Southwest Area Transportation Study

Final Report

MARICOPA ASSOCIATION of GOVERNMENTS

in support of the

MAG Regional Transportation Plan

September 2003

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Final Report

PREPARED FOR:

Maricopa Association of Governments

IN SUPPORT OF THE

MAG Regional Transportation Plan

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1 Existing Plans

As part of the Maricopa Association of Governments (MAG) Southwest Area Transportation Study, Wilbur Smith Associates (WSA) and their sub-contractors Kimley-Horn and Associates, Inc. (KHA) collected information on all transportation elements in the southwest valley study area. Over the course of several months, KHA contacted various municipalities and other agencies in an effort to develop a database of information relating to existing and proposed transportation plans, programs, and facilities within the study area. This chapter provides a summary of the data collection effort and resulting information that was obtained, as well as a brief overview of some of the major transportation issues that were identified as part of this data collection effort.

This chapter was developed as a Working Paper (WP) and contains data and information that is continuously updated, some of which may have changed or may have been superseded by the final Regional Transportation Plan (RTP). Information was current at the time of initial WP publication.

1.1 Data Collection Efforts

An initial letter request for information was sent to several municipalities and public agencies located within the study area in late November. A sample of this letter, dated November 30, 2001, is included in the Appendix I for reference. This initial contact was then followed up with an additional information request letter, dated December 20, 2001. A sample copy of this letter is also included in Appendix I. Other requests for specific information, studies, maps, or reports were also made by telephone, in person or as part of the one on one agency interviews. Agencies contacted as part of this data collection effort include the following:

- Maricopa County Department of Transportation (MCDOT)
- Maricopa Association of Governments (MAG)
- City of Phoenix
- Town of Buckeye
- City of Goodyear
- City of Avondale
- City of Litchfield Park
- City of Tolleson
- Town of Gila Bend
- RPTA – Valley Metro
- Arizona Department of Transportation (ADOT)
- Flood Control District of Maricopa County
- Arizona Department of Corrections

During the first two months of 2002, follow-up telephone calls and personal visits were made to many of these agencies in an effort to gather all pertinent information.

1.2 Information Obtained

General plan information, including street classification maps and land use maps, were obtained from all of the municipalities in the study area. To date, the Town of Gila Bend has provided their General Plan and a list of ongoing and proposed developments in the city. Other general information, such as traffic counts, capital improvement programs, bicycle facility plans, transit plans, and trails plans, were obtained from various agencies as requested. Table 1-1 summarizes the type of information that was collected from each agency.

Specific studies and reports were also requested from each agency as part of the data collection effort. Information of this type generally focuses on one particular area or corridor, and includes traffic impact analyses, corridor studies, design concept reports, candidate assessment reports, master circulation plans, and sub-area plans. This type of information has been categorized according to the municipality or agency that has jurisdiction over project or study area. Each of these reports is summarized below.

All information collected as part of the Southwest Area Transportation Study (SWATS) was reviewed and organized by agency or municipality, and each report, document, plan, or study is assigned a reference number for use with the project. Each report, study, and plan collected as part of the project was briefly summarized. The summaries generally provide an overview of the source document, describing the project limits or location of the study area, as well as the type of information provided. These summaries are provided below, and are organized by agency and SWATS reference number. In addition, the project or study area location of each piece of information, with the exception of MAG regional studies or plans, obtained as part of this SWATS data collection effort is summarized in Figure 1.

1.3 Database Organization

Hard copies of all information obtained as part of the SWATS data collection effort have been compiled into a project database for use throughout the course of the study. As additional reports or studies are made available to the WSA team, each item will be reviewed, summarized, and added to the project database.

Table 1-1
Summary of Data Collection

	Municipality / Organization										
Type of Study	City of Phoenix	Town of Buckeye	City of Goodyear	City of Avondale	City of Litchfield Park	City of Tolleson	Town of Gila Bend	Maricopa County Department of Transportation	Flood Control District of Maricopa County	RPTA - Valley Metro	Maricopa Association of Governments
Land Use Plan	X	X	X	X	X			X	X		
General Plan	X	X	X	X	X	X	X	X			
Traffic Counts			X					X			
Street Classification Map	X	X	X	X				X			
Capital Improvement Program	X										
Local Bus System						X				X	X
Regional Bus System			X					X		X	X
Trails Plan									X		
Bicycle Facility Plan	X		X	X		X		X			
Other Non-Motorized Circulation Plans						X		X			

1.4 Existing and Previous Plans, Programs, Reports, and Studies

1.4.1 City of Phoenix

1.4.1.1 PHX-01: Estrella Village Plan (March 1999)

Estrella Village is a planning unit within the City of Phoenix encompassing approximately 41 square miles. Estrella Village is located in the southwest portion of Phoenix, and is bordered by I-10 to the north, the Black Canyon (I-17) Freeway and 19th Avenue to the east, the Salt River on the south, and 75th, 83rd, and 107th Avenue on the west. Approximately 7½ square miles within the Village are located in unincorporated Maricopa County. Approximately 45,000 people live in Estrella and 38,000 people are employed in the Village. Estrella Village also has an ample supply of undeveloped land. The Estrella Village Plan provides an overview of existing land uses and zoning, and identifies future goals and objectives for the Village.

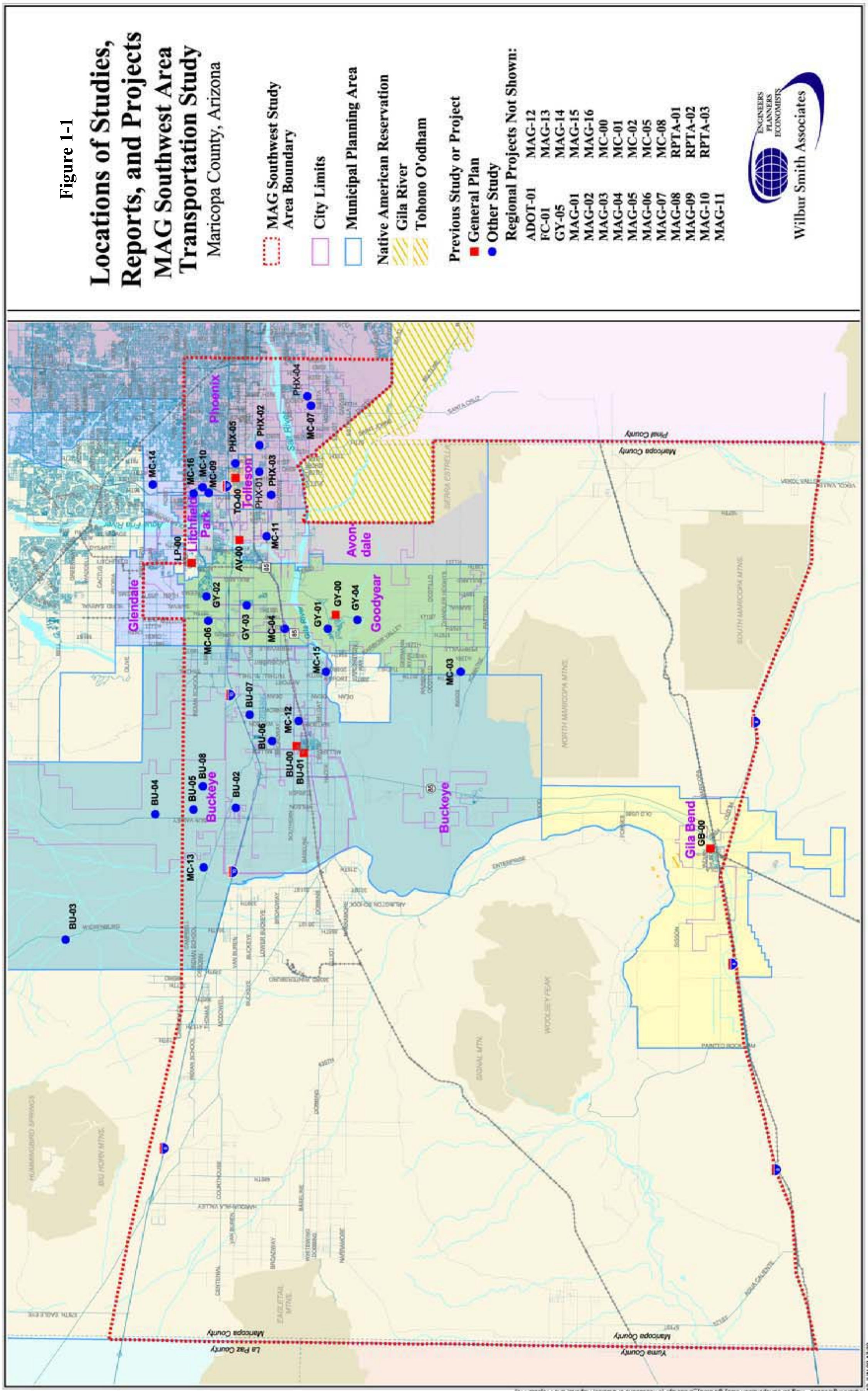


Figure 1-1
Locations of Studies, Reports, and Projects
MAG Southwest Area Transportation Study
Maricopa County, Arizona

1.4.1.2 PHX-02: Estrella Village Multi-Purpose Trail Plan (Undated)

The Phoenix General Plan recommends a citywide trail system. The Estrella Village Trail Plan identifies existing and future trails within the Estrella Village portion of Phoenix. As noted above, Estrella Village is located in the southwest portion of Phoenix, and is bordered by I-10 to the north, the Black Canyon (I-17) Freeway and 19th Avenue to the east, the Salt River on the south, and 75th, 83rd, and 107th Avenue on the west.

1.4.1.3 PHX-03: Estrella Village Arterial Street Landscaping Program (Undated)

This report identifies landscaping concepts and themes for public areas along arterial streets within Estrella Village. The landscape guide identifies types of trees and shrubs that are to be used along perimeter landscape areas and within the public street right-of-way in Estrella Village. As noted, Estrella Village is a planning unit within the City of Phoenix encompassing approximately 41 square miles.

1.4.1.4 PHX-04: Laveen Southwest Growth Study (January 1998)

Laveen is an area located in southwest Phoenix, portions of which have recently been annexed into the City. Laveen is an area covering 28 square miles and is bordered by 27th Avenue to the east, South Mountain Regional Park to the south, the Salt River to the north, and the Gila River Indian Community to the west. The Laveen study area encompasses approximately 16,700 acres. Primary land uses in the area include agriculture and vacant desert, with some scattered large-lot residential areas. As outlined in this report, future land uses in the Laveen area are expected to include a mixture of master-planned residential developments, commerce parks, public facilities, cluster-oriented “conservation communities”, and transit-oriented developments.

1.4.1.5 PHX-05: Five-Year Arterial Street and Storm Drain Program (FY 2001)

The Five – Year Arterial Street and Storm Drain Program is intended to provide for the construction of 45.9 miles of arterial streets with an average of 9.2 miles being constructed each year for five years. It includes the construction of bridges over Skunk Creek Wash at Happy Valley road, 40th Street and Indian Bend Wash (north of Cactus Road), and over the Salt River at 35th Avenue; arterial street retrofit projects; bridge rehabilitation projects; and railroad crossing improvement projects. Also included are several drainage projects composed of numerous storm drain trunk lines.

1.4.1.6 PHX-06: Laveen Watercourse/Greenbelt Pedestrian Trail Project

This report documents a MAG pedestrian assistance study to develop an integrated pedestrian system to link various pedestrian areas in an interconnected multiple use trail system of canals, laterals, and ditches, with nodes or areas of concentrated activity use such as parks and schools. It connects to transit routes and park and ride lots. The plan area is 47th to 71st Avenue from Baseline to Elliot Roads, completed in February 2001.

1.4.1.7 Key Issues in the City of Phoenix

As the City of Phoenix continues to grow, maintenance of current infrastructure and construction of additional infrastructure are needed. New developments must facilitate smart growth through well-planned designs that allow all modes of transportation to coexist.

1.4.2 City of Goodyear

1.4.2.1 GY-00: Goodyear General Plan (May 1998)

The Goodyear General Plan provides guidance for growth within the city of Goodyear and outlines goals and policies in accordance with the desired growth pattern. The total planning area encompasses approximately 115 square miles. The General Plan was initially adopted in mid-1998; Goodyear is currently in the process of updating the General Plan, however.

1.4.2.2 GY-01: Estrella Mountain Ranch Area Plan - Circulation Element (April 1998)

Estrella Mountain Ranch is a master-planned community in the southwest portion of the Phoenix metropolitan area, within the City of Goodyear. The planned development is bordered by Estrella Mountain Regional Park to the east, the Gila River to the north, Rainbow Valley Road to the west, and Patterson Road to the south. Estrella Mountain Ranch will include residential, commercial, office, and educational uses, and is expected to accommodate 196,000 residents, 65,000 residential dwelling units, and 28,000 employees at project buildout. The circulation element of the Area Plan establishes a recommended roadway network capable of accommodating projected transportation demand under buildout conditions.

1.4.2.3 GY-02: Palm Valley Master Plan Traffic Impact Analysis (June 1998)

Palm Valley is a large master-planned community covering approximately 9,000 acres in the City of Goodyear. The development is generally bordered by Camelback Road on the north, McDowell Road on the south, Dysart Road on the east, and Cotton Lane on the west. Palm Valley will include a mix of residential, employment, and commercial land uses, as well as schools, churches, parks, golf courses, and open spaces.

1.4.2.4 GY-03: Canyon Trails Traffic Analysis Report (December 1998)

Canyon Trails is a large planned area development covering approximately 2,200 acres in Goodyear. The site is generally bordered by I-10 to the north, Yuma Road to the south, Estrella Parkway to the east and Citrus Road to the west. This development will include up to 7,839 residential dwelling units, as well as 3 school sites, a church site, 4 parks, and open space. Several neighborhood commercial parcels are also located at arterial street intersections.

1.4.2.5 GY-04: Estrella Mountain Ranch Area Plan (August 1998)

The Estrella Mountain Ranch Area Plan is a complementary document to the City of Goodyear's General Plan to provide greater detail for the development of the 18.0-acre Estrella Mountain Ranch property. It contains a long-range vision and master plan for approximately 19 "villages" within the property (Estrella Mountain Ranch Area Plan 1). The project site is bounded on the north by the Gila River and on the south beyond Riggs Road and Chandler Heights to approximately ten miles from the base of the Maricopa Mountains.

1.4.2.6 GY-05: City of Goodyear Alternative Truck Route Study (August 2001)

This study was commissioned by the City of Goodyear in an effort to provide an analysis of current truck traffic conditions within the City and includes recommendations for a network of designated truck hauling routes that would serve this truck traffic. The study recommends the expansion of certain routes to accommodate future truck traffic as well as the closure of other routes to trucks due to capacity, noise, and safety issues. Study results were also intended to serve as the basis for a city ordinance restricting truck traffic to the recommended routes, in accordance with the City's

General Plan, in a manner that provides for the safe, effective, and efficient movement of goods and services through the City of Goodyear limits. The study area is bounded by Litchfield Road to the east, Beardsley Canal Road to the west, Camelback Road to the north, and MC-85 and the Salt River to the south.

1.4.2.7 GY-06: Parks, Trails, and Open Space Master Plan, 2001

1.4.2.8 Key Issues in the City of Goodyear

The City of Goodyear has many large, master-planned communities under development. Each development must adhere to the guidelines set forth in the general plan to set up a transportation network that accommodates pedestrians, bicycles, automobiles, trucks, and other forms of transportation.

According to City of Goodyear staff, completion of the arterial street grid system will progress as development occurs. The City does have several transportation infrastructure improvements currently planned or programmed. Two major City projects are scheduled for the current fiscal year, 2002-2003, including the following:

- Reconstruction/widening of Estrella Parkway from the existing 2-lane section to a 4-lane section with a center raised median, from a point ¼ -mile north of Yuma Road to a point ¼ -mile north of McDowell Road, a distance of approximately 2 miles; and
- Reconstruction/widening of McDowell Road from the existing 2-lane section to a 4-lane section with a center raised median, from Bullard Avenue to Pebble Creek Parkway, a distance of approximately 2 miles.

Within the next five (5) years, the City of Goodyear plans to complete several other transportation infrastructure improvements, including the following projects:

- Reconstruction/widening of Van Buren Street from the existing 2-lane section to a 4-lane section with a center raised median, from Litchfield Road to Estrella Parkway, a distance of approximately 2 miles;
- Reconstruction/widening of Yuma Road from the existing 2-lane section to a 4-lane section with a center raised median, from Bullard Avenue to Estrella Parkway, a distance of approximately 1 mile;
- Construction of two (2) new bridge crossings over the Bullard Wash, on Van Buren Street (4-lane crossing) and on Yuma Road (6-lane crossing); and
- Improvement of Bullard Avenue from existing graded gravel to paved roadway with asphalt concrete pavement, from Van Burne Street Street to Yuma Road, a distance of approximately 1 mile.

1.4.3 Maricopa County Department of Transportation

1.4.3.1 MC-00: Maricopa County Comprehensive Plan 2020: Eye to the Future (October 1997)

The Maricopa County Comprehensive Plan 2020: Eye to the Future is an overall plan for controlled development of the communities with an effort to conserve resources and protect the environment while still providing an efficient transportation system. It is intended as a guide for decisions concerning growth and development and contains goals, policies and standards to meet the plan.

1.4.3.2 MC-01: Southwest Valley Transportation Study - Final Report (July 1997)

The Southwest Valley Transportation Study Final Report is a study conducted to aid in the development of a comprehensive multimodal transportation plan for the cities of Avondale, Goodyear, Litchfield Park, Tolleson, and the Town of Buckeye. The study included the development of a five-year transportation improvement program (1996-2001), a ten-year action plan (2001-2006), and a twenty-five year long-range transportation plan. Information from this report was not utilized in MAG's development of the Long Range Transportation Plan. This report has been superseded by MAG's Southwest Area Transportation Study of which this Working Paper is one task.

1.4.3.3 MC-02: Southwest Valley Transportation Study - Goodyear Community Transportation Plan (May 1997)

The Southwest Valley Transportation Study - Goodyear Community Transportation Plan covers the Goodyear sub-area, which is bounded on the north by and including Northern Avenue, bounded on the south by Litchfield Road and Jack Rabbit Trail. The study included the development of a five-year (1996-2001) transportation improvement program, a ten-year (2001-2006), and a twenty-five-year, long-range transportation plan (Southwest Valley Transportation Study 1-1). The study includes: a review of previous plans and studies; formulation of transportation goals and policies; an inventory of existing conditions; socioeconomic and land use projections; refinement, calibration, and application of a travel demand model; an analysis of future conditions; an evaluation and prioritization of transportation improvement projects; an alternative modes development plan; public involvement activities, and an implementation and funding program (Southwest Valley Transportation Study - Goodyear Community Transportation Plan 1-1).

1.4.3.4 MC-03: Riggs Road- Rainbow Valley to SR-85: Final Candidate Assessment Report (June 2000)

Riggs Road-Rainbow Valley to SR-85: Final Candidate Assessment Report recommends the improvement of Riggs Road from Rainbow Valley Road to its western end, and to extend it to SR 85 parallel to the El Paso Gas line service road and changing the alignment to the north at the west end for better access to SR 85 (Riggs Road- Rainbow Valley to SR-85: Final Candidate Assessment Report 3). The improvements would include construction of a paved two-lane rural collector. Additional right-of-way must be acquired.

1.4.3.5 MC-04: MC Highway 85- State Route 85 at Oglesby Road to 75th Avenue: Final Corridor Improvement Study (July 1998)

Volume 1 consists of the Final Report, identifying needs and recommended improvements along the MC 85 corridor through Goodyear, Buckeye, and the southwest valley. One of the key elements of this study is the recommendation of a truck bypass route through the Town of Buckeye. Trucks traveling west along MC-85 would be diverted south on Watson Road to Beloat Road, then west on Beloat Road for 2½ miles and then southwest on a new road to Hazen Road. Trucks would then travel on Hazen Road to SR-85. This bypass route would allow trucks to avoid the central core area of the Town.

Volume 2 contains the following appendices:

- Proposed Model Access Control Ordinances
- Title VI/ Environmental Justice Overview

- Concept Plans
- Preliminary Cost Summaries per Segment
- Results of the Public Process and Agency Letters Received
- Summaries of Field Meetings and Agency Meetings
- City/Town Limits Maps

Volume 3 contains the following appendices:

- Quantity Estimates
- MCDOT Road Management System Road Summary Report
- Existing Access Summary Table
- Zoning Maps
- Utility Tables
- Typical Sections
- MCDOT Environmental Overview
- Transyt-7F Analyses Technical Memorandum

1.4.3.6 MC-05: Bicycle Transportation System Plan (May 1999)

This plan outlines the bicycle routes currently available in the MAG region and recommends goals to improve the routes and connect them into a network as well as recommended policies regarding cycling and the use of these routes. The plan estimates between 1000 and 1200 miles of bicycle facilities currently existing.

1.4.3.7 MC-06: Estrella Corridor Study - MC 85 to Interstate 17: Design Concept Report (March 1998)

This is a study to provide information regarding the potential development of the Estrella Corridor. The Estrella Corridor study considered an 800 m (2625 foot) wide section of roadway (with the exception of a 183 m (600-foot section that encompasses the existing L303) that is 59.4 km (37 miles) long. The corridor considered begins at MC 85 in the south; follows ADOT alignment along or east of Cotton Lane extending north to Grand Avenue. The corridor then extends from Grand Avenue to Lake Pleasant Road, and then follows the alignment of Happy Valley Road to Interstate 17. The study recommends that alignment of the corridor to match Happy Valley Road be discontinued and alignment to match Lake Pleasant Road be considered.

1.4.3.8 MC-07: Baseline Road- 51st Avenue to 7th Avenue: Final Design Concept Report (October 1997)

The Baseline Road - 51st Avenue to 7th Avenue: Final Design Concept Report covers the proposed improvement of an 8.3 km section of Baseline Road from 51st Avenue to 7th Avenue. The improvements include widening Baseline Road to a five-lane urban roadway section from a two-lane rural roadway section; the realignment of all the major crossroad intersections; and a new storm drain system under Baseline Road from 7th Avenue to 43rd Avenue.

1.4.3.9 MC-08: Maricopa County Final Transportation System Plan: 2020 Eye to the Future (December 1997)

The Maricopa County Final Transportation System Plan: 2020 Eye to the Future is a plan for unincorporated portion of the County through the year 2020.

1.4.3.10 MC-09: 99th Avenue Corridor: Improvement Staging Report (May 1998)

The 99th Avenue Corridor: Improvement Staging Report is an analysis of vehicle traffic on 99th Avenue and 91st Avenue, between I-10 and Glendale Avenue, in preparation for the construction of the remaining segments of Loop 101 (99th Avenue Corridor: Improvement Staging Report 1).

1.4.3.11 MC-10: 99th Avenue Corridor Study- I-10 to Glendale Avenue: Environmental Overview (June 1998)

The 99th Avenue Corridor Study is an environmental overview to assess the natural, physical, socio-economic, and cultural resource environment. The study area consists of a 1200-foot wide by 5.25-mile long corridor centered on 99th Avenue bounded by I-10 on the south and Glendale Avenue on the north (99th Avenue Corridor Study 1). This study does not meet the requirements of NEPA; it is only intended to identify environmental concerns related to future development.

1.4.3.12 MC-11: 115th Avenue - MC 85 to McDowell Road: Final Candidate Assessment Report (February 1997)

115th Avenue - MC 85 to McDowell Road is a 3.2 km (2-mile) project to improve traffic flow on 115th Avenue (located in Avondale) to the Phoenix International Raceway, and is divided into an urban section (I-10 to McDowell Road) and a rural section (MC 85, Buckeye Road, to I-10). The proposed improvement includes an urban, minor-arterial construction from I-10 to McDowell Road; a rural minor, arterial construction from MC 85 to I-10; installation of a traffic signal and widening of the roadway to a five-lane section (the length of the left turn lanes) on Van Buren Street; and installation of a traffic signal at the intersection of McDowell Road.

1.4.3.13 MC-12: Watson Road- MC 85 to Southern Avenue: Project Assessment Report (October 1996)

Watson Road is a north-south section line roadway located east of the Town of Buckeye in western Maricopa County (Watson Road- MC 85 to Southern Avenue 1). The proposed improvement of Watson Road is bounded on the North by the intersection of Watson road and southern avenue and on the south by the MC 85 (Baseline Road) and Watson Road intersection. The proposed improvement includes the construction of Watson Road, as a two-lane road between these boundaries to provide access for developers for a large, master plan development near I-10 and Watson Road. Construction of a bridge over the Buckeye Canal and a Railroad crossing are also included.

1.4.3.14 MC-13: Tonopah/Arlington Area Plan (September 2000)

This study was developed as a complementary document to the Maricopa County Comprehensive Plan: Eye to the Future 2020 (October 1997). The Tonopah/Arlington Area Plan provides a specific guide for development and growth in the Tonopah/Arlington planning area, and includes specific goals and objectives for transportation, land use, environmental issues, and economic development. The study area includes Tonopah and the surrounding area along Interstate 10, west of Buckeye in western Maricopa County.

1.4.3.15 MC-14: White Tanks/Grand Avenue Area Plan (Undated)

This study was developed as a complementary document to the Maricopa County Comprehensive Plan: Eye to the Future 2020 (October 1997). The White Tanks/Grand Avenue Area Plan provides a specific guide for development and growth in the planning area, and includes specific goals and objectives for transportation, land use, environmental issues, and economic development. The study area includes the western portion of the greater Phoenix metropolitan area surrounding Grand Avenue. The Study area is bounded by the Agua Fria River to the east, the White Tank Mountains to the west, Interstate 10 to the south, and the Yavapai County line to the north.

1.4.3.16 MC-15: Little Rainbow Valley Area Land Use Plan (January 1992)

The Little Rainbow Valley Area Plan provides a specific guide for development and growth in the planning area, and includes specific goals and objectives in the areas of natural resources, land use and zoning, and socio-economic development. The study area includes the area south of MC-85 between Estrella Parkway and Rainbow Road in the southwestern portion of the greater Phoenix metropolitan area. According to county staff, the Rainbow Valley Area Plan is currently in the process of being updated.

1.4.3.17 MC-16: 99th Avenue Design Concept Report- McDowell Road to Glendale Avenue (August 1999)

This report indicates that the 4-mile section of 99th Avenue between McDowell Road and the Grand Canal (Bethany Home Road alignment) needs to be widened to accommodate future traffic growth. Dual left turn lanes should be added on 99th Avenue at Thomas Road, Indian School Road, and Camelback Road. The initial phase will cost $14,403,000. The complete build-out will cost $22,400,000, with most of the additional cost being due to the relocation of a canal and some wells.

1.4.3.18 MC-17: Maricopa County Regional Trail System Plan, 2002

This map shows the Maricopa County Regional Trail System Plan.

1.4.3.19 MC-18: Sun Circle Trail

This map shows the Sun Circle Trail.

1.4.3.20 Key Issues for Maricopa County DOT

MCDOT currently has several major transportation infrastructure improvements planned, as identified in the current Five-Year Transportation Improvement Program for Fiscal Year 2003-2007. Major projects programmed for the next five years within the study area include the following:

- Reconstruction/widening of 51st Avenue from existing 2-lane section to 4-lane roadway with raised median, from Baseline Road to Broadway Road, a distance of approximately 2 miles;
- Reconstruction/widening of 51st Avenue from existing 2-lane section to 3-lane roadway from Baseline Road to Dobbins Road, and to a 5-lane roadway from Dobbins Road to Elliot Road, a combined distance of approximately 2 miles;
- Completion of Design Concept Report for future reconstruction of 75th Avenue from existing 2-lane section to 5-lane section with continuous center two-way left-turn lane, from MC-85 (Buckeye Road) to Van Buren Street, a distance of approximately one mile.
- Right-of-way acquisition along 99th Avenue between McDowell Road and Grand Canal (Bethany Home Road alignment), a distance of approximately 4 miles, in order to

accommodate future widening/reconstruction of 99th Avenue to a 5-lane roadway section;

- Reconstruction of Estrella Parkway to a 4-lane roadway section with a center raised median and signalized intersections, between Yuma Road and McDowell Road, a distance of approximately 3 miles;
- Completion of Design Concept Report to evaluate widening of Jackrabbit Trail from existing 2-lane road to 4-lane roadway with center raised median, from Yuma Road to Thomas Road, a distance of approximately 3 miles;
- Completion of Design Concept Report to establish 30% design parameters for eventual reconstruction/widening of MC-85 to 4-lane roadway with raised center median, from 107th Avenue to 75th Avenue, a distance of approximately 4 miles;
- Completion of Design Concept Report to establish 30% design parameters for eventual reconstruction/widening of MC-85 to 4-lane roadway with raised center median, from Airport Road to Jackrabbit Trail, a distance of approximately 1½ miles;
- Reconstruction/widening of MC-85 from existing 2-lane road to 5-lane roadway section, from Cotton Lane to Litchfield Road, a distance of approximately 4½ miles; and
- Reconstruction/widening of MC-85 to 4-lane roadway with center raised median and bicycle lanes, with acquisition of sufficient right-of-way for future expansion to a 6-lane roadway section, from El Mirage Road to 115th Avenue, a distance of approximately one mile.

1.4.4 Flood Control District of Maricopa County (FCDMC)

1.4.4.1 FC-01: Agua Fria Watercourse Master Plan (November 2001)

This study was commissioned to develop a flood protection strategy for the Agua Fria River Corridor in western portion of the Valley of the Sun. Flood control policies identified as part of this master plan are intended to preserve the cultural and archaeological history of the river while at the same time providing for multiple uses within the corridor. The Watercourse Master Plan "outlines specific recommendations relative to floodplain management strategies, recreation opportunities, and habitat preservation for the corridor." This study also identifies potential future trail systems and non-motorized circulation routes within the river corridor. The study area basically includes the Agua Fria River floodplain between Lake Pleasant and the Gila River.

1.4.4.2 FC-02: El Rio Vision (Undated)

This study was commissioned as a long-term planning effort for the Gila River, between the confluence of the Agua Fria River and the SR-85 crossing in the southwest valley. This study is intended to serve as a long-range vision and plan for managing this portion of the river. Five specific goals are outlined for the Gila River in this report, one of which is a focus on multi-use facilities and functions, including an emphasis on recreational, educational, and community needs. This study includes proposed uses along this portion of the Gila River, uses which include development of non-vehicular circulation elements such as river walks and bike paths within the corridor.

1.4.4.3 Key Issues of the FCDMC

Recreational, educational, and community needs must be considered when planning for multi-use facilities and functions within the Agua Fria and Gila River corridors. Potential future trail systems and non-motorized circulation routes are an important part of the transportation network within the corridors.

1.4.5 Maricopa Association of Governments (MAG)

1.4.5.1 MAG-01: MAG Long Range Transportation Plan - 2001 Update (July 2002)

The MAG Long Range Transportation Plan - 2001 Update documents the progress on the long-range transportation plan including any changes made to the overall plan. The plan includes expansion of existing freeways, and construction of new freeways, increasing street lane miles, tripling local bus services, quadrupling of express and commuter bus service, and a 39-mile light rail transit system (MAG Long Range Transportation Plan- 2001 Update EX-1).

1.4.5.2 MAG-02: MAG FY 2003-2007 Transportation Improvement Program (July 2002)

The MAG FY 2003-2007 Transportation Improvement Program is a five- year regional guide for management, preservation, and expansion of public transportation services (MAG FY 2003-2007 Transportation Improvement Program I-1). Parties included in the development of this program are the Maricopa Association of Governments, the Arizona Department of Transportation, and the Regional Public Transportation Authority. Projects within the five-year program are consistent with the MAG Long Range Transportation Plan.

1.4.5.3 MAG-03: MAG ITS Strategic Plan Update (April 2001)

The MAG ITS Strategic Plan Update is a report based on a 14-month study that will be used to guide ITS projects and programs in the MAG region for the next 20 years (MAG ITS Strategic Plan Update 1). It includes the following key elements that were identified or developed:

- ITS solutions to be deployed over the next 20 years to meet regional transportation needs
- System architecture for the region that shows how all of the systems, subsystems, and field elements work together
- Telecommunications Plan to support the candidate technologies
- Implementation Plan for short-, medium-, and long-term ITS deployment
- Operational and Implementation Strategies to outline agency roles, responsibilities, and resources needed to support long-term ITS operations in the region
- ITS Training and Capacity Building (TCB) Plan
- ITS Evaluation Plan (MAG ITS Strategic Plan Update 1).

1.4.5.4 MAG-04: MAG Conformity Analysis (July 2001)

The MAG Conformity Analysis reports on how well the MAG Transportation Improvement Program and the Long Rang Transportation Plan Update meet the requirements of the federal conformity rule. The conformity rule regulates air quality. The three main pollutants regulated are carbon monoxide (CO), ozone, and particulate matter less than ten microns in diameter.

1.4.5.5 MAG-05: Phoenix External Travel Survey - Final Report (February 2001)

The Phoenix External Travel Survey analyzes and maintains the regional travel demand-forecasting model for the Phoenix Metropolitan Area. The report includes a traditional intercept survey consisting of fifteen different survey sites, which included the major highways that leave the area.

- Sample selection
- Survey station layouts
- Permits and insurance
- Traffic count and classification data
- Survey preparation
- Survey conduct and lessons learned
- Data coding
- Trip factoring
- Summaries of expanded survey data

1.4.5.6 MAG-06: Regional Off-Street System Plan: Creating Non-Motorized Paths/Trails in Existing Corridors (February 2001)

The Regional Off-Street System Plan: Creating Non-Motorized Paths/ Trails in Existing Corridors is a plan to guide the development of non-motorized paths in a manner that makes them viable options for daily travel to aid in the reduction of traffic congestion and pollution. The plan contains goals and objectives to guide these efforts.

1.4.5.7 MAG-07: Desert Spaces: An Open Space Plan for the Maricopa Association of Governments (October 1995)

The Desert Spaces: An Opens Space Plan identifies and recommends conservation and management strategies for the natural resources and open spaces that are deemed critical to the quality of life in the Valley (Desert Spaces: An Open Space Plan for the Maricopa Association of Governments). It is intended as a guide to protect those opens spaces and resources.

1.4.5.8 MAG-08: Desert Spaces: Environmentally Sensitive Development Areas (ESDA) Policies & Design Guidelines (June 2000)

These design guidelines and policies are for the "Retention Areas" as defined in the Desert Spaces Plan. They are intended for use as a guide when developing projects built in the "Retention Areas". "Retention Areas" include some 1,419,265 acres of public and private land deemed to have high open space value

1.4.5.9 MAG-09: West Area Transportation Analysis - Final Report (June 1985)

The West Area Transportation Analysis - Final Report is a document detailing a long-term study of the transportation needs of the western portion of the Phoenix Metropolitan Area. The analysis determines if new regional high-capacity roadways were needed to support 20 to 30-year development. It also identifies street and highway needs not existing in other long-range plans. The analysis reports on where right-of-ways should be obtained in order to service the area and estimated costs to obtain them.

1.4.5.10 MAG-10: Pedestrian Area Policies and Design Guidelines (October 1995)

The Pedestrian Area Policies and Design Guidelines is intended to help entities design and develop pedestrian areas and corridors throughout the Maricopa Association of Governments area (Pedestrian Area Policies and Design Guidelines).

1.4.5.11 MAG-11: Central Area Transportation Study (March 1985)

The Central Area Transportation Study was conducted in order to determine the long-range transportation needs for the central portion of the Phoenix Metropolitan Area (this area is considered the portion of Phoenix that lies within the boundaries of the "Outer Loop"). The study is based upon the Transportation System Plan dated January 12, 1983 and projected an assessment of conditions for the Year 2003. This study is divided into three reports: the Executive Summary, Volume I and Volume II.

The Executive Summary contains a summary of the results for each of the sections in Volumes I and II.

Volume I contains the following parts:

- Transportation Plan Analysis
- Hohokam Expressway/East Papago Freeway Connection Analysis
- East Papago Freeway Extension Analysis
- Southwest Loop Corridor Analysis

Volume II contains the following parts:

- Paradise Parkway Alternatives Analysis
- East Phoenix Loop Corridor Analysis
- 32^{nd} Street/Shea Boulevard Traffic Analysis
- Squaw Peak Parkway Extension Analysis

1.4.5.12 MAG-12: MAG Regional Congestion Study Final Report (1998)

The MAG Regional Congestion Study Final Report is a report on the traffic patterns at intersections, intended to update an electronic database containing traffic information relevant to the MAG transportation planning process. The study is intended to evaluate and validate the traffic models used by MAG, to provide information and input for regional transportation planning studies, and to provide information for local traffic studies and design projects. The study also expands the database to cover a larger geographical area for planning purposes.

1.4.5.13 MAG-13: MAG Parking Cost Study – Final Report (1996)

The Maricopa Association of Governments Parking Cost Study analyzes the cost associated with hourly and daily parking. This information is used to determine the percent of home-based-work trips that are travel by transit for one person auto and two, three, or four person carpools (Maricopa Association of Governments Parking Cost Study – Final Report 1996 1). This study updates a previous study performed in 1984.

1.4.5.14 MAG-14: 1993 Study of Travel Speed and Delay in the MAG Region – Final Report (March 1995)

The 1993 Study of Travel Speed and Delay in the MAG Region is an analysis of field measured travel speeds and delays for incorporation in the regional transportation model, to aid in ensuring the conformity of transportation plans to federal and state air quality implementation plans (1993 Study of Travel Speed and Delay in the MAG Region ES-1).

1.4.5.15 MAG-15: MAG Bottleneck Study (Ongoing)

This study is currently being completed for the Maricopa Association of Governments. The focus of the bottleneck study is the identification and evaluation of major points of congestion along freeway facilities in the metropolitan area. This study is currently ongoing; no timetable for completion has been identified at this time.

1.4.5.16 MAG-16: West Valley Rivers: Draft Preliminary Plan, West Valley Multi-modal Transportation Corridors Study (April 2001)

This study identifies a series of proposed improvements to be completed along the New River and lower Agua Fria River in the western Phoenix metropolitan area. This plan identifies a number of improvements to the 42-mile river corridor that will accommodate a series of non-motorized trails, open space for linear parks, and other access roads and other public facilities that are critical to the proposed trail system.

1.4.5.17 MAG-17: MAG Park-and-Ride Study Executive Summary (January 2001)

This study recommends ten specific park-and-ride lots that should be built within the next five years. In addition, ten other sites have been identified for long-term deployment. These park-and-ride lots are expected to attract more participants to carpooling, vanpooling, and the regional bus system. This study also discusses the design guidelines, operations, management, and implementation plans for the system of park-and-ride lots.

1.4.5.18 MAG-18: Roads of Regional Significance Evaluation (January 1996)

This study assesses the feasibility of improving numerous existing arterial roads to create a 542-mile network of streets with a higher design standard. This network will help to alleviate peak hour congestion and increase mobility throughout the region. The total cost of constructing this Roads of Regional Significance network is estimated to be near $2 billion. HURF funds and an increase in gas tax are expected to generate the needed revenue.

1.4.5.19 MAG-17: MAG Regional Bicycle Plan, 1999 (MAP)

1.4.5.20 MAG-18: MAG Pedestrian Plan 2000, 1999 (MAP)

1.4.5.21 MAG-19: West Valley Multi-Modal Transportation Corridor Master Plan, 2001 (MAP)

1.4.5.22 Key Issues of MAG

MAG aids the various member agencies in identifying and resolving regional transportation matters such as congestion, parking, pollution, transit, ITS, and non-motorized travel.

1.4.6 City of Litchfield Park

1.4.6.1 LP-00: City of Litchfield Park General Plan Update (October 2001)

The Litchfield Park General Plan Update includes new sections dealing with housing, infill development, open space, environmental planning, water resources, growth areas, and costs of development. These new sections, together with those previously in the General Plan of community character, land use, circulation, and smart growth, define the City's goals and strategies for the future.

1.4.6.2 Key Issues in Litchfield Park

The City of Litchfield Park envisions strategically placing roadway improvements so as to avoid automobile traffic domination by promoting alternate modes of transportation. The only transportation infrastructure improvements currently planned by the City are construction of two (2) pedestrian grade-separated crossings on Litchfield Road, one just north of Wigwam Boulevard and the second just north of Camelback Road.

1.4.7 City of Tolleson

1.4.7.1 TO-00: Tolleson General Plan (November 1996)

The Tolleson General Plan is a statement of the City's goals and strategies for its future (Tolleson General Plan 1). It also outlines areas of circulation, economic development, community facilities, and land use as well as goals, policies and strategies to deal with these areas (Tolleson General Plan 1).

1.4.7.2 TO-01: Van Buren Traffic Calming Study

This study documents the desire of the Town of Tolleson to slow traffic and discourage truck through their downtown area, which includes schools and small retail. Traffic calming elements such as pedestrian crossing tables and bulbouts at intersections are used. Completed 2001.

1.4.7.3 Key Issues in Tolleson

The Tolleson General Plan identifies the need to improve the transportation network to accommodate growth while still maintaining the "small town" feel. These two seemingly conflicting goals can be accomplished through proper planning that will increase mobility, revitalize community character, and promote alternative modes of transportation.

According to City of Tolleson staff, the primary transportation infrastructure projects planned by the City in coming years are pedestrian-related improvements to Van Buren Street and 91st Avenue. While not yet designed, potential improvements would include preservation of existing landscaping, as well as construction of raised sidewalks to promote pedestrian safety along these two major corridors, as outlined in the Van Buren Traffic Calming Study. Construction of grade-separated pedestrian crossings over 91st Avenue and/or Van Buren Street might also be included as part of these improvements.

1.4.8 City of Avondale

1.4.8.1 AV-00: Avondale General Plan- City Council Final Draft (January 2002)

The Avondale General Plan is a document intended to provide the City with an update on how and what changes have occurred in Avondale since the 1990 Plan. It also provides guidance for future growth within the City of Avondale.

1.4.8.2 AV-01: Downtown Design Guidelines and Pedestrian Enhancement

This completion of Avondale's Old Town Design Guidelines on Western Avenue between Central and Dysart identify the area as "pedestrian friendly".

1.4.8.3 Key Issues in Avondale.

The Avondale General Plan recommends a safe, multimodal transportation network that supports land use planning and facilitates future growth. According to City of Avondale staff, completion of the arterial street grid system and improvement of existing roadways to ultimately planned half-street cross-sections will progress as development occurs. The City does have several transportation infrastructure improvements currently planned, however. Major City transportation infrastructure improvement projects scheduled for completion in the next five years include the following:

- Reconstruction/widening of 115th Avenue from the existing 2-lane section to a 6-lane section with a center raised median, from Interstate 10 south to Buckeye Road (MC-85), a distance of approximately 1½ miles (FY 02-03);
- Construction of traffic signal interconnection for traffic signals at various locations within the City of Avondale (FY 04-05);
- Reconstruction/widening of 115th Avenue from the existing 2-lane section to a 6-lane section with a center raised median, from Interstate 10 north to McDowell Road, a distance of approximately ¼ mile (FY 05-06); and
- Construction of intelligent transportation system (ITS) improvements along the Dysart Road corridor, from Van Buren Street to Indian School Road, a distance of approximately 3 miles.

The City of Avondale has also identified several long-term improvements (10 to 25 years) that are in various stages of planning and/or concept development. Long-term improvements identified by the City of Avondale include the following:

- Construction of limited-access freeway connection between planned South Mountain Freeway and the Loop 303, potentially located along the Southern Road or Broadway Road corridors;
- Reconstruction/widening of Lower Buckeye Road through the City of Avondale; and
- Reconstruction/widening of Broadway Road through the City of Avondale.

1.4.9 Town of Buckeye

1.4.9.1 BU-00: Town of Buckeye General Development 1989-2000 (September 1989)

The Buckeye General Plan outlines land use policies, goals, and objectives for the Town. These guidelines form the general framework of growth management for the Town and are intended for use in an effort to keep future development in harmony with land use strategies adopted by municipal leaders.

