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2035 REGIONAL TRANSPORTATION PLAN (RTP)

DECEMBER 2013

REGIONAL TRANSPORTATION PLAN

MARICOPA ASSOCIATION of GOVERNMENTS

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2035 REGIONAL TRANSPORTATION PLAN

DECEMBER 2013

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INTRODUCTION

The "2035 Regional Transportation Plan" (RTP) is a comprehensive, performance based, multi-modal and coordinated regional plan, covering the period through Fiscal Year (FY) 2035. 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 Phoenix metropolitan 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, as the designated Metropolitan Planning Organization (MPO) for transportation planning in the Phoenix metropolitan area. On May 9, 2013, the Governor of Arizona approved an expanded metropolitan planning area (MPA) boundary for MAG (see Figure I-1). As shown in Figure I-1, the MAG MPA boundary now extends significantly into Pinal County. The new MPA boundary is in accordance with federal regulations (§450.312 - Metropolitan Planning Area Boundaries), which require that metropolitan planning areas encompass at least the existing urbanized area and the contiguous area expected to become urbanized within a 20-year forecast. The new MAG MPA boundary was determined using the 2010 Census and the latest long-range population forecasts for the Maricopa and Pinal County areas.

In addition to transportation planning, MAG has 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. 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 also develops population estimates and projections for the region, and conducts human services planning.

MAG members include the region's 27 incorporated cities and towns, Maricopa County, Pinal 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 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

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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.

Regional Transportation Plan Updates

The "Regional Transportation Plan" was adopted by the MAG Regional Council on November 25, 2003, which culminated a three-year comprehensive planning effort. The development of the 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 has been updated periodically to reflect changing conditions and new information. On July 27, 2005, the MAG Regional Council approved the "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 "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 "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,

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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.

On July 28, 2010, the MAG Regional Council approved the 'Regional Transportation Plan - 2010 Update". The 2010 Update of the RTP addressed both capital improvements and operational activities on the regional transportation system in the MAG area. The 2010 Update, as well as the regional transportation planning process in the MAG area, continued to fully comply with SAFETEA-LU, Arizona House Bill 2292, and Arizona Revised Statute 28-6354. A major focus of the 2010 update process was maintaining the balance between program costs and reasonably available revenues expected over the period covered by the plan. In a letter dated August 25, 2010, the U.S. Department of Transportation issued a finding of air quality conformity for the MAG RTP, as approved by MAG on July 28, 2010.

2035 Regional Transportation Plan

The "2035 Regional Transportation Plan", which is contained in the following document, is the latest in the series of transportation plan updates. Its title is a departure from the titles of previous updates, e.g. "Regional Transportation Plan - 2010 Update". The new title format was chosen to place greater emphasis on the target year of the planning process and give greater recognition to the plan horizon year.

During the past several years, the transportation planning and programming has had to deal with falling revenue collections and significantly reduced revenue forecasts. Although receipts from the regional half-cent sales tax dedicated to transportation in the MAG area have recently recovered somewhat, the collections for FY 2012 remained 17.3 percent lower than those in FY 2007. In addition, current estimates of total 20-year revenues from the half-cent sales tax is over 42 percent lower than the estimate prepared before the effects of the 2007-2009 economic recession. Maintaining a balance between program costs and revenues under these circumstances has been an ongoing challenge, and a major emphasis of the planning process.

The following report documenting the 2035 RTP is organized into three major sections:

- Section One: Planning Process (Chapters One through Six):

  Addresses 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.

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- Section Two: Transportation Modes (Chapters Seven through Sixteen):

  Covers 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: System Operations and Management. (Chapters Seventeen through Twenty-Three):

  Describes 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.

Use of SAFETEA-LU Regional Transportation Planning Requirements

The 2035 Regional Transportation Plan has been developed consistent with the regional transportation planning requirements of the Federal Safe, Accountable, Flexible, Efficient, Transportation Equity Act - A legacy for Users (SAFETEA-LU). Although new federal transportation legislation (Moving Ahead for Progress in the 21st Century Act, or MAP-21) was signed into law by President Obama on July 6, 2012, it was clear that new federal planning regulations implementing MAP-21 would not available in time to apply them to the development of the 2035 RTP. This was particularly the case, since the planning process for the 2035 RTP was already underway when the legislation was signed. Using SAFETEA-LU regulations under these circumstances was confirmed with representatives of the Federal Highway Administration and the Federal Transit Administration in July 2012, and the planning process for the 2035 RTP proceeded under SAFETEA-LU federal planning regulations.

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2035
Regional Transportation Plan

Fig. I-1

REGIONAL TRANSPORTATION PLAN

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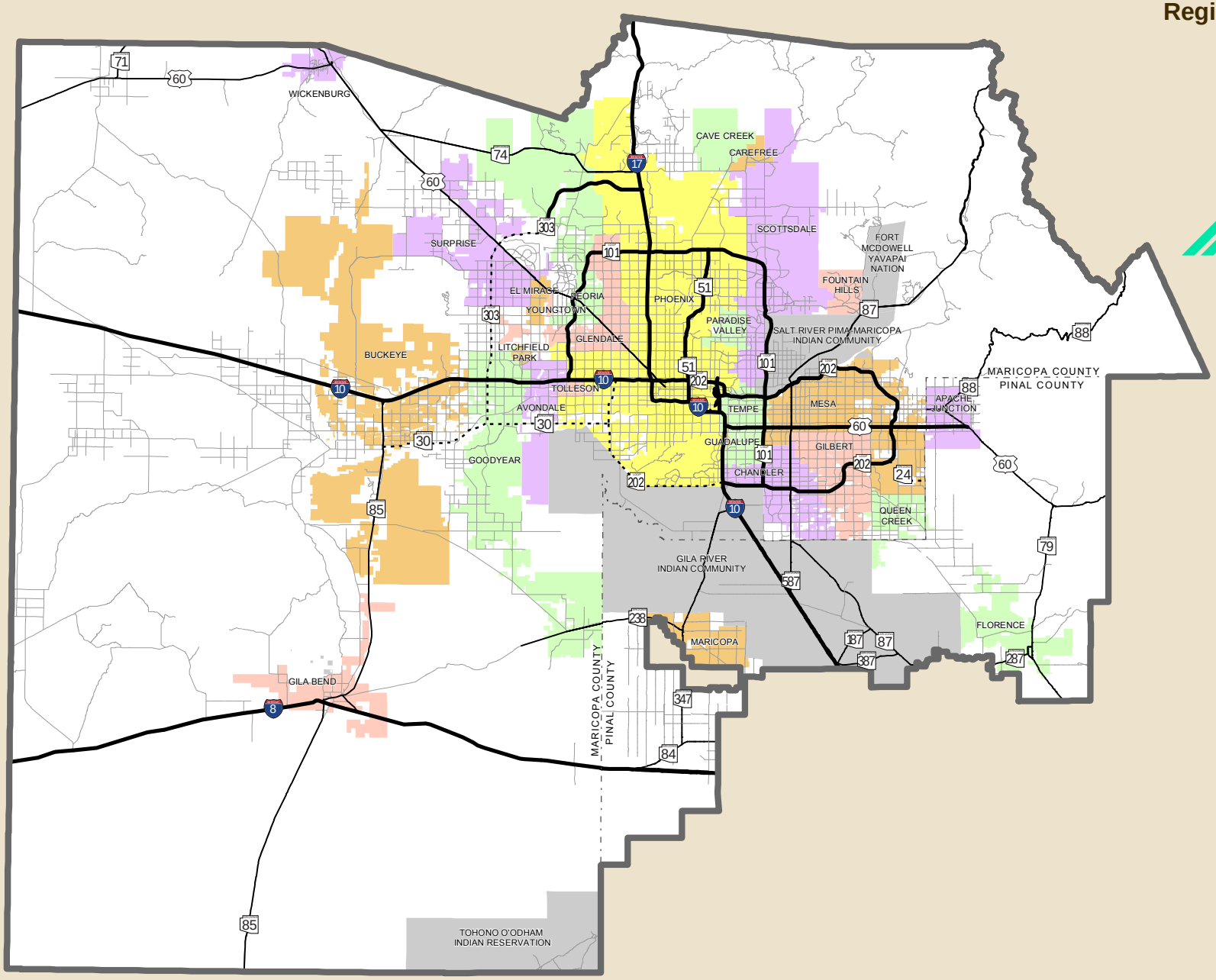
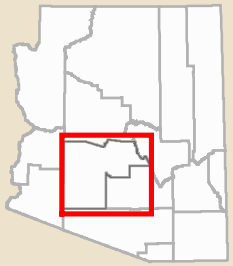


MAG Region

- Metropolitan Planning Area
- County Boundary
- Indian Communities
- Existing Freeway
- Planned Freeway/Highway
- Highways
- Other Roads

MAP AREA



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SECTION ONE

PLANNING PROCESS

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CHAPTER ONE

REGIONAL TRANSPORTATION PLANNING APPROACH

The Maricopa Association of Governments 2035 Regional Transportation Plan (RTP) covers the period through Fiscal Year (FY) 2035, and addresses all major transportation modes and related transportation activities 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. A number of different entities participate in developing, implementing and monitoring the RTP, which includes preparation of long-range plans, identification of programs and projects, construction of projects, and 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) was formed in 1967, as the designated Metropolitan Planning Organization (MPO) for transportation planning in the Phoenix metropolitan area. On May 9, 2013, the Governor of Arizona approved an expanded metropolitan planning area (MPA) boundary for MAG (see Figure I-1). As shown in Figure I-1, the MAG MPA boundary now extends significantly into Pinal County. The new MPA boundary is in accordance with federal regulations (§450.312 - Metropolitan Planning Area Boundaries), which require that metropolitan planning areas encompass at least the existing urbanized area and the contiguous area expected to become urbanized within a 20-year forecast. The new MAG MPA boundary was determined using the 2010 Census and the latest long-range population forecasts for the Maricopa and Pinal County areas.

MAG members include the region's 27 incorporated cities and towns, Maricopa County, Pinal 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

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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 area. The State Transportation Board cannot approve projects within the MAG area 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. In 1993, the RPTA Board adopted Valley Metro as the identity for the regional transit system. The (RPTA)/Valley Metro Board of Directors helps guide the agency by providing transportation leadership to best serve the region and their communities. Members are represented by an elected official who is appointed by their Mayor, Councilmembers or Board of Supervisors. Currently the Board includes Avondale, Buckeye, Chandler, El Mirage, Gilbert, Glendale, Goodyear, Maricopa County, Mesa, Peoria, Phoenix, Scottsdale, Surprise, Tempe, and Tolleson, and Wickenburg. The RPTA Board cannot approve projects and programs within the MAG area 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. 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 Valley Metro Rail Board of Directors includes members that are represented by an elected official who

is appointed by their Mayor, Councilmembers or Board of Supervisors. Currently the Board includes Chandler, Glendale, Mesa, Phoenix, and Tempe.

The Valley Metro Rail Board of Directors establishes procedures for the administration and oversight of the design, construction and operation of light rail. It also 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 area that are not consistent with the MAG RTP and the MAG TIP.

In March 2012, a decision was made to employ a single Chief Executive Officer (CEO) for both RPTA/Valley Metro (Bus) and Valley Metro Rail. Subsequently, the staffs of the two agencies were integrated into a single organization under the direction of the CEO. The combined staff organization will address all administrative, planning and operational functions for both agencies, including: (1) communications and marketing, (2) planning and development, (3) design and construction, (4) operations and maintenance, (5) finance, (6) administrative and organizational development, (7) legal, and (8) intergovernmental relations. The legal structure and Boards of the two agencies will not be affected.

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 and MAP-21

The 2035 Regional Transportation Plan has been developed consistent with the regional transportation planning requirements of the Federal Safe, Accountable, Flexible, Efficient, Transportation Equity Act - A legacy for Users (SAFETEA-LU). Although new federal transportation legislation (Moving Ahead for Progress in the 21st Century Act, or MAP-21) was signed into law by President Obama on July 6, 2012, it was clear that new federal planning regulations implementing MAP-21 would not available in time to apply them to the development of the 2035 RTP. This was particularly the case, since the MAG planning process for the 2035 RTP was already underway when the legislation was signed, with a preliminary draft RTP targeted for the winter/spring of 2013. Using SAFETEA-LU regulations was confirmed with representatives of the Federal Highway Administration and the Federal Transit Administration in July 2012, and the MAG planning process for the 2035 RTP proceeded under SAFETEA-LU federal planning regulations.

The 2035 RTP fully complies with the metropolitan planning requirements of SAFETEA-LU. 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 under SAFETEA-LU. The manner in which the MAG RTP responds to key elements of these 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 area 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

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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 transportation planning process, MAG consults 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.

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- 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 operations and maintenance 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 2035 RTP covers a period of 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.

- 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 planning period 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

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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 2010 and received a finding of air quality conformity from the Federal Highway Administration and the Federal Transit Administration in August 2010.

- 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 2035 RTP 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 2010 Census Survey was prepared by the State of Arizona and made available in December 2012. MAG has also developed a set of employment projections for Maricopa County that are consistent with these population projections. Using these figures as control totals, MAG developed a set of subregional population and employment projections. 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. MAG has developed a congestion management process (CMP) that is designed to be an integral part of the planning and programming process. This effort included identification of best practices, development of a performance measurement framework, and preparation of a CMP project assessment tool. The CMP provides a mechanism for considering the congestion management impacts of projects and project packages, providing input to the development of the transportation improvement program. 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, potential needs in 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 is 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. Pedestrian walkway and bicycle transportation facilities are addressed in a separate chapter in the RTP.

- The transportation plan shall include transportation and transit enhancement activities. MAG has participated in a transportation enhancement program that was administered by ADOT and involved the development of project proposals by the councils of governments and metropolitan planning organizations around the state. With the passage of MAP-21, procedures for enhancement projects will be altered consistent with federal planning regulations, when they are available. A chapter on enhancement

projects has been included in the RTP on a continuing basis and will be updated accordingly, as the detailed procedures for enhancement projects under MAP-21 are developed.

- 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 2004; the Arizona Highway Users 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 Statues require the major transportation implementing agencies in the MAG area to develop and maintain life cycle programs that ensure transportation program costs can be met by future revenues. These life cycle programs are also reflected in 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 2035 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 area 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 2035 RTP 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 at least a 20-year planning horizon. 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 system operations. 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.

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 significantly reduced forecasts of future revenues. For example, current estimates of total 20-year revenues from the half-cent sales tax dedicated to transportation in the MAG area is over 42 percent lower than the estimate prepared before the effects of the 2007-2009 economic recession. Maintaining a balance between program costs and revenues under these circumstances has been an ongoing challenge.

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 2035 RTP 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 uncertain, and 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 2013 dollars.

RTP Planning Period

The planning period for the RTP covers FY 2014 through FY 2035, with fiscal years (FYs) ending on June 30th. To facilitate the discussion of plan concepts and project priorities, three project groupings associated with intervals in the overall planning period have been identified:

- Group 1 (FY 2014 - FY 2018): Corresponds to the period covered by the MAG FY 2014-2018 Transportation Improvement Program (TIP). (Corridor discussions may also refer to construction that is underway during this period but may have been programmed earlier.)

- Group 2 (FY 2019 - FY 2026): Corresponds to the period beyond the TIP but within the Life Cycle Programs (LCPs), which extends through FY 2026.

- Group 3 (FY 2027 - FY 2035): Corresponds to the period beyond the LCPs but within the RTP planning period, which extends through FY 2035.

For highway projects, these groups are used to indicate the period in which funds are programmed for construction work. For example, a highway project labeled as a "Group 3" would be funded for construction during FY 2027 - FY 2035, but may have funding for design activities and/or right-of-way acquisition in earlier periods. For arterial projects, these groups are used to indicate the period in which a project is anticipated to be completed. Reimbursements from regional funding sources for arterial projects may occur in later periods. For transit capital expenditures, the group designation indicates the period when equipment or other capital items are acquired, or when construction of facilities is funded. For bus operations, the group designations represents the first period in which at least some funding was provided for the route from regional sources. Funding continues during subsequent periods, and service improvements on certain routes may also be initiated in a later period. For light rail transit/high capacity transit (LRT/HCT) operations, the group designation indicates the period when service is initiated. No regional funding is provided for LRT/HCT operating expenses.

Future Updates of the 2035 RTP

Changing conditions and new information continually arise during the course of implementing a long-range transportation plan. Certain planned projects may no longer respond to evolving travel patterns, or may no longer be consistent with available funding. Revenue sources may not provide the funding levels that were initially forecasted, or may be structured differently than originally anticipated. Public attitudes regarding transportation issues may shift and new concerns may emerge. These and other factors potentially require new strategies and revised priorities.

The 2035 RTP provides a detailed view of future transportation projects and programs in the region, as well as the financial resources needed to implement planned improvements. It is intended to serve as a blueprint to guide transportation investments in the region through FY 2035. However, this does not preclude future major reevaluation of all strategies, projects and programs in the plan, as part of the regional transportation planning process. Factors such as system development strategies, project selection priorities, and modal revenue allocations are subject to change. As a result, in future updates of the 2035 RTP, plan and program goals may be updated and new long-range transportation strategies defined. The allocation of revenues among modes and projects may be altered and new modal emphasis areas identified. Any changes to the RTP, of course, must be accompanied by extensive public involvement, reviewed through the MAG committee process, and subject to final approval by the MAG Regional Council.

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.

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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

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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.

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- 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.

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- 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 area. 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 area.

- 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

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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 area, 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 area. As a result, the RTP is structured to respond to different types of needs in different parts of the MAG area.

Although the modal emphasis of the transportation improvements identified in the RTP varies from area to area within the region, the effects of these improvements can be assessed using common measures of system performance and regional mobility. Example measures that can be utilized for this purpose are described below. These criteria can be used to evaluate alternatives and establish implementation priorities. They can also be applied 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

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- 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.

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CHAPTER THREE

REGIONAL DEVELOPMENT OVERVIEW

The MAG Metropolitan Planning Organization (MPO) is geographically situated in the south-central region of the State of Arizona, and encompasses an area of 10,654 square miles. The MAG MPO contains 27 incorporated cities and towns, three Native American Indian Communities and a large area of unincorporated land in both Maricopa County and Pinal County. The region is located in the Sonoran Desert with elevations generally ranging from 500 to 2,500 feet above sea level. In 2010, the MAG MPO contained approximately 63 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 2012, 29.1 percent of all land within the MAG MPO was under private ownership; 26.9 percent of lands were under the direct ownership of the Bureau of Land Management; 10.7 percent of lands were under the jurisdiction of the U.S. Military; 12.7 percent of lands were held within state trust; 10.4 percent of lands were under the direct ownership of the U.S Forest Service; 8 percent of land was comprised of Indian Communities; and the remaining 2 percent of lands were classified as "other" public lands.

Census 2010 and 2012 Population Update

In April 2010 the US Census Bureau conducted Census 2010. The Census found an April 1, 2010 population for the MAG MPO at 4,055,276 people. This represented an increase of 864,874 people, or about 28 percent since Census 2000 found an April 1, 2000 population of 3,160,402. The Census also determined the population for each city or town within the MAG MPO. MAG has updated the population count to provide population estimates that correspond to a mid-2012 timeframe. Table 3-1 lists the population numbers by jurisdiction for April 1, 2000 and July 1, 2012. During this time period, many of the fastest-growing cities in the MAG MPO showed annual percentage increases greater than 20 percent. The City of Maricopa had the highest annual percentage increase of 242.8 percent, followed by the Town of Queen Creek (49.2%), Town of Buckeye (48.8%), unincorporated portions of Pinal County (30.5%), and the City of El Mirage (29.2%) The City of Phoenix had the largest net increase in population, with the addition of 143,682 residents.

Population Forecasting

For the past several decades, the MAG MPO 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 2010, the MAG MPO had a resident population of 4,055,276. This was a population growth of approximately 28 percent, or 864,874 people in the decade from 2000 to 2010. MAG and Central Arizona Governments (CAG) Socioeconomic Projections indicate that this high growth rate is expected to continue.

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TABLE 3-1
TOTAL RESIDENT POPULATION BY JURISDICTION
CENSUS 2000 AND JULY 1, 2012 UPDATE

	Total Population			Percent Growth		Share	
Jurisdiction	April 1, 2000	July 1, 2012	Change	Overall	Annual	Share of Growth	Share of County
Apache Junction	32,032	36,928	4,896	15.28%	1.39%	0.51%	0.89%
Avondale	35,882	76,870	40,988	114.23%	10.38%	4.24%	1.86%
Buckeye	8,497	54,102	45,605	536.72%	48.79%	4.72%	1.31%
Carefree	2,927	3,388	461	15.75%	1.43%	0.05%	0.08%
Cave Creek	3,728	5,110	1,382	37.07%	3.37%	0.14%	0.12%
Chandler	176,581	241,214	64,633	36.60%	3.33%	6.69%	5.85%
El Mirage	7,609	32,067	24,458	321.44%	29.22%	2.53%	0.78%
Florence	17,050	26,773	9,723	57.03%	5.18%	1.01%	0.65%
Fort McDowell	824	976	152	18.45%	1.68%	0.02%	0.02%
Fountain Hills	20,235	22,695	2,460	12.16%	1.11%	0.25%	0.55%
Gila Bend	1,980	1,932	-48	-2.42%	-0.22%	0.00%	0.05%
Gila River	11,290	11,808	518	4.59%	0.42%	0.05%	0.29%
Gilbert	109,697	219,666	109,969	100.25%	9.11%	11.37%	5.32%
Glendale	218,812	229,008	10,196	4.66%	0.42%	1.05%	5.55%
Goodyear	18,911	69,018	50,107	264.96%	24.09%	5.18%	1.67%
Guadalupe	5,228	5,943	715	13.68%	1.24%	0.07%	0.14%
Litchfield Park	3,810	5,621	1,811	47.53%	4.32%	0.19%	0.14%
Maricopa	1,622	44,946	43,324	2671.02%	242.82%	4.48%	1.09%
Mesa	396,375	444,856	48,481	12.23%	1.11%	5.01%	10.78%
Paradise Valley	13,664	13,106	-558	-4.08%	-0.37%	-0.06%	0.32%
Peoria *1	108,363	157,653	49,290	45.49%	4.14%	5.10%	3.82%
Phoenix	1,321,045	1,464,727	143,682	10.88%	0.99%	14.86%	35.49%
Queen Creek	4,317	27,708	23,391	541.83%	49.26%	2.42%	0.67%
Salt River	6,405	6,437	32	0.50%	0.05%	0.00%	0.16%
Scottsdale	202,705	219,713	17,008	8.39%	0.76%	1.76%	5.32%
Surprise	30,848	119,530	88,682	287.48%	26.13%	9.17%	2.90%
Tempe	158,625	164,659	6,034	3.80%	0.35%	0.62%	3.99%
Tolleson	4,974	6,579	1,605	32.27%	2.93%	0.17%	0.16%
Wickenburg *1	5,082	6,458	1,376	27.08%	2.46%	0.14%	0.16%
Youngtown	3,010	6,188	3,178	105.58%	9.60%	0.33%	0.15%
Unincorp Maricopa Co	199,162	276,634	77,472	38.90%	3.54%	8.01%	6.70%
Unincorp Pinal Co	28,508	124,265	95,757	335.90%	30.54%	9.90%	3.01%
Total MAG MPO	**3,159,798**	**4,126,578**	966,780	30.60%	2.78%	100.00%	100.00%

*1 Maricopa County portion only.

Sources: U.S. Bureau of the Census, Census 2000, Arizona Department of Commerce, Maricopa Association of Governments, Central Arizona Governments

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Population Forecasting Process

According to Executive Order 2011-04, the Arizona Department of Administration (ADOA) is responsible for preparing an official set of population projections for Arizona and each of its counties. ADOA has prepared a set of residential population projections for Maricopa County and Pinal County consistent with the 2010 Census. MAG is responsible for developing a set of sub-regional projections for communities within Maricopa County, and CAG is responsible for developing a set of sub-regional projections for communities within Pinal County. These projection figures, which take into account recent population and employment information, were produced in early 2013 and were approved for Maricopa County by the MAG Regional Council on June 19, 2013 and for Pinal County by the CAG Regional Council on June 14, 2013.

Population Projections

As calculated by the 2013 MAG and CAG Socioeconomic Projections, by 2035, the MAG MPO is projected to increase its population by more than 54% over the 2010 base population, with an anticipated total of 6.2 million people. This means that the region will experience a growth of approximately 88,000 people annually through 2035.

Table 3-2 shows the total resident population for Municipal Planning Areas (MPAs) from July 1, 2010, to July 1, 2035. Total resident population includes the resident population in households, and the resident population in group quarters (dorms, nursing homes, prisons and military establishments). Over the 25-year period (2010-2035), six MPAs are projected to grow by more than 100,000 persons: Phoenix, Buckeye, Surprise, Mesa, Peoria, and Goodyear. Another nine MPAs are projected to experience population growth greater than 50,000 persons: Glendale, Gilbert, Florence, Scottsdale, Maricopa, Chandler, Avondale, Tempe, and Queen Creek.

Currently, there are six MPAs within the MAG Region with populations of over 200,000 persons: Phoenix, Mesa, Glendale, Chandler, Scottsdale, and Gilbert. By 2020, Peoria will surpass 200,000 in population. By 2035, the largest Municipal Planning Area, Phoenix, will contain over two million persons, followed by Mesa at 638,770, Glendale at 350,434, and Peoria at 309,974. Figures 3-1 and 3-2 are maps that display the population concentrations for 2010 and 2035. 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 2035 the MAG MPO is projected to nearly double its reported 2010 employment total. This means that employment within the region will grow by an average of more than 50,000 jobs per year through 2035. 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

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TABLE 3-2
TOTAL RESIDENT POPULATION BY MPA, 2013 MAG & CAG PROJECTIONS
JULY 1, 2010 and PROJECTIONS JULY 1, 2020 to JULY 1, 2035

MPA	Total Resident Population 2010	Total Resident Population 2020	Total Resident Population 2030	Total Resident Population 2035
Apache Junction	49,671	58,489	76,185	95,430
Avondale	77,900	96,600	121,500	138,667
Buckeye	62,800	103,600	183,800	250,108
Carefree	3,400	3,800	4,200	4,324
Cave Creek	4,900	5,900	7,400	8,150
Chandler	244,600	283,100	307,500	312,041
El Mirage	31,900	34,600	41,000	44,775
Florence	66,555	92,060	126,130	144,849
Fountain Hills	22,400	25,900	31,000	31,112
Fort McDowell	1,000	1,000	1,100	1,100
Gila Bend	2,500	2,800	6,200	11,710
Gila River	11,346	12,153	12,749	12,960
Gilbert	212,400	259,100	293,100	308,051
Glendale	252,800	291,500	343,500	350,434
Goodyear	68,000	115,300	167,700	205,351
Guadalupe	5,500	6,000	6,500	6,657
Litchfield Park	10,500	12,000	13,800	13,800
Maricopa	51,269	73,427	105,157	120,863
Mesa	482,500	543,400	620,300	638,770
Paradise Valley	12,800	13,000	14,100	14,271
Peoria *1	162,500	214,400	276,200	309,974
Phoenix	1,501,300	1,711,600	1,953,800	2,078,320
Queen Creek	35,299	58,328	82,471	87,343
Salt River	6,300	6,400	7,000	7,320
Scottsdale	217,400	252,300	283,000	289,781
Surprise	127,600	159,200	241,900	290,287
Tempe	162,100	183,900	211,700	214,714
Tolleson	6,600	7,000	8,200	8,550
Wickenburg *1	8,000	10,700	16,200	22,068
Youngtown	6,100	6,600	7,400	7,504
Unincorp Maricopa Co	94,600	104,100	119,900	133,929
Unincorp Pinal Co	60,003	66,577	79,951	95,239
TOTAL	**4,062,543**	**4,814,834**	**5,770,643**	**6,258,452**

Notes:

*1 Maricopa County portion only.

Total resident population includes resident population in households and resident population in group quarters

For complete notation on this series please refer to Caveats for Socioeconomic Projections 2013.

Sources: Maricopa Association of Governments, Central Arizona Governments

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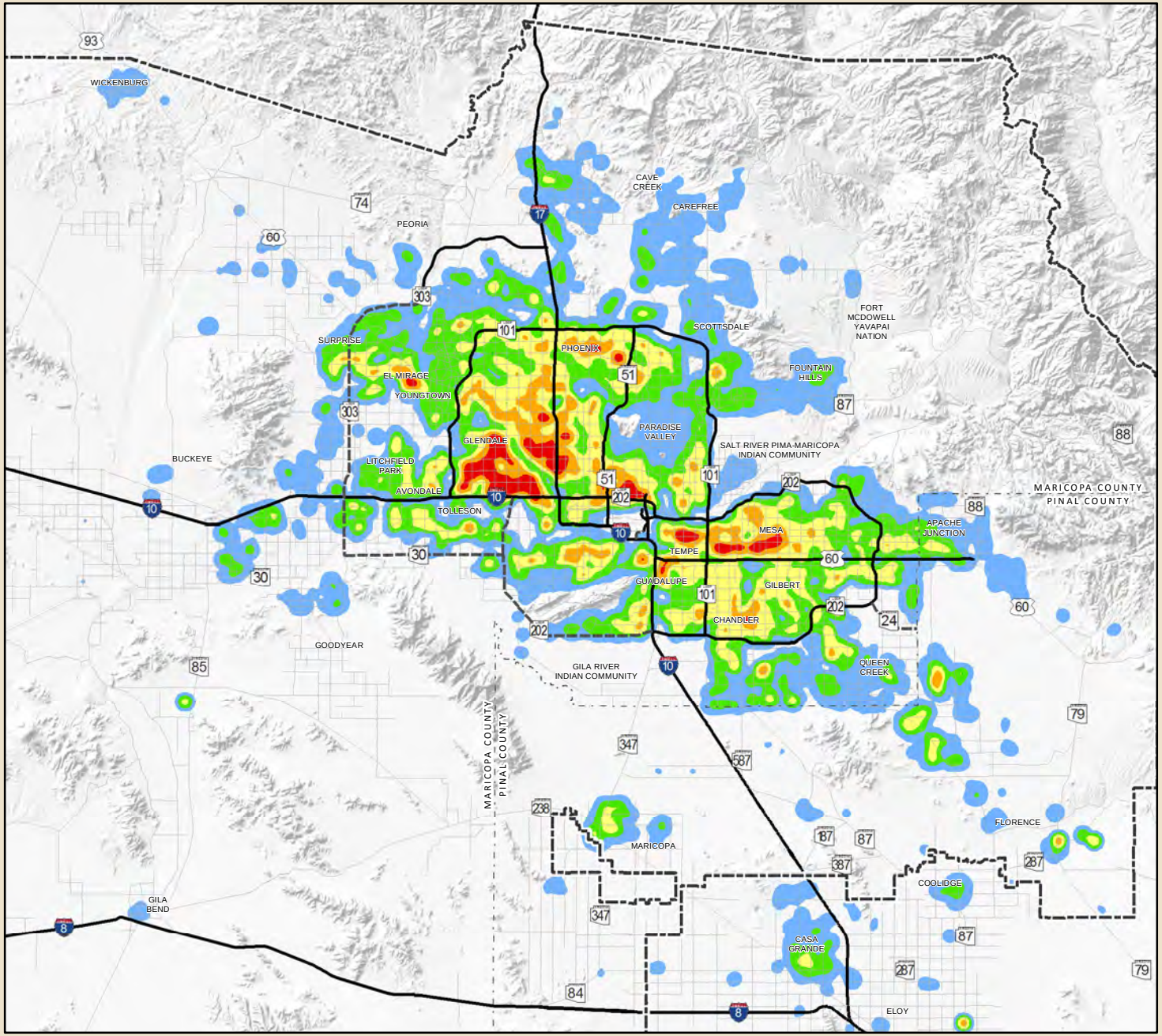
2035 Regional Transportation Plan

Fig. 3-1

REGIONAL TRANSPORTATION PLAN

MARICOPA ASSOCIATION of GOVERNMENTS

2010 Population Concentration



Persons per Square Mile
(Two County Average = 288)

- Less than 250
- 250 to 2000
- 2000 to 4000
- 4000 to 6000
- 6000 to 8000
- More than 8000
- Metropolitan Planning Area Boundary
- County Boundary
- Freeway
- Planned Freeway
- Major Roads

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

Source: MAG, CAG Projections 2012

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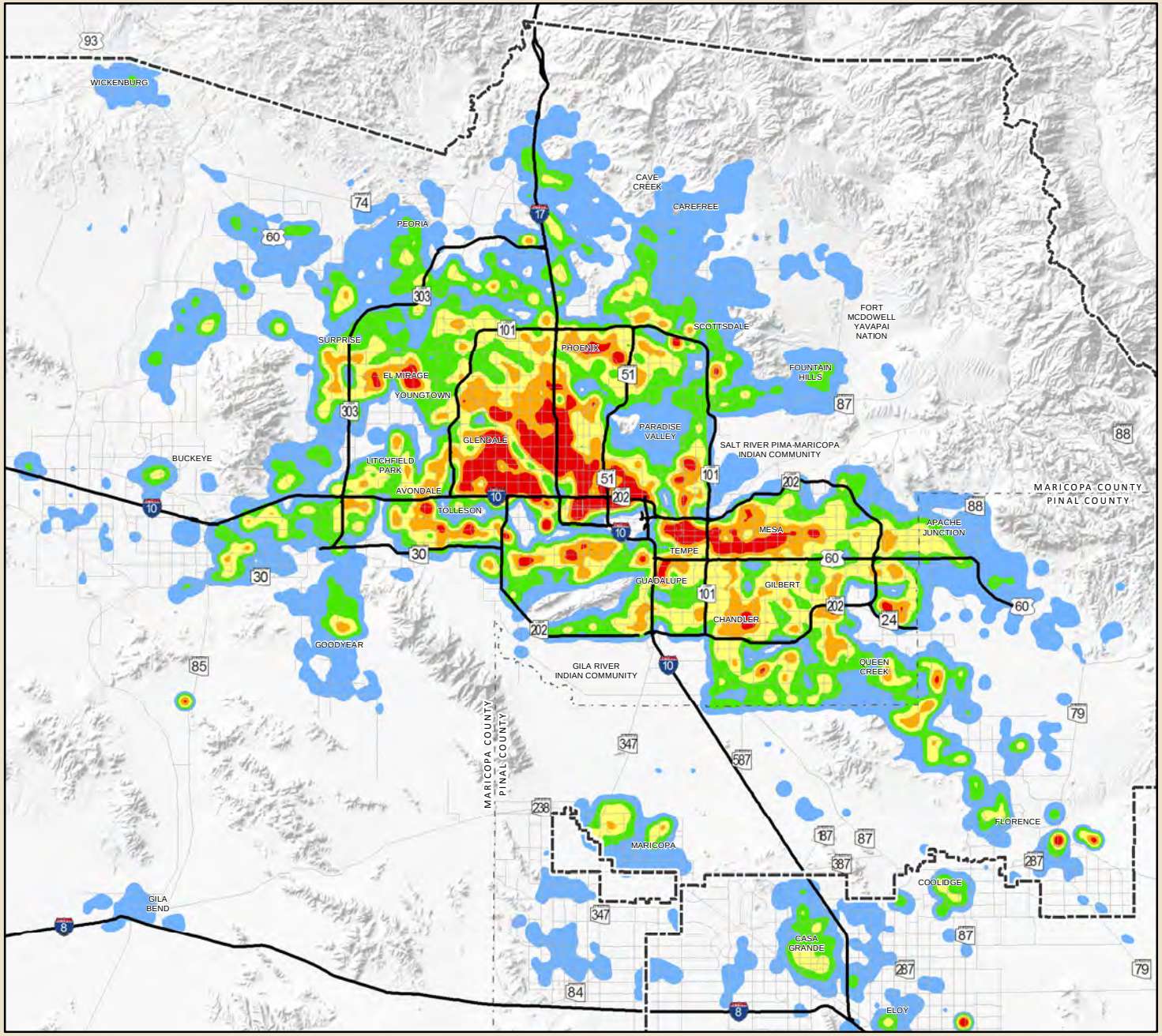
2035 Regional Transportation Plan

Fig. 3-2

REGIONAL TRANSPORTATION PLAN

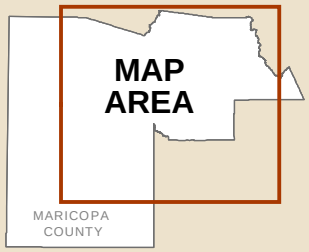
MARICOPA ASSOCIATION of GOVERNMENTS

2035 Population Concentration



Persons per Square Mile
(Two County Average = 451)

- Less than 250
- 250 to 2000
- 2000 to 4000
- 4000 to 6000
- 6000 to 8000
- More than 8000
- Metropolitan Planning Area Boundary
- County Boundary
- Freeways
- Major Roads



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Source: MAG, CAG Projections 2012

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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 2012, 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 252 job centers within the MAG MPO were identified. These job centers include just over 53,000 employers, or nearly 32 percent of the employers in the MAG MPO. Over 1 million employees work in these job centers, which accounts for 60 percent of the total number of employees in the County.

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.

Employment Forecasts

Table 3-3 displays the projected regional employment totals by MPA as calculated for the 2013 MAG and CAG Socioeconomic Projections, which is reported by total employment from July 1, 2010, to July 1, 2035. 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.

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, the 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.

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TABLE 3-3
TOTAL EMPLOYMENT BY MPA, 2013 MAG & CAG PROJECTIONS
JULY 1, 2010 and PROJECTIONS JULY 1, 2020 to JULY 1, 2035

MPA	Total Employment 2010	Total Employment 2020	Total Employment 2030	Total Employment 2035
Apache Junction	9,547	15,776	33,350	40,972
Avondale	14,064	27,170	40,712	45,273
Buckeye	12,833	29,183	56,315	76,797
Carefree	1,426	1,899	2,157	2,286
Cave Creek	1,838	2,798	3,385	3,777
Chandler	112,851	152,617	171,447	182,909
El Mirage	4,263	5,931	8,895	11,951
Florence	11,504	20,984	33,923	41,895
Fountain Hills	5,538	7,469	8,295	8,866
Fort McDowell	1,480	1,874	2,152	2,156
Gila Bend	791	1,538	3,309	4,805
Gila River	7,241	14,867	17,398	19,631
Gilbert	74,558	108,130	126,665	135,061
Glendale	78,593	116,435	143,402	155,918
Goodyear	24,227	46,481	70,445	81,796
Guadalupe	967	1,120	1,266	1,362
Litchfield Park	2,042	3,204	4,763	5,086
Maricopa	5,368	11,423	24,724	30,994
Mesa	160,814	215,396	256,016	273,236
Paradise Valley	4,327	6,253	6,246	6,227
Peoria*1	40,852	62,563	75,652	84,677
Phoenix	747,669	958,021	1,071,161	1,125,639
Queen Creek	6,042	13,375	22,749	27,484
Salt River	11,308	20,495	28,491	34,094
Scottsdale	165,809	212,788	224,475	228,476
Surprise	19,516	35,174	64,562	78,020
Tempe	169,095	221,367	236,384	240,433
Tolleson	10,628	13,985	15,697	18,585
Wickenburg*1	3,504	5,254	7,325	8,796
Youngtown	1,345	1,686	1,865	1,895
Unincorp Maricopa Co	24,514	30,292	33,668	36,387
Unincorp Pinal Co	1,911	3,761	5,514	8,248
TOTAL	1,736,465	2,369,309	2,802,408	3,023,732

Notes:

*1 Maricopa County portion only.

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

For complete notation on this series please refer to Caveats for Socioeconomic Projections 2013.

Sources: Maricopa Association of Governments, Central Arizona Governments

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Table 3-4 displays the existing and future land use data for the MAG MPO. MAG also tracks known development projects in the MAG MPO. Currently, the MAG development database has 2,889 known development projects. These projects include active, entitled and conceptual developments. These developments cover over 708,000 acres and could add approximately 1.6 million housing units to the MAG MPO.

TABLE 3-4
MAG MPO REGION EXISTING AND FUTURE LAND USE

Land Use	Existing Land Use (Sq. Mi.)	% Developed Land (Existing)	Future Land Use (Sq. Mi.)	% Developed Land (Future)
Residential	776.6	7.3%	4227.3	39.7%
Commercial	67.1	0.6%	132.2	1.2%
Industrial	52.0	0.5%	132.3	1.2%
Office	14.2	0.1%	21.1	0.2%
Other/Public/Transportation	382.2	3.6%	478.0	4.5%
Open Space	5081.7	47.7%	5263.5	49.4%
Mixed Use	0.8	0.0%	400.5	3.8%
Vacant	4280.2	40.2%		

Note: This analysis is for the MAG MPO only and does not include the Yavapai County parts of Peoria and Wickenburg.

Source: Maricopa Association of Governments

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.

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The land use, population, and socioeconomic modeling process is based on a three tier modeling approach. The first tier is a demographic model, specifically a cohort-component model, which is used to produce county level control totals of population by characteristics such as sex, age, and race. The model attempts to take into account such factors as the state's interaction with the rest of the country, long term trends affecting birth, death, and migration rates, and short-term economic conditions. The demographic model is operated by the Arizona State Demographer within the Arizona Department of Administration (ADOA) and projects population out to 2050.

The second and third tier models are heavily customized versions of the UrbanSim modeling system, which is used worldwide by many organizations conducting socioeconomic modeling. The second tier involves a set of models using the county level population control totals, matching a set of employment control totals to them, and allocating the population and employment to sub-regions or "market areas" defined within the county. This allocation is based on regional trends in home building, employment, and transportation infrastructure. The results of the allocation by market area are used by the third tier models as refined control totals at the smaller, market area geography. The third tier models are a set of sophisticated regression and multinomial logit "choice" models that predict the location behavior of individual household and employment records to built space records that are tied to neighborhood level polygons. The third tier models also simulate the demand for and supply of built space by the household and employment occupants. The models will build and redevelop land polygons as predicted by the choice models while respecting the local development plans, land use plans, and policies of MAG member agencies. The results of the third tier models are able to be aggregated to traffic analysis zones (along with many other geographies) to be used in other modeling, planning, or analysis as needed.

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

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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.

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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 is currently reviewing the plan for possible changes. Any changes made will follow the protocol of the most recent federal guidelines.

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, FY 2010, FY 2011 and FY 2012, and did not exactly follow the phases outlined in the adopted MAG Public Participation Plan. However, MAG conducted the FY 2013/2014 process generally as outlined in the Public Participation Plan. In addition, MAG developed a Public Participation Guide that is designed to provide Valley residents a roadmap for providing input on regional transportation plans.

Public Input Activities

The formal MAG public involvement program consists of three phases. The Early Phase is generally conducted at the beginning of the update process to obtain stakeholder input on potential Valley transportation projects. The Mid-Phase is used to solicit public input on transportation issues, concerns and priorities, and provide information on the direction of the transportation planning process. The Final Phase includes a variety of input opportunities, culminating with a Public Hearing on the Draft TIP, Draft RTP and Draft Air Quality Conformity Analysis. The details of the FY 2013/2014 three-phase process is discussed later in this chapter.

In addition to the formal three-phase process, in FY 2013/2014 MAG used a variety of other means to obtain input from small and large groups through presentations at meetings and attendance at special events. The continuous outreach effort is conducted throughout the 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.azmag.gov*.

- 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 public meetings and 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 2013/2014 Public Involvement Program

The FY 2013/2014 public involvement program represented a coordinated process to solicit input during development of the Draft MAG 2035 Regional Transportation Plan and Draft MAG FY 2014-2018 Transportation Improvement Program. MAG public involvement staff participated in large special events and made small and large 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 2013/2014 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 intelligent transportation system projects; bicycle and pedestrian projects; and 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 through a mailing to more than 3,000 Valley residents. All input received is made part of an FY 2013/2014 Early Phase Input Opportunity Report and is presented to MAG policy committees for review and consideration.

- Continued Input Opportunities During the Early Phase - Other input opportunities during the Early Phase includes special events, small and large group presentations as well as telephone and Web site correspondence. MAG participates in several special events in conjunction with ADOT, Valley Metro and METRO when possible, 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, Tempe Tardeada and the Phoenix Urban Expo. 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, Arizona Bridge to Independent Living, Foundation for Blind Children (two presentations), STAR (Staying Together and Recover – mental illness group), among others. MAG reaches hundreds of people during this time and is 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 include public comment periods. All meetings are held at the MAG offices in downtown Phoenix. The following committees offer 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 2013/2014 Mid-Phase Input Opportunity

The Mid-Phase is generally used to solicit public input on transportation issues, concerns and priorities, and provide information on the direction of the transportation planning process. A Transportation Public Meeting is held (summer of 2013), and e-mail and telephone responses to public inquiries are provided on a continuing basis. At the public meeting, staff from MAG is present to receive public comment. All comments/suggestions/concerns received at the public meeting are included in the FY 2013/2014 Mid-Phase Input Opportunity Report. This report, as well as a presentation on the Mid-Phase results, is provided to the Management Committee, Transportation Policy Committee and Regional Council for review and consideration in the decision-making process.

FY 2013/2014 Final Phase Input Opportunity

The Final Phase is conducted in conjunction with the air quality conformity analysis of the TIP and RTP (fall of 2013). This phase includes a variety of input opportunities, culminating with a Public Hearing on the Draft FY 2014-2018 TIP, Draft 2035 RTP and Draft Air Quality Conformity Analysis. At the public hearing, staff from MAG, ADOT, Valley Metro, METRO and the City of Phoenix Public Transit Department gathers to hear public comment. A court reporter is in attendance at the hearing to take down comments verbatim. All comments/suggestions/concerns received at the public hearing subsequently receive a formal response, and are included in the FY 2013/2014 Final Phase Input Opportunity Report. This report, as well as a presentation on the Final Phase results, is provided to the Management Committee, Transportation Policy Committee and Regional Council for review and consideration in the decision-making process.

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.

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CHAPTER FIVE

TITLE VI AND ENVIRONMENTAL JUSTICE

The voices and concerns of all people are critical to responsive regional planning. For more than 40 years, the considerations of vulnerable populations have played an integral role in all aspects of regional planning at the Maricopa Association of Governments (MAG). Title VI and environmental justice (EJ) activities are also mandated by the federal government to ensure that people of all races, income levels, ages, and abilities have an equal voice in the planning process and receive equal benefit from the results of such planning. MAG has prepared a Title VI and Environmental Justice Plan to fully integrate the needs of these vulnerable populations as part of MAG's activities. The Title VI and Environmental Justice Plan serves as an important element in the regional transportation planning process.

Key components in the Title VI/EJ process include the development of a demographic profile identifying the locations of Title VI and EJ groups, a planning process that identifies the transportation needs of people with low incomes and minority populations, and an analytical process that identifies the benefits and burdens of transportation system investments for different socioeconomic groups, identifies imbalances, and responds to the analysis produced. The goals of these activities are as follows:

- Comply with the public involvement and environmental justice requirements of the federal and state regulations.

- Avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations.

- Provide specific opportunities for the public and community-based organizations to discuss their views and provide input on the subject areas addressed in the planning activities of MAG.

- Ensure full and fair participation by all potentially affected communities in the transportation decision-making process.

- Inform members of the public about ongoing MAG planning activities, and their potential role in those activities.

Public Involvement Process for Title VI/EJ Communities

Regardless of the audience, the need for transportation commonly arises as a key concern. People rely on a range of transportation services to earn a living, secure education, and access medical care. Limited access to safe, affordable, reliable transportation options significantly

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impairs one's ability to live independently. Vulnerable populations are more deeply affected due to scarcity of alternatives and the depth of need for assistance. MAG addresses Title VI/EJ Communities in a number of ways, through numerous public outreach activities targeted to both specific minority groups and the general public as a whole.

Limited English Proficiency

Needs for the communities of concern are identified through public outreach. In order to ensure the public receives and understands information vital to participation in the planning process, a four-factor analysis is used to identify the needs of people with Limited English Proficiency (LEP). Section Five of the U.S. Department of Transportation guidance on LEP prescribes a four-factor analysis to determine the need for translation services in order to fully engage LEP populations in the planning process.

On the basis of this four-factor analysis, MAG maintains vital materials about the agency in Spanish and will translate into other languages upon request. Spanish-speaking staff is available at policy committee meetings and as needed for other public meetings to interpret for LEP populations. Additional materials and interpreters will be made available for areas with high concentrations of linguistically-isolated individuals. Resources to translate materials and interpret for individuals are available but finite. The investment is made to translate vital materials. MAG maintains a standing offer to translate additional materials into additional languages and provide alternative formats such as Braille or large print.

Public Participation Activities

The general public, as well as Title VI, EJ, and LEP populations, are engaged in the planning process through ongoing public outreach activities. More intensive tools such as focus groups are used to identify Title VI transportation needs for specific planning activities that may impact Title VI populations. Other tools are used on a consistent basis to facilitate an exchange of information and to fully engage communities of concern. Vital materials are translated into Spanish. Additional materials are translated and offered in alternative formats upon request. MAG maintains a disability associate to advise on issues related to people with disabilities and perform outreach to the disability community.

In SAFETEA-LU, visualization techniques in public involvement planning are considered essential to assisting public understanding of transportation plans and programs. MAG's description of visualization techniques in its Public Participation Plan was cited by the Federal Highway Administration (FHWA) as a notable practice among Metropolitan Planning Organizations (MPOs) throughout the nation.

- Events - It is a priority to engage communities of concern in public, openly accessible events. Going to where people are instead of requiring them to attend meetings at MAG increases the level of participation and the diversity of people offering feedback. MAG

public involvement staff routinely participates in more than 10 events each year focused on Title VI populations.

- Public hearings - MAG conducts up to two public meetings/hearings each year (or as appropriate), as part of the process when the MAG Transportation Improvement Program and Regional Transportation Plan are being updated. The first meeting/hearing provides residents an opportunity to comment on initial draft plans and programs. The second meeting/hearing provides residents the opportunity to comment on final draft plans and programs prior to adoption by MAG policy committees. After each public meeting/hearing, an input opportunity report is compiled and distributed to MAG policy committee members for review and consideration prior to taking any action.

- Surveys - MAG staff distributes awareness surveys at a variety of events in order to gauge public awareness of MAG and its plans and programs. The results from the awareness survey are a positive indicator of MAG's efforts to pursue public awareness and involvement in the transportation planning process. The survey also asks respondents about their transportation priorities and participation in the MAG planning process. Additional surveys are administered as part of projects to determine the needs of specific populations, such as people with disabilities, low incomes, or older adults. The results of these surveys provide a deeper understanding of the current and projected transportation needs among communities of concern.

- Focus groups and stakeholder group meetings - Focus groups and stakeholder group meetings offer opportunities for small groups of communities of concern to offer detailed feedback on specific topics. Focus groups are conducted with various vulnerable populations to gauge emerging needs, including those related to transportation. Meetings are held with communities of concern and the agencies serving them to inform planning activities as they move forward. Feedback from the communities of concern is provided to the appropriate MAG Committees.

- Newsletters - The MAGazine newsletter, MAG Transportation Policy Committee newsletter, and MAG Human Services newsletters are produced and distributed via print,), and direct mailing, resulting in greater awareness by subscribers of MAG's responsibilities and activities. Residents also benefit from timely notice of MAG events and a better understanding of how to participate in planning activities. The MAG Human Services Division also releases an electronic newsletter on at least a quarterly basis with a distribution list of more than 1,200 nonprofit agencies, faith-based organizations, and community groups serving communities of concern.

- Social Media and Video Outreach - MAG manages a social media program that engages members of the public through platforms such as Twitter, Facebook, and YouTube. MAG also implements a video outreach program in which project-specific videos are produced to inform the public about MAG activities and programs. These videos are

distributed to public access channels throughout the region, and are posted on MAG's website and on YouTube.

MAG Transportation Ambassador Program (TAP)

The MAG Transportation Ambassador Program (TAP) offers training, information, and networking opportunities to communities of concern and the agencies that serve them. Training is held on a quarterly basis for more than 320 participants in mainstream venues such as libraries and community centers. This training is also an extremely valuable source of feedback. Participants provide the information needed to complete the gaps-analysis required in the MAG Human Services Coordination Transportation Plans. Strategies to address the gaps-analysis are provided with each plan and implemented with the support of the TAP participants and communities of concern.

Communities of Concern

Communities of concern describe populations that have been determined by the federal government or the MPO as benefiting from protections to ensure their meaningful involvement in planning and services. These vulnerable populations have been identified through the Civil Rights Act of 1964, Executive Order 12898, and Executive Order 13166 to end discrimination and ensure equal access to all federally funded services. To assist with the identification of Title VI neighborhoods, the presence of Title VI populations is compared against the regional threshold for each community of concern.

Based on the most recently available Census data, the threshold for each mandated community of concern is as follows:

- Minority population: 41.0 percent of population or higher.
- Population in poverty: 14.7 percent of population or higher.
- Disability: 18.2 percent of population or higher.
- Linguistic isolation: 5.8 percent of households or higher.

The U.S. Census Bureau is the source of data used for determining the environmental justice communities of concern. The units of analysis are the census tract and the census block group. Census tracts are small, relatively permanent statistical subdivisions of a county that are updated by local participants prior to each decennial census. Census block groups are subdivisions of a Census tract. Because local participants work with the Census Bureau to create and update the census boundaries, the boundaries are more likely to reflect the community's view of where one neighborhood ends and another begins. Census tracts generally have a population size between 1,200 and 8,000 people, with an optimum size of 4,000 people. Census geographic boundaries are delineated with the intention of being maintained over a long time so that statistical comparisons can be made from census to census. Census tracts occasionally are split due to population growth or merged as a result of substantial population decline.

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Due to the expansion of the Census-defined Urbanized Area Boundary based on the 2010 Census, the Metropolitan Planning Area boundary for the MAG region was recently expanded in the southeast into portions of Pinal County. The new boundary follows the planning area boundaries for the municipalities that fall into this new area, however this boundary does not precisely line up with Census geography. Thus, a spatial analysis was performed in order to determine the best geographic match based on the distribution of population within Census tracts and block groups along the expanded portion of the MPA boundary within Pinal County. It was determined that the best match includes 43 full Census tracts and 3 Census block groups within Pinal County. The Census data used in this analysis includes these 46 new Census units (tracts and block groups) in addition to the 916 Census tracts within Maricopa County, for a total of 962 census geographic units (hereafter referred to as "census units").

Communities of concern are identified as those census units where the identified group represents a percentage of the population equal to or greater than that of the MPO threshold. Table 5-1 indicates the number of people represented by communities of concern and the percentage they represent of the total population in the region.

TABLE 5-1
COMMUNITIES OF CONCERN THE MAG MPO

Population			Census Units			
Category		**Percent**	**Number of Units ≥ County Average**	**% Units**	**Affected Population (5)**	**% of Targeted Population Captured in Census Units**
Population Base	4,054,972	100%	962	100%	--	--
Minority (1)	1,662,381	41%	377	39%	1,087,708	65%
Poverty (2)	582,479	15%	365	38%	416,504	72%
Disability (3)	522,477	18%	320	47%	331,749	64%
Linguistic Isolation (4)	84,769	6%	313	33%	67,098	79%

Sources: U.S. Census Bureau, 2007-2011American Community Survey (ACS) 5-Year Estimates , 2010 Decennial Census, and 2000 Decennial Census.

(1) Minority includes total population less White (Non Hispanic). Data from 2010 Decennial Census.

(2) Percent of the population for whom poverty status is determined does not include institutionalized persons or persons under 5 years of age. Data from 2007-2011ACS 5-Year estimates.

(3) Disability status from the 2000 Census data for persons 5 years and over. Disability status is not available at the

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Census Tract level in from 2007-2011ACS 5-Year estimates. All values in Table 5-1 for disability reflect 2000 Census data and its associated 2000 Census geography.

(4) A linguistically isolated household is one in which no member 14 years and over (1) speaks only English or (2) speaks a non- English language and speaks English "very well." In other words, all members of the household 14 years and over have at least some difficulty with English. Data from 2007-2011ACS 5-Year estimates. All values in Table 5-1 for linguistic Isolation reflect household level data.

(5) Affected population is the total of people or households (depending on the data "universe") that fall into the specified category for all Census units (either tracts or block groups) that have greater than or equal to the percentage for the MPO area (as defined by the Census geography).

Environmental Justice Analysis

The intent of environmental justice (EJ) is to ensure that communities of concern, defined as minority populations, poverty populations, mobility disabled populations, and linguistically isolated households 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*.

What one population segment may perceive as an adverse effect, another may perceive as a benefit. It is also possible that, within the same population, the same action may be perceived by various segments as both an adverse effect and a benefit. Therefore, when viewing the transportation system as a whole, the benefits provided or the impacts associated with facility segments were, on average, deemed to be approximately equivalent across a given mode of transportation. Based on this approach, each of the three major components of the RTP (freeways/highways, transit and arterial streets) were analyzed separately to assess the geographic distribution of facilities and services included within the RTP. This analysis determined the percentage of census units in each community of concern that is served by the long-range freeway/highway, transit and arterial networks* in the RTP. The percentage of census units representing non-minority communities that are served was also determined. These service levels were compared to assess the distribution of benefits and burdens. This overlay analysis relies on proximity to transportation facilities and services as a measure of equity in the transportation planning process.

*Due to the ubiquitous nature of the arterial system, (i.e., all census units are served), for arterials the analysis is based only on new or improved segments in the network.

Minority Populations

In 1998, the Federal Highway Administration (FHWA) published actions to address EJ in minority populations and low-income populations. Figure 5-1 indicates the location and density of minority households in the MAG region. FHWA guidance defined minority as the following: Black (having origins in any of the black racial groups of Africa); Hispanic (of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race); Asian American (having origins in any of the original peoples of the Far East, Southeast

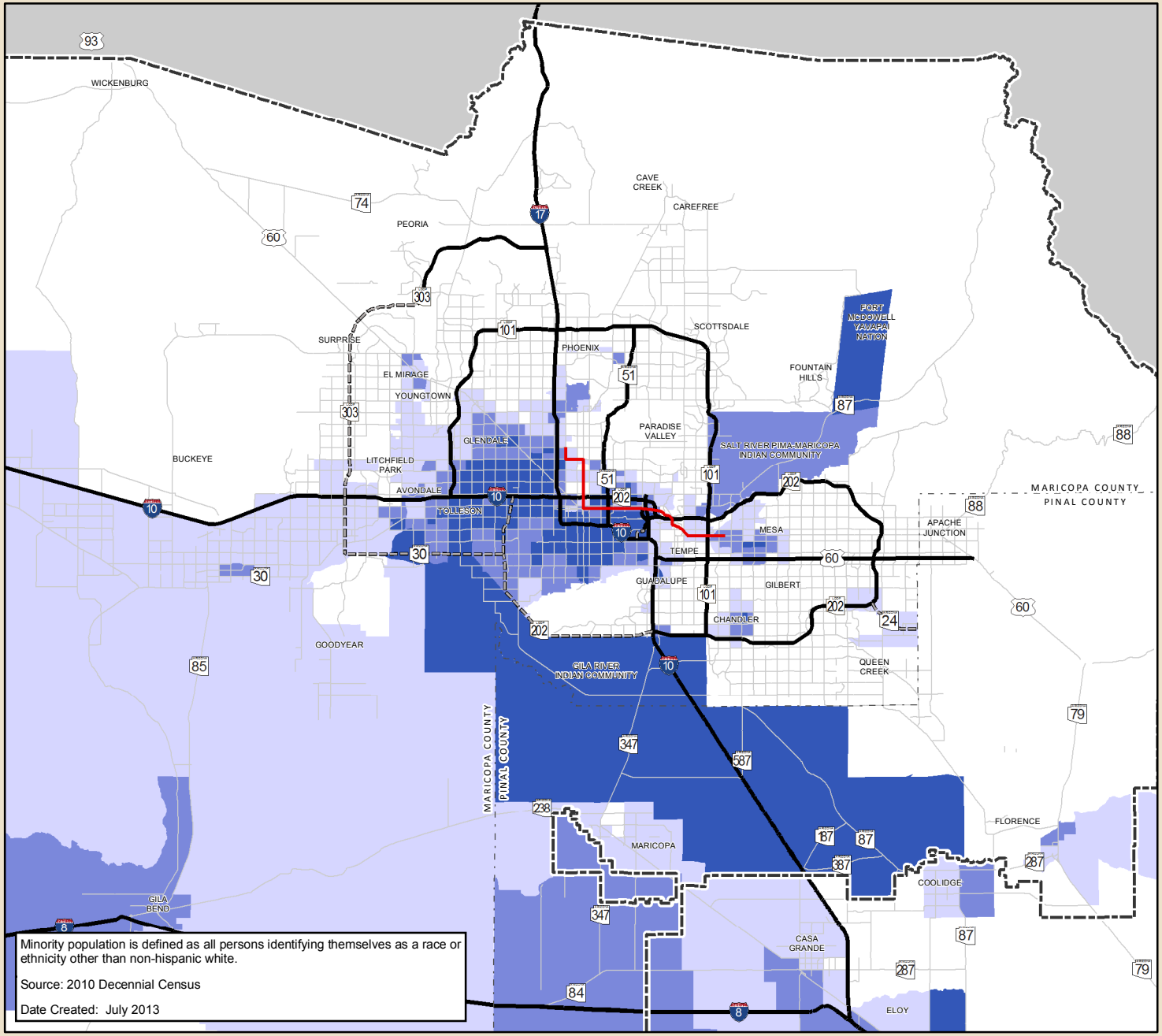
2035 Regional Transportation Plan

Fig. 5-1

REGIONAL TRANSPORTATION PLAN

MARICOPA ASSOCIATION of GOVERNMENTS

Minority Population (2010 Census)



Metropolitan Planning Area Boundary

County Boundary

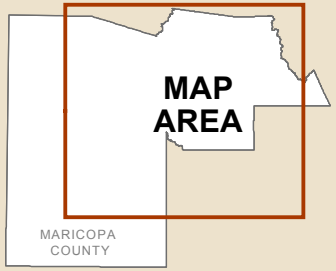
Light Rail Corridor

Freeway

Planned Freeway

Percent Minority Population

- Less than 41%
- 41% to 60%
- 60% to 80%
- More than 80%



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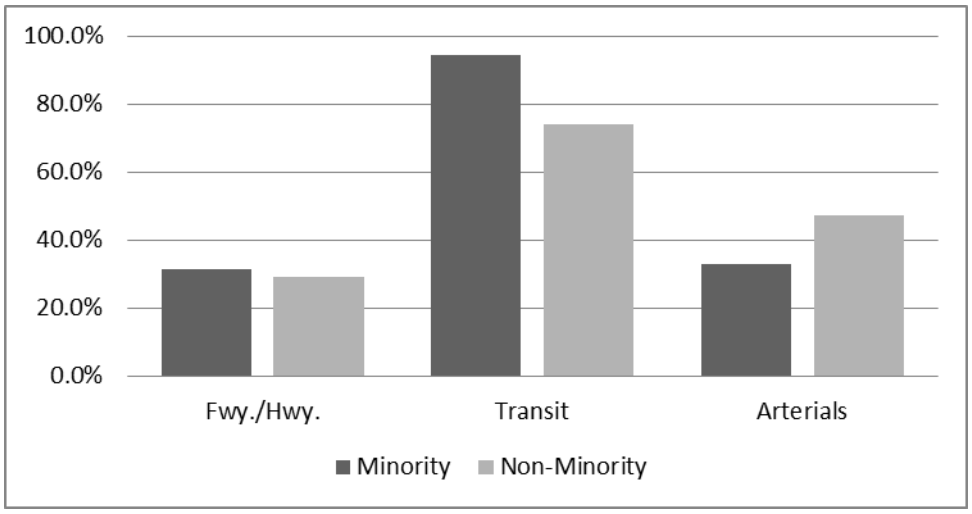
Asia, the Indian subcontinent, or the Pacific Islands); American Indian and Alaskan Native (having origins in any of the original people of North America and who maintain cultural identification through tribal affiliation or community recognition); In addition, MAG includes the following groups as defined by the U.S. Census: 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; Hispanic or Latino.

Minorities represent 41 percent of the population in MAG's planning region. Census units equal to or greater than this percentage number 377, or 39 percent of the 962 units in the county. Within these 377 units, 65 percent of the minority population in the MPO is found. The areas with a higher concentration of minorities (i.e. greater than 60 percent) are the central and south-central areas of the region, as well as the sovereign nations of the Gila River Indian Community (GRIC), the Salt River Pima-Maricopa Indian Community (SRPMIC), the San Lucy District of the Tohono O'Odham Nation, and the Fort McDowell Yavapai Nation. The areas with the highest concentration of minorities (i.e. greater 80 percent) are primarily located within the central Phoenix area, south of Indian School Road.

The transportation needs of minority populations are the same as society as a whole (not including economic status, which is considered in the next section). Thus, transportation facilities in minority communities should be the same as those in non-minority communities. Using census units (as defined above) as the measure, Figure 5-2 presents a comparison of the service provided by freeways/highways, transit and arterials in both minority and non-minority census tracts.

FIGURE 5-2
PERCENT MINORITY vs. NON-MINORITY CENSUS TRACTS AFFECTED BY THE RTP



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The percentage of the minority census units served by the freeway/highway system (31 percent) is somewhat higher than that of non-minority census units (29 percent). Transit routes serve 94 percent of minority census units and 74 percent of non-minority units. Arterial street projects serve 33 percent of the minority units compared to 47 percent for non-minority. Arterial street improvements occur primarily in growth areas located outside of the metropolitan core where the majority of units with above-threshold concentrations of the communities of concern exist. Because of the mature character of the core areas, transit services often represent the most advantageous approach to addressing mobility for communities of concern.

