- Highways
- Other Roads
- County Boundary



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Regional transportation facilities in Pinal County are planned by the Central Arizona Association of Governments (CAAG).

Alignments for new freeway, highway, arterial, and light rail/high capacity transit facilities will be determined following the completion of appropriate design and environmental studies.

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## **Employment Forecasts**

Table 3-3 displays the present projected regional employment totals by MPA, which is reported by total employment from July 1, 2005, to July 1, 2030. Total employment categories also include individuals that work at home, and all construction employment. Since construction employment typically follows development, the projected employment numbers may in fact show declines in future years for certain MPAs when the MPA growth has slowed down.

Compared to 2005, it is projected that there will be a more uniform distribution of jobs by place of work between MPAs throughout the MAG Region. Although the Phoenix MPA is expected to contain the most jobs in the region, its share declines from 46 percent of all jobs in 2005, to a figure of approximately 37 percent in 2030. In 2005, the top four MPAs of Phoenix, Mesa, Tempe and Scottsdale contained 77 percent of all jobs by place of work. By 2030, their collective share is projected to decline to 60 percent. Between 2005 and 2030, Maricopa County job growth is projected to be 1.6 million jobs, which includes the following stages of growth: 409,000 jobs between 2005 and 2010; 631,000 jobs between 2010 and 2020; and 591,000 jobs between 2020 and 2030.

## **Regional Land Use Patterns**

MAG maintains Geographic Information System regional databases of existing and future land uses for all MAG Member Agencies. The existing land use data set depicts the current status of land as it is built presently. The future land use data set is created using the current adopted General Plans and known developments from all MAG Member Agencies. Since these data sets are instrumental in developing socioeconomic projections, these data sets are updated on a regular basis. Also, these data sets are reviewed by MAG Member Agency staff to check for any errors or omissions.

Table 3-4 displays the existing and future land use data for Maricopa County. MAG also tracks known development projects in Maricopa County. Currently, the MAG development database has 990 known development projects. These projects include active, entitled and conceptual developments. These developments cover more than 460,000 acres and could add approximately 1.2 million housing units to Maricopa County.

Another consideration in regional land use patterns is the Pinal County area. The MAG transportation modeling region includes most of Pinal County, in order to take into account the transportation implications of growth outside of Maricopa County. As a part of this modeling process, projections of population, households and jobs in Pinal County were needed in order to estimate future travel demand. Working with the Arizona State Lands Department, Central Arizona Association of Governments (CAAG) and other local public agencies in Pinal County, MAG assembled databases and compiled placeholder projections. Based on this joint forecasting effort, the Pinal County portion of the MAG transportation modeling area is projected to grow from approximately 150,000 people in 2000, to approximately 1,010,000 by 2030. Total employment in the area is projected to grow from approximately 45,000 to 221,000 in the same period.

Data on known development projects from CAAG indicates that currently, Pinal County has 350 known active, entitled, and conceptual development projects. These developments cover approximately 200,000 acres and could add approximately 700,000 housing units to Pinal County.

**TABLE 3-3  
TOTAL EMPLOYMENT BY MPA  
JULY 1, 2005 and PROJECTIONS JULY 1, 2010 to JULY 1, 2030**

Municipal Planning Area (MPA)	Total Employment 2005	Total Employment 2010	Total Employment 2020	Total Employment 2030
Avondale	12,315	20,599	37,776	53,083
Buckeye	8,672	22,400	57,297	147,851
Carefree	2,669	3,270	3,992	4,329
Cave Creek	2,602	3,564	4,666	6,066
Chandler	86,732	128,244	168,141	178,116
County Areas	24,051	27,353	39,281	70,428
El Mirage	2,858	5,001	9,276	11,528
Fountain Hills	7,492	9,954	11,569	11,573
Fort McDowell	1,228	1,323	1,647	1,959
Gila Bend	1,077	1,691	2,760	6,824
Gila River	4,334	5,422	7,612	14,448
Gilbert	56,292	81,852	117,984	128,792
Glendale	88,172	117,110	156,508	171,498
Goodyear	15,794	28,167	73,622	130,336
Guadalupe	1,033	1,387	1,467	1,481
Litchfield Park	1,710	2,405	3,200	4,280
Mesa	174,909	218,085	275,236	306,030
Paradise Valley	5,769	6,717	7,707	8,734
Peoria	34,631	53,397	87,968	117,861
Phoenix	811,513	937,182	1,108,031	1,246,527
Queen Creek	4,021	9,652	22,213	35,145
Salt River	5,977	11,131	25,587	49,905
Scottsdale	181,652	208,073	232,832	252,015
Surprise	16,289	31,105	81,423	147,703
Tempe	176,688	198,243	219,543	235,616
Tolleson	12,340	15,808	19,854	22,314
Wickenburg	5,055	6,622	8,921	12,316
Youngtown	1,657	1,667	1,988	2,042
<b>TOTAL</b>	<b>1,747,532</b>	<b>2,157,424</b>	<b>2,788,101</b>	<b>3,378,800</b>

**Notes:**

Employment projections may show declines in future years, because construction employment follows development.

\*These projections include the Maricopa County portion of Peoria, Queen Creek and the Gila River Indian Community only.

The City of Apache Junction which became a MAG member in 2002, had employment of approximately 5,000 in the Year 2000. MAG has assembled databases and compiled placeholder projections based on their input for portions of Pinal County. Based upon their inp

For complete notation on this series please refer to Caveats for Socioeconomic Projections 2007.

**TABLE 3-4  
MARICOPA COUNTY EXISTING AND FUTURE LAND USE**

<b>Land Use</b>	<b>Existing Land Use (Sq. Mi.)</b>	<b>% Developed Land (Existing)</b>	<b>Future Land Use (Sq. Mi.)</b>	<b>% Developed Land (Future)</b>
<b>Residential</b>	720	12.0%	3,920	42.5%
<b>Commercial</b>	60	1.0%	120	1.3%
<b>Industrial</b>	50	0.8%	100	1.1%
<b>Office</b>	10	0.2%	20	0.2%
<b>Other/Public/Transportation</b>	160	2.7%	220	2.3%
<b>Open Space</b>	5,010	83.4%	4,540	49.2%
<b>Mixed Use</b>	0	0.0%	310	3.4%
<b>Vacant</b>	3,210		0	

Notes:

Area rounded to the nearest 10 sq. miles

This analysis is for Maricopa County only and does not include the Pinal County part of Queen Creek and Apache Junction or the Yavapai County part of Peoria and Wickenburg.

Land use data reviewed by MAG Member Agencies in 2006

### **Consistency with State and Local Planned Growth Patterns**

The regional transportation planning process maintains consistency with State and local planned growth patterns by: (1) incorporating them into the socioeconomic forecasting process, which provides the basis for travel demand modeling, and (2) taking them into account directly in subregional and corridor transportation studies.

### **Socioeconomic Forecasting**

The primary purpose of the population and socioeconomic projections developed by MAG is for input into the MAG transportation and air quality models. However, they are also used for a wide variety of regional planning programs such as human services, regional development and by MAG member agencies in developing their plans. Important objectives of the modeling process are to: (1) establish a linkage between transportation, land use and air quality models, (2) test various policy alternatives and land use scenarios, and (3) incorporate a Geographic Information System (GIS) into the process for better data sharing and review with member agencies and for maintaining an innovative approach to land use planning. The process for accomplishing each of these objectives takes into account State and local planned growth and economic development patterns.

The land use, population and socioeconomic forecasting process is based on a three-tier modeling approach. The first tier is a demographic model that is used to produce county control totals, within the state level context. The preparation of county and state level population projections is the responsibility of the Arizona Department of Economic Security (DES). This model is a

demographic model, projecting births, deaths and net migration in each county for a fifty-year time horizon. The model also takes into account short-term economic conditions. The second tier involves using a spatial interaction model to allocate the county control total population and employment to subregions. The forecasting procedure starts with regional trends, transportation facility descriptions and data on the current location of employment by sector. This information is then used to project the future location of households. The third tier allows for the allocation of the subregional population to smaller areas drawing upon land use plans and local policies of MAG member agencies. The third tier modeling process allocates population and employment from regional analysis zones to one-acre grids that are then aggregated to traffic analysis zones used in the travel demand modeling process.

The existing land use coverage is important to the projections process because it establishes areas that have already been developed or are not suitable for further development. The developed areas become ineligible for the allocation of population and employment growth, except where the area is planned for redevelopment. Non-developable areas include open space or environmentally sensitive lands, or areas where the relief makes construction infeasible. The existing land use database is digitized based on input from MAG member agencies and then circulated to the agencies for review and verification. Changes are made based on comments provided.

The Future land use coverage is also important in the forecasting process. The future land use database is based upon the plans of MAG member agencies and identifies both the type of development that is anticipated to occur in the future and the density of that development. The Future Plan Land Use database also allows for the direct comparison between existing and planned land use. The difference between the existing and planned land use databases helps determine where development may take place.

### **Subregional and Corridor Transportation Studies**

Area and corridor transportation planning studies are the foundation of the MAG regional transportation planning process. These studies assess transportation conditions within a specified geographic area or modal facility system, and evaluate potential new facilities and services, as well as improvements to existing elements. Travel demand and facility interactions over the entire region are recognized as part of this process, to ensure that compatible system improvements are being proposed.

One of the major steps in the area/corridor study process covers the inventory of land use and economic development factors. Data on existing and planned future conditions is assembled through consultation with State and local agencies. This process also includes the identification of potential land use and economic issues affecting the area or corridor under study. The information on existing and potential future conditions is a major input for identification of alternatives. Land use and economic development data and issues are also utilized as input for the development of evaluation criteria and the assessment of alternatives. This evaluation process provides insights regarding the possible land use and economic effects and helps take these factors into account in future decisions on proposed new transportation corridors or improvements to existing facilities and services.

## **CHAPTER FOUR**

### **PUBLIC INVOLVEMENT**

The transportation planning process for the development of the Regional Transportation Plan (RTP) benefits greatly by incorporating broad-based public input, which is received as the result of an extensive public involvement process. During the comprehensive update of the RTP in 2002 and 2003, MAG talked to thousands of people in an effort to identify public issues and concerns regarding future transportation needs. As part of this process, MAG held 150 public input opportunities, 173 stakeholder opportunities, and 117 agency meetings to solicit input from the public, community groups, business associations, transportation stakeholders, elected and appointed leaders, city planners, municipal technical staffs, transportation councils, and the region's Native American Indian Communities. In addition to these efforts, MAG pursues its continuing public involvement process throughout the year, which is described below.

#### **Development of the Public Participation Plan**

In response to requirements included in the Federal transportation legislation known as the Safe, Accountable, Flexible, Efficient Transportation Equity Act: a Legacy for Users (SAFETEA-LU), in 2006 MAG adopted a new Public Participation Plan as outlined in section *450.31: Interested parties, participation, and consultation*. MAG's previous public involvement process was adopted in 1994 and enhanced in 1998, and was pivotal in obtaining ongoing input to the regional transportation planning process.

As required under SAFETEA-LU, the purpose of the new MAG Public Participation Plan is to “define a process for providing citizens, affected public agencies, representatives of public transportation employees, freight shippers, providers of freight transportation services, private providers of transportation, representatives of users of public transportation, representatives of users of pedestrian walkways and bicycle transportation facilities, representatives of the disabled, agencies or entities responsible for safety/security operations, providers of non-emergency transportation services receiving financial assistance from a source other than Title 49, United States Code (U.S.C), Chapter 53, and other interested parties with reasonable opportunities to be involved in the transportation metropolitan planning process.”

The new Public Participation Plan was developed in consultation with all interested parties, and a public comment period of 45 days was provided for review before adoption. The approach to the public involvement process laid out in the MAG Public Participation Plan is described below.

#### **MAG Public Involvement Process**

MAG's public involvement process, as presented in its Public Participation Plan, is divided into four phases: Early Phase, Mid-Phase, Final Phase and continuous involvement. The Early Phase meetings ensure early involvement of the public in the development of these plans and programs. The Mid-Phase process provides for input on initial plan analysis for the RTP and Transportation Improvement Program (TIP), and includes a public hearing on regional transportation issues. The Final Phase provides an opportunity for final comment on the RTP, TIP and Air Quality

Conformity Analysis and also includes a public hearing. In addition, continuous outreach is conducted throughout the annual update process and includes activities such as distributing press releases and newsletters, presentations to community and civic groups, information booths, and special events coordinated with the Arizona Department of Transportation (ADOT), Regional Public Transportation Authority (Valley Metro), Valley Metro Rail (METRO) and the City of Phoenix Public Transit Department. All of the comments received through MAG's public involvement process are summarized and provided to the Management Committee, Transportation Policy Committee and Regional Council in the form of input opportunity reports. It is important to note that the public involvement process is tied to the planning and programming process. If there are changes in the planning and programming cycles, there will be changes to the public involvement phases. Due to a variety of factors, the planning and programming cycles changed during FY 2009 and FY 2010, and did not exactly follow the phases outlined in the adopted MAG Public Participation Plan. However, MAG continued to conduct a proactive, inclusive public outreach process and will look to update its Public Participation Plan to reflect any changes when the new cycles have been determined.

### **Public Input Activities**

The Early Phase is generally conducted from August through October, the Mid-Phase from February through March, and the Final Phase June through July. As noted previously, the planning and programming cycles did change for FY 2009 and FY 2010, and these changes will be reflected in this report. There are many ways in which MAG obtains input during these phases, from small group presentations to open houses to special events. In addition, continuous outreach is conducted throughout the annual update process and includes activities such as:

- **Coordination with the Citizens Transportation Oversight Committee (CTOC)** - In 1996, MAG expanded membership of the Regional Council to include the chairman of CTOC as an ex-officio member on matters relating to the Regional Freeway System. Providing CTOC membership on the Regional Council provides citizen representation and ensures citizen involvement on important matters relating to the MAG freeway plan.
- **Public Presentations to Groups** - MAG staff provides speakers upon request to make presentations to community and civic groups.
- **Traditionally Underserved Populations** - Through its public involvement process, MAG seeks to provide Title VI communities and low-income communities access to public information on, and an opportunity for public participation in, matters relating to human health or the environment, especially as they relate to MAG's transportation plans and programs. MAG recognizes that environmental justice is more than a set of legal and regulatory obligations. Following environmental justice principles and procedures will improve all levels of transportation decision-making. In addition, through Valley Metro and the MAG Elderly and Persons with Disabilities Transportation Committee, the needs of elderly and people with disabilities are addressed under the Regional Complementary Paratransit Plan. In addition, MAG seeks and considers the needs of those traditionally underserved by existing transportation systems by collaborating with the human services planning staff at MAG, which plans for services for low-income, elderly and disabled populations. MAG transportation plans and programs are submitted to the Human Services

Coordinating Committee for review. Additionally, MAG provides multimodal transportation information for review and comment to the Human Services planning process.

- **Open Meetings** - MAG conducts meetings in accord with open meeting laws. Meetings of technical committees, working groups, the Management Committee, Transportation Policy Committee and the Regional Council are open to the public.
- **Regional Council Comment Period** - Citizens are provided opportunities to speak at each Regional Council meeting. The first opportunity is during a Call to the Audience, in which members of the public can comment on items not on the agenda that fall under MAG's jurisdiction, or on items that are on the agenda but are not scheduled for action. Citizens are also given an opportunity to comment on Consent Items, and on any Action Item. Citizens have three minutes to comment during each opportunity, but may exceed three minutes at the discretion of the Chair.
- **MAG Web Site** - The MAG Web site lists information about member agencies, committee meetings and activities, planning activities, input opportunities, press releases, schedules of events, minutes, agendas and publications. The Internet address of the MAG Web site is [www.mag.maricopa.gov](http://www.mag.maricopa.gov). In addition to the main MAG Web site, MAG also maintains project specific sites such as [www.LetsKeepMoving.com](http://www.LetsKeepMoving.com), devoted to the Regional Transportation Plan, and [www.WebofFriends.org](http://www.WebofFriends.org), focusing on domestic violence.
- **Newsletters** - Newsletters report information of general interest on events and programs at MAG, as well as on specific items such as the RTP and the TIP. The newsletter also includes a calendar of meetings and input opportunities.
- **Press Releases** - Press releases are prepared and distributed to local media in conjunction with periodic news events.
- **Meeting Notices and Advertisements in Principal Newspapers** - All of the formal public hearings and public involvement opportunities are announced with public notices and/or display advertisements in the largest circulation newspaper and in minority-oriented newspapers. Where appropriate, information is provided in a bilingual format. Meeting notices for the RTP and the TIP are typically sent two weeks in advance.
- **Direct Mailing** - MAG maintains a current mailing list that includes interested citizens, affected transportation agencies and other public agencies, representatives of environmental and resource agencies, private providers of transportation, advocates for low income and minority interests, and representatives of community groups with an interest in transportation. This mailing list is used to announce meetings, distribute newsletters, and for other opportunities for public involvement. Interested individuals are added to the mailing list upon request.
- **Staff Contacts** - The name of an appropriate staff contact is published in the RTP, the TIP and other transportation documents, as well as on project pages of the MAG Web site.

## **Other Input Opportunities**

MAG hosts and participates in many other input opportunities for the public, such as freeway openings, transportation fairs, public hearings and a variety of other special events throughout the year. Before the completion of plans and programs, draft documents are available to the public for review and comment, so that public concerns can be considered and reflected in the final documents. Upon completion, draft studies, plans, programs and reports are presented to the Management Committee, Transportation Policy Committee and Regional Council for review and action and are available for public review. Historical reference files of all documents are maintained and these reports are also available for public review.

MAG has a diverse committee structure that involves technical professionals, administrative personnel, elected officials, business interests and citizen volunteers, representing every jurisdiction and many professions and interest groups. The meetings of the committees follow the policy described above under “Open Meetings.”

## **Visualization Techniques**

With the help of its graphics, Web, and Information Services staff, MAG utilizes many innovative techniques to help residents better understand what transportation investments are included in its transportation plans and TIPs, and to help them visually conceive what the plans will look like when completed. Examples include project-specific maps and graphs, digital photography, high resolution graphic displays, Geographical Information Systems, map overlays, PowerPoint presentations, aerial photography, photo simulations, technical drawings, charts and graphs. Alternative scenarios, including visual depictions of scenarios, are presented to demonstrate differences among solutions or approaches.

In 2008, MAG’s description of visualization techniques in its Public Participation Plan was cited by the Federal Highway Administration (FHWA) as a notable practice in Metropolitan Planning Organizations throughout the nation. MAG’s techniques are highlighted in the FHWA’s *Public Involvement/Public Participation Transportation Planning Process Resource Guide*.

## **Fiscal Year 2009 - 2010 Public Involvement Programs**

The FY 2009 and FY 2010 public involvement programs represented a coordinated process to solicit input on the 2010 Update of the RTP and FY 2011-2015 TIP Update. Due to a variety of factors, changes to the planning and programming schedules were required. These changes affected the timing and manner in which MAG conducted its FY 2009 and FY 2010 public input process. MAG public involvement staff continued to participate in large special events and make small group presentations. MAG staff also presented the information gathered from these events and presentations to MAG policy committees for review and consideration. Where possible, ADOT, Valley Metro, METRO and the City of Phoenix Public Transit Department participated with MAG in its public outreach efforts. A description of each phase of the update process follows.

### **FY 2009 Early Phase Input Opportunity**

In previous years, the Maricopa Association of Governments (MAG), Arizona Department of Transportation (ADOT), Valley Metro and Valley Metro Rail (METRO) have co-hosted an Early Phase Transportation Stakeholders meeting at the beginning of the update process. These meetings are held to obtain input on potential Valley transportation projects. This year, however, the only unprogrammed federal funds available were for air quality projects such as paving dirt roads and purchasing PM-10 street sweepers. Therefore, instead of hosting a meeting at MAG, residents were encouraged to submit comments/requests/suggestions in writing, via e-mail or by telephone.

MAG also participated in a variety of special events and provided a number of presentations throughout the Valley to inform residents of ongoing projects and gather input.

- **Continued Input Opportunities During the Early Phase** - Other input opportunities during the Early Phase included special events, small and large group presentations as well as telephone and Web site correspondence. MAG participated in several special events in conjunction with ADOT, Valley Metro and METRO including the Martin Luther King Day Festival, North Scottsdale Realtor Expo, Hispanic Women's Conference, Independent Living Summit, Arizona Disability Expo, National Federation of the Blind of Arizona Statewide Conference, four Latino Institute events, Tempe Tardeada, Chicanos Por La Causa Spanish Language Business Expo, One Stop Over the Top Community Health and Information Fair, John F. Long Community Information Fair, Scottsdale Hispanic Heritage Festival, EarthFest, Governor's Council on Developmental Disabilities Legislative Awareness Day and Traumatic Brain Injury Sufferer's Conference. Group presentations included the United Cerebral Palsy group, National Federation of the Blind of Arizona Statewide Conference presentation, Compass All Disabilities, Stroke Survivors group, Traumatic Brain Injury and Stroke Survivor Caregiver's group, Brainstorm Brain Injury support group, Tempe Brain Injury Survivors group, Mild Brain Injury support group, Myositis Support group, Families of Brain Injury Survivors group, Arizona Bridge to Independent Living (two presentations), Foundation for Blind Children (two presentations), STAR (Staying Together and Recover – mental illness group), among others. Events included the Hispanic Women's Conference, EarthFest Educators Night, National Federation for the Blind of Arizona Statewide Conference, , Tempe Tardeada and National Public Lands Day. MAG reached hundreds of people during this time and was able to distribute information and gather public input on transportation plans and programs.
- **Extended Public Comment Periods at MAG Transportation Committee Meetings** - During the Early Phase period, all MAG transportation committee meetings included public comment periods. All meetings were held at the MAG offices in downtown Phoenix. The following committees offered public comment periods: Air Quality Technical Advisory Committee, Intelligent Transportation Systems Committee, Pedestrian Working Group, Regional Bicycle Task Force, Street Committee, Telecommunications Advisory Group, Transportation Review Committee, Transportation Safety Committee, Management Committee, Transportation Policy Committee and Regional Council.

### **FY 2009 Mid-Phase Input Opportunity**

The Mid-Phase is generally used to solicit public on draft plans and programs. A Transportation Public Hearing was held in June 2009, and e-mail and telephone responses to public inquiries were

provided on a continuing basis. At the public hearing, staff from MAG, ADOT, Valley Metro, METRO and the City of Phoenix Public Transit Department gathered to hear public comment. A court reporter was in attendance at the hearing to take down comments verbatim. All comments/suggestions/concerns received at the public hearing received a formal response. All correspondence was included in a presentation and report provided to the Management Committee, Transportation Policy Committee and Regional Council for review and consideration prior to any action.

### **FY 2009 Final Phase Input Opportunity/FY 2010 Early Phase Input Opportunity**

The Final Phase carried beyond FY 2009 somewhat and was conducted in the fall of 2009, due to the planning and programming schedule shifts noted above. As a result, this phase also served as the FY 2010 Early Phase Input Opportunity. This phase included a variety of input opportunities, culminating with a public meeting conducted in November 2009. All comments, suggestions, and concerns received at the public meeting received a formal response. All correspondence was included in a presentation and report provided to the Management Committee, Transportation Policy Committee and Regional Council for review and consideration prior to any action.

### **FY 2010 Mid-Phase and Final Phase Input**

The public involvement process for the FY 2010 Mid-Phase and Final Phase elements followed the scheduled outlined in the MAG Public Participation Plan. The Mid-Phase Input Opportunity provides for input on the Draft RTP and Transportation Improvement Program (TIP), including a public hearing. The Final Phase provides an opportunity for final comment on the Draft RTP, TIP and Air Quality Conformity Analysis, and also includes a public hearing. All of the comments received through MAG's public involvement process are summarized, presented and provided to the Management Committee, Transportation Policy Committee and Regional Council in the form of input opportunity reports. A transportation public hearing was held on March 19, 2010, and the results were reported in the MAG FY 2010 Mid-Phase Input opportunity Report dated April 2010. A public hearing was conducted on the Draft RTP 2010 Update, the Draft FY 2011-2015 MAG Transportation Improvement Program, and the Draft Air Quality Conformity Analysis on June 21, 2010. Comments received at this hearing were provided in the FY 2010 Final Phase Input Opportunity Report.

### **Continuous Involvement**

As part of the continuous outreach process, MAG staff presented information on transportation planning and programming to a number of committees, groups and the media, including:

- Attended meetings of the Citizens Transportation Oversight Committee.
- Numerous special events co-hosted by MAG staff in conjunction and coordination with ADOT, Valley Metro, METRO and the City of Phoenix Public Transit Department.
- Provided feedback pages on all project pages of the Web, and responded to all comments received.

- Provided responses to public inquiries via Web site, telephone, and e-mail or written correspondence.
- Accommodated all public records requests.

## CHAPTER FIVE

### TITLE VI AND ENVIRONMENTAL JUSTICE

The intent of environmental justice (EJ) is to ensure that communities of concern, defined as minority populations, low income populations, aged populations, mobility disabled populations, and female head of household populations, are included in the transportation planning process, and to ensure that they may benefit equally from the transportation system without shouldering a disproportionate share of its burdens. Environmental justice is a planning consideration based on Title VI of the 1964 Civil Rights Act, and Executive Order 12898 of 1994, entitled *Federal Actions to Address Environmental Justice in Minority and Low Income Populations*.

MAG recognizes the significance of transportation to all residents of the metropolitan area and the importance of Title VI/Environmental considerations in the transportation planning process. As a result, an environmental justice analysis of the RTP has been prepared.

Environmental justice principles that relate to the development of the RTP include:

- Ensuring the full and fair participation by all potentially affected communities in the transportation decision-making process, including those of low income or minority populations.
- Preventing the denial of, reduction in, or significant delay in the receipt of benefits by low income and minority populations.
- Avoiding, minimizing or mitigating disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority and low income populations.

#### **Public Involvement Process for Title VI/EJ Communities**

MAG's adopted policy for public involvement identifies opportunities for public input early on in the process, during the planning process, and prior to final hearings. The process provides complete information on transportation plans, timely public notice, full public access to key decisions, and opportunities for early and continuing involvement in the process for all segments of the region's population, including Title VI and environmental justice communities.

MAG addresses underserved populations in a number of ways. Whether it is through the Title VI Community Outreach Program, GIS mapping, the Human Services Division of MAG, or through programs administered by the Regional Public Transportation Authority (RPTA) using MAG funds, the needs of the underserved are considered. Numerous public outreach activities have been conducted as part of the MAG RTP outreach efforts. These include staffed information booths, public workshops and meetings, attendance at events, presentations, and open houses. The outreach activities have been targeted to both specific minority groups and the general public as a whole.

During these public outreach activities, public comments on transportation issues are solicited from

a full range of participants. Feedback provided at these meetings and events is considered by MAG committees in the updating of the RTP. MAG's outreach to minority populations also involves the Spanish translation of RTP materials and documents. In addition, through RPTA's paratransit planning efforts, the needs of the elderly and people with disabilities are served. In addition, a MAG committee reviews and prioritizes applications for federal assistance under the Elderly Persons with Disabilities Transportation Fund, which provides capital investments to programs serving the elderly and people with disabilities. Additionally, MAG provides multi-modal transportation information for review and comment through the Human Services planning process.

**Communities of Concern**

Title VI of the 1964 Civil Rights Act and related statutes require that individuals not be excluded from participating in, denied the benefit of, or subject to discrimination under any program or activity receiving federal funding on the basis of race, color, national origin, age, sex, or disability. Executive Order 12898 further directs that federal programs, policies and activities not have a disproportionately high and adverse human health and environmental effect on low income populations.

Five communities are included in the Title VI/EJ Analysis. Table 5-1 lists these five communities and the proportion of the county population represented by each one. To identify the specific areas within the county, census tracts with concentrations of each community greater than the county average were identified for analysis.

**TABLE 5-1  
COMMUNITIES OF CONCERN FOR MARICOPA COUNTY**

Category	Population		Census Tracts			
	Population	Percent	Number of Tracts $\geq$ County Average	% Tracts	Affected Population	% of Targeted Population Captured in Tracts
Maricopa County	3,072,149	100%	663	100%	--	--
Minority	1,037,619	34%	238	36%	699,429	67%
Age 60+	466,269	15%	197	30%	280901	60%
Poverty	355,668	12%	234	35%	255373	72%
Mobility	368,306	12%	296	45%	235200	64%
Female Hsehd.	71,467	2%	322	49%	51639	72%

Source: U.S. Census - 2000

The 2000 U.S. Census is the source of data used for determining the environmental justice communities of concern. The unit of analysis is the census tract. Census tracts are intended to remain relatively stable, and when they do change, the exact nature of the changes is published. Census tracts are drawn up by local committees, and accordingly are more likely to reflect the community's view of where one neighborhood ends and another begins. Tracts also are comparable in population size.

Communities of concern are identified as those tracts where the identified group represents a percentage of the population equal to or greater than that of the County mean. Federal guidelines

state that minority populations should be identified where either (a) the minority population of the affected area exceeds 50 percent, or (b) the minority population percentage of the affected area is measurably greater than the minority population percentage in the general population or other appropriate unit of geographic analysis (CEQ, 1997).

The populations identified as communities of concern included the specific groups called out by the Federal Highway Administration's "Actions to Address Environmental Justice in Minority Populations and Low Income Populations" memorandum dated December 2, 1998, and by Presidential Executive Order 12898. Each of these populations is addressed below.

## **Environmental Justice Analysis**

Each of the three major components of the RTP (freeways/highways, transit and arterial roads) was analyzed separately in this environmental justice analysis to assess the distribution of benefits of projects included within the RTP. Regional funding of the arterial street system is about nine percent of the Plan, and represents approximately 10 percent of the region's arterial street funding. Analysis of the distribution of the arterial streets projects is included here to provide a consistent treatment of each of the major components of the Plan. The entire arterial system provides broad coverage throughout the region and is generally developed in consistency with growth patterns.

## **Minority Populations**

The Federal Highway Administration defines minority populations as American Indian or Alaskan Native; Asian or Pacific Islander; Black; not of Hispanic Origin; or Hispanic (FHWA, 1998). For the MAG RTP study this definition was expanded to include the following ethnic groups, as defined in the U.S. Census (2000): Black or African American alone - not Hispanic or Latino; American Indian and Alaska Native alone - not Hispanic or Latino; Asian alone - not Hispanic or Latino; Native Hawaiian and Other Pacific Islander alone - not Hispanic or Latino; some other race alone - not Hispanic or Latino; persons of two or more races - not Hispanic or Latino; and Hispanic or Latino (2000 U.S. Census SF4).

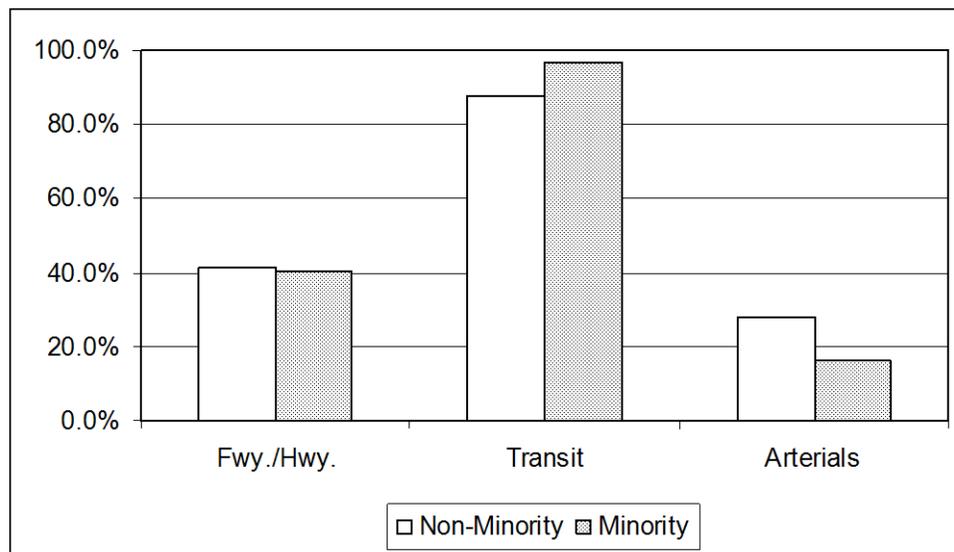
Minorities represent 33.8 percent of the population in Maricopa County. Census tracts equal to or greater than this percent number 238, or 36 percent of the 663 tracts in the County. Within these 238 tracts, 70 percent of the minority population in the County is found. The areas with a higher concentration of minorities (i.e. greater than one standard deviation above the mean) are the central and southwestern areas of Maricopa County, and the sovereign nations of the Gila River Indian Community (GRIC), the Salt River Pima-Maricopa Indian Community (SRPMIC), the Gila Bend Reservation of the Tohono O'Odham, and the Fort McDowell Mohave-Apache Reservation Indian Community. The tracts with the highest concentration of minorities (i.e. greater than two standard deviations above the mean) are primarily located within the central Phoenix area, south of Thomas Avenue.

The transportation needs of minority populations are the same as society as a whole (ignoring economic status that is considered in the next section). Thus, transportation facilities in minority communities should be the same as those in non-minority communities. Figure 5-1 presents a comparison, using census tracts as the measure, of the number of tracts served by freeway/highway, transit and arterial projects in the RTP in both minority and non-minority communities.

The percent of minority (40 percent) and non-minority (41 percent) communities that are served by new freeways or widening of existing freeways and highways is nearly identical. Planned transit improvements serve 97 percent of minority communities and 88 percent of non-minority communities. Arterial streets projects addressed by regional funding serve 16 percent of the minority communities compared to 28 percent for non-minority; These projects are primarily located in areas outside of the core metropolitan area where the majority of tracts with above average concentrations of the communities of concern exist. Because of the mature character of these core areas, transit improvements often represent the most advantageous approach to improving mobility.

Based on the review of freeway/highway, transit and arterial improvements, it is concluded that the RTP provides equal or better benefits to minority communities without causing disproportionately high adverse impacts.

**FIGURE 5-1  
MINORITY COMMUNITIES AFFECTED BY THE RTP**



### Low Income Populations

Low income populations are those whose median household income is at or below the Department of Health and Human Services poverty guidelines (2000 U.S. Census SF3). Poverty is based on the poverty thresholds developed and utilized by the U.S. Census, and are based on the size of family and number of related children less than 18 years of age. The poverty thresholds are revised annually to allow for changes in the cost of living. It is important to note that the poverty thresholds are the same for all parts of the country - they are not adjusted for regional, state or local variations in the cost of living.

To a great extent, the census tracts of higher than average minority populations are coincident with the tracts that contain a higher than average percentage of people living in poverty. Areas where

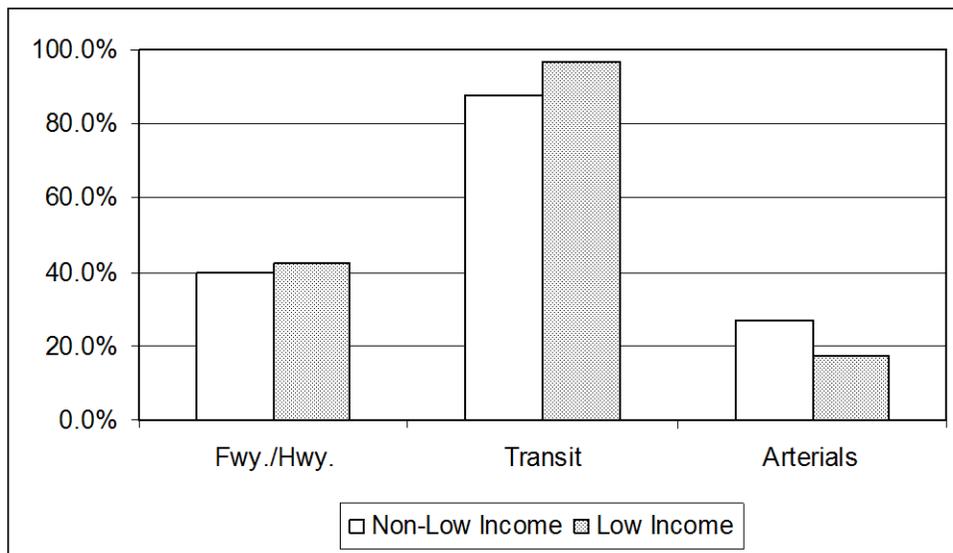
poverty is above the County average, but minority populations are not, include the northwestern portion of the County and areas of Mesa, Buckeye and North Phoenix. The tracts with the highest concentrations of persons living in poverty include Central Phoenix south of McDowell Road, the Gila River Indian Community, and the Tohono O'Odham Indian Community.

The transportation needs of low income communities would be met by more transit service than what would be important to the general population. Figure 5-2 presents a comparison of the number of census tracts served by the RTP in both low income and non-low income communities.

Low income communities that are served by the new freeways and widening of existing freeways and highways (43 percent) is slightly higher than communities identified as non-low income (40 percent). Transit improvements serve nearly all of the census tracts identified as low income (97 percent) and 88 percent of the non-low income tracts. Arterial street projects included in the RTP funding serve approximately 17 percent of the low income communities compared to 27 percent for non-low income; which are largely coincident with the minority tracts discussed in the previous section.

The analysis of the Plan improvements demonstrates that low income populations benefit from the Plan at about the same level, or in the case of transit considerably higher, than the census tracts not identified as low income.

**FIGURE 5-2  
LOW INCOME COMMUNITIES AFFECTED BY THE RTP**



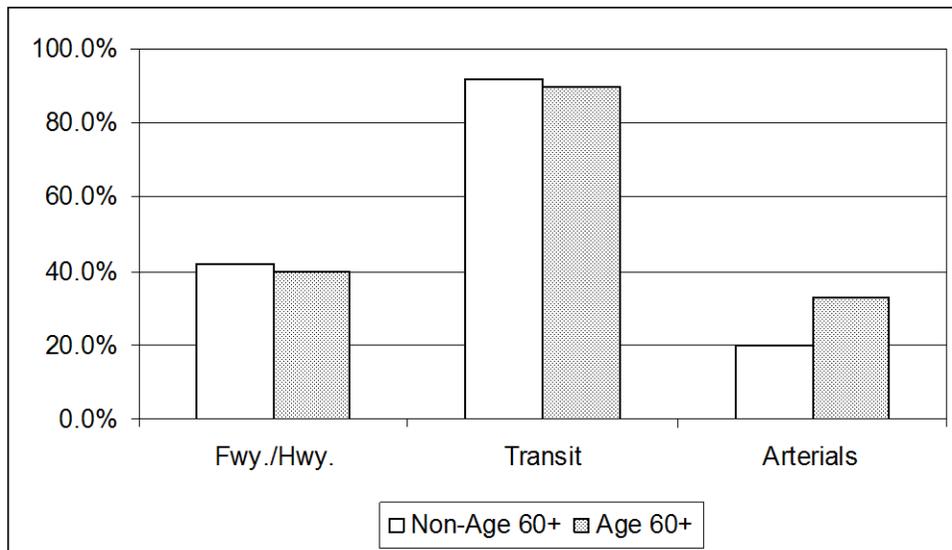
### Aged Populations

Aged populations are defined as people 60 years of age and older (2000 U.S. Census SF1). Areas with above average populations of age 60-plus persons are primarily located in the northern part of the County, with concentrations overlapping the concentrations of mobility-disadvantaged peoples

as identified in the following section. The transportation needs of aged populations are similar to those of the general population, with the need for transit increasing with age.

Figure 5-3 presents a comparison of the number of census tracts served by the RTP in age 60 plus communities and under age 60 communities. The age 60-plus communities are served about the same as the other age groups in both freeway (around 40 percent) and transit (around 90 percent) funding. Arterial streets projects included in the RTP funding serve approximately 33 percent of the age 60-plus communities; higher than the number of below-60 tracts served (20 percent). This is indicative of the fact that many of the tracts containing higher than average age 60-plus communities are located outside of the metropolitan area core.

**FIGURE 5-3  
AGE 60+ COMMUNITIES AFFECTED BY THE RTP**



### Mobility Disability Populations

Mobility Disability as defined in 42 U.S.C. § 12102, is a disability that necessitates the use of a wheelchair or scooter for mobility. For this study, mobility limitations are derived from the “physical” and “going-outside-of-home” categories for individuals that are age five and over (2000 U.S. Census SF3).

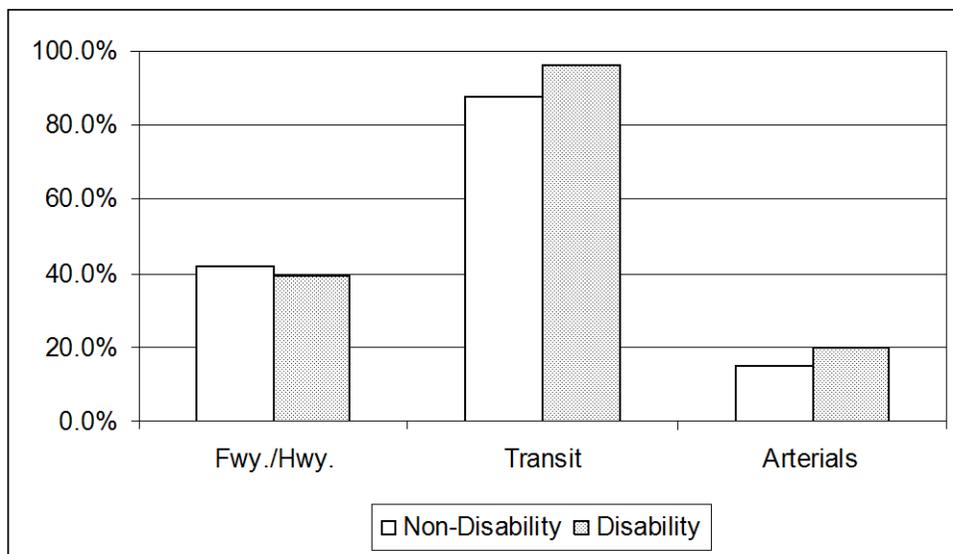
Census tracts with an above average percentage of mobility-disadvantaged people are widely scattered throughout the County, with notable concentrations in the unincorporated Sun City and Sun Lakes areas of Maricopa County, Youngtown, and south of East University Drive in Mesa.

Transportation needs of residents with mobility disabilities are not the same as those of the general population. People with mobility disabilities may require special apparatus for vehicular transportation. For this and other reasons, people with mobility disabilities may be more reliant on the transit options to meet their transportation needs. Figure 5-4 presents a comparison of the

number of census tracts served by the RTP in both mobility disability and non-mobility disability communities.

The number of Mobility Disability communities that are served by the new freeways and widening of existing freeways and highways (40 percent) is slightly lower than those not identified as mobility disability communities (42 percent). Transit improvements serve nearly all of the census tracts identified as mobility disability (96 percent). In addition to the transit coverage, the plan would regionally fund ADA complimentary paratransit service. Arterial street projects included in the RTP funding serve approximately 20 percent of the mobility disability communities, which is higher than the number of tracts identified as non-mobility disability.

**FIGURE 5-4  
MOBILITY DISABILITY COMMUNITIES AFFECTED BY THE RTP**



### Female Head of Household Populations

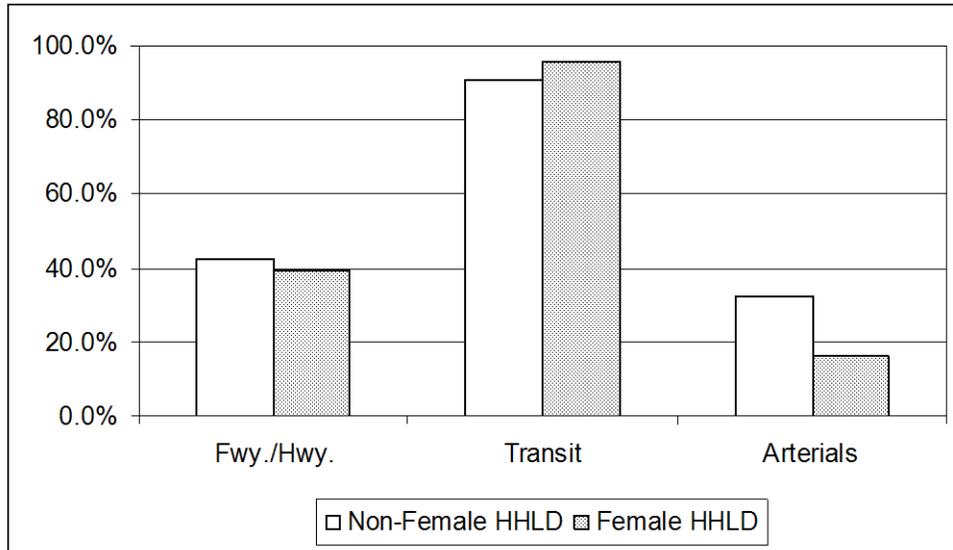
The female head of household category represents those households with a female householder, with no husband present, and with their own children under 18 years of age. Areas of “female head of household with children” greater than the county average are widely dispersed through the central Phoenix metropolitan area. Outside of the urban core the areas above the county average are largely limited to the Indian Communities. While census tracts above the county’s average for female head of households with children are largely coincident with poverty, they are more widely dispersed across the county than both low income and minority tracts.

The transportation needs of the female head of household populations are no different than that of the general population. Figure 5-5 presents a comparison of the number of census tracts served by the RTP in both female head of household and non-female head of household communities.

The percent of female head of household (39 percent) and non-female head of household (43 percent) communities that are served by new freeways or widening of existing freeways and

highways is nearly identical. Planned transit improvements serve 96 percent of female head of household communities and 91 percent of non-female head of household communities. Arterial streets projects included in the RTP funding serve approximately 16 percent of the female head of household census tracts. The RTP provides equal or better benefits to female head of household communities without causing disproportionately high adverse impacts.

**FIGURE 5-5  
FEMALE HEAD OF HOUSEHOLD COMMUNITIES AFFECTED BY THE RTP**



### Conclusion

MAG endeavors to incorporate environmental justice into regional transportation planning is an ongoing effort. Reaching out to disadvantaged communities and assessing their needs and interests is paramount to ensuring the continued quality of life of all residents in the Metropolitan Area.

MAG has demonstrated a commitment to listening to residents through continuous outreach efforts, and numerous events and activities have been held. To be effective, these efforts must be sustained, and the updating and expansion of contacts ongoing. Through the continued expression of this outreach effort, transportation planning for the region can equitably address the needs of all residents.

Approximately 40 percent of the census tracts for each of the communities of concern (minority, female head of household, poverty, disability and age 60+) are served by the improved freeway/highway network; virtually the same as the 40 percent of the non-minority census tracts that are served. Similar results were found in transit where around 90 percent or more of the communities of concern were served by the transit network; whereas, a slightly lower number of non-community of concern census tracts were affected.

The overlay analysis relies on proximity to transportation improvements as a measure of equity in the transportation planning process. Proximity is an important issue; however, it is only one of many issues related to transportation equity. Direct access to transit may be a benefit, however, locating a freeway in close proximity to a neighborhood may not be of benefit. Individual project impacts must, and will be addressed on a project-by-project basis. For those without cars in a region as geographically dispersed as the Phoenix Metropolitan area, transit provides a critical link to jobs, shopping and recreation. The 2000 Census reported that approximately two percent of the County's population used public transportation to travel to work, with an additional one percent regularly bicycling or walking to work. Reviewing the 2000 Census data, there appears to be a direct correlation between income and transit dependency.

Reaching out to address this need, the RTP increases funding for transit to 33 percent of the sales tax extension from the approximate two percent in the prior sales tax, demonstrating a growing commitment to provide transportation options for all residents of Maricopa County.

## CHAPTER SIX

### CONSULTATION ON ENVIRONMENTAL MITIGATION AND RESOURCE CONSERVATION

The process to develop transportation improvements to meet the travel demands of a growing metropolitan area, such as the MAG Region, must address a variety of concerns related to resource conservation and environmental mitigation. This issue is a key element of the metropolitan transportation planning process identified in the Federal Safe, Accountable, Flexible, and Efficient Transportation Equity Act – A Legacy for Users (SAFETEA-LU), which was signed into law on August 10, 2005. SAFETEA-LU includes requirements for consultation with state and local agencies regarding conservation plans and maps, as well as inventories of natural or historic resources. This legislation also calls for consultation with Federal, State, Tribal, wildlife and regulatory agencies on potential environmental mitigation activities.

#### **Environmental and Resource Factors in MAG Transportation Planning**

The MAG long range transportation planning process is structured to make planning decisions and prepare planning products that are sensitive to environmental mitigation and resource conservation considerations. A major element in this effort is consultation with environmental and resource agencies, as part of the annual update of the Regional Transportation Plan.

Another major environmental and resource element in the MAG transportation planning process is the air quality conformity analysis of the MAG TIP and the RTP. For a finding of conformity, the analysis must demonstrate that the TIP and RTP are in conformance with regional air quality plans and will not contribute to air quality violations. In its entirety, the conformity analysis must also demonstrate that the criteria specified in the federal transportation conformity rule for a conformity determination are satisfied by the TIP and RTP. A description of the conformity tests and results of the conformity analysis is provided in Chapter 23.

A further environmental and resource aspect of the transportation planning process is contained in MAG area and corridor transportation studies. As a part of these studies, environmental and resource factors are assessed, and agencies are solicited for early input so that environmental mitigation and resource conservation considerations are taken into account at all key stages of the planning effort.

#### **Agency Consultation Process**

As part of the planning process for the update of the Regional Transportation Plan (RTP), MAG reaches out to Federal, State, Tribal, regional, and local agencies to consult on environmental and resource issues and concerns. Specific topics of interest include: land use management, wildlife, natural resources, environmental protection, conservation, historic preservation, and potential environmental mitigation activities. The primary goal of this consultation effort is to make transportation planning decisions and prepare planning products that are sensitive to environmental mitigation and resource conservation considerations. It should also be noted that all of the cities and towns in Maricopa County, and the Arizona Department of Transportation (ADOT) are routinely involved in the RTP and its development, as members of MAG.

An important consideration in the consultation process is the recognition that previously adopted projects in the RTP undergo extensive environmental and resource impact assessment by the implementing agencies, such as the ADOT, the Regional Public Transportation Authority (RPTA), cities, towns and Maricopa County. With these processes already well established, including requirements for input on mitigation and resource issues, the primary goal of the RTP consultation effort is to gain insight regarding concerns that may potentially involve future transportation planning efforts and future Plan elements. This approach avoids duplicating work efforts and burdening agencies with multiple requests for the same information.

### **Environmental and Resource Agency Involvement**

The overall approach to the consultation process includes three types of activities: agency workshops, individual agency meetings, and participation in the MAG public involvement process.

- **Agency Workshops** - The consultation effort includes workshops held for the agencies involved in environmental and resource issues in the MAG Region. A comprehensive listing of the agencies that are invited to attend workshops is provided in Table 6-1. The purpose of the workshops is to receive input from the environmental and resource agencies, regarding the application of environmental mitigation and resource conservation concepts in the transportation planning process.
- **Individual Agency Meetings** - In addition to the workshops, separate meetings with individual agencies to discuss resource conservation and environmental mitigation issues are held, as may be appropriate. These meetings provide the opportunity to have detailed discussions on concerns and issues, as well as identify available data and information resources in depth.
- **MAG Public Involvement Process** - As part of the overall consultation process, the environmental and resource agencies are included in the MAG public involvement process. The MAG public involvement process is divided into four phases: early phase, mid-phase, final phase and continuous involvement.

### **FY 2007 Agency Workshop**

As part of the process to prepare the 2007 Update of the RTP, MAG conducted an extensive outreach program to obtain input from environmental and resource agencies. This effort was initiated with an agency workshop, which was held on August 17, 2006. The workshop provided an opportunity to familiarize the agencies with MAG's organization and planning responsibilities, as well the goals of the consultation process. Most importantly, agency input was obtained on environmental mitigation and resource conservation issues, available databases and other information resources, and future steps in the planning process.

Following the workshop, MAG staff held additional individual meetings with thirteen key environmental and resource agencies during September/October 2006. These meetings afforded the opportunity to conduct in depth discussions regarding concerns specific to those agencies. In

**TABLE 6-1**  
**RESOURCE AND ENVIRONMENTAL AGENCIES**

<p><b><u>Federal</u></b></p> <p>Army Corps of Engineers            Federal Aviation Administration            Emergency Management Agency (FEMA)            Environmental Protection Agency (EPA)            U. S. Fish and Wildlife Service            U. S. Forest Service            Federal Highway Administration            Bureau of Land Management            National Park Service            Federal Transit Administration            Luke Air Force Base</p> <p><b><u>Native American Indian Communities</u></b></p> <p>Fort McDowell Yavapai Nation            Gila Bend Native American Community            Gila River Indian Community            Salt River Pima-Maricopa Indian Community            Tohono O’Odham Native American Community</p>	<p><b><u>State</u></b></p> <p>Department of Commerce            Division of Emergency Management            Game and Fish Department            Historic Preservation Office            Mines and Mineral Resources            State Land Department            State Parks Department            Department of Transportation            Department of Water Resources            Department of Environmental Quality</p> <p><b><u>Maricopa County</u></b></p> <p>Air Quality Department            Environmental Services            Flood Control District            Parks and Recreation            Planning and Development Services            Department of Transportation</p>
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addition, it provided a means to gain excellent insight into environmental mitigation and resource conservation methods that would have potential application to the transportation planning process.

Following the workshop, MAG staff held additional individual meetings with thirteen key environmental and resource agencies during September/October 2007. These meetings afforded the opportunity to conduct in-depth discussions regarding concerns specific to those agencies. In addition, it provided a means to gain excellent insights into environmental mitigation and resource conservation methods that would have potential application to the transportation planning process.

Also during FY 2007, environmental and resource agencies were invited to participate in the MAG public involvement process. The agency workshop was held in conjunction with the early phase of this process. As part of the mid-phase of the public involvement process, which includes a public hearing on regional transportation issues, the agencies received a copy of the Draft 2007 RTP Update and were invited to submit written comments. Lastly, as part of the final phase of the process, which provides an opportunity for final comment on the RTP, TIP and Air Quality Conformity Analysis, agencies were given notice of the hearing and invited to comment.

Key comments at the August 17, 2006 Workshop and follow-up individual agency meetings are summarized in Appendix D.

### **FY 2008 Agency Workshop**

MAG has generally updated the RTP annually, even though federal regulations allow metropolitan transportation plans to be updated only every four years. However, during FY 2008, a decision was made to postpone the update of the RTP until FY 2009. This was due to uncertainties regarding federal policies for programming CMAQ funds and the completion date of a cost review of the Freeway/Highway Life Cycle Program.

Although the RTP was not updated during FY 2008, an agency workshop was held on November 6, 2007 to obtain input on ongoing MAG transportation studies. The agencies listed in Table 6-1 were invited to participate. The main purpose of the workshop was to receive input on two MAG studies that assess transportation needs in developing areas of the region. These studies were the I-10/Hassayampa Valley Transportation Framework Study, and the I-8 and I-10/Hidden Valley Transportation Framework Study.

Key comments at the November 6, 2007 Workshop are summarized in Appendix D.

### **FY 2009 Agency Workshop**

As in prior years, MAG reached out to Federal, State, Tribal, regional, and local agencies to consult on environmental mitigation and resource conservation issues and concerns, during the development of the 2010 Update of the Regional Transportation Plan (RTP). As part of this effort, an agency workshop was held on November 13, 2008 to review MAG studies and receive input from environmental and resource agencies, regarding the application of environmental mitigation and resource conservation concepts in the transportation planning process. The agencies listed in Table 6-1 were invited to participate.

Three studies were discussed at the workshop, including the I-10/Hassayampa Valley Transportation Framework Study, the I-8/I-10/ Hidden Valley Transportation Framework Study, and the Regional Transit Framework Study. Preliminary information from the first two of these studies was presented at the FY 2008 Workshop, and the FY 2009 Workshop provided an opportunity to discuss the studies in greater detail. In addition, preliminary information from the MAG Regional Transit Framework Study was presented, which evaluates future transit needs beyond those contained in the RTP.

Key comments at the November 13, 2008 Workshop are summarized in Appendix D.

### **FY 2010 Agency Workshop**

The development of the 2010 Update of the Regional Transportation Plan (RTP) continued through calendar year 2009, and an additional agency workshop was held on November 9, 2009 to receive input from environmental and resource agencies, regarding the application of environmental mitigation and resource conservation concepts in the transportation planning process. The agencies listed in Table 6-1 were invited to participate.

The emphasis at the November 2009 workshop was on proposed legislation at the federal level that may have an effect on the transportation planning process. In this regard, considerable activity had been occurring at the federal level in the areas of clean energy, climate change, and national funding for transportation. Many of the concepts in this proposed legislation address issues affecting the environmental and resource conservation aspects of transportation planning. The goal of the workshop was to discuss pending legislation, and develop insights and draw conclusions about the potential future direction of the regional transportation planning process.

Key comments at the November 9, 2009 Workshop are summarized in Appendix D.

### **Discussion of Environmental Mitigation, Natural and Historic Resource Conservation, and Planning Process Considerations**

A broad range of Federal, State, and Tribal agencies that specifically address wildlife, land management and regulatory matters were consulted regarding potential environmental mitigation activities that may have the greatest potential to address the environmental functions affected by the Plan. The transportation planning process and its future environmental implications were discussed, and concepts for potential environmental mitigation activities were identified. Since previously adopted projects in the RTP undergo extensive environmental and resource assessment by the implementing agencies through the NEPA process, the primary goal of the consultation effort was to gain insights regarding issues that may potentially involve future planning efforts and future Plan elements.

In addition, State and local agencies were consulted regarding transportation planning issues affecting land use management, natural resources, environmental protection, conservation and historic preservation. These discussions also included the identification of conservation maps, inventories of natural or historic resources, and other information sources to utilize in the regional transportation planning process. Similar to the environmental mitigation discussions, this consultation effort was aimed primarily at identifying resource and conservation concerns that address future planning efforts and future Plan elements.

During the meetings with key agencies, the discussions often led into the area of transportation planning, in general, and how environmental and resource concerns can be effectively integrated into the planning process. Also, discussions included the identification of key databases, conservation maps, inventories of natural or historic resources, and other information sources to utilize in the regional transportation planning process.

Appendices D and E document the input provided through the environmental and resource conservation consultation effort, representing a valuable resource for the ongoing transportation planning process. The points listed are not intended to represent MAG policies, but rather, are factors for consideration in the transportation planning process.

### **Consultation for Area and Corridor Transportation Planning Studies**

Area and corridor transportation planning studies play a vital role in the overall MAG transportation planning process. These studies assess evolving transportation needs not covered by the adopted

MAG RTP. They provide the opportunity to review transportation conditions in detail within a specified geographic area or modal facility system, identifying potential new RTP elements for consideration in the decision-making process. The area/corridor studies are conducted within the context of the entire regional system, so that travel demand and facility interactions throughout the region are recognized.

One of the major steps in the area/corridor study process covers the inventory of environmental and resource factors. Environmental and resource agencies are solicited for input early in the process, so that data on existing conditions can be assembled thoroughly and accurately. In addition to data collection, the process includes the identification of potential environmental, cultural and natural resource issues affecting the area or corridor under study. The information on existing conditions and potential issues provides one of the key inputs for identification of alternatives. Once alternatives have been identified, environmental and resource data and issues identified in the inventory phase are utilized as input for the development of evaluation criteria and the assessment of alternatives. This evaluation process provides valuable information on possible environmental and resource impacts and helps identify mitigation considerations connected with potential future decisions on proposed new transportation corridors or improvements to existing facilities.

The specific modal and area transportation planning studies that have been completed, or are ongoing, are discussed in “Chapter 16 - Extended Planning Outlook”. The findings and recommendations from these studies identify potential new corridors or other transportation improvements that may be considered in future updates of the RTP. In several cases, illustrative projects/corridors have been identified as a result of the studies and included in the RTP (see Chapter 16). Illustrative corridors and projects are provided for in the federal transportation planning regulations to allow identification of plan elements that would potentially be included in the Plan, if funding were available. One of the major benefits of identifying illustrative corridors is that it facilitates early and thorough vetting of potential environmental mitigation and resource conservation issues. In addition, the status of study results as illustrative plan elements also provides a continuing opportunity to assess their potential environmental and resource conservation effects, so that they may be taken into account throughout the decision-making process.

**SECTION TWO**

**TRANSPORTATION MODES**

## CHAPTER SEVEN

### FINANCIAL PLAN

The major regional funding sources for the Regional Transportation Plan (RTP) include:

- Half-cent Sales Tax
- Arizona Department of Transportation (ADOT) Funds
- MAG Area Federal Transportation Funds

These sources are considered to be reasonably available throughout the duration of the planning period, and have had a long history of funding availability for the RTP in the past. It should also be noted that revenue projections are expressed in “Year of Expenditure” (YOE) dollars, which reflect the actual number of dollars collected in a given year. In the individual modal chapters that follow, costs are also presented in terms of YOE dollars, which reflect the estimated effects of future price inflation and represent that actual number of dollars expended.

#### **Half-Cent Sales Tax**

On November 2, 2004, the voters of Maricopa County passed Proposition 400, which authorized the continuation of the existing half-cent sales tax for transportation in the region (also known as the *Maricopa County Transportation Excise Tax*). This action provides a 20-year extension of the half-cent sales tax through calendar year 2025 to implement projects and programs identified in the MAG RTP. The previous half-cent sales tax for transportation was approved by the voters of Maricopa County in 1985 through Proposition 300, and expired on December 31, 2005. The current half-cent sales tax extension approved through Proposition 400 went into affect on January 1, 2006.

The revenues collected from the half-cent sales tax are deposited into the Regional Area Road Fund (RARF), and allocated between freeway/highway and arterial street projects; and into the Public Transportation Fund (PTF) for public transit programs and projects. These monies must be applied to projects and programs consistent with the MAG RTP. Projects and programs in the MAG RTP that are not categorized into the freeways/highways, transit, or arterial street modes have not been allocated sales tax funding. As specified in ARS 42-6105.E, 56.2 percent of all sales tax collections will be distributed to freeways and highways (RARF); 10.5 percent will be distributed to arterial street improvements (RARF); and 33.3 percent of all collections will be distributed to transit (PTF).

Table 7-1 displays the distribution of projected revenues to the RARF and the PTF, including the sub-allocation of the RARF to freeway/highway and arterial street uses. As displayed in this table, total half-cent revenues from FY 2011 through FY 2031 are projected to be approximately \$15.7 billion (YOE \$’s). Of this total, \$8.8 billion will be allocated to freeway/highway projects; \$1.7 billion to arterial street improvements; and \$5.2 billion to transit projects and programs. It is important to note that these figures assume renewal of the tax in January 2026.

#### **Arizona Department of Transportation Funds**

ADOT relies on funding from two primary sources: the Highway User Revenue Fund (HURF) and

**TABLE 7-1**  
**MARICOPA COUNTY TRANSPORTATION EXCISE TAX: FY 2011-2031**  
 (Year of Expenditure Dollars in Millions)

Fiscal Year	Regional Area Road Fund (RARF)		Public Transportation Fund (PTF) (33.3%)	Total
	Freeways (56.2%)	Arterial Streets (10.5%)		
2011	180.9	33.8	107.2	321.9
2012	195.0	36.4	115.6	347.0
2013	213.1	39.8	126.2	379.1
2014	244.5	45.7	144.9	435.0
2015	276.6	51.7	163.9	492.2
2016	294.5	55.0	174.5	524.1
2017	313.2	58.5	185.6	557.3
2018	334.3	62.5	198.1	594.8
2019	355.8	66.5	210.8	633.1
2020	377.2	70.5	223.5	671.1
2021	399.7	74.7	236.8	711.2
2022	426.8	79.7	252.9	759.4
2023	451.6	84.4	267.6	803.6
2024	478.8	89.4	283.7	851.9
2025	508.6	95.0	301.4	905.0
2026	540.3	100.9	320.1	961.4
2027	574.0	107.2	340.1	1,021.3
2028	609.8	113.9	361.3	1,085.0
2029	647.8	121.0	383.8	1,152.6
2030	688.2	128.6	407.7	1,224.5
2031	731.0	136.6	433.2	1,300.8
<b>Totals</b>	<b>8,841.6</b>	<b>1,651.9</b>	<b>5,238.9</b>	<b>15,732.3</b>

federal transportation funds. The HURF is comprised of funds from the gasoline and use fuel taxes, a portion of the vehicle license tax, registration fees and other miscellaneous sources.

### ADOT Revenues

Of the total HURF funding, approximately 40 percent comes from the gasoline tax and another 15 percent comes from the sale of diesel fuel. The portion of the Vehicle License Tax (VLT) that flows into the HURF accounts for about 25 percent of the total HURF funds. According to the Arizona constitution, HURF funds can only be used on highways and streets, therefore, HURF funds cannot be used for transit purposes. For the purposes of revenue forecasting, total HURF funds were projected based on projected population and economic growth, assuming that there would no change in tax rates. Total HURF funds were then distributed to ADOT and the other entities based on the current statutory formula and policy.

From the ADOT HURF allocation, State statute provides that 12.6 percent of the HURF funds flowing to ADOT are earmarked for the MAG Region, and the region comprising the Pima Association of Governments (PAG), which includes metropolitan Tucson, Arizona. In addition, the

State Transportation Board has established a policy that another 2.6 percent of ADOT HURF funds would be allocated to the two regions. These funds are divided into 75 percent for the MAG Region and 25 percent for the PAG Region. These funds are referred to as “15 Percent Funds.”

After the deduction of the 15 Percent Funds, ADOT must pay for operations, maintenance, and debt service on outstanding bonds. This includes funds for the Motor Vehicle Division, administration, highway maintenance and additional funding for Department of Public Safety. The remaining HURF funds are then combined with federal highway funds to provide the basis for the ADOT Highway Construction Program. This block of funds is often referred to as “ADOT Discretionary Funds.”

### **ADOT Funding in the MAG Region**

Table 7-2 summarizes ADOT funds applicable to projects in the MAG RTP. It is projected that a total of \$7.8 billion will be available for the construction of freeways and highways in the MAG Region between FY 2011 and FY 2031. Funding for ADOT expenses for operations and maintenance is drawn from statewide sources and is not reflected in Table 7-2.

- **15 Percent Funding** - The MAG Region receives annual funding from the Arizona Department of Transportation (ADOT) in the form of ADOT 15 Percent Funds, which are allocated from the Highway User Revenue Fund (HURF). These funds are spent for improvements on limited access facilities on the State Highway System. A total of \$2.1 billion is projected to be available from this source.
- **MAG Share of ADOT Discretionary Funds** - A 37 percent share of ADOT Discretionary Funds is targeted to the MAG Region. Arizona Revised Statute 28-304 C.1 states that the percentage of ADOT discretionary monies allocated to the MAG Region in the RTP shall not increase or decrease unless the State Transportation Board, in cooperation with the regional planning agency, agrees to change the percentage of the discretionary monies. A total of \$5.7 billion is projected to be available from this source.

### **MAG Area Federal Transportation Funds**

In addition to the half-cent sales tax revenues and ADOT funding, a number of federal transportation funding sources are available for use in implementing projects in the MAG RTP. These sources are discussed below and summarized in Table 7-3. It is projected that a total of \$6.1 billion (YOE \$'s) will be available from this source for the implementation of projects in the MAG Region between FY 2011 and FY 2031.

#### **Federal Transit (5307) Funds**

These federal transit formula grants are available to large urban areas to fund bus purchases and other transit capital projects. Purchases made under this program must include a 20 percent local match. This funding source is expected to generate \$1.4 billion for transit development from FY 2011 through FY 2031.

**TABLE 7-2**  
**ADOT FUNDING IN MAG AREA: FY 2011-2031**  
 (Year of Expenditure Dollars in Millions)

<b>Fiscal Year</b>	<b>15% Funds</b>	<b>ADOT Discretionary</b>	<b>Total</b>
<b>2011</b>	61.8	286.8	348.6
<b>2012</b>	63.7	279.2	342.9
<b>2013</b>	66.0	190.8	256.8
<b>2014</b>	74.9	199.8	274.7
<b>2015</b>	79.8	196.9	276.7
<b>2016</b>	82.6	203.9	286.5
<b>2017</b>	85.9	210.0	295.9
<b>2018</b>	89.3	215.1	304.4
<b>2019</b>	92.9	225.4	318.3
<b>2020</b>	96.4	236.1	332.5
<b>2021</b>	99.9	247.3	347.2
<b>2022</b>	103.5	261.9	365.4
<b>2023</b>	107.3	270.9	378.2
<b>2024</b>	111.0	283.5	394.5
<b>2025</b>	114.9	296.5	411.4
<b>2026</b>	118.8	310.1	428.9
<b>2027</b>	123.0	324.3	447.3
<b>2028</b>	127.3	339.2	466.5
<b>2029</b>	131.8	354.7	486.5
<b>2030</b>	136.4	371.0	507.4
<b>2031</b>	141.2	388.0	529.2
<b>Totals</b>	<b>2,108.3</b>	<b>5,691.5</b>	<b>7,799.8</b>

### **Federal Transit (5309) Funds**

Transit 5309 funds are available through discretionary grants from the Federal Transit Administration (FTA), and applications are on a competitive basis. They include grants for bus transit development and “new starts” of Light Rail Transit (LRT) and other high capacity systems. Bus transit development requires a 20 percent local match, while new starts are expected to require a 50 percent local match. These funds are granted at the discretion of the FTA, following a very thorough evaluation process. Over the planning horizon, it is estimated that \$1.7 billion in 5309 funds for bus and rail transit projects will be made available to the MAG Region from the FTA. The total does not include the \$587 million in 5309 funds for the 20-mile light rail starter segment, which has already been committed to the region.

### **Federal Highway (MAG STP) Funds**

MAG Surface Transportation Program (STP) funds are the most flexible federal transportation funds and may be used for highways, transit or streets. Approximately \$1.6 billion will be

**TABLE 7-3**  
**MAG FEDERAL TRANSPORTATION FUNDS: FY 2011-2031**  
 (Year of Expenditure Dollars in Millions)

Year	Transit			MAG STP			MAG CMAQ					Grand Total	
	5307*	5309	Total	Fwy/Hwy	Arterial	Total	Fwy/Hwy	Arterial	Transit	Bk/Ped	AQ		Total
2011	50.6	37.7	88.3	34.1	20.0	54.1	9.3	6.6	17.6	8.3	7.2	49.0	191.4
2012	53.1	42.0	95.1	34.1	20.8	54.9	9.5	6.7	17.8	8.5	7.3	49.8	199.8
2013	55.2	59.5	114.7	34.1	21.7	55.8	9.7	6.8	18.1	8.6	7.4	50.6	221.1
2014	57.4	50.5	107.9	34.1	22.6	56.7	9.8	6.9	18.4	8.7	7.5	51.3	215.9
2015	58.6	59.7	118.3	34.1	24.9	59.0	10.4	7.3	19.5	9.2	7.9	54.3	231.6
2016	59.8	61.2	120.9	12.7	48.1	60.8	10.7	7.5	20.2	9.6	8.2	56.2	237.9
2017	60.9	60.0	120.9		62.9	62.9	11.1	7.8	20.9	9.9	8.5	58.2	242.1
2018	62.2	76.1	138.3		65.1	65.1	11.5	8.1	21.6	10.2	8.8	60.2	263.6
2019	63.4	89.1	152.5		67.4	67.4	11.9	8.4	22.4	10.6	9.1	62.4	282.3
2020	64.7	141.8	206.4		69.8	69.8	12.3	8.6	23.2	11.0	9.4	64.5	340.7
2021	66.0	109.5	175.4		72.2	72.2	12.8	9.0	24.0	11.4	9.8	67.0	314.6
2022	67.3	108.0	175.2		74.7	74.7	13.2	9.3	24.8	11.8	10.1	69.2	319.2
2023	68.6	122.2	190.8		77.3	77.3	13.7	9.6	25.7	12.2	10.4	71.6	339.8
2024	70.0	96.6	166.6		80.0	80.0	14.1	9.9	26.6	12.6	10.8	74.0	320.7
2025	71.4	94.5	165.9		82.9	82.9	14.6	10.3	27.5	13.0	11.2	76.6	325.3
2026	72.8	91.3	164.2		85.8	85.8	15.2	10.6	28.5	13.5	11.6	79.4	329.3
2027	74.3	76.5	150.8		88.8	88.8	15.7	11.0	29.5	14.0	12.0	82.2	321.7
2028	75.8	86.8	162.6		91.9	91.9	16.3	11.4	30.5	14.5	12.4	85.1	339.5
2029	77.3	98.4	175.7		95.1	95.1	16.9	11.8	31.6	15.0	12.9	88.0	358.8
2030	78.8	65.0	143.8		98.4	98.4	17.4	12.2	32.7	15.5	13.3	91.1	333.4
2031	80.4	74.9	155.3		101.8	101.8	18.1	12.6	33.8	16.0	13.8	94.3	351.4
<b>Totals</b>	<b>1,388.7</b>	<b>1,701.2</b>	<b>3,089.8</b>	<b>183.2</b>	<b>1,372.1</b>	<b>1,555.3</b>	<b>274.2</b>	<b>192.2</b>	<b>515.0</b>	<b>244.0</b>	<b>209.6</b>	<b>1,435.0</b>	<b>6,080.1</b>

\* Phoenix Urbanized Area

available from STP funds for projects during the period from FY 2011 through FY 2031. This amount includes \$34.1 million per year through FY 2015 that is passed through to ADOT to retire debt related to the completion of the Proposition 300 program.

### **Federal Highway (MAG CMAQ) Funds**

MAG Congestion Mitigation and Air Quality (CMAQ) funds are available for projects that improve air quality in areas that do not meet clean air standards (“non-attainment” areas). Projects may include a wide variety of highway, transit and alternate mode projects that contribute to improved air quality. While they are allocated to the State, Arizona’s funds have been dedicated entirely to the MAG Region, due to the high congestion levels and major air quality issues in the region. They are projected to provide \$1.4 billion in funding from FY 2011 through FY 2031.

### **Statewide Transportation Acceleration Needs (STAN) Account**

During the spring 2006 legislative session, the Arizona Legislature established the Statewide Transportation Acceleration Needs (STAN) Account, which provided \$307 million to accelerate highway projects statewide. Of this total amount, \$184 million was allocated to the MAG region, and on December 13, 2006, the MAG Regional Council approved a set of projects to be funded with the STAN monies. In January 2009, \$104 million of the STAN allocation to the MAG area was swept by the State Legislature to balance the FY 2009 State Budget. This meant that no funds from this account will be available for the planning period of the RTP, which covers FY 2011 through FY 2031.

### **American Recovery and Reinvestment Act**

The American Recovery and Reinvestment Act (ARRA) was signed by President Obama on February 17, 2009 and contains a national highway infrastructure component that provides \$350 million to the Arizona Department of Transportation (ADOT) for highway infrastructure improvements throughout Arizona. The ADOT Board determined that approximately \$130 million of this amount would be spent on projects on the State Highway System in the MAG area. The ARRA also sub-allocates funding to local jurisdictions for street and transit improvements in the amount of \$170 million. The ARRA funding will be obligated by the end of federal fiscal year 2010 and is not included among the funding sources for the planning period of the RTP (FY 2011 through FY 2031).

### **Regional Revenue Summary**

Regional revenue sources for the MAG RTP between FY 2011 and FY 2031 are summarized in Table 7-4 and include: the Proposition 400 half-cent sales tax extension (\$15.7 billion); ADOT funds (\$7.8 billion); Federal Transit (5307) funds (\$1.4 billion); Federal Transit (5309) funds (\$1.7 billion); Federal Highway Surface Transportation Program (STP) funds (\$1.6 billion); and Federal Highway Congestion Mitigation and Air Quality (CMAQ) funds (\$1.4 billion). The total of all these revenue sources is projected to amount to \$29.6 billion between FY 2011 and FY 2031.

Table 7-4 also indicates the distribution of regional revenues among the transportation modes and programs covered by the RTP. This funding is consistent with the allocation of revenues originally

adopted by MAG in November 2003, as part of the major plan update that was prepared prior to the vote on Proposition 400. At that time, modal funding levels were established after the facility planning process was completed, and reflected project needs determined through the technical planning process. In addition, the distribution of regional revenues takes into account federal and state restrictions on how individual funding sources may be applied to specific program areas. Table 7-5 displays the percentages provided to each program area by funding source, resulting from the allocation of regional revenues.

As indicated previously, the regional revenue forecasts are presented in terms of “Year of Expenditure” (YOE) dollars. YOE dollars reflect the actual number of dollars collected/expended in a given year, with no correction or discounting for inflation. Specific assumptions regarding bonding or other debt financing are included in the modal chapters.

In addition to the regional level sources summarized in Tables 7-4 and 7-5, the implementation of the RTP is accomplished through local funds and other State revenues. Local resources provide matching monies for capital projects in the Arterial Street Program and Light Rail Transit Program; subsidize certain transit operating costs; and, in the form of transit farebox monies, contribute significant funding for transit operations. Local and private sources also provide funding for the expansion of street and transit networks throughout the region in parallel with new residential and commercial development. Other State revenues provide funding for the routine maintenance and operation of the regional freeway/highway system, as well as the pavement preservation program. Since local funds and other State revenue sources generally are program-specific, they are identified in the individual modal chapters.

**TABLE 7-4**  
**SOURCES AND DISTRIBUTION OF REGIONAL REVENUES: FY 2011-2031**  
 (Year of Expenditure Dollars in Millions)

Sources	Uses						Total
	Highways/ Freeways	Arterial Streets	Bus Transit	Light Rail Transit	Bicycle/ Ped.	Air Quality	
Proposition 400: Half Cent Sales Tax Extension	8,841.6	1,651.9	2,973.4	2,265.5			15,732.3
ADOT Funds (Includes HURF and Federal Aid)	7,799.8						7,799.8
Federal Transit (5307 Funds) *			1,388.7				1,388.7
Federal Transit (5309 Funds)			350.0	1,351.2			1,701.2
Federal Highway (MAG STP)	183.2	1,372.1					1,555.3
Federal Highway (MAG CMAQ)	274.2	192.2	43.0	472.0	244.0	209.6	1,435.0
<b>Total</b>	<b>17,098.8</b>	<b>3,216.2</b>	<b>4,755.1</b>	<b>4,088.7</b>	<b>244.0</b>	<b>209.6</b>	<b>29,612.3</b>

\* Phoenix Urbanized Area

**TABLE 7-5**  
**PERCENTAGE DISTRIBUTION OF REGIONAL REVENUES: FY 2011-2031**  
 (Percentage of Funding Source Total)

Sources	Uses						Total
	Highways/ Freeways	Arterial Streets	Bus Transit	Light Rail Transit	Bicycle/ Ped.	Air Quality	
Proposition 400: Half Cent Sales Tax Extension (RARF)	56.2%	10.5%	18.9%	14.4%			100.0%
ADOT Funds (Includes HURF and Federal)	100.0%						100.0%
Federal Transit (5307 Funds)			100.0%				100.0%
Federal Transit (5309 Funds)			20.6%	79.4%			100.0%
Federal Highway (MAG STP)	11.8%	88.2%					100.0%
Federal Highway (MAG CMAQ)	19.1%	13.4%	3.0%	32.9%	17.0%	14.6%	100.0%
<b>Total</b>	<b>57.7%</b>	<b>10.9%</b>	<b>16.1%</b>	<b>13.8%</b>	<b>0.8%</b>	<b>0.7%</b>	<b>100.0%</b>

## CHAPTER EIGHT

### FREEWAYS AND HIGHWAYS

The freeway/highway system in the MAG Region represents one of the major elements in the Regional Transportation Plan (RTP). The RTP calls for new freeway/highway corridors, as well as added travel lanes on existing facilities. In addition, a series of new interchanges with arterial streets on existing freeways, along with direct connections between HOV lanes at freeway-to-freeway interchanges, are included. The RTP also provides regional funding for maintenance on the freeway system, directed at litter pickup and landscaping. The need to keep traffic flowing smoothly is addressed through funding identified for freeway management functions.