1.4.9.2 BU-01: Town of Buckeye General Development Plan Update- Draft: Growing Smarter Plus Elements (April 2001)

The Town of Buckeye General Development Plan Update - Draft: Growing Smarter Plus Elements is a plan to allow the town to accommodate growth. It contains the overall vision for the town and goals, objectives and policies to help create that vision. This report serves as an update to the Town's previously-adopted general plan, with specific focus on addressing issues associated with the state-mandated Growing Smarter Initiative.

1.4.9.3 BU-02: Tartesso Master-Planned Community - Traffic Analysis (May 2000)

Tartesso is a proposed master-planned community covering approximately 3,351 acres and containing approximately 141 acres of employment-related centers, 47 acres of commercial core development, 33.5 acres of neighborhood retail development, approximately 11,030 single-family residential dwelling units, and various miscellaneous parcels. The construction of Tartesso will be north of I-10 and east of Sun Valley Parkway (Traffic Analysis- Tartesso Master-Planned Community 1). This report contains a summary of existing transportation infrastructure in the area, projected traffic volumes associated with the proposed development, and recommendations for transportation improvements needed to serve the proposed development.

1.4.9.4 BU-03: Douglas Ranch Master-Planned Community- Master Circulation Study (June 2001)

The Douglas Ranch Master-Planned Community- Master Circulation Study analyses and quantifies future transportation demands as a result of the proposed development. The study assumes that the master-planned community will eventually be annexed into the town of Buckeye and is prepared in connection to the approval process required by the Town of Buckeye. The study includes an overview of the proposed development including intensity of land use and access provisions; an outline of existing conditions in the vicinity of the site; expected traffic generated by the development, including trip distribution and traffic assignment for individual parcels; recommendations for on-site planning and improvements; and review of off-site improvements needed to accommodate this and other developments in the area (Douglas Ranch Master Planned Community- Master Circulation Study 1).

1.4.9.5 BU-04: Sun Valley South Development- Traffic Analysis (September 2000)

The Sun Valley South Development- Traffic Analysis is a study of the proposed Sun Valley South development that includes an overview of the proposed development; an outline of existing conditions; a summary of likely future conditions; expected traffic generated by the development; recommendations for on-site planning and improvements; and review of off-site improvements needed to accommodate this and other developments in the area (Sun Valley South Development- Traffic Analysis 1).

1.4.9.6 BU-05: Tartesso North Master-Planned Community- Traffic Analysis (October 2000)

Tartesso North is a proposed master-planned community covering approximately 4,500 acres, including approximately 2,287,000 square feet of employment-related centers, 2,553,000 square feet of retail/commercial development, approximately 12,641 residential dwelling units, and various miscellaneous parcels. Tartesso North will be constructed along the Sun Valley Parkway between Thomas Road and Bethany Home Road. This report contains a summary of existing transportation infrastructure in the area, projected traffic volumes associated with the proposed development, and recommendations for transportation improvements needed to serve the proposed development.

1.4.9.7 BU-06: Roston/Buckeye- Traffic Analysis (April 2000)

Roston/Buckeye is a proposed mixed-use development covering approximately 1,114 acres, including 40 acres of employment uses, 30 acres of retail/commercial uses, 4,500 residential dwelling units, a regional sports center, and 2 schools. Roston/Buckeye will be constructed along SR-85 between Interstate 10 and Broadway Road. This report contains a summary of existing transportation infrastructure in the area, projected traffic volumes associated with the proposed development, and recommendations for transportation improvements needed to serve the proposed development.

1.4.9.8 BU-07: Sundance Community Master Plan (CMP) Development- Traffic Impact Analysis (September 2000)

The Sundance Community is a proposed mixed-use development covering approximately 2,015 acres, including a mix of residential, commercial, employment, school, and recreational land uses. Sundance will be constructed south of Interstate 10 between Miller Road and Jackrabbit Trail. This report contains a summary of existing transportation infrastructure in the area, projected traffic volumes associated with the proposed development, and recommendations for transportation improvements needed to serve the proposed development.

1.4.9.9 Key Issues

The Town of Buckeye has numerous large, master-planned communities under development. Each development must contribute positively to the transportation network in order to properly accommodate pedestrians, bicycles, automobiles, trucks, and other forms of transportation. Development adjacent to I-10 is of special interest and concern for the Town.

According to Town of Buckeye staff, completion of the arterial street grid system and improvement of existing roadways to ultimately planned half-street cross-sections will progress as development occurs. Several roadway projects, including improvements to Watson Road and Airport Road, will be funded by private development partners as part of these relatively large master-planned communities. A new traffic interchange along Interstate 10 at the Wilson Avenue alignment is also planned, and will be funded in large part by private development. Wilson Avenue is located approximately two (2) miles west of SR-85. Several new all-weather crossings of the Hassayampa River will also be constructed as part of planned development in the Sun Valley area of Buckeye. Within the study area, two (2) new crossings of the Hassayampa River are planned, at Camelback Road and the Tonopah-Salome Highway. According to Town staff, no new crossings of the Gila River are planned within Buckeye.

While a large portion of the transportation infrastructure in Buckeye is expected to be constructed in conjunction with private development projects, the Town does have several transportation infrastructure improvements currently planned. Transportation projects planned or proposed by the Town in various stages of planning or concept development include the following:

- Extension of Watson Road from existing terminus at Southern Avenue south to MC-85 (Baseline Road), a distance of approximately 1 mile, including construction of new crossings at existing Union Pacific railroad line and the Buckeye Canal;
- Acquisition of 66-foot right-of-way adjacent to existing Luke Air Force Base Auxiliary Airfield for future extension of Airport Road from Yuma Road north to Roosevelt Street alignment, a distance of approximately 1½ miles;
- Realignment of Dean Road to shift roadway alignment ¼ mile east of section line, from a point approximately ½ mile north of Lower Buckeye Road to a point approximately ½ mile north of Yuma Road, a distance of approximately 1 mile, in order to avoid large wash at the Yuma Road/Dean Road intersection.

1.4.10 Town of Gila Bend

1.4.10.1 GB-00: Town of Gila Bend Master Plan Update (September 1996)

The Gila Bend Master Plan Update identifies goals, objectives, policies and strategies for providing quality development in the community. The Master Plan Update consists of three plan elements; Land Use, Circulation and Public Facilities and Services. The Land Use Element also includes economic development strategies for the community. Combined these elements will help guide future growth and development in the town and provide a framework for day-to-day decisions by local officials and staff.

1.4.10.2 GB-01: Central Pedestrian Way

This project provided connections between residents and destinations such and a school, post office, library, etc. along a busy state highway.

1.4.10.3 Key Issues in Gila Bend

The Gila Bend Master Plan Update conveys the desire of the Town to create a safe, convenient and efficient transportation network in Gila Bend that allows for appropriate access to all land uses while still protecting the integrity of both residential and non-residential areas.

According to partial responses received from City staff, ongoing, planned, and proposed development projects include:

- Diamond Lake Ranch
- Gila Bend Airpark
- Gila Bend Estates
- Henry's RV Park
- Palo Verde Heights/Current Place
- Panda Gila River Power Plant
- Power Development Power Plant

1.4.11 RPTA - Valley Metro

1.4.11.1 RPTA-01: Valley Metro Bus Book (January 2002)

The Valley Metro Bus Book contains information regarding the bus routes, schedules, and times that services are provided throughout metropolitan Phoenix, including the SWATS area. This information is summarized in Working Paper 3.

1.4.11.2 RPTA-02: Short-Range Transit Report (2001 Annual Report)

The Short-Range Transit Report details the status of scheduled transit service and evaluates how well the system has performed (Short-Range Transit Report 1). The report also identifies service goals and standards; details and illustrates the Capital Improvement Program and the Transit Improvement Program projects (Short-Range Transit Report 1).

1.4.11.3 RPTA-03: Regional Transit System Study (Ongoing)

According to RPTA staff, this study is currently ongoing, with an expected completion date of December 2002.

1.4.11.4 Key Issues

The RPTA hopes to attract greater ridership by improving the current system through additional routes, park-and-ride lots, and upgraded facilities.

1.4.12 Arizona Department of Transportation

1.4.12.1 ADOT-01: I-10 West Corridor Profile Study (Ongoing)

This study evaluates potential commuter rail service along the I-10 corridor. Is this all the profile study evaluates. Service would operate during AM and PM peak hours on the existing Union Pacific Railroad tracks within the corridor. Proposed commuter rail service would run between downtown Phoenix and Buckeye, and would be directional in nature, with eastbound service to Phoenix in the mornings and westbound service to Buckeye in the evenings. This study is currently ongoing. No date for completion has been specified at this time.

1.4.12.2 Key Issues for ADOT

The potential commuter rail service along I-10 is still being evaluated. The ability to attract ridership is an important issue of this study.

ADOT is currently proceeding with design efforts for improvements to SR-85 between Interstate 10 near Buckeye and Interstate 8 near Gila Bend. This highway will ultimately be reconstructed as a limited-access freeway facility with grade-separated interchanges. The reconstructed mainline is expected to provide two travel lanes in each direction.

1.5 Key Transportation Issues

A review of the studies, plans, and reports obtained as part of the data collection task was completed in an effort to identify key transportation issues, including existing transportation network deficiencies, planned and proposed improvements, and other elements. Transportation issues addressed in these reports can generally be grouped into four different categories, including the following:

- Evaluation of limited-access regional transportation facilities;
- Completion of the arterial grid system;
- Identification of needs for new freeway interchanges and bridges; and
- Consideration of expanded public transportation within the study area.

A brief overview of each of these issues and a discussion of key points are provided in subsequent sections of this report.

1.5.1 Regional Roadway Network

Improvements to the regional roadway network are primarily focused on limited-access facilities, such as freeways and expressways. Issues identified through the data collection efforts focus on both expanding capacity of existing freeways and development of new regional freeways and expressways. Major issues include the following:

- Potential expansion of I-10 to 6 lanes from Avondale west to Buckeye;
- Maintaining previously-acquired right-of-way for Loop 303 (Estrella Freeway) between the Gila River and Grand Avenue, and ultimate construction of limited-access freeway facility along this alignment;
- Possible expansion and upgrade of MC-85 to a major arterial or limited-access facility paralleling Interstate 10; and
- Future expansion of SR-85 to a limited-access freeway facility between Interstate 10 and Interstate 8.

Continued growth and development in the study area is driving the need for additional freeway access between Phoenix and the southwest valley. Ongoing or planned developments in Goodyear, Avondale, Buckeye and other locations is projected to substantially increase travel demand along the I-10 corridor. This may result in the need for additional freeway capacity along I-10. To accommodate this demand, expansion of the freeway to three lanes in each direction may be required between Dysart Road in Avondale, where I-10 currently narrows to four lanes, and the Sun Valley area in Buckeye.

Loop 303 (Estrella Freeway) was originally planned as a limited-access facility between I-10 and I-17 in the west valley, roughly along the Cotton Lane alignment in the southwest valley. Loop 303 was recently removed from ADOT's long-range transportation plan due to a lack of funding. However, Maricopa County, Goodyear, and several other jurisdictions are attempting to preserve the right-of-way for Loop 303 between I-10 and US-60 in an effort to develop a future north-south expressway. This potential expressway would serve areas between US-60 and the Gila River, also potentially serving the large Estrella Mountain Ranch development in Goodyear south of the Gila River.

MC-85 is a county facility that parallels I-10 and provides an alternate east-west roadway within the study area. This roadway is expected to become more important to regional transportation as more growth occurs in the southwest valley. Specific standards with regards to the ultimate functional classification, cross-section, and access control along this facility will need to be developed.

SR-85 currently provides important access between Interstate 10 in Buckeye and Interstate 8 in Gila Bend, and is an important link between the Phoenix metropolitan area and San Diego, California and the Mexican coast. Plans have been developed for expansion of this roadway to a multi-lane, limited access facility between I-10 and I-8. This project is currently in the design phase.

1.5.2 Arterial Grid System

Major arterial streets within the Phoenix metropolitan area have been generally developed along section lines, resulting in a north-south, east-west grid system. This grid system is generally maintained and expanded as development occurs. However, the arterial grid system is currently incomplete in the southwest valley.

In some instances, planned development within the study area has created or is expected to create discontinuities in the grid system, as continuous section line roadways are not maintained. The Palm Valley Master-Planned Community in Goodyear is one example of a development where some deviation from the arterial grid system has been permitted.

General plans for many of the jurisdictions within the study area include projected functional classification for the arterial grid system. As development occurs, it currently is largely the responsibility of each community to preserve, expand, and complete the arterial grid system.

1.5.3 Interchanges and Bridges

Other issues identified through the data collection process include the need for additional interchange connections to Interstate 10 within the study area, as well as the need for additional all-weather crossings over the Salt River, Agua Fria River, and Gila River within the study area.

Additional access to I-10 will likely be needed to accommodate continued growth and development in the study area. Locations along I-10 where new interchanges have been programmed, planned, or proposed include the following:

- Bullard Avenue
- Citrus Road
- Airport Road
- Watson Road
- Wilson Avenue
- Bruner Road
- Johnson Road

Many of the river crossings in the southwest valley have been constructed as low-water crossings. These crossings are only accessible during periods of low river flows, and can become impassable as rivers rise as a result of additional rainfall. When these crossings are closed, substantial disruption of the transportation network is created. Construction of all-weather crossings (bridges) over major rivers and channels would improve overall access and circulation in the study area. Development of additional all-weather river crossings over the Gila River, particularly serving the Estrella Mountain Ranch development and other areas of Goodyear, has been identified as an important issue. The need for additional all-weather crossings over the Salt River and Agua Fria River upstream of their confluence with the Gila River has also been identified as necessary to serve the study area.

1.5.4 Public Transportation

The importance of alternative transportation modes is expected to increase along with population in the study area. To serve existing public transportation needs and accommodate growing demand, transit improvements to be evaluated include the following:

- Expansion of existing bus service in the southwest valley;
- Development of express bus service between the southwest valley (Buckeye, Goodyear) and Phoenix;

- Construction of additional park and ride lots in the study area; and
- Development of commuter rail service between Buckeye and Phoenix.

Additional bus service in the southwest valley would make public transportation available to a greater portion of the population in growing area communities, such as Goodyear, Avondale, Buckeye, and other locations. Development of express bus service between Buckeye and downtown Phoenix could provide peak-hour commuter service along Interstate 10 using existing HOV lanes. In conjunction with express bus service, additional park and ride facilities might be developed within the study area. There are currently three park-and-ride facilities in the study area. Proposed locations for possible new park and ride lots include the following:

- I-10 and Jackrabbit Trail (Buckeye)
- I-10 and Litchfield Road (Goodyear)

Establishment of commuter rail service between Buckeye and Phoenix has also been identified as a method of improving public transportation in the study area. Potential commuter rail service might be operated using Union Pacific Railroad (UPRR) tracks along the I-10 corridor. As many as five commuter stations could also be established as part of a commuter rail system, one each in Buckeye, Goodyear, and Tolleson, as well as two in central Phoenix (State Capital and Bank One Ballpark).

2 Socioeconomic Characteristics and Forecasts

The purpose of this element is to examine existing development trends and policies affecting land use, growth and development within the limits of the Southwest Area Transportation Study (SWATS) and prepare future year forecasts as inputs to the area travel demand computer model. The model is used to estimate existing and future trip generation and traffic volumes for area roadways and subsequently to evaluate future capacity improvements to the transportation system. Additionally this element identifies environmental justice and Title VI named population groups within the study area for later consideration in the evaluation of transportation improvement options.

This chapter was developed as a Working Paper (WP) and contains data and information that is continuously updated, some of which may have changed or may have been superseded by the final Regional Transportation Plan (RTP). Information was current at the time of initial WP publication.

2.1 Methodology for Determining Future Year Forecasts

This section addresses existing and future conditions that are closely associated with travel demand and trip generation characteristics of the southwest study area. The demographic variables examined within each traffic analysis zone (TAZ) and throughout the study area include:

- Resident Population in Households;
- Resident Population in Group Quarters;
- Transient Population;
- Seasonal Population;
- Resident Households (Occupied Dwelling Units);
- Group Quarter Households;
- Transient Households;
- Seasonal Households;
- Other Employment;
- Public Employment;
- Retail Employment;
- Office Employment;
- Industrial Employment;
- Households with <$15K Income;
- Households with $15 - $24, 999K Income;
- Households with $25 – $34, 999K Income;
- Households with $35 - $49,999K Income;

- Households with $50,000K + Income;
- Total Area (square miles);
- Office Area (square miles);
- Post High School Enrollment;
- Retirement Zone Flag;
- Sky Harbor Enplanements;
- Dwelling Units < 10 Years Old;
- Dwelling Units 10-19 Years Old;
- Dwelling Units 20-29 Years Old;
- Dwelling Units 30 + Years Old;
- Single Family Households; and,
- Multi Family Households.

Estimates for these demographic variables were developed at the TAZ level for the Year 2000 and for two horizon years, 2020 and 2030. The southwest study area includes 302 TAZs, 112 of which overlap with the northwest study area boundary, and includes the communities of Goodyear, Tolleson, Litchfield Park, Gila Bend, Avondale and a portion of Buckeye, Phoenix and Glendale as well unincorporated portions of Maricopa County. Census tract level data from 1990 and 2000 were utilized in the estimation process and are presented in Appendix II.

2.2 Year 2000 Regional Trip Generation File

A complete trip generation file for Base Year 2000 was provided by the Maricopa Association of Governments (MAG). This file included the planning variables for each TAZ, which was based on census information and other data collected by MAG to be consistent with the 2000 Census. This file was reviewed as part of this effort and notations were made where adjustments may be necessary.

2.3 Alternative Scenarios

As displayed in Tables 2-1 and 2-2, a scenario of population and employment forecasts was developed for the RTP. Although this scenario is currently in draft form and is subject to change, it is the best available set of projections. As shown population and employment in the Southwest Study Area is expected to equal, in the Year 2030, approximately 1.4 million and 800,000 respectively. Figures 2-1 and 2-2 graphically display total population and employment for the base year and each alternative scenario. Figure 2-3 and 2-4 show the population and employment densities in each of the census tracts in the study area for the base year and each alternative scenario.

Table 2-1*
Total Population, Alternative Scenarios

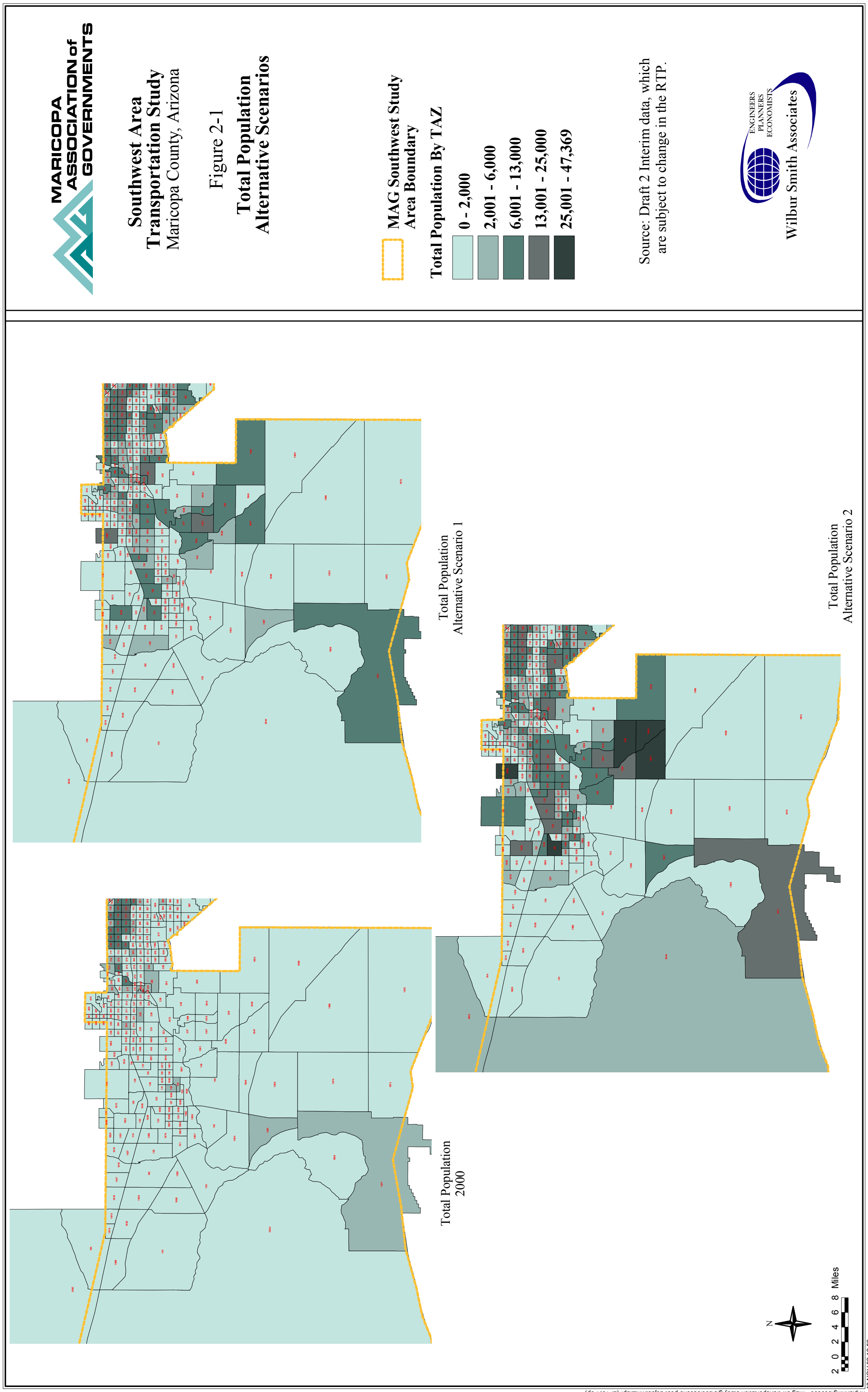
MPA	Total Population Year 2000	Total Population Alternative Scenario 1 Year 2020	Total Population Alternative Scenario 2 Year 2030
County (unincorporated areas)	7,407	20,244	39,696
Buckeye**	16,513	149,578	377,438
Avondale	37,827	103,457	114,374
Gila Bend	2,264	6,004	17,979
Glendale**	2,394	5,380	5,381
Litchfield Park	3,831	14,095	14,573
Tolleson	4,998	6,314	6,338
Goodyear	21,246	162,623	334,652
Phoenix**	289,503	464,403	524,347
Total	**385,983**	**932,098**	**1,434,778**

*Data are continuously updated and may have changed during the RTP process.
**Reflects population only within the southwest study area boundaries. Includes TAZs 2042 and 2044.

Table 2-2*
Total Employment, Alternative Scenarios

MPA	Total Employment Year 2000	Total Employment Alternative Scenario 1 Year 2020	Total Employment Alternative Scenario 2 Year 2030
County (unincorporated	6,548	13,322	20,652
Buckeye**	7,006	69,151	172,752
Avondale	9,041	54,644	64,229
Gila Bend	1,191	4,424	12,165
Glendale**	10,807	16,694	20,520
Litchfield Park	1,178	5,059	4,703
Tolleson	12,777	24,753	31,973
Goodyear	13,895	115,434	185,722
Phoenix**	119,088	233,287	309,328
Total	**181,531**	**536,768**	**822,044**

*Data are continuously updated and may have changed during the RTP process.
**Reflects employment only within the southwest study area boundaries. Includes TAZs 2042 and 2044


MARICOPA ASSOCIATION of GOVERNMENTS
Southwest Area Transportation Study
Maricopa County, Arizona
Figure 2-1
Total Population Alternative Scenarios
MAG Southwest Study Area Boundary
Total Population By TAZ
0 - 2,000
2,001 - 6,000
6,001 - 13,000
13,001 - 25,000
25,001 - 47,369
Source: Draft 2 Interim data, which are subject to change in the RTP.
ENGINEERS PLANNERS ECONOMISTS
Wilbur Smith Associates
Total Population Alternative Scenario 1
Total Population Alternative Scenario 2
Total Population 2000
N
2 0 2 4 6 8 Miles
13 NOV 02 12:52

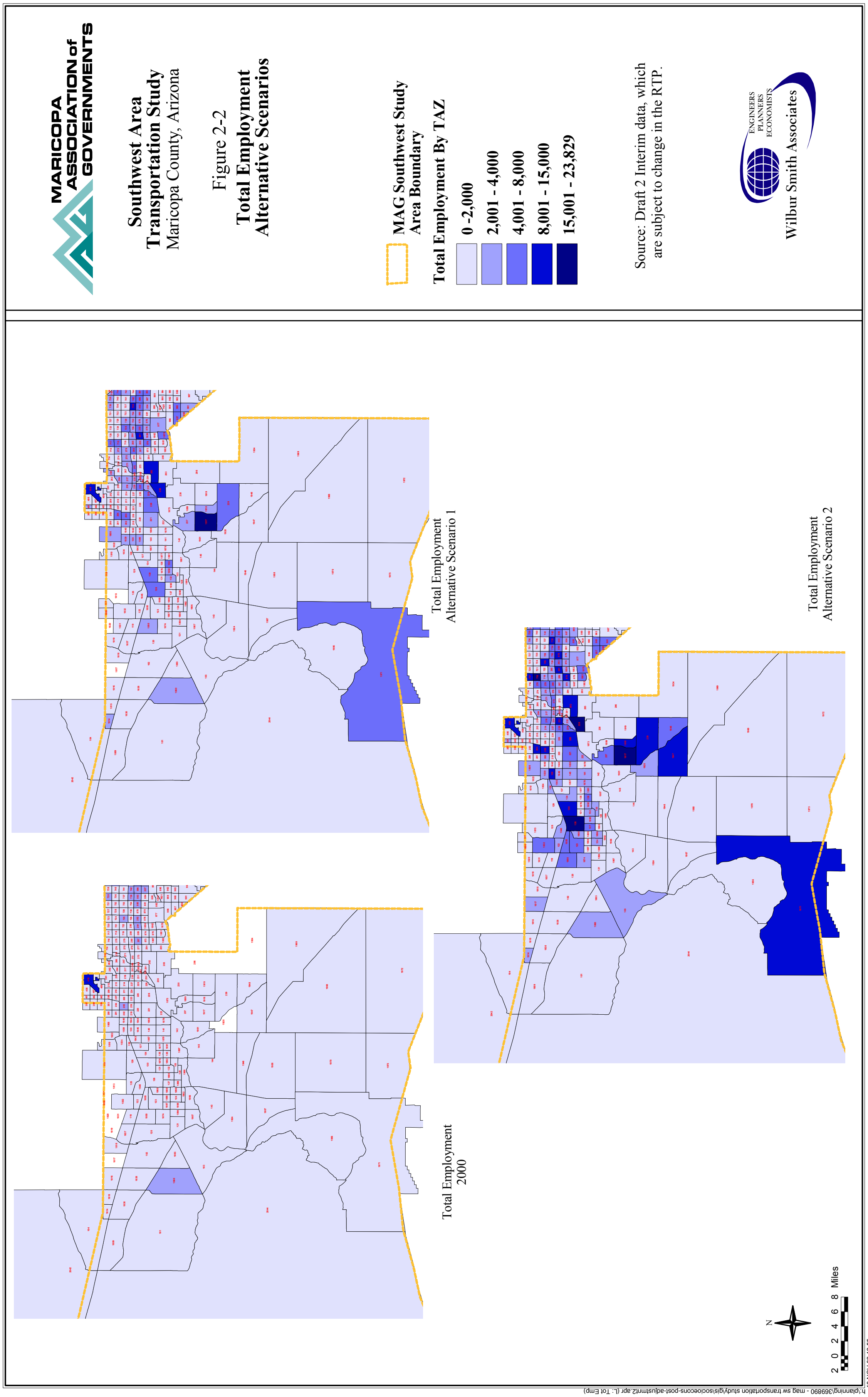
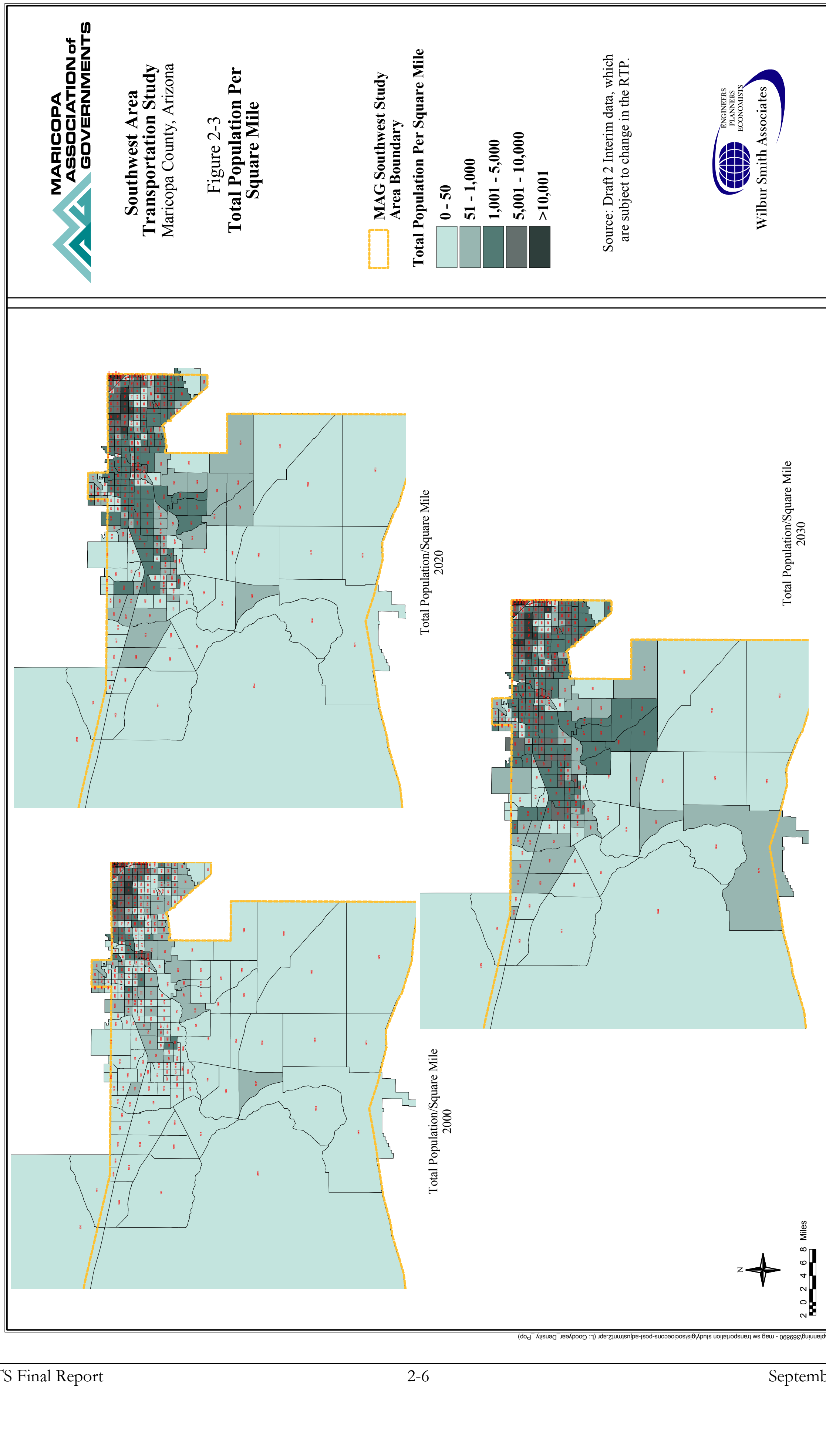
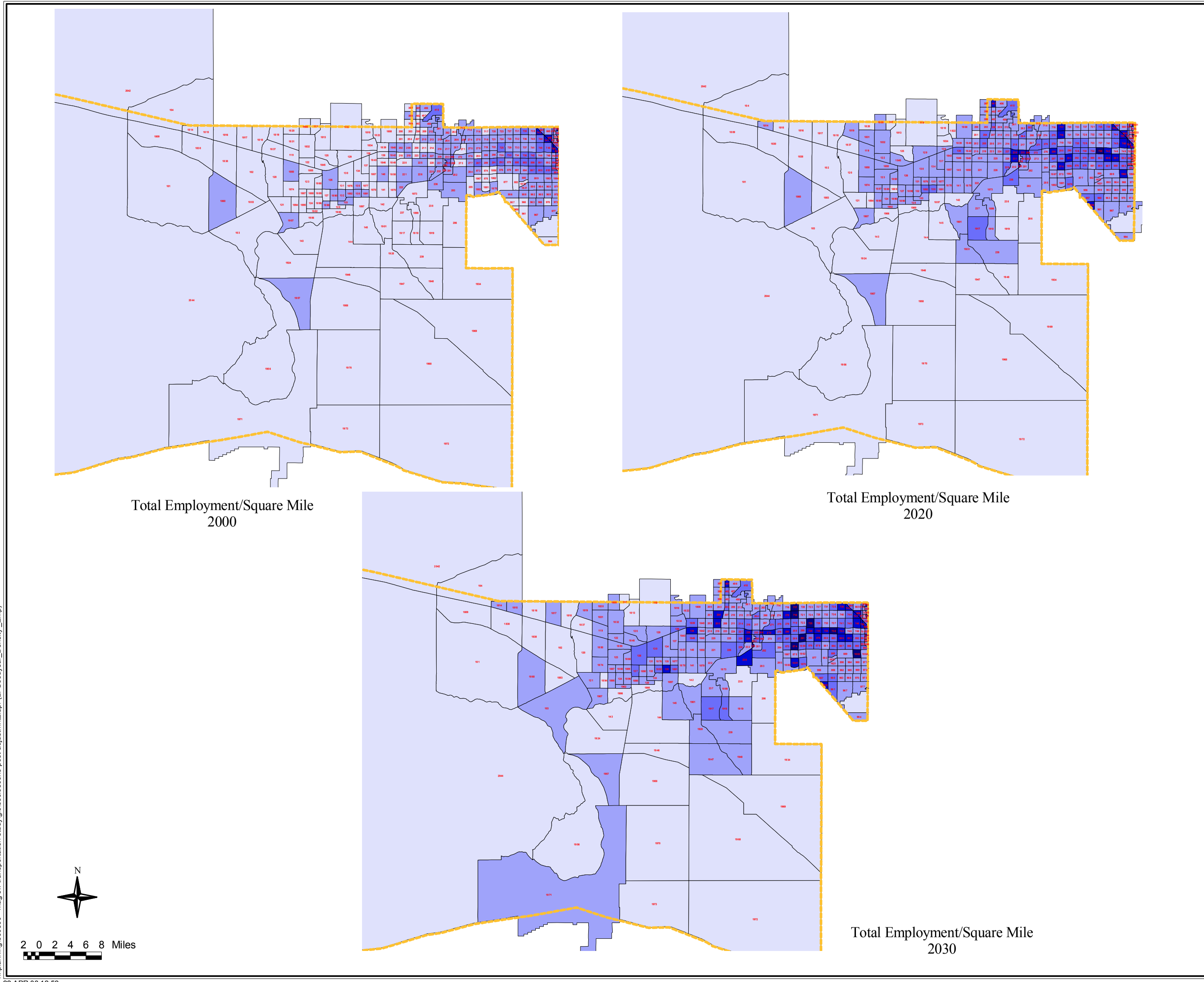


Figure 2-2
Total Employment
Alternative Scenarios



MARICOPA ASSOCIATION of GOVERNMENTS
Southwest Area Transportation Study
Maricopa County, Arizona
Figure 2-3
Total Population Per Square Mile
MAG Southwest Study Area Boundary
Total Population Per Square Mile
0 - 50
51 - 1,000
1,001 - 5,000
5,001 - 10,000
>10,001
Source: Draft 2 Interim data, which are subject to change in the RTP.
ENGINEERS PLANNERS ECONOMISTS
Wilbur Smith Associates
Total Population/Square Mile 2000
Total Population/Square Mile 2020
Total Population/Square Mile 2030
N
2 0 2 4 6 8 Miles
22 APR 03 12:52



MARICOPA ASSOCIATION of GOVERNMENTS

Southwest Area Transportation Study
Maricopa County, Arizona

Figure 2-4
Total Employment Per Square Mile

Alternative Scenario

MAG Southwest Study Area Boundary

Total Employment Per Square Mile

0 - 50
51 - 2,000
2,001 - 5,000
5,001 - 10,000
>10,001

Source: Draft 2 Interim data, which are subject to change in the RTP.

ENGINEERS PLANNERS ECONOMISTS
Wilbur Smith Associates

2.4 Summary of General Plans and Land Use Assumptions

This section summarizes local government plans, development trends and policies affecting land use, growth and development in the southwest study area. Policies related to land use, annexation, available infrastructure and growth influence the pattern and timing of land development and as a result affect population and employment forecasts. This information was obtained from each community's general plan and was taken into account in forecasting socioeconomic variables, including population and employment to the TAZ level. Consistency between the general plans and scenarios was reviewed and adjustments were made to the scenarios as necessary. The land use plans were also used in determining build out and the extent and type of future development in the local communities.

This section also documents any revisions to the general plans and summarizes land use observations and assumptions for each MPA based on meetings held with local communities and input received from them on existing and future development trends. These land use policies and development trends will serve as important considerations in identifying future regional transportation needs and in developing the Southwest Area Transportation Study. General plans were obtained for the communities of Avondale, Buckeye, Goodyear, Litchfield Park, Gila Bend and Tolleson. Plans prepared by the Phoenix Planning Department for the Villages of Estrella and Laveen are also summarized.

Some of the plans and land use assumptions may have been updated since publication of this WP.

2.5 Avondale General Plan

The City of Avondale is located in the southwest corner of the Phoenix Metropolitan Area. The city is bounded by Goodyear to the west, Litchfield Park to the north and Tolleson and Phoenix to the east. I-10 traverses the northern portion of the City and the Gila River bisects the community from east to west. Major land uses in the City include the Phoenix International Raceway and Estrella Mountain Regional Park located south of the Gila River. Over the past 10 years, Avondale has captured a significant amount of the residential growth that has occurred in the Phoenix Metropolitan Area, as its population has increased from 16,169 persons in 1990 to 35,883 persons in 2000, an increase of 122 percent. I-10, which was completed a decade ago, has provided improved access in the region and has resulted in increased commercial activity along this corridor.

2.5.1 Land Use

There are numerous policies and development trends affecting land use and growth in Avondale as identified in the City's General Plan (Final Draft, January 15, 2002). With increased growth and development over the past decade the City is changing from an agrarian to a suburban community. Avondale's general plan has identified the need for additional residential and commercial areas to accommodate future growth. This is reflected in the land use plan, which identifies increased amounts of land for residential development, employment and retail uses. Medium density residential is the largest land use category, representing 40 percent of total land uses in the 2001 general plan compared to agriculture, which was the largest land use category in the 1990 general plan.

In order to accommodate future growth the plan identified the following policies and objectives related to future development in the community. These policies will affect the development pattern in the community and influence future population and employment potential.

- Identify additional land for multi-family housing and ensure that multi-family lots as a percent of total residential development in Avondale is comparable to the percentage of multi family as a percent of total development countywide.
- Require that at least 25 percent of all housing in the south core be at a net density of 10 dwelling units per acre or more.
- Set aside large areas of low-density residential property to encourage high-end development.
- Develop a Specific Plan for the Avondale Planning Area south of the Estrella Mountains by the year 2005 to accommodate future residential housing demand.
- Promote infill development. The plan identifies commercial and residential commercial districts.
- Reserve adequate land to accommodate commercial and future light industrial development, along freeway corridors, to meet a job to population ratio of one job for every two residents

2.5.2 Public Facilities

With regards to facilities and services the city will continue to evaluate its services and facilities to meet the demand for continued growth and development. Policies related to community facilities and services include:

- Require the City and developers to grow within the capacity of available water supplies through evaluating new development needs against water availability and wastewater treatment plant capacity.
- Provide adequate public services and facilities concurrent with new development through requiring new development to provide its fair share of required services and infrastructure.

2.5.3 Land Use Assumptions and Observations

- Areas north of I-10 are currently actively developing, estimated to be approaching full build out by 2020.
- Land adjacent to I-10, largely non residential development, from 99th Avenue to 115th Avenue estimated to be at full build out by 2020.
- West of the Agua Fria River between Van Buren and Lower Buckeye, estimated to be near build out by 2020.
- Area from Van Buren to Lower Buckeye, east of the Agua Fria River, estimated near full build out by 2010.
- Area between lower Buckeye and Broadway being provided utility infrastructure within the next three years, estimated to be at full build out by 2020.

- Area from Broadway south to Gila River is constrained with floodplain and other natural features. This area is estimated to be in the 50 to 80 percent build out by 2020.
- Area to the south of the Estrella Mount Regional Park is anticipated to develop largely beyond the year 2020 due to infrastructure constraints.
- Parcel at the southeast corner of 115th Avenue and Thomas, likely to transition from nonresidential to residential.
- Parcel on the north side of Van Buren 1 ½ mile west of 115th Avenue is expected to transition from moderate/high density residential to mixed use/employment.

2.6 Tolleson General Plan

Tolleson is located on the western fringe of Phoenix along I-10, east of Avondale. The city comprises 6 square miles and is bounded on the east, north and south by the City of Phoenix. Avondale abuts Tolleson on the west. The city has experienced moderate population growth over the past decade as its population grew from 4,434 persons in 1990 to 4,974 persons in 2000, an increase of 12 percent. The majority of the City is located between two transportation corridors I-10 and the Southern Pacific Railroad. Although the community is surrounded by urban growth, it has managed to combat sprawl and maintain its compact, neighborhood oriented land use form. As with many communities surrounding the Phoenix Metropolitan area, increasing urbanization of the region is expected to impact Tolleson.

As identified in the community's general plan, through circulation and land use patterns the community wishes to enhance economic development, improve its community character, and maintain its compact, pedestrian friendly land use pattern. The community wishes to promote a compact urban form with schools, parks, recreation facilities and government offices within an approximate one-half square mile. New residential development will be located close to existing municipal services, schools and recreational facilities. Commercial businesses, which provide neighborhood needs will be located within the central business core, while tourist related commercial and industrial employment centers will be located along major transportation corridors (I-10). Tolleson is anticipating employment growth through expansion of businesses and industries and through increased tourism in the City.

2.6.1 Land Use

A key objective of the land use element of the plan is preserving Tolleson's compact land use pattern and small town atmosphere. Goals and strategies identified in the general plan that are related to land use and the pattern of development in the community include:

- Encourage the development of residential areas in close proximity to neighborhood commercial businesses;
- Encourage a mix of medium and higher residential densities near schools, parks and the business core;
- Use zoning ordinance to encourage the development of close neighborhoods;
- Encourage redevelopment, infill and expansion of retail and businesses;

- Encourage industrial warehouse development near the southern Pacific Railway corridor;
- More recreation and entertainment centers for visitors;
- Encourage businesses to accommodate residential community needs;
- Continue to encourage development of major industries in the Southern Pacific Railroad Corridor; and,
- Encourage the development of tourist attractions/facilities including a golf course, hotels, and restaurant facilities.

2.6.2 Community Facilities

With regards to community facilities the city has adequate facilities to meet current residential, commercial and industrial growth. They also have adequate staff and facilities to accommodate the needs of the daytime population. A key objective of the plan is to maintain existing facilities and level of service. This will include funding another fire station south of the Southern Pacific Railway to accommodate anticipated future industrial development in the area.

2.6.3 Land Use Assumptions and Observations

- The area north of Buckeye Road and east of 107th Avenue (TAZs 287 and 292) is planned for nonresidential development.
- Residential development in TAZs 289 and 290 is anticipated to be built out within the next two years.
- Ryan Business Park is currently being developed in TAZ 290.
- Potential annexation at the northwest corner of 75th and Buckeye.