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.

Poverty Status

Poverty status is determined by comparing annual income to a set of dollar values called thresholds that vary by family size, number of children, and age of householder. If a family's before-tax income is less than the dollar value of their threshold, then that family and every individual in it are considered to be in poverty. For people not living in families, poverty status is determined by comparing the individual's income to his or her threshold. The poverty thresholds are updated annually by the U.S. Department of Health and Human Services to allow for changes in the cost of living using the price index for all urban consumers (CPI-U). 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. Figure 5-3 indicates the location and density within the region of persons with income below the Federal poverty threshold. To some extent, the areas of higher minority populations are coincident with the areas that contain a higher percentage of people living in poverty. Areas where poverty is above the Maricopa County threshold, but minority populations are not, include the northwestern portion of the county and areas of Mesa, Buckeye and North Phoenix. The areas with the highest concentrations of persons living in poverty include Central Phoenix south of McDowell Road, and the Gila River Indian Community.

The transportation needs of poverty communities would be met by more transit service than what would be important to the general population. Figure 5-4 presents a comparison of the service provided by freeways/highways, transit and arterials in both poverty and non-poverty communities.

The portion of poverty census units served by the freeway/highway system (30 percent) is the same as that for non-poverty communities (30 percent). Transit routes serve nearly all of the census units identified as poverty tracts (93 percent) but a somewhat smaller portion (76 percent) of the non-poverty areas. Arterial street projects serve approximately 27 percent of the poverty areas compared to 51 percent for non-poverty. The location of poverty census units is largely coincident with the minority areas discussed in the previous section. The

2035 Regional Transportation Plan

Fig. 5-3

REGIONAL TRANSPORTATION PLAN

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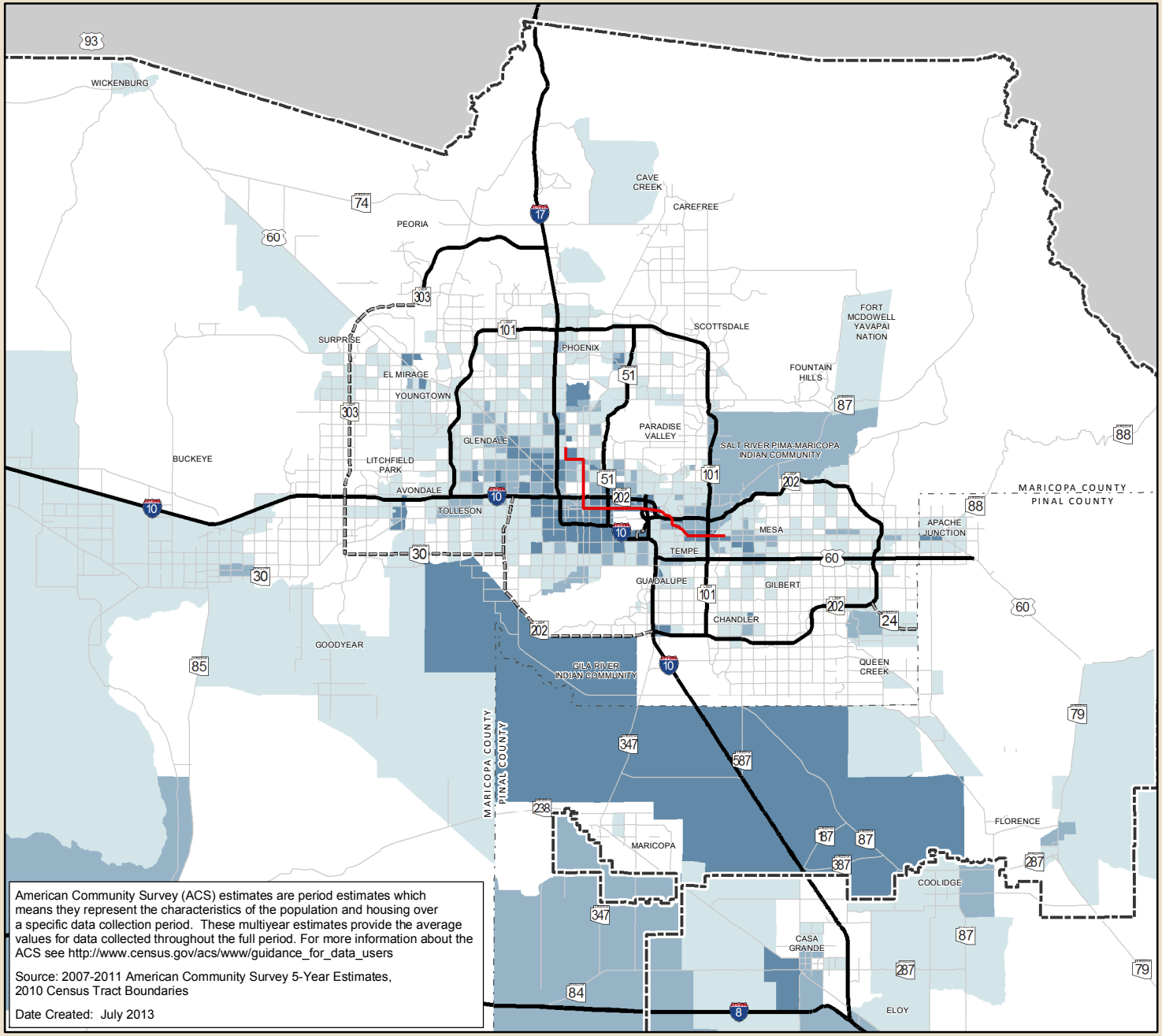
Population in Poverty (2007-2011 ACS 5-year Estimates)



Light Rail Corridor

Freeway

Planned Freeway

Metropolitan Planning Area Boundary

County Boundary

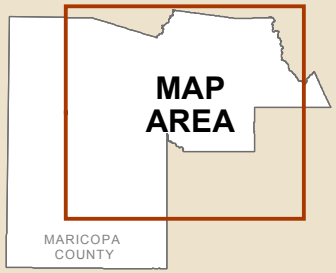
Percent Population in Poverty

- Less than 10%
- 10% to 25%
- 25% to 35%
- More than 35%

American Community Survey (ACS) estimates are period estimates which means they represent the characteristics of the population and housing over a specific data collection period. These multiyear estimates provide the average values for data collected throughout the full period. For more information about the ACS see http://www.census.gov/acs/www/guidance_for_data_users

Source: 2007-2011 American Community Survey 5-Year Estimates, 2010 Census Tract Boundaries

Date Created: July 2013



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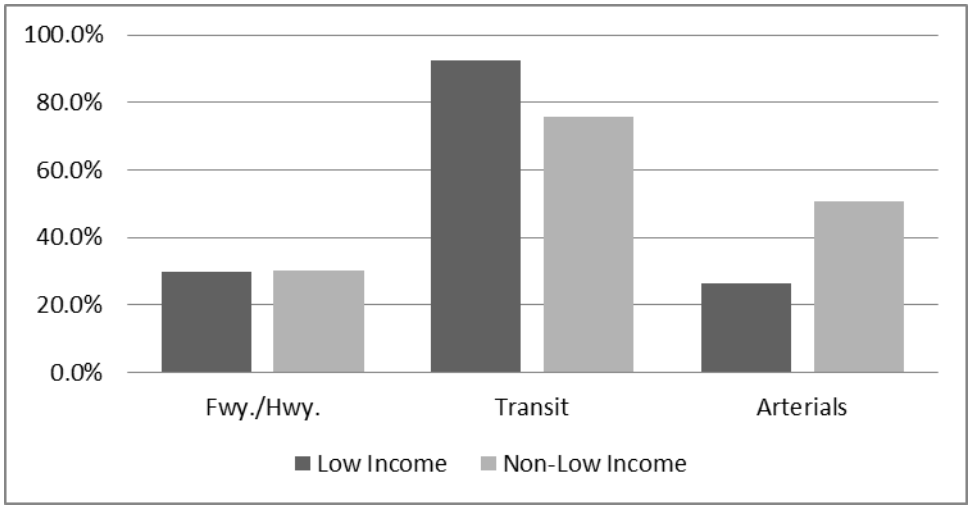
analysis of the plan improvements demonstrates that poverty populations generally benefit from the Plan at about the same level that the census tracts not identified as poverty. As noted previously, transit services appear to represent the most advantageous approach to addressing mobility for communities of concern.

FIGURE 5-4
PERCENT POVERTY vs. NON-POVERTY CENSUS TRACTS AFFECTED BY THE RTP



Disability Populations

People with disabilities: In 2008, section 42 U.S.C. § 12102 of the Americans with Disabilities Act of 1990 was amended to define disability in the following way: (1) a physical or mental impairment that substantially limits one or more major life activities of such individual, (2) a record of such an impairment, (3) being regarded as having such an impairment. Disabilities may be physical or cognitive. The U.S. Census Bureau further defines disability as "A long-lasting physical, mental, or emotional condition. This condition can make it difficult for a person to do activities such as walking, climbing stairs, dressing, bathing, learning, or remembering. This condition can also impede a person from being able to go outside the home alone or to work at a job or business."

Figure 5-5 indicates the location and density within the region of persons age 5 years and over with a disability. Census units with an above threshold percentage of people who reported a disability are widely scattered throughout Maricopa County, with notable concentrations in the unincorporated Sun City and Sun Lakes areas, Youngtown, and south of East University Drive in Mesa. Transportation needs of residents who reported a disability are not the same as those of The general population. People who reported a disability may require special apparatus for vehicular transportation. For this and other reasons, people who reported a disability may be more reliant on the transit options to meet their transportation needs.

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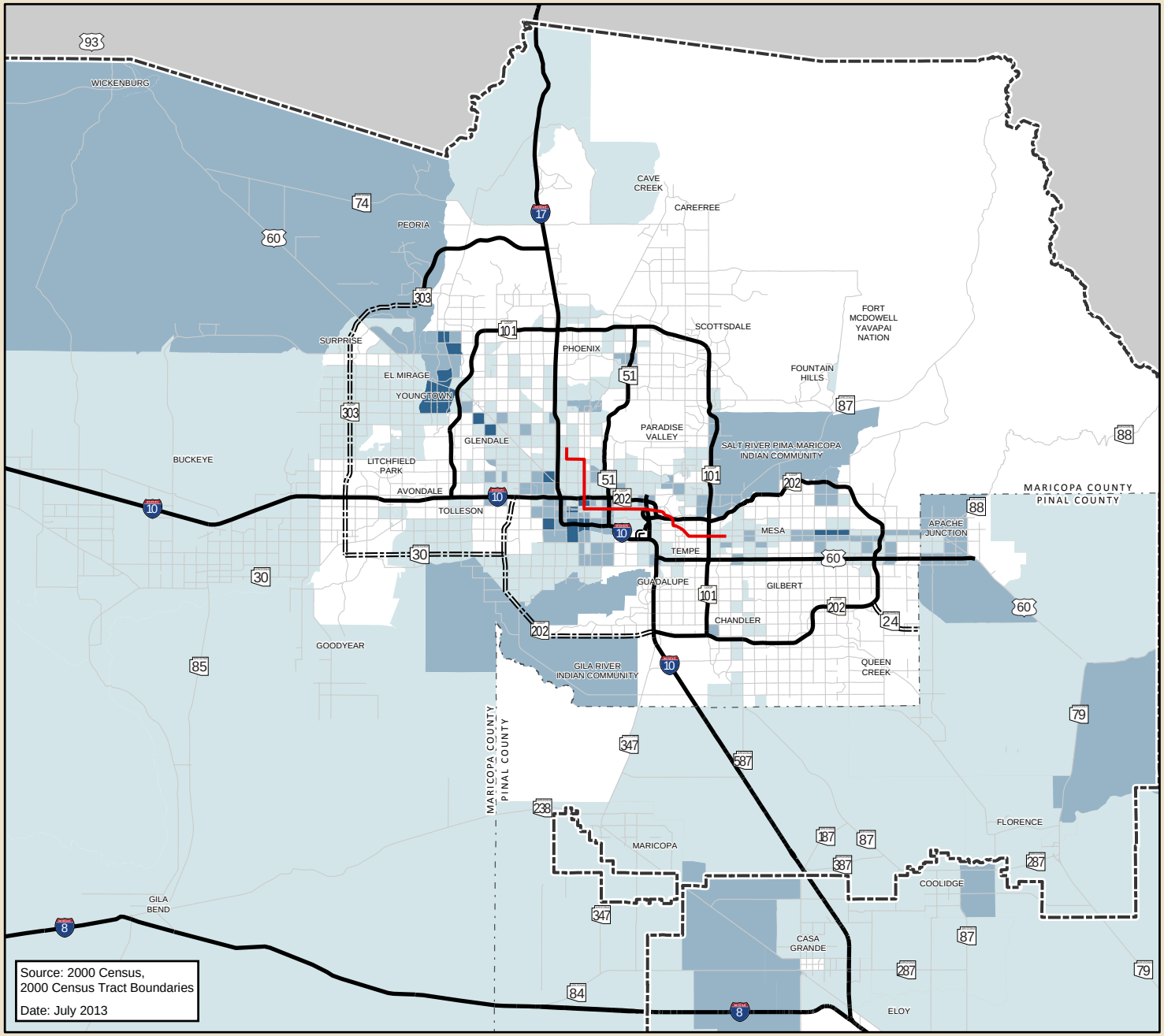
2035 Regional Transportation Plan

Fig. 5-5

REGIONAL TRANSPORTATION PLAN

MARICOPA ASSOCIATION of GOVERNMENTS

Population Age 5 and Over with a Disability (2000 Census)



Light Rail Line

Freeway

Planned Freeway

Metropolitan Planning Area Boundary

County Boundary

Percent Population, Age 5 and Over

- Less than 18%
- 18% to 25%
- 25% to 35%
- More than 35%

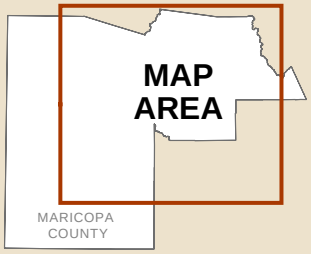


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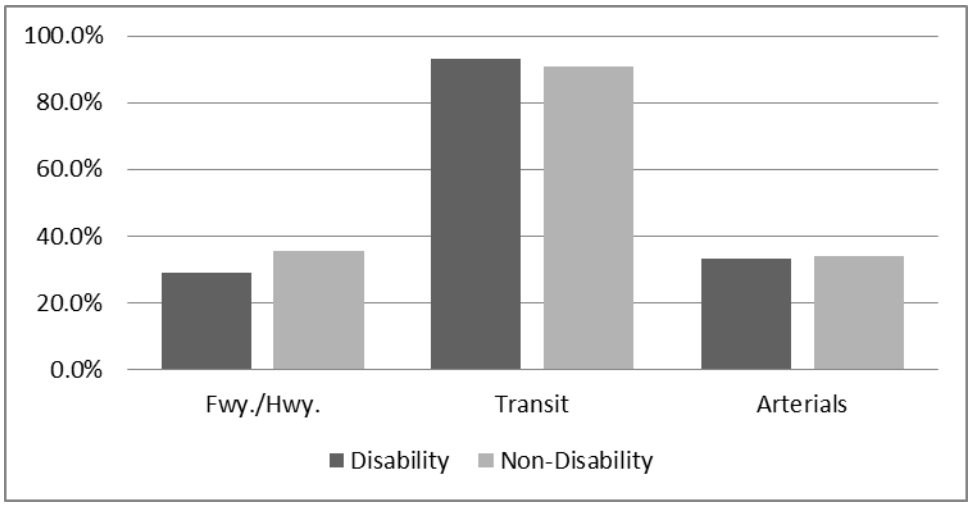
Figure 5-6 presents a comparison of the service provided by freeways/highways, transit and arterials in areas with and without high concentrations of persons with a disability. The portion of census units with a high percentage of persons who reported having a disability and are served by the freeway/highway system (29 percent) is somewhat lower than that for those areas with a low amount of disabled persons (36 percent). Transit routes serve nearly all of the census units identified as disability (93 percent), compared to 91 percent for non-disability areas. In addition to the transit coverage, the plan regionally funds ADA complimentary paratransit service. Arterial street projects serve approximately 33 percent of the disability areas, which is nearly the same as the percentage for areas identified as non-disability (34 percent).

FIGURE 5-6
PERCENT DISABILITY vs. NON-DISABILITY CENSUS TRACTS AFFECTED BY THE RTP



Linguistic Isolation

A linguistically isolated household (LEP) is one in which no member 14 years and over speaks only English, or speaks a non- English language and speaks English "very well." In other words, all members of the household 14 years and over have at least some difficulty with English. Figure 5-7 indicates the location and density of LEP households in the region.

To a great extent, the census tracts of higher than threshold LEPs are coincident with the tracts that contain a higher than threshold percentage of minorities. The exceptions generally are areas covered by of the Gila River Indian Community (GRIC), the Salt River Pima-Maricopa Indian Community (SRPMIC), the San Lucy District of the Tohono O'Odham Nation, and the Fort McDowell Yavapai Nation.

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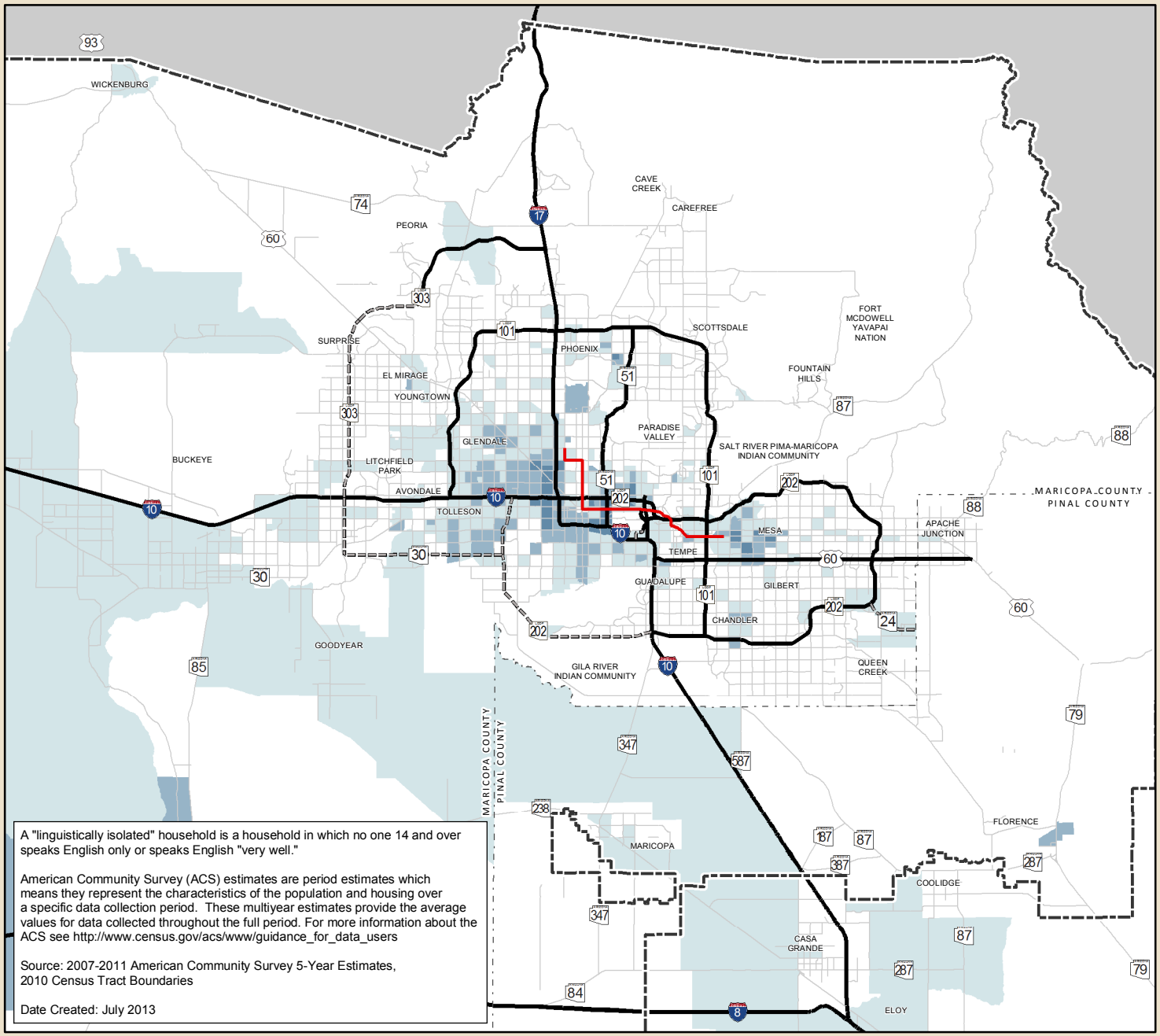
2035 Regional Transportation Plan
Fig. 5-7

REGIONAL TRANSPORTATION PLAN

MARICOPA ASSOCIATION of GOVERNMENTS

Linguistically Isolated Households, 2007-2011 ACS 5-year Estimates



A "linguistically isolated" household is a household in which no one 14 and over speaks English only or speaks English "very well."

American Community Survey (ACS) estimates are period estimates which means they represent the characteristics of the population and housing over a specific data collection period. These multiyear estimates provide the average values for data collected throughout the full period. For more information about the ACS see http://www.census.gov/acs/www/guidance_for_data_users

Source: 2007-2011 American Community Survey 5-Year Estimates, 2010 Census Tract Boundaries

Date Created: July 2013

- Light Rail Line
- Freeway
- Planned Freeway
- Metropolitan Planning Area Boundary
- County Boundary

Percent of Households

- Less than 5%
- 5% to 15%
- 15% to 30%
- More than 30%

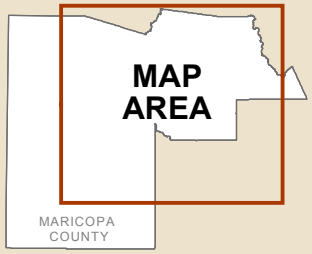


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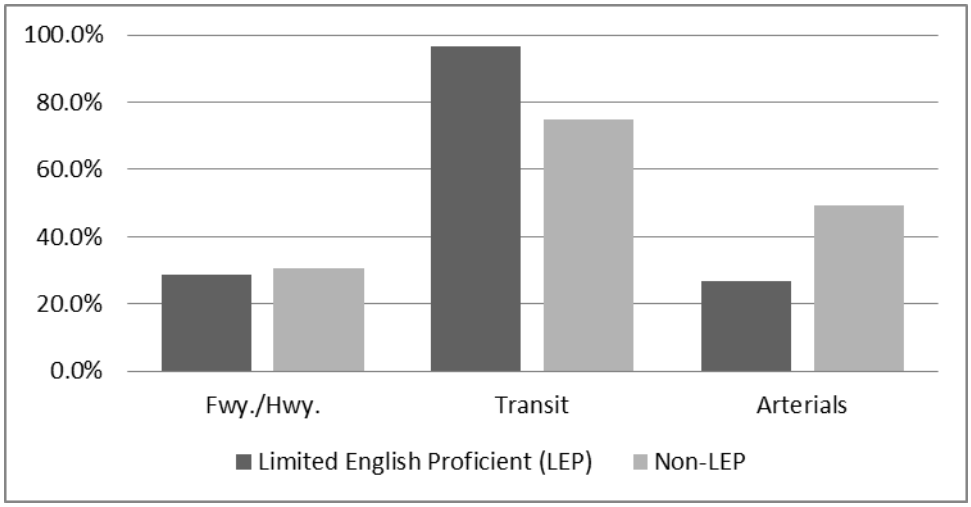
Figure 5-8 presents a comparison of the service provided by freeways/highways, transit and arterials in both LEP and non-LEP census tracts. The portion of LEP tracts served by the freeway/highway system (29 percent) is slightly lower than tracts identified as non-LEP (31 percent). Transit routes serve essentially all of the census tracts identified as LEP (97 percent), while only 75 percent of the non-LEP tracts are served. Arterial street projects serve approximately 27 percent of the LEP tracts, compared to 49 percent for non-LEP. The analysis of the Plan improvements demonstrates that, overall, LEP populations benefit from the Plan at about the same level that the census tracts not identified as LEP.

FIGURE 5-8
PERCENT LIMITED ENGLISH PROFICIENT vs. NON-LEP CENSUS TRACTS AFFECTED BY THE RTP



Conclusion

MAG endeavors to incorporate environmental justice into regional transportation planning as a continuing 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 prepared a Title VI and Environmental Justice Plan to fully integrate the needs of these vulnerable populations as part of MAG's activities. The Title VI and Environmental Justice Plan serves as an important element in the regional transportation planning process.

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

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the needs of all residents. Responding to public input during development of the Regional Transportation Plan (RTP), 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.

MAG conducted an environmental justice overlay analysis to assess the distribution of benefits and burdens of the RTP. Approximately 29-31 percent of the census units for each of the communities of concern (minority, poverty, disability, and limited English proficiency) are served by the freeway/highway network, which is nearly the same as the level for the non-communities of concern (29-36 percent). Similar results were found for transit, where 93-97 percent of the communities of concern census tracts were served by the transit network; whereas a slightly lower number of non-communities of concern tracts were served (75-91 percent). Arterial street projects serve 27-33 percent of the census tracts for each of the communities of concern, compared to 34-51 percent for non-communities of concern. Fewer arterial improvements tend to occur in core areas where the majority of the communities of concern are located, because of the mature character of the arterial system in these areas. Transit services often represent the most advantageous approach to addressing mobility for such areas.

The overlay analysis relies on proximity to transportation facilities and services as a measure of equity in the transportation planning process, and demonstrates that the communities of concern benefit equally from the transportation system without shouldering a disproportionate share of its burdens. Proximity is an important issue; however, it is only one of many issues related to transportation equity that MAG pursues.

MAG addresses and considers the needs of underserved populations throughout its planning and programming process, and provides outreach in a variety of ways, including the Title VI Community Outreach Program, Geographic Information System (GIS) mapping, the Human Services division of MAG, and through programs run by the Regional Public Transportation Authority (RPTA) using MAG funds. Through the Community Outreach Program, MAG's Community Outreach Specialist coordinates with minority communities to solicit input and to serve as a liaison between MAG and the communities. In addition to minority communities, MAG targets and solicits input from persons with disabilities. Through RPTA's Complementary Paratransit Plan, 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. MAG transportation plans and programs are also 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. The needs of older adults are further being addressed through a number of projects related to aging services planning such as the City Leaders Institute on Aging in Place and the Enhancing Age-Friendly Cities Initiative. These projects address the changing mobility options that are needed as people age.

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

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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, which include 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

TABLE 6-1
RESOURCE AND ENVIRONMENTAL AGENCIES

Federal	**State**
Army Corps of Engineers	Department of Commerce
Federal Aviation Administration	Division of Emergency Management
Emergency Management Agency (FEMA)	Game and Fish Department
Environmental Protection Agency (EPA)	Historic Preservation Office
U. S. Fish and Wildlife Service	Mines and Mineral Resources
U. S. Forest Service	State Land Department
Federal Highway Administration	State Parks Department
Bureau of Land Management	Department of Transportation
National Park Service	Department of Water Resources
Federal Transit Administration	Department of Environmental Quality
Luke Air Force Base	
	Maricopa County
Native American Indian Communities	Air Quality Department
Fort McDowell Yavapai Nation	Environmental Services
Gila Bend Native American Community	Flood Control District
Gila River Indian Community	Parks and Recreation
Salt River Pima-Maricopa Indian Community	Planning and Development
Tohono O'Odham Native American Community	Department of Transportation

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 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

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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 A.

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 A.

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 A.

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 A.

FY 2013 Agency Workshop

An update of the Regional Transportation Plan (RTP) was not conducted during FY 2011. Beginning in FY 2012 and continuing into FY 2013, work proceeded on the preparation of the 2035 RTP, which was targeted for adoption in the summer of 2013. In conjunction with the development of the 2035 RTP, an agency workshop was held on November 6, 2012 to receive input from environmental and resource agencies, regarding the application of environmental mitigation and resource conservation concepts in the transportation planning process. As at previous workshops, the agencies listed in Table 6-1 were invited to participate.

The emphasis at the November 2012 workshop was on work MAG has been conducting in the areas of: (1) sustainable transportation and land use integration, (2) complete streets guidelines, and (3) bicycle and pedestrian planning. In addition, an overview of the approach to developing the 2035 RTP was provided, which covered background on the contents of the current plan, new factors to be considered in preparing the updated plan, and future opportunities for comment on the planning process. Agencies were encouraged to provide input, either at the workshop or through later correspondence, regarding any experiences,

insights, or concerns from their agency perspective on the studies MAG has been conducting, as well as the overall regional transportation planning process.

Key comments received as a result of the November 6, 2012 Workshop are summarized in Appendix A.

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.

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SECTION TWO

TRANSPORTATION MODES

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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. 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 2014 through FY 2035 are projected to be approximately $13.6 billion (YOE $'s). Of this total, $7.6 billion will be allocated to freeway/highway projects; $1.4 billion to arterial street improvements; and $4.5 billion to transit projects and programs. It is important to note that these figures assume renewal of the tax in January 2026.

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TABLE 7-1
MARICOPA COUNTY TRANSPORTATION EXCISE TAX: FY 2014-2035
(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%)		
2014	202.9	37.9	120.2	361.1
2015	214.3	40.0	127.0	381.4
2016	225.8	42.2	133.8	401.8
2017	237.7	44.4	140.8	422.9
2018	249.0	46.5	147.5	443.0
2019	260.9	48.8	154.6	464.3
2020	274.2	51.2	162.5	487.9
2021	286.2	53.5	169.6	509.3
2022	299.2	55.9	177.3	532.4
2023	311.3	58.2	184.5	554.0
2024	324.8	60.7	192.5	578.0
2025	338.5	63.2	200.6	602.3
2026	354.4	66.2	210.0	630.6
2027	371.1	69.3	219.9	660.2
2028	388.5	72.6	230.2	691.3
2029	406.8	76.0	241.0	723.8
2030	425.9	79.6	252.3	757.8
2031	445.9	83.3	264.2	793.4
2032	466.8	87.2	276.6	830.7
2033	488.8	91.3	289.6	869.7
2034	511.8	95.6	303.2	910.6
2035	535.8	100.1	317.5	953.4
Totals	**7,620.7**	**1,423.8**	**4,515.5**	**13,559.9**

Arizona Department of Transportation Funds

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

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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 estimated based on projected population and economic growth, assuming that there would be 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 statutes provide 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

It is projected that a total of $6.7 billion (YOE $'s) in ADOT funds will be available for the construction and improvement of freeways and highways in the MAG RTP between FY 2014 and FY 2035. Funding for ADOT expenses for operations and maintenance is drawn from statewide sources and is not included in this estimate.

- 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 (see Table 7-2).

- Maricopa County Area ADOT Discretionary Funds - A 37 percent share of ADOT Discretionary Funds is targeted to the Maricopa County area of 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 $3.9 billion is projected to be available from this source (see Table 7-2).

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TABLE 7-2
ADOT FUNDING IN MAG AREA: FY 2014-2035
(Year of Expenditure Dollars in Millions)

Fiscal Year	15% Funds	ADOT Discretionary	Total
2014	64.1	217.8	281.9
2015	66.3	159.9	226.2
2016	68.9	219.0	287.9
2017	71.6	185.0	256.6
2018	74.6	145.1	219.7
2019	77.7	148.4	226.1
2020	80.8	151.4	232.2
2021	83.9	154.4	238.3
2022	86.9	157.4	244.3
2023	90.0	160.3	250.3
2024	93.2	163.4	256.6
2025	96.5	166.5	263.0
2026	99.7	169.7	269.4
2027	102.8	173.0	275.8
2028	106.0	176.3	282.3
2029	109.3	179.7	289.0
2030	112.7	183.1	295.8
2031	116.2	186.6	302.8
2032	119.8	190.2	310.0
2033	123.5	193.9	317.4
2034	127.4	197.6	325.0
2035	131.3	201.4	332.7
Maricopa Co. Area	2,103.3	3,880.0	5,983.2
Pinal Co. Area	N/A	680.0	680.0
Total	**2,103.3**	**4,560.0**	**6,663.2**

- Pinal County Area ADOT Discretionary Funds - A 50 percent share of ADOT Discretionary Funds is targeted to areas other than Maricopa County and Pima County. It is projected that this would amount to $5.2 billion for the period FY 2014 - FY 2035. Capital projects on state highways in Pinal County within the MAG MPA are estimated to total $680 million, representing only about 13 percent of the funding available statewide. On this basis, it was projected that reasonably available funding could be identified for these projects and included in the future ADOT Discretionary Funds for the MAG area (See Table 7-2.) It should be noted that these projects are not included in the Freeway/Highway Life Cycle Program.

MAG Area Federal Transportation Funds

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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 and Table 7-4. It is projected that a total of $5.5 billion (YOE $'s) will be available from these sources for the implementation of projects in the MAG Region between FY 2014 and FY 2035, with approximately $2.6 billion from Federal Highway Administration sources and $2.9 billion from Federal Transit Administration sources. Arizona is included in the "Sliding Scale Rates in Public Land States" (Notice N 4540.12), in which some of the federal programs may allow for a higher federal participation rate. Rates notated in the following federal programs may differ based on the FHWA and FTA programs as approved by the oversight agency and are subject to change. Details are noted in the MAG Programming Guidebook.

Federal Highway Administration Funding

The Federal Highway Administration (FHWA) is an agency within the U.S. Department of Transportation that supports state and local governments in the design, construction, and maintenance of the Nation's highway system (Federal Aid Highway Program) and various federally and tribal owned lands (Federal Lands Highway Program). Through financial and technical assistance to state and local governments, the Federal Highway Administration is responsible for ensuring that America's roads and highways continue to be among the safest and most technologically sound in the world. FHWA's role in the Federal-aid Highway Program is to oversee federal funds used for constructing and maintaining the National Highway System (primarily Interstate Highways, U.S. Routes and most State Routes). This funding mostly comes from the federal gasoline tax. FHWA oversees projects using these funds to ensure that federal requirements for project eligibility, contract administration and construction standards are adhered to. The FHWA funding programs applicable to the MAG area are described below.

- 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. The statutory match for STP program funding is 94.3 percent federal, 5.7 percent local. Approximately $1.2 billion (YOE $'s) will be available from STP funds for projects during the period from FY 2014 through FY 2035. This amount includes a total of $80.9 million during FY 2014 through FY 2016 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. Due to the high congestion levels and major air quality issues in the region, MAG receives the major share of CMAQ funds coming to Arizona. The statutory match for STP program funding is 94.3 percent federal, 5.7 percent local. Approximately $1.2 billion will be available from CMAQ funds for projects during the period from FY 2014 through FY 2035.

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TABLE 7-3
MAG FHWA TRANSPORTATION FUNDS: FY 2014-2035
(Year of Expenditure Dollars in Millions)

			STP			CMAQ						
FY	HSIP	Transp. Alt.	Fwy./ Hwy.	Art. Pgm.	Total	Fwy./ Hwy.	Art. & ITS	Transit Pgm.	Bike/ Ped.	Air Qual.	Total	Grand Total
2014	1.3	4.4	34.1	14.5	48.6	8.7	6.1	16.4	7.8	7.4	46.4	100.7
2015	1.3	4.4	34.1	14.5	48.6	8.7	6.1	16.4	7.8	7.4	46.4	100.7
2016	1.3	4.4	12.7	35.9	48.6	8.7	6.1	16.4	7.8	7.4	46.4	100.7
2017	1.3	4.4		48.6	48.6	8.7	6.1	16.4	7.8	7.4	46.4	100.7
2018	1.3	4.4		48.6	48.6	8.7	6.1	16.4	7.8	7.4	46.4	100.7
2019	1.4	4.5		49.8	49.8	8.9	6.3	16.8	7.9	7.5	47.5	103.1
2020	1.4	4.6		50.8	50.8	9.1	6.4	17.1	8.1	7.7	48.4	105.1
2021	1.4	4.7		51.8	51.8	9.3	6.5	17.5	8.3	7.8	49.4	107.2
2022	1.4	4.8		52.7	52.7	9.5	6.6	17.8	8.4	8.0	50.3	109.3
2023	1.5	4.9		53.7	53.7	9.6	6.8	18.1	8.6	8.1	51.3	111.3
2024	1.5	5.0		54.7	54.7	9.8	6.9	18.5	8.7	8.3	52.2	113.4
2025	1.5	5.0		55.8	55.8	10.0	7.0	18.8	8.9	8.5	53.2	115.6
2026	1.6	5.1		56.8	56.8	10.2	7.2	19.2	9.1	8.6	54.2	117.8
2027	1.6	5.2		57.9	57.9	10.4	7.3	19.5	9.3	8.8	55.3	120.0
2028	1.6	5.3		59.0	59.0	10.6	7.4	19.9	9.4	8.9	56.3	122.3
2029	1.6	5.4		60.1	60.1	10.8	7.6	20.3	9.6	9.1	57.4	124.6
2030	1.7	5.5		61.3	61.3	11.0	7.7	20.7	9.8	9.3	58.5	127.0
2031	1.7	5.7		62.4	62.4	11.2	7.9	21.1	10.0	9.5	59.6	129.4
2032	1.7	5.8		63.6	63.6	11.4	8.0	21.5	10.2	9.6	60.7	131.9
2033	1.8	5.9		64.9	64.9	11.6	8.2	21.9	10.4	9.8	61.9	134.4
2034	1.8	6.0		66.1	66.1	11.9	8.3	22.3	10.6	10.0	63.1	136.9
2035	1.8	6.1		67.4	67.4	12.1	8.5	22.7	10.8	10.2	64.3	139.6
Total	**33.6**	**111.5**	**80.9**	**1,150.7**	**1,231.6**	**221.1**	**155.2**	**415.7**	**196.8**	**186.8**	**1,175.6**	**2,552.4**

TABLE 7-4
MAG FTA TRANSPORTATION FUNDS: FY 2014-2035
(Year of Expenditure Dollars in Millions)

			5337							
FY	5307/ 5340	5310	FGM	Hi Bus	Total	5339	STP-AZ	5309 N. Strt.	AVN UZA	Grand Total
2014	47.5	2.8	0.3	2.0	2.4	4.9	3.0	59.6	4.2	124.3
2015	47.5	2.8	0.3	2.0	2.4	4.9	3.0	59.6	4.2	124.3
2016	47.5	2.8	0.3	2.0	2.4	4.9	3.0	59.6	4.2	124.3
2017	47.5	2.8	0.3	2.0	2.4	4.9	3.0	59.6	4.2	124.3
2018	47.5	2.8	0.3	2.0	2.4	4.9	3.0	59.6	4.2	124.3
2019	48.6	2.8	0.3	2.1	2.4	5.0	3.1	59.6	4.2	125.7
2020	49.6	2.9	0.3	2.1	2.5	5.1	3.2	59.6	4.3	127.0
2021	50.6	2.9	0.4	2.2	2.5	5.2	3.2	59.6	4.4	128.4
2022	51.5	3.0	0.4	2.2	2.6	5.3	3.3	59.6	4.4	129.7
2023	52.5	3.0	0.4	2.2	2.6	5.4	3.4	59.6	3.8	130.3
2024	53.5	3.1	0.4	2.3	2.7	5.5	3.4	59.6	3.9	131.6
2025	54.5	3.2	0.4	2.3	2.7	5.6	3.5	59.6	3.9	133.0
2026	55.6	3.2	0.4	2.4	2.8	5.7	3.5	59.6	4.0	134.4
2027	56.6	3.3	0.4	2.4	2.8	5.8	3.6	59.6	4.1	135.8
2028	57.7	3.3	0.4	2.5	2.9	5.9	3.7	59.6	4.1	137.2
2029	58.8	3.4	0.4	2.5	2.9	6.0	3.8	59.6	4.2	138.7
2030	59.9	3.5	0.4	2.6	3.0	6.1	3.8	59.6	4.3	140.2
2031	61.0	3.5	0.4	2.6	3.0	6.2	3.9	59.6	4.4	141.7
2032	62.2	3.6	0.4	2.7	3.1	6.4	4.0	59.6	4.4	143.3
2033	63.4	3.7	0.4	2.7	3.1	6.5	4.0	59.6	4.5	144.9
2034	64.6	3.7	0.5	2.8	3.2	6.6	4.1	59.6	4.6	146.5
2035	65.8	3.8	0.5	2.8	3.3	6.7	4.2	59.6	4.7	148.1
Total	**1,203.9**	**69.9**	**8.5**	**51.3**	**59.8**	**123.0**	**76.8**	**1,311.2**	**93.2**	**2,937.8**

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- Federal Highway (HISP) Funds - The Highway Safety Improvement Program (HSIP) is a core Federal-aid program with the purpose of achieving a significant reduction in fatalities and serious injuries on all public roads, including non-state-owned public roads. Projects are intended to correct or improve a hazardous road location or feature; or address a highway safety problem. Eligibility of specific projects, strategies and activities generally are based on consistency with a state's strategic highway safety plan (SHSP) and data-supported safety performance compliance. The federal share for highway safety improvement projects is 90 percent. This funding source is expected to generate $34 million for safety projects from FY 2014 through FY 2035.

- Federal Highway (TAP) Funds - The Transportation Alternatives Program (TAP) provides funding for programs and projects defined as transportation alternatives, including on- and off-road pedestrian and bicycle facilities, infrastructure projects for improving non-driver access to public transportation and enhanced mobility, community improvement activities, and environmental mitigation; recreational trail program projects; safe routes to school projects; and projects for the planning, design or construction of boulevards and other roadways largely in the right-of-way of former Interstate System routes or other divided highways. The federal share for TAP projects is generally is 80 percent. This funding source is expected to generate $112 million for transportation alternatives projects from FY 2014 through FY 2035.

Federal Transit Administration Funding

The Federal Transit Administration (FTA) is an agency within the United States Department of Transportation (DOT) that provides financial and technical assistance to local public transit systems. Public transportation includes buses, subways, light rail, commuter rail, monorail, passenger ferry boats, trolleys, inclined railways, and people movers. The federal government, through the FTA, provides financial assistance to develop new transit systems and improve, maintain, and operate existing systems. The FTA oversees grants to state and local transit providers, primarily through its ten regional offices. Grants are managed by the "governor-approved" Designated Recipient of FTA funds. These grantees are responsible for managing their programs in accordance with federal requirements, and the FTA is responsible for ensuring that grantees follow federal mandates along with statutory and administrative requirements. The FTA funding programs applicable to the MAG area are described below.

- Federal Transit (5307/5340) Funds - The Urbanized Area Formula Funding program (5307/5340) provides funding to Urbanized Areas (UZA) for public transportation capital, planning, job access and reverse commute projects, as well as operating expenses in certain circumstances. These funds constitute a core investment in the enhancement and revitalization of public transportation systems in the urbanized areas, which depend on public transportation to improve mobility and reduce congestion. Recipients must expend one percent for transportation security projects or certify that it is not necessary to do so. New under MAP-21, operating costs, up to certain limits, for grantees in areas with populations greater than 200,000 and that operate a maximum of

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100 buses in fixed-route service during peak hours (rail fixed guideway excluded) are eligible. Transit enhancements are removed and replaced by more narrowly defined "associated transportation improvements", where recipients must expend at least one percent of their 5307 apportionment on these improvements. Funding provided by other government agencies or departments that are eligible to be expended on transportation may be used as local match. Certain expenditures by vanpool operators may be used as local match. MAP-21 removes eligibility for the transfer of 5307 transit funds to highway projects. This funding source is expected to generate $1.2 billion for transit development from FY 2014 through FY 2035.

- AVN/UZA Funds - Avondale(AVN)/UZA funds are part of the 5307 category that are distributed to the designated recipient for the small urbanized areas to provide general transit services and capital, specifically for that area. This funding source is expected to generate $93 million for transit development from FY 2014 through FY 2035.

- 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 new and expanded rail, bus rapid transit, and ferry systems that reflect local priorities to improve transportation options in key corridors. This program defines a new category of eligible projects, known as core capacity projects, which expand capacity by at least 10 percent in existing fixed-guideway transit corridors that are already at or above capacity today, or are expected to be at or above capacity within five years. The program also includes provisions for streamlining aspects of the "New Starts" process to increase efficiency and reduce the time required to meet critical milestones. This discretionary program requires project sponsors to undergo a multi-step, multi-year process to be eligible for funding. Many new items have been added under MAP-21. Over the planning horizon, it is estimated that $1.3 billion in 5309 funds for bus and rail transit projects will be made available to the MAG region.

- Federal Transit (5310) Funds - This program is intended to enhance mobility for seniors and persons with disabilities by providing funds for programs to serve the special needs of transit-dependent populations beyond traditional public transportation services and Americans with Disabilities Act (ADA) complementary paratransit services. The Federal share of eligible capital costs may not exceed 80 percent of the net cost of the activity. At least 55 percent of program funds must be used on capital projects that are public transportation projects planned, designed, and carried out to meet the special needs of seniors and individuals with disabilities when public transportation is insufficient, inappropriate, or unavailable. The remaining 45 percent may be used for public transportation projects that: (1) exceed the requirements of the ADA, (2) improve access to fixed-route service and decrease reliance by individuals with disabilities on complementary paratransit, or (3) provide alternatives to public transportation that assist seniors and individuals with disabilities. Operating assistance is now available under this program, which is new to the program under MAP-21, consolidating the

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"New Freedom Program" and the "Elderly and Disabled Program". The Avondale-Goodyear Urbanized Area and the rural portions of the MAG planning region apply through a statewide competitive process with the Arizona Department of Transportation. Also new under MAP-21, the Phoenix-Mesa Urbanized Area receives an annual funding allocation for which projects competitively apply. This funding source is expected to generate $70 million for transit development from FY 2014 through FY 2035.

- Federal Transit (5337) Funds - This is a formula-based, "State of Good Repair" program that is dedicated to repairing and upgrading the nation's rail transit systems along with high-intensity motor bus systems that use high-occupancy vehicle lanes, including bus rapid transit (BRT). Projects are limited to replacement and rehabilitation or capital projects required to maintain public transportation systems in a state of good repair. The program comprises two separate formula programs: High Intensity Fixed Guideway and High Intensity Motorbus. The federal share is 80 percent with a required 20 percent match. New under MAP-21, high-occupancy vehicle (HOV) lanes are no longer part of the definition for fixed-guideway systems. There is a new definition for high-intensity motor buses, which is defined as public transportation that shares lanes with other HOV vehicles. Projects are limited to replacement and rehabilitation, or capital projects required to maintain public transportation systems in a state of good repair. Projects must be included in a Transit Asset Management Plan. This funding source is expected to generate $60 million for transit development from FY 2014 through FY 2035.

- Federal Transit (5339) Funds - The objective of this "Bus and Bus Facilities Program" program is to provide capital funding to replace, rehabilitate and purchase buses and related equipment and to construct bus-related facilities. The Federal share is 80 percent with a required 20 percent local match. New under MAP-21, funds are eligible to be transferred by the state to supplement urban and rural formula grant programs (5307 and 5311, respectively). This funding source is expected to generate $123 million for transit development from FY 2014 through FY 2035.

- STP-AZ Funds - These are (STP) Flexible Funds that ADOT makes available for transit purposes in urban and rural Arizona. Upon transfer from FHWA, these funds are made available by FTA to the designated recipients and applied for in appropriate grants for applicants that operate general public transit and/or elderly/disabled transit systems. These funds are expected to generate $77 million for transit development from FY 2014 through FY 2035.

Regional Revenue Summary

Regional revenue sources for the MAG RTP between FY 2014 and FY 2035 are summarized in Table 7-5 (in YOE $'s) and include: the Proposition 400 half-cent sales tax extension ($13.6 billion); ADOT funds ($6.7 billion); Federal Transit funds ($2.9 billion); Federal Highway Surface Transportation Program (STP) funds ($1.2 billion); Federal Highway Congestion Mitigation and

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Air Quality (CMAQ) funds ($1.2 billion); and other Federal Highway Funding ($140 million). The total of all these revenue sources is projected to amount to $25.7 billion between FY 2014 and FY 2035.

Table 7-5 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.

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 Table 7-5, the implementation of the RTP is accomplished through local funds and other state revenues. Local resources provide funding for capital projects and maintenance/operations in the arterial street and transit programs; and, in the form of transit farebox receipts, 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 7-5
SOURCES AND DISTRIBUTION OF REGIONAL REVENUES: FY 2014-2035
(Year of Expenditure Dollars in Millions)

	Uses						
Sources	**Highways/ Freeways**	**Arterial Streets**	**Transit**	**Bicycle/ Ped.**	**Air Quality**	**Other Programs**	**Total**
Proposition 400: Half Cent Sales Tax Extension	7,620.7	1,423.8	4,515.5				13,560.0
ADOT Funds (Includes HURF and Federal Aid)	6,663.2						6,663.2
Federal Transit Funds			2,937.8				2,937.8
Federal Highway (MAG STP)	80.9	1,150.7					1,231.6
Federal Highway (MAG CMAQ)	221.1	155.2	415.7	196.8	186.8		1,175.6
Federal Highway (MAG Other)						145.1	145.1
Total	**14,585.9**	**2,729.7**	**7,869.0**	**196.8**	**186.8**	**145.1**	**25,713.3**

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CHAPTER EIGHT

FREEWAYS AND HIGHWAYS

The freeway/highway system in the MAG area 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 area is shown in Figure 8-1, as modeled for 2012. 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 by route. A total of 850 existing centerline miles are included in the freeway/highway network, and an additional 71 miles are planned for future development during the planning period. This leads to a system totaling 921 centerline miles in the year 2035.

Freeway/Highway Corridor Development

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 amount identified in the RTP for the planning period (FY 2014 - FY 2035) for development and maintenance of the freeway/highway system totals $15.3 billion (YOE $'s). Funding is provided almost entirely by regional sources, except for some state-level funding for maintenance activities.

The projected configuration of the future freeway/highway network in 2035 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 group designations indicating the period in which funds are programmed for the final construction of a facility. Projects may have funding for design activities and right-of-way acquisition in earlier periods. A detailed listing of the timing and cost of planned improvements and other programs is provided in Appendix A.

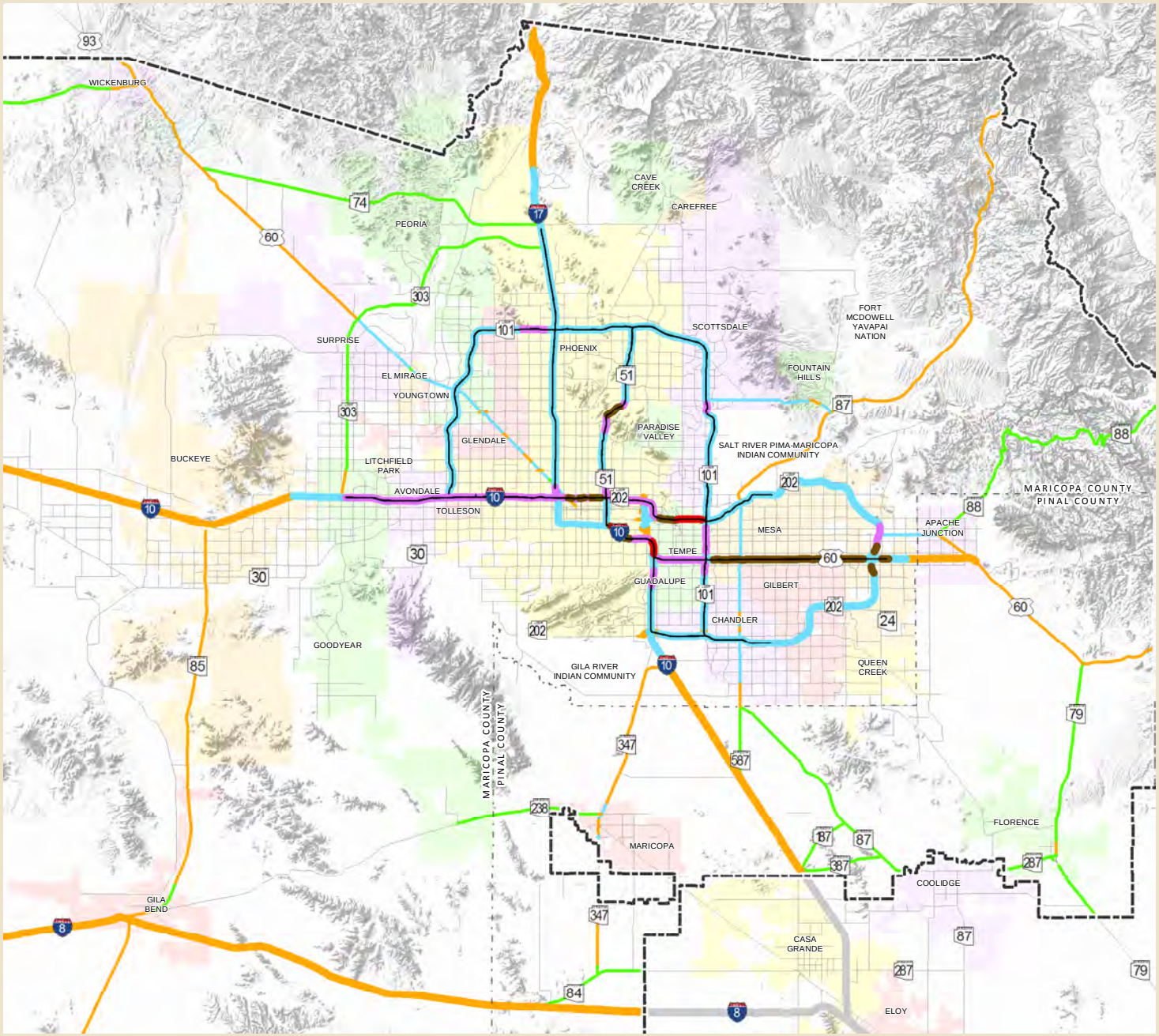
2035 Regional Transportation Plan

Fig. 8-1

REGIONAL TRANSPORTATION PLAN

MARICOPA ASSOCIATION of GOVERNMENTS

2012 Freeway/Highway System Number of Lanes



Freeway lanes are represented with thicker lines

- 2 General Use Lanes
- 4 General Use Lanes
- 6 General Use Lanes
- 8 General Use Lanes
- 10 General Use Lanes
- 12 General Use Lanes
- High Occupancy Vehicle (HOV) Lanes*
- Other Roads
- Metropolitan Planning Area Boundary
- 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

		Centerline Mileage					Centerline Mileage		
Route No.	Facility	Existing	Planned	Total	Route No.	Facility	Existing	Planned	Total
I-8	**Yuma-Casa Grande Hwy.**				**US 60**	**Grand Avenue**			
	Yuma County to SR 85	37	--	37		US 93 to SR 74	10	--	10
	SR 85 to Pinal Co. Line	31	--	31		SR 74 to 303L	18	--	18
	Maricopa Co. Line to MPA Bndry.	14		14		303L to 101L (Agua Fria)	10	--	10
	Sub-total I-8	82	--	82		101L (Agua Fria) to Van Buren St	11	--	11
						Sub-total Grand	49	--	49
I-10	**Papago/Maricopa Freeway**								
	La Paz Co. Line to SR 85	42	--	42	**US 60**	**Superstition Freeway**			
	SR 85 to 303L	12	--	12		I-10 to 101L (Price)	5	--	5
	303L to 101L	11	--	11		101L (Price) to SR 87	4	--	4
	101L to I-17	7	--	7		SR 87 to 202L (Red Mtn./Santan)	12	--	12
	I-17 to SR 51	5	--	5		202L (Red Mtn./Santan) to Pinal Co. Line	4	--	4
	SR 51 to I-17	3	--	3		Maricopa Co. Line to MPA Bndry.	25	--	25
	I-17 to US 60	6	--	6		Sub-total Superstition	50	--	50
	US 60 to 202L (Santan)	6	--	6					
	202L (Santan) to Pinal Co. Line	7	--	7	**US 60**	**Business Route 60**			
	Maricopa Co. Line to MPA Bndry.	17	--	17		Sossaman Rd. to Meridain Rd.	5	--	5
	Sub-total I-10	116	--	116		Sub-total Business Route 60	5	--	5
I-17	**Black Canyon Freeway**				**SR 71**	**Aguila-Congress Jct. hwy.**			
	I-10 (East) to I-10 (West)	7	--	7		US 60 to Yavapai Co. Line	5	--	5
	I-10 (West) to 101L (Agua Fria/Pima)	14	--	14		Sub-total SR 71	5	--	5
	101L (Pima) to New River Rd.	17	--	17					
	New River Rd. to Yavapai Co. Line	10	--	10	**SR 74**	**Morristown-New River Hwy.**			
	Sub-total I-17	48	--	48		US 60 (Grand) to 303L	25	--	25
						303L to I-17	6	--	6
SR 24	**Gateway Freeway**					Sub-total SR 74	31	--	31
	202L (Santan) to Ellsworth Rd.	--	2	2					
	Ellsworth Rd. to Pinal Co. Line	--	3	3	**SR 79**	**Pinal Parkway**			
	Sub-total SR 24	--	5	5		US 60 to SR 287	17	--	17
						SR 287 to MPA Bndry.	7	--	7
SR 30	**I-10 Reliever**					Sub-total SR 79	24	--	24
	SR 85 to 303L	--	11	11					
	303L to 202L/South Mtn.	--	13	13	**SR 84**	**Gila Bend-Casa Grande Hwy.**			
	Sub-total SR 30	--	24	24		I-8 to SR 347	6	--	6
						SR 348 to MPA Bndry.	4	--	4
SR 51	**Piestewa Freeway**					Sub-total SR 84	10	--	10
	202L (Red Mtn.) to 101L (Pima)	16	--	16					
	Sub-total SR 51	16	--	16	**SR 85**	**Gila Bend-Buckeye Hwy.**			
						Pima Co. Line to I-8	32	--	32
US 60	**Quartzsite-Wickenburg Hwy.**					I-8 to I-10	37	--	37
	La Paz County to US 93	31	--	31		Sub-total SR 85	69	--	69
	Sub-total Aguila Hwy.	31	--	31					

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

		Centerline Mileage					Centerline Mileage		
Route No.	Facility	Existing	Planned	Total	Route No.	Facility	Existing	Planned	Total
SR 87	**Beeline Highway**				**202L**	**Santan Freeway**			
	MPA Bndry. To Maricopa Co. Line	19	--	19		US 60 (Superstition) to SR 87	17	--	17
	Pinal Co. Line to Ocotillo Rd.	3	--	3		SR 87 to 101L (Price)	4	--	4
	Elliot Rd. to US 60 (Superstition)	2	--	2		101L (Price) to I-10	4	--	4
	202L (Red Mtn.) to Gila Co. Line	46	--	46		Sub-total Santan	25	--	25
	Sub-total SR 87	70	--	70					
					202L	**South Mountain Freeway**			
SR 88	**Apache Trail**					I-10 (East) to SR 801	--	17	17
	Pinal Co. Line to Gila Co. Line	33	--	33		SR 801 to I-10 (West)	--	5	5
	Sub-total SR 88	33	--	33		Sub-total South Mountain	--	22	22
SR 93	**Kingman-Wickenburg Hwy.**				**SR 238**	**Mobile Highway**			
	Wickenburg Bypass	1	--	1		SR 347 to Mobile	17	--	17
	Wickenbury Bypass to Yavapai Co. Line	3	--	3		Sub-total SR 238	17	--	17
	Sub-total US 93	4	--	4					
					SR 287	**Florence-Coolidge Hwy.**			
101L	**Agua Fria Freeway**					SR 79 to MPA Bndry.	4	--	4
	I-10 to US 60 (Grand)	10	--	10		Sub-total SR 287	4	--	4
	US 60 (Grand) to I-17	12	--	12					
	Sub-total Agua Fria	22	--	22	**303L**	**Estrella Freeway**			
						SR 30 to I-10	--	5	5
101L	**Pima Freeway**					I-10 to US 60 (Grand)	--	15	15
	I-17 to SR 51	7	--	7		US 60 (Grand) to I-17 (Interim)	18	--	18
	SR 51 to 202L (Red Mtn.)	21	--	21		Sub-total 303L	18	20	38
	Sub-total Pima	28	--	28					
					SR 347	**Maricopa Road**			
101L	**Price Freeway**					I-10 to SR 238	16	--	16
	202L (Red Mtn.) to US 60 (Superstition)	4	--	4		SR 238 to SR 84	13	--	13
	US 60 (Superstition) to 202L (Santan)	6	--	6		Sub-total SR 347	29	--	29
	Sub-total Price	10	--	10					
					SR 387	**Casa Grande-Coolidge Hwy.**			
SR 143	**Hohokam Expressway**					I-10 to SR 87	7	--	7
	I-10 to 202L (Red Mtn.)	3	--	3		Sub-total SR 387	7	--	7
	202L (Red Mtn.) to McDowell Rd.	1	--	1					
	Sub-total SR 143	4	--	4	**SR 587**	**I-10 Mesa Hwy.**			
						I-10 to SR 87	6	--	6
SR 187	**Casa Grande-Olberg Hwy.**					Sub-total SR 587	6	--	6
	SR 87 to I-10	6	--	6					
	Sub-total SR 187	6	--	6		**Regional Totals**	850	71	921
202L	**Red Mountain Freeway**								
	I-10/SR 51 to 101L (Pima)	9	--	9		Note: Planned mileage totals 89 miles,			
	101L (Pima) to US 60 (Superstition)	22	--	22		if upgrading 303L from US-60			
	Sub-total Red Mountain	31	--	31		to I-17 to a full freeway is included.			