#### **Current Freeway/Highway System**

The freeway/highway system currently serving the MAG Region is shown in Figure 8-1, as modeled for 2009. This system includes routes on the Interstate System, urban freeways and highways, and rural highway mileage. All the facilities in this system are on the State Highway System, which is constructed, maintained and operated by the Arizona Department of Transportation (ADOT). Table 8-1 lists the centerline mileages in this system in the MAG area (i.e., within Maricopa County) by route. A total of 621 existing centerline miles are included in the freeway/highway network, and an additional 89 miles are planned for future development during the planning period. Of the existing 621 miles, 269 miles are currently urban in character, whereas 352 miles are situated in rural areas of the region.

#### **Planned Freeway/Highway Corridors and Improvements**

The freeway/highway element of the RTP includes both new facilities and improvements to the existing system. Operation and maintenance of the system are also addressed. Projects include new freeway corridors, additional lanes on existing facilities, new interchanges at arterial cross streets, High Occupancy Vehicle (HOV) ramps at system interchanges, and maintenance and operations programs. The projected configuration of the future freeway/highway network in 2030 is depicted in Figure 8-2.

The improvements planned for the system, including both new freeway corridors and improvements to existing freeway and highway facilities, are shown in Figure 8-3. Figure 8-4 and Figure 8-5 depict how projects will be phased over the planning period, with phase designations indicating the period in which funds are programmed for the final construction of the facility. A detailed listing of the timing and cost of planned improvements is provided in Appendix A.

The status of new and existing freeway/highway corridors, as well as system-wide programs, is described below. In this discussion, the phase identified for a project refers primarily to its actual construction. Projects may have funding for design activities and right-of-way acquisition in earlier phases.

The abbreviations used in this discussion include:

# 2010 Update Regional Transportation Plan

Fig. 8-1

REGIONAL  
TRANSPORTATION  
PLAN



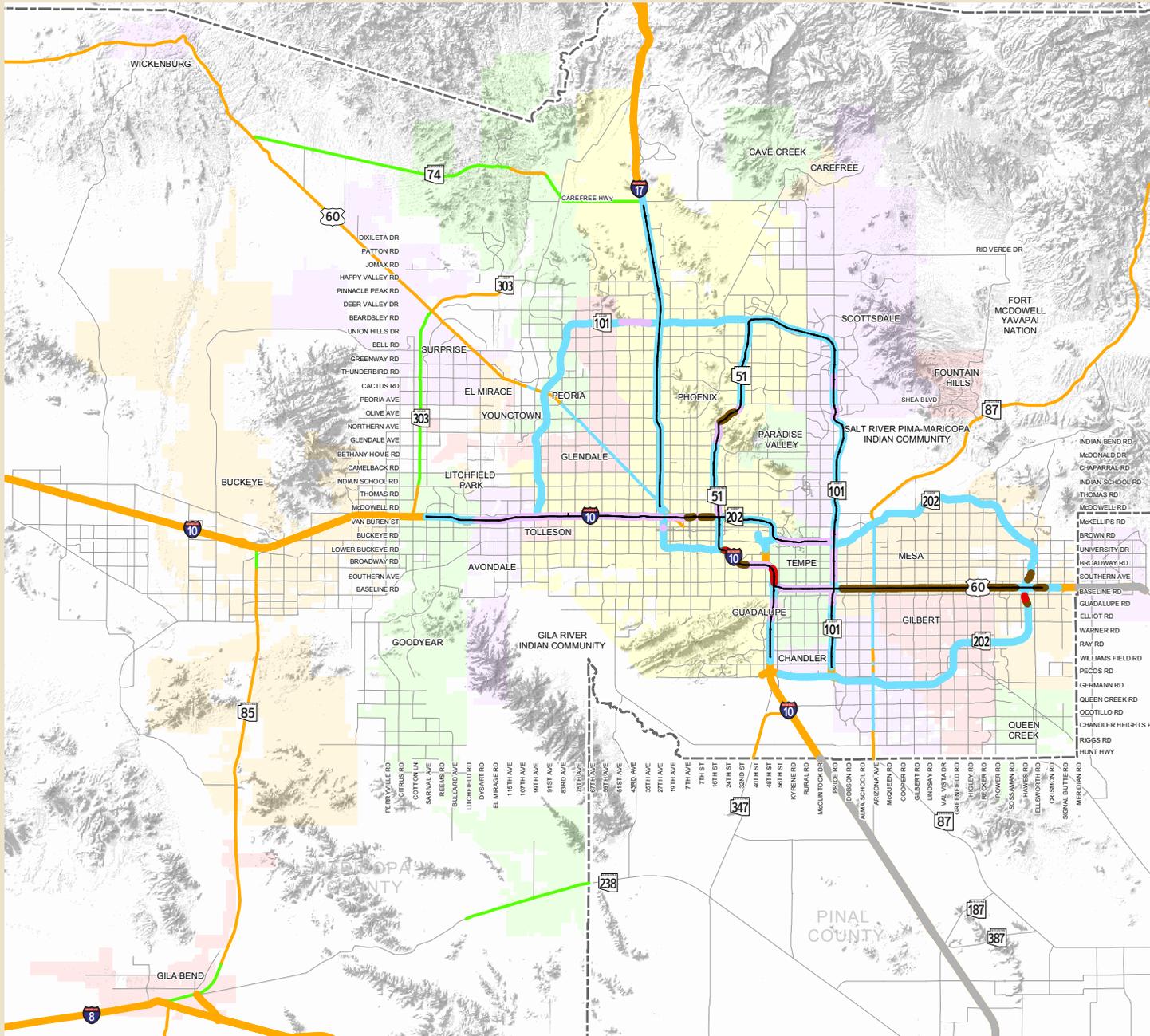
## 2009 Freeway/Highway System Number of Lanes

Freeway lanes are represented  
with thicker lines

- 2 General Use Lanes
- 3 - 4 General Use Lanes
- 5 - 6 General Use Lanes
- 7 - 8 General Use Lanes
- 9 - 10 General Use Lanes
- 11 - 12 General Use Lanes
- High Occupancy Vehicle (HOV) Lanes\*
- Other Roads
- County Boundary

\*The HOV line represents 1 lane in each direction

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**TABLE 8-1  
FREEWAY/HIGHWAY MILEAGES IN THE MAG AREA**

Route No.	Facility	Centerline Mileage			Route No.	Facility	Centerline Mileage		
		Existing	Planned	Total			Existing	Planned	Total
<b>I-8</b>	<b>Interstate 8</b>				<b>US 60</b>	<b>Superstition Freeway</b>			
	Yuma County to SR 85	37	--	37		I-10 to 101L (Price)	5	--	5
	SR 85 to Pinal Co. Line	31	--	31		101L (Price) to SR 87	4	--	4
	Sub-total I-8	68	--	68		SR 87 to 202L (Red Mtn./Santan)	12	--	12
						202L (Red Mtn./Santan) to Pinal Co. Line	3	--	3
<b>I-10</b>	<b>Interstate 10</b>					Sub-total Superstition	24	--	24
	Yuma Co. Line to SR 85	42	--	42					
	SR 85 to 303L	12	--	12	<b>SR 71</b>	<b>State Route 71</b>			
	303L to 101L	11	--	11		US 60 to Yavapai Co. Line	5	--	5
	101L to I-17	7	--	7		Sub-total SR 71	5	--	5
	I-17 to SR 51	5	--	5					
	SR 51 to I-17	3	--	3	<b>SR 74</b>	<b>State Route 74</b>			
	I-17 to US 60	6	--	6		US 60 (Grand) to 303L	25	--	25
	US 60 to 202L (Santan)	6	--	6		303L to I-17	6	--	6
	202L (Santan) to Pinal Co. Line	7	--	7		Sub-total SR 74	31	--	31
	Sub-total I-10	99	--	99					
					<b>SR 85</b>	<b>State Route 85</b>			
<b>I-17</b>	<b>Interstate 17</b>					Pima Co. Line to I-8	32	--	32
	I-10 (East) to I-10 (West)	7	--	7		I-8 to I-10	37	--	37
	I-10 (West) to 101L (Agua Fria/Pima)	14	--	14		Sub-total SR 85	69	--	69
	101L (Pima) to New River Rd.	17	--	17					
	New River Rd. to Yavapai Co. Line	10	--	10	<b>SR 87</b>	<b>Beeline Highway</b>			
	Sub-total I-17	48	--	48		Pinal Co. Line to 202L (Santan)	5	--	5
						202L (Santan) to US 60 (Superstition)	8	--	8
<b>SR 51</b>	<b>Piestewa Freeway</b>					US 60 (Superstition) to 202L (Red Mtn.)	4	--	4
	202L (Red Mtn.) to 101L (Pima)	16	--	16		202L (Red Mtn.) to Gila Co. Line	46	--	46
	Sub-total SR 51	16	--	16		Sub-total SR 87	63	--	63
<b>US 60</b>	<b>Aguila Highway</b>				<b>SR 88</b>	<b>State Route 88</b>			
	La Paz County to US 93	31	--	31		Pinal Co. Line to Gila Co. Line	33	--	33
	Sub-total Aguila	31	--	31		Sub-total SR 88	33	--	33
<b>US 60</b>	<b>Grand Avenue</b>				<b>US 93</b>	<b>State Route 93</b>			
	US 93 to SR 74	10	--	10		Wickenburg Bypass	1	--	1
	SR 74 to 303L	18	--	18		Wickenbury Bypass to Yavapai Co. Line	3	--	3
	303L to 101L (Agua Fria)	10	--	10		Sub-total US 93	4	--	4
	101L (Agua Fria) to Van Buren St	11	--	11					
	Sub-total Grand	49	--	49					

**Table 8-1 Freeway/Highway Mileages in the MAG Area (Continued)**

Route No.	Facility	Centerline Mileage			Route No.	Facility	Centerline Mileage		
		Existing	Planned	Total			Existing	Planned	Total
<b>101L</b>	<b>Agua Fria Freeway</b>				<b>SR 238</b>	<b>Mobile Highway</b>			
	I-10 to US 60 (Grand)	10	--	10		Mobile to Pinal Co. Line	4	--	4
	US 60 (Grand) to I-17	12	--	12		Sub-total SR 238	4	--	4
	Sub-total Agua Fria	22	--	22					
<b>101L</b>	<b>Pima Freeway</b>				<b>303L</b>	<b>Estrella Freeway</b>			
	I-17 to SR 51	7	--	7		SR 801 to I-10	--	5	5
	SR 51 to 202L (Red Mtn.)	21	--	21		I-10 to US 60 (Grand)	--	15	15
	Sub-total Pima	28	--	28		US 60 (Grand) to I-17	--	18	18
						Sub-total 303L	--	38	38
<b>101L</b>	<b>Price Freeway</b>				<b>SR 347</b>	<b>Maricopa Road</b>			
	202L (Red Mtn.) to US 60 (Superstition)	4	--	4		Pinal Co. Line to I-10	6	--	6
	US 60 (Superstition) to 202L (Santan)	6	--	6		Sub-total SR 347	6	--	6
	Sub-total Price	10	--	10					
<b>SR 143</b>	<b>Hohokam Expressway</b>				<b>SR 801</b>	<b>I-10 Reliever</b>			
	I-10 to 202L (Red Mtn.)	3	--	3		SR 85 to 303L	--	11	11
	202L (Red Mtn.) to McDowell Rd.	1	--	1		303L to 202L/South Mtn.	--	13	13
	Sub-total SR 143	4	--	4		Sub-total SR 801	--	24	24
<b>SR 153</b>	<b>Sky Harbor Expressway</b>				<b>SR 802</b>	<b>Williams Gateway Freeway</b>			
	Superior Ave. to University Dr.	--	--	0		202L (Santan) to Pinal Co. Line	--	5	5
	University Dr. to Washington Blvd.	--	--	0		Sub-total SR 802	--	5	5
	Sub-total SR 153	--	--	0					
						<b>Regional Totals</b>	<b>621</b>	<b>89</b>	<b>710</b>
<b>202L</b>	<b>Red Mountain Freeway</b>								
	I-10/SR 51 to 101L (Pima)	9	--	9					
	101L (Pima) to US 60 (Superstition)	22	--	22					
	Sub-total Red Mountain	31	--	31					
<b>202L</b>	<b>Santan Freeway</b>								
	US 60 (Superstition) to SR 87	17	--	17					
	SR 87 to 101L (Price)	4	--	4					
	101L (Price) to I-10	4	--	4					
	Sub-total Santan	25	--	25					
<b>202L</b>	<b>South Mountain Freeway</b>								
	I-10 (East) to SR 801	--	17	17					
	SR 801 to I-10 (West)	--	5	5					
	Sub-total South Mountain	--	22	22					

# 2010 Update Regional Transportation Plan

Fig. 8-2

REGIONAL  
TRANSPORTATION  
PLAN



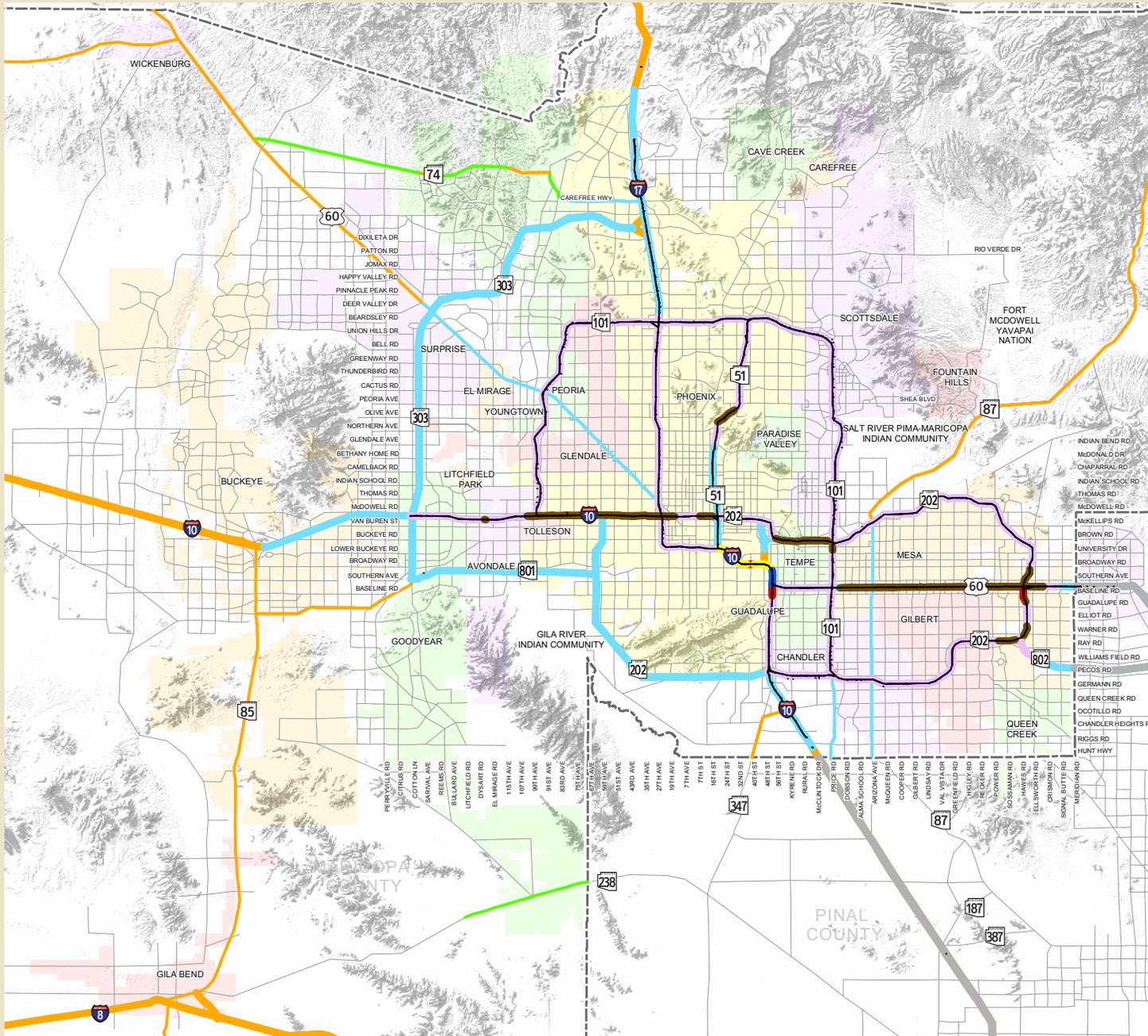
## 2030 Freeway/Highway System Number of Lanes

Freeway lanes are represented with thicker lines

- 2 General Use Lanes
- 3 - 4 General Use Lanes
- 5 - 6 General Use Lanes
- 7 - 8 General Use Lanes
- 9 - 10 General Use Lanes
- 11 - 12 General Use Lanes
- 13 - 16 General Use Lanes
- 17 - 20 General Use Lanes
- High Occupancy Vehicle (HOV) Lanes
- Other Roads
- County Boundary

\*The HOV line represents 1 lane in each direction

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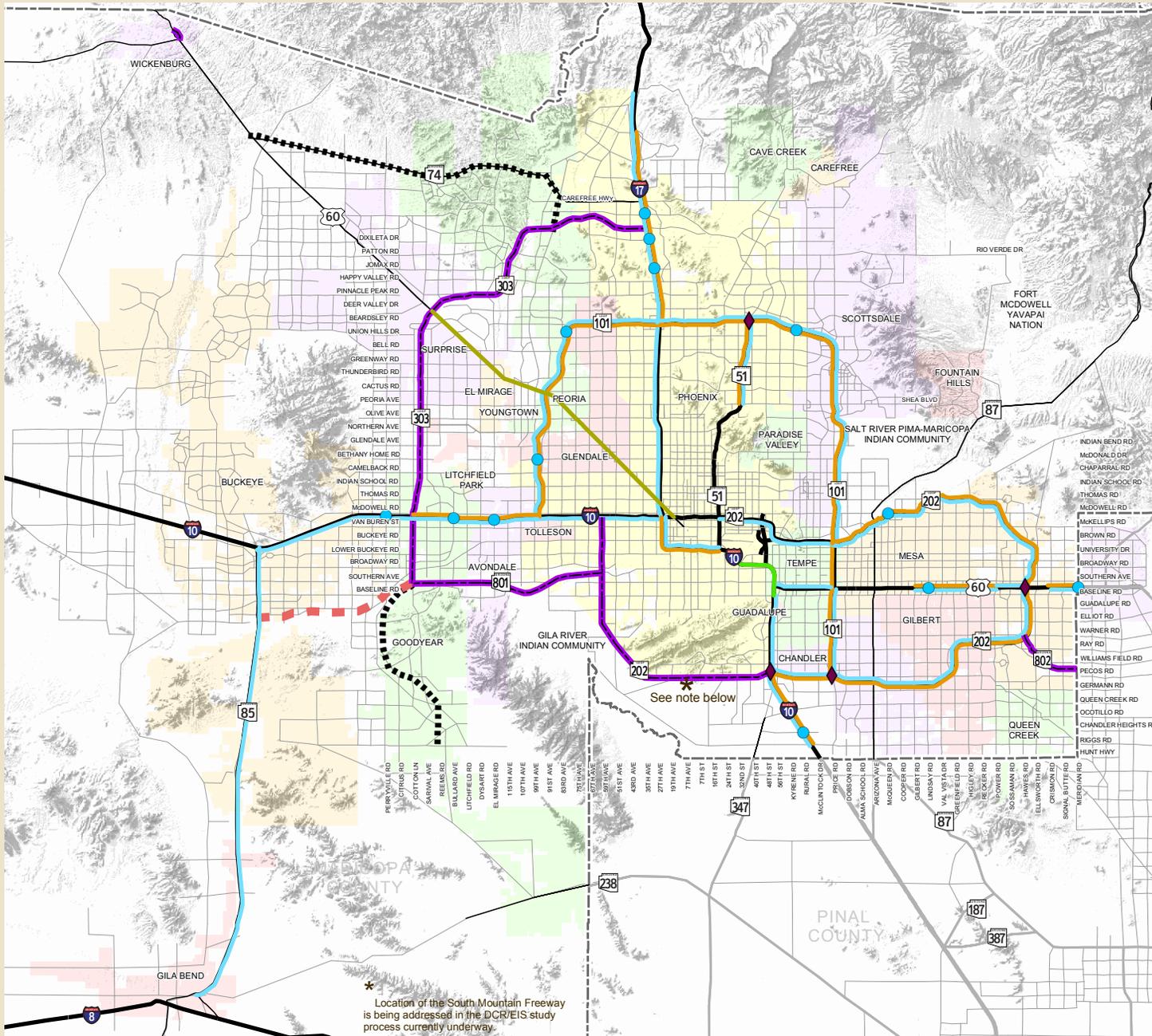
# 2010 Update Regional Transportation Plan Fig. 8-3



## Planned Freeway/Highway Improvements

- New Traffic Interchange
- New High Occupancy Vehicle Ramp Connection
- Grand Avenue Corridor Improvements
- New High Occupancy Vehicle Lanes
- New General Purpose Lanes
- Corridor Capacity Improvements
- New Freeway/Highway
- Interim Corridor Development
- Right of Way Preservation
- Existing Freeway
- Other Roads
- County Boundary

Alignments for new freeway, highway, arterial, and light rail/high capacity transit facilities will be determined following the completion of appropriate design and environmental studies.



\* Location of the South Mountain Freeway is being addressed in the DCR/EIS study process currently underway.

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# 2010 Update Regional Transportation Plan

Fig. 8-4



## Plan Phasing Freeways/Highways

- Phase 1 (FY 2006 - FY 2010)\*
- Phase 2 (FY 2011 - FY 2015)\*
- Phase 3 (FY 2016 - FY 2020)\*
- Phase 4 (FY 2021 - FY 2025)\*
- Phase 5 (FY 2026 - FY 2031)\*

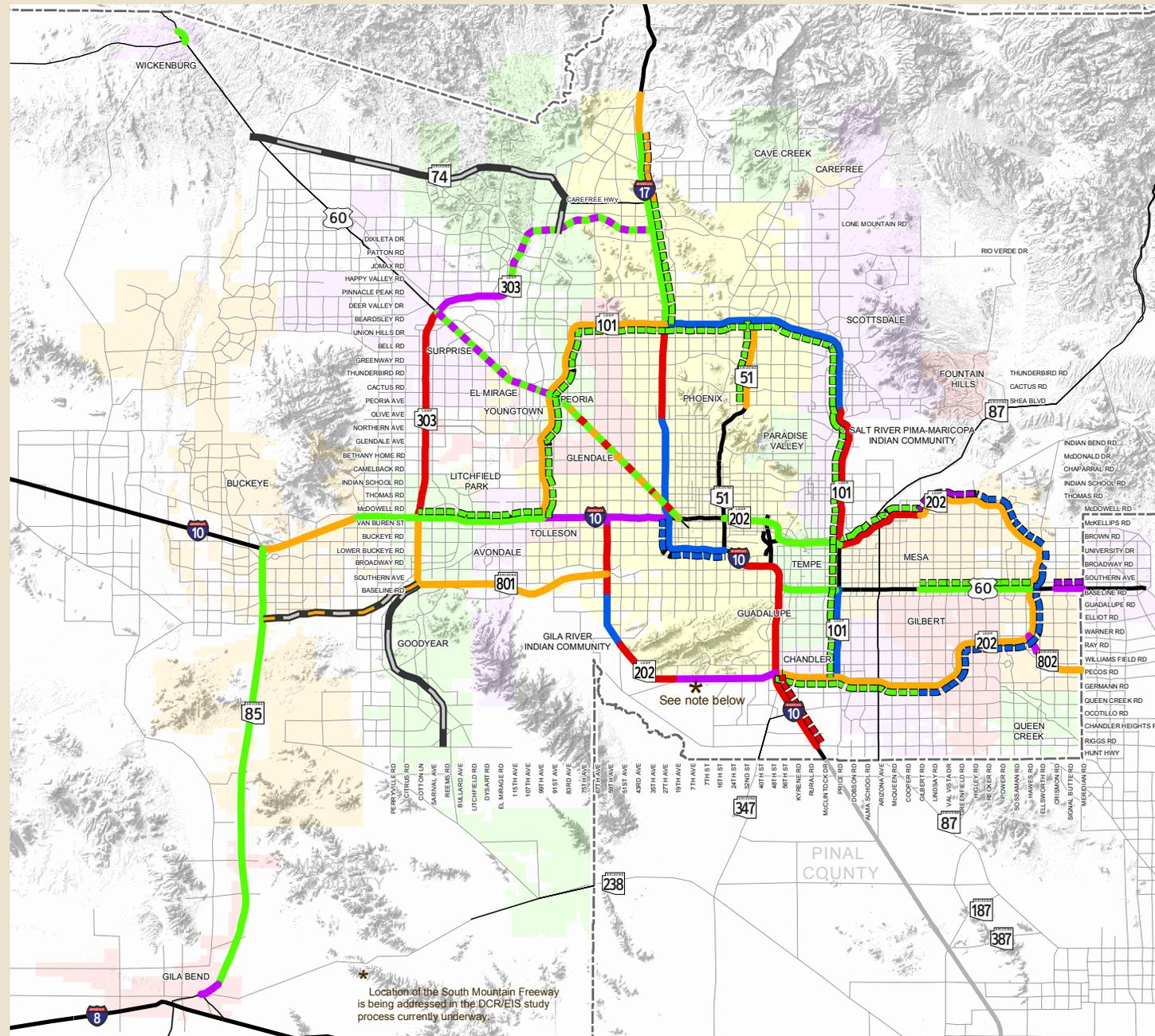
\*Broken lines represent HOV lane phasing

- Right of Way Preservation Phase 5, Includes Interim Construction
- Right of Way Preservation Phase 5
- Freeways
- Other Roads
- County Boundary

Alignments for new freeway, highway, arterial, and light rail/high capacity transit facilities will be determined following the completion of appropriate design and environmental studies.



MARICOPA COUNTY



\* Location of the South Mountain Freeway is being addressed in the DCR/EIS study process currently underway.

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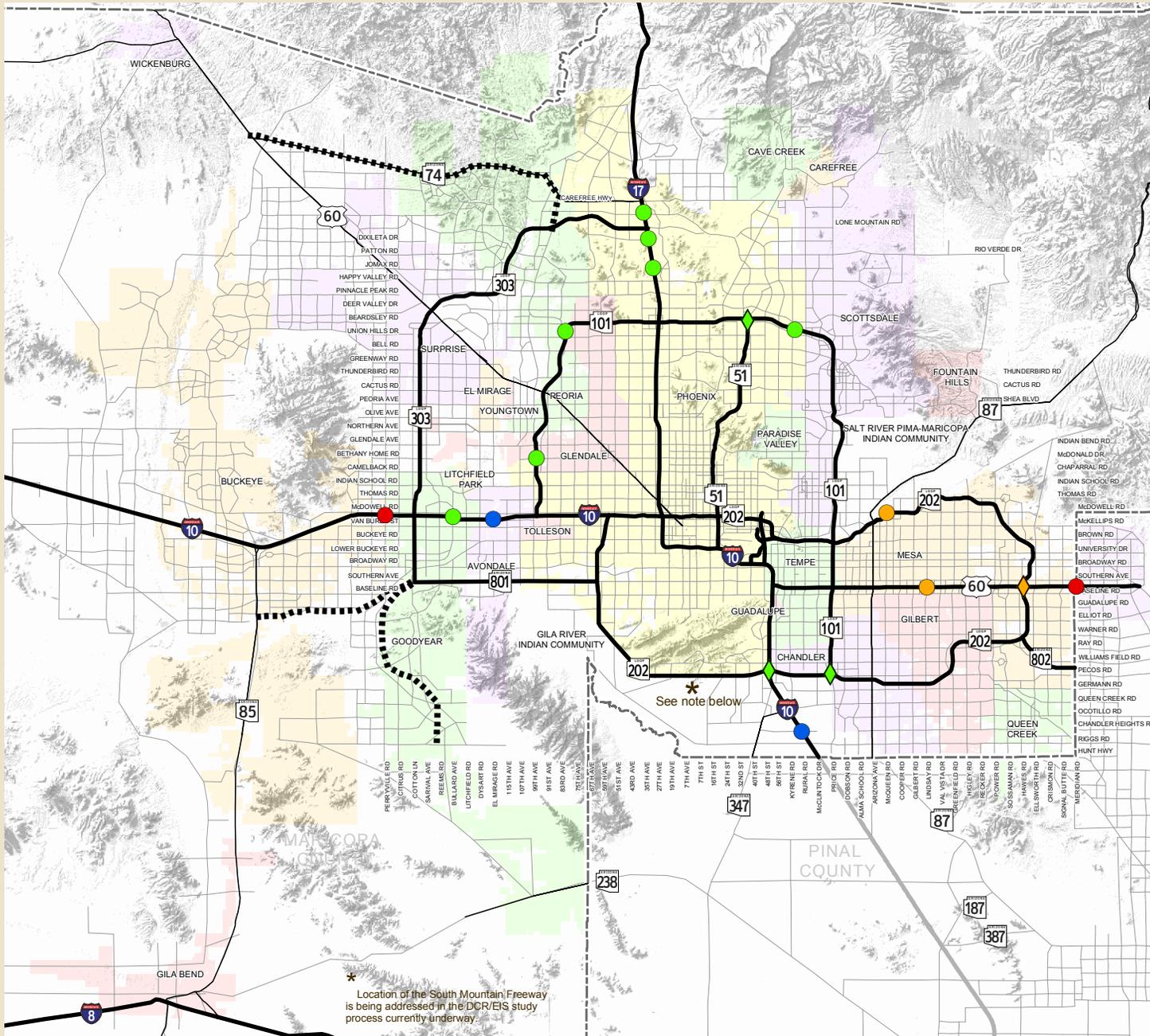
# 2010 Update Regional Transportation Plan Fig. 8-5



## Plan Phasing New Interchanges and HOV Ramp Connections

- New Traffic Interchange
- ◆ New System HOV Ramp Connections
- Phase 1 (FY 2006 - FY 2010)
- Phase 2 (FY 2011 - FY 2015)
- Phase 3 (FY 2016 - FY 2020)
- Phase 4 (FY 2021 - FY 2025)
- Phase 5 (FY 2026 - FY 2031)
- Right of Way Preservation Phase 5
- Freeways
- Other Roads
- County Boundary

Alignments for new freeway, highway, arterial, and light rail/high capacity transit facilities will be determined following the completion of appropriate design and environmental studies.



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- CE - Categorical Exclusion
- DCR - Design Concept Report
- EA - Environment Assessment
- EIS - Environmental Impact Statement

### **Interstate 10/Papago Freeway**

- **Corridor Concept** - The RTP identifies the need for additional general purpose lanes along the Papago Freeway from SR-85 to I-17. In addition, HOV lanes are called for between Loop 101 (Agua Fria) and Loop 303, providing a continuous HOV connection between Loop 303 and I-17. New traffic interchanges are also added at El Mirage Rd., Bullard Ave., and Perryville Rd. Other minor improvements are listed in Appendix A.
- **Implementation Progress** - Construction work to add HOV and general purpose lanes in the median of I-10 between Sarival Ave. and Loop 101 is targeted for completion in late 2009/early 2010. The addition of general purpose lanes along the outside of the facility between Sarival Ave. and Dysart Rd. is scheduled for completion in spring 2011. When completed, these projects will result in four general purpose lanes and one HOV lane in each direction along I-10 between Loop 101 and Sarival Ave. The addition of one general purpose lane in each direction between Sarival Ave. and Verrado Way is also underway, with completion anticipated by mid-2011. When completed, this project will result in three general purpose lanes in each direction along I-10 between Sarival Ave. to Verrado Way. A new traffic interchange providing access to I-10 from Bullard Ave. was completed in FY 2008. Crossroad improvements at the Avondale Blvd. traffic interchange are programmed in FY 2010.
- **Future Corridor Improvements** - A project to increase general purpose lane capacity along the segment between Loop 101 (Agua Fria) and I-17 is identified for implementation in Phase II. This work would be developed in coordination with construction of the Loop 202 (South Mountain) interchange at I-10 and possible improvements to the I-10/I-17 interchange, which may be identified as part of a broader solution to central area freeway congestion. The addition of one general purpose lane in each direction along the segment between Verrado Way and SR-85 is programmed for Phase V. Construction of new traffic interchanges at Perryville Rd and El Mirage Rd. are identified in Phase II and Phase IV, respectively.

### **Interstate 10/Maricopa Freeway**

- **Corridor Concept** - The RTP identifies capacity improvements on the Maricopa Freeway to ease congestion from central Phoenix to the Pinal County line at Riggs Rd. This would be addressed through construction of local/express lanes in the I-10 corridor between 32<sup>nd</sup> St. and Baseline Rd., addition of general purpose lanes between Baseline Rd. and Riggs Rd., and extension of HOV lanes from Loop 202 (Santan) to Riggs Rd. A new traffic interchange at Chandler Heights Rd. would also be added. Other minor improvements are listed in Appendix A.

- **Implementation Progress** - A DCR/EIS for local/express lanes and other capacity improvements between 32<sup>nd</sup> St. and Loop 202 (Santan) is scheduled for completion in spring 2011. An ADOT statewide program DCR/EA is underway on the segment between Loop 202 (Santan) and I-8 for freeway widening concepts. The project to construct both general purpose and HOV lanes between Loop 202 (Santan) and Riggs Rd. is being addressed as part of this study. An auxiliary lane to facilitate weaving movements by westbound traffic entering I-10 from the Superstition Freeway was opened to traffic in August 2008.
- **Future Corridor Improvements** - The construction of local/express lanes between 32<sup>nd</sup> St. and Baseline Rd., including improvements to the I-10/SR-143 interchange, are scheduled for Phase II. Construction of one general purpose lane in each direction between Baseline Rd. and Loop 202 (Santan), as well as addition of one general purpose and one HOV lane in each direction between Loop 202 (Santan) and Riggs Rd., is also programmed for Phase II. In addition, a project for improved access to the west entrance to Sky Harbor Airport from I-10 has been included in Phase II. Construction of a new traffic interchange at Chandler Heights Rd. is identified for Phase IV.

### **Interstate 17/Black Canyon Freeway**

- **Corridor Concept** - The RTP includes capacity improvements on I-17 between I-10 at the “Split” on the south and New River Rd. on the north. This includes the addition of both general purpose lanes and HOV lanes to address capacity needs and bottlenecks. In addition, new traffic interchanges are identified for Dove Valley Rd., Jomax Rd. and Dixileta Dr.
- **Implementation Progress** - Construction to add one general purpose lane and one HOV lane in each direction between Loop 101 and SR-74 (Carefree Hwy.) will be completed in late 2009/early 2010. This will result in a cross-section of three general purpose lanes and one HOV lane in each direction along this segment of I-17. Work to add one general purpose lane in each direction between Carefree Hwy. and Anthem Way is anticipated to be completed by mid-2010. When completed, this project will result in three general purpose lanes in each direction along I-17 between SR 74 (Carefree Hwy.) and Anthem Way. New traffic interchanges providing access to I-17 from Jomax Rd and Dilxileta Rd. were completed and opened to traffic in September 2008. The traffic interchange between I-17 and SR-74 (Carefree Hwy.) was reconstructed to provide greater capacity and opened to traffic in October 2008. A new traffic interchange between I-17 and Dove Valley Rd. is under construction and anticipated to be completed by mid-2010. An study of transportation options for the central area of the region (MAG Central Phoenix Transportation Framework Study), as well as a DCR/EIS addressing capacity improvements along I-17 between Loop 101 and I-10 (Split), is anticipated to be underway in early 2010, with study completion targeted for the end of 2012.
- **Future Corridor Improvements** - The addition of one general purpose lane in each direction between the Arizona Canal and Loop 101 is included in Phase II. The addition of one general purpose lane and one HOV lane in each direction between I-10 (Stack) and I-10 (Split) is included in Phase IV. The addition of one general purpose lane in each direction and service interchange ramp improvements between the Arizona Canal and I-10 (Stack) are

also identified for Phase IV. In general, this will result in a cross-section of one HOV lane and four general purpose lanes in each direction along the entire segment between Loop 101 and I-10 (Split). The specific approach to addressing the entire stretch of I-17 between Loop 101 and I-10 (Split) will be based on the findings of the DCR/EIS to be conducted by ADOT and the MAG Central Phoenix Transportation Framework Study. Both studies are programmed for completion in FY 2012. The construction of an urban, three-lane cross-section plus HOV lanes between SR-74 and Anthem., as well as the addition of one general purpose lane in each direction between Anthem Way and New River Rd, are included in Phase V.

### **State Route 51/Piestawa Freeway**

- **Corridor Concept** - The RTP includes construction of additional general purpose and HOV lanes on SR 51 between Shea Boulevard and Loop 101 (Pima). The addition of direct HOV ramp connections is also included at the freeway-to-freeway interchange at Loop 101 (Pima). The Piestawa Freeway between I-10 and Glendale Ave. was originally constructed by the City of Phoenix and is designed to lower standards than the rest of the regional freeway system.
- **Implementation Progress** - A project to construct one HOV lane in each direction between Shea Blvd. and Loop 101 has been completed and was opened to traffic in January 2009. The project included ramps at the system interchange between SR 51 and Loop 101 (Pima), providing direct HOV movements to and from the east.
- **Future Corridor Improvements** - The construction of one additional general purpose lane in each direction between Shea Blvd. and Loop 101 is included in Phase V.

### **US-60/Grand Avenue**

- **Corridor Concept** - The RTP identifies a series of improvement projects along various segments of US-60 (Grand Ave.) between Loop 303 and McDowell Rd., including the addition of general purpose lanes, grade separations and other improvements. Among the major projects are the widening of Grand Ave. to six lanes between Loop 303 and 83<sup>rd</sup> Ave. and access controls and other corridor improvement projects between Loop 101 and McDowell Rd. In addition, a number of possible grade separations have been identified in preliminary studies of potential improvements to Grand Ave.
- **Implementation Progress** - Work to widen Grand Ave. between 99<sup>th</sup> Ave. and 83<sup>rd</sup> Ave., is anticipated to be completed in early 2011. Another widening project between Loop 303 and 99<sup>th</sup> Ave. is anticipated to be completed in mid-2011. When completed, these projects will widen US-60 (Grand Ave.) to six lanes between 83<sup>rd</sup> Ave. and Loop 303. Design work on corridor improvement projects between Loop 101 and McDowell Rd. will be completed in early 2010 and construction work will begin by mid-2010. A feasibility study on potential grade separation projects identified for Grand Ave. between Loop 303 and Loop 101 was completed in January 2009.

- **Future Corridor Improvements** - Additional road improvements between Loop 101 and McDowell Rd. are programmed for Phase II. Also, potential grade separation projects on the segment from Loop 303 to Loop 101, as well as the segment from Loop 101 to McDowell Rd., are identified in Phase III and Phase V, respectively.

### US-60/ Superstition Freeway

- **Corridor Concept** - The RTP includes widening projects along several segments of the Superstition Freeway, providing additional general purpose lanes and extending HOV lanes. The major component of these improvements is the construction of both general purpose and HOV lanes from Val Vista Dr. to Power Road, which was completed during FY 2007. Other improvements include the addition of general purpose lanes between I-10 and Loop 101, and the addition of general purpose and HOV lanes from Crismon Road to Meridian Road. In addition, new half-diamond, traffic interchanges are called for at Lindsay Rd. and Meridian Rd.
- **Implementation Progress** - A project to add one HOV lane and two general purpose lanes in each direction between Val Vista Dr. and Power Rd. has been completed and was opened to traffic in June 2007. Completion of this project complemented earlier work on the Superstition Fwy., resulting in five general purpose lanes and one HOV lane along the entire length of the freeway between Loop 101 and Loop 202. Construction work to add one general purpose lane in each direction along the Superstition Fwy. between I-10 and Loop 101 is anticipated to be completed by late 2009/early 2010. This will result in four general purpose lanes and one HOV lane in each direction along this stretch of US-60.
- **Future Corridor Improvements** - The construction of one general purpose and one HOV lane in each direction from Crismon Rd. to Meridian Rd. is included in Phase III. Construction of new, new half-diamond traffic interchanges at Meridian Rd. and Lindsay Rd. are programmed in Phase II and Phase V, respectively.

### State Route 74/Carefree Highway

- **Corridor Concept** - The RTP includes funding for right-of-way protection along the SR-74 corridor for a potential future freeway facility. Since identification of the original concept, two minor passing lane projects have been added to improve safety in the corridor.
- **Implementation Progress** - Projects to construct passing lanes between mileposts 20-22, and between mileposts 13-15, are anticipated to be completed in spring 2011.
- **Future Corridor Improvements** - Right-of-way acquisition funding has been included in Phase V.

### State Route 85

- **Corridor Concept** - The RTP calls for widening SR-85 to a four-lane, divided roadway between Gila Bend and I-8, with the emphasis primarily on improving safety in the corridor.

- **Implementation Progress** - Construction has been completed on frontage roads between MC 85 and Southern Ave., and the construction of an improved roadway segment between Southern Ave. and I-10 is anticipated to be completed by mid-2011. Construction has been completed on several other segments between MC-85 and Gila Bend, and it is anticipated that the final segment between mileposts 130 and 137 will be completed by early 2010. Along with earlier widening projects, completion of these projects will provide a four-lane, divided roadway for essentially the entire distance between I-10 and Gila Bend. Intersection improvements at Butterfield Trail are programmed for FY 2010.
- **Future Corridor Improvements** - Widening projects on SR-85 as it enters Gila Bend from the north are included in Phase II. Preliminary engineering is being conducted on a future freeway-to-freeway interchange between SR-85 and I-8, but the freeway program does not have the financial resources to fund construction during the RTP planning period.

#### State Route 87

- **Corridor Concept** - Since identification of the original concepts for corridors in the RTP, two projects were added on SR-87 to refine roadway cross-section and provide for turning movements at a high volume recreational location.
- **Implementation Progress** - A project for improvements between the National Forest Boundary and New Four Peaks Rd., including an interchange at Bush Hwy., was completed in late 2008. Construction of a climbing lane and shoulder widening between New Four Peaks Rd. and Dos S Ranch Rd. is scheduled to be advertised for bids in early 2010.
- **Future Corridor Improvements** - No additional improvements in the corridor are programmed for the RTP planning period.

#### State Route 88

- **Corridor Concept** - Minor spot improvement as may be necessary.
- **Implementation Progress** - Minor spot improvement for a retaining wall in the vicinity of Fish Creek Hill is programmed for FY 2010.
- **Future Corridor Improvements** - No additional improvements in the corridor are programmed for the RTP planning period.

#### US-93

- **Corridor Concept** - The concept for the improvement to US-93 is to construct a new roadway on a new alignment to provide a by-pass around downtown Wickenburg, allowing a more effective connection between US-60 and US-93.

- **Implementation Progress** - The by-pass of the downtown Wickenburg area, which connects US-60 and US-93, was completed in late 2009.
- **Future Corridor Improvements** - No additional improvements in the corridor are programmed for the RTP planning period.

### Loop 101/Agua Fria Freeway

- **Corridor Concept** - The RTP includes construction of one additional general purpose lane and one additional HOV lane in each direction along the entire length the length of the Agua Fria Freeway. In addition, new interchanges are identified at Beardsley Rd./Union Hills Rd., and Bethany Home Rd.
- **Implementation Progress** - A new traffic interchange providing access to the Agua Fria Freeway from Bethany Home Rd. was completed in FY 2008. Work to provide ramp connections from Loop 101 to Beardsley Rd., as well as the expansion of the Union Hills Traffic Interchange, is anticipated to be completed in mid-2011. Work on improvements to the traffic interchange at Thunderbird Rd. was completed in late 2009. A DCR/CE for HOV lanes between I-10 and SR 51 on the Agua Fria and Pima Freeways is scheduled for completion in late 2010. A project to provide improvements along 99<sup>th</sup> Ave. between I-10 and Buckeye Rd at the southern terminus of Loop 101 (Agua Fria) is anticipated to be advertised for bids in early 2010. Crossroad improvements at the Olive Rd. traffic interchange are programmed in FY 2010. In addition, the construction of one HOV lane in each direction between I-10 and I-17, which was formerly programmed for Phase II, has been advanced as a design/build project to FY 2010.
- **Future Corridor Improvements** - The construction of one general purpose lane in each direction between I-10 and I-17 is in Phase V. The addition of direct HOV ramp connections at the freeway-to-freeway interchanges at I-10 and I-17 has been identified as an illustrative project.

### Loop 101/Pima Freeway

- **Corridor Concept** - The RTP calls for construction of one additional general purpose lane and one additional HOV lane in each direction along the entire length the length of the Pima Freeway. In addition, a new interchange is identified at 64<sup>th</sup> St., and direct HOV ramp connections are included at the freeway-to-freeway interchange at SR-51.
- **Implementation Progress** - Construction work to add one HOV lane in each direction along the Pima Freeway between Loop 202 and Via De Ventura and Via De Ventura and Princess Dr. was completed in November 2009 and May 2009, respectively. Construction of one HOV lane in each direction from Tatum Boulevard to Princess Dr., including direct HOV ramps at the SR-51 interchange, was completed in August 2009. The construction of a new traffic interchange at 64<sup>th</sup> St. was completed in October 2008. A DCR/EA for general purpose lanes between Princess Dr. and Loop 202 (Red Mountain) was completed in the fall of 2009.

Crossroad improvements at the Chaparral Rd. traffic interchange are programmed in FY 2010. The construction of one HOV lane in each direction along the segment between SR 51 to I-17, which was formerly programmed for Phase II, has been advanced as a design/build project to FY 2010.

- **Future Corridor Improvements** - The construction of one general purpose lane in each direction from Shea Blvd. to Loop 202 (Red Mountain) is in Phase II, while construction of general purpose lanes along the remainder of the Pima Freeway (Shea Blvd. to I-17) is in Phase IV.

### **Loop 101/Price Freeway**

- **Corridor Concept** - The RTP includes construction of one additional general purpose lane and one additional HOV lane in each direction along the entire length the length of the Price Freeway. The addition of direct HOV ramp connections is also included at the freeway-to-freeway interchange at Loop 202 (Santan).
- **Implementation Progress** - The construction of one HOV lane in each direction between Loop 202 (Red Mountain) and Loop 202 (Santan), was completed in November 2009. A DCR/EA for general purpose lanes between Loop 202 (Red Mountain) and Loop 202 (Santan) was completed in the fall of 2009.
- **Future Corridor Improvements** - The construction of direct HOV ramp connections at the freeway-to-freeway interchange at Loop 202 (Santan) is included in an HOV lane project on the San Tan Fwy., which is in Phase II. The construction of one general purpose lane in each direction between Baseline Rd. and Loop 202 (Santan) has been programmed for Phase IV.

### **SR-143/Hohokam Expressway**

- **Corridor Concept** - Improvements to SR-143 that provide better access to and from Sky Harbor Airport will be implemented with funding that has been made available by the deletion of SR-153 (Sky Harbor Expressway) from the RTP. Analyses indicated that the original concept for SR 153 as a connector to I-10 at 40<sup>th</sup> St. would no longer be effective. As a result, a major amendment to the RTP was approved to delete State Route (SR) 153/Sky Harbor Expressway from the RTP, and shift the available funding to improvements on SR-143/Hohokam Expressway.
- **Implementation Progress** - Design work on improvements to the interchange between SR-143 and the Loop 202 (Red Mountain) access road to Sky Harbor Airport has been completed and it is anticipated that this project will be advertised for bids in the spring of 2010.
- **Future Corridor Improvements** - No additional improvements at this location are programmed for the RTP planning period.

## SR 153 (Sky Harbor Expressway)

- **Corridor Concept** - On July 25, 2007, the MAG Regional Council approved deleting State Route (SR) 153/Sky Harbor Expressway from the RTP, and shifting the available funding to improvements on SR 143/Hohokam Expressway. This major amendment to the RTP was approved after completion of a thirty-day review period and agency consultation as set forth in Arizona Revised Statute (A.R.S.) 28-6353.

## Loop 202/Red Mountain Freeway

- **Corridor Concept** - The RTP includes construction of additional general purpose and HOV lanes along essentially the entire length of the Red Mountain Freeway. However, the segment from State Route 51 to Loop 101 (Pima) is scheduled for additional general purpose lanes, only, as HOV lanes already exist along this segment. The addition of direct HOV ramp connections is also included at the freeway-to-freeway interchange at US-60 (Superstition).
- **Implementation Progress** - The widening of structures at Washington Ave. and Mill Ave. was completed in early 2009. Construction of general purpose lanes between State Route 51 and Loop 101 (Pima) through a design/build contract is anticipated to be completed in mid-2010. Construction of one HOV lane in each direction between Loop 101 (Pima) and Gilbert Rd. is also targeted for completion in mid-2010. A DCR/EA for HOV lanes on the Red Mountain Freeway between Gilbert Rd. and US-60 (Superstition) is scheduled for completion in the spring of 2011.
- **Future Corridor Improvements** - The construction of one HOV lane in each direction from Gilbert Rd. to Higley Rd. and from Higley Rd. to US-60 (Superstition) are included in Phase III and Phase IV, respectively. The construction of one general purpose lane in each direction between Loop 101 (Pima) and Gilbert Rd. is in Phase II, while construction of one general purpose lane in each direction along the remainder of the Red Mountain Fwy. (Gilbert Rd. to US-60) is in Phase V. The addition of direct HOV ramp connections at the freeway-to-freeway interchange at US-60 (Superstition) is also in Phase V.

## Loop 202/Santan Freeway

- **Corridor Concept** - The RTP includes construction of additional general purpose and HOV lanes along the entire length of the Santan Freeway. The addition of direct HOV ramp connections is also included at the freeway-to-freeway interchange at I-10 and Loop 101.
- **Implementation Progress** - The construction of one HOV lane in each direction from I-10 to Gilbert Rd., including direct HOV ramp connections at the freeway-to-freeway interchanges at I-10 and Loop 101 (Price), which was formerly scheduled for Phase II, has been advanced as a design/build project to FY 2010. A DCR/EA for HOV lanes on the remainder of the Santan Freeway between US-60 (Superstition) and I-10 is targeted for completion in the spring of 2011.

- **Future Corridor Improvements** - One HOV lane in each direction from Gilbert Rd. to US-60 (Superstition) is in Phase IV. The construction of one general purpose lane in each direction from I-10 to US-60 is identified in Phase V.

### Loop 202/South Mountain Freeway

- **Corridor Concept** - The South Mountain Freeway is a new corridor and is planned to loop south of the central area of the region, connecting the western terminus of the Santan Freeway at I-10 (Maricopa) with I-10 (Papago) in the West Valley in the area of 59<sup>th</sup> Ave. The South Mountain Freeway links with the Santan Freeway, creating a southern loop around the region, and provides an alternative to I-10 through the congested areas of central Phoenix.
- **Implementation Progress** - As part of the Proposition 300 freeway program, a fully directional, freeway-to-freeway interchange was constructed at the confluence of I-10 (Maricopa), Loop 202 (Santan), and Loop 202 (South Mountain). As part of the interchange, a freeway cross-section extends along the South Mountain corridor for approximately three-quarters of a mile west through the interchange. Approximately 95 percent of the right-of-way needed for a six-lane freeway was also acquired along Pecos Rd. under Proposition 300, approximately between I-10 and 27<sup>th</sup> Ave. A DCR/EIS is currently progressing for the South Mountain Freeway corridor. Completion and approval of a final EIS, as well as a U.S. Department of Transportation “Record-of-Decision” on the recommended alternative for the corridor, is anticipated sometime during calendar year 2010.
- **Future Corridor Improvements** - The South Mountain corridor will be developed as a freeway facility, with three general purpose lanes and one HOV lane in each direction. Construction of the facility begins in Phase II and extends into Phase III. The option of later constructing one additional general purpose lane in each direction will be retained, with an emphasis on minimizing the right-of-way footprint of the ultimate facility. The alignment of the facility will be determined as a result of the ongoing DCR/EIS, with the end points of the corridor anticipated to be at the existing system interchange at I-10/Loop 202 and at I-10/59<sup>th</sup> Ave. It is anticipated that the alignment of the facility between Buckeye Rd. and I-10 would utilize 59<sup>th</sup> Ave. right-of-way to the maximum degree possible.

### Loop 303 Freeway

- **Corridor Concept** - The Loop 303 Freeway is a new corridor and is planned to extend west from I-17 at Lone Mountain Road, traversing southwest to Grand Ave., running south in the vicinity of Cotton Lane to I-10, and then terminating at MC-85 (Buckeye Road). Loop 303 will play a vital role in providing north-south connections for the communities of the West Valley, will serve the next ring of development beyond Loop 101 (Agua Fria), and will provide traffic relief to Loop 101 and I-17. The need for right-of-way protection is also identified for the segment between MC-85 and Riggs Road.

- Implementation Progress** - A interim, two-lane roadway was constructed by ADOT between I-10 and US-60 during the early stages of the Proposition 300 freeway program to help secure future right-of-way for a freeway. Maricopa County constructed an interim, four-lane divided roadway between US-60 (Grand Ave.) and Happy Valley Rd., as well as a bridge structure over Grand Ave., while the facility was under their jurisdiction. Full freeway right-of-way was also acquired by Maricopa County along most of this segment. Construction on an interim four-lane divided roadway between Happy Valley Rd. and I-17 will be completed by late 2011/early 2012. Construction of future T.I.s at Bell Rd., Waddell Rd. and Cactus Rd. is anticipated to be completed in mid-2010. A DCR/EA on the segment between I-10 and US-60 (Grand Ave.) for construction of a freeway facility has been completed. DCR/EA's on the segment between I-10 and MC 85, and the segment between Grand Ave. and Happy Valley Rd., are scheduled for completion in late 2012 and July 2010, respectively. These studies will cover construction of full freeway facilities in the corridor.
- Future Corridor Improvements** - The Loop 303 corridor will be developed as a freeway facility, with three general purpose lanes in each direction. The option of later constructing one HOV lane in each direction in the median of the facility, as well as one additional general purpose lane in each direction along the outside of the existing lanes, will be retained. Construction of the freeway facility between I-10 and Grand Ave. is scheduled for Phase II. Expansion of the interim facility to a full six-lane freeway between Grand Ave. and I-17 will occur in Phase III. The construction of the segment from I-10 to MC-85 is identified for Phase V, as well as upgrading the interchange at Grand Ave. to a single-point-urban design or other higher level design concept.

### State Route 801

- Corridor Concept** - SR-801 (originally labeled as the I-10 Reliever Freeway) is a new corridor and is planned as an east-west facility south of I-10 connecting Loop 202 (South Mountain) and SR-85. With major travel demand growth forecasted in the West Valley, SR-801 will serve to provide capacity relief to the I-10 corridor, as well as improved accessibility to the southwestern areas of the region.
- Implementation Progress** - A DCR/EA is underway on the segment between Loop 202 (South Mountain) and Loop 303, as well as the segment between Loop 303 and SR-85. Both studies are targeted for completion in late 2012/early 2013.
- Future Corridor Improvements** - The SR-801 corridor between Loop 202 (South Mountain) and Loop 303 will be developed as a freeway facility, with three general purpose lanes in each direction. Construction of this facility is identified for Phase V. The option of later constructing one HOV lane in each direction in the median of the facility, as well as one additional general purpose lane in each direction along the outside of the existing lanes, will be retained. Between Loop 303 and SR-85, the facility will be developed initially as a two lane roadway, with an emphasis on completion of preliminary engineering studies so right-of-way can be protected. Construction of the interim facility is included in Phase V.

### SR-802/Williams Gateway Freeway

- **Corridor Concept** - State Route 802 is a new corridor and is planned to extend from Loop 202 (Santan) south to the Williams Gateway Airport, and east to the Pinal County line. The alignment of the facility extends southwestward from Loop 202 (Santan) in the area of Hawes Rd. to Ellsworth Rd., and swings to an east-west alignment generally along Frye Rd. to the Pinal County line. The facility is planned to extend to US-60 in Pinal County. The facility will provide access to the major activity center at the airport, and link the future growth areas of the far East Valley and Northern Pinal County into the regional freeway system. Location studies are underway by ADOT for further extension of the facility into Northern Pinal County.
- **Implementation Progress** - In FY 2006, a preferred location for this facility within Maricopa County was adopted by MAG. A DCR/EA is underway for the entire corridor (including the Pinal County portion) and is anticipated to continue through FY 2010. On May 27, 2009, the MAG Regional Council approved advancing the design and right-of-way for an interim connection of the Williams Gateway Freeway between the Santan Freeway and Ellsworth Rd. by approximately three years from FY 2013/2015 to FY 2010.
- **Future Corridor Improvements** - The SR-802 corridor will be developed as a freeway facility, with three general purpose lanes in each direction. The option of later constructing one HOV lane in each direction in the median of the facility, as well as one additional general purpose lane in each direction along the outside of the existing lanes, will be retained. Construction of an interim facility between Loop 202 (Santan) and Ellsworth Rd. is programmed in Phase III. Final construction of a freeway on this segment, as well as construction of a freeway from Ellsworth Rd. to Meridian Rd., is in to Phase V. Although a location for the extension of SR-802 into Pinal County is understudy by ADOT, funding resources for the construction of the facility have not been identified.

### System-wide/Preliminary Engineering

- **Program Concept** - The effort to develop the designs and plans for eventual construction of freeway and highway facilities is an essential step in the overall highway development process. The preliminary engineering phase, which is addressed in this program area, involves a number of activities, including: (1) preparation of environmental impact analyses, (2) development of detailed facility design concepts, (3) conducting public involvement, education and outreach programs, and (4) preparing and updating the long-range schedule of projects covering construction of the entire freeway plan
- **Implementation Progress** - Since the start of the Proposition 400 program, ADOT has pursued engineering studies on essentially every corridor in the freeway plan. This has led to final designs on 10 projects, 60 percent plans on one project, 30 percent plans on nine projects, 15 percent plans on 3 projects, and one design-build project.
- **Future Program Levels** - A total of approximately \$352 million has been identified for this activity during the planning period of the RTP (FY 2011 to 2031).

### System-wide/Freeway Management System

- **Program Concept** - This program area includes projects to enhance, maintain and operate the freeway management system (FMS), which helps keep traffic flowing as smoothly as possible. FMS covers items such as traffic monitoring equipment, ramp metering, changeable message signs, and other measures to facilitate traffic flow.
- **Implementation Progress** - Enhancement and operation of the freeway management system has proceeded since the start of the Proposition 400 program. Approximately \$10 million has been obligated through FY 2010 to activities in this system-wide program area.
- **Future Program Levels** - A total of approximately \$107 million has been identified for this activity during the planning period of the RTP (FY 2011 to 2031).

### System-wide/Maintenance

- **Program Concept** - The RTP includes a block of funding for maintenance of the regional freeway system in the MAG Region. These regional resources are dedicated only to litter pick-up, landscaping maintenance and landscaping restoration. The goal of this funding is to supplement, not supplant, the state-level revenues that ADOT dedicates to maintenance and preservation in the MAG Region.
- **Implementation Progress** - Since the start of the Proposition 400 program, ADOT has provided an increased level of landscaping, litter pick up and sweeping maintenance on existing freeways in the Valley, and will expand this effort as RTP projects are constructed. Approximately \$ 52 million has been obligated through FY 2010 to activities in this system-wide program area.
- **Future Program Levels** - A total of approximately \$308 million has been identified for this activity during the planning period of the RTP (FY 2011 to 2031).

### System-wide/Minor Projects

- **Program Concept** - Another category in the system-wide programs area covers various minor, spot improvements throughout the system. This includes projects such as park-and-ride lots, improvements at existing traffic interchanges with arterial streets, drainage improvements, and the Freeway Service Patrol.
- **Implementation Progress** - As part of this program area, an interchange improvement at Loop 101 (Agua Fria)/Thunderbird Rd. has been completed, and improvements at I-10 (Papago)/Avondale Blvd., Loop 101 (Agua Fria)/Olive Ave., and Loop 101 (Pima)/Chaparral Rd. are programmed for FY 2010. Another project under this category, the Freeway Service Patrol, has assisted more than 10,000 motorists each year.
- **Future Program Levels** - A total of approximately \$26 million has been identified for this activity during the planning period of the RTP (FY 2011 to 2031).

### System-wide/Noise Mitigation

- **Program Concept** - The RTP identifies a block of funding for noise mitigation projects on the freeway system in the MAG Region. This funding will be used for mitigation projects such as rubberized asphalt overlays and noise walls. Since noise mitigation is included as part of the construction of new freeways or the expansion of existing facilities, the focus of these funds is for areas with no planned improvements or improvements a number of years in the future. The noise mitigation funds would provide noise mitigation for areas that exhibit high noise levels and where feasible options exist that could reduce noise levels.
- **Implementation Progress** - Approximately \$55 million of this funding has been expended for rubberized asphalt on freeway facilities, leaving \$20 million for other noise mitigation projects. A list of noise wall projects was developed for use of these funds and approved by the MAG Regional Council in 2008. Engineering is proceeding on these projects leading up to advertisement for bids in FY 2010.
- **Future Program Levels** - A total of approximately \$150 million has been identified for this activity during the planning period of the RTP (FY 2011 to 2031). This would provide funding for future rehabilitation of quiet pavements.

#### **System-wide/Right-of-Way**

- **Program Concept** - The overall highway development process involves a number of steps that are necessary to prepare projects for eventual construction. One of the major elements in this process is the acquisition and management of the right-of-way needed for facility construction. Some of the key right-of-way activities include: (1) advanced acquisition of properties to respond to development pressures in a corridor; (2) management of acquired properties, (3) evaluation of construction plans, (4) title research, and (5) administration of property purchases.
- **Implementation Progress** - Since the start of the Proposition 400 program, ADOT has acquired approximately 1,900 acres required for freeway and highway construction.
- **Future Program Levels** - A total of approximately \$92 million has been identified for this activity during the planning period of the RTP (FY 2011 to 2031).

#### **Proposition 300 - Regional Freeway Program**

The Proposition 300 - Regional Freeway Program was initiated in 1985 with voter passage of a half-cent sales tax in Maricopa County for use on the regional freeway system. The program was drawn to a close with the opening of the freeway segment between University Dr. and Power Rd. on the Red Mountain Freeway on July 21, 2008.

Although sales tax collections for Proposition 300 ended on December 31, 2005, ongoing work that utilized State and Federal funding sources continued through mid-2008 to complete the last segments of the program. In addition, certain debt service requirements and other financial obligations for the program will continue through FY 2026. These obligations have been taken fully

into account in the planning process for the RTP, to ensure there are no conflicting demands on revenues.

### **System Operation, Maintenance and Preservation**

One of the key goals of the RTP is to operate and maintain a high quality transportation network, and to preserve the significant investment that has been made in transportation facilities through the MAG Region. For the freeway/highway system, this translates into actions to ensure not only the physical integrity and safety of the system, but also measures to address its visual impacts on motorists and surrounding neighborhoods. The amount identified in the RTP for system operation, maintenance and preservation totals \$1.2 billion (YOE \$'s).

### **Regionally Funded Landscape and Litter Maintenance Activities**

The RTP includes a block of funding for maintenance of the regional freeway system in the MAG Region. These regional resources are dedicated only to litter pick-up, landscaping maintenance and landscaping restoration. The goal of this funding is to supplement, not supplant, the state-level revenues that ADOT dedicates to maintenance and preservation in the MAG Region. ADOT is providing an increased level of landscaping, litter pick up and sweeping maintenance on existing freeways in the Valley, and will expand this effort as RTP projects are constructed.

### **Routine Maintenance and Operations**

Routine maintenance and operation of the regional freeway/highway network in the MAG Region is accomplished by ADOT through its maintenance districts. These districts are organized to provide services in five key functional areas, addressing roadway maintenance, landscape maintenance, electrical operations, traffic engineering and administrative services.

Example activities include maintenance of pavement, guard rails and median cable barriers, drainage channels, canals, tunnels, retention basins, and sound walls, as well as maintenance and restoration of landscaping. In addition, traffic operations are addressed, including roadway lighting, traffic signals, signing and striping, and freeway management system support. Other functions cover utility locating services, encroachment permits, crash clearing and repairing damaged safety features.

### **Pavement Preservation**

The ADOT organization includes a Pavement Management Section, which is charged with the responsibility to develop and provide a cost effective pavement rehabilitation construction program. The pavement preservation program receives a high priority within ADOT, to preserve the investment in the freeway/highway system and enhance transportation safety and efficiency. The program is accomplished by performing a yearly inventory of the pavements in the system, with particular attention to smoothness of ride, amount of cracking, bleeding, patching, and rutting, and the friction characteristics. As part of this process, a large relational database is used to help prioritize the work needed to keep the system performing within predetermined service levels.

Freeways/highways constructed from concrete have a longer initial life and overlay life than facilities that are constructed using asphalt. In this regard, the predominance of concrete pavements on

MAG urban freeways is a definite advantage. As a result, pavement projects have focused on I-10 to the west, I-17 to the north, and the portion of US-60 falling along Grand Avenue.

## **Funding and Expenditure Summary**

Table 8-2 has been prepared to provide an overview of the funding and expenditures for the freeway/highway element of the RTP. This table lists the reasonably available funding sources for the planning period and the uses of those funds. The revenue sources included in Table 8-2 are considered to be reasonably available throughout the planning period, having had a long history of providing funding for the RTP. As indicated in Table 8-2, projected future funding is in balance with estimated future program expenditures, indicating that the freeway/highway element can be accomplished using reasonably available funding sources over the planning period.

### **Funding Sources**

Funding sources shown in Table 8-2 for the freeway/highway element include the half-cent sales tax (\$8.8 billion); MAG area ADOT funds (\$7.8 billion); Federal Highway Congestion Mitigation/Air Quality funds and Surface Transportation Program funds (\$466 million); ADOT statewide funding (\$550 million); other funding (\$212 million); bond proceeds (\$4.0 billion); and an estimated cash balance of \$145 million at the beginning of FY 2011. Debt service and other expenses totaling \$6.2 billion are deducted from these sources, yielding a net total of \$15.9 billion (YOE \$'s) for use on freeway/highway construction projects. The above revenue sources have been major funding elements for transportation facilities in the MAG Region for decades and are considered to be reasonably available to the region throughout the planning period.

### **Program Expenditures**

Table 8-2 also lists estimated future costs for the freeway/highway element of the RTP, expressed in YOE \$'s. Expected expenditures during the planning period total \$15.9 billion. This includes \$7.9 billion for construction of new corridors; \$5.0 billion for widening of existing facilities; \$207 million for construction of new interchanges on existing freeways; \$1.4 billion for system-wide programs; and \$1.2 billion for operations, maintenance and preservation.

**TABLE 8-2  
FREEWAY/HIGHWAY FUNDING PLAN FY 2011 - 2031**

<b>FUNDING (Year of Expenditure \$'s in Millions)</b>	
	<b>Totals</b>
Regional Funds	
MAG Half-Cent Sales Tax	8,841.6
MAG Area ADOT Funds	7,799.8
MAG Federal CMAQ and STP	466.4
Total Regional Funds	17,107.8
Other Funding	
ADOT Statewide Funding	550.0
Other Income	212.3
Total Other Funding	762.3
Bond Proceeds	4,035.0
Beginning Balance	145.4
Allowance for Debt Service and Other Expenses	(6,191.8)
<b>Total Funding (2007 \$'s)</b>	<b>15,858.7</b>
<b>EXPENDITURES (Year of Expenditure \$'s in Millions)</b>	
	<b>Totals</b>
New Facilities and Improvements	
New Corridors	7,948.5
Widening of Existing Facilities: General Purpose and HOV Lanes	5,023.4
New Interchanges and New HOV Ramps on Existing Facilities	207.0
Systemwide Programs: Noise Mitigation, Minor Projects, Litter/Landscaping, FMS, Preliminary Engr., Right-of-Way Mgmt.	1,436.8
Other Projects	8.3
Total New Facilities and Improvements	14,624.0
System Operation, Maintenance and Preservation	1,230.2
<b>Total Expenditures (2007 \$'s)</b>	<b>15,854.2</b>

## CHAPTER NINE

### ARTERIAL STREETS

The arterial street grid system is a vital component of the regional transportation system in the MAG Region and is a key element of the Regional Transportation Plan (RTP). The RTP provides regional funding for widening existing streets, improving intersections, and constructing new arterial segments. The continued implementation of Intelligent Transportation Systems (ITS) and dust control measures, for air quality purposes, are also funded. While MAG is responsible for developing the RTP, local jurisdictions are primarily responsible for design, right-of-way acquisition, and construction of arterial facilities as identified in the plan. Local jurisdictions are also responsible for the maintenance of these facilities.

#### **Current Arterial Street System**

The arterial street system is a critical element of the regional transportation network and consists primarily of roadways with four or more lanes on a mile grid. This system provides the region with a high level of accessibility and mobility, complementing the regional freeway system and serving automobile traffic, transit, bicycle and pedestrian traffic. The arterial system carries over half of the total vehicle-miles-traveled in the region. Figure 9-1 presents the existing arterial grid system, as modeled for the year 2009.

In addition to the arterial street system, the region is served by non-arterial streets, which include all local and collector streets. Non-arterial streets carry a relatively small amount of the total traffic in the region, primarily providing access to businesses and residences. The development of local street mileage is closely associated with the growth in population and employment.

#### **Planned Arterial Facilities and Improvements**

As the MAG area grows in the future, the continued expansion and improvement of the arterial street system will be vital to the functioning of the regional transportation system. The Regional Transportation Plan identifies a long-range regional arterial grid system that provides for access to existing and newly developing areas in the region. This system is characterized by a one-mile grid network of streets and will be developed through a combination of public and private funding sources.

The future arterial network anticipated in the MAG Region by 2030 is depicted in Figure 9-2. Improvements to the system are staged to parallel new development. This network was determined through ongoing consultation with local agencies and sub-regional studies conducted by MAG. The future arterial network extends the current one-mile arterial grid system concurrent with new development, and also closes gaps and improves connectivity in both developed and developing areas. In addition, certain existing arterials receive capacity improvements.

It is anticipated that the overall arterial street network will expand by a combination of the construction of new roadway alignments; the paving of dirt roads on the one-mile arterial grid

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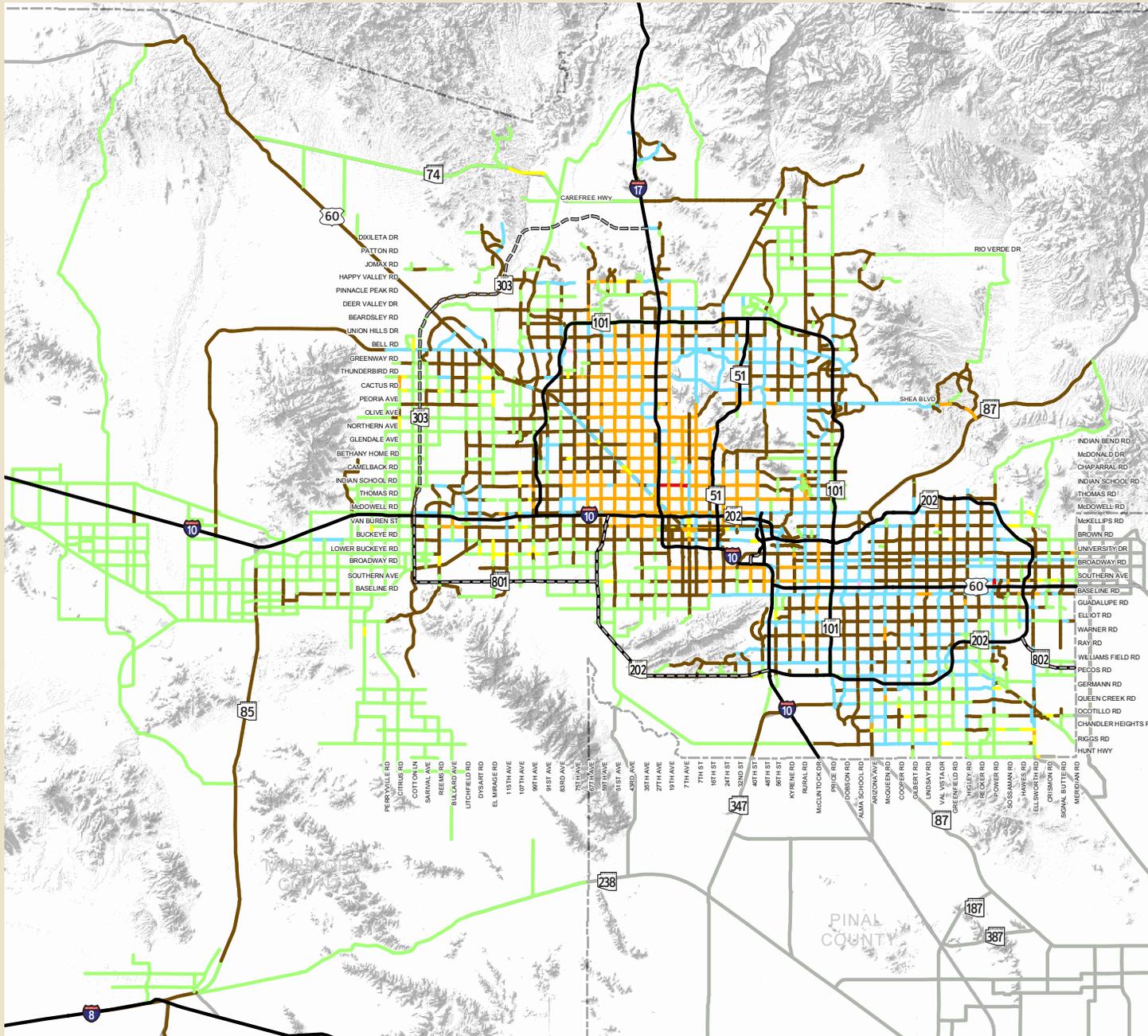
Fig. 9-1



## 2009 Arterial Street System Total Through Lanes

- 2 Lanes
- 3 Lanes
- 4 Lanes
- 5 Lanes
- 6 Lanes
- 7 Lanes
- 8 Lanes
- Freeways
- - - Proposed Freeways
- Other Roads
- County Boundary

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Fig. 9-2

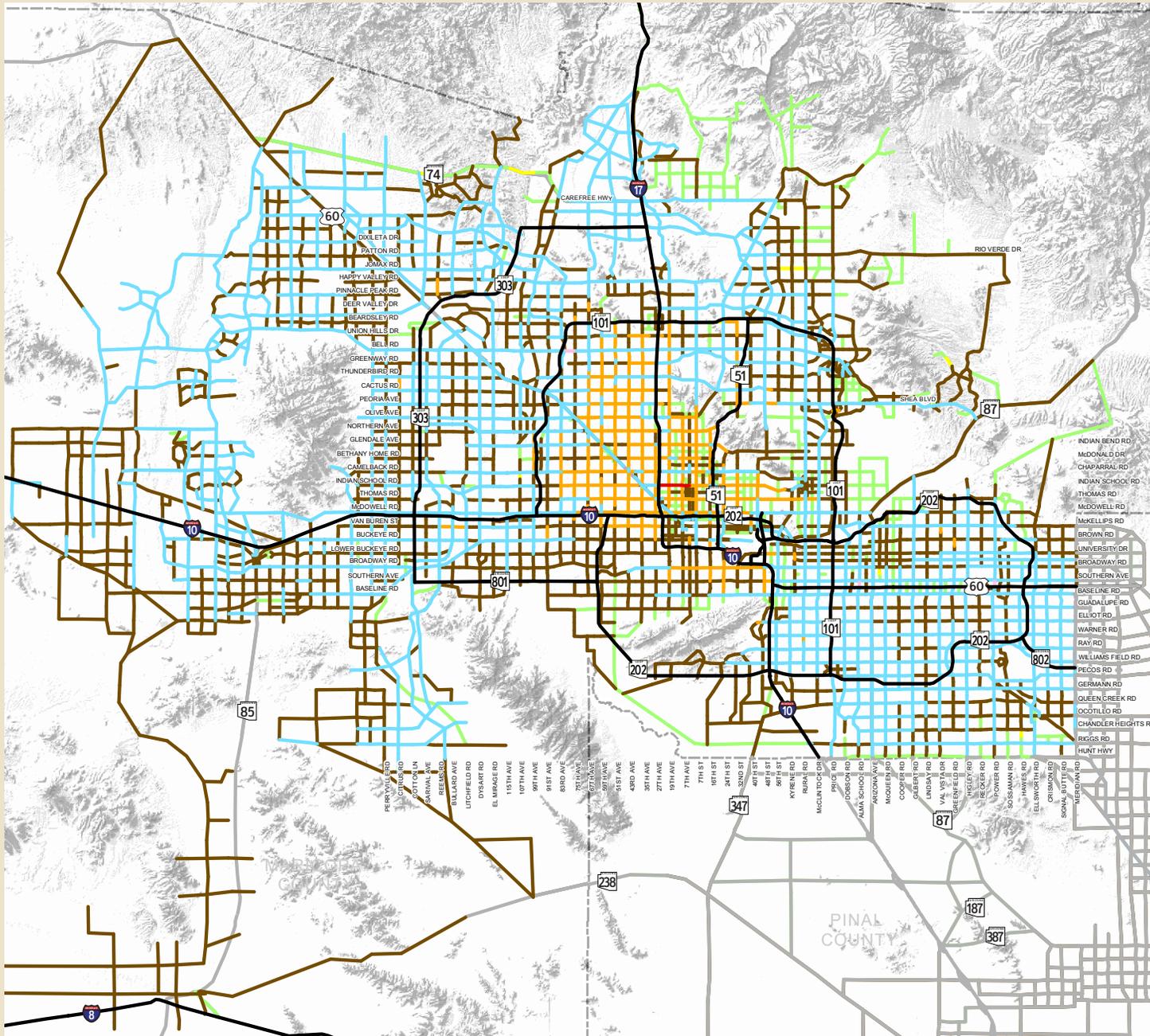


## 2030 Arterial Street System Total Through Lanes

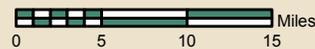
- 2 Lanes
- 3 Lanes
- 4 Lanes
- 5 Lanes
- 6 Lanes
- 7 Lanes
- 8 Lanes
- Freeways
- Other Roads
- County Boundary

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Alignments for new freeway, highway, arterial, and light rail/high capacity transit facilities will be determined following the completion of appropriate design and environmental studies.



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system; and the widening of existing arterial streets. In some areas, natural features, such as mountains and areas of steep terrain, will preclude the extension of the one-mile arterial grid system. The amount identified in the RTP for the planning period (FY 2011 - FY 2031) for development of the arterial grid system totals \$15.2 billion (YOE \$'s). This includes regionally funded projects, as well as those constructed through a combination of privately supported and local government funded sources.