2.7 Town of Buckeye General Development Plan

Buckeye is located off of I-10 to the west of Litchfield Park, Avondale and Goodyear. The town is approximately 450 square miles and has been the hub of Maricopa County agribusiness for generations. Population over the past decade has increased from 5,038 in 1990 to 6,537 in 2000, an increase of 30 percent. The town is experiencing tremendous growth pressures with the approval of several master planned communities to the north of I-10. To accommodate and prepare for this anticipated growth the Town prepared a General Plan Update with new planning requirements, goals and policies.

The community is preparing for extensive growth through several master planned communities, intensification of development in and around Downtown Buckeye and through annexation. While preparing for this growth the community supports farming as a principal component of the Town's open space as well as of its economy. Farming is important to the Town's character and the community recognizes the need to protect it from urban impacts while allowing development in the community.

2.7.1 Utilities

In terms of utilities the town has an ample water supply and is able to support large-scale urban growth, however as future growth and development occurs they will need to sustain their supply. The Town's water delivery system is near capacity and will require expansion to support additional development. Buckeye's wastewater treatment facilities have been expanded to handle a population of 16,000 persons.

2.7.2 Growth Areas

Growth areas identified in the general plan, which will contribute to population and employment in the community, include the following:

- **Master Planned Communities** –Eight master planned residential developments, referred to as the North Buckeye Master Plan, have been approved. Each development will be supported with a mixture of shopping, service, institutional, employment and open space uses. These master planned communities will probably represent 80 percent or more of Buckeye's population growth to the year 2020. Dwelling units in these eight communities is expected to equal 129,990 with a population of 389,970 persons. These master planned communities will be located north of I-10 and Sun Valley Parkway will connect the proposed master planned communities to other parts of Buckeye and the metropolitan region.
- **Freeway Corridor** – Three freeway corridor communities, White Stone, Sundance and Rostan have also been approved. The estimated residential units and population of these three communities is expected to equal 24,250 dwelling units with a population of 72,750 persons.
- **Freeway Interchange Centers** – The Town is anticipating that nodes of highway serving, hospitality and employment uses will occur at designated interchanges along I-10.
- **Central Buckeye Development** – In the general plan downtown is expected to become more intense, pedestrian oriented and larger in scale. The plan focuses on infill development incentives to accomplish this.
- **Employment Corridors** – Buckeye wishes to maintain an adequate housing to jobs balance and therefore will promote employment growth in certain key corridors that are nearby and accessible to the Town's residential growth areas. This includes Buckeye Airport, located south of I-10, which is an ideal location for economic development.
- **Annexation Growth** – The city plans on annexing the State Prison complex, along State Route 85. This annexation will add jobs and population to Buckeye. Additionally, further annexations in particularly to the west and south may be anticipated for commercial and highway convenience uses, and accommodations for visitors.

2.7.3 Land Use Assumptions and Observations

- Residential and commercial development will primarily occur within the central part of the city and this area is anticipated to be built out by the Year 2020.
- Other key growth areas include Verado, TAZs 1810, 1834 (north of I-10 and south of Camelback) and Sun Valley, TAZ 1805 (south of Camelback). These areas are anticipated to build out by the Year 2020.
- A large group quarters population in the Year 2000 was shown in TAZ 1898, no group

quarters population was shown in TAZ 1957, which is the location of the prison. This was adjusted for the revised 5.4 and 6.8 interpolated scenarios.

- Areas north of I-10 is not expected to completely build out by the Year 2020.
- Growth in the southern part of the MPA boundary (south of Gila River), which includes TAZs 1924, 1946, 1957 and 1958, is expected to occur well beyond 2020 due to lack of infrastructure.

2.8 Gila Bend Master Plan Update

The Town of Gila Bend is located 65 miles south of the Phoenix Metropolitan Area. Situated at the intersection of Interstate 8 and State Route 85, 30 miles south of Interstate 10, Gila Bend is a traverse point for travelers between Phoenix, San Diego and Puerto Penasco, Mexico. With a U.S. Census population of 1,980 persons in the Year 2000, a 13 percent increase since 1990, Gila Bend's has had moderate population growth. Through interviews associated with this transportation study, based upon recent development interest, expansion of local employers and development of new industries, the population is expected to crest 5,000 persons by Year 2010.

To accommodate the projected increase in population, the master plan identifies a need for an additional 119 acres of residential land use by the Year 2020. This additional acreage has been increased by a land demand expansion factor of 2.5 to allow development choice. Similarly, the additional acreage identified for projected future commercial and industrial land use is 148 acres. The additional nonresidential acreage is for an increase of 25 percent for commercial retail and industrial development and 50 percent for a recreational vehicle site. The expansion factor was also applied to the projected commercial and industrial acreage.

2.8.1 Key Land Use Issues

The following issues were identified in the Master Plan Update:

- Encourage both residential and commercial development infill;
- Develop industrial use along Butterfield Highway (State Business Route 8);
- Plan for future annexation to the west and south, which indicated future growth pattern;
- Potential future development of a landfill to the west, along Citrus Valley Road north of I-8;
- Need for a recreational vehicle park and golf course development; and,
- Provision of mixed use developments.

2.8.2 Land Use Plan

In all, the land use plan includes six residential classifications ranging from one (very low density) to 16 (high density) dwelling units per acre, two commercial categories with maximum floor area ratios (FAR) of 0.25 (neighborhood) and 0.30 (general business), and three industrial designations each with FARs of 0.35. In addition there are public/semi-public areas and parks and open space.

2.8.3 Development Assets

According to the Master Plan, the Town has several economic development assets, which translate into future development opportunities for the purpose of this transportation study. The assets listed in the plan are as follows:

- Land adjacent to the Southern Pacific Railroad;
- Substantial vacant commercial land with available infrastructure;
- Vacant industrial land along Butterfield Highway;
- Vacant developable land along I-8;
- Large land holdings, which may lend themselves to larger mixed use developments;
- Job opportunities in the retail and service sectors;
- Employment opportunities at the potential future regional landfill site to the west of Town;
- Economic development opportunities associates with the Gila Bend Municipal Airport; and,
- Quality education, which is attractive for residential development.

2.8.4 Facilities and Services

The availability and adequacy of public facilities and services contributes to the Town's ability to develop in the future. A policy of the master plan is to encourage development in areas where there are adequate public facilities and services or where they can be extended in a fiscally responsible manner. The availability of these facilities and services will guide the timing and sequencing of future growth within the Gila Bend MPA. Key recommended improvements include a water supply study to determine future expansion needs as well as a capital improvement program to schedule and budget capital facilities and improvements.

2.8.5 Land Use Assumptions and Observations

- Power plant to the north of the City, approximately 60 employees.
- Power plant to the west of the City, approximately 40 employees.
- Diamond Lake Ranch, a master planned community with golf course and approximately 100 lots.
- Potential annexation of land along I-8.
- Population expected to equal 5,000 to 10,000 by 2010.
- Potential annexation of Paloma Ranch to the west of the City.

2.9 Goodyear General Plan

The City of Goodyear is located in the West Valley at the urbanized edge of the Phoenix Metropolitan Area. The City is abutted by Avondale to the east, Litchfield Park to the northeast, and Buckeye to the west and is within close proximity to Tolleson and Phoenix to the east, Surprise to the north and partially by unincorporated Maricopa County to the north, west and south. Interstate 10 traverses the northern extent of the community and the Gila River bisects the community from east to west. The Phoenix-Goodyear Airport is located adjacent to the north of

County Route 85 and Luke Air Force Base is situated to the north of the City, each of which present constraints to future development. The Arizona State Prison Complex at Perryville and the Casey Abbott Recreation Area are two of the major land use features in the City. The Estrella Mountain Regional Park is also located to the east of the planning area of which approximately 10,240 acres (15 square miles) is within the planning area boundary.

With an estimated population of 16,865 persons in the Year 2000, an 86.7 percent increase since 1995, Goodyear has been experiencing a high rate of growth, which is expected to continue through the Year 2020 and beyond. According to their General Plan prepared in 1998, which references forecasts prepared by the Maricopa Association of Governments (MAG), the City's population is projected to exceed 88,000 residents by the Year 2020. As stated in the plan and confirmed through interviews associated with this transportation study, based upon their ongoing development trends, it is anticipated that population will exceed the Year 2020 projection. The General Plan has the flexibility to guide development that will result in a population between 200,000 and 700,000 persons.

2.9.1 Economic Analysis

A component of the general plan update, and specifically the land forecast and demand analysis of the proposed land use plan, is an economic analysis. The analysis outlines the amount of land necessary to support the projected future population and employment. Key issues and outcomes identified in the plan are as follows:

- Employment related land is designated near or adjacent to the Phoenix-Goodyear Airport as well as along I-10 and the Southern Pacific Railroad.
- The community has a 60 percent ratio of employed persons to residents, which is higher than any other municipality in the West Valley and places it second to Phoenix as an employment center.
- As identified in the general plan, the employment to population ratio is anticipated to decrease to around 25 percent by the Year 2020. The Goodyear Focused Future Strategic Plan for Economic Development has a goal of an employment to population ratio of no less than 50 percent.
- Based upon a projected Year 2020 population of 88,021 persons and a 50 percent employment to population ratio, there will be 44,010 jobs in the Year 2020, which equates to an additional 2,000 acres of land for employment use by the Year 2020.
- There are significant amounts of land within the City that are impacted by the noise contours of the Phoenix-Goodyear Airport and Luke Air Force Base, which constrains future residential development in these areas. These areas are, however, appropriate for employment uses.
- Two square miles of land within the City have been designated as Agriculture, which is valued to provide for an economic development component (Food, Fiber and Natural Products).
- A 640-acre City Center is planned as a central focal point of the community, including the master planned communities of Estrella Mountain Ranch and Palm Valley.
- The total population at build out is estimated to range from 286,309 to 688,777 persons, which is dependent upon density. Assumptions include 2.75 persons per household, 20 percent of all residential acreage consumed by rights-of-way and 10 percent vacancy.

2.9.2 Summary of Development Objectives:

The following are key development objectives identified in the Master Plan that affect and guide growth in the community.

- Maintain a minimum of 50 percent employment per population ratio;
- Maintain enough employment designated land to support the community through build-out regardless of short term market trends;
- Continue to encourage expansion and retention of Goodyear's growing retail business base and become the retail center for West Valley;
- Promote master planned developments that contain an appropriate mix of uses so residents can live, work and shop in close proximity;
- Do not allow residential development within the 65 dnl (average yearly day/night) noise contours associated with Luke Air Force Base and the Phoenix Goodyear Airport; and,
- Promote development that is close to existing infrastructure.

2.9.3 Land Use

The City of Goodyear is largely undeveloped with two master planned communities, Palm Valley and Estrella Mountain Ranch, located on the north and south portions of the planning boundary. The City's Land Use Plan encourages a balance of employment and residential development. A key goal of the master plan is to diversify the economy, increase employment opportunities within the community and maintain Goodyear as a self sufficient community. There are twelve land use categories shown on the plan, which includes five residential categories with densities ranging from 1du/ac or less to 12+ du/ac.

2.9.4 Land Use Assumptions and Observations:

- TAZ 200 is more likely to develop as employment rather than residential because of its proximity to Luke Air Force Base.
- TAZs 229, 230, 231 and 232, as designated on the general plan, will most likely develop as nonresidential.
- A group quarters population of 226 persons is shown in TAZ 232. This was identified as being in the wrong TAZ. A group quarters population of approximately 226 persons should be shown in TAZ 217 due to the presence of a nursing home.
- TAZ 214, population will increase as there are several developments planned for the area totaling approximately 2,700 units.
- TAZ 217, a hospital is being built in this TAZ, therefore the number of employees will increase.
- TAZ 233 and 1873, based on known planned developments population will increase.

2.10 Phoenix

The southwest portion of Phoenix is located within the study area, which includes the Villages of Estrella and Laveen. The Phoenix General Plan identifies future land use patterns for these communities. Additionally the villages have prepared individual plans to guide more specifically growth in their community. Recently, the Phoenix Planning Department prepared two plans for the villages of Laveen and Estrella. The purpose of these plans was to review and update previous general plans to reflect current conditions and needs of the community. These general plans will serve as a guide for future growth and development in these communities.

In 1998, The City of Phoenix Planning Department prepared a Southwest Growth Study for the community of Laveen. Laveen is located in southwest Phoenix, with part of the community in the city limits and part in Maricopa County. The community is largely undeveloped and is a 10 to 20 minute commute to I-10 and downtown Phoenix. The study area of the plan is 28 square miles and includes all land bounded by 27th Avenue, South Mountain Park, the Gila River Indian Community and the Salt River. The purpose of the plan is guide future development in the area while protecting its natural amenities. The general plan for this study area proposes Laveen to develop primarily as low to medium density residential with the South Mountain Loop providing access to and from the area and serving as the focus for employment and business land uses. According to the study, at build out, the projected population of this area is expected to equal approximately 94,000 persons.

The Estrella Village Plan was prepared in 1999. Estrella Village encompasses approximately 41 square miles and is located south of I-10 and north of the Salt River, in southwest Phoenix. Approximately 45,000 people live in the Village and 38,000 people are employed in the community. The majority of the community, 62 percent, is undeveloped or used for agriculture purposes. Estrella borders the City of Tolleson and Avondale on the west. The general plan for Estrella Village proposes for low to moderate density residential development south of Buckeye Road and west of 59th Avenue, a significant amount of industrial development (40 percent of all land uses) to the east of 59th Avenue and a village core, which would include commercial development and community wide facilities. According to the plan, at build out population estimates are expected to equal 104,592 persons.

2.10.1 Land Use Assumptions and Observations

- Non residential development in Estrella Village is expected to be 75 percent built out by the Year 2020. Residential development is expected to be 70 to 80 percent built out by the year 2020.
- Residential development in Laveen is expected to be built out by the year 2020 with the exception of TAZs 1621, 890, 964, 968 and 971, located south of Salt River, which are expected to be built out beyond the year 2020.
- Potential rezoning of TAZ 874 (tract south of Buckeye and east of 99th Street, area around the Tolleson wastewater treatment plant) from industrial to residential.
- Potential rezoning of the northeast corner of TAZ 879, located south of Buckeye Road and east of 75th Avenue, from industrial to residential.

2.11 Litchfield Park

The City of Litchfield Park is located north of I-10 at the southwestern edge of the Phoenix metropolitan area. The City is abutted by Avondale on the east and Goodyear on the west. Litchfield Park consists of an area slightly more than three square miles and a population of 3,739 persons. The City's area could potentially increase to four square miles due to annexation. The City currently consists primarily of residential development, with a large portion of its land devoted to recreational purposes.

2.11.1 Land Use

Land uses currently present in the community consist of residential neighborhoods surrounding the Village center and the Wigwam Resort. Commercial and employment uses are currently minimal. A key objective of the land use element is to encourage appropriate, new nonresidential development while preserving the City's residential and resort character. Therefore key issues facing the community include the careful selection of land uses for infill, reuse or redevelopment and annexation to achieve an appropriate and desired mix of uses. The Land Use Plan consists of 10 categories with three residential categories ranging from 0-4 du/ac to 11+ du/ac. Additional categories include commercial, resort, golf course, parks, public, health care and industrial.

2.11.2 Growth Areas

Growth in the community is expected to occur through continued development in two master planned sectors, intensification of the central core and through annexation. The following are growth areas in the community:

- The Village at Litchfield Park –More than 1,000 dwelling units are proposed in this development.
- Rancho La Loma Healthcare Campus – This campus is intended as a masterplanned subcommunity dedicated to health care and will include continuum of care living.
- Resort Expansion/Infill development – Wigwam Resort plans to expand its guest facilities. Additionally, there is potential for infill development in the village core.
- Dysart Road Corners – Retail development is being planned on the northeast corner of Indian School and Dysart and the southeast corner of Dysart and Camelback.
- Camelback and Litchfield – This 80 acre site offers the potential for retail commercial and office uses.

2.11.3 Land Use Assumptions

TAZ 261

- 23 acres has been annexed from Goodyear for the Village at Litchfield Park Development.
- 10 acres at the northwest corner of the Litchfield Bypass and Indian School Road will be converted from general commercial to residential as part of the Village of Litchfield Park Development.
- 300 acre development at the northwest corner of Litchfield and Camelback Road, includes 760 dwelling units as part of the La Loma development, in addition 52 acres has been zoned

for continuum of care (estimated 100 units). A 75, 000 square foot office complex is currently in the development review phase.
- 80 acre tract at the northeast corner of Litchfield and Camelback Road likely to develop as mixed use.

TAZ 263

- 20 acre Wigwam Creek Center at the northeast corner of Dysart Road and Indian School Road is in the development review phase (150,000 sq. ft. retail center).
- Wigwam Creek Development is actively developing with an estimated build out of a 130 units.

2.12 Glendale

The majority of Glendale is within the northwest study area; therefore its general plan was not summarized in this section.

2.12.1 Land Use Assumptions and Observations

- Minimal residential development will occur in TAZ 408, due to the Air Installation Compatible Use Zone (AICUZ), not more than 1 unit per acre.
- Currently there is a commercial activity node planned for TAZ 401. Potential for 700 to 800 jobs in this TAZ.
- Based on existing development patterns, residential development in 411 will approach build out by the Year 2020.

2.13 Maricopa County

Maricopa County, located in central Arizona, encompasses 9,226 square miles. The county is bisected by the Salt River, which runs northeast to southwest. Maricopa County has experienced rapid growth throughout its history and has transformed from an agriculture center to a commercial, recreational and industrial hub. Population in the county grew from 2,122,101 persons in 1990 to 3,072,149 persons in 2000, an increase of 45 percent. The Arizona Department of Economic Security projects that the county will have a population of 4.5 million people by the year 2020.

2.13.1 Land Use

The land use element focuses on accommodating growth in the unincorporated areas of the county. Due to the vast area of Maricopa County, land use designations identified in the plan consist of generalized land use, development, or preservation concepts, not specific land uses or densities. However some areas do have more detailed plans that identify specific land uses. Land use designations include: incorporated areas, general plan development areas, county area plans, established communities, existing development master plans, dedicated open space, proposed open space, rural development area, and municipal planning area. Land use densities range from one dwelling unit per five acres in rural development areas to much higher densities allowed as part of a development master plan.

Development Master Plans are an important part of the development pattern in the county because they provide opportunities for innovative design, a variety of housing choices, mixed land use opportunities and a multi modal transportation system. The county encourages development master plans within any land use area. Currently there are 11 development master plans that are built out, under construction or proposed within the County. One of these master plans, Belmont is located in the southwest study area and is currently in the proposal phase.

There is significant amount of dedicated open space areas in the unincorporated areas of the county under public ownership. These areas include regional parks, wilderness areas, wildlife areas and the Tonto National Forest. In the southwest study area there are several wilderness areas including Eagletail Mountains, Signal Mountain, Woolsey Peak, North Maricopa Mountains and South Maricopa Mountains. A national monument area is also located in the south part of the study area. In addition to areas designated as open space there is also a significant amount of land owned by the State and Bureau of Land Management. There are 650 square miles of proposed open space in the unincorporated areas of the county, of which 360 square miles are publicly-owned.

2.13.2 Land Use Assumptions and Observations

- There is a significant amount of land in the county owned by the state and federal governments including the Bureau of Land Management (BLM). There is uncertainty as to the future development of this land, however, it is not expected to develop any time in the next 20 years.
- The majority of land in TAZ 1956 is owned by the BLM and the State.
- TAZs 1968, 1970, 1972 and 1973 is a national monument area, therefore minimal development will occur in this area.

2.14 Environmental Justice and Title VI

In accordance with federal and state requirements, individuals who fall into identified environmental justice and Title IV population groups within the southwest study area are identified in this section for later consideration in the evaluation of transportation improvement options. Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations, requires "federal agencies to achieve environmental justice by identifying and addressing disproportionately high and adverse human health and environmental effects, including the interrelated social and economic effects of their programs, policies, and activities on minority populations and low income populations in the United States" (FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations). Population groups identified in this section include minority, elderly, low income, female head of households and persons with a disability.

Data is provided at the census tract level for this analysis. Some census tracts fit within the boundary of the southwest study area; however, others are split by the study area boundary. Census tracts should not be subdivided indiscriminately; therefore data for the entire census tract were used even though the entire tract was not within the study area boundary. This element was prepared prior to the release of the full year 2000 decennial census. Therefore the 1990 Census and/or 1995 MAG Special Census was used for certain demographic variables not yet released by the Census Bureau at the tract level for the Year 2000. Figure 2-5 displays the 1990 and 2000 study area census tracts used for this analysis. Demographic data at the census tract level is provided in Section 2.17.

2.14.1 Minority Populations

This section involves assessing the number of White and minority populations within the study area. Minority populations are defined in accordance with Executive Order 12898, U.S. Department of Transportation's (DOT) Order DOT 5610.2 and Federal Highway Administration's DOT Order 6640.23 Actions to Address Environmental Justice in Minority Populations and Low-income Populations. Minority is defined as:

- 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 Asia, the Indian subcontinent, or the Pacific Islands); or
- American Indian and Alaskan Native (having origins in any of the original people of North America and who maintains cultural identification through tribal affiliation or community recognition).

Table 2-3 displays race, Hispanic Origin and minority populations for the study area and Maricopa County. As shown, 65 percent of the study area consists of minority populations, which is almost double the percentage of the minority population in the county. Additionally, there are a significant number of persons of Hispanic origin in the study area, 217,587 persons or 55 percent, compared to

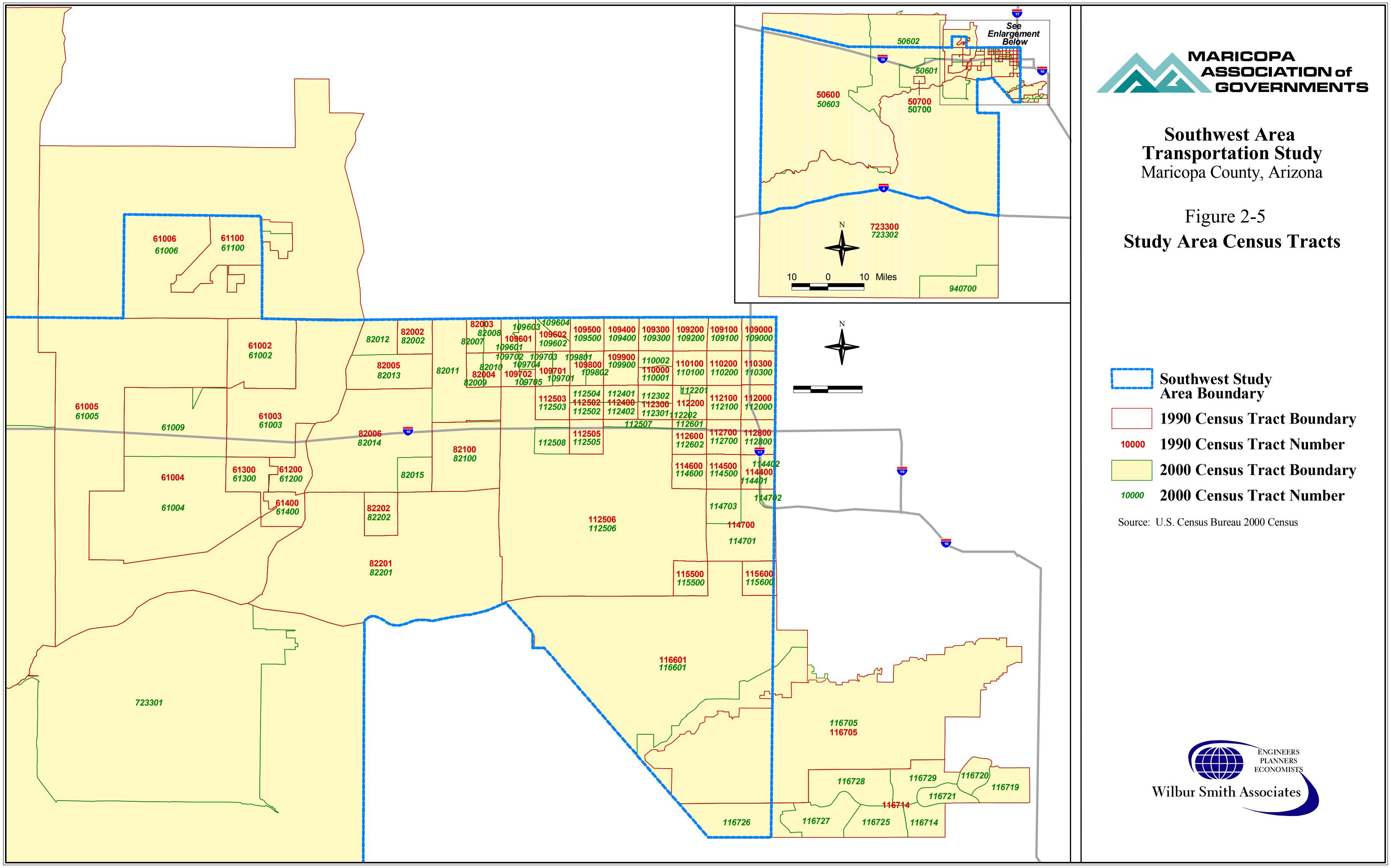

MARICOPA ASSOCIATION of GOVERNMENTS
Southwest Area Transportation Study
Maricopa County, Arizona
Figure 2-5
Study Area Census Tracts
Southwest Study Area Boundary
1990 Census Tract Boundary
10000 1990 Census Tract Number
2000 Census Tract Boundary
10000 2000 Census Tract Number
Source: U.S. Census Bureau 2000 Census
ENGINEERS PLANNERS ECONOMISTS
Wilbur Smith Associates
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Table 2-3
Race, Hispanic & Minority Population, 2000

	Study Area	Percent	Maricopa County	Percent
White alone	224,357	56.6	2,376,359	77.4
Black or African American alone	23,104	5.8	114,551	3.7
American Indian and Alaska Native alone	8,529	2.2	56,706	1.8
Asian alone	5,914	1.5	66,445	2.2
Native Hawaiian and Other Pacific Islander alone	557	0.1	4,406	0.1
Some other race alone	117,897	29.8	364,213	11.9
Two or more races	15,822	4.0	89,469	2.9
Total Population	**396,180**	**100.0**	**3,072,149**	**100.0**
Hispanic Origin	217,587	54.9	763,341	24.8
Minority Population	257,686	65.0	1,037,619	33.8

Source: U.S. Census Bureau, 2000

25 percent in the county. As shown in Figure 2-6, there are a significant number of census tracts with high concentrations of minority populations, with the majority of tracts in the study area having a minority population of 50 percent or more.

2.14.2 Age 60 Years and Over

As displayed in Table 2-4, Census data indicates that 9 percent of the population in the study area consists of persons more than 60 years of age, which is lower than the county average of 15 percent. As displayed in Figure 2-7, the highest concentrations of the elderly (census tracts where 22 to 30 percent of population consists of persons 60 years and over) are located in two tracts in Goodyear and Litchfield Park. Other concentrations of persons 60 years and over are located in the City of Phoenix. The majority of the study area consists of census tracts with 8 to 15 percent of the population 60 years and over.

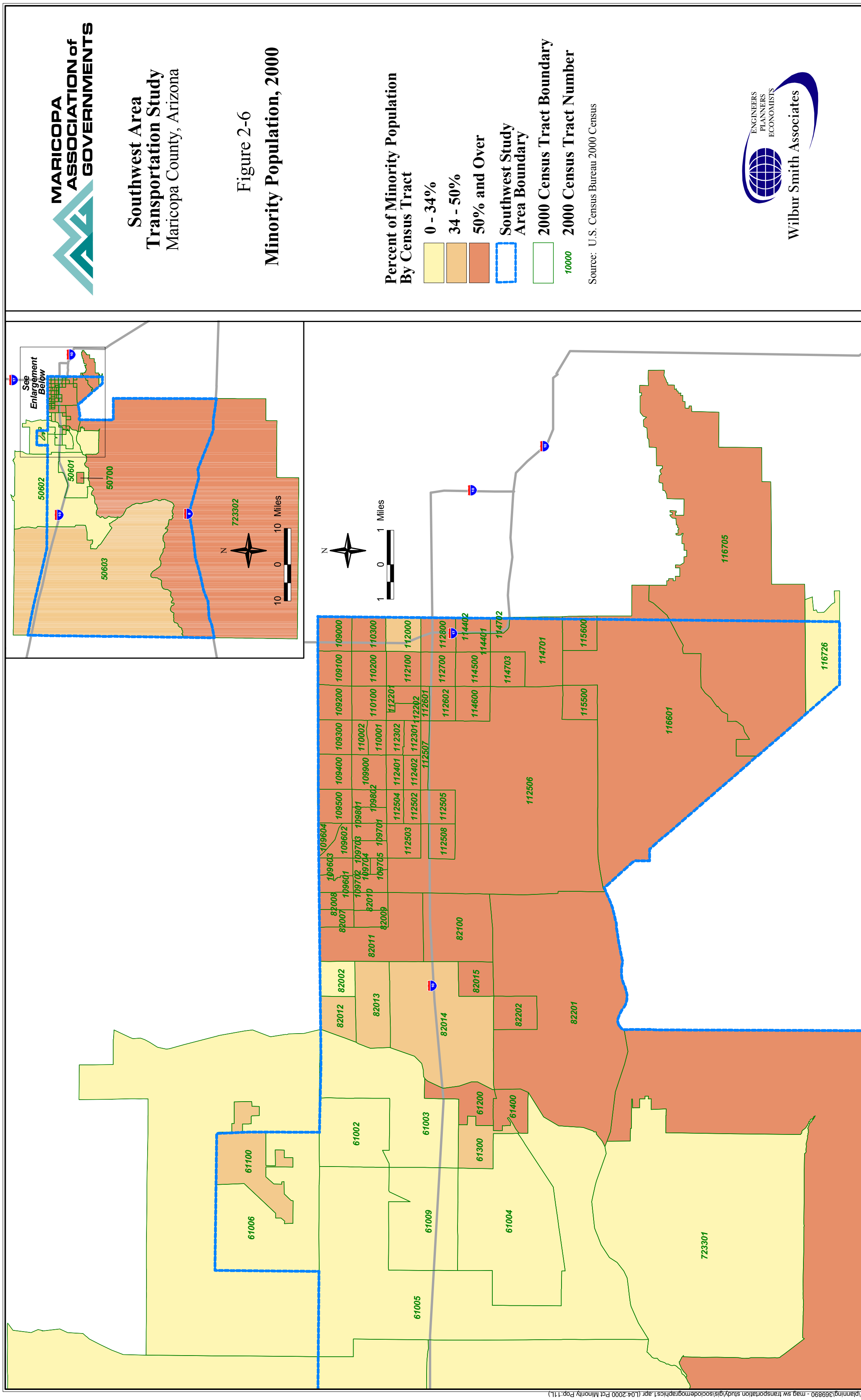
Table 2-4
Age 60 Years and Over, 2000

	Persons Over 60 years of Age	Percent	Total Population
Study Area	33,688	9	396,180
Maricopa County	466,269	15	3,072,149

Source: U.S. Census Bureau, 2000

2.14.3 Poverty

Table 2-5 identifies persons whose income in 1989 was below poverty level. The average poverty threshold for a family of four persons was $12,674 in 1989. As shown, 18 percent of the population within the study area was living below poverty level, compared to 12 percent of the county population. Figure 2-8 displays the percent of tract population living below poverty level. According to the 1990 Census, the majority of census tracts in the study area had 15 to 30 percent of


MARICOPA ASSOCIATION of GOVERNMENTS
Southwest Area Transportation Study
Maricopa County, Arizona
Figure 2-6
Minority Population, 2000
Percent of Minority Population By Census Tract
0 - 34%
34 - 50%
50% and Over
Southwest Study Area Boundary
2000 Census Tract Boundary
10000 2000 Census Tract Number
Source: U.S. Census Bureau 2000 Census
Wilbur Smith Associates
ENGINEERS PLANNERS ECONOMISTS
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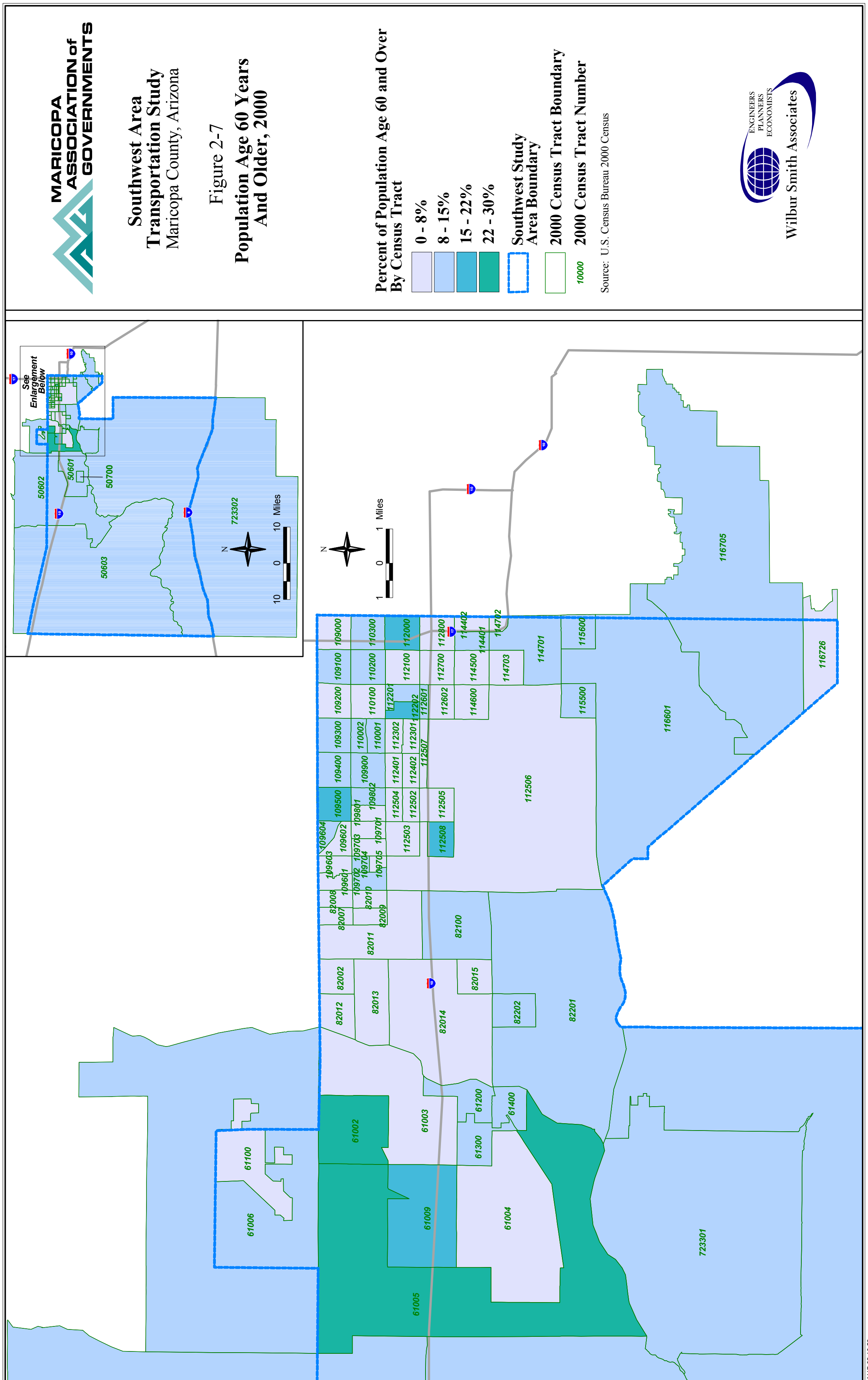
MARICOPA ASSOCIATION of GOVERNMENTS
Southwest Area Transportation Study
Maricopa County, Arizona
Figure 2-7
Population Age 60 Years And Older, 2000
Percent of Population Age 60 and Over By Census Tract
0 - 8%
8 - 15%
15 - 22%
22 - 30%
Southwest Study Area Boundary
2000 Census Tract Boundary
10000
2000 Census Tract Number
Source: U.S. Census Bureau 2000 Census
ENGINEERS PLANNERS ECONOMISTS
Wilbur Smith Associates
See Enlargement Below
Miles
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their population living below poverty level. A higher concentration of persons living below poverty level is located in the eastern part of the study area just south of I-10 and west of I-17. Only one census tract located in the City of Phoenix (Tract 1128) was identified as having 50 percent or more of the population living below poverty level.

Table 2-5
Persons Living Below Poverty Level, 1990

	Total Population	Below Poverty Level	
		Persons	Percent
Study Area	278,167	48,842	18
Maricopa County	2,122,101	257,359	12

Source: U.S. Census Bureau, 1990

2.14.4 Household Income

Table 2-6 displays the number of households with an income less than $15,000, based on the 1995 MAG Special Census. Sixteen percent of households in the study area had an income below $15,000 compared to 12 percent of households countywide. As shown in Figure 2-9, the majority of census tracts had 10 to 20 percent of households with an income less than $15,000. The highest concentrations of households with an income less than $15,000 are located in a few tracts primarily in the City of Phoenix.

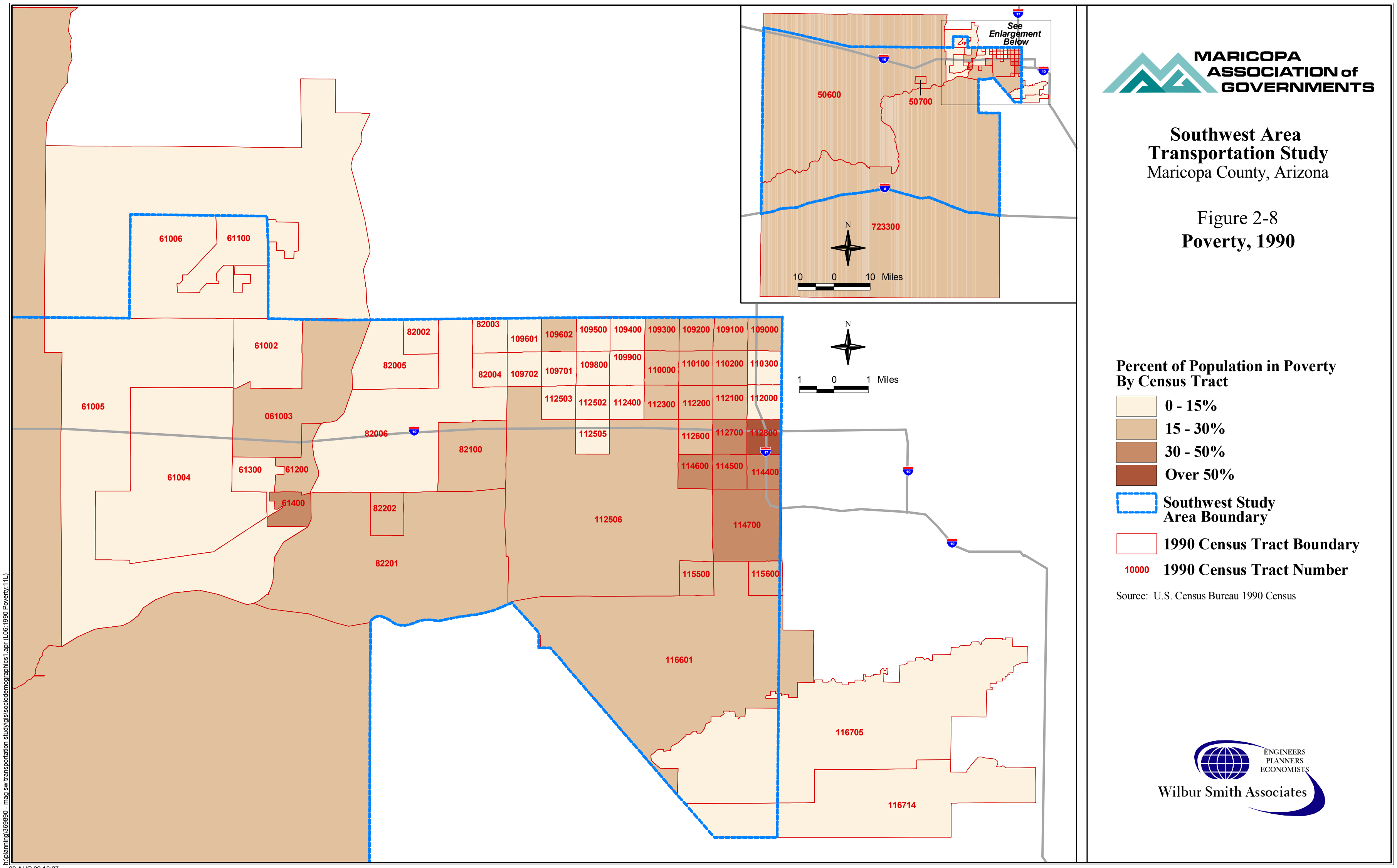
Table 2-6
Number of Households with Income Less than $15,000 in 1995

	Households	Total Households	Percent
Study Area	16,571	104,335	16
Maricopa County	114,342	957,730	12

Source: 1995 MAG Special Census

2.14.5 Educational Attainment

Educational attainment refers to the highest degree earned or the highest level of schooling earned. Educational attainment at a level of receiving a diploma or less, historically are lower wage earners. As shown in Table 2-7, 60 percent of persons 25 years of age and over in the study area received a high school diploma or less compared to 44 percent of persons countywide.