2035 Regional Transportation Plan

Fig. 8-2

REGIONAL TRANSPORTATION PLAN

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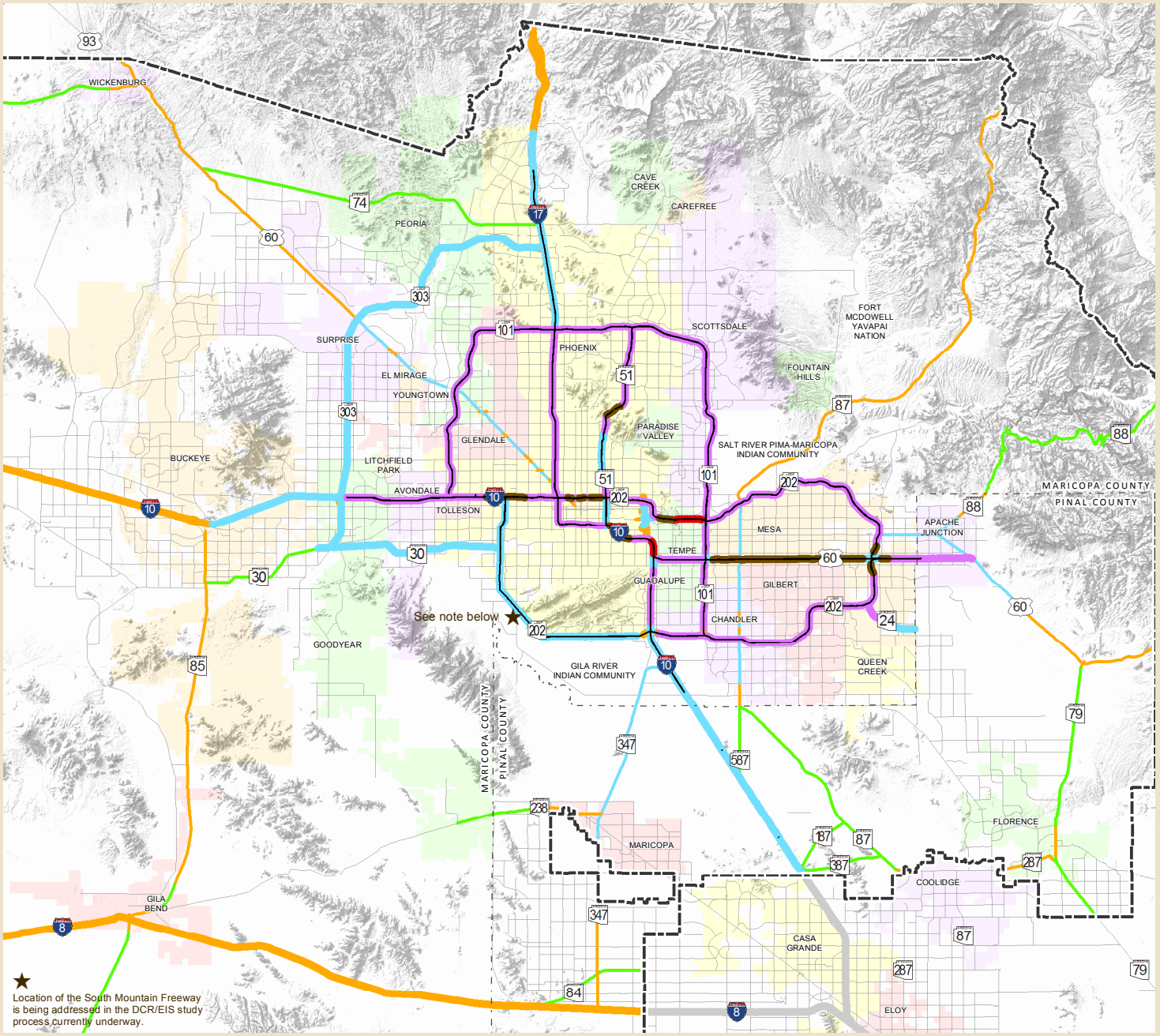
2035 Freeway/Highway System Number of Lanes



Freeway lanes are represented with thicker lines

- 2 General Use Lanes
- 4 General Use Lanes
- 6 General Use Lanes
- 8 General Use Lanes
- 10 General Use Lanes
- 12 General Use Lanes
- High Occupancy Vehicle (HOV) Lanes
- Other Roads
- County Boundary
- Metropolitan Planning Area Boundary

**The HOV line represents 1 lane in each direction*

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2035 Regional Transportation Plan

Fig. 8-3

REGIONAL TRANSPORTATION PLAN

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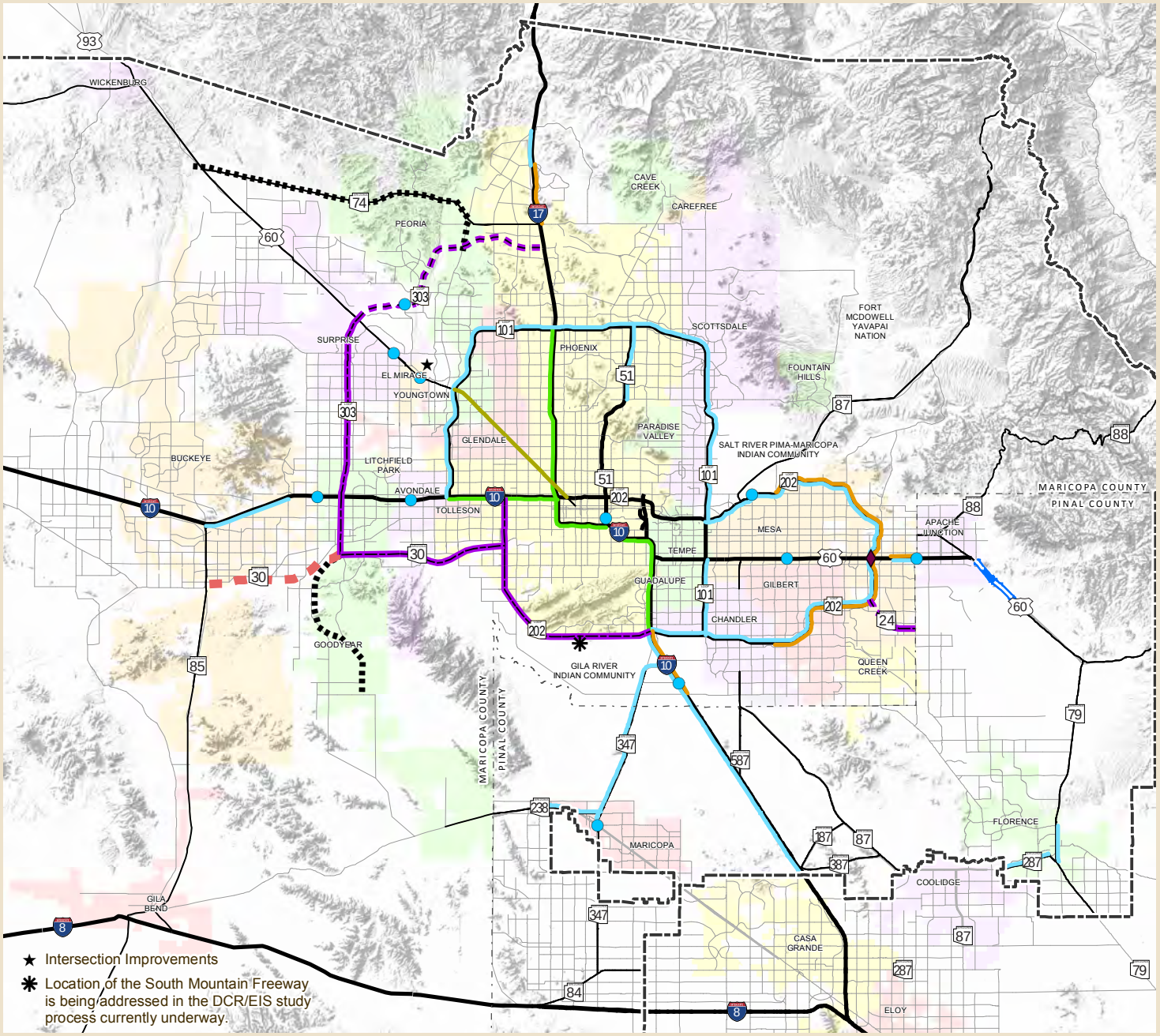
Regional Freeway/Highway Projects (FY 2014 - FY 2035)



- 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
- Upgrade to Full Freeway
- Interim Corridor Development
- Arizona Parkway
- Right of Way Preservation
- Existing Freeway
- Other Roads
- Metropolitan Planning Area Boundary
- 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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2035 Regional Transportation Plan

Fig. 8-4

REGIONAL TRANSPORTATION PLAN

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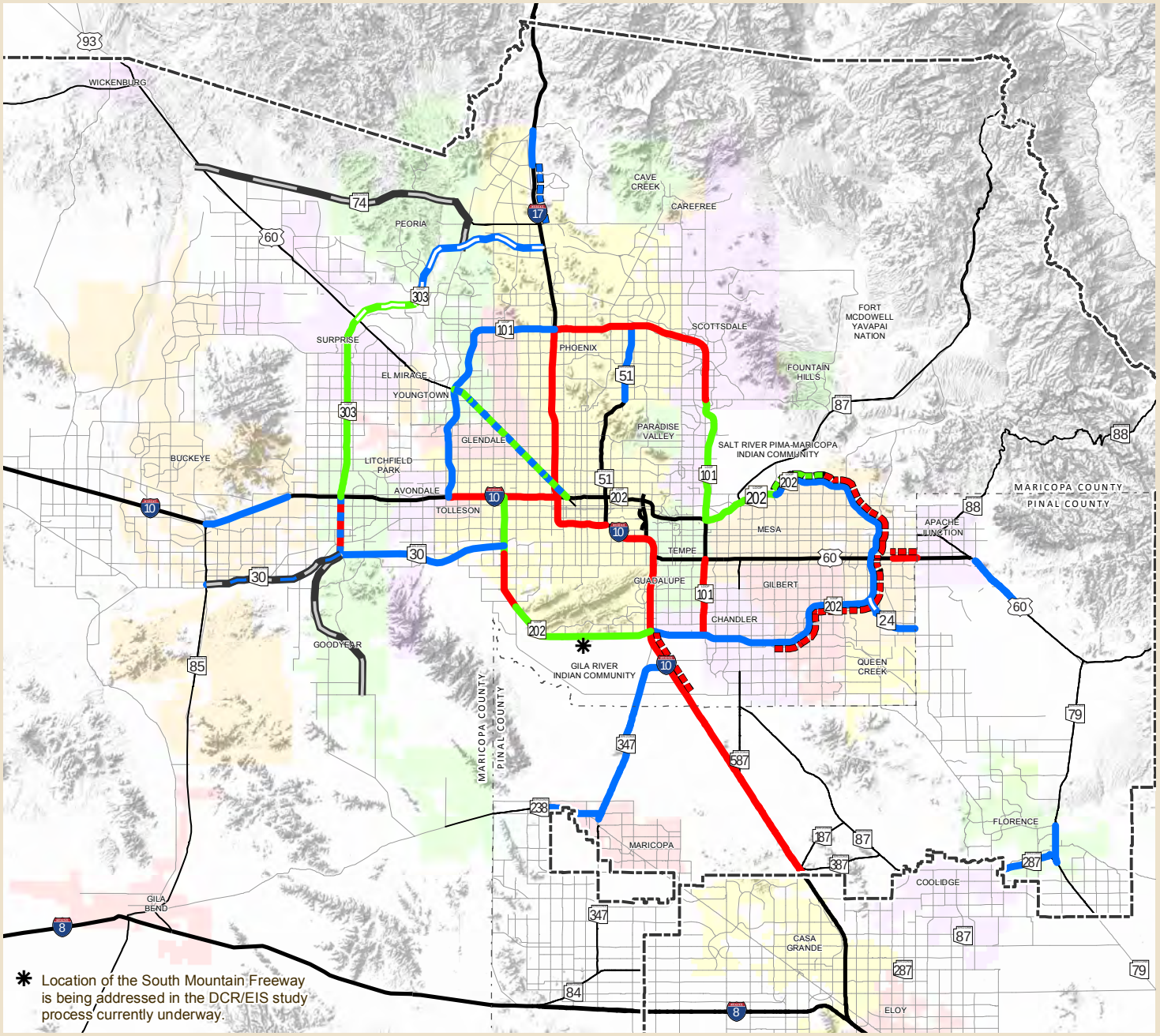
Regional Freeway/Highway Projects Phasing (FY 2014 - FY 2035)



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

- Group 1 (FY 2014 - FY 2018)
- Group 2 (FY 2019 - FY 2026)
- Group 3 (FY 2027 - FY 2035)

**Broken lines represent HOV lane phasing*

- Upgrade to Full Freeway, Group 1
- Upgrade to Full Freeway, Group 3
- Right of Way Preservation Group 3, Includes Interim Construction
- Right of Way Preservation Group 3
- Freeways
- Other Roads
- Metropolitan Planning Area Boundary
- 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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2035 Regional Transportation Plan

Fig. 8-5

REGIONAL TRANSPORTATION PLAN

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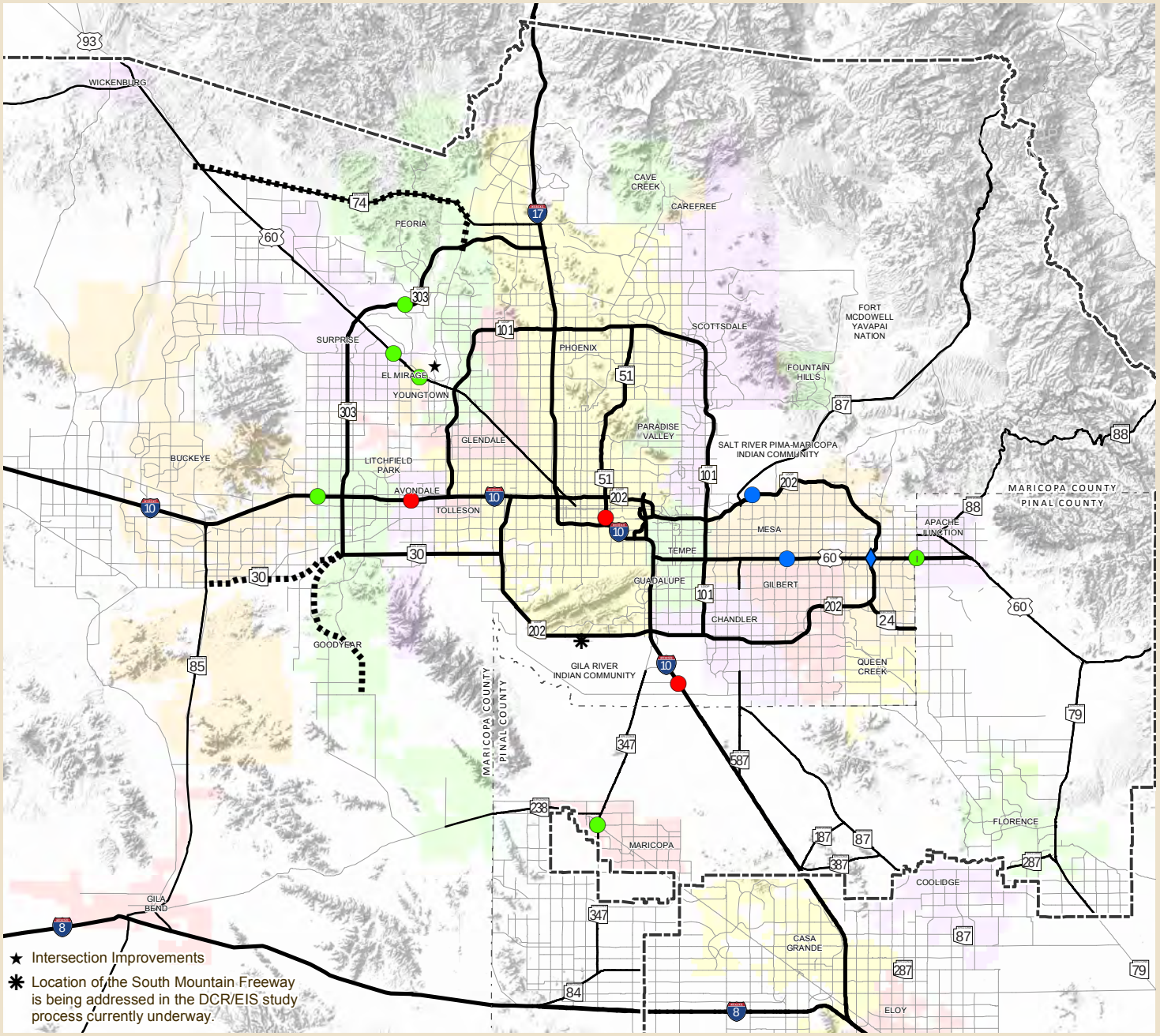
New Interchanges and HOV Ramp Connections - Phasing (FY 2014 - FY 2035)



- New Traffic Interchange
- New System HOV Ramp Connections
- Group 1 (FY 2014 - FY 2018)
- Group 2 (FY 2019 - FY 2026)
- Group 3 (FY 2027 - FY 2035)
- Right of Way Preservation Group 3
- Freeways
- Other Roads
- Metropolitan Planning Area Boundary
- 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 description by corridor of planned freeway/highway improvements and other programs included in the RTP is provided below. These descriptions address projects that are underway, or will be implemented within the planning period. It should be noted that a number of major improvements to the regional freeway system have been completed since the RTP was adopted in 2003. The reader is referred to the series of reports that have been prepared beginning in 2005, which provide detailed information on specific project accomplishments. (See Annual Reports on the Status of the Implementation of Proposition 400.)

Interstate 10/Papago Freeway/Maricopa Freeway

- Overview - The Papago/Maricopa Freeway crosses through the heart of the MAG area, extending 116 miles from the La Paz County border to the MAG metropolitan planning area (MPA) boundary in Pinal County. It traverses highly built-up urban areas within the region, as well as areas in the process of commercial, industrial and residential development, and serves as a vital link to the core of the MAG area. It provides passenger and freight mobility within the region and is also a major truck route, linking the region to population centers throughout the southwestern U.S.

- Development Outlook - A project between Loop 101 and I-17 to enhance capacity along this segment has been identified as a Group 2 (FY 2019 - FY 2026) project. The approach taken will be contingent on the design and timing of the South Mountain Freeway interchange with I-10, as well as the recommendations of the MAG Central Phoenix Framework Study, and will consider the possibility of a future light rail extension along I-10 in this segment. Capacity improvements between 32nd St. and Loop 202 (Santan Freeway) have also been identified in Group 2. Concepts for these improvements are under study and may involve managed lanes applications. The addition of one general purpose lane and one HOV lane in each direction between Loop 202 and Riggs Rd. has been identified as a Group 2 project. The construction of one general purpose lane in each direction between Verrado Way and SR-85 has been identified as a Group 3 (FY 2027 - FY 2035) project.

  Construction of a new interchange at Perryville Rd. is underway and a new interchange at Fairview Dr. has been identified as a Group 2 (FY 2019 – FY 2026) project. Construction of interchange improvements at the Sky Harbor Airport west access from I-10, and construction of a new interchange at Chandler Heights Rd., have also been identified as Group 2 projects. The addition of one general purpose lane in each direction between Riggs Rd. and the MAG MPA boundary (including interchange improvement/installation at Casa Blanca Rd., Seed Farm Rd., and Pinal Ave.) has been identified as a Group 2 (FY 2019 - FY 2026) project, but is not a part of the Freeway/Highway Life Cycle Program.

Interstate 17/Black Canyon Freeway

- Overview - The Black Canyon Freeway serves as the north-south backbone of the freeway system, terminating at the junction of I-10 in the center of the urban area. In addition to serving the core of the region, it provides mobility to residential and commercial development in the northern parts of the MAG area. This freeway route connects the MAG Region with I-40 to the north, representing a vital link to Northern Arizona and the rest of the Interstate System.

- Development Outlook - Group 2 (FY 2019 - FY 2026) projects between Loop 101 and I-10 (Split) to enhance capacity along the segment have been identified. Concepts for these improvements are under study and may involve managed lanes applications, as well as direct HOV ramps. In addition, Group 3 (FY 2027 - FY 2035) projects have been identified for construction of one additional general purpose lane in each direction from New River Rd. to Anthem Way, and to convert the pavement to concrete and construct one HOV lane in each direction from Anthem Way to Carefree Highway.

State Route 24/Gateway Freeway

- Overview - The Gateway Freeway is a new freeway corridor extending from Loop 202 (Santan) south to the Phoenix-Mesa Gateway Airport, and east to the Pinal County line. The Pinal County portion of the facility, which is not funded as part of the RTP, would extend east to US 60. The Gateway Freeway will provide access to job centers, commercial areas and residential development in the far East Valley, including the Phoenix-Mesa Gateway Airport, which is a major regional activity center. In addition, expected growth in Pinal County will require freeway linkages to the MAG Region.

- Development Outlook - Construction is underway between Loop 202 (Santan) and Ellsworth Rd. on an interim roadway, including a full freeway-to-freeway interchange with the Santan Fwy. In addition, Group 3 (FY 2027 - FY 2035) projects have been identified for final construction of this segment as a six-lane freeway, as well as construction of a six-lane freeway from Ellsworth Rd. to Meridian Rd.

State Route 30/I-10 Reliever Freeway

- Overview - State Route 30 is planned as an east-west facility south of I-10 in the vicinity of Southern Ave. connecting the South Mountain Freeway (Loop 202) and SR-85. The route is identified as a freeway between Loop 202 and Loop 303; and as an arterial roadway between Loop 303 and SR-85, with right-of-way preservation for a future freeway facility. This facility will provide a second major east-west freeway serving the central urban area, relieving traffic on I-10. State Route 30 will serve to provide improved accessibility to the residential, commercial and industrial areas south of I-10, which include truck terminals and other generators of truck traffic.

- Development Outlook - Construction of SR-30 between Loop 202 and Loop 303 as a six-lane freeway, and construction as an express way between Loop 303 and SR-85, have

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been identified for Group 3 (FY 2027 - FY 2035). Environmental and design concept studies are underway on the segment between Loop 202 and Loop 303, and are targeted for completion in 2013. A location study is underway for the segment between Loop 303 and SR-85.

State Route 51/Piestawa Freeway

- Overview - The Piestawa Freeway extends from the I-10/Loop 202 (Red Mountain) Freeway interchange and Loop 101. It serves the Phoenix central business core, providing an important commuter route to the north and one of the few means of access through the Phoenix Mountains. It also provides access to the rest of the regional freeway system for these areas, particularly to the Red Mountain Freeway and the Maricopa Freeway.

- Development Outlook - Construction of one additional general purpose lane in each direction between Loop 101 to Shea Blvd. have been identified for Group 3 (FY 2027 - FY 2035).

US-60/Grand Avenue

- Overview - US-60 extends diagonally on Grand Ave. from the core of the urban area to the northwest corner of the MAG region, providing a direct connection to communities in the northwest area. It also provides important connectivity to regional freeway system elements, including Loop 303, Loop 101, I-17 and I-10. Because Grand Avenue is aligned diagonally across the regional grid and is parallel to an active railroad track, it presents a number of traffic and design engineering challenges.

- Development Outlook - Construction is underway on access control and other improvements from Loop 101 to Van Buren St. Additional roadway improvements along this segment have been identified for Group 1 (FY 2014 - FY 2018), and future potential grade separation projects on the segment have been designated for Group 3 (FY 2027 - FY 2035). In addition, grade separation projects between Loop 303 and Loop 101 have been allocated to Group 1.

US-60/ Superstition Freeway

- Overview - The Superstition Freeway is an east-west freeway route, extending through the East Valley of the MAG area, and continuing into Pinal County and eastern Arizona as US-60. It is the spine of the freeway system in the East Valley, directly serving Tempe, Mesa, Gilbert and Apache Junction, and connecting to I-10 on the west and Loop 202 on the east. It provides access to a variety residential, commercial, and industrial activities, both in established and developing areas.

- Development Outlook - Construction of a new half-diamond interchange at Meridian Rd. has been identified as a Group 1 (FY 2014 - FY 2018) project. Construction of one HOV lane and one additional general purpose lane in each direction between Crismon Rd. and Meridian Rd. have been identified for Group 2 (FY 2019 - FY 2026). Construction of a half-diamond interchange at Lindsey Rd. has been identified for Group 3 (FY 2027 - FY 2035). In addition, the upgrading of US 60 between Mountain Rd. and the Renaissance Festival to an Arizona Parkway has been identified as a Group 3 (FY 2027 - FY 2035) project, but is not a part of the Freeway/Highway Life Cycle Program.

State Route 74

- Overview - State Route 74 travels in an east-west direction in the Northwest Valley, extending from I-17 at Carefree Highway to US 60 at Morristown. The two-lane facility is primarily a rural route, and provides access to the Lake Pleasant recreational area, which is approximately 10 miles west of I-17. It passes through areas that will undergo development in the future, particularly along the eastern third of the route.

- Development Outlook - Right-of-way protection along the SR-74 corridor for a potential future freeway facility has been identified for Group 3 (FY 2027 - FY 2035).

State Route 85

- Overview - State Route 85 travels in a north-south direction in the Southwest Valley, extending from I-10 to I-8 at Gila Bend. The facility also continues south of I-8 to the Maricopa County Line, but experiences relatively low volumes of traffic along that stretch. State Route 85 is a major connector route between I-10 and I-8 and also serves as a by-pass for the metropolitan area for truckers using I-10.

- Development Outlook – A project is currently underway that includes construction of a new, elevated intersection at State Route 85 (Pima St.) and Business Route 8 (B-8), a wider bridge over the Union Pacific Railroad, and realigning both State Route 85 (Pima St.) and Maricopa Rd. A grade-separated crossing at Warner St. is included in Group 1 (FY 2014 - FY 2018).

State Route 87

- Overview - State Route 87 connects the MAG region to the recreational areas in the eastern mountains, extending east along the Beeline Highway from Country Club Dr. as a four-lane divided facility. It also extends south along Country Club Rd./Arizona Ave. to the Pinal County line and to points further south in Pinal County.

- Development Outlook - Projects have been completed on SR 87 to refine roadway cross-section and provide for turning movements at a high volume recreational location. No additional improvements are included in the period covered by the RTP.

State Route 88

- Overview **-** This two-lane highway provides access to Canyon Lake in eastern Maricopa County.

- Development Outlook - No improvements are included in the period covered by the RTP.

US-93

- Overview - US-93 extends northward from US 60 in Wickenburg, continuing to the northwest part of Arizona and providing a link to Las Vegas, Nevada. Proposed Interstate 11 falls along US 93 between the Arizona/Nevada border and Wickenburg.

- Development Outlook - A new alignment of US 93, providing an interim bypass around downtown Wickenburg was previously completed. No new improvements are included in the period covered by the RTP.

Loop 101/Agua Fria Freeway/Pima Freeway/Price Freeway

- Overview - Loop 101 is a circumferential freeway that loops around the northern part of the MAG area. It is divided into three segments: the Agua Fria Freeway (I-10 to I-17), the Pima Freeway (I-17 to Loop 202/Red Mountain), and the Price Freeway (Loop 202/Red Mountain to Loop 202/Santan). Loop 101 directly links 10 of MAG's 25 cities and towns, plus unincorporated areas of Maricopa County, and provides connectivity among a broad range of key activity centers in the region.

- Development Outlook - The construction of high occupancy vehicle (HOV) lane ramps at Loop 101 and Maryland Ave. is currently underway. Group 1 (FY 2014 - FY 2018) includes a project to construct one additional general purpose lane in each direction between Shea Blvd. and Loop 202/Red Mountain. Group 2 (FY 2019 - FY 2026) includes projects to construct: (1) one additional general purpose lane in each direction from Shea Blvd. to I-17, and (2) one additional general purpose lane in each direction between Baseline Rd. and Loop 202/Santan. Group 3 (FY 2027 - FY 2035) includes a project to construct one additional general purpose lane in each direction between I-10 and I-17. The addition of direct HOV ramp connections at the freeway-to-freeway interchanges at I-10 and I-17 have been identified as illustrative projects.

SR-143/Hohokam Expressway

- Overview - The Hohokam Expressway links I-10 and Loop 202 (Red Mountain), terminating at McDowell Road. It connects to the Sky Harbor Expressway ramp

connections to Loop 202 (Red Mountain). It provides access to the Sky Harbor Airport as well as greater connectivity for the freeway network.

- Development Outlook - Improvements to the interchange between SR 143 and the Loop 202 access road to Sky Harbor Airport have been completed. No new improvements are included in the period covered by the RTP.

SR 153 (Sky Harbor Expressway)

- Overview - 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/Santan Freeway/South Mountain Freeway

- Overview - Loop 202 is a circumferential freeway, serving the southern part of the MAG region. It is divided into three segments: the Red Mountain Freeway (I-10 to US 60), the Santan Freeway (US 60 to I-10), and the South Mountain Freeway (I-10/ Papago to I-10/Maricopa). The Red Mountain and Santan freeways loop around Tempe, Mesa, Queen Creek, Gilbert and Chandler, providing connectivity among these jurisdictions and mobility throughout the East Valley area. The Red Mountain Freeway also links the East Valley to Central Phoenix. The South Mountain segment of the Loop 202 is a vital component in the freeway system, linking the southern areas of the region with the central metropolitan area, and providing an alternative route to the highly congested I-10/Papago Freeway.

- Development Outlook - In late FY 2013, two projects on the Red Mountain Freeway were advanced into FY 2013 to take advantage of available obligation authority within the Federal Highway Administration program. These projects were: (1) one additional general purpose lane in each direction from Loop 101 to Gilbert Rd., and (2) one HOV lane in each direction between Gilbert Rd. and Broadway Rd. Group 2 (FY 2019 - FY 2026) projects have been identified to construct one HOV lane in each direction on Loop 202 between Higley Rd. on the Red Mountain Freeway to Gilbert Rd. on the Santan Freeway. Group 3 (FY 2027 - FY 2035) projects have been identified to construction one additional general purpose lane in each direction from Gilbert Rd. on the Red Mountain Freeway to I-10 on the Santan Freeway. A project to construct an interchange at Mesa Dr. on the Red Mountain Freeway is also included in Group 3.

  The Loop 202/South Mountain Freeway is planned as a freeway facility connecting the western terminus of the Santan Freeway in the East Valley with I-10 at 59th Ave. in the West Valley. Projects in Group 1 (FY 2014 - FY 2018) and early Group 2 have been

identified for completion of a freeway facility with three general purpose lanes and one HOV lane in each direction.

Loop 303 Freeway

- Overview - Loop 303 is planned as a six-lane freeway facility extending west from I-17 at Lone Mountain Rd., swinging southwest to Grand Ave., running south in the vicinity of Cotton Lane to I-10, and then to SR-30. An interim four-lane divided roadway was completed between Grand Ave. and Happy Valley Rd. by Maricopa County in 2004, and full freeway right-of-way was also acquired along most of this segment. Loop 303 will provide service to a number of West Valley Communities, which collectively represent a large area of growth in the region. Communities in this area will be linked together and tied into the regional freeway network. In addition, the facility will offer an alternative route to I-17 for trips destined to the West Valley.

- Development Outlook - Construction has been completed on an interim four-lane divided roadway between I-17 and Grand Ave. In late FY 2013, a project to construct a final freeway between Grand Ave. and Happy Valley Rd. was advanced into FY 2013 to take advantage of available obligation authority within the Federal Highway Administration program. Construction is also currently underway on a six lane freeway facility between Grand Ave. and I-10. Additional Group 1 (FY 2014 - FY 2018) projects have been identified for final construction on this segment. Group 2 (FY 2019 - FY 2026) projects have been identified for initial construction on the segment from I-10 to SR-30, as well as final construction work on the interchange at Grand Ave. Group 3 (FY 2027 - FY 2035) projects have been identified for final construction on the segment from I-10 to SR-30, as well as upgrading the segment between Happy Valley Rd. and I-17 to a six-lane freeway.

  In addition, construction of an interchange at El Mirage Rd. is included in Group 1. Final construction work on the interchange at Northern Parkway is included in Group 3, as well as right-of-way protection for a future extension from SR-30 to Riggs Rd.

Pinal County Area Routes

- Overview - The expansion of the MAG metropolitan planning area (MPA) into Pinal County resulted in the addition of significant new mileage onto the regional freeway/highway system. This mileage covers the Pinal County portion of routes already in the MAG freeway/highway network, as well as the addition of totally new routes onto the system. The added routes provide service throughout the Pinal County area and are an important element of the regional transportation network. These routes include: I-8, I-10, US-60, SR-79, SR-84, SR-87, SR-187, SR-238, SR-287, SR-387, SR-587, and SR-347.

- Development Outlook - In the Pinal County area of the MAG MPA, the following improvements to the freeway/highway network are included in the RTP. None of these projects would be a part of the Freeway/Highway Life Cycle Program.

  - I-10 (Riggs Rd. to the MAG MPA Boundary): Addition of one general purpose in each direction (including interchange improvement/installation at Casa Blanca Rd., Seed Farm Rd., and Pinal Ave.) has been identified as a Group 2 (FY 2019 - FY 2026) project.

  - US-60 (Mountain Rd. to the Renaissance Festival): Construction of an Arizona Parkway along US 60 has been identified as a Group 3 (FY 2027 - FY 2035) project.

  - SR-79 (Butte Ave. to CAP): Addition of one general purpose in each direction has been identified as a Group 3 (FY 2027 - FY 2035) project.

  - SR-238 (SR-347 to Warren Rd.): Addition of one general purpose in each direction has been identified as a Group 3 (FY 2027 - FY 2035) project.

  - SR-287 (SR-79 to SR-87): Addition of one general purpose in each direction has been identified as a Group 3 (FY 2027 - FY 2035) project.

  - SR-347 (At Maricopa-Casa Grande Road): Intersection improvement, including an overpass of the Union Pacific Railroad tracks, has been identified as a Group 1 (FY 2014 - FY 2018) project.

    (I-10 to SR-238): Addition of one general purpose in each direction has been identified as a Group 3 (FY 2027 - FY 2035) project.

  - North-South Freeway Corridor (Including SR-24): Right-of-way protection has been identified as a Group 3 (FY 2027 - FY 2035) project.

Program Support and Other Improvements

- Overview - The overall highway development process involves a number of steps that are necessary to prepare projects for eventual construction. Key elements that are included in this area are as follows: (1) Preliminary Engineering - preparation of preliminary plans defining facility design concepts, right-of-way requirements and environmental factors; (2) Advance Right-of-Way Acquisition - acquisition of right-of-way to respond to development pressures in a corridor; (3) Property Management/Plans and Titles - procedures to acquire property and manage it until needed for construction; and (4) Risk Management - programs to minimize the risk of litigation.

In addition, limited funding may be available above and beyond that currently estimated to be needed to complete the freeway/highway projects and programs specifically identified in the RTP. Since these financial resources would be present in the last few years of the RTP planning period, when uncertainties regarding costs and revenues are at their maximum, identifying projects and programs in addition to those already included in the RTP for use of these funds is not warranted at this time.

- Development Outlook - Funding is provided throughout the planning period to address program support areas. In addition, it is estimated that approximately 1.5% of the total program may be available for projects not currently identified in the RTP.

System Operations, 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 area. 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 the planning period (FY 2014 - FY 2035) for operation and maintenance of the freeway/highway system totals $2.7 billion (YOE $'s), including regionally funded and other programs.

Regionally Funded Programs

The RTP includes regional funding for maintenance and operation of the regional freeway system in the MAG area. These regional resources are dedicated specific programs, as described below. The goal of this funding is to supplement, not supplant, the state-level revenues that ADOT dedicates to maintenance and preservation in the MAG area. As a result of the regional funding, ADOT is providing improved operations and maintenance on existing freeways in the Valley, and will expand this effort as additional RTP projects are constructed.

The RTP includes number of system-wide programs that are critical to the proper functioning of the regional freeway/highway system. These programs include projects to: (1) help keep traffic flowing as smoothly as possible, (2) pick-up litter and maintain landscaping, and (3) mitigate noise from the freeway system.

- Freeway Management System - Funding for the freeway management system (FMS) has been identified for the MAG area. This includes projects to enhance FMS on existing facilities, as well as to expand the system to new corridors. FMS covers items such as ramp metering, changeable message signs, and other measures to facilitate traffic flow. Funding will be directed to both the development of new FMS projects, as well as preservation and maintenance of existing equipment. A function related to freeway system management, the Freeway Service Patrol, has also been allocated funding in the RTP.

- Litter Pick-up, Sweeping, and Landscaping Maintenance - Regional funding for the freeway system in the MAG area has been dedicated to litter pick-up, litter education, sweeping, landscaping maintenance, and landscaping restoration. The use of MAG regional funds to supplement ADOT funds has allowed ADOT to provide a level of landscaping, litter pick-up, and sweeping maintenance on the freeway system that would not have been possible without this funding.

- Quiet Pavement - A block of funding was previously identified for noise mitigation projects on the freeway system in the MAG area. This funding was used for mitigation projects such as rubberized asphalt overlays on existing freeways (quiet pavement) and noise walls. Group 3 (FY 2027 - FY 2035) includes projects for future rehabilitation of rubberized asphalt overlays.

Other Operations, Maintenance and Preservation

Operation and maintenance (O&M) of the regional freeway/highway network in the MAG area 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. Funding for these districts is provided through ADOT's annual state budgeting process, which draws from state and federal revenue sources. As noted previously, in the MAG area this funding is supplemented by the regional funds.

Example O&M 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.

The ADOT organization also 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 ($7.6 billion); MAG area ADOT funds ($6.7 billion); Federal Highway Congestion Mitigation/Air Quality funds and Surface Transportation Program funds ($302 million); ADOT statewide funding ($1.5 billion); other funding ($105 million); bond proceeds ($1.0 billion); and an estimated available beginning cash balance of $750 million. Debt service and other expenses totaling $3.1 billion are deducted from these sources, yielding a net total of $14.9 billion (YOE $'s) for use on freeway/highway construction projects and programs. The above 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 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 also total $14.9 billion. This includes: $6.2 billion for construction of new corridors; $5.1 billion for construction of additional lanes and new interchanges on existing freeways; and $1.0 billion for system-wide programs, such as preliminary engineering, right-of-way administration, and freeway system traffic management. In addition, $2.7 billion is identified for roadway operations and maintenance functions, including routine roadway and right-of-way maintenance, quiet pavement rehabilitation, and litter pick-up, sweeping and landscape maintenance.

TABLE 8-2
FREEWAY/HIGHWAY FUNDING PLAN FY 2014 - 2035

FUNDING (Year of Expenditure $'s in Millions)		
		Totals
Regional Funds		
MAG Half-Cent Sales Tax	7,620.7	
MAG Area ADOT Funds	6,663.2	
MAG Federal CMAQ and STP	302.0	
Other Income	105.2	
Beginning Available Cash	750.1	
Bond Proceeds	1,040.0	
Allowance for Debt Service and Other Expenses	(3,063.6)	
Total Regional Funds		13,417.6
Other Funding		
ADOT Statewide Funding	1,526.4	
Total Other Funding		1,526.4
Total Funding		**14,944.0**
EXPENDITURES (Year of Expenditure $'s in Millions)		
		Totals
Regionally Funded Projects		
New Corridors	6,214.5	
Improvements to Existing Facilities: General Purpose Lanes, HOV Lanes, Interchanges	5,051.7	
Freeway Management System, Freeway Safety Patrol	253.0	
Preliminary Engr., Risk Mgmt., R/W Management, Advance R/W Acquisition	444.6	
Quiet Pavement Rehab.	204.0	
Litter Pick-Up, Sweeping, Landscaping	437.4	
Other Maintenance Programs	504.3	
Other Regionally Funded Projects	308.1	
Total Regionally Funded Projects		13,417.6
Other Funded Projects		
System Operation, Maintenance and Preservation		1,526.4
Total Expenditures		**14,944.0**

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CHAPTER NINE

ARTERIAL STREETS

The arterial street grid system is a vital component of the regional transportation system in the MAG area and is a key element of the Regional Transportation Plan (RTP). Development of this system is accomplished through regionally funded projects, as well as projects constructed through a combination of local government and private sources. 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 2012.

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.

Future 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 2035 is depicted in Figure 9-2**.** (It should be noted that Figure 9-2, and 9-1, are conceptual and do not represent a formal functional classification of roadways.) 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.

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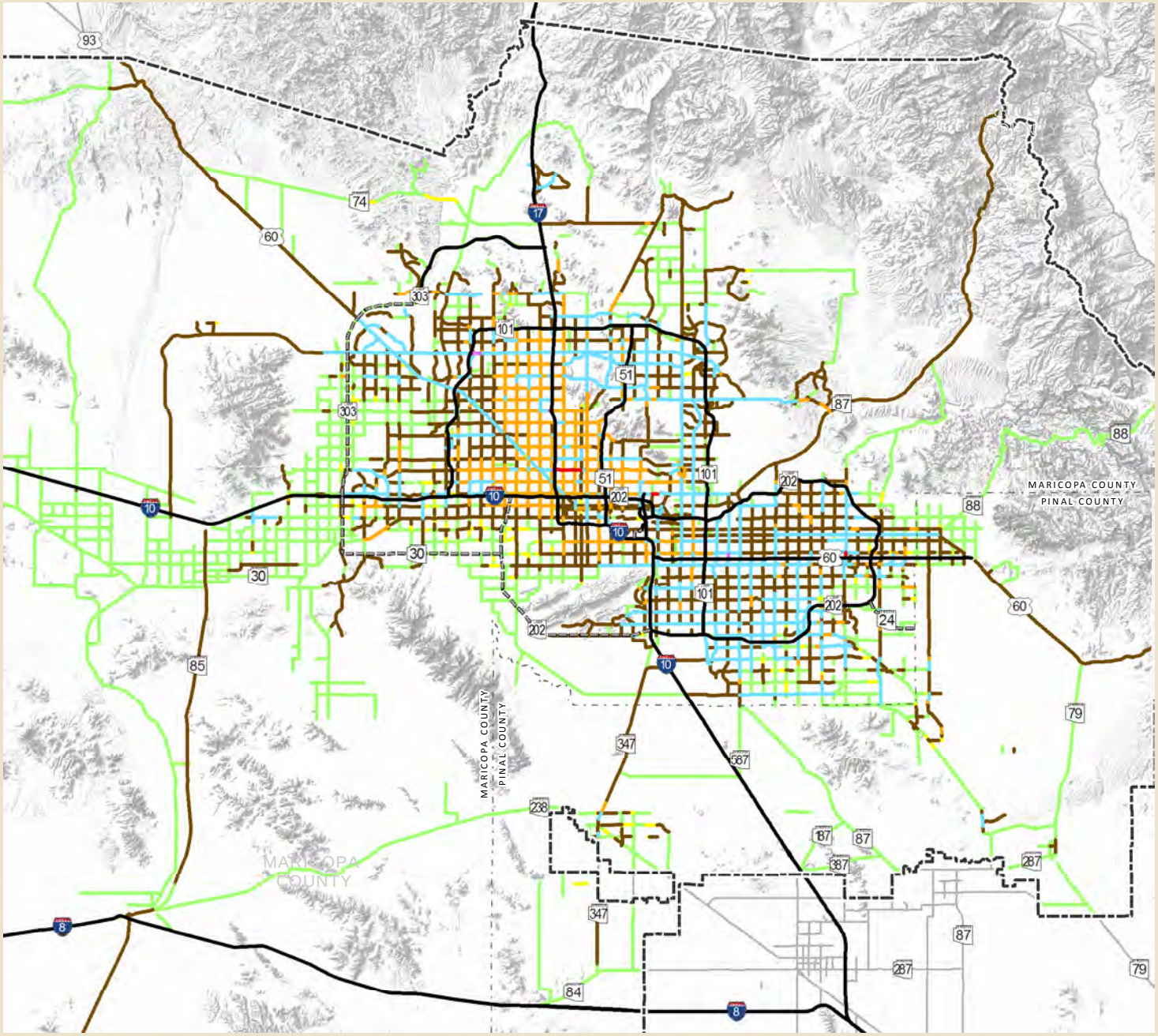
2035
Regional Transportation Plan
Fig. 9-1

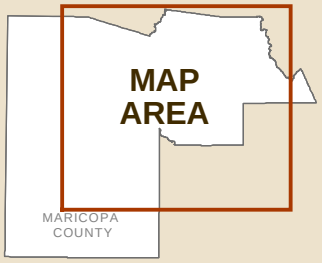
REGIONAL TRANSPORTATION PLAN

MARICOPA ASSOCIATION of GOVERNMENTS

2012 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
- Metropolitan Planning Area



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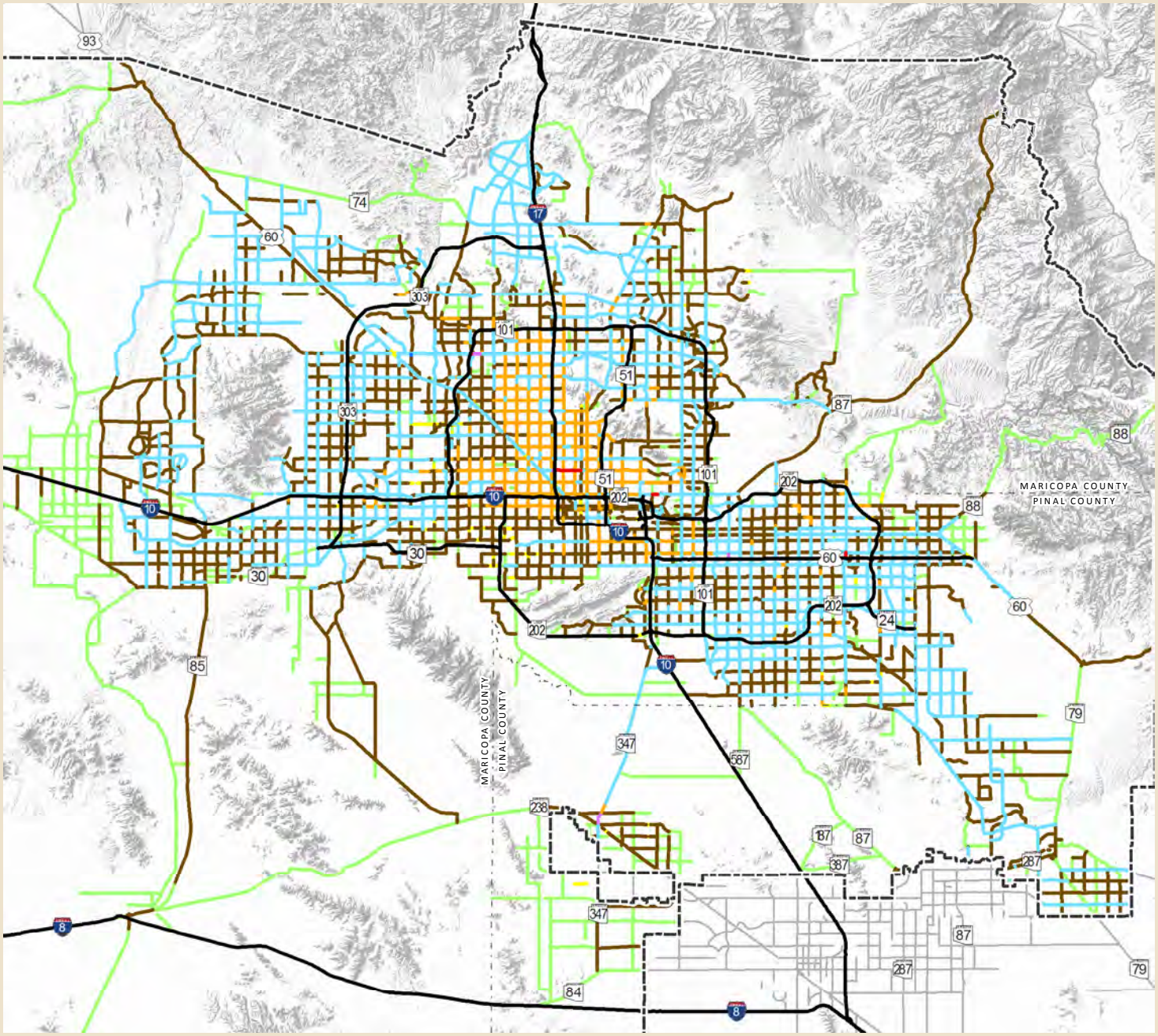
2035
Regional Transportation Plan
Fig. 9-2

REGIONAL TRANSPORTATION PLAN

MARICOPA ASSOCIATION of GOVERNMENTS



2035 Arterial Street System Total Through Lanes

- 2 Lanes
- 3 Lanes
- 4 Lanes
- 5 Lanes
- 6 Lanes
- 7 Lanes
- 8 Lanes
- 10 Lanes
- Freeways
- Other Roads
- County Boundary
- Metropolitan Planning Area Boundary

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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It is anticipated that the overall arterial street network will expand by a combination of the construction of new roadway alignments; the upgrading of roads that lie along the mile-arterial grid to arterial street standards; 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 2014 - FY 2035) for development and maintenance of the arterial grid system totals $25.4 billion (YOE $'s). This includes regionally funded projects, as well as those constructed through local government and privately supported financial resources.

Regional Arterial Street Projects

The package of regional arterial projects provides for the construction of new arterial linkages, widening of existing streets, and improvement of intersections. In addition, implementation of dust control and other air quality control measures and projects on the regional Intelligent Transportation System (ITS) Plan are included. A total of $2.9 billion (YOE $'s) in funding is provided by regional sources. An additional $2.0 billion (YOE $'s) is added to the projects from local matching funds, for a total of $4.9 billion (YOE $'s).

- 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. These improvements are planned for the system through the MAG Arterial Life Cycle Program (ALCP), and 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 group designations indicating the period in which actual project construction is finished. The total regional funding for these improvements is $1.4 billion (YOE $'s). The local match for these projects provides an additional $1.4 billion (YOE $'s) for a total of $2.8 billion (YOE $'s). A detailed listing of the specific regional arterial projects is provided in Appendix C.

- Intelligent Transportation Systems (ITS) - The RTP allocates funding through the MAG Arterial Life Cycle Program 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 funding for these improvements during the planning period (FY 2014 through FY 2035), including local contributions, is $27.5 million (YOE $'s).

- Implementation Studies - As established in the RTP approved in 2003, 3.65 percent of the half-cent funding for arterial streets is allocated to planning implementation studies for the region. These implementation studies are conducted by MAG, with a total funding of $38.3 million (YOE $'s) for the planning period (FY 2014 through FY 2035).

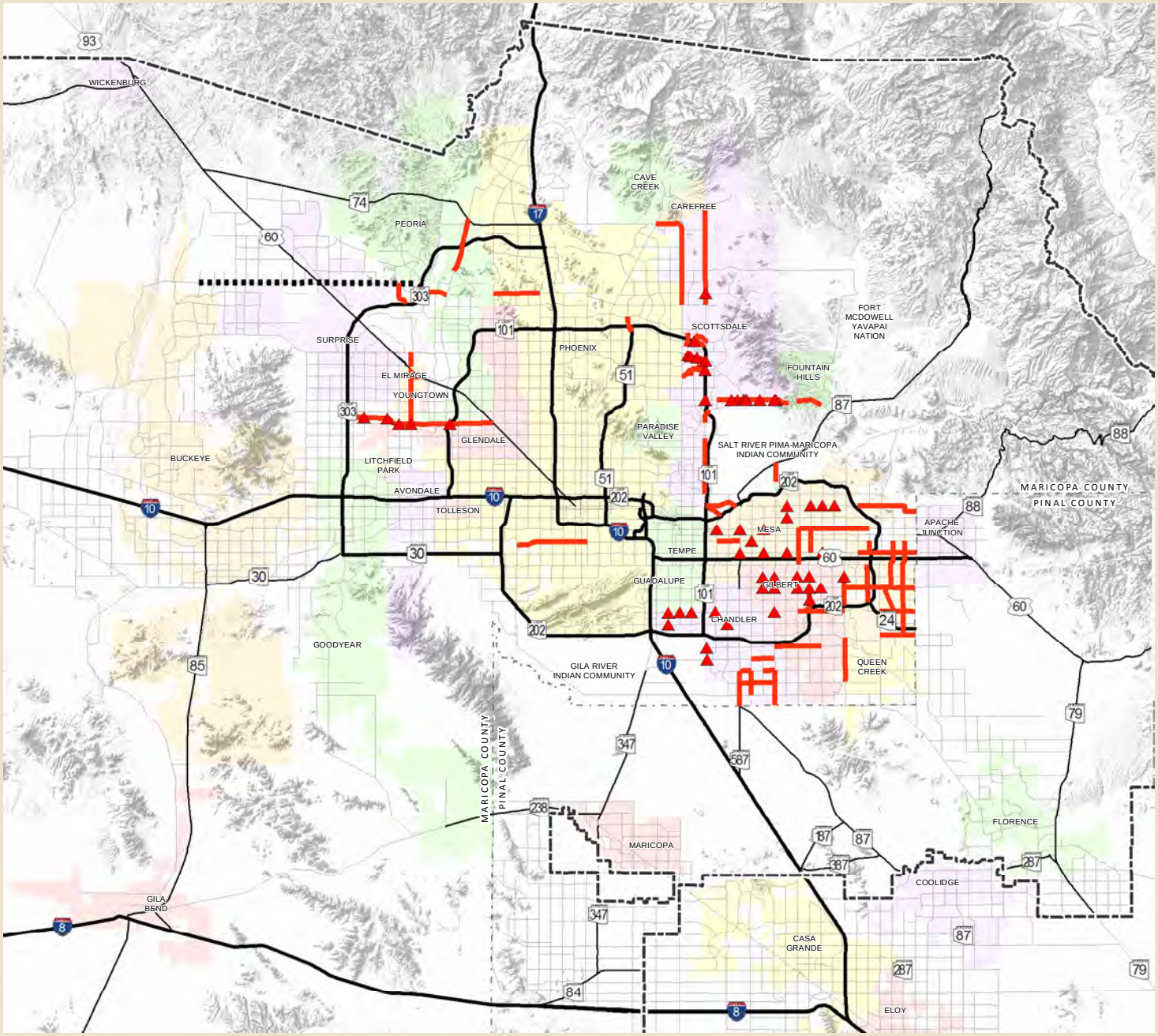
2035 Regional Transportation Plan

Fig. 9-3

REGIONAL TRANSPORTATION PLAN

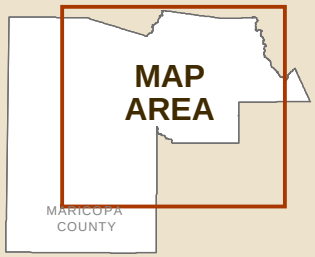
MARICOPA ASSOCIATION of GOVERNMENTS

Regional Arterial Street Projects (FY 2014 - FY 2035)



- Improved Intersections
- New/Improved Arterials
- Right of Way Preservation
- Freeways
- Highways
- Other Roads
- Metropolitan Planning Area Boundary
- 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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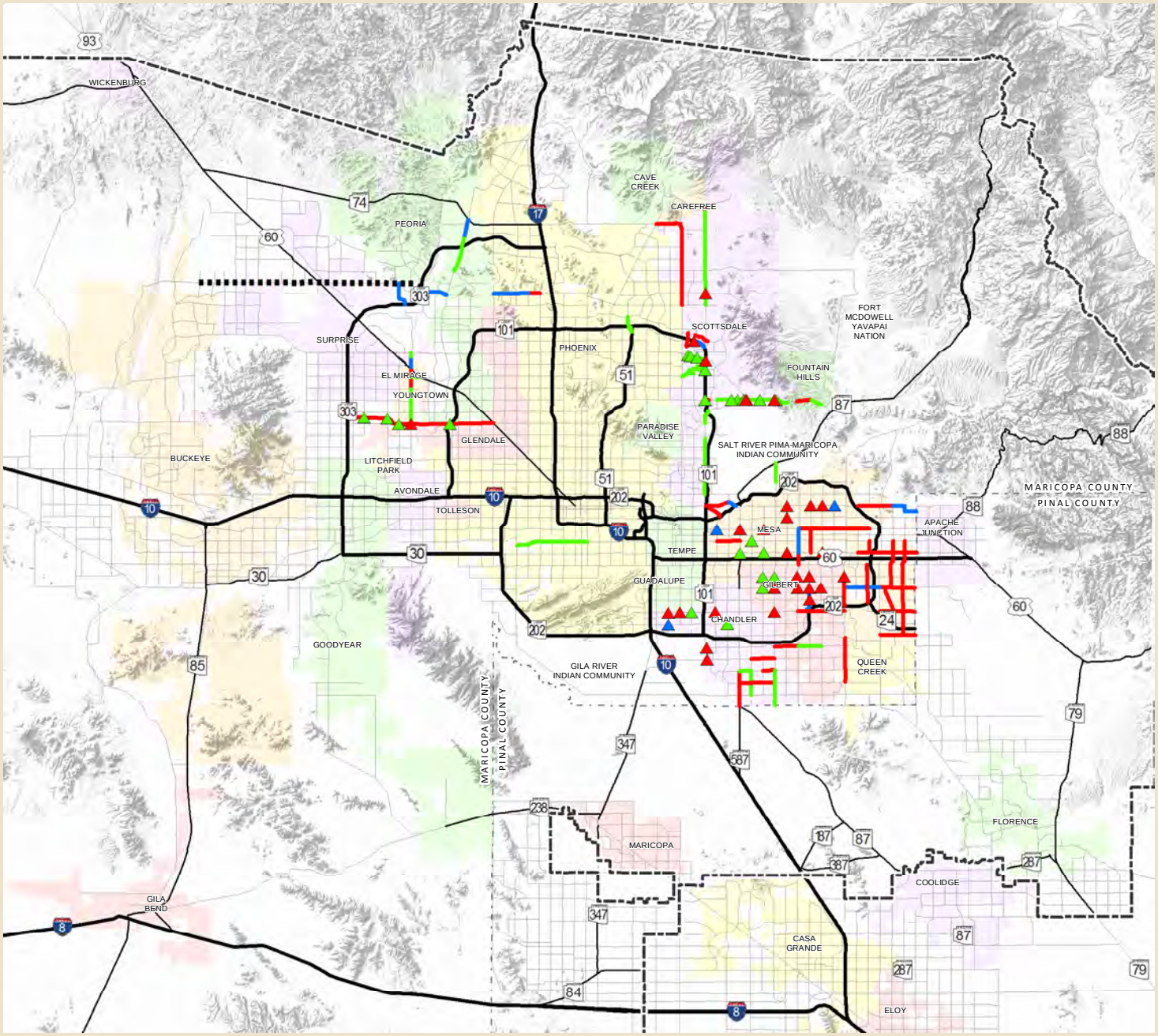
2035 Regional Transportation Plan

Fig. 9-4

REGIONAL TRANSPORTATION PLAN

MARICOPA ASSOCIATION of GOVERNMENTS

Regional Arterial Street Projects - Phasing (FY 2014 - FY 2035)



- Improved Intersections
- New/Improved Arterials
  - Group 1 (FY 2014 - FY 2018)
  - Group 2 (FY 2019 - FY 2026)
  - Group 3 (FY 2027 - FY 2035)
  - Right of Way Preservation
  - Freeways
  - Highways
  - Other Roads
  - Metropolitan Planning Area Boundary
  - 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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- Dust Control and Other Air Quality Control Measures - The RTP incorporates funding for measures to reduce PM-10 emissions generated by vehicle travel. Approximately $4.5 million (YOE $'s) in CMAQ funding is programmed to purchase PM-10 certified sweepers in fiscal years 2014 through 2018 of the FY 2014-2018 MAG Transportation Improvement Program (TIP). After FY 2018, 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 unpaved roads will continue to be paved each year in the Maricopa County PM-10 Nonattainment Area.

  The funding and expenditures for purchasing PM-10 certified street sweepers and paving dirt roads are reflected in the FY 2014 to FY 2035 arterial funding estimates. Long-term implementation of these dust control measures will be financed with the resources shown in Table 9-2.

- Other Arterial Street Grid Extensions, Widenings and Improvements - It is estimated that an additional $1.3 billion (YOE $'s) may be provided from reasonably available regional funding sources not currently identified in terms of specific regional projects in the RTP. These resources would be used to construct additional arterial system improvements or applied to other arterial-related programs. This funding would be matched by $543 million (YOE $'s) in local funding for a total of $1.8 billion (YOE $'s). In addition, a total of $168 million (YOE $'s) in regional CMAQ funding is identified for PM-10 and other air quality programs for the FY 2014-2035 planning period.

Local Government and Private Developer Projects

Based on historical patterns, the construction of new streets that accompany new development will continue to be from local government and private developer sources. It is estimated that these projects represent a total of approximately $6.1 billion (YOE $'s) in new street construction and other street improvements. These improvements were identified during the review of future arterial street networks during ongoing consultation with local agencies.

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, lane markings, pavement maintenance, storm drains, the operation of traffic

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signals, and other recurring costs necessary to maintain the arterial street network. The amount identified in the RTP for the planning period for operation, maintenance and preservation totals $14.3 billion (YOE $'s). It should be noted that this estimate includes costs on the arterial system, as well as the associated feeder collector and local streets.

A particularly important part of the maintenance 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. MAG member agencies have developed PMS programs for roads within their jurisdictions. Table 9-1 lists key characteristics of existing PMS programs.

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 ($1.4 billion); Federal Surface Transportation Program funds ($1.2 billion); Federal Highway Congestion Mitigation/Air Quality funds ($342 million); and an estimated cash balance of $2 million in regional funds at the beginning of FY 2014. These regional funds are complemented by local/other sources, which include city/county highway user revenues ($10.2 billion); other local funding sources ($10.0 billion); and private funds ($2.3 billion). This represents a total of $25.4 billion 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 $25.4 billion. This includes $4.9 billion for regionally funded arterial street improvements, including the accompanying local match; $6.2 billion for locally and privately funded improvements and extension of the arterial grid; and $14.3 billion in local funding for operations, maintenance and preservation.

TABLE 9-1 PAVEMENT MANAGEMENT SUMMARY				
Agency	**Software**	**Assessment Frequency**	**Rating System/Approach**	**Additional Comments**
ADOT	Highway Pavement Maintenance Application (HPMA) PECOS	Annual	International Roughness Index (IRI) Present Serviceability Rating (PSR)	Pavement preservation activities are planned five years in advance, based on technical indicators. The effects of new construction and reconstruction projects on pavement preservation requirements are also taken into account in pavement preservation programming. Extensive coordination is maintained to avoid overlapping pavement treatments, such as roads being restriped shortly before a pavement overlay project.
Apache Junction	iWorQ	Annual	Remaining Service Life (RSL)	Five main distresses are measured: fatigue, transverse cracking, longitudinal cracking, patches, and edge of pavement cracking. Raveling and other indices are also monitored. Inspectors use a guide to rate pavement. Software is used to recommend maintenance activities based on ratings. Pavement preservation measures are prioritized and coordinated with crack sealing.
Avondale	iWorQ	2 years	Not Available	Experience has indicated that past patterns of pavement maintenance have had a significant effect on current pavement conditions.
Buckeye	Microsoft Excel	Continuously check, update informally	Pavement Surface Evaluation and Rating (PASER)	The roadway maintenance approach is focused on obtaining grant funding for major arterials, while maintaining the highest traffic volume residential roadways. Pavement maintenance program focuses on keeping the greatest number of residents satisfied.

TABLE 9-1: PAVEMENT MANAGEMENT SUMMARY (CONT'D)				
Agency	**Software**	**Assessment Frequency**	**Rating System/Approach**	**Additional Comments**
Carefree	Microsoft Word & Microsoft Excel	4-5 years	Modified Version of the Transportation Research Board Process	Through field inspection, 10 categories of pavement defects are scored. Defects are weighted based on severity and importance. Unique roadway and pavement conditions are noted. A three step approach to the operations and maintenance program is used; (1) identify defects, (2) prioritize needs, and (3) assess program options versus budget funding.
Cave Creek	No Formal System	Informal-routine	Informal system - Chip seal five miles of roads a year when funding is available. Other improvements are prioritized based upon available funding	Pavement management software is being researched and reviewed. Many of the available packages seem to be too complex to fit the pavement management needs of a small system.
Chandler	Proprietary road matrix software by Stantec	3 years	Pavement Quality Index (PQI)	Developers provide a one year final inspection on new roadways, at which time the developer may be required to apply the first seal coat. Pavement life is targeted at 25-30 years before the first mill and overlay.
El Mirage	Microsoft Excel	Goal – 2 years Current – 4 years	Pavement Surface Evaluation and Rating (PASER)	Projects are planned in order to maximize use of available funding. In order to achieve economies of scale, larger projects are performed, limiting the variety of activities in a given year. For example, one year all available funding may go toward one arterial; the next year, crack sealing and fogging the network.

TABLE 9-1: PAVEMENT MANAGEMENT SUMMARY (CONT'D)				
Agency	**Software**	**Assessment Frequency**	**Rating System/Approach**	**Additional Comments**
Fountain Hills	No Formal System	7 years	Seven Zones-treat one annually	Maintenance is performed on a seven year cycle between seven zones. Each year, one zone is crack and slurry sealed or micro-paved. Roads are typically 40 years old and the majority have never had significant treatments.
Gila Bend	No Formal System	Informal	Informal	Establishment of a formal system is under consideration.
Gilbert	CHEC software switching to GBA	3-4 years	Pavement Condition Index (PCI)	Pavement management program makes extensive use of the Pavement Condition Index. There is an ongoing effort to demonstrate to decision-makers how pavement preservation funding levels affect the Pavement Condition Index.
Glendale	Lucity	5 year goal	Pavement Condition Index (PCI)	Pavement preservation projects are included in the Capital Improvement Program, which utilizes General Obligation funds. The Structural Index (SI) is tracked on arterials to provide a basis for pavement management activities.
Goodyear	Lucity	3 year goal	Pavement Condition Index (PCI)	Because the majority of roads are relatively new, they are typically in good condition, which tends to increase the system average Pavement Condition Index. Recent rapid growth in the size of the roadway system may result in increased future maintenance program funding needs that may not be apparent due to the high current average PCI.
Litchfield Park	Microsoft Excel	5 years	Pavement Condition Index (PCI)	All roads in the network were assessed in 2006 and 10-year maintenance activities recommended. Roadway segments are reviewed annually to determine if recommended treatments are still warranted, or if a roadway's condition has worsened enough that it needs more than the original prescribed level of maintenance.

TABLE 9-1: PAVEMENT MANAGEMENT SUMMARY (CONT'D)				
Agency	**Software**	**Assessment Frequency**	**Rating System/Approach**	**Additional Comments**
MCDOT	Proprietary Software - Roadway Management System (RMS)	Arterials-annual Others-Biannual	Pavement Condition Rating (PCR) and International Roughness Index (IRI)	The pavement management process focuses predominantly on roadways classified as arterials. The roadway maintenance program does not maintain or manage landscape features.
Mesa	Modified MicroPAVER	Annual	Pavement Condition Index (PCI)	An activity-based budget process is used, tying pavement maintenance activities to strategic goals. Roadway operations and maintenance funding is kept separate from the Capital Improvement Program and major pavement projects are prioritized depending on funding levels. Typically a 20-30 year pavement life is experienced.
Paradise Valley	In House Program*	4 years	Pavement Condition Rating (PCR)	Maintenance is performed on a 15 year cycle between 15 sections. Each year, one section is milled and overlaid. Roads are typically crack sealed every 7-8 years.
Peoria	Hansen Asset Management Software, Microsoft Excel for pavement condition	Bi-annual	Pavement Condition Index (PCI)	To maximize benefits from available funding, maintenance activities focus on arterial projects with greater or longer term impact. Projects are prioritized to maintain high levels of safety, while some lower rated pavements may not be treated due to funding limitations. Major pavement rehabilitation, when necessary in the future, may face funding issues.
Phoenix	Lucity	Bi-annual	Pavement Condition Index (PCI) and SCI	Specially equipped vans are used in the pavement assessment process to measure and record roadway Pavement Condition Index data. Reconstruction of pavements is not programmed, placing an emphasis on periodic/routine maintenance activities to preserve pavement quality over the long term.

TABLE 9-1: PAVEMENT MANAGEMENT SUMMARY (CONT'D)				
Agency	**Software**	**Assessment Frequency**	**Rating System/Approach**	**Additional Comments**
Queen Creek	MicroPAVER and Microsoft Excel	Goal- 3-5 years 10 year actual	Pavement Condition Index (PCI)	The majority of roads are relatively new, with an average age less than ten years, resulting in a relatively high Pavement Condition Index. The basic approach is to crack seal the roads annually, with a fog seal every three years. Slurry seals are used when there is significant cracking.
Scottsdale	Lucity	4 years	Pavement Condition Index (PCI)	Pavements are rated using the Pavement Condition Index, with intersections assessed separately. Data is recorded and tracked using GIS polygons rather than lane mile units, which is aimed at providing a more precise measurement of pavement areas**.**
Surprise	Hansen Pavement Management software	4 years	Overall Condition Index (OCI)	While most of the roads in the network are relatively new, efforts are aimed at adequate maintenance to continue high levels of pavement quality in the future. Typically roads are assessed every four years, using the time in between to perform improvements. The pavement management system is continually updated as improvements are performed, but new defects may not be documented until the next periodic assessment.
Tempe	Roadmatrix	3 years	Pavement Quality Index (PQI)	Avoiding a "worst first" repair prioritization approach, pavement maintenance strategies focus on consistent minor maintenance to preserve pavements, deferring the need for major maintenance projects. High standards are targeted, but if a road falls into poor condition, maintenance may be stopped and the road is later reconstructed. Predictable funding sources are being sought to maintain a strong pavement management program, instead of bonding or reliance on State shared revenues.