## Regionally Funded Improvements

The package of regionally funded projects provides for the construction of new arterial linkages, widening of existing streets, and improvement of intersections. In addition, implementation of dust control measures and projects in the regional Intelligent Transportation System (ITS) Plan are included. A total of \$3.4 billion (YOE \$'s) in funding is provided by regional sources. An additional \$1.9 billion is added to the projects from local matching funds, for a total of \$5.3 billion.

- **MAG Arterial Life Cycle Program** - The Arterial Life Cycle Program (ALCP) extends through FY 2026 and is maintained by MAG to implement arterial street projects identified as part of Proposition 400. When the RTP was originally developed in 2003, all of the regionally funded projects described in the ALCP were targeted for completion by the end of FY 2026. Increases in project cost estimates and decreases in revenue collections and forecasts have resulted in the deferral of certain projects beyond this time period. However, all projects fall within the FY 2031 time horizon of the RTP. Given the uncertainty accompanying long-range forecasts of costs and revenues, no additional arterial street projects have been specifically programmed in the ALCP at this time. The Program provides a total of approximately \$2.0 billion (YOE \$'s) in reimbursements, and with \$1.4 billion from local matching funds totals \$3.4 billion. This includes the following:
  - **Arterial Capacity/Intersection Improvements** - These improvements vary in nature, including the widening or major upgrading of existing arterial streets, and construction of new facilities on new alignments. Also, improvements at individual intersections are addressed in this category. The total regional funding for these improvements is \$1.9 billion. The local match for these projects provides an additional \$1.4 billion. The improvements planned for the system are shown in Figure 9-3. Figure 9-4 depicts how regionally funded reimbursements from the ALCP for arterial street projects will be phased over the planning period, with phase designations indicating the period in which the final reimbursements are provided. A detailed listing of the specific ALCP street improvement projects is provided in Appendix B.
  - **Intelligent Transportation Systems (ITS)** - The RTP allocates funding to assist in the implementation of projects identified in the regional ITS Plan. These projects smooth traffic flow and help the transportation system to operate more efficiently. The total cost of these improvements, including local contributions, is \$90 million (YOE \$'s).
  - **Implementation Studies** - As established in the RTP approved in 2003, 0.3 percent of the half-cent funding for arterial streets is allocated to planning implementation

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Fig. 9-3

REGIONAL  
TRANSPORTATION  
PLAN



## Planned Arterial Street Improvements

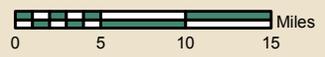
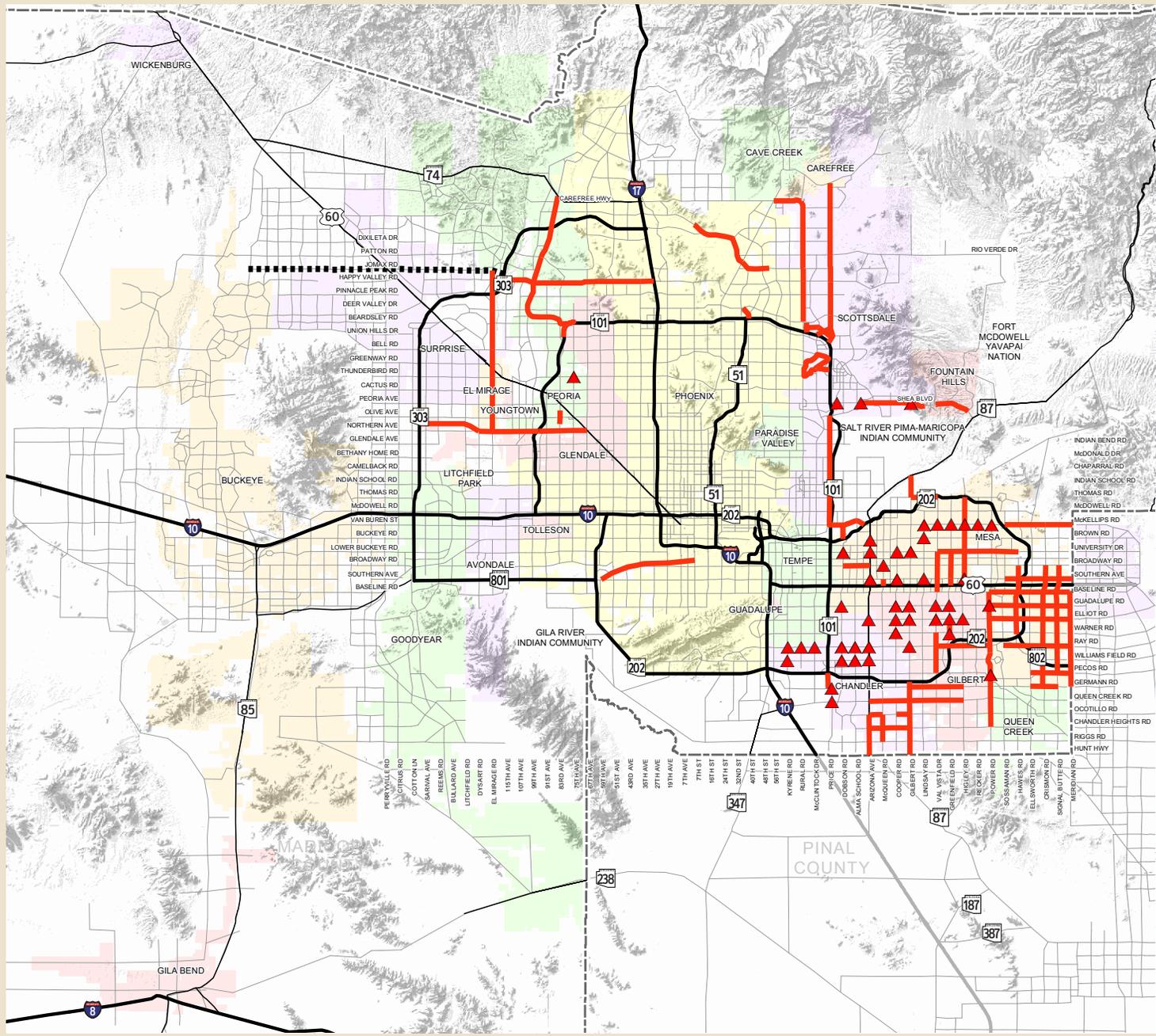
- ▲ Improved Intersections
- New/Improved Arterials
- ▬ Right of Way Preservation
- Freeways
- Highways
- Other Roads
- ▭ County Boundary

*Alignments for new freeway, highway, arterial, and light rail/high capacity transit facilities will be determined following the completion of appropriate design and environmental studies.*

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Fig. 9-4

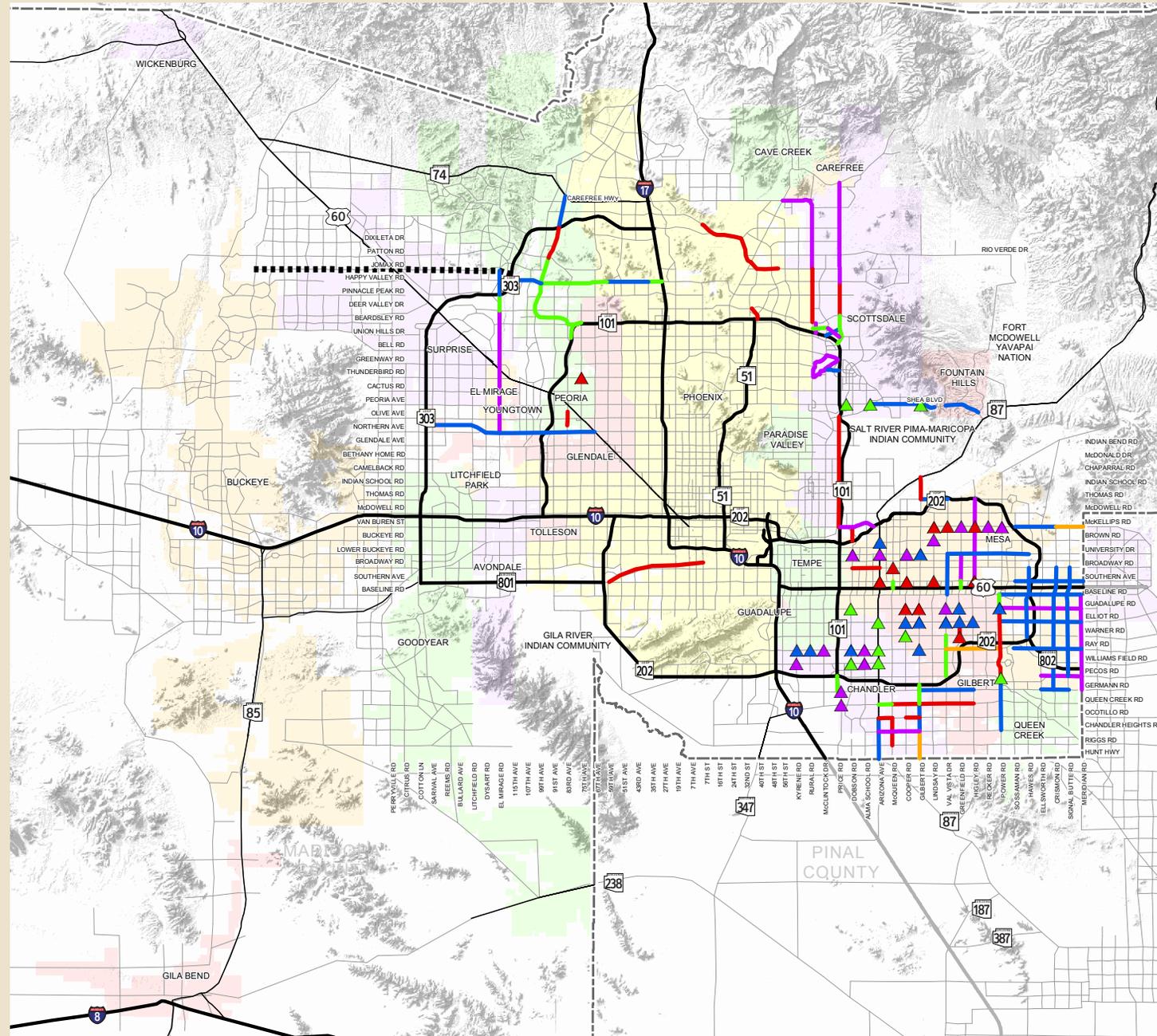
REGIONAL  
TRANSPORTATION  
PLAN



## Plan Phasing Arterial Street Improvements

- ▲ Improved Intersections
- New/Improved Arterials
  - Phase 1 (FY 2006 - FY 2010)
  - Phase 2 (FY 2011 - FY 2015)
  - Phase 3 (FY 2016 - FY 2020)
  - Phase 4 (FY 2021 - FY 2025)
  - Phase 5 (FY 2026 - FY 2031)
- Right of Way Preservation
- Freeways
- Highways
- Other Roads
- County Boundary

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Alignments for new freeway, highway, arterial, and light rail/high capacity transit facilities will be determined following the completion of appropriate design and environmental studies.

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studies for the region. These implementation studies are conducted by MAG and are reflected in the approved Arterial Life Cycle Program. Including local match, the amount identified in the Program for implementation studies totals approximately \$34 million (YOE \$'s).

- **Dust Control Measures** - The RTP incorporates funding for measures to reduce PM-10 emissions generated by vehicle travel. From FY 2001 to FY 2010, \$23.1 million in Congestion Mitigation and Air Quality Improvement (CMAQ) funds were committed to purchase 150 PM-10 certified street sweepers.

An additional \$3.6 million in CMAQ funding is programmed to purchase 20 additional PM-10 certified sweepers in fiscal years 2011 through 2014 of the FY 2011-2015 MAG Transportation Improvement Program (TIP). After FY 2014, it is assumed that local governments will continue to purchase five PM-10 certified sweepers each year to replace older PM-10 certified sweepers, expand the area swept, and increase the frequency of sweeping.

In the RTP, the paving of dirt roads by local jurisdictions reflects a continuation of current commitments to reduce fugitive dust on unpaved roads with high traffic volumes; eliminate dirt roads in areas of new development; and to pave dirt alleys, shoulders, and access points. Consistent with past trends, the RTP assumes that 10 centerline miles of high Average Daily Traffic (ADT) unpaved roads will continue to be paved each year.

The funding and expenditures for purchasing PM-10 certified street sweepers and paving dirt roads after FY 2010 are reflected in the FY 2011 to FY 2031 arterial funding estimates. Long-term implementation of these dust control measures will be financed with the resources shown in Table 9-2.

- **Other Arterial Grid Extensions, Widening and Improvements** - It is estimated that an additional \$1.2 billion (YOE \$'s) would be provided from reasonably available regional funding sources not currently programmed in the Arterial Life Cycle Program. These resources would be applied to additional arterial system improvements, including construction of new arterial linkages, widening of existing streets, improvement of intersections, and ITS projects. This funding would be matched by \$508 million in local funding for a total of \$1.7 billion. In addition, a total of \$210 million in regional CMAQ funding is identified for PM-10 and other air quality programs for the FY 2011-2031 planning period.

### **Local Government and Private Sources**

Based on historical patterns, the construction of new streets that accompany new development will continue to be funded largely from private sources. In addition, projects to widen existing streets will receive significant funding from public sources, including local government funds. It is estimated that these resources represent a total of approximately \$9.8 billion in reasonably available funding sources that would be applied to the extension and improvement of the regional arterial network.

## **System Operation, Maintenance and Preservation**

MAG member agencies seek to maintain and operate the arterial street system in a way that preserves past investments and obtains the maximum capacity from existing facilities. To achieve this goal, agencies apply local funds and their share of State Highway User Revenue Funds to a range of expenditures, including street lighting, street sweeping, landscaping, sign maintenance, pavement maintenance, the operation of traffic signals, and other recurring costs necessary to maintain the arterial street network. A particularly important part of the preservation effort involves the application of pavement management systems.

Pavement management systems (PMS) are systematic processes that provide information for use in implementing cost-effective pavement reconstruction, rehabilitation, and preventative maintenance programs, which result in pavements capable of accommodating current and forecasted traffic in a safe, durable, and cost-effective manner. ADOT has developed and implemented a PMS for the State Highway System. Other MAG member agencies have developed PMS programs for roads within their jurisdictions. Table 9-1 lists key characteristics of existing PMS programs. The amount identified in the RTP for the planning period for maintenance and preservation totals \$9.1 billion (YOE \$'s).

## **Funding and Expenditure Summary**

Table 9-2 has been prepared to provide a summary of the funding scenario for the streets element of the RTP. This table lists the reasonably available funding sources for the planning period and the uses of those funds. The balance between the funds that are available and the potential expenditures indicates that the arterial element of the RTP can be accomplished by using reasonably available funding sources over the planning period.

### **Funding Sources**

Regional funding sources for the arterial streets element of the RTP are shown in Table 9-2 in terms of (YOE \$'s), and include the half-cent sales tax (\$1.7 billion); Federal Highway Congestion Mitigation/Air Quality funds (\$402 million); Federal Surface Transportation Program funds (\$1.4 billion); bond proceeds (\$332 million); and an estimated cash balance of \$106 million in regional funds at the beginning of FY 2011. These regional funds are complemented by local/other sources, which include city/county funding (\$17.3 billion); and private funds (\$3.4 billion). Deducting debt service \$367 million, a net total of \$24.2 billion is available for use on arterial street projects and programs. These revenue sources have been major funding elements for transportation facilities in the MAG area for decades and are considered to be reasonably available to the region throughout the planning period.

### **Program Expenditures**

Table 9-2 also lists estimated future costs for the arterial street element of the RTP in terms of YOE \$'s. Estimated expenditures during the planning period total \$24.2 billion. This includes \$5.3 billion for regionally funded arterial street improvements, including the accompanying local match; \$9.8 billion for locally and privately funded improvements and extension of the arterial grid; and \$9.1 billion in local funding for operations, maintenance and preservation.

**TABLE 9-1 PAVEMENT MANAGEMENT SYSTEMS**

Agency	PMS Software	Data Range	Freq.	Comments
ADOT	NOS	Full	Annual	Network Optimization Software designed by consultant. Inertial Profilometers used.
Apache Junction	Carte-Graph	Good	Annual	The CarteGraph System has been slow to become operational. The program had many bugs in the system and was unable to retain the data entered. The program will have information on street width, street condition, maintenance history, right-of-way information, curb, gutter and sidewalk notation, storm drainage appurtenances, etc.
Carefree	In-House System	Good	3 yrs	Visual inspection conducted by staff every 18 to 24 months. Inspectors complete a form developed by the Asphalt Institute.
Chandler	Stantec Super PMS 1.41	Full	4 yrs	Data is collected on street details and distresses. A Pavement Quality Index (PQI) is formulated from a Surface Distress Index and a Ride Distress Index (RDI). Data is collected on over 18 distress types on each section of pavement. The PQI is used to set annual maintenance and rehabilitation programs for city streets.
El Mirage	None	Good	Annual	Visual inspection and evaluation as needed.
Fountain Hills	In-House System	Good	3 yrs	The Town uses a asphalt pavement distress data form to collect information on seven categories with each category assigned a rating of low, moderate or high severity. These categories are then combined to create an overall distress index, not to exceed 100 total points.
Gilbert	Chec PMS	Good	Annual	Visual inspection and manual system. Implementing a software based system.
Glendale	Hansen	Good	3 yrs	Inventory collected visually.
Goodyear	Carte-Graph	Full	2 yrs	Currently the City is using a manual system since Cartegraph was abandoned. Currently researching THE as a viable system.
Litchfield Park	None	Good	Annual	Visual inspection. Manual inventory system.
Maricopa County	In house program	Full	Annual	In-house programmed pavement management system. It accepts our Pavement Condition Ratings (PCR), International Roughness Index (IRI) ratings, and sufficiency ratings for all County roadways. It then calculates pavement needs and capacity upgrading needs for all County Roadways. It outputs lists of roadways needing various surface treatments and capacity needs.
Mesa	In house program	Full	Annual	Mesa uses a system named "MicroPAV Pro" that was developed by Southwest Systems Consultants, Inc. The program provides for a complete classification of all inventory items, work history and distress data collection and history. The software is capable of performing cost analysis, condition projection and forecasts. It also can produce reports and graphs for all data items.

**TABLE 9-1 (continued)**

Agency	PMS Software	Data Range	Freq.	Comments
Paradise Valley	In house program	Full	Annual	PMS was developed using Access software, and is based on a Kimley-Horn engineering study of the Town streets. All streets are inspected on an annual basis. Streets are rated based upon inspections, and the rating of streets is the primary statistic used to determine what streets will be proposed for crack sealing, slurry sealing, or resurfacing. The resurfacing of streets is budgeted through the Town's Capital Improvement Program.
Peoria	Hansen	Good	3 yrs	The City uses Hansen.
Phoenix	Stantec	Full	2 yrs	Automated system using the PURD from Stantec. Data is collected on all street classifications for surface distresses and ride comfort. A Pavement Quality Index (PQI) is formulated using the Surface Distress Index (SDI) and International Roughness Index (IRI). The software is capable of performing cost analysis for annual maintenance programming.
Scottsdale	Mixed System	Good	Annual	Automated system being developed. Current manual system.
Surprise	Hansen	Good	Annual	The City is switching from a manual system to Hansen.
Tempe	Stanley ITX	Full	5 yrs	Uses a software based system.
Tolleson	None	Good	Annual	Visual inspection. Manual system.
Wickenburg	None	Good	Annual	Visual inspection. Manual system.
Youngtown	None	Good	Annual	Visual inspection. Manual system.

**TABLE 9-2**  
**ARTERIAL STREET FUNDING PLAN FY 2011 - 2031**

<b>FUNDING (Year of Expenditure \$'s in Millions)</b>	
	<b>Totals</b>
<b>Regional Funds</b>	
MAG Half-Cent Sales Tax	1,651.9
MAG Federal STP	1,372.1
MAG Federal CMAQ (For arterial improvements)	192.2
MAG Federal CMAQ (For PM-10 and other air quality programs)	209.6
<b>Total Regional Funds</b>	<b>3,425.8</b>
<b>Local/Other Funds</b>	
City/County Highway User Revenue Funds and County VLT	10,851.7
Local Sources (General Funds, Local Sales Taxes, etc.)	6,457.5
Private Funds (PAD Improvements, Developer Contributions, etc.)	3,400.0
<b>Total Local/Other Funds</b>	<b>20,709.2</b>
Bond Proceeds (Regional Funding)	331.5
Beginning Balance (Regional Funding)	105.5
Allowance for Debt Service (Regional Funding)	(367.4)
<b>Total Funding</b>	<b>24,204.6</b>
<b>EXPENDITURES (Year of Expenditure \$'s in Millions)</b>	
	<b>Totals</b>
<b>Regionally Funded Projects</b>	
Capacity/Intersection Improvements (ALCP)	1,975.5
Intelligent Transportation Systems (ALCP)	62.7
MAG Implementation Studies (ALCP)	34.0
PM-10 and Other Air Quality Programs	209.6
Other Arterial Grid Extensions, Widening and Improvements	1,144.0
<b>Total Regionally Funded Projects</b>	<b>3,425.8</b>
<b>Local/Other Funded Projects</b>	
Match for Regionally Funded Projects	1,880.7
Future Arterial Grid Extensions, Widening and Improvements	9,841.4
System Operation, Maintenance and Preservation	9,055.6
<b>Total Local/Other Funded Projects</b>	<b>20,777.7</b>
<b>Total Expenditures</b>	<b>24,203.5</b>

## CHAPTER TEN

### PUBLIC TRANSIT

In 1985, the Arizona Legislature passed legislation authorizing the creation of the Regional Public Transportation Authority (RPTA). The passage of a sales tax for transportation in October of 1985 provided the RPTA with a modest amount of regional funding (approximately two percent of the annual revenues raised by the new sales tax) to underwrite transit services within the county. Since 1985, the MAG Region has experienced phenomenal growth that has placed additional demands on its roads and public transportation services. With the passage of Proposition 400 in November 2004, approximately one-third of the regional half-cent sales tax for transportation is being devoted to mass transit. The Regional Transportation Plan (RTP) reflects this significant increase in funding, with transit plans and programs providing for expanded regional bus service and new light rail transit facilities. The RTP provides for a range of transit facilities and services throughout the region. In total, about 33 percent of regional funding is allocated to projects in the transit element.

#### **Current Bus Transit System**

The transit system currently serving the MAG area is depicted in Figure 10-1 and consists of local bus service, express bus service, as coded for the 2009 base network. These services operate primarily on arterial streets and serve a range of trip needs, including work, shopping, medical appointments and school trips. The service design emphasis is on area coverage, so that the maximum possible population can access the bus network. Service levels on particular routes are dictated by the demand for transit along those routes, as well as by availability of funding. Routes typically operate all day, seven days a week, in some cases with higher levels of service during peak travel hours. Express services are oriented around peak periods of demand.

#### **Planned Bus Facilities and Service Improvements**

As part of the RTP, a regional bus network is funded; including operating costs, to ensure that reliable service is available on a continuing basis. In addition to the regionally funded elements, local sales tax initiatives fund transit services in the cities of Avondale, Glendale, Mesa, Phoenix, Scottsdale, and Tempe. Currently, local agencies operate approximately 85 percent of the bus transit services provided in Maricopa County.

Fixed route bus service in the MAG Region represents an increasingly important component of the regional transportation network. Over time, new routes will be added to the existing transit system. Funding for the additional transit service will be provided by revenue from Proposition 400, existing local sales taxes, and anticipated future local sales tax initiatives. Based on the recent trend in the Valley for cities to implement local transit sales taxes, it is reasonable to assume that other cities will also fund transit service beyond what is identified in Proposition 400. Figure 10-2 depicts the 2030 fixed route bus network. This figure covers the regionally funded services that are described below, including bus rapid transit/express, regional grid system, and rural routes, as well as additional, locally funded service. The amount identified in the RTP for bus facilities and services (including vanpool, dial-a-ride, rideshare and support services) from all funding sources totals over \$11.1 billion (YOE \$'s). Of this total, \$5.4 billion will be regionally funded and \$5.7 billion will be funded from local sources, which include farebox receipts.

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Fig. 10-1

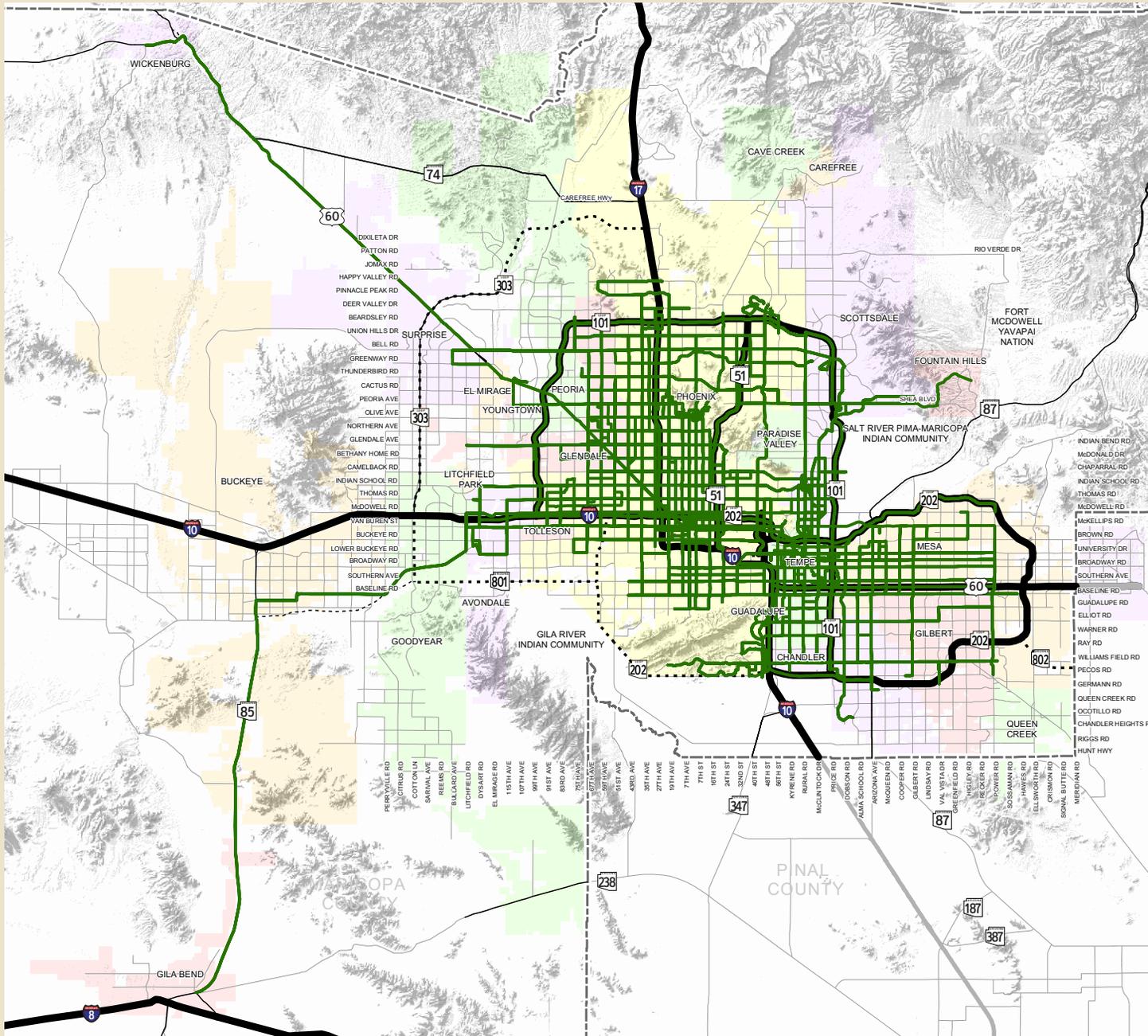


## 2009 Bus Service Network

- Bus Network
- Existing Freeway
- Planned Freeway/Highway
- Highways
- Other Roads
- County Boundary

*Alignments for new freeway, highway, arterial, and light rail/high capacity transit facilities will be determined following the completion of appropriate design and environmental studies.*

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Fig. 10-2

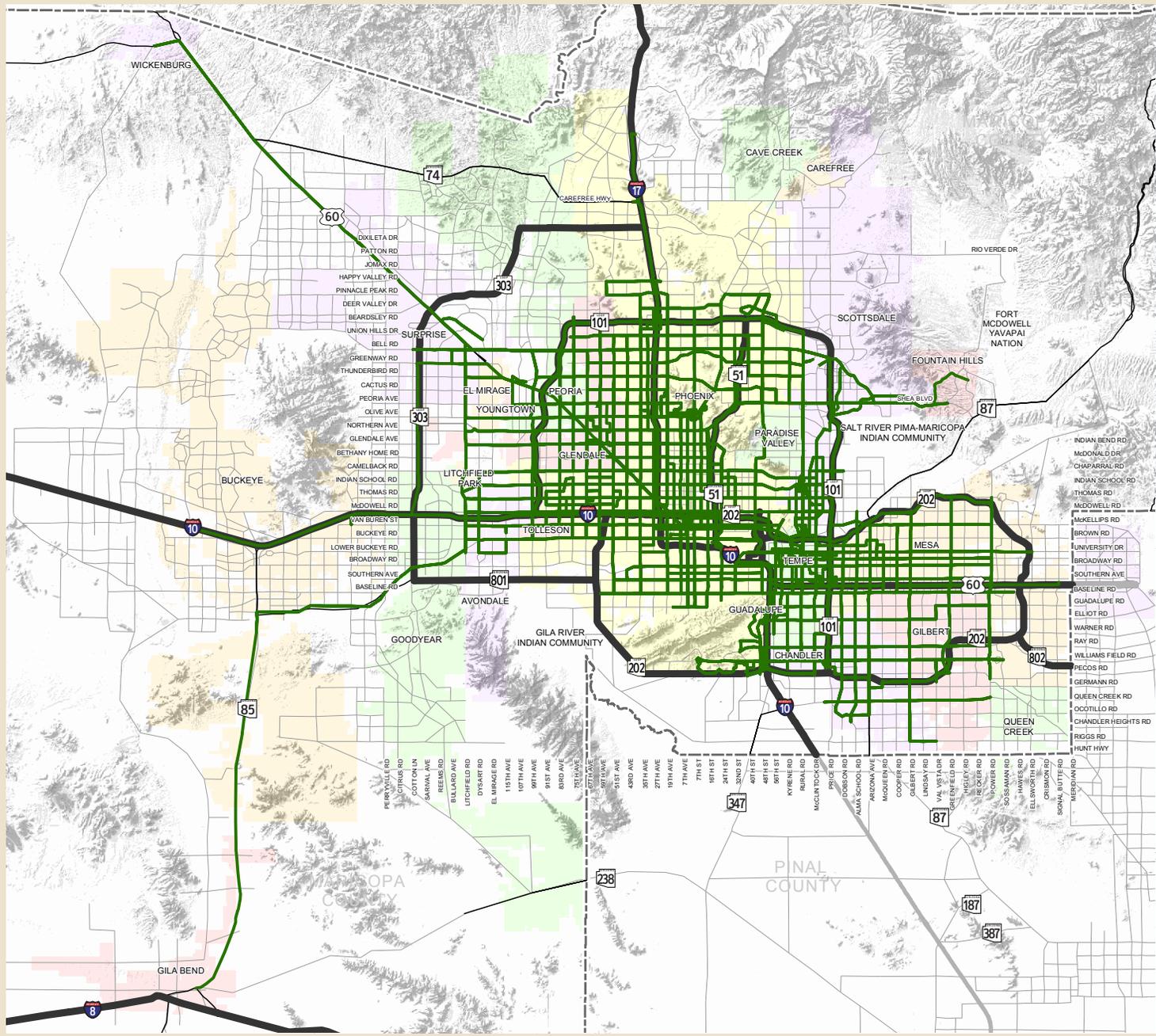


## 2030 Bus Service Network

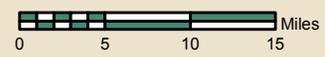
-  Bus Network
-  Freeways
-  Highways
-  Other Roads
-  County Boundary

*Alignments for new freeway, highway, arterial, and light rail/high capacity transit facilities will be determined following the completion of appropriate design and environmental studies.*

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A detailed listing of the timing and cost of planned service and capital improvements that are regionally funded is provided in Appendix C.

### **Bus Operations: Bus Rapid Transit (BRT)/Express**

Regional BRT/Express transit services are comprised of Arterial BRT and Freeway BRT/Express routes. Arterial BRT routes are intended to operate as overlays on corridors served by local fixed route service, but provide higher speed services by operating with limited stops and with other enhancements, such as bus only lanes, queue-jumpers or signal priority systems. The proposed Arterial BRT routes as identified in the RTP are intended to operate during peak and off-peak periods. In addition to Arterial BRT routes, the RTP also includes Freeway BRT/Express routes, which use existing and proposed high occupancy vehicle (HOV) facilities to connect park-and-ride lots with major activity centers, including core downtown areas. Freeway routes provide suburb-to-suburb, as well as suburb to central city connections using the regional freeway system and intermediate stops. Regional funding has been allocated for Bus Rapid Transit (BRT)/Express operations throughout the RTP planning period. This represents approximately four percent of the total regional funding budget allocated for transit. There are a total of 29 Bus Rapid Transit (BRT)/Express routes identified for funding. Figure 10-3 depicts the Regional BRT/Express transit services that will be regionally funded, while Figure 10-4 indicates how services will be phased in over the planning period, with phase designations indicating the period in which service is initially provided.

### **Bus Operations: Regional Grid**

Regional Grid bus routes, which are also commonly referred to as “Supergrid Routes,” include bus routes that are situated along major roads on the regional arterial grid network. The supergrid addresses the need for a consistent level of service across all served jurisdictions. Regional funding of bus operations along the arterial grid network ensures a degree of consistency in service levels across jurisdictions, which may not otherwise be possible due to varying funding limitations at the local level. Regional funding has been allocated for bus operations on the Regional Grid throughout the RTP planning period. This represents approximately 317 percent of the total regional funding budget allocated for transit. There are a total of 34 Regional Grid routes identified for funding. It should be noted that regionally funded bus routes will be phased in over the 20 year program to allow for the acquisition of transit fleet and the construction of supporting infrastructure (i.e. operations and maintenance facilities, passenger facilities, road improvements, etc.) Figure 10-5 depicts the Regional Grid Bus services that will be regionally funded, while Figure 10-6 indicates how services will be phased in over the planning period, with phase designations indicating the period in which service is initially provided.

### **Bus Operations: Other**

In addition to the BRT/Express and Regional Grid services, regional funding for operating costs for the period FY 2011 through FY 2031 has been allocated to other bus services. These services include rural/flexible routes, commuter vanpools and paratransit services.

# 2010 Update Regional Transportation Plan

Fig. 10-3

REGIONAL  
TRANSPORTATION  
PLAN



## Planned Bus Rapid Transit (BRT) System

- Completed Minimum Operating LRT
- Arterial BRT Routes
- Freeway BRT Routes
- Freeways
- Highways
- Other Roads
- County Boundary

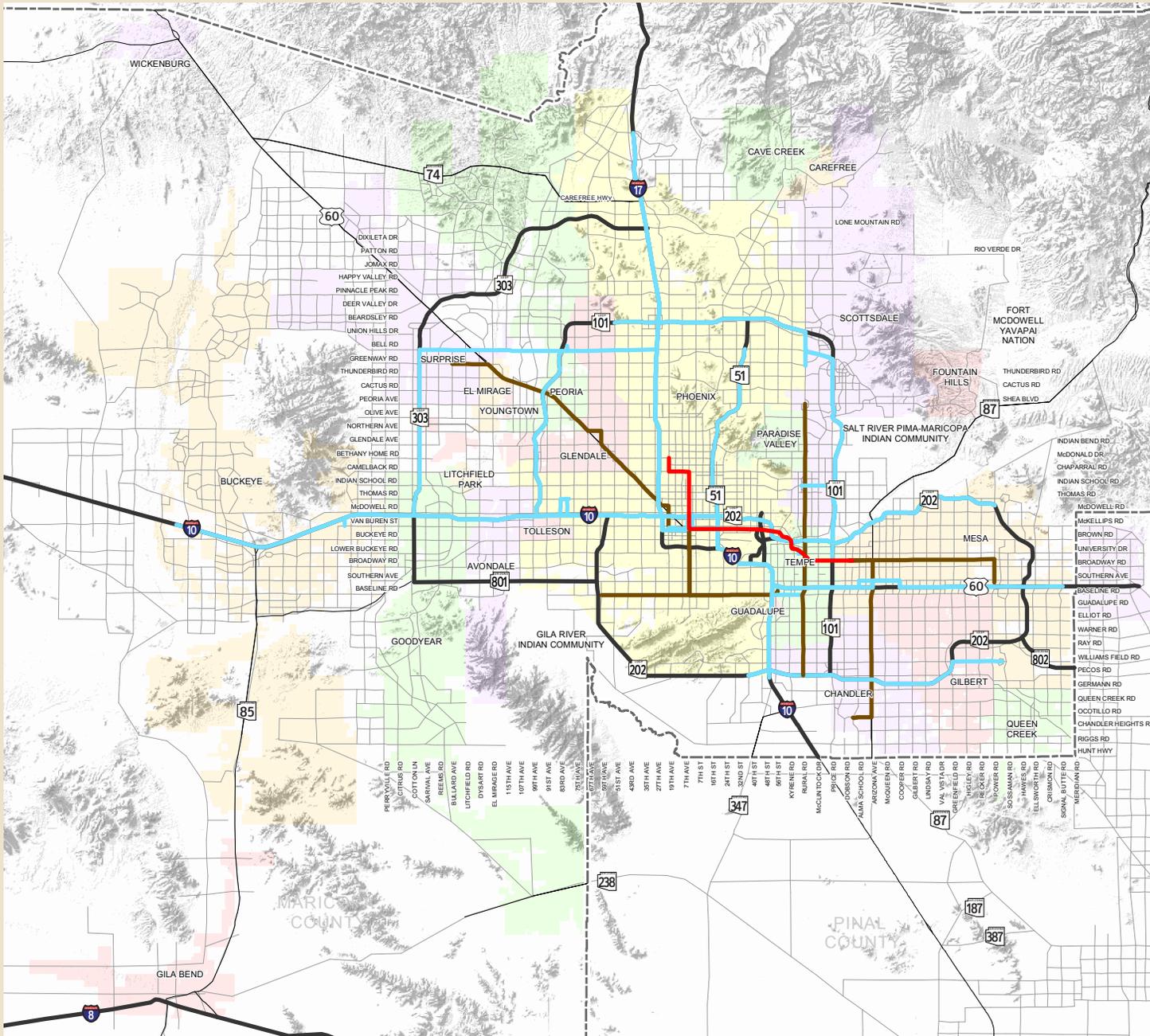
*Alignments for new freeway, highway, arterial, and light rail/high capacity transit facilities will be determined following the completion of appropriate design and environmental studies.*

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**MAP  
AREA**

MARICOPA  
COUNTY



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# 2010 Update Regional Transportation Plan

Fig. 10-4



## Bus Rapid Transit (BRT) System Phasing

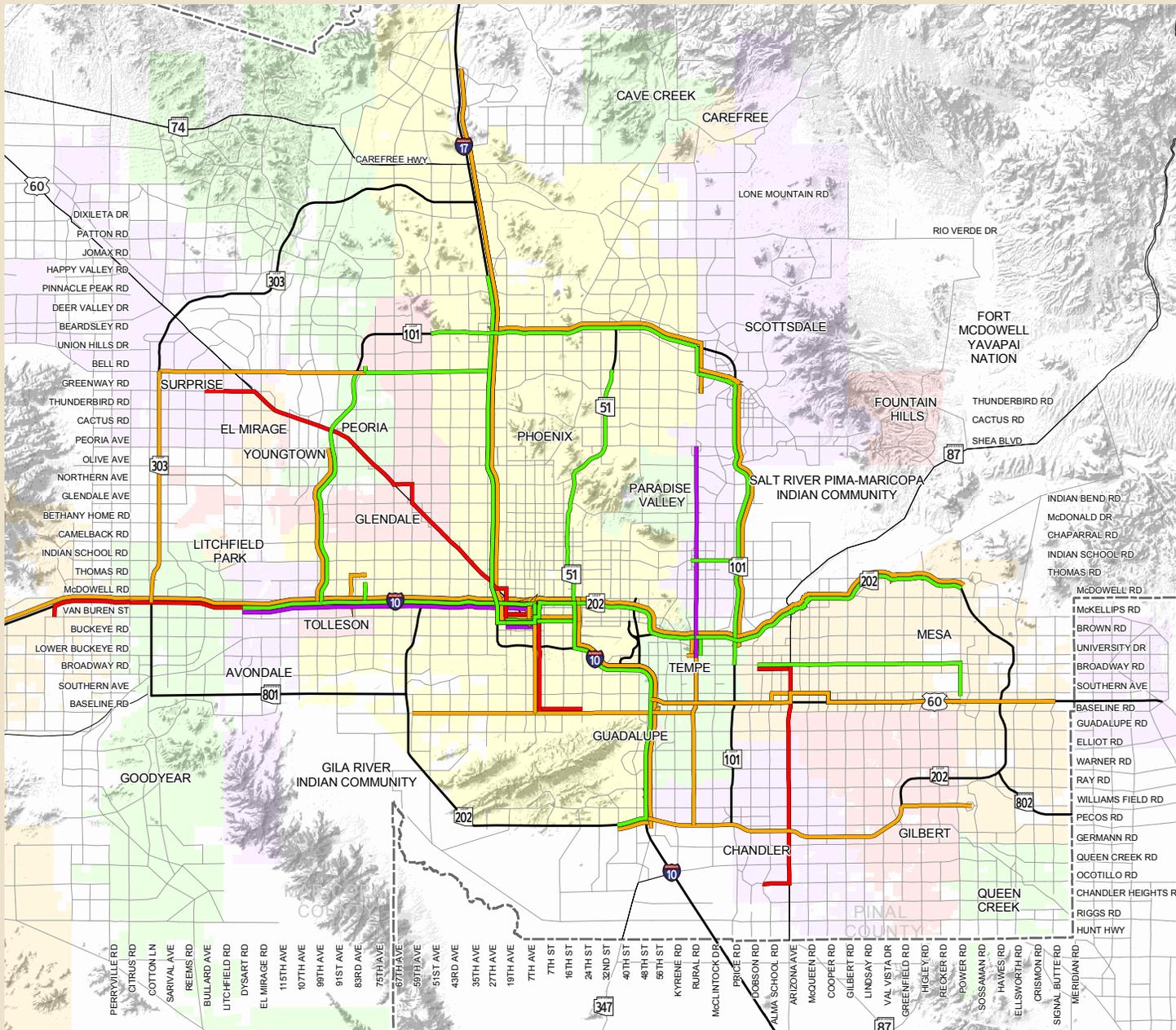
- Phase 1 (FY 2006-2010)
- Phase 2 (FY 2011-2015)
- Phase 3 (FY 2016-2020)
- Phase 4 (FY 2021-2025)
- Phase 5 (FY 2026-2031)
- Freeways
- Highways
- Other Roads
- County Boundary

*Alignments for new freeway, highway, arterial, and light rail/high capacity transit facilities will be determined following the completion of appropriate design and environmental studies.*

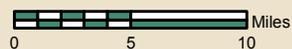
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MARICOPA COUNTY



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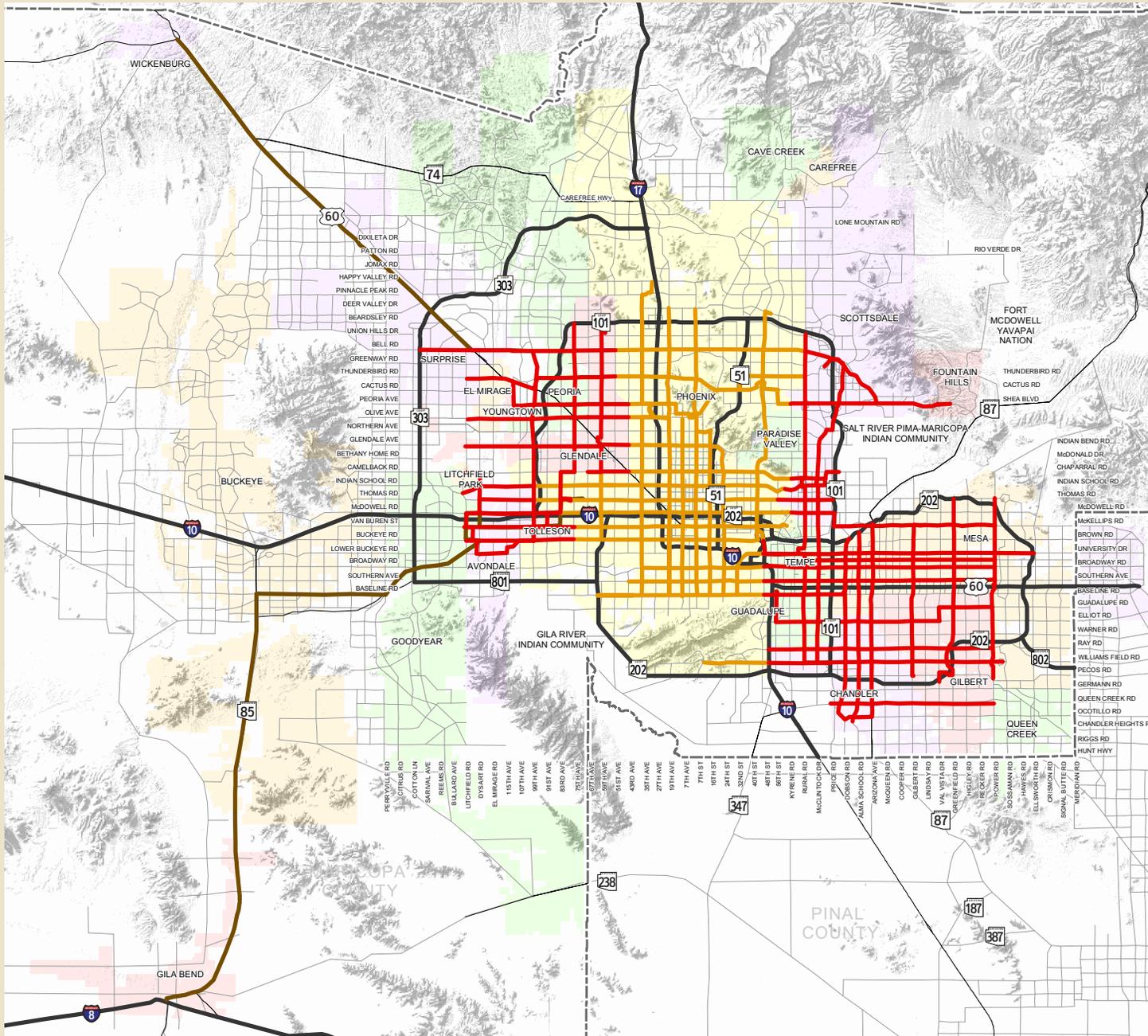
# 2010 Update Regional Transportation Plan

Fig. 10-5

REGIONAL  
TRANSPORTATION  
PLAN



## Planned Regional Super Grid Bus System



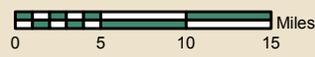
- Regional Grid Routes
- Grid Routes Funded by City of Phoenix
- New Rural Routes
- Freeways
- Highways
- Other Roads
- County Boundary

*Alignments for new freeway, highway, arterial, and light rail/high capacity transit facilities will be determined following the completion of appropriate design and environmental studies.*

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# 2010 Update Regional Transportation Plan

Fig. 10-6

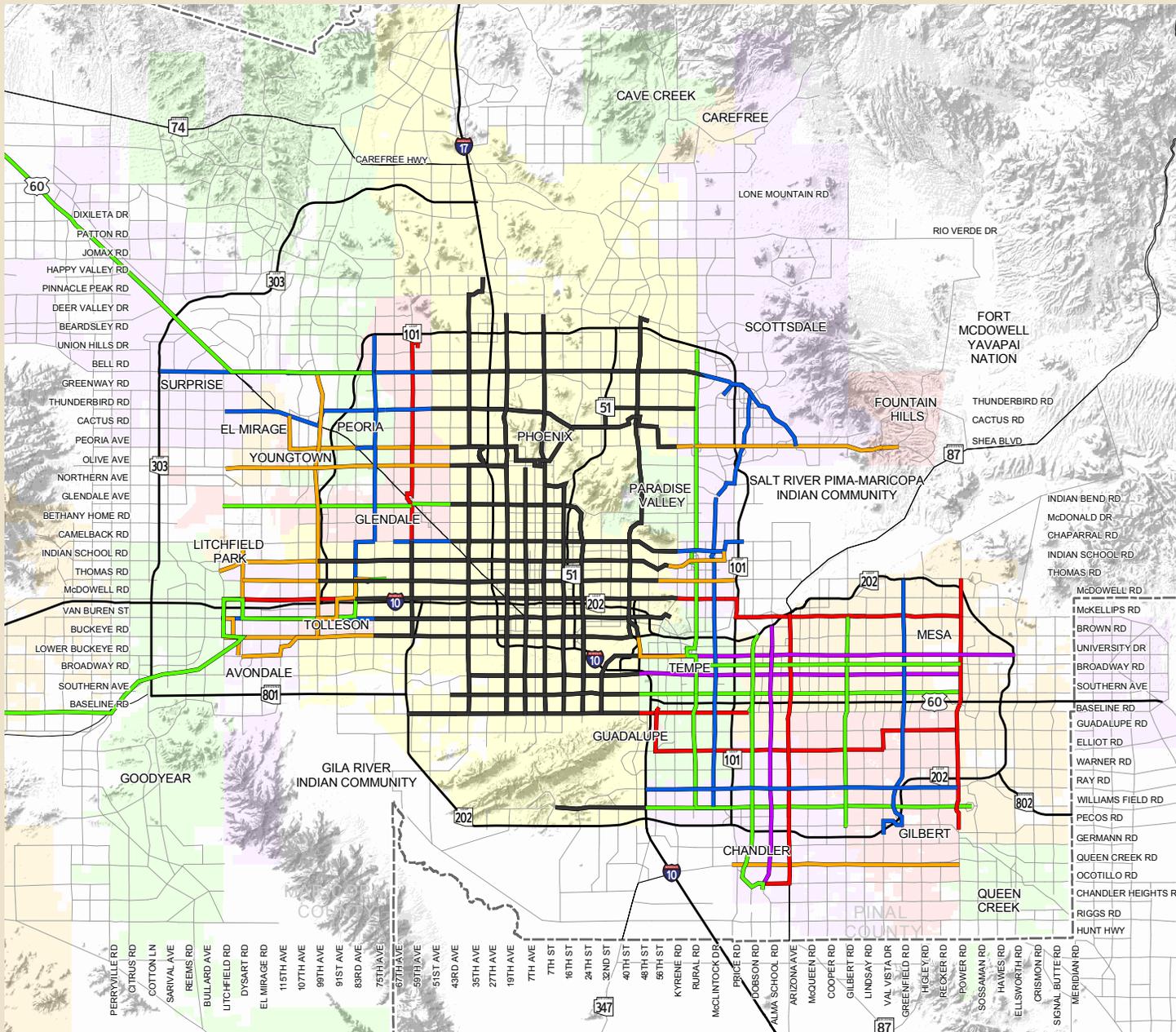


## Super Grid Bus System Phasing

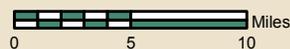
- Phase 1 (FY 2006-2010)
- Phase 2 (FY 2011-2015)
- Phase 3 (FY 2016-2020)
- Phase 4 (FY 2021-2025)
- Phase 5 (FY 2026-2031)
- Funded By City of Phoenix
- Freeways
- Highways
- Other Roads
- County Boundary

*Alignments for new freeway, highway, arterial, and light rail/high capacity transit facilities will be determined following the completion of appropriate design and environmental studies.*

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- **Rural/Flexible Routes** - This service type addresses the need to provide connections between the urban and rural communities of the county, serving a range of trip needs including work, shopping, education, and access to various community services. Figure 10-5 and Figure 10-6 include the rural services.
- **Commuter Vanpools** - Commuter vanpools allow groups of employees to self-organize and lease a vehicle from Valley Metro to use to operate a carpool service, providing a flexible transit solution for those trips not well served by more conventional fixed route service. The vanpool program is managed by RPTA through its complementary rideshare program.
- **Paratransit Services** - Paratransit includes all modes of transit service generally intended to serve only seniors and persons with disabilities. Paratransit service is demand-response and provides curbside pick-ups and drop-offs. Paratransit consists of two types of service: (1) ADA-paratransit service, which is required by the Americans with Disabilities Act (ADA) for all areas within  $\frac{3}{4}$  mile of a fixed route; and (2) senior paratransit service, which is an optional service provided for the senior population and disabled patrons who do not meet ADA eligibility criteria. Under the RTP, ADA paratransit service is regionally funded, while senior paratransit service (Dial-a-Ride) continues to be locally funded.

### **Bus Capital: Facilities**

Associated with the expansion of transit service will be the need for additional maintenance and passenger facilities. The identification of specific locations that will host these facilities will occur as the result of ongoing capital planning efforts. These efforts will include the identification and evaluation of potential sites for transit passenger and maintenance facilities. This process will guide the selection of sites, and will be done in cooperation with the host communities, which will include public outreach efforts to identify and address the concerns of affected neighborhoods, institutions, and commercial users. Significant delays in the timing have resulted from the recent downturn in the economy, but the majority of the planned projects remain funded. Several planned operations and maintenance facilities are unfunded and will be re-evaluated based on future needs and growth in the system.

### **Bus Capital: Fleet**

Over the duration of the planning period, a total of 1,501 buses will be purchased for fixed route networks; 40 buses for rural routes; 1,061 Dial-a-Ride (DAR) vans for paratransit purposes; and 1,375 vanpool vans. These procurements reflect both replacement and expansion vehicles.

### **Current Light Rail Transit Facilities**

The alignment for the Light Rail Transit (LRT) Minimum Operating Segment (MOS) starter segment extends from Bethany Home Road and 19<sup>th</sup> Avenue into downtown Phoenix; from downtown Phoenix to downtown Tempe and Arizona State University; and continuing to the intersection of Main Street and Sycamore in Mesa. The MOS was completed in December 2008 and operates primarily at-grade on city streets. The LRT system has two tracks, with light rail vehicles running in trains from one to three cars. Important elements of the light rail plan include provisions for park-and-ride lots at the end of rail lines and signal priority strategies to improve speed. Stations

are generally located about a mile apart, but closer (1/2 mile apart) in urban centers. Shuttle buses and an improved fixed route network also play an important role in the light rail system. Half-cent sales tax money from Proposition 400 was not utilized to pay for route construction of the MOS, but rather was allocated toward certain elements of the support infrastructure. Figure 10-7 depicts the MOS within the planned LRT system.

### **Planned Light Rail Transit (LRT)/High Capacity Transit (HCT) Facilities**

The RTP includes a 57.7-mile LRT/HCT system, which incorporates the Minimum Operating Segment (MOS), a northwest extension, an extension to downtown Glendale, an extension west in the I-10 corridor, an extension to Paradise Valley Mall, an extension south of the MOS to Southern Avenue, and an extension east to Mesa Drive. In addition, provisions are made to fund regional LRT/HCT support infrastructure. Figure 10-7 depicts the LRT/HCT system planned for the region, while Figure 10-8 indicates how services will be phased in over the planning period, with phase designations indicating the period in which service is initially provided. A detailed listing of the timing and cost of planned improvements is provided in Appendix C.

The amount identified in the RTP from all funding sources for LRT/HCT expenditures totals \$5.2 billion (YOE \$'s). Of this total, \$3.0 billion will be regionally funded and \$2.2 billion will be funded from local sources, which include farebox receipts. It should be noted that half-cent sales tax funding from Proposition 400 has not been utilized to pay for route construction of the LRT/MOS, but rather has been allocated toward certain elements of the support infrastructure (regional park-and-ride lots, bridges, vehicles, and for the cost to relocate utilities). In addition, the LRT/HCT extension to downtown Glendale and the LRT Northwest Extension will receive only approximately half of their funding from regional sources in the form of Federal 5309 funds for construction. Local sources will provide the remaining half. It is anticipated that a small amount of half-cent funds will be applied to these two segments for certain support infrastructure elements. Proposition 400 half-cent sales tax funding will not be used for operating expenses on any part of the LRT/HCT system.

#### **Light Rail Transit/High Capacity Transit: Support Infrastructure**

The RTP allocates funding toward the completion of support infrastructure affiliated with the LRT/HCT system. This includes infrastructure along the LRT MOS; infrastructure needs on the Northwest Extension, from 19<sup>th</sup> Avenue/Bethany Home Road to 25<sup>th</sup> Avenue/Mountain View Road; infrastructure needs on the Glendale Link from 19<sup>th</sup> Avenue/Bethany Home Road to Downtown Glendale; and other improvements throughout the future LRT/HCT system.

#### **Light Rail Transit/High Capacity Transit: Route Extensions**

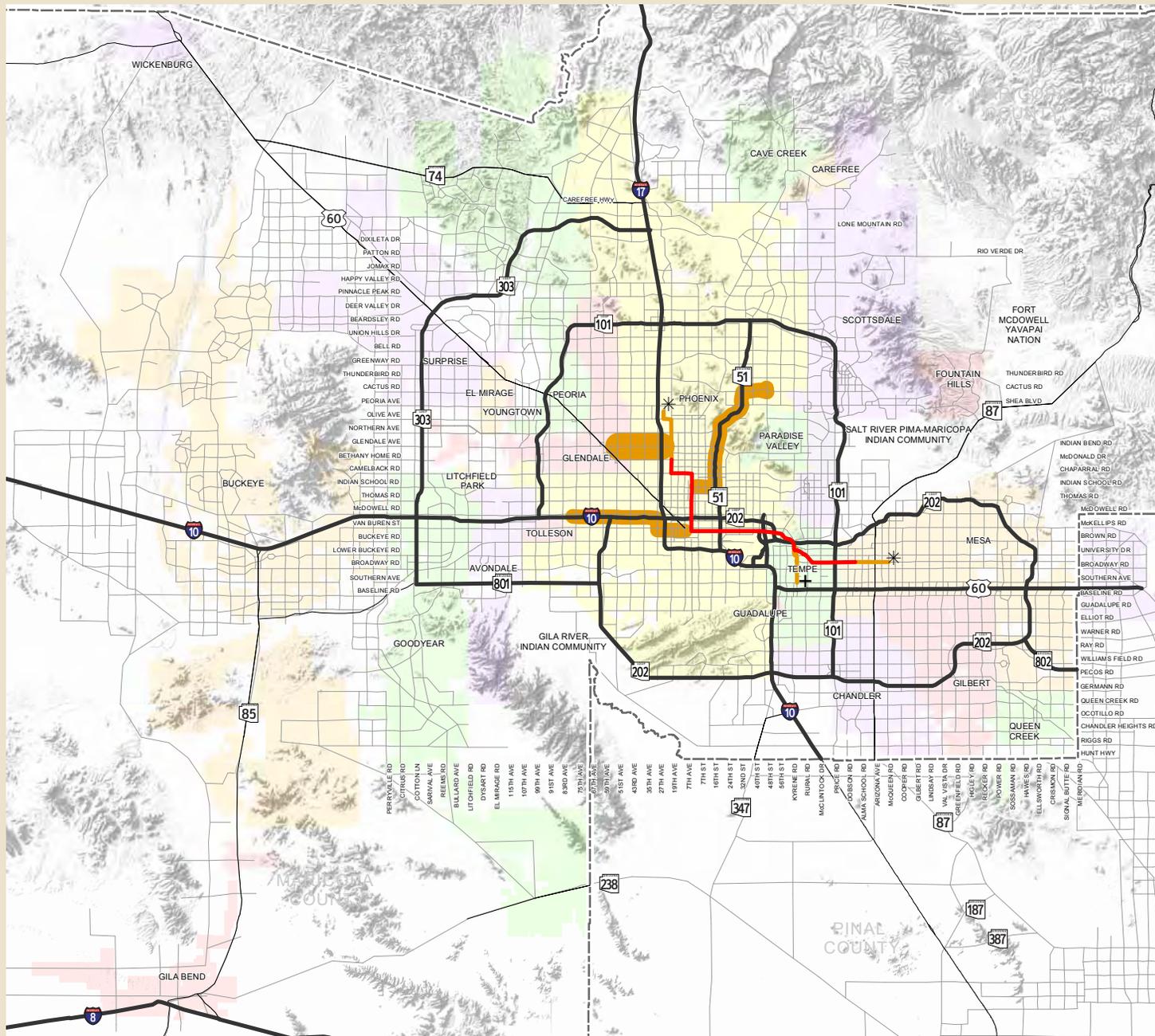
The RTP includes regional funding for the completion of six additional LRT segments on the system. These include a five-mile Northwest Extension to 25<sup>th</sup> Avenue/Mountain View Road; a five-mile extension to downtown Glendale; an 11-mile extension in the I-10 corridor west to 79<sup>th</sup> Avenue; a 12-mile extension to Paradise Valley Mall; a two-mile extension south of the MOS on to Southern Avenue; and a 2.7-mile extension from the east terminus of the MOS to Mesa Drive. In total, the extensions account for a total of 37.7 miles of the 57.7-mile system. To date, the

# 2010 Update Regional Transportation Plan

Fig. 10-7



## Existing and Planned Light Rail Transit (LRT)/ High Capacity Transit



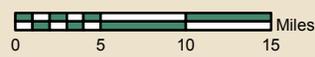
- Completed Minimum Operating Segment
- Future High Capacity Transit Corridor
- Freeways
- Highways
- Other Roads
- County Boundary

*Alignments for new freeway, highway, arterial, and light rail/high capacity transit facilities will be determined following the completion of appropriate design and environmental studies.*

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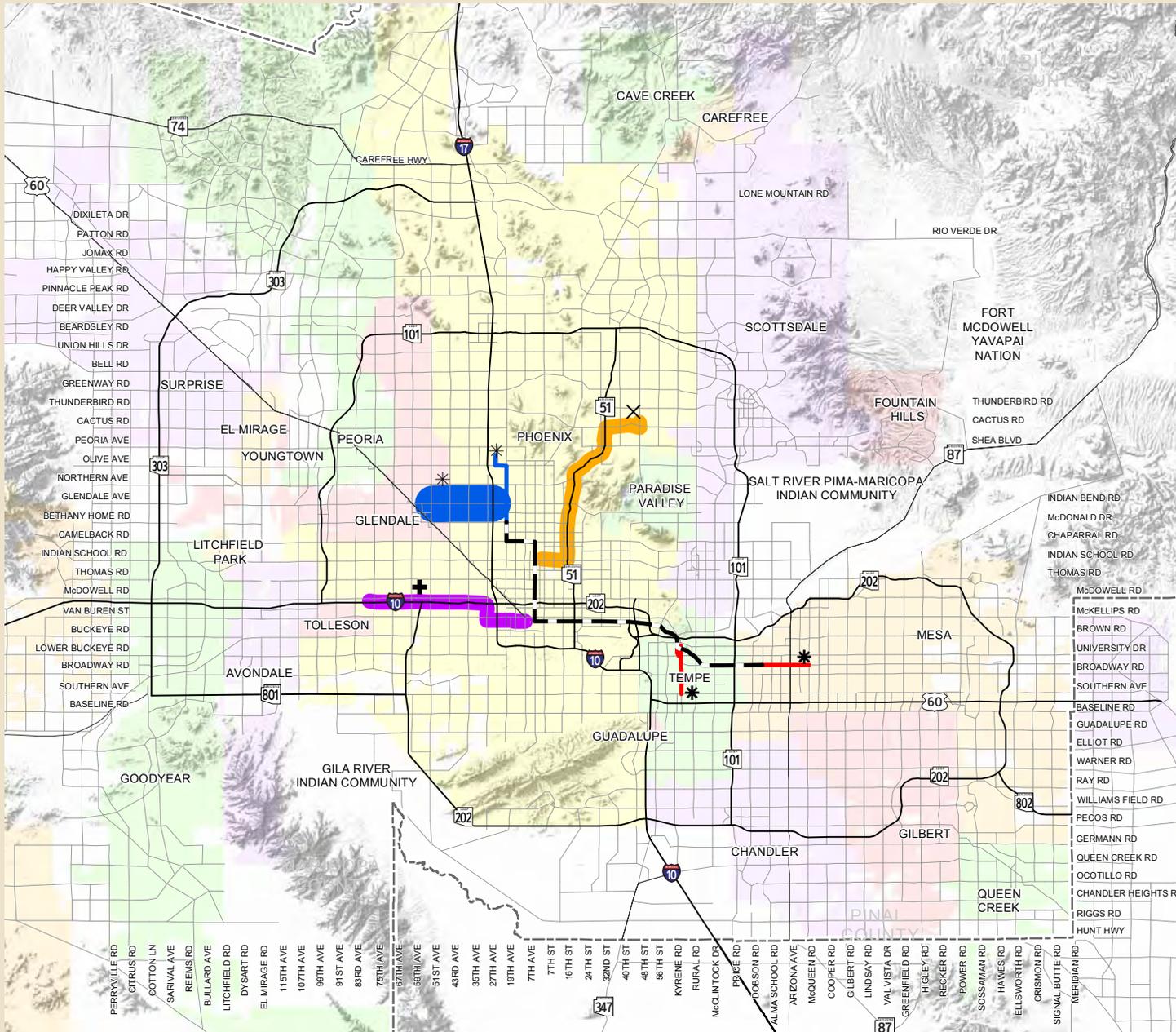
- + Modern Streetcar
- \* LRT Corridor

# 2010 Update Regional Transportation Plan

Fig. 10-8



## Existing and Planned Light Rail Transit (LRT)/ High Capacity Transit



- Phase 1 (FY 2006-2010)
- Phase 2 (FY 2011-2015)
- Phase 3 (FY 2016-2020)
- Phase 4 (FY 2021-2025)
- Phase 5 (FY 2026-2031)
- Completed Minimum Operating Segment
- Freeways
- Highways
- Other Roads
- County Boundary

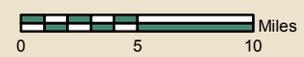
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- Target Opening Dates:
- \* December, 2016
  - + December, 2022
  - \* December, 2026
  - X December, 2031

Northwest Extension and the Central Mesa Extension have been designated as LRT, and the Tempe South Extension has been designated as a modern streetcar, through an FTA Alternatives Analysis (AA). The alignment and transit technology of the other extensions are subject to the results of an AA.

It should also be noted that local sources will provide a significant share of the funding for the extension to downtown Glendale and the Northwest Extension. For these segments, regional funding in the form of Federal transit funds may provide a portion of the funding, with local sources providing the remaining funding. Other than the funding for support infrastructure as previously identified, it is not anticipated that half-cent funds will be applied to these segments.

### **Commuter Rail**

The MAG High Capacity Transit Study identified over 129 miles of potential commuter rail corridors in the region. The RTP recognizes that these corridors may potentially serve a vital function in addressing future travel needs in the region, especially as continuing land development limits opportunities for developing entirely new high capacity corridors. Depending on future development patterns, population densities sufficient to warrant investment in commuter rail may not occur within the current planning horizon (FY 2031) of the RTP. However, since population expansion could occur at a higher rate than currently projected, it will be important to maintain all modal options in the region.

MAG has recently completed a Commuter Rail Strategic Plan that will guide future efforts regarding commuter rail service in the metropolitan area. It is also in the process of preparing Commuter Rail Corridor Development Plans for the Grand Avenue Corridor and the Union Pacific/Yuma West Corridor, as well as a Commuter Rail System Plan.

### **Sky Harbor Automated Train System**

The Sky Train is a fully automated, grade separated transit system that will connect the major facilities at Sky Harbor International Airport with the Metro light rail transit (LRT) system. Stage One of the project extends from the LRT station at 44<sup>th</sup> St. to Airport Terminal Four. Stage Two is planned to link the remaining airport terminals with the rental car center, and has been identified as an illustrative project in the RTP. On June 24, 2009, the Regional Council amended the FY 2008-2012 MAG Transportation Improvement Program (TIP) and Regional Transportation Plan (RTP) - 2007 Update to include Stage One.

### **Funding and Expenditure Summary**

Table 10-1 has been prepared to provide a summary of the funding picture for the transit element of the RTP. This table lists the reasonably available funding sources for the planning period and the uses of those funds. This includes farebox revenues, as well as operating and capital costs. The balance between funds available and expenditures indicates that the transit element can be accomplished with reasonably available funding sources over the planning period.

## Funding Sources

Regional funding sources for transit in terms of YOE \$'s are shown in Table 10-1 for the period FY 2011-2031. These sources include the half-cent sales tax (\$5.2 billion); Federal Transit Section 5307 funds (\$1.4 billion) and Section 5309 funds (\$1.7 billion); Federal Congestion and Air Quality Mitigation funds (\$515 million); bond proceeds (\$288 million); local/other funding sources (\$7.9 billion); and the estimated cash balance of \$98 million in regional funds at the beginning of FY 2011. An additional \$124 million in half-cent sales tax funding is received through ADOT for planning activities. Debt service and other expenses totaling \$404 million are deducted from these sources. This yields a net total of \$16.9 billion (YOE \$'s) for use on transit services and projects. These revenue sources have been major funding elements for transportation facilities in the MAG area for decades and are considered to be reasonably available to the region throughout the planning period.

In the communities that use them, the single largest source of transit funding is dedicated sales taxes. The following cities have a dedicated transportation sales tax: Phoenix, Glendale and Tempe. Not all sales taxes are available to fund transit service, and funds reserved for transit are not always available for non-high capacity transit. Each city's sales tax program is described below.

- Phoenix began to collect a \$0.004 sales tax in 2000. Funds collected are reserved for bus service, paratransit, light rail and support services. The tax sunsets after 20 years. For purposes of the RTP, this tax is assumed to be renewed in 2020.
- Glendale began to collect a \$0.005 sales tax in 2002. Funds collected are reserved for the following programs: fixed route bus, paratransit, light rail, transit education (TDM) and street improvements. The Glendale tax does not sunset.
- Tempe began to collect a \$0.005 sales tax for transit in 1996. Tempe's sales tax funds are used on an as-needed basis and are not reserved for specific projects. A portion of the Tempe sales tax income is set aside for expenses related to the light rail program. The Tempe tax does not sunset.

## Program Expenditures

Table 10-1 also lists estimated future costs for the transit element of the RTP, expressed in YOE \$'s. Expected expenditures during the planning period total \$16.3 billion. This includes \$11.1 billion for bus capital and operating (including vanpool, dial-a-ride, rideshare and support services); and \$5.2 billion for light rail transit capital and operating.

**TABLE 10-1: TRANSIT FUNDING PLAN: FY 2011 through FY 2031**

<b>FUNDING (Year of Expenditure \$'s in Millions)</b>		
<b>FUNDING (Year of Expenditure \$'s)</b>		<b>Totals</b>
<b>Regional</b>		
Maricopa County Transportation Excise Tax	5,362.8	
Federal Transit (Section 5307)	1,388.7	
Federal Transit (Section 5309)	1,701.2	
MAG Federal CMAQ	515.0	
<b>Total Regional Funding</b>		<b>8,967.5</b>
<b>Beginning Balance (Regional Funds)</b>		<b>97.8</b>
<b>Local / Other</b>		
Fixed Route Bus Fares	1,944.3	
Light Rail Transit Fares	373.9	
Paratransit Vehicle Fares	89.2	
Vanpool Fares	188.6	
Local General Funds	882.0	
Local Sales Tax	4,104.2	
LTAF II	0.0	
<b>Total Local / Other Funding</b>		<b>7,582.3</b>
<b>Bond Proceeds</b>		<b>288.1</b>
<b>Less Allowance for Debt Service and Inflation</b>		
Debt Service	(404.3)	
Inflation		
<b>Total Allowances</b>		<b>(404.3)</b>
<b>TOTAL FUNDING</b>		<b>16,531.4</b>
<b>EXPENDITURES (Year of Expenditure \$'s in Millions)</b>		
<b>Regionally Funded</b>		
<i>Capital</i>		
Regional Bus Fleet	1,034.5	
Bus Maintenance and Passenger Facilities	396.3	
Light Rail Transit (LRT) Regional Infrastructure	800.0	
Light Rail Transit Extensions	2,196.2	
Paratransit (Americans with Disabilities Act, or ADA, compliant)	126.8	
Vanpool	62.6	
Rural/Non-Fixed Route Transit	4.4	
<i>Total Capital</i>	<i>4,620.9</i>	
<i>Operating</i>		
Supergrid	1,987.0	
Freeway Bus Rapid Transit (BRT) and Express Bus	262.7	
Arterial BRT	99.5	
Regional Support Services	211.4	
Paratransit (ADA-compliant)	807.9	
Light Rail Transit	0.0	
Rural/Non-Fixed Route Transit	33.3	
Vanpool	213.9	
Planning	183.0	
<i>Total Operating</i>	<i>3,798.7</i>	
<b>Total Regionally Funded Expenditures</b>		<b>8,419.6</b>
<b>Locally / Other Funded</b>		
<i>Capital</i>		
Light Rail	790.4	
<i>Total Capital</i>	<i>790.4</i>	
<i>Operating Costs</i>		
Local Fixed Route Service	5,055.7	
Paratransit	293.6	
Light Rail	1,361.1	
Travel Demand Management	67.9	
<i>Total Operating</i>	<i>6,778.4</i>	
<b>Total Locally/Other Funded Expenditures</b>		<b>7,568.8</b>
<b>TOTAL EXPENDITURES</b>		<b>15,988.4</b>

## CHAPTER ELEVEN

### AVIATION

The existing airport system consists of 16 airports, including one major commercial facility, Phoenix Sky Harbor International Airport, seven general aviation reliever airports and six additional general aviation airports. One of the airports, Phoenix-Mesa Gateway, is currently classified as a non-hub commercial airport, providing commercial service to supplement Phoenix Sky Harbor International Airport. A map of the airports is shown in Figure 11-1.

In 2006 the MAG Regional Aviation System Plan (RASP) Update and the aviation planning program were completed. The aviation program examined the future air transportation needs of the region with the aim of maximizing the transportation and economic benefits of airports, while minimizing any adverse impacts related to congestion, the environment and airspace. The Federal Aviation Administration (FAA) is the agency responsible for the planning and management of airspace. Because the work on the program was completed, the MAG RASP Policy Committee and the MAG RASP Technical Advisory Committees, which oversaw and guided the preparation of the plan, were eliminated.

An important element of the planning program has been the overall support for Sky Harbor International Airport and Luke Air Force Base. Sky Harbor International Airport served more than 38 million passengers in 2009, and Luke Air Force Base is the largest F-16 training base in the world. These vital facilities not only fulfill air transportation and national defense needs, but they also contribute billions of dollars annually to the regional economy.

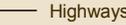
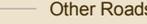
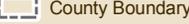
Future planning efforts will focus upon ground access needs to airports in terms of both highway and transit facilities, interacting with the region's airport personnel and exploring opportunities for improving the regional aviation system, and developing an aviation database that will support the MAG airport model that develops air pollutant emissions inventory for airports in Maricopa County.

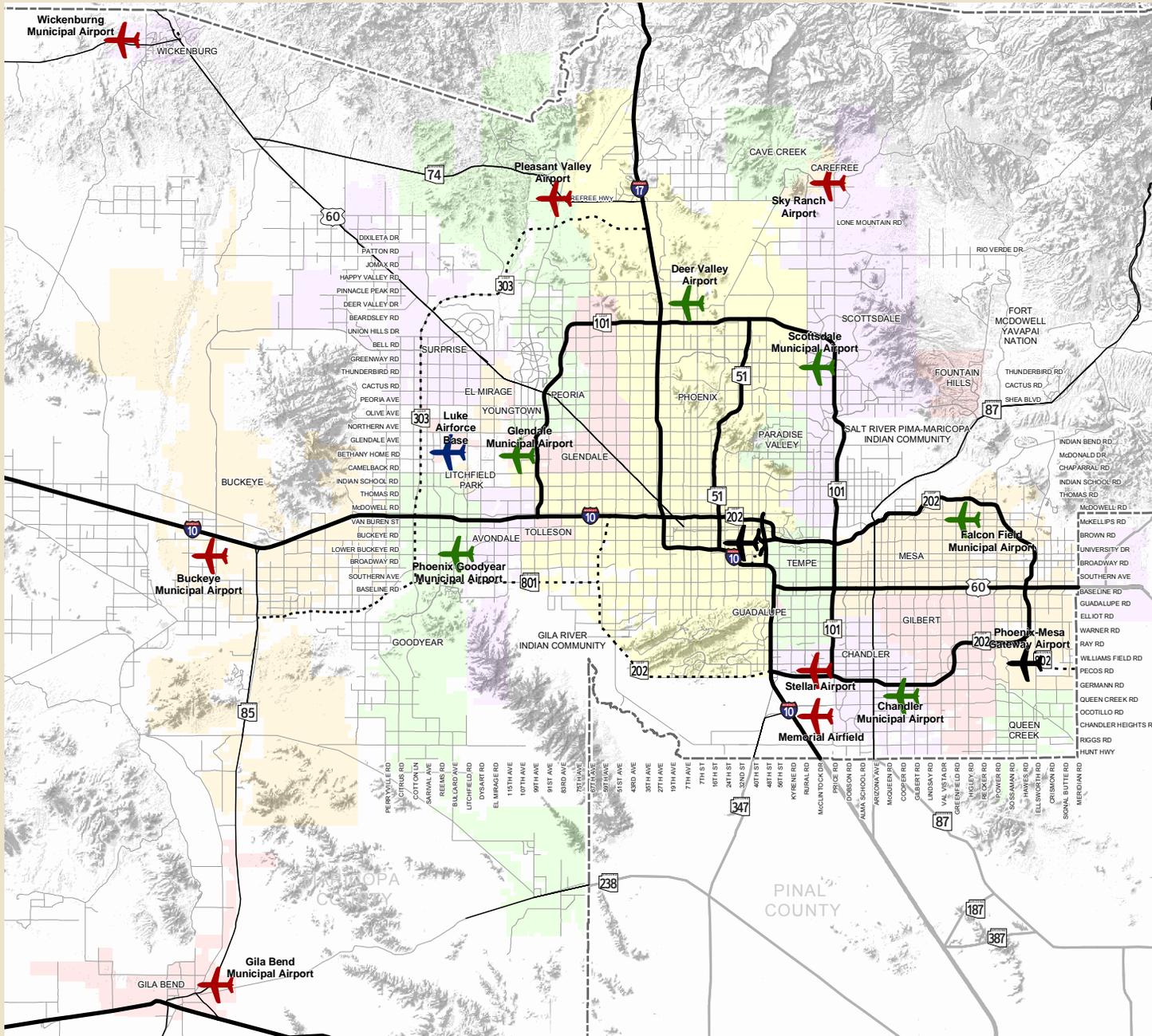
# 2010 Update Regional Transportation Plan

Fig. 11-1



## Regional Aviation System Plan

-  Commercial Service
-  Military
-  General Aviation Reliever
-  General Aviation
-  Existing Freeway
-  Planned Freeway/Highway
-  Highways
-  Other Roads
-  County Boundary



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## CHAPTER TWELVE

### BICYCLES AND PEDESTRIANS

Maricopa Association of Governments (MAG) has maintained an active role in promoting the establishment of improved travel opportunities for bicyclists and pedestrians for many years. The MAG Regional Bicycle Task Force, which was responsible for assisting in the development of the original MAG Bicycle Plan in 1992, has maintained an active role in promoting improved travel opportunities for bicyclists. The MAG Regional Bicycle Task Force continues to provide key input into bicycle planning and decision making activities. MAG is also a leader in promoting improvement in the Valley's streetside environments to better accommodate pedestrian travel. Past pedestrian planning efforts conducted by MAG and its member agencies have led to a variety of pedestrian-oriented policies, programs and roadway improvements. In 1994, MAG formed the Pedestrian Working Group to promote increased awareness of walking as an alternative mode of travel and to improve facilities for people who walk.