MARICOPA ASSOCIATION of GOVERNMENTS
Southwest Area Transportation Study
Maricopa County, Arizona
Figure 2-8
Poverty, 1990
Percent of Population in Poverty By Census Tract
0 - 15%
15 - 30%
30 - 50%
Over 50%
Southwest Study Area Boundary
1990 Census Tract Boundary
10000 1990 Census Tract Number
Source: U.S. Census Bureau 1990 Census
ENGINEERS PLANNERS ECONOMISTS
Wilbur Smith Associates
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61006
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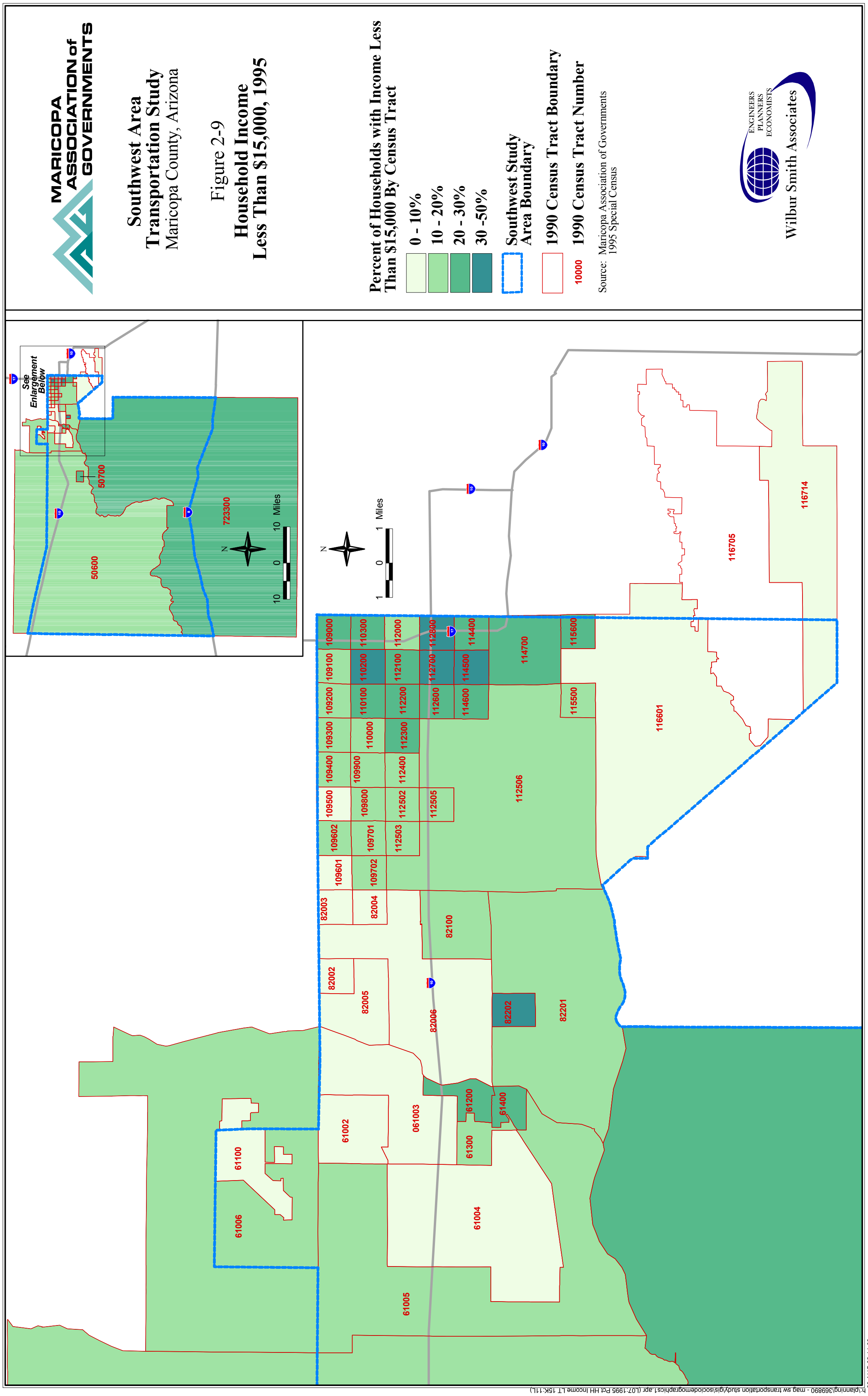
MARICOPA ASSOCIATION of GOVERNMENTS
Southwest Area Transportation Study
Maricopa County, Arizona
Figure 2-9
Household Income Less Than $15,000, 1995
Percent of Households with Income Less Than $15,000 By Census Tract
0 - 10%
10 - 20%
20 - 30%
30 -50%
Southwest Study Area Boundary
1990 Census Tract Boundary
10000 1990 Census Tract Number
Source: Maricopa Association of Governments 1995 Special Census
ENGINEERS PLANNERS ECONOMISTS
Wilbur Smith Associates
See Enlargement Below
Miles
Miles

Table 2-7
Persons 25 Years and Older Who Received
A High School Diploma Or Less, 1990

	Persons	Persons 25 Years and Over	Percent
Study Area	92,978	154,079	60
Maricopa County	591,069	1,344,654	44

Source: U.S. Census Bureau, 1990

2.14.6 Female Head of Household

Households headed by females with no husband present have historically been known to be lower in income than other households. As displayed in Table 2-8, 15 percent of households in the study area were headed by females compared to 11 percent countywide. As shown in Figure 2-10, there are higher concentrations of female headed households throughout the study area than compared to the county average. The majority of the area consists of census tracts with 7 to 25 percent of households headed by females. Based on the census data, the highest concentration of female headed households are located within several tracts in the northeast portion of the study area. Tract 1147.02 had the highest concentration with over 50 percent of households headed by females.

Table 2-8
Female Head of Households, 2000

	Total Households	Female Headed Households, No Husband Present	Percent	Female Headed Households With Children Under 18	Percent
Study Area	111,833	17,000	15	10,999	10
Maricopa County	1,132,886	121,637	11	75,031	7

Source: U.S. Census Bureau, 2000

2.14.7 Work and/or Mobility Disability

Table 2-9 identifies the percentage of population in 1990, greater than or equal to 16 years of age with a mobility disability, work disability, or self-care limitation.

According to the Census Bureau, persons were identified as having a mobility limitation if they had a health condition that had lasted for six or more months and which made it difficult to go outside the home alone. Examples of outside activities include shopping and visiting the doctor's office.

Persons were identified as having a self-care limitation if they had a health condition that had lasted for six or more months and which made it difficult to take care of their own personal needs, such as dressing, bathing, or getting around inside the home.

Persons were identified as having a work disability if they had a health condition that had lasted for six or more months and which limited the kind or amount of work they could do at a job or

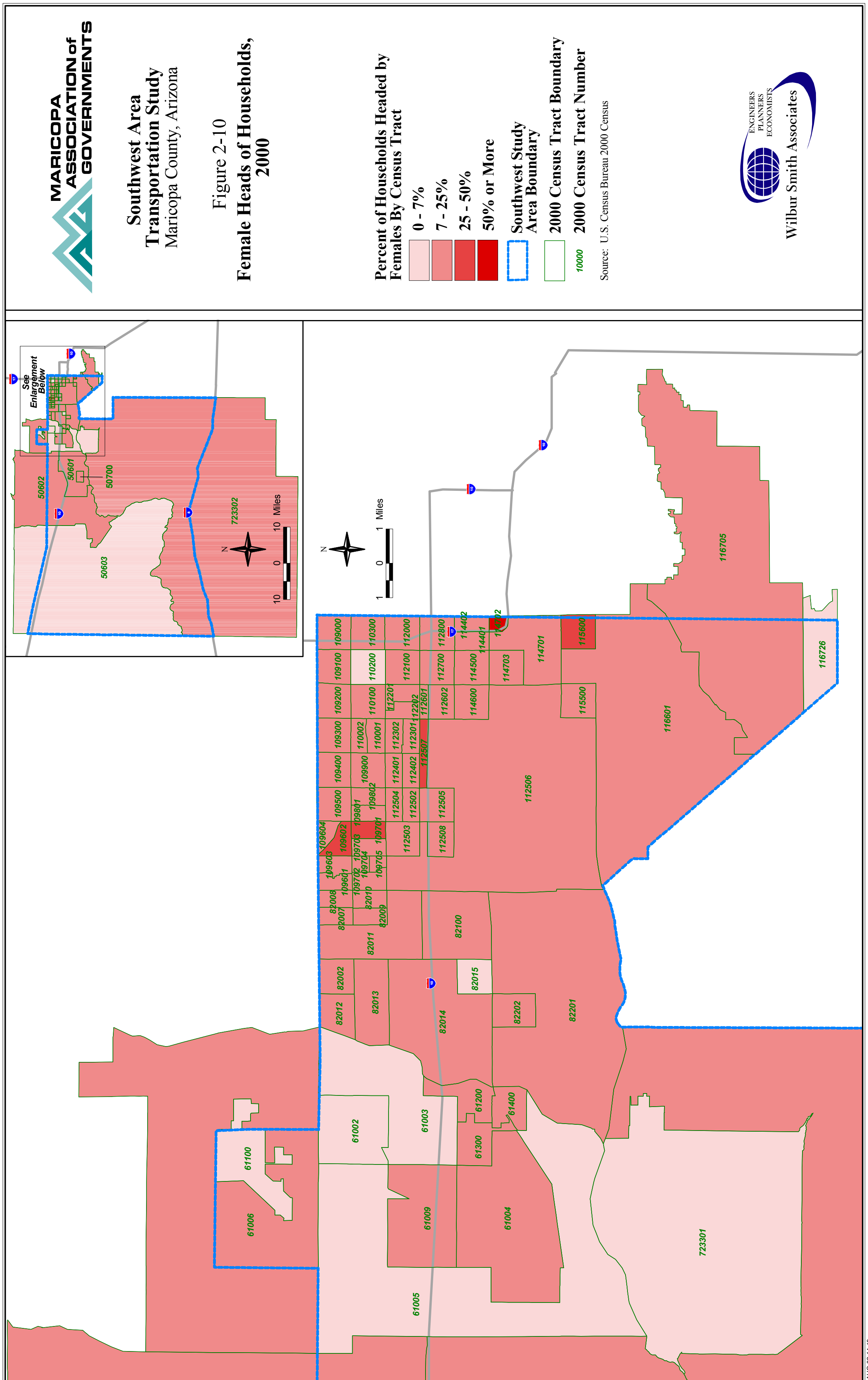

Figure 2-10
Female Heads of Households, 2000

Table 2-9
Population 16 Years of Age and Older
With A Work, Mobility or Self Care Disability, 1990

	Population>16 Years of Age	Disability (Work, Mobility, Self Care)		Mobility Disability	
		Persons	Percent	Persons	Percent
Census Tracts within the Study Area	195,603	26,705	14.0	7,409	3.8
Maricopa County	1,621,189	207,610	13.0	56,942	3.5

Source: U.S. Census Bureau, 1990

business. A person was limited in the kind of work he or she could do if the person had a health condition which restricted his or her choice of jobs. A person was limited in the amount of work if he or she was not able to work full-time.

As shown in Table 2-9, 14 percent of persons 16 years of age and over in the study area claimed a disability, which is slightly higher than the county average of 13 percent. As displayed in Figure 2-11, the highest concentration of persons claiming a disability in the study area are located in a few census tracts in the City of Phoenix. The majority of census tracts in the study area have 10 to 20 percent of tract population claiming a disability.

2.15 Transit-Dependent Populations

Transit-dependent populations typically include the elderly, children enrolled in school, persons with a mobility disability, minority persons, young female population and low-income persons. There are several demographic characteristics that can be analyzed to determine concentrations of transit-dependent populations, many of which have been previously identified in this section, including the elderly, minority persons, median household income and persons living below poverty level. Additional demographic characteristics that can be used in identifying transit-dependent populations are identified below and include households with no vehicle available, persons with a mobility disability, children enrolled in school and young female population.

2.15.1 Households with No Vehicle Available

The level of automobile ownership has a significant influence on the market for public transit service. Generally, where there are low levels of automobile ownership, there is a high level of transit demand potential. Households without a vehicle must rely on public transportation, friends, or walking to get to work and other destinations. As shown in Table 2-10, Census data indicates that 9 percent of occupied housing units in the study area have no vehicle available, which is slightly higher than the County average of 7 percent. As displayed in Figure 2-12, the highest concentrations of housing units with no vehicles (census tracts with greater than 25 percent of

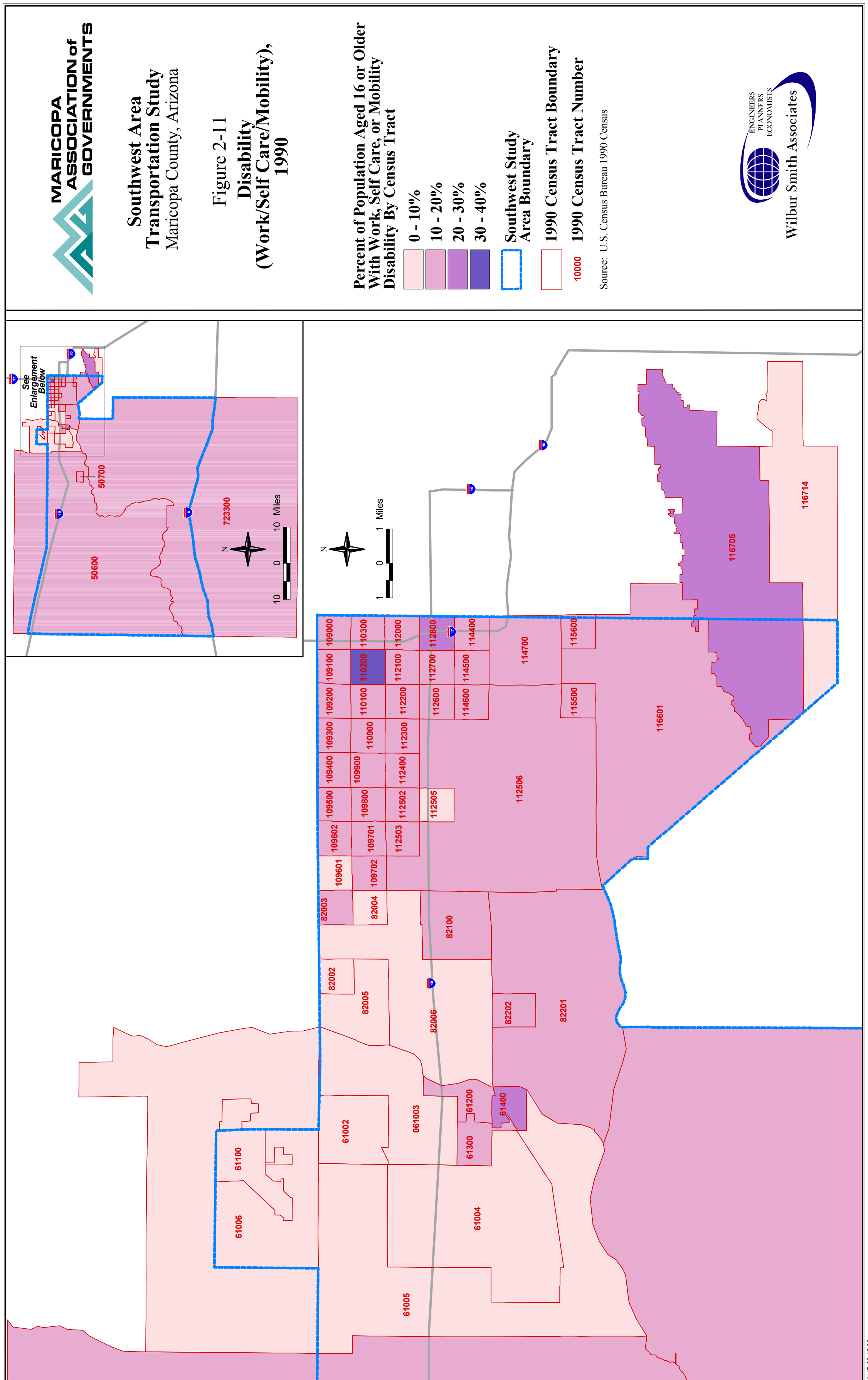
MARICOPA ASSOCIATION of GOVERNMENTS
Southwest Area Transportation Study
Maricopa County, Arizona
Figure 2-11
Disability (Work/Self Care/Mobility), 1990
Percent of Population Aged 16 or Older With Work, Self Care, or Mobility Disability By Census Tract
0 - 10%
10 - 20%
20 - 30%
30 - 40%
Southwest Study Area Boundary
1990 Census Tract Boundary
10000 1990 Census Tract Number
Source: U.S. Census Bureau 1990 Census
ENGINEERS PLANNERS ECONOMISTS
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Table 2-10
Occupied Housing Units with no Vehicle Available, 1990

	No Vehicle	Occupied Housing Units	Percent
Study Area	7,998	88,983	9.0
Maricopa County	57,626	807,560	7.1

Source: U.S. Census Bureau, 1990

housing units without an automobile) available are located in several census tracts in the eastern portion of the study area. The majority of census tracts in the study area have less than 10 percent of occupied housing units with no vehicles available.

2.15.2 Children Enrolled in School

As shown in Table 2-11, approximately 21 percent of the total population in 1990 was enrolled in school, compared to 17 percent of the County population. As displayed in Figure 2-13, the highest concentrations of school children (census tracts where 24 percent or more of the population is enrolled in school) are located in several tracts located in the northeast portion of the study area, in the City of Phoenix and in the City of Avondale. The majority of the study area consists of census tracts with 16 to 24 percent of the population enrolled in school.

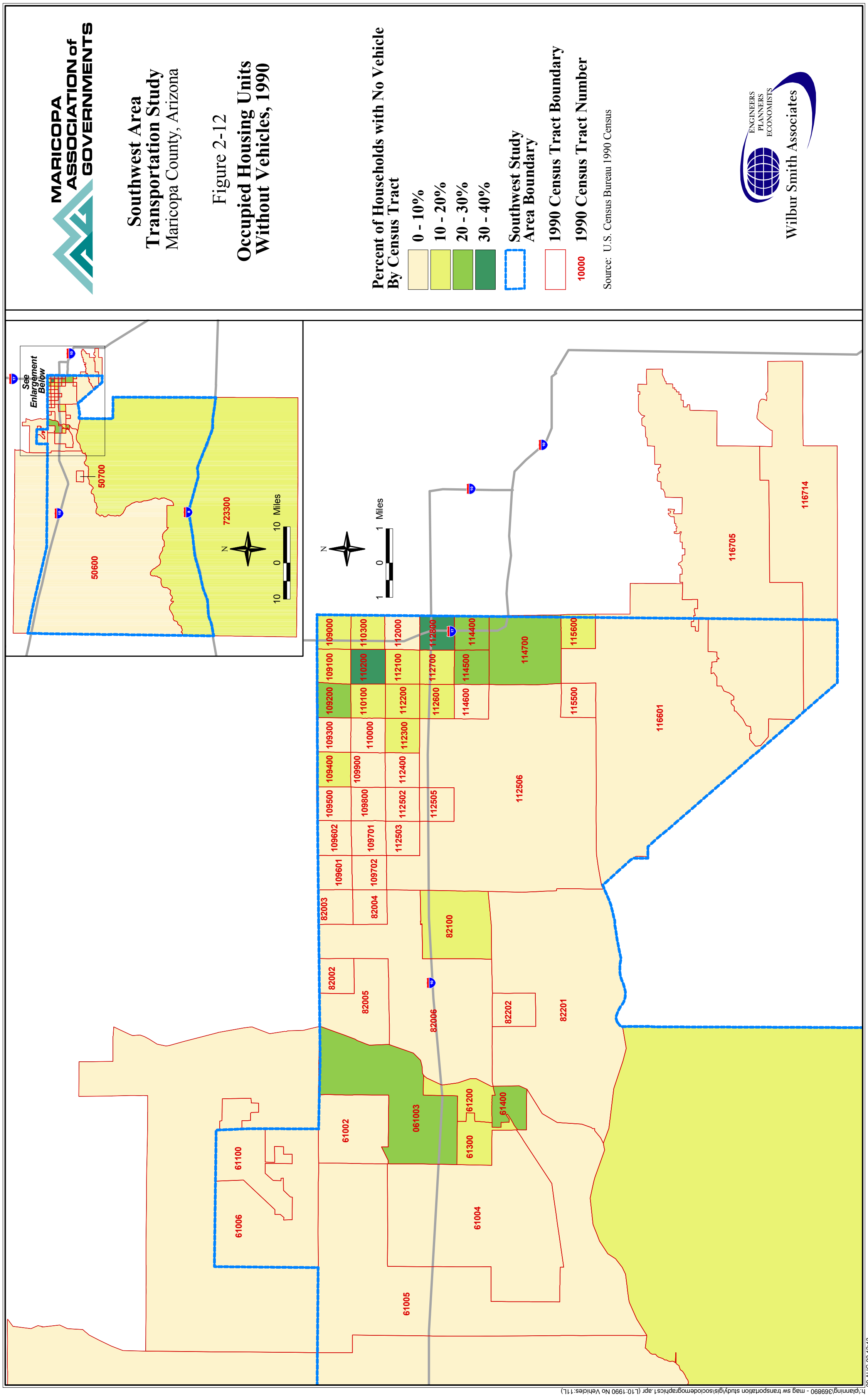
Table 2-11
Person enrolled in Elementary or High School, 1990

	Students	Total Population	Percent
Study Area	57,929	278,167	20.8
Maricopa County	351,130	2,122,101	16.5

Source: U.S. Census Bureau, 1990

2.15.3 Persons with a Mobility Limitation

Persons with mobility limitations include all civilian non-institutionalized persons 16 years and older who reported having a physical or mental handicap which limits their mobility. In many cases these persons require the use of special transit services with door-to-door personal assistance and handicap accessible vehicles. However, there is a certain percentage of these persons who, if transit is available would be willing and able to use this service. As shown in Table 2-9, 3.8 percent of the population 16 years and over in the southwest study area claimed a mobility disability. Displayed in Figure 2-14 are concentrations of mobility impaired persons as a percentage of census tract population 16 years and over. As shown, there are no major concentrations persons with a mobility limitation. The majority of the study area has census tracts with 3 to 6 percent of the population claiming a mobility disability. None of the tracts within the study area have mobility impaired populations exceeding 13 percent.


MARICOPA ASSOCIATION of GOVERNMENTS
Southwest Area Transportation Study
Maricopa County, Arizona
Figure 2-12
Occupied Housing Units Without Vehicles, 1990
Percent of Households with No Vehicle By Census Tract
0 - 10%
10 - 20%
20 - 30%
30 - 40%
Southwest Study Area Boundary
1990 Census Tract Boundary
10000 1990 Census Tract Number
Source: U.S. Census Bureau 1990 Census
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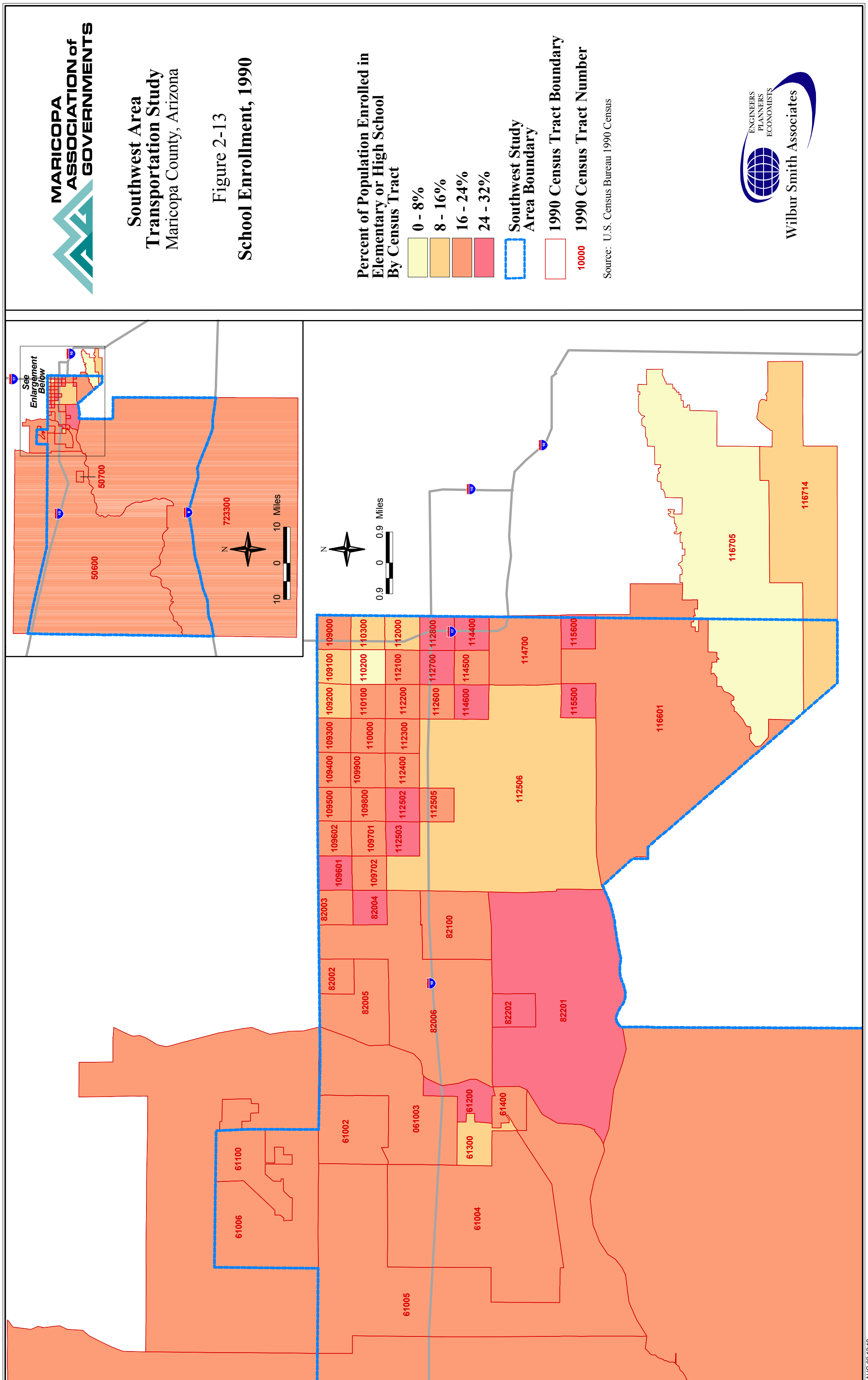
MARICOPA ASSOCIATION of GOVERNMENTS
Southwest Area Transportation Study
Maricopa County, Arizona
Figure 2-13
School Enrollment, 1990
Percent of Population Enrolled in Elementary or High School By Census Tract
0 - 8%
8 - 16%
16 - 24%
24 - 32%
Southwest Study Area Boundary
1990 Census Tract Boundary
10000 1990 Census Tract Number
Source: U.S. Census Bureau 1990 Census
ENGINEERS PLANNERS ECONOMISTS
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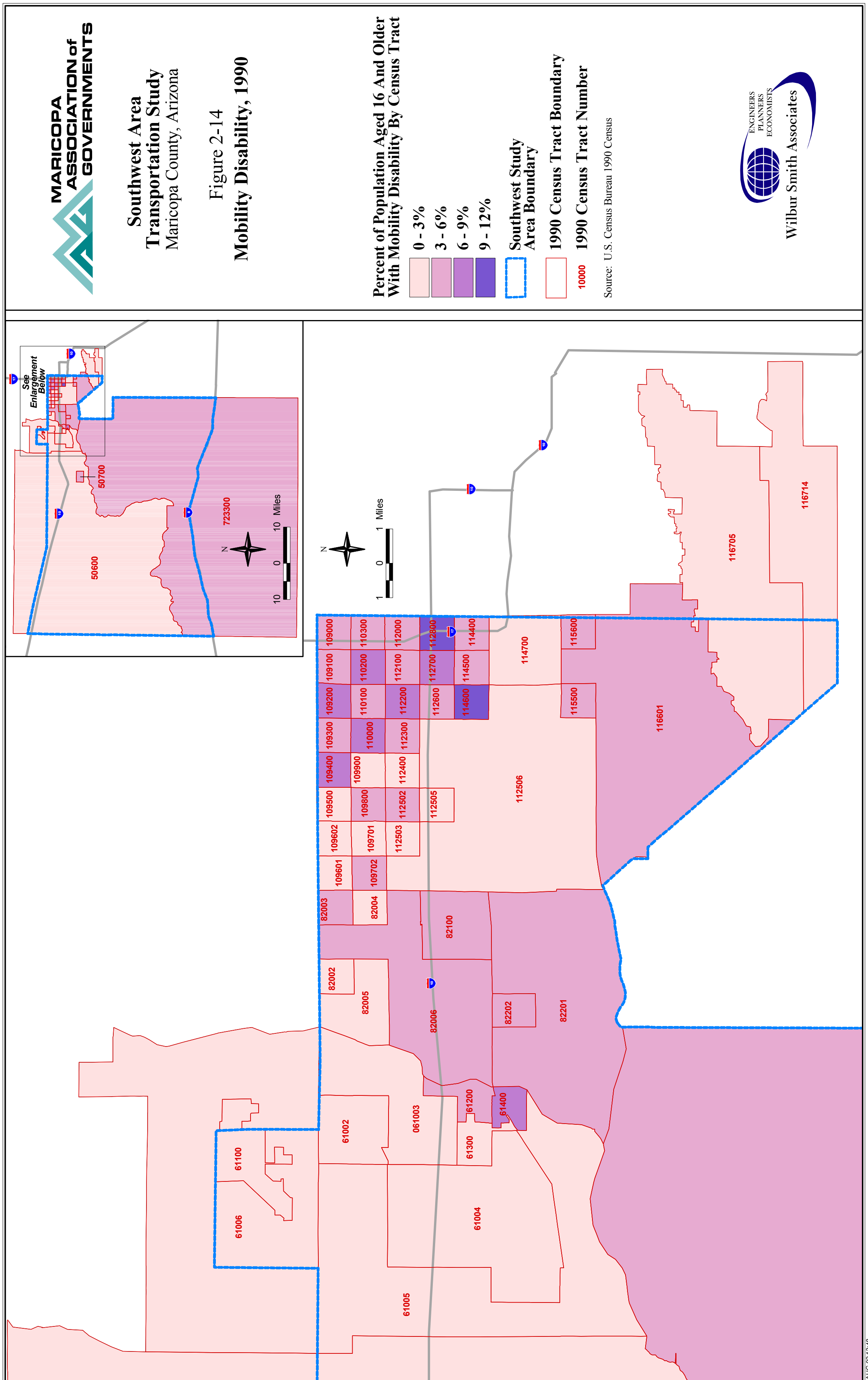

MARICOPA ASSOCIATION of GOVERNMENTS
Southwest Area Transportation Study
Maricopa County, Arizona
Figure 2-14
Mobility Disability, 1990
Percent of Population Aged 16 And Older With Mobility Disability By Census Tract
0 - 3%
3 - 6%
6 - 9%
9 - 12%
Southwest Study Area Boundary
1990 Census Tract Boundary
10000 1990 Census Tract Number
Source: U.S. Census Bureau 1990 Census
ENGINEERS PLANNERS ECONOMISTS
Wilbur Smith Associates
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2.15.4 Young Female Population

Typically females ranging from 15 to 24 years of age are also considered a transit dependent population group. As shown in Table 2-12, the young female population in the study area includes a total of 31,020 persons, which is 8 percent of the study area population. Figure 2-15 displays the percentage of young female population (15-24) by census tract. As shown the young female population is primarily concentrated in census tracts located in the City of Phoenix.

Table 2-12
Young Female Population, 15-24 years of age, 2000

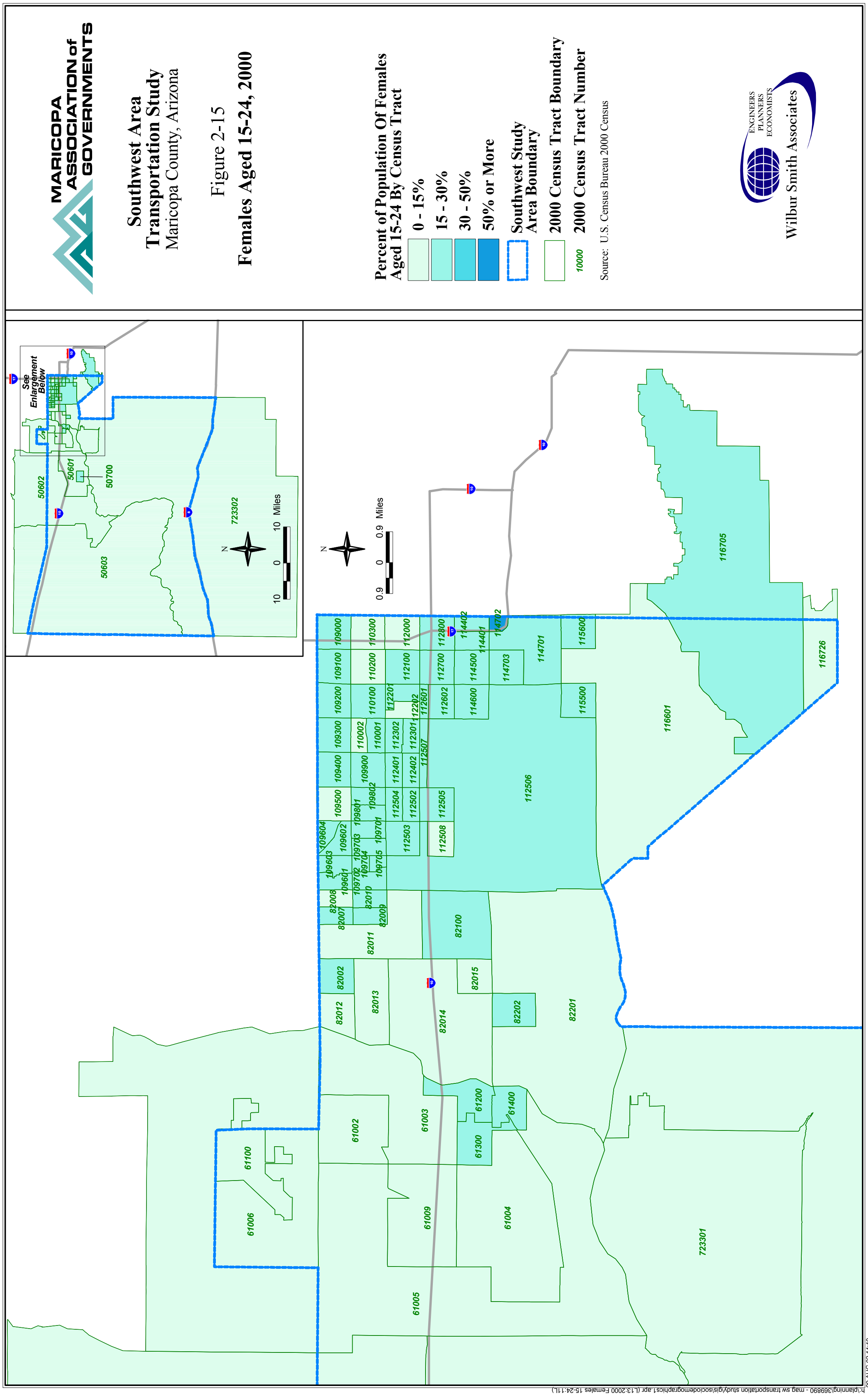
	Females 15-24	Total Population	Percent
Study Area	31,020	396,180	8
Maricopa County	208,700	3,072,149	7

Source: U.S. Census Bureau, 2000

2.16 Conclusion

Population and employment growth are indicative of the need for transportation improvements to accommodate this growth and related increases in travel demand. Based on policies identified in the communities' general plans and socioeconomic forecasts, population and employment growth is expected in the southwest planning area, resulting in increased demands on the region's transportation facilities. The socioeconomic forecasts and scenarios developed for the study area will serve as needed inputs into the travel demand computer model, and help determine anticipated transportation needs in Maricopa County. Based on the alternative scenarios, population and employment is expected to equal approximately 1.3 million persons and 800,000 employees as reflected in Scenario 6.8.

Environmental justice and Title IV named population groups identified in this element include a significant minority population within the study area as well as concentrations of elderly and low-income populations and female headed households. In accordance with federal requirements these population groups should be considered in the evaluation of any transportation improvement options.


MARICOPA ASSOCIATION of GOVERNMENTS
Southwest Area
Transportation Study
Maricopa County, Arizona
Figure 2-15
Females Aged 15-24, 2000
Percent of Population Of Females Aged 15-24 By Census Tract
0 - 15%
15 - 30%
30 - 50%
50% or More
Southwest Study Area Boundary
2000 Census Tract Boundary
10000
2000 Census Tract Number
Source: U.S. Census Bureau 2000 Census
ENGINEERS
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Wilbur Smith Associates
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3 Current and Future Transportation Facilities and Conditions

The purpose of this chapter is to identify and document the transportation facilities and services in the southwest portion of the Phoenix Metropolitan area. The chapter examines the current and expected conditions of transportation facilities in the study of the Southwest Area Transportation Study. The purpose of this chapter is to inform the development of the Regional Transportation Plan for the greater Phoenix area. The conclusions of this chapter form the foundation for the identification of new transportation facilities and services needed in the southwest valley to meet the future demands of the area.

This chapter was developed as a Working Paper (WP) and contains data and information that is continuously updated, some of which may have changed or may have been superseded by the final Regional Transportation Plan (RTP). Information was current at the time of initial WP publication.

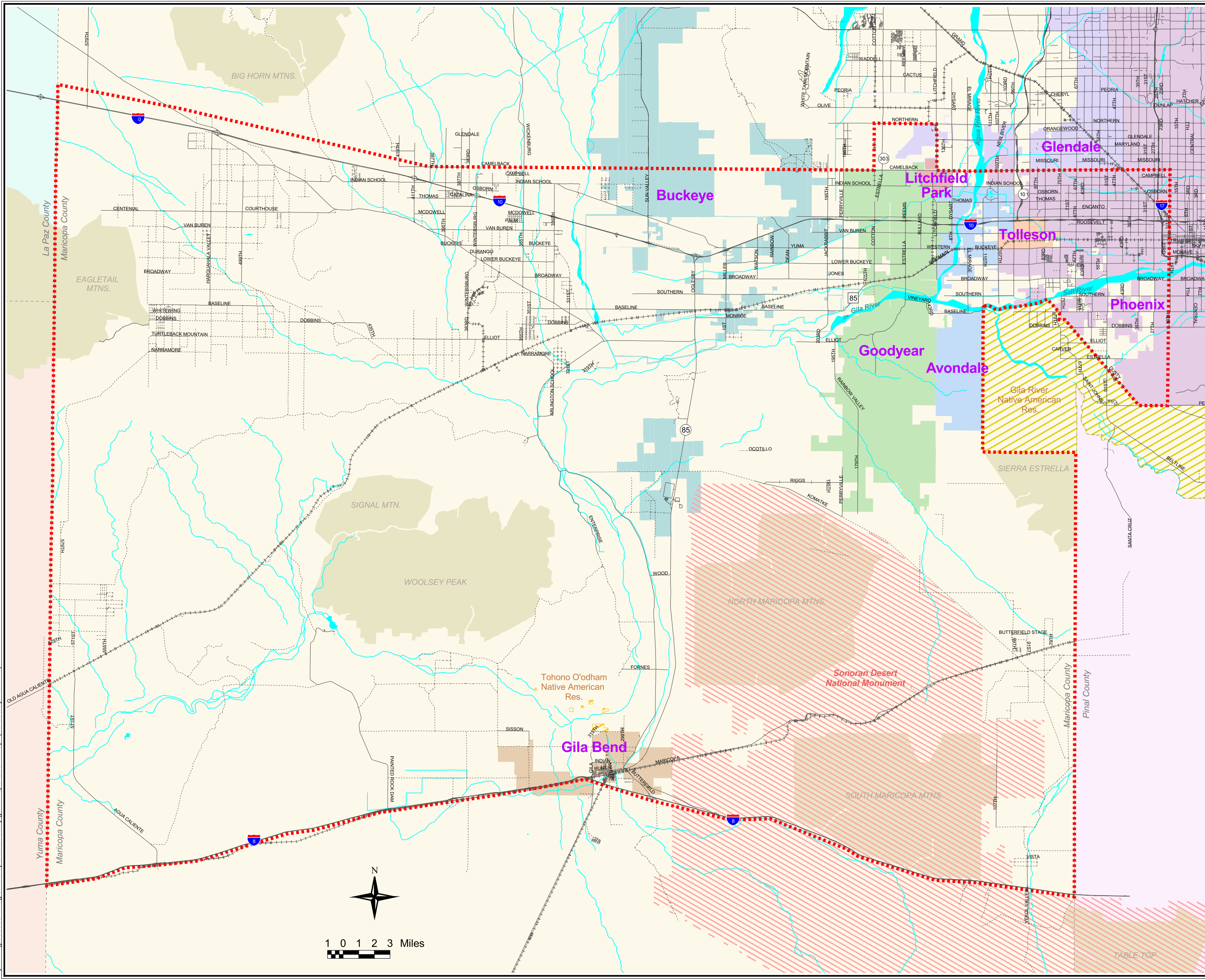
The area included in the SWATS is shown in Figure 3-1. The study area is bounded on the west by the Maricopa County line. From the western county line, it is bounded on the north by a line parallel to I-10, one mile to the north of that highway, until that line reaches the projected alignment of Camelback Road. The alignment of Camelback Road forms the remainder of the study area's northern boundary, except where the boundary swings north around Luke Air Force Base, which is fully included in the study area. The eastern boundary of the study area is 19th Avenue north of the Gila River Indian Community (GRIC) and the eastern boundary of Maricopa County south of the GRIC. The eastern boundary swings west around the GRIC, which is fully outside the study area. The southern boundary of the study area is I-8.

Much of this study area is lightly populated with limited transportation services, facilities, and needs. The focus of the study effort is on the portions of the area that are more heavily populated closer to Phoenix or that are expected to experience population growth in the next 50 years such that improved transportation facilities and services will be required.

This chapter identifies the transportation facilities and services currently in the study area and evaluates their levels of use. The chapter also identifies an assumed set of future transportation facilities and services based on the Long Range Transportation Plan and other documents and information and referred to hereafter as the future LRTP based transportation system. Forecasts of their levels of use at two future "horizon" years: 2020 and 2030.

Of the 3.2 million metropolitan population, just under 0.4 million, or about 12 percent, was in the SWATS area in 2000. The population in the SWATS area is forecast to be just over 900,000 in 2020 and represent a growing portion of the metropolitan area population. In the year 2030, the SWATS area is forecast to have over 1.4 million people, about 20 percent of the metropolitan.

In 2000 there were approximately 180,000 jobs located in the SWATS area. As the metropolitan population increases, the number of jobs in the SWATS area is expected to increase also. In the year 2020, an employment will surpass half a million. By 2030 an employment base of nearly 825,000 is expected in the SWATS area. (The forecast of the distribution of the 900,000 and 1.4 million



MARICOPA ASSOCIATION of GOVERNMENTS

Southwest Area Transportation Study

Figure 3-1
Study Area Map

Study Area Boundary

Source: Maricopa Association of Governments, U.S. Census Bureau, Wilbur Smith Associates

Wilbur Smith Associates
ENGINEERS PLANNERS ECONOMISTS

population within the SWATS area in 2020 and 2030, respectively, as well as the forecast of the distribution of employment, is the subject of Chapter 2, and represents an input to forecasting transportation demand in the SWATS area.)

These forecast increases in population and employment in the southwest valley will place additional demands on the transportation systems serving the area. Those demands are compared to the future LRTP based transportation system in this chapter to determine where congestion and other transportation system problems and failures can be expected to occur and at which population threshold levels.

Chapter Organization

This chapter starts with a general description of the types of transportation facilities to be examined. The sources of data about the transportation systems and their use are also described along with comments on the reliability of those data. This is followed by a detailed description of the transportation facilities in the area (current and future LRTP based) and their levels of current and expected use in the future, including a description of expected congestion and other failures of the current and future LRTP based transportation systems. A summary follows incorporating an identification of transportation problems, existing and expected. Subsequent chapters of this Final Report document tests of specific strategies and projects to address those problems and make recommendations about strategies, facilities, and services to implement.

3.1 Existing and Future Facilities and Use

This report covers the current and future conditions of three transportation modes: highways, transit, and non-motorized. The following three subsections address each of those modes respectively. The facilities and services currently available for each mode are inventoried. The facilities and services included in the future LRTP based transportation system are also inventoried and described. Major differences between the current facilities and facilities assumed in the future LRTP based system are identified.

The levels of use of the current facilities and services are described, including an identification of services and facilities whose levels of use exceed their intended operational capacity or indicate an imminent capacity problem. Levels of use are forecast for the future LRTP based transportation system and those levels are reported along with an identification of capacity problems.

A variety of sources of data were used to create the inventory of current facilities and services and their levels of use. Data were gathered from MAG, the Arizona Department of Transportation (ADOT), the Maricopa County Department of Transportation (MCDOT), the Regional Public Transportation Authority (RPTA or Valley Metro), Southwest Transit and Regional Transportation (START), local jurisdictions, and other organizations.

The sources of the data presented in this chapter are identified. The quality and reliability of the data vary. Some of the data are less than a year old and were collected by field observation. Other data are older and may be less reliable. Much of the data is derived from samples, meaning that data collected from a relatively small subset of a large group are generalized to the entire large group. Still other data are the products of models which, by their nature, represent estimations. The limitations of the data and appropriate qualifications to its accuracy, precision, and reliability are provided in the chapter.

3.1.1 Roadways

The MAG traffic forecasting model is a primary source of information on existing and future roadway characteristics and traffic within the study area. To assess the reliability of this information, a search of relevant traffic data and limited field reconnaissance were conducted within the project area to determine how well the current network is being represented by the model.

Relevant traffic count information was received from ADOT and MCDOT. Other traffic volume sources, such as localized impact studies, were not used due to the uncertainty of the data presented. Unlike traffic volumes from ADOT and MCDOT, it was not possible to determine if other volumes were raw numbers or processed to include factors such as axle pair adjustments and seasonal variations. Therefore, only data provided from the above agencies were used when comparing model volumes to existing ground counts. The MAG transportation model has been calibrated to current conditions.