TABLE 9-1: PAVEMENT MANAGEMENT SUMMARY (CONT'D)				
Agency	**Software**	**Assessment Frequency**	**Rating System/Approach**	**Additional Comments**
Tolleson	Microsoft Excel	Ongoing	Pavement Condition Index (PCI)	An inventory of roadway network conditions is maintained in Microsoft Excel and used to assess which streets need reconstruction, mill and overlay, etc. A ten-year pavement maintenance plan is being formalized, and repairs are beginning on the lowest rated parts of the network.
Wickenburg	No Formal System	Informal	Informal, need based prioritization	Projects are identified through an informal pavement condition assessment. In FY 2010 and 2011, $100,000 from the Capital Improvement Program was available for roadway maintenance in addition to HURF. The local power grid, which is municipally owned, helps fund the Capital Improvement Program.
Youngtown	No Formal System	Informal	Informal, need based prioritization	A slurry seal was done on all roads In 2004. A specific annual roadway operation and maintenance program is not part of the budget process. Community Development Block Grant funding, or other funding, has been used as it becomes available in the past for roadway maintenance projects. HURF funds typically cover costs to fix vandalism or matching for grants.

*as last reported

TABLE 9-2
ARTERIAL STREET FUNDING PLAN FY 2014 - 2035

FUNDING (Year of Expenditure $'s in Millions)		
		Totals
Regional Funds		
MAG Half-Cent Sales Tax	1,423.8	
MAG Federal STP	1,150.7	
MAG Federal CMAQ (For arterial improvements)	155.2	
MAG Federal CMAQ (For PM-10 and other air quality programs)	186.8	
Beginning Balance (Regional Funds)	2.0	
Total Regional Funds		2,918.5
Local/Other Funds		
City/County Highway User Revenue Funds and County VLT	10,231.8	
Local Sources (General Funds, Local Sales Taxes, etc.)	9,998.3	
Private Funds (PAD Improvements, Developer Contributions, etc.)	2,251.6	
Total Local/Other Funds		22,481.7
Total Funding		**25,400.2**
EXPENDITURES (Year of Expenditure $'s in Millions)		
		Totals
Regionally Funded Projects		
Capacity/Intersection Improvements (ALCP)	1,368.7	
Intelligent Transportation Systems (ALCP)	25.9	
MAG Implementation Studies (ALCP)	52.0	
PM-10 and Other Air Quality Programs	186.8	
Other Arterial Grid Improvements	1,285.1	
Total Regionally Funded Projects		2,918.5
Local/Other Funded Projects		
Match for Regionally Funded and Other Projects	2,019.9	
Future Arterial Grid Extensions, Widenings and Improvements	6,121.5	
System Operation, Maintenance and Preservation	14,340.3	
Total Local/Other Funded Projects		22,481.7
Total Expenditures		**25,400.2**

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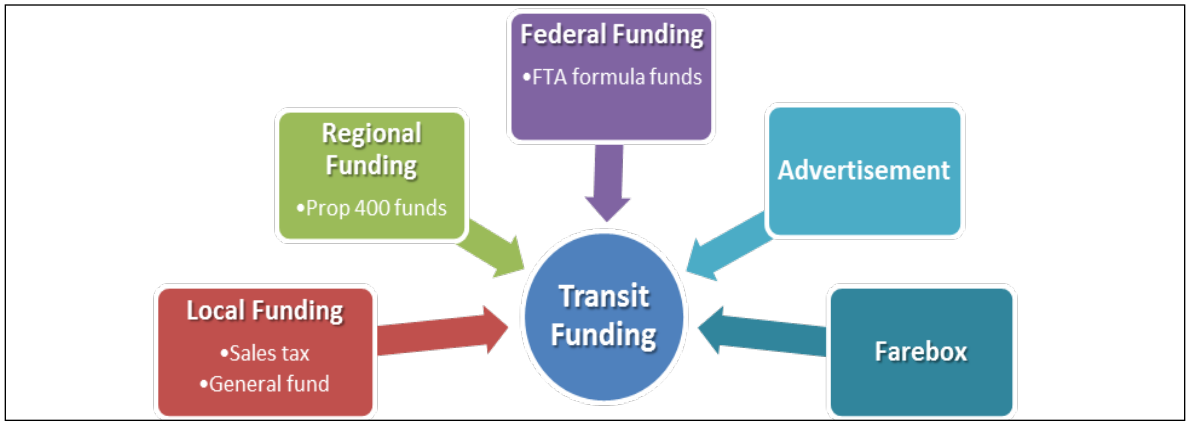
CHAPTER TEN

PUBLIC TRANSIT

The 2035 Regional Transportation Plan (RTP) includes a regional transit network that encompasses all transit modes in the region. The regional transit system is supported by federal, regional, and local funding sources. Federal funds are directed to the transit system in the region via formula and competitive programs from the Federal Transit Administration and Federal Highway Administration. Regional funding sources include the Public Transportation Fund (PTF), also known as Proposition 400, which dedicates approximately one-third of the regional half-cent sales tax for transportation to mass transit. Local funding sources include dedicated sales taxes, general funds, local transportation assistance funds, revenue from fares, advertisement sales, and other funding sources. Figure 10-1 depicts the primary financial resources for transit in the region.

FIGURE 10-1
TRANSIT SYSTEM FUNDING RESOURCES



Current Transit Network

The transit network currently serving the MAG region, regardless of funding source, consists of multiple components, including bus operations, paratransit, and high capacity transit/light rail transit (LRT). In addition to these services, capital investments (facilities, fleet, and infrastructure) make up the regional transit network. Figure 10-2 shows how these components are layered to make up the total transit network.

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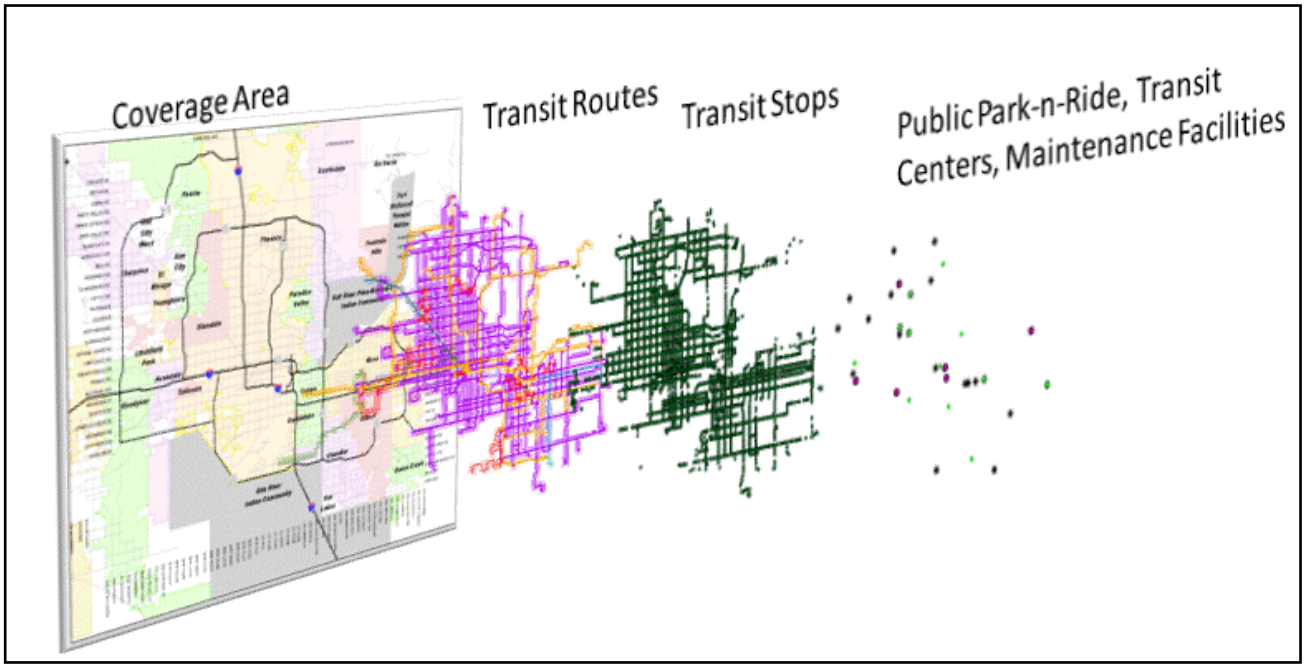
FIGURE 10-2
REGIONAL TRANSIT NETWORK COMPONENTS



Bus Operations

The region has five service operators (four local and one regional agency) overseeing the bus network. Currently, local agencies support approximately 70% percent of the bus transit services provided in Maricopa County. The existing bus network is depicted in Figure 10-3 and consists of local bus service, circulators, RAPID/Express, limited, LINK and rural bus service, as coded for the 2012 base network. These services operate on local and arterial streets and in freeway high occupancy vehicle (HOV) lanes. They serve a range of trip needs, including work, shopping, medical appointments and school trips. The service design emphasis is on system efficiency and effectiveness, in order to provide a high level of transit service that is reliable and affordable for users and taxpayers in the region. 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/RAPID and limited services are oriented around peak periods of demand. The bus network is supported by varying types of transit infrastructure such as bus stops, transit centers, park-and-rides, control centers and maintenance yards.

As previously noted, local and regional sales taxes and other revenue sources fund transit services in the region. The regional sales tax helps fund a regional bus network, including operating costs, as part of the RTP. This network ensures that reliable service is available on a continuing basis. Unfortunately, due to the recent economic recession, transit has been

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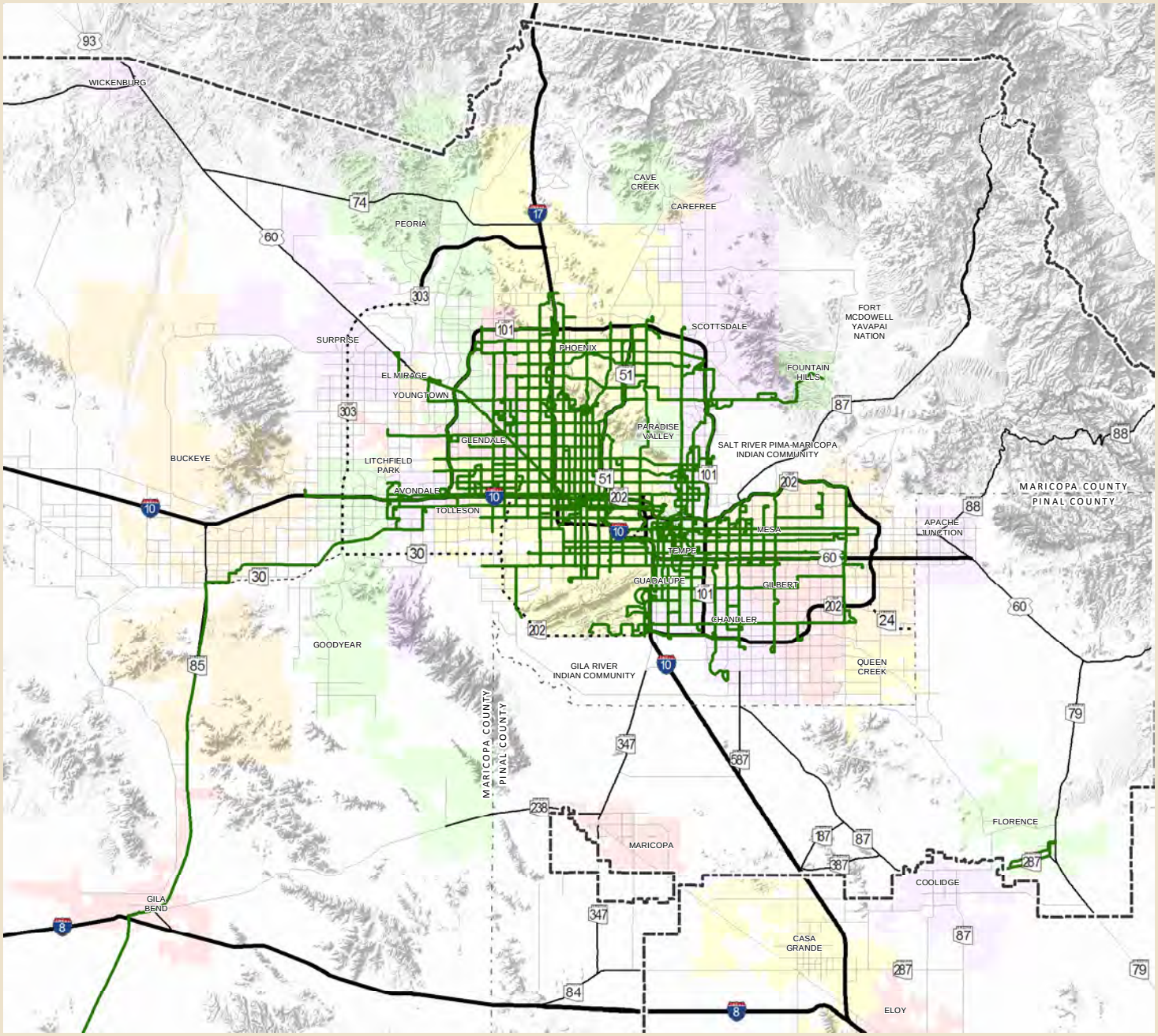
2035 Regional Transportation Plan

Fig. 10-3

REGIONAL TRANSPORTATION PLAN

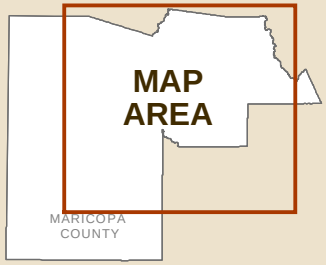
MARICOPA ASSOCIATION of GOVERNMENTS

2012 Bus Service Network



- Bus Network
- Existing Freeway
- Planned Freeway/Highway
- Highways
- Other Roads
- Metropolitan Planning Area Boundary
- 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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negatively impacted by service decreases and elimination or postponement of certain new services. The types of services covered by bus operations are described below.

- Circulators/Shuttles - Circulator service operates within a specific locale, such as a neighborhood or downtown area, and connects to major traffic corridors. There are currently 17 circulator routes and one pilot route in the region, operating in Phoenix, Tempe, Avondale/Tolleson, Scottsdale, Mesa and Glendale.

- Local Routes - Scheduled bus service operates on a fixed route that involves frequent stops and lower travel speeds, the purpose is to deliver and pick up transit passengers close to their destinations or origins. In addition, local routes are transit routes in a city or its immediate vicinity, distinguishing them from regional transit service or interurban lines. Local routes make up 58 percent of total number of bus routes in the system.

- Regional Super Grid - Regional grid bus routes, which are also commonly referred to as "supergrid routes," are routes that follow the alignment of major roads of the regional arterial grid network. The supergrid addresses the need for a consistent level of service across all 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.

- Rural/Flex 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 medical, work, shopping, education, and access to various community services. The current bus system identifies one rural/flex route to Gila Bend.

- Limited Routes - Limited route bus service operates on a fixed route, typically major arterials, which provides higher speeds and fewer stops than found on other portions of the bus system or on the same route in local service. Due to recent budget cuts, there is one limited route in the region on Grand Avenue.

- RAPID/Express Routes - Express bus provides enhanced-speed, moderate-volume commuter or regional access in the MAG region and is designed to operate primarily on the region's freeway system, including High Occupancy Vehicle (HOV) lanes. Express bus service typically operates from park-and-ride locations to employment centers throughout the region. These routes provide service Monday through Friday during the morning and evening peak time periods. While Express bus service usually operates one-way in the peak direction, two-way service may be warranted in reverse commute markets. There are currently 20 RAPID/Express routes that serve valley residents. All RAPID/Express routes, with the exception of a bidirectional route between Tempe and Scottsdale, have Downtown Phoenix as their final inbound destination. The term RAPID is express service that operates solely within the boundaries of the City of Phoenix.

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- LINK Service - Valley Metro LINK is a state-of-the-art bus service in Mesa, Chandler and Gilbert that lets customers enjoy rail-like comfort, speed and reliability. LINK service has elevated platforms, off board fare collection and offer WiFi. LINK vehicles may have traffic signal priority at some intersections, meaning that stoplights wait to turn red until they pass. The service operates in mixed traffic. There are two LINK routes in service. LINK service is similar to Bus Rapid Transit (BRT), but it does not operate in an exclusive right of way and the frequency is less than the current light rail transit (LRT) system.

Paratransit

Paratransit service includes various types of passenger transportation that is more flexible than conventional fixed-route transit but more structured than the use of private automobiles. Paratransit includes dial-a-ride (DAR)/demand response (DR) transportation services, shared-ride taxis, car-pooling and vanpooling. Under the RTP, Americans with Disabilities Act (ADA) paratransit service is regionally funded, while senior paratransit service continues to be locally funded.

- Dial-a-Ride - Dial-a-Ride is a shared-ride origin to destination service that provides transportation for passengers unable to access fixed route local bus service. This includes ADA certified and non-ADA service. ADA paratransit service is a type of DAR service required to be provided according to ADA federal regulations as an alternative form of transit when and where local fixed route bus service is running. The federally mandated service area is three-fourths of a mile on each side of each fixed route merged together such that, with few and small exceptions, all origins and destinations within the area would be served. A certification process determines a user's eligibility for ADA DAR service.

  Some cities in the region have elected to provide DAR services beyond the federal requirements, to those that are not ADA certified. Non-ADA service provides shared-ride public transportation to seniors and persons with disabilities. Under the RTP, ADA service is regionally funded, while senior and other DAR services continue to be locally funded. Table 10-1 below describes the cities and their DAR eligibility criteria. In most cases, passengers can travel within a DAR service area without transferring to another vehicle. However, if the passenger's final destination is in another service area, the passenger may have to transfer to a DAR vehicle serving that area. Figure 10-4 shows the current DAR service areas.

- 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. In FY 2012, vanpool service logged 1,145,501 boardings. The current fleet is comprised of 383 vehicles; seating capacity per vehicle varies from eight to fifteen passengers.

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TABLE 10-1
DIAL-A-RIDE ELIGIBILITY CRITERIA

Jurisdiction	Eligibility Criteria		
	ADA	Non-ADA	ADA & Non-ADA
Avondale	x		
Buckeye		x	
Chandler - North			x
Chandler - South		x	
El Mirage	x		
Gilbert	x		
Glendale			x
Goodyear	x		
Guadalupe	x		
Mesa	x		
Paradise Valley	x		
Peoria			x
Phoenix	x		
Scottsdale			x
Sun City	x		
Surprise			x
Tempe			x
Tolleson			x
Youngtown	x		

High Capacity Transit Operations

High Capacity Transit (HCT) is categorized into two categories, HCT/All Day and HCT/Peak Period. HCT/All Day provides high-capacity regional access, and introduces a time-saving element by operating solely in an exclusive guideway. HCT/Peak Period provides higher-speed, high-volume commuter or regional access, when compared with express bus. HCT/Peak Period service can utilize either buses or rail vehicles. HCT service benefits from supportive local bus service connections, as well as adequate land uses and population/employment densities. The MAG region currently provides only HCT/ All Day service.

- High Capacity Transit/All Day - HCT/All Day typically operates two-way service, seven days a week. Fixed route bus or rail vehicles (e.g., light rail, streetcar) are used for this service, operating in an exclusive guideway or mixed traffic. Passenger access is available at stations located approximately every half-mile to one mile. Supergrid and arterial BRT service in the MAG region generally operate in mixed traffic and lack the time-saving element of an exclusive guideway. In addition to addressing transportation needs, HCT/All Day service and related modes that operate in a fixed guideways such as light rail, have demonstrated the ability to provide significant economic development benefits.

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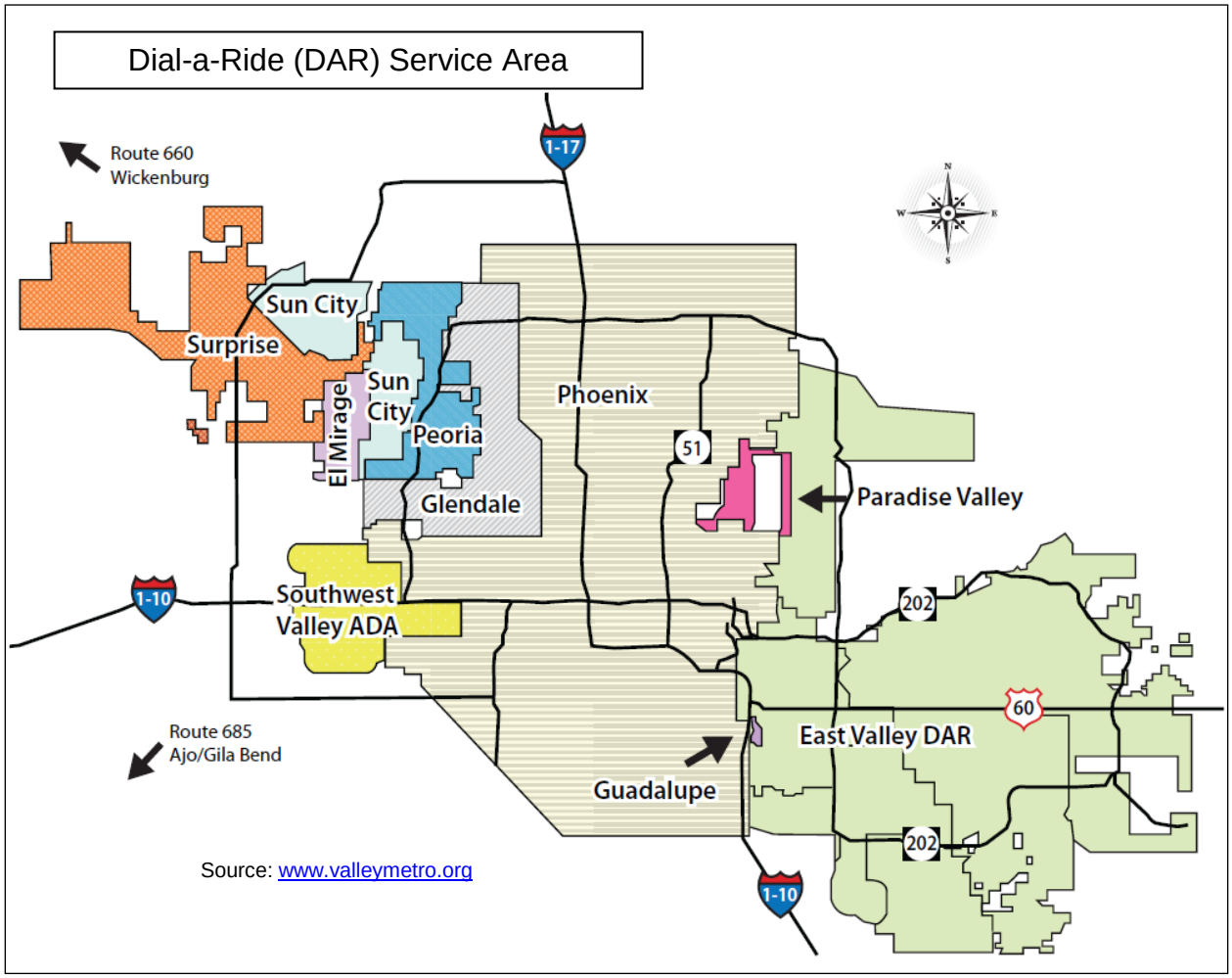
FIGURE 10-4
DIAL-A-RIDE SERVICE AREAS



- *Light Rail Transit*: On the weekdays, this service operates approximately 20 hours a day with 12-minute peak and midday service and 20-minute early morning and evening service. On Fridays and Saturdays this service operates approximately 23 hours a day. Saturday frequency is 15-minute during the peak and midday and 20-minute in early morning and evening. On Sunday, this service operates approximately 19.5 hours a day with 20-minute all day service. Figure 10-9 depicts the existing minimum operating system (MOS) within the planned LRT system.

- *Arterial Bus Rapid Transit (BRT)*: BRT is a two-way service that operates at higher speeds than local or regional grid bus service by taking advantage of limited stops and other time saving enhancements. As defined by federal regulation, BRT operates in a separated and dedicated right-of-way for public transit use during peak

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periods. The bus service operations described above, including the LINK bus routes, do not meet this definition.

- *Sky Train (Stage One)*: The Sky Train is a fully automated, grade separated transit system that connects the major facilities at Sky Harbor International Airport with the LRT system. Stage One of the project extends from the LRT station at 44th St., stopping at the East Economy Parking lot and continuing to Airport Terminal Four. The 1.7 mile long service opened in April 2013. The Sky Train runs 24 hours a day and arrives at stations every three minutes during peak periods and delivers passengers to their stops within five minutes of boarding.

- High Capacity Transit/Peak Period - HCT/Peak Period provides higher-speed, high-volume commuter or regional access, when compared with express bus. While express bus sometimes operates in mixed traffic, HCT/Peak Period generally operates in an exclusive guideway, providing service between park-and-ride locations and major employment centers. This service typically operates Monday through Friday during the morning and evening peak time periods traveling in the peak direction using bus or rail vehicles (e.g., commuter rail). HCT/Peak Period service can utilize either buses or rail vehicles. This type of service is not currently provided in the MAG region.

Facilities, Fleet, and Infrastructure

Transit operations are made possible by the capital facilities, fleet and infrastructure that carry passengers to their destinations. This covers not only the vehicles, tracks, stations, bus terminals, and bus stops that are directly used by passengers, but also includes the support facilities that are needed for vehicle maintenance, provide training, and house customer services.

- Facilities - The facilities that support the current transit system include 15 transit centers and 48 park-and-ride lots, some of which are publicly owned, while others are in partnership with commercial establishments. Facilities also include four bus and one light rail operations and maintenance facilities, and over 7,100 bus stops. Finally, there is also a transit mobility center that houses regional customer service and where the ADA in-person assessments are conducted. These facilities are shown in Figure 10-5.

- Fleet - The current fleet in the transit system include: 734 buses, 113 shuttles/circulators, 196 dial-a-ride vehicles, 385 vanpools, 50 light rail vehicles, and seven regional connectors.

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Fig. 10-5

REGIONAL TRANSPORTATION PLAN

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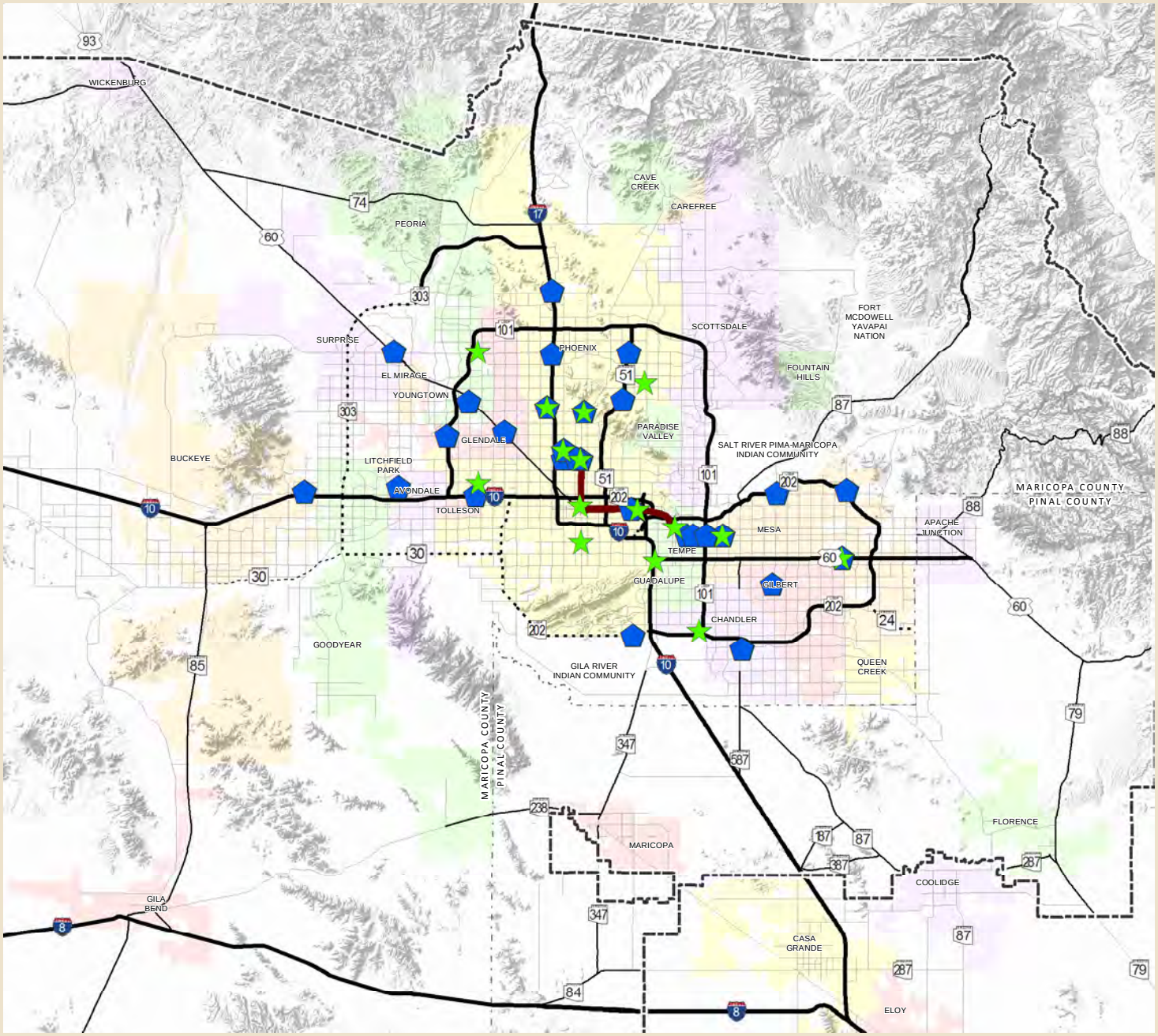
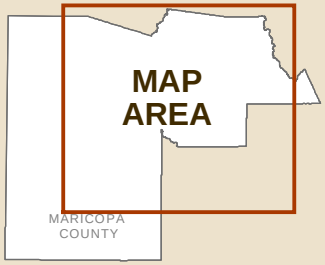
Transit Center and Park-and-Ride Facilities (2012)



- Transit Centers
- Park & Ride
- Completed Minimum Operating LRT
- Existing Freeway
- Planned Freeway/Highway
- Highways
- Other Roads
- Metropolitan Planning Area Boundary
- 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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- Infrastructure - The LRT system has two tracks, with light rail trains comprised of one to two light rail vehicles and the capacity to run three vehicle trains if needed. Important elements of the light rail system include park-and-ride lots at various locations along the alignment and signal priority strategies that improve speed. Passenger stations are generally located about a mile apart, but closer (1/2 mile apart) in urban centers. 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: vehicles, bridges, park-and-rides, and operations and maintenance facility.

  LINK bus stations serve as innovative bus stops. The stations feature raised platforms which allow passengers to walk directly onto the bus and include dynamic messaging signs for bus arrival information, plus bike racks, generous seating and shade. Fare vending machines also are planned in the near future at select locations. In addition shelters incorporate elements of sustainability and comfort by utilizing a special design that incorporates passenger safety and protection from the elements, regardless of season.

  Additionally, the transit network utilizes direct HOV ramps and busways to support the Express/Rapid routes.

Future Transit Network

The 2035 Regional Transportation Plan includes a broad vision for future transit facilities and services in the region. Future bus service in the MAG Region will be a critical component of the planned regional transportation network. Paratransit services will also be essential, providing transportation for passengers unable to access conventional transit services. High capacity transit, which typically operates in an exclusive guideway, addresses higher volume transit needs and has demonstrated the ability to provide significant economic development benefits. In addition, investments in capital facilities, fleet and infrastructure are necessary to provide the vehicles, tracks, stations, bus terminals, and bus stops that are directly used by passengers, as well the support facilities that are needed for vehicle maintenance, provide training, and house customer services.

Planned Bus Service

The future bus service in the MAG Region is an important component of the planned 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 federal, Proposition 400, and local sources. Based on the interest to implement transit services, it is reasonable to assume that other cities will also fund transit service beyond what is identified in Proposition 400 and current local sales taxes. Figure 10-6 depicts the 2035 fixed route bus network. This figure covers regionally and locally funded services. The amount identified in the 22-year long-

2035 Regional Transportation Plan

Fig. 10-6

REGIONAL TRANSPORTATION PLAN

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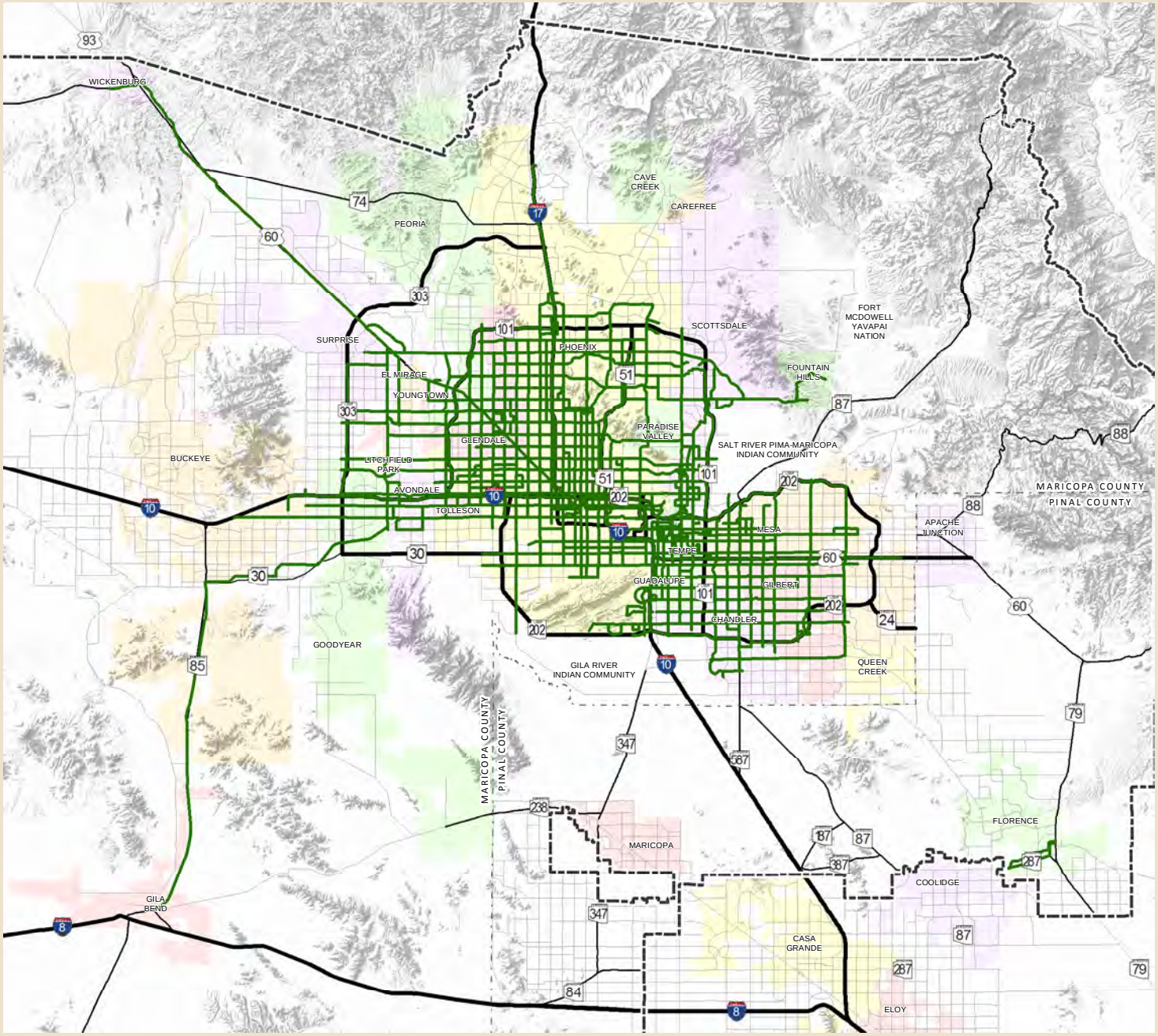
2035 Bus Service Network



- Bus Network
- Freeways
- Highways
- Other Roads
- Metropolitan Planning Area Boundary
- 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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range plan for bus facilities and services, which also includes vanpool, dial-a-ride, and passenger support services, totals approximately $10.8 billion (YOE $'s) from all funding sources. Of this total, $4.6 billion will be regionally funded and $6.2 billion will be funded from local sources, which include farebox revenues.

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

- Circulators/Shuttles - It is anticipated that local agencies throughout the region will continue to add local circulators/shuttles to their transit operations in parallel with available resources, during the planning period.

- Local Routes - Consistent with population growth and development patterns, it is anticipated that locally funded routes will incrementally be extended to meet demand within individual jurisdictions. Furthermore, current routes are expected to be modified in order to best meet ridership demand and effectively and efficiently use all available resources. It is also anticipated that several local routes will transition to regional supergrid routes.

- Regional Super Grid - It is anticipated that by FY 2035 the remaining regionally funded transit routes outlined in the Transit Life Cycle Program will be operational. Regionally funded bus routes are phased in during the planning period 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 10-7 indicates how services will be phased in over the planning period.

- Rural/Flex Routes - It is anticipated that the Rural/Flex route will continue operating and be regionally funded. Determining whether to reinstate or extend a Rural/Flex route in the future will depend on ridership demand and available funding.

- Limited Routes - It is anticipated that the current limited route on Grand Avenue will continue operating and be regionally funded. Determining whether to reinstate or extend limited routes in the future will depend on ridership demand and available funding.

- RAPID/Express Routes - The proposed RAPID/Express routes as identified in the RTP are intended to operate during peak and off-peak periods using the high occupancy vehicle (HOV) facilities to connect park-and-ride lots with major activity centers, including core downtown areas. Regional funding has been allocated for RAPID/Express operations

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Regional Transportation Plan
Fig. 10-7

REGIONAL TRANSPORTATION PLAN

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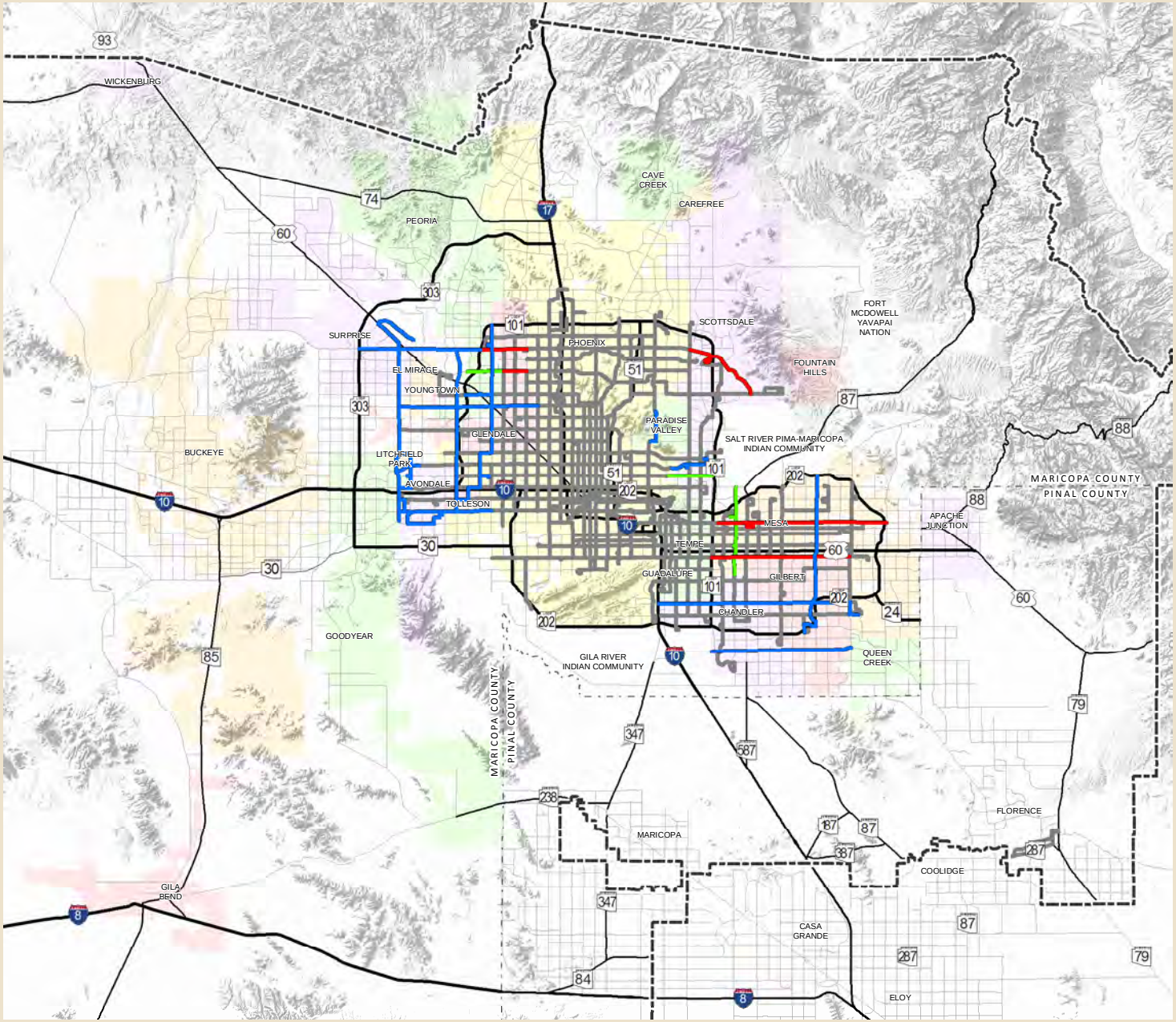
Regional Super Grid Bus System Improvements (FY 2014 - FY 2035)



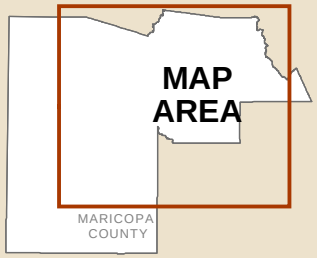
- Existing (In Operation as of 2012)
- Group 1 (FY 2014 - FY 2018)
- Group 2 (FY 2019 - FY 2026)
- Group 3 (FY 2027 - FY 2035)

Other Features

- Freeways
- Highways
- Other Roads
- Metropolitan Planning Area Boundary
- 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.

Local arterial grid network within the City of Phoenix is funded by the City of Phoenix



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throughout the RTP planning period. Figure 10-8 indicates how services will be phased in over the planning period.

- LINK Service - In addition to the two current LINK routes, there is one additional route planned to open on Scottsdale/Rural Road by FY 2015, which will be funded using regional funds. Figure 10-8 includes this route.

Planned Paratransit Services

Paratransit service includes various types of passenger transportation that offers a shared-ride origin to destination service that provides transportation for passengers unable to access fixed route local bus service. It can also allow groups of employees to self-organize and operate a carpool service, providing a flexible transit solution for those trips not well served by more conventional fixed route service. Paratransit includes dial-a-ride (DAR)/demand response (DR) transportation services, shared-ride taxis, car-pooling and vanpooling.

- Dial-A-Ride - It is anticipated that dial-a-ride (DAR) service covered by the Americans with Disabilities Act (ADA) will grow commensurate to the number of fixed route bus miles expanded on per year.

- Vanpools - The future of the regional vanpool program is expected to grow due to its level of convenience and ease of customization to meet user's needs. Regional sources fund the purchase of the van only, while the operations support for this program comes from local funds, including passenger fares.

Planned High Capacity Transit

High Capacity Transit (HCT) falls into two categories, HCT/All Day and HCT/Peak Period. HCT/All Day typically operates two-way service, seven days a week, and operates in an exclusive guideway. HCT/Peak Period provides higher speed, high volume commuter or regional access. This service typically operates Monday through Friday during the morning and evening time periods. A detailed listing of the timing and cost of planned high capacity service and capital improvements is provided in Appendix D.

- HCT/All Day –Fixed route bus or rail vehicles (e.g., light rail, streetcar) are used for this service, operating solely in an exclusive guideway. Passenger access is available at stations located approximately every half-mile to one mile.

  - *Light Rail Transit/High Capacity Transit:* The RTP includes a 59.7-mile HCT system, which incorporates the Minimum Operating Segment (MOS) and eight future extensions. The amount identified in the RTP from all funding sources for LRT/HCT expenditures during the planning period totals $6.4 billion (YOE $'s). Of this total,

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2035
Regional Transportation Plan
Fig. 10-8

REGIONAL TRANSPORTATION PLAN

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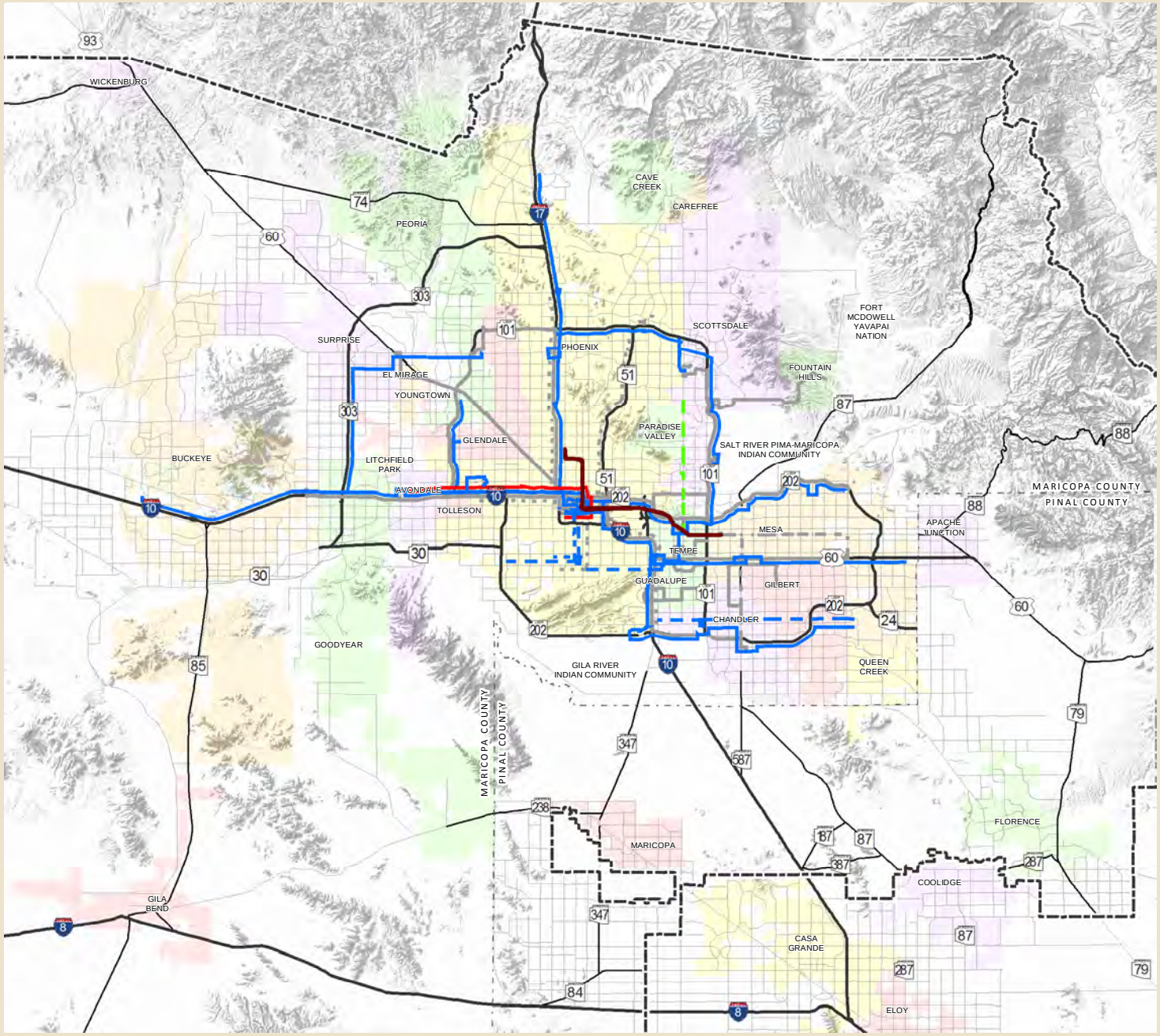
Regional Express/LINK Improvements
(FY 2014 - FY 2035)



Service Type

- Express Routes
- LINK Routes
- RAPID Routes

Phases

- Existing (In Operation as of 2012)
- Group 1 (FY 2014 - FY 2018)
- Group 2 (FY 2019 - FY 2026)
- Group 3 (FY 2027 - FY 2035)
- Highways
- Other Roads
- Completed Minimum Operating LRT
- Metropolitan Planning Area Boundary
- County Boundary

For visualization purposes, current and future services may appear offset from their true alignment.

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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$3.3 billion will be regionally funded and $3.1 billion will be funded from local sources. Proposition 400 half-cent sales tax funding will not be used for operating expenses on any part of the LRT/HCT system. Operating funds, which include farebox receipts, will come from participating jurisdictions.

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 approximately one-half of the funding, with local sources providing the remaining half. An exception is Phase I of the Northwest Extension, which will not be covered by any federal funding. It is anticipated that a small amount of half-cent funds will be applied to these two segments for certain support infrastructure elements.

In addition, provisions are made to fund regional LRT/HCT support infrastructure. Table 10-2 lists the HCT extensions and attributes. Figure 10-9 indicates how services will be phased in over the 22-year planning period.

TABLE 10-2
HIGH CAPACITY TRANSIT/LIGHT RAIL - EXTENSIONS

Extension Route Name, Location	Technology	Length	Year Open
Central Mesa (to Mesa Dr.), Mesa	LRT	3.1	2016
Northwest Phase I, Phoenix	LRT	3.2	2016
Northwest Phase II, Phoenix	LRT	TBD*	2026
Tempe Streetcar, Tempe	Street Car	2.6	2017
West Phoenix / Central Glendale, Phoenix and Glendale	TBD*	5.0	2026
Capitol / I-10 West, Phoenix	LRT	11.0	2023
Northeast, Phoenix	TBD*	12.0	2034
Central Mesa (to Gilbert Rd.), Mesa	LRT	1.9	2018

*TBD – To be determined

- *SkyTrain (Stage One-A):* The SkyTrain (Stage One) 1.7 mile segment from the LRT station at 44th St. to Airport Terminal 4 opened in April 2013. Stage One-A, which continues from Terminal 4 to Terminal 3 for 0.7 miles with a short walkway to Terminal 2, will open in early 2015. In the future, SkyTrain (Stage Two) will extend the SkyTrain an additional 1.8 miles to the Rental Car Center. On April 22, 2009, the MAG Regional Council approved inclusion of Stage Two as an illustrative project in the RTP. The total estimated project cost of $1.6 billion is paid for with airport revenues and passenger fees (no local tax dollars).

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Regional Transportation Plan
Fig. 10-9

REGIONAL TRANSPORTATION PLAN

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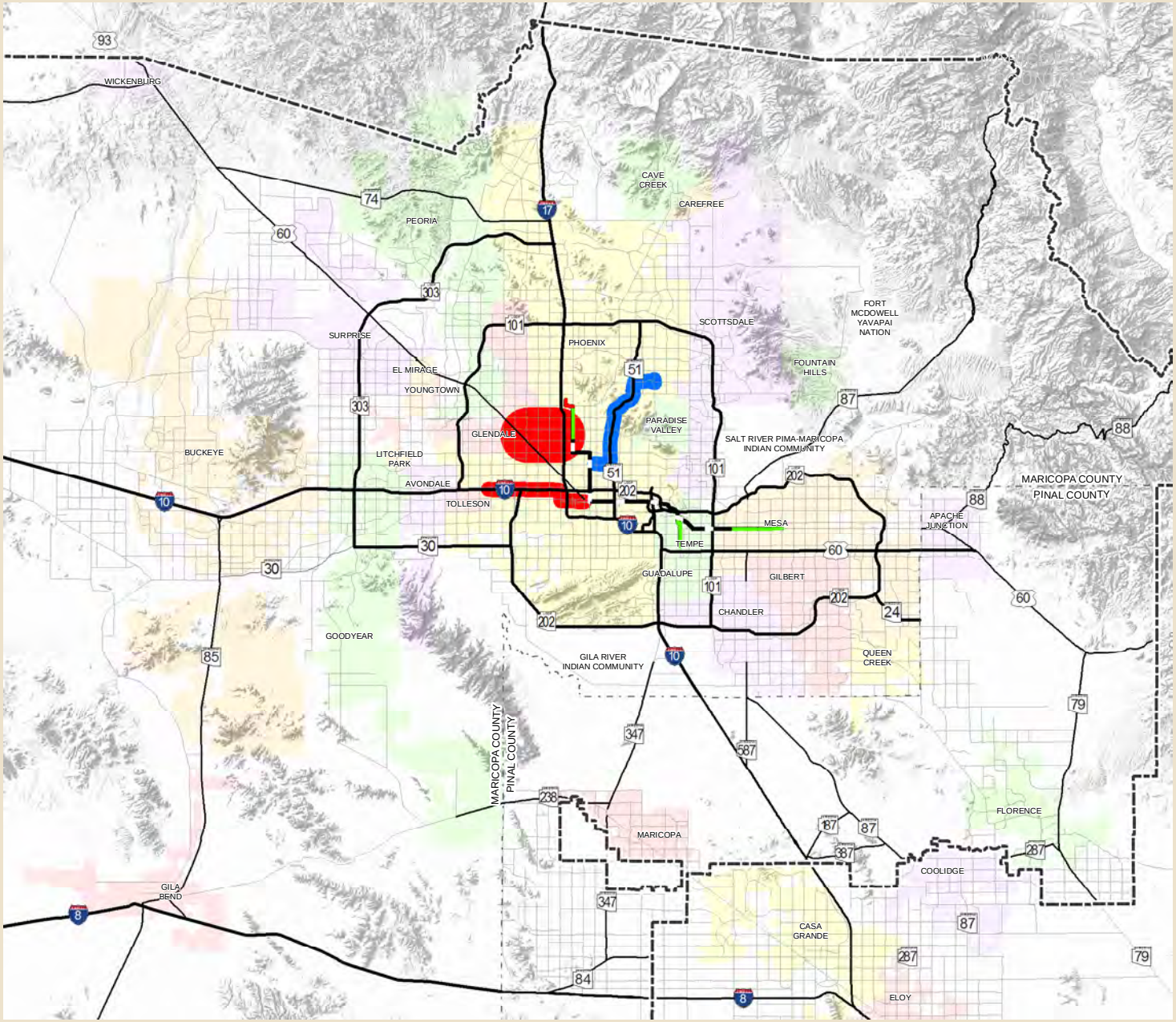
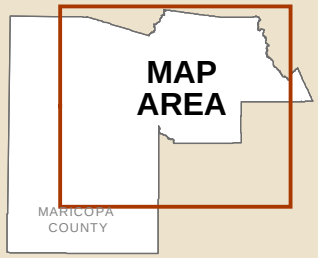
Regional Light Rail Transit (LRT)/ High Capacity Transit Extensions
(FY 2014 - FY 2035)



- Group 1 (FY 2014 - FY 2018)
- Group 2 (FY 2019 - FY 2026)
- Group 3 (FY 2027 - FY 2035)
- Completed Minimum Operating Segment
- Freeways
- Highways
- Other Roads
- Metropolitan Planning Area Boundary
- 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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- HCT/Peak Period - HCT/Peak Period provides higher-speed, high-volume commuter or regional access. HCT/Peak Period generally operates in an exclusive guideway, providing service between park-and-ride locations and major employment centers. This service typically operates Monday through Friday during the morning and evening peak time periods traveling in the peak direction using bus or rail vehicles (e.g., commuter rail). HCT/Peak Period service can utilize either buses or rail vehicles. The MAG region has studied this type of service, but it is not currently provided in the MAG region.

  - *MAG Regional Transit Framework Study:* This transportation framework study identified over 129 miles of potential HCT/Peak Period/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, and has included them as illustrative corridors (see Chapter 16).

  - *Commuter Rail:* MAG has recently completed a Commuter Rail Strategic Plan that will guide future efforts regarding commuter rail service in the metropolitan area. It has also prepared 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. Depending on future development patterns, population densities sufficient to warrant investment in commuter rail may not occur within the current planning horizon of the RTP. However, it will be important to maintain all modal options in the region, especially as continuing land development limits opportunities for developing entirely new high capacity corridors. There are currently no funds identified for implementing commuter rail in the next 22 years.

Planned Facilities, Fleet, and Infrastructure

Future transit operations will depend on the capital facilities, fleet and infrastructure that are necessary to carry passengers to their destinations. This covers not only the vehicles, tracks, stations, bus terminals, and bus stops that are directly used by passengers, but also includes the support facilities that are needed for vehicle maintenance, provide training, and house customer services. It is estimated that a total of $6.8 billion (YOE $'s) will be used for these purposes during the planning period.

- 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.

- Fleet - Over the duration of the planning period, buses and LRT/HCT vehicles will be purchased for fixed route networks, and rural routes. Dial-a-Ride (DAR) vans for paratransit purposes and vanpool vans will also be acquired. These procurements reflect both replacement and expansion vehicles.
- Infrastructure - The RTP allocates funding toward the completion of support infrastructure affiliated with the LRT/HCT extensions. This includes infrastructure for the rail, right of way purchase, park and rides, ITS equipment, etc.

Funding and Expenditure Summary

Table 10-3 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. Sources include farebox receipts, and uses cover both 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 10-3 for the period FY 2014-2035. These sources include the half-cent sales tax ($4.5 billion); federal transit funds ($2.9 billion) and federal Congestion and Air Quality Mitigation funds ($416 million); bond proceeds ($225 million); local/other funding sources, including farebox receipts, ($9.3 billion); and an estimated cash balance of $68 million in regional funds at the beginning of FY 2014. Debt service expenses totaling $381 million are deducted from these sources. This yields a net total of $17.1 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.

Local funding contributions to transit services in the region have been significant in the past and, as noted above, are anticipated to continue to play an important funding role in the future. Based on the "MAG Transit Services Inventory Report, February 2013", it was determined that approximately $247 million in local funding was directed to transit services during 2012. Taking into account population growth over the planning period, this level of participation was projected into the future, resulting in an estimated total of $6.6 billion in potential funding from this source.

Program Expenditures

Table 10-3 also lists estimated future costs for the transit element of the RTP, expressed in YOE $'s. Expected expenditures during the planning period total $17.1 billion. This includes $10.8 billion for bus capital and operating (including vanpool, dial-a-ride, and support services); and $6.4 billion for high capacity transit/light rail transit capital and operating.

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TABLE 10-3: TRANSIT FUNDING PLAN: FY 2014 through FY 2035

FUNDING (Year of Expenditure $'s in Millions)		
		Totals
Regional Funds		
MAG Half-Cent Sales Tax	4,515.5	
MAG Federal Transit Funds	2,937.8	
MAG Federal CMAQ	415.7	
Beginning Balance (Regional Funds)	68.1	
Bond Proceeds	225.0	
Allowance for Debt Service and Other Expenses	(381.4)	
Total Regional Funds		7,780.7
Local / Other		
Fixed Route Bus Fares	1,675.4	
Light Rail Transit/High Capacity Transit Fares	498.1	
Paratransit Vehicle Fares	130.6	
Vanpool Fares	68.1	
LTAF	299.1	
Local Funds	6,602.4	
Total Local/Other Funds		9,273.7
Total Funding		**17,054.4**
EXPENDITURES (Year of Expenditure $'s in Millions)		
		Totals
Regionally Funded Projects		
Capital		
Regional Bus Fleet	1,084.7	
Bus Maintenance and Passenger Facilities	357.4	
Light Rail Transit/High Capacity Transit Regional Infrastructure	350.2	
Light Rail Transit/High Capacity Transit Extensions	3,063.1	
Paratransit (Americans with Disabilities Act, or ADA, compliant)	79.9	
Vanpool	42.0	
Rural/Non-Fixed Route Transit	2.2	
Total Capital		4,979.5
Operating		
Supergrid	1,457.3	
Freeway Rapid Bus and Express Bus	269.2	
LINK Service	148.8	
Regional Passenger Support Services	203.3	
Paratransit (ADA-compliant)	768.5	
Light Rail Transit/High Capacity Transit	0.0	
Rural/Non-Fixed Route Transit	10.5	
Vanpool	68.1	
Planning and Programming	97.5	
Total Operating		3,023.2
FTA Funds Forecast Contingency		(222.0)
Total Regionally Funded Projects		7,780.7
Locally / Other Funded Projects		
Capital		
Local Fixed Route Service	964.2	
Paratransit	52.5	
Light Rail Transit/High Capacity Transit	841.6	
Total Capital		1,858.3
Operating Costs		
Local Fixed Route Bus Service	4,485.8	
Paratransit	694.6	
Light Rail Transit/High Capacity Transit	1,836.2	
Planning, Programming and Other Support	176.8	
Total Operating		7,193.4
FTA Funds Forecast Contingency		222.0
Total Locally/Other Funded Projects		9,273.7
Total Expenditures		**17,054.4**

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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 flights around the United States that supplement Phoenix Sky Harbor International Airport. A map of all the airports in the MAG region 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.

2035 Regional Transportation Plan

Fig. 11-1

REGIONAL TRANSPORTATION PLAN

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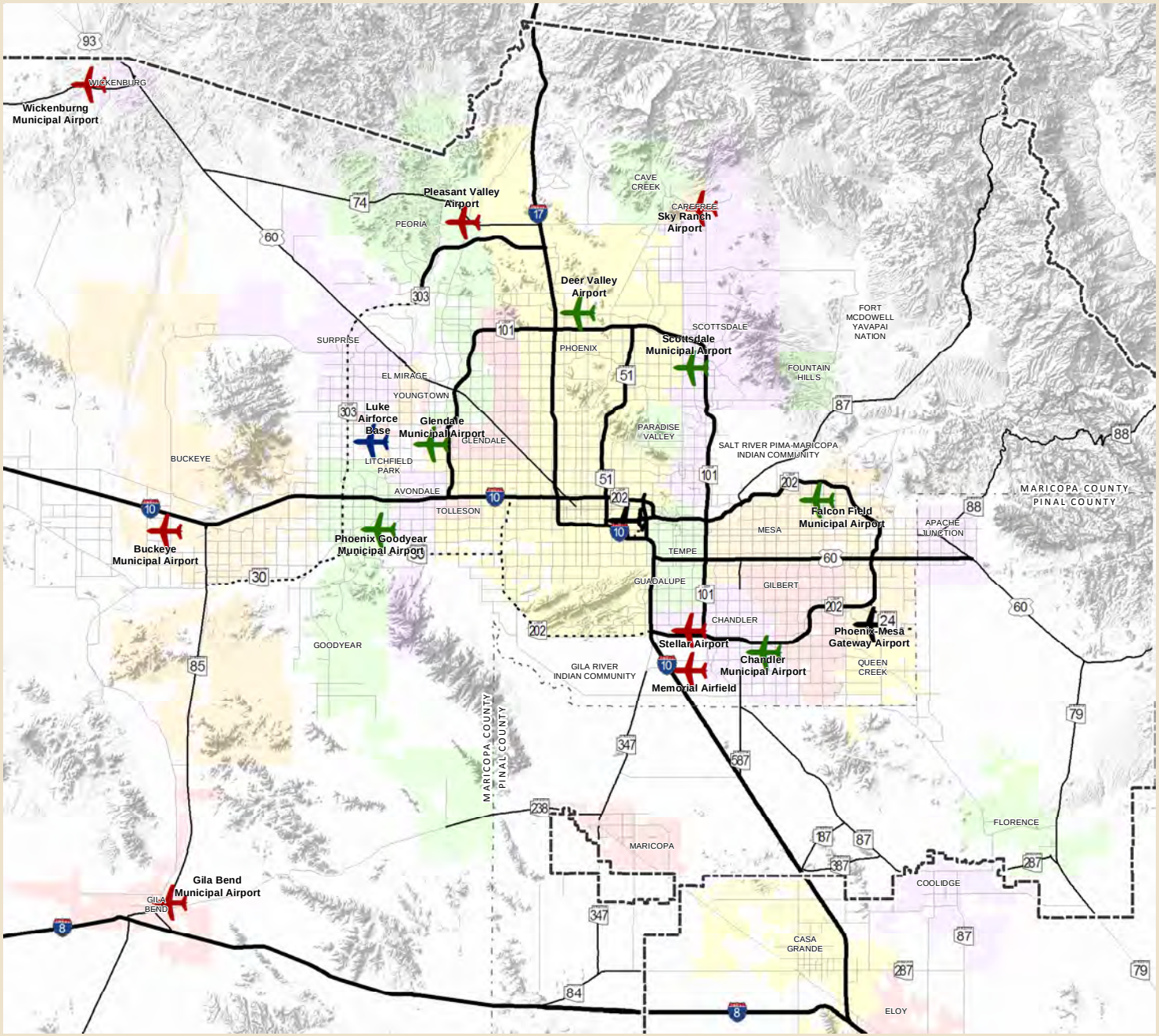
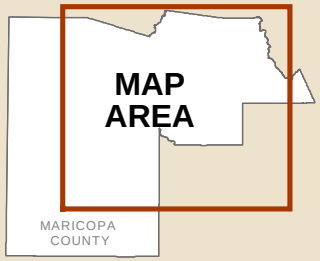
Regional Aviation System



- Commercial Service
- Military
- General Aviation Reliever
- General Aviation
- Existing Freeway
- Planned Freeway/Highway
- Highways
- Metropolitan Planning Area Boundary
- 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. 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. The MAG Regional Bicycle Task Force was responsible for assisting in the development of the original MAG Bicycle Plan in 1992. 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. In 2001, MAG combined the groups to form the MAG Bicycle and Pedestrian Committee.