#### **Regional Bicycle and Pedestrian Plans**

MAG's continuing bicycle and pedestrian planning efforts cover a variety of regional planning activities. This has included development of regional bicycle plans, regional pedestrian plans, and multimodal corridor plans. In addition, MAG has developed bicycle and pedestrian design guidelines and design assistance programs.

#### **MAG Regional Bikeway Master Plan**

In February 1992, the MAG Regional Council adopted the MAG Regional Bicycle Plan to address the needs and concerns of bicyclists in the region, and to encourage bicycling as a way to alleviate congestion and air pollution. The MAG Regional Council adopted a Bicycle Plan Update in March of 1999. MAG followed the 1999 Bicycle Plan Update with the Regional Off-Street System (ROSS) Plan, which was adopted by the MAG Regional Council in February 2001.

In 2007, MAG developed the MAG Regional Bikeway Master Plan, which incorporated the 1999 MAG Regional Bicycle Plan, the Alternative Solutions to Pedestrian Mid-block Crossings at Canals, and the 2001 ROSS Plan. The goal of the MAG Regional Bikeway Master Plan is to update and integrate all three documents into one master plan, in order to develop an inter-connected bikeway system of on-street and off-street facilities. The MAG Regional Bikeway Master Plan provides a guide for the development of a convenient and efficient transportation system where people can bike safely to all destinations. This plan recognizes the growing needs of the bicycling public and seeks to encourage more bicycling for transportation and health reasons. Bicycling, as a transportation mode, improves air quality and reduces traffic congestion and is less costly than operating a motorized vehicle. In addition, bicyclists benefit from improved health and fitness.

#### **West Valley Multi-Modal Transportation Corridor Plan**

The MAG West Valley Multi-Modal Transportation Corridor Plan and accompanying action plan were adopted by the MAG Regional Council on October 3, 2001. The MAG West Valley Multi-Modal Transportation Corridor Plan creates a master plan and action plan to implement a 42-mile

trail network for pedestrians, equestrians, bicyclists and other non-motorized trail users for the New River and lower Agua Fria River areas. It provides for regional consistency in the development of non-motorized transportation facilities along the corridor by establishing consistent and uniform design for the development of a safe and comfortable multi-modal trail system. MAG continues to serve on the oversight committee of the West Valley Recreation Corridor Board of Directors.

## **Regional Pedestrian Plan**

The MAG *Pedestrian Plan 2000* identifies and recommends programs and actions that guide and encourage the development of pedestrian areas and pedestrian facilities. Walking is a viable mode of transportation throughout the region. Everyone is a pedestrian. The update incorporates flexible design tools (Roadside Performance Guidelines) to assist MAG member agencies in creating better walking environments within the existing or new roadway network. A stakeholders group was directly involved in the development of the plan update, which was overseen by the Pedestrian Working Group, and adopted by the MAG Regional Council on December 8, 1999.

The plan contains five goals that are vital to creating a mode shift away from driving and towards pedestrian mobility. The five goals are: land use compatibility, public awareness, funding, design, and intermodal linkages. One of the major regional initiatives reflected throughout the goals and objectives of the *Pedestrian Plan 2000* is to establish performance guidelines for pedestrian facilities within road right-of-ways. Establishing regionwide performance guidelines, as opposed to rigid roadway cross-sections, provide design flexibility to MAG member agencies. Providing this flexibility within performance guidelines, as opposed to prescriptive cross-sectional standards, will ensure that roadways meet the needs of other travel modes while simultaneously encouraging pedestrian travel throughout the MAG Region.

## **MAG Pedestrian Policies and Design Guidelines**

In 2005, MAG updated the MAG Pedestrian Policies and Design Guidelines, which were originally written in 1995. The Guidelines are intended to provide a source of information and design assistance to support walking as an alternative transportation mode. Through application of the policies and design guidance offered in the document, jurisdictions, neighborhoods, land planners, and other entities will be able to: 1) better recognize opportunities to enhance the built environment for pedestrians; 2) better create and redevelop pedestrian areas throughout the region that integrate facilities for walking with other transportation modes; 3) support the development of areas where walking is the preferred transportation mode; and 4) encourage the development of other independent pedestrian focused transportation facilities. The updated document includes information on elder mobility, Safe Routes to School, and discusses changes in the Americans with Disabilities Act Accessibility Guidelines (ADAAG). The Guidelines can be downloaded from the MAG website.

## **Bicycle and Pedestrian Design Assistance Program**

The FY 2009 MAG Unified Planning Work Program and Annual Budget, approved by the MAG Regional Council in May 2008, included \$150,000 for the Pedestrian Design Assistance Program and \$250,000 for the Bicycle/Shared-Use Design Assistance Program. The Design programs allow MAG member agencies to apply for funding for the design portion of a bicycle or pedestrian project. The MAG Pedestrian Design Assistance Program was initiated in 1996 to encourage the development of

designs for pedestrian facilities according to the *MAG Pedestrian Policies and Design Guidelines*. The intent of the program is to stimulate integration of pedestrian facilities into the planning and design of all types of infrastructure and development. Through the program, the design of pedestrian facilities that are compatible with existing land use and transportation practices is promoted. MAG anticipates that through this program, MAG members and private sector professionals involved in transportation and land use design will become familiar with the *MAG Pedestrian Policies and Design Guidelines* and the opportunities for integrating facilities that support walking into land use and transportation planning. Creating areas where people choose to walk instead of using a private vehicle assists in managing congestion and improving air quality.

The MAG Bicycle Design Assistance Program was introduced in 2006. The Bicycle/Shared-Use Design program assists jurisdictions by providing design assistance for bicycle and shared-use projects. The bicycle and shared-use projects utilize the nationally recognized *AASHTO Guide for the Development of Bicycle Facilities*.

All projects in the Bicycle and Pedestrian Design Assistance Program consider the needs of seniors according to the *Federal Highway Administration: Guidelines and Recommendations To Accommodate Older Drivers and Pedestrians*.

### **Bicycle and Pedestrian Facilities Integration Plan**

In February 2009, MAG embarked on developing a Complete Streets plan known as the Bicycle and Pedestrian Facilities Integration Plan. The purpose of the Bicycle and Pedestrian Facilities Integration Plan is to ensure that bicycle and pedestrian facilities are included in all street designs, to the greatest extent possible, and are ultimately being considered as integral to a street as a fundamental component of community mobility, health, and safety. Two Complete Streets workshops were held in May 2009 attracting 150 transportation professionals.

### **Funding Summary**

The bicycle and pedestrian element should be viewed as an illustrative plan rather than a fully funded part of the RTP. The cost to reconstruct existing roadways to accommodate the above plan is beyond the reasonable available revenues at this time. The bicycle element can serve as a guide to coordinate street and bicycle investments within cities and between jurisdictions. In addition, the MAG Regional Transportation Plan and MAG Transportation Improvement Program include a strong commitment to implement bicycle facility improvements. It should be noted that many street projects in the TIP that add new through lane capacity include improvements to accommodate bicycle usage. The funding for these projects is accounted for in Chapter Nine - Arterial Streets, as it is not possible to separate out the combined cost of adding new through lanes and bicycle improvements in the same project.

The RTP has identified a share of the regional funding available for bicycle and pedestrian projects. This funding consists primarily of Congestion Mitigation and Air Quality (CMAQ) funds. Table 12-1 summarizes these figures for the planning period.

**TABLE 12-1  
BICYCLE/PEDESTRIAN FUNDING PLAN FY 2011 - 2031**

<b>FUNDING (Year of Expenditure \$'s in Millions)</b>	
	<b>Totals</b>
Regional Funds	
MAG Federal CMAQ	244.0
Total Regional Funds	244.0
Local/Other Funds	
Local Sources (HURF, General Funds, Local Sales Taxes, etc.)	104.6
Total Local/Other Funds	104.6
<b>Total Funding</b>	<b>348.6</b>
<b>EXPENDITURES (Year of Expenditure \$'s in Millions)</b>	
	<b>Totals</b>
Bicycle and Pedestrian Projects	
Total New Facilities and Improvements	348.6
<b>Total Expenditures</b>	<b>348.6</b>

# CHAPTER THIRTEEN

## FREIGHT

The movement of goods into, within, and out of the region is vital to the local economy. The movement of goods is conducted through the utilization of multiple modes of transport, such as air, pipeline, water, truck, rail, or other non-traditional means. Freight transport involves a complexity of networks and players who use a variety of methods, modes, available information technologies, and equipment to move raw materials, semi-processed and processed goods through regional, national and international markets for the purpose of commerce.

In the United States, the freight industry is essentially dominated by the private sector, and includes trucking companies, railroads, air carriers, pipeline industries, couriers, freight brokers, terminal operators, freight intermediaries, freight forwarders, package express carriers, and all other shippers and receivers of freight, as well as all freight industry customers.

### **Regional Freight Infrastructure**

Within the MAG Region, the regional highway network, the regional arterial network, railroads, airports, pipelines, freight terminals, warehouses, and intermodal facilities comprise the region's overall "freight infrastructure." Figure 13-1 displays the current freight infrastructure system that handles the movement goods to, from and within the MAG Region.

Warehouses, trucking companies, freight terminals, manufacturers, wholesale facilities, air couriers, and the local postal system represent some of the primary freight generators located throughout the MAG Region. Other freight generators of significance are the region's intermodal facilities and the primary air cargo airports, which are Sky Harbor International Airport and Phoenix-Mesa Gateway Airport.

### **Freight Modes in the MAG Region**

In 2001, 48.9 percent of all aggregate freight that was hauled by truck, rail, or air was received into the region from other destinations outside of Maricopa County. A total of 43.0 percent of all transported freight in the region was shipped out to other destinations throughout Arizona and to other areas of the country. Also, as displayed by Figure 13-2, when considering all aggregate inbound and outbound freight flows for the MAG Region, 86.1 percent of all movements take place by truck, 13.3 percent occurred by rail, and the remaining 0.6 percent was generated by air.

When considering incoming goods, in 2001, 79.3 percent of all freight came from the western region of the United States. The major trading area for incoming goods into the MAG Region consisted of the remaining 14 counties within Arizona. Approximately 35 percent of all incoming freight was generated from areas within the State. When assessing trading areas throughout the United States in 2001, the primary trade area for the MAG Region for all incoming and outgoing freight was the State of Arizona.

# 2010 Update Regional Transportation Plan

Fig. 13-1



## Regional Freight Infrastructure

Intermodal Facilities

Cargo Airports

County Boundary

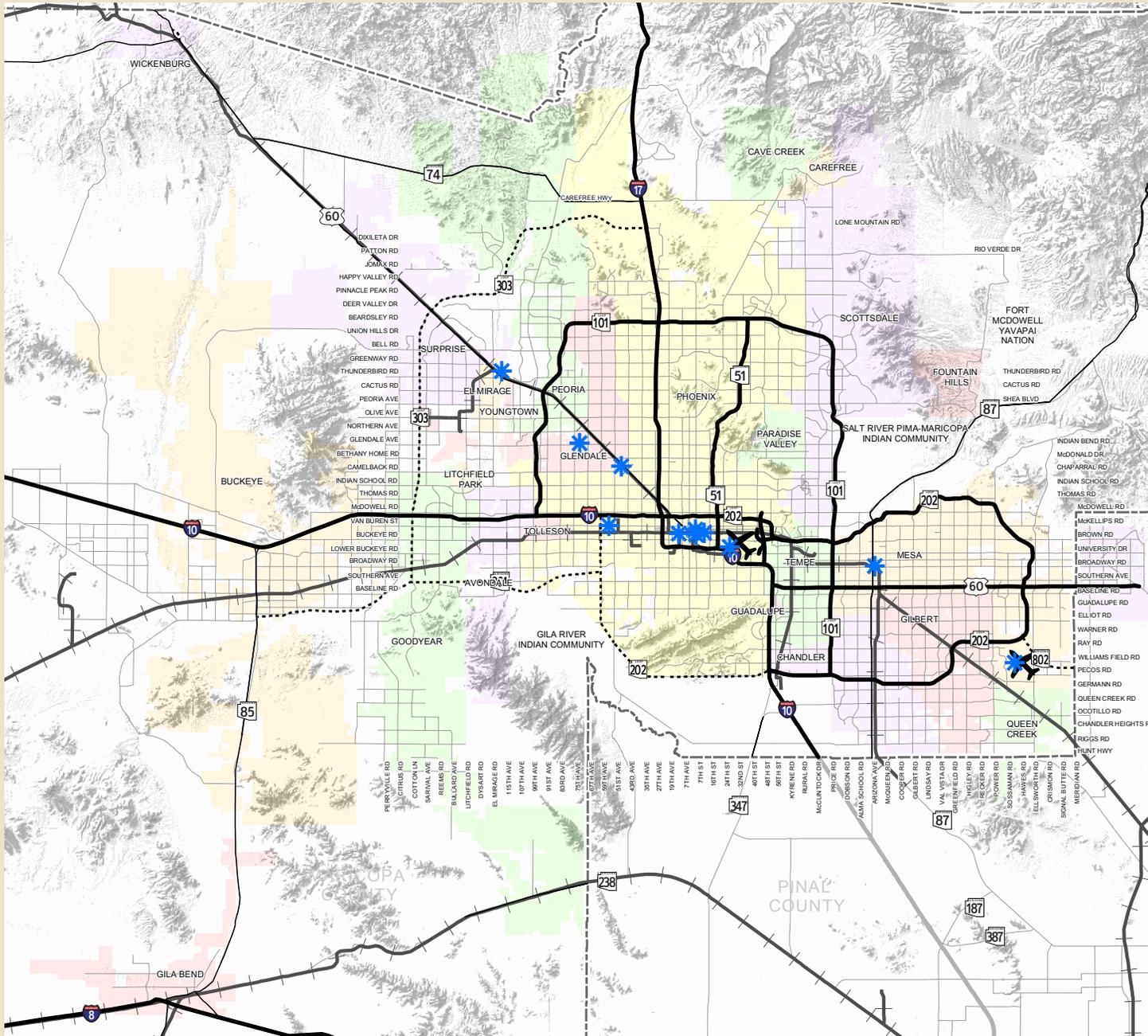
Existing Freeway

Planned Freeway/Highway

Highways

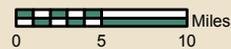
Railroads

*Regional transportation facilities in Pinal County are planned by the Central Arizona Association of Governments (CAAG).*



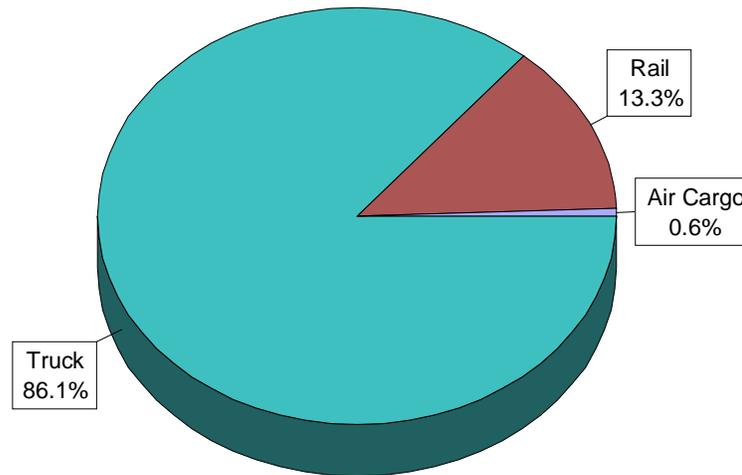
Source: MAG Regional Freight Assessment

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**FIGURE 13-2**  
**TOTAL INBOUND AND OUTBOUND FREIGHT FLOWS**  
**IN THE MAG REGION BY MODE**  
**(by Total Tons)**



**Source: Reebie Associates, Maricopa Association of Governments**

Overall, the MAG Region receives more freight than it exports to other areas, and the trucking industry maintains a key role in the transporting of goods into, within, and out of the region.

### **Trucking**

Trucks are responsible for moving the bulk share of freight within our region's cities and towns, and their ability to operate in an efficient environment is crucial to maintaining the regional economy. Trucking companies maintain an important role in local economies by providing for the necessary ground-based transportation of goods, and in many cases, needed services or ancillary uses such as the movement of waste products. From a freight perspective, the trucking industry is responsible for bringing in raw materials and processed goods for manufacturing; transporting freight to and from intermodal facilities; distributing goods to warehouses and retail locations; and delivering goods to businesses and consumers.

In 2001, a total of 80.2 percent of all inbound freight was received through truck transport. Also, 95.5 percent of all goods that were sent out of the region were shipped through the use of a truck. As displayed by Table 13-1, in 2001 the majority (59.2 percent) of all outbound truck freight was shipped to other destinations through for-hire Truckload (TL) movements; whereas 38.8 percent of all truck freight consisted of private truck movements, and only 2.0 percent consisted of for-hire Less Than Truckload (LTL) movements. Reported LTL movements as displayed by Table 13-1 consist of individual loads that are less than 10,000 pounds.

**TABLE 13-1**  
**INBOUND/OUTBOUND TRUCK FREIGHT MOVEMENTS**  
**(By Type of Carrier – 2001)**

<b>OUTBOUND TRUCK FREIGHT</b>		
<b>Type of Movement</b>	<b>Total Tons</b>	<b>Percent</b>
For-Hire Truckload (TL)	13,236,146	59.2
For-Hire Less Than Truckload (LTL)	447,167	2.0
Private Truck	8,675,041	38.8
<b>Total</b>	<b>22,358,354</b>	<b>100.0</b>
<b>INBOUND TRUCK FREIGHT</b>		
<b>Type of Movement</b>	<b>Total Tons</b>	<b>Percent</b>
For-Hire Truckload (TL)	19,056,247	63.9
For-Hire Less Than Truckload (LTL)	1,192,879	4.0
Private Truck	9,572,856	32.1
<b>Total</b>	<b>29,821,982</b>	<b>100.0</b>

### **Rail**

The railroad industry plays a major part in the national and regional economy, and transports certain types of goods throughout the country that would not be cost-effective or feasible to be hauled by other types of freight modes, such as truck, air or pipeline. Railroads in the United States are essentially transporters of bulk quantity goods, which are usually hauled by multiple train carloads over long distances. Trains are often the mode of choice for low value, bulk commodities that are not extremely time sensitive.

At present, there are a total of three operational railroads in the MAG Region. These railroads include the Burlington Northern and Santa Fe Railway (BNSF), the Union Pacific Railroad (UP), and the Arizona and California Railroad (ARZC). The BNSF and the UP are classified as Class I carriers, whereas the ARZC is considered to be an active Short Line, or Line Haul railroad. As of 2003, the BNSF maintained approximately 70 miles of active track in the MAG Region, the UP maintained a total of approximately 180 miles of active track, and the ARZC maintained a total of about 27 miles of active track.

From a broader, regional and national perspective, the BNSF and the UP railroads maintain lines that are part of an integrated, transcontinental system. The BNSF line that maintains operations in the City of Phoenix travels northwest through the Town of Wickenburg, across Yavapai and Coconino Counties, to a junction near Flagstaff, Arizona. The northern BNSF line serves as an important link between the ports of California, the Chicago metropolitan area, and a number of East Coast markets. The ARZC is located in the far northwest region of MAG. The ARZC line branches off from the BNSF line near the Town of Wickenburg, and exits the region at the La Paz County border, located on the western boundary of the MAG Region.

The current UP rails located in the Phoenix metropolitan area are essentially a northern track

network that extend from the southern UP main line, which is located in the southern MAG Region. The southern MAG UP line travels east and west throughout the region and the State of Arizona, and serves as a viable east-west transcontinental connection between southern California; the City of Chicago; the ports of the Gulf Coast; markets in the eastern U.S.; and a number of cities throughout the south. Within the MAG Region, the northern UP branch extends from its origin in central Pinal County, and enters into the metropolitan Phoenix area from the southeast valley. The northern UP line travels west into downtown and terminates near the Palo Verde nuclear facility in the West Valley. Today, all northbound and southbound freight to Phoenix that travels along the existing UP lines originates near Picacho Junction, which is located near the City of Eloy in central Pinal County.

Within the MAG Region, each of the existing railroad companies that are presently conducting operations are primarily involved in the movement of freight. The only section of rail that presently contains Amtrak passenger service is located in southern Maricopa County along the UP mainline. The Phoenix metropolitan area presently lacks any viable form of commuter or passenger rail service.

The BNSF Railway currently maintains four active intermodal facilities within the MAG Region. The UP also maintains four active intermodal facilities. All BNSF and UP freight operations utilize numerous rails, and each company also maintains their respective areas of right-of-way within their designated track areas, transfer areas, and switching facilities. The primary modes of access for all eight of the identified BNSF and UP intermodal facilities include rail and truck.

As indicated in Table 13-2, 88.2 percent (7,117,336 tons) of rail cargo was inbound, and 11.8 percent (954,067) was outbound from the region in 2001. When assessing the types of movements that occur in the rail industry, most goods are either categorized as being transported by carload or intermodal rail. Unlike other areas of the country where intermodal rail freight can be transferred by truck, pipeline, air or water, within the MAG Region, the only connecting mode with intermodal rail freight is through truck.

**TABLE 13-2**  
**INBOUND/OUTBOUND RAIL MOVEMENTS**  
**(By Type – 2001)**

<b>OUTBOUND RAIL FREIGHT</b>		
<b>Type of Movement</b>	<b>Total Tons</b>	<b>Percent</b>
Carload	606,301	63.6
Intermodal	347,766	36.4
<b>Total</b>	<b>954,067</b>	<b>100.0</b>
<b>INBOUND RAIL FREIGHT</b>		
<b>Type of Movement</b>	<b>Total Tons</b>	<b>Percent</b>
Carload	6,261,089	88.0
Intermodal	856,247	12.0
<b>Total</b>	<b>7,117,336</b>	<b>100.0</b>

By definition, intermodal rail is considered freight that utilizes various combinations, such as highway and rail. This is common for Container-on-Flatcar (COFC) and Trailer-on-Flatcar (TOFC) movements, where the long haul portion of the trip is conducted by flat car, and the pickup or delivery of the container or trailer is conducted by truck. By contrast, carload rail freight is non-intermodal, and is conducted through the transport of other means.

## **Air Cargo**

The Air Cargo, or “air freight” industry in the United States maintains a very important role in the overall freight transportation industry, and generates billions of dollars on an annual basis. Although the bulk share of goods that are transported in the U.S. by plane are relatively low in comparison to the truck and rail freight modes, the air cargo industry continues to play an important role in specific segments of the overall goods movement process. The industry serves a number of particular markets, which are primarily focused on time-sensitivity issues, accommodating high-value commodities, and goods that solely rely on air transport for a variety of reasons.

Any form of freight that is transported by plane is considered air cargo. According to the U.S. Department of Transportation, for identification purposes, air freight services are categorized into whether goods are time sensitive, or less time sensitive; whether they are sent by integrated or non-integrated providers; or by the major type of cargo carrier, which are identified as being one of the following: express carrier, scheduled, mail or chartered air service providers.

There are presently a total of 12 airports located throughout the Greater Phoenix Metropolitan Area of MAG. Of these airports, Phoenix Sky Harbor International and Phoenix-Mesa Gateway are the primary airports that maintain functional air cargo operations that significantly contribute to the regional economy. Sky Harbor International and Phoenix-Mesa Gateway are the largest airports in the MAG Region, and maintain considerably active schedules for inbound and outbound air freight.

At present, Sky Harbor International Airport maintains four active air cargo facilities on the west side of the airport, which provide non-integrated and integrated air cargo services. Cargo Buildings A, B and C contain a total of 197,760 square feet of space, and collectively have a total of 103 air cargo bays to facilitate planes and air cargo.

At present, air cargo operations at Phoenix-Mesa Gateway are comprised of specialized services, and are essentially comprised of unscheduled charter flights. However, according to the *Phoenix-Mesa Gateway Airport Master Plan*, there are specific plans to increase air cargo services to serve the growing demands of the East Valley of metropolitan Phoenix, and to alleviate cargo volume at the Phoenix Sky Harbor International Airport.

Future dedicated air cargo facilities have been planned for the east and west sides of the airport, and there is a planned expansion of one of the airport’s runways to effectively accommodate air cargo aircraft. A new cargo facilities, which includes an \$11 million cargo ramp, has been completed. Land adjacent to the ramps for new cargo related buildings is also being leased.

In 2001, there was a total of 342,674 tons of inbound and outbound air cargo moving in and out of the MAG Region. Of this amount, 72.1 percent (247,172 tons) was inbound, and 27.9 percent (95,502) was outbound from the region. Approximately 0.3 percent of all inbound and outbound freight movements within the MAG Region were conducted by air.

## **Pipelines**

At present, the El Paso Corporation and the Southwest Gas Corporation are the only companies that are actively involved in the regional distribution of natural gas products for residential and commercial use. In addition to these companies, there is a primary metropolitan pipeline terminal facility located on the west side of the City of Phoenix. This facility is located near I-10 and provides refined oil and gasoline products that are transferred to trucks. It also contains main pipelines that connect with the States of California and New Mexico, and a series of smaller pipelines that connect to Phoenix Sky Harbor International Airport and Luke Air Force Base. The facility also contains a smaller line that extends south to the Tucson area.

## **Future Regional Freight Planning**

In 2004, MAG completed a comprehensive *Regional Freight Assessment* of the region. The *Regional Freight Assessment* represented an in-depth inventory and analysis process that addressed various aspects of the freight transportation industry; provided an analysis of freight flows, the total amount of transported tons, and the types of commodities that were moved; and also provided an overview of the modes of transport that are responsible for moving goods to, from, within and throughout the MAG Region. In addition to this assessment, past regional freight planning activities have included: 1) developing an Intermodal Management Systems report, which is considered in the preparation of the MAG Transportation Improvement Program, 2) conducting freight forums, which provided goods movement providers and users an opportunity to give input on transportation needs and investments, and 3) considering freight movement factors as a part of modal plan development, which has been specifically addressed in the airport planning process.

Future steps in freight planning include: 1) continuing to monitor the impact and role of freight in the regional transportation system, 2) enhancing the freight aspects of regional transportation demand forecasting, through improvements in the truck travel modeling process, 3) maintaining interaction with the “freight community” and exploring opportunities for expanded coordination in the regional transportation planning process, and 5) evolving an appropriate, long-range freight planning function in the overall regional transportation planning process.

## CHAPTER FOURTEEN

### SPECIAL NEEDS TRANSPORTATION

The transportation needs of special populations are a regional concern. Limitations caused by age or disability often complicate the process of securing transportation for a portion of the population. In addition, those who are seeking employment or training and those who lack financial resources, find limited transportation options available to reach second or third shifts and weekend employment. Our region is at a defining moment in human services transportation where the demand is increasing but available funding for services is decreasing. It is estimated our region will grow to 5.2 million by 2020 to six million by 2030. This population growth will increase the strain on services already at capacity.

The downturn of the economy has placed additional burdens on these services. Most providers report increases in demand. Individuals are requesting more assistance as they struggle to maintain their jobs and medical care. At the same time, many agencies have experienced funding reductions that have forced them to reduce or eliminate services altogether. This creates gaps in service that cannot easily be filled.

Therein lies the challenge: to meet the transportation needs of a growing population with limited service options. MAG, in partnership with stakeholders throughout the region, is undertaking steps to meet the need of the most vulnerable populations. Innovative efforts are being implemented through collaborations throughout the region.

#### **Concerns of Older Adults, People with Disabilities and People with Low Incomes**

##### **Older Adults**

The 2007 American Community Survey reports 15.6 percent of residents in Maricopa County are aged 60 and over. By the year 2020, approximately 26 percent of the residents in the region will be age 60 or older. Of this number, approximately one third will be 75 or older. Although the older adults of the future will be healthier, better educated, and more financially secure than their peers of a few years ago, many will experience physical, financial, emotional and mental barriers in using various modes of transport. Older adults living alone may have disabilities that prevent them from driving. They may also lack the availability of close-by family members to provide assistance and/or have limited financial means which can lead them to face more difficult and life-threatening transportation challenges.

##### **People with Disabilities**

A disability may be defined both within the context of the person's level of ability, as well as by society's ability to accommodate their needs. Disabilities include physical limitations, cognitive impairments, and visual impairments. The 2007 American Community Survey reports 12.5 percent of people in the region lives with a disability of any kind. The human services transportation solutions identified for people with disabilities often benefit all people by making transportation more accessible for everyone.

## **People with Low Incomes**

The 2007 American Community Survey reports 12.8 percent of people in the region live below the poverty level. Income affects access to a variety of resources, including transportation. Low-income people are more likely to utilize transit services. They are also more likely to work second or third shifts when transit services are not available. People with low-incomes out of necessity will live in more affordable housing that may not be located near employment centers. Federal grants like Job Access and Reverse Commute (JARC) were developed specifically to address these needs. As with people who have disabilities, it is more cost effective to offer people with low incomes access to transportation so they may maintain their self-sufficiency instead of using to state sponsored health care and financial assistance.

## **Resources for Transportation Disadvantaged Populations**

### **Regional Action Plan on Aging and Mobility**

In response to address the need as described, MAG began an intensive process to develop a *Regional Action Plan on Aging and Mobility*. MAG brought together experts and concerned citizens to form the Elderly Mobility Stakeholder Working Group. The group studied and then developed 25 recommendations for an action plan based on Infrastructure and Land Use, Alternative Transportation Modes, Driver Competency, and Education and Training needs. The plan provided a comprehensive overview of senior mobility issues and was adopted by the MAG Regional Council on October 3, 2001. MAG continues to use the 25 recommendations to guide regional planning on aging and mobility.

### **Human Services Transportation Coordination Planning**

As a condition for receiving formula funding under certain Federal Transit Administration programs, proposed projects must be derived from a locally developed Public Transit/Human Services Transportation Plan. According to federal regulations, there is a need to provide short-term strategies specifically for applicants of Section 5310, 5316 and 5317. While agencies applying for these funds are required to comply with these strategies, all agencies providing human services transportation have been encouraged to utilize these concepts.

Each plan contains an extensive inventory of the human services transportation providers. This activity has taken on even more importance as other agencies that used to keep track of similar information have ceased doing so due to funding reductions. The inventory is updated with each plan and has grown considerably from one year to the next. The plans also contain a gaps analysis based on the provider inventory, population demographics, and stakeholder feedback. Strategies for addressing the needs as revealed by the gaps analysis are included and tracked in every plan.

The plans are developed through a process that includes representatives of the public and private sectors, non-profit transportation and human services providers, and members of the general public. The first plan was approved by the MAG Regional Council in 2007. Updates were approved in 2008 and 2009. In March 2009, the Federal Transit Administration bestowed the United We Ride Leadership Award for major urbanized areas to the Maricopa Association of Governments Human

Services Coordination Transportation Planning Program. The award was given on the basis of the 2007 MAG Human Services Coordination Transportation Plan and the 2008 Update.

Each plan builds on the success of the previous plan. The 2007 Plan focused on establishing a good base for coordination through improved communication and interaction among stakeholders. Goals such as creating an online comprehensive service directory, the coordination of sub-regional meetings, and ongoing assessment and evaluation poised the region to intensify coordination efforts.

The success of the first plan was evident through the impact at the regional level and recognition at the national level. A MAG representative was invited to serve on the Steering Committee for the National Resource Center for Human Services Transportation Coordination and continues to do so. This alignment of regional and national synergy gave additional energy and influence to local coordination efforts.

The 2008 Update strove to standardize operations and policies among the human services transportation service providers. Strategies such as standardized driver training, the development of coordination policy templates, and travel training assisted agencies and individuals to implement this goal. The MAG Transportation Ambassador Program engages people in mainstream venues such as community centers and libraries to learn more about human services transportation options. The result is that people are empowered to move more easily throughout the region. The Virginia G. Piper Charitable Trust generously sponsored the launch of the program in 2008 and will continue to do so in the program's second year in operation.

The goal of the 2009 Update is to maximize the capacity of the current system by providing more rides for the targeted populations for the same or fewer resources. The following strategies will achieve this goal and enhance coordination efforts throughout the region.

- **Shared Vehicles** - Continuing the implementation of the United We Ride goals, this strategy will focus on maximizing resources and reducing unused capacity by rewarding Section 5310 applicants who request shared vehicles. A coordinated effort among agencies is essential to meet the demands of an increasing population. Recognizing partnerships between agencies for shared vehicles is hoped to provide an incentive to put into action further collaborative efforts. MAG, along with Arizona Department of Transportation and the City of Phoenix, will monitor requests of agencies who partner their efforts through the application processes for Section 5310, 5316 and 5317.
- **Travel Training Inventory** - Complete an inventory of agency travel training programs in the region. The inventory will lead to a better understanding of the availability of programs, better coordination, and the development of new programs to fill gaps in service. The inventory will provide information on agencies that offer, or would be willing to offer travel training to others outside of their agency. Valley Metro, in partnership with MAG, will distribute the travel training inventory survey to regional human services transportation agencies. Valley Metro will compile the inventories and analyze any gaps in trainings.
- **Match Mechanism** - Develop a mechanism for matching agencies with the capacity to offer more trips with agencies needing transportation for their clients as well as people in need from the community. This strategy will maximize available resources to help meet the

increasing demand for services. In determining capacity, this meets the United We Ride goal of providing more rides for the same or fewer resources. MAG will survey agencies inquiring if they are currently, or would consider transporting older adults, people with disabilities, and people with low incomes who are not their clients. Information received will be listed in the Community Information and Referral Directory.

- **United We Ride Goal Consistency** - Encourage and award applicants that have supported the development and implementation of the coordination plans. This will be evident by an agencies inclusion in the plan update Participant List, as well projects that promote the United We Ride goals to improve efficiency, effectiveness and quality. MAG, along with Arizona Department of Transportation and the City of Phoenix, will monitor the implementation through the application processes for Section 5310, 5316 and 5317.

## CHAPTER FIFTEEN

### TRANSPORTATION ENHANCEMENT ACTIVITIES

The purpose of this chapter is to provide an overview of the Transportation Enhancement Program in the MAG Region, and to address the role of transportation enhancements and their function in the regional intermodal transportation system. This chapter will address items pertaining to transportation enhancement concepts, and review the planning and programming process that is followed prior to constructing transportation enhancement projects throughout the MAG Region. The chapter will address information on the types of projects that have been constructed between the years of 1993 and 2007, and will also provide an overview of funding.

#### **Transportation Enhancement Concepts**

Transportation Enhancements are a category of federal funding that comes directly to the State of Arizona through federal transportation legislation known as the Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users (SAFETEA-LU). The Transportation Enhancement Program was originally enacted by the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991, and was created to improve surface transportation activities by developing projects that go “above and beyond” normal, or routine transportation activities and funding. Enhancement projects are required to have a direct relationship to all elements of the intermodal surface transportation system, with the exception of aviation activities.

As part of an annual appropriations process at the federal level, funds for transportation enhancement projects are allocated to Arizona through the U.S. Department of Transportation, Federal Highway Administration (FHWA). Although FHWA has issued guidance on how states may implement transportation enhancement funding, individual rules about the program are determined and administered by each state. In Arizona, transportation enhancements are administered by the Arizona Department of Transportation (ADOT), Transportation Enhancement and Scenic Roads Section. ADOT determines how much money will be available throughout the State on an annual basis, and also sets application deadlines for eligible applicants applying for transportation enhancement funding.

In Arizona, projects in the Transportation Enhancement Program can be developed within one of 11 eligible activity categories, which include:

- Provision of Facilities for Pedestrians and Bicycles.
- Provision of Safety and Educational Activities for Pedestrians and Bicyclists.
- Scenic or Historic Highway Programs.
- Landscaping and Other Scenic Beautification.
- Historic Preservation.
- Rehabilitation of Historic Transportation Buildings, Structures, or Facilities.
- Preservation of Abandoned Railway Corridors.
- Control and Removal of Outdoor Advertising.
- Archaeological Planning and Research.

- Environmental Mitigation.
- Establishment of Transportation Museums.

## **Planning and Programming Process**

ADOT determines the annual schedule for receiving transportation enhancement applications from eligible applicants throughout the State. ADOT also sets funding levels and announces how much money will be available within the State's Transportation Enhancement (TE) Program. The availability of transportation enhancement funding for Arizona is typically announced by ADOT during April of each year, and applications are due during the month of September. The ADOT Transportation Enhancement (TE) Program is not a grant program, and functions entirely as a reimbursement program. Awarded applicants must be prepared to pay for all incurred costs, and then request reimbursement for expenditures as specified in a required Joint Project Agreement between their respective agency and ADOT, once a project is awarded. Applicants are also responsible for any costs that go beyond any amount as originally approved in the application.

As part of the annual application process, all projects that are considered for funding are divided into "Local" and "State" categories. Projects located on local roadways are referred to as "Local projects," and projects located on State highways are referred to as "State projects." As specified within ADOT program guidelines, State project funding is intended for those applicants containing projects with a minimum of 75 percent of the proposed project site located within ADOT right-of-way on a State highway; whereas Local project funding is intended for projects situated on local roadways. The total amount of funding that an applicant can request from the Local category may not exceed \$500,000, and the total amount of funding that an applicant can request from the State category may not exceed \$1.0 million.

In 2008, ADOT initially determined that there was a total of \$13.0 million in available TE Program funding for Arizona. Of this amount, \$8.0 million was available from the Local category, and the remaining \$5.0 million was available from the State category. These amounts were later reduced to \$6.1 million for local projects and \$3.9 million for state projects because of anticipated budget reductions. ADOT typically receives anywhere from \$12.0 million to \$15.0 million in annual funds from FHWA, with non-awarded funding being reserved for overhead and program implementation.

In 2009, ADOT also initially determined that there was a total of \$13.0 million in available TE Program funding for Arizona. Of this amount, \$8.0 million was available from the Local category, and the remaining \$5.0 million was available from the State category. However, because of ARRA (American Recovery and Reinvestment Act), additional funding of \$2.0 million was added to the Local category and \$2.0 million was added to the State category.

Unlike a process whereby MAG automatically receives Federal Congestion Management and Air Quality (CMAQ) funds, or a sub-allocation of MAG Surface Transportation Program (STP) Funds, TE Program funds are actually a State "set aside" of STP funds that are open to a competitive process from multiple agencies throughout Arizona. The State Councils of Governments, which consist of the Central Arizona Association of Governments (CAAG), the Northern Arizona Council of Governments (NACOG), the Pima Association of Governments (PAG), the Southeastern Arizona Governments Organization (SEAGO), and the Western Arizona Council of Governments

(WACOG); and the State's Metropolitan Planning Organizations (MPOs), which consist of the Central Yavapai MPO, the Flagstaff MPO, and the Yuma MPO, all compete with MAG for limited project funding.

The application review process for applicants within the MAG Region occurs at two different levels. One review process occurs at MAG internally during the spring, and the other occurs at the state level, typically during the month of October. On April 28, 1993, the MAG Regional Council approved the formation of the MAG Enhancement Funds Working Group (EFWG) to evaluate and make recommendations to the MAG Regional Council on transportation enhancement applications that would be submitted to ADOT. In establishing the Working Group, it was envisioned that committee members would represent the eligible areas of transportation enhancement activities as defined in federal legislation. According to guidance given by the MAG Regional Council, the MAG EFWG consisted of seven members representing the arts, landscape architecture, historic preservation and archaeology interests, and representatives from the MAG Regional Bicycle Task Force, MAG Pedestrian Working Group and MAG Street Committee. The group was co-chaired by a member of the MAG Regional Council, and a member of the MAG Management Committee, for a total of nine members.

On May 28, 2008, the MAG Regional Council approved several revisions to the Enhancement Funds Working Group. The Regional Council action reconstituted the EFWG into the Enhancement Peer Review Group (EPRG), which is chaired by a member of the MAG Transportation Review Committee. The appointment of the Chair and the group members are made by the Chair of the Regional Council. A summary of the changes enacted by the Regional Council included the following:

### **Composition and Operating Procedures**

- Re-establish the EFWG as an Enhancement Peer Review Group (EPRG).
- Prohibit members serving on the (EPRG) from ranking their own projects.
- Provide that members on the EPRG serve terms up to two years.
- Geographically balance the membership on the EPRG.
- Ensure transparent voting.

### **Leadership/Membership of the new Enhancement Peer Review Group**

- Chaired and vice chair by a member from the MAG Transportation Review Committee.
- One Member from Streets Committee.
- One Member from the Bicycle and Pedestrian Committee.
- One Historic preservation representative.
- One landscape architecture/riparian interest representative.
- One Arts representative.

Each year, the EPRG reviews and ranks all projects submitted for transportation enhancement funding in the MAG Region. After the projects are ranked, the top ranked applications are then forwarded to the Management Committee for recommendation, and then to the Regional Council for approval. After review, the Regional Council usually forwards the list to ADOT during the

month of September for further project review and selection at the state level.

After project applications are received from ADOT during September of each year, the applications are then subject to a State review process. During October of each year, ADOT conducts a meeting of the State Transportation Enhancement Review Committee (TERC), which is comprised of 16 voting members representing the State Transportation Board, ADOT, the State's MPOs and Council of Governments, the Arizona Historic Advisory Commission, the Arizona Commission on the Arts, the Arizona Office of Tourism, Arizona State Parks, and a statewide bicycle representative. The State TERC meets for a period of three days during October to hear project presentations from representatives of each Council of Government and MPO in Arizona, and to review applications for compliance with published selection criteria. The TERC then ranks, selects, and recommends projects for funding to the ADOT State Transportation Board, which usually considers and approves the TERC rankings during the month of November. After a project has been awarded funding, the applicant is invited to an ADOT project scoping meeting to initiate the project development process, resulting in actual construction of the project. This meeting typically occurs within six months from the date of receiving written notification from the State Transportation Board that the applicant's project has been officially awarded.

### **Transportation Enhancement Projects**

Within the MAG Region, the majority of projects have focused on traditional uses of enhancement fund categories, which include items that are focused on the provision of facilities for pedestrians and bicycles, and landscaping. Since 1993, the majority of projects in the MAG Region have received funding to complete multi-use pathways, sidewalks, and support facilities for pedestrians and bicyclists. Since the inception of the Transportation Enhancement Program in Arizona, the MAG Region has been awarded funding for a total of approximately 30 multi-use or shared use pathways along existing routes and canals, including projects for sidewalks and pedestrian crossings; 19 projects directly related to bike routes and bike facilities; and a number of projects pertaining to streetscapes and pedestrian alleyways, historic preservation and lighting, transportation-related museums, archaeological projects and street signs. Many of these awarded projects have included a secondary component that included landscaping.

Although there are 11 total eligible categories of Transportation Enhancement funding available, approximately 85 percent of all MAG projects through the years have included items directly pertaining to the provision of facilities for pedestrians and bicycles, and landscaping. Appendix F provides an overview of all projects that have received funding between the years of 1993 and 2009 within the MAG Region. These projects are listed in chronological order, and include a brief project description; information pertaining to the total amount of federal funds awarded for the project; the awarded project's sponsor; and information related to which round and year the project received funding.

### **Transportation Enhancement Projects - American Recovery and Reinvestment Act (ARRA)**

In March 2009, ADOT announced that \$15.6 million would be available from the American Recovery and Reinvestment Act for transportation enhancement projects. In order to ensure rapid deployment of this funding, ADOT targeted previously approved enhancement projects that could

demonstrate constructability within 120 days. There were 26 Enhancement projects identified that met this criteria statewide. Of the 26 projects, 9 were in the MAG region, which are listed in Table 15-1.

**TABLE 15-1  
MAG AREA ARRA ENHANCEMENT PROJECTS**

City/Town	Project Name	Federal Share	Local Share	Total Cost
Gilbert	Canal Crossing Project	\$270,000	\$410,000	\$680,000
Gilbert	Heritage District Downtown Ped. Project	578,670	--	578,670
Maricopa Co.	Bush Hwy from Usery Pass Rd to Stewart Mtn. Rd.	750,000	367,817	1,117,817
Scottsdale	Crosscut Canal, Thomas Rd to Indian School Rd.	750,000	636,272	1,386,272
Mesa	Consolidated Canal Pathway	750,000	759,375	1,509,375
Chandler	Paseo MUP Unit I	750,000	411,610	1,161,610
Glendale	Old Roma Alley	732,562	--	732,562
Scottsdale	Downtown Canal Bank Improvements	600,000	25,402	625,402
Tempe	Crosscut Canal from Papago Park to Mouer Park	750,000	650,000	1,400,000

### **Transit - Related Enhancements**

The Transportation Enhancement Program is designed to strengthen the aesthetic, cultural and environmental aspects of the region's intermodal transportation system. Although the majority of enhancement projects within the MAG Region have focused on the provision of facilities for pedestrians and bicycles, many of these projects have strong intermodal ties to regional transit activities. Often, many of the constructed pedestrian and bicycle enhancements terminate at major intersections, or along routes containing connections to buses, thus allowing for another choice in transportation for pedestrians and cyclists. Many enhancement projects occur near bus stops and bus shelters, and provide safer pedestrian access through the construction of new paths and sidewalks; ADA-compliant curb cuts; marked pedestrian walkways; and in many cases, also provide an aesthetic upgrade to adjacent transit facilities by providing landscaping and shading, artwork, signs, lighting, benches and trash receptacles.

One example of a transit-related enhancement project is a recently funded project in the City the Tempe. The Tempe Bike Station at the Downtown Transit Center is a facility that allows for a secure, indoor parking facility, which is an integral part of the Transit Center. The Bike Station is actually located within the Downtown Transit Center, which will function as an Intermodal Passenger Terminal by accommodating several modes of transportation. The center will provide pedestrians and bicyclists with choices to buses, and a future light rail station that provides access to other communities in the region.

Since the beginning of the program, the MAG Enhancement Funds Working Group reviewed a number of transit-related projects for the consideration of funding. Such items have included shading for bus stops, and a number of requests to provide enhancements to areas containing existing transit stops along bus routes connecting to the regional bus system. Although several of these projects have been advanced to the ADOT Transportation Enhancement Review Committee for the consideration of funding, few have been funded. However, MAG acknowledges the need for the interaction of such modes and will continue to pursue transit-related enhancements in the future as part of the program.

### **Transportation Enhancement Funding Summary**

Transportation Enhancements in Arizona were first allocated to communities in 1993. Between the years of 1993 (Round I) and 2009 (Round XVII), there have been a total of 17 rounds of funding. Applicants from the MAG Region have received approximately \$29.5 million

Table 15-2 provides an overview of the regional transportation enhancement funding recipients between the years of 1993 and 2009 in the MAG Region. The table provides an overview of the total number of projects that have been awarded by applicant, and also displays the total amount of funding received. Within the region, aside from MAG member jurisdictions, funding over the years has also been received by Arizona State University, MAG; the State of Arizona; and the Bureau of Land Management.

### **2009 Enhancement Project Selection**

The Enhancement Peer Review Group, with MAG staff support, is proceeding with the process of reviewing and ranking the enhancement project applications for the MAG area. The top ranked applications were forwarded to the Management Committee for recommendation, and then to the Regional Council for approval. The approved list was forwarded to ADOT in September for further project review and selection at the state level by the State Transportation Enhancement Review Committee, and subsequent approval of funding by the ADOT State Transportation Board.

TABLE 15-2

## MAG REGIONAL TRANSPORTATION ENHANCEMENT FUNDING: 1993 to 2009

Agency	Total Number of Projects	Total Amount of Funding	Percentage of Total Funding
City of Phoenix	20	\$7,709,521	26.1%
City of Glendale	8	2,348,479	8.0%
City of Tempe	6	3,000,000	10.2%
Maricopa County	6	2,746,857	9.3%
Town of Gilbert	5	2,180,000	7.4%
City of Chandler	4	1,456,803	4.9%
City of Mesa	3	1,077,662	3.7%
City of Peoria	4	1,415,893	4.8%
Town of Wickenburg	3	1,846,613	6.3%
City of Scottsdale	3	1,364,000	4.6%
State of Arizona	2	723,721	2.5%
Town of Guadalupe	2	651,500	2.2%
City of Avondale	2	445,102	1.5%
Arizona State University	2	268,788	0.9%
Valley Metro/RPTA	2	952,000	3.2%
Maricopa Association of Governments	1	450,000	1.5%
Town of Cave Creek	1	274,625	0.9%
City of El Mirage	1	268,788	0.9%
City of Litchfield Park	1	140,000	0.5%
City of Goodyear	1	125,000	0.4%
Bureau of Land Management	1	70,800	0.2%
<b>Totals: 1993- 2009</b>	<b>78</b>	<b>\$29,516,152</b>	<b>100.0%</b>

## CHAPTER SIXTEEN

### EXTENDED REGIONAL TRANSPORTATION PLANNING OUTLOOK

In 2003, the MAG Regional Transportation Plan (RTP) was updated through a comprehensive review, which resulted in the adoption of a major revision of the RTP by the MAG Regional Council. Since 2003, the RTP has generally been updated annually to reflect new information and changing conditions in the region. Because the Plan underwent a major revision in 2003, these updates have not included additional new transportation corridors or significant new service additions beyond those already identified in the 2003 version of the Plan. Although there have not been significant additions to the RTP since 2003, MAG has continued to look to the future in an effort to assess regional trends that affect transportation demand, and continues to assess the need for additional new facilities and services. Three important aspects of this ongoing effort are inter-regional cooperation and coordination, modal and area transportation studies, and illustrative corridors/projects.

#### **Inter-Regional Cooperation and Coordination**

One of the key factors affecting future transportation needs in the MAG Region has been the emergence of individual regional growth patterns in Central Arizona into a multi-county matrix of development. This pattern has made inter-regional coordination among planning agencies increasingly important. MAG has pursued inter-regional coordination of its planning programs for many years and will continue to place an emphasis on this effort in the future.

#### **Regional and Statewide Growth Patterns**

The MAG Region has been one of the fastest growing metropolitan areas in the United States for the last several decades. Between 1990 and 2000, the region grew from 2.1 million to 3 million people, which represents a 43 percent increase in population growth. According to the mid-decade special Census Survey of Maricopa County, in 2005 the County reached a population of 3.7 million people. This represented a 23 percent increase during the five year period since 2000, maintaining a high level of growth in the region. According to recent population projections, the MAG Region is expected to increase to a total population of 6.1 million people by 2040.

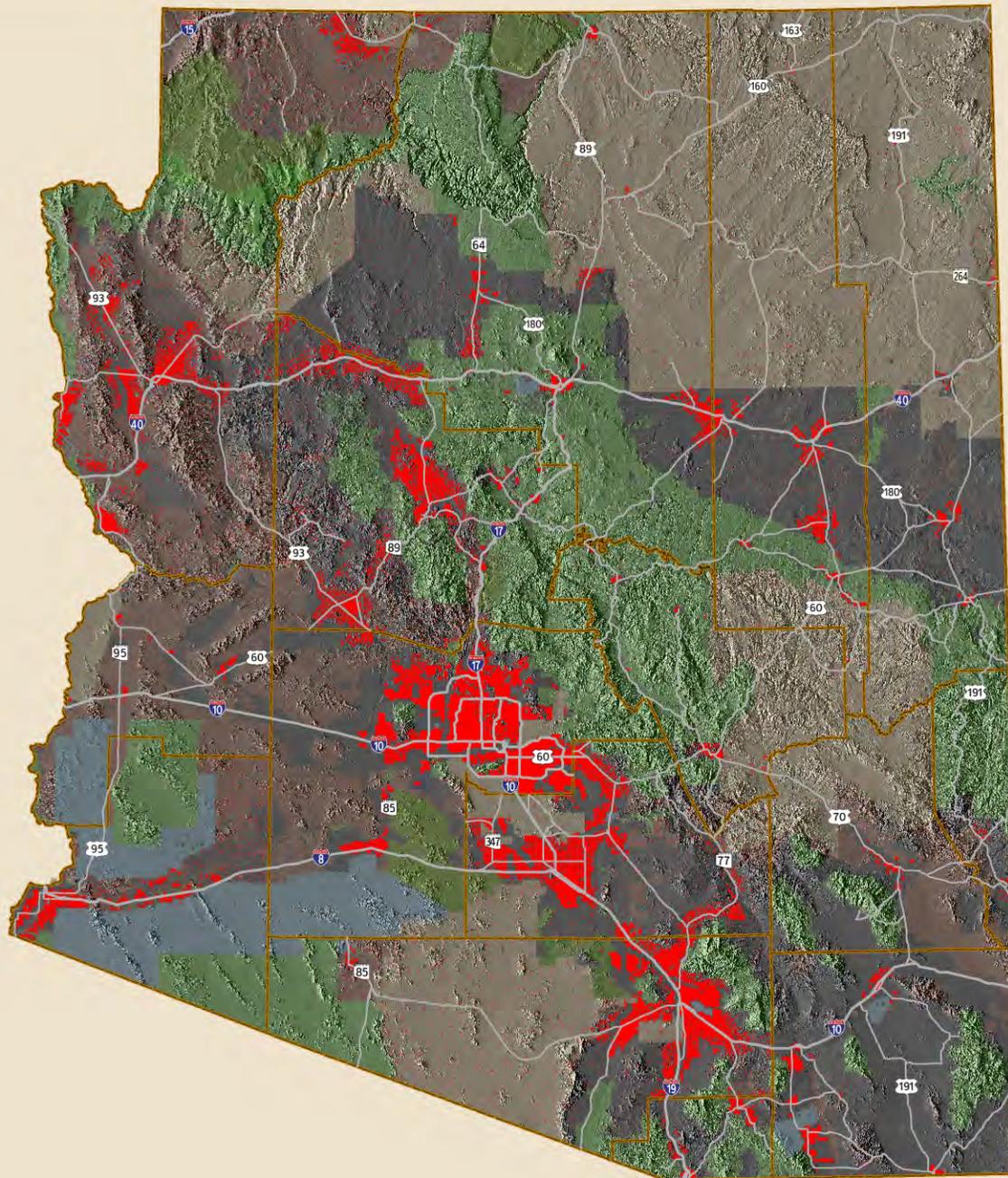
Since 1990, much of the growth in the MAG Region has moved away from the central region of Maricopa County, toward areas of very extensive, vacant parcels of land on the urban periphery. Many developers are now constructing large-scale communities on the existing urban fringe, and offering new, lower-cost residential housing. This trend in development has created significant growth in formerly rural areas of Maricopa County and adjacent Pinal County. Such development places increasing demands on existing transportation routes, and creates the need for new transportation corridors that provide regional connectivity between metropolitan Phoenix and the outer peripheral areas. Aside from the immediate MAG Region, and Pinal County, significant increases in population are also anticipated in adjacent Yavapai County over the next several decades. As displayed by Figure 16-1, the growth of population of Arizona in may require a network of additional and enhanced transportation corridors and transit options to ensure mobility and connectivity from one region of the State to another. A total population of approximately 16

# 2010 Update Regional Transportation Plan

Fig. 16-1



## Arizona's Future 2050: 16 Million People



- POPULATION
  - FREEWAY
  - MAJOR ROAD
  - COUNTY
- OWNERSHIP**
- PRIVATE AND STATE TRUST
  - BLM
  - INDIAN COMMUNITY
  - FOREST, PARK, MONUMENT
  - MILITARY



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million is projected for Arizona by 2050, which will require creative financing options and engineering solutions for additional transportation infrastructure and services.

### **Interagency Coordination**

The recent and projected population growth throughout the Maricopa County, Central Arizona and other areas of the State is fostering the need for effective, ongoing cooperation and coordination among Councils of Government and Arizona counties. Since the formation of the Maricopa Association of Governments (MAG) in 1967, the agency has continually reached out maintain a dialogue with other agencies, counties and communities throughout Arizona on a variety of issues and common interests. Beginning in the early 1980s, the MAG Executive Director has served as an active member of the Arizona COG Directors Association, which was established for the purpose of fostering communication and ensuring coordinated planning efforts among Arizona's Councils of Governments. MAG has used this association, as well as individual one-on-one sessions, to coordinate with other regions on a variety of regional, State and Federal programs, including human service, land use, environmental, and transportation planning issues of concern. MAG also maintains discussions with other Councils of Governments and similar organizations throughout the United States concerning common transportation issues and Federal policies.

This interagency dialogue has been crucial in order to effectively assess congestion issues, evaluate key transportation needs, and identify funding options for the construction of future transportation corridors to address regional and statewide connectivity. As part of this effort, MAG has developed study partnerships with the Central Arizona Association of Governments (CAAG), the Pima Association of Governments (PAG), and their member agencies. These studies are assessing transportation needs in southeastern and southwestern Maricopa County and northern Pinal County. Another example has been coordination on data collection and population forecasting covering Maricopa, Pinal and Pima Counties. MAG has also initiated discussions with Yavapai County, which is a member of the Northern Arizona Council of Governments. MAG and Yavapai County will discuss a framework study to address transportation needs and connectivity issues between Maricopa and Yavapai counties. These cooperative efforts have also involved the Arizona Department of Transportation (ADOT) and the Federal Highway Administration (FHWA).

### **Modal and Area Transportation Studies**

Modal and area transportation planning studies play a key part in the overall MAG transportation planning process. These studies provide the opportunity to assess growth and resulting transportation needs that are not identified in the current RTP. The study findings provide detailed information for a specified geographic area or modal facility system, and identify potential new RTP elements for consideration in the decision-making process. As noted above, these studies often cover multi-county areas and include the participation of other COGs and agencies outside of Maricopa County, as well as State and Federal agencies.

### **Southeast Maricopa/Northern Pinal County Area Transportation Study**

Completed during 2002, the Southeast Maricopa/Northern Pinal County Area Transportation Study (SEMNPTS) was initiated in an effort to develop inter-county planning; document the transportation relationships between Maricopa and Pinal Counties; examine the long-range

transportation needs of the study area between the two counties; and identify projects to address the area's primary transportation needs. The study represented an opportunity for joint cooperation between Maricopa and Pinal Counties, and reinforced the dialogue between both areas to identify shared, regional transportation issues and concerns. The findings and recommendations of the SEMPTS were considered in the development of the MAG RTP, provided input for the Pinal County Transportation Plan, and identified the major corridors for the ADOT Pinal County Corridor Definition Studies.

### **ADOT Pinal Corridors Studies**

As an outgrowth of the SEMPTS, during September of 2004 the Arizona Department of Transportation (ADOT) initiated a total of three corridor studies within Pinal County, in areas located adjacent to the MAG Region. These studies involved the US 60 Corridor Definition Study, the Williams Gateway Corridor Definition Study, and the Pinal County Corridors Definition Study. The ADOT corridor studies assessed overall need and feasibility, and identified general locations for the development of high-capacity roadways within the study area. The precise location of any potential new roadways would be determined by future studies.

At its February 2006 meeting, the State Transportation Board approved the adoption of the recommendations of the three Corridor Definition Studies into the MoveAZ (Move Arizona) long-range statewide plan. While no funding was identified for the purchase of right-of-way or for the construction of the recommended corridors, inclusion in MoveAZ allowed for the funding of further studies that would identify the actual alignments of the potential new roadways.

### **Interstate 10 /Hassayampa Valley Transportation Framework Study**

On February 27, 2008 the MAG Regional Council accepted the findings of the Interstate 10 / Hassayampa Valley Transportation Framework Study. MAG, in association with ADOT, the Maricopa County Department of Transportation, the Town of Buckeye, and the Cities of Goodyear and Surprise, funded and developed the study. The study began in May 2006 for an area bounded by SR-74 on the north, SR-303L on the east, the Gila River on the south, and 459th Avenue on the west.

The action to accept the study included: (1) accept the findings of the Interstate 10-Hassayampa Valley Transportation Framework Study as the surface and public transportation framework for the Hassayampa Valley; (2) adopt the traffic interchange locations for the Interstate 10/Papago Freeway from SR-303L/Estrella Freeway to 459th Avenue, (3) adopt a two-mile traffic interchange spacing policy for new freeway facilities within the Hassayampa Valley with appropriate planning for non-access crossings of the freeway facilities to facilitate local transportation movements; (4) adopt a new functional classification as a parkway, recognizing the Arizona Parkway as a type of parkway with unique operating characteristics for congestion and air quality planning purposes; (5) accept the findings and implementation strategies as described in the study for inclusion as illustrative corridors in the Regional Transportation Plan; and (6) recommend the affected jurisdictions within the Hassayampa Valley study area incorporate this study's recommendations into future updates of their general plans.

While the study provides a significant milestone in transportation planning for the Hassayampa Valley, the recommendations are not funded. Therefore, the Regional Council was requested to accept the study's findings versus adopting them. In taking this action, the planning process can be moved forward in an illustrative manner, thereby providing guidance to MAG and the affected agencies in the Hassayampa Valley for future activities, including updates to the Regional Transportation Plan.

### **Interstates 8 and 10 - Hidden Valley Transportation Framework Study**

On September 30, 2009, the MAG Regional Council accepted the findings of the Interstate 10 / Hassayampa Valley Transportation Framework Study. This is a joint study including MAG, the Central Arizona Association of Governments, county and local jurisdictions in Maricopa and Pinal Counties, ADOT and FHWA. The study began in 2006 and covers portions of both Maricopa and Pinal Counties, and is generally bounded by: Overfield Road on the east, I-8 on the south, 459<sup>th</sup> Avenue on the west, and the Gila River and/or the north boundary of the Gila River Indian Community on the north.

The action to accept the study included: (1) accept the findings of the Interstates 8 and 10 –Hidden Valley Transportation Framework Study as the surface and public transportation framework for the Hidden Valley area of the MAG region that is bounded by the Gila River on the north, SR-87 and Pinal County on the east, the Tohono O’Odham Indian Community and the Barry Goldwater Range on the south, and 459<sup>th</sup> Avenue on the west; (2) adopt a two-mile traffic interchange spacing policy for new freeway facilities within the Hidden Valley area with appropriate planning for non-access crossings of the freeway facilities to facilitate local transportation movements; (3) accept the findings and implementation strategies as described in the study for inclusion as long-range unfunded illustrative corridors in the Regional Transportation Plan; (4) recommend the affected jurisdictions within the Hidden Valley study area incorporate this study's recommendations into future updates of their general plans; and (5) coordinate this acceptance with the tribal councils of the Gila River and Ak Chin Indian Communities.

As with the Hassayampa Valley Study, it is recognized that most of the study recommendations are not funded. Therefore, the Regional Council was requested to accept the study's findings versus adopting them. However, in taking this action, the planning process can be moved forward in an illustrative manner, providing transportation planning guidance to MAG, ADOT, CAAG, Maricopa County, Pinal County Department of Public Works, the Town of Buckeye, the Cities of Goodyear, Maricopa, and Casa Grande, and the Federal Highway Administration.

### **Hassayampa Transportation Framework Study for the Wickenburg Area**

The Hassayampa Transportation Framework Study for the Wickenburg Area covers the northwest part of Maricopa County, from approximately the SR-74/Carefree Highway alignment to the south, encompassing the Town of Wickenburg planning area, north to the US-93/SR-71 junction, 459<sup>th</sup> Avenue to the west, and to the extension of the proposed Turner Parkway (267<sup>th</sup> Avenue) to the east. The study area includes the northern planning area of the Town of Buckeye, the Town of Wickenburg planning area, the portions of the City of Surprise, and unincorporated areas in Maricopa and Yavapai Counties. This study will develop a transportation framework for the study

area that will ultimately be implemented at multiple jurisdictional levels. The project is estimated to take twelve months and is anticipated to begin in the summer of 2009.

### **Central Phoenix Transportation Framework Study**

The Central Phoenix Transportation Framework Study aims to developed a multi-modal, transportation framework for the area approximately bounded by Northern Avenue on the north, the SR-143/Hohokam Expressway (projected northward) on the east, the South Mountain Freeway on the south, and 75<sup>th</sup> Avenue on the west. The study will establish a blueprint for future transportation investment decisions to improve mobility along Interstate 10, Interstate 17, SR-51, Loop 202, key arterials streets and proposed corridors in the RTP. While the major beneficiary of the study effort will be the core of the Phoenix urban area, the framework resulting from the study will enhance transportation in and out of the region's primary economic center, guiding decision-making affecting the entire MAG area. It is anticipated that the study will be underway in early FY 2010.

### **MAG Commuter Rail Studies**

It should be noted that the RTP does not include funding to build and operate commuter rail in the MAG region. Generally, regional forecasts indicate that population densities sufficient to warrant an investment in commuter rail may not occur within the twenty year planning horizon. However, recognizing that population growth and economic conditions may evolve differently than currently projected, the RTP allocates funding to continue developing commuter rail concepts for the region.

- **Commuter Rail Strategic Plan** - On April 23, 2008, the MAG Regional Council accepted the findings of the MAG Commuter Rail Strategic Plan. MAG launched the commuter rail strategic planning process in February 2007. The purpose of the planning process was to develop an implementation strategy for commuter rail service in Maricopa County and northern Pinal County. The strategic plan builds upon technical information from the High Capacity Transit Study and ongoing passenger rail planning by the Arizona Department of Transportation (ADOT) to provide a framework for implementing commuter rail service in the MAG region.

The action by the Regional Council included accepting the findings of the Commuter Rail Strategic Plan as the guiding implementation framework for commuter rail, and for MAG to proceed with the first four implementation steps identified on page nine of the Executive Summary: 1) Ongoing Coordination; 2) Union Pacific Passenger Rail Coordination; 3) Burlington Northern Santa Fe Railway Coordination; and 4) Regional Transit Planning.

- **Grand Avenue Commuter Rail Corridor Development Plan** - The purpose of this study is to determine the feasibility of implementing commuter rail service along the BNSF Phoenix Subdivision between Phoenix and Wickenburg, Arizona, a distance of approximately 54 miles. The final product will be a Corridor Development Plan that will describe the elements necessary to successfully implement commuter rail transit service in the Grand Avenue Corridor. This corridor development plan will include a review of existing documentation, ongoing public involvement, an inventory of the existing BNSF Northwest rail line, development of a conceptual commuter rail operating plan,

identification of infrastructure improvements necessary for the implementation of commuter rail service, development of capital cost estimates, and the development of annual operating cost estimates for commuter rail service. Initiated in 2008, it is anticipated that the study will be completed sometime during 2010.

- **Union Pacific/Yuma West Commuter Rail Corridor Development Plan** - The purpose of this study is to determine the feasibility of implementing commuter rail service along the Union Pacific (UP) Yuma West rail line between Buckeye in the west and either the Union Station in downtown Phoenix or to the UP Tempe Branch line in Tempe, Arizona. The final product will be a Corridor Development Plan that will describe the elements necessary to successfully implement commuter rail transit service along this corridor. The project also addresses opportunities for connections with other high capacity transit corridors, including the METRO I-10 West AA/EIS currently being studied in the MAG region. This corridor development plan will include a review of existing documentation, ongoing public involvement, an inventory of the existing Union Pacific West rail line, development of a conceptual commuter rail operating plan, identification of infrastructure improvements necessary for the implementation of commuter rail service, development of capital cost estimates, and the development of annual operating cost estimates for commuter rail service. Initiated in 2009, it is anticipated that the study will be completed sometime during 2010.
- **MAG Commuter Rail System Plan** - The purpose of this study is to evaluate commuter rail options for the MAG region and the potential connecting routes immediately adjacent to the MAG region. The study will establish priorities for implementing commuter rail service through an evaluation of ridership potential, operating strategies, and associated capital and operating costs. All existing freight corridors and possible rail extension areas identified in the Commuter Rail Strategic Plan will be evaluated as part of the study. This system plan will include a review of existing documentation, ongoing public involvement, an inventory of the existing BNSF and UPRR rail lines, potential extension corridors, development of a conceptual commuter rail operating plan, identification of infrastructure improvements necessary for the implementation of commuter rail service, development of capital cost estimates, and the development of annual operating cost estimates for commuter rail service. Initiated in 2009, it is anticipated that the study will be completed sometime during 2010.
- **Phoenix-Tucson Commuter Rail Study** - In addition to the MAG studies described above, it is anticipated that during FY 2010 ADOT will initiate a Phoenix-Tucson Regional Passenger Rail Service/Commuter Rail Study, in which MAG will participate. This study will include an EIS/Alternatives Analysis component and will assess the potential for passenger rail service between Phoenix and Tucson.

### **MAG Regional Transit Framework Study**

On March 31, 2010, the MAG Regional Council accepted the Illustrative Transit Corridors map in the Regional Transit Framework Study for inclusion as unfunded regional transit illustrative corridors in the RTP. In addition, the future planning actions identified in the study were accepted for consideration through the MAG Unified Planning Work Program process.

Initiated in 2008, the MAG Regional Transit Framework Study (RTFS) provides a needs-based planning process for identifying and prioritizing regional transit improvements that will supplement the existing RTP through year 2030, with consideration for even longer range transportation needs through year 2050. The planning process has included a technical approach to identify future travel demand and travel markets through an analysis of future growth patterns. Specific markets were identified through a technical evaluation of high-demand travel markets and an understanding of traveler behavior. It included the technical analyses of land use, socioeconomic conditions, existing and planned transit service, and infrastructure, along with the stated customer preference attributes, identified public transit needs, deficiencies, opportunities and constraints within the region.

### **Valley Metro/Regional Public Transportation Authority (RPTA) Studies**

Valley Metro/RPTA has contracted with several consulting firms to conduct a number of studies that are designed to assist in the implementation of the agency's 20-year transit program. Work to be completed on the planning studies will define the operational and capital requirements of transit investments that were originally identified and approved by Maricopa County voters during 2004, as part of Proposition 400.

The discussion below covers study efforts related to bus and rail services that may lead to recommendations or projects for incorporation into a future update of the MAG RTP.

- **Regional Dial-a-Ride Implementation** - Short range and operational planning associated with the implementation of the recommendations of the Regional Paratransit Study including development of the regional call center, and drafting of required intergovernmental agreements necessary to implementing a regional ADA Paratransit program.
- **Annual Update of the Short Range Transportation Program** - Required under Prop 400. Defines/refines the first five years of the TLCP operating and capital programs. Includes modifications to operating program developed in response to system and route performance data from TPR. Coordinates with development of the transit element of the Transportation Improvement Program (TIP).
- **Mesa Main Street Metro Link (Bus Rapid Transit) Implementation** - The project has moved into the final design/construction phase with construction related tasks beginning January 5, 2009. The LINK bus service began service on December 27, 2008 concurrent with the start of METRO Light Rail Transit (LRT) service. LINK buses are currently using temporary stops and will do so until the construction project is complete and the new stations are put into service. LINK bus service is supplemented by Route 40 Supergrid service which operates in the same corridor. The LINK operates as a limited stop service with stations every mile. In this respect it resembles the LRT service to which it connects. It is anticipated all LINK stations will be in service by the end of December 2009.
- **Arizona Avenue Metro Link (Bus Rapid Transit) Implementation** - Following the completion of the Design Concept Report (DCR) for this corridor the project moved into final design/construction phase. A contractor and construction management team have been procured and construction of right of way and station improvements will begin in early 2010. Planned start of service on this corridor is late July of 2010. This project has been

selected for Federal funding through the America Recovery and Reinvestment Act (ARRA) stimulus grant program.

- **Database Development Services for Web-Based reporting and monitoring of Valley Metro Performance Indices** - The Service Efficiency and Effectiveness study aimed to determine overall performance of current bus service offerings through a detailed analysis of performance factors. A recommendation of this study was the development of a Web-Based reporting tool to facilitate a timely and consistent reporting of performance data by all of Valley Metro members who operate service. The collection of this data is crucial to the effective monitoring of operational investments that are being implemented with funding from Proposition 400 and will be utilized by the independent performance audit of the transit system which will occur in 2010. This data collection will also insure that Valley Metro/RPTA is prepared for the State Performance Audits required under Prop 400. A software vendor under contract with Valley Metro/RPTA has developed a web-based reporting tool that will be accessible to agency staff and to member agencies. Pre-rollout testing of the software has been concluded and activation of the reporting tool occurred in July of 2009. As part of the reporting tool rollout, agency staff hosted an interagency training session on the software and distributed manuals. The reporting tool will allow the agency to produce both quarterly and annual reports on regional transit performance.
- **Park-and-Ride/Transit Center Environmental Assessment and Site Selection** - The Park-and-Ride/Transit Center Environmental Assessment and Site Selection project objective is to assist local municipalities that are developing passenger facilities. This effort will include: a) determining site selection criteria; b) identifying potential locations; c) recommending a preferred site; d) determining the appropriate level of environmental analysis required; e) performing environmental research and technical studies, as appropriate; f) assisting with presentation of materials and gathering input from the public, as well as municipal staff, local councils, and elected officials; and g) preparing environmental documents for submittal to the regional designated recipient of Federal funds and the Federal Transit Administration.
- **Origination and Destination Survey (O&D Survey)** - The purpose of the origin and destination survey of passengers on-board Valley Metro fixed transit routes is to collect data about passenger travel patterns. The data collected from this study is being used to update travel pattern data to calibrate and validate the Regional Travel Demand Model, and also for air quality forecasting and long range planning by the Maricopa Association of Governments. The on-board survey was conducted in fall 2007 with data cleaning, trip table development, final survey report development, and MAG model calibration occurring in 2008. The O&D Survey also serves as the “before” survey for the Central Phoenix-East Valley Light Rail Transit Line, which is partially funded through a New Starts capital grant from the Federal Transit Administration. Planning for an “after” survey to occur in fall of 2010 or spring of 2011 is currently underway. The “after” survey is a component of the “after study” on the METRO light rail transit project which is required of all New Starts funded high capacity transit projects.
- **Scottsdale Road Park-and-Ride Lot** - This project will address the planning and engineering studies leading up to the construction of a park-and-ride lot in the vicinity of

Scottsdale Road and Loop 101. Site selection and the development of a categorical exclusion were conducted in the first phase of this effort with final design and construction to follow. This project has been selected for American Recovery and Reinvestment Act (ARRA) Stimulus grant funding.

- **Scottsdale/Rural Alternatives Analysis (AA)** - This study will define the mode and alignment for Scottsdale/Rural Bus Rapid Transit (BRT) line that will operate in the cities of Scottsdale, Tempe and the Chandler. It is anticipated that the study will get underway in early 2010.
- **Regional Bus Stop Database** - This project involves the development of a comprehensive geo-coded database of all bus and rail passenger stops in Maricopa County. The database will enable full functionality of trip planning software, including real time bus arrival information via Nextbus cell phone interface.

In addition to the bus service studies discussed above, Valley Metro Rail, Inc. (METRO) has a number of planning studies either in process or on the horizon for FY2010. A list of the more extensive planning efforts are described below.

- **Central Mesa Environmental Assessment/Preliminary Design** - METRO has completed the alternative analysis of the Central Mesa Corridor with the adoption of a locally preferred alignment the Mesa City Council, the METRO Board of Directors and MAG. The next step in the process is to prepare Draft Environmental Assessment (EA), New Starts Report, and an Economic Market Study for the Central Mesa High Capacity Transit Corridor. Preliminary design for the Locally Preferred Alternative is expected to begin in FY 10.
- **Tempe South EIS/Preliminary Design** - METRO anticipates concluding the alternative analysis of the South Tempe Corridor in the Spring of 2010. After the adoption of the locally preferred alternative, the next step in the process will be to prepare Draft Environmental Impact Statement (DEIS), New Starts Report, and an Economic Market Study for the Tempe South High Capacity Transit Corridor. This would be followed by begin preliminary design and the Final Environmental Impact Statement (FEIS) for the Locally Preferred Alternative.
- **Phoenix West (formerly I-10 West) DEIS** - In winter 2009, METRO expects to conclude the alternative analysis for the I-10 West Corridor. Once the locally preferred alternative is adopted, work will begin on developing the Draft Environmental Impact Statement (DEIS), New Starts Report, and an Economic Market Study for the I-10 West High Capacity Transit Corridor.
- **Glendale AA** - METRO expects to begin an Alternative Analysis (AA) for the Glendale High Capacity Transit Corridor. The initial phase of the AA will include an evaluation of two corridor options and a preliminary assessment of alignment opportunities in each corridor. The outcome of the initial phase will be the selection of a priority corridor to develop.

- **Transit System Configuration Study, Phase III** - METRO is finalizing Phase II of the Configuration study. Once this effort is completed, it is anticipated that analysis of the support infrastructure requirements associated with the development of the 57-mile high capacity/light rail transit system may begin. This will include recommendations regarding features such as upgrades to the power supply, signal systems, and parking requirements. As various High Capacity Transit Corridor Alternative Analyses are completed, further refinement to the LRT system configuration will be analyzed.
- **TOD Support** - METRO provides on-going assistance to member cities with technical support in community education on transit-oriented development (TOD). Assistance is provided through TOD workshops and visual representation of example TOD sites. METRO anticipates that TOD assistance will be provided to the City of Peoria once the MAG Regional Transit Framework Study and the Grand Avenue Commuter Rail Development Plan are complete.

### **Illustrative Corridors/Projects**

The transportation studies discussed in the previous sections represent collaborative efforts between MAG and other agencies, communities, counties and regions, and have implications for the extended planning effort beyond the currently adopted MAG RTP. Given the current and expected continuing population growth in the MAG Region, these studies provide a perspective on future transportation needs, which is essential for effective long range planning. Their findings and recommendations identify potential new corridors or other transportation improvements that can be considered in future updates of the RTP. One approach to identifying potential new corridors/projects or other transportation improvements that might be considered for inclusion in future updates of the RTP is the concept of illustrative projects.

### **Illustrative Corridor/Project Concept**

Federal regulations for metropolitan transportation planning identify the concept of “illustrative projects” as an element of the planning process. These are projects that could potentially be included in the plan, if additional resources beyond the reasonably available financial resources identified in the plan were available. They are discussed in the metropolitan transportation plan for illustrative purposes only, and are not included in the financial plan or air quality conformity determination. There is no requirement to select any project from an illustrative list of projects in a metropolitan transportation plan at some future date, when funding might become available. In addition, no priorities are stated or implied by inclusion as an illustrative corridor.

An illustrative project may not be needed until after the planning horizon of the RTP. However, illustrative projects can be helpful in guiding transportation and land use planning efforts at both the regional and local level, even though funding for the projects has not yet been identified. This would be especially applicable to making provisions for the development of potential future transportation facilities in municipal general plans. In addition, including an illustrative regional transportation project provides the project sponsor with support in seeking funding from other sources to implement the project, since the project has been vetted through a planning study or process and through MAG.

An illustrative project must be identified through a transportation planning process such as a framework study, corridor or modal analysis, or other similar transportation studies. The illustrative project must be for a regionally significant project and is a corridor or link in the regional transportation system that enhances mobility in the region. The inclusion of an illustrative project in the Regional Transportation Plan does not imply in any way that the project has priority for future funding over other illustrative projects in the RTP or future projects yet to be identified. The MAG Regional Council, acting on a recommendation from the Transportation Policy Committee, can add or delete an illustrative project in the MAG Regional Transportation Plan.