3.1.1.1 General Description

The SWATS area roadway network includes all of the state and county highways in the study area, as well as local streets in all or part of Avondale, Buckeye, Gila Bend, Glendale, Goodyear, Litchfield Park, Phoenix, Tolleson, Luke Air Force Base, and the unincorporated portions of Maricopa County. The roadway network, matching population density, is mainly concentrated in the northeasterly section of the study area. Areas to the west and south of this section are sparse in population with traffic demand accommodated mostly by minor roads servicing local needs or small traffic generating areas. Figure 3-2 provides a base map of the road network and other geographic features that exist within the study area. There are over 4,000 roadway centerline miles in the study area.

The most obvious feature of the base map is the large rural area that exists in the south and west with limited road development. Large preserve and wilderness areas are contained within the central and southern portions of the study area where both existing and projected population and employment are relatively small. Eagletail Mountain, North and South Maricopa Mountains, Signal Mountain, Woolsey Peak, Painted Rock Wildlife Area, and other public environmentally sensitive areas including desert preserve spaces and private holdings will avoid development in the foreseeable future. Roadway construction in these areas is projected to be minor, with only limited, localized new road construction. At the opposite extreme, the northeast section of the study area and the I-10 corridor are currently experiencing or are planned for major development.

Numerous housing developments in Goodyear, Avondale, Litchfield Park, and western Phoenix will soon fill vacant areas. Large scale master planned communities are planned in Avondale, Goodyear, and Buckeye as the urbanized area expands westerly along the I-10 corridor.

The resulting increased traffic demand in this area will tax the existing roadway facilities in the near future. Facilities such as I-10 are already experiencing directional rush hour congestion and poor levels of service. Pressure is growing in the impacted communities to expand the current arterial grid network, upgrade and construct new river crossings, and build and plan for high capacity roadways.

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Southwest Area Transportation Study

Figure 3-2 Roadway Base Map

Non-Residential Roadways
- Paved
- Unpaved
- MAG Southwest Study Area Boundary

Source: Maricopa Association of Governments

Engineers Planners Economists
Wilbur Smith Associates

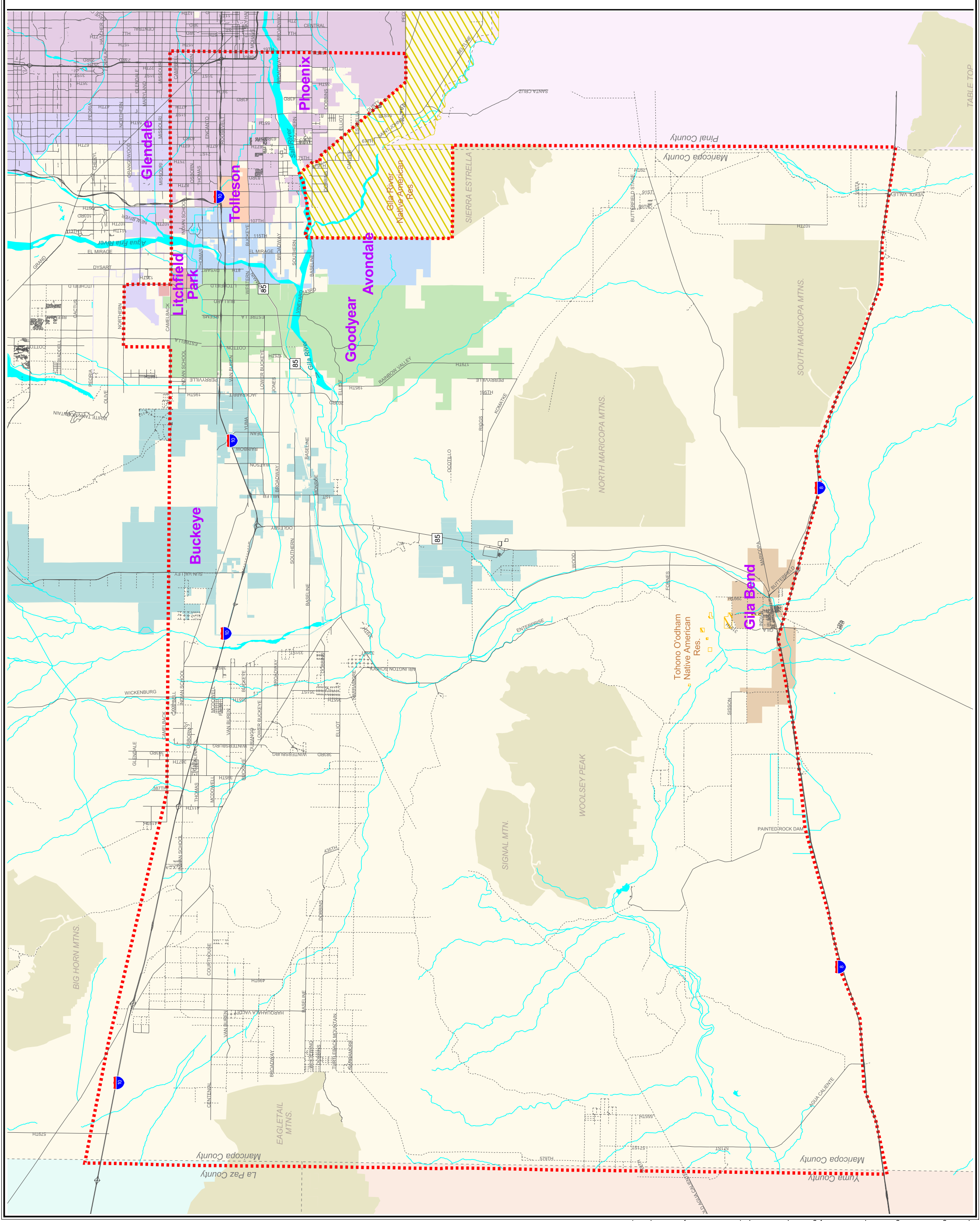

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Figure 3-3 displays the current roadway network based on MAG's current year transportation model network. The major freeway serving most of the study area is I-10. The I-10 corridor runs east and west through the northern portion of the study area, providing a high capacity, high speed connection between the study area and employment centers located in downtown Phoenix, east and west Phoenix, La Paz County, and beyond. Twenty-six full or partial interchanges exist on I-10 between I-17 to the east and La Paz County to the west. In the east, interchanges are at one mile intervals until 99th Avenue. West of 99th Avenue to approximately the 303 Loop and the Cotton Lane interchange, population density decreases and I-10 interchanges are spaced further apart. West of Buckeye Valley and the Hassayampa River, the distance between interchanges further increases, predominantly serving spot developments and the rural community.

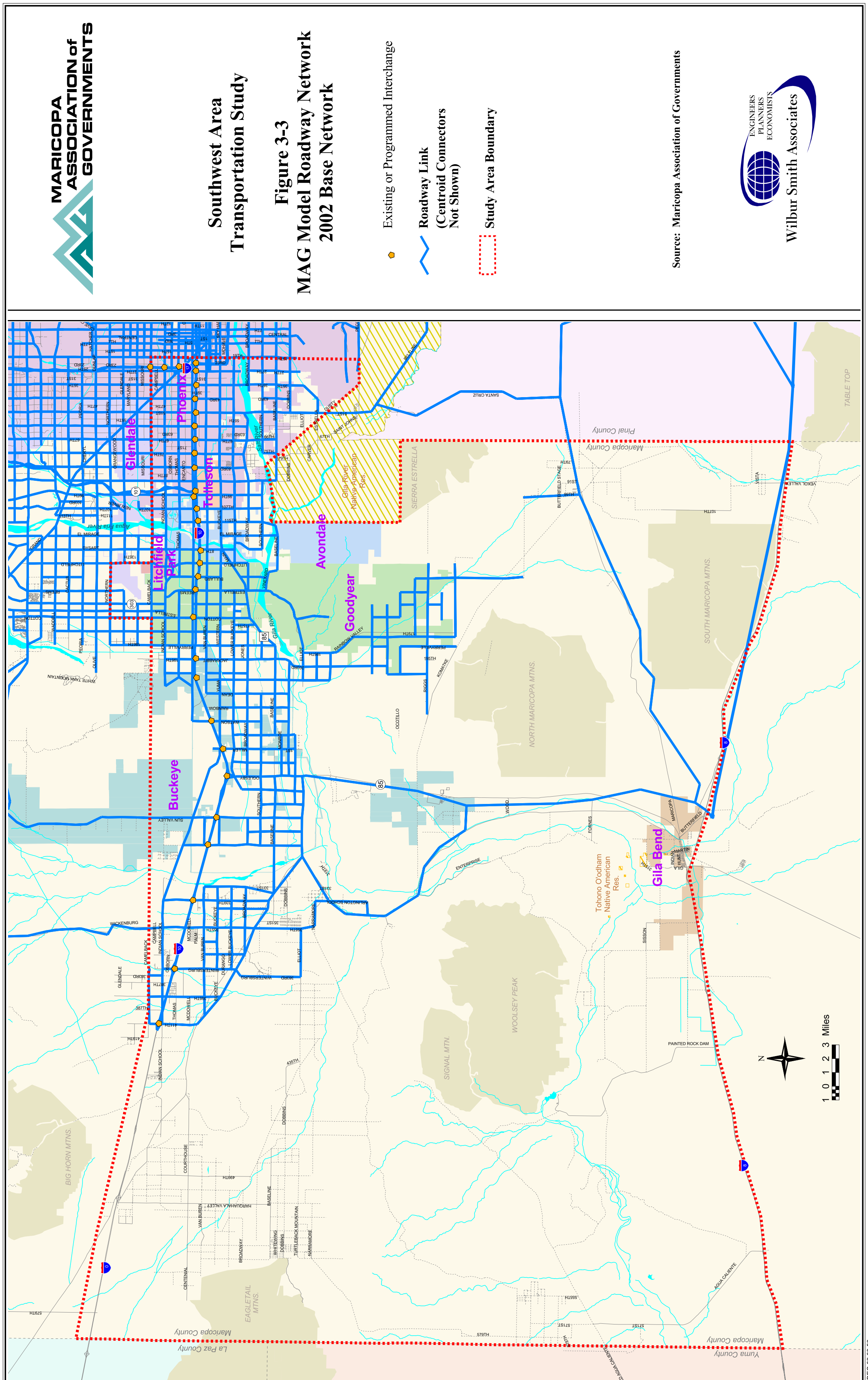
The only other east-west freeway segment, I-8, is located at the study area's southerly limit. I-8 serves as a major regional link connecting travel from the study area west to the southern California region and east toward Tucson. Few interchanges exist along this corridor due to the desert topography and the Barry M. Goldwater Gunnery Range located just to the south. Travel between the west Phoenix area and I-8 is served via State Route 85.

The I-17 and State Route Loop 101 freeways also traverse the study area, but for only short distances in the north-south direction. I-17 is located near the easterly limit of the study area serving as the main north-south artery for central Phoenix and areas north of the downtown area. Loop 101, approximately 9 miles to the west of I-17, currently terminates at I-10. Extending to the north, Loop 101 serves as a westerly by-pass to I-17, providing access to the northwestern suburbs of Phoenix. Interchanges are located at one mile intervals on both facilities.

There are two expressway facilities within the study area. These facilities do not display the typical expressway characteristics which include divided roadways, four or more lanes, and a high degree of access control. Loop 303 is a two lane north-south facility, located approximately 9 miles west of Loop 101. Loop 303 originates at the I-10/Cotton Lane interchange and extends north beyond the study boundary limits to US 60/Grand Avenue. This facility serves the northern portion of the Town of Goodyear, Luke Air Force Base, and towns north of the study area. Right-of-way has been secured for future expansion of the facility. South of I-10, alternatives are being studied to extend Loop 303 south to Maricopa County Route 85 (MC-85). No time frame has been established for this work to begin.

MC-85 is the other defined expressway facility in the study area. Beginning at State Route 85 (SR-85) approximately 3 miles south of I-10, it travels approximately 17 miles east before merging into the arterial network at the Agua Fria River crossing, east of the Phoenix-Goodyear Municipal Airport. This facility currently provides motorists an alternative east-west corridor south of I-10 to the western Phoenix area, downtown, and I-17.

The general layout of the arterial and collector roadway systems in the study area is largely consistent with the grid pattern existing throughout most of the metropolitan Phoenix region orientated in the cardinal directions. These roadways are designed to connect traffic to the major regional roadway facilities from local streets and from abutting properties. East of the Agua Fria and Gila Rivers the grid system is mostly complete, with some exceptions at the river crossings, thereby providing a full complement of both north-south and east-west movements. To the west of these rivers where geography permits, implementation of the grid pattern is under development, as communities rely on land developers to complete the network. As it is the only high capacity facility in the area, most roads are currently designed to funnel traffic toward I-10.


MARICOPA ASSOCIATION of GOVERNMENTS
Southwest Area Transportation Study
Figure 3-3
MAG Model Roadway Network
2002 Base Network
Existing or Programmed Interchange
Roadway Link (Centroid Connectors Not Shown)
Study Area Boundary
Source: Maricopa Association of Governments
ENGINEERS PLANNERS ECONOMISTS
Wilbur Smith Associates
Glendale
Phoenix
Tolleson
Litchfield Park
Avondale
Goodyear
Buckeye
Gila Bend
Gila River Native American Res.
Tohono O'odham Native American Res.
Pinal County
Maricopa County
Yuma County
La Paz County
SIERRA ESTRELLA
NORTH MARICOPA MTNS.
SOUTH MARICOPA MTNS.
WOOLSEY PEAK
SIGNAL MTN.
BIG HORN MTNS.
EAGLETAIL MTNS.
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Some isolated communities including the Estrella Mountain Ranch Development and other proposed developments have adopted curvilinear neighborhood street systems, somewhat inconsistent with the grid system. They are mostly self contained and have been planned with a street hierarchy acceptable to local officials and tying into the regional grid network.

Important arterials within the study area include SR-85 and Estrella Parkway. SR-85 serves as the main north-south corridor between I-8 at Gila Bend connecting to I-10 at milepost 112. This roadway segment primarily consists of a two lane cross section and paved shoulders with intermittent passing lanes in either direction. Estrella Parkway has four lanes serving the southern Goodyear communities south and west of Estrella Mountain before crossing the Gila River and narrowing to two lanes with bike lanes south of I-10. This road is projected to carry heavy traffic volumes for the large master planned communities in the area. Grand Avenue (US Route 60) is a major arterial slicing through the northeast section of the study area for approximately 4 miles at a 45 degree angle to the grid system, paralleling the BNSF Railroad right-of-way. This alignment creates a number of six legged at-grade intersections. Future plans include constructing grade separated intersections at Thomas Road/27th Avenue and at Camelback Road/43rd Avenue to reduce congestion.

MAG has identified a number of roadways within the study area as important to the mobility of the area. Approved in 1999, Roads of Regional Significance (RRS) typically constitute higher roadway design criteria expected to facilitate movement within the urbanized areas, supplementing the freeway system. Roads of Regional Significance identified within the study area include:

- Jackrabbit Trail – between Olive Avenue and MC85;
- Cotton Lane and Loop 303 – from north of the study area boundary south to I-10;
- Dysart Road – from MC-85 north to the study area boundary;
- 99th Avenue – between I-10 and Baseline Road;
- 59th Avenue – north of I-10 to the study area boundary;
- 19th Avenue – from Baseline Road north to the study area boundary;
- Sun Valley Parkway – from I-10 north to the study area boundary;
- Indian School Road – from Jackrabbit Trail (195th Avenue) east to the study area boundary; and
- MC-85 – between SR-85 and I-17.

A six lane divided cross-section with bike lanes, a 140-foot right-of-way, and limited access is the typical design. Implementation of this system has been limited to date.

A similar system, called Arterial Roadway Corridors (ARCs) has also been defined for this study. These routes have been identified potentially for substantial improvements designed to handle higher volumes at somewhat higher speeds than typical arterial roadways. Potential ARC routes in the study area include:

- McDowell Road east of Sun Valley Parkway beyond the eastern study area boundary;
- Yuma Road east of SR-85, following Buckeye Road east beyond the study area boundary;
- Beloat Road east of SR-85 to Jackrabbit Trail;
- Maricopa-85 east of Jackrabbit Trail to Estrella Parkway;
- 59th Avenue north of I-10 beyond the study area boundary;

- Dysart Road north of Broadway beyond the study area boundary;
- Estrella Parkway south of I-10 to Elliot Road, continuing on Eliott Road to Rainbow Valley Road;
- Perryville Road from north of the study area to I-10 and to the south on either Perryville Road or Jackrabbit Trail connecting to Rainbow Valley Road to the south; and
- Miller Road from I-10 south to Beloat Road.

Some portions of the arterial roadways on the ARC system do not currently exist, while others are not yet constructed to the design standard envisioned for ARC roadways.

Figure 3-4 displays the future LRTP based roadway network projected to be completed and used for all future year traffic forecasts. Additions and changes from the existing roadway network reflect programmed and planned improvements, including some changes identified by local jurisdictions.

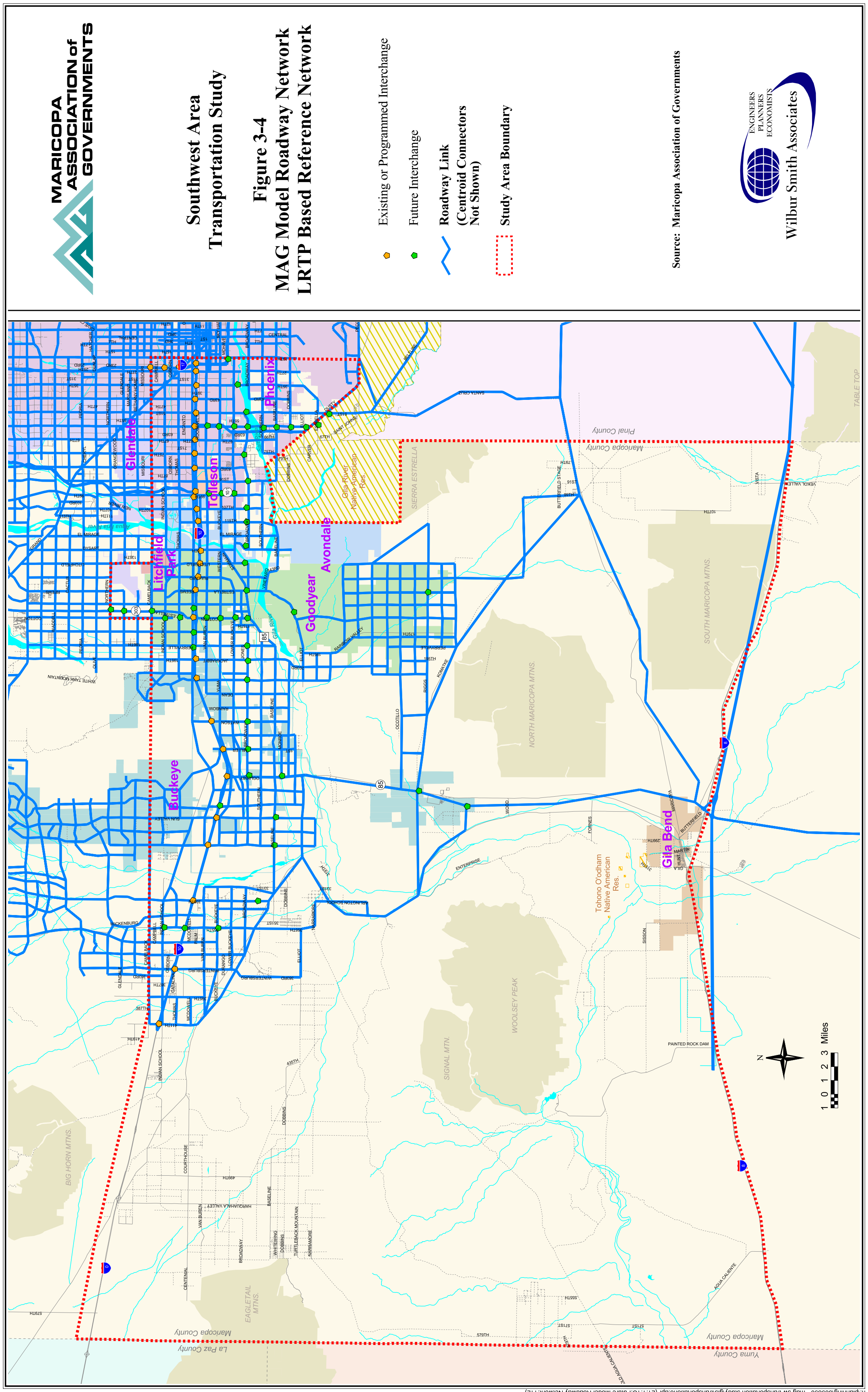
Figure 3-5 highlights new roadways included in the future LRTP based network. One new high capacity, high speed roadway is shown in the study area. Work on the Santan Freeway, east of the study area, is currently advancing with a scheduled completion date of 2007. The western extension of this freeway, the South Mountain Bypass (Loop 202), will serve the study area. Although funding has not been established, implementation of this facility will provide a southerly by-pass of downtown Phoenix. Final alignment is currently under investigation.

Other new roadways in the future LRTP based network include the addition of arterial and collector roads north of I-10 on either side of the White Tank Mountains. New roadway segments along Grand Avenue reflect the planned replacement of some signalized at-grade intersections with overpasses. Construction of 195th Avenue north of Indian School Road and connections to the east are included. Other localized improvements are shown in the figure. Figure 3-5 also displays extensions of the region's HOV lanes on I-10, I-17, and Loop 101 in the future LRTP based network.

Additional characteristics of the roadways in the study area are noteworthy. These include the extensive river crossings, scalloped street curb lines, and the variety of area types found within the study area. Four rivers, the Salt, the Agua Fria, the Hassayampa, and the Gila, flow through the more populated northerly section of the study area. Rivers are a natural impediment to travel.

Overcoming this impediment opens up new lands for development, but represents a substantial investment in the bridges needed to accomplish the task.

The Salt River (also known as Rio Salado) enters the study area in the northeast corner, meanders in a southwesterly direction for approximately 10 miles south of the I-10 corridor, and flows into the Gila River at approximately 107th Avenue. The Agua Fria River, traveling in a southerly direction, enters the study area at Camelback Road and 115th Avenue before combining with the Gila River in southwest Avondale near the intersections of Litchfield Road and Indian Springs Roads. The Gila River, entering the study area from the Gila River Indian Community flows in a northwesterly direction until it is joined by the Salt River. The Gila then travels in a westerly direction and is joined by the Agua Fria River. The Gila continues west past SR-85 and is joined by the Hassayampa River before turning south toward Gila Bend.


MARICOPA ASSOCIATION of GOVERNMENTS
Southwest Area Transportation Study
Figure 3-4
MAG Model Roadway Network
LRTP Based Reference Network
Existing or Programmed Interchange
Future Interchange
Roadway Link (Centroid Connectors Not Shown)
Study Area Boundary
Source: Maricopa Association of Governments
ENGINEERS PLANNERS ECONOMISTS
Wilbur Smith Associates
Glendale
Tolleson
Phoenix
Litchfield Park
Avondale
Goodyear
Buckeye
Gila Bend
Gila River Native American Res.
Tohono O'odham Native American Res.
SIERRA ESTRELLA
NORTH MARICOPA MTNS.
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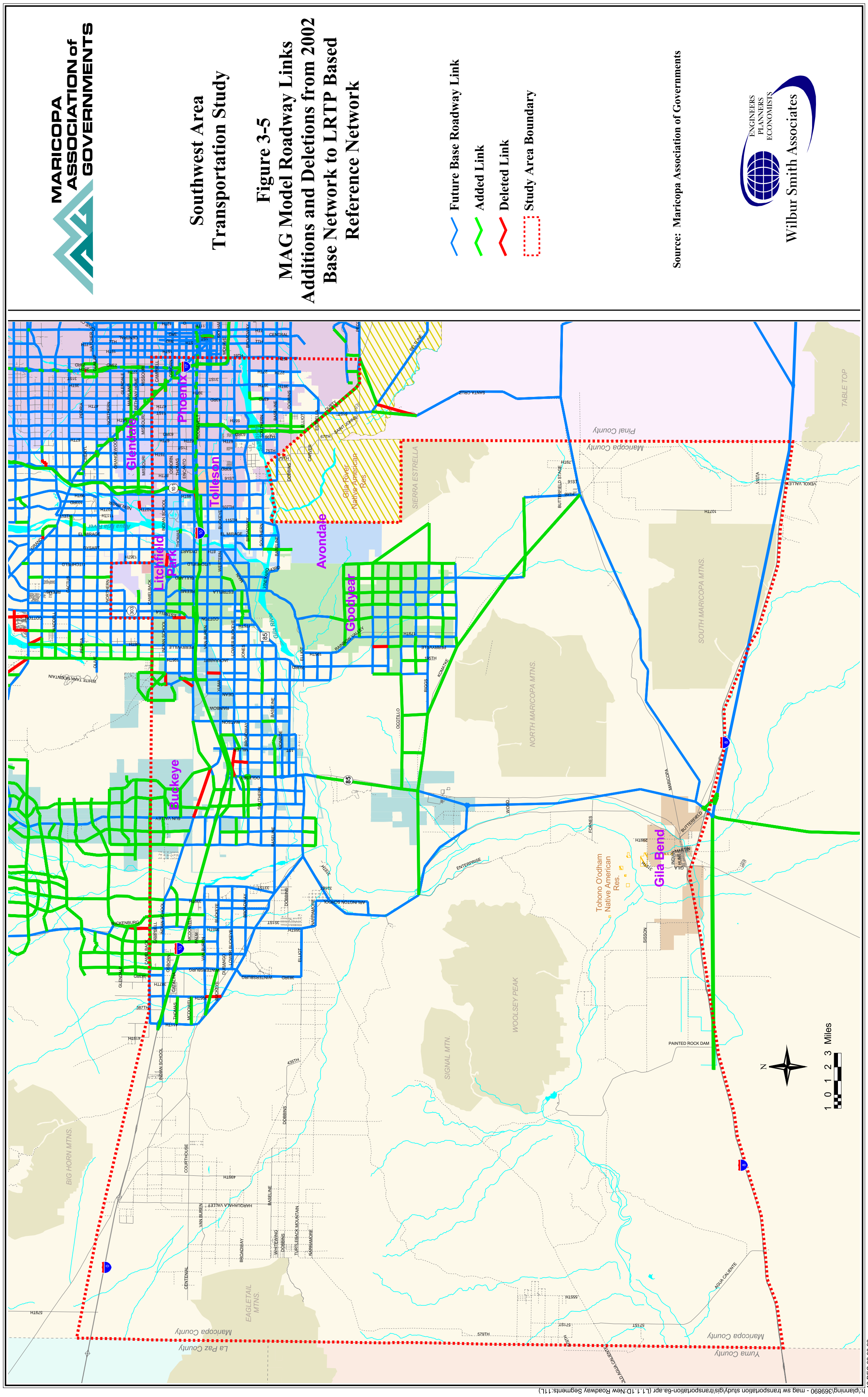

MARICOPA ASSOCIATION of GOVERNMENTS
Southwest Area Transportation Study
Figure 3-5
MAG Model Roadway Links Additions and Deletions from 2002 Base Network to LRTP Based Reference Network
Future Base Roadway Link
Added Link
Deleted Link
Study Area Boundary
Source: Maricopa Association of Governments
ENGINEERS PLANNERS ECONOMISTS
Wilbur Smith Associates
Glendale
Phoenix
Tolleson
Litchfield Park
Avondale
Goodyear
Buckeye
Gila Bend
Gila River Native American Res.
Tohono O'odham Native American Res.
Maricopa County
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River crossings in the more developed northeastern portion of the study area are identified below. Salt River roadway crossings, from east to west include:

- 19th Avenue;
- 35th Avenue;
- 51st Avenue;
- 67th Avenue; and
- 91st Avenue.

Agua Fria River crossings, from north to south include:

- Camelback Road;
- Indian School Road;
- McDowell Road;
- I-10;
- Van Buren Street;
- Buckeye Road; and
- Lower Buckeye Road.

Gila River crossings, from east to west include:

- 115th Avenue;
- 123rd Avenue (El Mirage Road);
- Bullard Avenue (147th Avenue);
- Estrella Parkway;
- Tuthill Road/Jackrabbit Trail;
- Airport Road; and
- SR-85.

Another characteristic of roadways in developing parts of the Phoenix metropolitan area, including the study area, is the widening of sections of arterial roadways in a piecemeal fashion, resulting in "scalloped" curb lines. This happens when development occurs along a rural two lane arterial roadway, typically with 66 feet of right-of-way. As a parcel develops, the responsible public agency typically requires the developer to dedicate additional right-of-way and widen the roadway on the side being developed. This additional dedicated right-of-way is typically enough to provide half of a 120 to 140-foot ultimate right-of-way. The developer's construction of abutting roadway results in some sections which are widened to two or three lanes in one direction on a half-section of 60 to 70 foot right-of-way, while the opposite side or adjacent section may remain only one lane on a 33-foot half section of right-of-way. The resulting irregular curb line is a condition commonly referred to as "scalloped street" or "scalloped curb line". The capacity of the roadway is limited by the section with the least capacity and the shifting pavement edge can be hazardous for bicyclists moving laterally in and out of travel lanes.

A third noteworthy roadway characteristic involves the differences between roads in the lightly developed portions of the study area and the more intensely developed urban areas. As one travels east and north through the study area, land use, development intensity, travel patterns, and roadway characteristics change. Curb and gutter increasingly capture roadway runoff, intersection control changes from stop control to signal control, and an increase in the number of lanes is required to serve additional traffic demand. As population and employment centers become more intense, the movements of a greater number of people occur in less space. Vehicle occupancy increases and higher levels of public transit are available. An increase of pedestrian trips is observed and there are more conflicts between vehicles and pedestrians for street space. Extended pedestrian crossing times at traffic signals reduce vehicle capacity. Although these changes generally occur as one moves toward the northeast corner of the study area, there are pockets of older development throughout the study area that exhibit some of these more intense transportation characteristics, such as Tolleson and Avondale.

The study area's roadway network is extensive. The following sections provide additional details on particular aspects of the current and future LRTP based roadway networks.

3.1.1.2 Functional Classification

Roadways are classified according to function served in the circulation system. On the lower end of the functional classification system are local streets whose principal function is to provide access to abutting property. At the higher end of the system are freeways whose principal function is to move traffic longer distances at higher rates of speed. Each class fits into a hierarchy of vehicular speed and lane capacity based on design characteristics.

MAG uses ten "facility types" that, in part, represent the functional classes of roadways included in the network component of the MAG travel demand model. MAG's facility types include freeways, hov lanes, expressways, arterials (of two types as described below), and collectors. These facility types are used to describe the functional class of roadways in the study area. Each of these classes is defined below consistent with generally accepted definitions found in the transportation literature. Local streets are not included in the MAG model network, but these are mostly low speed, two lane roads providing property access. Four of MAG's facility types (centroid connectors, freeway ramps, ramp meters, and river crossings) are not used to describe the functional class of roadways.

- Freeway – A high speed, high capacity roadway with full access control. The main purpose of these facilities is to serve the movement of goods and people over longer distances both between regions and over longer distances within regions. This roadway type serves travel to and from destinations of longer trip length.
- High Occupancy Lanes (HOV) – Exclusive lanes currently found on freeways designated for buses, motorcycles, and passenger vehicles with occupancy of two passengers or more during peak travel demand periods. During off peak periods, the HOV lanes function as general purpose lanes without occupancy restriction. Exclusive HOV ramp systems are present on some freeway to freeway connections to increase safety and facilitate movement. These lanes provide less congested traffic service to vehicles serving more than a single passenger.
- Expressway – A high speed, high capacity roadway with partial access control. Expressways may contain at-grade intersections and median separation between travel directions. This facility type serves longer distance travel mostly within a region. Some expressways include a bike lane.
- Arterial – A medium capacity, mid-speed roadway connecting freeways or expressways to other less significant road classifications. These roads serve medium length trips, may have partial access control, and usually include at-grade signalized intersections. The arterial

system in the SWATS area is generally a grid at 1 mile intervals within more developed areas of the region. Arterials typically have a minimum four, and typical six, lane cross section. Many arterials include bike lanes. MAG's model separately classifies arterials into major arterials and arterials with a six-legged intersection.

- Collector – A lower volume, lower speed roadway as compared to arterials designed to distribute traffic to other lower class roads, and to provide access to employment centers and abutting properties. These roadways can be located at the mile or half-mile section within developed areas or serve as the major roadway connection in more rural areas.

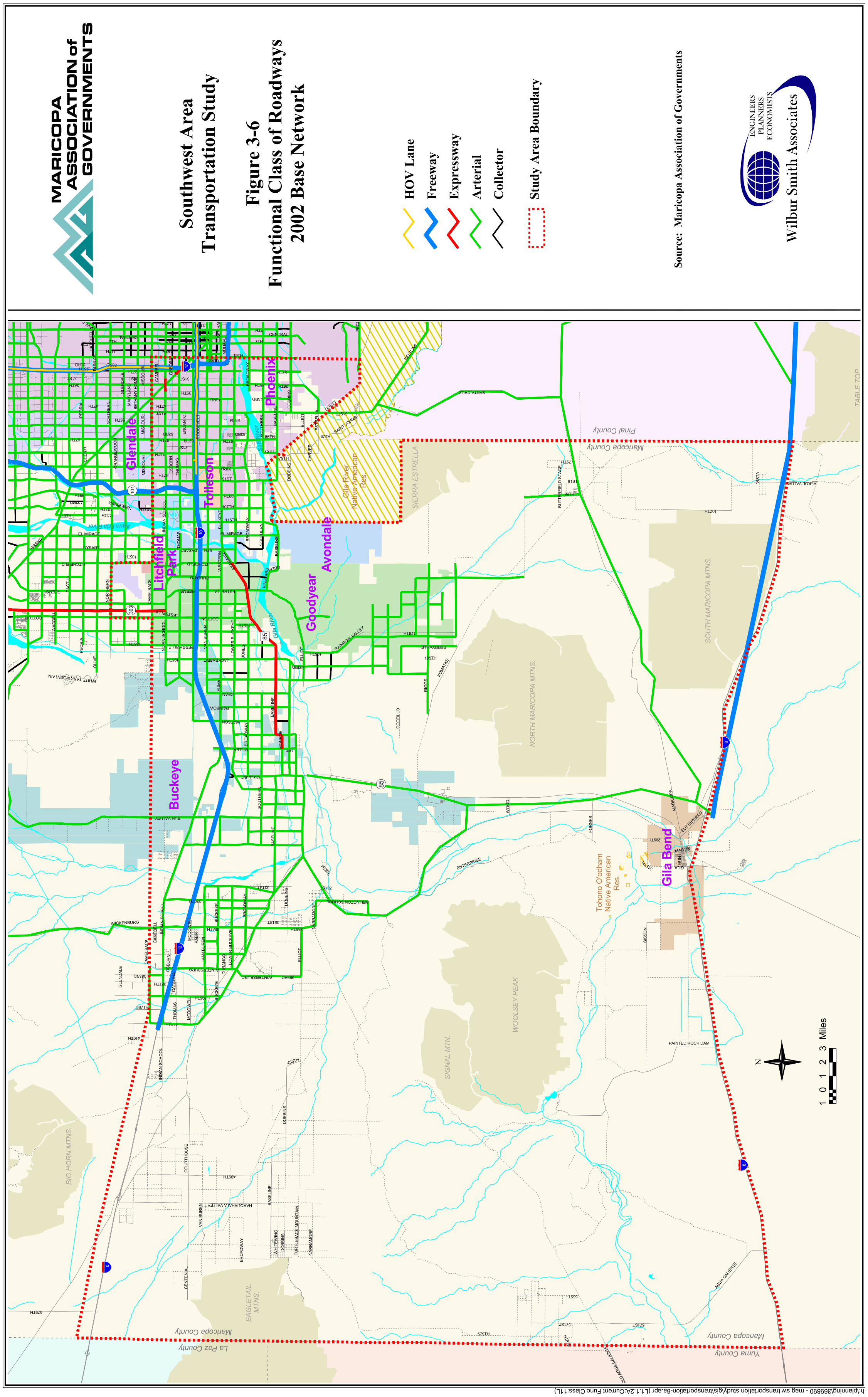
Figure 3-6 shows the functional classification of the existing roadway network. The data are taken from the MAG travel model network. The area covered by MAG's model does not include the entire study area, particularly the less developed areas to the south and west. (Data on roadway mileage by functional class are presented in the following sections.) This figure shows a concentration of roadways in the northeasterly portion of the study area north of the Salt and Gila Rivers and east of Cotton Lane. In this area there is a fairly complete arterial grid network and a full complement of all roadway classification types. Developing areas south and west of this quadrant, including the areas of Avondale, Goodyear, and Buckeye, provide arterial and collector roadways focused on directing traffic toward I-10 then east toward the Phoenix area. Isolated rural development south and west of the I-10 corridor contains mostly lower classification roadways. Only one major road, State Route 85 connects the northern and southern portions of the study area. In the rural desert areas of the southern portion of the study area, there are only two roads of higher functional class: Maricopa Road (SR-238) and I-8. The area west of SR-85 contains farmland and desert space, with a scattering of two lane roads, both paved and unpaved.

Figure 3-7 illustrates the functional class of roadways in MAG's future LRTP based roadway network. In some instances, the roadway classification has changed between the current and the future LRTP based networks. These changes can be attributed to improvements currently programmed into agency budgets or to other anticipated improvements that have a high probability of being implemented by developers and governmental agencies. Review of Figure 3-7 reveals that most new road development is limited to the northeast portion of the study area. New roadway segments are also identified north of I-10 near Buckeye and in south Goodyear as a result of planned developments in the area. Continued upgrading of the arterial grid network from the existing condition is projected. The southern portion of the study area is not currently planned for major development and is likely to remain largely without major new road construction.

To better identify the changes in functional class between the current and future LRTP based networks, Figure 3-8 identifies roadway segments that have been upgraded in functional classification (higher speed and capacity) or are new, as well as roadways that have been downgraded in functional class.

Below are the major upgrades in functional class between the current and future LRTP based roadway networks:

- South Mountain Bypass from I-10 in the east to I-10 connection at 55th Avenue (new);
- I-10 HOV Lanes from Loop 101 to 411th Avenue (new);
- Loop 101 HOV Lanes from I-10 north (new);
- SR-85 from I-10 to Komatke Road (upgrade from arterial to freeway);
- SR-85 from Maricopa Road to I-8 (arterial to freeway);


MARICOPA ASSOCIATION of GOVERNMENTS
Southwest Area Transportation Study
Figure 3-6
Functional Class of Roadways
2002 Base Network
HOV Lane
Freeway
Expressway
Arterial
Collector
Study Area Boundary
Source: Maricopa Association of Governments
ENGINEERS PLANNERS ECONOMISTS
Wilbur Smith Associates
Glendale
Tolleson
Phoenix
Litchfield Park
Avondale
Goodyear
Buckeye
Gila Bend
Gila River Native American Res.
Tohono O'odham Native American Res.
SIERRA ESTRELLA
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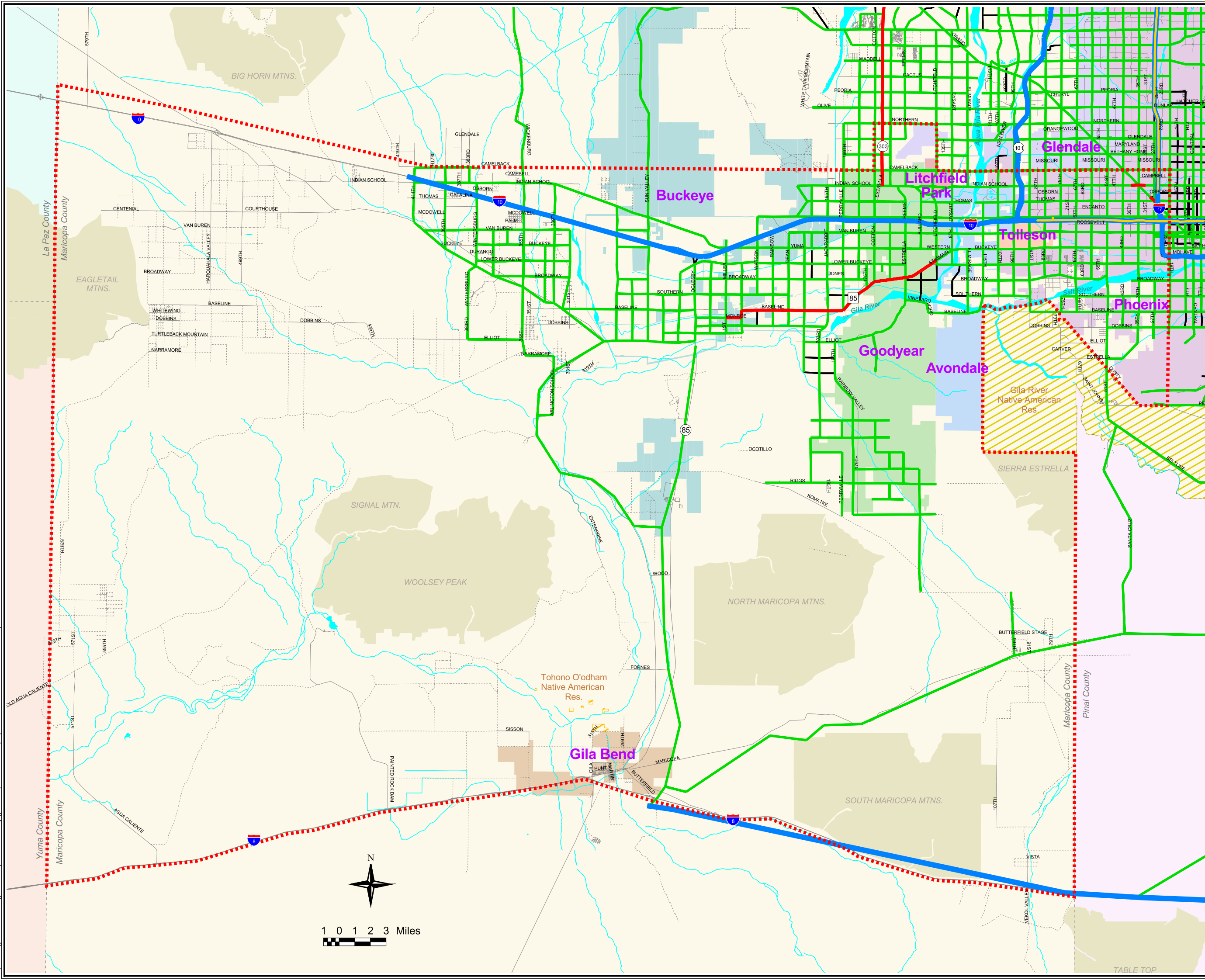
MARICOPA ASSOCIATION of GOVERNMENTS

Southwest Area Transportation Study

Figure 3-7
Functional Class of Roadways
LRTP Based Reference Network



HOV Lane
Freeway
Expressway
Arterial
Collector
Study Area Boundary

Source: Maricopa Association of Governments

Wilbur Smith Associates
ENGINEERS PLANNERS ECONOMISTS

h:\planning\369890 - mag sw transportation study\gis\transportation-6a.apr (L1.1.2A Current Func Class:11L)
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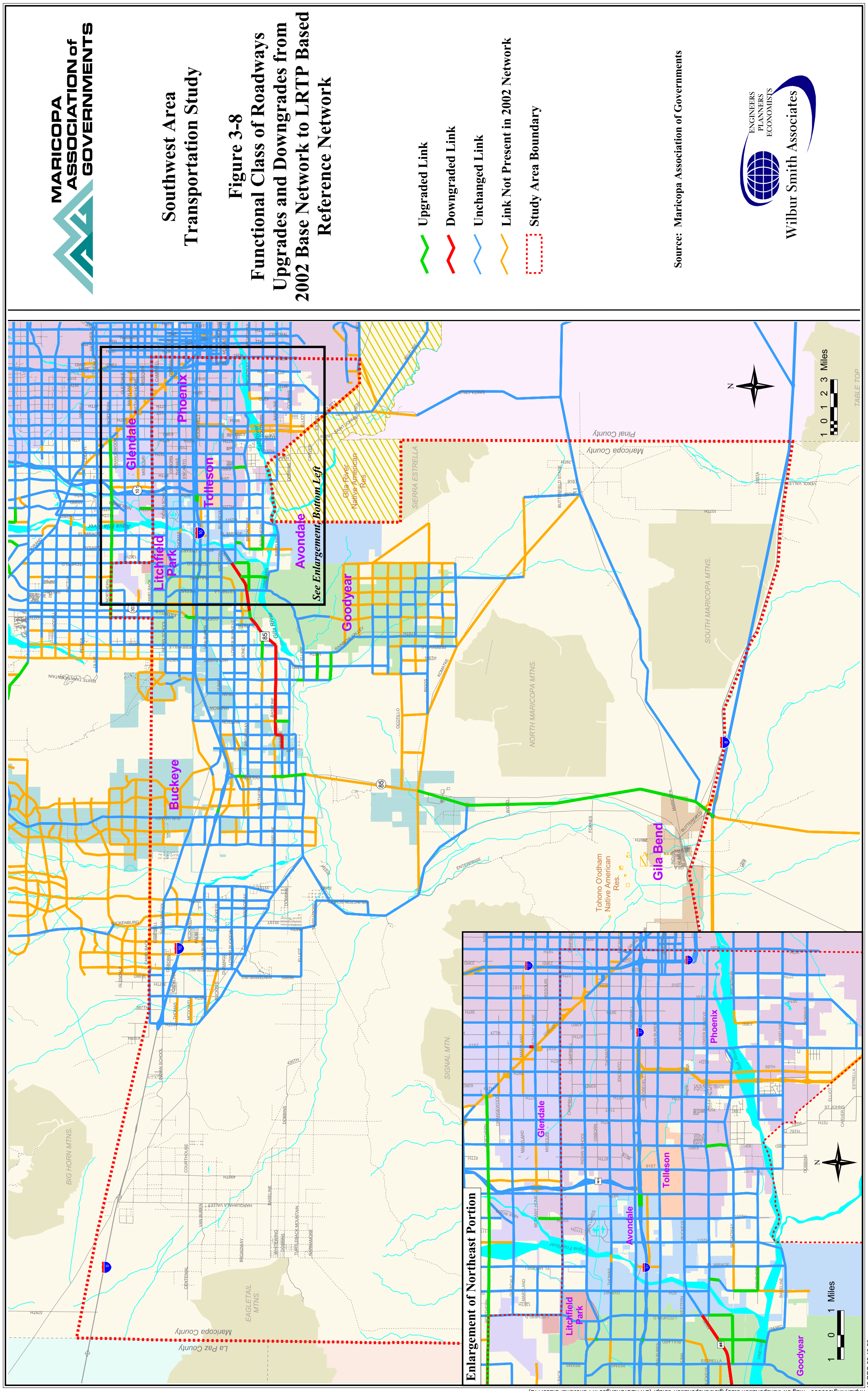

MARICOPA ASSOCIATION of GOVERNMENTS
Southwest Area Transportation Study
Figure 3-8
Functional Class of Roadways Upgrades and Downgrades from 2002 Base Network to LRTP Based Reference Network
Upgraded Link
Downgraded Link
Unchanged Link
Link Not Present in 2002 Network
Study Area Boundary
Source: Maricopa Association of Governments
ENGINEERS PLANNERS ECONOMISTS
Wilbur Smith Associates
Glendale
Phoenix
Tolleson
Litchfield Park
Avondale
Goodyear
Buckeye
Gila Bend
See Enlargement Bottom Left
Gila River Native American Res.
Tohono O'odham Native American Res.
SIERRA ESTRELLA
NORTH MARICOPA MTNS.
SOUTH MARICOPA MTNS.
SIGNAL MTN.
BIG HORN MTNS.
EAGLETAIL MTNS.
TABLE TOP
Maricopa County
Pinal County
La Paz County
Miles
Enlargement of Northeast Portion
12 DEC 02 13:58

- Upgrades of several collector roads to arterial status in Goodyear;
- Grand Avenue (US 60) from 6 legged arterial to arterial with some expressway segments;
- Continuation of the grid system north of I-10 in the Buckeye area;
- I-10 / I-17 ramp to ramp HOV lanes; and
- Numerous new freeway ramp metering locations.