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

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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 2012 MAG Unified Planning Work Program and Annual Budget, included $200,000 for the Bicycle and Pedestrian Design Assistance program. The Design programs allow MAG member agencies to apply for funding for the preliminary engineering portion of a bicycle or pedestrian project including shared-use pathways.

The MAG program was initiated in 1996 as the Pedestrian Design Assistance Program 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 to assist 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.*

As of the end of 2012, there have been 57 projects that have been or are currently in design. Design fees expended are $3,448,508 and this has garnered over $25,003,949 in construction funds.

Complete Streets Guide

MAG completed a Complete Streets Guide in 2011. The purpose of the Guide 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. The Guide contains Complete Streets goals, strategies and a planning process. Complete Streets contribute to the overall capacity of a street, to an increase in property values, health of individuals and create a sense of place.

MAG Regional Bikeways Map

Every three years MAG develops and prints a regional bikeway map indicating bike lanes, shared use paths, off street trails, and canals. The map also presents bike education information including the Arizona State Law and information on taking a bike on the bus and on the light rail. The map also includes photographs of desirable bicycling locations. In 2012, MAG expanded the print version to include an electronic version for the smart phone.

Funding for Bicycle and Pedestrian Projects

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. Funding specifically for bicycle and pedestrian projects from regional sources totals $187 million (YOE $'s). This funding is provided from MAG CMAQ funds and requires a 5.7 percent local match.

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 from both local and regional sources and is accounted for in Chapter Nine - Arterial Streets. It is not possible to separate out the individual cost of adding new through vehicle lanes and bicycle improvements in the same project.

CHAPTER THIRTEEN

FREIGHT PLANNING

Freight transport involves a complexity of networks and users who use a variety of methods, modes, and equipment to move raw materials, and processed goods through regional, national and international markets for the purpose of commerce. 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 issues are very complex and usually are not restrained by a county border or to a state. Supply chains, market demand and competitive transportation corridors are constantly changing, requiring neighboring regions and countries to collaborate and create unified plans for moving freight efficiently and keeping the region globally competitive.

The movement of goods into, within, and out of the region is vital to the regional economy. In 2010, the Maricopa Association of Governments, Central Arizona Association of Governments, and the Pima Association of Governments formed the Joint Planning Advisory Council (JPAC) to look at long range planning efforts for the three contiguous counties. In 2012, The JPAC completed the MAG Freight Transportation Framework Study which evaluated the freight-related economic development opportunities for the Sun Corridor (Maricopa, Pinal and Pima Counties) and is referenced frequently in this chapter.

Commodity Flow Overview

Arizona has historically served as a conduit for imported goods moving through the Ports of Los Angeles and Long Beach to U.S. destinations. Southern California is a major gateway for international trade, especially trade with China, and much of those imports move through Arizona by rail or truck. Other imports that move from the ports to Southern California's Inland Empire for transloading, value added services, or later distribution also largely move through Arizona by rail or truck. These patterns have become more pronounced over the last decade as China's share of imports has increased, and especially as Mexico's share has declined. While Arizona is not likely to become the new Inland Empire, possible shifts in U.S. sourcing (e.g. back to Mexico) could change the dynamics of value and supply chains for specific industries and products.

Mexico is the United States' third biggest trading partner in import value and second in exports. The fact that the Sun Corridor directly imports less than one-half percent of many consumer oriented goods imported through the Arizona ports of entry from Mexico, offers some indication of potential opportunities for modifying distribution networks, especially if the sourcing of imports into the U.S. from Mexico increases.

The majority of inbound goods movement into the Sun Corridor is comprised of mostly domestic cargo. Accounting for 37.5 million tons and an aggregate value of $107 billion, the major commodities moved are high value manufactured goods, such as transportation

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equipment, pharmaceuticals and electronics, and food and beverage products. This commodity flow is very typical of a strongly consumer based regional economy.

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.

Trucking and Motor Freight

Every part of the United States has a vital interest in having an efficient motor carrier system. Goods movements across the U.S. rarely complete their journey from origin to destination without relying upon a truck or motor freight carrier for a segment of the trip. The MAG Freight Transportation Framework Study identified the vital importance of trucking and motor freight to Maricopa County and the Sun Corridor, with the majority of cargo being shipped into and out of the region taking place on trucks.

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

- Truck Freight Flows - Figure 13-2 illustrates the distribution of containerized freight by mode based on tonnage shipped nationally in 2009. Figure 13-2 clearly illustrates the significance of trucking and motor freight in goods movement in the U.S. with approximately two-thirds of all commodities moving by truck (truck and LTL). As shown in Figure 13-3, this pattern is consistent with the nature of goods movement in the MAG area, although trucking represents an even higher share of goods movement in this region. 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.

- Highway Network - The highway network provides the underlying infrastructure that

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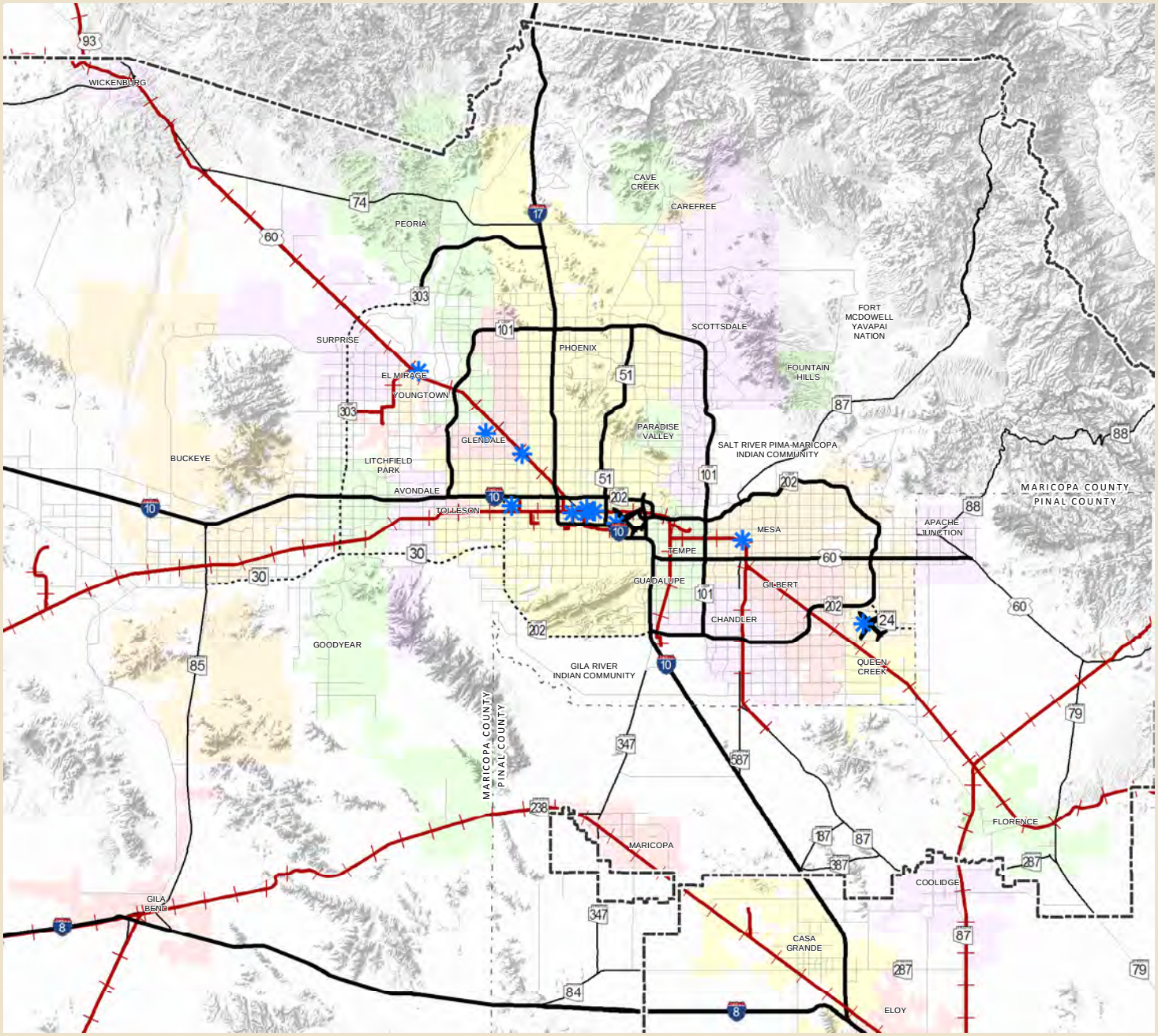
2035
Regional Transportation Plan

Fig. 13-1



Source: MAG Regional Freight Assessment

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

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REGIONAL TRANSPORTATION PLAN

MARICOPA ASSOCIATION of GOVERNMENTS

Regional Freight Infrastructure

- Intermodal Facilities
- Cargo Airports
- Existing Freeway
- Planned Freeway/Highway
- Highways
- Railroads
- Metropolitan Planning Area Boundary
- County Boundary

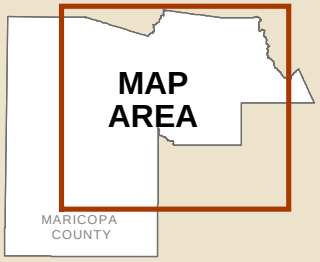

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FIGURE 13-2
U.S. MODAL DISTRIBUTION of CONTAINERIZED FREIGHT (for 2009 by Tonnage)

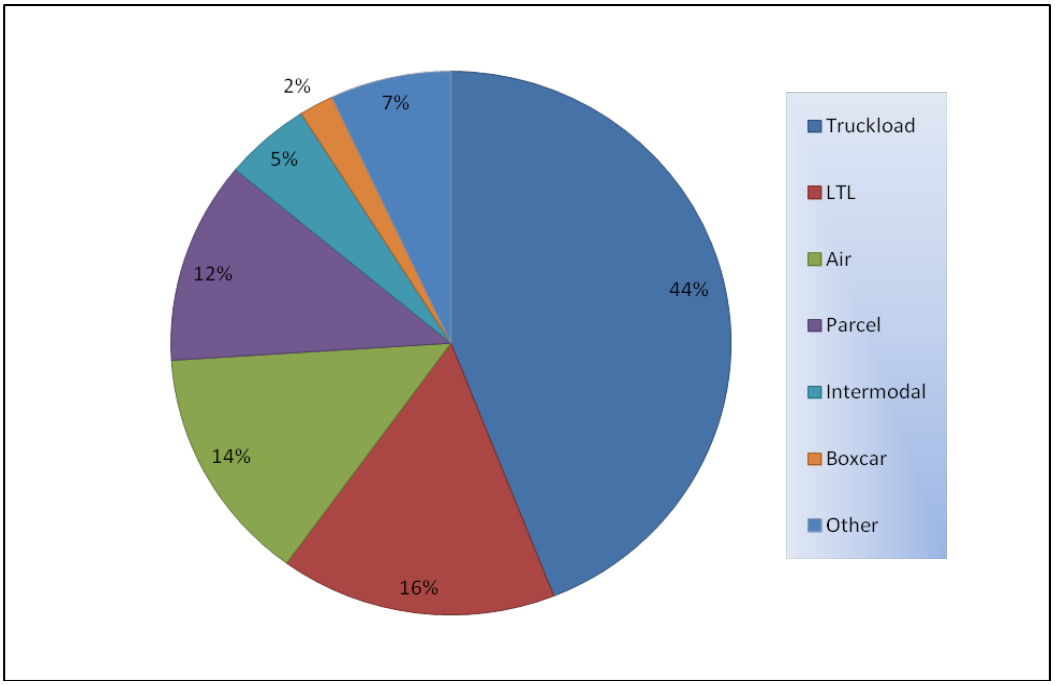
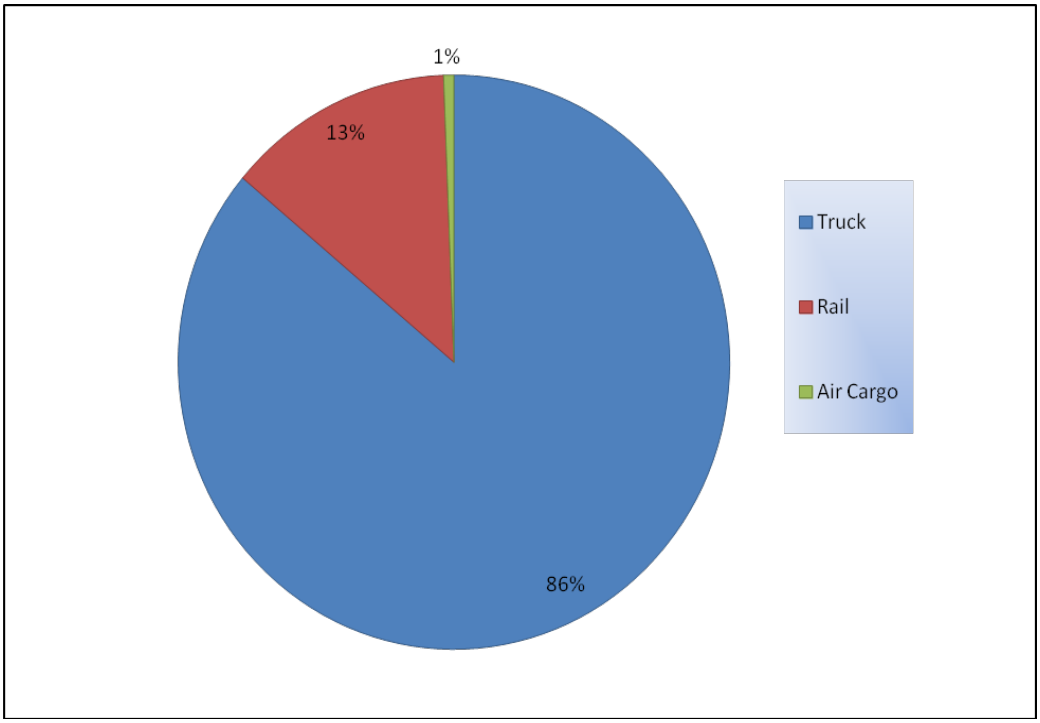


FIGURE 13-3
TOTAL INBOUND AND OUTBOUND FREIGHT FLOWS in the MAG REGION
(by Mode - Total Tons)



Source: Reebie Associates, Maricopa Association of Governments

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supports the movement of goods by truck and therefore represents a critical element of the goods movement system. Conversely, the movement of goods on the highway system creates impacts that can affect traffic flows and the ability to maintain the system. Achieving a balance between the need to facilitate cargo shipments on the highway system without excessively burdening other users of the system and the facility owners represents a major challenge in the context of goods movement.

There are approximately 55,000 total road miles within Arizona. Interstate Highways comprise 2.1 percent of the total state system mileage, but represent 25.5 percent of the total travel volumes. The highest volumes of truck travel within the state are also on Interstate Highways, specifically Interstates 10, 17, 19, and 40. Interstate 8 is also a significant segment, but has a comparatively lower volume of truck travel. Several factors affect the movement of truck freight on the highway system, including number of roadway lanes, areas of traffic congestion, locations of steep grades and connectivity between major traffic generators (like adjacent metropolitan areas).

- Potential Bottlenecks - A study by the American Transportation Research Institute (ATRI) in cooperation with the Federal Highway Administration (FHWA) Office of Freight Management and Operations indicates that three Sun Corridor interchanges ranked among the 100 worst in the nation specifically for goods movement.* These include the I-10 and I-17 interchange, also known as "The Stack", in Phoenix (ranked 36), I-10 and I-19 interchange in Tucson (ranked 78) and the I-10, SR-51 and SR-202 interchange, also known as "The Mini-Stack", in Phoenix (ranked 86). Results of the 2007 MAG Travel Time and Travel Speed Study reiterate the ATRI study findings by highlighting the duration of congestion at bottleneck location within the Phoenix metropolitan area. Various locations along I-10 and I-17, in particular, present challenges for reliable goods movement to, from and through Maricopa County and the Sun Corridor.

* Freight Performance Measures, 2009 Bottleneck Analysis of 100 Freight Significant Highway Locations. American Transportation Research Institute (ATRI) and the Federal Highway Administration (FHWA) Office of Freight Management and Operations

Railroads

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.

Train inbound frequencies are higher than outbound frequencies. This imbalance in rail service frequencies reflects MAG region's economic status as a predominately consumption center. This imbalance also increases the cost of shipping goods to Maricopa County versus from the Maricopa County, because of the additional cost incurred by the railroads to "deadhead" equipment back to the service origins after delivery to Arizona.

- BNSF Rail Network - BNSF's "Transcon" line moves across the northern part of the State of Arizona connecting Chicago to Los Angeles. This double track route passes through as well as serving Kingman, Williams, Flagstaff, Winslow, Holbrook and other northern Arizona communities. BNSF has access to Phoenix through its Phoenix Subdivision, otherwise known as the Peavine. The Peavine is a 209 mile line that connects with the Transcon at Williams Junction west of Flagstaff. The line is a single track with a maximum train speed of 49 miles per hour due to the condition of the track. The restricted speed coupled with the single track limits the capacity of the line.

  In addition to providing direct service to rail customers in the Phoenix metropolitan region with sidings, BNSF also accesses several modal transfer facilities. BNSF also operates an intermodal container and trailer terminal in Glendale with an annual lift capacity of approximately 150,000 units. The terminal principally serves the domestic market with scheduled container and trailer services between Phoenix and Chicago, Kansas City, and Alliance, TX.

- Union Pacific (UP) - UP's "Sunset Corridor" connects Southern California to El Paso, Texas, and on through the State of Texas and Midwest to Chicago. The Sunset Corridor is UP's principal corridor connecting the Los Angeles Basin, including the Ports of Los Angeles and Long Beach with markets in the Midwest and East. The line serves communities and economic centers in the southern part of the State of Arizona. The UP also has direct access to markets in Mexico through its Nogales Subdivision that connects Tucson to Nogales, Mexico. At the US/Mexico border near Nogales, the UP connects with Ferrocarril Mexicano (Ferromex) giving the railroad (and the region) access to the maquiladora industry and Mexico's industrial centers. Ferromex also serves the Port of Guaymas. Despite the crossing location at Nogales, currently, the majority of UP's Mexico traffic flows through the U.S. Ports of Entry at Laredo, Texas (37 percent) and Eagle Pass, Texas (32 percent). Nogales is UP's third largest border crossing with 12 percent of the traffic.

  While UP serves Tucson and Pinal County directly through the Sunset Corridor, UP, like BNSF accesses the Phoenix area by a lesser used line, the Phoenix Subdivision. This 125

mile route connects to the Sunset Corridor near Eloy and terminates at a point west of Arlington, west of Phoenix. Maximum operating speed on the line is 60 mph with train activity currently at less than 10 trains per day. Union Pacific serves three transload facilities in the Sun Corridor.

- UP Wellton Branch Line - The UP Phoenix subdivision includes a line segment, the Wellton branch, that provides another linkage between Phoenix and the Sunset Corridor connecting at Wellton Junction, Arizona. Besides UP freight trains, Amtrak at one time operated over this line. Currently, the Wellton branch is inactive between Roll and Arlington, although the line is still in place. That portion of the line was removed from operation in 1997 when UP modified its operations to serve Phoenix over the east leg of the Phoenix subdivision.

  With the closure of the Wellton branch, freight traffic destined for the Phoenix area is delivered to UP's yard in Tucson by a mainline train. There it is consolidated with other traffic into a train for delivery to Phoenix. The opposite occurs for traffic originating in Phoenix. A new Red Rock, Arizona yard is intended to improve and expedite the classification process.

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. Most airports with scheduled commercial passenger service have some level of freight activity in the form of belly cargo. Freight forwarders are generally active in every market, and integrated express services like UPS and FedEx serve all major airports within the Sun Corridor. The major difference in the services between airports is the frequency of service and the size of aircraft utilized.

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. These airports each have a runway with sufficient length to accommodate take off and landings for a smaller Integrated Express Carrier or All-Cargo Carrier jet such as a Boeing 727 aircraft (minimum runway length of 5,800 feet). Both of the airports have the ability to accommodate larger freighter aircraft that would likely be flown by an Integrated Express Carrier or All-Cargo Carrier utilizing an airport facility for a hub operation, such as a McDonnell Douglas MD-10 or Boeing 747 aircraft (runway length greater than 9,800 feet). Such a hub operation would include package sorting facilities rather than straight transfer of packages to trucks.

In addition to the runway length, factors that would influence the selection of one of these airports as a hub for air cargo could include air traffic control during night time hours, available land on or surrounding the airport for sorting facilities, roadway access to the interstate system

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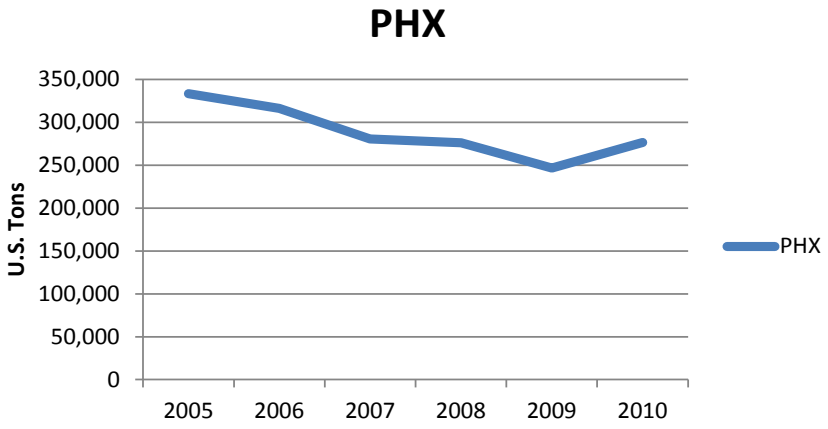
and environmental concerns such as noise control. The following bullets provide a brief description of current cargo shipments and the potential of air cargo hub operations at the two airports operating air freight service in the MAG Region. Currently, only Sky Harbor Airport in the MAG region has scheduled air cargo service.

- Phoenix Sky Harbor International Airport (PHX) – This facility is located about three miles southeast of the central business district of the City of Phoenix. In 2010, the total cargo and air parcel operations represented 276,338 standard tons, which is a 12.1 percent increase compared to 2009. About 20 percent of the airport's freight is shipped through belly cargo in commercial airliners while 80 percent is shipped via several cargo airlines, such as ABX Air, Astar Air Cargo, FedEx, and UPS. The company Ameriflight uses the airport as a hub. Officials do not intend to build additional cargo facilities, instead preferring expansion to Phoenix-Mesa Gateway to serve the metropolitan area. The airport is a designated Port of Entry and Service Port, and as one of the busiest airports in the U.S. is categorized with Class B airspace.

  Figure 13-4 presents air cargo activity from 2005 to 2010 at PHX, including weight of air mail, air express, and air freight, in revenue ton miles for U.S. commercial carriers. Figure 13-4 clearly indicates the effects of the recent economic recession on air cargo shipments between 2005 and 2009, at PHX, and the modest increase in cargo shipments during the last year as the economy recovers.

FIGURE 13-4
AIR CARGO ACTIVITY FOR SKY HARBOR AIRPORT



Source: Phoenix Sky Harbor International Airport; July 2011

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- Phoenix-Mesa Gateway (IWA) – This facility is located in the City of Mesa, southeast of the City of Phoenix. Currently, air cargo service consists of unscheduled charter flights. The 2009 Airport Master Plan forecasts that in the short term, Phoenix-Mesa Gateway Airport will host daily cargo service by two feeder aircraft and one jet freighter the size of a Boeing 727. The airport is a designated Port of Entry as a User Fee Airport with a fee charged for use of Customs and Border Protection services. IWA is categorized as Class D airspace signifying airport tower controlled airspace.

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.

Regional Freight Planning

In 2012, MAG in cooperation with the Joint Planning Advisory Council (JPAC) completed the Freight Transportation Framework Study. The goal of the Freight Transportation Framework Study was to identify freight related economic development opportunities in the Arizona Sun Corridor. The framework study completed an extensive freight survey that: (1) included 2,500 shippers and carriers across the United States, (2) conducted phone and in-person interviews with local freight stakeholders, (3) evaluated commodity flows and truck rates, (4) identified 16 freight focus areas, (5) analyzed the industry real estate market, (6) completed a detailed assessment of four emerging focus areas that included the evaluation of the industry market, land use plans (existing and future), inventory of existing businesses, education, travel times, commodities, transportation infrastructure and economic development incentives.

The Freight Framework study also presents the results of a detailed evaluation of commodity flows affecting the Sun Corridor, with a particular focus on goods movements between Mexico, sources in the southeast United States and markets along the West Coast. A screening of potential freight focus areas leads to the determination of freight related opportunities within the region, including the designation and evaluation of area typologies representing differing relevant majority use types that would support an enhance role for the Sun Corridor in the global supply chain.

Supply Chain Opportunities

Figure 13-5 illustrates the "Big Picture" for supply chain opportunities in the Sun Corridor. As depicted in Figure 13-5, the Sun Corridor is strategically located to serve as an import distribution gateway for nearshored products being imported from Mexico, and as a mixing center pooling international goods with products from points of origin in the southeastern U.S., including the maritime ports along the Gulf Coast. The Sun Corridor represents the only major anchor market in the 1,500 miles between Southern California and Houston providing opportunity to serve as a local warehouse and distribution center. Furthermore, existing and proposed transportation connectivity to Southern California and other West Coast, Mountain West and North West Markets makes the Sun Corridor convenient to serve as a major forward distribution hub.

FIGURE 13-5

SUN CORRIODOR SUPPLY CHAIN OPPORTUNITIES

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Important Distribution Centers

The strongest opportunity for the Sun Corridor is to serve as a hub first for import distribution centers (IDCs) staging nearshored products from Mexico. The IDCs would be anchored by the huge local market offered by the population of the Sun Corridor and act as the logistical control and jumping-off point for products bound primarily for the western U.S. and beyond. Supply chain staging serves multiple purposes, from value-adding functions like product modification and packaging, to market response functions like acceleration and change of ultimate destination. Furthermore, these IDCs could be expanded into larger roles as mixing centers.

These centers would pool Mexican imports with products moving westward to Pacific Coast markets on the I-8, I-10 and I-40/I-15 corridors, and emanating from domestic manufacture and the Gulf Coast and Atlantic Coast ports. The pooled goods would benefit from the full range of staging functions, and ultimately would be consolidated for local and west coast delivery by truck, rail, or air. IDCs combined with or converted into mixing centers would begin to develop the Sun Corridor into the local and Pacific Coast distribution hub for westbound products, a position it has not held in the past.

Potential Freight System Initiatives

In order to capitalize on the opportunities for the development of IDC's, the goods movement system needs to provide: rapid time to market, low delivered costs, and minimization of risk. In addition to development of modern distribution properties well-situated for access to local and long-distance markets, these requirements suggest several elements to start with:

- Reduction in border-crossing delay, so that Nogales offers one of the most productive logistical operations on the border.

- Efficient connection straight through from Nogales to Sun Corridor IDCs, both for physical freight and for supply chain and customs tracking information. This could include utilization of Mexican truck fleets for the short 66 miles from the international border through to Tucson.

- Security strengthened by the same tracking information, so that risk to the public and to supply chains is minimized.

- High quality access to multimodal connections: to air freight, to more rail, and to reliable truck capacity, enhanced because the region can begin to offer a greater volume of outbound freight, capitalizing on the current imbalance toward inbound shipments.

- Ample capacity on multimodal corridors, potentially including the proposed Interstate 11, whose conceptual configuration effectively supports the Sun Corridor's development as a hub for westbound distribution.

Future Freight Planning

Building on the findings from the Freight Transportation Framework Study, MAG will be initiating, in late (FY) 2013, the MAG Freight Plan, which will analyze the flow of goods through Maricopa County, identify hazardous cargo routes, freight sub-corridors, bottlenecks, and link freight corridors to major clusters located throughout the region. This effort will be structured to complement the freight infrastructure needs identified in the Freight Transportation Framework Study, and advance the effort to stake out a prominent role in global freight distribution for the MAG region and the Sun Corridor.

In particular, the planning approach will emphasize the development of a freight system and supply chain functions that focus on the three drivers for opportunities in the Sun Corridor: (1) ascendance to major market status, (2) threshold position on West Coast bound trade routes, and (3) the rise of nearshoring.

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. In the MAG region, human services transportation is facing increasing demand but available funding for services is decreasing. It is estimated our region will grow to 4.5 million by 2020 and to 5.4 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.

These conditions represent an ongoing 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 2010 U.S. Census reports 12.5 percent of residents in Maricopa County are aged 65 and over. By the year 2020, approximately 15 percent of the residents in the region will be age 65 or older. Of this number, approximately forty percent will be 75 years 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 2011 American Community Survey (ACS) one-year

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estimates reports 9.9 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 2011 American Community Survey one-year estimates reports 17.4 percent of people in the region live below the poverty level.* Income affects access to a variety of resources, including transportation. People with low incomes 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 that address job access and reverse commute issues are 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

To address the mobility needs of older adults, 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.

The MAG Municipal Aging Services Project (MASP) also addresses the transportation needs of older adults in the region. MAG engaged community stakeholders to determine current and projected transportation needs, preferred transportation modes, and ways to provide input to MAG and local governments. The information gathered helped to develop a toolkit that identified best practices and offers resources for local government to address the needs of older adults. The work of these projects will guide changes in the community to help people lead more social, active lives and allow greater opportunity for aging in place.

*It should be noted that the estimates on disability and poverty levels differ from those in Table 5-1, due to data sources. The values in Table 5-1 are from the 2010 Decennial Census and the 2000 Decennial Census. These sources were utilized because of the need for data on the geographic distribution of communities of concern. The estimates stated in the above text are one-year ACS estimates, which do not distribute data at the census tract level.

Human Services Transportation Coordination Planning

As a condition for receiving formula funding under certain Federal Transit Administration programs, proposed projects must be included from a locally developed Public Transit/Human Services Transportation Plan. According to Moving Ahead for Progress in the 21st Century federal regulations, there is a need to provide short-term strategies specifically for applicants of Section 5310. While an agency applying for this funding is required to comply with these strategies, all agencies providing human services transportation have been encouraged to utilize these concepts.

- Public Transit/Human Services Transportation Plans - 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 strategies for addressing the needs as revealed by the gaps analysis are included and tracked in every plan. Each plan builds on the success of the previous 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 have been approved from 2008 through 2013. 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.

- 2007 Plan - The 2007 Public Transit/Human Services Transportation 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. This alignment of regional and national synergy gave additional energy and influence to local coordination efforts.

- 2008 Update - 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

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Ambassador Program (TAP) 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 helped to lay the foundation for the program to continue.

- 2009 Update - The 2009 Update focused on maximizing resources and reducing unused capacity to coordinated effort among agencies to meet the demands of an increasing population. An inventory of agency travel training programs in the region was completed. The inventory is leading to a better understanding of the availability of programs, better coordination, and the development of new programs to fill gaps in service. The inventory provided information on agencies that offer, or would be willing to offer, travel training to others outside of their agency.

- FY 2010-2011 Update - The FY 2010-2011 Update integrated changes to include data from fiscal year activities for use in analyzing gaps in the region along with the inclusion of long-term strategies to ensure the sustainability of coordination planning efforts. The update focused on utilizing existing programs such as available grant opportunities and alternative transportation options to support human services transportation activities. Providing information on available grants increases opportunities for agencies to provide services for their clients. The use of vanpools and travel training to clients of non-profit agencies provides the targeted population access to their community, services, social and recreational activities, and to necessary medical appointments. The long-term strategy focused on utilizing more taxi cab and mileage reimbursement programs for areas where transportation services are unavailable and/or insufficient. The result was an increase in the awareness of programs and resources that are already available in the community to assist consumers in areas with less transportation infrastructure who once relied on public transit which has been reduced or is no longer available

- FY 2011-2012 Update - The FY 2011-2012 Update focused on strengthening the coordination efforts with stakeholders in the community such as Title VI stakeholders, the private sector, and the Native Community. Domestic violence and homeless shelters were engaged to identify and map their clients' travel needs. The goal is to provide better access to transportation that supports their employment and work-preparation activities. Discussion of the issue of insurance policies as a barrier for agencies to collaborate on transportation services was explored to offer support of coordination efforts among agencies. An inventory of human services transportation providers' vehicle usage offered insightful information to aid in the better utilization of vehicles and improve services for clients. An inventory of volunteer drivers programs was a long-term strategy to identify programs throughout the region as possible transportation alternatives. Outreach to private sectors, Native Communities, homeless and domestic violence shelters enhances regional coordination planning efforts. Researching travel training programs, exploring insurance policy concerns, and inventorying the usage of

agency's vehicles provides valuable resources to address transportation needs in the community.

- FY 2012-2013 Update - The goal of the FY 2012-2013 Update is to maximize the capacity of the current system by providing more rides for the targeted populations with the same or fewer resources. The following strategies will achieve this goal and enhance coordination efforts throughout the region.

  - Provide a Human Services Transportation Resource Webpage: Design a web page to accommodate the MAG Human Services Provider Inventory with searching capabilities. This addresses the United We Ride goal of simplifying consumer's access to transportation by providing information regarding human services transportation resources that are available in the region. MAG, the Arizona Department of Transportation (ADOT), and Valley Metro will collaborate on elements necessary for an interactive inventory. Progress will be reported at TAP meetings.

  - Address the Issue of Insurance: Continue to address insurance as a barrier for agencies to coordinate services addresses the United We Ride goal of streamlining regulations that impede the coordinated delivery of services. Research policies involving using drivers from other agencies to transport consumers with varying abilities. In collaboration with ADOT, insurance companies, and behavioral health stakeholders, identify the gaps and possible solutions. Progress made will be reported to the MAG Human Services Coordinating Committee and TAP stakeholders.

  - Engage Small and Rural Communities: Outreach to community members enriches the coordination activities for the region. Engaging at least 10 new stakeholders in small and outlying communities to participate in TAP meetings, attending five human services community meetings and developing a TAP information flyer to disperse at community events will further outreach efforts. Increasing the number of additional stakeholders will provide additional resources for human services transportation and coordination activities to support the United We Ride initiative to simplify customer access to transportation.

  - Utilize Sub-Regional Mobility Managers: Due to the size of the region, four sub-regional mobility managers provide a network of coverage for regional coordination efforts. Three sub-regional mobility managers have been identified -- one in Central Phoenix, the Northwest Valley, and the East Valley -- with a fourth yet to be determined in the West Valley. Increasing communication and the utilization of mobility managers offers the opportunity for collaborating on human services transportation efforts and support across the region. The impact will provide an opportunity for more nonprofit agencies to participate in

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collaborative efforts and improve the efficiency of services using existing resources of providing more rides for the same or fewer resources.

- Facilitate One-Call Center Dialogue - Facilitating regional dialogue about establishing a one-call center to coordinate the scheduling and dispatch of paratransit services for older adults and people with disabilities benefits consumers in the region. Providing at least two presentations on national best practices at local events will aid with the discussion of a one-call center. This is consistent with the goal of the United We Ride initiative to reduce duplication of transportation services and improve the efficiency of services.

The plan's strategies are consistent with the goals of the United We Ride initiative to simplify customer access to transportation, reduce duplication of transportation services, and streamline federal rules and regulations that may impede the coordinated delivery of services, and improve the efficiency of services using existing resources to provide more rides for the same or lower cost. Following these guidelines, the Human Services Coordination Transportation plans have provided a continuum of efforts to ensure the transportation needs of the vulnerable population that includes older adults, people with disabilities and people with low-income are met.

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CHAPTER FIFTEEN

TRANSPORTATION ENHANCEMENT ACTIVITIES

The Transportation Enhancement Program is designed to strengthen the aesthetic, cultural and environmental aspects of the region's intermodal transportation system. MAG enhancement projects have focused on the provision of facilities for pedestrians and bicycles, and landscaping. Many of these projects also have strong intermodal ties to regional transit activities. MAG is working closely with ADOT to identify procedures for transitioning enhancement project funding from SAFETEA-LU to MAP-21.

Transportation Enhancement Projects

Within the MAG Region, the majority of enhancement 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 the MAG Region, funding has been awarded for multi-use or shared use pathways along existing routes and canals, including projects for sidewalks and pedestrian crossings; 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 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.

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.

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Enhancement Project Selection

The application review process for applicants within the MAG Region occurs at two different levels. One review process occurs at MAG internally, and the other occurs at the state level (ADOT). 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

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Council for approval. After review, the Regional Council forwards the list to ADOT for further project review and selection at the state level.

After project applications are received by ADOT, the applications are then subject to a State review process. 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 mets 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 considers and approves the TERC rankings. After a project had been awarded funding, the applicant is invited to an ADOT project scoping meeting to initiate the project development process.

Funding of Transportation Enhancement Projects

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 were required to have a direct relationship to all elements of the intermodal surface transportation system, with the exception of aviation activities. Under federal transportation legislation known as the Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users (SAFETEA-LU), transportation enhancements funding came directly to the State of Arizona (ADOT).

On July 6, 2012, President Obama signed into law P.L. 112-141, the Moving Ahead for Progress in the 21st Century Act (MAP-21). Funding surface transportation programs at over $105 billion for fiscal years (FY) 2013 and 2014, MAP-21 is the first long-term highway authorization enacted since 2005. MAP-21 builds on and refines many of the highway, transit, bike, and pedestrian programs and policies established in 1991.

MAP-21 establishes a new program to provide for a variety of alternative transportation projects that were previously eligible activities under separately funded programs. This program is funded at a level equal to two percent of the total of all MAP-21 authorized federal-aid highway and highway research funds, with the amount for each state set aside from the state's formula apportionments. Unless a state opts out, it must use a specified portion of its Transportation Alternatives (TA) funds for recreational trails projects. Eligible activities include:

- Transportation alternatives (new definition incorporates many transportation enhancement activities and several new activities).
- Recreational trails program (program remains unchanged).
- Safe routes to schools program.

- Planning, designing, or constructing roadways within the right-of way of former Interstate routes or other divided highways.

Fifty percent of TA funds are distributed to areas based on population (suballocated), similar to the Surface Transportation Funds. States and MPOs for urbanized areas with more than 200,000 people will conduct a competitive application process for use of the suballocated funds; eligible applicants include tribal governments, local governments, transit agencies, and school districts. Options are included to allow states flexibility in use of these funds.

MAG is working closely with ADOT to interpret the new TA program and identify procedures for transitioning enhancement project funding from SAFETEA-LU to MAP-21. This includes determining the amount of funding available for enhancement projects, addressing enhancement projects already "in the pipeline", and developing revised procedures for prioritizing and selecting enhancement projects in the future.

Projecting long range funding for a new program such as Transportation Alternatives is somewhat tenuous, particularly since MAP-21 only covers FY 2013 and 2014. However, based on the funding expected in FY 2014 under MAP-21 and a conservative annual growth rate of 1.9 percent, $112 million (YOE $'s) in federal monies has been projected to be available for TA projects during the RTP planning period (FY 2014 - FY 2035). Including a local match of 5.7 percent, this funding would total approximately $119 million (YOE $'s).

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 been updated periodically 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.

Interagency Coordination

The 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

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transportation corridors to address regional and statewide connectivity. As part of this effort, MAG developed transportation study partnerships with the Central Arizona Association of Governments (CAAG), the Pima Association of Governments (PAG), and their member agencies. Another example has been coordination on data collection and population forecasting covering Maricopa, Pinal and Pima Counties. These three core counties of Arizona are often referred to as the "Sun Corridor" (see Figure 16-1).

Joint Planning Advisory Council

On December 17, 2009, MAG, PAG, and CAAG signed a resolution stating their desire to jointly coordinate planning efforts in the Sun Corridor, creating the Joint Planning Advisory Council (JPAC). These three agencies are located adjacent to one another with linked economies and acknowledge that regional planning issues transcend jurisdictional boundaries. On May 9, 2013, the Governor of Arizona approved an expanded metropolitan planning area (MPA) boundary for MAG that takes in areas in Pinal County, including Maricopa, Florence and unincorporated portions of the County (see Figure I-1). In addition, a new metropolitan planning organization (MPO) was formed in Pinal County (Sun Corridor MPO or SCMPO), generally encompassing the incorporated communities of Casa Grande, Coolidge, and Eloy, as well as surrounding unincorporated areas in Pinal County. It is anticipated that SCMPO will participate in JPAC in the future.

In the past, MAG, CAAG, and Pinal County have participated in many cooperative planning studies, such as the Southeast Maricopa/Northern Pinal County Study, the Commuter Rail Strategic Plan, the Hidden Valley Transportation Framework Study, and the Freight Transportation Framework Study for the betterment of the overall region. To further demonstrate regionalism, MAG and CAAG have six member agencies in common (Apache Junction, Florence, Gila River Indian Community, Maricopa, Pinal County, and Queen Creek), and PAG and CAAG share one member agency in common (Marana). In addition, MAG is working closely with the SCMPO on transportation air quality conformity analyses.

The Joint Planning Advisory Council (JPAC) was established to identify mutually agreed upon goals and interests, provide guidance on possible technical assistance and joint planning activities, and enhance the communication and cooperation among the policymakers in the three regions. JPAC has a shared vision to jointly coordinate planning efforts for the greater good of the regions and the State of Arizona. It is the intent of MAG, PAG and CAAG to coordinate their respective planning activities and cooperatively work together to foster a successful and economically viable Sun Corridor in the State of Arizona.

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

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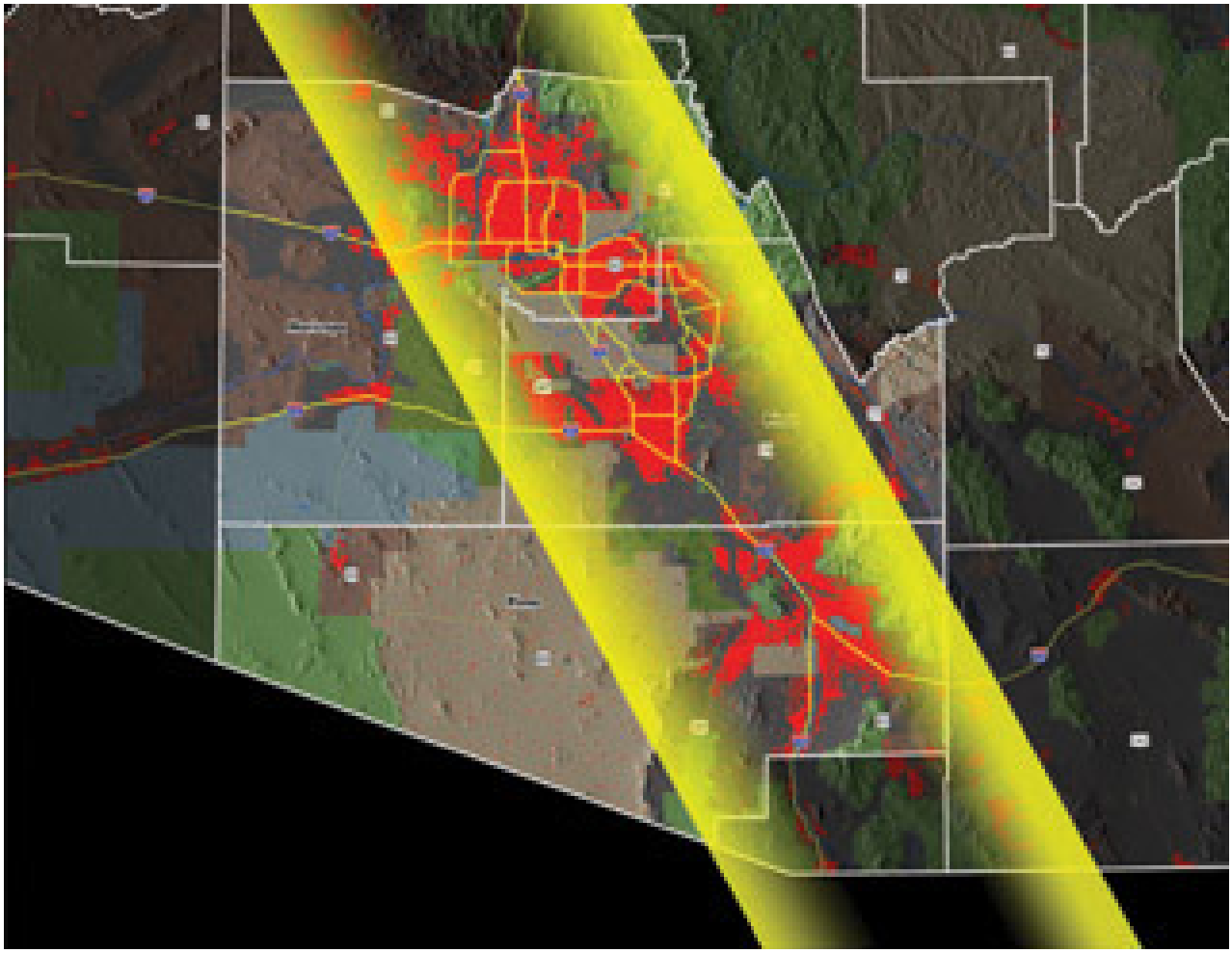
identify potential new RTP elements for consideration in the decision-making process. The studies often cover multi-county areas and include the participation of other COGs and agencies outside of Maricopa County, as well as state and federal agencies.

FIGURE 16-1

THE SUN CORRIDOR



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

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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, 459th 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 459th 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, 459th Avenue to the west, and to the extension of the proposed Turner Parkway (267th 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 developed a transportation framework for the study area that will ultimately be implemented at multiple jurisdictional levels.

Central Phoenix Transportation Framework Study

The Central Phoenix Transportation Framework Study aimed at developing 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 75th Avenue on the west. The study established 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.

Southeast Corridor Major Investment Study

The Southeast Corridor Major Investment Study was originated for the purpose of investigating alternate transportation strategies, in response to the growing travel demand between the East Valley and Central Phoenix. This included identifying member agency needs and developing a multi-modal approach in accordance with the anticipated traffic volume on I-10, including the US-60/ Superstition Freeway and the Interstate 17/Black Canyon Freeway traffic interchanges.

Beginning in 2001, the Arizona Department of Transportation (ADOT) and the Federal Highway Administration (FHWA) launched an Environmental Impact Statement (EIS) Study for the Interstate 10 corridor between SR-51 and SR-202L/Santan-South Mountain Freeways. The primary purpose of this EIS was to consider different expansion options for Interstate 10. As this effort was underway, MAG member agencies wanted other transportation options to be considered in the Southeast Corridor, as well as the potential for congestion pricing along I-10 to meet future travel demand. The Southeast Corridor Major Investment Study was developed to examine these options in this portion of the Valley.

The analysis performed for this Major Investment Study produced alternatives for the corridor in the form of high capacity transit on exclusive right-of-way, improved local transit access via ramps directly accessing HOV lanes, additional freeway general purpose lanes, increasing HOV capacity, interconnectivity with the existing light rail system, potential commuter rail options, and managed lanes concepts. The study found that managed lanes operations along I-10 and I-

17, including DHOV ramps, provides highest level of performance while accommodating increased traffic volumes in the freeway corridor. Also, a strategically focused network of high capacity transit services featuring exclusive guideway transit offers the most productive transit investment in the corridor.

MAG Managed Lanes Development Strategy

MAG, in cooperation with the Arizona Department of Transportation (ADOT), Federal Highway Administration (FHWA), Valley Metro, and member agencies, explored a regional managed lanes system in the Phoenix Metro area. This effort was in part a response to Arizona House Bill 2396, which enables ADOT to consider Public-Private-Partnerships (P3) as a tool for financing transportation infrastructure in Arizona. The study entails determining future needs for High-Occupancy Vehicle (HOV), and evaluating the potential introduction of High-Occupancy Toll (HOT) lanes, and active traffic management strategies.

Specific study efforts include establishing goals and objectives for managed lanes in the region, exploring various management strategies and operations policies for managed lanes, and evaluating the existing regional freeway network for managed lanes potential in terms of constructability, traffic performance, facility cost, and revenue potential. The results of the Phase One study have determined that implementing a system of managed lanes in the MAG region is feasible. Results reveal that a system of managed lanes is constructible, improves overall highway system performance, efficiency and traffic operations, provides additional reliable travel options for system users, and generates a net positive cash flow. Based on the Phase One study effort, it was recommended that MAG and its key transportation partners endorse and actively pursue the implementation of a broad array of enhanced mobility options, including the use of managed lanes, congestion pricing, active traffic management, and other similar innovative transportation solutions.

Based upon this recommendation, a second phase to this project was initiated at the end of FY 2013. In this phase, the project work will turn towards developing a unified branding strategy, identifying demonstration projects as an initial proof of concept, and identifying methods for enhancing existing HOV operations on the regional freeway system.

US-60/Grand Avenue Corridor Optimization, Access Management Plan, and System Study (COMPASS)

The US-60/Grand Avenue COMPASS project has begun to identify a long-term transportation vision for this regional West Valley corridor. The project is examining the route between the SR-303L/Estrella Freeway in Surprise and Willeta Street in Central Phoenix, the end of Arizona Department of Transportation (ADOT) maintenance. A key component to this study effort has been the establishment of a “Charter Partners” group representing the elected leadership in the corridor. Upon study completion, this group will present its recommendation, a vision for the US-60/Grand Avenue corridor, to the MAG Regional Council for incorporation into a future Regional Transportation Plan.

Options under study range from roadway improvements, to traffic operations strategies, to transit possibilities for US-60. These options have been grouped into four concepts:

- Continuing with planned improvements from the MAG Regional Transportation Plan as a benchmark for measuring the next three concepts.

- Reconsidering the US-60/Grand Avenue Expressway option that originally envisioned for the corridor recommended in Proposition 300.

- Planning for commuter rail in the US-60 corridor with operational highway improvements to meet the demands for this new mode.

- Identifying other High Capacity Transit options for Grand Avenue with improvements for accommodating future US-60 travel demand.

It is anticipated the US-60/Grand Avenue COMPASS study will be completed late in FY 2014.

Interstate 11 Corridor/CANAMEX Corridor

The Phoenix and Las Vegas metropolitan areas are the largest in the nation not linked by an Interstate Highway corridor. The combined population of the Phoenix, Tucson, Las Vegas and Reno areas was less than 700,000 when the Federal Aid Highway Act of 1956 was enacted. Today, the combined population of these cities is 8 million and is expected to grow even further, prompting the need for better surface transportation connections to accommodate not only the travel demand between these metropolitan areas, but also improved mobility for freight shipments throughout the Intermountain West and inland portions of the West Coast.

An Interstate 11 (I-11) corridor to address this need was designated as part of the recent federal transportation bill, Moving Ahead for Progress in the 21st Century Act (MAP-21), which was signed into law by President Obama on July 6, 2012. The move makes the corridor eligible for federal funds; however, funding to construct a potential I-11 corridor has not been identified. Although initially envisioned to connect Phoenix and Las Vegas, the potential exists to replace U.S. 93 and extend the corridor north and south to the Canadian and Mexican borders, essentially becoming the new CANAMEX corridor through the Intermountain West. Such a corridor would connect communities, national and international economies, existing and future domestic and international deepwater ports, and would intersect with transcontinental roadways and railroad corridors.

The idea for an Interstate Highway corridor had its origins at the Maricopa Association of Governments through MAG studies on establishing a network of transportation facilities to meet the buildout travel demand in the region, including the need for a 152-mile freeway corridor (I-11) west and south of the Phoenix area, connecting Casa Grande to Wickenburg. The I-11 Corridor was identified in the Hassayampa Valley Transportation Framework Study and

the Hidden Valley Transportation Framework Study, which were described previously. The findings and implementation strategies of these studies, including the I-11 Corridor, were accepted for inclusion as illustrative corridors in the Regional Transportation Plan. (See Illustrative Corridors/Projects below.)

The Arizona and Nevada Departments of Transportation are working together on a two-year I-11 and Intermountain West Corridor Study. The study includes detailed corridor planning of a possible high priority Interstate Highway link between Phoenix and Las Vegas, and high-level visioning for potentially extending the corridor north to Canada and south to Mexico.

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 was 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 provided a Corridor Development Plan that describes the elements necessary to successfully implement commuter rail transit service in the Grand Avenue Corridor. This corridor development plan includes 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

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commuter rail service, development of capital cost estimates, and the development of annual operating cost estimates for commuter rail service.

- Union Pacific/Yuma West Commuter Rail Corridor Development Plan - The purpose of this study was 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 is a Corridor Development Plan that describes 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 provides 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.

- MAG Commuter Rail System Plan - The purpose of this study was to evaluate commuter rail options for the MAG region and the potential connecting routes immediately adjacent to the MAG region. The study establishes 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 were evaluated as part of the study. This system plan included 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.

- Phoenix-Tucson Commuter Rail Study - In addition to the MAG studies described above, MAG is participating in a Phoenix-Tucson Regional Passenger Rail Service/Commuter Rail Study. This study is assessing the potential for passenger rail service between Phoenix and Tucson, with a focus on: (1) connecting downtown Phoenix to downtown Tucson, and (2) ensuring system connectivity, including commuter rail extensions to Buckeye and Surprise, as well as a high capacity transit connection to Tucson International Airport.

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.

Recent Transit Studies

Two local transit system studies have been conducted to investigate the transit service needs brought about by extended periods of rapid population and employment growth in certain areas of the MAG region. Communities saw their populations double or triple in size in less than a decade. Not surprisingly, with such increases in growth comes increased demand for transit service. While these areas have experienced rapid growth in the past, the recent economic downturn has impacted the outlook for current and future transit services. The purpose of the studies was to identify opportunities and strategies for improving existing transit services, and to develop short, mid, and long range local transit plans that effectively provide circulation within the study areas, as well as connections to the regional transit system.

The Southwest Valley Local Transit System Study includes portions of the City of Phoenix, City of Avondale, City of Goodyear, City of Tolleson, City of Litchfield Park, Town of Buckeye and surrounding unincorporated portions of Maricopa County. This study was recently finalized and accepted by Regional Council during FY 2013. The Northwest Valley Local Transit System Study (SWVLTSS) includes portions of the City of Glendale and City of Peoria, as well as the City of Surprise, City of El Mirage, Town of Youngtown, and portions of unincorporated Maricopa County. Sun City, Sun City West, and Sun City Festival, which is in the northeastern area of the Town of Buckeye, are included in the study area as well. This study is in the final stages and will soon be presented to the Regional Council in FY 2014 for acceptance. Ultimately, the recommendations arising from these studies will serve as a blueprint for local communities for a sustainable and market-based local transit system, which ties into the regional transit network.

Another study that is nearing completion and going through the MAG committee process for acceptance in FY 2014 is the Sustainable Transportation and Land Use Integration Study (ST-LUIS). The ST-LUIS highlights the potential to move the region towards greater use of sustainable transportation modes – transit, walking and biking. The study provides a fresh look at ideas for transit investments and services that have been under previous consideration, and supports the creation of walkable and transit-oriented communities. The uniqueness of the ST-LUIS is the holistic approach taken to investigating transit's potential, by integrating real estate

market analysis with transit corridor assessment and ridership modeling. The Study's focus on transit and supportive land use is joined up with recommendations for creating compact walkable places throughout the region.

MAG also completed the Designing Transit Accessible Communities Study during FY 2013. Transit stops are the gateways to the public transportation system. Therefore, it is important that the bus stops provide a consistent, safe, and accessible environment to the user. Currently, bus stops in the MAG region give riders mixed messages, depending on accessibility and how safe each stop feels. MAG and its partners understand that safe and accessible transit stops are an integral part of the public transit system. This study focused on challenges faced by pedestrians and bicyclists as they access transit at the stop level. This study furnishes member agencies with additional tools and guidance to promote and sustain better planning associated with improving existing deficiencies and deploying future stops that are more accessible and supportive of adjacent neighborhood needs.

The MAG Regional Council approved the initiation of two additional transit studies in the FY2014 Unified Planning Work Program. The first is the Southeast Valley Transit System Study, which will analyze transit services and ridership demand in transit-established and transit-aspiring communities within the Southeast Valley. The study will also look at efficiencies in current and planned transit services in the study area. Lastly, the study intends to identify an integrated, demand driven transit system that effectively and efficiently connects areas within the Southeast Valley of the MAG Region, as well as to existing and planned regional transit improvements. Communities participating in the study are Apache Junction, Chandler, Florence, Gila River Indian Community, Gilbert, Guadalupe, Maricopa, Mesa, Phoenix, Queen Creek, Tempe and the surrounding portions of Maricopa County and Pinal County.

The second study is the Regional Multimodal Level of Service (LOS) Study. This study will assess how well an urban street serves the needs of all users, including pedestrians, bicyclists, and transit users. It will include a tool that demonstrates the applicability of a multimodal LOS analysis, and how it can be utilized by engineers, development review staff, city planners, and transit planners to better understand the impact of geometry, design, and traffic on all users of the urban street.

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 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 RTP 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.

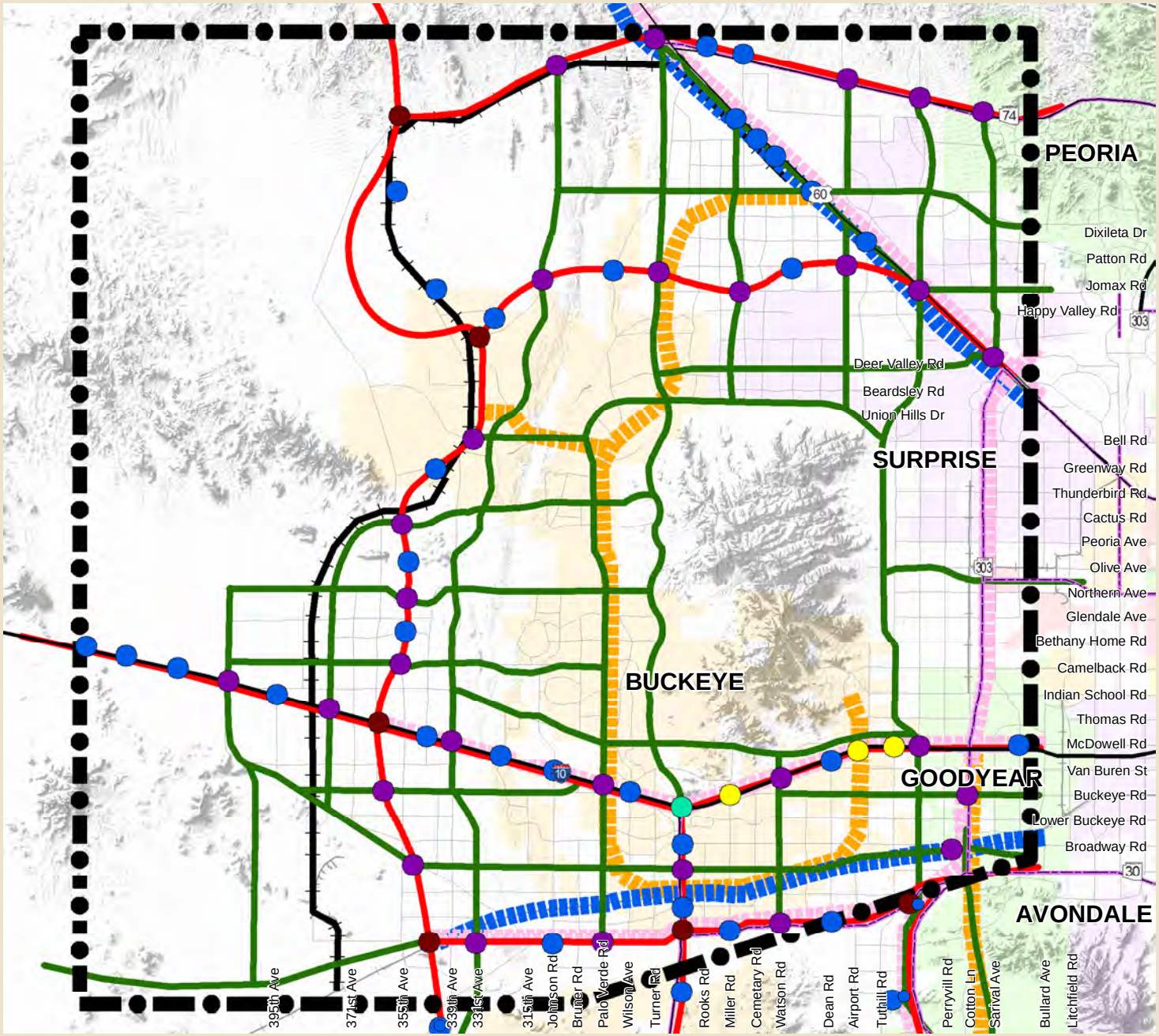
2035 Regional Transportation Plan

Fig. 16-2

REGIONAL TRANSPORTATION PLAN

MARICOPA ASSOCIATION of GOVERNMENTS

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
- Metropolitan Planning Area

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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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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 was formalized in the 2010 Update of the RTP, and has been included in the 2035 RTP. The New River Corridor is depicted in Figure 16-4.

Sky Harbor Automated Train System

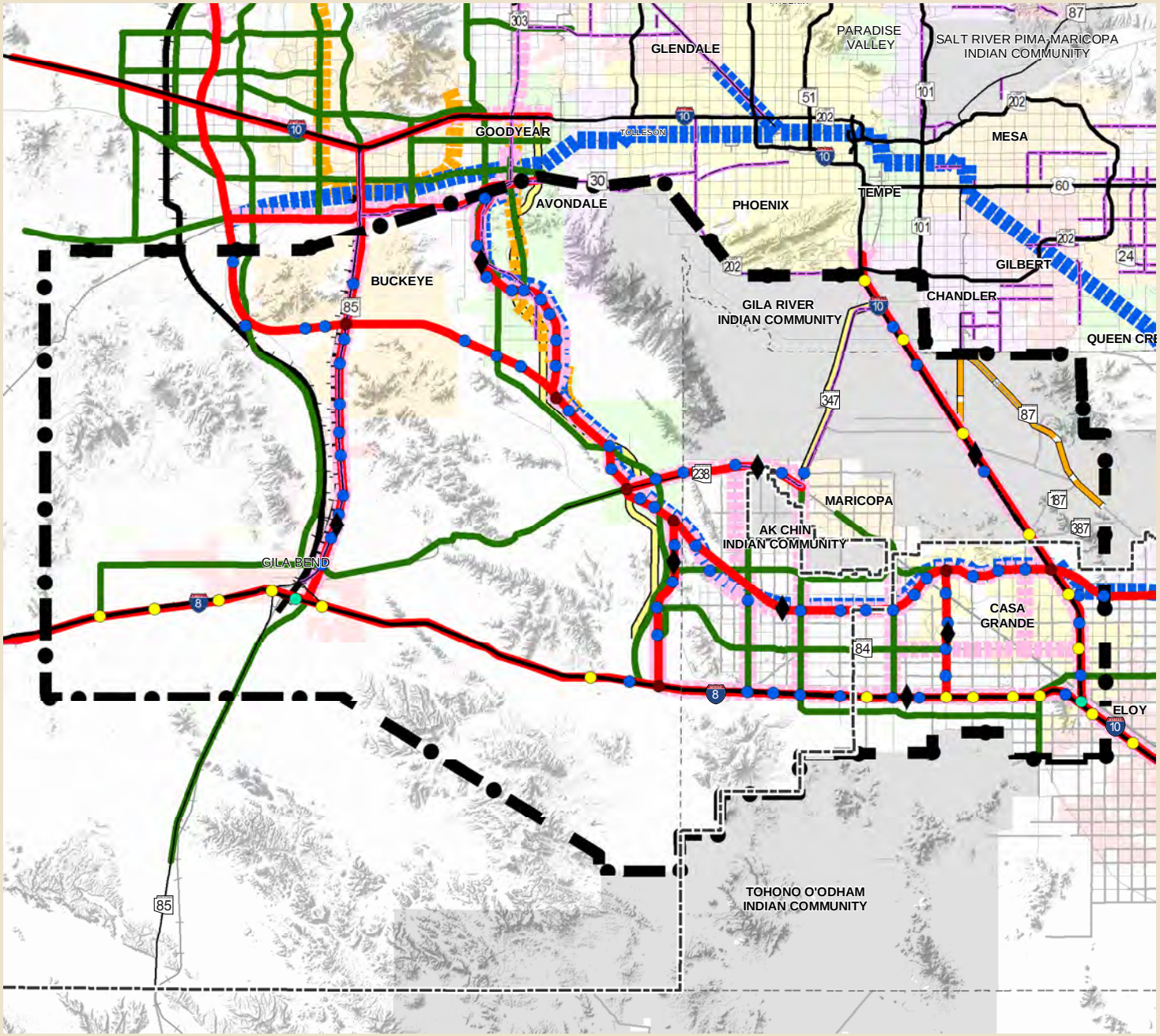
On April 22, 2009, the Regional Council approved inclusion of Stage Two of the Sky Harbor Automated Train System (Sky Train) as an illustrative project in the RTP. The Sky Train is a fully automated, grade separated transit system that will connect the major facilities at Sky Harbor International Airport with the Metro light rail transit (LRT) system. Stage One of the project, which was completed in early 2013, extends from the LRT station at 44th St. to Airport Terminal Four. Stage One-A, which continues from Terminal 4 to Terminal 3 for 0.7 miles with a short walkway to Terminal 2, will open in early 2015. Stage Two is planned to link the remaining airport terminals with the rental car center, extending an additional 1.8 miles. The total estimated project cost of $1.6 billion is paid for with airport revenues and passenger fees (no local tax dollars).