The illustrative corridors/projects included in the Regional Transportation Plan - 2010 Update are discussed below.

### **Interstate 10/Hassayampa Valley Transportation Framework Study**

On February 27, 2008, the MAG Regional Council accepted the findings of the Interstate 10/Hassayampa Valley Transportation Framework Study. A key aspect of this action was to accept the findings and implementation strategies as described in the study for inclusion as illustrative corridors in the Regional Transportation Plan.

In taking this action, it was recognized that the study recommendations are not funded. Figure 16-2 depicts the illustrative corridors recommended by this study, which includes potential freeway facilities, parkway facilities, interchanges, and high capacity transit corridors.

### **Interstates 8 and 10/ Hidden Valley Transportation Framework Study**

On September 30, 2009, the MAG Regional Council accepted the findings of the Interstates 8 and 10 - Hidden Valley Transportation Framework Study. A key aspect of this action was to accept the findings and implementation strategies as described in the study for inclusion as illustrative corridors in the Regional Transportation Plan.

In taking this action, it was recognized that the study recommendations are largely unfunded. Figure 16-3 depicts the illustrative corridors recommended by this study, which includes potential freeway facilities, parkway facilities, interchanges, and high capacity transit corridors.

### **New River Corridor**

On November 25, 2003, the Regional Council approved inclusion of a connection between Loop 303 and I-17 in the vicinity of New River Road as a corridor for further study. At that time, it was noted that funding for the New River Corridor was not included in the Regional Transportation Plan. In August 2005, the Arizona Department of Transportation completed an Alignment Selection Report, which identified a possible alignment for a potential future freeway facility in the corridor. Consistent with the Federal planning regulations promulgated by USDOT as a result of SAFETEA-LU, the status of this corridor as an illustrative corridor is being formalized in the 2010 Update. The New River Corridor is depicted in Figure 16-4.

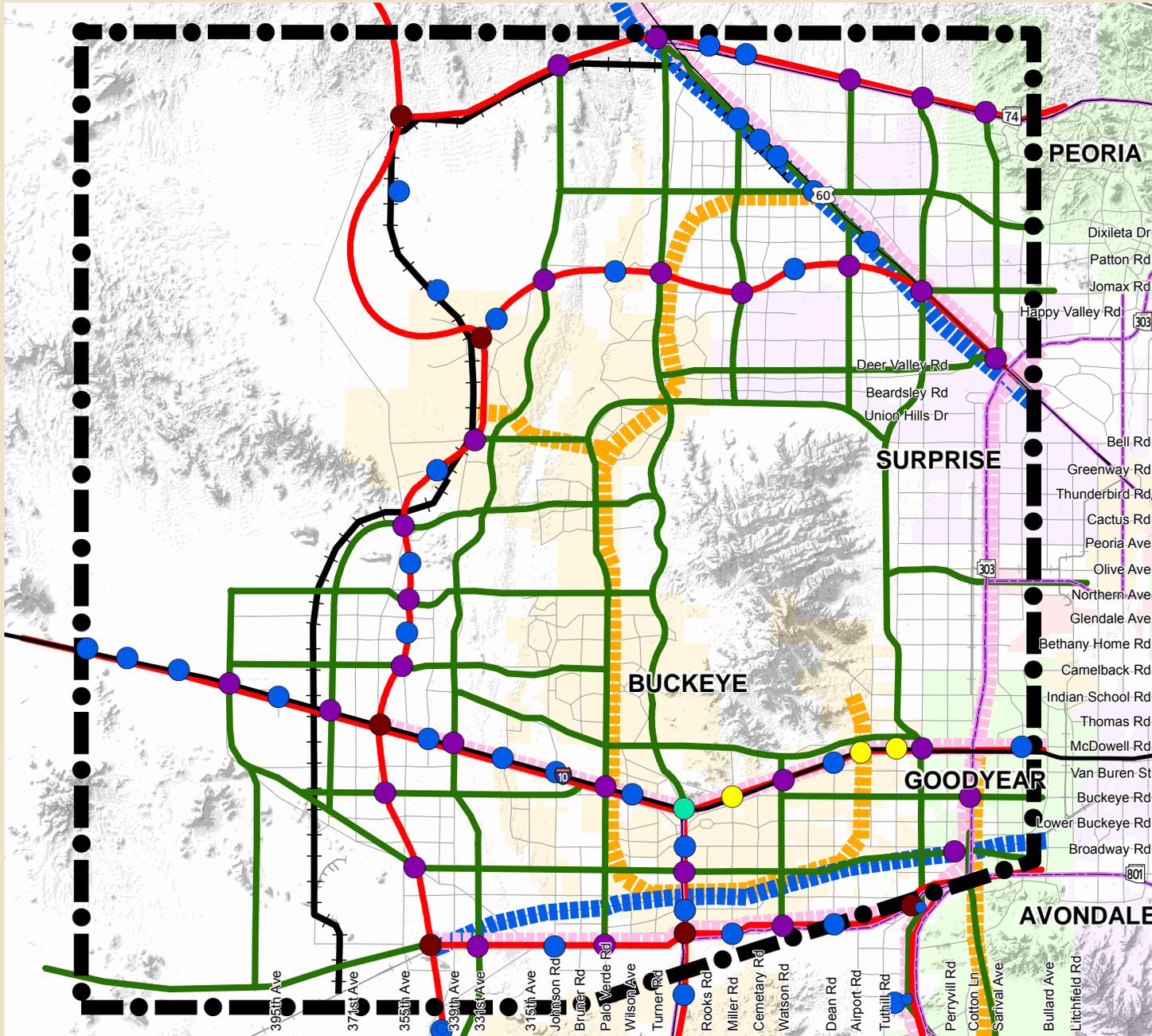
# 2010 Update Regional Transportation Plan

Fig. 16-2

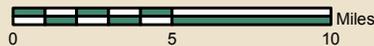


## Hassayampa Illustrative Corridors

- Study Area Boundary
- Existing Traffic Interchanges
- Illustrative Traffic Interchanges
- Existing System Interchange
- Illustrative System Interchanges
- Illustrative Parkway Traffic Interchanges
- Illustrative Freeways/Improvements
- Illustrative Parkways
- Adopted Regional Transportation Plan Facilities
- Illustrative and Adopted Bus Rapid Transit
- Illustrative High Capacity Transit (Peak Service)
- Illustrative High Capacity Community Transit
- Illustrative Freight Rail Connector
- Existing Railroads
- Existing Freeway
- Major Roads
- County Boundary



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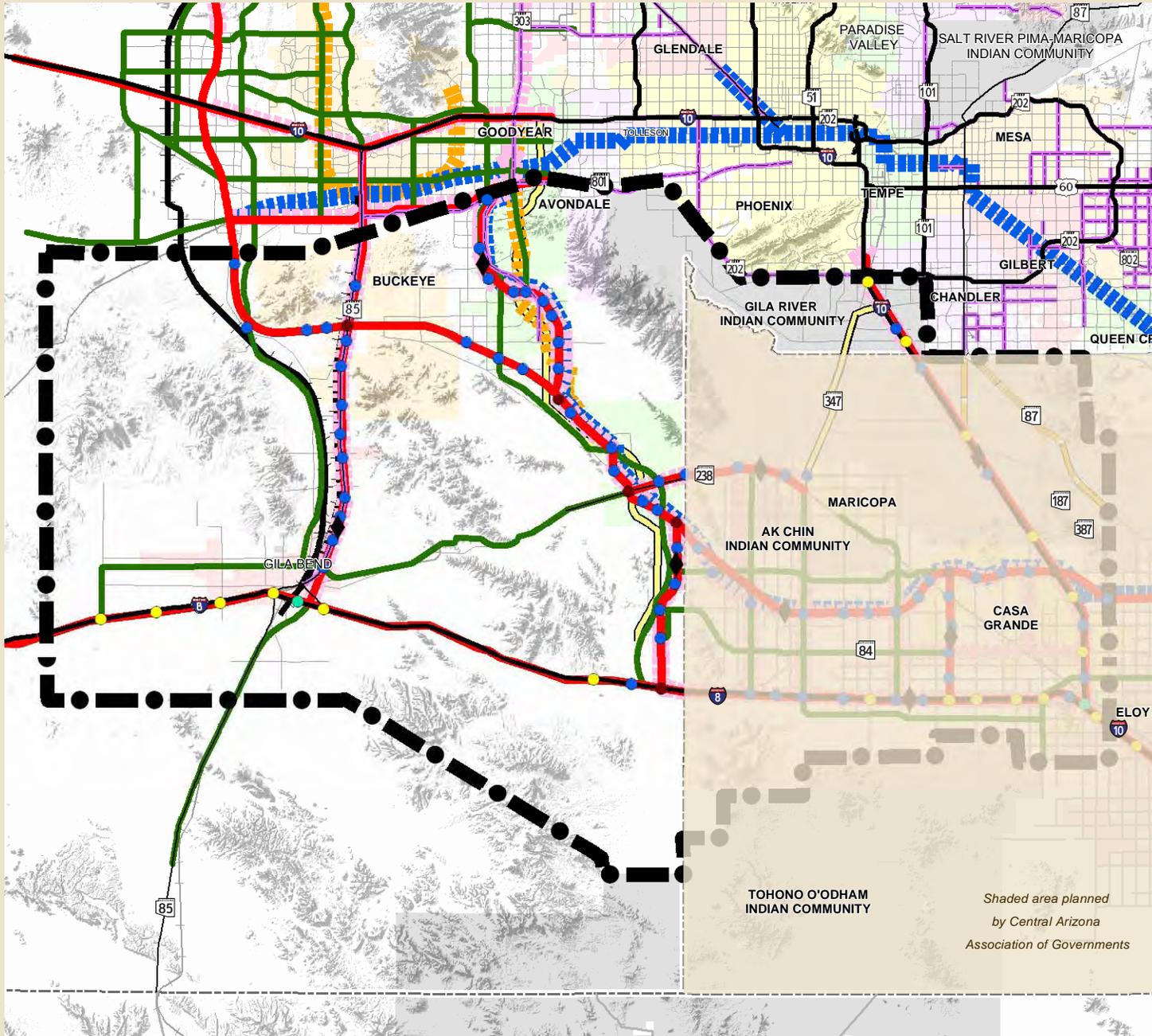
Alignments for new freeway, highway, arterial, and bridge facilities will be determined following the completion of appropriate design and environmental studies.

# 2010 Update Regional Transportation Plan Fig. 16-3



## Hidden Valley Illustrative Corridors

- Study Area Boundary
- Existing Traffic Interchange
- Illustrative Traffic Interchange
- Existing System Interchange
- Illustrative System Interchange
- Illustrative High Occupancy Vehicle Lane
- Illustrative Freeways/Improvements
- Illustrative Parkways; Scenic Parkways
- Adopted Regional Transportation Plan Facilities
- Illustrative and Adopted Bus Rapid Transit
- Illustrative High Capacity Community Transit
- Illustrative High Capacity Transit (Peak Service)
- Freight Connector
- Enhanced Transit Corridor
- Safety and Operational Improvements Corridor
- Existing Freeway
- Major Roads
- Existing Railroads
- County Boundary



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Alignments for new freeway, highway, arterial, and bridge facilities will be determined following the completion of appropriate design and environmental studies.

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## **Sky Harbor Automated Train System**

On April 22, 2009, the Regional Council approved inclusion of Stage Two of the Sky Harbor Automated Train System (Sky Train) as an illustrative project in the RTP. The Sky Train is a fully automated, grade separated transit system that will connect the major facilities at Sky Harbor International Airport with the Metro light rail transit (LRT) system. Stage One of the project extends from the LRT station at 44<sup>th</sup> St. to Airport Terminal Four. Stage Two is planned to link the remaining airport terminals with the rental car center. On June 24, 2009, the Regional Council amended the FY 2008-2012 MAG Transportation Improvement Program (TIP) and Regional Transportation Plan (RTP) - 2007 Update to include Stage One.

## **Central Mesa Light Rail Transit - Phase II**

On September 30, 2009, the MAG Regional Council approved a recommendation for extension of the Central Mesa Light Rail Transit (LRT) Corridor on Main Street to approximately Gilbert Road, and to improve service frequency on the Main Street LINK Bus Rapid Transit to match the LRT, as illustrative projects in the Regional Transportation Plan.

## **Regional Transit Framework Study**

On March 31, 2010, the MAG Regional Council accepted the Illustrative Transit Corridors map in the Regional Transit Framework Study for inclusion as unfunded regional transit illustrative corridors in the RTP. In addition, the future planning actions identified in the study were accepted for consideration through the MAG Unified Planning Work Program process. Figure 16-5 depicts the illustrative corridors recommended by this study, which include all-day and peak period high capacity transit, and arterial bus rapid transit.

## **Tempe South Alternatives Analysis**

On December 8, 2010, the MAG Regional Council approved a recommendation for inclusion of a potential future phase of modern streetcar east along Southern Avenue to Rural Road, as an illustrative transit corridor in the MAG Regional Transportation Plan.

## **Potential Improvements to the Existing Freeway/Highway System**

Certain additional projects to improve the existing freeway/highway system have been identified as a result of various ADOT corridor and design concept studies. These illustrative projects are:

- **SR-85 (I-10 to I-8)** - Upgrading SR-85 to a full freeway, including construction of a fully directional interchange at I-8.
- **I-10 (SR-101L/Agua Fria to I-17)** - Capacity improvements after completion of the I-10/SR-202L interchange and possible enhancements to the I-10 “Stack”.
- **101L/Agua Fria (HOV Ramps at Maryland Overpass)** - Construction of direct connection HOV ramps from 101L to the Maryland Overpass.

## Projects in Formerly 2003 Plan

Certain freeway/highway and bus route projects that were originally identified during the 2003 planning process have been moved beyond the current planning period of the RTP (FY 2011 - 2031). To ensure that these projects will continue to be considered in future planning efforts, they are being included in the 2010 RTP Update as illustrative projects. These illustrative projects are:

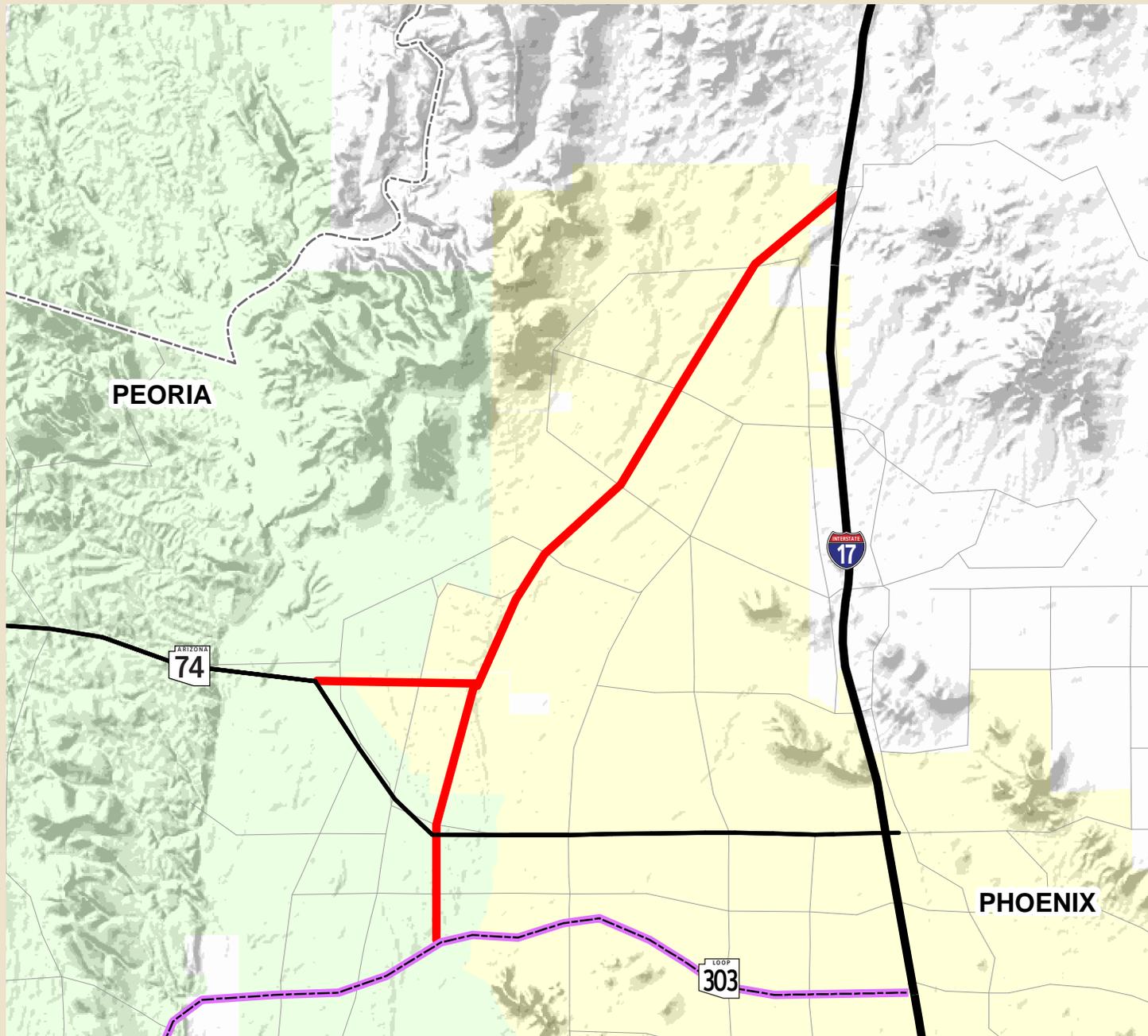
- **SR-101L (Agua Fria Freeway)** - Installation of direct HOV ramps at the system interchanges with I-17 and I-10.
- **I-10 (SR-51 to 32<sup>nd</sup> St.)** - Extension of the local/express lane concept north from 32<sup>nd</sup> St. to the SR-51/SR-202L/I-10 interchange.
- **Chandler Blvd. LINK** - Arterial Bus Rapid Transit service extending from Phoenix/Mesa Gateway Airport and ASU East Campus to I-10 via Chandler Blvd.
- **Litchfield Rd. Super Grid Route** - Regional Super Grid bus service extending from Lower Buckeye Rd./Goodyear Airport to 128<sup>th</sup> Ave. and R.H. Johnson Blvd. via Litchfield Rd.

# 2010 Update Regional Transportation Plan

Fig. 16-4



## New River Illustrative Corridors



- Illustrative Freeway Corridor
- Future Regional Transportation Plan Freeway
- Existing Freeway
- Highways
- Major Roads

*Alignments for new freeway, highway, arterial, and bridge facilities will be determined following the completion of appropriate design and environmental studies.*



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# 2010 Update Regional Transportation Plan Fig. 16-5

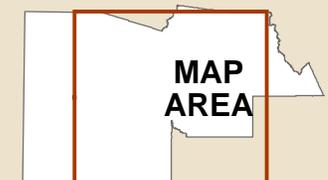


## Illustrative Transit Corridors

- Initial 20-mile Light Rail Segment
- Adopted High Capacity Transit Corridors (RTP Funded) \*
- Adopted Arterial Bus Rapid Transit (RTP Funded) \*
- Illustrative Modern Streetcar Transit
- Illustrative High Capacity Transit (All-day Service) \*\*
- Illustrative High Capacity Transit (Peak Service) \*\*
- Illustrative Arterial Bus Rapid Transit \*\*
- Freeways
- Highways
- Other Roads
- County Boundary

\* RTP funding based on estimates of reasonably available revenues (2011-2031)

\*\* Illustrative corridors do not have funding identified in the RTP



**MAP  
AREA**

Regional transportation facilities in Pinal County are planned by the Central Arizona Association of Governments (CAAG).

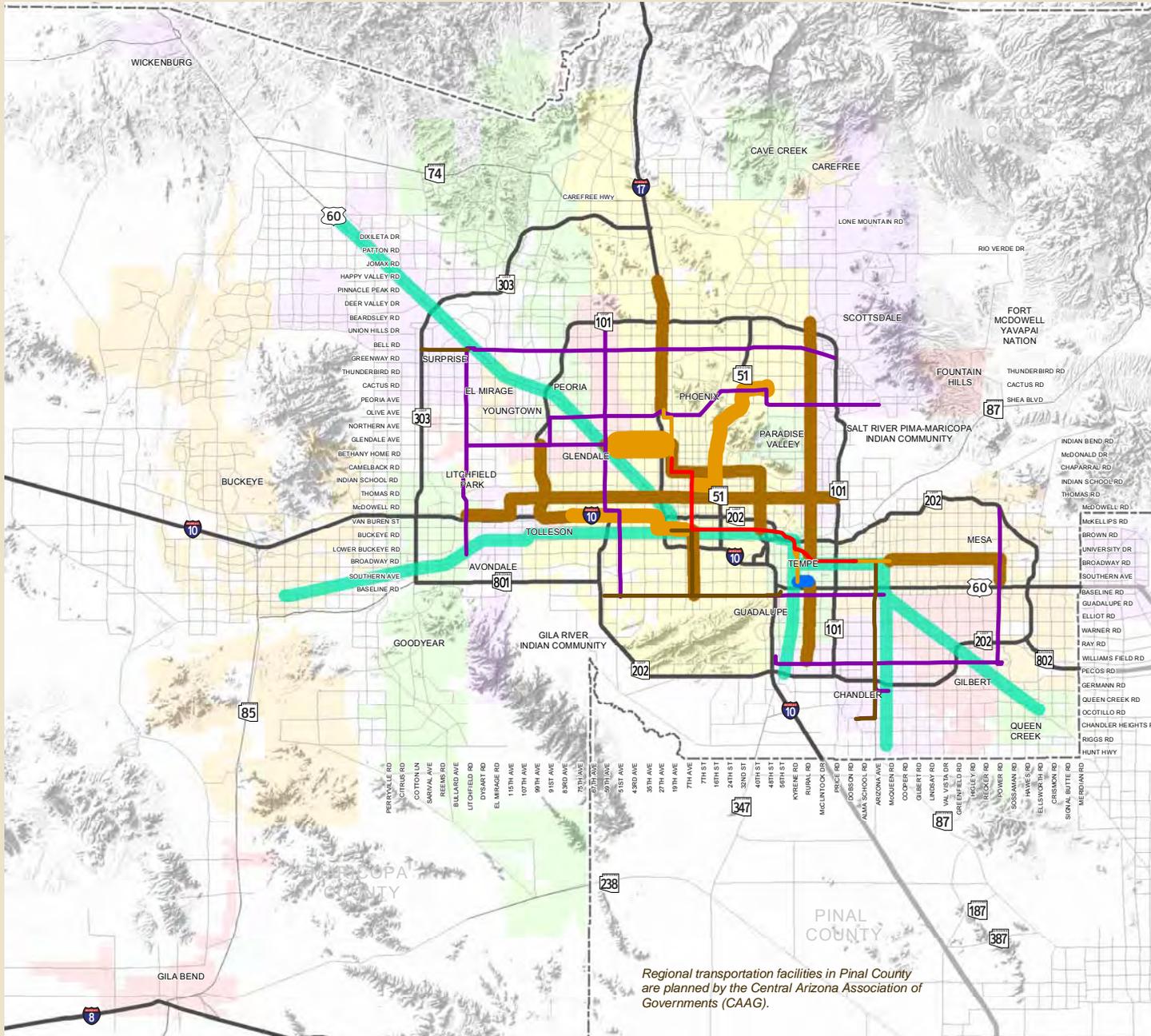


Alignments for new freeway, highway, arterial, and light rail/high capacity transit facilities will be determined following the completion of appropriate design and environmental studies.

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**SECTION THREE**

**SYSTEMS MANAGEMENT AND  
OPERATIONS**

## CHAPTER SEVENTEEN

### SYSTEMS MANAGEMENT AND OPERATIONS

Systems Management and Operations (SM&O) in the context of regional transportation refers to a regionally integrated approach that continuously strives to optimize the performance of the multimodal transportation system. This is accomplished through multi-modal, cross-jurisdictional systems, services, and projects. These systems, services, and projects are designed to preserve capacity and improve safety, security, and reliability of the transportation system. Implementation of SM&O programs help accommodate the safe and efficient movement of people and vehicles within the transportation system. The full spectrum of transportation technology applications, known as Intelligent Transportation Systems, now forms the basis for all of these programs.

#### **Intelligent Transportation Systems (ITS)**

Intelligent Transportation Systems, or ITS, involve the application of advanced sensors, computers, electronics and communication technologies in an integrated manner, along with effective management strategies, to increase the safety and efficiency of the surface transportation system. The most important component of all these technologically advanced systems are the highly skilled people that help operate them in an integrated manner. The realization of full benefits from strategic investments in ITS solutions also require the commitment, support and resources for skilled personnel essential for managing and operating these complex systems at local and state agencies.

The MAG region has made a firm commitment to utilize ITS and the solutions it provides to enhance the regional transportation system, through sizeable regional investments in ITS infrastructure. These solutions involve large regional investments, as identified in this Plan, and are based on collaborative regional efforts. Except in a few instances, most regional ITS investments are directed at infrastructure improvements or technology upgrades. The ability to monitor traffic through sensors and cameras is a fundamental requirement for ITS applications. The region continues to make large investments in expanding this capability while delivering improved system management and operations.

The products and services resulting from ITS help improve safety and efficiency by:

- Collecting and transmitting information on traffic conditions and transit schedules to aid travelers before and during their trips.
- Relieving congestion by reducing the number of traffic incidents through better traffic flow coordination, detecting and clearing incidents quickly when they occur, and rerouting traffic flow.
- Providing road condition information to drivers to help them better plan their trips and reach desired destinations in a safe and efficient manner.
- Benefiting public and governmental agencies through lower costs, enhanced services and a

healthier environment for all.

- Helping people and goods move more safely and efficiently by providing information links between travelers, vehicles and infrastructure.

### **Intelligent Transportation Systems Strategic Plan**

Since 1996, MAG has taken progressive steps toward mainstreaming the development of regional ITS within the transportation planning process. All planning activities for public sector owned ITS infrastructure development in the region are currently coordinated by MAG. In April 2001 MAG approved the first comprehensive ITS Strategic Plan and ITS Architecture for the region. Oversight for this Plan was provided by a stakeholders group that consisted of members of the MAG ITS Committee and other regional transportation stakeholders. This Plan has provided direction for ITS implementation within the region. The Regional ITS Architecture (RIA), which is part of the Plan, played a direct role in the identification of ITS projects for programming in the five-year Transportation Improvement Program (TIP).

A project that would update the 2001 ITS Strategic Plan is expected to be launched in mid to late 2009. A USDOT requirement, referred to as the Rule 940, stipulates that all federally funded regional ITS projects must be consistent with a regional ITS architecture and must also include a Systems Engineering Analysis (SEA). In August 2006, FHWA and MAG jointly developed an Interim Guidance on Systems Engineering Analysis Required for ITS Projects for use by local agencies. All ITS projects launched in the MAG region by both Arizona DOT and local agencies are now expected to include a SEA. While MAG facilitates regional compliance with the USDOT Rule 940, the responsibility for oversight of this process lies with the local office of FHWA.

### **Regional ITS Architecture**

The Regional ITS Architecture (RIA) provides a common framework for planning, defining, and integrating intelligent transportation systems. It is a product that reflects the contributions of a broad cross-section of the ITS community (transportation practitioners, systems engineers, system developers, technology specialists, consultants, etc.). A comprehensive update of the RIA was performed through a project completed in February 2009. The entire RIA document is posted at the MAG website depicting many details that need to be considered during the design of future ITS projects. Local agencies have already begun using the RIA information to better define planned ITS projects at the Design Concept Report stage, thus ensuring regional compatibility and better integration in the future.

The Regional ITS Architecture defines:

- The stakeholders involved in transportation system.
- The needs of the stakeholders.
- The functions to fulfill the needs (e.g., gather traffic information).

- The physical entities or subsystems where these functions reside (e.g., the field or the vehicle).
- The information flows and data flows that connect the physical subsystems together into an integrated system.
- The standards that govern the smooth functioning of subsystems and information flows (e.g., communication standards).
- The security of all the ITS systems and information (e.g., controlled access to signal system).
- The maintenance of ITS architecture itself.

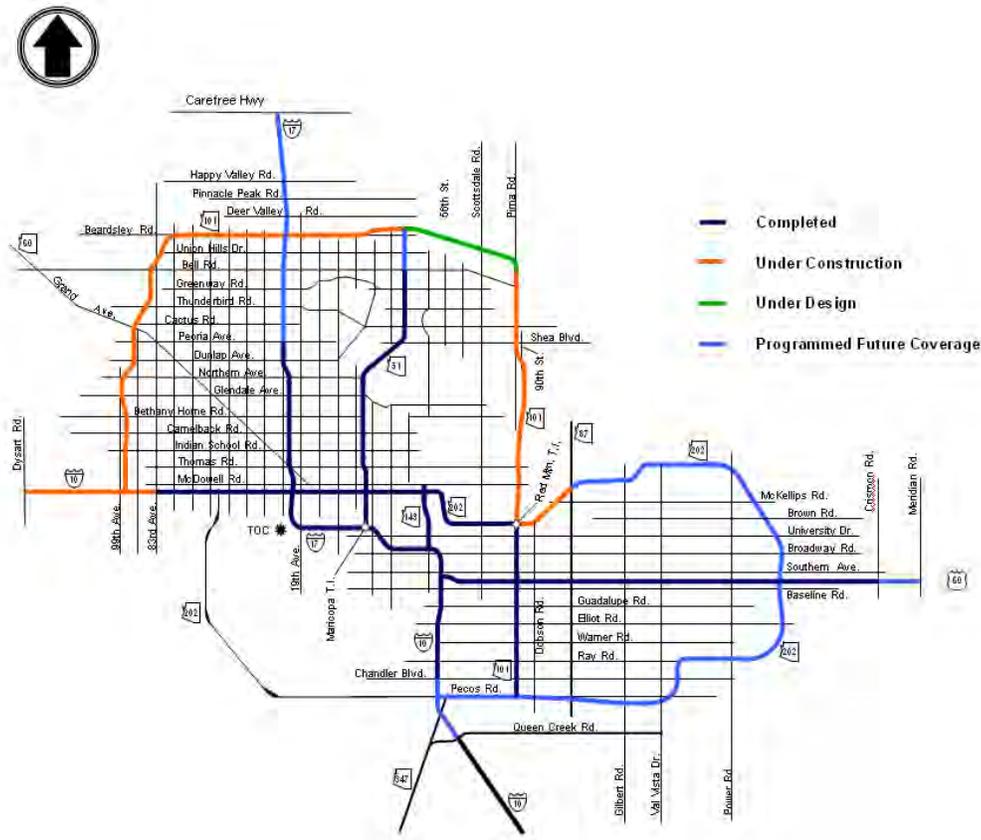
### **Freeway Management System**

The Arizona Department of Transportation (ADOT) is utilizing an integrated package of ITS strategies commonly referred to as a Freeway Management System (FMS). The regional FMS first became operational in 1996 and currently provides surveillance, incident management, travel time displays and traveler advisory functions. All FMS operations are centrally coordinated from the ADOT Traffic Operations Center (TOC) which is staffed 24 hours. The TOC also serves as a statewide emergency coordination center during freeway emergencies. Due to the critical role played by the TOC in both regional and statewide transportation operations, redundancy has been planned. A back-up function for the TOC is planned by ADOT to be installed within the City of Peoria's Traffic Management Center. One of the key functions of the FMS is dissemination of information on real-time freeway traffic conditions. This is accomplished via the real-time freeway speed map available on the internet at [www.az511.com](http://www.az511.com). This website is heavily utilized by local television and radio traffic reporters as well as members of the public to obtain freeway condition information. Information on freeway construction and major incidents is also available via the telephone based 5-1-1 traveler information system. A joint MAG-ADOT project, completed in June 2007, extended the availability of freeway condition information to the public via cellular phones and other Personal Digital Assistant devices (PDAs) with access to the internet ([www.az511.com/pda/](http://www.az511.com/pda/)). This information service provides real-time freeway speed maps and point-to-point travel times on the fully instrumented portion of the urban freeway system. In January 2008, a new service was launched to display real-time point-to-point travel times on six freeway corridors, that is generated from traffic data gathered via the FMS. During the AM peak period, travel times for in-bound traffic are shown on Dynamic Message Signs. Similarly, travel times are shown for out-bound traffic during the PM peak period. An evaluation of this real-time information service has indicated that this service is a very popular feature of the freeway system among travelers.

The coverage of the regional FMS, as of mid-2009, is approximately 100 miles. Completion of the FMS is recognized as an important priority for the region. To facilitate rapid FMS expansion, the installation of communication conduits and other basic infrastructure is included as part of all new regional freeway construction, through MAG action that predates the 2003 RTP.

A review of the FMS carried out in 2006 identified the need for increased maintenance of field devices, and the need to replace aging FMS devices, as essential for improving the overall reliability of the system. This review also identified some measures for reducing FMS costs. The new funding strategy for the allocation of RTP resources for FMS expansion is expected to significantly improve the overall performance, reliability and usefulness of the FMS. It is estimated that by 2023 the total FMS coverage of regional freeways will be approximately 225 miles. This will exclude coverage on Loop 303, Loop 202 South Mountain and the I-10 Reliever freeways. This new planned coverage will be less than the 275 miles originally identified, due to increased funding required for maintenance and instrumentation. Figure 17-1 shows the existing and projected expansion of the regional FMS based on resources allocated towards project this in the RTP.

A number of new traffic information services have been launched by private sector agencies that utilize existing information sources such as the FMS, supplemented by probe vehicle data. As a result real-time freeway speed information, beyond the current FMS coverage, is now available at websites supported by these companies. A number of state DOTs have initiated real-time traffic information services based on probe vehicle data. In partnership with ADOT, MAG will be investigating the feasibility of utilizing available probe data sources instead of fixed vehicle detectors in the future. If that proves to be feasible, the reduction in infrastructure requirements could lead to substantial savings in capital and maintenance costs. This, however, would not eliminate the need for accurate traffic data count stations and archived data to support planning.



Source: ADOT FMS Information, Feb 2009

**FIGURE 17-1 FREEWAY MANAGEMENT SYSTEM**

## Freeway Service Patrol Program

The Freeway Service Patrol (FSP) program contributes to the safe and efficient operation of the urban freeway system. The patrol vehicles are operated by civilian employees of the Department of Public Safety (DPS) that provide services as Roadside Motorist Assistants on the urban freeway system during peak traffic periods. The many services provided by the FSP include helping stranded motorists to change tires; providing emergency gasoline; and removing road debris and abandoned vehicles. The program is extremely popular with the traveling public, with over 10,000 stranded motorists helped annually by the program. Table 17-1 provides a brief summary of the services provided by the Freeway Service Patrol program in 2005 through 2008.

The current fleet of eight FSP vehicles patrol nearly 260 miles of freeway within Maricopa County and has clearly improved safety on the freeway system. A joint review of the program, carried out by MAG, ADOT and DPS in 2006, identified increased resource needs for the program to support both capital expenses and operating costs. These increases were due to factors such as increasing urban freeway mileage that needs to be patrolled by the FSP, and the need to replace aging vehicles. New FSP vehicles, as needed, and additional personnel will be funded to keep abreast of the expanding regional freeway system. The planned expansion of the FSP coverage will see the vehicle fleet double during the 20-year planning period, to be able to cover nearly 360 miles of freeway. The FSP program has been incorporated into the Regional Transportation Plan (RTP) and is currently funded with state and regional sources totaling \$21.5 million through 2026.

**TABLE 17-1**

### **SUMMARY OF FREEWAY SERVICE PATROL ASSISTANCE**

	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
Miles Driven	277599	306522	290495	426760
Assistance at Crash Scenes	637	605	541	443
Removal of Abandoned Vehicles	1016	686	533	2733
Motorists Assisted	9885	8593	11482	10327

Source: FSP Quarterly Reports, Department of Public Safety

## **Arterial ITS Program for Improved Traffic Management**

The focus of the Arterial ITS Program is to improve the management of traffic on the municipal arterial street system in the MAG region through strategic investments in essential infrastructure and regional initiatives for operational improvements. The function of managing traffic flow on arterial streets is the sole responsibility of individual jurisdictions. The coordination of traffic operations across the many jurisdictional boundaries is accomplished through on-going regional dialogue among agency staff. The dialogue on operations planning is facilitated at MAG through the ITS Committee. Detailed discussions on technical issues are held under the AZTech™ banner, an ad-hoc regional traffic management collaboration. No single agency in the region has been entrusted with the responsibility for regionwide arterial traffic operations. The more populated cities and towns in the region have installed computerized traffic management systems that are managed and operated from the agency's Traffic Management Center (TMC). A few of the newer TMCs also house local law enforcement units and serve as local emergency coordination centers. The current focus of local jurisdictions is to manage the arterial street system to maximize the levels of safety and efficiency of the entire arterial grid system. The 2001 ITS Strategic Plan identified certain high priority corridors that were referred to as "Smart Corridors". This concept expected the development of a few arterials that would operate at high efficiencies, but is no longer supported as viable concept for the arterial grid street network in the region. Instead, the current emphasis is on improving safety and improving traffic operations all across the major arterial street grid, with the emphasis given to north-south and east-west traffic flows to be determined by local operators based on actual ground conditions. A preliminary Draft Arterial ITS Plan was developed in 2006. It is anticipated that this will be incorporated in the update of the region's ITS Strategic Plan.

In 2006, a decision was made by MAG to accelerate the programmed funds for arterial ITS to the first ten years of the Plan, through 2017. This is being implemented through the acceleration of annual programming of arterial ITS projects in the MAG Transportation Improvement Program (TIP). A total of 60 arterial ITS projects have been programmed for FY 2009 through FY 2013. Funding for the implementation of arterial ITS solutions beyond 2017 is expected to be addressed in future updates of the RTP.

## **Regional Concept of Transportation Operations**

In 2003, MAG developed the Regional Concept of Transportation Operations, a high-level plan for the coordination of transportation operations in the region. This plan resulted in eleven initiatives to improve transportation operations in the region, which are led by volunteer "champions." The primary goal driving all these initiatives is to fully utilize the regional investments made in ITS infrastructure to better manage the transportation system.

## **Other Regional ITS Initiatives**

In recent years, a number of other systems and initiatives have been pursued as part of the regional ITS planning process. These include the following:

- Development of a Concept of Operations for the I-10 Integrated Corridor Management System – for mitigating the impact of a large regional freeway construction project.

- Enhancements to the Arizona 511 Road Information System.
- Regional Traffic Signal Optimization Program that provides technical assistance to local agencies for improving traffic signal operations. This includes providing assistance in obtaining the required signal timing software and providing training for agency personnel.
- Regional Archived Data Service (RADS), an archive of transportation system management data from various agencies across the region. Current information includes freeway speed detector data, Phoenix Fire Computer Aided Dispatch information, traffic signal timing data from various cities and towns

### **Advanced Public Transportation Systems**

Advanced Public Transportation Systems (APTS) are defined as advanced technology based ITS applications in public transportation. These applications are relevant to fixed route bus, paratransit, vanpool, and rail. These technologies can be used to improve passenger convenience, vehicle operations, and mechanical systems. Passenger convenience technologies directly benefit passengers through advanced traveler information, real-time schedule updates, and fare payment. Vehicle operations technologies are associated with dispatching vehicles and in-vehicle systems. Mechanical systems technologies are designed to remotely monitor the electrical and mechanical infrastructure of transit vehicles.

Over the years, Valley Metro’s Vehicle Management System (VMS) Master Plan has served as the regional guide for implementing APTS applications in the region. Full implementation of the VMS, which was completed in 2005, has resulted in an integrated system with components on 750 fixed-route buses, 200 paratransit (Dial-A-Ride) vehicles and 60 support vehicles. It also includes a Computer Aided Dispatch (CAD) system to track and manage the day-to-day operations of the region’s transit vehicle fleet. Other features and devices installed in transit vehicles include: a radio communication system; an Automatic Vehicle Location (AVL) system, which uses Global Positioning Satellite (GPS) receivers to track vehicle location; a next stop announcement system; and an automatic passenger counting system that has been installed on some transit vehicles. A bus schedule display system has been deployed, by the City of Phoenix, with 20 electronic signs providing Valley Metro RAPID riders with enhanced fixed bus schedule information at their stops. The VMS is engineered to be scalable to accommodate any future growth of the Valley Metro agencies.

All transit operations are centrally managed from the Transit Control Center (TCC). Located adjacent to the TCC is the control center dedicated to Light Rail Transit (LRT) operations.

### **Funding and Expenditure Summary**

Table 17-2 summarizes the funding dedicated to system management projects and programs, as well as the allocation of these funds. A total of \$244 million (YOE \$’s) is allocated in the RTP for system management. Specific areas to which this is applied include \$147 million for the freeway management system, \$77 million for intelligent transportation system projects on the arterial street system, and \$20 million for the freeway service patrol. It should be noted that the funding for these

programs is also included in the funding and expenditure summaries provided in the modal chapters on freeways/highways and arterial streets.

**TABLE 17-2  
SYSTEM MANAGEMENT FUNDING PLAN FY 2011 - 2031**

<b>FUNDING (Year of Expenditure \$'s in Millions)</b>	
	<b>Totals</b>
Regional Funds	
MAG Federal CMAQ	203.7
MAG Area ADOT Funds	16.7
Total Regional Funds	220.4
Local/Other Funds	
Local Sources (HURF, General Funds, Local Sales Taxes, etc.)	23.2
Total Other Funds	23.2
<b>Total Funding</b>	<b>243.6</b>
<b>EXPENDITURES (Year of Expenditure \$'s in Millions)</b>	
	<b>Totals</b>
Transportation Management Systems	
Arterial ITS Projects	77.0
Freeway Management System	146.6
Total Transportation Management Systems	223.6
Freeway Service Patrol	20.0
<b>Total Expenditures</b>	<b>243.6</b>

## **CHAPTER EIGHTEEN**

### **DEMAND MANAGEMENT**

The MAG Region benefits from a broad range of demand management techniques and programs. These programs lessen vehicular congestion by helping to reduce the number of vehicles on the roadway network and making more efficient use of existing transportation facilities. This reduction in vehicle miles of travel also helps improve air quality by decreasing the level of vehicular emissions contributing to the total amount of pollutants in the air. A number of demand management activities are utilized throughout the MAG Region.

#### **Demand Management Programs**

Transportation Demand Management (TDM) programs encourage reductions in travel demand within the transportation system. These programs promote alternative modes of travel, which include carpooling, vanpooling, transit, walking, bicycling, alternative work schedules that reduce trips, telecommuting and compressed work schedules.

#### **Rideshare Programs**

The rideshare programs support efforts to use alternative modes of transportation and work schedules throughout the MAG Region. Valley Metro conducts a variety of services, including a free carpool/vanpool on-line ride matching service; the promotion of Single-Occupancy Vehicle (SOV) alternatives; assistance to Transportation Coordinator Associations ; assistance to employers in the Maricopa County's Trip Reduction Program; administration of the Vanpool Program, and administration of the telework program. In addition, the Arizona Department of Administration's Travel Reduction Program offers carpool matching and other rideshare services to all State employees located in Maricopa County.

#### **Trip Reduction Program**

Mandated by Arizona legislation in 1988, employers with 100 or more workers at a site began participating in the Maricopa County Trip Reduction Program (TRP) in 1989. Participating employers are required to conduct an annual survey of the commuting modes of their employees, and prepare and implement a travel reduction plan to reduce the rates of single-occupancy vehicle (SOV) trips or the single occupancy vehicle miles traveled. The program was amended in July 1994 to include employers with 50 or more employees. In the summer of 1996, a special session of the legislature passed an innovative enhancement to the TRP whereby employers would be allowed to implement several new "flexibility" strategies to meet TRP goals. Under these flexibility provisions, employers have an expanded menu of measures for implementation, including reduction of business-related vehicle trips, off-peak hour commuting, reduced use of other gasoline powered equipment, and stationary source emission reductions.

#### **Vanpool Program**

The RPTA has provided vanpool service to interested commuters since 1987. Over 1.4 million passenger trips per year are made in over 380 vanpools. RPTA contracts with a third party private

vanpool firm to provide insurance, fleet services, and billing. Seeking to make the program more cost effective, Valley Metro initiated an aggressive van purchasing program using Federal Congestion Mitigation and Air Quality (CMAQ) funds to replace vendor owned vans in the vanpool fleet, and as a result, the agency now owns the entire vanpool fleet. Vanpooling is one of the Transportation Demand Management strategies many employers have implemented as a Trip Reduction Program measure.

### **Transportation Management Associations**

Another approach to travel demand management is the formation of Transportation Coordinator Alliance (TCA) groups. Through these informal associations, employers share resources to promote alternative mode use, improve mobility, or implement trip reduction programs in their local areas. There are six TCAs in the MAG Region. Together, these TCAs involve about 1,200 employers. RPTA provides staff support to all of the network groups in the MAG Region.

### **Telework**

With the advent of new technology and the change to a knowledge-based economy, a growing number of employers are allowing their employees to work in a location other than the central office. With telework, employees can be linked to an office by a personal computer. Employees may telework either on a full-time or on a part-time basis, with most teleworkers working at or near home one or two days per week. By working at home, or at a satellite work center, the commute trip is eliminated or shortened.

### **Teleconferencing / Videoconferencing Project**

MAG has established a Teleconferencing Program to link MAG and its member agencies via teleconferencing. The first phase of this program, the MAG Regional Videoconferencing System Project, is designed to facilitate communication between agencies while reducing the need to travel to meetings. The MAG Regional Videoconferencing System has a central videoconferencing location at the MAG offices and satellite locations housed at each member agency. This system allows for communication between MAG and its member agencies as well as among member agencies without direct participation by MAG.

### **Funding Outlook**

Transportation Demand Management programs will be funded by a number of revenue sources during the planning period. Regional funding sources will contribute to rideshare, trip reduction and vanpool activities (See Table 7-4 for air quality programs, and Table 10-1 for other transit). In addition, it is anticipated that elements of travel demand management and the vanpool program will be addressed by local transit funding sources (See Table 10-1).

## CHAPTER NINETEEN

### CONGESTION MANAGEMENT PROCESS

The need to address traffic congestion throughout the MAG Region is a significant transportation issue. Increases in traffic volumes and the resulting travel delays have caused concerns among residents, the business sector, elected officials, and community leaders, regarding current and future congestion levels. Two primary factors contributing to traffic congestion within the MAG Region have been an increasing population and a strong economy. These factors have resulted in high levels of internal metropolitan growth, and have also brought significant levels of urban development to previously undeveloped lands on the urban fringe. Such internal and peripheral growth has created greater travel demand throughout the region, bringing about higher traffic volumes and congestion on the existing freeway and arterial roadway network. In addition to lower levels of overall economic productivity from increased travel times, congestion also affects air quality and other quality of life effects. As part of the regional transportation planning process, the Maricopa Association of Governments (MAG) maintains a congestion management process to improve traffic flow and mitigate congestion throughout the metropolitan area.

#### **Federal Congestion Management Requirements**

Federal requirements state that regions with more than 200,000 people, known as Transportation Management Areas (TMAs), must maintain a Congestion Management Process (CMP) and use it to inform transportation planning and decision-making. These requirements were originally introduced by the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991, establishing the need for a Congestion Management System and were continued under the successor law, the Transportation Equity Act for the 21st Century (TEA-21). Whereas previous laws referred to a CMS, the most recent surface transportation authorization law, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), refers to a “congestion management process”, reflecting that the goal of the law is to utilize a process that is an integral component of metropolitan transportation planning.

#### **Congestion Management Concepts**

Throughout the nation, regions utilize a variety of roadway and transit improvement programs in an effort to reduce traffic congestion. These programs generally cover four major strategies: (1) constructing additional roadway capacity, (2) expanding public transit service, (3) managing the existing system, and (4) reducing peak-period travel demand. Specific methods may include intersection and other road capacity additions; coordination of traffic signals and use of other intelligent transportation system approaches; promoting the use of buses, light rail and carpooling; and implementation of programs that reduce peak-hour travel demand, such as telecommuting and flex-schedules.

Information included in this chapter refers to the Congestion Management Systems process that MAG has been updating, including the series of strategies to address congestion, and the development and implementation of a new Congestion Management Process as mandated by the new Federal Requirement in SAFETEA-LU (§ 450.320). The new regulation mandates the establishment of an integrated Congestion Management Process (CMP) that is cooperatively

developed and implemented, resulting in a metropolitan wide strategy for transportation facilities through the use of travel demand reduction and operational management strategies. The MAG CMP is proposing a functional integration with a multimodal system performance measurement program. It is anticipated that this integration will be reflected in the evaluating, planning and programming functions at MAG.

### **Intermodal Surface Transportation Efficiency Act (1991)**

As mentioned, the Federal Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 called for the development of six transportation management systems, including a Congestion Management System (CMS). In response to ISTEA, in 1993 MAG initiated an ongoing process, which provided for an overall analysis of various congestion management strategies and their applicability to the region. This process was based on three planning efforts. The first phase included an analysis of traffic congestion and related problems in the region, and was completed in 1991. The second phase included the development of congestion management alternatives, and the final phase, which was initially adopted in September of 1994, involved the full implementation of the CMS through the recommendations of an annual report and the programming of specific improvements in the MAG Five-Year Transportation Improvement Program (TIP).

The original MAG CMS was a multimodal planning process that considered a variety of alternative transportation options in an effort to reduce congestion throughout the greater metropolitan region. This was an ongoing process that provided for the identification of congestion areas; implemented the development of management system alternatives and defined the continuing process for traffic management in the MAG Region; monitored sub-regional and regional travel patterns; and applied multi-modal transportation improvements and travel reduction efforts to the congested portions of the transportation system. MAG, through the annual review, approval and implementation of numerous plans, the Regional Transportation Plan (RTP), and the development of a 5-Year TIP, continues to promote methods to reduce congestion throughout the region.

A key facet of MAG's congestion management activities is the annual updating of the TIP. To date, MAG's congestion management strategies have been implemented using both the original CMS model combined with the modal committee-based recommendation taking into account quantitative and qualitative factors. This process was applied in the development of the latest approved TIP (2008-2012), authorized in 2007 by the MAG Regional Council. The CMS was primarily developed collaboratively through the CMS Working Group and built on several years of analysis that culminated in a Congestion Management Systems Alternatives report published in April 1994. The CMS comprised two main criteria, the establishment of a series of strategies to address congestion, and the development and implementation of a CMS Rating System. The elements that were considered include performance measures, data collection and system monitoring, the identification and evaluation of proposed strategies, the implementation of those strategies, and the evaluation of the effectiveness of those strategies.

For projects funded through the Congestion Mitigation and Air Quality (CMAQ) Improvement program, which constitutes a federally funded program, (MAG) has developed methodologies for quantifying emission reductions and cost effectiveness. As part of the programming process, jurisdictions are requested through the MAG Management Committee, Transportation Review Committee, and MAG modal committees, to submit annual requests for federally funded projects. MAG evaluates CMAQ projects for possible inclusion in the Transportation Improvement

Program. The MAG modal committees are furnished with the CMAQ assessment, along with the Congestion Management System rating system score, for project evaluation purposes. Recommendations from the MAG modal committees are forwarded to the Transportation Review Committee for programming consideration. The CMAQ project assessment may be in the form of a quantitative analysis resulting from the methodologies or a qualitative evaluation. CMAQ guidance allows a qualitative evaluation to be made when a quantitative analysis is not possible, although every effort is made to quantify the emissions reduction impact of each project. Qualitative assessments may be based on a reasonable review of how a project or program will decrease emissions. Committed transportation control measures identified in the air quality plans receive priority in CMAQ project programming.

### **Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (2005)**

On August 10, 2005, the President signed the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). This legislation authorized the nation's surface transportation programs for highways, highway safety, and transit over a five year period between 2005 and 2009. As part of this Act, guidance was provided on the desired features of the congestion management process in transportation management areas. Key features of the process include:

- Methods to monitor and evaluate the performance of the multimodal transportation system.
- Definition of congestion management objectives and appropriate performance measures.
- Establishment of a coordinated program for data collection and system performance monitoring.
- Identification and evaluation of anticipated performance and expected benefits of appropriate congestion management strategies.
- Identification of an implementation schedule, implementation responsibilities, and possible funding sources.
- Implementation of a process for periodic assessment of the effectiveness of implemented strategies.

Through the development and implementation of the CMS system at MAG, the fundamental premises of a congestion management process had been established that complied with the features identified in SAFETEA-LU (2005). The original MAG CMS was developed to integrate the transportation project programming process with system performance and system preservation measures, environmental justice measures, and safety and air quality measures. As part of this effort, MAG prepared an annual Transportation Improvement Program (TIP) Guidance Report that provided a systematic examination and review of safety, air quality, socio-economic data and conditions, system preservation, and a number of other factors in developing and implementing a regional TIP and Regional Transportation Plan

### **Travel Demand Reduction and Operational Strategies**

The MAG Region currently benefits from a broad range of strategies for travel demand management, promotion of alternative modes, and optimization of operational procedures. Initially, the identification and selection of travel demand reduction strategies was a function of the collaborative MAG CMS Working Group. Later, they were formally integrated into the CMS process. Through this process, a variety of alternative transportation options were considered in an effort to reduce congestion throughout the greater metropolitan region. These programs included carpooling, vanpooling, walking, bicycling, alternative and compressed work schedules as well as telework programs. In order to develop project priorities and implementation schedules, the CMS Working Group process took into account the impact of each strategy on system performance, efficiencies as well as available funding and geographic conditions.

A number of projects are generated from individual MAG modal committees, taking into account MAG modal funding policies. This is the case for all the operation management strategies and improvements, which are identified and assessed in partnership with the MAG Intelligent Transportation Systems (ITS) and Safety Committees. Criteria applied by the ITS committee include whether the project has leveraged partners of adjacent jurisdictions to have greater impact, whether the project complies with the ITS Strategic Plan Guidelines, and if it is integrated with the Regional ITS Architecture.

Following the normal TIP process, an initial list of possible projects is developed, in conjunction with projects that are listed in the MAG RTP. (The projects from the RTP were identified, previously, through a performance-based evaluation of the regional system, producing a list of projects to address congestion and mobility issues). Furthermore, projects identified to be included in the RTP had been previously coded into regional networks and were subject to travel demand model runs to assess their anticipated performance and expected benefits with respect to congestion management and mitigation.

The project implementation process recognizes the existing statutory limitations on funding expenditures, as well as the potential flexibility that applies to certain federal sources. The MAG RTP, the ADOT Life Cycle Program, the MAG Arterial Life Cycle Program and the RPTA Life Cycle Program also identify general funding needs schedules and sources. These conditions are taken into account during the project review process and the annual update of the TIP and RTP. Updated project lists are incorporated into the TIP then submitted to the MAG Management Committee, who in turn reviews the modal recommendations, and forwards them to the MAG Regional Council for final review and approval.

## **Performance Measures**

MAG has developed a Performance Measures Framework and Regional Performance Report, published in November of 2009 to illustrate the most important characteristics associated with the status of surface transportation in the MAG region. Measures captured in these multi-modal documents include VMT, throughput, speeds, spatial and temporal congestion as well as travel times for the MAG modeling area. The MAG Performance Report is based on observed data sets and constitutes a fundamental tool in the CMP evaluation process. Not only does it establish benchmarks for evaluating current year performance and congestion levels but in time will allow for historic archiving facilitating trend analysis. Selected results of the MAG 2009 Performance Measurement Report are illustrated as maps in this chapter. Figure 19-1 depicts regional freeway

# 2010 Update Regional Transportation Plan

Fig. 19-1

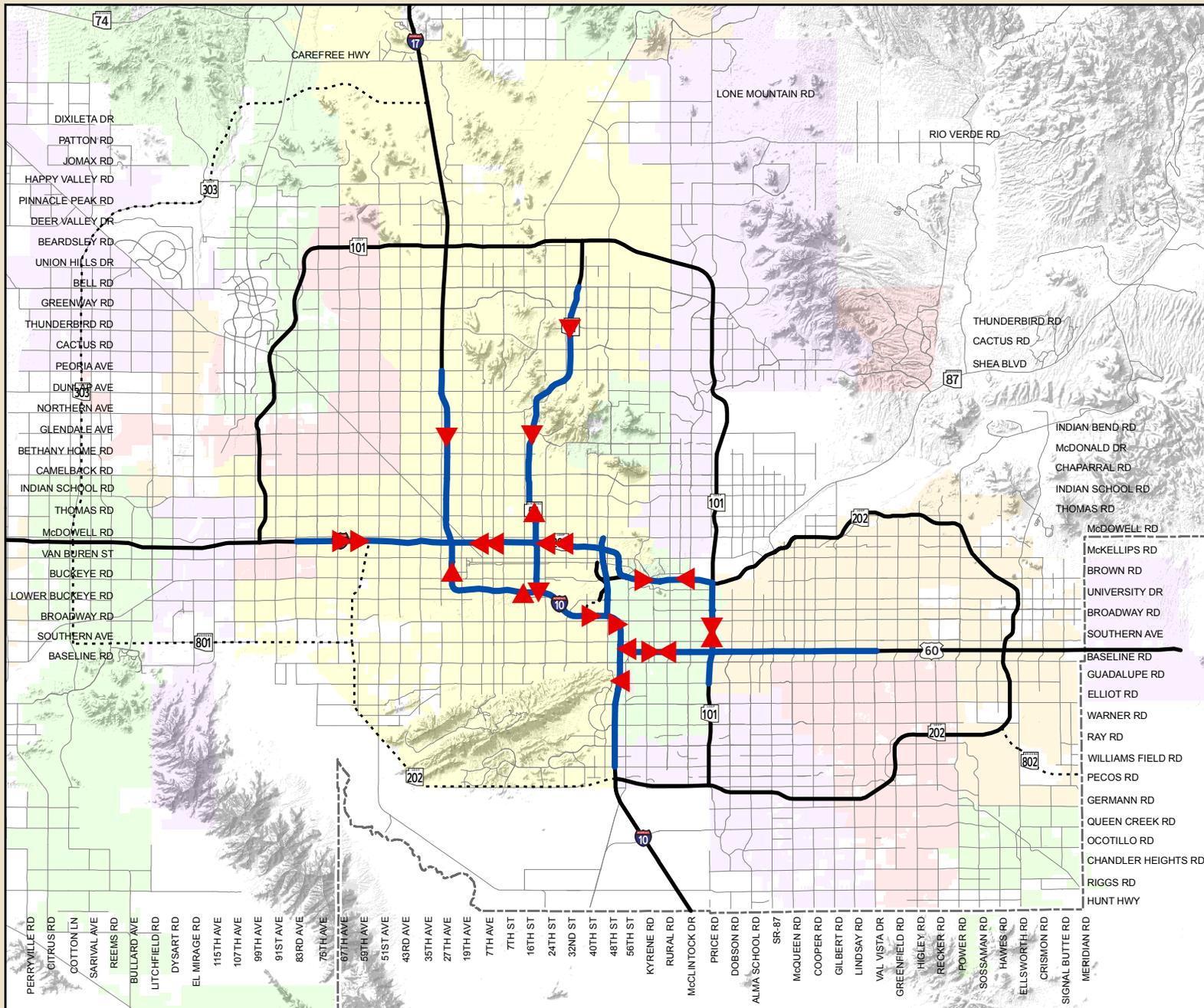


## Limited Access Highway Lost Productivity

Peak Period  
Lost Productivity  
Locations (2007) \*

- Northbound
- Southbound
- Eastbound
- Westbound
- Instrumented Freeways
- Freeways (non-instrumented)
- Planned Freeway/Highway
- Major Roads

\* Performance Measures  
Study



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system locations of congestion and lost productivity. Figure 19-2 shows arterial spatial extent of congestion. Parallel to this effort, as shown in Chapter 20 of this RTP Update, results of travel demand model runs that simulate performance for future network scenarios allow for the evaluation of proposed projects and effectiveness of program implementation.

### **Data Collection and System Monitoring**

MAG has an ongoing program for data collection and system monitoring which includes periodic surveys of travel characteristics such as traffic volumes, travel times, congestion levels, occupancy rates, vehicle classification, trip making properties, and public transit user factors. This information is used to assess current conditions and provide data to enhance the MAG travel demand modeling capability.

### **Strategy Identification and Evaluation**

MAG has an established project application, programming schedule, project evaluation process, and project selection process. This process includes an evaluation of the expected emissions reductions and cost effectiveness, a project evaluation process at the Technical Advisory Committees (TAC), and project selection through the MAG Committee Process: Transportation Review Committee (TRC), Management Committee, and Transportation Policy Committee (TPC) for review and recommendation, and then Regional Council for approval.

The transportation project types and responsible technical advisory committees (TAC) are:

- Bicycle and pedestrian projects are presented, reviewed, ranked at the Pedestrian Working Group and The Regional Bicycle Task Force, and then forwarded to the TRC.
- Intelligent transportation system (ITS) projects are presented, reviewed, and ranked at the ITS Committee, and then forwarded to the TRC.
- Paving unpaved road projects are presented and reviewed at the Streets Committee, ranked at the Air Quality TAC, and then forwarded to the TRC.
- PM-10 certified street sweeper projects are reviewed at the Streets Committee, ranked at the Air Quality TAC, and then forwarded to the MAG Management Committee.
- In addition, the AQTAC may forward a ranking of Air Quality Projects to the Transportation Review Committee.

With the upcoming implementation of the new CMP, project evaluation will include consideration of the application of the following ten factors: (1) transportation demand management measures, (2) traffic operational improvements, (3) HOV usage, (4) public transit capital improvements, (5) public transit operational improvements, (6) non-traditional mode usage, (7) growth management and activity center strategies, (8) access management techniques, (9) incident management techniques on freeways, and (10) intelligent vehicle highway system strategies.

Fig. 19-2

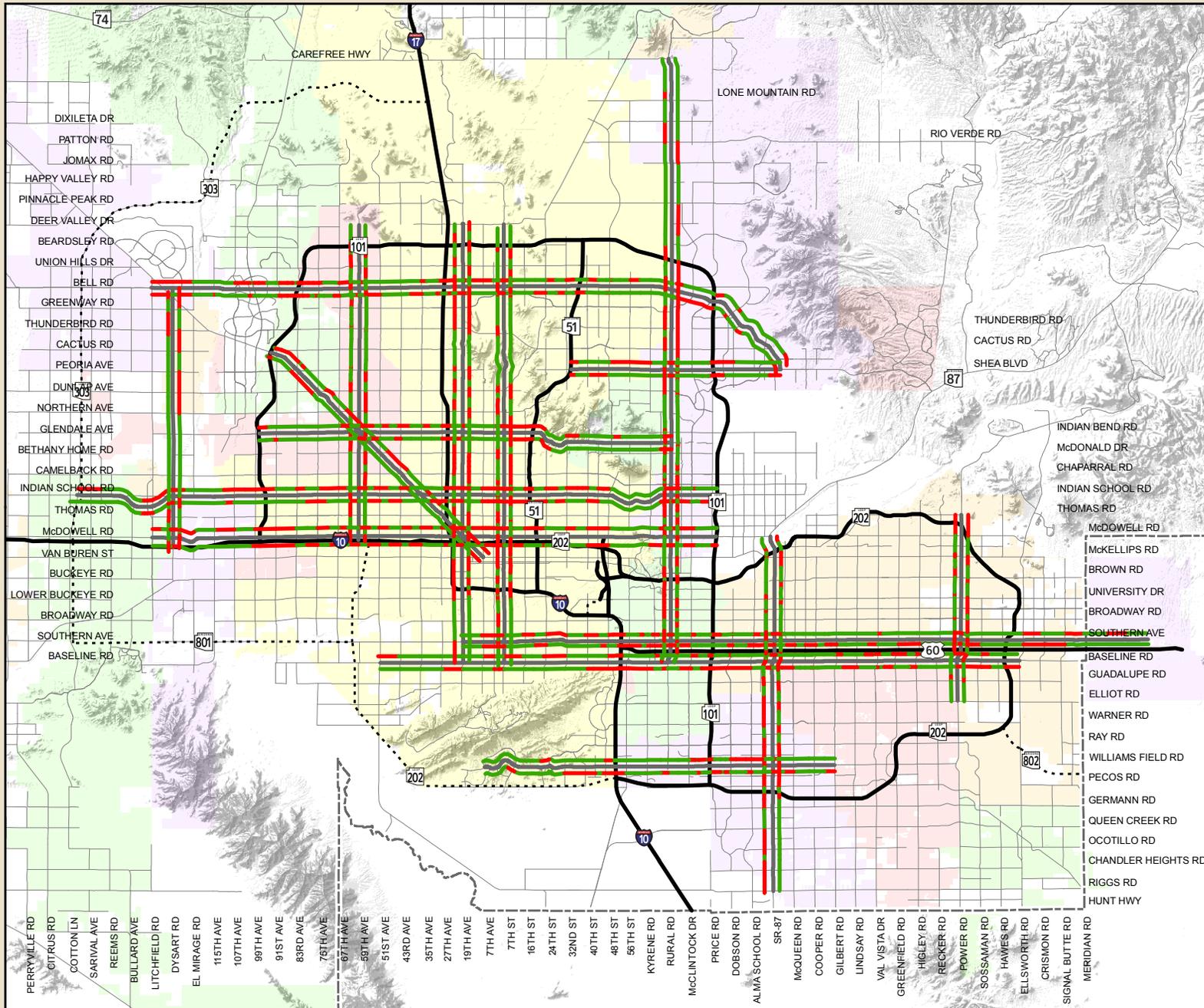


### Arterial Spatial Extent of Congestion PM Peak Period

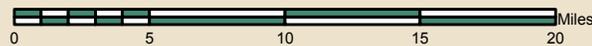
PM Peak Period Spatial Extent of Congestion (2007) \*

- Avg Speed < 75% of Posted Speed
- Avg Speed > 75% of Posted Speed
- Arterials
- Existing Freeway
- - - Planned Freeway/Highway
- Major Roads

\* Performance Measures Study



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In addition to the above factors, other strategies are considered in periodic updates of the Regional Transportation Plan. As part of this process, the MAG travel model is utilized to assess future levels of congestion in the transportation system and evaluate the potential future effectiveness of congestion management strategies.

### **Future Congestion Management Efforts**

The RTP, which covers a twenty year planning period, includes three life cycle programs: the Freeway Program Life Cycle Program (FLCP), the Arterial Life Cycle Program (ALCP), and the Transit Life Cycle Program (TLCP). Multi-modal programs and projects included in the life cycle programs have been determined since the RTP's inception and are scheduled for inclusion in the MAG TIP following the annual update process. These life cycle programs establish a programming approach that forecasts and allocates funds through the full life of a major funding source such as the Proposition 400 tax extension, local and other federal funding sources, and reflect a fiscal balance between anticipated revenues and expenditures.

As new funding sources become available, the updated CMP will play a greater role in the planning and programming of future transportation investments in the MAG Region. CMP strategies will continue to be based on the same goals and objectives of the original 2003 RTP, and will continue to use the same congestion mitigation criteria in the assessment and evaluation of the projects submitted for consideration. Following this principle, the new CMP will evolve from its current role to become a consistent and integral part of the planning process.

As mentioned, in 2008 MAG initiated work on a *Performance Measurement Framework and Congestion Management Update*, which assesses the congestion management process throughout the region. This effort is designed to develop a performance measuring and monitoring system for regional multi-modal transportation planning, programming and reporting purposes. In addition, this report updates the progress of the MAG Region's congestion management strategies and their integration into the MAG transportation planning processes. As MAG develops this next-generation process for Congestion Management, special consideration will be given to stakeholder involvement as well as the informational and communications component.

The current CMP update will include four key components: (1) the integration of system and corridor performance measures to help identify areas of highest congestion mitigation needs, (2) the utilization of analytical and visual tools to communicate and quantify congestion, (3) the early involvement of a stakeholder group representing both planning and operational components of the CMP, and (4) the emphasis on searching for management and operational solutions as well as travel demand reduction strategies as a prerequisite for any proposed additional SOV capacity increase.

It is anticipated that the MAG *Performance Measurement Framework and Congestion Management Update* will conclude during early 2010.

## CHAPTER TWENTY

### PERFORMANCE MONITORING AND ASSESSMENT

Proposition 400 legislation set forth the factors to be considered during the development of the MAG Regional Transportation Plan (RTP), such as the impact of growth on transportation systems and the use of a performance-based planning approach. Consistent with State legislation, the development of the MAG Regional Transportation Plan (RTP) included a performance-based planning and programming process. This process established goals, objectives and performance measures for developing various options and evaluating potential scenarios to be included in the Plan. A number of the goals and objectives adopted relate to the performance of the system as a whole as well as the individual components of the systems across all modes. MAG, continuing to place emphasis on performance-based planning, has established an ongoing Transportation System Performance Monitoring and Assessment Program. The implementation of the RTP is underway, projects identified in Phase I of the Plan have been substantially completed and Phase II is in its early stages. Regional freeway and arterial traffic is experiencing the benefits of an enhanced multi-modal system as the MAG urbanized area continues to grow. The material presented in this chapter documents performance of the system as a result of the on-going monitoring and assessment program, as well as forecasted performance of the system based on simulations for 2030.

#### **Performance Monitoring and Assessment Concepts**

The transportation system performance monitoring and assessment process includes: (1) tracking of the performance of the transportation system on an ongoing basis, and (2) forecasting how the system is likely to perform in the future. The tracking element emphasizes collection of data and development of comparative statistics that reveal trends in system performance over time. The forecasting element focuses on the use of travel demand computer models to project travel conditions and draw conclusions regarding future performance of the transportation system.

#### **Monitoring Current Conditions**

The optimum combination of accuracy and detail for performance measurement is based on real time, observed data sources. This data provides the information to assess the principal operating characteristics of the current transportation system and to establish a historical record that tracks performance trends over time. The specific parameters observed vary by the transportation mode and must take into consideration the practicality and expense of collecting data on a continuing basis. The latter factor is particularly important if a historical record is to be established that allows effective analysis of performance trends. A large amount of data is collected annually in the MAG region related to the movement of people, goods, and services. Data from the Arizona Department of Transportation's (ADOT) Freeway Management System (FMS) is collected continuously from sensors and other systems that detect and record the movement of vehicles across a large portion of the MAG region. As the FMS system continues to grow, it will allow the use of these data for future reliability performance calculations. In addition, traffic data is collected on arterial roadways through both permanent and temporary counting stations deployed by a variety of MAG member agencies.

Moreover, periodic studies are conducted to collect information on topics such as the average number of people in cars, the proportion of trucks on the roadways, and levels of congestion on the freeways and arterials.

Per Capita Freeway Vehicle-Miles of Travel (VMT) is defined as the average number of freeway miles a vehicle in the Phoenix-Mesa urbanized area travels per day. This measure tracks overall personal vehicle use travel trends for the region. As seen in Table 20-1, the average person in the Phoenix-Mesa urbanized area traveled 8.36 freeway miles by vehicle per day in 2008, which is a decrease of 5.0 percent compared to 2006, and a decrease of 1.6 percent compared to 2007. Total freeway travel also decreased from 29,451,000 vehicle miles of travel in 2006 to 29,416,000 vehicle miles of travel in 2007, and significantly down to 29,130,000 in 2008.

Results in Table 20-1 are illustrative of the fact that national and regional economic conditions have changed between FY2006 and 2008. Economic indicators point at a reduction in automobile use due to higher fuel costs. This is confirmed by a reduction in HURF (Highway User Fund) revenues primarily due to a decrease in travel volume and registration of motor vehicles. Additionally, Arizona’s economy has reached recession levels partly related to job losses and a prolonged housing market slowdown. These changes have had an effect in VMT (vehicle miles traveled) and congestion measures, as well as an impact in transit ridership measures.

**TABLE 20-1  
PER CAPITA VMT for the PHOENIX/MESA URBANIZED AREA**

	<b>2006</b>	<b>2007</b>	<b>2008</b>
Total Freeway VMT	29,451,000	29,416,000	29,130,000
Population of Phoenix-Mesa Urbanized Area	3,350,000	3,459,000	3,481,000
Per Capita Freeway VMT	8.80	8.50	8.36

*Source: ADOT Highway Performance Monitoring System (HPMS)*

For roadway systems, typical data collected to assess current performance includes: vehicle counts at a sample of locations; vehicle densities along various roadway segments; speeds and point-to-point travel times; intersection queue lengths and delays; and number and types of accidents.

In the near future, MAG is anticipated to contract with private data collection sources to supplement the arterial and freeway observed data. This will allow the current data archive to be more geographically comprehensive and enable MAG to perform analysis on system and corridor performance from real-time data sources. For transit systems, common data items cover: boardings and farebox revenues by route; on-board passenger loadings at various points in the system; operating costs; and service reliability.

### **Forecasting Future Performance**

The second key aspect of performance monitoring and assessment is the analysis of future conditions on the transportation system. An understanding of potential future performance status provides valuable input into the decision-making process for prioritizing expansions or other improvements to the system. Forecasts of travel on the roadway and transit system are developed through the use of computer simulations of the future transportation network. These simulations are based on assumptions regarding potential future improvements to the transportation system, projections of future population levels, and other critical factors such as land use densities and patterns. The use of computer simulations allows the testing of various network options to determine how future system performance is affected by alternative investment strategies. The models have the capability to produce simulated data for all the same factors that are collected as part of the monitoring process, as well as additional data that would be impractical or too costly to collect.

Transportation network simulation models are also used to assess the impact of improvements compared to “no-build” conditions. This capability is especially important when an area experiences high growth, such as the years 2004-2006 in the MAG region. Under high growth conditions, the performance of the transportation system may decline even though improvements are made, due to increased travel demand brought on by the growth in housing units and population. However, conditions may have been much worse, if improvements had not been made. Network simulation models provide the capability to analyze conditions with and without improvements, allowing an assessment of project performance relative to a “no-build” option.

An important observation regarding the current MAG Four Step Travel Demand Model is that it is inherently a static model. Current performance results have been consolidated from model runs using the 2007 Update to the Socioeconomic Projections, which may not reflect recent changes in regional demographics, as well as the fact that market conditions such as fuel costs are not factored into the simulation runs.

## **Roadway System Performance**

A broad range of monitoring data on the performance of the roadway system in the MAG area has been collected over the years. These data collection efforts have addressed a variety of performance factors and have enabled historical comparisons to be made. In addition, the MAG Travel Demand Model has been applied routinely to assess future performance of the roadway network.

### **Roadway Monitoring Data**

Currently traffic data is available for the MAG Region from various recently completed studies and surveys. These include: the 2003 and 2007 Travel Time and Speed Study, the 2006 Weekday Traffic Volume Study and Database, the 2006 Regional Freeway Bottleneck Study, the 2006 Freeway Level of Service Study, the Phoenix External Travel Survey, and the Freeway Travel Conditions and Trends Study. During the 2007-2009 Fiscal Years, a number of additional studies have been completed, including: the ADOT Freeway Management System (FMS) Detector Accuracy Evaluation, the 2008 Regional Household Survey, the 2007 Regional On-Board Transit Survey conducted by RPTA and the Internal Truck Travel Survey. Work on the GIS-T Phase II Study is underway and is expected to be completed by the end of 2010.

## **Volume Data**

The ADOT Freeway Management System (FMS) provides count data on the mainline general purpose lanes and HOV lanes 24/7/365, and on ramps on the majority of the urbanized freeway system. Traffic counts are collected through in-pavement loop detectors and passive acoustic detectors (PADs). This data feeds directly to the Arizona AZ511 system, providing real-time traveler information. Data is also aggregated in periods from five minutes to 24 hours for weekdays and weekends.

For the arterial system, MAG collects traffic data at over 770 stations using machine counts. Data is collected on weekdays every three to four years, over a 48-hour time period, and aggregated by 15 minute, hour, peak period, and 24 hours. Counts are conducted by direction at mid-block locations throughout the region. Data from the MAG count program undergoes a variety of data quality control checks; count data collected from other jurisdictions/member agencies is usually subject to the same kind of quality control checks.

## **Travel Time Data**

Travel Time is among the measures that are most meaningful to travelers and system managers alike, since it relates to their experience of everyday travel. Point-to-point travel time is the average time required to traverse a fixed distance in a single direction. Point-to-point travel times were calculated for specific freeway origin-destination (O-D) pairs that are representative of common commutes in the MAG region.

The travel time changes shown in Table 20-2 are illustrative of many of the measured changes in freeway performance between 2006 and 2007. They show that freeway conditions in the MAG region are changing, but those changes are generally modest in size and scope and differ from facility to facility across the region. Travel on two of the representative trips in the region became faster in 2007 than 2006. The other five trips remained essentially the same, experiencing changes in travel time of less than one minute. All of the changes from 2006 to 2007 are modest in size, with the largest representing a five percent change in travel time. The other changes are approximately one to two percent, and are small enough that they are unlikely to be noticeable to the public.

## **Speed Data**

The principal source of speed data is the MAG Travel Time and Speed Study, conducted in 2003 and 2007. This study used probe vehicles to collect travel times on freeways (including both general purpose and HOV lanes) and on arterials. Data was collected for the peak hours and mid-day for over 2,038 centerline miles. Roadways were divided into 7,492 segments for data collection and reporting purposes. In all, 71,841 miles of travel time runs were undertaken for the 2007 study. Speed data is also available through the ADOT FMS, the ADOT Transportation Planning Division

**TABLE 20-2  
FREEWAY TRAVEL TIME RESULTS for SELECTED LOCATIONS**

From	To	Time Period	Dir	Average Peak Period Travel Time (min)		
				2006	2007	Change from 2006
US 60 at Val Vista Drive - midway between Loop 101 and Loop 202	SR 143 at Sky Harbor Blvd - just east of Sky Harbor Airport	AM Peak	WB	22	22	0
Loop 101 at US 60 - south of Loop 202 (Red Mountain)	I-10 at 7th Street - north of downtown Phoenix	PM Peak	WB	19	19	0
Loop 101 at Guadalupe - south of US 60	I-17 and Dunlap - near MetroCenter Mall	AM Peak	NB	32	32	0
I-17 at 19th Avenue - east of the Durango Curve	I-10 at Elliot - midway between US 60 and Loop 202 (Santan)	PM Peak	WB	24	23	-1
I-10 at Warner Road - midway between US 60 and Loop 202 (Santan)	SR 143 at University - west end of Tempe, near Sky Harbor Airport	AM Peak	NB	12	12	0
I-10 at 83rd Avenue - east of Loop 101	SR 51 at Bell Road - south of Loop 101	PM Peak	EB/NB	26	25	-1
I-10 at 83rd Avenue - east of Loop 101	Loop 202 at Loop 101 - near Tempe Marketplace	Off-Peak	EB	22	22	0

traffic detector stations. Table 20-3 depicts changes in average speed for all freeway corridors monitored by ADOT'S FMS System between 2006 and 2007.

### Roadway Performance Forecasts

In order to analyze future congestion, it is necessary to make use of simulations of the regional transportation network. The MAG travel demand model, which is a state-of-the-art computer travel demand model, was utilized for this purpose.

- **Modeling Scenarios** - For the analysis presented in this chapter, three network scenarios were modeled to assess potential future conditions on the transportation system in the region.
  - 2008 Current Year Scenario - For this scenario the highway, arterial and transit networks reflect the current year 2008. This network reflects conditions after implementing a number of projects identified in the RTP, as well as 2008 travel demand. The socio-economic data that generated the travel demand for this scenario is based on the 2007 Update to the Socioeconomic Projections.