Figure 3-8 and the above list provide a representation of projected roadway construction. Only one newly planned expressway or freeway facility is projected, the South Mountain Bypass. This facility is included in the future LRTP based network as a loop to the southwest of central Phoenix, connecting I-10 at 55th Avenue to the Santan Freeway in Chandler, running adjacent to the northern section of the Gila River Indian Community. Alternative alignments are currently being studied and a preferred alternative will not be available within the timeframe of this study. This roadway is projected to help relieve congestion in the South Mountain Park and south Phoenix areas. Only one roadway is projected to be upgraded from its current arterial classification to freeway status, SR-85. Approximately 13.5 miles of SR-85 is projected to be constructed as freeway between I-10 and Komatke Road and approximately 3 miles north of I-8 in Gila Bend. This leaves 17 miles of SR-85 as arterial. The expansion and filling of the existing arterial grid network is also anticipated. The only additional river crossings projected in MAG's future LRTP based roadway network in addition to the South Mountain Bypass crossing of the Salt River is a parallel crossing on 59th Avenue and a Gila River crossing at Cotton Lane.

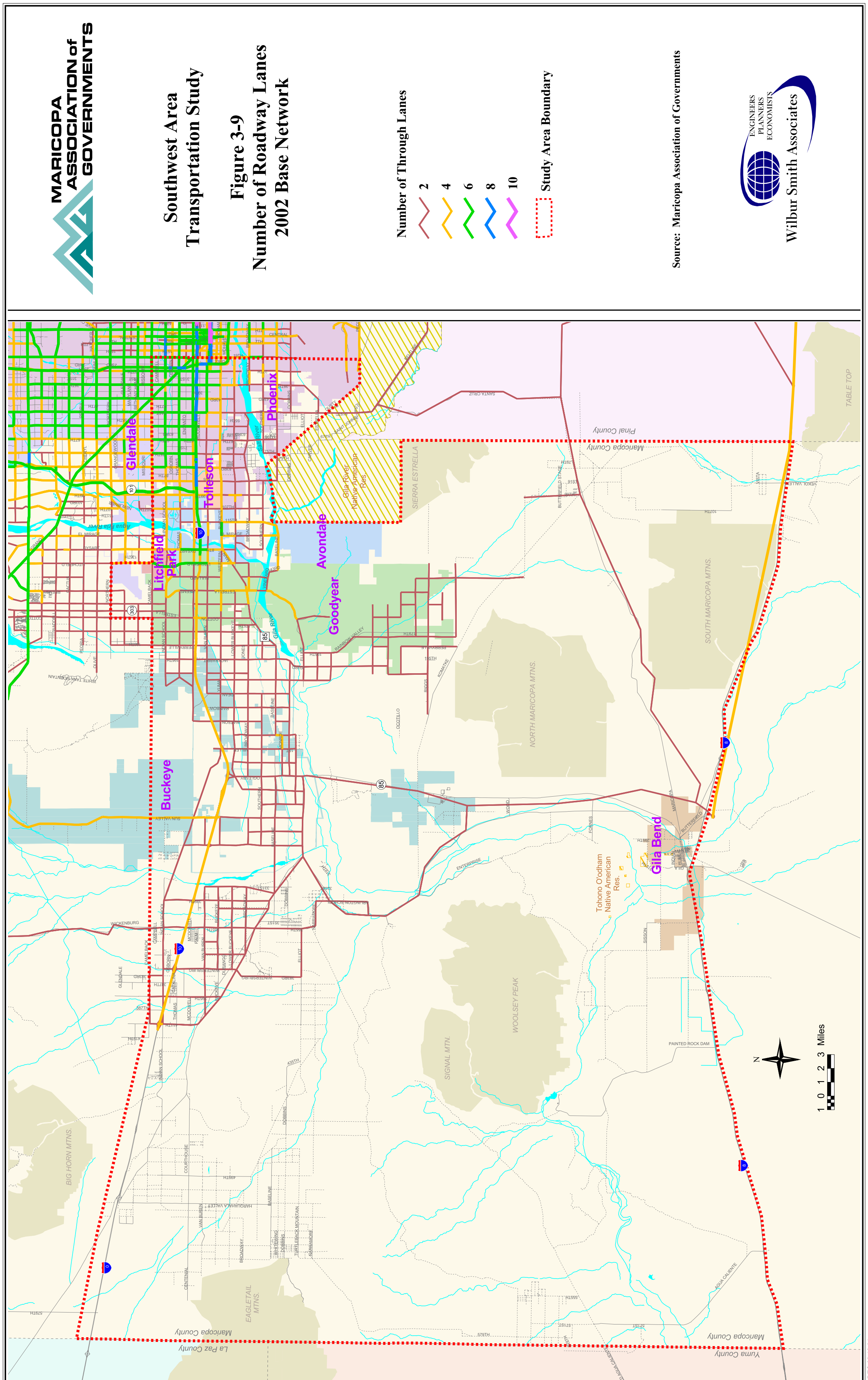
3.1.1.3 Number of Lanes

The current and future number of through travel lanes in each direction have been extracted from MAG's traffic model for both the current and future LRTP based networks. Figure 3-9 shows the number of travel lanes in each mid-block section of the current roadway system. Roadways in the study area but outside the area modeled in the MAG network are not shown in the figure. Generally, such roadways have a single lane in each direction, except for the highest functional classes such as freeways. The lowest functional class roadways, local streets, are not shown in the figure since they are rarely included in the MAG network. Most of those roadways have a single lane in each direction. Auxiliary or turn lanes at intersections and other locations are not shown in the figure. The figure does not reflect mid-block changes in lanes created by spot development of abutting land or by other causes of irregular pavement width. Figure 3-10 shows the travel lanes assumed in MAG's future LRTP based network.

Review of the existing lane configuration indicates the number of travel lanes in the study area varies within each of the functional classes, with a higher concentration of multi-lane facilities in the more populated areas.

The major east-west freeway in the study area, I-10, varies in the number of lanes, decreasing in number as the distance from central Phoenix increases. Four general purpose through lanes are carried in each direction at the eastern boundary of the study area (at 19th Avenue) to the interchange with Loop 101, where the number of lanes falls to three. The three lanes are carried through the cities of Tolleson and Avondale and are reduced to two lanes west of the Agua Fria River crossing. I-10 then remains two lanes in each direction as it continues westward through the study area.

HOV lanes in the study area are confined to I-10 and I-17 freeway sections. On I-17 HOV lanes are provided north of Thomas Road. On I-10 HOV lanes are provided west of central Phoenix to Loop


MARICOPA ASSOCIATION of GOVERNMENTS
Southwest Area Transportation Study
Figure 3-9
Number of Roadway Lanes
2002 Base Network
Number of Through Lanes
2
4
6
8
10
Study Area Boundary
Source: Maricopa Association of Governments
ENGINEERS PLANNERS ECONOMISTS
Wilbur Smith Associates
Glendale
Phoenix
Tolleson
Litchfield Park
Avondale
Goodyear
Buckeye
Gila Bend
Gila River Native American Res.
Tohono O'odham Native American Res.
Maricopa County
Pinal County
La Paz County
Yuma County
NORTH MARICOPA MTNS.
SOUTH MARICOPA MTNS.
SIERRA ESTRELLA
WOOLSEY PEAK
SIGNAL MTN.
BIG HORN MTNS.
EAGLETAIL MTNS.
TABLE TOP
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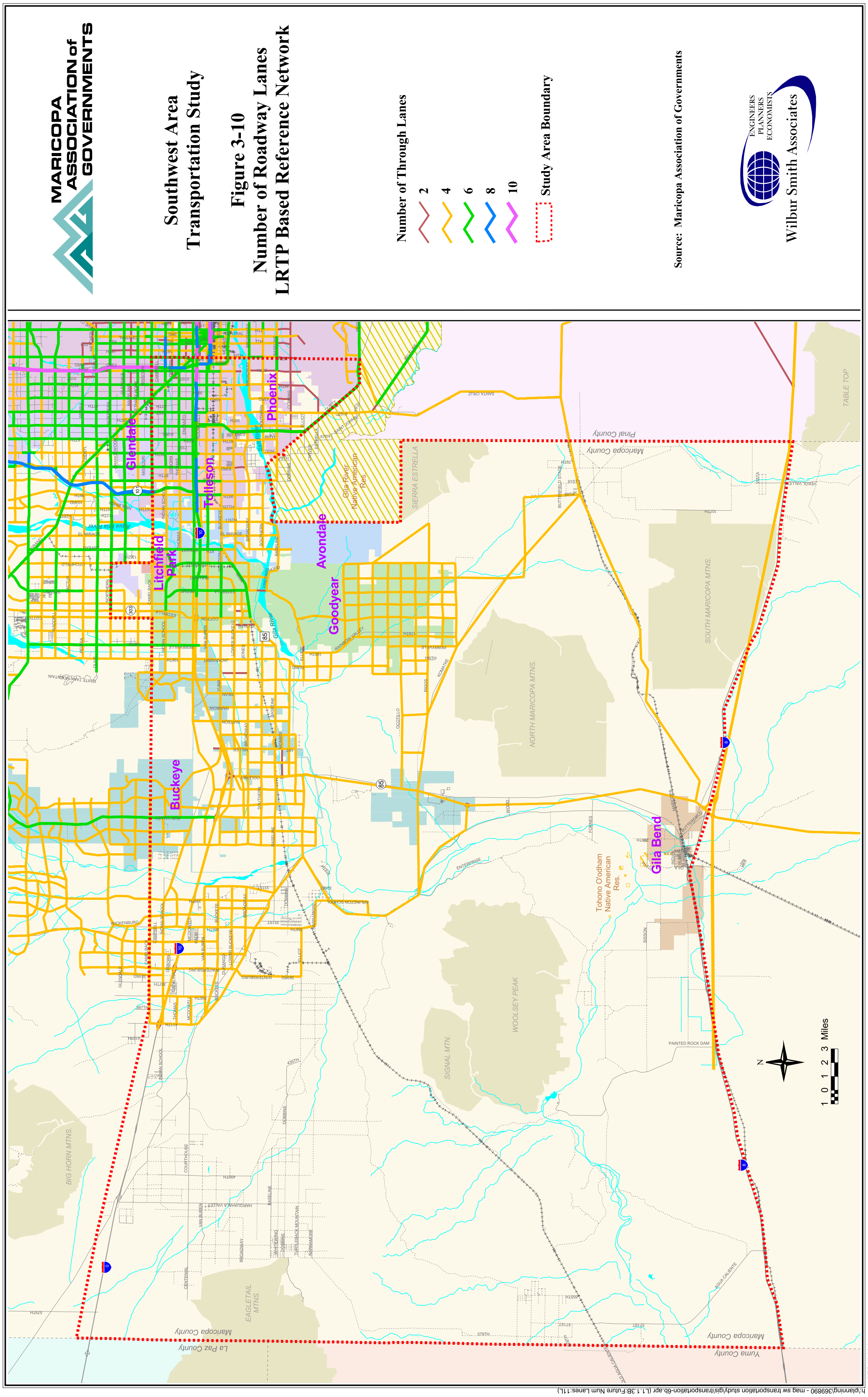
1 0 1 2 3 Miles


MARICOPA ASSOCIATION of GOVERNMENTS
Southwest Area Transportation Study
Figure 3-10
Number of Roadway Lanes
LRTP Based Reference Network
Number of Through Lanes
2
4
6
8
10
Study Area Boundary
Source: Maricopa Association of Governments
ENGINEERS PLANNERS ECONOMISTS
Wilbur Smith Associates
Glendale
Phoenix
Tolleson
Litchfield Park
Avondale
Goodyear
Buckeye
Gila Bend
Gila River Native American Res.
Tohono O'odham Native American Res.
SIERRA ESTRELLA
NORTH MARICOPA MTNS.
SOUTH MARICOPA MTNS.
WOOLSEY PEAK
SIGNAL MTN.
BIG HORN MTNS.
EAGLETAIL MTNS.
TABLE TOP
Maricopa County
Pinal County
La Paz County
Yuma County
Miles
11 DEC 02 12:34

101. One HOV travel lane is provided in each direction. Lane widths for this roadway type follow typical design standards and are a minimum 12 feet in width. They are located on the inside of the highway beside the median or center divider.

Designated expressways in the existing condition are mostly two lane roadways, with some four lane segments. MC-85 has variable pavement width with an irregular cross section west of its crossing over the Agua Fria River, from which it maintains four lanes to the east. Loop 303 is a two lane facility currently being upgraded to a four lane divided facility from Indian School to McDowell Road.

Arterial and collector road widths vary with adjacent development and population as to their number of lanes. In the extreme northeast section of the study area, each arterial provides 6 lanes. South of I-10 and west of the Loop 101, the arterial grid reduces to a 2 or 4 lane cross section. West of the Town of Goodyear, the majority of roads provide for only a single travel lane in each direction.

Review of MAG's future LRTP based roadway network reveals that significant construction is projected to add lanes to existing roadways. In the more populated northeast, many arterial level roads will provide for an additional travel lane in both directions. Many roads in the less populated areas west of SR-85 show an increase in lanes. Figure 3-11 displays roadway segments projected to be widened or narrowed in MAG's future LRTP based network.

3.1.1.4 Centerline and Lane Miles

Table 3-1 shows the centerline miles of the current roadway by functional class by area type in the study area based on MAG's traffic model. Because the MAG model does not cover 100 percent of the study area and the model network is the source for these data, mileages by functional class and area type in rural areas are understated. Mileages of unclassified streets represent the difference between total roadway centerline miles in the MAG roadway database and the sum of all classes as shown in Table 3-1. The table shows that there are currently over 4,000 centerline miles of streets and highways in the study area, and that 1,000 of those miles (or 25%) are of a functional class higher than local streets.

Table 3-1
Current 2002 Base Network Centerline Roadway Miles
by Functional Class by Area Type

Facility/Area Type	CBD	Urban	Urban Fringe	Suburban	Rural	Total
Freeway with HOV	0.7	4.8	2.8	1.8	0.0	10.1
Freeway no HOV	3.8	1.3	1.1	10.2	62.9	79.3
Expressway	1.1	0.9	0.0	0.0	19.0	21.0
Arterial	4.4	41.2	35.9	145.8	634.6	861.8
Collector	2.0	4.1	1.9	4.7	13.8	26.5
Total Classified	**12.0**	**52.4**	**41.6**	**162.4**	**730.3**	**998.8**
Unclassified						3,023.3
Total						**4,022.1**

Source: MAG

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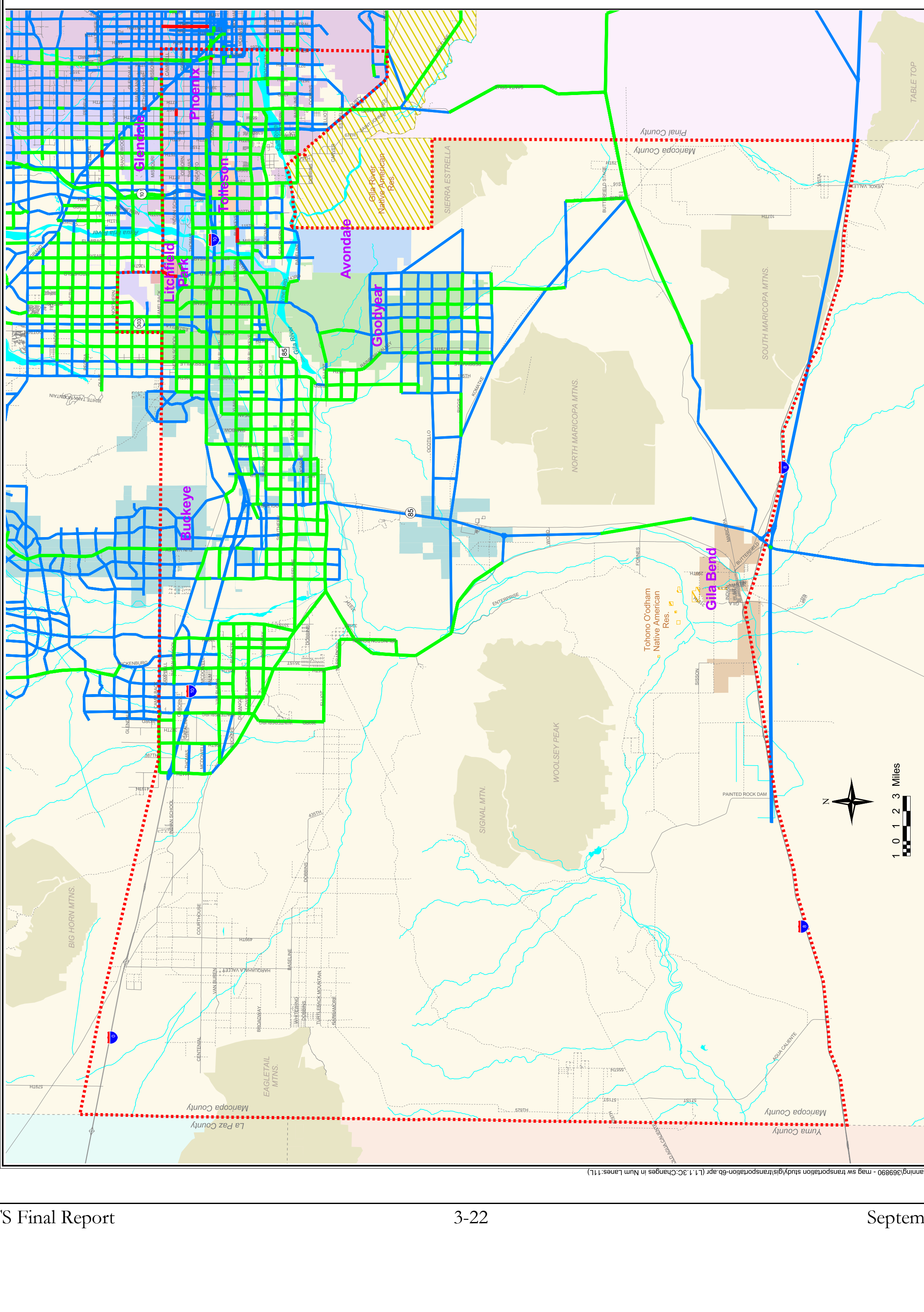
Southwest Area Transportation Study

Figure 3-11
Number of Roadway Lanes Widenings from 2002 Base Network to LRTP Based Reference Network

- Future Base Roadway Link
- Widened Link
- Narrowed Link
- Study Area Boundary

Source: Maricopa Association of Governments

Wilbur Smith Associates
ENGINEERS PLANNERS ECONOMISTS



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Area type reflects five different kinds of development ranging from the central business district (CBD) to rural. Table 3-2 shows centerline miles from MAG's future LRTP based network. That table shows 291.6 more centerline miles of the covered classes than are shown in the current network (as depicted in Table 3-1). The substantial changes in centerline miles by area type indicate extensive modification to the boundaries of the area types.

Table 3-2
LRTP Based Reference Network Centerline Roadway Miles
by Functional Class by Area Type

Facility/Area Type	CBD	Urban	Urban Fringe	Suburban	Rural	Total
Freeway with HOV	2.8	11.9	17.4	24.0	5.1	61.1
Freeway no HOV	1.7	1.6	3.7	11.6	32.6	51.1
Expressway	0.0	1.9	1.0	8.0	24.5	35.4
Arterial	9.2	81.5	170.6	507.7	355.8	1,124.8
Collector	4.1	7.1	5.0	1.9	0.0	18.1
Total Classified	**17.6**	**104.0**	**197.6**	**553.1**	**418.0**	**1290.4**

Source: MAG

Multiplication of each roadway segment's length by its number of lanes provides total roadway lane miles within the study area. Table 3-3 shows the existing number of lane miles by functional class by area type based on the roadway network in MAG's traffic model. About 2,750 lane miles provide traffic service in the study area. This is exclusive of local streets and other minor facilities not included in MAG's traffic model network and all roadways outside the portion of the study area covered by the MAG traffic model. In MAG's future LRTP based network shown in Table 3-4, the number of lane miles doubles to about 5,500.

Table 3-3
Current 2002 Base Network Roadway Lane Miles by Functional Class by Area Type

Facility/Area Type	CBD	Urban	Urban Fringe	Suburban	Rural	Total
HOV Lanes	1.5	9.6	5.7	3.5	0.0	20.3
Freeway (except HOV)	22.3	44.2	24.3	71.9	251.7	414.3
Expressway	6.5	3.7	0.0	0.0	43.6	53.8
Arterial	21.9	206.3	156.3	458.8	1,355.3	2,198.7
Collector	7.0	12.5	7.5	12.3	29.6	69.0
Total Classified	**59.2**	**276.3**	**193.8**	**546.5**	**1,680.2**	**2,756.0**

Source: MAG

Table 3-4
LRTP Based Reference Network Roadway Lane Miles
by Functional Class by Area Type

Facility/Area Type	CBD	Urban	Urban Fringe	Suburban	Rural	Total
HOV	5.5	23.7	34.7	48.0	10.2	122.1
Freeway (except HOV)	23.4	90.4	119.0	155.5	150.7	539.0
Expressway	0.0	10.1	5.8	37.0	98.1	151.0
Arterial	47.4	398.0	744.3	2,044.6	1,423.3	4,657.6
Collector	17.2	30.0	20.2	3.7	0.0	71.1
Total Classified	**93.5**	**552.3**	**924.0**	**2,288.7**	**1,682.3**	**5,540.7**

Source: MAG

Using a daily capacity of 21,000 vehicles per lane for freeways and expressways and a daily capacity of 8,000 for arterials and collectors, capacity miles in the study area were calculated for each functional class. Table 3-5 shows daily capacity by functional class for the current and future LRTP based networks. The table indicates that daily capacity availability for each facility type will increase between the current and future networks. The smallest capacity increase is projected for the collector facility type, an increase of only 17,000 capacity miles or 3 percent above the existing base model year.

Table 3-5
Capacity Miles by Functional Class

Facility Type	Lane Capacity (per day)	Current 2002 Base Network Capacity Miles	LRTP Based Reference Network Capacity Miles
HOV	21,000	426,090	2,564,940
Freeway	21,000	8,700,720	11,318,370
Expressway	21,000	1,129,800	3,171,420
Arterial	8,000	17,589,200	37,260,400
Collector	8,000	551,600	568,480
Total Classified		**28,397,410**	**54,883,610**

3.1.1.5 ITS Implementation

Intelligent Transportation Systems (ITS) is the application of communication technologies and management strategies, as well as advanced sensor, computer, and electronic technologies in an integrated manner. It is the goal of ITS to improve the safety and overall efficiency of the ground transportation system. ITS infrastructure in the Phoenix metropolitan area consists of field devices (such as programmable electronic message boards, cameras, on-ramp meters, vehicle sensors, and vehicle location devices) which are integrated into a regional communications network linked to centralized transportation management centers. ITS is also used for pedestrian detection to trigger signal changes, for warning signals for persons with disabilities, and for improved crossing information, such as visible signal countdown.

The Phoenix metropolitan area started the process of implementing ITS in the early 1980s. Today the MAG region has a vast ITS network that includes Traffic Signal Coordination, ADOT's Freeway Management System (FMS), the Metropolitan Model Deployment Initiative, Statewide ITS Early Deployment Plan, and Rural ITS Deployment. The services that will be provided in the study area utilizing ITS will include:

- Better and more responsive traffic management strategies;
- Reduced delays due to traffic incidents;
- Better traffic information to motorists; and
- Facilities that help motorists plan their trips.

Existing freeways in the study area will be among the first to be added to the Regional Freeway Management System (FMS). New freeways such as Loop 303 and the I-10 Reliever, will be added to the FMS upon their completion.

All arterial traffic management systems are operated independently by the municipalities in the study area and elsewhere throughout the MAG region. A number of municipalities in the study area either have or are planning to build local Traffic Management Centers (TMSs). Efforts are already underway to integrate individual agency systems and the FMS as a regional traffic management system. The regional architecture that will serve as the basis for accomplishing this is contained in the *MAG ITS Strategic Plan*. A backbone of that plan is a system of telecommunications linking transportation facilities around the region and the southwest valley. Figure 3-12 shows the plan for that telecommunications system. Access to real-time transportation information on major roads and transit services in Arizona have already been implemented via the 511 automated telephone answering system.

3.1.1.6 Vehicle Miles of Travel

The total vehicle miles of travel (VMT) on roadways in the portion of the study area covered by the MAG travel model is shown in Table 3-6. The table shows estimated current VMT, as well as forecast VMT on the LRTP for 2020 and 2030, by facility type. The table shows that current weekday VMT in the portion of the study area covered by the MAG traffic model is 14.5 million miles. In the year 2020 VMT on the LRTP roadway network is forecast at 37.6 million miles, growing to 53.2 million miles in 2030.

Table 3-6
Current 2002 Base Network and LRTP Based Reference Network:
Daily Vehicle Miles of Travel by Facility Type: 2002, 2020, and 2030

Facility Type	Current Base 2002	LRTP 2020	LRTP 2030
Freeway	7,151,995	12,137,227	14,856,310
Expressway	388,532	2,663,287	3,038,593
Arterial	6,870,346	22,435,342	34,870,689
Collector	86,303	350,646	452,913
Total	**14,497,175**	**37,586,502**	**53,218,505**

Source: MAG

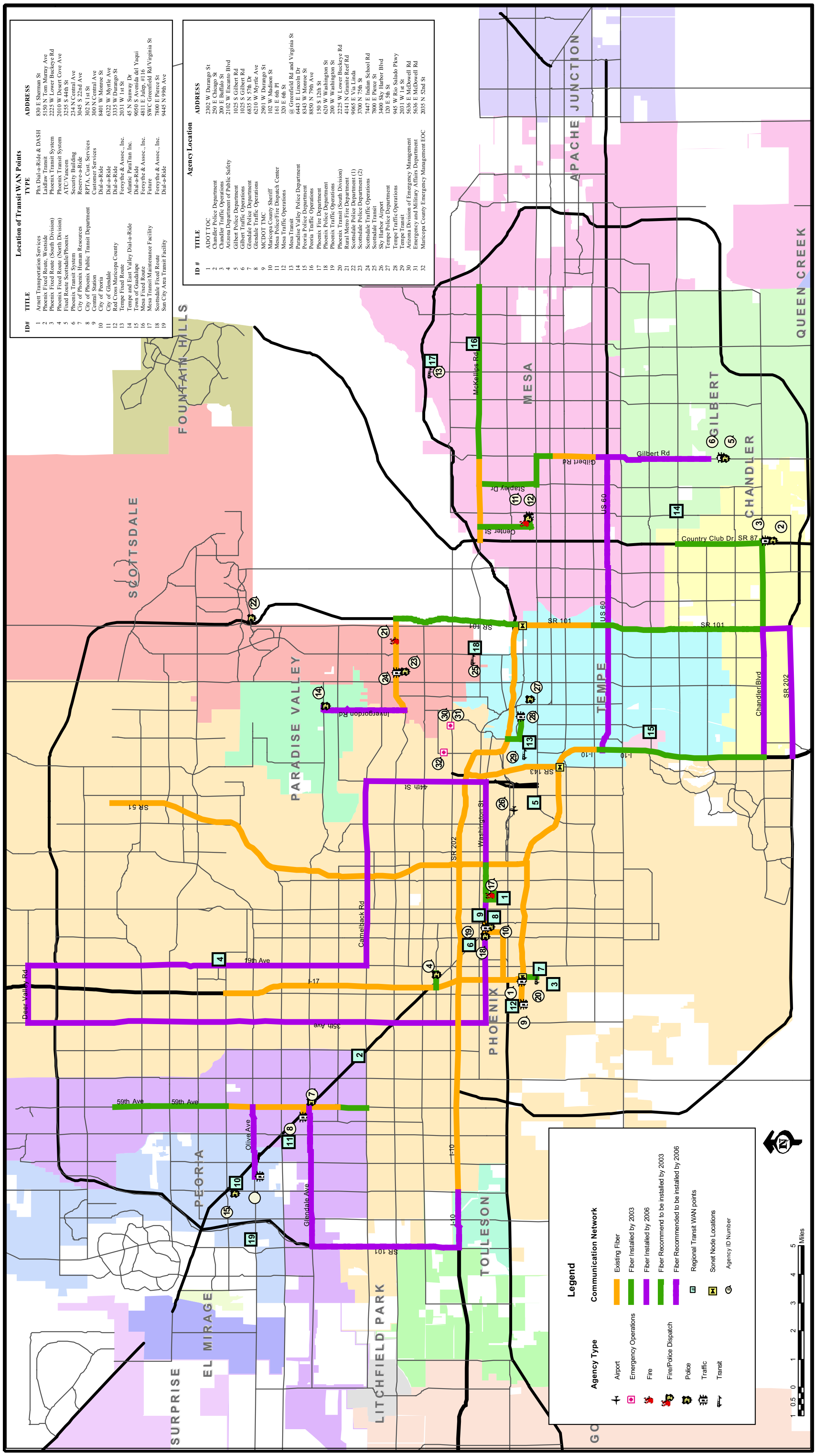

Figure 3-12

MAG ITS Strategic Plan Update - November 2000
ITS Telecommunications Plan

Weekday truck travel is shown in Table 3-7. An estimated 3.8 million vehicle miles of truck travel currently occur in the SWATS area. In 2020 that amount is forecast to increase to 9.4 million, with further growth to 13.0 million in 2030.

Table 3-7
Current 2002 Base Network and LRTP Based Reference Network:
Truck Miles of Travel by Facility Type: 2002, 2020, and 2030

Facility Type	Current Base 2002	LRTP 2020	LRTP 2030
Freeway	1,951,141	3,182,836	3,974,190
Expressway	102,628	961,038	1,041,947
Arterial	1,692,490	5,160,140	7,849,686
Collector	17,810	81,358	112,593
Total	**3,764,070**	**9,385,372**	**12,978,416**

Source: MAG

In the peak hour of weekday traffic, current VMT is estimated at 765,000 vehicle miles, as shown in Table 3-8. The forecast of peak hour VMT in 2020 on the LRTP roadway network is just over 2 million, growing to 2.9 million in 2030.

Table 3-8
Current 2002 Base Network and LRTP Based Reference Network:
Peak Hour Vehicle Miles of Travel by Facility Type: 2002, 2020, and 2030

Facility Type	Current Base 2002	LRTP 2020	LRTP 2030
Freeway	337,282	616,052	708,938
Expressway	22,013	113,879	140,093
Arterial	400,007	1,276,556	2,039,333
Collector	6,106	19,024	25,425
Total	**765,409**	**2,025,510**	**2,913,789**

Source: MAG

3.1.1.7 Traffic Volumes

Recent mid-block traffic volume data were collected from ADOT and MCDOT. Volume data collected typically did not distinguish between vehicle types, and did not indicate if seasonal or other correction factors had been applied. Figure 3-13 shows recent traffic volume data collected in the field.

Figure 3-14 shows current daily volumes for the freeway network in the study area estimated by MAG. Figure 3-15 and Figure 3-16 show volumes forecast by MAG on the freeways of the LRTP roadway network for 2020 and 2030, respectively. A comparison of these three figures shows steady volumes increases through 2030. The highest volumes are generally found closer to central Phoenix with volumes generally falling off with increasing distance from the downtown.

Figure 3-17 shows current daily volumes for the arterial network in the study area estimated by MAG. Figure 3-18 and Figure 3-19 show volumes forecast by MAG on the arterials of the LRTP roadway network for 2020 and 2030, respectively.

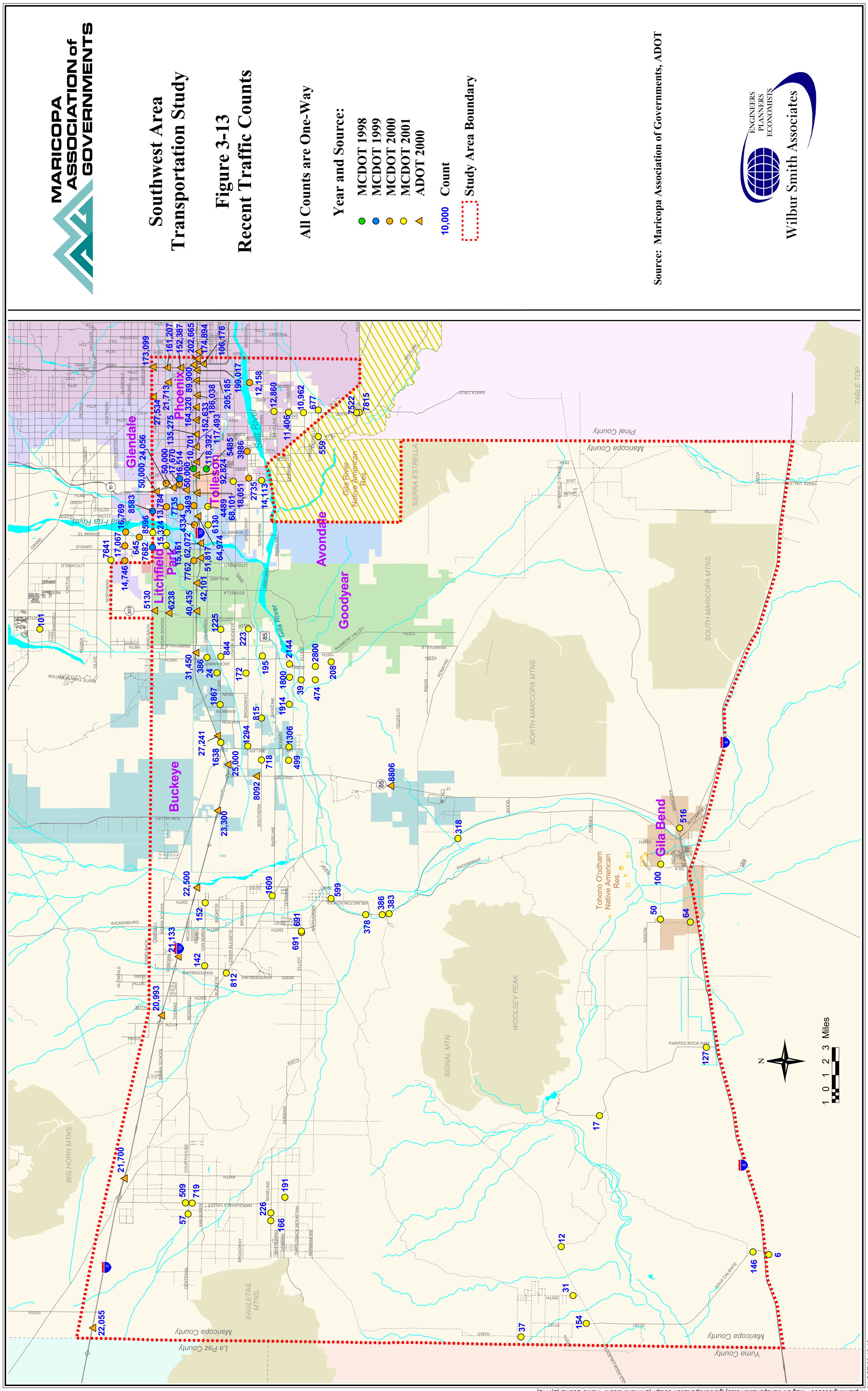
MARICOPA ASSOCIATION of GOVERNMENTS
Southwest Area Transportation Study
Figure 3-13
Recent Traffic Counts
All Counts are One-Way
Year and Source:
MCDOT 1998
MCDOT 1999
MCDOT 2000
MCDOT 2001
ADOT 2000
10,000 Count
Study Area Boundary
Source: Maricopa Association of Governments, ADOT
Wilbur Smith Associates
ENGINEERS PLANNERS ECONOMISTS
Glendale
Phoenix
Tolleson
Litchfield Park
Avondale
Goodyear
Buckeye
Gila Bend
Gila River Native American Res.
Tohono O'odham Native American Res.
Maricopa County
Pinal County
La Paz County
Yuma County
1 0 1 2 3 Miles
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Figure 3-14
Freeway Daily Traffic Volumes: Current Base 2002

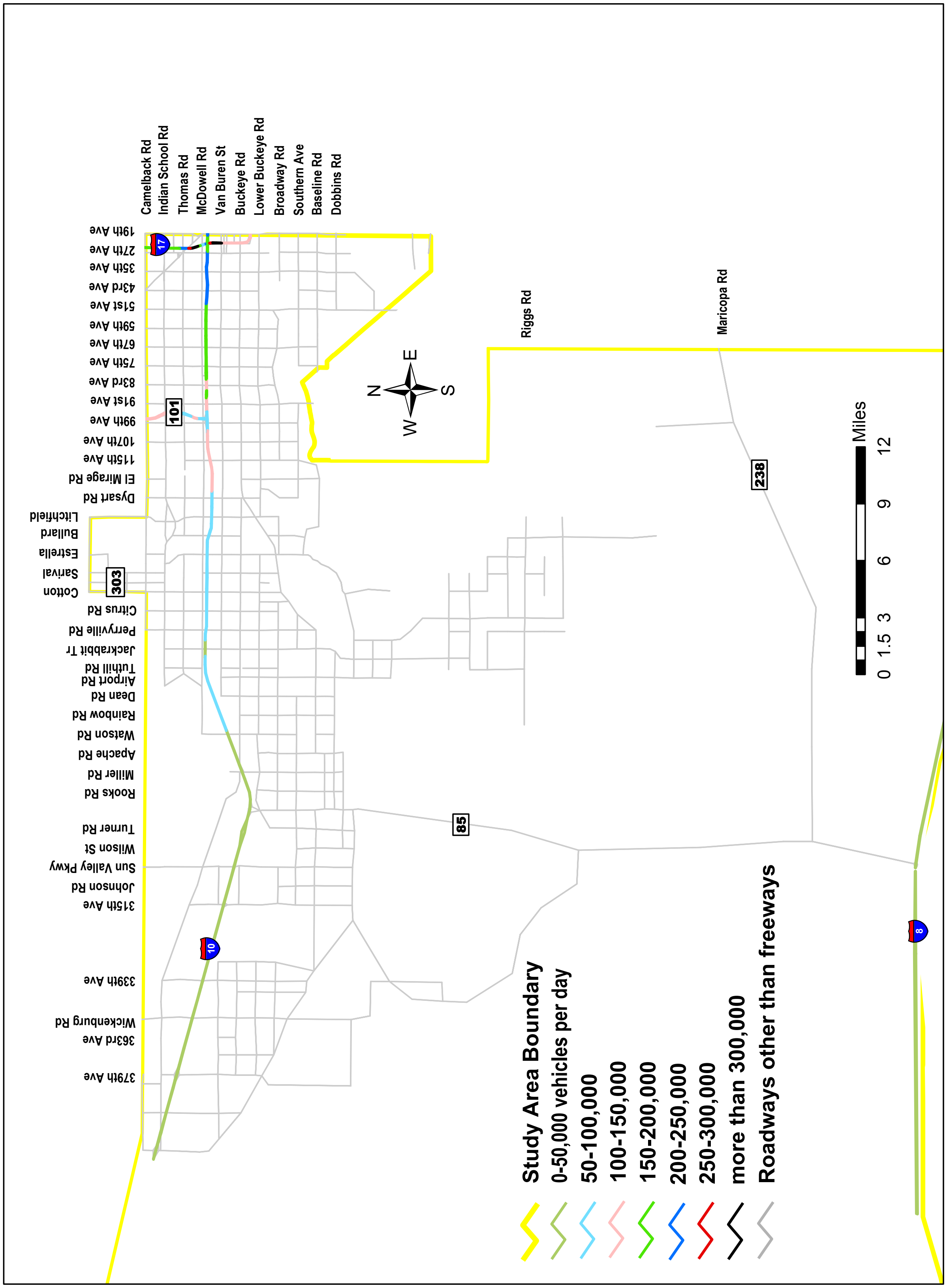

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Figure 3-15
Freeway Daily Traffic Volumes: LRTP 2020