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.

2035 Regional Transportation Plan

Fig. 16-3



REGIONAL TRANSPORTATION PLAN

MARICOPA ASSOCIATION of GOVERNMENTS

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
- Metropolitan Planning Area Boundary
- County Boundaries

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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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2035
Regional Transportation Plan

Fig. 16-4

REGIONAL TRANSPORTATION PLAN

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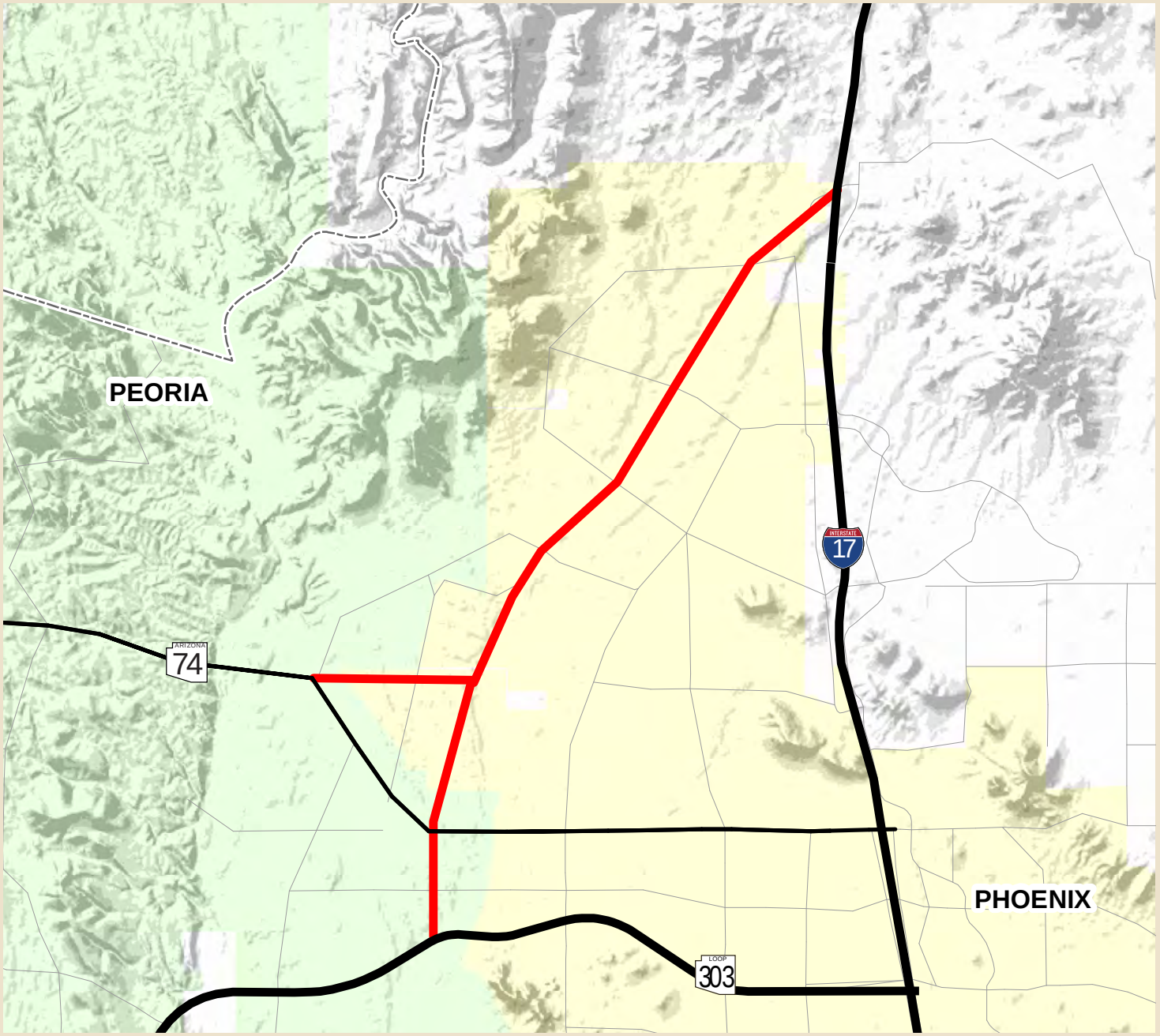
New River Illustrative Corridors



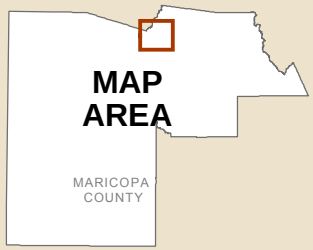
Illustrative Freeway Corridor

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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2035
Regional Transportation Plan
Fig. 16-5

REGIONAL TRANSPORTATION PLAN

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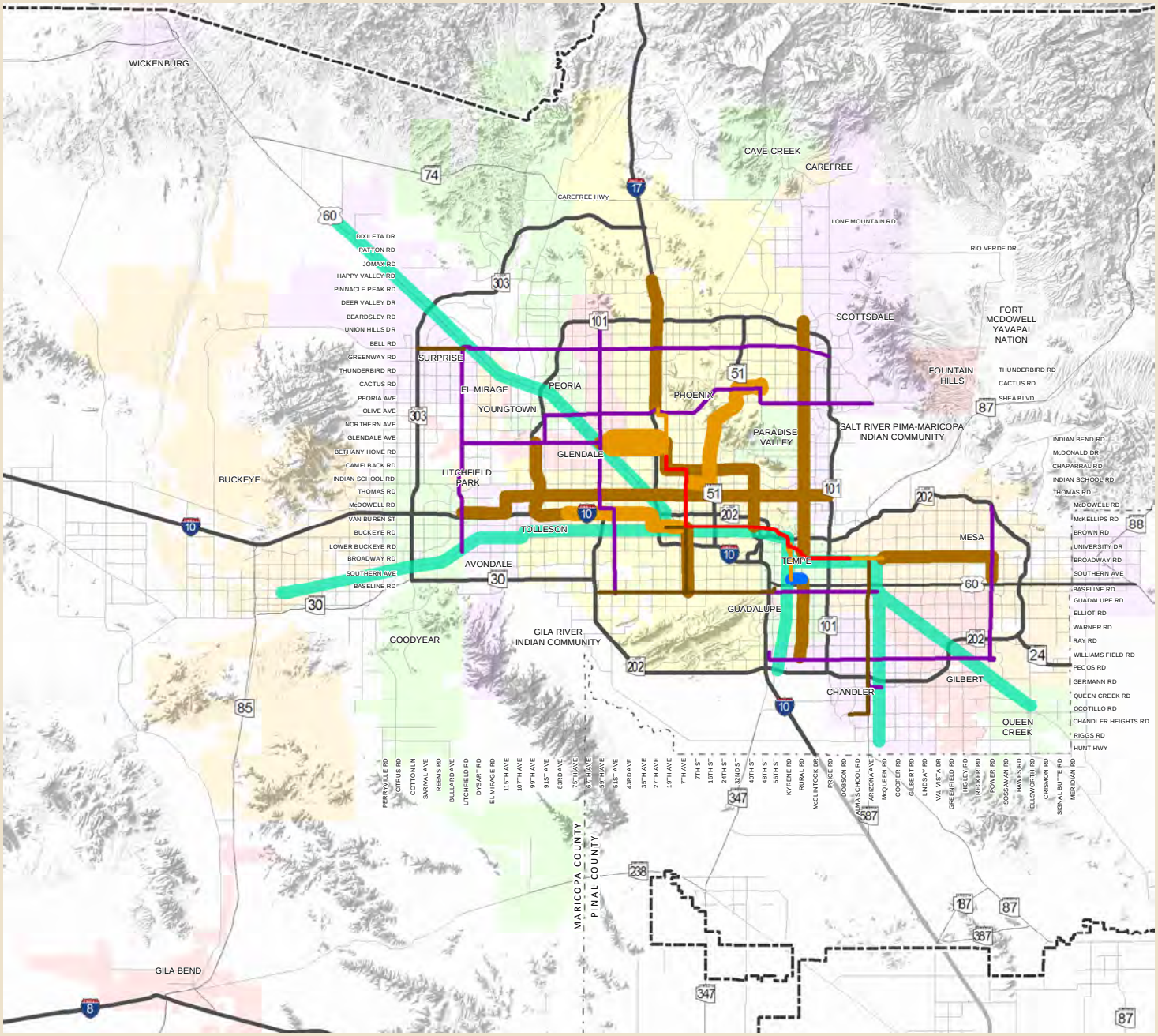
Illustrative Transit Corridors



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

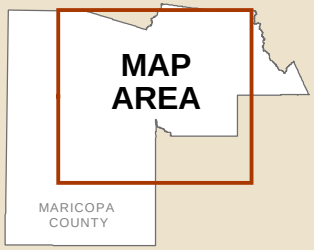
Highways

Other Roads

Metropolitan Planning Area

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

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



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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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Central Mesa Light Rail Transit - Phase II

On September 30, 2009, the 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 RTP. On March 27, 2013, the extension to Gilbert Road was added to the RTP by action of the Regional Council.

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".

- SR-101L (Agua Fria Freeway) - Installation of direct HOV ramps at the system interchanges with I-17 and I-10.

SECTION THREE

SYSTEM MANAGEMENT AND OPERATIONS

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CHAPTER SEVENTEEN

SYSTEM 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 multi-modal transportation system. This is accomplished through multi-modal, cross-jurisdictional systems and services. These systems are designed to improve efficiency, safety and reliability of the transportation system. Implementation of SM&O programs help accommodate the safe and efficient movement of people and freight 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, surveillance cameras, computers, electronics and wired and wireless communication technologies in an integrated manner, along with effective management strategies, to improve safety, efficiency and reliability of the surface transportation system. The realization of full benefits from strategic investments in ITS solutions require the commitment, support and resources for hiring and retaining skilled personnel that are essential for conducting day-to-day management of traffic operations using these complex systems at the public agencies.

The MAG region has made a firm commitment to utilize ITS and the solutions it provides to enhance the regional transportation system, through regional investments in ITS infrastructure. Many of these solutions involve large regional investments based on collaborative regional efforts, and are identified in this Plan. 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 investments in expanding this capability while delivering improved systems management and operations during periods of heaviest travel demand.

The products and services resulting from ITS help improve safety, efficiency and travel time reliability by:

- Collecting and transmitting real-time information on traffic conditions and transit arrival times to aid travelers before and during their trips.

- Relieving congestion by reducing the number of traffic incidents through better incident response, traffic flow coordination, detecting and clearing incidents quickly when they occur, and efficient rerouting traffic flow.

- Making road condition information available to drivers to help them better plan their

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trips and reach desired destinations in a safe and efficient manner.

- Benefiting public and governmental agencies through lower vehicle operating costs, enhanced services and a healthier environment for all.

- Helping freight companies move goods safely and efficiently utilizing real-time traffic information made available via ITS infrastructure.

2012 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 on freeways and arterials in the region are currently coordinated by MAG. In April 2001 MAG approved the first comprehensive ITS Strategic Plan for the region. For the next ten years, this Plan provided direction for ITS implementation within the region.

In December 2012 a new ITS Strategic Plan was approved by MAG. Oversight for this Plan was provided by members of the MAG ITS Committee. The Plan recommended a shift of focus from specific future projects to programs or emphasis areas. It identified the following emphasis areas for future investments in ITS in the MAG region:

- Improving freeway operations
- Improving transit operations
- Improving arterial operations
- Improving road safety

The Plan also established investment targets to be used as guidance when programming new CMAQ funds for arterial ITS improvements. It recommended the following investment targets:

- Arterial ITS technology projects - 50% of available resources
- Integrated Corridor Management projects - 25% of available resources
- ITS technology for improving road safety - 20% of available resources
- Support for developing local ITS plans - 5% of available resources

National and Regional ITS Architectures

The USDOT led a nationwide effort involving many stakeholder agencies in the development of the first version of the National ITS Architecture (NIA) in 1994. The main goal of the NIA is the development of a nationally interoperable ITS infrastructure. An FHWA rule and FTA policy on issued in 2001 requires that ITS projects funded by the Highway Trust Fund and the Mass Transit Account conform to the NIA. This was followed by the 2001 USDOT Rule 940 which stipulates that all federally funded regional ITS projects must be consistent with: (1) A Regional ITS Architecture (RIA); and (2) Include a Systems Engineering Analysis.

The MAG Regional ITS Architecture is based on the NIA and provides a common framework for planning, defining, and integrating intelligent transportation systems across a region. 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 2009. The RIA was further updated in 2011 to reflect all programmed ITS projects through 2014. The RIA was modified in 2013 to accurately reflect Version 7.0 of the National ITS Architecture released in 2011 and also to incorporate new ITS projects programmed in the TIP through FY2017. In addition, the 2013 RIA Update incorporated all Transit ITS applications that are implemented or planned by Valley Metro, thus enabling the regional transit planning agency to fully comply with FTA regulations related to RIA. The MAG RIA is considered a national best practice in ITS planning and has been presented to several national audiences including a webinar to FHWA staff nationwide.

The RIA is posted at the MAG website as interactive webpages and depicts many details that need to be considered when local agencies begin designing programmed ITS projects. Local agencies are currently utilizing the RIA information pertinent to their jurisdictions to better define planned ITS projects, during the Design Concept Report stage, thus ensuring regional compatibility and better regionally integrated systems in the future. Figure 17-1 shows how closed-circuit television (CCTV) camera component of ITS in the City of Phoenix is depicted in the RIA.

All federally funded ITS projects implemented in the MAG region, by both Arizona DOT and local agencies, are now required to include a Systems Engineering Analysis (SEA). While MAG is responsible for compliance with the USDOT Rule 940 stipulation on RIA, the responsibility for compliance with SEA requirement is overseen by the local office of FHWA and Arizona DOT.

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).

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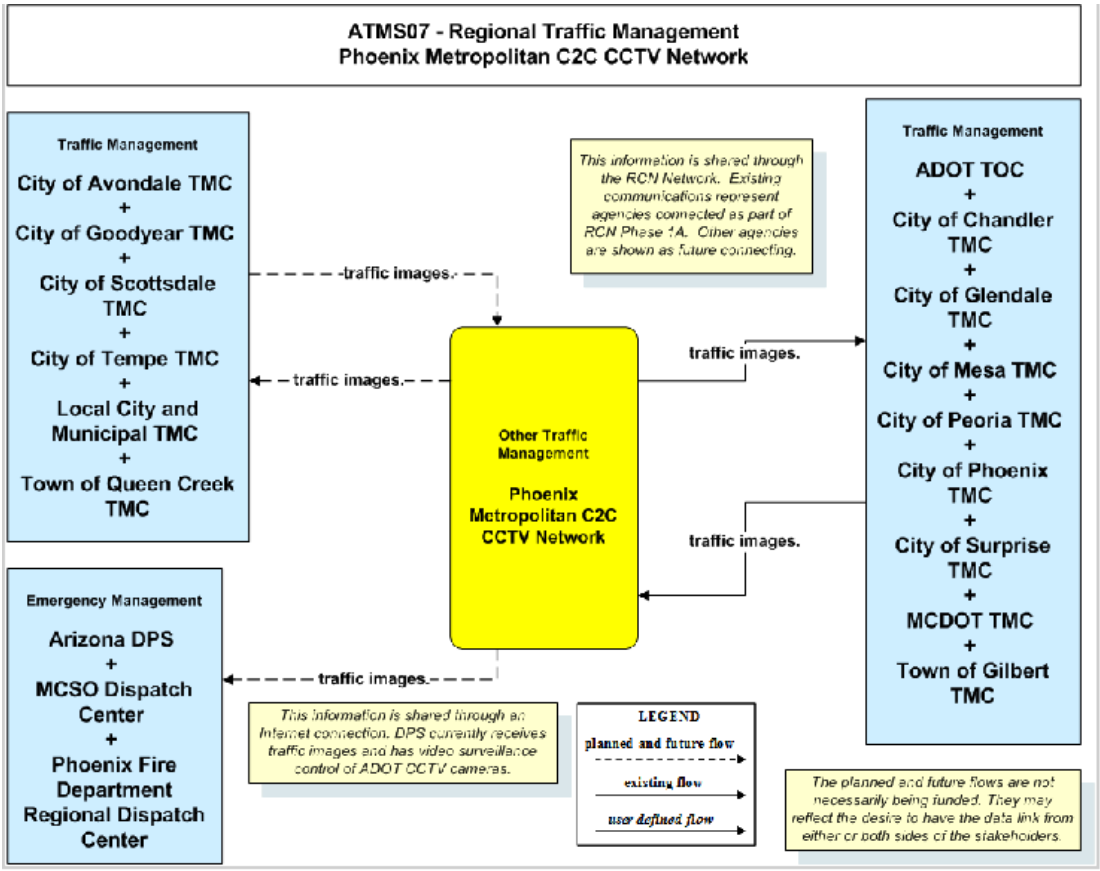
- The security of all the ITS systems and information (e.g., controlled access to signal system).

- The maintenance of ITS architecture itself.

FIGURE 17-1
CITY OF PHOENIX CCTV CAMERAS



Regional Transportation Operations

In 2003, MAG developed the Regional Concept of Transportation Operations (RCTO), 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. The RCTO serves as the foundation for many regional discussions on management and operations.

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Management and Operation of the Freeway System

The Arizona Department of Transportation (ADOT) is utilizing an integrated package of ITS infrastructure and management 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 has been 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.gov. 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 with access to the internet (www.az511.com/pda/). This information service provides real-time freeway speed maps and point-to-point travel times, with coverage limited to the fully instrumented portion of the urban freeway system. The FMS also provides displays of 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.

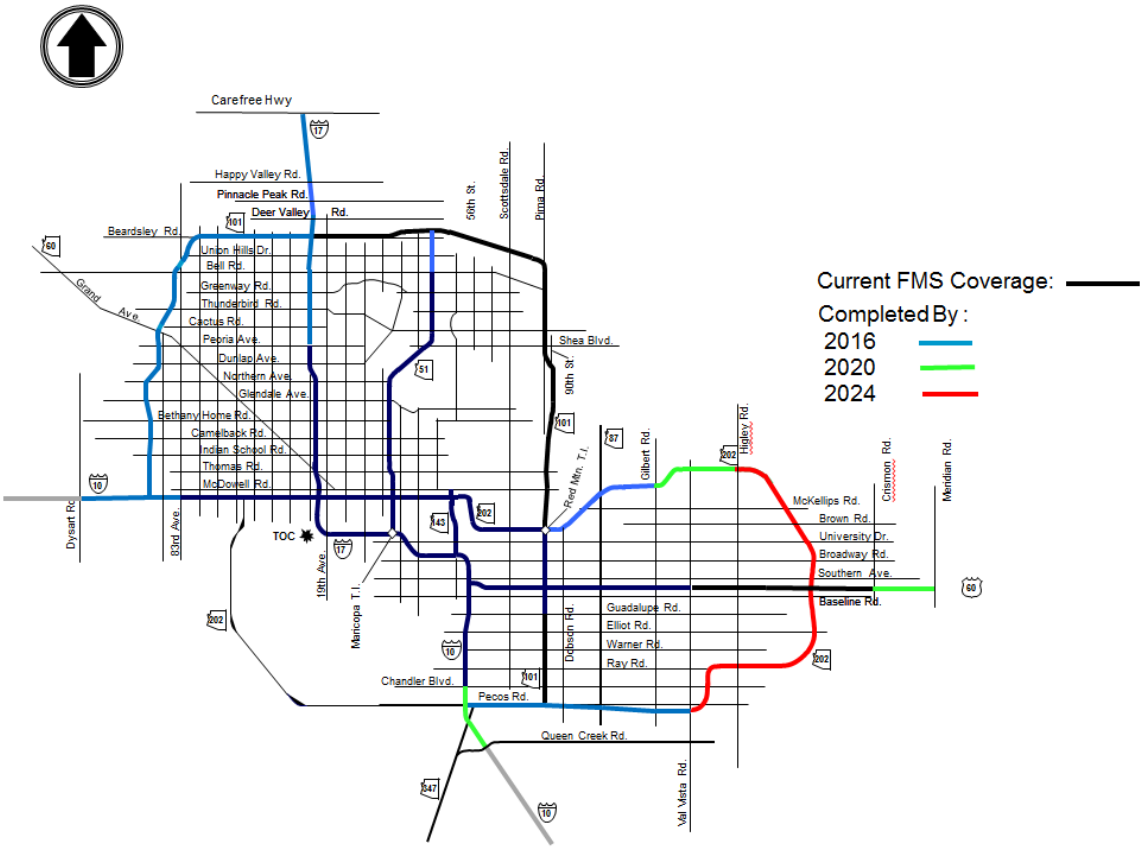
The extent of coverage of the regional FMS, as of late 2012, is approximately 150 miles. Completion of the FMS is recognized as an important priority for the region. To facilitate rapid FMS expansion, the installation of communication conduits and other basic infrastructure is included as part of all new regional freeway construction, through MAG action that predates the 2003 RTP.

Based on a review of the FMS in 2006, some of the FMS funds have been allocated for increased maintenance of field devices, and the need to replace aging FMS devices. This was seen as essential for improving the overall reliability of the system. 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 17-2 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

generated by private data providers. As a result, real-time freeway speed information beyond the current FMS coverage is now available at websites such as Google and Mapquest that are supported by these companies. A number of state DOTs have initiated real-time traffic information services based on probe vehicle data. In 2011 MAG conducted a study that concluded that it was feasible to expand FMS coverage by utilizing available private probe data sources instead of fixed vehicle detectors in the future, thus future reducing FMS capital and maintenance costs. This, however, would not eliminate the need for a strategic regional network of accurate traffic data count stations and an archive of traffic data to support transportation planning.

FIGURE 17-2
FREEWAY MANAGEMENT SYSTEM



Source: ADOT FMS Information, Oct 2012

Freeway Service Patrol Program

The Freeway Service Patrol (FSP) program is a key component of the regional ITS strategy to efficiently manage and operate the freeway system. The 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

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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 2008 through 2012.

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).

TABLE 17-1
SUMMARY OF FREEWAY SERVICE PATROL ASSISTANCE

	2008	2009	2010	2011	2012
Miles Driven	426,760	406,631	411,835	381,473	326,066
Assistance at Crash Scenes	443	267	384	331	337
Motorists Assisted	10327	9,143	11,172	10,457	8910

Source: FSP Quarterly Reports, Department of Public Safety

Management and Operation of the Arterial System

In 2011, MAG developed a comprehensive web-based summary of the Regional Transportation Systems Management and Operations for the arterial street system. Tables 17-2 and 17-3 show a summary of the arterial ITS infrastructure in the region. The management and operation of traffic flow on arterial streets is the sole responsibility of individual MAG jurisdictions. The coordination of traffic operations across the many jurisdictional boundaries is accomplished through on-going regional dialogue among agency technical staff. The dialogue on operations

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TABLE 17-2
SIGNAL SYSTEM RESPONSIBILITIES

Jurisdiction/Agency	# of Signals Owned	# of Signals Operated from TMC	# of Signals Maintained
Avondale, City of	46	0	63
Buckeye, Town of	10	0	10
Chandler, City of	199	187	199
Gilbert, Town of	174	167	174
Glendale, City of	193	130	193
Goodyear, City of	74	18	74
Maricopa County DOT	154	93	166
Mesa, City of	379	404	408
Peoria, City of	108	105	108
Phoenix, City of	1092	615	1092
Queen Creek, Town of	34	12	3
Scottsdale, City of	301	280	301
Surprise, City of	41	25	41
Tempe, City of	221	199	220
Youngtown, Town of	0	0	0
Total	**3026**	**2235**	**3052**

TABLE 17-3
TRAFFIC MANAGEMENT AND OPERATIONS CENTERS

			Existing Traffic Management Center						
			Hours of Coverage			Square Footage			
Jurisdiction/Agency	Existing	Planned	Peak	Business	Business+	24/7	< 500	500 - 1000	> 1000
Avondale, City of	X				X		X		
Buckeye, Town of									
Chandler, City of	X			X				X	
Gilbert, Town of	X			X				X	
Glendale, City of	X				X				X
Goodyear, City of	X				X		X		
Maricopa County DOT	X				X				X
Mesa, City of	X			X					X
Peoria, City of	X		X	X	X				X
Phoenix, City of	X			X				X	
Queen Creek, Town of	X				X		X		
Scottsdale, City of	X			X				X	
Surprise, City of	X			X				X	
Tempe, City of	X			X					X
Youngtown, Town of									

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planning is facilitated at MAG through the ITS Committee where infrastructure improvement needs, as well as operational issues, are discussed. The committee also provides recommendations for infrastructure improvements to be funded through the MAG TIP process. Special studies that may be required for exploring complex issues related to traffic operations are carried out through the MAG Work Program.

Discussions on detailed technical issues are held under the AZTech™ banner, an ad-hoc regional traffic management collaboration, co-chaired by Arizona DOT and Maricopa County. The Arizona DOT is responsible for traffic management operations on all freeways in the region as well as on state owned highways. However, the entire arterial street system is managed and operated by each individual local jurisdiction, with the exception of a few smaller jurisdictions that have entered into agreements with adjacent larger cities. The Maricopa County DOT is responsible for the management and operation of roads that are located within unincorporated County areas. 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 with the emphasis given to north-south and east-west traffic flows to be determined by local operators based on actual ground conditions. A new regional focus on developing Integrated Corridor Management (ICM) has resulted from recommendations in the 2012 ITS Strategic Plan. A pilot project has been initiated to develop an ICM on the segment of I-10 from I-17 to Loop 101, where the operation of ADOT operated freeways and parallel arterial systems operated by local jurisdictions will be closely coordinated. The initial focus under ICM will be to address traffic incident management issues on heavily traveled corridors within the region, through collaboration between MAG, DPS, ADOT and all affected local agencies. MAG has developed the necessary tools and has begun to provide planning support through Analysis, Modeling and Simulation (AMS) for evaluating the ICM strategies and to test and validate effective traffic management strategies in through traffic simulations.

Arterial ITS applications are currently funded with CMAQ funds in the MAG Arterial Life Cycle Program.

Management and Operation of the Public Transportation System

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

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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. The VMS is engineered to be scalable to accommodate any future growth of the Valley Metro agencies.

In 2011, the region's first real-time transit arrival information system NextRide was launched. It provides real-time information on the next bus or train arrival times at any bus or train stop in the region. This information can also be received on a cell phone by sending a text message with the bus/train stop ID. The region's most advanced Transit ITS applications are currently seen on the Arizona Avenue LINK bus route that provides next bus arrival information at bus stops, utilizes queue jump at signalized intersections to reduce intersection delay, and also provided free WiFi to passengers on the buses.

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.

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:

- The development of a regional 24-hour Dynus-T dynamic traffic assignment model to that will be utilized extensively in planning for traffic management and operations.

- A study on non-recurring congestion that identified the causes, impact and distribution of both recurring and non-recurring congestion on freeways and arterials.

- 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

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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.

Funding for System Management and Operations

Funding specifically for System Management and Operations from regional sources totals $283 million (YOE $'s). This includes $26 million for arterial ITS projects, and $257 million for the freeway system management and the freeway safety 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. In addition, funding for operations and maintenance functions is provided from local and state sources, which is also identified in the modal chapters.

CHAPTER EIGHTEEN

DEMAND MANAGEMENT

The MAG region benefits from a broad range of demand management techniques and programs. Transportation Demand Management (TDM) reduces congestion by encouraging more efficient use of existing transportation infrastructure through alternatives to driving alone. Reducing vehicle miles traveled also helps improve air quality by decreasing vehicular emissions contributing to the total amount of air pollutants. TDM activities in the MAG region are described below.

Transportation Demand Management Programs

TDM programs encourage reductions in travel demand within the transportation system. TDM activities generally focus on both improved travel choice and incentives to reduce driving alone. These programs promote alternatives to driving alone, including carpooling, vanpooling, transit, walking, and bicycling. TDM also encourages alternative work schedules that reduce trips, including teleworking and compressed work schedules. TDM activities generally focus on commute trips and student trips during peak travel periods. In this region, MAG provides funding for TDM activities conducted by the Regional Public Transportation Authority (Valley Metro/RPTA), the Arizona Department of Administration, and Maricopa County Air Quality Department.

Commute Solutions Program (Regional Rideshare)

Valley Metro/RPTA receives funding from the Arizona Department of Environmental Quality, MAG, and the Maricopa County Air Quality Department to encourage commuters and employers to use alternative transportation modes and work schedules throughout the MAG region. Valley Metro/RPTA promotes alternative transportation modes including carpooling, bicycling and walking, subsidized transit fare, vanpools, teleworking and compressed work schedules through a variety of services, including a free on-line trip matching service, the promotion of Single-Occupancy Vehicle (SOV) alternatives, assistance to employers in the Maricopa County Trip Reduction Program, and administration of a regional vanpool program.

- Trip Matching - Valley Metro/RPTA services include an Internet-based trip matching service at ShareTheRide.com that provides on-line ridematching and commute tracking program. The service matches commuters based on proximity, destination and travel route, as well as schedules and preferences. The on-line tool connects commuters to a secure on-line matching program that displays carpooling, vanpooling, and bicycle options. Valley Metro/RPTA also assists the general public with seeking a ridesharing partner should they not have access to the on-line system. ShareTheRide also manages on-line contests for alternative mode users, calculates pollution savings from alternative mode usage on an individual or custom sub-site basis, and also calculates gas savings and the financial savings associated with alternative mode usage. The service also allows

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employers in the Maricopa County Trip Reduction Program to manage their Trip Reduction Plan (TRP) by administering custom sub-sites, obtaining reports of employees who are applicants, enter employee applications for employees without Internet access, include online matching services with other trip reduction efforts, monitor employee usage of alternative modes as recorded in the system, and facilitate contests as incentives to promote alternative mode usage. From FY 2011 to FY 2012, the number of companies using ShareTheRide to manage their TRP increased from 147 to 170, an increase of more than 15 percent.

- SOV Alternatives Campaigns - Valley Metro/RPTA staff promotes SOV alternatives by developing and implementing campaigns and contests, enhancing online resources, contacting employers and providing regional advocacy for alternative modes and schedules, and by developing materials that educate users how to implement alternative modes and schedules. Each year, a communications plan is developed to encourage commuters to seek options to driving alone. Each April, a phone survey is conducted to measure commute mode choice, shifts to and away from SOV use, and to examine opinions regarding transit, rideshare, air quality and traffic issues. The survey helps staff determine marketing strategies and measure awareness and effectiveness of Valley Metro/RPTA programs and services.

  Valley Metro/RPTA uses a number of campaigns, including Rideshare Month and Valley Bike Month, to bring awareness and attention to alternatives to driving alone. With campaigns and communication efforts, commuters and companies are educated about who provides commuter solutions and defines the available solutions.

  Rideshare Month is held in October to bring awareness to ridesharing options, such as carpool, vanpool, and riding transit. Communication efforts and materials direct the audience to ShareTheRide.com to create an account to find carpool, bus and light rail travel options and to log daily commute trips for a chance to win prizes (donated by sponsors). Sometimes events are held to inform participants about alternative modes and schedules. A week-long employer challenge offers an opportunity for prizes when employees use an alternative mode of transportation one or more days during the week.

  Valley Bike Month is held in April each year to bring attention to bicycling as an alternative mode for commuting and other trip purposes. People are encouraged to participate in biking events throughout the Valley, such as family fun rides, bike expos and safety events. Bicycle safety and education information was provided at various Valley events, and cities sponsor more than a dozen special events to encourage bicycling. Events also include bike to work and school days. Bicycle rodeos are hosted to teach safe bicycling behavior. Valley Bike Month is a regional effort that relies on the partnership of both public and private organizations. Activities are promoted Valley-wide through cities and employers in the Maricopa County TRP.

The Clean Air Campaign Awards luncheon is held to honor individuals and organizations that demonstrate outstanding efforts in support of clean air programs and alternative mode usage. The event is made possible by sponsors and corporate donations. Award recipients were nominated in one of 25 categories. More than 500 attend each annual event.

In addition, on-line contests are administered to encourage commuters to register and track commute trips in the on-line trip matching system, ShareTheRide.com. Creating a larger database of potential ride matches increases the likelihood a new user will be matched successfully. Prizes for online contests are donated by community organizations that support the clean air and reduced congestion messages provided to commuters.

- Employer/Employee Education and Partnerships - Valley Metro/RPA develops brochures, informational materials, collateral materials and promotional items that promote alternative modes and schedules. Each year, a communications plan is developed that includes electronic newsletters, media and general public events to education the public about transportation and commute options and benefits, periodic news releases to coincide with campaigns and annual survey results, and social media, including Facebook and Twitter postings. Each year, a campaign is developed to educate and encourage Valley residents to use alternative modes and work schedules, and other commute solutions. Methods of distribution include print materials, paid and unpaid media, public and media relations, and special events. In addition, employer and general-public online resources are provided at ShareTheRide.com and ValleyMetro.org to enable employers to build sustainable and effective alternative transportation mode programs, and provide commuters to identify the commute solution that best meets their individual needs. In FY 2013, ShareTheRide.com will be enhanced with several functions to enhance the user experience, and the integration between ShareTheRide.com and ValleyMetro.org will be improved.

  Valley employers are routinely contacted to increase use of alternative commute modes by their employees. Programs include, but are not limited to, carpooling, vanpooling, transit, telework, compressed work weeks, proximate commuting, and fare media availability/access. Techniques such as online training and employer on-site presentations are used to encourage use of alternative commute modes.

  Valley Metro/RPTA also seeks partnerships with employers and related community organizations to expand educational opportunities about alternative commute modes and work schedules. Staff coordinates with other organizations on measures that may impact the potential for alternative mode use including HOV facilities, new development, transit service and extensions, carsharing and bike sharing programs, and parking or zoning issues.

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Valley Metro/RPTA works with major retailers to provide transit fares at retail outlets. This program reduces the cost of transit fares for passengers, saves time for transit riders, provides access to lower-cost passes in areas with Title VI populations and expands communication channels to additional businesses. Transit users may obtain a list of retail locations selling transit passes by visiting ValleyMetro.org. Transit users can also clearly see which fare types are sold at different retail locations. Site visitors may search by zip code or city name. There are now more than 700 retail locations where passes can be purchased (an increase from 50 locations since mid-2009).

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 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. Approximately 1,200 employers with 577,432 employees participate in the TRP.

The Trip Reduction Program is administered by the Maricopa County Air Quality Department, and Valley Metro/RPTA receives funding from Maricopa County to provide training and technical assistance through one-on-one assistance, promotion and informational and educational materials to TRP employers on the requirements of the law including the survey process, plan writing, documentation, and the types of alternative modes and trip reduction strategies that may be used in achieving the prescribed reductions in single occupant vehicle trips or single occupant vehicle miles traveled. Valley Metro/RPTA also assists in the facilitation of Transportation Coordinator Associations in which employers share resources to promote alternative mode use, improve mobility, or implement trip reduction programs in their local areas. There are five TCAs in the MAG Region. Finally, Valley Metro/RPTA conducts a year round campaign for employees which may include print materials, paid media, public and media relations, public affairs, and events that encourage weekly use of trip reduction solutions.

Travel Reduction Programs

The Arizona Department of Administration Office of Travel Reduction Programs encourages state employees in Maricopa County to use alternative modes of transportation through instruction, promotion, and incentives. In addition, the Travel Reduction Programs Office offers carpool matching and other rideshare services through Capitol Rideshare to all state employees

located in Maricopa County. The Office of Travel Reduction Programs assists state agencies in meeting their travel reduction goals, designs and implements the State of Arizona Travel Reduction Plan for Maricopa County, and provides education and motivation for more than 23,000 state employees.

Vanpool Program

In addition to facilitating ridesharing vanpools with vans owned by others, Valley Metro/RPTA has provided vanpool service to interested commuters since 1987. The clearly marked vans are provided to qualifying groups of six to 15 commuters, driven by one of the vanpool members. Passengers share the cost of operating the van by paying a monthly fee to the primary driver. The fee includes fuel, insurance and vehicle maintenance costs. In FY 2012, more than 1.1 million passenger trips were made in approximately 375 vanpools. Valley Metro/RPTA contracts with a third party private vanpool firm to provide insurance, fleet services, and billing. Vanpooling is one of the Transportation Demand Management strategies many employers have implemented as a Trip Reduction Program measure.

The Valley Metro/RPTA vanpool program has a 100 percent farebox recovery goal. Farebox recovery is the percentage of operating costs in a public transit system that are paid by users of the system. In FY 2012, the program had a 99.29 percent fare recovery. In FY 2012, staff introduced a pilot program to add bicycle racks to vanpool vehicles. More than 40 requests were received from vanpool drivers who want to participate in a pilot program to add bicycle racks to 12 vanpool vehicles. Due to the program's success demonstrated through a user survey, bicycle racks will be added to an additional 50 vanpool vehicles. The program helps improve air quality by removing cold-start trips and short-distance SOV trips.

Teleconferencing / Videoconferencing Project

MAG has established a Teleconferencing Program to link MAG and its member agencies via teleconferencing. 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, as well as local transit funding sources, contribute to rideshare, trip and travel reduction, and vanpool activities. It is estimated that a total of $110 million will be devoted to vanpool programs, and approximately $75 million for rideshare, trip reduction, and other travel demand management activities.

CHAPTER NINETEEN

CONGESTION MANAGEMENT PROCESS

The Congestion Management Process (CMP) is an objectives-driven, performance-based systematic approach to addressing traffic congestion problems and their effects throughout the MAG Transportation Management Area. The CMP is intended to address congestion through effective development, management and operation of transportation facilities and services, as well as to implement effective strategies and solutions to reduce mobility problems in the region.

Information included in this chapter refers to congestion management applications, 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). This regulation mandated 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.

Congestion Management Concepts

Congestion results when traffic demand approaches or exceeds the available capacity of the system and travel time becomes unreliable. It is important to note that congestion is due to two distinct sources: recurring and non-recurring. Recurring congestion typically occurs during peak travel periods when there are more vehicles trying to use the available roadways, while non-recurring congestion (NRC) is a more random phenomenon and it is difficult to identify. Generally, incidents and road construction are the primary causes of NRC.

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) managing the existing system, (2) expanding public transit service, (3) reducing peak-period travel demand, and (4) constructing additional roadway capacity. Specific methods may include: coordination of traffic signals and use of other intelligent transportation system approaches; promoting the use of buses, light rail and carpooling, implementation of programs that reduce peak-hour travel demand such as telecommuting and flex-schedules and intersection and other road capacity additions.

Over the last two decades, the two primary factors responsible for increased traffic congestion within the MAG Region have generally been an increase in population and a strong economy. These factors resulted in high rates of urban metropolitan growth, and also brought significant levels of development to previously undeveloped lands on the urban fringe. Such internal and peripheral growth created greater travel demand throughout the region, bringing about higher traffic volumes and congestion on the existing freeway and arterial roadway network.

During the last five years, the downturn in the American economy dramatically affected the State of Arizona and in particular the MAG region. A pronounced economic decline, unprecedented in the history of Maricopa County, has been experienced. Higher fuel costs, stagnant employment rates and a slowdown in residential construction in the ex-urban areas also resulted in less travelers on the road and shifts in demand on the roadway system. Recent observed data and analysis shows a slight reduction in congestion duration, increased speeds and reduced bottleneck intensity. Preliminary 2012 figures are showing that the employment base is starting to improve as well as showing modest increases in most regional economic indicators.

According to the Texas Transportation Institute's (TTI's) 2010 Mobility Report the Phoenix urban area ranks 15th within the U.S. in terms of total travel delay, 20th in Travel Time Index, and 12th in total cost of congestion. A peak period auto commuter in the Phoenix region experienced 35 hours of delay due to congestion in 2010, compared to 36 hours in 2009. The number of "rush hours" in the region has remained stable at a total of five for the last 4 years reported.

The 2011 MAG Non-Recurring Congestion Study found that on freeway study corridors, NRC represented 46 percent of total weekday congestion.

Federal Congestion Management Requirements

The overall planning and programming process used at MAG and at other metropolitan planning organizations is driven by regulations put forth by the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA), two of the modal administrations of the United States Department of Transportation. FHWA and FTA issue regulations and policies that put into practice legislation that Congress passes authorizing federal funding for transportation. 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). The Safe, Accountable, Flexible and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) introduced a change to the reporting format and content, requiring a "congestion management process". The goal of the law was to utilize a process that is an integral component of metropolitan transportation planning.

New federal transportation legislation (Moving Ahead for Progress in the 21st Century Act, or MAP-21) was signed into law by President Obama on July 6, 2012. This transportation legislation emphasizes the need for performance measurement in planning and programming activities at the national, state and MPO levels. MAP-21 also includes the Congestion Management Process as one of its requirements. The elements of MAP-21 will be incorporated

into the MAG transportation planning process, when regulations detailing its implementation are promulgated. The guidance provided by SAFETEA-LU will be utilized until new regulations are available.

Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)

The Congestion Management Process (CMP) was first introduced in, 2005, when the President signed the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). 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.

Moving Ahead for Progress in the 21st Century Act (MAP-21)

Under MAP-21, U.S. DOT will establish performance measures and state DOTs will develop performance targets in consultation with metropolitan planning organizations (MPOs) and others. The language in the bill stipulates that States must make cost-effective and efficient transportation investments that make progress toward these performance targets. MPOs must incorporate these performance measures and targets into their Transportation Improvement Programs (TIPs) and Long Range Transportation Plans; additionally, MPOs are also required to report on how these investments will make progress toward meeting those targets.

Performance measures under MAP-21 introduce significant modifications to the federal-aid highway program and provide a means to accomplish the most efficient investment of federal funds. This is done by refocusing on national transportation goals, increasing the accountability

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and transparency as well as improving project decision making through performance-based planning and programming.

MAP-21 identifies seven thematic areas for which the Secretary of Transportation will determine performance measures. These areas include:

(1) Safety
(2) Infrastructure condition
(3) Congestion reduction
(4) System reliability
(5) Freight movement and economic vitality
(6) Environmental sustainability
(7) Reduced project delivery delays

MAG Congestion Management Activities

MAG has pursued a broad range of programs in response to the need to address congestion issues in the region. These have included early efforts in the area of travel demand reduction and operational strategies, as well as programs directed at system performance monitoring and assessment. Most recently, efforts have focused on the MAG Congestion Management Process.

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 Congestion Management System (CMS) Working Group, which was established under TEA-21 and ISTEA. Through this process, a variety of alternative transportation options were developed 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.

Performance Monitoring and Assessment

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.

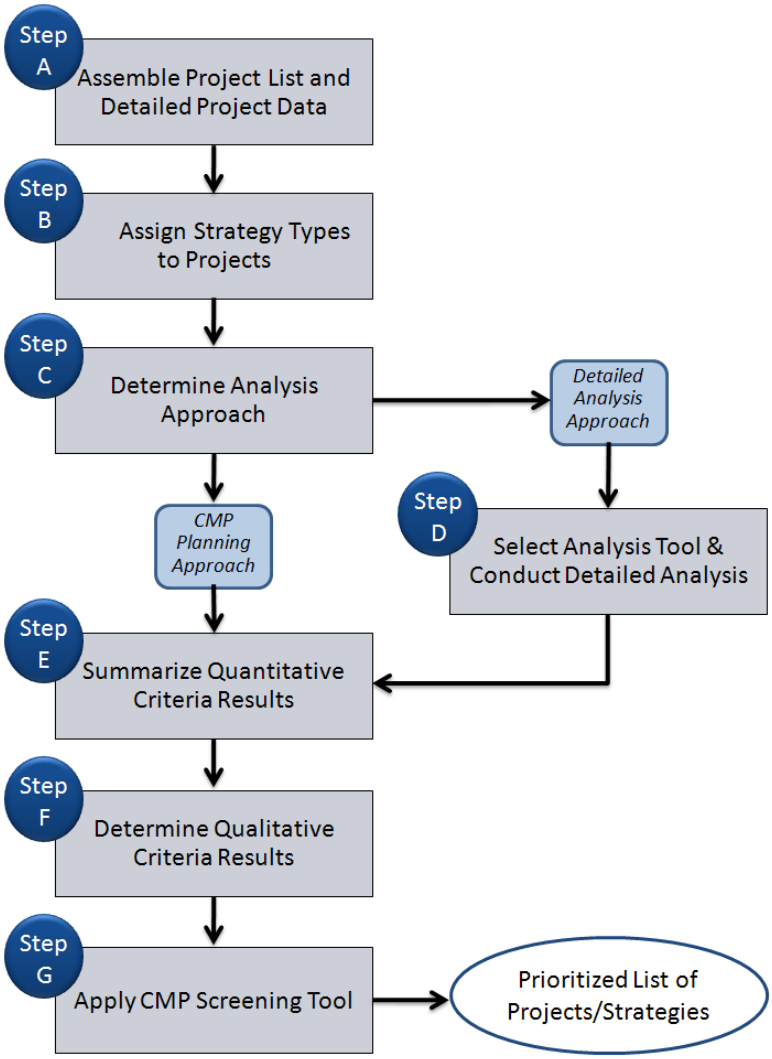
In addition, continuing to place emphasis on performance-based planning, MAG has established an ongoing Transportation System Performance Monitoring and Assessment Program. Over the last four years, this program has developed various reporting methodologies and web-based components, allowing policymakers, technical users and the public in general easy access to performance data and visualization. MAG has developed a Performance Measures Framework and Regional Performance Report, 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.

MAG Congestion Management Process

MAG conducted an update of is congestion management process (CMP), through the participation of the MAG CMP Working Group. This effort relied on historical and current traffic data analysis and culminated in a Congestion Management Process Report published in December of 2009. The CMP comprises two main criteria, the establishment of a series of strategies to address congestion, and the development and implementation of a CMP evaluative Sketch Tool. 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.

- CMP Sketch Tool - The CMP Sketch Tool provides a step by step sketch planning approach that facilitates the analysis process for evaluating congestion management strategies or projects. The core of the tool is a spreadsheet that uses both quantitative and qualitative criteria to assess strategy and project effectiveness and to assist in the assignment of ranks to projects so they can be prioritized. The process and sketch planning tool are designed to be applied to sets of projects or congestion management strategies for which some quantitative data is available. Figure 19-1 depicts the structure of the CMP Sketch Tool. Target outcome for development of the CMP Sketch Tool included:

FIGURE 19 -1
MAG CMP SKETCH TOOL STRUCTURE



- Assist in generating an evaluation and ranking of projects for programming during each application cycle.

- Indentify and document process in meeting the Regional Transportation Plan goals.

- Meet FHWA requirements.

- Provide a tested and accepted practice for evaluating projects if funding is increased or decreased in the adopted TIP.

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- Determine data collection needs and propose methods to address gaps in data collection that strengthens the quantitative evaluation.

The CMP makes use of existing performance measurement systems that monitor and report on the status of the transportation network. These measures are an integral part of the MAG CMP sketch tool, which incorporates evaluative elements for each of the modes including criteria developed by modal committees. The CMP tool also provides input to the development of the Transportation Improvement Program (TIP), using quantitative and qualitative methods to assist MAG committees in considering the merits of proposed projects under consideration for competitive funding.

- CMP in the Programming Process - A key component of MAG's congestion management activities is the periodic updating of the Transportation Improvement Program (TIP). This is the most important application of the updated Congestion Management Process and tools. To date, MAG's congestion management strategies have been implemented using the updated CMP model combined with the modal committee-based recommendations, taking into account quantitative and qualitative factors. This process was applied in the development of the latest two approved TIP cycles authorized by the MAG Regional Council, i.e., FY 2008 - 2012 and FY 2009-2013.

  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.

  For the 2013 Fiscal year's cycle, the CMP update and tool were implemented at the Intelligent Transportation Systems and Bicycle and Pedestrian modal committees, as required by 23 CFR. The MAG modal committees developed the Sketch Tool scores and ranked the projects. Figure 19-2 depicts an example project assessment results. These results are furnished with the CMAQ assessment, for final project evaluation purposes. Recommendations from the MAG modal committees are forwarded to the Transportation Review Committee for programming consideration. CMAQ guidance allows a qualitative evaluation to be made when a quantitative analysis is not possible. Although every effort is made to quantify the congestion reduction impact of each project, qualitative assessments may be based on a reasonable review of how a project or program will decrease congestion.

  MAG has an established project application, programming schedule, project evaluation process, and project selection process. This process includes an evaluation of the

FIGURE 19 -2
MAG CMP SCREENING TOOL – EXAMPLE RANKINGS SUMMARY

			PROJECT NUMBERS:								
	CRITERIA	Weight	1	2	3	4	5	6	7	8	9
Quantitative Data	VOLUME/AADT *	25%	7	7	9	4	4	3	4	1	2
	CRASH RATE	5%	1	1	1	1	1	1	1	9	1
	TRUCK VOLUME / AADT	5%	7	7	9	4	4	3	4	2	1
	CONGESTION / LOST PRODUCTIVITY GP	10%	5	5	3	7	7	4	7	2	1
	Total Weighted Score:		2.65	2.65	3.05	1.95	1.95	1.35	1.95	1.00	0.70
	Rank Order:		2	2	1	4	4	7	4	8	9
Qualitative Data	CMP OBJECTIVES	35%	3.33	2.60	2.57	3.29	2.14	3.29	3.57	3.43	3.29
	PROJECT/MODE SPECIFIC ASSESSMENT	20%	4	4	1	4	3	4	3	4	4
	Total Weighted Score:		1.37	1.11	1.70	1.35	1.15	1.35	1.65	1.40	1.35
	Rank Order:		4	9	1	5	8	5	2	3	5
All Data	Total Weighted Score:		4.02	3.76	5.75	3.30	3.10	2.70	3.60	2.40	2.05
	Rank Order:		2	3	1	5	6	7	4	8	9

* For ITS Projects:
- AADT can be replaced by VMT or VMT/lane
- Cost can be another quantitative factor expressed in VMT/$ spent

expected emissions reductions and cost effectiveness, a CMP tool assisted project evaluation process at the modal committees, 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.

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- 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.

Future Congestion Management Efforts

The RTP, which covers a twenty year planning period, includes projects from 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 future of CMP will evolve from its current role to become a further integral part of the planning process.

The MAG Performance Measurement Report continues to be updated since its first edition in 2009 with charts, maps and graphics available on the MAG website, additionally; an interactive web-based dashboard tool has been developed to reach a greater audience. These tools constitute a performance measuring and monitoring system for regional multi-modal transportation planning, as well as an integral component for life-cycle programming and federally funded programs.

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, such as freeway, arterial and transit corridors.

MAG, continuing to place emphasis on performance-based planning, has established an ongoing Transportation System Performance Monitoring and Assessment Program. Over the last four years, this program has developed various reporting methodologies and web-based components, allowing policymakers, technical users and the public in general easy access to performance data and visualization. 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 2035.

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 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.

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- Data Items - 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. 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.

- Data Sources - Data from the Arizona Department of Transportation's (ADOT) Freeway Management System (FMS), which now includes 122 centerline miles of the regional freeway system is collected continuously in five minute increments from loop and acoustic sensors 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.

  For the past three years, MAG has also acquired speed traffic data for freeways and arterials in the region from commercial sources; this acquisition has enhanced the baseline traffic data archive serving planning, programming and performance measurement activities. Two private data providers are under contract with MAG to supply GPS-based speed data for all regional freeways and all major arterials, thus supplementing the existing arterial database and ADOT FMS freeway database. It is anticipated that this acquisition will be renewed on a yearly basis allowing the current data archive to be more geographically complete and enable MAG to perform analysis on system and corridor performance from comprehensive data sources.

  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.

- Recent Monitoring Results - 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 per person. This measure tracks overall vehicle travel trends for the region. As seen in Table 20-1, the total number of freeway vehicle miles traveled in 2012 (29,073,331) is 0.4 percent greater than that in 2009. The results in Table 20-1 are reflective of a slight upward trend in the national and regional economy. Latest economic indicators point at some increase in economic activity, as Arizona slowly recovers from the Great Recession. For example, HURF (Highway User Revenue Funds) revenues have shown an increase of 0.5% when comparing 2011 and 2012.

TABLE 20-1
PER CAPITA FREEWAY VMT for the PHOENIX/MESA URBANIZED AREA

	2009	2010	2011	2012
Total Freeway VMT*	28,950,000	29,087,000	29,495,000	29,073,331
Population of Phoenix-Mesa Urbanized Area**	3,308,396	3,348,298	3,370,250	3,392,348
Per Capita Freeway VMT	8.75	8.67	8.75	8.57

Source:
*ADOT Highway Performance Monitoring System (HPMS) 2012 Draft
** ACS and Census 2010 (2012 Draft Estimate)

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.

- Travel Demand Forecasting - 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.

  An important observation regarding the current MAG four-step Travel Demand Model is that it is inherently a static model. Statistics on performance results have been tabulated for the Maricopa County portion of the MAG modeling area, while performance maps have been prepared covering the fully expanded MAG metropolitan planning area (including Pinal County areas). Modeling was based on the MAG 2013 Socio-economic Projections, which reflect recent changes in regional demographics and market. Conditions such as fuel costs and other road user costs are not factored into the simulation runs.

- Build vs. No-Build Scenarios - Transportation network simulation models are also used to assess the impact of improvements (Build Scenarios) compared to conditions without improvements (No-Build Scenarios). This capability is especially important when an area

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experiences significant changes in growth patterns. Under high growth conditions, the performance of the transportation system may decline even though improvements are made, due to additional travel demand brought on by the increase in housing units and population. The reverse occurs when a decrease in demand results in a reduction in congestion levels. However, in the case of an increased demand scenario such as the one depicted in the "2035 No-Build" column of Table 20-3, conditions easily reach critical levels, if improvements are not implemented. 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.

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 studies and surveys underway and completed within the last 5 years. Besides the yearly ADOT FMS and private sector speed data mentioned before, data sources include: two current studies: the 2011/12 Traffic Data Collection Management Study, the 2013 Bottleneck Data collection and Model Validation Study; among the completed studies are the 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 last two years, the following studies have been completed: 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. During the 2010-2011 Fiscal Year, four additional studies which have enhanced existing transportation databases have been initiated, the Southwest Corridor Major Investment Study, the update to the Mode Choice Model, the Central Phoenix Framework Study and the Sustainable Transportation-Land Use Study.

- 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

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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. Since 2010 MAG has developed a web-based Traffic Data Management System which is a repository of all available traffic counts, turning movement counts and travel time databases.

- 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. The Travel Time Index (TTI) is a measure of average conditions that tells one how much longer, on average, travel times are during congestion compared to during light traffic. For example, a value of 1.30 TTI means that a 20 minute trip at free flow speeds takes 30 percent longer, or 26 minutes in the peak hours.

  Figure 20-1 and Table 20-2 respectively depict the location of the regional freeway segments and the calculated commuting TTI for the a.m. and p.m. commuting peak periods on the instrumented freeway corridors based on 2010 and 2011 ADOT FMS data. It can be observed that the 2010 TTI peak period values have generally maintained their values in 2011 for most freeway corridors in the Phoenix region. However, certain corridors have experienced significant changes.

  Significant declines (a lower TTI indicates improved conditions) in the TTI for selected corridors include:

  - I-10 Maricopa Fwy. (Chandler Blvd. to SR-51/202L): Westbound/AM/peak, TTI decreased by 7.7%.
  - I-10 Papago Fwy. (SR-51 to 83rd Ave.): Westbound/PM/peak, TTI decreased by 5.90%.
  - I-17 (Peoria Ave. to I-10): Southbound/PM/peak, TTI decreased by 7.3%.
  - SR-51 (Bell Rd. to the I-10): Southbound/AM/peak, TTI decreased by 5.4%.
  - SR-51 (I-10 to Bell Rd.): Northbound/PM/peak TTI, decreased by 5.7%.

  Significant increases (a higher TTI indicates worse conditions) in the TTI for selected corridors include:

  - I-10 Papago Fwy. (83rd Ave. to SR-51): Eastbound/AM/peak, TTI increased by 9.20%.
  - Loop 101 Pima Fwy. (Princess Dr. to 202L): Southbound/PM/peak, TTI increased by 12.4%.
  - Loop 101 Pima Fwy. (202L to Princess Dr.): Northbound/AM/peak, TTI increased by 8.7%.
  - Loop 202 Red Mtn. Fwy. (101L to SR-51/I-10): Westbound/PM/peak, TTI increased by 15.7%.

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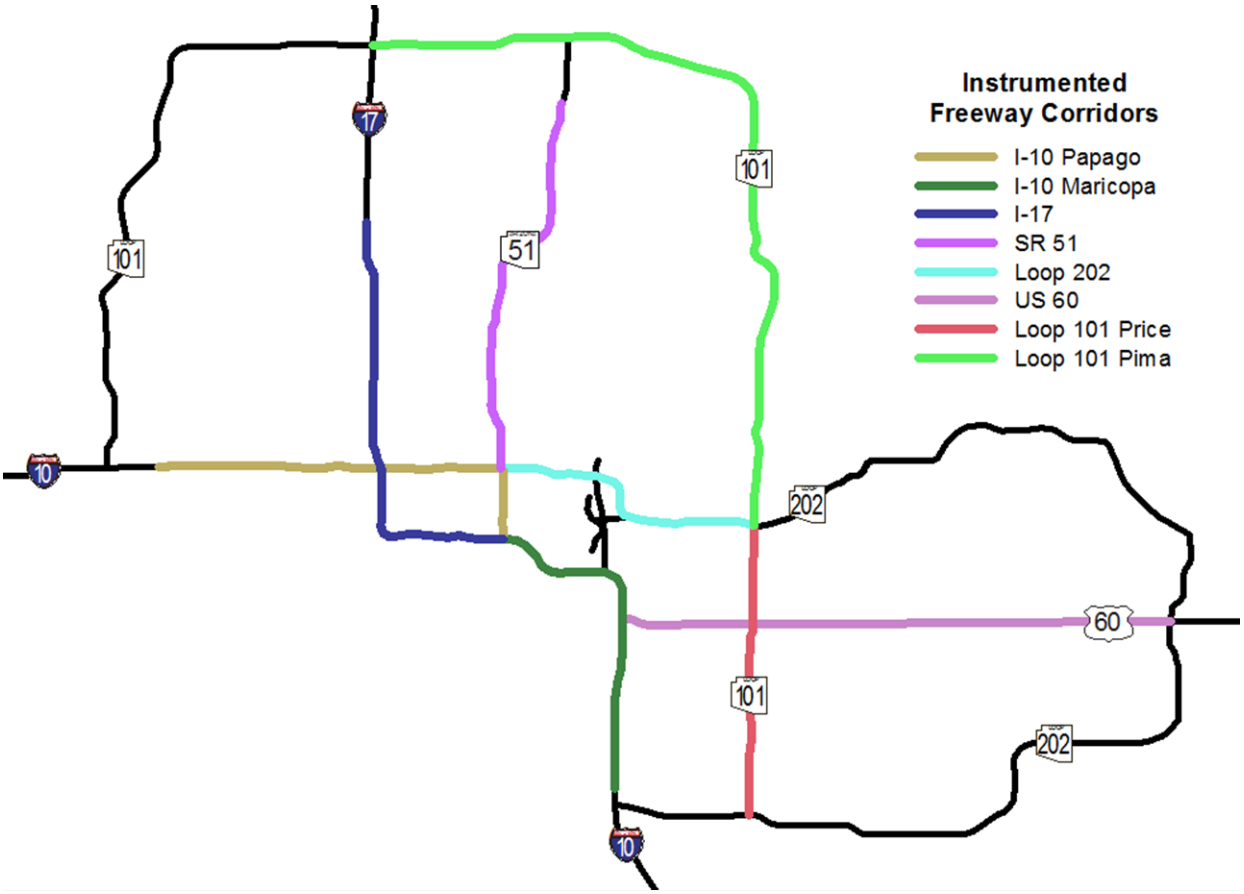
In general, improvements in TTIs can be traced to the completion new general purpose, HOV lanes, and direct HOV ramps, which have helped to encourage carpooling along major regional commuter routes. In addition, enhanced ADOT Traffic Operations Center monitoring capabilities and the Dynamic Messaging System (DMS) on urban freeways have provided additional operational benefits to the travelling public, helping to mitigation recurring congestion levels. On the other hand, some corridors are experiencing the return of increased congestion levels, likely due to the early effects of an economic recovery across our region.

FIGURE 20-1
SELECTED FREEWAY CORRIDORS



- Speed Data - Currently, the two principal, most comprehensive sources of speed data for the MAG region are: the private sector data bases, which have been acquired by MAG starting in 2010, and the ADOT freeway management system (FMS) permanent count detector database. The source for private sector traffic data is mainly GPS-equipped vehicles and other mobile consumer devices. The significant benefit to these products is their consistency in reporting, as well as the full coverage of the MAG freeway and major arterial network. Speed data for the instrumented portions of the

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TABLE 20-2
TRAVEL TIME INDEX FOR SELECTED FREEWAY CORRIDORS
(GENERAL PURPOSE LANES)

Freeway	Direction	From	To	AM Peak Period TTI			PM Peak Period TTI		
				2010	2011	% change	2010	2011	% change
I-10 Papago	EB	83rd Ave	SR 51/Loop 202	1.31	1.43	9.20%	1.02	1.02	0.00%
	WB	SR 51/Loop 202	83rd Ave	1.02	1.00	-2.00%	1.18	1.11	-5.90%
I-10 Maricopa	EB	SR 51/Loop 202	Chandler Blvd	1.00	1.00	0.00%	1.71	1.65	-3.50%
	WB	Chandler Blvd	SR 51/Loop 202	1.17	1.08	-7.70%	1.00	1.00	0.00%
I-17	NB	I-10 Maricopa	Peoria Ave	1.03	1.00	-2.90%	1.26	1.27	0.80%
	SB	Peoria Ave	I-10 Maricopa	1.17	1.20	2.60%	1.09	1.01	-7.30%
SR 51	NB	I-10 Papago	Bell Rd	1.00	1.00	0.00%	1.06	1.00	-5.70%
	SB	Bell Rd	I-10 Papago	1.11	1.05	-5.40%	1.00	1.00	0.00%
Loop 202	EB	SR 51/I-10	Loop 101	1.00	1.00	0.00%	1.00	1.00	0.00%
	WB	Loop 101	SR 51/I-10	1.19	1.25	5.00%	1.34	1.55	15.70%
US 60	EB	I-10 Maricopa	Loop 202	1.00	1.00	0.00%	1.10	1.06	-3.60%
	WB	Loop 202	I-10 Maricopa	1.05	1.09	3.80%	1.00	1.00	0.00%
SR 143	NB	I-10 Maricopa	Loop 202 Red Mountain	1.09	1.10	0.90%	1.09	1.13	3.70%
	SB	Loop 202 Red Mountain	I-10 Maricopa	1.06	missing data	missing data	1.19	missing data	missing data
Loop 101 Price	NB	Loop 202 Santan	Loop 202 Red Mountain	missing data	1.02	missing data	missing data	1.02	missing data
	SB	Loop 202 Red Mountain	Loop 202 Santan	missing data	1.02	missing data	missing data	1.02	missing data
Loop 101 Pima	NB	Loop 202 Red Mountain	Princess Dr	1.15	1.25	8.70%	1.02	1.03	1.00%
	SB	Princess Dr	Loop 202 Red Mountain	1.00	1.00	0.00%	1.21	1.36	12.40%

Source: ADOT FMS

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freeway system is also available through the ADOT FMS, and the ADOT Transportation Planning Division traffic detector stations.

Appendix Tables E-1 and E-2 depict changes in average speed for all freeway corridors monitored by ADOT'S FMS System between 2011 and 2012. For these two years, it can be observed that major facilities have generally maintained their average speeds, with afternoon peak period changes fluctuating between one and four miles per hour. A notable exception is eastbound 101L between I-17 and SR-51, which experienced an increase of 7.4 mph in PM peak speeds and 6.8 mph in the AM peak speeds between 2011 and 2012. (This segment is part of an extensive 30 mile project, completed in 2012, consisting of the addition of one HOV lane in each direction between I-10 and SR-51).

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.

- Forecast 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.

    - 2011 Base Year Scenario: For this scenario the highway, arterial and transit networks reflect the base year 2011. This network reflects "up-to date" conditions after implementing a number of projects identified in the RTP, as well as 2011 travel demand. The socio-economic data that generated the travel demand for this scenario is based on the 2013 Socioeconomic Projections.