**TABLE 20-3  
EXAMPLE RESULTS FOR AVERAGE SPEED FOR FREEWAY CORRIDORS**

Freeway Corridor	Dir	AM Peak		PM Peak	
		2007	Change from 2006	2007	Change from 2006
I-10 Papago: 81 <sup>st</sup> Avenue to SR 51	EB	39.6	0.0	58.8	1.1
I-10 Papago: SR 51 to 82 <sup>nd</sup> Avenue	WB	60.4	0.2	36.6	-1.5
I-10 Maricopa: SR 51 to Chandler Blvd	EB	60.1	1.6	34.8	1.9
I-10 Maricopa: Chandler Blvd to SR 51	WB	36.3	-0.1	54.5	-0.1
I-17: Maricopa Traffic Interchange to Peoria Avenue	NB	57.8	-0.1	38.9	-1.9
I-17: Peoria Ave to Maricopa Traffic Interchange	SB	39.1	0.0	49.3	2.2
SR 51: I-10/Loop 202 to Bell Road	NB	64.3	-0.8	53.4	-0.3
SR 51: Bell Road to I-10/Loop 202	SB	52.3	3.0	56.9	2.5
Loop 202: I-10/SR 51 to Loop 101	EB	60.7	-0.3	37.6	-0.5
Loop 202: Loop 101 to I-10/SR 51	WB	44.0	-0.1	41.2	-0.8
US 60: I-10 to Val Vista Drive	EB	59.5	2.3	52.4	3.8
US 60: Val Vista Drive to I-10	WB	43.4	0.0	60.1	2.0
Loop 101: Guadalupe Road to Loop 202	NB	41.8	-0.1	62.6	-0.2
Loop 101: Loop 202 to Guadalupe Road	SB	62.6	0.2	29.9	-1.7
SR 143: I-10 to Loop 202/McDowell Road	NB	57.0	-0.6	55.1	0.9
SR 143: Loop 202/McDowell Road to I-10	SB	56.0	0.4	34.5	-3.4

Source: ADOT FMS detector data.

- 2030 RTP Plan Scenario - The network used for this model run includes all the projects in the RTP Plan and utilizes MAG's 2007 Update to the Socioeconomic Projections for the year 2030.

- 2030 No-Build Scenario - The purpose of this scenario is to quantify the performance of the system without including the RTP major investments and assess the impact on levels of service. This scenario uses the same socioeconomic data for 2030 as that used for the RTP scenario, but does not include the regionally funded freeway system improvements identified in the RTP.
- **Roadway Performance Measures** - To illustrate the relationship between the various indicators of future roadway system performance, data has been grouped into three categories: Supply Measures, Demand Measures and Level of Service Measures. These measures have been selected as representative indicators of the overall performance of the transportation system and are presented in a comparative fashion among three modeling scenarios: the 2008 Current Base Year, the 2030 RTP and the 2030 No-Build. All data is for the Maricopa County portion of the MAG transportation modeling area. Table 20-4 provides a comparison of key system level parameters and performance measures for the three scenarios that were modeled.
- **Supply Measures** - Two measures of the supply of roadway capacity in the region are included in Table 20-4: lanes miles and capacity miles. As shown, there is an increase of approximately 49 percent in freeway capacity between the 2008 Base Year and the 2030 RTP. Arterial capacity miles for the RTP nearly double, increasing by approximately 98 percent as compared to the Base 2008 Year network.
- **Demand Measures** - The demand measure identified in Table 20-4 is vehicle miles of travel (VMT) for arterials and freeways on an average weekday. These facility types were selected, since they carry the vast majority of travel in the roadway network. However, there is some additional VMT carried by local and collector streets, which is not reflected in the figures in Table 20-4. Comparing the 2008 Base Year and the 2030 RTP, a 73 percent VMT increase is observed on freeways and 76 percent on arterials. For the No Build scenario, the VMT increases are 28 percent and 100 percent, respectively, reflecting the increased burden of traffic that arterials must carry due to lack of freeway improvements.
- **Level of Service (LOS) Measures** - A number of LOS measures are included in Table 20-4 for the three modeled scenarios, including congestion on freeways, congested VMT, and vehicle hours of delay. As noted previously, congested freeway segments are those with LOS E-F, and delay represents amount of extra travel time due to congestion.

A review of Table 20-4 indicates that, while the number of lane miles of congested freeways nearly doubles between the 2008 Base Year and the 2030 RTP, the portion of total lane miles that are congested increases by only 27 percent. When comparing the 2008 Base Year to the No Build scenario, the percentage of congested freeway lane miles more than

**TABLE 20-4  
ROADWAY PERFORMANCE MEASURES FROM MAG MODEL  
(Maricopa County Portion of MAG Modeling Area)\***

Measures	Scenario		
	2008 Base	2030 RTP	2030 No Build
<b>Population**</b>	4,236,285	6,381,4254	6,381,425
<b>Supply Measures</b>			
Lane-Miles			
Freeways	1,920	2,865	1,914
Arterials	10,270	19,596	18,166
Capacity Miles			
Freeways	53,210,043	79,389,209	53,048,469
Arterials	79,486,623	157,610,234	146,796,437
<b>Demand Measures</b>			
Daily Vehicle-Miles (VMT)			
Freeways	33,721,948	58,423,300	43,355,601
Arterials	46,296,429	81,316,236	92,823,216
<b>Level of Service Measures</b>			
Congested Lane-Miles			
Freeways	433	825	966
Arterials	1,236	2,277	3,994
% Congested Lane-Miles			
Freeways	22.6	28.8	50.5
Arterials	12.0	11.6	22.0
Daily Congested VMT			
Freeways	11,777,622	22,588,646	27,677,484
Arterials	10,095,551	19,153,038	33,478,230
% Daily Congested VMT			
Freeways	34.9	38.7	63.8
Arterials	21.8	23.6	36.1
Total Vehicle Hours of Delay			
Hours of Delay	686,069	1,436,565	2,115,615
Hrs of. Delay per 1000 VMT	8.50	10.2	15.5

\* Results are derived from Base Year 2008, 2030 RTP and 2030 No Build MAG model runs - August 2009

\* The No-build is based on the 2008 Base Year Freeway and the Planned Arterial networks

\*\* Resident population in households + resident population in group quarters (excluding institutional facilities, military and correctional facilities) + Transient population + Seasonal Population.

doubles. The total vehicle hours of delay experiences an increase of 109 percent between the 2008 Base Year and the 2030 RTP, but dramatically increases by more than two hundred percent under the No Build scenario. Clearly, the freeway capacity added in the RTP helps significantly to mitigate the effects of a growing population. For arterials, the percentage of congested lane miles for the RTP increases by approximately three percent compared to the

2008 Base Year. This is, in part, a consequence of the projected nearly doubling of arterial lane miles between the 2008 Base and the RTP. However, even though a similar high rate of increase in arterial lane miles occurs in the No-Build scenario, its percentage of congested lane miles is 83 percent higher than the 2008 Base.

A similar pattern occurs for the percentage of congested VMT on arterials, with the percentage of congested VMT for the RTP 8.2 percent higher than the 2008 Base, versus 66 percent higher for the No Build. Clearly, the enhanced freeway network provided in the RTP, but not included in the No Build scenario, results in significant congestion relief on the arterial system.

The vehicle hours of delay per 1000 VMT also reveals the benefits of the expanded freeway system. The vehicle hours of delay per 1000 VMT increases by 20 percent between the 2008 Base Year and the 2030 RTP, but experiences an increase of 82 percent under the No Build scenario.

Figures 20-1, 20-2 and 20-3 show the geographic distribution of P.M. peak period congestion patterns for the three modeled scenarios, depicting number of hours in congestion for the Maricopa County portion of the MAG freeway system. Similarly, arterial intersection maps shown in Figures 20-4, 20-5 and 20-6 indicate locations and distribution of congested intersections for the P.M. peak period.

## **Transit system Performance**

One of the key components of the transit performance monitoring effort is the Transit Performance Report (TPR). The TPR is prepared and updated annually by Valley Metro/Regional Public Transportation Authority (RPTA). This report is developed using input from, and is reviewed by, member agencies and the RPTA Board. The TPR serves as an important information source for the MAG regional transportation planning process.

### **Service Efficiency and Effectiveness Study**

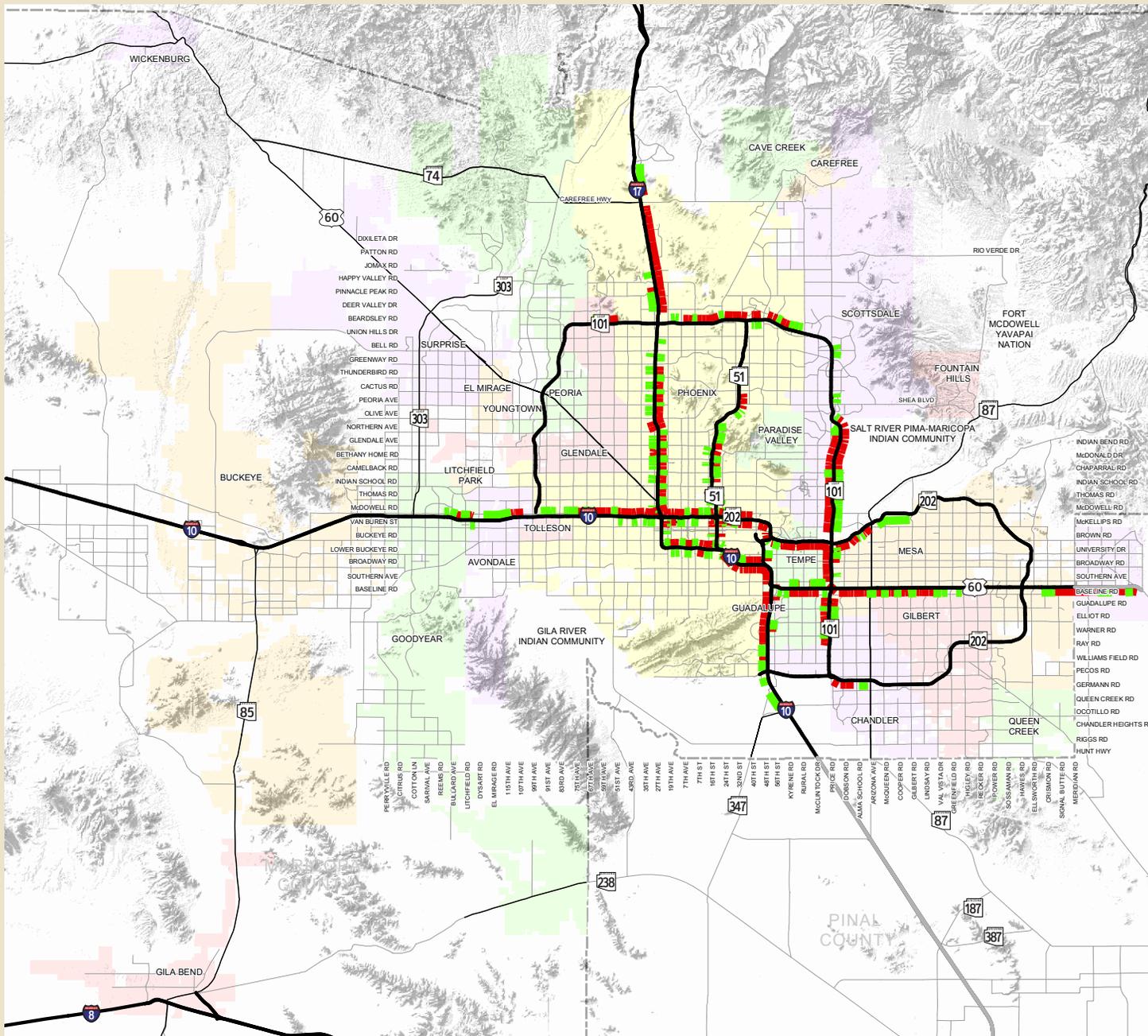
In 2006 RPTA hired a consultant to conduct a Service Efficiency and Effectiveness Study (SEES). One task of this study was to develop a series of performance measures. This SEES also developed initial performance targets that allow comparison between performance expectations and actual performance. These performance measures and performance targets are being incorporated into the TPR. As plan implementation continues, targets are reviewed, refined and indexed to inflation as appropriate.

The SEES framework performance targets establish a baseline of performance expectation for Fixed Route bus (system-wide); Fixed Route bus at the route level; Paratransit; and Light Rail Transit (LRT). One of the key goals of the performance targets is to ensure consistent service levels throughout the region.

2010 Update  
Regional Transportation Plan  
Fig. 20-1



2008 Base Year Network:  
Freeway PM Peak Period  
Hours of  
Level of Service E & F



- █ Less than 1
- █ Greater than 1
- Freeways
- Highways
- Other Roads
- County Boundary

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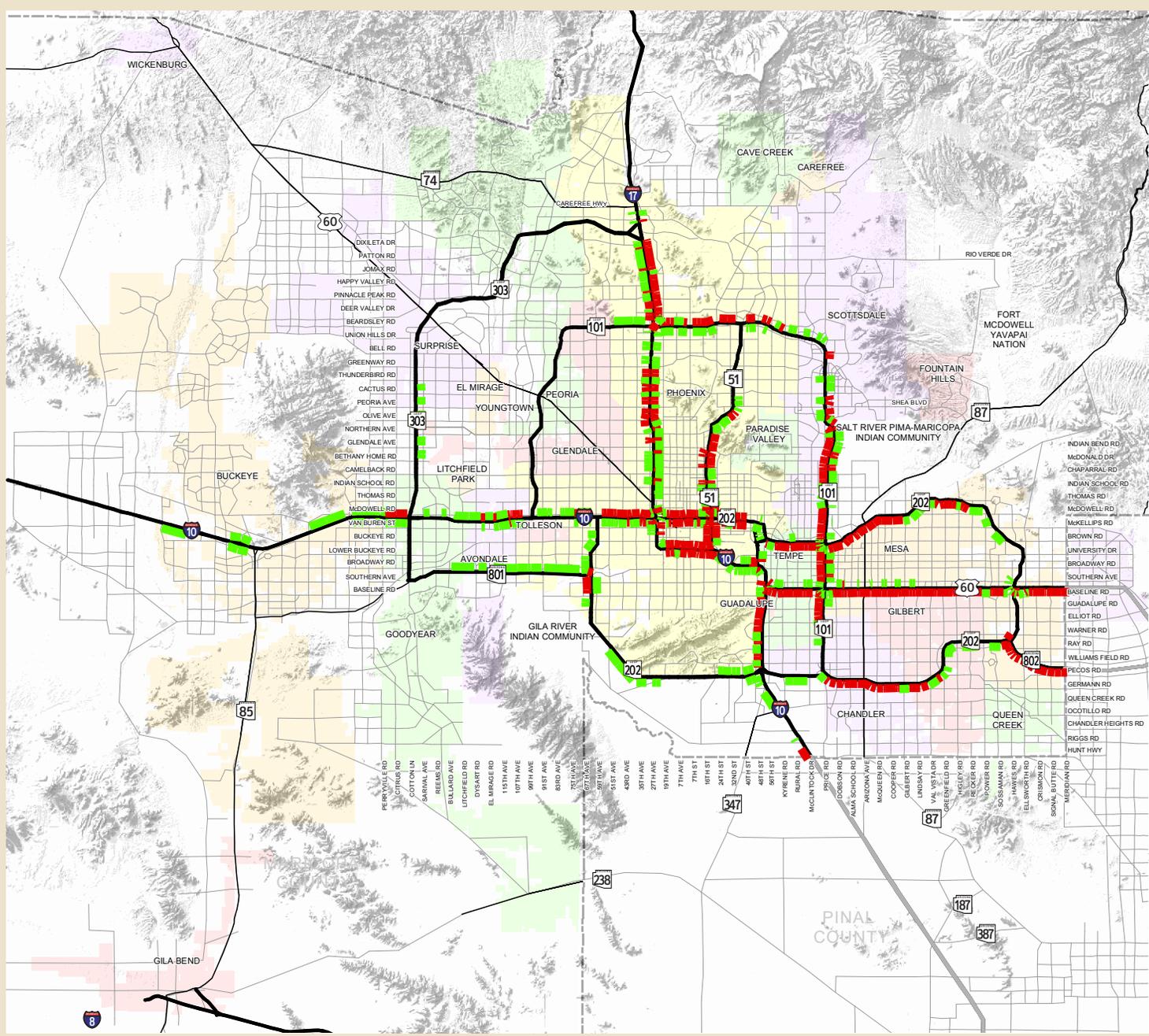
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# 2010 Update Regional Transportation Plan

Fig. 20-2



## 2030 RTP Network: Freeway PM Peak Period Hours of Level of Service E & F



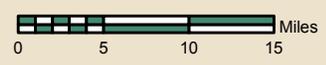
- █ Less than 1
- █ Greater than 1
- Freeways
- Highways
- Other Roads
- County Boundary

*Alignments for new freeway, highway, arterial, and light rail/high capacity transit facilities will be determined following the completion of appropriate design and environmental studies.*

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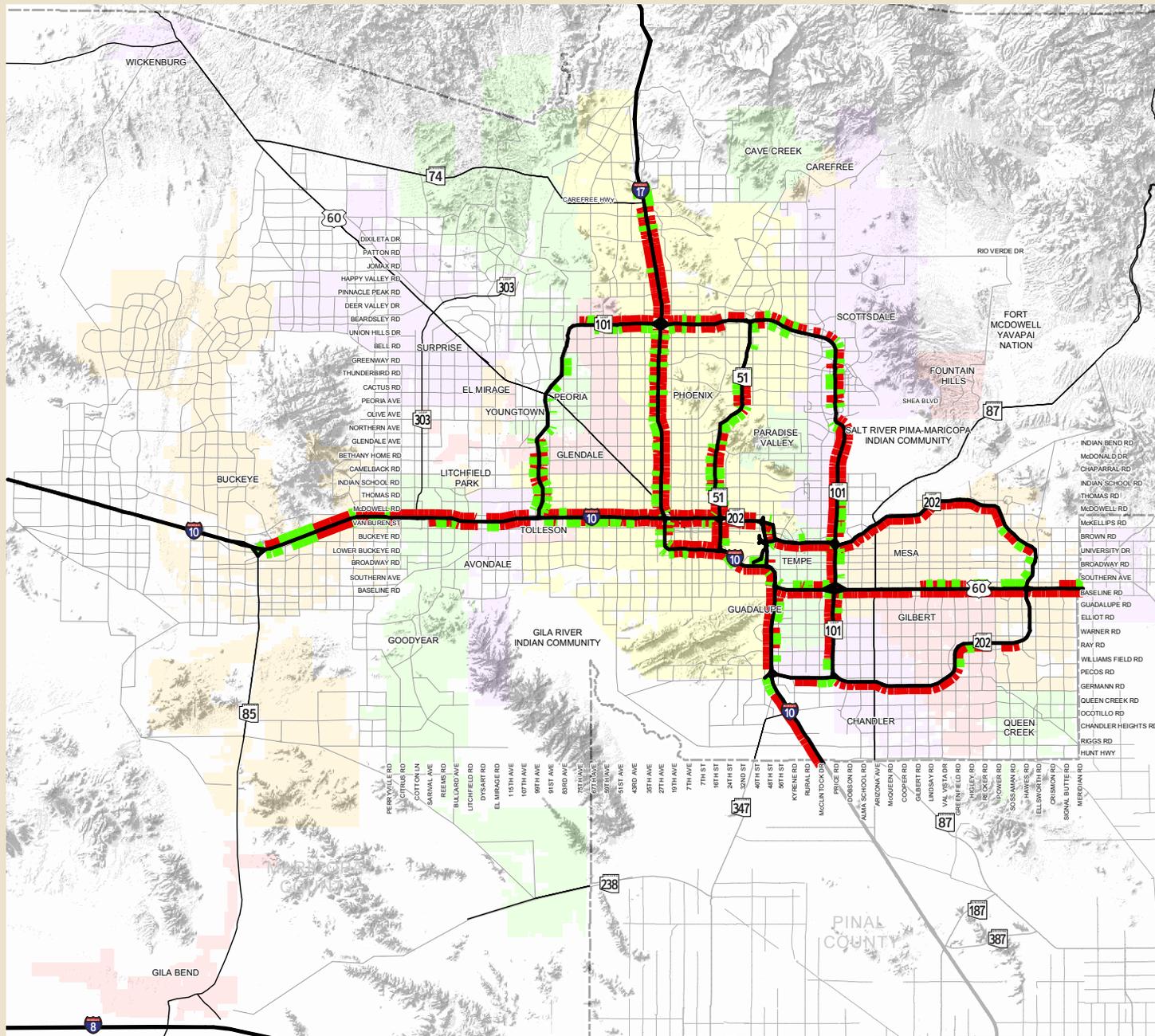


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2010 Update  
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Fig. 20-3



2030 No Build Network:  
Freeway PM Peak Period  
Hours of  
Level of Service E & F

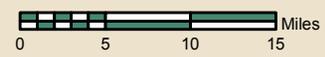


- Less than 1
- Greater than 1
- Freeways
- Highways
- Other Roads
- County Boundary

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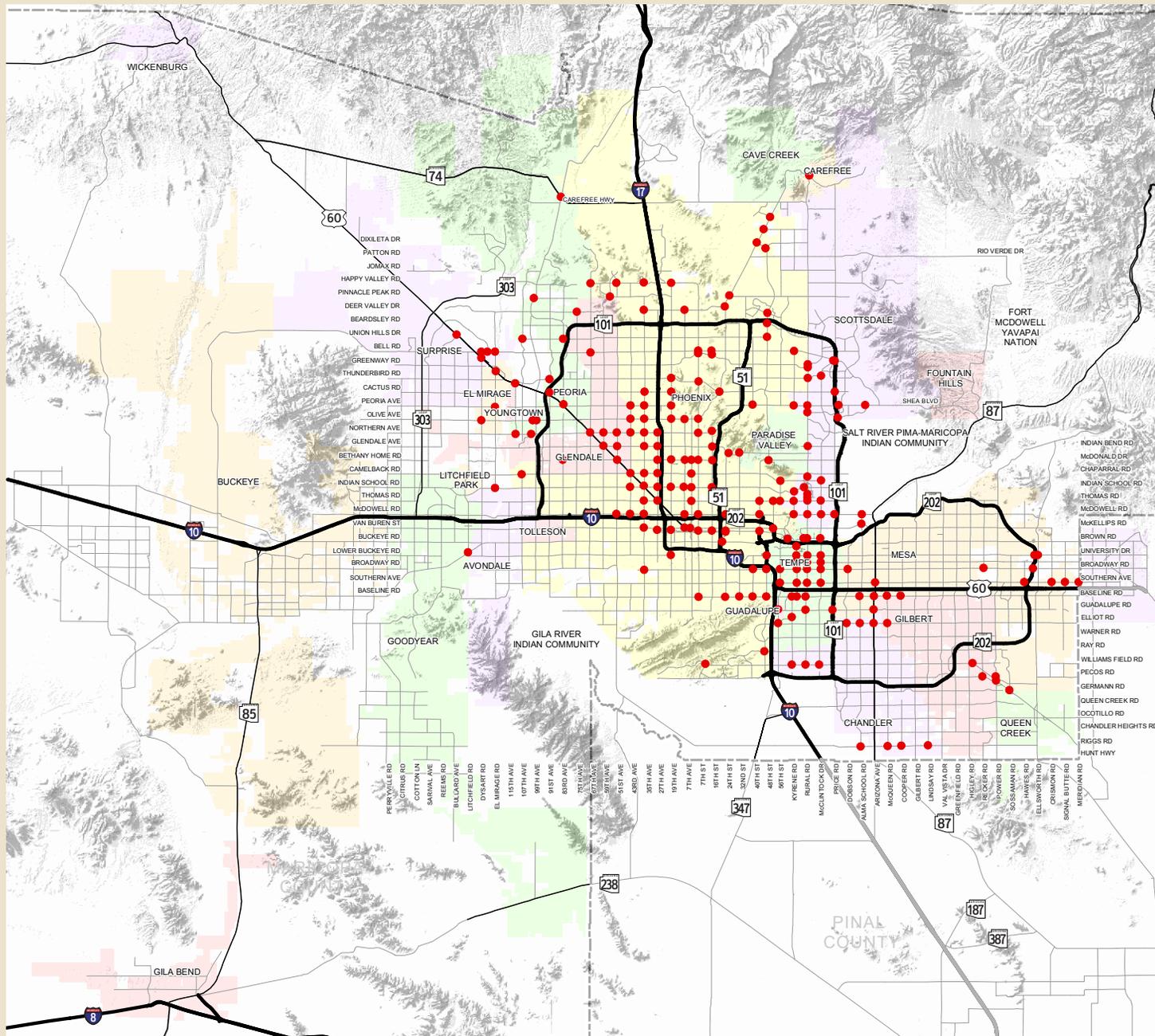


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Regional Transportation Plan  
Fig. 20-4



2008 Base Year Network:  
Intersections  
PM Peak Period  
Level of Service E & F

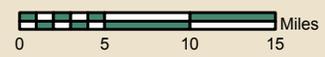


- Level of Service E & F
- Freeways
- Highways
- Other Roads
- County Boundary

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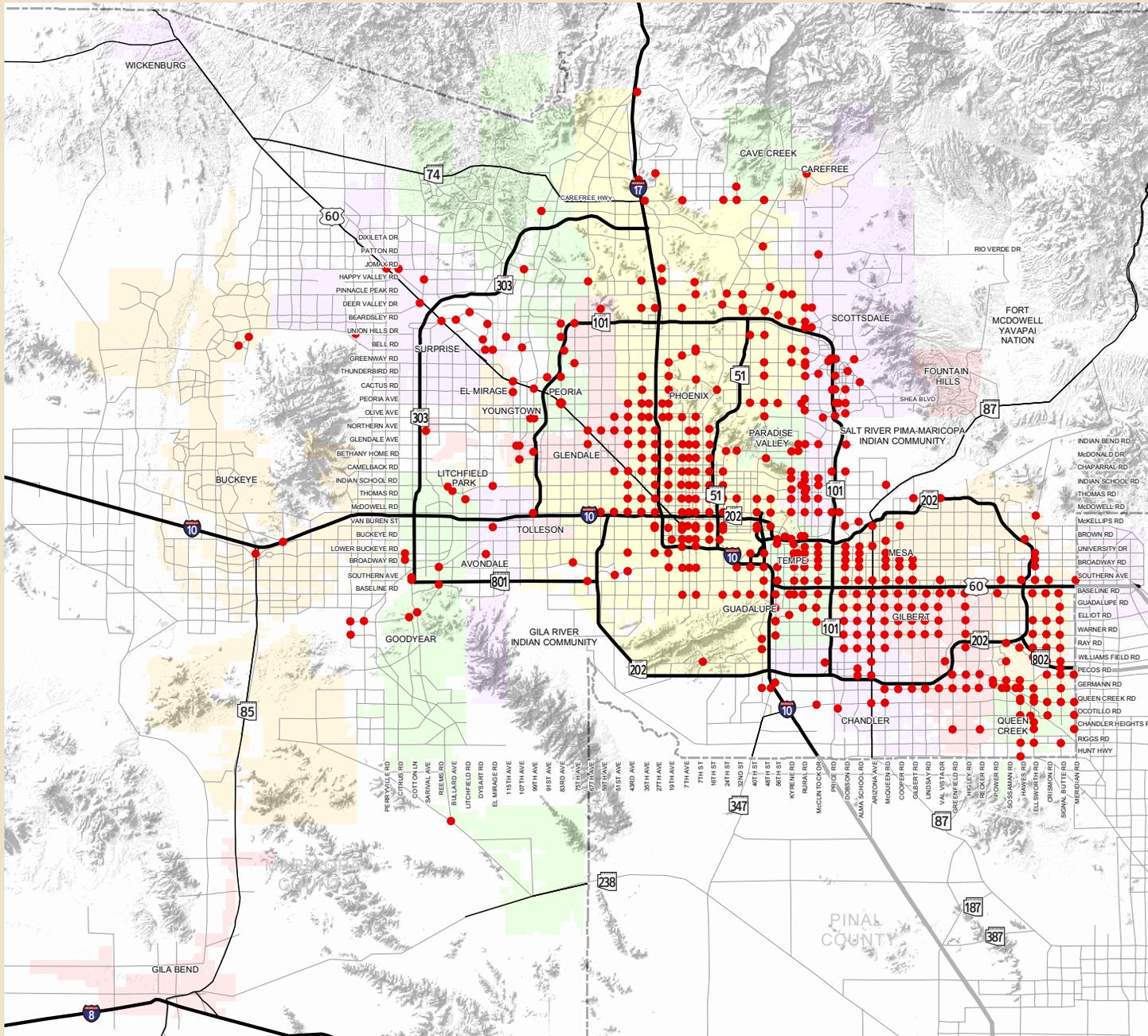


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2010 Update  
Regional Transportation Plan  
Fig. 20-5



2030 RTP Network:  
Intersections  
PM Peak Period  
Level of Service E & F



- Level of Service E & F
- Freeways
- Highways
- Other Roads
- ⊔ County Boundary

Alignments for new freeway, highway, arterial, and light rail/high capacity transit facilities will be determined following the completion of appropriate design and environmental studies.

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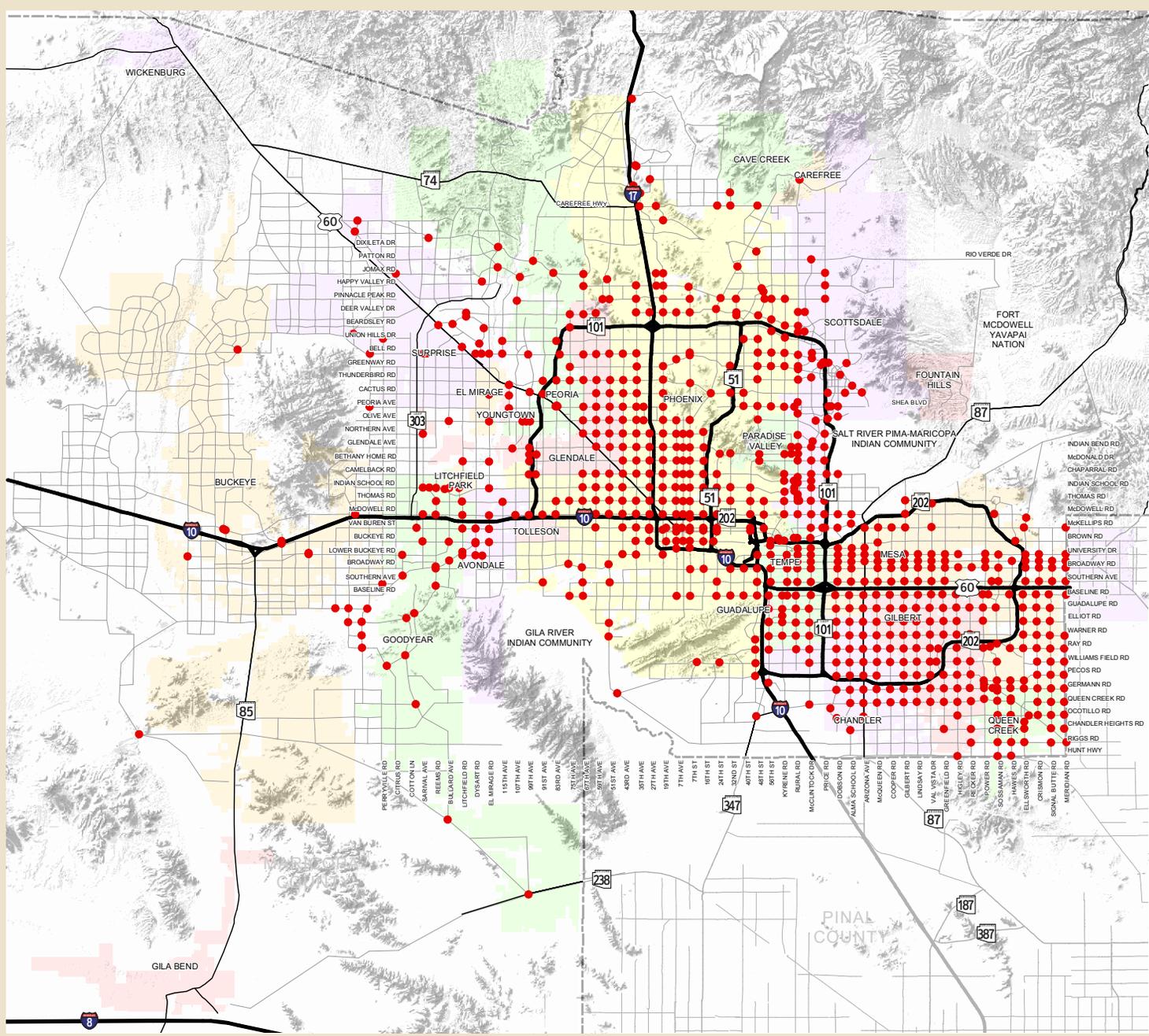
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# 2010 Update Regional Transportation Plan

Fig. 20-6



## 2030 No Build Network: Intersections PM Peak Period Level of Service E & F



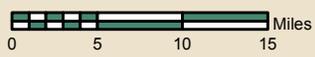
- Level of Service E & F
- Freeways
- Highways
- Other Roads
- County Boundary

*Alignments for new freeway, highway, arterial, and light rail/high capacity transit facilities will be determined following the completion of appropriate design and environmental studies.*

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## Performance Targets and Operating Results

The specific performance measures and targets developed during the Service Efficiency and Effectiveness Study are listed in Tables 20-5 through 20-7. It is important to note that SEES targets for LRT are preliminary, since data only represents one year of service. Results are preliminary and may not be an appropriate basis for final targets until the system continues to operate and mature.

Tables 20-5 through 20-7 also include actual operating results, where available, from the 2006, 2007 and 2008 Transit Performance Reports (TPR). The TPR process is still in a transition between the previous Performance Management Analysis System format and the new TPR. The data presented is based on the findings from the SEES and data available at this time. The modes covered by the TPR includes fixed route bus, paratransit, and, in the future, light rail.

**TABLE 20-5  
FIXED ROUTE BUS PERFORMANCE MEASURES (SYSTEM-WIDE)**

Measure	Target	2006 Results	2007 Results	2008 Results
<b>Cost Efficiency/Effectiveness</b>				
Farebox Recovery Ratio	25%	23.6%	24.2%	22.4%
Operating Cost per Boarding	\$2.49	\$2.29	\$2.62	\$3.05
Subsidy (Net Operating Cost per Boarding)	\$1.88	\$1.75	\$1.99	\$2.37
Operating Cost Per Revenue Mile	\$5.32	\$4.90	\$5.28	\$5.61
Average Fare	\$0.72	\$0.54	\$0.64	\$0.68
<b>Service Effectiveness</b>				
Annual Increase in Total Boardings	3.0%	3.4%	-1.1%	3.5%
Annual Increase in Average Boardings (Weekday/Sat., Sun.)	3.0%, 3.0%	5.0%, 10%, 6%	-1.9%, -2.7%, 1.15%	3.3%, 3.8%, 12.1%
Avg. Boardings per Revenue Mile	2.10	2.15	2.01	1.84

**TABLE 20-6  
PARATRANSIT PERFORMANCE MEASURES**

Measure	Target	2006 Results	2007 Results	2008 Results
<b>Cost Efficiency/Effectiveness</b>				
Farebox Recovery Ratio	5.0%	4.9%	4.4%	4.0%
Operating Cost per Boarding	\$30.61	\$28.55	\$31.97	\$35.33
Subsidy (Net Operating Cost) per Boarding)	\$29.12	\$27.16	\$30.56	\$33.90
Operating Cost Per Revenue Hour	\$53.92	\$50.30	\$55.46	\$59.04
<b>Service Effectiveness</b>				
Annual Increase in Total Boardings	3.0%	3.1%	-1.7%	-2.1%
Boardings per Revenue Hour	1.76	1.76	1.73	1.67
ADA On-time Performance	90.0%	89.8%	95.4%	94.7%

**TABLE 20-7  
LIGHT RAIL TRANSIT (LRT) PERFORMANCE MEASURES**

Measure	Target	Actual FY 10 July 1, 2009 thru June 30, 2010
<b><u>Cost Efficiency/Effectiveness</u></b>		
Farebox Recovery Ratio	25.0%	28.1%
Operating Cost per Boarding	\$3.04	\$2.71
Subsidy (Net Operating Cost per Boarding)	\$2.23	\$1.95
Cost Per Revenue Mile	\$15.43	\$12.39
Average Fare	\$0.82	\$0.76
<b><u>Service Effectiveness</u></b>		
Annual Total Boardings	7,827,000	12,112,733
Boardings Average Weekday	26,090	38,098
Boardings Average Saturday	20,800	27,779
Boardings Average Sunday/Holiday	11,267	16,801
Boardings per Vehicle Revenue Mile	3.94	4.57
Boardings per Revenue Mile	8.04	9.13
Safety Incidents per 100,000 Vehicle Miles	0.874	0.41
Security Incidents per "x" Boardings	2.00	No data
Complaints per "x" Boardings	28	No data
On-Time Performance	95.0%	95.8%
Miles Between Mechanical Failures	25,000	11,738
Customer Satisfaction	89.0%	No data

Fixed route bus service includes local routes, super grid (major arterial routes), Express/Bus Rapid Transit, Circulators, and rural connector routes and shuttles.

### **Performance Monitoring and Assessment Program Outlook**

The MAG Transportation System Performance Monitoring and Assessment Program has been established to provide a framework for reporting performance at the system and corridor levels, and serve as a repository of historical, simulated and observed data for the transportation system in the MAG Region. As part of this effort, the program consolidates the data collection efforts related to system performance and develops an archive of historic and current performance data sets that can be used for future evaluation and analysis. The overall goal of the program is to communicate measures related to mobility and accessibility in the MAG Region, and to continuously provide the public with timely and relevant information on the performance of the multi-modal transportation system.

As mentioned, the Regional Public Transportation Authority has established a specific set of performance measures to monitor and evaluate bus and rail systems in the region, results are

published in the RPTA Annual Transit Performance Report. For roadway systems in the region, a broad range data to support performance measurement activities has been collected and state-of-the-art modeling capabilities are in place. In order to enhance these initial efforts, in June 2008 MAG initiated the Performance Measurement Framework consultant study to further refine and focus the performance monitoring approach for the regional roadway network. A Performance Measurement Framework has been developed with the participation of MAG's member agencies, and will be used for periodic reporting as the implementation of the RTP moves forward. Additionally, recognizing the close relationship between congestion and performance, and in an effort to align key performance measurement indicators with the congestion management process, MAG has combined this study with the Congestion Management Update in order to coordinate results and implementation of strategies. Based on the findings of this study and input from the Transit Performance Report, MAG will annually produce a Transportation System Monitoring and Performance Report.

## CHAPTER TWENTY-ONE

### TRANSPORTATION SAFETY

The Transportation Safety Planning Program at MAG was initiated in 2001 and it continues to be enhanced and expanded. A Regional Transportation Safety Stakeholders Group was formed in November 2001 with representation from member agencies and a broad cross section of safety advocacy groups. In September 2004, the Maricopa Association of Governments (MAG) formed a Transportation Safety Committee, thus clearly establishing the intent to incorporate explicit safety considerations within the metropolitan planning process. In October 2005, the committee completed the process of developing and adopting the region's first Strategic Transportation Safety Plan, a task that was begun in 2002 by the Stakeholder's Group. The authorization of the Federal Safe, Accountable, Flexible, and Efficient Transportation Equity Act – A Legacy for Users (SAFETEA-LU) in 2005 and the new Highway Safety Improvement Program (HSIP) was expected to result in an increase in federal resources for road safety improvements. However, SAFETEA-LU did not provide in any new funding source for road safety, except for a small grant program that addressed Safe Routes to School, administered by the state DOT. The national Highway Safety Improvement Program has provided new guidelines and criteria to be considered when allocating safety resources to problem locations, giving consideration to the number of fatalities, the amount of travel and the lane-miles of public roadway available. Responsibility for the process that allocates safety resources remains with the state DOT.

In August 2008, Arizona DOT announced a new process for allocating HSIP resources across the state. This process is depicted in Figure 21-1. Based on this process the MAG region can expect to receive annually nearly \$987,000 for safety improvement projects managed at the regional level. In addition, deserving projects could also compete for the 70 percent HSIP, managed by Arizona DOT.

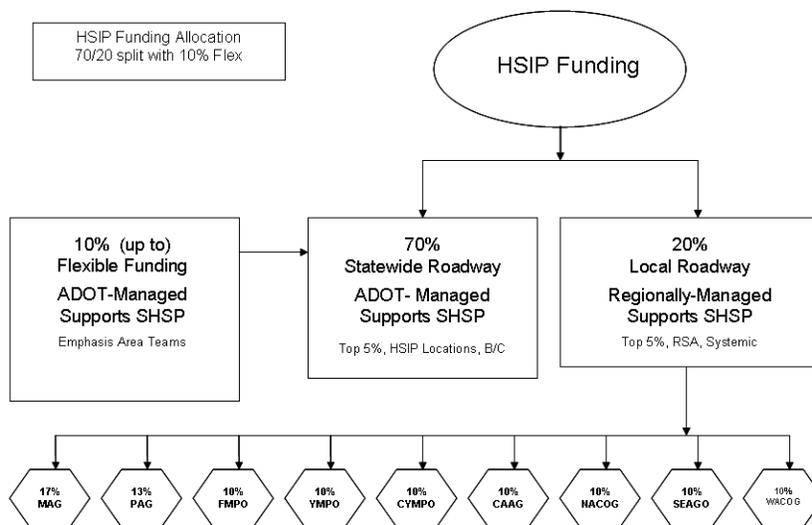


Fig 21-1 New HSIP Funding Allocation in Arizona

An effort is currently underway, led by the Transportation Safety Committee to develop a network screening methodology for identifying high risk crash locations in the region for potential road safety improvement projects. The MAG region stands to benefit from the new Arizona DOT process that is focused on allocating resources to areas in the state where road safety problems are most severe. In the current process there is no specific sub allocation of road safety funds for the region. All local agencies across the entire state have access to 25 percent of federal road safety improvement funds, available through an application review process established by the Federal Highway Administration and the Arizona DOT. Projects are screened selected based on an application process.

As the largest population center in the State (at 60 percent of Arizona's total population), the MAG Region experiences a significant portion of the negative road risk/safety consequences that occur in Arizona. Recent crash statistics show that nearly 66 percent of all crashes, and 40 percent of all fatal crashes in Arizona, occur in the MAG Region. Historically, the region has not been able to obtain more than about 5 percent of the state's road safety funds for improving safety in the most populous region in the state. The proposed HSIP process attempts to address this disparity.

### **MAG Transportation Safety Planning**

Transportation safety is addressed at two levels within the MAG planning process. The first involves the consideration of road safety as a criteria in comprehensive planning, such as the MAG Regional Transportation Plan (RTP), where decisions are made on large investments in regional transportation infrastructure. These planning decisions, made at the regional level on infrastructure investment priorities, have a significant indirect impact on the long-term road safety provided by the transportation system. This decision making task is supported by an assessment of the different regional transportation alternatives from a safety viewpoint. The four-step Urban Transportation Modeling System (UTMS) is typically used to forecast future travel demand on the future transportation system. The methodology used by MAG for safety impact assessment of transportation alternatives utilizes results from the travel demand forecasting step and estimates the total number of crashes in the system, based on the forecasted traffic volumes. Simplified models that utilize historical crash data and crash rates for different road types are used to estimate the number of crashes and their consequences. It should be noted that the forecasting of road safety consequences of planning alternatives, at the macroscopic or regional level, is largely based on the stability of crash rates and their historical trends.

At the second level, transportation safety planning is addressed more strategically and addresses short to medium-term needs, comprehensively described in the 2005 MAG Strategic Transportation Safety Plan. This Plan identifies general strategies and potential actions to be carried out with oversight provided by the MAG Transportation Safety Committee. This process includes cross-cutting safety initiatives that would also involve other stakeholder groups. An example is a road signage project that was launched in FY 2007, developed in cooperation with the MAG Elder Mobility Stakeholders to improve road safety for older road users. Another on-going project is developing a Regional Transportation Safety Information Management System (RTSIMS). One of the products from this system will be period reports on the state of road safety in the region.

As a result of the new HSIP funding allocation, a significant increase is anticipated in federally funded road safety projects in the region. New clarifications on funding eligibility provided by the Federal Highway Administration have also opened opportunities for improving traffic operations that would contribute to overall road safety improvements.

All transportation safety planning activities at the regional level are closely coordinated with similar planning at the state level. MAG was an active member of the Governor's Traffic Safety Advisory Council (GTSAC), established in 2004 through an executive order by the then Governor Janet Napolitano. The Council was responsible for the annual preparation and recommendation of the State's Strategic Highway Safety Plan for approval by the Governor. The GTSAC structure that provided oversight for safety planning at the state level is currently under review.

### **Road Safety Experience in the MAG Region**

The Transportation Safety program utilizes the MAG website extensively for sharing information on the road safety experience or safety performance in the region. This information is generated through safety analyses performed by MAG staff. The crash data used in these analyses are provided to MAG by the Arizona DOT. Community leaders, citizens, public and private agencies and local media often interested in road safety issues can now refer to accurate safety information and indicators provided at the website.

Appendix G provides a range of statistics on the safety experience in the MAG area. In 2008, the economic loss due to vehicular crashes in Maricopa County was estimated to be nearly \$1.5 billion. A total of 372 lives were lost due to road crashes in 2008, and nearly 35,800 persons seriously injured due to crashes in the region. From 2006 to 2008 a significant decline has occurred in the total number of crashes, injuries and deaths. The total number of fatal crashes in Maricopa County was at this level fifteen years ago, back in 1994. This decline in road crashes has also been noted across the nation in all communities, and is attributed primarily to large declines in total travel caused by the unfavorable economic conditions. In comparison, between 1994 and 2006 total crashes have increased by 50 percent, total injury crashes have increased by 7 percent, and the number of total fatal crashes increased by 66 percent. During this period the population in the Maricopa County has increased by 46 percent to 3.8 million.

Planning data at MAG indicate that about 60 percent of state's population lived in Maricopa County and 53 percent of the state's travel (measured in vehicle miles of travel or VMT) occurred in Maricopa County. Consistent with these levels, Maricopa County generally represents about two-thirds of all injuries in the State due to motor vehicle crashes and about 40 percent of fatalities. In 2008, 372 lives were lost and nearly 35,800 persons injured within the MAG region. The State of Arizona has been identified by the USDOT as an "opportunity state" for road safety improvement, due to the State's poor road safety record. Statistics indicate that a substantial part of the state's poor road safety record could be attributed to the experience in the MAG region. This points to the need for a comparable investment of the state's road safety resources in the MAG region.

### **Freeways**

The urban freeway system currently consists of I-10, I-17, US 60, SR 51, SR 143, Loop 101 and Loop 202. Crash statistics clearly indicate that the urban freeway system is a safer road environment in comparison to the arterial street network. The freeway system carries about 40 percent of all the trips made in the region, but experienced only 23 percent of all crashes, and 18 percent of fatalities in 2008.

Different freeway corridors in the region have differences in road geometry, traffic demand, vehicle composition etc. For example, much of the I-17 corridor does not have emergency shoulders on the left side. The I-10 corridor is a major national truck route and carries a high percentage of trucks. A comparison of road safety levels also requires the consideration of total traffic flow or traffic exposure. An accepted measure for traffic exposure is the number of vehicles miles traveled

on a facility, expressed in millions of vehicle miles traveled (MVMT). Based on the crash rate per million vehicle miles traveled, I-17 had the highest crash rate above 2.00, while Loop 202 had the lowest with a rate near 1.50.

The overall safety on the regional freeway system has been enhanced through several MAG-sponsored safety projects launched in the past, such as the implementation of Cable Median Barriers and the Freeway Service Patrol Program. The Freeway Management System (FMS) operated by Arizona Department of Transportation (ADOT) is another contributor to improved safety on freeways. The Arizona DOT's FMS staff are on duty 24-hours a day and 365 days a year monitoring the state's freeway system and rest of the state highway system. They are responsible for the operation of electronic signs, ramp meters and traffic surveillance cameras, currently installed on nearly 100 miles of urban freeway. There is close coordination between the FMS operators, the Department of Public Safety, local law enforcement and local transportation agencies. Nearly all freeway traffic advisories broadcast on local radio stations, television channels, and the internet are based on information generated by the FMS. This information is made available to media at no cost. Expansion of the FMS to cover the entire urban freeway system is recognized as a regional priority and is funded in the RTP (see Chapter 17). Excessive speeding and occasional incidents involving road rage continue to pose a threat to road safety. The Department of Public Safety continues to monitor and address threats to overall safety through enforcement.

The use of both fixed and mobile photo radar cameras on the urban freeway system appears to have reduced speeding. Their effect on overall road safety remains to be determined based on an analysis of crash statistics.

### **Arterials and Local Streets**

On the arterial street system most severe crashes occur at intersections and they are a major traffic safety concern in the region. This is mainly due to the number of conflicting movements possible at intersections. The arterial street system carries nearly 60 percent of all travel in the region but experiences nearly 80 percent of all crashes in the region, and also 80 percent of crashes involving injuries or fatalities. In 2008, of the 60,610 crashes that occurred on the arterial system 30,684 or 51 percent occurred at or near intersections. Of these crashes at intersections a total of 10,759 crashes or 35 percent resulted in either a fatality or serious injury. These statistics clearly point to the need for improving safety at intersections on the arterial street system in the region.

Speeding and red light running are the key contributory factors for the more severe intersection crashes. Past studies by the Insurance Institute for Highway Safety have identified Phoenix and Mesa as having high red light running crash rates based on population. A number of MAG jurisdictions have installed automated photo-enforcement systems to address speeding and intersection red light running.

Recent crash statistics indicate that, following the declining trend for all crashes between 2006 and 2008, the arterial crash numbers have also been declining. While this indicates a reduction in crash consequences, the root cause of this reduction is more likely due to reduced travel than to any significant change or improvement in road safety practices.

### **Bicycle Facilities**

Developing safe bicycle facilities or bikeways as an integral part of a multi-modal transportation system in the MAG Region, and making bicycling a viable option for daily travel trips is a stated goal of the Regional Bicycle Plan. Other goals include, educating bicyclists and motorists in order to

increase safety on shared roads, and educating engineers and planners on bicycle safety issues. The 2005 MAG Strategic Transportation Safety Plan has identified a number of goals, strategies and actions for improving bicyclist or pedestrian safety. A few of the goals and strategies are:

- **Goal # 1** - Reduce the number of crashes that involve bicyclists or pedestrians, by educating bicyclists on road safety; and promoting bicyclist training programs for youth and adults in coordination with Coalition of Arizona Bicyclists.
- **Goal # 2** - Improve safety on access routes to schools, by establishing recommended walk or bike routes to school, promoting Safe Routes to Schools programs, training crossing guards, encouraging safe driving near schools, and sponsoring new legislation on school citing.

It is difficult to obtain a comprehensive assessment of the safety of bicycle users, as crash data are available only for crashes on public roads that involve at least one motor vehicle. Available information indicates that total bicycle crashes decreased by 26 percent between 1999 and 2008. However, the short-term pattern since 2006 indicates an increasing trend in total bicycle crashes. This is possibly a consequence of more exposure due to more people riding bicycles due to elevated gasoline prices in 2008 and the poor economy.

### **Pedestrian Facilities**

Although the percentage of pedestrian crashes in the region is relatively small, pedestrian safety is a primary area of concern due to very high fatality rates. In recent times, national studies have referred to Phoenix and Mesa as having very high pedestrian fatality rates. Total pedestrian crashes in the MAG area have decreased by nine percent between 1999 and 2008.

The 2005 MAG Strategic Transportation Safety Plan collectively addresses the topic of bicyclist and pedestrian safety as many of the road safety issues are common to both modes of movement. Some of the goals identified in the Plan are: (1) incorporating safety considerations in pedestrian facility planning, (2) promoting safe multimodal access, and (3) reducing mid-block pedestrian crashes.

### **Younger and Older Drivers**

Both road safety research and literature have documented that both younger drivers (of age less than 25 years) and older drivers (of age more than 65 years) are associated with elevated risk for vehicular crashes, based on their historical involvement in crashes. The total number of younger drivers involved in crashes each year has steadily increased until 2006 and have declined since then. A similar trend is observable for crashes involving older drivers. Both these trends seem to reflect the overall drop in crashes observable across all types of crashes.

Older drivers have been observed to be particularly susceptible to crashes at intersections. Safety issues are always considered by local agencies when existing intersections are improved, such as the addition of a left-turn lane or a left turn protected signal phase. The adequacy of street signs and pavement markings are potential safety issues confronted by older drivers. The need for better signage was addressed through a recent regional project carried out by MAG. This project, involving fifteen member agencies, has introduced Clearview font to the street name sign practice in the region. A few participating agencies have already begun using Clearview font for all their street name signs. Local agencies continue to explore other initiatives that would assist older drivers, such as including protected left-turn signal phasing and turning lanes at intersections.

## **Transit Riders and Operators**

Through the procurement process for transit operations, RPTA requires operators to be apprised of safety and security issues, as well as to perform multiple functions related to safety of capital equipment. Contract incentives are provided for preventable accidents. Future improvements to safety and security in transit vehicles are being addressed through RPTA's Vehicle Management System Plan.

## **Strategic Transportation Safety Plan**

The Strategic Transportation Safety Plan was developed in 2005 by the MAG Transportation Safety Committee as an immediate planning measure to address road safety needs in the region. It outlines specific goals and actions for improving safety generated by three working groups that focused on: (1) Roadways; (2) Enforcement, Education and Emergency Medical Services, and (3) Pedestrians and Bicycle and Transit Users. A summary of these goals is shown in Table 21-1.

When developing the Plan, the safety stakeholders in the region expected that new funding would come from the much anticipated SAFETEA-LU reauthorization. Although SAFETEA-LU has created a new core program for safety called the Highway Safety Improvement Program (HSIP), no additional Federal funding has been made available to the states for improving safety. Therefore, the implementation of the Strategic Transportation Safety Plan is expected to occur through safety projects and initiatives launched at State, regional and local levels utilizing traditional funding sources. Lead agencies identified in the Plan have agreed to explore ways to pursue action under each goal. The identification of Lead Agencies was based on the alignment of each agency's mission with respect to the goals, and did not involve any commitment of current or future agency resources.

## **Related Safety Planning Activities**

Several safety projects and priorities identified in the Strategic Transportation Safety Plan are being carried out with programmed funds. Brief descriptions of these are provided below:

### **Regional Transportation Safety Information Management System (RTSIMS)**

The 2005 MAG Strategic Transportation Safety Plan recognized the need for an information management system that would provide the ability to extract safety performance information from transportation safety/crash data. Such a system would be a very useful tool to gain a thorough understanding of road safety issues and risks across the MAG region. This need was also recognized by MAG in 2001, and the resulting discussions with Arizona DOT led to the programming of a project to develop the RTSIMS. The project has been scoped into three separate phases. The first of two projects identified for Phase 2 has been completed. The second project will be completed during FY 2010. The resulting information system will enable the generation of safety/crash analyses and reports for the entire MAG region, for any selected jurisdiction, or a selected freeway or arterial corridor.

**TABLE 21-1  
SUMMARY OF SAFETY GOALS**

<b>Goal</b>	<b>Roadway Safety</b>	<b>Enforcement, Education, EMS</b>	<b>Pedestrian, Bicycle, Transit</b>
<b>1</b>	Develop a reliable and an efficient method to assess the safety performance of the regional transportation system.	Improve the overall public awareness on key road safety issues.	Reduce the number of crashes that involve bicyclists and pedestrians.
<b>2</b>	Promote road safety audits	Reduce crashes related to DUI, Speeding, red-light running and the illegal passing of stopped school buses.	Improve safety on access routes to schools.
<b>3</b>	Better utilize available road safety funds.	Strengthen driver training and licensing standards.	Incorporate safety considerations in pedestrian and bicycle planning.
<b>4</b>	Reduce the crash clearance time.	Reduce time to respond and clear crash sites.	Promote safe multi-modal access.
<b>5</b>	Reduce severe intersection crashes.	Educate the public on safe actions to take at road crash sites.	Reduce mid-block pedestrian crashes.
<b>6</b>	Improve traffic safety in work zones.		Enhance Transportation Security.
<b>7</b>	Conduct safety reviews of proposed LRT and BRT operations starting at design.		
<b>8</b>	Improved lighting, signage and delineation for older road users.		
<b>9</b>	Improved lighting, signage and accessibility for physically handicapped users.		

### **Freeway Service Patrol**

A MAG project launched the region's first Freeway Service Patrol (FSP) Program in 2001. This service delivers prompt assistance, provided by Roadside Motorist Assistants driving fully-equipped patrol vehicles, to motorists stranded on the regional freeway system. It is staffed by civilian employees of the Department of Public Safety (DPS) and funded through an agreement between ADOT and DPS. Launching of the program and the first two-years of capital equipment and operations were funded through a MAG pilot project. More than 10,000 motorists are assisted by FSP each year (See Table 17-1). The services rendered by FSP have clearly made significant contributions to improving overall safety on the urban freeway system. Similar patrols in other regions of the nation have been documented to yield cost-benefit ratios that exceed 1:35. Funds for the FSP program, through 2026, have been identified in the RTP as part of the region's transportation system management program.

### **Regional School Crossing Guard Training Workshops**

Until 2006, the City of Phoenix had been providing training to School Crossing Guards through a structured workshop for nearly 40 years. While this workshop was mainly focused on schools

within the City of Phoenix, a few schools from adjacent jurisdictions also benefited. In 2006, staff from MAG, City of Phoenix and a few other member agencies developed a regional training workshop for School Crossing Guards. It is based on the workshops conducted by the City of Phoenix and the City's national award winning school safety program. These regional workshops have now been held on three successive years. Based on the demand for this training, it is likely to be an annual road safety training event sponsored by MAG. In 2008, two training workshops were held covering both the east and west valleys. A total of 375 crossing guards were provided basic safety training at these two workshops. MAG also produced a road safety video documentary titled "Guardians of Future" that explains safety procedures that need to be followed at yellow crosswalks. It is available in both English and Spanish versions and was used in the training workshops. Copies of this video documentary have been distributed to nearly 975 schools in Maricopa County, and all public school districts in the region.

The state's Safe Routes to School Program has recently provided a grant to MAG that will be used to purchase Safety Kits to be provided to all crossing guard trainees attending the 2009 workshops, to be held in the City of Peoria and the City of Mesa. Many agencies and school districts from other parts of Arizona and around the nation have made inquiries about this program.

### **Arizona's Safe Routes to School (SRTS) Program**

In recognition of the importance of safety on access routes to schools, the SAFETEA-LU reauthorization created a new national program for Safe Routes to School (SRTS). States have been encouraged to allocate funds and create this new program, with a minimum of \$1 million statewide for school safety each year. The Arizona DOT allocated \$2,600,000 in the most recent cycle of SRTS awards that were finalized in early 2008. Any city, town, county, Indian Community, K-8 school or non-profit organization is eligible to apply for funds to carry out qualifying SRTS projects. The large number of applications typically generated by this region, clearly points to the need for improving safety on access routes to school and the interest among various safety advocates. The FY 2008 SRTS grants resulted in seven awards to the region. Member agencies are supported and encouraged to apply for these SRTS grants and utilize them to develop SRTS programs at local agencies and schools. All SRTS applications are reviewed by MAG and a ranked list of projects recommended to the Arizona DOT. The final selection of SRTS projects is performed by a statewide SRTS panel.

## **CHAPTER TWENTY TWO**

### **TRANSPORTATION SECURITY**

The purpose of this chapter is to provide an overview of transportation security, and to discuss security-related issues and ongoing efforts that are currently being coordinated to protect transportation networks and facilities at the Federal, State and regional levels. This chapter will consider a variety of responses to national security issues as they pertain to transportation, and will focus on a number of agencies and transportation security efforts at various levels of government. While it is acknowledged that there are many smaller agencies, offices, consortiums, groups and committees that are committed to providing various aspects of security, this chapter will address some of the primary governmental and regional efforts that directly impact, assess, or implement measures to protect transportation facilities, systems and networks.

#### **Transportation Security Concepts**

When reviewing transportation security, immediately following the September 11, 2001, terrorist attacks on the United States, many agencies began to develop and implement policies and programs to provide for the safety and security of the nation's transportation networks. Also, recent attacks on foreign public transit systems have heightened the need for increased transit security efforts in American cities. Although programs for transportation safety have been around for many years, the concept of planning for transportation security and implementing security procedures on different modes of transportation is relatively new. In some cases, the phrases "safety" and "security" are used simultaneously or interchangeably by many agencies to describe planning or programming components of broader transportation programs or initiatives. However, the intent of the words "safety" and "security" are different from one another. By definition, safety can be described as the "freedom from danger," whereas security is the "freedom from *intentional* danger." While implementing safety programs for transportation is intended to protect the motoring and non-motoring public by reducing fatalities, injuries and crashes, the implementation of security measures and security programs are developed to identify and prevent attacks that are intended to harm people, facilities, modes of travel and important transportation infrastructure.

Transportation security efforts consist of programs, measures or initiatives that are primarily focused on an overall transportation system, or network, which collectively comprise our overall means of travel. However, another important aspect of transportation security is concerned with maintaining the American economy and allowing for the free flow of goods. Protecting free trade and allowing for the safe movement of imports and exports is vital to the economy of the United States, and involves providing a high level of security for the nation's overall freight system. Therefore, when considering transportation mobility and the movement of goods, the implementation, or planning for transportation security measures or policies is crucial to protecting important transportation infrastructure. Important infrastructure includes a variety of elements such as roads and freeways; local and regional road networks; bridges; tunnels; emergency access roads; connector roads; railroads; ports; intermodal passenger facilities; intermodal cargo facilities; freight corridors; pedestrian and bicycling networks; airports; pipelines; public transit systems and evacuation corridors.

Another aspect of providing for secure transportation has to do with the subject of “emergency planning.” While transportation security is directly related to preventing attacks that are intended to harm people and damage facilities, harm modes of travel, and harm important transportation infrastructure, emergency planning is intended to respond to unforeseen natural events and disasters. A security incident is one that directly pertains to acts of terror resulting in regional, local or specific-location attacks on people, sites, facilities, or transportation infrastructure; whereas emergency response planning efforts maintain responsibility for preparedness, and response and recovery to natural disasters such as earthquakes, floods, hurricanes, violent weather, fires, and similar incidents. However, there are several agencies that coordinate on security and safety matters for the purpose of homeland security. The term “homeland security” refers to domestic governmental actions designed to prevent, detect, respond to, and recover from acts of terrorism, and also respond to natural disasters. Homeland security is a definition, or broader concept that typically refers to a concerted, national effort to protect the homeland by all levels of government at the Federal, State, local and tribal levels, for the sole purpose of protecting the territory of the United States from internal and external hazards.

The following sections of this chapter will address a variety of transportation security efforts at various levels, and also provides a summary that identifies the Maricopa Association of Governments (MAG) future role in regional transportation security efforts. The information located within Table 22-1 identifies a list of Federal agencies, State agencies, and regional efforts within the MAG Region that actively address transportation security concerns on a regular basis. Table 22-1 displays each agency responsible for addressing the primary transportation “sectors of concern” relating to roads, transit, air transportation facilities, cargo facilities and commodity movements, and transportation security planning. While these efforts may range from the active implementation of programs and measures, to lesser actions of simply coordinating activities with other agencies, the role of each agency enhances security on the MAG regional transportation network. The agencies identified in Table 22-1 collectively represent a multifaceted and layered approach to protecting and maintaining security, and responding to potential incidents throughout the MAG Region.

### **U.S. Department of Transportation Programs**

The U.S. Department of Transportation is responsible ensuring a fast, safe, efficient, accessible, and convenient transportation system that meets national interests and enhances the quality of life for the nation’s citizens. The department consists of 11 administrations, which are collectively responsible for establishing national transportation policies pertaining to highway planning, development and construction; mass transit; aviation; railroads; ports, waterways and pipelines; and transportation safety and security issues. Individual administrations coordinate with officials at the State, regional and local levels on fiscal, regulatory, administrative and policy-related matters. Although each administration with the U.S. Department of Transportation is involved with different aspects of transportation security, the following information will provide a brief overview of agencies that are directly involved in various aspects of MAG’s regional transportation system. These agencies include the Federal Highway Administration, the Federal Transit Administration, the Federal Railroad Administration, and the Federal Aviation Administration.

TABLE 22-1

<b>AGENCIES AND TRANSPORTATION SECURITY EFFORTS BY SECTOR OF CONCERN</b>					
<b>AGENCY</b>	<b>SECTOR OF CONCERN</b>				
	<b>Roads</b>	<b>Transit</b>	<b>Air Transportation Facilities</b>	<b>Cargo Facilities and Commodity Movements</b>	<b>Transportation Security Planning</b>
<b>US DEPARTMENT OF TRANSPORTATION</b>	•	•	•	•	•
• Federal Highway Administration	•				•
• Federal Transit Administration		•			•
• Federal Railroad Administration		•			•
• Federal Aviation Administration			•	•	•
<b>U.S. DEPARTMENT OF HOMELAND SECURITY</b>	•	•	•	•	•
• Transportation Security Administration			•	•	•
• U.S. Customs and Borders Protection			•	•	•
• Federal Emergency Management Agency	•				
<b>TRANSPORTATION RESEARCH BOARD</b>					•
<b>STATE OF ARIZONA</b>					
• Arizona Office of Homeland Security	•	•	•	•	•
• Arizona Department of Public Safety	•				•
• Arizona Department of Transportation	•	•	•	•	•
<b>REGIONAL EFFORTS</b>					
• Maricopa County Department of Emergency Management					•
• Maricopa Association of Governments 911 – Emergency Telephone					•
• Regional Public Transportation Authority/Valley Metro		•			•
• Valley Metro Rail		•			•

## **Federal Highway Administration**

The Federal Highway Administration (FHWA) is responsible for ensuring that the nation's roads and highways are safe and efficient, and have access to the most current forms of technology that allows for a high-level of system performance. Through a variety of programs, the FHWA provides technical and financial support to State, local and tribal governments in an effort to allow for the construction, improvement, and preservation of the National Highway System. Assistance is also provided for roads on Federal lands, such as national parks and forests.

In time of national disasters or external security threats, the National Highway System serves as an essential component of the nation's defense mobility. The FHWA often conducts emergency preparedness meetings with State officials and members of the U.S. Military to specifically address a variety of issues pertaining to military deployment coordination during times of natural disasters and national security emergencies. The FHWA has worked with the U.S. Department of Defense, and is committed to strengthening deployment coordination and military mobilization during security emergencies by enhancing the conditions of the Strategic Highway Network (STRAHNET) and its connectors.

Shortly after September 11, 2001, the FHWA set up a National Infrastructure Security Committee at the U.S. Department of Transportation, to address intermodal security issues across the United States. Since then, FHWA has worked with States and a variety of local transportation agencies to increase the awareness and understanding of emergency planning and security operations. During September of 2003, the FHWA provided recommendations for maintaining national bridge and tunnel security. This was primarily done to develop strategies and practices for deterring and mitigating potential attacks. The FHWA has also worked with a number of states to identify vulnerable transportation facilities, and has conducted regional emergency management workshops. The FHWA has also supported communication links between public safety departments and the agencies responsible for providing operations; addressed the deployment of Intelligent Transportation System (ITS) projects; prepared a number of case studies addressing transportation security responses; and continues to meet with a variety of officials to discuss security issues as part of their ongoing coordination efforts.

## **Federal Transit Administration**

The Federal Transit Administration (FTA) provides financial assistance to develop new transit systems throughout the country, and to improve and maintain other transit systems that are already in existence. The FTA is responsible for distributing grant funds to State and local transit providers, who in turn are responsible for operating their own systems and programs in accordance with Federal guidelines. The FTA also oversees many initiatives and programs that are directly related to transit, livable communities, financing, database maintenance, human services coordination, and Intelligent Transportation Systems (ITS). Although the FTA oversees many different aspects of transit, public transportation throughout the MAG Region is primarily limited to buses, maintenance facilities, vanpools and paratransit vehicles. However, as specified in the MAG Regional Transportation Plan (RTP), the FTA will provide funding for light rail's 20-mile Minimum Operating System within the cities of Tempe, Mesa and Phoenix, which will be fully operational during 2008. It is also assumed that the FTA will provide funding for future light rail extensions throughout the urban area of metropolitan Phoenix.

The FTA has also been very active through their attempts to develop a number of security measures. A primary focus of FTA is to integrate security throughout individual transit-provider programs, operations and transit infrastructure. In an effort to protect the general public from threats and terrorist attacks, the FTA has implemented provisions for direct funding and providing initiatives and assistance to local transit agencies throughout the country. In response to the September 11, 2001, terrorist attacks on the United States, the FTA announced a Five Point Initiative. FTA has begun the implementation of this initiative by assisting transit agencies in completing vulnerability assessments of their respective systems; by deploying technical assistance teams to a number of transit providers; by awarding grant funds to conduct emergency drills; by accelerating technology and research projects and initiatives by providing facilitated training; and by working to form regional collaborations and networks for the purpose of responding to security and emergency situations.

The FTA also addressed security issues by developing a comprehensive list of Security Program Action Items for transit corporations and agencies, which represent the most important elements for incorporation into individual System Security Program Plans. These items are based on good security practices identified through FTA's Security Assessments and Technical Assistance that is provided to the largest transit agencies. FTA is working with transit agencies to incorporate these practices into their programs.

In another effort to assist transit corporations and agencies throughout the country, FTA has developed a comprehensive, 20-point list of entitled *Security Program Action Items*. This checklist was specifically developed for transit agencies to incorporate the most important security elements pertaining to transit into their System Security Program Plans (SSPS). The items on the checklist are based on a compilation of best security practices that were identified through FTA's technical assistance and outreach efforts to develop security assessments for transit agencies and corporations. FTA also assesses a number of transit operation elements, and recommends the concept of integrating layered security systems into transit operations. The FTA also coordinates activities with the Transportation Security Administration, the intelligence community, and transit agencies and corporations throughout the country in an effort to continually enhance its transit security strategies.

### **Federal Railroad Administration**

The Federal Rail Administration (FRA) is primarily responsible for enforcing rail safety; providing a number of assistance programs related to rail; addressing issues related to intermodal transportation; and conducting research for rail transportation policy and safety. The FRA is also responsible for addressing security-related issues. Through joint efforts with the U.S. Department of Homeland Security, the Transportation Security Administration (TSA), and the Federal Transit Administration (FTA), the FRA is working toward establishing initiatives that are intended to enhance security efforts. The FRA's efforts have been directed at addressing both passenger rail and freight rail security issues.

Shortly after the terrorist attacks on September 11, 2001, the FRA worked closely with the U. S. Department of Homeland Security to conduct comprehensive vulnerability assessments on passenger rail networks that operate in highly dense urban settings. The FRA is responsible for administering Federal grants to the Amtrak rail system throughout the United States, and has been working toward the assessment of Amtrak's nationwide passenger rail system in an effort to ascertain passenger rail's level of preparedness toward external security threats and acts of terrorism.

When assessing the movement of freight over rail corridors, the FRA also works with the U.S. Department of Homeland Security on issues related to implementing security action items on the movement of hazardous materials.

The FRA also works with the Association of American Railroads, which is a consortium of the nation's major freight railroads. Shortly after September 11, 2001, the Association of American Railroads assessed the nation's 142,000-mile rail system, and focused on areas pertaining to the identification and protection of critical assets; the movement and transportation of hazardous materials; freight operations; and the intensification of inspections. As a result of this assessment, they created a full-time operations center referred to as the Railway Alert Network (RAN), which is certified by the U.S. Department of Defense. This center works to monitor various levels of intelligence on potential threats to the national rail network. As part of this process, the Association of American Railroads also created the Surface Transportation Information Sharing and Analysis Center, which collects and analyzes physical and cyber threats to national rail freight security.

### **Federal Aviation Administration**

The Federal Aviation Administration (FAA) is primarily responsible for regulating civil aviation to promote safety and to develop civil aeronautics, new aviation technologies, and to oversee a system of air traffic control and navigation for civil and military aircraft throughout the country. The FAA also works to control aircraft noise, regulates commercial air transportation, and researches and develops the National Airspace System. In addition, the FAA maintains an Internal Security function that specifically works to reduce and eliminate risks associated with terrorism, sabotage, espionage, theft, vandalism and a variety of other criminal acts. Although the FAA has an internal security function, it also maintains an active and open working partnership with the Transportation Security Administration (TSA). The TSA is responsible for screening airline passengers in an effort to minimize security threats. The TSA is also responsible for screening all air cargo materials and onboard airline baggage, and ensures that all commercial air activity is free from potential security risks.

### **U.S. Department of Homeland Security Programs**

The U.S. Department of Homeland Security (DHS) was established during the aftermath of the September 11, 2001, attacks on the nation. The agency is responsible for protecting the security of the United States from external threats and terrorist attacks, and for responding to natural disasters and domestic emergencies. The Department was created from 22 existing Federal agencies, and today consists of a number of directorates and eight other departments. As part of the agency's mission, the DHS leverages resources at the Federal, State and local levels, and thereby coordinates the transition of multiple agencies and layers of government into a single, integrated agency that is focused on protecting the overall security of the American people. As reported by the DHS, there are currently more than 87,000 different governmental jurisdictions at the Federal, State and local levels that are charged with employing homeland security responsibilities. This is a strategy of maintaining a complementary system that connects all levels of government without duplicating efforts, resulting in a "national mission" of security.

The DHS is primarily concerned with items such as border security, critical infrastructure protection, emergency preparedness and response, domestic intelligence activities, biodefense,

researching and implementing security technologies, the detection of nuclear and radiological materials, and the provision of transportation security. Although DHS consists of many agencies that are responsible for national security issues, the agencies listed below have a direct responsibility for overseeing cargo movements and aviation activities within the MAG Region.

### **U.S. Customs and Borders Protection**

The U.S. Customs and Border Protection (CBP) agency is responsible for the overall protection of the country's borders, and for facilitating the flow of legal trade and travel. The CBP prevents terrorists and dangerous weapons from entering into the country, and enforces hundreds of U.S. Trade and immigration laws. The agency processes incoming and outgoing passengers, pedestrians, cargo, vehicles and ships, and protects the nation's borders with Canada and Mexico. The CBP is also responsible for protecting the nation's shorelines. Aside from border patrol enforcement, the CBP is also responsible for processing all incoming trade via truck, rail, ship and sea containers, and for managing the nation's 317 ports of entry at terminals, ports and airports. After September 11, 2001, the CBP established the Container Security Initiative (CSI), which identifies high-risk containers; uses technology to screen high-risk containers at a faster pace; uses smarter and secure, tamper proof containers; and prescreens containers before they are shipped. This level of scrutiny is extremely vital to national security, because once received, the majority of these imported containers are shipped from American ports of entry to all destinations throughout the country, including Arizona.

The CBP is also responsible for maintaining security for incoming trade to Arizona's Foreign – Trade Zones. Foreign-Trade Zones are defined by the CBP as secure areas under customs supervision that are generally considered outside the customs area, upon activation of the zone. Merchandise located in the zone can be shipped in “duty-free” for the purposes of storing, packing, repackaging, assembling or manufacturing. There are currently Foreign-Trade Zones located at Phoenix Sky-Harbor and Mesa Williams Gateway airports. To ensure security, the CBP maintains verification and inspection of incoming shipments at these facilities, and offers a full-range of cargo processing functions. As U.S. ports of entry, shipments coming into the Phoenix Sky Harbor and Mesa Williams Gateway airports are subject to the same levels of scrutiny and enforcement procedures that are implemented at other Foreign-Trade Zones throughout the country.

### **Transportation Security Administration**

The Transportation Security Administration (TSA) was created on November 19, 2001, as part of the Aviation and Transportation Security Act. The agency was created to fill three separate mandates, which included the creation of a new Federal agency with the responsibility for providing security on all modes of transportation; to recruit and train security officers for commercial airports at 450 locations; and to take on the responsibility of screening all commercial luggage and packages for explosives and other threats. The TSA maintains the mission of protecting air passengers, and has deployed Federal air marshals aboard commercial air flights. The Federal air marshals serve as the primary law enforcement entity within TSA, and also work closely with a variety of other law enforcement agencies in order to provide security for airline passengers. The TSA also maintains programs that place an emphasis on law enforcement training teams, canine detection teams, deploying Federal flight deck officers, hazardous materials training, crew member self defense, a registered traveler program, and the implementation of transit and rail inspection pilot programs.

The TSA has also created an Air Cargo Program, which has recommended enhancements to the current security requirements for various types of cargo carried on commercial aircraft.

## **Federal Emergency Management Agency**

The Federal Emergency Management Agency (FEMA) is responsible for preparing the nation for potential hazards, and effectively coordinating and managing a national response to an array of disasters such as earthquakes, hurricanes, tornadoes, fires, floods, hazardous material spills, and terrorist threats. FEMA works in coordination with other organizations and agencies that are part of the nation's emergency management system. Some of FEMA's primary goals are focused on reducing the loss of life and property; minimizing the level of disruption and suffering affiliated with the consequences of a national disaster; serving as the nation's portal for emergency management information and services; and preparing the nation to address issues and consequences associated with terrorist activities. FEMA functions as the independent Federal agency responsible for leading the nation's efforts to prepare for, prevent, respond to, and recover from disasters.

Under the U.S. Department of Homeland Security, FEMA has formed the internal Office of National Preparedness. This FEMA office serves to implement terrorism incident management programs, and is responsible for coordinating efforts with State and local governments to prepare functions that are necessary to manage natural disaster and terrorist related emergencies. FEMA works in coordination with other agencies, and also works to address issues pertaining to transportation mobility and security at different levels of government during times of natural disasters and terrorist attacks.

## **Transportation Research Board**

The Transportation Research Board (TRB) is a division of the National Research Council, and functions within an advisory role to the Federal government and other entities on subject matters of national importance. The primary purpose of the TRB is to promote innovation and progress through solid transportation research. TRB has been very active in the process of providing research on the subject of transportation system security, and has collaborated with all levels of Federal government and the private sector. The TRB conducts special studies on a number of transportation policy issues and research items at the request of the United States Congress, and at the request of government agencies.

## **State of Arizona Programs**

### **Arizona Department of Homeland Security**

Governor Janet Napolitano created the Arizona Office of Homeland Security during March of 2003, in an effort to coordinate activities of the U.S. Department of Homeland Security at all levels of government within the State of Arizona. In 2006, the Arizona Office of Homeland Security became the Arizona Department of Homeland Security. As defined, the mission of the Arizona Department of Homeland Security is to enhance the State's ability to detect and prevent future acts of terrorism and to improve "all hazards" preparedness, response and recovery capabilities. The office coordinates with Federal, State, county, municipal, tribes, citizens, and members of private entities in order to provide security initiatives.