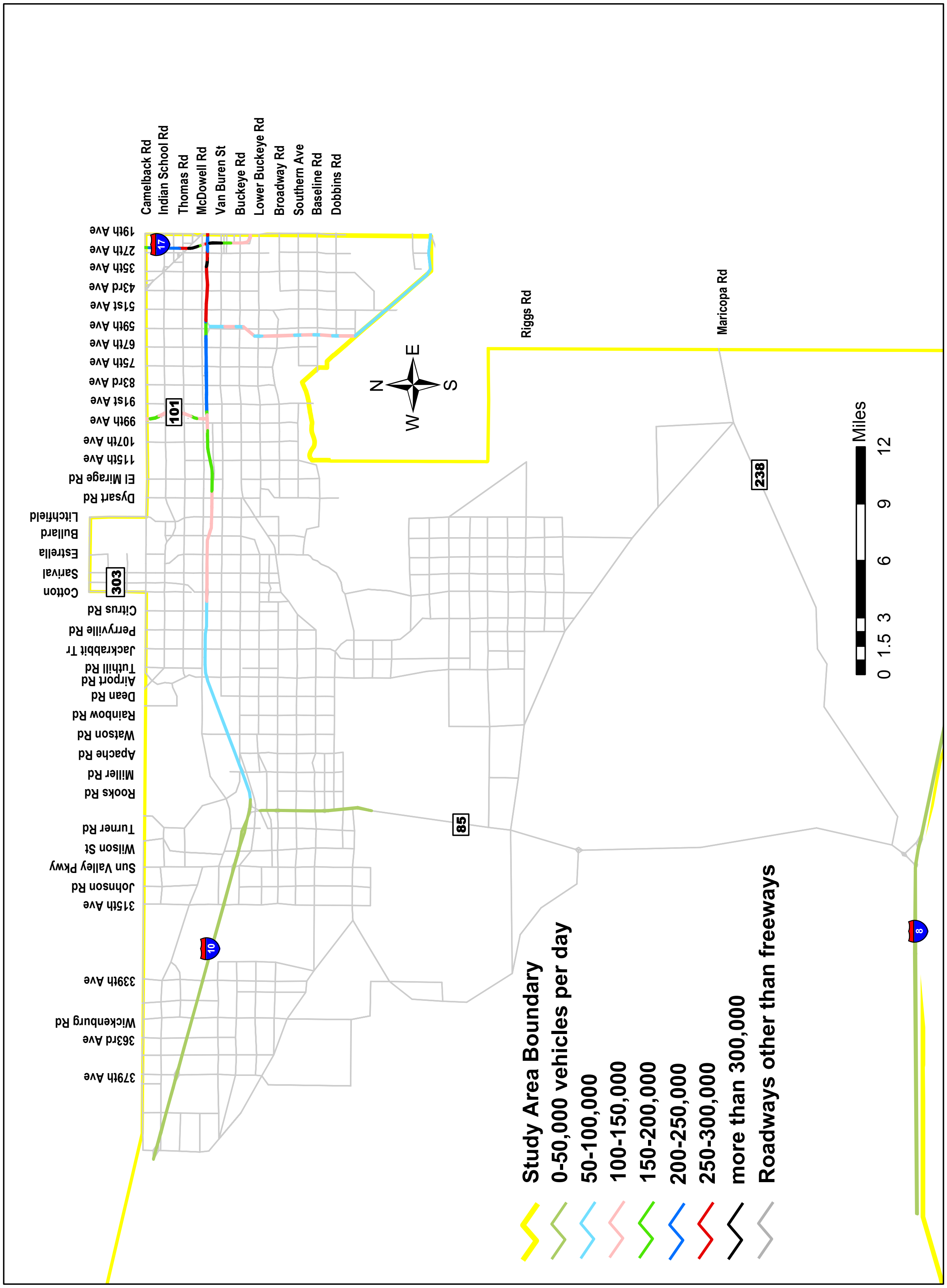

Figure 3-16
Freeway Daily Traffic Volumes: LRTP 2030

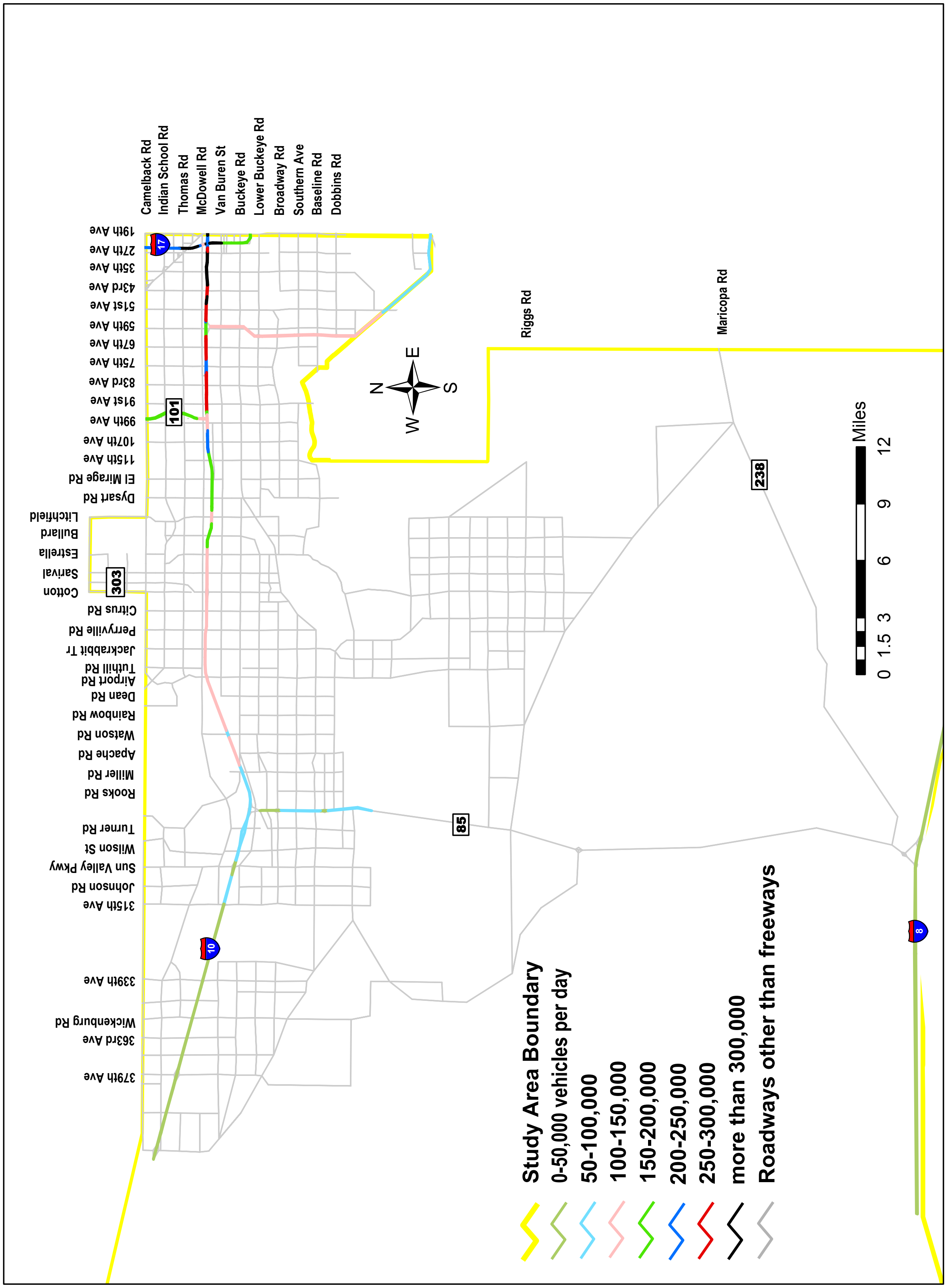

Figure 3-17
Off-Freeway Daily Traffic Volumes: Current Base 2002

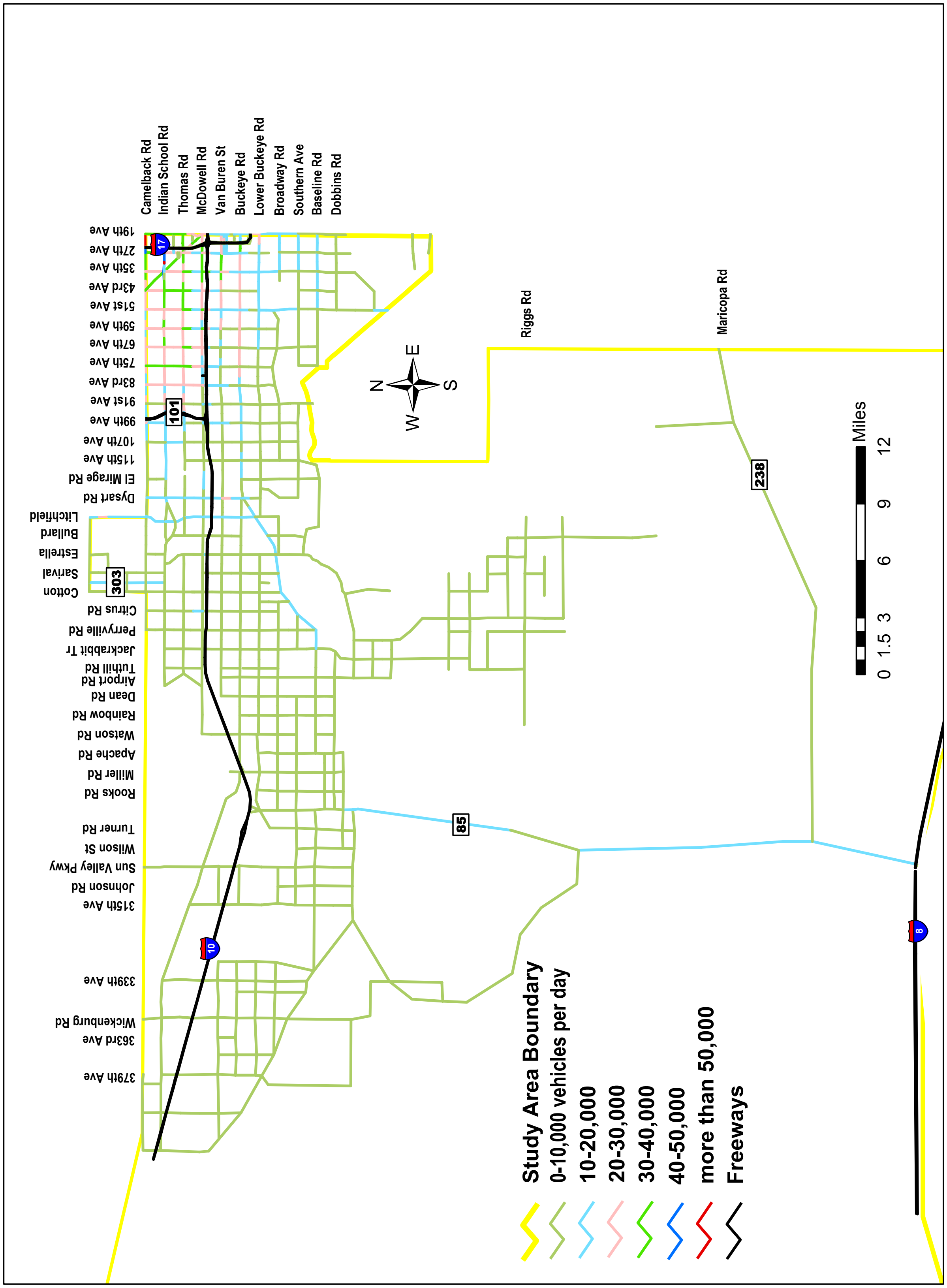

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Figure 3-18
Off-Freeway Daily Traffic Volumes: LRTP 2020

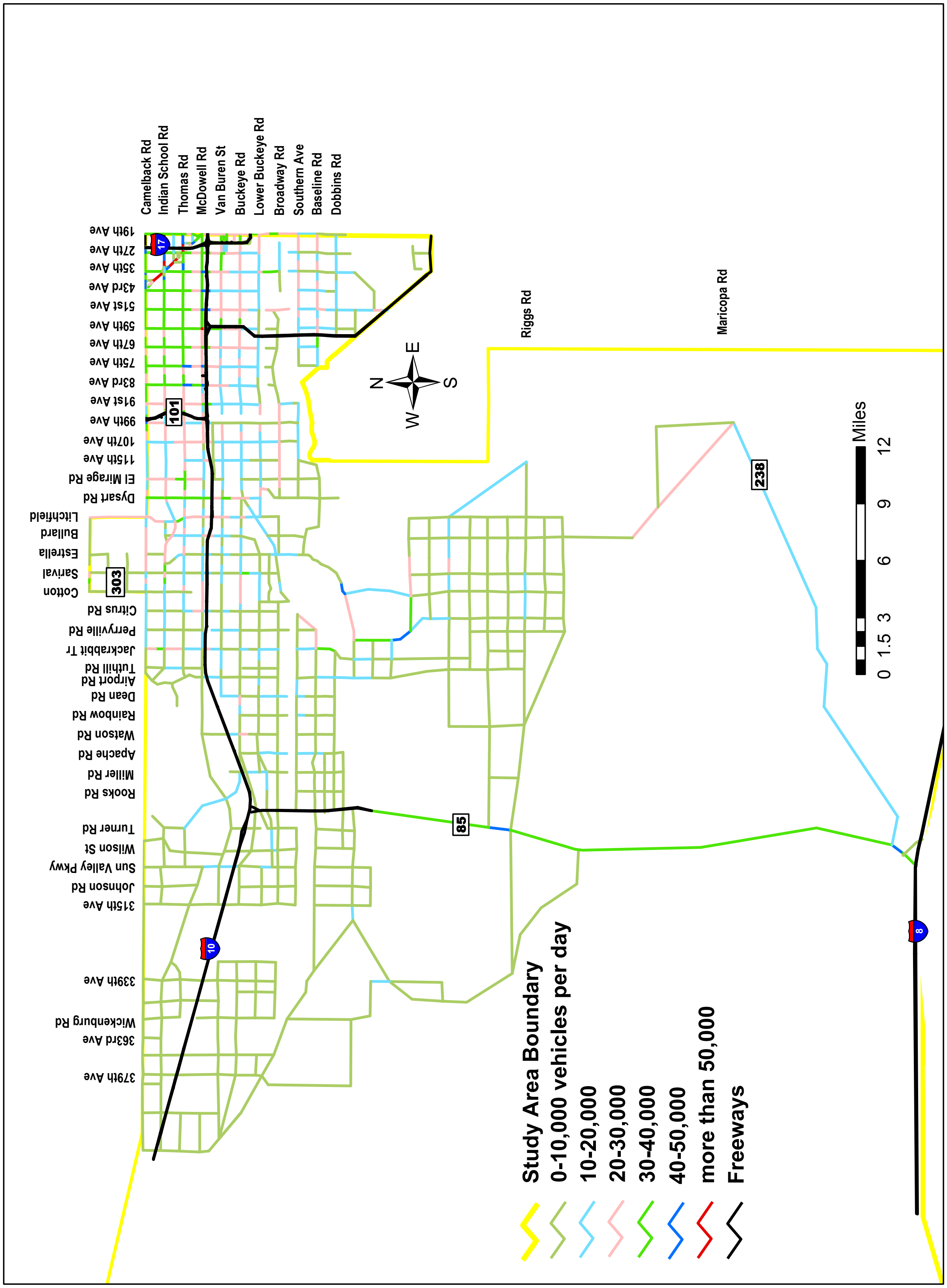
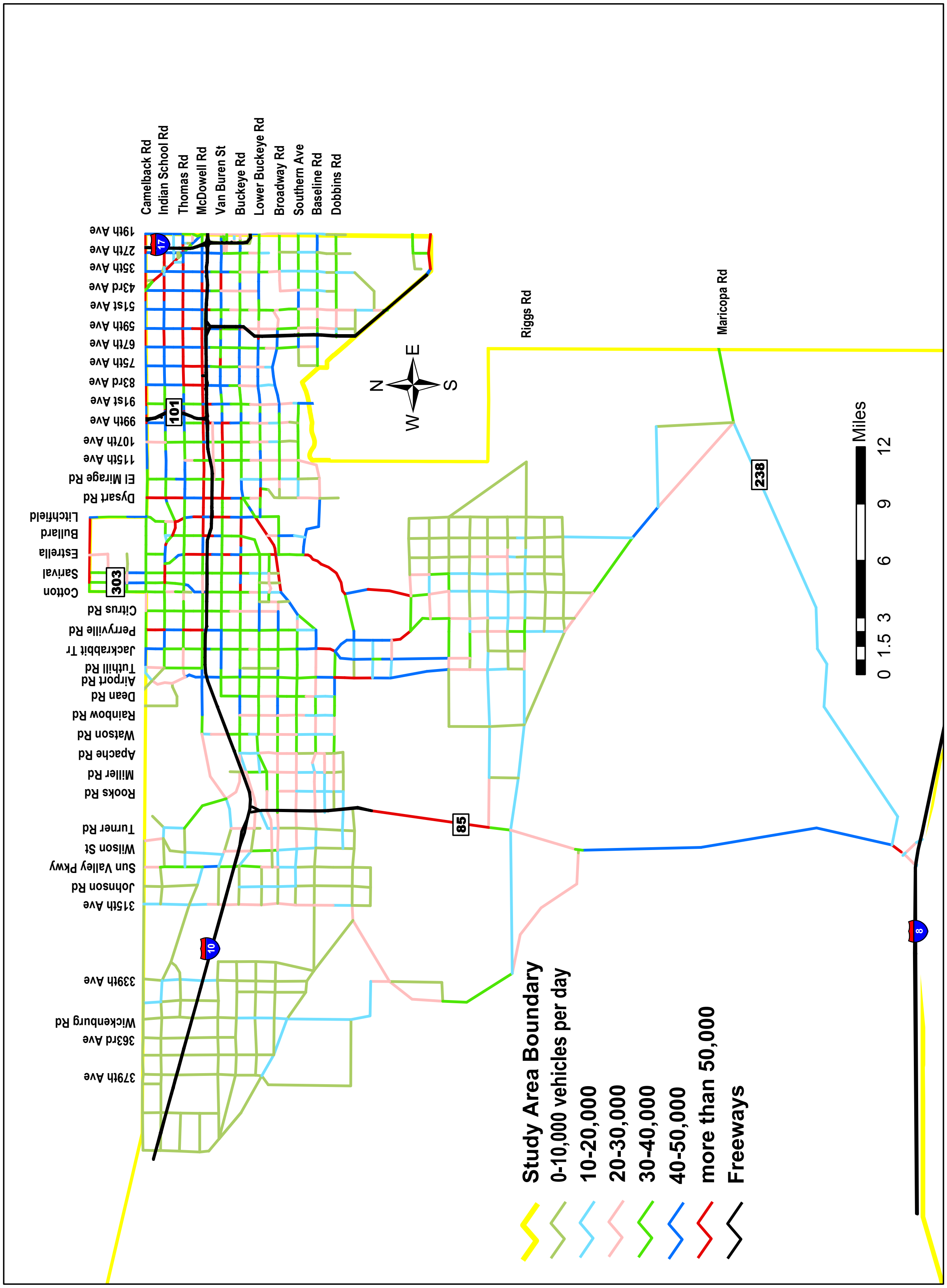


Figure 3-19
Off-Freeway Daily Traffic Volumes: LRTP 2030



Current daily truck volumes estimated by MAG are shown on Figure 3-20. Figure 3-21 and Figure 3-22 show truck volumes forecast by MAG on the roadways of the LRTP network for 2020 and 2030, respectively.

3.1.1.8 Current Delay and Level of Service Measures

Level-of-service is a measure of congestion and delay on roadways and at intersections. Level-of-service is graded based on an A to F scale, where level A is an uncongested free-low of traffic and level 5 is jammed flow. Different techniques are employed to estimate the level-of-service of intersections, stretches of arterials, and freeways. Figure 3-23 shows the estimate of current peak hour level-of-service for each of the arterial and freeway links in the SWATS area. Figure 3-24 shows the forecast peak hour level-of-service for the study area in 2020 on the LRTP roadway network. Figure 3-25 shows the forecast level-of-service for the study area in 2030.

Figure 3-26 shows the estimate of current peak hour level-of-service for many of the intersections in the SWATS area. Figure 3-27 shows the 2020 forecast peak hour level-of-service for intersections in the LRTP roadway network. Figure 3-28 shows the 2030 forecast.

The figures show a steady increase in the number of roadway links and intersections operating at the unacceptable levels-of-service E and F during the peak hour. Table 3-9 compares the number of intersections and miles of roadway operating with unacceptable (E&F) levels-of-service.

Table 3-9
Directional Roadway Miles and Intersections
Operating at LOS E and F: 2002, 2020, and 2030

Facility	Current Base 2002	LRTP 2020	LRTP 2030
Directional Roadway Miles	75	255	749
Percent of Directional Miles	4%	10%	29%
Arterial Intersections	22	134	301
Intersections Analyzed	476	646	646
Percent of Intersections Analyzed	5%	21%	47%

Source: MAG

3.1.1.9 Motor Vehicle Accident Data

Recent roadway motor vehicle accident data were collected from ADOT. The only data uniformly available for the study area are annual numbers of motor vehicle accidents by jurisdiction by severity. Data for the three year period 1999-2001 are presented in Table 3-10. Jurisdictional population data are also presented from 2000 and accident rates per 1,000 population are calculated. (Both accident and population data are for entire jurisdictions, even though some jurisdictions are only partially within the study area.

These data must be interpreted carefully. They do not indicate that any one roadway or specific location in the study area has an unusually high rate of accidents. Accident rates, generally presented as number of accidents per million miles of vehicle travel or per million vehicles entering an intersection, are the best measure of a whether a specific location has an unusually high rate of accidents. Accident rate data are not available for the study area.

Figure 3-20
Daily Truck Volumes: Current Base Network 2002

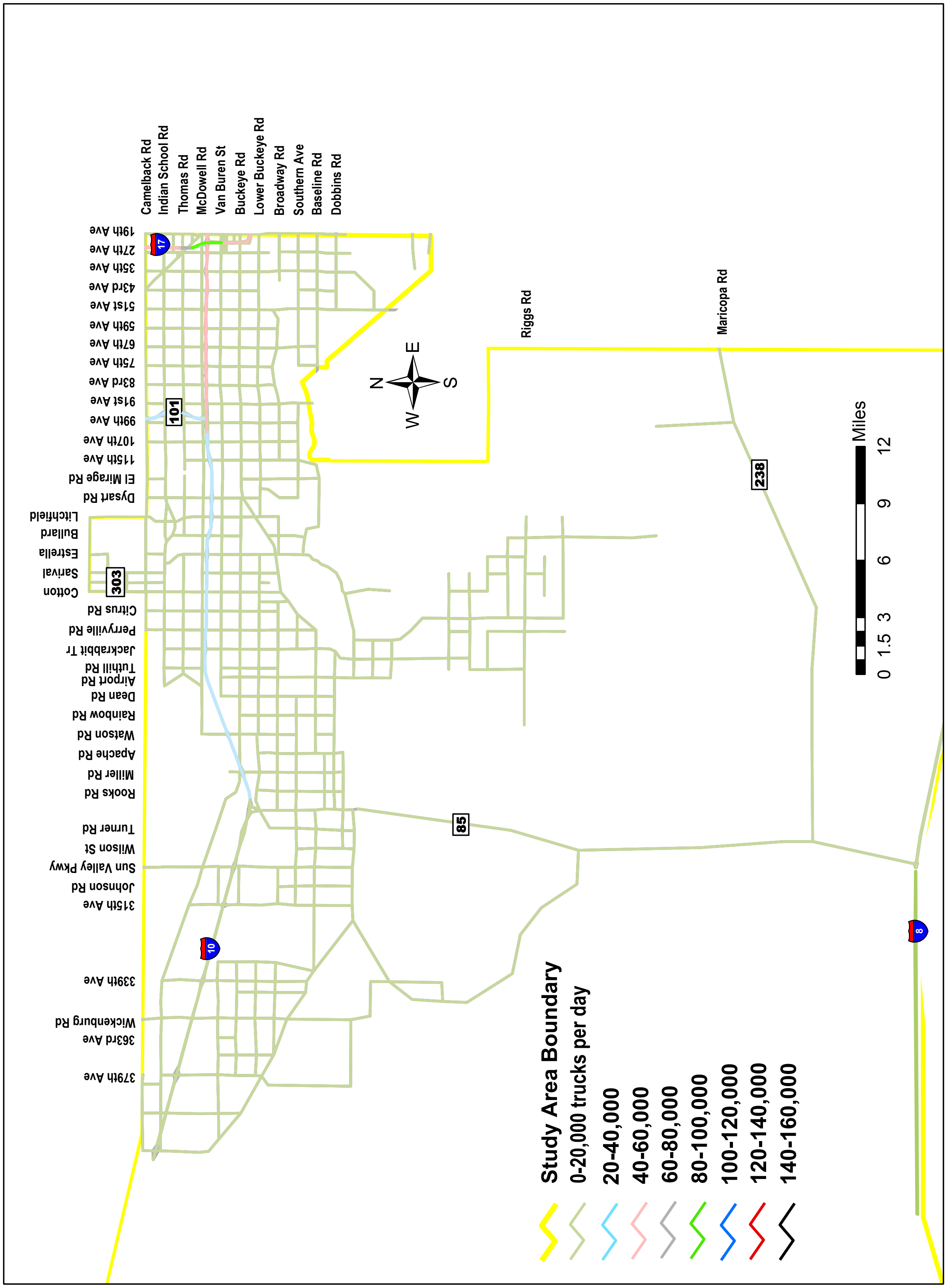
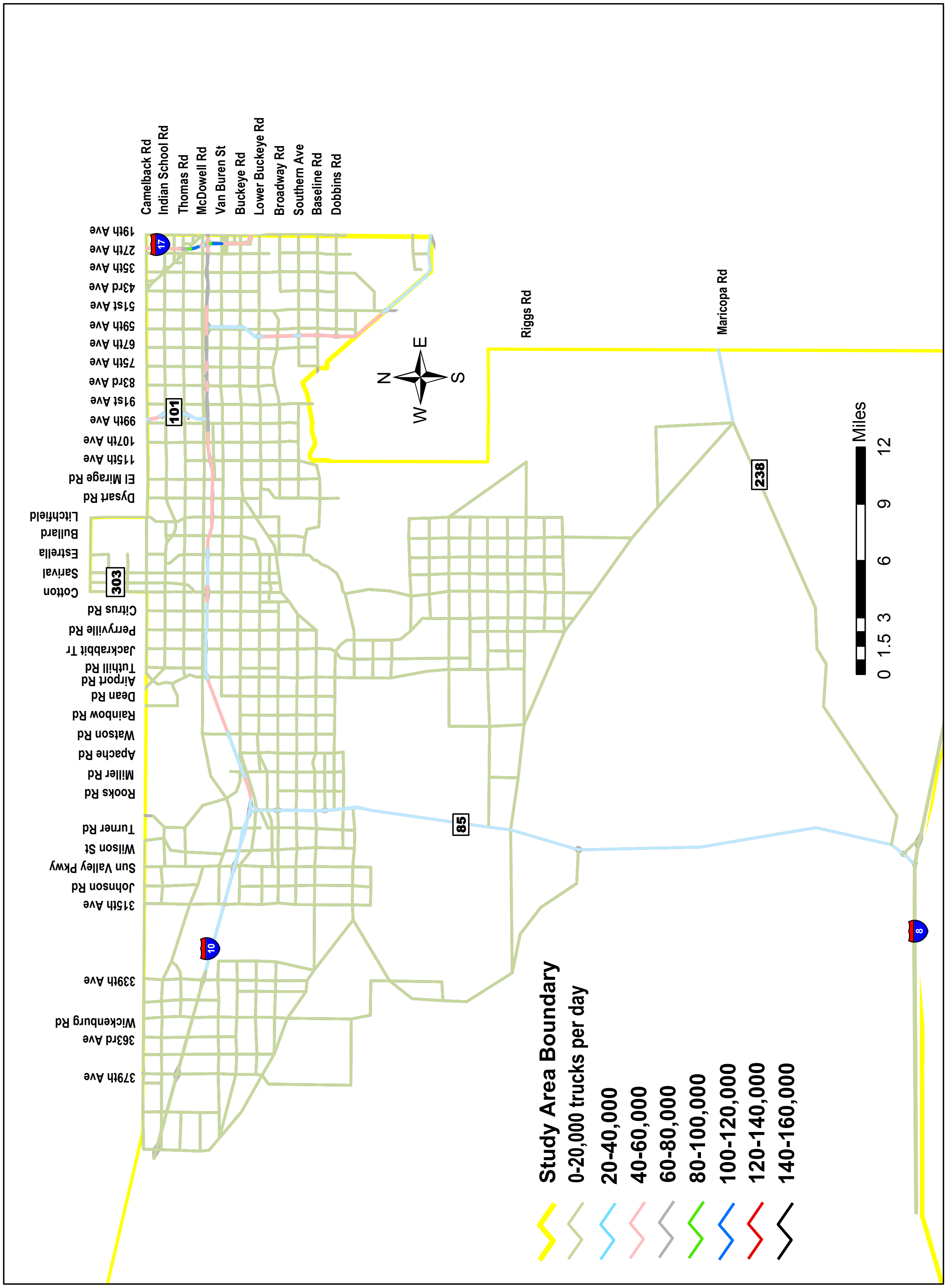