    - 2035 RTP Plan Scenario: The network used for this model run includes all the projects in the RTP Plan and utilizes MAG's 2013 Socioeconomic Projections for the year 2035.

    - 2035 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 2035 as that used for the RTP scenario, but does not include the regionally funded freeway system improvements identified in the RTP.

- Forecast 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

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modeling scenarios: the 2011 Current Base Year, the 2035 RTP and the 2035 No-Build. All data is for the Maricopa County portion of the MAG transportation modeling area. Table 20-3 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 20-3: lanes miles and capacity miles. As shown, there is an increase of approximately 32 percent in freeway capacity between the 2011 Base Year and the 2035 RTP. Arterial capacity miles for the RTP increase also significantly, by approximately 43 percent as compared to the Base 2011 Year network.

- Demand Measures: The demand measure identified in Table 20-3 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 20-3. Comparing the 2011 Base Year and the 2035 RTP, a 67 percent VMT increase is observed on freeways and approximately 59 percent on arterials. For the No-Build scenario, the VMT increases are 36 percent and 60 percent, respectively, reflecting the lack of facility improvements.

- Level of Service (LOS) Measures: A number of LOS measures are included in Table 20-3 for the three modeled scenarios, including congestion on freeways and arterials, congested VMT, and vehicle hours of delay. As noted previously, congested segments are those with LOS E-F, and delay represents amount of extra travel time due to congestion.

- Build vs. No-Build: A review of Table 20-3 indicates that, while the number of lane miles of congested freeways increases by 99 percent between the 2011 Base Year and the 2035 RTP, the percentage of total lane miles that are congested increases by only 50 percent. When comparing the 2011 Base Year to the 2035 No-Build scenario, the percentage of congested freeway lane miles increases by 112 percent.

  For arterials, the percentage of lane miles that are congested in the RTP scenario shows significant increases compared to the 2011 Base Year, increasing from 1.6 percent to 5.0 percent. However, for the 2035 No-Build scenario, the percentage of lane miles that is congested increases to nearly 11 times the value of 2011, increasing from 1.6 percent to 17.2 percent. A similar pattern occurs for the percentage of daily VMT on arterials that is congested, with the percent of VMT

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TABLE 20-3
ROADWAY PERFORMANCE MEASURES FROM MAG MODEL
(Maricopa County Portion of MAG Modeling Area)

	Scenario		
Measures	**2011**	**2035 RTP**	**2035 No Build**
Population	4,104,542	6,202,221	6,202,221
Supply Measures			
Lane-Miles			
Freeways	2,241	2,984	2,241
Arterials	10,572	15,261	10,572
Capacity Miles			
Freeways	59,711,711	79,044,939	58,822,999
Arterials	108,173,839	154,278,917	104,715,728
Demand Measures			
Daily Vehicle-Miles (VMT)*			
Freeways	33,769,220	56,428,103	46,079,126
Arterials	41,912,871	66,500,409	67,387,011
Level of Service Measures			
Congested Lane-Miles			
Freeways	504	1,004	1,071
Arterials	169	769	1,822
% Congested Lane-Miles			
Freeways	22.5	33.7	47.8
Arterials	1.6	5.0	17.2
Daily Congested VMT			
Freeways	13,411,429	27,538,148	31,278,559
Arterials	1,647,195	7,790,712	19,320,644
% Daily Congested VMT			
Freeways	39.7	48.8	67.9
Arterials	3.9	11.7	28.7
Total Vehicle Hours of Delay			
Hours of Delay	735,398	1,715,043	2,629,036
Hrs of. Delay per 1000 VMT	9.7	14	23.2

Source: MAG Transportation Model; Maricopa County portion of modeling area.
Note: Values calculated for facilities included in the Maricopa County portion of the MAG Modeling Area. Population totals reflect adjustments for use in travel model.

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on the No-Build scenario increasing to over 7 times the value of 2011, increasing from 3.9 percent to 28.7 percent.

The total vehicle hours of delay experiences an increase of 133 percent between the 2011 Base Year and the 2035 RTP, but dramatically increases by 257 percent under the No-Build scenario. The vehicle hours of delay per 1,000 VMT increases by 44 percent between the 2011 Base Year and the 2035 RTP; nevertheless, it increases at a much higher rate, by 139 percent under the No-Build scenario.

- Clearly, the enhanced freeway network and additional arterial mileage provided in the RTP, but not included in the No-Build scenario, result in significant congestion relief on the both the freeway and arterial systems. These system improvements also help significantly to mitigate the effects of a growing population.

- Level of Service Maps: Appendix Figures E-1 through E-6 show the geographic distribution of P.M. peak period congestion patterns for the three modeled scenarios, depicting facility Levels of Service for the Maricopa County portion of the MAG freeway system and Levels of Service at arterial intersections. Figures E-1 through E-3 show levels of service on the freeway system for the 2011 Base Year, 2035 RTP, and the 2035 No-Build scenarios. Figures E-4 through E-6 indicate locations and distribution of congested intersections for the P.M. peak period at arterial intersections for these same scenarios. A complete Freeway and Arterial Performance Dashboard Report can be accessed interactively from the MAG performance website (performance.azmag.gov).

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. This Report also updates the Valley Metro Short Range Transit Plan. Valley Metro also publishes an annual report of transit passenger ridership for all the operating agencies in the region. The report includes annual weekday, Saturday and Sunday ridership figures by select transit modes (bus, circulator, rural and light rail). Principal performance measures include total boardings and boardings per mile across the system as well as total number of riders and revenue miles by route and by City.

The full Transit Performance Report and The Valley Metro Ridership report can be accessed from the Valley Metro Website (www.valleymetro.org).

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 established 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.

A Technical Advisory Group (TAG) made up of Valley Metro member agencies and MAG, was formed in November 2012 and has been tasked with the development of Regional Transit Standards and Performance Measures. The focus of the first Phase of this effort has been to prepare service delivery goals, develop transit operational standards, initiate a performance measures review, and develop a process for transit service changes. Phase II will address additional standards and focus on development of performance measures to compliment agency goals.

Performance Targets and Operating Results

The specific performance measures and targets developed during the Service Efficiency and Effectiveness Study are listed in Tables 20-4 through 20-6. Tables 20-4 through 20-6 also include actual operating results, from the 2010, 2011 and 2012 Transit Performance Reports (TPR). The data presented is based on the findings from the SEES and data available at this time. The modes covered by the TPR include Fixed Route Bus, Paratransit, and Light Rail. Fixed Route bus service includes Local Routes, Super Grid (major arterial routes) and Shuttles. 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

TABLE 20-4

FIXED ROUTE BUS PERFORMANCE MEASURES (SYSTEM-WIDE)

Measure		2010 Results	2011 Results	2012 Results
Cost Efficiency/Effectiveness				
Farebox Recovery Ratio		24.1%	22.0%	22.2%
Operating Cost per Boarding		$3.50	$3.77	$3.73
Subsidy (Net Operating Cost per Boarding)		$2.66	$2.94	$2.90
Operating Cost per Revenue Mile		$5.90	$7.08	$7.47
Average Fare		$0.84	$0.83	$0.83
Service Effectiveness				
Annual Increase in Total Boardings		-15.22%	-1.37%	4.90%
Annual Increase in Average Boardings	Weekday	-14.08%	1.24-	4.44%
	Sat.	-14.08%	1.77%	8.9%
	Sun.	-16.58%	3.82%	5.69%
Average Boardings per Revenue Mile		1.69	1.88	2.00

Sources: Valley Metro Transit Report and Valley Metro Fact Sheet

TABLE 20-5

PARATRANSIT PERFORMANCE MEASURES

Measure	2010 Results	2011 Results	2012 Results
Cost Efficiency/Effectiveness			
Farebox Recovery Ratio	6.3%	6.8%	5.9%
Operating Cost per Boarding	$36.99	$37.72	$38.54
Subsidy (Net Operating Cost per Boarding)	$34.69	$35.17	$36.25
Operating Cost per Revenue Hour	$60.15	$68.26	$62.93
Service Effectiveness			
ADA On-time Performance	97.35%	97.39%	96.76%

Sources: Valley Metro Transit Report and Valley Metro Fact Sheet

TABLE 20-6

LIGHT RAIL TRANSIT (LRT) PERFORMANCE MEASURES

Measure	2010 Results	2011 Results	2012 Results
Cost Efficiency/Effectiveness			
Farebox Recovery Ratio	28.0%	33.0%	41.0%
Operating Cost per Boarding	$2.72	$2.42	$2.13
Subsidy (Net Operating Cost per Boarding)	$1.96	$1.62	$1.26
Operating Cost per Revenue Hour	$12.43	$12.90	$11.87
Service Effectiveness			
Annual Total Boardings	12,100,000	12,800,000	13,600,000
Boardings per Revenue Mile	4.57	5.32	5.56
ADA On-time Performance	95.80%	97.50%	97.20%

Sources: Valley Metro Transit Report and Valley Metro Fact Sheet

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. MAGnitude, the web-based Dashboard is the primary source for roadway system and corridor performance in the region, providing a broad range of data to support analysis for planning and programming activities at MAG.

The Performance Measurement Framework, developed with the participation of MAG's member agencies will continue to be used as the reference for periodic enhancements 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 developed an update to the Congestion Management Process in 2010 to coordinate results and implementation of strategies. Based on the multitude of observed and archived data sources, as well as input from the Transit Performance Report, MAG will continue to publish semi-annual performance reports in various formats including hard-copy, web-based, map and interactive dashboards.

CHAPTER TWENTY-ONE

TRANSPORTATION SAFETY

In September 2004, the Maricopa Association of Governments (MAG) formed a Transportation Safety Committee clearly establishing the intent to incorporate explicit safety considerations within the metropolitan planning process. One year later, in October 2005, MAG adopted the region's first Strategic Transportation Safety Plan that was developed and recommended by the committee. All MAG planning activities related to transportation safety are performed by MAG staff with support provided by qualified consultants.

Safety Planning Process

Transportation safety is addressed through several activities within the MAG planning process, as described in the following sections:

Safety Assessment of Transportation Alternatives

At the highest level of planning, likely road safety outcomes are used as criteria in long-range 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 regional travel demand model 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 defined within the RTP, has utilized results from the travel demand forecasting step and estimated the total number of crashes in the system, based on the forecasted traffic volumes. Simplified models that utilize historical 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. It is anticipated that in future iterations of the RTP analysis more sophisticated safety forecasting methodologies are likely to be utilized.

Strategic Transportation Safety Plan

At the next level, transportation safety planning is addressed more tactically, identifies short to medium-term needs, as comprehensively described in the 2005 MAG Strategic Transportation Safety Plan (STSP). This Plan identifies goals, emphasis areas, general strategies and potential actions to be carried out with oversight provided by the MAG Transportation Safety Committee.

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Table 21-1 provides a summary of the goals and emphasis areas identified in the STSP. A project that would update the STSP is planned to commence in 2013.

The STSP recommends cross-cutting safety initiatives that would also involve other stakeholder groups. An example is the 2007 MAG project that introduced "Clearview Font" for street name signs in the region, a measure targeted to improve road safety for older road users. Many local agencies have since adopted this font for all future road signs. Another recommendation in the STSP led to the development of the crash data analysis software named Regional Transportation Safety Information Management System (RTSIMS). This system is currently being used extensively for performing analysis of crash data, monitoring road safety performance and producing reports on the state of road safety in the MAG region. This software is owned by MAG and has been made available to local agencies at no cost. This software is currently being used by the Pima Association of Governments and the Arizona Department of Transportation (ADOT) has expressed interest in obtaining a copy.

TABLE 21-1
SUMMARY OF 2005 STSP

Goals	Safety Emphasis Areas & Strategies		
	Roadway Safety	**Enforcement, Education, EMS**	**Pedestrian, Bicycle, Transit**
1	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.
2	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.
3	Better utilize available road safety funds.	Strengthen driver training and licensing standards.	Incorporate safety considerations in pedestrian and bicycle planning.
4	Reduce the crash clearance time.	Reduce time to respond and clear crash sites.	Promote safe multi-modal access.
5	Reduce severe intersection crashes.	Educate the public on safe actions to take at road crash sites.	Reduce mid-block pedestrian crashes.
6	Improve traffic safety in work zones.		Enhance Transportation Security.
7	Conduct safety reviews of proposed LRT and BRT operations starting at design.		
8	Improved lighting, signage and delineation for older road users.		
9	Improved lighting, signage and accessibility for physically handicapped users.		

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Network Screening and Road Safety Assessments

In 2010, MAG developed a network screening methodology utilizing RTSIMS, to identify and rank all intersections in the region based on crash risk. This was applied to screen 17,000 intersection crash locations in the region and rank them by crash risk. This was a landmark accomplishment for the region, and has helped some local agencies obtain HSIP funds from the state for deserving road safety projects.

Another recommendation in the 2005 STSP was the performance of Road Safety Assessments (RSA) at high risk locations in the region. In 2011, MAG developed and executed a very successful RSA program with valuable assistance from the RSA program at ADOT. A total of 17 RSA projects were carried out at 21 urban intersections located in 10 local jurisdictions. The RSA program was instrumental in helping seven local on-call consultants develop expertise in performing RSAs. Since there were no good examples available for establishing an urban RSA program, it was developed from fundamental principles of RSAs, including the addition of a human factors expert to the RSA team. Based on requests from member agencies, MAG is currently planning to expand future RSAs to include safety reviews of road designs immediately prior to construction. The RSA program will continue to be funded with MAG with planning funds.

MAG Sponsored Regional Road Safety Activities

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 seven successive years.

Based on the demand for this training, it has become an annual road safety training event sponsored by MAG. In 2013, three training workshops were held covering the central city and both east and west valleys. Each year, nearly 400-500 crossing guards are provided basic safety training at these 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, all public school districts in the region and to a number of agencies outside Arizona that have sent in requests.

Safe Routes to School (SRTS) Program

Under MAP-21 guidelines ADOT will begin sub-allocating a portion of funds to the MAG region for Safe Routes to School projects. The programming of these funds towards projects will be defined within the MAG Transportation Alternatives Program.

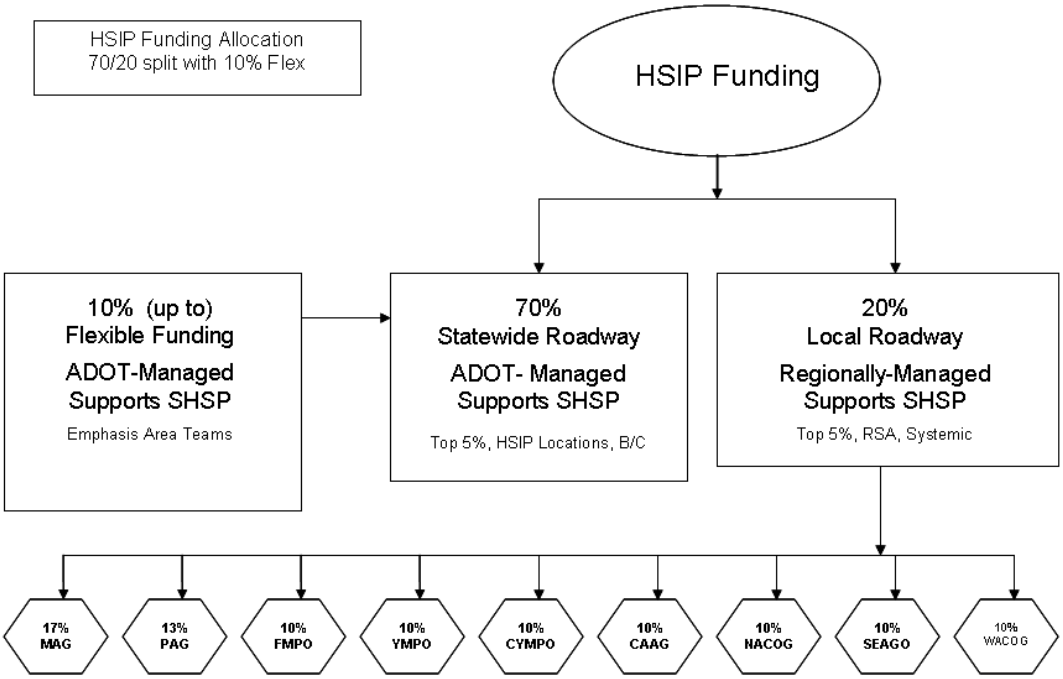
Coordination with State Strategic Highway Safety Planning

All MAG transportation safety planning activities are closely coordinated with similar planning at the state level. ADOT has informed MAG that plans are underway to begin developing an update to the 2007 Strategic Highway Safety Plan. It is likely that the planned 2013 update of the MAG Strategic Transportation Safety Plan will occur at the same time and the two efforts will be closely coordinated.

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 federal funds to the MAG region for safety improvements lies with ADOT.

In August 2008, ADOT 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 began receiving approximately $1 million that could be directed towards to qualifying low-cost safety improvement projects at discretion of MAG. These funds, referred to as MAG-HSIP, have been systematically programmed by MAG for qualifying road safety projects in FY2010 through FY2014. Most of these low-cost projects are administered directly by ADOT Local Government Section.

Fig 21-1
HSIP FUNDING ALLOCATION IN ARIZONA



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The larger pool of Federal HSIP funds (70 percent) is dedicated for larger road safety projects on all public roads across the state and are managed entirely by ADOT. At the current time, there is no multi-year programming process established for applying these funds for projects. Projects can be submitted by local agencies at any time to ADOT and compete for HSIP funds available in any given year, as determined by ADOT. At present, HSIP remains the only funding source available for larger infrastructure projects for road safety improvement in the MAG region.

Status of Transportation Safety in the MAG Region

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.

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 ADOT. 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. Road safety data, statistics and trends for the MAG region, generated using Regional Transportation Safety Information Management System (RTSIMS), are posted at the MAG website. They are frequently quoted by news media and agencies interested in road safety.

Appendix F 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

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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 for the calendar year 2011, I-17 had the highest crash rate of 1.73, while Loop 202 had the lowest with a rate near 1.21.

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. ADOT's FMS staff is on duty 24-hours a day and 365 days a year monitoring the state's freeway and highway system. They are responsible for the operation of electronic signs, ramp meters and traffic surveillance cameras, currently installed on nearly 150 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 and local police departments continue to monitor and address threats to overall safety through enforcement.

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

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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 are identified in the RTP as part of the region's transportation system management program.

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 2011, of the 54,815 crashes that occurred on the arterial system 32,321 or 59 percent occurred at or near intersections. Of these crashes at intersections a total of 11,146 crashes or 34 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.

Crash statistics indicate that, following a declining trend for all crashes in the region between 2006 and 2009, the total number of crashes have increased from a low of 69,090 in 2009 to 72,804 in 2011. This trend is also reflected in crashes on arterial streets.

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. Crash statistics for bicycle involved crashes indicate that crashes have increased by 7 percent between 2009 and 2011.

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. In 2010, the total pedestrian crashes in the MAG region was 943, the lowest since 1999. This downward trend appears to have reversed in 2011 with 1043 crashes.

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.

Funding for Transportation Safety

The implementation of countermeasures to address existing road safety issues are carried out by MAG member agencies. The role of MAG is limited to recommending the funding of safety improvement projects using available funding sources. At the current time, the only funding source available to local agencies in the MAG region for making explicit road safety improvements is the Federal Highway Safety Improvement Program (HSIP) funds. This was discussed in detail in the section on "Coordination with State Strategic Highway Safety Planning".

The Transportation Safety Committee recommends projects for the portion of HSIP that is suballocated to the MAG region by ADOT. MAG currently receives about $1 million annually in HSIP funds that are allocated towards low cost road safety projects such as countdown pedestrian signals, larger traffic signal lights and "Clearview" street name signs. Local agencies could also submit projects directly to ADOT to be funded with statewide HSIP.

Since MAP-21 only covers FY 2013 and 2014, developing a long range funding projection for the safety program is difficult. However, based on the funding expected in FY 2014 under MAP-21 and a conservative annual growth rate of 1.9 percent, it is estimated that approximately $32 million in HSIP funding will be made available to the MAG area during the planning period (FY 2014 - FY 2035). Including a local match of 5.7 percent, this funding would total approximately $34 million (YOE $'s).

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

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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

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TABLE 22-1
AGENCIES AND TRANSPORTATION SECURITY EFFORTS BY SECTOR OF CONCERN

AGENCY	SECTOR OF CONCERN				
	Roads	Transit	Air Transportation Facilities	Cargo Facilities and Commodity Movements	Transportation Security Planning
U.S. DEPARTMENT OF TRANSPORTATION	•	•	•	•	•
• Federal Highway Administration	•				•
• Federal Transit Administration		•			•
• Federal Railroad Administration		•			•
• Federal Aviation Administration			•	•	•
U.S. DEPARTMENT OF HOMELAND SECURITY	•	•	•	•	•
• Transportation Security Administration			•	•	•
• U.S. Customs and Borders Protection			•	•	•
• Federal Emergency Management Agency	•				
TRANSPORTATION RESEARCH BOARD					•
STATE OF ARIZONA					
• Arizona Office of Homeland Security	•	•	•	•	•
• Arizona Div. of Emergency Management	•	•	•	•	•
• Arizona Department of Public Safety	•				•
• Arizona Department of Transportation	•	•	•	•	•
REGIONAL EFFORTS					
• Maricopa Co. Dept. of Emergency Mgmt.					•
• MAG 911 – Emergency Telephone					•
• RPTA/Valley Metro		•			•
• Valley Metro Rail		•			•

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.

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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). The FTA is involved in many different aspects of transit, public transportation throughout the MAG Region, including buses, maintenance facilities, vanpools, paratransit vehicles and light rail.

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 that 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 Phoenix-Mesa 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 Phoenix-Mesa 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 provided 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 Division of Emergency Management

The Arizona Division of Emergency Management (ADEM) is a unit within the The Department of Emergency and Military Affairs, which also includes the Army and the Air National Guard and the Joint Programs Division. The Division of Emergency Management is structured into four sections to address disaster preparedness, response, recovery, mitigation, and logistics. The Preparedness Section prepares state agencies and local emergency management organizations to prevent, respond to, recover from and mitigate against disasters through planning, training and exercise activities. The Operations Section is ADEM's disaster mitigation and emergency response arm. The Disaster Recovery Section's mission is to coordinate state and federal actions with local jurisdictions to assist those impacted communities in recovering from disasters. The Logistics Section provides facilities, transportation, supplies, equipment maintenance and fueling, food service, communications, and medical services for incident personnel.

The State of Arizona Emergency Response and Recovery Plan (SERRP) is administered by ADEM, and is designed to complement and coordinate preparedness, emergency response, and recovery activities by integrating with the National Response Framework and county, local, and tribal emergency operations plans and procedures. The plan consists of four sections: The Basic Plan, Functional Annexes, Support Annexes, and Incident Annexes. The Functional Annexes are organized by emergency support Functions as defined by the Department of Homeland

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Security. The Support Annexes provide detailed guidance regarding the Division's procedures for managing disaster operations and administration. Incident Annexes have been composed to provide policies and delineate responsibilities for response to specific events requiring complex interagency coordination.

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 and emergency response. Ongoing security efforts 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
    - Energy Assurance
- Internal Programs:
    - Vulnerability Assessment of Highway/Interstate Structures (bridges, tunnels, etc.)
    - Employee Training and Exercises
    - Business Continuity/Disaster Recovery Planning
    - Emergency Operations Planning
- Continued Support and Distribution of Public Information via 511 and www.az511.com

- Situation Reporting for major incidents and responses shared through WebEOC to multiple state agencies and the Arizona Counterterrorism Information Center

- 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
    - FHWA Traffic Incident Management Training
    - Distribution of TSA's Highway Infrastructure Counterterrorism Guide

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 though 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. Since development of this plan, attention has been focused on planning for site-specific emergencies.

A Multi-jurisdictional Hazard Mitigation Plan was adopted on April 14, 2010. This mitigation plan helps communities become more sustainable and disaster-resistant by focusing efforts on the hazards, disaster-prone areas and identifying appropriate mitigation actions. Maricopa

County and twenty four incorporated cities and towns, two tribes and one other governmental organization participated in a cooperative effort to update the Maricopa County Multi-jurisdictional Hazard Mitigation Plan.

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.

Valley Metro/Regional Public Transportation Authority

The safety and security of light rail, bus, paratransit, dial-a-ride and vanpool customers are very important to Valley Metro. Valley Metro's Safety and Security Department is responsible for establishing requirements for the identification, evaluation, and minimization of safety and security risks during revenue transit operations, construction and testing of LINK lines, rail line extensions, and related facilities. Additionally, the department has developed, and is currently administering provisions of its System Safety Program Plan, System Security Plan, Safety and Security Management Plan, and Security and Emergency Preparedness Plans, and has increased security personnel presence and modern security-related technologies that assist in securing our system and facilities throughout. Valley Metro's Light Rail 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 in Arizona.

The Federal Transit Administration (FTA) and the Department of Homeland Security (DHS) have 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 and DHS. In an effort to provide a secure environment for its passengers, Valley Metro conducts periodic TVAs or Transit Threat and Vulnerability Assessments at its facilities. The assessments considers general threat conditions and potential vulnerabilities to attacks, and also involved personnel interviews, site visits and documentation review. The TVA's findings and mitigation factors were considered by Valley Metro staff, and resulted in a number of physical security upgrades and added security personnel that greatly reduce the opportunity for undesired security breaches.

Additionally, Valley Metro partners with local, state and federal law enforcement agencies to share information or intelligence that greatly assist in the development of strategies and plans to keep its passengers safe. To ensure the effectiveness of Valley Metro's plans, Valley Metro conducts and participates in numerous yearly and triennial audits.

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 will be conducted on the MAG Transportation Improvement Program (TIP) and the Regional Transportation Plan (RTP) as a whole. 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. 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 will be provided upon completion of the 2013 Conformity Analysis.

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 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.

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APPENDICES

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Appendix A

Consultation on Environmental Mitigation and Resource Conservation Factors

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TABLE A-1
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. 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).

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- 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

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FIGURE A-1
CONSULTATION ON ENVIRONMENTAL MITIGATION AND RESOURCE CONSERVATION

FY 2013 Agency Consultation

An update of the Regional Transportation Plan (RTP) was not conducted during FY 2011. Beginning in FY 2012 and continuing into FY 2013, work proceeded on the preparation of the 2035 RTP, which was targeted for adoption in August 2013. In conjunction with the development of the 2035 RTP, an agency workshop was held on November 6, 2012 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 November 2012 workshop was on work MAG has been conducting in the areas of: (1) sustainable transportation and land use integration, (2) complete streets guidelines, and (3) bicycle and pedestrian planning. In addition, an overview of the approach to developing the 2035 RTP was provided, which covered background on the contents of the current plan, new factors to be considered in preparing the updated plan, and future opportunities for comment on the planning process. Agencies were encouraged to provide input, either at the workshop or through later correspondence, regarding any experiences, insights, or concerns from their agency perspective on the studies MAG has been conducting, as well as the overall regional transportation planning process.

Sustainable Transportation and Land Use Integration

Agency comments regarding sustainability issues and transportation included:

- Transit oriented development (TOD) can be a very positive factor in enhancing the climate for transit usage, but the need to consistently retain business at TOD sites should not be overlooked.

- TOD is means to not only enhance transit usage, but offers an opportunity to promote and implement “green design” and other environmental considerations.

- The maintenance of wildlife habitat needs to be recognized as an important factor in the sustainability arena. Thinking should move from a view of

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"how do we have to accommodate wildlife" to "look at the benefits of keeping these habitats and wildlife intact".

- There is a need to get people at all levels of government to think more about infrastructure development and how it affects wildlife resource conservation and open space, especially protecting wildlife corridors/linkages and habitats. A wealth of information is available regarding these issues and should be taken advantage of during the planning, design and construction of transportation facilities.

Complete Streets Guidelines

Agency comments regarding street planning issues included:

- There appear to be conflicting messages sent by the transportation planning process regarding transit and street development. While a strong emphasis is placed on the benefits and desirability of transit usage, at the same time a major amount of resources is spent on planning, designing and constructing street facilities.

- Long-range street plans for currently undeveloped areas seem to include excessive amounts of street mileage, which may be redundant and encourage leap-frog development into these areas.

- There is a continuing need to maintain coordination among all levels of government in the street planning process. Local-government-to-local government coordination is an aspect that appears to need greater emphasis.

Bicycle and Pedestrian Planning

Agency comments regarding bicycle and pedestrian planning included:

- Bicycle and pedestrian planning efforts should stay aware of the need to improve non-motorized access to park and other recreational areas.

- Bicycle and pedestrian facilities have a large constituency that may, sometimes, be overlooked in the transportation planning process. Transportation plans should be more specific, regarding these facilities.

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2035 Regional Transportation Plan Approach

Agency comments regarding the approach to development of the 2035 Regional Transportation Plan included:

- Multi-modal ground access to aviation facilities is an important element of the transportation planning process that warrants continuing consideration.

- Consultation early and often with environmental and resources agencies is a very productive effort and can yield increasing benefits to the transportation planning process. This kind of consultation should also be applied to neighboring counties, regional planning organizations, and large activity centers such as hospitals and other health care centers. In addition, consultation efforts with environmental and resources agencies should be pursued not only be regional organizations but also by local governments.

- The regional transportation planning process should be continuously aware of the need to minimize right-of-way requirements for all types of transportation projects, and avoid impacts of facilities on the surrounding land uses.

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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.

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- 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.

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- 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.

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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 were 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

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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.

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- 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.

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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 overlayed on these coverages to help identify potential areas were 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 Groups
- Land Ownership
- Future Land Use
- Planned Developments
- Biological Resources/Species

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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

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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.

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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.

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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

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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.

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- **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.

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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 51st 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.

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- **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.

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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.

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- **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

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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

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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 pro-active 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.

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- **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.

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- **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.

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Appendix B

Regional Freeway/Highway Projects

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TABLE B-1
2035 REGIONAL TRANSPORTATION PLAN
REGIONAL FREEWAY/ HIGHWAY PROJECTS

PROJECT TYPE	CORR-IDOR	PROJECT DESCRIPTION	COST FY 2014 - FY 2035 (2013 $'S in THOUSANDS)	PLAN GROUP
I-10 PAPAGO CORRIDOR				
GPL	10	SR101L, Agua Fria - I-17 (Utilities)	14,400	Group 1
TI	10	Fairview Dr (TI)	20,300	Group 2
GPL	10	SR85 - Verrado Way	42,800	Group 3
		Sub-total	77,500	
I-10 MARICOPA CORRIDOR				
GPL	10	32nd St. - 202L, Santan	492,300	Group 2
HOV/GPL	10	SR202L, Santan - Riggs Rd	73,700	Group 2
TI	10	Sky Harbor West Airport Access	50,600	Group 2
TI	10	Chandler Heights	22,900	Group 2
GPL	10	Riggs Rd - MPA Boundry ***	216,000	Group 2
		Sub-total	855,500	
I-17 BLACK CANYON CORRIDOR				
MISC	17	Peoria Ave - Greenway Rd (Drainage Improvements)	16,500	Group 2
HOV/GPL	17	I-10/I-17 Split -SR101L, Agua Fria	877,400	Group 2
HOV	17	SR74, Carefree Highway - Anthem Way	89,500	Group 3
GPL	17	Anthem Way - New River	57,400	Group 3
		Sub-total	1,040,800	
SR24 GATEWAY CORRIDOR				
NEW	24	SR202L, Santan - Ellsworth Rd Ph 2 (Full Freeway Upgrade)	46,900	Group 3
NEW	24	Ellsworth Rd - Meridian Rd	212,600	Group 3
		Sub-total	259,500	
SR30 I-10 RELIEVER CORRIDOR				
NEW	30	SR303L - SR202L, South Mountain (R/W Protection)	55,900	Group 2-3
NEW	30	SR85 - SR303L	192,700	Group 3
NEW	30	303L - Estrella Pkwy	279,400	Group 3
NEW	30	Estrella Pkwy - Dysart Rd	243,400	Group 3
NEW	30	Dysart Rd - Avondale Blvd	116,600	Group 3
NEW	30	Avondale Blvd - 97th Ave	148,900	Group 3
NEW	30	97th Ave - 67th Ave	223,200	Group 3
NEW	30	67th Ave - 202L South Mountain	296,800	Group 3
		Sub-total	1,556,900	
SR51 PIESTEWA CORRIDOR				
GPL	51	Shea Blvd - SR101L, Pima	60,200	Group 3
US60 GRAND AVENUE CORRIDOR				
TI	60G	Bell Rd TI	45,000	Group 1
TI	60G	Thompson Ranch/Thunderbird (TI)	13,000	Group 1
IMP	60G	SR101L, Agua Fria - Van Buren St (Phase 2)	22,825	Group 1
GPL/IMP	60G	SR101L, Agua Fria - Van Buren St (Phase 3)	86,200	Group 3
		Sub-total	167,025	
US60 SUPERSTITION CORRIDOR				
TI	60S	Meridian Rd (Half Interchange)	11,700	Group 1
HOV/GPL	60S	Crismon Rd - Meridian Rd	28,400	Group 2
GPL	60S	Mountain Rd - Ren. Fest. (Az Parkway) ***	24,000	Group 3
TI	60S	Lindsay Rd Half Interchange	8,200	Group 3
		Sub-total	72,300	
SR74 CAREFREE CORRIDOR				
GPL	74	US60, Grand - SR303L, Bob Stump (R/W Protection)	1,860	Group 3
GPL	74	US60, Grand Ave - I-17 Black Canyon (R/W Protection)	40,100	Group 3
		Sub-total	41,960	

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PROJECT TYPE	CORR-IDOR	PROJECT DESCRIPTION	COST FY 2014 - FY 2035 (2013 $'S in THOUSANDS)	PLAN GROUP
SR79 PINAL PARKWAY				
GPL	79	Butte Ave. - CAP ***	15,000	Group 3
SR85 CORRIDOR				
GPL	85	Warner Street Bridge	5,300	Group 1
SR87 DUTHIE-MARTIN CORRIDOR			0	N/A
SR88 CORRIDOR			0	N/A
US93 CORRIDOR			0	N/A
101L AGUA FRIA CORRIDOR				
GPL	101AF	I-10 - US60, Grand Ave	116,400	Group 3
GPL	101AF	US60, Grand Ave - I-17	150,400	Group 3
		Sub-total	266,800	
101L PIMA CORRIDOR				
MISC	101PI	Pima Road Extension (JPA)	3,931	Group 1
GPL	101PI	Shea Blvd - SR202L, Red Mountain	91,000	Group 1
GPL	101PI	Princess Dr - Shea Blvd	56,400	Group 2
GPL	101PI	SR51 - Princess Dr	77,900	Group 2
GPL	101PI	I-17 - SR51	73,500	Group 2
		Sub-total	302,731	
101L PRICE CORRIDOR				
MISC	101PR	Balboa Dr, Multi-use Path, Local	2,000	Group 1
GPL	101PR	Baseline Rd - SR202L, Santan	53,400	Group 2
		Sub-total	55,400	
SR143 HOHOKAM CORRIDOR			0	N/A
202L RED MOUNTAIN CORRIDOR				
GPL	202RM	SR101L - Gilbert Rd ** (R/W only)	4,500	Group 1
HOV	202RM	Broadway Rd - US60, Superstition	5,650	Group 2
HOV	202RM	Gilbert Rd - Broadway Rd **	0	Group 1
GPL	202RM	Gilbert Rd - Higley Rd	51,900	Group 3
GPL	202RM	Higley Rd - US60, Superstition	108,300	Group 3
RAMP	202RM	US60, Superstition System TI	42,100	Group 3
TI	202RM	Mesa Dr, Ramps Only	13,500	Group 3
		Sub-total	225,950	
202L SANTAN CORRIDOR				
HOV	202SAN	US60, Superstition - Gilbert	50,200	Group 2
GPL	202SAN	Dobson Rd - I-10	50,300	Group 3
GPL	202SAN	Val Vista Dr - Dobson Rd	83,500	Group 3
GPL	202SAN	US60, Superstition - Val Vista Dr	104,000	Group 3
		Sub-total	288,000	
202L SOUTH MOUNTAIN CORRIDOR				
NEW	202SM	17th Ave - 51st Ave	387,240	Group 1
NEW	202SM	Salt River Bridge	92,900	Group 1
NEW	202SM	Salt River - Buckeye Rd	181,000	Group 1
NEW	202SM	24th St - 17th Ave	138,800	Group 1
NEW	202SM	I-10 Maricopa - 24th St	178,300	Group 1
NEW	202SM	I-10 Papago/ SR202L System Interchange	594,100	Group 1
NEW	202SM	Baseline Rd - Salt River	53,200	Group 2
NEW	202SM	51st Ave - Elliot Rd	69,400	Group 2
NEW	202SM	Elliot Rd - Baseline Rd	96,800	Group 2
		Sub-total	1,791,740	

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PROJECT TYPE	CORR-IDOR	PROJECT DESCRIPTION	COST FY 2014 - FY 2035 (2013 $'S in THOUSANDS)	PLAN GROUP
SR238 MOBILE HIGHWAY				
GPL	238	SR347 - Warren Rd. ***	25,000	Group 3
SR287 FLORENCE-COOLIDGE HIGHWAY				
GPL	287	SR79 - SR87 ***	15,000	Group 3
303L ESTRELLA CORRIDOR				
LNDSCP	303	I-10/SR303L TI - US60 Grand Avenue	18,490	Group 1
TI	303	US60 Grand Avenue/SR303L (Interim TI)	48,400	Group 1
NEW	303	I-10/303L TI, Phase II	62,000	Group 1
TI	303	El Mirage Rd TI	33,500	Group 1
TI	303	US60 Grand Avenue/SR303L (Final TI)	124,600	Group 2
NEW	303	Van Buren Street - MC85/I-10 Reliver	248,800	Group 2-3
NEW	302	US60, Grand Ave -Happy Valley Rd (Final Freeway) ** (R/W only)	1,000	Group 1
NEW	303	Happy Valley Rd - I-17 (Final Freeway)	227,400	Group 3
TI	303	Northern Parkway System (Final TI)	85,600	Group 3
NEW	303	Riggs Rd - I-10 Reliever (R/W Protection)	46,600	Group 3
		Sub-total	896,390	
SR347 MARICOPA ROAD				
TI	347	Casa Grande Hwy/R.R. Overpass ***	60,000	Group 1
GPL	347	I-10 - SR238 ***	80,000	Group 3
		Sub-total	140,000	
NORTH-SOUTH FREEWAY CORRIDOR				
NEW	N/A	R/W Protection (Including SR24 Corridor)	65,000	Group 3
FREEWAY MANAGEMENT SYSTEM (FMS)				
FMS	SW	Freeway Management System Preservation and Projects	160,130	Group 1-2
MAINTENANCE				
MAINT	SW	Maintenance (Landscape, Litter & Sweep)	321,600	Group 1-3
MINOR PROJECTS				
MISC	SW	Freeway Service Patrol	25,900	Group 1-3
NOISE MITIGATION				
NOISE	SW	Quiet Pavement Preservation	150,000	Group 3
PRELIMINARY ENGINEERING				
ADMIN	SW	Preliminary Engineering	258,900	Group 1-3
RIGHT OF WAY				
R/W	SW	R/W Management and Advance Acquisition	67,950	Group 1-3
		GRAND TOTAL	9,268,476	

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PROJECT TYPE	CORR-IDOR	PROJECT DESCRIPTION	COST FY 2014 - FY 2035 (2013 $'S in THOUSANDS)	PLAN GROUP

* Plan Groups:
  Group 1 - (FY 2014 - FY 2018)
  Group 2 - (FY 2019 - FY 2026)
  Group 3 - (FY 2027 - FY 2035)

** Amended into FY 2013 on June 19, 2013.

*** Project is not part of Freeway/Highway Life Cycle Program. Cost covers MAG area portion only.

For freeway/expressway projects, the Plan Group generally indicates the period in which a project is programmed for construction activity. Projects may be programmed for design and/or right-of-way acquisition in earlier periods.

Abbreviations:

FMS - Freeway Management System
GPL - General Purpose Lanes
HOV - High Occupancy Vehicle (Lanes)
IMP - Spot Roadway and Access Control Improvements
LNDSCP - Landscaping
NEW - New Freeway on New Right-of-Way
RAMP - Ramps to HOV Lanes in Interchanges
R/W - Right-of-Way
SW - Systemwide
TI - Traffic Interchange

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Appendix C

Regional Arterial Street Projects

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TABLE C-1
2035 REGIONAL TRANSPORTATION PLAN
REGIONALLY FUNDED ARTERIAL STREET PROJECTS

FACILITY/LOCATION	REGIONALLY FUNDED REIMBURSEMENTS: FY 2014 - FY 2026 (2011 $'S in THOUSANDS)	REGIONALLY FUNDED REIMBURSEMENTS: FY 2026 - FY 2035 (2011 $'S in THOUSANDS)	TOTAL PROJECT COST: FY 2014 - FY 2035 (2011 $'S in THOUSANDS)	PLAN GROUP*
CHANDLER				
Arizona Ave/Chandler Blvd	0	0	0	Project Completed
Arizona Ave/Elliot Rd	0	0	0	Project Completed
Arizona Ave/Ray Rd	0	0	0	Project Completed
Arizona Ave: Ocotillo Rd to Hunt Highway	4,433	3,018	16,692	Group 2
Chandler Blvd/Alma School Rd	2,606	942	10,832	Group 1
Chandler Blvd/Dobson Rd	0	0	0	Project Completed
Chandler Blvd/Kyrene Rd	0	3,776	8,385	Group 3
Gilbert Rd: SR-202L to Hunt Hwy				
Gilbert Rd: SR-202L/Germann to Queen Creek Rd	0	0	0	Project Completed
Gilbert Rd: Queen Creek to Hunt Hwy	0	0	0	Project Completed
Gilbert Rd: Queen Creek Rd to Ocotillo Rd	1,869	0	0	Project Completed
Gilbert Rd: Ocotillo Rd to Chandler Heights	6,160	0	4,853	Group 1
Gilbert Rd: Chandler Heights Rd to Hunt Hwy	3,528	2,649	5,298	Group 1
Kyrene Rd/Ray Rd	3,775	0	8,753	Group 2
Price Rd Substitute Projects				
Chandler Heights Rd: Arizona Avenue to McQueen Road	7,325	0	11,157	Group 2
Chandler Heights Road: McQueen Road to Gilbert Road	6,535	0	27,903	Group 2
McQueen Road: Ocotillo Road to Riggs Road	6,482	0	10,766	Group 1
Ocotillo Road: Arizona Avenue to McQueen Road	5,295	1,408	13,486	Group 1
Ocotillo Road: Cooper Road to Gilbert Road	6,499	0	13,637	Group 2
Price Rd at Germann Rd: Intersection Improvements	3,178	0	5,415	Group 2
Price Rd at Queen Creek Rd: Intersection Improvements	5,222	0	6,687	Group 2
Price Rd: Santan to Germann	0	0	0	Project Completed
Ray Rd/Alma School Rd	0	0	0	Project Completed
Ray Rd/Dobson Rd	6,718	0	10,515	Group 2
Ray Rd/McClintock Dr	5,646	0	8,419	Group 1
Ray Rd/Rural Rd	3,775	0	7,907	Group 2
CHANDLER/GILBERT				
Queen Creek Rd: Arizona Ave to Higley Rd				

FACILITY/LOCATION	REGIONALLY FUNDED REIMBURSEMENTS: FY 2014 - FY 2026 (2011 $'S in THOUSANDS)	REGIONALLY FUNDED REIMBURSEMENTS: FY 2026 - FY 2035 (2011 $'S in THOUSANDS)	TOTAL PROJECT COST: FY 2014 - FY 2035 (2011 $'S in THOUSANDS)	PLAN GROUP*
Queen Creek Rd: Arizona Ave to McQueen Rd (CHA)	0	0	0	Project Completed
Queen Creek Rd: McQueen Rd to Gilbert Rd (CHA)	7,448	5,112	18,146	Group 2
Queen Creek Rd: Greenfield Rd to Higley (GIL)	0	0	0	Project Completed. Savings reallocated to AIIGUD3003 and ACIGER2003B
EL MIRAGE/MARICOPA COUNTY				
El Mirage Rd: Northern Ave to Bell Rd (Phase I)				
El Mirage Road Design Concept Report	0	0	0	Project Completed
El Mirage Rd: Bell Rd to Picerne Dr (MC)	0	0	2,570	Group 1
El Mirage Rd: Northern Ave to Cactus (MC)	0	0	0	Project Completed
El Mirage Rd: Cactus to Grand & Thunderbird Rd: El Mirage to Grand (ELM)	1,788	0	1,044	Group 1
El Mirage Rd: Northern Ave to Peoria Ave (MC)	9,856	0	12,604	Group 1
Thunderbird Rd: 127th Ave to Grand Avenue (ELM)	2,817	0	4,024	Group 1
El Mirage Rd: Peoria Ave to Cactus Rd (ELM)	7,612	0	10,875	Group 1
El Mirage Rd: Northern Ave to Bell Rd (Phase II)				
El Mirage Rd: Cactus to Grand Avenue (ELM)	13,553	0	19,361	Group 2
El Mirage Rd: Grand Avenue to Picerne Drive (MC)	0	0	2,000	Group 3
FOUNTAIN HILLS				
Shea Blvd: Palisades Blvd to Cereus Wash				
Shea Blvd: Palisades Blvd to Fountain Hills Blvd	0	0	0	Project Completed
Shea Blvd: Technology Dr to Cereus Wash	2,803	0	4484.78	Group 1
Shea Blvd: Fountain Hills Blvd to Technology Dr	2,131	692	4,826	Group 2
GILBERT				
Elliot Rd/Cooper Rd	4,140	0	7,615	Group 1
Elliot Rd/Gilbert Rd	3,775	3,600	9,382	Group 2
Elliot Rd/Greenfield Rd	3,774	0	7,895	Group 2
Elliot Rd/Higley Rd	3,775	1,137	7,615	Group 2
Elliot Rd/Val Vista Dr	3,775	699	7,615	Group 2
Germann Rd: Gilbert Rd to Power Rd				
Germann Rd: Gilbert Rd to Val Vista Dr	5,285	1,458	12,386	Group 2
Germann Rd: Val Vista Dr to Higley Rd	17,816	0	20,257	Group 1

FACILITY/LOCATION	REGIONALLY FUNDED REIMBURSEMENTS: FY 2014 - FY 2026 (2011 $'S in THOUSANDS)	REGIONALLY FUNDED REIMBURSEMENTS: FY 2026 - FY 2035 (2011 $'S in THOUSANDS)	TOTAL PROJECT COST: FY 2014 - FY 2035 (2011 $'S in THOUSANDS)	PLAN GROUP*
Greenfield Rd: Elliot Rd to Ray Rd	3,775	0	5,254	Group 3
Guadalupe Rd/Cooper Rd	3,518	0	5,937	Group 1
Guadalupe Rd/Gilbert Rd	2,775	0	6,670	Group 1
Guadalupe Rd/Greenfield Rd	2,992	1,919	9,534	Group 2
Guadalupe Rd/Power Rd	2,379	3,901	9,704	Group 2
Guadalupe Rd/Val Vista Dr	3,775	0	7,615	Group 2
Ray Rd: Val Vista Dr to Power Rd	16,683	0	21,239	Group 2
Ray Rd/Gilbert Rd	0	3,775	7,615	Group 2
Val Vista Dr: Warner Rd to Pecos	0	0	0	Project Completed
Warner Rd/Cooper Rd	0	0	0	Project Completed
Warner Rd/Greenfield Rd	3,775	0	7,615	Group 2
GILBERT/MESA/MARICOPA COUNTY				
Power Rd: Santan Fwy to Chandler Heights				
Power Rd/Pecos (GIL)	0	0	0	Project Completed
Power Rd: Santan Fwy to Pecos Rd (MES)	11,957	0	17,738	Group 1
Power Rd: Pecos to Chandler Heights (GIL)	0	0	27,993	Group 2
Power Rd: Baseline Rd to Santan Fwy				
Power Rd: East Maricopa Floodway to Santan Fwy/Loop 202 (MES)	8,193	0	11,785	Group 2
Power Rd: Baseline Rd to East Maricopa Floodway (MC)	0	0	11,507	Group 1
MARICOPA COUNTY				
Dobson Rd: Bridge over Salt River	18,632	0	47,110	Group 2
El Mirage Rd: Bell Rd to Jomax Rd				
El Mirage Rd: Bell Rd to Deer Valley Dr	9,725	0	0	Project Completed
El Mirage Rd: L303 to Jomax	0	0	17,889	Group 3
El Mirage Rd: Deer Valley Dr to L303	0	0	0	Project Completed
Gilbert Rd: Bridge over Salt River	12,332	0	41,200	Group 2
Jomax Rd: SR-303L to Sun Valley Parkway	6,830	17,761	35,130	Group 2
McKellips Rd: Bridge over Salt River	0	14,005	27,418	Group 3
McKellips Rd: SR-101L to SRP-MIC/Alma School Rd	22,885	14,567	44,715	Group 2
Northern Pkwy: Sarival to Grand (Phase I)				
Northern Parkway: Sarival to Dysart	0	0	0	Project Completed
Northern Parkway: ROW Protection	0	0	0	Project Completed
Northern Pkwy: Sarival to Grand (Phase II)				

FACILITY/LOCATION	REGIONALLY FUNDED REIMBURSEMENTS: FY 2014 - FY 2026 (2011 $'S in THOUSANDS)	REGIONALLY FUNDED REIMBURSEMENTS: FY 2026 - FY 2035 (2011 $'S in THOUSANDS)	TOTAL PROJECT COST: FY 2014 - FY 2035 (2011 $'S in THOUSANDS)	PLAN GROUP*
Northern Parkway: Sarival to Dysart	2,410	0	2,545	Group 1
Northern Pkwy: Dysart to 111th	23,639	0	30,989	Group 1
Northern Parkway: Reems and Litchfield Overpasses	6,866	0	12,495	Group 1
Northern Pkwy: Northern Ave at L101	8,448	0	12,299	Group 1
Northern Pkwy: Dysart Overpass	23,357	0	33,066	Group 1
Northern Pkwy: ROW Protection	1,400	0	2,000	Group 1
Northern Parkway: Interim Construction	17,880	0	23,630	Group 2
Northern Pkwy: Sarival to Grand (Phase III)				
Northern Pkwy: El Mirage Alternative Access	2,915	0	4,164	Group 2
Northern Pkwy: El Mirage Overpass	21,515	0	30,587	Group 2
Northern Pkwy: Agua Fria to 111th	2,817	0	3,874	Group 2
Northern Pkwy: 111th to 107th	15,424	0	21,883	Group 2
Northern Pkwy: 107th to 99th	20,572	0	29,239	Group 2
Northern Pkwy: Loop 101 to 91st	3,575	0	4,957	Group 2
Northern Pkwy: 91st to Grand Intersection Improvements	5,907	0	8,229	Group 2
Northern Pkwy: ROW Protection	0	0	4,250	Group 2
Northern Pkwy: Ultimate Construction	15,840	0	18,591	Group 2
MESA				
Baseline Rd: Power Rd to Meridian Rd				
Baseline Rd: Power Rd to Ellsworth Rd	8,936	0	LRT Deletion	LRT Deletion
Baseline Rd: Ellsworth Rd to Meridian Rd	9,361	0	LRT Deletion	LRT Deletion
Broadway Rd: Dobson Rd to Country Club	3,751	4,741	20,002	Group 2
Country Club/University Dr	8,325	0	21,138	Group 2
Country Club/Brown Rd	4,030	0	LRT Deletion	LRT Deletion
Crismon Rd: Broadway Rd to Germann Rd				
Crismon Rd: Broadway Rd to Guadalupe Rd	0	9,919	17,965	Group 2
Crismon Rd: Guadalupe Rd to Ray Rd	12,406	0	18,094	Group 2
Crismon Rd: Ray Rd to Germann Rd	12,327	0	LRT Deletion	LRT Deletion
Dobson Rd/Guadalupe Rd	0	0	0	Project Completed
Dobson Rd/University Dr	0	4,921	8223.7	Group 3
Elliot Rd: Power Rd to Meridian Rd				
Elliot Rd: Power Rd to Ellsworth Rd	0	8,646	13,396	Group 2
Elliot Rd: Ellsworth Rd to Meridian Rd	9,330	0	13,607	Group 2
Germann Rd: Ellsworth Rd to Signal Butte Rd	12,795	0	LRT Deletion	LRT Deletion

FACILITY/LOCATION	REGIONALLY FUNDED REIMBURSEMENTS: FY 2014 - FY 2026 (2011 $'S in THOUSANDS)	REGIONALLY FUNDED REIMBURSEMENTS: FY 2026 - FY 2035 (2011 $'S in THOUSANDS)	TOTAL PROJECT COST: FY 2014 - FY 2035 (2011 $'S in THOUSANDS)	PLAN GROUP*
Gilbert Rd/University Dr	0	0	0	Project Completed
Greenfield Rd: University Rd to Baseline Rd				
Greenfield Rd: Baseline Rd to Southern Ave	0	0	0	Project Completed
Greenfield Rd: Southern Ave to University Rd	0	6,585	11,756	Group 2
Guadalupe Rd: Power Rd to Meridian Rd				
Guadalupe Rd: Power Rd to Hawes Rd	8,790	0	LRT Deletion	LRT Deletion
Guadalupe Rd: Hawes Rd to Crimson Rd	8,921	0	LRT Deletion	LRT Deletion
Guadalupe Rd: Crimson Rd to Meridian Rd	7,558	0	LRT Deletion	LRT Deletion
Hawes Rd: Broadway Rd to Ray Rd				
Hawes Rd: Broadway Rd to US60	0	0	10,697	Group 2
Hawes Rd: Baseline Rd to Elliot Rd	7,108	0	10,368	Group 2
Hawes Rd: Elliot Rd to Santan Freeway	4,415	0	5,581	Group 2
Hawes Rd: Santan Freeway to Ray Rd	0	0	0	Project Completed
Higley Rd Parkway: US 60 to SR-202L				
Higley Rd Parkway: SR-202L to Brown Rd	8,582	0	LRT Deletion	LRT Deletion
Higley Rd Parkway: Brown Rd to US-60	8,582	0	LRT Deletion	LRT Deletion
Higley Rd Parkway: US 60 to SR 202L (RM) Grade Separations	22,490	0	LRT Deletion	LRT Deletion
Lindsay Rd/Brown Rd	3,919	0	5,565	Group 2
McKellips Rd: East of Sossaman to Meridian				
McKellips Rd: East of Sossaman to Crismon Rd	12,283	0	17,444	Group 2
McKellips Rd: Crismon Rd to Meridian Rd	0	0	11,545	Group 2
McKellips Rd: Gilbert Rd to Power Rd				
McKellips Rd/Lindsay Rd	6,137	0	9,690	Group 2
McKellips Rd/Greenfield Rd	2,630	0	3,396	Group 2
McKellips Rd/Higley Rd	6,310	0	9,157	Group 2
McKellips Rd/Power Rd	3,393	0	LRT Deletion	LRT Deletion
McKellips Rd/Recker Rd	3,393	0	5,210	Group 2
McKellips Rd/Val Vista Dr	2,911	0	LRT Deletion	LRT Deletion
Meridian Rd: Baseline Rd to Germann Rd				
Meridian Rd: Baseline Rd to Ray Rd	17,224	0	LRT Deletion	LRT Deletion
Meridian Rd: Ray Rd to Germann Rd	12,721	0	LRT Deletion	LRT Deletion
Mesa Dr: Southern Ave to US60 and Mesa Dr to Broadway Rd				

FACILITY/LOCATION	REGIONALLY FUNDED REIMBURSEMENTS: FY 2014 - FY 2026 (2011 $'S in THOUSANDS)	REGIONALLY FUNDED REIMBURSEMENTS: FY 2026 - FY 2035 (2011 $'S in THOUSANDS)	TOTAL PROJECT COST: FY 2014 - FY 2035 (2011 $'S in THOUSANDS)	PLAN GROUP*
Mesa Dr: US 60 to Southern Ave	6,461	0	23,131	Group 1
Mesa Dr/Broadway Rd	8,217	0	19,990	Group 1
Pecos Rd: Ellsworth Rd to Meridian Rd	15,381	0	22,158	Group 2
Ray Rd: Sossaman Rd to Meridian Rd				
Ray Rd: Sossaman Rd to Ellsworth Rd	0	0	0	Project Completed
Ray Rd: Ellsworth Rd to Meridian Rd	21,848	0	31,865	Group 2
Signal Butte Rd: Broadway to Pecos Rd				
Signal Butte Rd: Broadway Rd to Elliot Rd	17,217	0	25,051	Group 2
Signal Butte Rd: Elliot Rd to Pecos Rd	16,576	0	24,175	Group 2
Southern Ave: Country Club Dr to Recker Rd				
Southern/Country Club Dr	5,559	0	7,453	Group 1
Southern Ave/Stapley Dr	8,948	0	20,450	Group 2
Southern Ave/Lindsay Rd	4,251	0	6,189	Group 2
Southern Ave/Higley Rd	6,287	0	9,170	Group 2
Southern Ave: Sossaman Rd to Meridian Rd				
Southern Ave: Sossaman Rd to Crismon Rd	0	8,014	15,735	Group 2
Southern Ave: Crismon Rd to Meridian Rd	0	5,296	10,788	Group 2
Stapley Dr/University Dr	7,785	0	21,532	Group 2
Thomas Rd: Gilbert Rd to Val Vista Dr	4,746	0	LRT Deletion	LRT Deletion
University Dr: Val Vista Dr to Hawes Rd				
University Dr: Val Vista Dr to Higley Rd	11,204	0	16,340	Group 2
University Dr: Higley Rd to Hawes Rd	10,829	0	16,127	Group 2
Val Vista Dr: University Dr to Baseline Rd				
Val Vista Dr: Baseline Rd to Southern Ave	8,320	0	15,104	Group 2
Val Vista Dr: Southern Ave to University Dr	0	4,722	12,150	Group 2
PEORIA				
Beardsley Connection: SR-101L to Beardsley Rd				
Beardsley Connection: Loop 101 to 83rd Ave/Lake Pleasant Pkwy	0	0	0	Project Completed.
Loop 101 (Agua Fria Fwy) at Beardsley Rd/Union Hills Dr	0	0	0	Project Completed
83rd Avenue: Butler Rd to Mountain View	2,593	0	0	Project Completed
75th Ave at Thunderbird Rd: Intersection Improvement	0	0	0	Project Completed
Happy Valley Rd: L303 to 67th Avenue				
Happy Valley Rd: Loop 303 to Lake Pleasant Parkway	0	0	25,000	Group 3

FACILITY/LOCATION	REGIONALLY FUNDED REIMBURSEMENTS: FY 2014 - FY 2026 (2011 $'S in THOUSANDS)	REGIONALLY FUNDED REIMBURSEMENTS: FY 2026 - FY 2035 (2011 $'S in THOUSANDS)	TOTAL PROJECT COST: FY 2014 - FY 2035 (2011 $'S in THOUSANDS)	PLAN GROUP*
Happy Valley Rd: Lake Pleasant Pkwy to 67th Ave	0	0	0	Project Completed
Lake Pleasant Pkwy: Union Hills to SR74				
Lake Pleasant Pkwy: Dynamite Blvd to CAP	13,867	11,114	24,746	Group 1
Lake Pleasant Pkwy: Union Hills to Dynamite Rd	0	0	0	Project Completed
Lake Pleasant Pkwy: CAP to SR-74/Carefree Hwy	0	0	47,500	Group 3
PHOENIX				
Avenida Rio Salado: 51st Ave. to 7th St.	14,336	0	22,797	Group 1
Black Mountain Blvd: SR-51and Loop 101/Pima Fwy to Deer Valley Rd	17,490	0	24,986	Group 1
Happy Valley Rd: 67th Ave to I-17				
Happy Valley: I-17 to 35th Ave	5,343	78	0	Project Completed
Happy Valley: 35th Ave to 43rd Ave	0	5,232	11,700	Group 2
Happy Valley: 43rd Ave to 55th Ave	0	4,671	11,159	Group 3
Happy Valley: 55th Ave to 67th Ave	0	3,310	10,645	Group 3
Sonoran Blvd: 15th Avenue to Cave Creek	9,194	0	0	Project Completed
SCOTTSDALE/CAREFREE				
Pima Rd: SR101L to Happy Valley Rd and Dynamite Rd to Cave Creek				
Pima Rd: Thompson Peak Parkway to Pinnacle Peak (SCT)	0	0	0	Project completed.
Pima Rd/Happy Valley (SCT)	0	0	0	Project Completed
Pima Rd: Pinnacle Peak to Happy Valley Rd (SCT)	15,991	0	22,844	Group 1
Pima Rd: Dynamite Blvd to Stagecoach Rd (SCT)	37,892	0	55,270	Group 2
Pima Rd: Stagecoach Rd to Cave Creek (CFR)	4,933	625	7,940	Group 2
Pima Rd: SR101L to Thompson Peak Pkwy (SCT)	0	0	0	Project Completed
SCOTTSDALE				
Carefree Hwy: Cave Creek Rd to Scottsdale Rd	8,012	0	14,344	Group 2
SR-101L North Frontage Roads: Pima/Princess Dr to Scottsdale Rd				
SR-101L Frontage Rd: Hayden Rd to Scottsdale Rd	0	0	0	Project Completed
SR-101L Frontage Rd: Pima Rd/Princess Dr to Hayden Rd	0	29,014	41,449	Group 3
SR-101L South Frontage Rd: Hayden Rd to Pima	0	0	3,857	Group 1
Miller Rd/SR-101L Underpass	14,005	0	20,007	Group 2
Pima Rd: Happy Valley Rd to Dynamite Blvd	23,747	0	33,925	Group 1
Pima Rd: McKellips Rd to Via Linda				

FACILITY/LOCATION	REGIONALLY FUNDED REIMBURSEMENTS: FY 2014 - FY 2026 (2011 $'S in THOUSANDS)	REGIONALLY FUNDED REIMBURSEMENTS: FY 2026 - FY 2035 (2011 $'S in THOUSANDS)	TOTAL PROJECT COST: FY 2014 - FY 2035 (2011 $'S in THOUSANDS)	PLAN GROUP*
Pima Rd: Via Linda to Via De Ventura	1,339	0	2,354	Group 1
Pima Rd: Via De Ventura to Krail	0	0	0	Project Completed
Pima Rd: Krail to Chaparral	9,463	0	16,551	Group 1
Pima Rd: Chaparral Rd to Thomas Rd	6,326	0	11,041	Group 1
Pima Rd: Thomas Rd to McDowell Rd	6,080	0	8,761	Group 1
Scottsdale Airport: Runway Tunnel				
Frank Lloyd Wright -Loop 101 Traffic Interchange	5,633	0	8,047	Group 2
Raintree -Loop 101 Traffic Interchange	2,817	0	4,024	Group 1
Northsight Blvd: Hayden to Frank Lloyd Wright	4,929	0	3,924	Group 1
Frank Lloyd Wright Frontage Rd: Northsight to Greenway-Hayden Loop	7,746	0	10,059	Group 1
Redfield Rd: Scottsdale Rd to Hayden	3,873	0	5,030	Group 1
Raintree Extension: Hayden to Redfield	12,147	0	17,809	Group 1
Raintree Drive: Loop 101 to Hayden	11,266	0	16,423	Group 1
Frank Lloyd Wright at 76th/78th/82nd Street: Intersection Improvements	704	0	1,006	Group 1
Southbound Loop 101 Frontage Road Connections	3,052	0	3,857	Group 1
Hayden Rd - Loop 101 Interchange Improvements	11,427	0	16,652	Group 2
Airpark DCR	0	0	0	Project Completed
Scottsdale Rd: Thompson Peak Pkwy to Jomax Rd				
Scottsdale Rd: Thompson Peak Pkwy to Pinnacle Peak Pkwy	13,211	0	18,873	Group 1
Scottsdale Rd: Pinnacle Peak Pkwy to Jomax Rd	1,800	0	38,032	Group 2
Scottsdale Rd: Jomax Rd to Carefree Hwy				
Scottsdale Rd: Jomax Rd to Dixileta Dr	9,499	0	18,801	Group 2
Scottsdale Rd: Dixileta Dr to Ashler Hills Dr	9,499	0	16,624	Group 2
Scottsdale Rd: Ashler Hills Dr to Carefree Highway	9,499	0	16,624	Group 2
Shea Blvd: SR-101L to SR-87				
Shea Blvd at 90th/92nd/96th	0	0	0	Project Completed
Shea Auxiliary Lane from 90th St to Loop 101	6,390	0	9,129	Group 2
Shea Blvd at Via Linda (Phase1)	0	0	0	Project Completed
Shea Blvd at Via Linda (Phase 2)	2,086	0	2,980	Group 1
Shea Blvd at 120/124th St	0	0	0	Project Completed
Shea Blvd at Mayo/134th St	0	0	0	Project Completed
Shea Blvd: SR-101L to 96th St, ITS Improvements	0	0	0	Project Completed

FACILITY/LOCATION	REGIONALLY FUNDED REIMBURSEMENTS: FY 2014 - FY 2026 (2011 $'S in THOUSANDS)	REGIONALLY FUNDED REIMBURSEMENTS: FY 2026 - FY 2035 (2011 $'S in THOUSANDS)	TOTAL PROJECT COST: FY 2014 - FY 2035 (2011 $'S in THOUSANDS)	PLAN GROUP*
Shea Blvd: 96th St to 144th St, ITS Improvements	2,360	0	3,372	Group 1
Shea Blvd at Loop 101	3,688	0	5,269	Group 1
Shea Blvd at 110th St	266	0	379	Group 1
Shea Blvd at 114th St	266	0	379	Group 2
Shea Blvd at Frank Lloyd Wright Blvd	664	0	738	Group 1
Shea Blvd at 115th St	111	0	159	Group 2
Shea Blvd at 125th St	880	0	1,257	Group 1
Shea Blvd at 135th St	111	0	159	Group 2
Shea Blvd at 136th St	376	0	211	Group 1
Legacy Dr: Hayden Rd to 88th Street	2,073	10,021	21,910	Group 2
TOTAL	**1,171,423.9**	**197,329.5**	**2,098,713.7**	

* Plan Groups:

Group 1 (FY 2014 - FY 2018)
Group 2 (FY 2019 - FY 2026)
Group 3 (FY 2027 - FY 2035)

For arterial projects, the Plan Group indicates the period in which a project is anticipated to be completed. Reimbursements from regional funding sources for arterial projects may occur in later periods.