## **Arizona Department of Public Safety**

The mission statement of the Arizona Department of Public Safety is to “protect human life and property by enforcing State laws, deterring criminal activity, assuring highway and public safety, and providing vital scientific, technical, and operational support to other criminal justice agencies. The Arizona Department of Public Safety is comprised of four divisions, which include highway patrol, agency support, criminal investigations and criminal justice support. Aside from providing for safety and law enforcement activities, the Arizona Department of Public Safety is also responsible for responding to security threats and engaging in homeland security and counter-terrorism tactics.

## **Arizona Department of Transportation**

The Arizona Department of Transportation (ADOT) coordinates activities with the U.S. Department of Transportation on a variety of modes for the purpose of providing transportation security, and also works with State and local agencies on issues pertaining to transportation security. Ongoing security efforts and policies by ADOT include the following:

- Utilization of Homeland Security Grant Funds to Support Internal Projects:
  - Continuity of Operations
  - Interoperable Communications
  - Cyber Security
  - Automated Vehicle Location Devices on Critical Vehicles
  - HAZMAT
  - Needs Assessment
  - Vulnerability Assessment
  - Security Locks at Fueling Station Yards (provide fuel for first responders)
  - Video Equipment at key ports of entry
- Internal Programs:
  - Vulnerability Assessment of Highway/Interstate Structures (bridges, tunnels, etc.)
  - Employee Awareness and Training of Emergency Preparedness
  - Homeland Security Threat Level Advisory Checklist
  - Business Continuity/Disaster Recovery Planning
  - Emergency Operations Planning
- Continued Support and Distribution of Public Information via 511 and [www.az511.com](http://www.az511.com)
- Support of State, Regional, and National Programs:
  - National Incident Management System (NIMS) Compliance
  - State Emergency Response and Recovery Plan (SERRP)
  - Participation in Local, Regional, and Statewide Exercises for Emergency Preparedness
  - Participation in Urban Area Security Infrastructure (UASI) Efforts and Exercises

## **MAG Area Programs**

### **Maricopa County Department of Emergency Management**

The Maricopa County Department of Emergency Management is responsible for providing a comprehensive emergency management program for Maricopa County. The department is responsible for coordinating response and recovery activities through the implementation of emergency response plans during and after emergencies. As part of the emergency response process, the county calls for a system that coordinates implementation through assistance from local cities and towns, volunteer agencies, and other agencies and county departments. Some of the departmental functions include assisting with, and developing strategies for homeland security; maintaining and monitoring a warning and communications system; providing disaster assistance training to hospitals and nursing homes; assisting schools with emergency planning; the provision of disaster assistance; assisting in the testing and administration of the Maricopa County Medical Alerting System (MCMAS); maintaining public awareness; and coordinating the activities of several committees for the purposes of implementing emergency management services.

During July of 2004, the Maricopa County Department of Emergency Management developed an *Emergency Evacuation Strategy Plan* for the County, in an effort to address mass evacuation during times of potential security threats, emergencies, and disasters. The study was jointly administered by the Maricopa County Department of Transportation. The *Emergency Evacuation Strategy Plan* examined existing conditions of municipal emergency operations plans, completed a traffic analysis, established evacuation goals, objectives, and agency goals, and developed emergency evacuation strategies for Maricopa County.

### **MAG 9-1-1 Emergency Telephone Number**

In the late 1970s, the Maricopa Association of Governments (MAG) formed a committee to implement the 9-1-1 emergency telephone number system in Maricopa County. This system became operational on September 9, 1985. A MAG Committee comprised of public safety managers meets on a regular basis to make recommendations regarding operational issues, and to guide the purchase of new equipment to ensure system compatibility. The City of Phoenix serves as the contract agent for the system. In January 2003, MAG was awarded a contract by the Arizona Department of Environmental Quality to establish and operate the Community Emergency Notification System/Reverse-911 that provides emergency agencies within the MAG 9-1-1 service area with the ability to notify citizens by telephone (in English or Spanish) of evacuations, security threats, or other emergencies. The system became operational on January 1, 2004. According to the Reverse-911 administrators, for the first six months of 2009 the system had 24 emergency occurrences and placed approximately 16,105 phone calls notifying the public of an emergency.

### **Valley Metro/Regional Public Transportation Authority**

The Valley Metro/Regional Public Transportation Authority (RPTA), or otherwise referred to as “Valley Metro,” is the agency responsible for providing transit planning services to the MAG Region. Valley Metro is by definition a political subdivision of the State of Arizona, and is overseen by a board of elected officials. Valley Metro provides public bus services; provides for the oversight

of dial-a-ride services, vanpool programs and the regional rideshare program; paratransit services; and also promotes the marketing of programs such as the regional Clean Air Campaign and the Maricopa County Trip Reduction Program. Valley Metro provides public transit information to the public, and is also responsible for the operations and maintenance of their vehicle fleets. Valley Metro has a total of 13 member agencies, which include the cities of Avondale, Chandler, El Mirage, Glendale, Mesa, Peoria, Phoenix, Scottsdale, Surprise, and Tempe; the towns of Gilbert and Queen Creek; and Maricopa County.

The Federal Transit Administration (FTA) has been very active through their attempts to work with transit providers across the country to develop security measures, which are intended to protect members of the transit public, and to also protect vital components of transit system infrastructure. With regard to transportation security, Valley Metro currently coordinates a number of activities with FTA. In an effort to assess and respond to security issues, Valley Metro recently completed a Transit Threat and Vulnerability Analysis at several East Valley facilities. This analysis considered general threat conditions and potential vulnerabilities to attacks, and also involved personnel interviews, site visits and documentation review. The analysis findings and mitigation factors were considered by Valley Metro staff, and resulted in a number of recommended actions that will directly respond to potential threats and vulnerabilities. In addition to this effort, Valley Metro is also in the process of completing a *Regional Safety and Security Study*, which is currently in draft form and is anticipated to be finalized during FY 2010. This study will conduct a thorough analysis of the transit system, and address techniques and principles to implement system security requirements.

## **Valley Metro Rail**

Valley Metro Rail, commonly referred to as “METRO,” maintains a System Safety and Security Department that is responsible for establishing requirements for the identification, evaluation, and minimization of safety and security risks during construction, testing, and revenue operations for regional light rail. The department has developed, and is currently administering provisions of a System Safety Program Plan, System Security Program Plan, and Safety and Security Certification Plan. METRO's safety and security programs have been developed in cooperation with the Arizona Department of Transportation (ADOT), which is the designated State Oversight Agency for light rail projects in Arizona.

## **Future Security Program Efforts**

This Chapter provided an overview of agencies at the Federal, State and Regional levels, which collectively address various aspects of transportation security throughout the MAG Region. Since the September 11, 2001, terrorist attacks on the United States, the Federal government and the State of Arizona have taken considerable steps to protect the nation's transportation networks, which include roads, local and regional rail networks, passenger and freight terminals, port facilities, intermodal facilities, transportation infrastructure and transit systems. Many Federal and State agencies have taken leading roles to ensure the implementation of security procedures within Arizona, which also includes the implementation of necessary security measures within the MAG Region.

Federal and State agencies will continue to refine transportation security measures over the years, and work toward closer cooperation, coordination and integration of tasks at all levels of

government in an effort to provide safe transportation networks and facilities throughout the United States. Although MAG does not currently have a direct role in Federal and State Transportation Security policy decisions, in the future, MAG will continue to maintain a supportive regional role for transportation security planning. As the regional Metropolitan Planning Organization, MAG will work to coordinate activities with local, State and Federal agencies and officials in order to provide a regional forum on security issues, and will continue to provide a high level of support for existing and ongoing transportation security measures.

## **CHAPTER TWENTY-THREE**

### **AIR QUALITY CONFORMITY**

As required by the Clean Air Act, an air quality conformity analysis was conducted by MAG on the Draft FY 2011-2015 Transportation Improvement Program (TIP) and the Draft Regional Transportation Plan 2010 Update (RTP), as a whole. The conformity analysis demonstrates that the TIP and RTP are in conformance with regional air quality plans and will not contribute to air quality violations. In its entirety, the conformity analysis demonstrates that the criteria specified in the federal transportation conformity rule for a conformity determination are satisfied by the TIP and RTP. A description of the conformity requirements, conformity tests, and the results of the 2010 Conformity Analysis are summarized below. The 2010 MAG Conformity Analysis supports a finding of conformity for the FY 2011-2015 Transportation Improvement Program and Regional Transportation Plan 2010 Update.

#### **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. Under the federal transportation conformity rule, the principal criteria for a determination of conformity for transportation plans and programs are:

- The TIP and RTP must pass an emissions budget test with a budget that has been found to be adequate or approved by the U.S. Environmental Protection Agency (EPA) for transportation conformity purposes, or interim emissions tests.
- The latest planning assumptions and emission models in force at the time the conformity analysis begins must be employed.
- The TIP and RTP must provide for the timely implementation of transportation control measures (TCMs) specified in the applicable air quality implementation plans.
- 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) the 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.

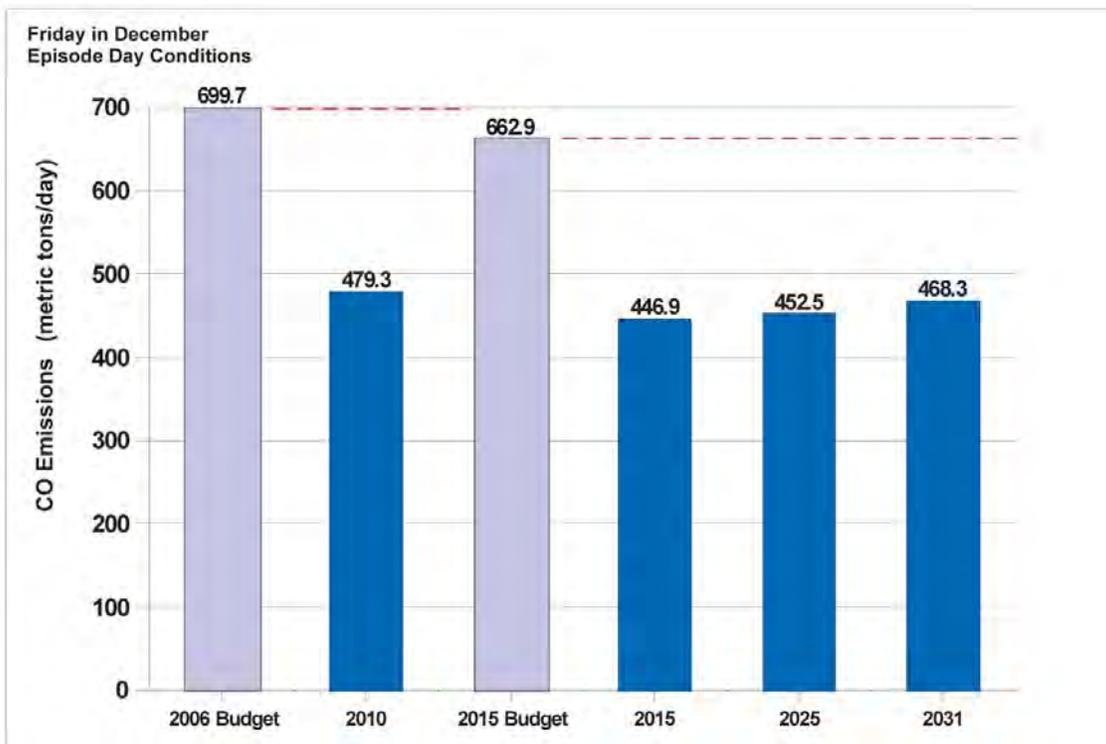
For the 2010 MAG Conformity Analysis, for carbon monoxide the emissions budget test was applied using the approved conformity budgets from the Carbon Monoxide Maintenance Plan. For eight-hour ozone, emissions budget tests were applied using the adequate conformity budgets for volatile organic compounds and nitrogen oxides from the MAG Eight-Hour Ozone Plan. For PM-10, the emissions budget test was applied using the adequate conformity budget from the MAG 2007 Five Percent Plan for PM-10.

## **Results of the Conformity Analysis**

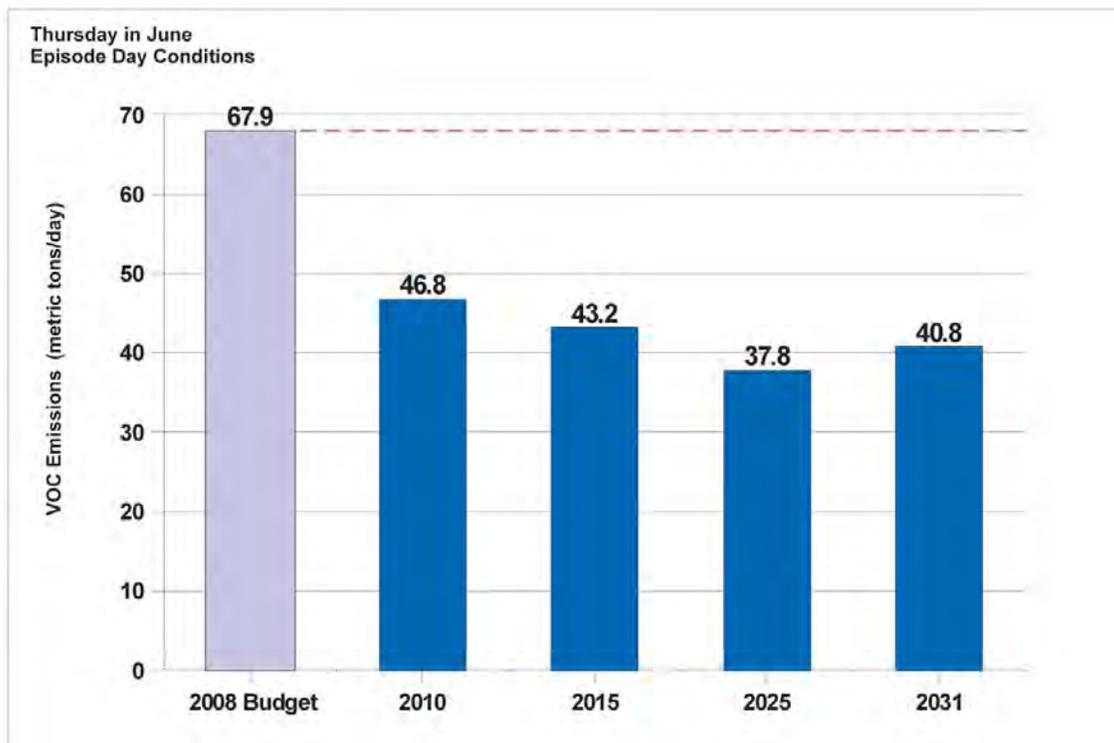
For the 2010 MAG Conformity Analysis, a regional emissions analysis was conducted for carbon monoxide, for the eight-hour ozone precursors (volatile organic compounds and nitrogen oxides), and PM-10 for the years: 2010, 2015, 2025, and 2031. All analyses were conducted using the latest planning assumptions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

- For carbon monoxide, the total vehicle-related emissions associated with implementation of the TIP and Regional Transportation Plan for the analysis year 2010 are projected to be less than the approved 2006 emissions budget, and the emissions associated with implementation of the TIP and Regional Transportation Plan for the analysis years 2015, 2025, and 2031 are projected to be less than the approved budget for 2015. The applicable conformity test for carbon monoxide is therefore satisfied. The results of the regional emissions analysis for carbon monoxide are presented in Figure 23-1.
- For eight-hour ozone, the total vehicle-related volatile organic compound and nitrogen oxide emissions associated with implementation of the TIP and Regional Transportation Plan for the analysis years of 2010, 2015, 2025, and 2031 are projected to be less than the adequate 2008 emissions budgets. The applicable conformity tests for eight-hour ozone are therefore satisfied. The results of the regional emissions analysis for eight-hour ozone are presented in Figures 23-2 and 23-3.
- For PM-10, the total vehicle-related emissions associated with implementation of the TIP and Regional Transportation Plan for the analysis years of 2010, 2015, 2025, and 2031 are projected to be less than the adequate 2010 emissions budget. The conformity test for PM-10 is therefore satisfied. The results of the regional emissions analysis for PM-10 are presented in Figure 23-4.
- A review of the implementation status of TCMs in applicable air quality plans has indicated that the TIP and Regional Transportation Plan will provide for the timely implementation of the TCMs and there are no obstacles to the implementation of any TCM.
- Consultation has been conducted in accordance with federal requirements.

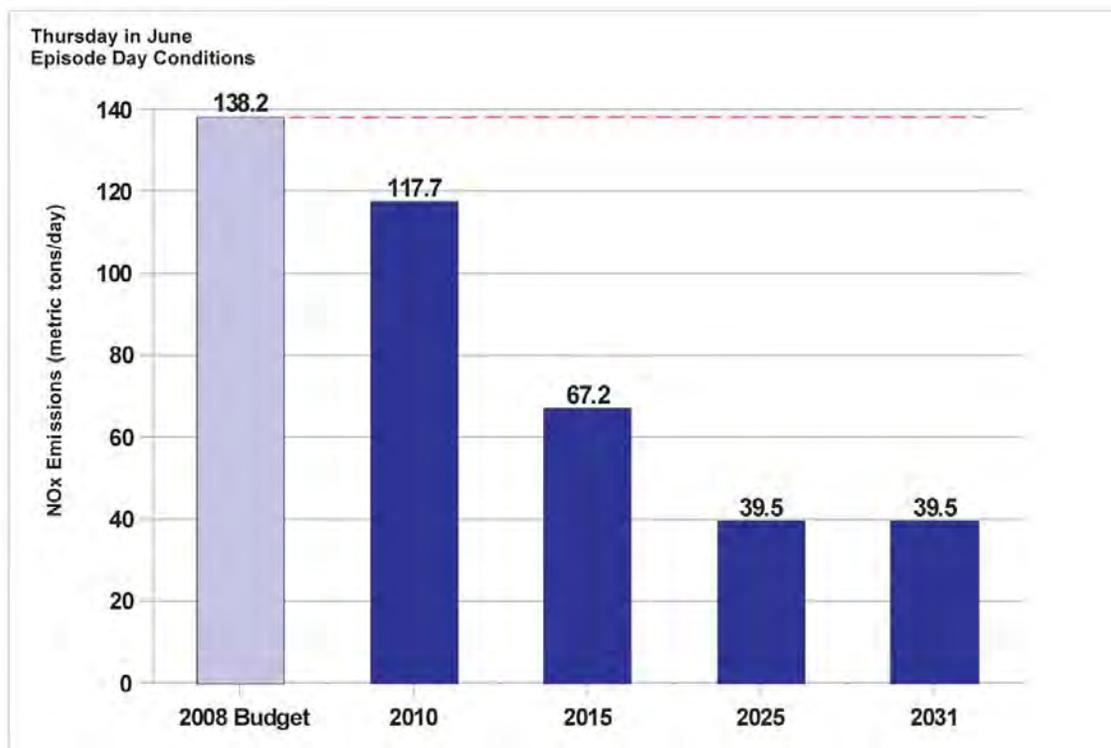
**FIGURE 23-1  
CARBON MONOXIDE RESULTS FOR CONFORMITY BUDGET TEST**



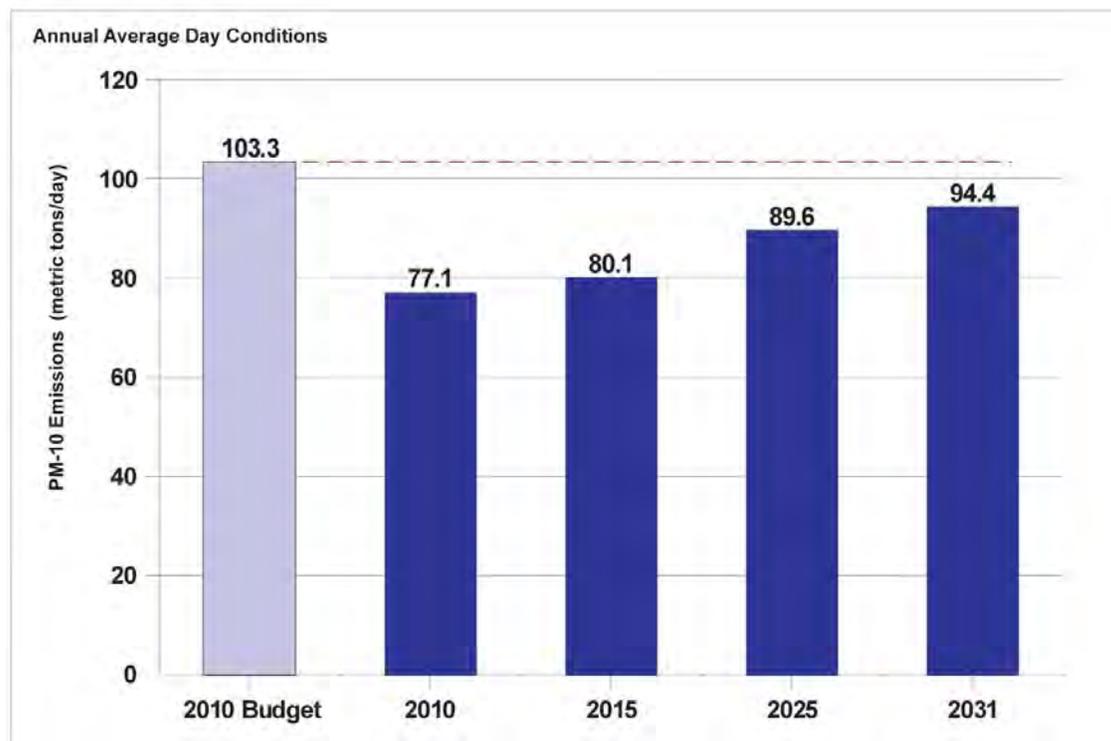
**FIGURE 23-2  
EIGHT HOUR OZONE: VOLATILE ORGANIC COMPOUNDS (VOC) RESULTS FOR CONFORMITY BUDGET TEST**



**FIGURE 23-3  
EIGHT HOUR OZONE: NITROGEN OXIDES (NO<sub>x</sub>) RESULTS FOR CONFORMITY BUDGET TEST**



**FIGURE 23-4  
PM-10 RESULTS FOR CONFORMITY BUDGET TEST**



**Appendix A**  
**Freeway/Highway Program**

**REGIONAL TRANSPORTATION PLAN - 2010 UPDATE**  
**REGIONAL FREEWAY/HIGHWAY SYSTEM PROGRAM**

**(Thousands of YOE & 2010 \$'s)**

Project Type	Corridor	Plan Const. Phase	Project Description	Cost (Thousands of YOE & 2010 \$'s)		
				FY 06-10	FY 11-31	Total
<b>I-10 PAPAGO CORRIDOR</b>						
TI	10	I	43rd Ave / 51st Ave TI	2,432		2,432
TI	10	I	Bullard Ave TI	13,672		13,672
HOV/GPL	10	I	Sarival Ave - SR101L	99,205		99,205
GPL	10	I	Verrado Way - Sarival Ave	29,997		29,997
GPL	10	I	Sarival Ave - Dysart Rd (Outside lane)	42,030	5,000	47,030
TI	10	I	Avondale Blvd TI	2,000		2,000
GPL	10	III	SR101L, Agua Fria - I-17 (Phase 1)		87,900	87,900
TI	10	II	Perryville Rd TI		21,100	21,100
TI	10	IV	EI Mirage Rd TI		20,300	20,300
GPL	10	V	SR85 - Verrado Way		42,800	42,800
GPL	10	N/A	SR101L, Agua Fria - I-17 (Phase 2)			
			Total	189,336	177,100	366,436
<b>I-10 MARICOPA CORRIDOR</b>						
TI	10	I	Ray Rd TI	8,053		8,053
IMP	10	I	Southern Ave - SR143	3,107		3,107
TI	10	I	SR347 TI	215		215
TI	10	II	Sky Harbor West Airport Access		50,600	50,600
GPL	10	II	32nd St. - 202L, Santan (Phase 1)	81,800	250,100	331,900
GPL	10	II	32nd St. - 202L, Santan (Phase 2)		146,900	146,900
GPL	10	II	32nd St - 202L, Santan (Phase 3)		216,200	216,200
HOV/GPL	10	II	SR202L, Santan - Riggs Rd		73,700	73,700
TI	10	IV	Chandler Heights TI		22,900	22,900
GPL	10	N/A	SR51 Piestewa - 32nd St.			
			Total	93,175	760,400	853,575
<b>I-17 BLACK CANYON CORRIDOR</b>						
TI	17	I	Cactus Rd TI	6,792		6,792
TI	17	I	Jomax Rd / Dixileta Dr TI	49,655		49,655
HOV/GPL	17	I	SR101L - SR 74, Carefree Hwy	297,390		297,390
TI	17	I	SR74 TI, Carefree Highway	24,966		24,966
TI	17	I	Dove Valley TI	24,999		24,999
GPL	17	I	SR74, Carefree Highway - Anthem Way (Interim)	15,914		15,914
MISC	17	II	Bethany Home Rd - Northern Ave, Alhambra Distr.		2,100	2,100
GPL	17	II	Arizona Canal - SR101L		92,400	92,400
MISC	17	II	Peoria Ave - Greenway Rd (Drainage Imprvmnts.)		16,500	16,500
HOV/GPL	17	IV	I-10 East - I-10 West		400,000	400,000
GPL	17	IV	McDowell Rd - Arizona Canal		598,600	598,600
HOV	17	V	SR74, Carefree Highway - Anthem Way (Final)		89,500	89,500

Project Type	Corridor	Plan Const. Phase	Project Description	Cost (Thousands of YOE & 2010 \$'s)		
				FY 06-10	FY 11-31	Total
GPL	17	V	Anthem Way - New River		57,400	57,400
MISC	17	N/A	16th St - Buckeye Rd, (Local Construction)			
			Total	419,716	1,256,500	1,676,216
<b><u>SR 51 PIESTEWA CORRIDOR</u></b>						
HOV/RMP	51	I	Shea Blvd - SR101L, Pima	51,112		51,112
GPL	51	V	Shea Blvd - SR101L, Pima		60,200	60,200
			Total	51,112	60,200	111,312
<b><u>US 60 GRAND AVENUE CORRIDOR</u></b>						
IMP	60G	I	71st Avenue - Grand Canal Brdg	3,979		3,979
IMP	60G	I	83rd Avenue/Peoria Avenue	2,060		2,060
GPL	60G	I	99th Ave - 83rd Ave, Incl New River Brdg	8,205		8,205
GPL	60G	I	SR303L - 99th Ave (Phase 1)	27,071		27,071
GPL	60G	I	SR101L, Agua Fria - McDowell Rd (Phase 1)	36,200		36,200
GPL/IMP	60G	II	SR101L, Agua Fria - McDowell Rd (Phase 2)		22,000	22,000
GPL/IMP	60G	II	SR303L - 99th Ave (Phase 2)		65,000	65,000
GPL/IMP	60G	V	SR101L, Agua Fria - McDowell Rd (Phase 3)		86,200	86,200
			Total	77,515	173,200	250,715
<b><u>US 60 SUPERSTITION CORRIDOR</u></b>						
HOV/GPL	60S	I	Gilbert Rd - Power Rd	90,687		90,687
TI	60S	I	Higley Rd TI	5,342		5,342
GPL	60S	I	I-10 - SR101L, Price	25,000		25,000
TI	60S	II	Meridian Rd Half Interchange		12,500	12,500
HOV/GPL	60S	III	Crismon Rd - Meridian Rd		28,400	28,400
TI	60S	V	Lindsay Rd Half Interchange		8,200	8,200
			Total	121,029	49,100	170,129
<b><u>SR 74 CAREFREE CORRIDOR</u></b>						
GPL	74	I	US60, Grand - SR303L (MP20-22 Passing Lanes)	2,238		2,238
GPL	74	I	US60, Grand - SR303L (MP13 - 15 Passing Lanes)	3,800		3,800
GPL	74	I & V	US60, Grand - SR303L (R/W Protection)	3,000	41,960	44,960
			Total	9,038	41,960	50,998
<b><u>SR 85 CORRIDOR</u></b>						
GPL	85	I	MP 130.7 - 137.0	28,729		28,729
GPL	85	I	MP 139.01 - 141.71	22,994		22,994
GPL	85	I	MC85 - Southern Ave	9,416		9,416
GPL	85	I	Southern Ave - I-10	21,381		21,381
GPL	85	I	Broadway Rd - Lower Buckeye (Connecting Rd. IGA)	4,110		4,110
TI	85	I	I-8 TI (Phase 1/HES Project)	28,400		28,400

Project Type	Corridor	Plan Const. Phase	Project Description	Cost (Thousands of YOE & 2010 \$'s)		
				FY 06-10	FY 11-31	Total
GPL	85	I	I-8 - I-10	21,447		21,447
GPL	85	II	Warner Street Bridge		5,300	5,300
TI	85	III	I-8 TI (Phase 2)		43,300	43,300
TI	85	N/A	I-8 TI (Phase 3)			
GPL	85	N/A	Hazen Rd - Broadway Rd			
			Total	136,477	48,600	185,077
<b>SR87 DUTHIE-MARTIN CORRIDOR</b>						
MISC	87	I	Forest Boundary - New Four Peaks	21,506		21,506
MISC	87	I	MP 211.8 - MP 213.0	2,220		2,220
MISC	87	I	New Four Peaks Rd - Dos S Ranch Rd	20,300		20,300
			Total	44,026		44,026
<b>SR88 CORRIDOR</b>						
MISC	88	I	Fish Creek Hill (Retaining Wall)	1,650		1,650
			Total	1,650		1,650
<b>US93 CORRIDOR</b>						
IMP	93	I	Wickenburg By-Pass	41,850		41,850
			Total	41,850		
<b>101L AGUA FRIA CORRIDOR</b>						
TI	101AF	I	Bethany Home Rd, North Half	9,387		9,387
LNS	101AF	I	Northern Ave - 31st Ave (Median Landscape)	1,467		1,467
TI	101AF	I	Thunderbird Rd TI (Imp)	2,804		2,804
TI	101AF	I	Beardsley Rd/Union Hills Dr TI	24,025		24,025
MISC	101AF	I	99th Ave (I-10 - Van Buren St)	6,600		6,600
TI	101AF	I	Olive Ave TI (Crossroad Imp)	3,000		3,000
HOV	101AF	I	I-10 - US60, Grand Ave	44,000		44,000
HOV	101AF	I	US60, Grand Ave - I-17	50,700		50,700
GPL	101AF	V	I-10 - US60, Grand Ave		116,400	116,400
GPL	101AF	V	US60, Grand Ave - I-17		150,400	150,400
RAMP	101AF	N/A	I-10 System Interchange (DHOV Ramps)			
RAMP	101AF	N/A	I-17 System Interchange (DHOV Ramps)			
			Total	141,983	266,800	408,783
<b>101L PIMA CORRIDOR</b>						
HOV	101PI	I	Princess Dr - SR202L, Red Mountain	61,319		61,319
HOV	101PI	I	Tatum Blvd - Princess Dr	18,766		18,766
TI	101PI	I	64th St TI	31,380		31,380
TI	101PI	I	Chaparral Rd TI (Imp)	940		940
MISC	101PI	II	Pima Road Extension (JPA)	300	3,634	3,934

Project Type	Corridor	Plan Const. Phase	Project Description	Cost (Thousands of YOE & 2010 \$'s)		
				FY 06-10	FY 11-31	Total
HOV	101PI	I	I-17 - Tatum Blvd	44,800		44,800
GPL	101PI	II	Shea Blvd - SR202L, Red Mountain		97,400	97,400
GPL	101PI	IV	Princess Dr - Shea Blvd		56,400	56,400
GPL	101PI	IV	SR51 - Princess Dr		77,900	77,900
GPL	101PI	IV	I-17 - SR51		73,500	73,500
			Total	157,505	308,834	466,339
<b>101L PRICE CORRIDOR</b>						
HOV	101PR	I	SR202L, Red Mountain - SR202L, Santan	43,219		43,219
MISC	101PR	I	Galveston Street (Drainage Improvements)	2,100		2,100
MISC	101PR	II	Balboa Dr, Multi-use Path (Local Construction)		1,800	1,800
GPL	101PR	IV	Baseline Rd - SR202L, Santan		53,400	53,400
			Total	45,319	55,200	100,519
<b>SR143 HOHOKAM CORRIDOR</b>						
TI	143HK	I	SR143/Sky Harbor Blvd TI	38,700		38,700
			Total	38,700		38,700
<b>202L RED MOUNTAIN CORRIDOR</b>						
GPL	202RM	I	Mill Ave & Washington St (Brdg Widen)	7,211		7,211
GPL	202RM	I	I-10/SR51 TI - SR101L, Pima	219,777		219,777
HOV	202RM	I	SR101L - Gilbert Rd	26,821		26,821
GPL	202RM	II	SR101L - Gilbert Rd		60,300	60,300
HOV	202RM	III	Gilbert Rd - Higley Rd		19,300	19,300
HOV	202RM	IV	Higley Rd - US60, Superstition		33,500	33,500
GPL	202RM	V	Gilbert Rd - Higley Rd		51,900	51,900
GPL	202RM	V	Higley Rd - US60, Superstition		108,300	108,300
RAMP	202RM	V	US60, Superstition System TI (DHOV Ramps)		42,100	42,100
TI	202RM	V	Mesa Dr TI (Ramps Only)		13,500	13,500
			Total	253,809	328,900	582,709
<b>202L SANTAN CORRIDOR</b>						
MISC	202SAN	I	Lindsay Rd - Gilbert Rd	500		500
HOV/RAMP	202SAN	I	Price Rd - I-10	59,100		59,100
HOV/RAMP	202SAN	I	Gilbert Rd - Price Rd	86,900		86,900
HOV	202SAN	IV	US60, Superstition - Gilbert		45,200	45,200
GPL	202SAN	V	Dobson Rd - I-10		50,300	50,300
GPL	202SAN	V	Val Vista Dr - Dobson Rd		83,500	83,500
GPL	202SAN	V	US60, Superstition - Val Vista Dr		104,000	104,000
			Total	146,500	283,000	429,500
<b>202L SOUTH MOUNTAIN CORRIDOR</b>						



Project Type	Corridor	Plan Const. Phase	Project Description	Cost (Thousands of YOE & 2010 \$'s)		
				FY 06-10	FY 11-31	Total
NEW	802	I & II	SR202L, Santan - Meridian Rd (R/W Protection)	8,000	4,000	12,000
NEW	802	II	SR202L, Santan - Ellsworth Rd (Phase 1)	44,100	158,300	202,400
NEW	802	V	SR202L, Santan - Ellsworth Rd (Phase 2)		46,900	46,900
NEW	802	V	Ellsworth Rd - Meridian Rd		212,600	212,600
			Total	52,100	421,800	473,900
<b><u>NOISE MITIGATION</u></b>						
NOISE	SW	I & V	Noise Mitigation/Quiet Pavement	67,722	150,000	217,722
			Total	67,722	150,000	217,722
<b><u>MINOR PROJECTS</u></b>						
MISC & TI	SW	I - V	Minor Projects	10,729	25,900	36,629
			Total	10,729	25,900	36,629
<b><u>MAINTENANCE</u></b>						
MAINT	SW	I - V	Maintenance (Landscape, litter & sweep)	49,300	308,400	357,700
			Total	49,300	308,400	357,700
<b><u>PRELIMINARY ENGINEERING/DESIGN</u></b>						
ENGR	SW	I - V	Preliminary Engineering	142,203	351,500	493,703
			Total	142,203	351,500	493,703
<b><u>FREEWAY MANAGEMENT SYSTEM (FMS)</u></b>						
FMS	SW	I - IV	FMS Projects & Preservation	38,634	107,020	145,654
			Total	38,634	107,020	145,654
<b><u>RIGHT OF WAY MANAGEMENT</u></b>						
R/W	SW	I - V	R/W Acquisition & Mgmt	39,500	92,200	131,700
			Total	39,500	92,200	131,700
<b><u>TOTALS</u></b>						
			Corridor Projects	2,737,791	9,499,594	12,237,385
			Systemwide	348,088	1,035,020	1,383,108
			Grand Total	3,085,879	10,534,614	13,620,493

## NOTES

### Plan Phases:

I	FY 2006 - FY 2010
II	FY 2011 - FY 2015
III	FY 2016 - FY 2020
IV	FY 2021 - FY 2025
V	FY 2026 - FY 2031
N/A	Illustrative Project

### Abbreviations:

FMS	Freeway Management System
GPL	General Purpose Lanes
HOV	High Occupancy Vehicle (Lanes)
IMP	Improvements (Roadway)
LNS	Landscaping
MISC	Miscellaneous (Improvements)
NEW	New Corridor
R/W	Right-of-Way
TI	Traffic Interchange

**Appendix B**  
**Arterial Street Program**

**REGIONAL TRANSPORTATION PLAN - 2010 UPDATE**  
**REGIONALLY FUNDED ARTERIAL STREET PROJECTS**

Project Location	Phase		Fund Type	Reimb. To Date (YOE\$)	Future Reimb. (2010\$)	Total Reimb. (YOE\$, 2010\$)	Total Cost (YOE\$, 2010\$)
	Const. Complete	Program Reimb.					
<b>CHANDLER</b>							
Arizona Ave/Chandler Blvd: Intersection Improvements	I	I	RARF	3.582	0.000	3.582	7.209
Arizona Ave/Elliot Rd: Intersection Improvements	I	I	RARF	3.211	0.000	3.211	4.587
Arizona Ave/Ray Rd: Intersection Improvements	I	I	RARF	3.464	0.000	3.464	4.949
Arizona Ave: Ocotillo Rd to Hunt Hwy	IV	IV	STP-MAG	0.000	7.407	7.407	15.902
Chandler Blvd/Alma School: Intersection Improvements	II	I, III	RARF	0.735	3.361	4.096	11.721
Chandler Blvd/Dobson Rd: Intersection Improvements	I	I	RARF	2.073	0.427	2.500	7.349
Chandler Blvd/Kyrene Rd: Intersection Improvements	IV	IV	CMAQ	0.000	3.753	3.753	16.656
Gilbert Rd: SR-202L to Hunt Hwy				6.078	14.649	20.727	65.128
Gilbert Rd: SR-202L/Germann to Queen Creek Rd	I	I, IV	RARF	6.078	0.670	6.747	10.307
Gilbert Rd: Queen Creek Rd to Ocotillo Rd	II	III, IV	RARF	0.000	4.011	4.011	11.059
Gilbert Rd: Chandler Heights Rd to Hunt Hwy	II	IV, V	RARF	0.000	5.957	5.957	32.703
Gilbert Rd: Ocotillo Rd to Chandler Heights	II	III, IV	RARF	0.000	4.011	4.011	11.059
Kyrene Rd/Ray Rd: Intersection Improvements	IV	IV	CMAQ	0.000	3.753	3.753	17.419
Price Rd Substitute Projects				0.000	49.506	49.506	76.525
Chandler Heights Rd: Arizona Avenue to McQueen Road	III	III	STP-MAG	0.000	7.282	7.282	10.403
Chandler Heights Road: McQueen Road to Gilbert Road	III	III	STP-MAG	0.000	10.728	10.728	17.250
McQueen Road: Ocotillo Road to Riggs Road	II	II, IV	RARF	0.000	7.226	7.226	12.224
Ocotillo Road: Arizona Avenue to McQueen Road	II	II, IV	RARF	0.000	6.227	6.227	10.794
Ocotillo Road: Cooper Road to Gilbert Road	III	III	STP-MAG	0.000	6.460	6.460	9.229
Price Rd at Germann Rd: Intersection Improvements	III	III	CMAQ	0.000	3.357	3.357	4.795
Price Rd at Queen Creek Rd: Intersection Improvements	III	III	CMAQ	0.000	5.191	5.191	7.415
Price Rd: Santan to Germann	I	II	RARF	0.000	3.035	3.035	4.414
Ray Rd/Alma School Rd: Intersection Improvements	II	I, III	RARF	2.217	3.630	5.846	12.784
Ray Rd/Dobson Rd: Intersection Improvements	II	III	STP-MAG	0.000	6.678	6.678	9.541
Ray Rd/McClintock Dr: Intersection Improvements	II	III	STP-MAG	0.000	5.614	5.614	8.346
Ray Rd/Rural Rd: Intersection Improvements	IV	IV	CMAQ	0.000	3.753	3.753	15.822
<b>CHANDLER/GILBERT</b>							
Queen Creek Rd: Arizona Ave to Higley Rd				5.672	31.675	37.347	56.851
CHANDLER Queen Creek Rd: Arizona Ave to McQueen Rd	I	I	RARF	5.672	0.000	5.672	8.103
CHANDLER Queen Creek Rd: McQueen Rd to Gilbert Rd	III	III, IV	STP-MAG	0.000	10.478	10.478	14.969
GILBERT Queen Creek Rd: Lindsay Rd to Greenfield Rd	II	II	RARF	0.000	11.530	11.530	17.298

Project Location	Phase		Fund Type	Reimb. To Date (YOE\$)	Future Reimb. (2010\$)	Total Reimb. (YOE\$, 2010\$)	Total Cost (YOE\$, 2010\$)
	Const. Complete	Program Reimb.					
GILBERT Queen Creek Rd: Greenfield Rd to Higley	II	II	RARF	0.000	9.667	9.667	16.482
<b>FOUNTAIN HILLS</b>							
Shea Blvd: Palisades Blvd to Cereus Wash				0.367	5.681	6.049	8.782
Shea Blvd: Palisades Blvd to Fountain Hills Blvd	II	I, II	RARF	0.247	0.040	0.287	0.411
Shea Blvd: Technology Dr to Cereus Wash	II	I,II	RARF	0.121	3.043	3.163	4.577
Shea Blvd: Palisades Blvd to Technology Dr	III	III	STP-MAG	0.000	2.598	2.598	3.794
<b>GILBERT</b>							
Elliot Rd/Cooper Rd: Intersection Improvements	III	IV	STP-MAG	0.000	4.116	4.116	6.976
Elliot Rd/Gilbert Rd: Intersection Improvements	IV	IV	CMAQ	0.000	3.753	3.753	10.474
Elliot Rd/Greenfield Rd: Intersection Improvements	III	IV	RARF	0.000	3.753	3.753	5.364
Elliot Rd/Higley Rd: Intersection Improvements	III	IV	CMAQ	0.000	3.753	3.753	6.976
Elliot Rd/Val Vista Dr: Intersection Improvements	III	IV	RARF	0.000	3.753	3.753	6.976
Germann Rd: Gilbert Rd to Power Rd				0.000	22.034	22.034	31.479
Germann Rd: Gilbert Rd to Val Vista Dr	II	IV	RARF	0.000	6.609	6.609	9.444
Germann Rd: Val Vista Dr to Higley Rd	II	III, IV	RARF	0.000	15.424	15.424	22.035
Greenfield Rd: Elliot Rd to Ray Rd	II	II	RARF	0.000	3.753	3.753	5.525
Guadalupe Rd/Cooper Rd: Intersection Improvements	II	II	RARF	0.000	3.753	3.753	6.939
Guadalupe Rd/Gilbert Rd: Intersection Improvements	II	II	RARF	0.000	3.753	3.753	5.361
Guadalupe Rd/Greenfield Rd: Intersection Improvements	IV	IV	CMAQ	0.000	3.753	3.753	6.976
Guadalupe Rd/Power Rd: Intersection Improvements	III	IV	RARF	0.000	3.753	3.753	8.919
Guadalupe Rd/Val Vista Dr: Intersection Improvements	III	III	CMAQ	0.000	3.753	3.753	5.659
Ray Rd: Val Vista Dr to Power Rd				0.000	16.586	16.586	23.694
Ray Rd: Val Vista to Higley	III	IV	RARF	0.000	5.240	5.240	7.486
Ray Rd: Higley to Recker	III	IV	RARF	0.000	3.779	3.779	5.399
Ray Rd: Recker to Power	III	IV, V	RARF	0.000	7.567	7.567	10.809
Ray Rd/Gilbert Rd: Intersection Improvements	III	IV	RARF	0.000	3.753	3.753	5.362
Val Vista Dr: Warner Rd to Pecos Rd	I	I	RARF	10.398	0.000	10.398	16.308
Warner Rd/Cooper Rd: Intersection Improvements	I	I	RARF	3.701	0.000	3.701	6.268
Warner Rd/Greenfield Rd: Intersection Improvements	II	II	RARF	0.000	3.753	3.753	5.361
<b>GILBERT/MESA/MARICOPA COUNTY</b>							
Power Rd: Santan Fwy to Chandler Heights				5.143	15.356	20.499	63.732
GILBERT Power Rd/Pecos: Intersection Improvements	I	I	RARF	5.143	0.000	5.143	7.347
GILBERT Power Rd: Santan Fwy to Pecos Rd	II	II	RARF	0.000	15.356	15.356	28.557
GILBERT Power Rd: Pecos Rd to Chandler Heights	IV	n/a	RARF	0.000	0.000	0.000	27.828
Power Rd: Baseline Rd to Santan Fwy				7.760	10.197	17.958	38.359
MESA Power Rd: East Maricopa Floodway to Santan Fwy/Loop 202	III	III	RARF	0.000	10.197	10.197	16.319
M.C. Power Rd: Baseline Rd to East Maricopa Floodway	I	I	RARF	7.760	0.000	7.760	22.040

Project Location	Phase		Fund Type	Reimb. To Date (YOE\$)	Future Reimb. (2010\$)	Total Reimb. (YOE\$, 2010\$)	Total Cost (YOE\$, 2010\$)
	Const. Complete	Program Reimb.					
<b>MARICOPA COUNTY</b>							
Dobson Rd: Bridge over Salt River	II	II, III	STP-MAG	0.000	18.523	18.523	43.357
El Mirage Rd: Bell Rd to Jomax Rd				5.535	13.869	19.403	50.157
El Mirage Rd: Bell Rd to Deer Valley Drive	II	II, III	RARF	0.000	13.869	13.869	24.467
El Mirage Rd: L303 to Jomax	IV	n/a	RARF	0.000	0.000	0.000	17.783
El Mirage Rd: Deer Valley Drive to L303	I	I	RARF	5.535	0.000	5.535	7.906
El Mirage Rd: Thunderbird Rd to Bell Rd	III	I - III	RARF	1.448	19.843	21.290	48.028
El Mirage Rd: Thunderbird Rd to Northern Ave	III	III	RARF	0.000	16.707	16.707	26.291
Gilbert Rd: Bridge over Salt River	II	II	STP-MAG	0.000	13.922	13.922	40.910
Jomax Rd: SR-303L to Sun Valley Parkway	na	III	RARF	0.000	20.581	20.581	29.401
McKellips Rd: Bridge over Salt River	III	II, III	RARF	0.000	13.922	13.922	28.140
McKellips Rd: SR-101L to SRP-MIC/Alma School Rd	II	II, III	RARF/ STP-MAG	0.000	39.225	39.225	48.005
Northern Pkwy: Sarival to Grand (Phase I)				19.776	40.532	60.308	86.155
Northern Parkway: Sarival to Dysart	II	I, II	STP-MAG	19.776	35.330	55.106	78.723
Northern Parkway: ROW Protection	n/a	II	STP-MAG	0.000	5.202	5.202	7.432
Northern Pkwy: Sarival to Grand (Phase II)				0.000	80.371	80.371	115.116
Northern Pkwy: Dysart to 111th	II	III	STP-MAG	0.000	18.919	18.919	27.028
Northern Pkwy: Sarival Overpass	II	III	STP-MAG	0.000	9.753	9.753	13.933
Northern Pkwy: Reems Overpass	II	III	STP-MAG	0.000	8.360	8.360	11.942
Northern Pkwy: Litchfield Overpass	II	III	STP-MAG	0.000	7.846	7.846	11.466
Northern Pkwy: Agua Fria Bridge	II	III	STP-MAG	0.000	4.913	4.913	7.019
Northern Pkwy: Northern Ave at L101	II	III	STP-MAG	0.000	5.940	5.940	8.485
Northern Pkwy: Dysart Overpass	III	III, IV	STP-MAG	0.000	20.313	20.313	29.062
Northern Pkwy: ROW Protection	n/a	III	STP-MAG	0.000	4.327	4.327	6.181
Northern Pkwy: Sarival to Grand (Phase III)				0.000	82.778	82.778	118.487
Northern Pkwy: El Mirage Alternative Access	IV	IV	STP-MAG	0.000	4.180	4.180	5.972
Northern Pkwy: El Mirage Overpass	IV	IV	STP-MAG	0.000	21.999	21.999	31.428
Northern Pkwy: Agua Fria to 111th	IV	IV	STP-MAG	0.000	2.713	2.713	3.876
Northern Pkwy: 111th to 107th	IV	IV	STP-MAG	0.000	14.740	14.740	21.057
Northern Pkwy: 107th to 99th	IV	IV	STP-MAG	0.000	21.119	21.119	30.171
Northern Pkwy: Loop 101 to 91st	IV	IV	STP-MAG	0.000	3.447	3.447	4.924
Northern Pkwy: 91st to Grand Intersection Improvements	IV	IV	CMAQ	0.000	5.866	5.866	8.381
Northern Pkwy: ROW Protection	n/a	IV	STP-MAG	0.000	2.567	2.567	3.667
Northern Pkwy: Ultimate Construction	IV	IV	STP-MAG	0.000	6.147	6.147	9.013
<b>MESA</b>							
Baseline Rd: Power Rd to Meridian Rd				0.000	17.796	17.796	25.501
Baseline Rd: Power Rd to Ellsworth Rd	III	IV	RARF	0.000	8.708	8.708	12.512
Baseline Rd: Ellsworth Rd to Meridian Rd	III	IV	RARF	0.000	9.089	9.089	12.989

Project Location	Phase		Fund Type	Reimb. To Date (YOE\$)	Future Reimb. (2010\$)	Total Reimb. (YOE\$, 2010\$)	Total Cost (YOE\$, 2010\$)
	Const. Complete	Program Reimb.					
Broadway Rd: Dobson to Country Club	II	I, II	RARF	0.082	7.299	7.381	19.332
Country Club/University: Intersection Improvements	II	III	RARF	0.000	2.784	2.784	8.887
Country Club/Brown: Intersection Improvements	III	IV	RARF	0.000	2.784	2.784	5.033
Crismon Rd: Broadway Rd to Germann Rd				0.000	36.561	36.561	52.289
Crismon Rd: Broadway Rd to Guadalupe Rd	III	IV	RARF	0.000	12.456	12.456	17.809
Crismon Rd: Guadalupe Rd to Ray Rd	IV	IV	STP-MAG	0.000	12.090	12.090	17.272
Crismon Rd: Ray Rd to Germann Rd	III	IV	STP-MAG	0.000	12.016	12.016	17.209
Dobson Rd/Guadalupe Rd: Intersection Improvements	I	I	RARF	0.707	2.063	2.770	4.274
Dobson Rd/University Dr: Intersection Improvements	II	III	RARF	0.000	2.784	2.784	6.988
Elliot Rd: Power Rd to Meridian Rd				0.000	18.038	18.038	25.770
Elliot Rd: Power Rd to Ellsworth Rd	IV	IV	STP-MAG	0.000	8.950	8.950	12.785
Elliot Rd: Ellsworth Rd to Meridian	IV	IV	STP-MAG	0.000	9.089	9.089	12.985
Germann Rd: Ellsworth Rd to Signal Butte Rd	IV	IV	STP-MAG	0.000	12.470	12.470	17.822
Gilbert Rd/University Dr: Intersection Improvements	I	I	RARF	2.741	0.000	2.741	11.765
Greenfield Rd: University Rd to Baseline Rd				2.367	8.356	10.723	19.317
Greenfield Rd: Baseline Rd to Southern Ave	I	I	RARF	2.367	2.810	5.176	8.296
Greenfield Rd: Southern Ave to University Rd	III	II, III	RARF/ STP-MAG	0.000	5.546	5.546	11.021
Guadalupe Rd: Power Rd to Meridian Rd				0.000	23.002	23.002	38.544
Guadalupe Rd: Power Rd to Hawes Rd	III	III, IV	RARF	0.000	7.830	7.830	15.037
Guadalupe Rd: Hawes Rd to Crimson Rd	III	III	STP-MAG	0.000	7.830	7.830	13.017
Guadalupe Rd: Crimson Rd to Meridian Rd	III	III	STP-MAG	0.000	7.343	7.343	10.490
Hawes Rd: Broadway Rd to Ray Rd				0.000	20.702	20.702	29.997
Hawes Rd: Broadway Rd to US60	IV	IV	STP-MAG	0.000	7.131	7.131	10.187
Hawes Rd: Baseline Rd to Elliot Rd	IV	IV	STP-MAG	0.000	6.922	6.922	9.889
Hawes Rd: Elliot Rd to Santan Freeway	IV	IV	STP-MAG	0.000	4.296	4.296	6.138
Hawes Rd: Santan Freeway to Ray Rd	II	IV	RARF	0.000	2.353	2.353	3.784
Higley Rd Parkway: US 60 to SR-202L				0.000	16.707	16.707	23.867
Higley Pkwy: SR202L to Brown Rd	III	III	STP-MAG	0.000	8.353	8.353	11.934
Higley Pkwy: Brown Rd to US-60	III	III	STP-MAG	0.000	8.353	8.353	11.933
Higley Rd Parkway: US 60 to SR 202L Grade Separations	III	III	RARF	0.000	27.724	27.724	39.606
Lindsay Rd/Brown Rd: Intersection Improvements	III	II, III	RARF	0.000	2.784	2.784	4.049
McKellips Rd: East of Sossaman to Meridian				0.000	19.854	19.854	28.364
McKellips Rd: E. of Sossaman to Crismon	III	IV	RARF	0.000	11.969	11.969	17.100
McKellips Rd: Crismon Rd to Meridian Rd	III	V	RARF	0.000	7.885	7.885	11.264
McKellips Rd: Gilbert Rd to Power Rd				0.162	21.501	21.663	34.163
McKellips Rd/Lindsay Rd: Intersection Improvements	III	I, III	RARF	0.043	6.299	6.341	10.462
McKellips Rd/Greenfield Rd: Intersection Improvements	III	I, III	RARF/ STP-MAG	0.040	2.869	2.909	5.058

Project Location	Phase		Fund Type	Reimb. To Date (YOE\$)	Future Reimb. (2010\$)	Total Reimb. (YOE\$, 2010\$)	Total Cost (YOE\$, 2010\$)
	Const. Complete	Program Reimb.					
McKellips Rd/Higley Rd: Intersection Improvements	III	I, III	RARF/ CMAQ	0.040	2.869	2.909	5.065
McKellips Rd/Power Rd: Intersection Improvements	III	III	CMAQ	0.000	3.298	3.298	4.711
McKellips Rd/Recker Rd: Intersection Improvements	III	III	CMAQ	0.000	3.297	3.297	4.710
McKellips Rd/Val Vista Dr: Intersection Improvements	III	I, III	RARF / STP-MAG	0.040	2.869	2.909	4.157
Meridian Rd: Baseline Rd to Germann Rd				0.000	29.176	29.176	41.683
Meridian Rd: Baseline Rd to Ray Rd	III	III	RARF	0.000	16.779	16.779	23.973
Meridian Rd: Ray Rd to Germann Rd	III	III	RARF	0.000	12.397	12.397	17.710
Mesa Dr: Southern Ave to US60 and Mesa Dr to Broadway Rd				0.312	9.003	9.316	39.118
Mesa Dr: US60 to Southern Ave	II	I, II	RARF	0.257	8.199	8.456	13.704
Mesa Dr/Broadway Rd: Intersection Improvements	II	I, II	RARF	0.056	0.804	0.860	25.414
Pecos Rd: Ellsworth Rd to Meridian Rd	III	III	RARF	0.000	12.591	12.591	19.246
Ray Rd: Sossaman Rd to Meridian Rd				0.000	25.060	25.060	37.039
Ray Rd: Sossaman Rd to Ellsworth Rd	II	IV	RARF	0.000	3.799	3.799	9.489
Ray Rd: Ellsworth Rd to Meridian Rd	IV	IV	STP-MAG	0.000	21.262	21.262	27.550
Signal Butte Rd: Broadway to Pecos Rd				0.000	32.929	32.929	47.044
Signal Butte Rd: Broadway Rd to Elliot Rd	IV	IV	STP-MAG	0.000	16.780	16.780	23.972
Signal Butte Rd: Elliot Rd to Pecos Rd	IV	IV	STP-MAG	0.000	16.150	16.150	23.072
Southern Ave: Country Club Dr to Recker Rd				0.168	30.455	30.623	50.350
Southern/Country Club Dr: Intersection Improvements	II	II	RARF	0.000	4.861	4.861	8.380
Southern Ave/Stapley Dr: Intersection Improvements	II	I, II	RARF	0.168	12.560	12.728	21.917
Southern Ave/Lindsay Rd: Intersection Improvements	II	II	RARF	0.000	4.779	4.779	8.258
Southern Ave/Higley Rd: Intersection Improvements	II	II	RARF	0.000	8.255	8.255	11.796
Southern Ave: Sossaman to Meridian				0.000	18.038	18.038	25.770
Southern Ave: Sossaman Rd to Crismon Rd	IV	IV	STP-MAG	0.000	10.908	10.908	15.584
Southern Ave: Crismon Rd to Meridian Rd	IV	IV	STP-MAG	0.000	7.130	7.130	10.186
Stapley Dr/University Dr: Intersection Improvements	II	III	CMAQ	0.000	2.784	2.784	13.458
Thomas Rd: Gilbert Rd to Val Vista Dr	IV	IV	STP-MAG	0.000	5.569	5.569	8.035
University Dr: Val Vista Dr to Hawes Rd				0.000	21.670	21.670	30.962
University Dr: Val Vista Dr to Higley Rd	IV	IV	STP-MAG	0.000	10.906	10.906	15.585
University Dr: Higley Rd to Hawes Rd	IV	IV	STP-MAG	0.000	10.764	10.764	15.377
Val Vista Dr: University Dr to Baseline				0.000	11.017	11.017	16.867
Val Vista Dr: Baseline Rd to Southern Ave	II	IV	RARF	0.000	5.563	5.563	9.075
Val Vista Dr: Southern Ave to University Dr	III	IV	RARF	0.000	5.454	5.454	7.792

Project Location	Phase		Fund Type	Reimb. To Date (YOE\$)	Future Reimb. (2010\$)	Total Reimb. (YOE\$, 2010\$)	Total Cost (YOE\$, 2010\$)
	Const. Complete	Program Reimb.					
<b>PEORIA</b>							
Beardsley Connection: SR-101L to Beardsley Rd at 83rd Ave/Lake Pleasant Pkwy				16.976	6.003	22.978	41.621
Beardsley Connection: Loop 101 to 83rd Ave/Lake Pleasant Pkwy	I	I	STP-MAG	6.125	0.000	6.125	8.473
Loop 101 (Agua Fria Fwy) at Beardsley Rd/Union Hills Dr	I	I	STP-MAG	10.851	0.000	10.851	19.151
83rd Avenue: Butler Rd to Mountain View	II	I, II	RARF	0.000	4.118	4.118	6.225
75th Ave at Thunderbird Rd: Intersection Improvement	II	I, II	RARF	0.000	1.884	1.884	7.771
Happy Valley Rd: L303 to 67th Avenue				0.000	20.581	20.581	50.078
Happy Valley Rd: Loop 303 to Lake Pleasant Parkway	III	IV	RARF	0.000	0.000	0.000	0.000
Happy Valley Rd: Lake Pleasant Pkwy to 67th Ave	I	II	RARF	0.000	20.581	20.581	50.078
Lake Pleasant Pkwy: Union Hills to SR74				29.034	24.744	53.779	85.321
Lake Pleasant Pkwy: Dynamite Blvd to CAP	II	I, II, IV	RARF/ STP-MAG	1.907	22.327	24.234	43.114
Lake Pleasant Pkwy: Union Hills to Dynamite Rd	I	I	RARF	27.127	0.000	27.127	38.753
Lake Pleasant Pkwy: CAP to SR-74/Carefree Hwy	IV	V	RARF	0.000	2.418	2.418	3.454
<b>PHOENIX</b>							
Avendia Rio Salado: 51st Ave. to 7th St.	II	II	STP-MAG	0.000	44.430	44.430	70.786
Black Mountain Blvd: SR-51 and Loop 101/Pima Fwy to Deer Valley Rd	II	II	STP-MAG	0.000	22.397	22.397	32.036
Happy Valley Rd:67th Avenue to I-17				0.000	16.465	16.465	37.993
Happy Valley: I-17 to 35th Ave	I	IV	RARF	0.000	5.218	5.218	7.454
Happy Valley: 35th Ave to 43rd Ave	III	IV	RARF	0.000	4.237	4.237	12.069
Happy Valley: 43rd Ave to 55th Ave	III	IV	RARF	0.000	4.181	4.181	9.508
Happy Valley: 55th Ave to 67th Ave	III	IV, V	RARF	0.000	2.828	2.828	8.962
Sonoran Blvd: 15th Avenue to Cave Creek	II	II	RARF	0.000	32.445	32.445	60.182
<b>SCOTTSDALE/CAREFREE</b>							
Pima Rd: SR101L to Happy Valley Rd and Dynamite Rd to Cave Creek Rd				16.891	79.527	96.417	140.911
SCOTTSDALE Pima Rd: Thompson Peak Pkwy to Pinnacle Peak	II	I, II	RARF	3.251	20.544	23.795	33.993
SCOTTSDALE Pima Rd/Happy Valley Intersection Improvement	I	n/a	RARF	0.000	0.000	0.000	1.599
SCOTTSDALE Pima Rd: Pinnacle Peak to Happy Valley Rd	II	II	RARF	0.000	15.896	15.896	22.709
SCOTTSDALE Pima Rd: Dynamite Blvd to Stagecoach Rd	III	III	RARF	0.000	37.669	37.669	54.945
CAREFREE Pima Rd: Stagecoach Rd to Cave Creek	III	III	RARF	0.000	5.417	5.417	7.739
SCOTTSDALE Pima Rd: SR101L to Thompson Peak Pkwy	I	I	RARF	13.639	0.000	13.639	19.926
<b>SCOTTSDALE</b>							
Carefree Hwy: Cave Creek Rd to Scottsdale Rd	III	III	RARF	0.000	9.322	9.322	14.260
SR-101L North Frontage Roads: Pima/Princess Dr to Scottsdale Rd				3.745	16.097	19.842	24.018
SR-101L Frontage Rd: Hayden Rd to Scottsdale Rd	I	I	RARF	3.745	0.000	3.745	5.350
SR-101L Frontage Rd: Pima Rd/Princess Dr to Hayden Rd	II	III, IV	RARF	0.000	16.097	16.097	18.668
Miller Rd/SR-101L Underpass	III	III	STP-MAG	0.000	13.922	13.922	19.889
Pima Rd: Happy Valley Rd to Dynamite Blvd	III	III	STP-MAG	0.000	23.607	23.607	33.725

Project Location	Phase		Fund Type	Reimb. To Date (YOE\$)	Future Reimb. (2010\$)	Total Reimb. (YOE\$, 2010\$)	Total Cost (YOE\$, 2010\$)
	Const. Complete	Program Reimb.					
Pima Rd: McKellips Rd to Via Linda				0.000	30.294	30.294	49.080
Pima Rd: Via Linda to Via De Ventura	II	II	RARF	0.000	1.331	1.331	2.341
Pima Rd: Via De Ventura to Krail	II	II	RARF	0.000	7.467	7.467	10.670
Pima Rd: Thomas Rd to McDowell Rd	II	II	RARF	0.000	6.044	6.044	8.641
Pima Rd: Krail to Chaparral	II	II	RARF	0.000	9.407	9.407	16.453
Pima Rd: Chaparral Rd to Thomas Rd	II	II	RARF	0.000	6.044	6.044	10.976
Scottsdale Airpark Area Capacity Improvements				0.000	72.983	72.983	104.261
Frank Lloyd Wright -Loop 101 Traffic Interchange	II	III	RARF	0.000	3.954	3.954	5.648
Raintree -Loop 101 Traffic Interchange	II	II	RARF	0.000	1.168	1.168	1.668
Northsight Blvd: Hayden to Frank Lloyd Wright	II	II	RARF	0.000	6.957	6.957	9.939
Frank Lloyd Wright Frontage Rd: Northsight to Greenway-Hayden Loop	II	III	RARF	0.000	0.977	0.977	1.396
Redfield Rd: Scottsdale Rd to Hayden	II	II, III	RARF	0.000	2.456	2.456	3.509
Thunderbird-Raintree Loop	III	II, III	RARF	0.000	20.596	20.596	29.422
Raintree Drive: Loop 101 to Hayden	IV	IV	STP-MAG	0.000	17.715	17.715	25.307
Hayden Rd: Redfield to Raintree	IV	IV	STP-MAG	0.000	4.819	4.819	6.884
CAP Canal South Frontage Rd: Loop 101 to Frank Lloyd Wright	III	III	RARF	0.000	2.753	2.753	3.933
Hayden Rd - Loop 101 Interchange Improvements	IV	IV	STP-MAG	0.000	11.588	11.588	16.555
Scottsdale Rd: Thompson Peak Pkwy to Jomax Rd				0.000	13.317	13.317	54.323
Scottsdale Rd: Thompson Peak Pkwy to Pinnacle Peak Pkwy	II	II	RARF	0.000	11.528	11.528	16.514
Scottsdale Rd: Pinnacle Peak Pkwy to Jomax Rd	II	II	RARF	0.000	1.789	1.789	37.809
Scottsdale Rd: Jomax Rd to Carefree Hwy				0.000	28.329	28.329	51.027
Scottsdale Rd: Jomax Rd to Dixileta Dr	III	III	STP-MAG	0.000	9.443	9.443	17.975
Scottsdale Rd: Dixileta Dr to Ashler Hills Dr	III	III	STP-MAG	0.000	9.443	9.443	16.526
Scottsdale Rd: Ashler Hills Dr to Carefree Highway	III	III	STP-MAG	0.000	9.443	9.443	16.526
Shea Blvd: SR-101L to SR-87				4.839	18.173	23.012	32.876
Shea Blvd at 90th/92nd/96th: Intersection Improvements	I	I	RARF	4.056	0.000	4.056	5.794
Shea Auxiliary Lane from 90th St to Loop 101	IV	IV, V	RARF	0.000	6.353	6.353	9.075
Shea Blvd at Via Linda (Phase1): Intersection Improvements	I	I	RARF	0.621	0.000	0.621	0.888
Shea Blvd at Via Linda (Phase 2): Intersection Improvements	III	IV	RARF	0.000	2.074	2.074	2.962
Shea Blvd at 120/124th St: Intersection Improvements	I	IV, V	RARF	0.000	1.391	1.391	1.988
Shea Blvd at Mayo/134th St: Intersection Improvements		I	RARF	0.162	0.000	0.162	0.231
Shea Blvd: SR-101L to 96th St: ITS Improvements	I	IV	RARF	0.000	0.381	0.381	0.545
Shea Blvd: 96th St to 144th St: ITS Improvements	II	IV	RARF	0.000	2.347	2.347	3.352
Shea Blvd at Loop 101: Intersection Improvements	III	IV	RARF	0.000	3.667	3.667	5.238

Project Location	Phase		Fund Type	Reimb. To Date (YOE\$)	Future Reimb. (2010\$)	Total Reimb. (YOE\$, 2010\$)	Total Cost (YOE\$, 2010\$)
	Const. Complete	Program Reimb.					
Shea Blvd at 110th St: Intersection Improvements	III	IV	RARF	0.000	0.264	0.264	0.377
Shea Blvd at 114th St: Intersection Improvements	III	IV	RARF	0.000	0.264	0.264	0.377
Shea Blvd at Frank Lloyd Wright Blvd: Intersection Improvements	II	IV	RARF	0.000	0.660	0.660	0.943
Shea Blvd at 115th St: Intersection Improvements	III	IV	RARF	0.000	0.110	0.110	0.158
Shea Blvd at 125th St: Intersection Improvements	III	IV	RARF	0.000	0.377	0.377	0.540
Shea Blvd at 135th St: Intersection Improvements	III	IV	RARF	0.000	0.110	0.110	0.158
Shea Blvd at 136th St: Intersection Improvements	III	IV	RARF	0.000	0.176	0.176	0.251
Legacy Dr: Hayden Rd to 88th Street	IV	IV	STP-MAG	0.000	13.559	13.559	21.357

**Totals (millions)**

Reimbursed to Date (YOE\$) \$ 159  
Future Reimbursements (2010\$) \$ 1,541  
Total Reimbursed (YOE\$, 2010\$) \$ 1,700  
Total Cost (YOE\$, 2010\$) \$ 2,889

**Appendix C**  
**Public Transit Program**

**REGIONAL TRANSPORTATION PLAN - 2010 UPDATE**  
**REGIONAL BUS OPERATING COSTS**  
(Millions of YOE & 2010 \$'s)

	Route	Implementation Phase	Operating Cost		Total
			2006-2010	2011-2031	
<b>Freeway Express/BRT</b>					
	Express Route 573	I	2.6	18.0	20.6
	Express Route 572	I	2.8	9.8	12.6
	Express Route 511	I	0.9	6.3	7.2
	Main Street LINK	I	2.9	43.1	46.0
	Express Route 562	I	0.3	3.5	3.9
	Express Route 535	I	0.4	4.9	5.4
	Express Route 536	I	0.2	0.0	0.2
	Express Route 575	I	0.7	6.8	7.5
	Express Route 576	I	0.7	0.0	0.7
	I-10 West RAPID	I	1.5	0.0	1.5
	Apache Junction Express	V	0.0	2.0	2.0
	Arizona Avenue LINK	II	0.0	16.8	16.8
	Buckeye Express	II	0.0	7.1	7.1
	Superstition Freeway Connector	V	0.0	0.7	0.7
	Grand Avenue Limited	II	0.0	7.7	7.7
	Pima Express	V	0.0	1.7	1.7
	Peoria Express	V	0.0	1.2	1.2
	Scottsdale/Rural LINK	III & V	0.0	9.2	9.2
	S. Central Express	II	0.0	10.4	10.4
	Black Canyon Freeway Connector	V	0.0	0.3	0.3
	I-17 RAPID	I	4.6	0.0	4.6
	South Central Avenue LINK	V	0.0	0.8	0.8
	Ahwatukee Connector	V	0.0	0.2	0.2
	Anthem Express	V	0.0	0.5	0.5
	Santan Express	V	0.0	0.7	0.7
	Red Mountain Freeway Connector	V	0.0	0.3	0.3
	Superstition Springs Express	V	0.0	0.5	0.5
	Avondale Express	III	0.0	3.0	3.0
	North I-17 Express	V	0.0	0.5	0.5
	Loop 303 Express	V	0.0	0.7	0.7
	SR 51 RAPID	I	2.8	1.2	4.0
	I-10 East RAPID	I	3.5	0.0	3.5
	Chandler Boulevard LINK	NA	0.0	0.0	0.0
Sub-total			23.9	158.0	181.8
<b>Supergrid Route</b>					
	Scottsdale Road	I	25.2	139.3	164.5
	Chandler Boulevard	I	12.0	103.9	115.9
	Glendale Avenue	I	18.6	123.2	141.8
	Main Street	I	3.1	45.5	48.6
	Arizona Avenue/Country Club	II	0.0	43.9	43.9
	Gilbert Road	I	1.1	31.5	32.6
	Baseline Road	II	0.0	48.7	48.7
	Southern Avenue	I	9.7	107.9	117.7
	Dobson Road	I	4.7	48.4	53.1
	Camelback Road	IV	0.0	32.7	32.7

	Route	Implementation Phase	Operating Cost		Total
			2006-2010	2011-2031	
	Alma School Rd.	III	0.0	18.5	18.5
	Elliot Road	II	0.0	29.9	29.9
	University Drive	III	0.0	59.0	59.0
	Dysart Road	V	0.0	2.8	2.8
	Hayden/McClintock	IV	0.0	44.2	44.2
	59th Avenue	II	0.0	32.3	32.3
	Broadway Avenue	III	0.0	57.8	57.8
	Power Road	II	0.0	32.0	32.0
	Ray Road	IV	0.0	8.0	8.0
	Tatum Boulevard/44th Street	V	0.0	2.9	2.9
	McDowell/McKellips Road	II	0.0	99.1	99.1
	Peoria/Shea Avenue	V	0.0	17.2	17.2
	Van Buren	IV	0.0	44.9	44.9
	Bell Road	IV	0.0	52.2	52.2
	Waddell Road/Thunderbird	IV	0.0	29.6	29.6
	99th Avenue	V	0.0	1.0	1.0
	Buckeye Road	V	0.0	1.7	1.7
	Dunlap/Olive Avenue	V	0.0	2.1	2.1
	Indian School Road	V	0.0	4.5	4.5
	Queen Creek Road	V	0.0	0.3	0.3
	Thomas Road	V	0.0	4.0	4.0
	Litchfield Road	NA	0.0	0.0	0.0
	83rd Avenue/75th Avenue	IV	0.0	14.6	14.6
	Greenfield Road	IV	0.0	9.7	9.7
Sub-total			74.5	1,293.3	1,367.9
<b>Rural Service</b>					
	Gila Bend connector	I	1.8	15.6	17.3
	Wickenburg connector	I	1.1	6.1	7.2
Sub-total			2.8	21.7	24.6
<b>RPTA Funded Service That Predates RTP</b>					
	Local Bus Service	I	24.1	48.5	72.6
	Express Bus Service	I	21.7	86.5	108.3
	SCAT	I	0.4	1.3	1.7
Sub-total			46.2	136.4	182.6
<b>Other Services</b>					
	ADA Complementary Paratransit	I	32.6	555.8	588.4
	Regional Customer Services	I	32.5	149.7	182.3
	RPTA Planning and Administration	I	21.4	88.8	110.3
	Safety and Security Programs	I	1.5	24.3	25.7
	Operating Contingency	I	1.0	11.4	12.4
Sub-total			89.0	830.0	919.1
<b>Total</b>			<b>236.5</b>	<b>2,439.4</b>	<b>2,675.9</b>

**REGIONAL TRANSPORTATION PLAN - 2010 UPDATE**  
**REGIONAL BUS CAPITAL COSTS**  
(Millions of YOE & 2010 \$'s)

	Facility	Const./Acquisition Phase	Capital Cost		Total
			2006-2010	2011-2031	
<b>Fleet</b>					
	Fixed Route Buses	All	147.1	768.4	915.5
	Rural Routes	All	0.5	3.3	3.8
	Paratransit	All	17.3	87.8	105.1
	Van Pool	All	9.9	43.8	53.7
<b>Sub-total</b>			<b>174.8</b>	<b>903.3</b>	<b>1,078.0</b>
<b>Capital Facilities</b>					
<b>Park and Rides</b>					
	East Buckeye	II	2.1	3.1	5.2
	Chandler	I	4.6	0.0	4.6
	Val Vista/202	V	0.0	5.2	5.2
	Glendale Arrowhead	II	0.0	23.5	23.5
	Country Club	I	9.4	0.0	9.4
	Peoria Grand	III	0.0	5.2	5.2
	Desert Sky	II	0.0	14.3	14.3
	Laveen/59th Ave	III	0.0	5.2	5.2
	Elliot/I-10	V	0.0	5.2	5.2
	Camelback/101	V	0.0	5.2	5.2
	Happy Valley-I-17	II	5.5	0.0	5.5
	Scottsdale/Loop 101	II	5.0	0.0	5.0
	Grand/Surprise	II	4.5	0.0	4.5
<b>Total Park and Rides</b>			<b>31.1</b>	<b>67.1</b>	<b>98.2</b>
<b>Transit Centers</b>					
	Downtown Chandler 4-bay	V	0.0	2.2	2.2
	South Chandler 4-bay	V	0.0	2.2	2.2
	Glendale/Grand 4-bay	V	0.0	2.2	2.2
	Arrowhead 6-bay	II	0.0	3.2	3.2
	Mesa Downtown 6-bay	III	0.0	3.2	3.2
	Peoria 4-bay	II	0.0	2.2	2.2
	19thAveCamelback 6-bay	V	0.0	3.2	3.2
	44th Cactus 6-bay	V	0.0	3.2	3.2
	Central Station Rehab	II	4.9	0.0	4.9
	Metrocenter TC Rehab	V	0.0	7.7	7.7
	Scottsdale 4-bay	V	0.0	2.2	2.2
	South Tempe 4-bay	V	0.0	2.2	2.2
	College/ASU Expansion/Rehab	V	0.0	7.7	7.7
<b>Total Transit Centers</b>			<b>4.9</b>	<b>41.5</b>	<b>46.3</b>
<b>Operations and Maintenance Facilities</b>					
	Paratransit EVDAR	V	0.0	11.0	11.0
	Mesa Purchase	I	9.9	0.0	9.9

	Facility	Const./Acquisition Phase	Capital Cost		Total
			2006-2010	2011-2031	
	Rehab Mesa	V	0.0	11.3	11.3
	Phoenix West	I	43.6	0.0	43.6
	Phoenix Heavy	NA	0.0	0.0	0.0
	Rehab Phx-South	V	0.0	11.3	11.3
	Paratransit Phoenix	V	0.0	11.0	11.0
	Tempe	I	43.6	0.0	43.6
	Fixed Route (New)	NA	0.0	0.0	0.0
	Rural Facility	NA	0.0	0.0	0.0
	Vanpool	NA	0.0	0.0	0.0
	<b>Total O &amp; M Facilities</b>		<b>97.2</b>	<b>44.8</b>	<b>142.0</b>
	<b>BRT Right-of-Way Improvements</b>				
	Main Street	I	15.2	0.0	15.2
	Arizona Avenue	II	12.0	12.1	24.1
	Scottsdale/Rural Roads	III	0.0	37.5	37.5
	South Central Avenue	V	0.0	19.3	19.3
	Chandler Boulevard	NA	0.0	0.0	0.0
	<b>Total BRT ROW Improvements</b>		<b>27.2</b>	<b>68.9</b>	<b>96.0</b>
	<b>Other Capital Improvements</b>				
	Bus Stop Improvements	I	5.8	0.0	5.8
	Vehicle Upgrades	II	6.6	17.8	24.4
	<b>Total Other Capital</b>		<b>12.5</b>	<b>17.8</b>	<b>30.2</b>
	<b>Contingency for Capital Projects</b>	All	2.5	37.2	39.7
	<b>TOTAL</b>		<b>350.0</b>	<b>1,180.5</b>	<b>1,530.6</b>

**REGIONAL TRANSPORTATION PLAN - 2010 UPDATE**  
**HIGH CAPACITY TRANSIT/LIGHT RAIL TRANSIT OPERATING COSTS**

**(Millions of YOE & 2010 \$'s)**

	Route	Implementation Phase	Operating Cost		Total
			2006-2010	2011-2031	
<b>LRT Segments</b>					
	NW Extension - Phase One (1)	IV		29.0	29.0
	Central Mesa (2)	II		54.0	54.0
	Tempe South (2)	II		26.9	26.9
	Glendale (3)	IV		27.4	27.4
	NW Extension - Phase Two (3)	IV		7.7	7.7
	Phoenix West (4)	III		126.0	126.0
	NE Phoenix (5)	V		0.0	0.0
	CP/EV	I	49.5	708.4	757.9
<b>TOTAL</b>			<b>49.5</b>	<b>979.4</b>	<b>1,028.9</b>

(1) Target opening - December 2023.

(4) Target opening - December 2022

(2) Target opening - December 2016.