Appendix D

Regional Transit Projects

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TABLE D-1
2035 REGIONAL TRANSPORTATION PLAN
REGIONAL BUS ROUTES - OPERATING

ROUTE		OPERATING COSTS FY 2014 - FY 2035 (2013 $'S in THOUSANDS)	PLAN GROUP *
Express and LINK			
511	Tempe/Scottsdale Airpark Express	6,672	Existing
512	Scottsdale Express	5,474	Existing
520	Tempe Express	2,824	Existing
521	Tempe Express	5,241	Existing
522	Tempe Express SC	6,099	Existing
531	Mesa/Gilbert Express	11,228	Existing
533	Mesa Express	12,614	Existing
535	Northeast Mesa/Downtown Express	10,196	Existing
541	Chandler Express	7,821	Existing
542	Chandler/Downtown Express	10,140	Existing
562	Goodyear Express	5,327	Existing
563	Buckeye Express	2,622	Existing
571	Surprise Express	3,489	Existing
573	Northwest Valley/Downtown Express	11,922	Existing
575	Northwest Valley/Downtown Express	7,704	Existing
	Ahwatukee Connector	1,334	Group 3
	Anthem Express	3,350	Group 3
	Apache Junction Express	4,440	Group 3
	Arizona Ave/Country Club LINK	31,339	Existing
	Avondale Express	4,108	Group 2
	Black Canyon Freeway Connector	2,179	Group 3
	Buckeye Express	4,043	Group 3
	Chandler Blvd LINK	8,908	Group 3
	Grand Ave Limited	3,153	Existing
	Loop 303 Express	4,006	Group 3
	Main St LINK	36,220	Existing
	North I-17 Express	3,617	Group 3
	Peoria Express	3,639	Group 3
	Pima Express	3,358	Group 3
	Red Mountain Freeway Connector	3,086	Group 3
	San Tan Express	8,780	Group 3
	Scottsdale/Rural Rd LINK	22,426	Group 1
	South Central Express	19,924	Existing
	South Central LINK A	2,783	Group 3
	South Central LINK B	2,919	Group 3
	Superstition Freeway Connector	1,341	Group 3
	Superstition Springs Express	4,685	Group 3
Sub-total		**289,012**	
Supergrid Routes			
3	Van Buren St	18,782	Existing
13	Buckeye Rd	5,312	Group 3
17	McDowell/McKellips	25,067	Existing
29	Thomas Rd	12,983	Group 1
30	University Dr	28,530	Group 2
40	Main St	48,617	Existing
41	Indian School Rd	8,301	Group 3

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ROUTE		OPERATING COSTS FY 2014 - FY 2035 (2013 $'S in THOUSANDS)	PLAN GROUP
44	44th St/Tatum	1,075	Group 3
45	Broadway Rd	13,238	Existing
48	48th St/Rio Salado Pkwy	2,518	Existing
50	Camelback Rd	8,788	Existing
56	56th St	4,626	Existing
59	59th Ave	24,142	Existing
61	Southern Ave	80,558	Existing
66	Mill/Kyrene	8,052	Existing
70	Glendale Ave	43,607	Existing
72	Scottsdale/Rural	129,647	Existing
77	Baseline Rd	26,945	Group 2
81	Hayden/McClintock	63,168	Existing
83	83rd/75th Ave	21,638	Group 3
90	Dunlap/Olive	9,522	Group 3
96	Dobson Rd	41,888	Existing
99	99th Ave	11,494	Group 3
104	Alma School Rd	28,251	Group 1
106	Peoria/Shea	38,286	Existing
108	Elliot Rd	39,838	Existing
112	Arizona Ave/Country Club Dr	32,427	Existing
131	Dysart Rd	3,616	Group 3
136	Gilbert Rd	32,965	Existing
138	Wadell/Thunderbird	20,360	Group 1
139	Litchfield Rd	18,249	Group 3
140	Ray Rd	23,232	Group 3
156	Chandler Blvd	66,756	Existing
160	Greenfield Rd	15,295	Group 3
170	Bell Rd	18,052	Group 2
184	Power Rd	39,045	Existing
204	Queen Creek Rd	4,506	Group 3
Sub-total		**1,019,377**	
Rural Service			
	Gila Bend connector	7,585	Existing
	Wickenburg connector	0	N/A
Sub-total		**7,585**	
Other Services			
	ADA Complementary Paratransit	556,905	Existing
	Regional Customer Services	132,076	Existing
	RPTA Planning and Administration	71,010	Existing
	Safety and Security Programs	17,050	Existing
	Operating Contingency	0	N/A
Sub-total		**777,040**	
Total		**2,093,015**	

* Plan Groups:

Group 1 (FY 2014 - FY 2018)

Group 2 (FY 2019 - FY 2026)

Group 3 (FY 2027 - FY 2035)

Existing (in operation and being funded prior to the "Group 1" period)

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For bus operations, the "Group" designations represents the first period in which at least some regional funding was provided for the route. Funding for these routes continues during subsequent periods, and service improvements on certain routes may also be provided in a later period. Operating costs reflect total costs and are not offset by farebox receipts. Routes designated as "Existing" may also receive service enhancements in later periods which are not specifically indicated. For detailed service enhancements please refer to the latest version of the Transit Life Cycle Program.

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TABLE D-2
2035 REGIONAL TRANSPORTATION PLAN
REGIONAL BUS ROUTES - CAPITAL

ROUTE		CAPITAL COSTS FY 2014 - FY 2035 (2013 $'S in THOUSANDS)	PLAN GROUP *
Fleet			
	Fixed Route Buses	790,465	Group 1,2,3
	Rural Routes	1,610	Group 1,2,3
	Paratransit	58,330	Group 1,2,3
	Vanpool	33,656	Group 1,2,3
Sub-total		**884,061**	
Park and Rides			
	Baseline/24th St	3,895	Group 1
	Camelback/101	5,628	Group 3
	Elliot/-I-10	116	Group 3
	Laveen/59th Ave	5,795	Group 1
	Peoria Grand	5,631	Group 1
Total Park and Rides		**21,065**	
Transit Centers			
	19thAveCamelback 6-bay	3,434	Group 3
	44th Cactus 6-bay	3,434	Group 3
	Arrowhead	10,462	Group 1
	Downtown Chandler 4-bay	2,389	Group 3
	Glendale/Grand 4-bay	2,389	Group 3
	Mesa Downtown 6-bay	2,126	Group 1
	Metrocenter TC Rehab	8,212	Group 3
	Peoria 4-bay	2,317	Group 1
	Scottsdale 4-bay	2,389	Group 3
	South Chandler	2,389	Group 3
	South Tempe 4-bay	2,389	Group 3
Total Transit Centers		**41,931**	
Operations and Maintenance Facilities			
	Heavy Maintenance	59,726	Group 3
	Mesa Rehab	12,169	Group 3
	Paratransit Phoenix	11,860	Group 3
	South Rehab	12,169	Group 3
Total O & M Facilities		**95,925**	
BRT Right-of-Way Improvements			
	Scottsdale/Rural Rd LINK	44,019.5	Group 1,3
	South Central LINK	20,665.2	Group 3
Total BRT ROW Improvements		**64,685**	
Other Capital Improvements			
	Bus Stop Improvements	0	N/A
	Vehicle Upgrades	18,257	Group 1
Total Other Capital		**18,257**	
Contingency for Capital Projects		0	N/A
TOTAL		**1,125,924**	

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* Plan Groups:

Group 1 (FY 2014 - FY 2018)

Group 2 (FY 2019 - FY 2026)

Group 3 (FY 2027 - FY 2035)

For transit capital expenditures, the group designation indicates the period when equipment or other capital items are acquired, or when construction of facilities is funded.

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TABLE D-3
2035 REGIONAL TRANSPORTATION PLAN
REGIONAL LIGHT RAIL TRANSIT/HIGH CAPACITY TRANSIT - OPERATING

ROUTE		OPERATING COSTS FY 2014 - FY 2035 (2013 $'S in THOUSANDS)	PLAN GROUP *
LRT/HCT Segments			
	CP/EV	810,885	Group 1
	Northwest Phase I	67,743	Group 1
	Northwest Phase II	13,620	Group 3
	Central Mesa	65,626	Group 1
	Tempe Streetcar	52,963	Group 1
	Capitol / I-10 West	143,087	Group 2
	Northeast Phoenix	37,011	Group 3
	Gilbert Road Extension	40,808	Group 1
	West Phoenix / Central Glendale	48,645	Group 3
Total		**1,280,387**	

TABLE D-4
2035 REGIONAL TRANSPORTATION PLAN
REGIONAL LIGHT RAIL TRANSIT/HIGH CAPACITY TRANSIT - CAPITAL

ROUTE		CAPITAL COSTS FY 2014 - FY 2035 (2013 $'S in THOUSANDS)	PLAN GROUP
LRT/HCT Segments			
	Northwest Phase I	174,369	Group 1
	Central Mesa	111,438	Group 1
	Tempe Streetcar	105,908	Group 1
	West Phoenix / Central Glendale	411,692	Group 2,3
	Northwest Phase II	115,651	Group 2,3
	Capitol / I-10 West	895,920	Group 1,2
	Northeast Phoenix	961,216	Group 2,3
	Gilbert Road Extension	122,814	Group 1
Sub-total		**2,899,009**	
LRT Systemwide Support			
	Systemwide Support Infrastructure	91,238	Group 1,2
	Capital Project Development	36,301	Group 1,2,3
	System Planning and Design	2,939	Group 1
	Utility Reimbursements	142,924	Group 1,2,3
Sub-total		**273,402**	Group 1,2,3
TOTAL		**3,172,410**	

* Plan Groups:

Group 1 (FY 2014 - FY 2018)
Group 2 (FY 2019 - FY 2026)
Group 3 (FY 2027 - FY 2035)

For transit capital expenditures, the group designation indicates the period when equipment or other capital items are acquired, or when construction of facilities is funded. For light rail transit/high capacity transit (LRT/HCT) operations, the group designation indicates the period when service is initiated. Funding continues during subsequent periods, and service improvements on certain routes may also be initiated in a later period. Operating costs reflect total costs and are not offset by farebox receipts. No regional funding is provided for LRT/HCT operating expenses.

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Appendix E

Performance Monitoring

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TABLE E-1
AVERAGE AM PEAK PERIOD SPEED FOR SELECTED FREEWAY CORRIDORS

Freeway Corridor	Dir	From	To	Average AM Peak Period Speed (mph)					
				General-purpose Lanes			HOV Lanes		
				2011	2012	% Change	2011	2012	% Change
I-10 Papago	EB	83rd Ave	I-17	51.1	50.2	-1.8%	55.4	54.5	-1.6%
	WB	I-17	83rd Ave	63.2	66.4	5.1%	65.6	68.1	3.8%
I-10 Papago	EB	I-17	SR 51/Loop 202	54.0	53.1	-1.7%	63.3	62.6	-1.1%
	WB	SR 51/Loop 202	I-17	60.8	62.8	3.3%	68.8	70.4	2.3%
I-10 Maricopa	EB	SR 51/Loop 202	US 60	62.3	61.9	-0.6%	67.1	67.6	0.7%
	WB	US 60	SR 51/Loop 202	61.2	57.5	-6.0%	64.3	63.6	-1.1%
I-10 Maricopa	EB	US 60	Chandler Blvd	66.8	65.5	-1.9%	70.7	71.0	0.4%
	WB	Chandler Blvd	US 60	46.0	44.3	-3.7%	61.3	58.3	-4.9%
I-17	NB	Maricopa TI	I-10	60.1	61.5	2.3%	n/a	n/a	n/a
	SB	I-10	Maricopa TI	53.3	52.9	-0.8%	n/a	n/a	n/a
I-17	NB	I-10	Peoria Ave	60.6	59.5	-1.8%	63.9	60.4	-5.5%
	SB	Peoria Ave	I-10	55.8	53.8	-3.6%	62.6	58.6	-6.4%
SR 51	NB	I-10/Loop 202	Glendale Ave	65.9	63.4	-3.8%	68.4	64.5	-5.7%
	SB	Glendale Ave	I-10/Loop 202	58.6	55.8	-4.8%	61.7	59.2	-4.1%
SR 51	NB	Glendale Ave	Bell Road	69.2	67.7	-2.2%	65.9	68.8	4.4%
	SB	Bell Road	Glendale Ave	63.3	63.3	0.0%	68.7	67.0	-2.5%
Loop 202	EB	I-10/SR 51	Loop 101	66.2	65.9	-0.5%	70.4	70.5	0.1%
	WB	Loop 101	I-10/SR 51	55.7	57.8	3.8%	67.4	66.7	-1.0%
US 60	EB	I-10	Loop 101	62.0	63.7	2.7%	63.9	63.5	-0.6%
	WB	Loop 101	I-10	53.4	52.9	-0.9%	not available	not available	n/a
US 60	EB	Loop 101	Val Vista Dr	62.9	65.3	3.8%	63.5	67.1	5.7%
	WB	Val Vista Dr	Loop 101	60.0	61.7	2.8%	65.5	69.8	6.6%
US 60	EB	Val Vista Dr	Loop 202	67.3	68.4	1.6%	70.3	71.2	1.3%
	WB	Loop 202	Val Vista Dr	66.4	69.1	4.1%	43.2	71.2	64.8%
SR 143	NB	I-10	Loop 202/McDowell Rd	54.3	not available	n/a	n/a	n/a	n/a
	SB	Loop 202/McDowell Rd	I-10	52.4	not available	n/a	n/a	n/a	n/a
Loop 101	NB	Loop 202 Santan	US 60	56.0	54.7	-2.3%	66.3	65.5	-1.2%
	SB	US 60	Loop 202 Santan	68.5	66.4	-3.1%	74.4	72.4	-2.7%
Loop 101	NB	US 60	Loop 202 Red Mountain	56.1	56.0	-0.2%	67.6	68.2	0.9%
	SB	Loop 202 Red Mountain	US 60	67.5	67.5	0.0%	72.6	74.5	2.6%
Loop 101	NB	Loop 202 Red Mountain	90th St	56.6	54.8	-3.2%	66.1	66.1	0.0%
	SB	90th St	Loop 202 Red Mountain	65.5	66.4	1.4%	73.2	71.0	-3.0%
Loop 101	NB	90th St	Pima Rd	65.4	65.9	0.8%	69.7	70.7	1.4%
	SB	Pima Rd	90th St	65.8	66.8	1.5%	72.9	73.3	0.5%
Loop 101	EB	Pima Rd	SR 51	62.6	61.1	-2.4%	70.5	69.9	-0.9%
	WB	SR 51	Pima Rd	68.0	69.9	2.8%	71.2	75.2	5.6%
Loop 101	EB	SR 51	I-17	48.1	50.8	5.6%	not available	64.0	n/a
	WB	I-17	SR 51	61.9	68.7	11.0%	not available	74.7	n/a

Source: ADOT FMS

n/a = not applicable

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TABLE E-2
AVERAGE PM PEAK PERIOD SPEED FOR SELECTED FREEWAY CORRIDORS

Freeway Corridor	Dir	From	To	Average PM Peak Period Speed (mph)					
				General-purpose Lanes			HOV Lanes		
				2011	2012	% Change	2011	2012	% Change
I-10 Papago	EB	83rd Ave	I-17	64.4	66.8	3.7%	64.8	67.3	3.9%
	WB	I-17	83rd Ave	55.9	58.8	5.2%	60.5	62.7	3.6%
I-10 Papago	EB	I-17	SR 51/Loop 202	56.8	56.9	0.2%	63.8	63.7	-0.2%
	WB	SR 51/Loop 202	I-17	37.2	40.6	9.1%	47.0	48.4	3.0%
I-10 Maricopa	EB	SR 51/Loop 202	US 60	48.6	47.9	-1.4%	56.6	55.3	-2.3%
	WB	US 60	SR 51/Loop 202	64.2	60.3	-6.1%	65.7	65.1	-0.9%
I-10 Maricopa	EB	US 60	Chandler Blvd	58.3	57.0	-2.2%	66.5	64.6	-2.9%
	WB	Chandler Blvd	US 60	63.6	61.9	-2.7%	67.2	66.1	-1.6%
I-17	NB	Maricopa TI	I-10	51.1	51.8	1.4%	n/a	n/a	n/a
	SB	I-10	Maricopa TI	59.7	60.9	2.0%	n/a	n/a	n/a
I-17	NB	I-10	Peoria Ave	49.9	48.4	-3.0%	57.5	52.6	-8.5%
	SB	Peoria Ave	I-10	61.6	61.4	-0.3%	68.4	64.6	-5.6%
SR 51	NB	I-10/Loop 202	Glendale Ave	58.0	55.2	-4.8%	66.1	61.2	-7.4%
	SB	Glendale Ave	I-10/Loop 202	61.8	61.6	-0.3%	63.6	62.1	-2.4%
SR 51	NB	Glendale Ave	Bell Road	68.2	66.6	-2.3%	65.7	68.1	3.7%
	SB	Bell Road	Glendale Ave	66.9	67.6	1.0%	70.2	68.8	-2.0%
Loop 202	EB	I-10/SR 51	Loop 101	63.2	62.1	-1.7%	69.6	69.1	-0.7%
	WB	Loop 101	I-10/SR 51	59.1	60.7	2.7%	66.9	66.1	-1.2%
US 60	EB	I-10	Loop 101	58.4	59.9	2.6%	64.9	64.7	-0.3%
	WB	Loop 101	I-10	64.0	65.2	1.9%	not available	not available	n/a
US 60	EB	Loop 101	Val Vista Dr	61.1	63.0	3.1%	64.8	68.8	6.2%
	WB	Val Vista Dr	Loop 101	64.7	66.7	3.1%	63.9	67.4	5.5%
US 60	EB	Val Vista Dr	Loop 202	67.6	68.8	1.8%	73.2	72.4	-1.1%
	WB	Loop 202	Val Vista Dr	66.0	68.9	4.4%	71.5	70.0	-2.1%
SR 143	NB	I-10	Loop 202/McDowell Rd	54.4	not available	n/a	n/a	n/a	n/a
	SB	Loop 202/McDowell Rd	I-10	53.2	not available	n/a	n/a	n/a	n/a
Loop 101	NB	Loop 202 Santan	US 60	65.5	64.8	-1.1%	72.1	71.0	-1.5%
	SB	US 60	Loop 202 Santan	59.1	57.5	-2.7%	70.2	66.0	-6.0%
Loop 101	NB	US 60	Loop 202 Red Mountain	64.8	65.2	0.6%	72.0	73.0	1.4%
	SB	Loop 202 Red Mountain	US 60	46.4	44.9	-3.2%	60.4	60.3	-0.2%
Loop 101	NB	Loop 202 Red Mountain	90th St	61.6	60.6	-1.6%	68.8	69.2	0.6%
	SB	90th St	Loop 202 Red Mountain	52.1	51.0	-2.1%	65.7	61.4	-6.5%
Loop 101	NB	90th St	Pima Rd	63.8	63.7	-0.2%	69.5	69.9	0.6%
	SB	Pima Rd	90th St	65.3	65.6	0.5%	72.9	72.8	-0.1%
Loop 101	EB	Pima Rd	SR 51	67.0	68.1	1.6%	73.1	74.0	1.2%
	WB	SR 51	Pima Rd	58.5	61.8	5.6%	69.0	70.9	2.8%
Loop 101	EB	SR 51	I-17	59.0	66.4	12.5%	not available	72.4	n/a
	WB	I-17	SR 51	51.4	55.5	8.0%	not available	66.9	n/a

Source: ADOT FMS

n/a = not applicable

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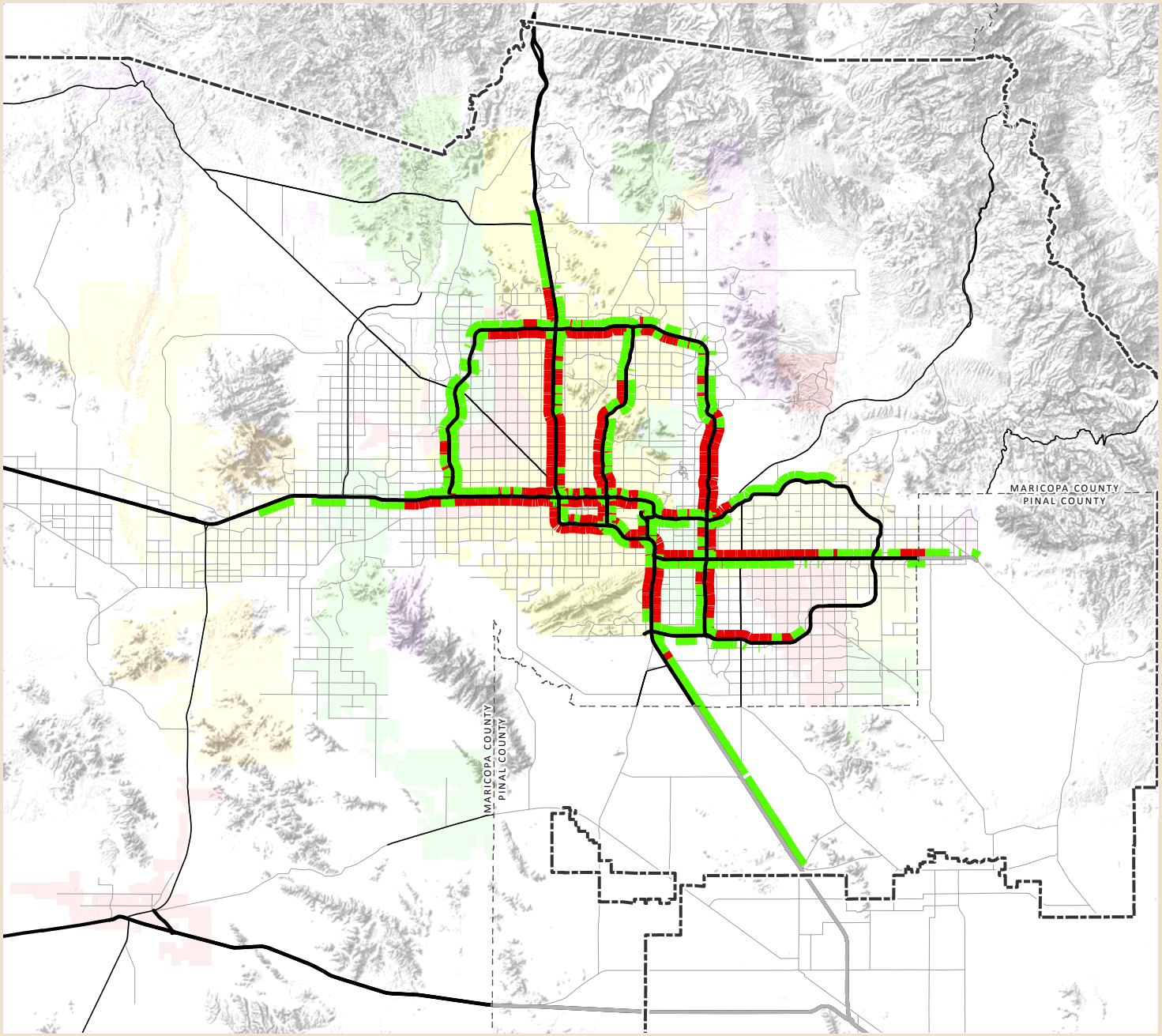

2011 Base Year Network: Freeway PM Peak Period Level of Service

- Levels C & D
- Levels E & F
- Freeways
- Highways
- Other Roads
- Metropolitan Planning Area Boundary
- County Boundary

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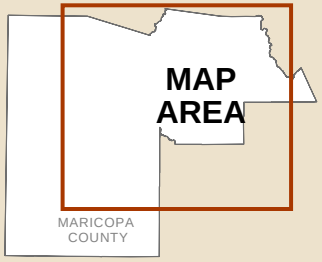

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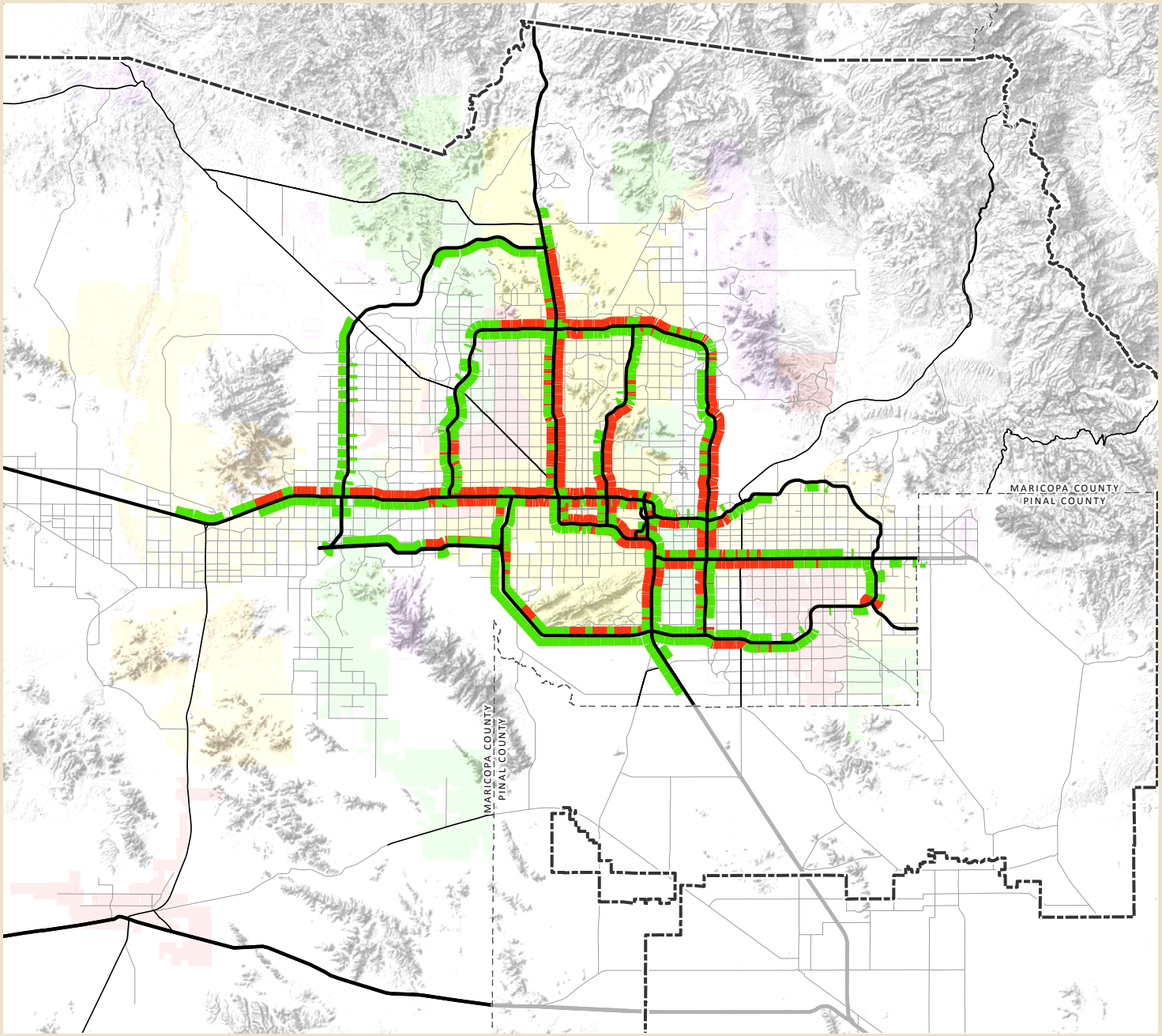

2035 RTP Network: Freeway PM Peak Period Level of Service

- Levels C & D
- Levels E & F
- Freeways
- Highways
- Other Roads
- Metropolitan Planning Area Boundary
- County Boundary

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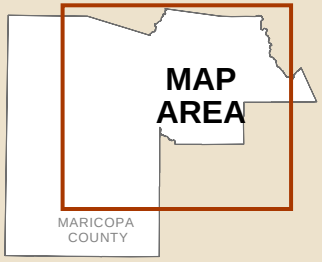

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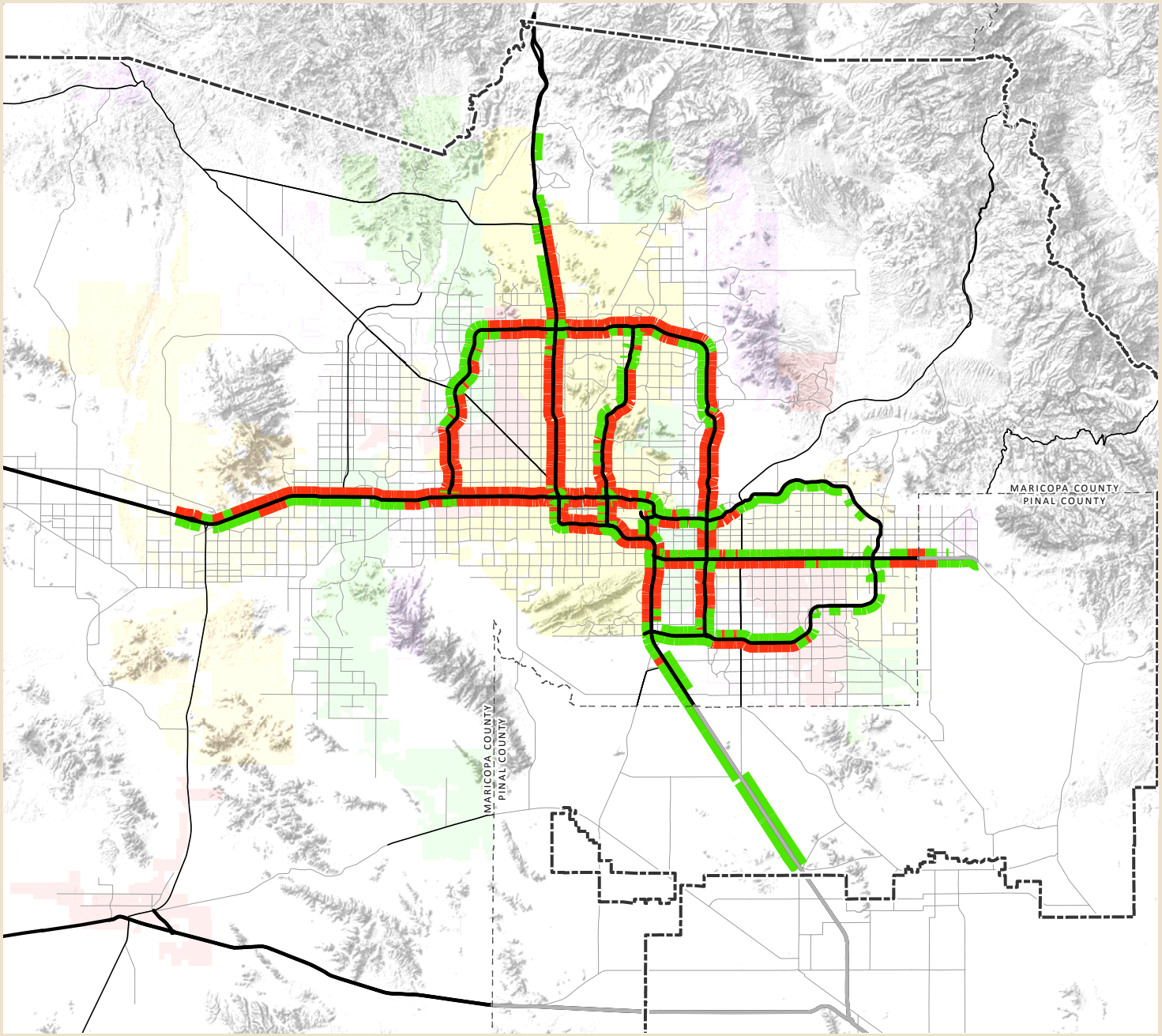

2035 No Build Network: Freeway PM Peak Period Level of Service

- Levels C & D
- Levles E & F
- Freeways
- Highways
- Other Roads
- Metropolitan Planning Area Boundary
- County Boundary

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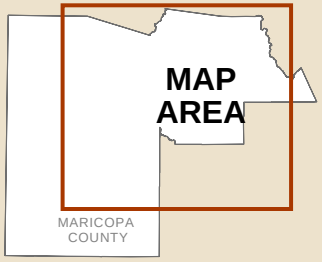

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REGIONAL TRANSPORTATION PLAN

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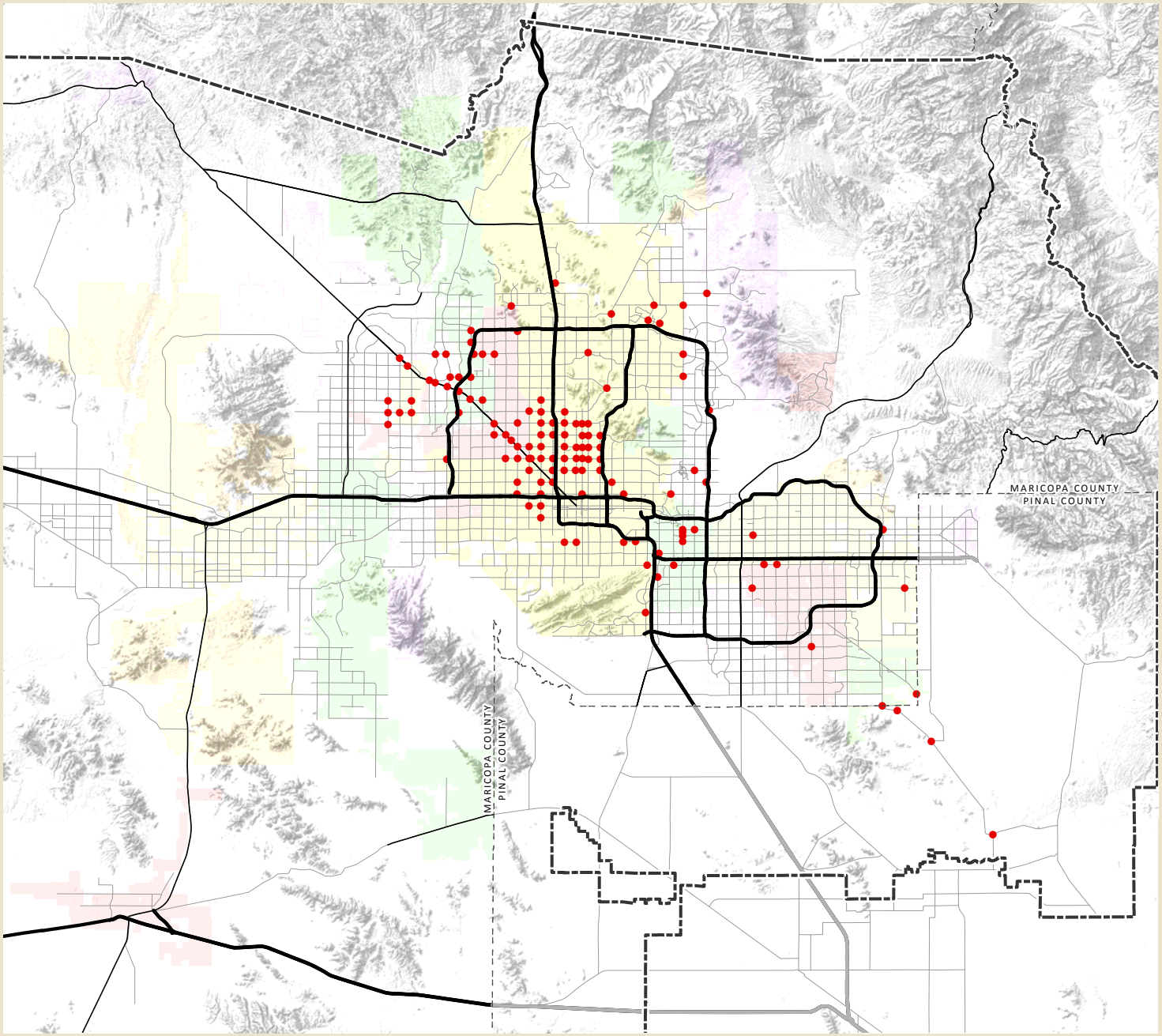
2011 Base Year Network: Intersections PM Peak Period Level of Service E & F



- Level of Service E & F
- Freeways
- Highways
- Other Roads
- Metropolitan Planning Area Boundary
- County Boundary

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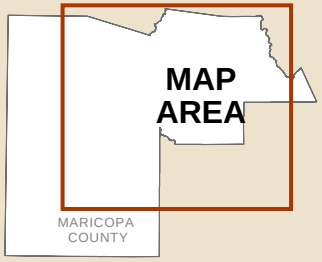

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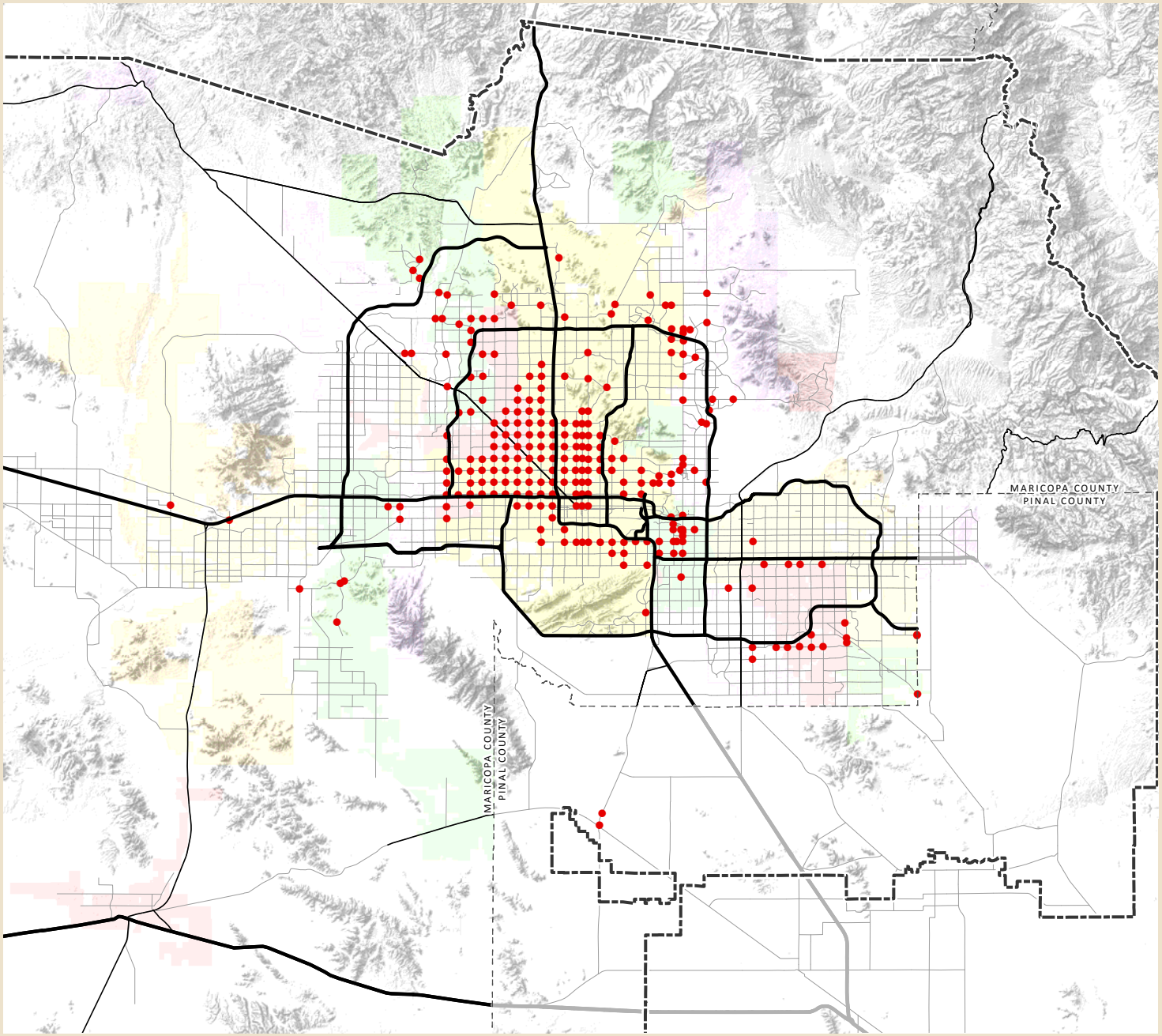
2035 RTP Network: Intersections PM Peak Period Level of Service E & F



- Level of Service E & F
- Freeways
- Highways
- Other Roads
- Metropolitan Planning Area Boundary
- County Boundary

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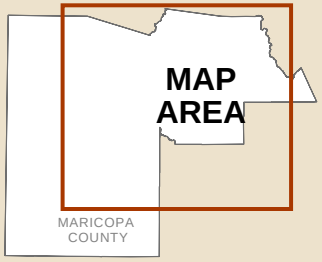

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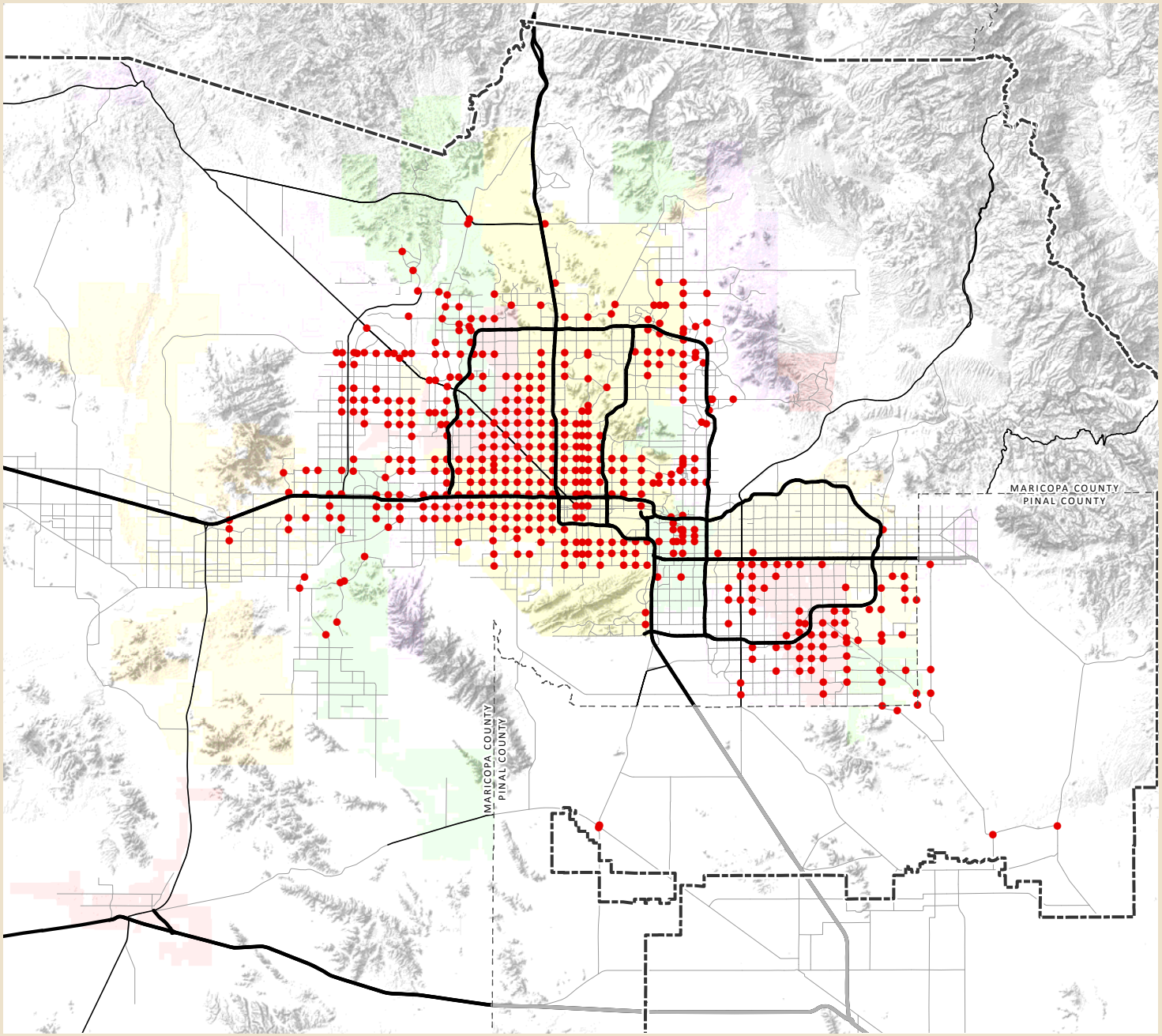
2035 No Build Network: Intersections PM Peak Period Level of Service E & F



- Level of Service E & F
- Freeways
- Highways
- Other Roads
- Metropolitan Planning Area Boundary
- County Boundary

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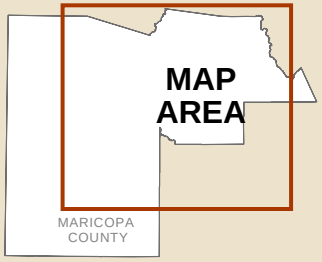

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Appendix F

Transportation Safety

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TABLE F-1

SEVERITY OF CRASHES IN MARICOPA COUNTY[1] & ECONOMIC LOSS (1999-2011)

Year	Fatal Crashes	Injury Crashes	Property Damage Only (PDO) Crashes	Total Crashes	Economic Loss (Millions $)
1999	394	30,381	52,428	83,203	$5,401
2000	394	31,934	54,649	86,977	$5,511
2001	445	30,790	55,554	86,789	$5,714
2002	442	30,606	56,833	87,881	$5,625
2003	416	29,468	54,767	84,651	$5,310
2005	482	30,361	62,309	93,152	$5,787
2006	507	30,285	65,909	96,701	$5,881
2007	422	28,686	65,231	94,339	$5,257
2008	338	23,955	53,887	78,180	$4,291
2009	280	21,428	46,999	68,707	$3,727
2010	291	21,384	46,904	68,579	$3,749
2011	309	22,768	49,321	72,398	$4,014

[1] Does not include crashes in Apache Junction

TABLE F-2

COMPARISON OF CRASH RISK - STATEWIDE vs. MAG REGION (1999-2006)

	Fatalities			Injuries			Total Crashes		
Year	**Arizona**	**MAG**	**% in MAG**	**Arizona**	**MAG**	**% in MAG**	**Arizona**	**MAG**	**% in MAG**
1999	1,024	436	43%	73,514	48,689	66%	125,764	83,616	66%
2000	1,036	436	42%	76,626	51,195	67%	131,368	87,308	66%
2001	1,047	500	48%	73,962	49,434	67%	131,573	87,194	66%
2002	1,119	492	44%	74,230	49,286	66%	134,228	88,311	66%
2003	1,118	460	41%	71,901	47,023	65%	130,895	85,104	65%
2004	1,151	462	40%	73,475	48,480	66%	138,547	91,144	66%
2005	1,179	530	45%	70,293	47,086	67%	139,265	93,643	67%
2006	1,296	571	44%	68,574	46,585	68%	140,197	97,230	69%
2007	1,071	464	43%	65,705	43,511	66%	140,371	94,862	68%
2008	937	372	40%	56,009	35,880	64%	119,588	78,660	66%
2009	806	308	38%	50,610	32,415	64%	106,767	69,090	65%
2010	762	318	42%	50,110	32,364	65%	106,177	68,996	65%
2011	825	333	40%	49,550	34,181	69%	103,423	72,804	70%

TABLE F-3

COMPARISON OF CRASH RISK – ART. & LOC. STR. vs. FWYS.

	ARTERIALS & LOCAL STREETS			FREEWAYS		
Year	Fatalities	Injuries	All Crashes	Fatalities	Injuries	All Crashes
1999	379	43,531	71,961	57	5,158	11,655
2000	366	44,964	73,326	70	6,231	13,982
2001	414	42,360	71,638	86	7,074	15,556
2002	400	41,223	70,483	92	8,063	17,828
2003	368	39,021	67,333	92	8,002	17,771
2004	372	39,653	71,839	90	8,827	19,305
2005	426	38,791	75,081	104	8,295	18,562
2006	467	37,846	77,095	104	8,739	20,135
2007	375	34,475	73,620	89	9,036	21,242
2008	306	28,322	60,773	66	7,558	17,887
2009	249	25,984	54,206	59	6,431	14,884
2010	249	25,340	52,665	69	7,024	16,331
2011	275	26,133	54,815	58	8,048	17,989

TABLE F-4

CRASH RISK ON ARTERIALS

	INTERSECTION RELATED			MID- BLOCK			ALL		
Year	Fatal	Injury	PDO	Fatal	Injury	PDO	Fatal	Injury	PDO
1999	158	14,334	19,026	189	12,809	25,428	347	27,143	44,454
2000	154	14,689	19,652	182	13,206	25,439	336	27,895	45,091
2001	171	13,963	19,490	202	12,331	25,465	373	26,294	44,955
2002	168	13,588	19,607	199	11,917	24,995	367	25,505	44,602
2003	139	13,152	19,296	200	11,202	23,333	339	24,354	42,629
2004	135	13,704	21,091	203	11,480	25,216	338	25,184	46,307
2005	161	13,817	23,137	233	11,202	26,521	394	25,019	49,658
2006	174	13,937	25,280	248	10,656	26,787	422	24,593	52,067
2007	140	12,759	23,881	206	10,123	26,493	346	22,882	50,374
2008	121	10,669	19,982	162	8,403	21,427	283	19,072	41,409
2009	95	10,001	18,500	133	7,304	18,171	228	17,305	36,671
2010	80	10,043	18,769	154	6,729	16,890	234	16,772	35,659
2011	110	10,689	20,379	148	6,655	16,834	258	17,344	37,213

TABLE F-5

SEVERITY OF CRASHES INVOLVING BICYCLISTS & PEDESTRIANS

	PEDESTRIAN		BICYCLIST	
Year	**Fatal**	**Injury**	**Fatal**	**Injury**
1999	78	1,007	19	1,525
2000	81	1,086	21	1,372
2001	93	1,016	19	1,218
2002	85	935	11	1,153
2003	83	933	8	1,114
2004	68	1,019	17	1,215
2005	89	956	25	1,185
2006	100	959	22	1,063
2007	82	1,029	14	1,061
2008	72	928	8	1,133
2009	58	826	15	1,161
2010	83	787	16	1,102
2011	71	832	15	1,207

TABLE F-8

SEVERITY OF CRASHES INVOLVING YOUNGER DRIVERS & OLDER DRIVERS

	YOUNGER DRIVERS (< 25 YRS)			OLDER DRIVERS (> 65 YRS)		
Year	**Fatal**	**Injury**	**PDO**	**Fatal**	**Injury**	**PDO**
1999	153	13,590	21,970	61	3,681	5,692
2000	164	14,584	23,319	62	3,622	5,635
2001	181	13,845	23,060	54	3,381	5,354
2002	175	13,989	24,227	67	3,296	5,583
2003	145	13,496	23,353	65	3,285	5,417
2004	176	14,048	25,481	50	3,409	6,059
2005	200	13,740	26,552	61	3,421	6,040
2006	196	13,813	27,959	56	3,261	6,161
2007	165	12,533	27,210	55	3,140	6,171
2008	126	9,926	21,348	51	2,871	5,672
2009	81	8,694	18,836	45	2,736	5,461
2010	77	8,647	18,579	45	2,830	5,611
2011	101	9,070	19,355	54	2,999	6,030

TABLE F-6
PEDESTRIANS INJURED & KILLED BY AGE GROUP

Age	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2008 Populati on	% Population by Age
<5	61	44	70	49	41	37	39	36	38	24	39	26	34	319,035	8%
5 - 14	207	259	220	194	206	191	163	163	178	130	125	122	120	598,191	15%
15 - 24	222	246	228	225	227	249	261	228	230	261	225	188	224	558,312	14%
25 - 34	152	163	165	131	150	148	152	163	151	137	123	119	144	638,071	16%
35 - 44	190	172	171	138	159	173	158	155	165	134	126	122	117	598,191	15%
45 – 54	122	146	110	148	131	147	136	149	158	140	115	136	127	478,553	12%
55 – 64	68	68	63	61	56	74	75	98	98	82	69	88	89	319,035	8%
>65	82	83	60	68	56	69	62	78	85	77	73	72	79	478,553	12%
Unknown	47	58	95	60	53	74	53	51	51	58	32	41	19		
Total	1,151	1,239	1,182	1,074	1,079	1,162	1,099	1,121	1,154	1,043	927	914	953	3,987,942	100%

TABLE F-7
BICYCLISTS INJURED & KILLED BY AGE GROUP (1999-2008)

Age	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2008 Population	% Population by Age
<5	6	4	9	6	5	4	3	4	4	3	3	1	6	319,035	8%
5 - 14	377	326	258	239	244	289	252	205	204	194	198	182	169	598,191	15%
15 - 24	397	338	298	273	272	318	304	260	280	296	340	300	348	558,312	14%
25 - 34	254	240	179	167	159	160	167	143	154	159	173	163	185	638,071	16%
35 - 44	232	205	211	193	182	152	175	186	166	162	161	152	149	598,191	15%
45 – 54	128	130	122	132	149	166	163	166	149	165	166	160	200	478,553	12%
55 – 64	53	61	32	49	51	54	64	48	64	85	82	99	108	319,035	8%
>65	45	32	32	31	31	35	44	42	31	49	33	45	37	478,553	12%
Unknown	47	58	98	72	25	50	36	33	22	32	20	26	32		
Total	1,539	1,394	1,239	1,162	1,118	1,228	1,208	1,087	1,074	1,145	1,176	1,128	1,234	3,987,942	100%

FIGURE F-1 TOTAL CRASHES BY FREEWAY CORRIDOR

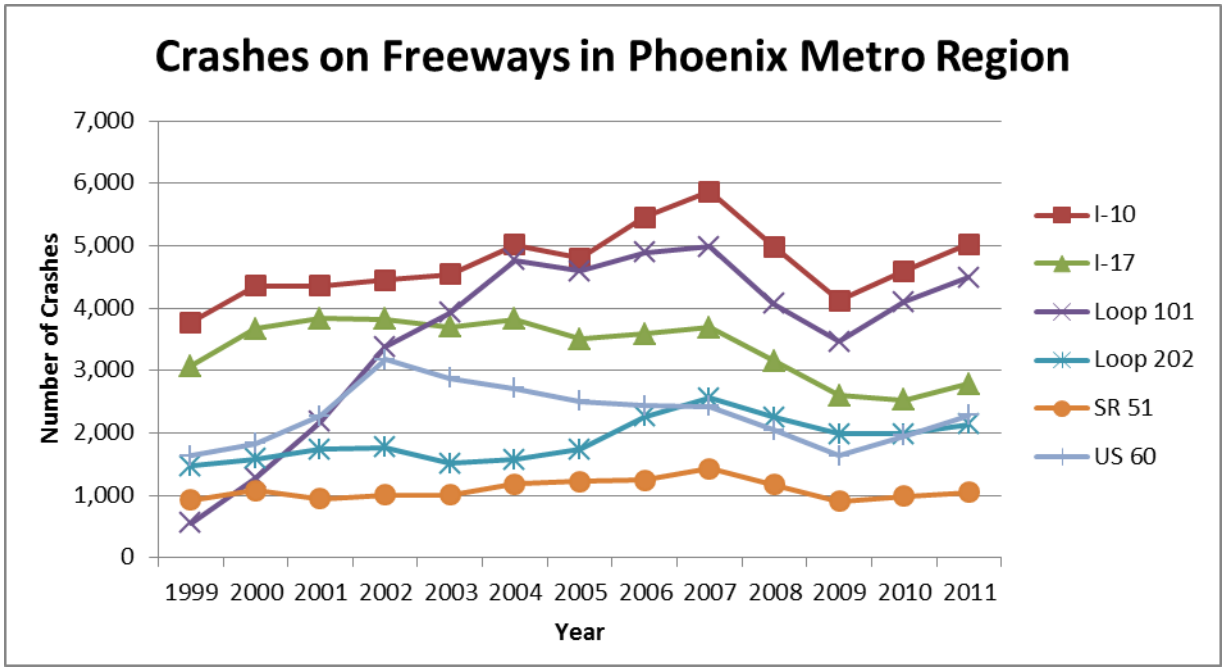

FIGURE F-2 NUMBER OF INJURIES BY FREEWAY CORRIDOR

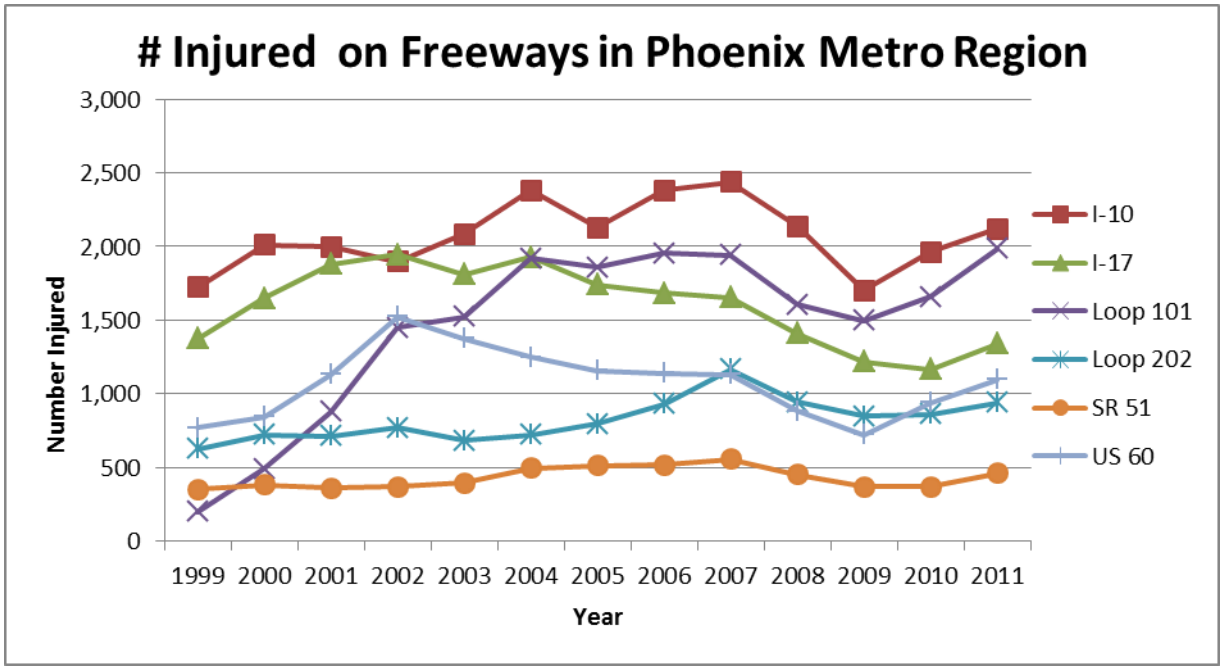

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FIGURE F-3 NUMBER OF FATALITIES BY FREEWAY CORRIDOR

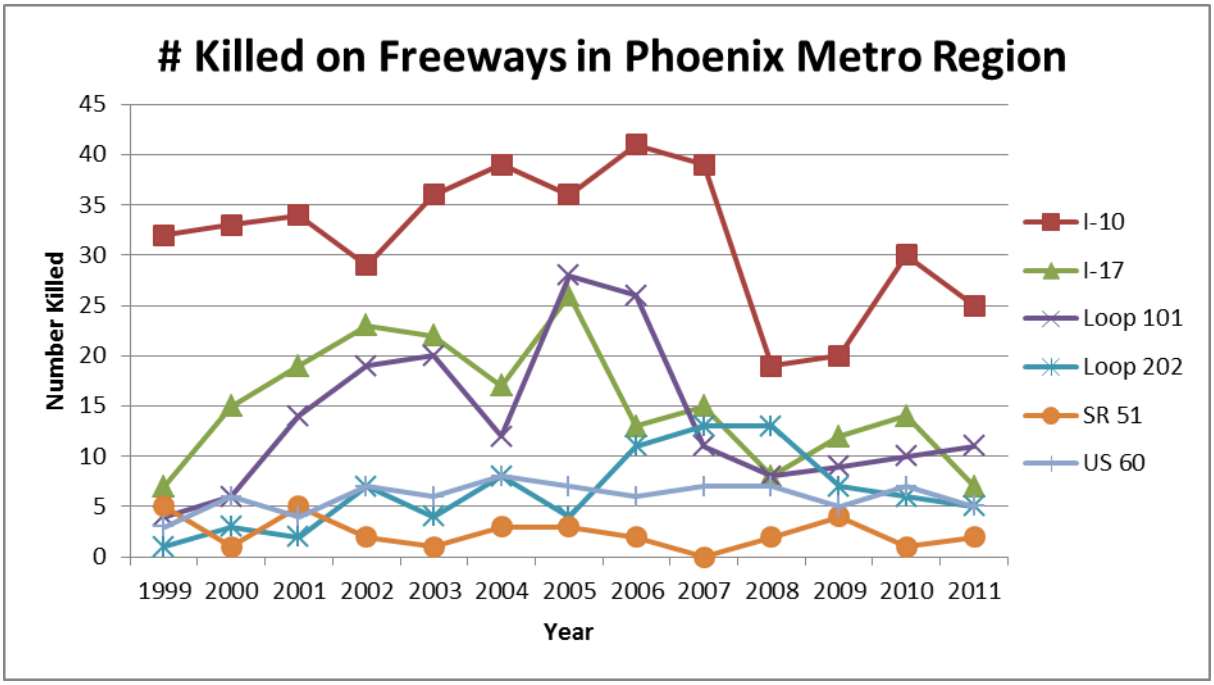
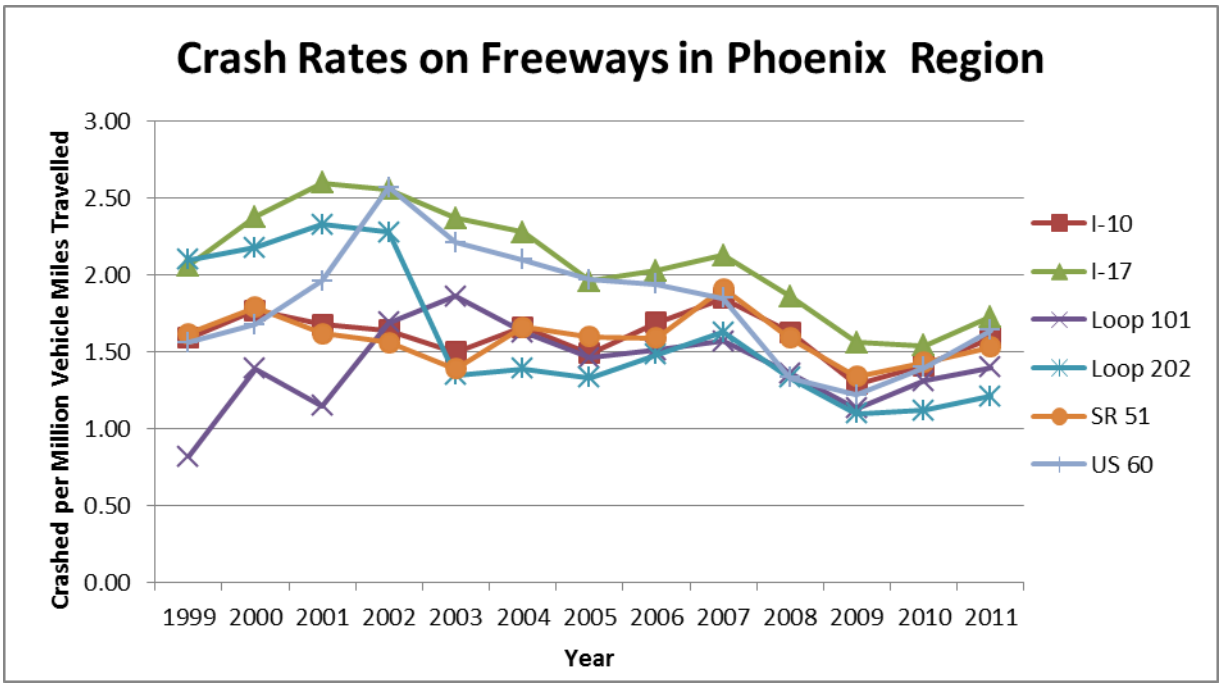


FIGURE F-4 CRASH RATES BY FREEWAY CORRIDOR



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.

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