(5) Target opening - December 2031

(3) Target opening - December 2026

**REGIONAL TRANSPORTATION PLAN - 2010 UPDATE**  
**HIGH CAPACITY TRANSIT/LIGHT RAIL TRANSIT CAPITAL COSTS**

**(Millions of YOE & 2010 \$'s)**

	Route	Implementation Phase	Capital Cost		Total
			2006-2010	2011-2031	
<b>LRT Segments</b>					
	NW Extension - Phase One (1)	IV	85.2	204.4	289.6
	Central Mesa (2)	II	5.4	210.8	216.2
	Tempe South (2)	II	4.0	136.8	140.7
	Glendale (3)	IV	0.0	358.6	358.6
	NW Extension - Phase Two (3)	IV	0.0	100.1	100.1
	Phoenix West (4)	III	17.7	765.8	783.5
	NE Phoenix (5)	V	0.0	697.0	697.0
	CP/EV	I			0.0
Sub-total			112.3	2,473.5	2,585.8
<b>LRT Systemwide Support</b>					
	CP/EV Regional Reimbursements	I-II	151.0	47.8	198.8
	Systemwide Support Infrastructure	I-V	0.6	443.7	444.3
	Design Standards and System Planning	I-V	3.6	3.2	6.8
	Capital Project Development Admin,	I-V	1.1	31.5	32.6
	Utility Reimbursements	I-V	80.6	119.6	200.1
Sub-total			236.9	645.7	882.6
<b>TOTAL</b>			<b>349.2</b>	<b>3,119.2</b>	<b>3,468.4</b>

(1) Target opening - December 2023.

(4) Target opening - December 2022

(2) Target opening - December 2016.

(5) Target opening - December 2031

(3) Target opening - December 2026

## **Appendix D**

### **Consultation on Environmental Mitigation and Resource Conservation Factors**

## **FY 2010 Agency Consultation**

The development of the 2010 Update of the Regional Transportation Plan (RTP) continued through calendar year 2009, and an additional agency workshop was held on November 9, 2009 to receive input from environmental and resource agencies, regarding the application of environmental mitigation and resource conservation concepts in the transportation planning process.

The emphasis at the 2009 workshop was on proposed legislation at the federal level that may have an effect on the transportation planning process. In this regard, considerable activity had been occurring at the federal level in the areas of clean energy, climate change, and national funding for transportation. Many of the concepts in this proposed legislation address issues affecting the environmental and resource conservation aspects of transportation planning. The goal of the workshop was to discuss pending legislation and develop insights and draw conclusions about the potential future direction of the regional transportation planning process.

### **Clean Energy Jobs and American Power Act - S. 1733 and American Clean Energy and Security Act of 2009 - H.R. 2454**

The Clean Energy Jobs and American Power Act (S. 1733) was introduced in the U.S. Senate on September 30, 2009. A similar proposal, the American Clean Energy and Security Act of 2009 (H.R. 2454), was passed by the U.S. House of Representatives on June 26, 2009. Both pieces of legislation set targets for carbon emission reductions from major U.S. sources by 80 percent by 2050, and include various green house gas (GHG) requirements on the utility sector, as well as other elements of business and industry.

In addition, both proposed measures identify new roles and requirements for metropolitan planning organizations (MPO's), regarding the transportation planning process. While the details differ somewhat between the two proposals, the major thrust of each piece of legislation is very similar and is described in general terms below.

- New planning considerations for MPO's:
  - Achieve sustainability and livability.
  - Reduce surface transportation-related GHG emissions and reliance on oil.
  - Adapt to the effects of climate change.
  - Protect public health.
  - Promote consistency between transportation improvements and housing and land use patterns.
  - Assess impacts on the environment.
- MPOs in Transportation Management Areas must develop targets and strategies for GHG reductions to meet targets. Targets must demonstrate progress in stabilizing and reducing transportation GHG emissions, and contribute to national goals. MPO's must consult with state air agencies in

setting targets and selecting strategies, and cooperate with state land use, resource management and environmental agencies.

- Possible MPO strategies for GHS reductions:
  - Increase transit ridership.
  - Increase walking, bicycling and other forms of nonmotorized transportation.
  - Implementation of zoning and other land use regulations and plans to support infill and transit oriented development.
  - Travel demand management programs – carpool, vanpool or car-share projects, transportation pricing measures, parking policies and programs to promote telecommuting, flexible work schedules, and satellite work centers.
  - Transportation system operation improvements – intelligent transportation systems and congestion system management.
  - Intercity passenger rail.
  - Intercity bus improvements.
  - Freight rail improvements.
  - Use of materials or equipment for construction or maintenance of transportation projects that reduce GHG emissions.
  - Public facilities for supplying electricity to electric and hybrid-electric vehicles.
  
- U.S. DOT and EPA must approve the plan and determine that plan is likely to achieve the GHG targets.

### **Surface Transportation Reauthorization**

The current surface transportation funding legislation, the Safe, Accountable, Flexible, Efficient, Transportation Equity Act - A Legacy for Users (SAFETEA – LU) was signed by the President on August 10, 2005. This act expired on September 30, 2009, and has been held over through continuing resolutions. These temporary extensions are anticipated to continue to occur for the foreseeable future. However, in June 2009, the U.S. House Transportation and Infrastructure Committee passed a concept for the Surface Transportation Authorization Act of 2009, which provides some indication of the direction of future transportation legislation at the federal level. Key features of this legislative blueprint are listed below.

- Create a National Transportation Strategic Plan.
- Improve the safety of the surface transportation network.
- Bring existing highway and transit facilities and equipment to a state of good repair.
- Facilitate goods movement.
- Improve metropolitan mobility and access.
- Expand rural access and interconnectivity.
- Lessen environmental impacts from the transportation network.

- Improve the project delivery process by eliminating duplication in documentation and procedures.
- Facilitate private investment in the national transportation system that furthers the public interest.
- Ensure that States receive a fair rate of return on their contributions to the Trust Fund.
- Provide transportation choices.
- Improve the sustainability and livability of communities.

Metropolitan Planning Organizations may be particularly affected by proposals involving a Metropolitan Mobility Program, a larger role for transit services in urban areas, an emphasis on livability to be facilitate through cooperative efforts of U.S. DOT, EPA and HUD, implementation of high speed and commuter rail, and a changing revenue source landscape.

## **FY 2009 Agency Consultation**

MAG reached out to Federal, State, Tribal, regional, and local agencies to consult on environmental mitigation and resource conservation issues and concerns, during the development of the 2010 Update of the Regional Transportation Plan (RTP). An agency workshop was held on November 13, 2008 to review MAG studies and receive input from environmental and resource agencies, regarding the application of environmental mitigation and resource conservation concepts in the transportation planning process.

Three studies were discussed at the workshop, including the I-10/Hassayampa Valley Transportation Framework Study, the I-8/I-10/ Hidden Valley Transportation Framework Study, and the Regional Transit Framework Study. Preliminary information from the first two of these studies was presented at the FY 2008 Workshop, and the FY 2009 Workshop provided an opportunity to discuss the studies in greater detail. In addition, preliminary information from the MAG Regional Transit Framework Study was presented, which evaluates future transit needs beyond those contained in the RTP.

### **Comparisons of Transportation Plans with Conservation Plans and Inventories of Natural or Historic Resources**

As part of the FY 2009 consultation effort, environmental scans prepared for the I-10/Hassayampa Valley Transportation Framework Study and the I-8/I-10/ Hidden Valley Transportation Framework Study were presented at the November 13, 2008 agency workshop. These environmental scans included geographic coverages to help identify potential areas where future facilities may impact environmental and resource elements in the surrounding areas.

Specific overlays that were reviewed included:

- Air Quality Non-Attainment Areas
- Drainage Floodplains
- Hazardous Materials
- Existing Land Use
- Natural Vegetation
- Recreational Opportunities
- Wildlife Linkages
- Conservation Areas
- Environmental Justice Populations
- Land Ownership
- Future Land Use
- Planned Developments
- Biological Resources/Species

In addition, as part of the presentation of findings from the MAG Regional Transit Framework Study, land use patterns and the transportation system were discussed, including key connections between activity centers. Corridor concepts at the community level, subarea level, and regional level were described, and the tie between transit system options and environmental issues such as sustainability, carbon footprint, smart growth, and air quality were assessed.

## **Environmental Mitigation Factors, Natural and Historic Resource Conservation, and Planning Process Considerations**

Key comments received at the FY 2009 workshop are summarized below. The points listed are not intended to represent MAG policies, but rather, are factors for consideration in the transportation planning process.

- Significant progress regarding the consideration of environmental mitigation factors, as well as natural and historic resource conservation, has been made in the MAG long-range transportation planning process. The environmental scans included in the transportation framework studies have been particularly effective in analyzing environmental and resource factors. This approach should be pursued on a continuing basis, as it offers the opportunity to identify environmental and resource issues early in the transportation planning process and effectively involve key environmental and resource agencies.
- As a part of the transportation framework studies, as well as the transportation planning process in general, it will continue to be important to emphasize that findings resulting from study efforts are general and subject to change. It is true that identifying the potential, future location of transportation facilities and services is a key output of planning studies and is of major interest to the public. However, it is important to avoid premature conclusions by neighborhoods, communities, and the public-at-large about the localized impacts, and benefits, of transportation improvements. Every effort should be made to remind the audiences of both planning presentations and written documents that the “lines on the map” are not “cast in stone”.
- Drainage studies by the Maricopa County Flood Control District are ongoing in the Wittman area and should be used as a resource in transportation planning activities.
- The location of existing and future power transmission lines should be considered as part of the transportation planning process for new facilities, as well as the location of waters of the United States.
- Continuing involvement of the Maricopa County Parks and Recreation Department will be important to identify recreational opportunities as new areas of the region develop.
- Planning of future transportation systems in developing areas should recognize the need for accessibility to health care facilities.
- Land use planning in the developing parts of the region should take into account conflicts between conservation areas and areas planned for development. In addition, the potential limits of water availability and strategies for water reuse should be included in the planning process.

## **FY 2008 Agency Consultation**

Although the RTP was not updated during FY 2008, an agency workshop was held on November 6, 2007 to obtain input on ongoing MAG transportation studies. The main purpose of the workshop was to receive input on two MAG studies that assess transportation needs in developing areas of the region. These studies were the I-10/Hassayampa Valley Transportation Framework Study, and the I-8 and I-10/Hidden Valley Transportation Framework Study.

The I-10/Hassayampa Valley Roadway Framework Study covers the western portions of the MAG planning area and includes concepts for future freeway and parkway corridors in the area. Since these corridors are not yet a part of the Regional Transportation Plan, the goal of the workshop was to gain insights regarding agency concerns before the corridors are considered for inclusion in the Plan at some future date. In addition, preliminary results from the I-8 and I-10/ Hidden Valley Roadway Framework Study were reviewed. This study covers southwest Maricopa County and west/central Pinal County. Although the process for both these studies has included extensive involvement of environmental and resource agencies, the RTP workshop provided another opportunity for MAG to familiarize the agencies with the study results and to obtain comments on potential mitigation and conservation approaches.

### **Comparisons of Transportation Plans with Conservation Plans and Inventories of Natural or Historic Resources**

As part of the FY 2008 consultation effort, a series of maps that depict the distribution of natural resources, land use patterns, demographic factors, and conservation areas was prepared for the Hassayampa Valley and Hidden Valley study areas. Proposed transportation facility networks were overlaid on these coverages to help identify potential areas where future facilities may impact the natural environment, and existing or future land use patterns. These maps were presented at the November 6, 2007 Workshop and provided a basis for comment and discussion.

Specific overlays that were reviewed included:

- Air Quality Non-Attainment Areas
- Drainage Floodplains
- Hazardous Materials
- Existing Land Use
- Natural Vegetation
- Recreational Opportunities
- Wildlife Linkages
- Conservation Areas
- Environmental Justice Populations
- Land Ownership
- Future Land Use
- Planned Developments
- Biological Resources/Species

## **Environmental Mitigation Factors, Natural and Historic Resource Conservation, and Planning Process Considerations**

Key comments received at the FY 2008 workshop are summarized below. The points listed are not intended to represent MAG policies, but rather, are factors for consideration in the transportation planning process.

- When assessing air quality issues and potential impacts, the new eight-hour ozone standards and non-attainment area boundaries should be employed.
- The transportation planning process in developing areas should include consideration of methods for protecting right-of-way for new freeway corridors and other key transportation facilities.
- Drainage studies by the Maricopa County Flood Control District are ongoing in the Wittman area and should be used as a resource in transportation planning activities.
- The location of existing and future power transmission lines should be considered as part of the transportation planning process for new facilities, as well as the location of waters of the United States.
- Continuing involvement of the Maricopa County Parks and Recreation Department will be important to identify recreational opportunities as new areas of the region develop.
- Planning of future transportation systems in developing areas should recognize the need for accessibility to health care facilities.
- Land use planning in the developing parts of the region should take into account conflicts between conservation areas and areas planned for development. In addition, the potential limits of water availability and strategies for water reuse should be included in the planning process.
- Future noise mitigation issues should be anticipated in planning corridors in currently vacant areas. Policies should be established as part of the planning process to help ensure that community development patterns are designed to minimize future mitigation requirements. This is especially important to conserve funding so that it can be focused on construction of actual transportation facilities.
- Provisions for future park-and-ride lots should be considered in the planning process for the transportation framework in developing areas. These facilities are key elements of the transportation system and need to be recognized early, and throughout, the planning process. Fueling locations for alternative vehicle should also receive some consideration.

- The full range of transportation modes should be addressed in planning for developing areas, including high capacity transit facilities, goods movement facilities, and both passenger and freight intermodal facilities.
- The effects of an extensive roadway network on the urban heat island effect should be considered in the planning process as new areas are developed.
- Concerns about the impacts of transportation facilities on specific cultural sites, as well as the overall effects on the traditional cultural, are an important issue for Native American communities.

## **FY 2007 Agency Consultation**

The FY 2007 consultation effort was initiated with an agency workshop, which was held on August 17, 2006. The workshop provided an opportunity to familiarize the agencies with MAG's organization and planning responsibilities, as well the goals of the consultation process. Most importantly, agency input was obtained on environmental mitigation and resource conservation issues, available databases and other information resources, and future steps in the planning process. Following the workshop, MAG staff held additional individual meetings with thirteen key environmental and resource agencies during September/October 2006.

Key input provided at the workshop and follow-up sessions is summarized below. This input cover three main topic areas: (1) environmental mitigation factors, (2) natural and historic resource conservation, and planning process considerations.

### **Environmental Mitigation Factors**

The consultation process with environmental and resource agencies yielded mitigation issues and concepts in four major areas: air quality, water quality, noise, and habitat. The key points emerging from the discussions on these topics have been summarized below for consideration in the transportation planning process.

#### **Air Quality**

- **PM-10** - A major, transportation-related air quality issue in the MAG Region is PM-10 non-attainment. Streets and highways are a source of fugitive dust, as the action of traffic stirs up dust from the roadway into the air. Also, construction activity on transportation facilities can result in the track-out of soil onto streets and highways, and fugitive dust can be generated on transportation construction sites. Unpaved roads are also dust generators. Currently undeveloped areas contain significant mileages of unpaved roads. As development in the region expands, these facilities could become an increasingly important element in addressing PM-10 air quality issues.

Street sweeping, paving of shoulders, paving unpaved roads, and construction site management can help reduce dust emissions significantly. The application of "best practice" dust control measures at construction sites is essential in helping to reduce the impacts of developing new transportation corridors or improving existing facilities. Making effective use of available funds for PM-10 control measures may help move the region into attainment as quickly as possible. Arterial improvement projects to extend existing roadway would have the dual benefit of improved access and reducing emissions from unpaved roads. At the same time, paving these unpaved roads may increase access to sensitive habitat areas.

- **Other Mobile Sources** - Transportation can affect air quality because of the tailpipe emissions of gases and particles from vehicles. Increases in vehicle-miles-of-travel can result in higher total emissions compared to what they would be without those increases. The emissions from potential future transportation corridors in both attainment and non-attainment areas of the region should be considered. An overall assessment of how additional corridors will affect regional air quality issues is important.

Efforts to reduce growth in vehicle-miles traveled can help lessen the impacts of the transportation system. The overall impact of travel and transportation facilities can be reduced by measures that lessen the amount of vehicular travel on streets and highways. Steps such as telecommuting, carpooling, flexible schedules, transit, and usage of alternative modes such as bicycles and walking can contribute to this effort. MAG Region ambient air quality readings for ozone are quite close to the allowable 8-hour standard. At some point in the future, this may require the implementation of new or enhanced transportation control measures aimed at reducing precursor emissions.

- **Stationary Sources** - The location of significant stationary sources should be considered when locating new transportation corridors or expanding existing transportation facilities. The proximity of transportation sources and stationary sources may have the potential to create concentration “hot spots” that should be avoided. On the other hand, serving certain major stationary sources with adequate transportation facilities may be important to minimize impacts on surrounding communities.

## Water Quality

- **Development Impacts** - In general, transportation facilities, as a component of development in the region, place an increasingly intensive burden on natural water systems. Effective design and management of this development to take into account the range of impacts it has on the environment will be vital as growth continues in the region.
- **Storm Water Runoff from Existing Facilities** - A major water quality issue affected by transportation facilities involves the storm water runoff from existing roads. Beginning in December 2007, the U.S. Environmental Protection Agency is expected to increase the enforcement of water quality standards related to storm water runoff. Runoff contains contaminants that may affect the quality of surface water and ultimately ground water. The quality of runoff from existing transportation facilities into rivers and streams represents a significant water quality issue. In addition, ground water may be affected by the retention basins associated with major freeways and highways, especially where drywells are employed.

The runoff from existing transportation facilities can be dealt with through containment and treatment, before it is allowed to enter surface streams or ground water aquifers. The primary mitigation measures for storm water runoff involve the

application of best management practices to address transportation facility impacts. These best management practices include steps such as retention basins or traps for runoff that enable capture of sediments before the runoff enters natural streams or lakes. Use of screens at facility drains can catch trash and prevent it from entering natural water courses. Substitution of planted drainage channels for concrete-lined structures can improve water quality and also reduce the velocity of water that enters natural streams and lakes, reducing erosion. Best management practices need to be applied to both freeways and arterial streets, and the right-of-way needs of these measures should be taken into account when new facilities are being identified and developed.

In addition, the amount of runoff and the areas where water is concentrated can affect surrounding land uses. Storm water runoff from freeways can impact ground water quality in adjacent areas. Best management practices should be employed to monitor and treat any runoff that may encroach into the adjacent community. In the long term, storm water should be directed away from the adjacent areas entirely.

- **Storm Water Runoff During Construction** - Storm water runoff from transportation facilities under constructions may also contain contaminants that affect surface and ground water quality. In addition, any discharge of dredge or fill materials into waters of the U.S. during construction must adhere to a series of watercourse permitting procedures administered by the U.S. Army Corp of Engineers. This includes the 404 Permit process.

During the construction of transportation facilities, measures are needed to control and/or treat storm water to meet water quality discharge standards and avoid exacerbating any existing water quality problems. The water quality impacts from storm runoff at transportation facility construction sites can be addressed through site management plans. These plans call for “Best Management Practices” that apply specific measures to limit the amount of contaminants that may be contained in the runoff from construction sites. On larger projects, this can include installation of sediment basins to ensure the quality of discharges. Measures such as street sweeping and steps to reduce track-out from construction sites can also reduce the amount of sediments in runoff from transportation facilities.

- **Disturbance of Watercourses and Wetlands** - Another effect of transportation facilities on water resources is related to the disturbance of watercourses and wetlands, impacting the ability of washes, rivers and wetlands to exist as functioning systems. Transportation structures can impede natural flow and flood patterns, which may affect surface water quality, the ground water recharge process, and riparian habitats.

The impacts of transportation facility crossings of washes, rivers and wetlands can be addressed through design practices that focus attention on keeping water courses as functional as possible. In addition to design measures, direct avoidance of sites, where possible, is another approach to limiting the impacts of transportation facilities. The trade-off between channelizing and bridging a stream, river or wetland

involves both cost considerations and environmental factors. Bridging with channelization may be more attractive than bridging, alone, in terms of cost, but the environmental consequences of the former may be much more significant.

Future locations where new transportation facilities may have significant effects on water courses are in the Hassayampa Valley area and along the Gila River. In particular, this would involve an expanded transportation network to handle population growth west of the White Tank Mountains and the development of SR 801 (I-10 Reliever Freeway). New or expanded transportation facilities in both these locations will be affecting major riparian areas and their biological habitats. The crossing of the Agua Fria River delta at the Gila River will involve a number of major of 404 Permit and other environmental factors.

- **Water Conservation, Subsidence and Other Factors** - Ground water should not be used for high water using plants and water features located in publicly owned rights-of-way of highways, streets and other transportation facilities. Subsidence due to ground water pumping can present an issue for transportation facilities, causing settling or misalignment of roadways after they are constructed. In addition other water-related sites should be avoided where possible. Examples of such sites includes water treatment plants, fresh water wells, test wells, contaminated or potentially contaminated areas (bio-soils, feed lots, superfund sites), surface water intakes, earth fissures, runoff discharges near well sites, and unique streams.

The evolving nature of data needs to be kept in mind. Features such as water tables, stream contours and water sheds can change in response to climatic trends, development and other factors.

## Noise

- **Facility Mitigation** - The vehicular traffic in transportation corridors may potentially affect noise levels in areas adjacent to the corridor. Mitigation measures such as rubberized asphalt pavement overlays, noise walls, berms and depressed facilities should be considered. Also, coordination with local government planning can direct appropriate land uses to areas adjacent to major transportation facilities.

## Habitat

- **Wildlife Corridors** - Wildlife movements often form corridors, and transportation facilities that cut across these corridors can interrupt normal migration patterns and jeopardize the viability of wildlife groups. Canals and railways, as well as roads, can be barriers to habitat and wildlife connectivity. Like wildlife, plant life dispersal patterns can be affected by transportation facilities, but perhaps to a lesser extent than wildlife. A wildlife corridor in general is defined as the entire habitat area including the entrance, exit, and habitat within.

As development increases along a wildlife corridor, it decreases the likelihood of travel by wildlife. Mountain ranges in general have been relatively easier to conserve

due to the understanding that the species found there are specific to the montane habitat. However, now the valley bottoms between mountain ranges are becoming more important than ever. The species contained in these areas are becoming more threatened due to development and habitat fragmentation. It is important to note that even if wildlife connectivity corridors are incorporated into development patterns, it may be difficult for wildlife to find the specific corridor, because they are accustomed to traveling the entire valley bottom. One of the long term concerns is that wildlife populations will have to be artificially augmented through animal transportation to have continued genetic diversity, due to habitat fragmentation.

An effective response to this issue is to identify where wildlife corridor interruptions may occur and to provide “wildlife-friendly” crossing structures (bridges, culverts, underpasses etc.) for the involved transportation facility. Studies to determine the best habitat corridor and fencing options to funnel wildlife may be able to assist in these types of situations. Other measures include timing construction to minimize disruption of breeding seasons, and pursuing mitigation banking. Also, using existing utility corridors for roads, canals, railways, etc. can help limit the amount of disruption. The area along 51<sup>st</sup> Avenue needs a wildlife friendly crossing structure so that wildlife may travel from South Mountain to the Sierra Estrella Mountains. It should be noted that paving existing dirt roads may tend to increase traffic volumes and speeds, increasing barrier effects to wildlife.

- **Riparian Areas** - Wildlife migration patterns form corridors that are often along riparian areas. Transportation facilities can affect the wildlife and plant life associated with rivers, streams and wetlands, in addition to the water quality. Locations such as the Salt River, Gila River, Agua Fria River, and many large washes are used by a large diversity of wildlife. A continuing effort will be required in order to preserve existent habitat in the central part of Maricopa County, as well as the habitat in the currently rural areas of the County. Providing wildlife-friendly” crossings, reducing the number of streambed crossings, and eliminating wetland intrusions can help minimize impacts. The current location of the Canamex Corridor crosses a number of major washes and will pose riparian habitat challenges.
- **Mitigation Banking** - There is a tendency for mitigation efforts to lag, and not be effective until well after construction is completed, resulting in greater impacts on habitat. Mitigation banking attempts to ameliorate this pattern by establishing new habitats, or implementing other mitigation measures at locations removed from the construction site, so that habitats will be continuously available. This helps maintain uninterrupted habitat opportunities for wildlife and lessens the impacts of new construction. The priority for mitigation banking is in a location immediately adjacent to a project, followed by locations in the same watershed, and finally “in-lieu” habitat purchases or mitigation measures in well removed locations.
- **Facility Maintenance and Surveys** - The timing of road maintenance and repairs, surveys of riparian vegetation and aquatic communities around bridge abutments, assessment of hazardous spills, and designation of critical habitat are

factors of continuing interest for habitat protection as the transportation planning process proceeds.

- **Urban Heat Island** - The urban heat island effect of transportation facilities, especially heat retention by pavements, warrants consideration in assessing environmental issues related to long-range transportation planning efforts.

## **Natural and Historic Resource Conservation**

The consultation process with environmental and resource agencies yielded resource conservation issues and concepts in three major areas: cultural resources, natural resources, and land use patterns. The key points emerging from the discussions on these topics have been summarized below for consideration in the transportation planning process.

### **Cultural Resources**

- **Tribal Cultural Resources** - In the transportation planning process tribal cultural resources, in particular, should be considered early and in considerable detail. This may warrant early consultation with Native American Tribes concerning facility locations, before alternatives are actually identified in detail. This may help avoid selection of a final option that has major impacts that are not discovered until construction earthwork is underway. New technologies can yield significant information that will help in the definition of alignment alternatives that have the least impact on archaeological sites. In general, riparian locations are may be closely associated with archeological sites. This will be a major factor affecting the S.R. 801 corridor.

Excavation, particularly of burial sites, is no longer considered under Section 106 of the National Historic Preservation Act, to be a “no adverse effect” mitigation measure, but rather an “adverse effect.” Therefore, the potential for new transportation facilities to intrude in such areas has taken on greater significance and warrants extensive identification and eligibility determinations before final decisions are made regarding facility locations.

- **Cultural Context** - Another factor that warrants early consideration in the transportation planning process relates to the historic and cultural context (theme, location, time period) associated with the potential location of a transportation facility. Certain locations and topographical/geological features may have particular significance to a given culture. The potential impact of transportation structures in these locations bears consideration in the planning process. This factor is particularly relevant to the S.R. 202L (South Mountain Freeway) corridor.
- **Historic Structures** - Negative impacts to historic structures, archaeological sites, and Traditional Cultural Places should be avoided where possible. Cultural features such as canals may be historic, and the impacts of new transportation facilities or facility improvements not overlooked. The structures associated with transportation facilities, in themselves, can be historic in nature, and a given route

can represent an historic element in the overall history of a particular region or place. It is important to identify the key historical aspects of transportation facilities for future preservation.

- The general visual effects of transportation facilities on the surrounding community are an aspect that should not be overlooked. This may be particularly important as it relates to historic and cultural elements of the community.
- **Federal Requirements** - Some projects will involve federal funding, land, permits, or other types of federal involvement. These projects will need to be reviewed for impacts to cultural resources following the Section 106 process. There are federal standards (the Secretary of Interior's Standards) and requirements, such as tribal consultation, that will need to be followed. The federal agency involved in the project or plan will take the lead completing this process.
- **Other Considerations** - While often not addressed in this context, bicycle and pedestrian facilities represent, in effect, important cultural resources that need to be maintained and fully taken into account in the transportation planning process.

## Natural Resources

- **National Forest Areas** - Transportation facilities have high impacts on National Forest areas, potentially bringing high volumes of vehicles and people to areas that are readily affected by the accompanying air pollution, fire risk, soil erosion, damage to plants and wildlife, and other impacts. In addition, development that is adjacent to National Forest areas will place an increasing burden of users on a finite resource. Dealing with these demands, while conserving forest resources, requires a balanced approach and presents a variety of challenges.

Given their extensive impacts, new transportation corridors are a major concern for the protection of National Forest areas. Proposals for new corridors must first have a clearly defined purpose and need, as well as demonstrated benefits for Forest areas, before they can be considered for further study. The potential impacts of new transportation corridors are always accompanied by public and agency concerns over the degradation of the natural environment of Forest areas.

It is recognized that there may be a need for transportation facility operators to address safety and capacity issues related to existing highways through forest areas. This may result in the need for rock-fall prevention measures, addition of grade separations, shoulder widening or additional lanes. Assessing the potential impact of these kinds of improvements and identifying mitigation measures are a key element in the NEPA process. In addition to project-specific mitigation, there may be a need to mitigate the presence of a highway corridor, in general, through accommodations for wildlife linkages or other facility alterations.

- **Other Federal Lands** - Access to federal lands is a major issue in the relationship between transportation and resource conservation. An effort is made to focus access to federal lands through specific “portals” that control where people and vehicles can enter but, at the same time, provide adequate opportunities for the public to take advantage of recreational opportunities. Designated Federal Wilderness Areas may not be used for transportation purposes or developed in any other manner.

If local government land use and circulation plans result in blocking portals to federal lands, effectively isolating the land, public access suffers. On the other hand, if major roadways run through federal lands, it opens up the potential for vehicles to turn off and enter these areas indiscriminately. This can result in environmental damage and create other environmental issues such as dust from unauthorized off-road vehicle usage. In both cases, coordination by land use and transportation agencies is vital to reach a balance between too much and too little access. Exits from major roadways specifically to provide access to federal lands can help address the issue. Also, integrating federal land portals into local land use and circulation plans can help avoid isolating federal lands and maintain public access.

The future extension of the Loop 303 corridor, enhancements to SR 238, implementation of the Wickenburg Bypass, and development of new corridors in the West Valley will potentially have major impacts on federal lands.

## Land Use Patterns

- **Open Space** - Maintaining critical open space areas should be a major factor in preparing future transportation plans, along with wildlife migratory routes between habitats. The Regional Park and Trail System warrant careful consideration as part of the transportation planning process. Maricopa County has a County Park Master Plan for the regional park system that looks out over the next 20 years. Similarly, the Maricopa Trail is an example of a resource that needs to be protected in the future. Transportation also needs to consider transportation facilities that are effective in moving people to regional park areas.
- **Sustainable Communities** - A major aspect of the land use planning/transportation planning process should be a focus on the development of sustainable communities, taking a comprehensive view of transportation trade-offs in the urban environment. The land use planning/transportation planning nexus is key in the overall effort to maintain environmental quality. Land use planning approaches that emphasize mixed use development are essential. They help increase the proximity of homes to shopping and jobs and minimize the increase in travel that accompanies population growth in the region. Developments should be planned to accommodate park-and-ride lots and other alternative mode facilities, so that their implementation is not precluded as land costs increase in the future.

At the same time, traditional activities, such as agriculture, produce complaints from nearby residents who live in neighborhoods that were constructed immediately at the boundaries of these activities. Sustaining these activities in the overall land use mix represents a major challenge.

- **Development Community** - The development community should take a proactive role in addressing environmental issues and the impacts of development on transportation facilities and other infrastructure. Careful attention to the development process is vital to dealing with the high pace of growth in the region, and the resulting major infrastructure and environmental impacts. By working closely, at every opportunity with the development community during the land use planning process, State, regional, and local agencies can help ensure that effective infrastructure systems, including transportation facilities, are identified and integrated into development plans. This helps maintain an orderly development process and helps mitigate the regional impacts of growth.
- **Access Impacts** - Transportation facilities that lie along the border of a community may result in environmental impacts on that community, including effects on air and water quality, noise, dumping of trash, vehicle trespass, and potential effects of trucking. The commercial development that transportation facilities attract also may affect the surrounding community. These effects should be considering as part of the transportation planning process.

### **Planning Process Considerations**

During the meetings with key environmental and resource agencies, the discussions often led into the area of transportation planning, in general, and how environmental and resource concerns can be effectively integrated into the planning process. The major points made in this connection, which focused on the areas of early agency involvement and planning coordination, are summarized below.

#### **Early Involvement**

- **Environmental and Resource Agencies** - Early involvement by environmental and resource agencies in planning for new transportation corridors, as well as improvements to existing facilities, is essential to ensure that workable alternatives are defined, and full consideration of required mitigation measures is properly addressed. It is especially important not to overlook the fact that the need for early involvement improvements/changes to existing transportation facilities is as important as coordination on new corridors.
- **All Project Levels** - Early involvement is not only important for major corridors, such as those developed by ADOT, but is also vital for projects constructed at the city and county level. Participation in the planning process during MAG area studies and transportation corridor studies will provide the opportunity for input before key planning decisions are made. This involvement should occur prior to implementing the NEPA process, so that key environmental and resource issues

can be considered before they become large and significant. Early involvement is also important for effective identification and application of databases and other information inventories.

- **Cultural Resources** - Early consultation regarding cultural resources has become an increasingly important factor in transportation studies. It is important to consider land use, cultural, and environmental factors at the very beginning of transportation studies (including the identification of alternatives), so that significant conflicts can be noted and alternatives with high impacts can potentially be avoided, before major amounts of time and resources are invested in analysis.
- **Access Issues** - Early involvement of resource agencies in the transportation planning process can help ensure that access control issues are addressed effectively, both in terms of the location of access and the timing of access control structures. Controlling access is a key factor in limiting damage to sensitive areas, but, at the same time, adequate access is an important factor for the value of State land holdings. Features such as interchange spacing intervals along freeway/expressway routes are especially significant.

### **Planning Coordination**

- **Corridor Level Focus** - In transportation corridor and area studies, potential environmental mitigation measures specific to each corridor alternative should be described and assessed as part of the characteristics of the corridor, rather than addressing the issue, as a whole, in the overall study process. In addition, as part of these studies it is important to maintain the focus on issues affecting the immediate study area and avoid diverting attention to other areas or facilities.
- **Technical Committees** - MAG technical committees and working groups represent an excellent avenue for agencies to follow key issues in the region, as well as to provide information on environmental mitigation and resource conservation methods and concerns. It would be advantageous for key environmental and resource agencies to be involved in these groups.
- **Emergency Management** - Emergency evacuation routes should be a consideration in the transportation planning process. This includes the potential need for evacuation of the MAG Region, as well as handling of evacuees into the area from other parts of the country. The need to use transportation facilities for evacuation purposes also has numerous design implications, including ease of facility ingress/egress, chokepoints, and alternative routes. Emergency evacuation preparedness requires regional coordination among local entities. As transportation facilities are planned, consideration should also be given to the need for access by emergency service vehicles and accommodation of farm equipment.
- **Interregional Planning** - The central Arizona area, especially the Maricopa County and Pinal County areas, would greatly benefit from an integrated planning program. The growth in this area has become a multi-county proposition, as

development patterns have extended across county boundaries. Additionally, the issue of an adequate resources base needed to deal with multi-county infrastructure needs is a growing issue. Public transit services in the MAG Region should be closely coordinated with Pinal County communities. The impact of the motor vehicle travel from this high growth area into Maricopa County is significant and needs to be addressed.

- **Public Information** - A broad range of street, highway and light rail transit improvements are being constructed in the region simultaneously. Implementing agencies should make every effort to schedule improvement projects in a way that retains alternative route options along major north-south and east-west corridors. In addition, construction activities and closures should be well-publicized in advance, allowing motorists to make efficient adjustments in their travel patterns.
- **Right-of-Way** - The potential complexities of right-of-way acquisition for future facilities should be recognized early in the planning process, so that they do not become a major barrier to effective project development later in the plan implementation process. This is particularly the case where right-of-way on allotted Indian Community land might be involved.

The State Land Department is legally prohibited from donating right-of-way for the construction of transportation facilities. Also, early transportation right-of-way sales, when prices are lower, to ensure good access to State lands in the future are problematic. The courts have held that the actual realization of increased future access and the resulting land value benefits are too uncertain to justify early sale of right-of-way.

**Appendix E**  
**Planning Information Sources**

## **PLANNING INFORMATION SOURCES**

- Arizona Department of Environmental Quality
  - Air Quality Inventory (Ambient air quality data).
  - AZMAPPER: Water Quality Database.
- Arizona Department of Transportation
  - Website has a number of environmentally related resources. Templates for Categorical Exclusions and Environmental Assessments would help to identify key environmental factors and issues that may be considered. Air Quality Inventory (Ambient air quality data).
- Arizona Game and Fish Department
  - Website covering species of concern, riparian locations, wildlife environments and other related information. The Department has additional resources that would be useful in the transportation planning process, such as wildlife habitat corridors. Air Quality Inventory (Ambient air quality data).
  - Wildlife Linkages Assessment will be finalized soon. Specific linkage assessments are also being currently being performed. These documents and maps will be made available through the ADOT Linkages Website.
  - The Heritage Data Management System is a database that tracks locations of sensitive species in Arizona. This data system has GIS and database analysis for species in a particular area etc. Visit the programs web site at <http://www.azgfd.gov/hdms> for more specific information such as species abstracts, species lists, and distribution maps. AZMAPPER: Water Quality Database.
- Arizona State Historic Preservation Office
  - AZSITE Database – Arizona's designated Cultural Resources Electronic Inventory system including a database and GIS, which includes identified properties, information about the properties, National Register eligibility, and survey areas.
  - Archeological and Historical Sites Inventory (Hardcopy listing and maps).
- Arizona State Land Department

- Land Use GIS Database.
- Gila River Indian Community
  - Historical and Cultural Site Inventories.
- Maricopa County Air Quality Department
  - Maricopa County Point Source Emission Inventories.
  - Travel Reduction Program Commuter Travel Database.
- Maricopa County Department of Transportation
  - Environmental information resources applicable to the regional transportation planning process.
- Maricopa County Flood Control District
  - Water Course Master Plans.
  - Drainage Area Master Plans.
  - Cultural and biological inventories from water course and drainage studies
  - GIS flood plain contours and other GIS cultural and biological layers.
- National Resource Conservation Service
  - Soil and vegetation maps can be used in the long-range transportation planning process to identify potential wetland areas.
- U. S. Army Corp of Engineers
  - Los Angeles District Regulatory Web Page
  - Clean Water Act Section 404 Program Regulations (33 CFR 320-331)
- U. S. Bureau of Land Management
  - Soil and vegetation maps can be used in the long-range transportation Preliminary Draft Management Alternatives; Phoenix South and Sonoran Desert National Monument Planning Areas; Department of the Interior,

Bureau of Land Management, Phoenix Field Office; Public Workshops  
February – March 2005.

- Agua Fria National Monument and Bradshaw-Harquahala Draft Resource Management Plan and Draft Environmental Impact Statement; Department of the Interior, Bureau of Land Management, Phoenix Field Office; October 2005.
- U. S. Forest Service - Tonto National Forest
  - Tonto National Forest: Forest Resources GIS Database
  - Tonto National Forest: Land Management Plan

**Appendix F**

**Transportation Enhancement Projects**

## TRANSPORTATION ENHANCEMENT PROJECTS (1993 - 2009)

PROJECT DESCRIPTION	AMOUNT FUNDED	RECIPIENT	YEAR
<b>PHOENIX SUNNYSLOPE CANAL BANK</b> - Canal bank improvement including enhancements of 1.5 miles of non-motorized, multi-use pathways. The addition of lights, landscaping, art and other pedestrian amenities, and linkages to public transit routes are included. This is the first of five identified canal bank improvement demonstration projects in Phoenix.	\$500,000	Phoenix	1993
<b>RIO SALADO NON-MOTORIZED PATH SYSTEM</b> - Two miles of new multi-use paths and 1.5 miles of concrete paths, 5 acres of landscaping, 25 lighting fixtures, 6 rest area/ramadas, and visual enhancements to 2 pedestrian/equestrian crossings under the roadway at the south end of Papago Park, south of the Red Mountain Freeway on the north side of the Salt River between Southern Pacific Railroad and Rural Road.	\$500,000	Tempe	1994
<b>DOWNTOWN CANAL BANK IMPROVEMENTS</b> - Pedestrian and Bicycle Crossing of Canal in Downtown Scottsdale (part of waterfront Project)	\$364,000	Scottsdale	1994
<b>PASEO MULTI-USE BRIDGE AND CONNECTING PATH AT THE ARIZONA CANAL</b> - Bridge and bicycle path	\$34,457	Glendale	1994
<b>ARIZONA RAILWAY MUSEUM</b> - Electrification for historic rail car	\$16,000	Chandler	1994
<b>PEORIA CLASS 2 BICYCLE ROUTE PLAN</b> - Adds Striping for an on-street bicycle route.	\$90,000	Peoria	1994
<b>3RD AVENUE BICYCLE BRIDGE OVER THE GRAND CANAL</b> - Bridge for 3rd Avenue Commuter bicycle route	\$104,000	Phoenix	1994
<b>TOVREA CASTLE</b> - Acquisition of 5.7 acres of land to secure right of way for bicycle paths and trails to link to Papago Trail System.	\$500,000	Phoenix	1995
<b>SUNNYSLOPE SAFE PEDESTRIAN ZONES</b> - Pedestrian paths and enhancements (public art, signs, street furniture) to for Sunnyslope neighborhood core	\$80,000	Phoenix	1995
<b>BUTTERFIELD STATE ROUTE PAINTED ROCKS PETROGLYPH SITE</b> - Development of a site located on historic transportation route from St. Louis to San Francisco with an interpretive center, parking and pedestrian paths.	\$70,800	Bureau of Land Management	1995
<b>CENTRAL CITY ELDERLY PEDESTRIAN DEMONSTRATION PROJECT</b> - Internally illuminated street signs, universal symbol signs at traffic signals, improvements to refuge islands for elderly pedestrians in the area between 7th Street and 7th Avenue and Camelback Road to the Downtown area.	\$180,000	Phoenix	1995
<b>BIKE REST AREAS - 8TH ST/ADOBE</b> - Addition of five bicycle rest areas including ramadas, drinking fountains, shade trees, bicycle racks, and identifying signs to existing bikeway system.	\$96,159	Mesa	1995
<b>GRAND AVENUE FRONTAGE ROAD ENHANCEMENT</b> - Construction of 15,000 linear feet of sidewalk and landscaping within the cities of El Mirage and Surprise	\$268,788	El Mirage	1995
<b>ELECTRONIC ARCHIVES AND INTERPRETIVE PROGRAMS FOR THE TOWNS AND VILLAGES OF HOHOKAM CANAL SYSTEM II</b> - Construction of an electronic pathway to prehistoric towns and villages located on Hohokam Canal System II sites excavated during Phoenix Freeway Construction. Archives will include 'virtual tours' of the settlements, synthesis of archaeology, and approximately 100,000 pages of reports.	\$201,500	ASU	1996
<b>WEST FIFTH STREET MULTI-MODAL FACILITIES</b> - Multi-modal facilities for one mile of collector street (West 5th Street) through the Riverside/Sunset Neighborhood. Neighborhood Association providing the match. Includes sidewalk widening, provision of bicycle lanes, landscaping, lighting, and public art.	\$500,000	Tempe	1996
<b>CENTRAL AVENUE ART WALK/HEARD MUSEUM NORTH ANCHOR</b> - ½ mile pedestrian walkway that will incorporate public art, native landscaping, and pedestrian amenities such as benches and signs. Phase I of the Art Walk linking Heard Museum to the Phoenix Art Museum and Hance Park. Match largely private funds.	\$320,000	Phoenix	1996
<b>PHOENIX CENTRAL STATION STREETScape</b> - 1,400 linear feet of landscaping, kiosks, improved bush shelters, pedestrian lighting, benches, and sidewalk paving to complement the design elements of the Central Station. This area includes bus stops that pass by but do not enter Central Station.	\$200,000	Phoenix	1996
<b>BUSH HIGHWAY BIKE LANE</b> - 5.8 miles bike lane/shoulder along Bush Highway from Mesa City Limits to Usury Pass Road. Regional Bicycle Route #71.	\$250,000	Maricopa County	1996
<b>CAVE CREEK WASH MULTI MODAL COMMUTER BICYCLE PATH</b> - Design and Construction of gaps in a six-mile section of the 18+ mile Cave Creek non-motorized path system. Includes 10' wide pavement, underpass modifications, guide and interpretive signs, and amenities (fountains, benches, lighting). An artist will be involved in design.	\$274,625	Cave Creek	1996
<b>CITY OF PHOENIX BIKE LANES</b> - Bike lanes on 4.5 miles of Central Avenue from Jefferson St. to Baseline Rd. And construction of a Gateway at the Central Avenue Bridge.	\$500,000	Phoenix	1997
<b>ASU SPENCE AVE. BIKE PATH</b> - 610 feet of bicycle path on Spence Ave. from Rural Road to McAllister Mall	\$67,288	Arizona State University	1997

## TRANSPORTATION ENHANCEMENT PROJECTS (1993 - 2009)

PROJECT DESCRIPTION	AMOUNT FUNDED	RECIPIENT	YEAR
<b>MARICOPA COUNTY USURY RD. BIKE PATH</b> - Six miles of bike path on Usury Rd. From Mesa City limits to Salt River Recreation Site at Bush Highway.	\$300,000	Maricopa County	1997
<b>GUADALUPE - CALLE MAGDALENA PEDESTRIAN PATH</b> -1,100 foot pedestrian path on Calle Magdalena from Avenida Del Yaqui to Calle Maravilla	\$180,000	Guadalupe	1997
<b>LITCHFIELD PARK BIKE PATH</b> - 1,386 feet of bike path	\$140,000	Litchfield Park	1997
<b>ARIZONA DEPT. OF ADMINISTRATION</b> - 17 <sup>th</sup> Avenue Pedestrian Improvements	\$500,000	State of Arizona	1997
<b>ARIZONA DEPT. OF TRANSPORTATION</b> - Electronic Archive of archaeological and cultural information	\$223,721	ADOT	1997
<b>PASEO MULTI-USE PATH</b> - Construct a 12-foot-wide multi-use path and equestrian trail along the Consolidated Canal from Galveston St. to Pecos Rd. In Chandler. The 1.5 mile path will be for walking, jogging, roller-blading, biking and horseback riding. It will be part of a 6.5-mile trail system that will extend from Galveston St. to Riggs Rd.	\$500,000	Chandler	1998
<b>CONSOLIDATED CANAL PATHWAY</b> - Construct a 10-ft-wide bicycle/pedestrian path along the Consolidated Canal between 8 <sup>th</sup> St. and Meadowgreen Park.	\$500,000	Mesa	1998
<b>DOWNTOWN PEDESTRIAN CONNECTION</b> - Widen and connect sidewalks in a one-square-mile are of downtown Mesa and add street furniture, shad trees and public art.	\$481,503	Mesa	1998
<b>WEST VALLEY MULTI-MODAL TRANSPORTATION CORRIDOR</b> - Design the development of a 42-mile multi-use path along the New and Agua Fria Rivers from the town of New River to the Salt River	\$450,000	MAG	1998
<b>MARICOPA FREEWAY ENHANCEMENT PROJECT</b> - Restore and enhance nine underpasses along an elevated section of the Maricopa Freeway from 16 <sup>th</sup> St. to 19 <sup>th</sup> Ave. With improved lighting, safe walking and bicycling areas, and public art designed by students in adjacent schools.	\$400,000	ADOT / Phoenix	1998
<b>HISTORIC CATLIN COURT SHARED USE ALLEYWAY</b> - Redesign and enhance four existing alleyways for safe shared use by pedestrians and bicyclists; based on Dutch "woonerf". Includes undergrounding utilities, night safety lighting, realigning existing path to accommodate landscaping, seating walls and niches, public art alcoves, alley entry/exit features and shared alleyway etiquette and directional signage.	\$498,000	Glendale	1999
<b>FQ STORY HISTORIC DISTRICT INTERSECTION WALKWAY</b> - Enhance intersection and walkway safety through pedestrian crosswalks of eight foot wide red unit pavers to highlight crosswalks for pedestrians, bicyclists and motorists and historic street lighting. Matching funds provided entirely by F.Q. Story Preservation Association representing 600 homeowners.	\$213,746	Phoenix	1999
<b>RIO SALADO/SCOTTSDALE PATHWAY LINK</b> - Extends new multi-use paths 3/4 mile with decorative concrete, lighting, rest area ramadas, and visual enhancements for pedestrians under Loop 202. Prominent in developing Rio Salado. Critical connection for cyclists linking Indian Bend Wash and Grand Canal pathways.	\$500,000	Tempe	1999
<b>CANAL MULTI-USE PATH</b> - A 0.75 mile, 12' wide concrete path with landscaping, lighting and public art along Tempe Canal. Located in Apache Blvd. redevelopment area.	\$500,000	Tempe	1999
<b>PASEO PROJECT PHASE THREE</b> - 10' wide concrete multi-use path along the Consolidated Canal from Ryan Road to Ocotillo Road (1.5 miles). Includes separated natural earth equestrian trail. Seating and rest areas every 1/4-mile along the path. Connects origins and destinations. Has license agreement with SRP.	\$500,000	Chandler	1999
<b>THUNDERBIRD PASEO SHARED-USE PATH</b> - 10' wide, 1,800' concrete shared use path across Thunderbird Paseo Park from the Marshall Ranch Foot bridge to the existing Paseo bicycle path which connects with the exiting Sweetwater asphalt path. This project completes the last major linkage in Glendale's 55 <sup>th</sup> Avenue bikeway route. It will improve safety and access, and eliminate a significant distance barrier for commuters and recreationalists. Aesthetically enhanced rest area facilities, landscaping and shade trees are included.	\$272,107	Glendale	1999
<b>HERITAGE TRAIL (CHANDLER SEGMENT)</b> - Heritage Trail is 4.5 miles of multi-use and equestrian trails designed to provide alternative access, passive recreation and open space. This segment is 1.5 miles and is part of a comprehensive trail system in Gilbert and links to Chandler and Mesa pathways. Provides an alternative transportation route for non-motorized transportation. Completion of this link and the Chandler segment will provide continuous access from Mesa to Chandler along the 18-mile length of the Consolidated Canal.	\$500,000	Gilbert	1999

## TRANSPORTATION ENHANCEMENT PROJECTS (1993 - 2009)

PROJECT DESCRIPTION	AMOUNT FUNDED	RECIPIENT	YEAR
<b>US 60 PEORIA GRAND AVE. PEDESTRIAN - CROSSINGS</b> - Construct 4 pedestrian crossings across Grand Avenue at 83rd Avenue and Peoria Avenue to allow safe pedestrian access from the north and south sides of Grand Avenue. Refuge areas shall include landscaping, park benches, decorative brick paving, concrete, and lighting to match Old Town Peoria landscape. Encompasses approximately 2.5 acres.	\$449,133	ADOT/ Peoria	1999
<b>PEORIA AVENUE TO GRAND AVENUE/ LOOP 101 TRAIL</b> - In Peoria Rivers & Trails Plan, West Valley Multi-Modal Transportation Corridor Plan. Includes 1 mile multi-use path along New River from Peoria to Grand Avenue. Part of Sun Circle Trail. Connects origins and destinations.	\$376,760	Peoria	2000
<b>BIKE BOX PROGRAM</b> - Comprehensive bicycle rider traffic safety education program. Each bike box contains a step-by-step train the trainer manual, instructional equipment, safety videos, a helmet, children's worksheets, etc. necessary to conduct an effective safety class. Will be distributed throughout Glendale to schools and libraries by Glendale and Phoenix Children's Hospital. If successful, PCH will take the program statewide.	\$41,050	Glendale	2000
<b>CONNECTIONS: CREATING PEDESTRIAN AMENITIES ON 7<sup>TH</sup> AVENUE</b> - Between Indian School and Camelback. Develop a new bicycle/pedestrian landscape to connect commercial along 7 <sup>th</sup> Ave to residents. Includes bike/ped paths, shade trees and landscaping, activity surfaces, civic and commercial display areas, street furniture and public art. Extensive community collaboration (residents, business, ASU)	\$500,000	Phoenix	2000
<b>HERITAGE TRAIL, MESA SEGMENT</b> - 1.5-mile concrete path along Consolidated Canal. Part of a 4.5-mile system. Last remaining link on the Consolidated Canal to provide access from Brown Road in Mesa to Riggs Road in south Chandler, which is nearly the 18-mile length of the Consolidated Canal.	\$500,000	Gilbert	2000
<b>SUN CIRCLE TRAIL AT GUADALUPE BRIDGE</b> - Project will close gap over I-10. 10' path on a 290' addition and 1450' approaches, 800' retaining wall. Important connection for multi-use Sun Circle Trail.	\$797,080	ADOT/ Maricopa County	2000
<b>HISTORIC RAILROAD STATION IN THE NEW GOODYEAR CITY CENTER</b> - Acquire and move Old Litchfield Train Depot to Estrella Pkwy and Yuma Rd, future site of Town Center. Current owner wishes to sell to city. Is eligible for listing on National Register of Historic Places.	\$125,000	Goodyear	2001
<b>2<sup>ND</sup> AVENUE BICYCLE, PEDESTRIAN &amp; LANDSCAPING ENHANCEMENT</b> - Improve the streetscape along 2 <sup>nd</sup> Ave. from Monroe to Fillmore by reducing street width; adding landscaping, wider sidewalks, street furniture, and historic street lighting. Connects Roosevelt Historic District to downtown Phoenix.	\$500,000	Phoenix	2001
<b>COLDWATER PARK TO COMMUNITY PARK 2 AGUA FRIA CONNECTOR ROUTE</b> - Two 12' wide under crossings at I-10 and Van Buren, two miles of safety railing along the west side of the Agua Fria, and a trail that crosses the Agua Fria River near McDowell Rd.	\$433,786	Avondale	2001
<b>POWERLINE TRAIL MULTI-MODAL PATH</b> - 10' path to provide access across SRP utility easement to link Eastern, Consolidated, Western and Roosevelt Conservation District Canals. Includes lighting, landscaping, drinking fountains, etc. Links origins and destinations.	\$500,000	Gilbert	2001
<b>PRESERVING HISTORIC VISTAS/STATE ROUTE 202/TOVREA CASTLE</b> - Acquisition of up to 24 acres to complete creation of historic park adjacent to Loop 202 and preserve historic vistas.	\$500,000	ADOT/ Phoenix	2001
<b>US 60 MULTI-USE PATH</b> - Demonstration project within US 60 in Wickenburg. 2.9 miles from Los Altos Drive to Sunset Park.	\$507,626	ADOT/ Wickenburg	2001
<b>CAMELBACK CORE PEDESTRIAN ENHANCEMENT PROJECT</b> - Enhance 2 intersections at 20 <sup>th</sup> Street and 24 <sup>th</sup> Street to promote bike and pedestrian use. Includes enlarged pedestrian/bike refuge areas and ramps to the crosswalks, shade structures, way-finding markers at intersections, new "pedestrian countdown" traffic signals.	\$392,491	Phoenix	2002
<b>GLENDALE'S BICYCLE/PEDESTRIAN REST AREA</b> - Rest area for bicyclists & pedestrians at 43 <sup>rd</sup> and Peoria Avenues. Includes decorative walkways and seating areas, shade, landscaping, drinking fountains, water feature. Near multi-use paths and underpass.	\$336,826	Glendale	2002
<b>GUADALUPE ROAD (1-10 TO TEMPE LIMITS)</b> - Construct concrete curb and gutter with bike lanes (both sides) and sidewalk (north side) and trail (south side) of Guadalupe Rd. Completes Sun Circle Trail link from Highline Canal to I-10 bridge crossing. Also includes landscaping and irrigation.	\$471,500	Guadalupe	2002
<b>CANAL CROSSING PROJECT</b> - Install 4 AASHTO approved bridges along the Consolidated (Heritage Trail) and Eastern (Santan Vista Trail) Canals. Will improve connectivity to neighborhoods and safety.	\$180,000	Gilbert	2002

## TRANSPORTATION ENHANCEMENT PROJECTS (1993 - 2009)

PROJECT DESCRIPTION	AMOUNT FUNDED	RECIPIENT	YEAR
<b>BICYCLE LANES ON SR 87 (ARIZONA AVE.) SOUTH OF OCOTILLO RD. TO HUNT HWY. –</b> Extend bike lanes. Bike lanes exist already to Ocotillo Rd. Existing roadway is in milled condition, creating a rough surface for cyclists. Connects to origins and destinations, and to paths on Consolidated Canal.	\$440,803	ADOT/City of Chandler	2002
<b>2<sup>ND</sup> AVENUE: FILLMORE TO ROOSEVELT PEDESTRIAN AND LANDSCAPE ENHANCEMENTS –</b> Continue TE funded project along 2 <sup>nd</sup> Avenue. Includes landscaping, new sidewalks, street furniture and lighting. New improvements will meet ADA.	\$500,000	Phoenix	2003
<b>PEDESTRIAN SCHOOL SAFETY ZONES PROJECT – Phase I –</b> Provide pedestrian improvements at high-risk school crosswalks. At 10 sites, provide countdown pedestrian signals. At 10 sites, provide speed monitor radar units. At two sites, narrow road crossing length by providing pedestrian refuge islands. Sites will be selected based on engineering analysis and community and school input.	\$500,000	Phoenix	2003
<b>ARCADIA PORTAL - PAPAGO MULTI-USE CANAL TRAIL ENHANCEMENT -</b> Improves safety and amenities for pedestrians and bicyclists and completes a critical link of the Papago Trail, spanning Phoenix, Scottsdale and Tempe.	\$500,000	Phoenix	2004
<b>HISTORIC STREETLIGHT RESTORATION PROJECT -</b> The restoration of over a hundred historic concrete and metal streetlights in three Historic Neighborhood Districts located in central Phoenix.	\$328,133	Phoenix	2004
<b>TEMPE BIKE STATION AT THE DOWNTOWN TRANSIT CENTER -</b> An attended, indoor, secure bicycle parking facility that includes service amenities. The Bike station concept is an integral part of the Downtown Tempe Transit Center. 2,000 sf. of the 20,000 sf. Downtown Tempe Transit Center will be dedicated to the Bike Station Concept.	\$500,000	Tempe	2004
<b>OLD ROMA ALLEY PEDESTRIAN ENHANCEMENTS AND LANDSCAPE BEAUTIFICATION -</b> Transforms an existing service alley in downtown Glendale into an attractive, pedestrian-friendly walkway and green space. It contains a 170' long and 20' wide walkway connecting the Old Town retail district to civic areas.	\$500,000	Glendale	2004
<b>CYCLE TO THE SALT -</b> Adds a bicycle lane on both sides of the Bush highway from Utery Path Road to Stewart Mountain Dam Road. Construction provides an additional 10' (5' of paved shoulders on both sides) of area for 4.6 miles, and adds 3 left turn lanes into the Salt River recreational sites.	\$500,000	Maricopa County	2005
<b>CROSSCUT CANAL MULTI-USE PATH PHASE II -</b> A one-mile, non-motorized path facility that will connect to the recently completed, award-winning 1.25 mile Crosscut Canal Multi-Use Path (Phase I). Includes a paved path facility, landscaping, lighting, the construction of 3 bridges over the canal, and a public art element.	\$500,000	Tempe	2005
<b>CROSSCUT CANAL MULTI-USE PATH: THOMAS ROAD TO INDIAN SCHOOL ROAD -</b> Design and construction of a 10' to 12' path along the east bank of the Crosscut Canal (approximately 64 <sup>th</sup> St.) from Thomas to Indian School Roads. Provides improved path links to Tempe and Phoenix. Includes ADA ramps, lighting, landscaping, benches, and signage.	\$500,000	Scottsdale	2005
<b>City of Avondale Pedestrian Safety Education Program -</b> Will allow the city to procure materials and equipment to implement a pedestrian safety education program.	\$11,316	Avondale	2006
<b>South Mountain Community College Pedestrian Crossing -</b> This project will provide a 40-foot long by 10' wide pedestrian bridge over the Western Canal linking the South Mountain Community College, the Legacy Village Shopping Center, and the Arizona Agribusiness Equine Science Center. Located near the intersection of 24th street and Baseline Rd. Also includes a crosswalk, landscaping, and ADA ramp.	\$491,151	Phoenix	2006
<b>Grand Canal Pedestrian Pathway Between Loop 101 and N. 107<sup>th</sup> Avenue -</b> The Grand Avenue Canal is a 10' wide, 1.3 mile long Multiuse path to be built along the existing canal maintenance roads on the W. Bethany Home Rd. alignment, between Loop 101 and North 107th Avenue. Includes pedestrian and bicycle amenities, lighting and landscaping. This project is the link in Western Glendale's trail system.	\$500,000	Glendale	2006
<b>Gilbert Heritage District Downtown Pedestrian Project -</b> Will improve pedestrian access in Gilbert's downtown Heritage District by installing a total of 1.25 miles of 6' wide, ADA-compliant concrete sidewalks and shade trees north of Elliot Road, between Gilbert Road and North Oak Street. Provides linkages between downtown destinations, including a park-and-ride lot, the Gilbert Senior Center and the Boys and Girls Club. Existing sidewalks are inadequate, and the project will enhance safety and connectivity. Also includes benches, bike racks, trash receptacles and signage.	\$500,000	Gilbert	2006

## TRANSPORTATION ENHANCEMENT PROJECTS (1993 - 2009)

PROJECT DESCRIPTION	AMOUNT FUNDED	RECIPIENT	YEAR
<b>US 60 Multi-Use Path</b> - Involves the construction of a 10' wide, multi-use path within the right-of-way of US 60 within the Town of Wickenburg, from the Vulture Mine Road crossing to Los Altos Drive, a distance of 1.4 miles. Phase II of the original master plan for pedestrian access from the Town Core to Sunset Park. Includes landscaping (seeding) and signage.	\$855,708	Wickenburg	2006
<b>Maricopa County - Regional Safe Routes to School Support Center Project</b> - This project provides integrated programs to develop safe routes for children to walk and bike to school, and instills in students the necessary lifelong skills regarding healthy and active life choices, traffic safety and travel injury prevention.	\$399,777	Maricopa County	2007
<b>Valley Metro/RPTA - Regional Bicycle and Pedestrian Safety Education Program</b> - Increase the awareness and implementation of safety practices with a goal to reduce the number of bicycle and pedestrian-related crashes and fatalities. This program is aimed at bicyclists and pedestrians, as well as motorists.	\$475,000	Valley Metro/RPTA	2007
<b>Maryland Avenue Spot Improvements</b> - The project will add additional asphalt for bike lanes where Maryland Avenue is too narrow, and will construct short, multi-use pathway segments to tie Maryland Avenue into existing pathways in Discovery Park.	\$166,039	Glendale	2007
<b>Old US-80 Gila River Bridge</b> - Restoration of the 1,662 foot Gillespie Dam Bridge, which was listed on the National Historic Register of Historic Places in 1981.	\$500,000	Maricopa County	2008
<b>Royal Palm Bicycle &amp; Pedestrian Bridge</b> - Design and construct a 10-foot wide bicycle and pedestrian bridge across the Arizona Canal, north of Dunlap Avenue between 15th Avenue and 19th Avenue. The 80-foot wide bridge would be ADA compliant.	\$500,000	Phoenix	2008
<b>Wickenburg Bicycle and Pedestrian Bridge</b> - Installation of 15,480 sq ft of a decorative asphalt bridge deck resurfacing treatment, bike lane striping and pedestrian lighting across the existing structure. Additional features include pedestrian seating, trash receptacles, bollards and lighting.	\$483,279	Wickenburg	2009
<b>Scottsdale Shared Use Path 64th St to Goldwater Blvd</b> - Construct .9 miles of 14 ft wide concrete plus 4 foot stabilized decomposed granite shared use path. This will provide a critical link with the Crosscut Canal in Tempe, Arizona Canal in Scottsdale & Phoenix, Indian Bend Wash in Scottsdale, Rio Salado along the Salt River.	\$500,000	Scottsdale	2009
<b>Peoria New River Multi-use Path</b> - Construction of a one-mile of a minimum 10-foot wide asphalt path between Northern Ave & Olive Ave along the top of the west embankment of the New River. The path would be linking retail, sports and entertainment centers.	\$500,000	Peoria	2009
<b>Valley Metro/RPTA - Regional Bicycle and Pedestrian Safety Education Program</b> - Increase the awareness and implementation of safety practices thru a two year program with emphasis on targeting messages to low income and minority workers; to multi-generations - encouraging seniors to ride and on light rail and HAWK crossing bike safety;	\$500,000	Valley Metro RPTA	2009
<b>Total Funds Awarded: 1993 - 2008</b>	<b>\$29,539,152</b>		

**Appendix G**  
**Transportation Safety Data**

**TABLE G-1. SEVERITY OF CRASHES IN MARICOPA COUNTY<sup>1</sup> & ECONOMIC LOSS (1994-2008)**

<b>Year</b>	<b>Fatal Crashes</b>	<b>Injury Crashes</b>	<b>Property Damage Only (PDO) Crashes</b>	<b>Total Crashes</b>	<b>Economic Loss (Millions \$)</b>
1994	337	27,655	38,781	66,773	1,255
1995	417	29,066	42,875	72,358	1,593
1996	360	28,769	43,867	72,996	1,205
1997	372	27,567	45,667	73,616	1,260
1998	372	28,730	49,293	78,395	1,267
1999	394	30,331	52,345	83,070	1,332
2000	394	31,837	54,457	86,688	1,547
2001	445	30,762	55,491	86,698	1,633
2002	441	30,529	56,636	87,606	1,660
2003	414	29,455	54,740	84,619	1,735
2004	414	30,745	59,441	90,600	1,796
2005	480	30,177	61,950	92,607	1,927
2006	507	30,282	65,904	96,693	2,046
2007	422	28,674	65,208	94,304	1,919
2008	338	23,899	53,798	78,035	1,527

<sup>1</sup> Does not include crashes in Apache Junction

**TABLE G-2. COMPARISON OF CRASH RISK - STATEWIDE vs. MAG REGION (1999-2006)**

Year	Fatalities		% in MAG	Injuries		% in MAG	Total Crashes		% in MAG
	Arizona	MAG		Arizona	MAG		Arizona	MAG	
1999	1,024	437	43%	73,514	48,688	66%	125,764	83,622	66%
2000	1,036	436	42%	76,626	51,196	67%	131,368	87,310	66%
2001	1,047	500	48%	73,962	49,449	67%	131,573	87,210	66%
2002	1,119	491	44%	74,230	49,294	66%	134,228	88,321	66%
2003	1,118	458	41%	71,901	46,997	65%	130,895	85,082	65%
2004	1,151	465	40%	73,475	48,401	66%	138,547	90,979	66%
2005	1,179	528	45%	70,293	46,729	66%	139,265	92,986	67%
2006	1,296	571	44%	68,574	46,579	68%	140,197	97,216	69%
2007	1,071	464	43%	65,705	43,494	66%	140,371	94,827	67%
2008	937	372	40%	56,009	35,800	64%	119,588	78,506	66%

**TABLE G-3. COMPARISON OF CRASH RISK – ARTERIAL & LOCAL STREETS vs. FREEWAYS**

Year	ARTERIALS & LOCAL STREETS			FREEWAYS		
	Fatalities	Injuries	All Crashes	Fatalities	Injuries	All Crashes
1999	379	43,524	71,950	58	5,164	11,672
2000	366	44,961	73,325	70	6,235	13,985
2001	414	42,366	71,637	86	7,083	15,573
2002	398	41,219	70,485	93	8,075	17,836
2003	366	38,994	67,308	92	8,003	17,774
2004	374	39,594	71,711	91	8,807	19,268
2005	424	38,454	74,473	104	8,275	18,513
2006	467	37,397	77,068	104	8,754	20,148
2007	375	34,126	73,569	89	9,045	21,258
2008	305	28,010	60,610	67	7,564	17,896

**TABLE G-4. CRASH RISK ON ARTERIALS**

Year	INTERSECTION RELATED			MID- BLOCK			ALL		
	Fatal	Injury	PDO	Fatal	Injury	PDO	Fatal	Injury	PDO
<b>1999</b>	159	15,286	20,683	189	11,858	23,775	348	27,144	44,458
<b>2000</b>	147	15,423	21,291	171	12,158	24,135	318	27,581	45,426
<b>2001</b>	178	14,564	20,651	195	11,740	24,309	373	26,304	44,960
<b>2002</b>	173	14,092	20,645	193	11,416	23,965	366	25,508	44,610
<b>2003</b>	137	13,714	20,397	200	10,630	22,230	337	24,344	42,627
<b>2004</b>	135	14,368	22,424	205	10,779	23,800	340	25,147	46,224
<b>2005</b>	161	14,463	24,563	231	10,357	24,698	392	24,820	49,261
<b>2006</b>	173	13,935	25,274	249	38,523	26,784	422	24,588	52,058
<b>2007</b>	140	12,752	23,869	206	35,623	26,483	346	22,871	50,352
<b>2008</b>	121	10,638	19,925	162	29,653	21,387	283	19,015	41,312

**TABLE G-5. SEVERITY OF CRASHES INVOLVING BICYCLISTS & PEDESTRIANS**

Year	PEDESTRIAN		BICYCLIST	
	Fatal	Injury	Fatal	Injury
<b>1999</b>	78	1,014	19	1,511
<b>2000</b>	80	1,087	21	1,364
<b>2001</b>	92	1,015	19	1,214
<b>2002</b>	84	936	10	1,148
<b>2003</b>	82	935	8	1,101
<b>2004</b>	67	1,024	17	1,204
<b>2005</b>	87	956	25	1,170
<b>2006</b>	100	958	22	1063
<b>2007</b>	82	1027	14	1060
<b>2008</b>	72	923	8	1128

**TABLE G-6. PEDESTRIANS INJURED & KILLED BY AGE GROUP**

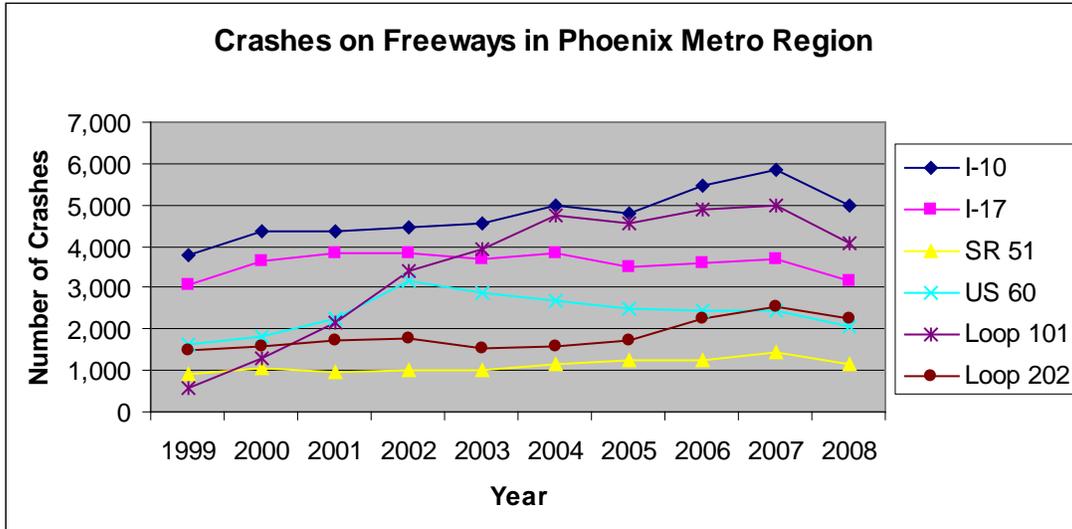
Age	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2008 Population	% Population by Age
<5	108	100	70	49	41	36	34	36	38	23	319,035	8%
5 - 14	207	259	220	194	206	191	161	163	175	130	598,191	15%
15 - 24	222	246	228	225	227	249	261	228	230	259	558,312	14%
25 - 34	152	163	165	131	150	148	151	163	133	136	638,071	16%
35 - 44	191	172	171	138	159	173	156	155	164	134	598,191	15%
45 - 54	122	146	110	148	131	147	136	149	158	139	478,553	12%
55 - 64	68	68	63	61	56	74	75	98	98	82	319,035	8%
>65	82	83	61	70	59	77	71	77	87	77	478,553	12%
<b>Total</b>	1,152	1,237	1,088	1,016	1,029	1,095	1,045	1,069	1,083	980	3,987,942	100%

**TABLE G-7. BICYCLISTS INJURED & KILLED BY AGE GROUP (1999-2008)**

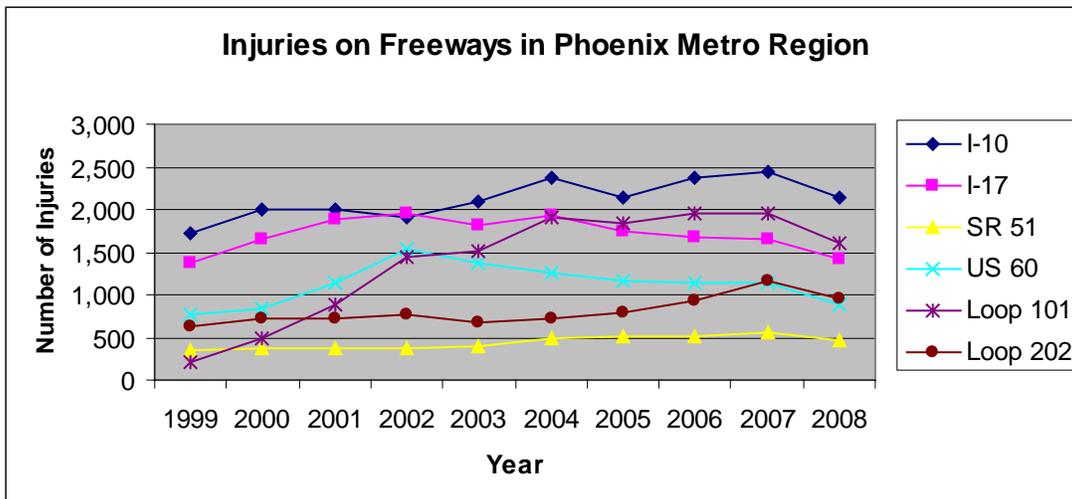
Age	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2008 Population	% Population by Age
<5	53	62	9	6	5	4	2	4	4	3	319,035	8%
5 - 14	377	326	259	239	244	289	249	205	203	194	598,191	15%
15 - 24	397	338	298	273	272	318	304	260	280	295	558,312	14%
25 - 34	254	240	179	168	157	160	164	143	154	158	638,071	16%
35 - 44	232	205	212	193	182	152	175	186	166	162	598,191	15%
45 - 54	128	130	122	132	149	166	161	166	149	165	478,553	12%
55 - 64	53	61	32	49	51	54	64	48	64	84	319,035	8%
>65	45	32	33	31	31	36	45	42	31	48	478,553	12%
<b>Total</b>	1,539	1,394	1,144	1,091	1,091	1,179	1,164	1,054	1,051	1,109	3,987,942	100%

**TABLE G-8. SEVERITY OF CRASHES INVOLVING YOUNGER DRIVERS & OLDER DRIVERS**

Year	YOUNGER DRIVERS (< 25 YRS)			OLDER DRIVERS (> 65 YRS)		
	Fatal	Injury	PDO	Fatal	Injury	PDO
1999	147	13,424	21,721	63	3,927	6,058
2000	158	14,247	23,148	65	3,888	6,072
2001	177	13,684	22,811	56	3,682	5,838
2002	171	13,806	23,960	72	3,549	6,052
2003	140	13,336	23,068	71	3,565	5,847
2004	172	13,837	25,176	55	3,686	6,541
2005	197	13,471	26,117	65	3,687	6,544
2006	194	13,620	27,682	65	3,549	6,723
2007	162	12,387	26,973	60	3,421	6,783
2008	124	9,813	21,160	55	3,150	6,266



**FIGURE G-1. TOTAL CRASHES BY FREEWAY CORRIDOR**



**FIGURE G-2. NUMBER OF INJURIES BY FREEWAY CORRIDOR**

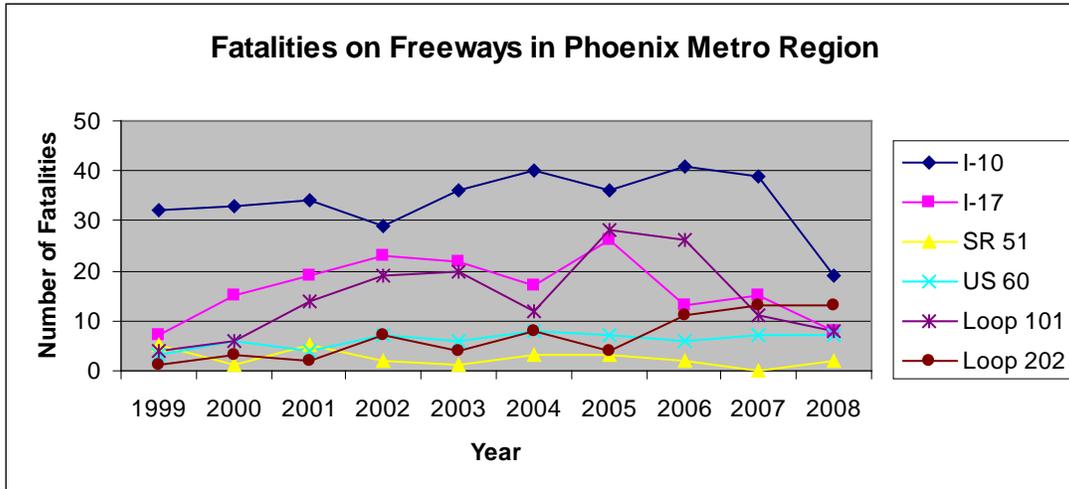


FIGURE G-3. NUMBER OF FATALITIES BY FREEWAY CORRIDOR

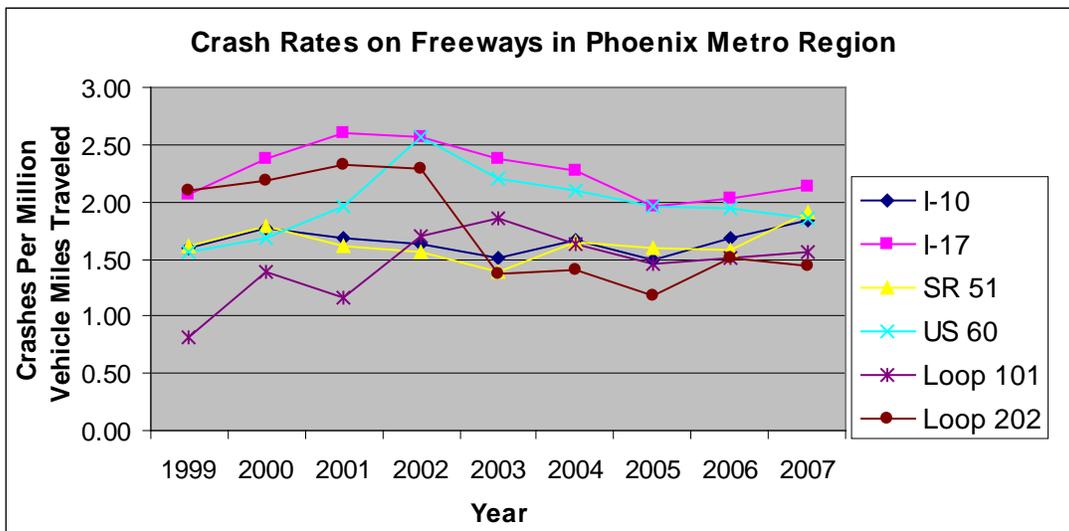


FIGURE G-4. CRASH RATES BY FREEWAY CORRIDOR

Note: Loop 101 and Loop 202 crash trends depicted in FIG G-1 through G-4 reflect the effects of increasing corridor mileage due to opening of new freeway segments.