Figure 3-21
Daily Truck Volumes: LRTP 2020



Wilbur Smith Associates

Figure 3-22
Daily Truck Volumes: LRTP 2030

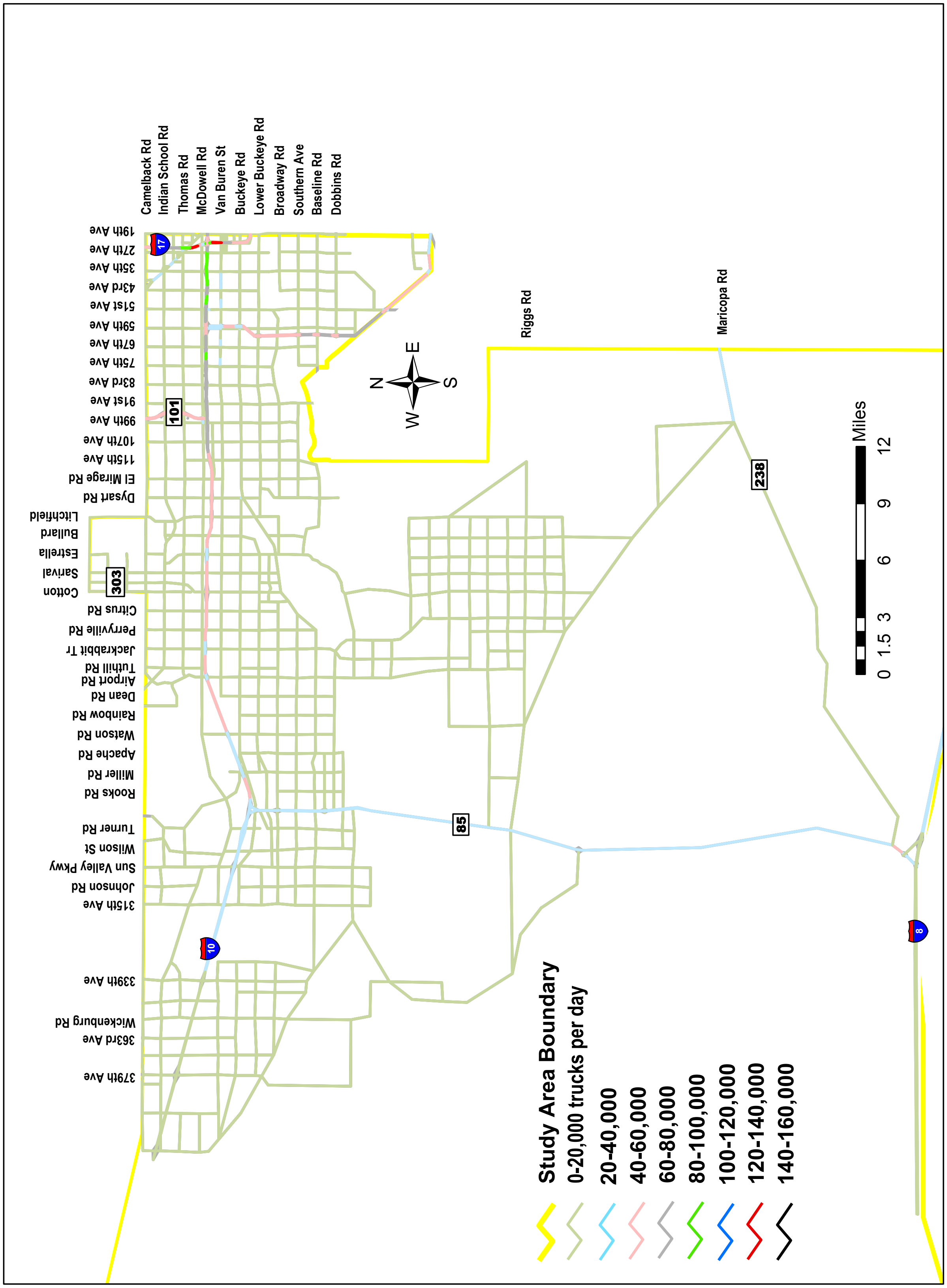


Figure 3-23
Roadway Level-of-Service: Current Base 2002

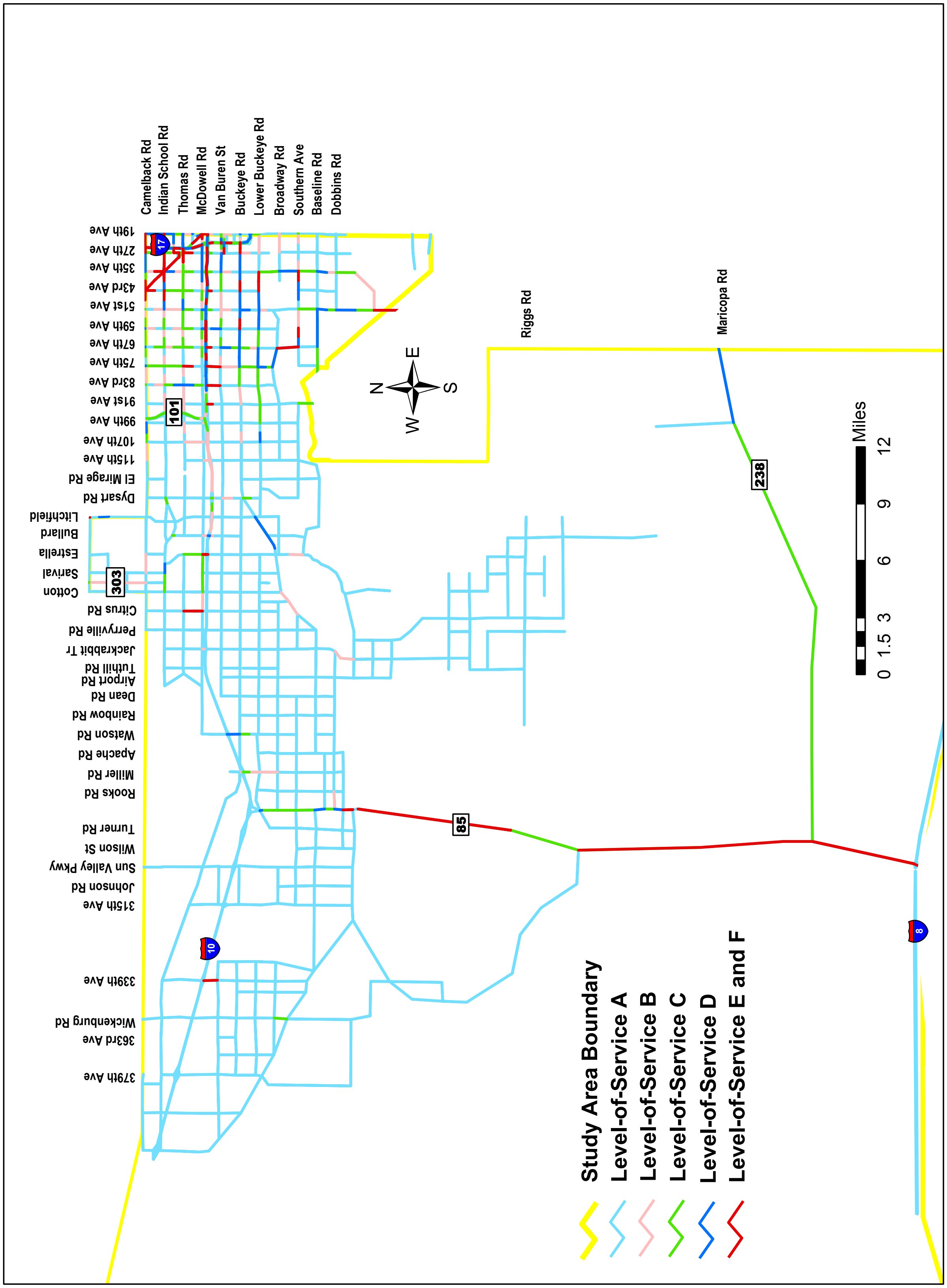


Figure 3-24
Roadway Level-of-Service: LRTP 2020

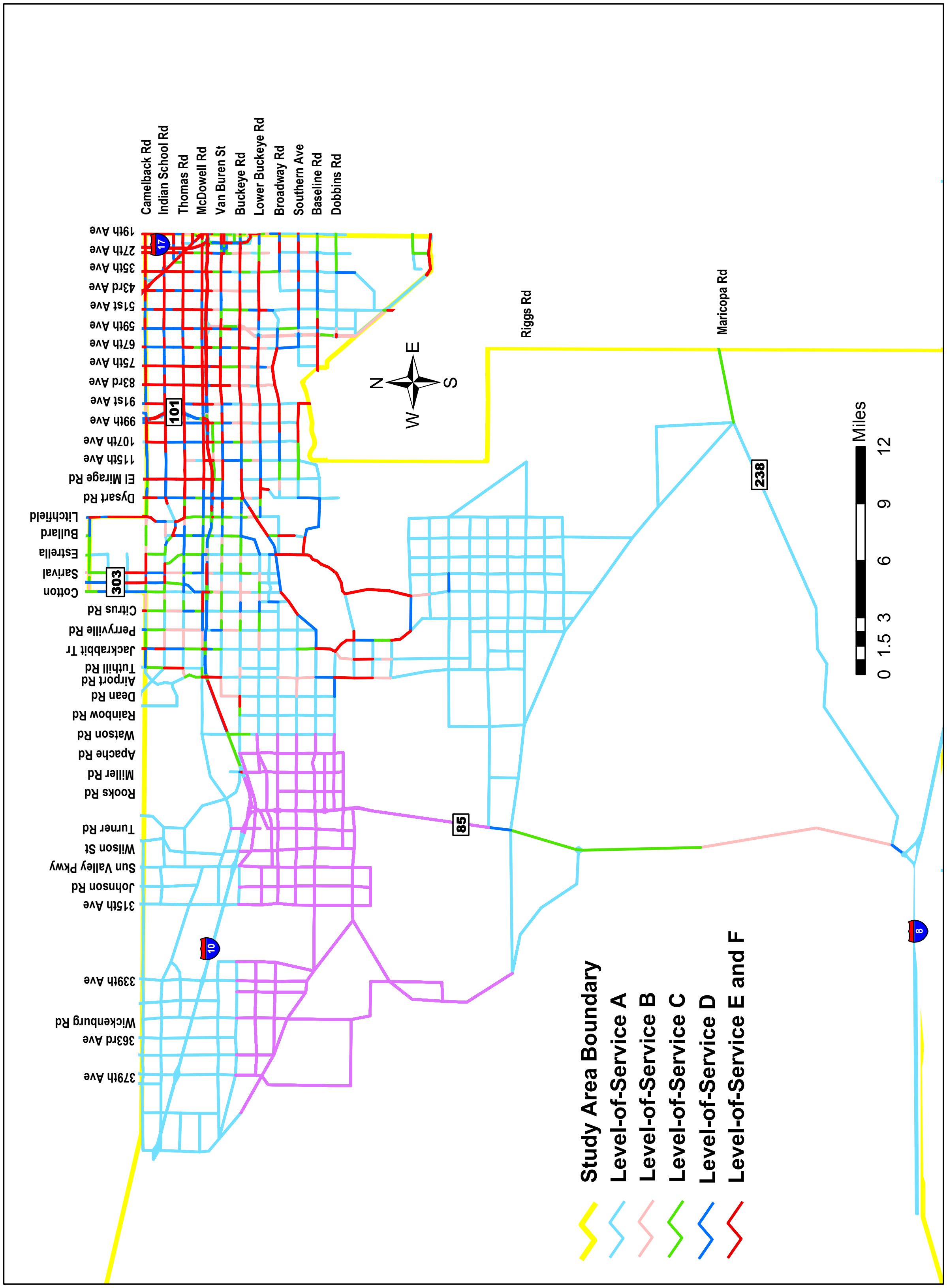


Figure 3-25
Roadway Level-of-Service: LRTP 2030

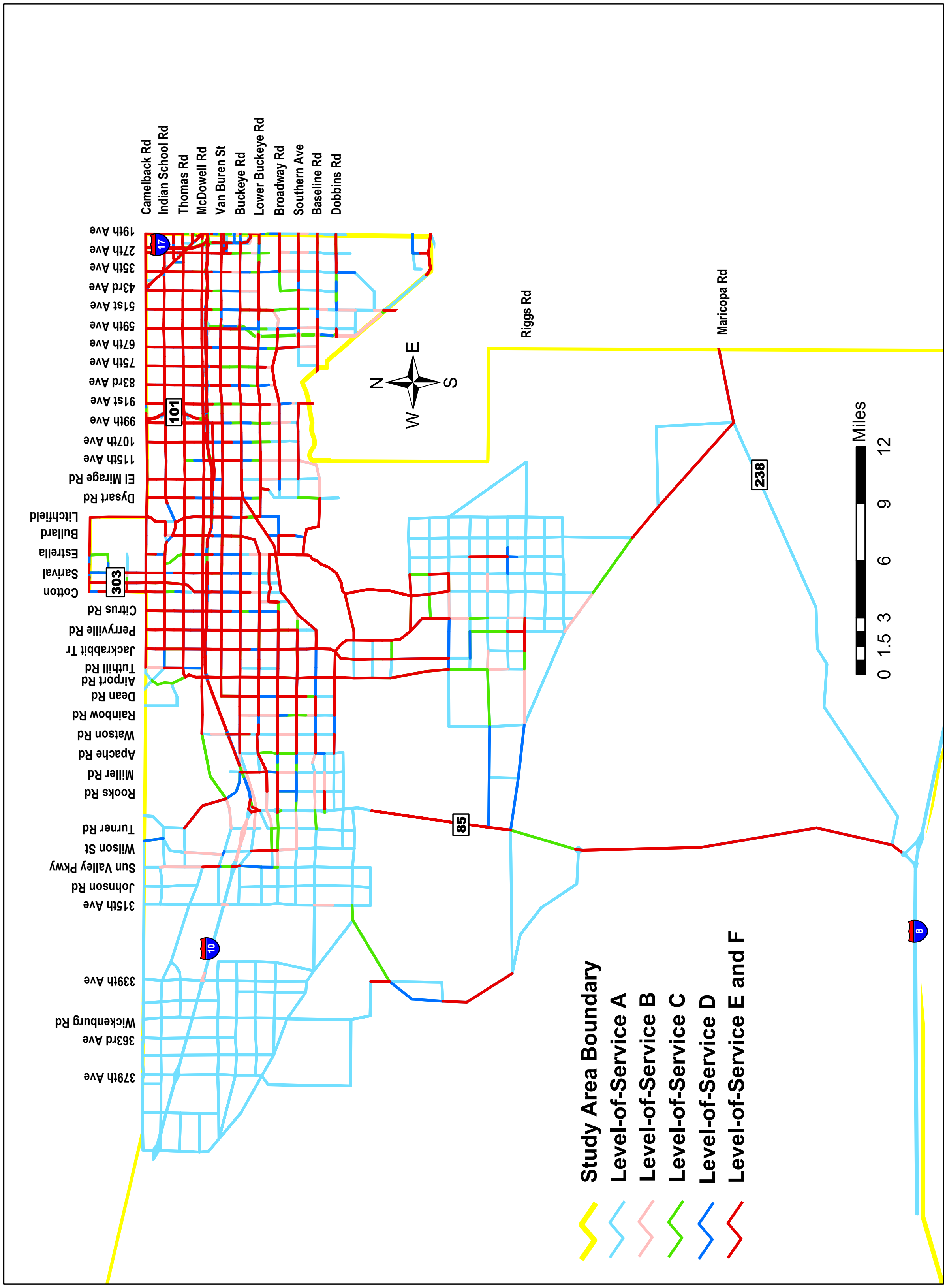


Figure 3-26
Intersection Level-of-Service: Current Base 2002

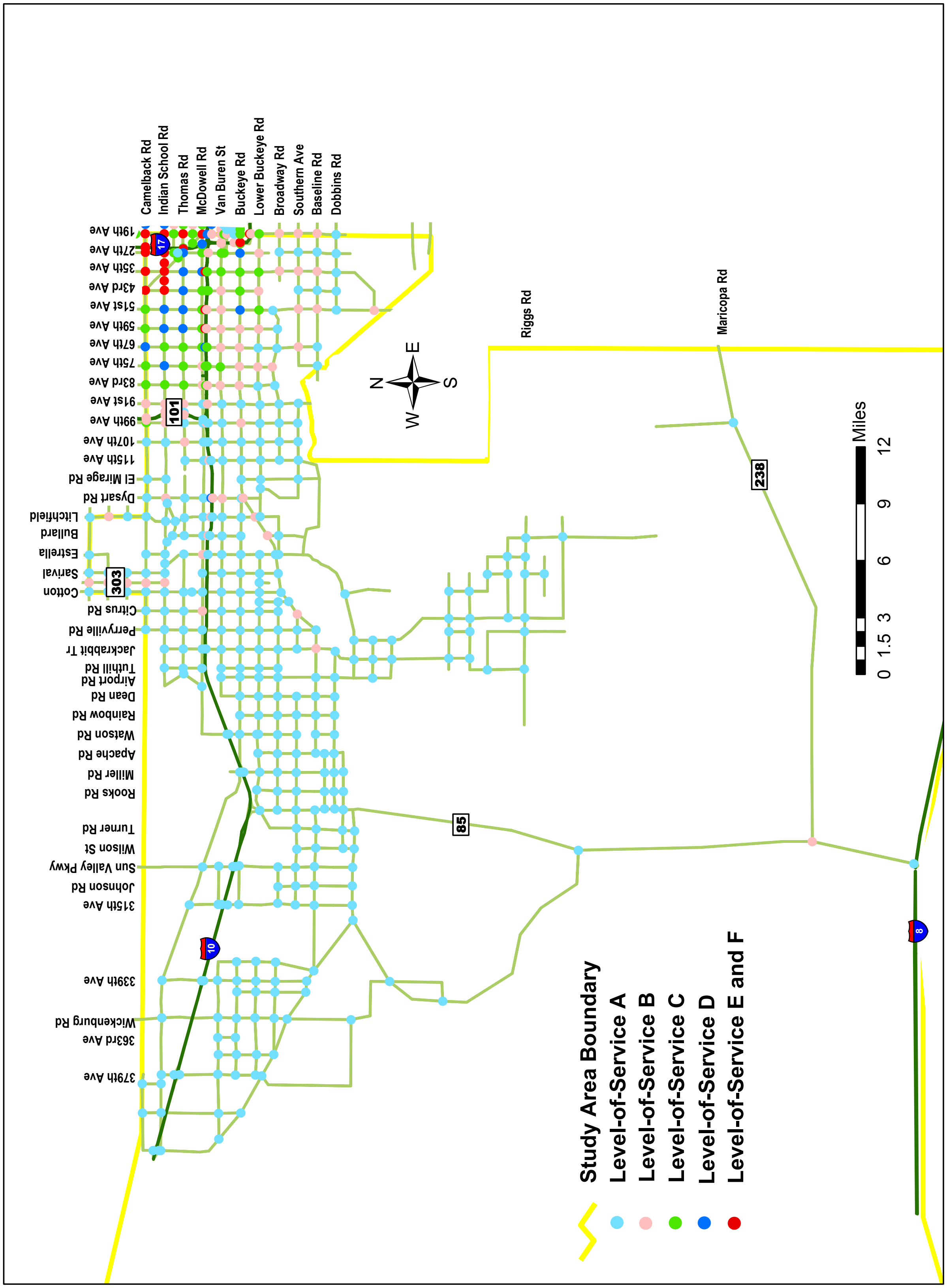


Figure 3-27
Intersection Level-of-Service: LRTP 2020

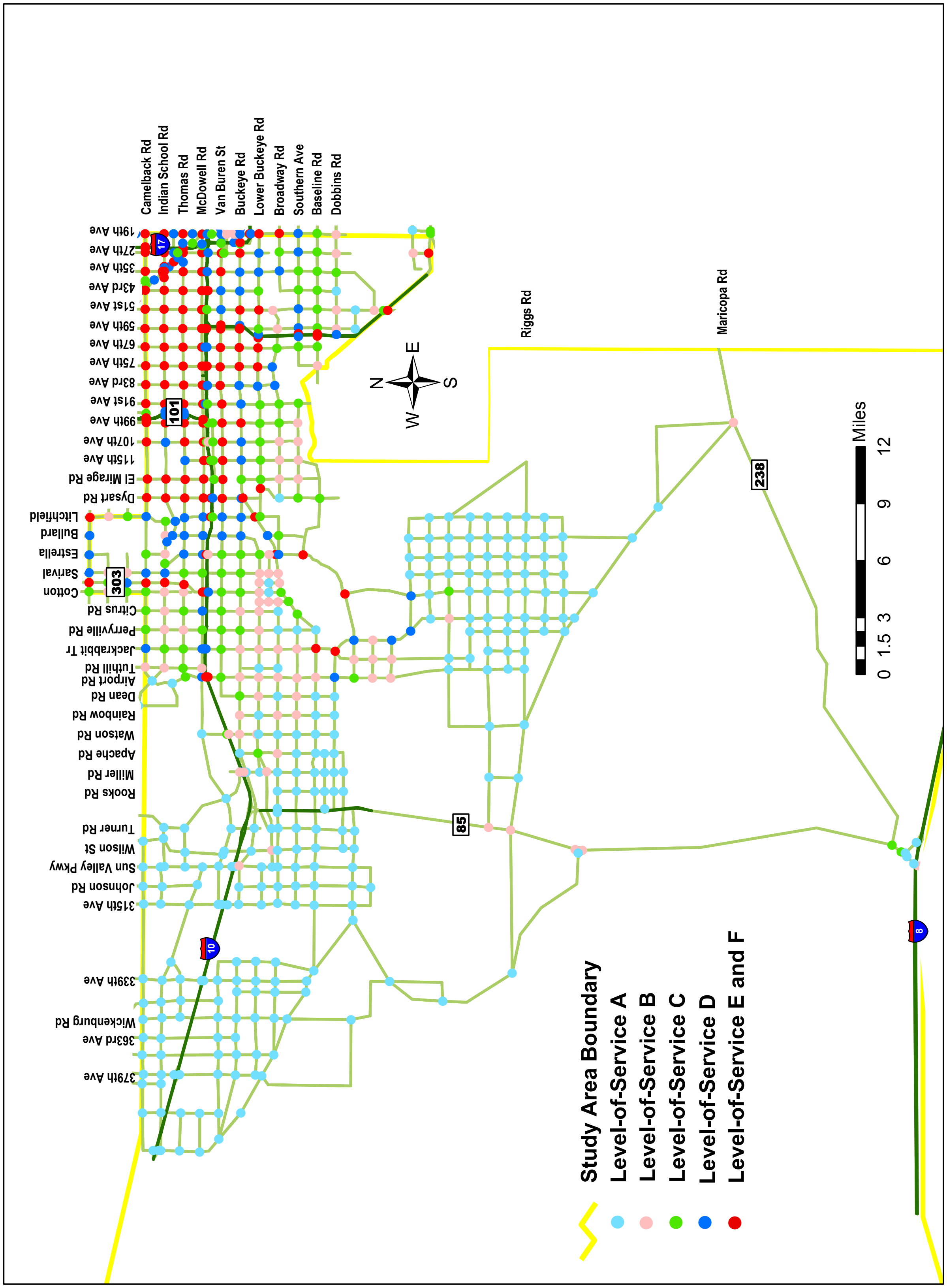


Figure 3-28
Intersection Level-of-Service: LRTP 2030

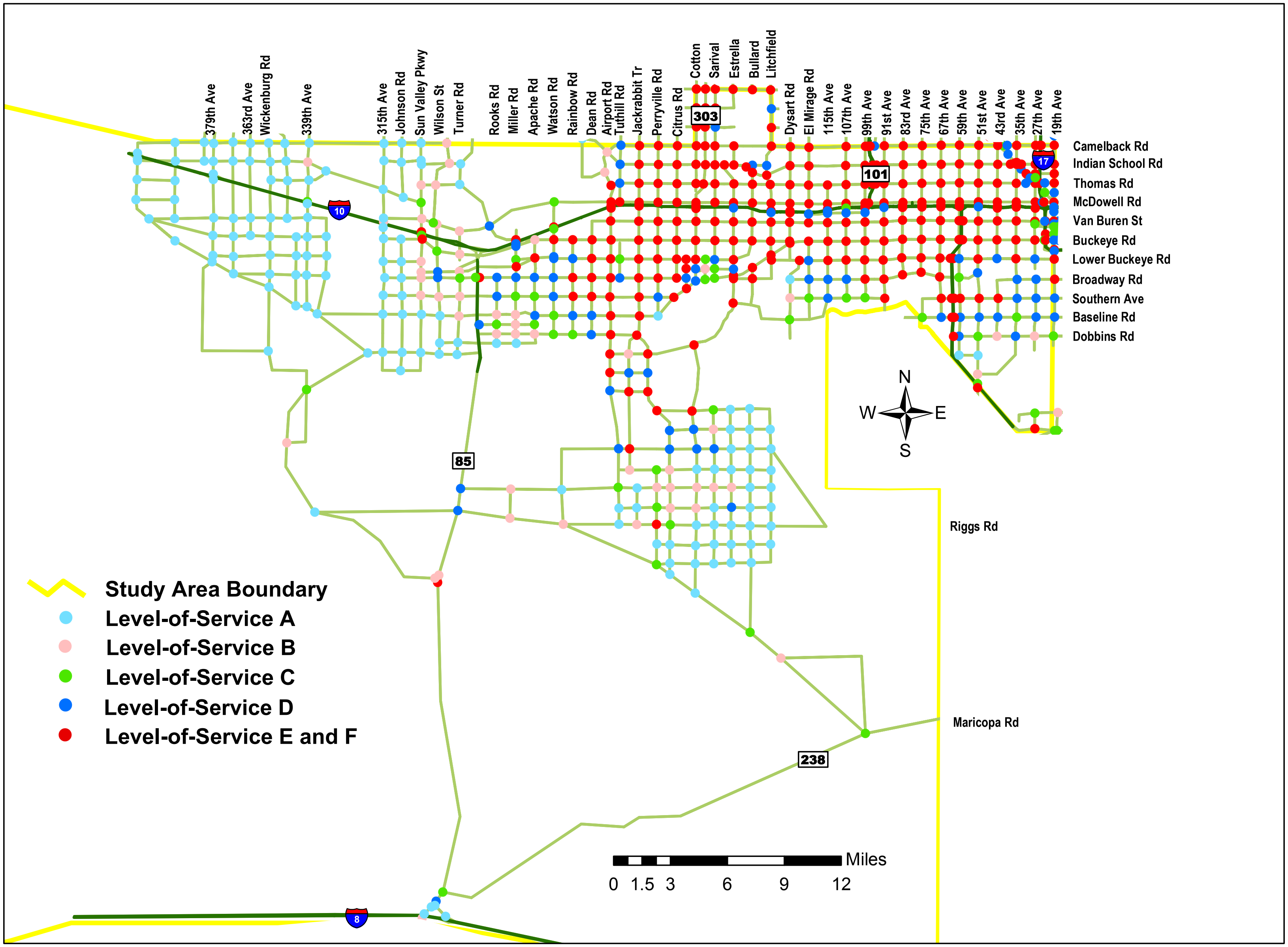


Table 3-10
Motor Vehicle Accidents by Jurisdiction 1999-2001

	Annual Average Motor Vehicle Accidents				2000	Annual Average Motor Vehicle Accidents per 1000 Population			
Jurisdiction	**Fatal**	**Injury**	**Property**	**Total**	**Population**	**Fatal**	**Injury**	**Property**	**Total**
Gila Bend	0	4	15	20	1,980	0.168	2.020	7.744	9.933
Litchfield Park	1	22	32	55	3,810	0.262	5.774	8.399	14.436
Tolleson	0	48	96	144	4,974	0.000	9.650	19.367	29.018
Buckeye	3	28	37	67	6,537	0.459	4.207	5.584	10.249
Goodyear	4	99	186	289	18,911	0.229	5.253	9.818	15.300
Avondale	4	158	368	530	35,883	0.102	4.412	10.246	14.761
Glendale	18	1,604	2,894	4,516	218,812	0.082	7.332	13.226	20.640
Phoenix	190	16,798	26,296	43,284	1,324,045	0.143	12.687	19.861	32.691

Buckeye data are for 2000 and 2001 only and Litchfield Park data are for 2001 only.

The data in Table 3-10 show three types of accidents: those involving a fatality, those involving a personal injury (but not a fatality), and those involving only property damage. Except for Litchfield Park and, especially, Tolleson, the total number of accidents per person generally increases with population size. This is not unexpected in that larger population centers tend to have more motor vehicles, denser development, and thus more opportunity for conflict among motor vehicles and between motor vehicles and pedestrians, bicycles, and fixed objects. There is no readily apparent reason why Tolleson has an accident rate per person nearly as high as the City of Phoenix. Data were only available for Litchfield Park for a single year (2001) and that year may have had an unusual number of motor vehicle accidents for some reason.

Table 3-11 shows an estimate of motor vehicle accidents in the SWATS area by severity and type of roadway facility. The estimate is based on accident rates estimated for the different types of roadway facilities with data from other jurisdictions. The table shows estimated number of crashes and their severity distribution for the LRTP network in 2020 and 2030. The Current Base is an estimate based

Table 3-11
Motor Vehicle Accidents:
Estimated for 2002 and Forecast for 2020 and 2030

	Current Base	Future Base		Future Base	
Accident Type	**2002**	**2020**	**%Ch***	**2030**	**%Ch***
Freeway Fatal	22	33	50	36	64
Freeway Injury	1,418	2,298	62	2,516	77
Freeway PDO**	3,480	5,668	63	6,209	78
Freeway Subtotal	**4,920**	**7,999**	63	**8,761**	78
Other Segment Fatal	74	148	100	192	159
Other Segment Injury	6,699	13,717	105	17,972	168
Other Segment PDO**	13,361	27,406	105	35,892	169
Other Segment Subtotal	**20,134**	**41,271**	105	**54,056**	168
Intersection	15,219	23,083	52	26,411	74
Total	**40,273**	**72,353**	80	**89,228**	122

*%Ch is percent change is from Current Base 2002. *Source: MAG*
***PDO: Property Damage Only*

on the same crash rates used to estimate future year crashes and does not reflect the actual current crashes in the MAG region. Estimates for the Current Base are only for comparative purposes. The percent change (shown in the tables) for 2020 and 2030 is the percent change compared to the Current Base. The data estimate an 80 percent increase in motor vehicle accidents on the LRTP network in the SWATS area in 2020 and a 122 percent increase in 2030.

3.1.2 Public Transit

Public transit includes a variety of facilities and services. In addition to the traditional fixed route bus services, transit also includes other ridesharing alternatives, such as carpooling, vanpooling, and bikes on buses. It also includes dial-a-ride services and some paratransit services offered by social service agencies. Public transit does not include private services not open to the public such as airport shuttles to rental car agencies and hotels, condominium or homeowner association services providing services exclusively for their residents, and other similar services not available to the public. There are a plethora of such services and very little systematic collection of data on them. The following sections describe the public transit services available in the study area.

3.1.2.1 General Description

The RPTA is the predominant provider of public transit services in the SWATS area. There are other providers, including Greyhound, the Maricopa County Department of Human Services, and Southwest Transit and Regional Transportation (START). These agencies provide a variety of services including fixed route bus service (both local, express, and interstate), demand services such as dial-a-ride service for specialized populations, and ridesharing services.

3.1.2.2 Transit Routes and Services

The RPTA provides the bulk of the regular route transit service in the SWATS area on 19 bus routes. These routes are shown in Figure 3-29. Two express routes (the 560 and 561) provide peak hour service between downtown Phoenix and Desert Sky Mall via I-10. The 560 route continues to Tolleson and Avondale.

The 131 route (the START bus) complements the 560 and 561 routes by providing peak hour service, as well as midday service, between Desert Sky Mall and Litchfield Park via Tolleson and Avondale. The START provides service in the SWATS area on this one route. The route is managed by the RPTA as the 131 route. It is funded by jurisdictions in the southwest valley and Maricopa County's Work Links program. The 560 and 131 routes are the only RPTA regular route services west of 83rd Avenue.

The routes of the remaining 16 regular local bus routes in the SWATS area generally follow an arterial highway. The routes, the arterial that each follows, and the endpoints of the routes within the SWATS area are shown in Table 3-12. The table also shows the approximate headways during the peak hours, the number of miles of the route within the study area, and the percentage of the total route length within the study area.

Route 3 has two branches in the SWATS area. Half of the buses leave Van Buren Street at 35th Avenue, so that service on Van Buren Street west to 43rd Avenue is on 30 minute peak period headways. Similarly, Route 17 and Route 41 also have two branches. Half of the Route 17 buses on McDowell Road and half of the Route 41 buses on Indian School Road leave those arterials at 51st Avenue, thus reducing the peak period headways on those routes west to 83rd Avenue to 30 minutes.

Route 10 is exceptional in that its route is not dominated by service on a single major arterial. The

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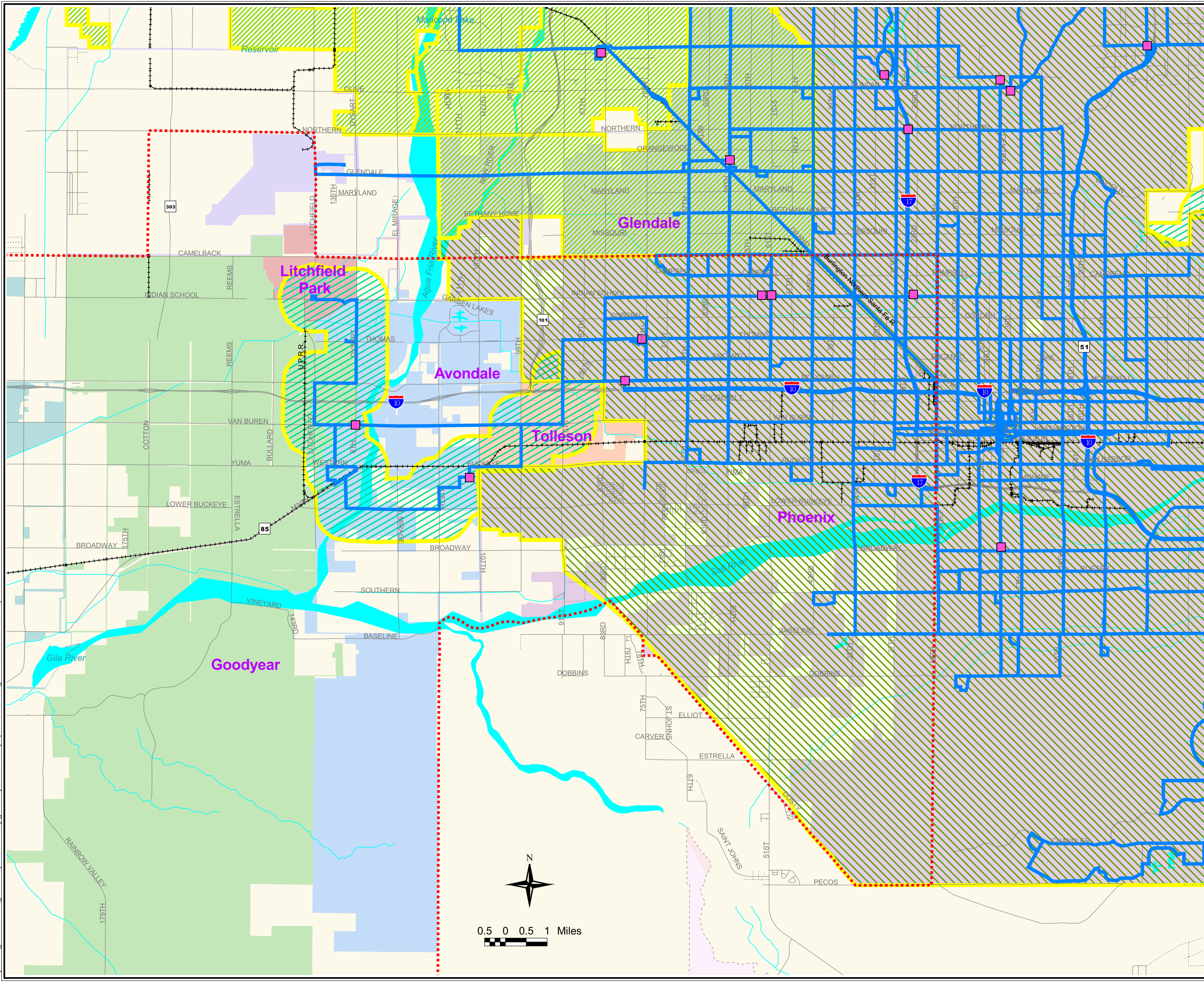
Southwest Area Transportation Study

Figure 3-29 Existing Transit Service Routes and Service Areas



- Existing Bus Service (Valley METRO)
- Existing Park & Ride Lot
- Existing Dial-a-ride Service
  - ADA Only
  - General Public
  - Seniors & Disabled
- Existing Freight Rail Service
- Study Area Boundary

Source: Valley METRO Regional Public Transportation Authority (RPTA); City of Phoenix Public Transportation Department

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Table 3-12
RPTA Transit Routes

Route	Arterial Served	SWATS End Points	Type Service	Mileage of Route within SWATS	Percent of Route within SWATS	Peak Period Headway in Minutes
3	Van Buren Street	67th Avenue	Local	7.93	33	15
10	Durango Road	22nd Avenue	Local	4.88	27	30
13	Buckeye Road	75th Avenue	Local	7.67	42	35
17	McDowell Road	83rd Avenue	Local	15.44	49	15
19	19th Avenue	Baseline Road	Local	12.60	46	15
27	27th Avenue	Jefferson Street	Local	6.41	27	30
35	35th Avenue	Baseline Road	Local	11.44	43	20
41	Indian School Road	83rd Avenue	Local	17.26	56	15
43	43rd Avenue	Mohave Street	Local	6.20	36	30
50	Camelback Road	67th Avenue	Local	7.48	32	15
59	59th Avenue	Buckeye Road	Local	6.95	37	30
61	Southern Avenue	43rd Avenue	Local	4.03	13	15
67	67th Avenue	Buckeye Road	Local	5.94	36	30
77	Baseline	39th Avenue	Local	2.68	14	30
131	Various	Litchfield Park and Desert Sky Mall	Local	19.49	100	70
560	Various	Avondale to Downtown Phoenix	Express	29.06	79	50
561	I-10	Desert Sky Mall to Downtown Phoenix	Express	31.19	81	25
Green	Desert Sky Mall	Thomas/Encanto	Local	16.45	55	10
Yellow	Grand Avenue	Downtown	Local	5.68	17	30

route enters the study area from Pima Street and proceeds south along 19th Avenue, turning west along Durango Street past Maricopa County's Durango Complex. The route then turns south along 35th Avenue from which it turns east onto Lower Buckeye Road.

Route 19 serving 19th Avenue provides 15 minute peak period headways north of Lower Buckeye Road, but only 30 minute headways south to Cesar Chavez High School west of 19th Avenue on Baseline Road.

Route 27 serves 27th Avenue north of Jefferson Street. Rather than continuing south on 27th Avenue, the route turns east to serve the State Capitol and downtown area.

There are a small number of routes which operate within the boundaries of the study area but provide either no or extremely limited service to the area. They have therefore been excluded from further consideration here. The Dash Route and Routes 45, 52, and 70 have turn around loops at their western ends. The former three use 19th Avenue as part of that loop and thus provide an extremely small amount of service to the study area west of the 19th Avenue study boundary. Similarly, Route 70 uses Litchfield Road adjacent to Luke AFB, which is within the study area, as part of its turnaround.

The Red Route touches the extreme northeast corner of the study area at the intersection of Camelback Road and 19th Avenue. While the study area lies to the southwest of that intersection, the Red Route approaches that intersection from the east and turns north at the intersection. Thus the amount of the study area served by the route is extremely small.

The Route 500 and 570 peak period express services are in the study area only from their common terminus at 22nd Avenue and Lower Buckeye Road until they enter the downtown area at Jefferson Street and 19th Avenue. The routes continue local service through downtown and then express to locations outside the study area. The Route 580 peak period express service provides local service on Jefferson and Adams Streets between 19th Avenue and I-17 before expressing north and out of the study area. Express service on Routes 581, 582, 590, and 591 operates within the study area. However, the routes are operated "closed door" as they express through a portion of the study area. No boardings or alightings are permitted in the SWATS area, so there is actually no service provided in the SWATS area.

The service area of regular transit route buses is generally considered to include the area within ¼ mile of the route. The time it takes a patron to walk ¼ mile to a transit stop is generally considered to be the average limit of time that patrons will tolerate to access transit. RPTA's provision of bike racks on all of its regular route transit vehicles increases the service area for bicylists, because a bicycle can cover more ground than a pedestrian in the same amount of time. The following analysis of transit service area population includes both population within ¼ and within ½ mile of transit bus routes.

The population residing within ¼ mile of a local RPTA bus service (including the START Route 131) inside the study area in 2000 is estimated to be 225,371. Based on the 2000 SWATS area population estimate of 392,061, 57 percent of the SWATS area population is within the RPTA local bus service area. If the service area is expanded to the land within ½ mile of a local RPTA bus route, the SWATS area population in the RPTA service increases to 285,074, or 73 percent of the SWATS population. The additional increment of population served by the "open door" component of RPTA express bus services is 11,832 for a ¼ mile service area and 7,004 for a ½ mile service area.

The number of jobs located within ¼ mile of a local RPTA bus service inside the study area in 2000 is estimated to be 89,984. Based on the 2000 SWATS area employment estimate of 189,172, 48 percent of the SWATS area employment is within the RPTA local bus service area. If the service area is expanded to the land within ½ mile of a local RPTA bus route, the SWATS area employment in the RPTA service area increases to 118,836, or 63 percent of the SWATS employment.

Complementary ADA services for the mobility impaired are provided by the RPTA to and from locations within ¾ of a mile of regular route service. This is a dial-a-ride service and is also provided along the START Route 131.

There are six park-and-ride facilities in the study area. These are shown on Figure 3-29. Each location provides a parking facility where bus patrons can park a car used to access the bus line. One facility is an express park-and-ride lot and is owned and operated by the RPTA. This parking lot is located adjacent to I-10 at 79th Avenue. From that parking lot express buses run into downtown Phoenix via the I-10 HOV (high occupancy vehicle) lanes. There is a dedicated set of ramps linking the lot to the HOV lanes, so that buses do not travel in mixed traffic from the lot to the HOV lanes.

The RPTA provides additional services to the study area. A carpool matching service is provided to identify potential carpool partners. This service is provided for all residents and employees in the greater Phoenix area and is free. The RPTA also provides a variety of vanpool support services for larger, more regular, and more formal ridesharing. The vanpool services provided vary and some carry fees.

The Maricopa County Department of Human Services provides Specialized Transportation Services (STS) through two programs in the study area. The services are targeted primarily to the indigent, elderly, and disabled. The areas served by these programs include Avondale, Buckeye, Cashion, Gila Bend, and Tolleson. The STS Core Program provides transportation for medical appointments, senior center trips, shopping, and recreational purposes. The program also delivers meals for homebound individuals. The Work Links Program provides employment and employment related transportation services, including child care and medical transportation, to eligible participants for up to six months. The services are provided from 8:00 A.M. to 4:00 P.M. weekdays.

Greyhound has bus routes on I-8 and I-10 in the study area. The routes on I-8 serve Gila Bend twice daily in each direction with interregional service. Two routes provide service along the I-10 corridor in the SWATS area. Service on both routes is provided from Phoenix to Tolleson and Buckeye. From Buckeye service continues to either Gila Bend and Yuma or Blythe, California and points west on I-10. Six buses per day in each direction stop in downtown Tolleson and four per day in each direction stop in Buckeye on MC-85 at N. 4th Street. All of the buses serving Buckeye serve Tolleson, while three go on to Gila Bend and Yuma. The fourth bus serving Buckeye continues west to Blyth California and points west on I-10.

3.1.2.3 Future Transit Facilities

Additional transit facilities and services in the study area will clearly be necessary. Figure 3-30, taken from the *Regional Transportation Plan Final Draft Summary Report* approved by MAG's Transportation Policy Committee and Regional Council in September 2003 shows a number of high capacity transit corridors in the SWATS area. The figure shows the I-10 corridor west of the light rail line currently under construction to 79th Avenue as a corridor to which high capacity transit is committed. Other eligible corridors in the SWATS area where some type of high capacity transit such as bus-rapid-transit, light rail, or commuter rail is to be considered include:

- I-10 west of 79th Avenue to 115th Avenue;
- Loop 101 north of I-10 to Bethany Home Road: and
- The Union Pacific Railroad west of downtown Phoenix to Buckeye.

The "Bus Rapid Transit Map" from the same document shows potential bus-rapid-transit routes along I-10, Loop 101, and Loop 303 in the SWATS area. The Regional Public Transportation Authority's (Valley Metro's) *Regional Transit System Study* shows expansion of local transit service west of the White Tank Mountains by 2030. Figure 3-31 includes local bus services west of the Hassayampa River in the I-10 corridor. Additional park-and-ride facilities are also shown along I-10.

Automatic vehicle location (AVL) technology is currently in place on 68 of the RPTA's buses. This number will increase as additional bus purchases take place, until the fleet is fully equipped. MAG's *ITS Strategic Plan* provides that transit operations in the study area will have a full complement of ITS applications that will enhance passenger safety and convenience. Access to real-time transportation information on major roads and transit services in Arizona have already been implemented via the 511 automated telephone answering system. Other anticipated ITS applications in transit include real-time bus arrival information at bus stops.

Figure 3-30

IDENTIFIED HIGH CAPACITY CORRIDORS
September 9, 2003

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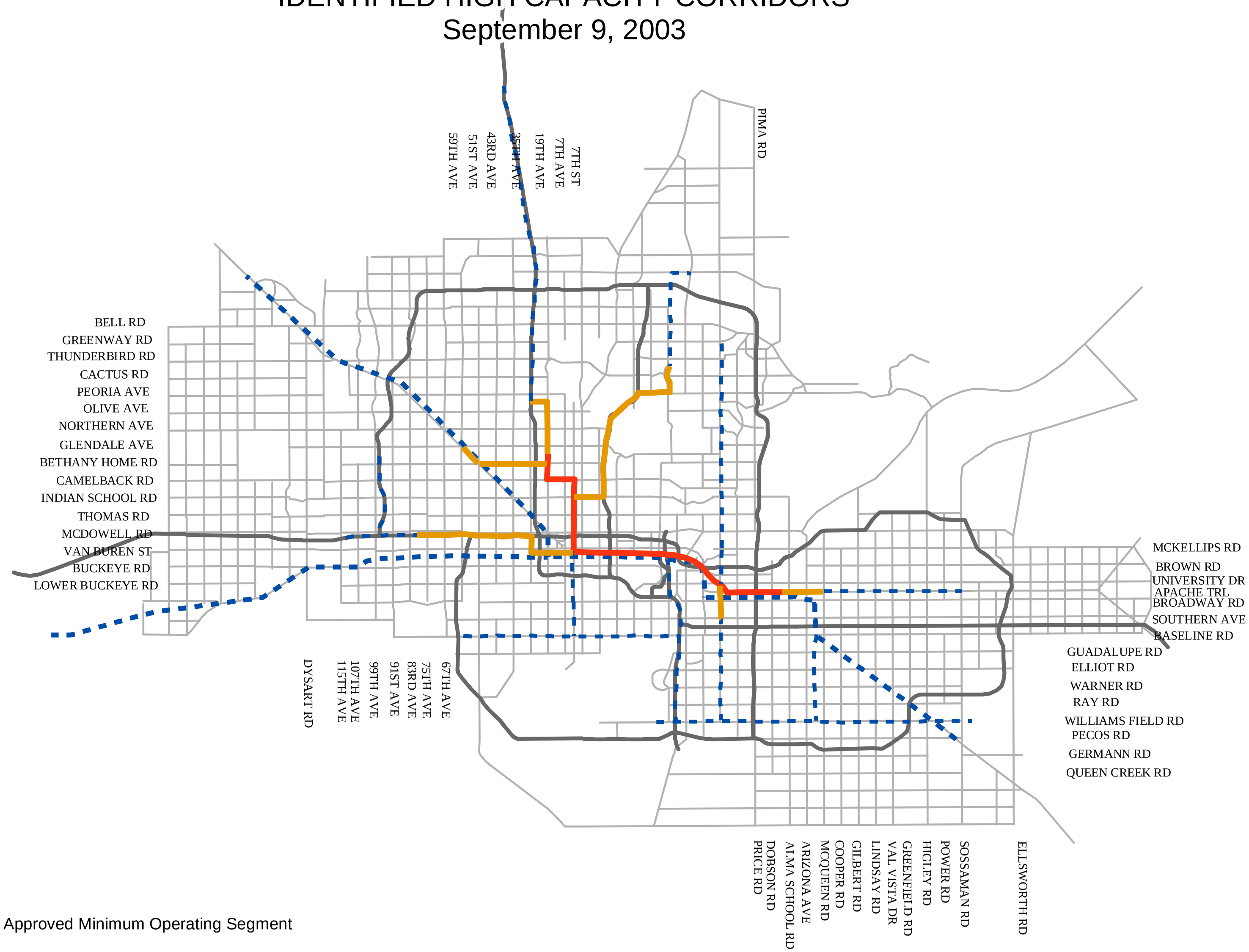

LEGEND

- Approved Minimum Operating Segment
- Committed Light Rail/ High Capacity Corridors
- Eligible High Capacity Corridors
- Planned or Existing Freeways

0 2.5 5 10 Miles

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Valley Metro
Regional Public Transportation Authority

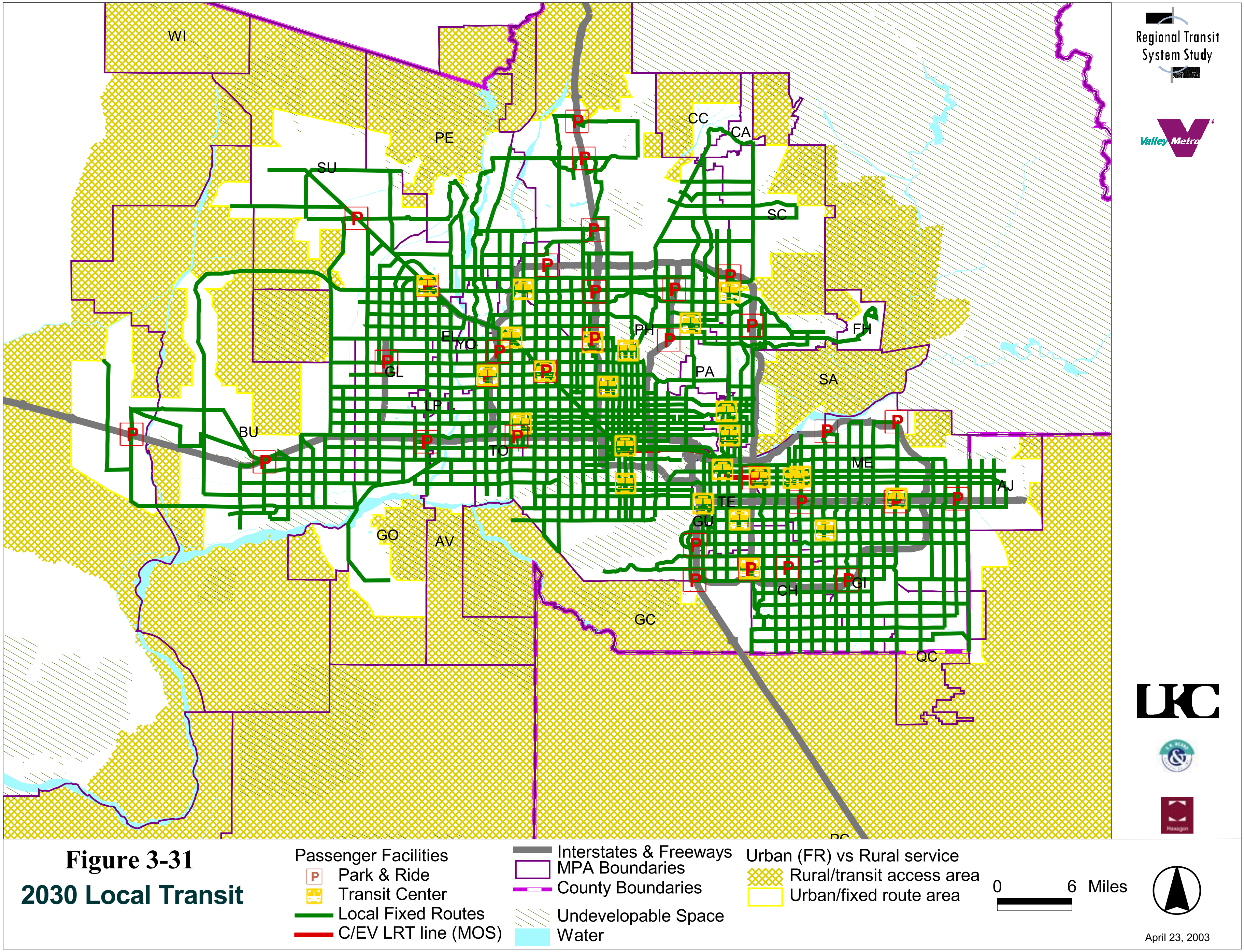


Figure 3-31
2030 Local Transit

3.1.3 Non-Motorized Transportation System

This section provides a description of the facilities available for use by non-motorized forms of transportation. These forms predominanly include walking, biking, skating, and horseback riding and cover trips for business, errands, recreation, fitness, connections to other modes, and other types of trip making. The section summarizes the non-motorized plans and policies of numerous jurisdictions affecting the study area. Data were gathered from MAG, the Arizona Department of Transportation (ADOT), Maricopa County Department of Transportation (MCDOT), local jurisdictions, and fieldwork.

3.1.3.1 General Description of Non-Motorized Systems

Typical origins for non-motorized travel in the SWATS area are population centers, residential areas, transit stations, resort areas, or access points for backcountry travel. Regional destinations for non-motorized travel are end points from origins such as schools, employment centers, concentrations of retail or tourist facilities, regional recreational centers and trailheads, and historic or cultural attractions.

Human-powered transportation occurs on shared-streets, streets with bike lanes, streets marked as bike routes, sidewalks, multi-use paths built on separate right-of-way, and multi-use trails that built on separate right-of-way.

In general, all streets are open to cyclists and pedestrians, unless specifically designated and posted otherwise. Therefore, the street grid provides the basic access and connections for bicycle and pedestrian travel. Most jurisdictions have addressed the needs of the non-motorized public on their street grid. This study only briefly assesses the existence of plans and facilities within the urban areas. Because of its regional nature, the SWATS focuses on the potential or actual connecting routes between them.

Planning for bicycle transportation can be approached as conventional transportation planning, i.e., where the same factors of access, convenience, safety, cost, efficiency, travel demand, connections, and engineering considerations all should apply. Integration of motorized and non-motorized transportation is a critical element of successful planning and design. This applies whether the non-motorized facility is on- or off-street. For optimum outcomes, such integration needs to be accomplished in the earliest planning stages. The following terminology is useful in the presentation of non-motorized transportation.

- Bicycle Facility: Denotes provisions and/or improvements made to accommodate or encourage cycling, including all bikeways, shared-streets, parking provisions, and signing.
- Bicycle Lanes: Bike lanes are a part of the roadbed, a minimum of 4 feet in width exclusive of the gutter pan, and are adjacent to the curb and gutter. Bike lanes by law are one-way, so a bike lane is needed on each side of the roadway. Specific national and local standards exist for striping, marking and signage.
- Bicycle Route: Any combination of paths, lanes, trails or streets that is designated by mapping or signing as a travel route for alternate modes. These facilities may be exclusive for non-motorized users or be shared with all transportation modes.
- Bikeway: See Bicycle Route. Bikeways may or may not be signed and may or may not be mapped.
- Grade Separation: Vertical isolation of travelways achieved with underpasses, overpasses, or

bridges. Usually applied to the intersections of paths or trails with streets to avoid interactions between motorized and non-motorized modes.
- Multi-use Path: A paved path, typically 10 feet in width, of concrete or asphalt material, preferably in a greenway or natural setting, well-separated from busy streets.
- Off-Road Facilities: Multi-use paths, shared-use trails, sidewalks, etc., that are not a part of a roadway.
- Pedestrian Facilities: Physical infrastructure that supports walking as a stand-alone mode of travel, or supports walking between origins and destinations such as a transit hub.
- Shared-Streets: Essentially any street open to cyclists. In most locales, all streets are open to cyclists except where specifically posted by local ordinance. Preferential striping or signing, or extra pavement width may or may not be present.
- Shared-Use Trail: Designates a "soft-surface" trail suitable for use by equestrians. Typically shared with other non-motorized users who don't require a hard surface for travel.

3.1.3.2 Origins/Destinations

In the SWATS study area there are origin/destination pairs present in both the urban and rural areas, with the urban routes linking the pairs identified. In some cases, the routes have been well developed by various jurisdictions. The rural routes are less well identified (although not less used).Each of the urban areas in the study area serves as a potential origin for pedestrians and bicyclists. Destinations are listed for pedestrian activity, cyclists, and equestrians. Figure 3-32 shows the major regional non-motorized facilities in the SWATS area.

Avondale

Avondale has implemented bicycle lanes on certain streets, and the City of Avondale General Plan includes a Bicycling Element, as well as policies concerning pedestrians and non-vehicular transportation. The city has a retail and craft-oriented Pedestrian Zone that has been designated and built on Western Avenue, between Central Avenue and Dysart Road.

Buckeye

The Town of Buckeye is working on a *General Development Plan.* The downtown area has sidewalks in some sections, but there are no specific facilities for cyclists or areas for pedestrians.

Goodyear

The City of Goodyear has a *General Plan* that addresses pedestrian facilities, and has implemented a study and first phase construction to improve pedestrian facilities on Litchfield Road, Western Avenue, and Yuma Road. Goodyear has a bicycle route on Dysart Road. The *City of Goodyear General Plan, 1998*, includes a bicycle plan with designated routes.

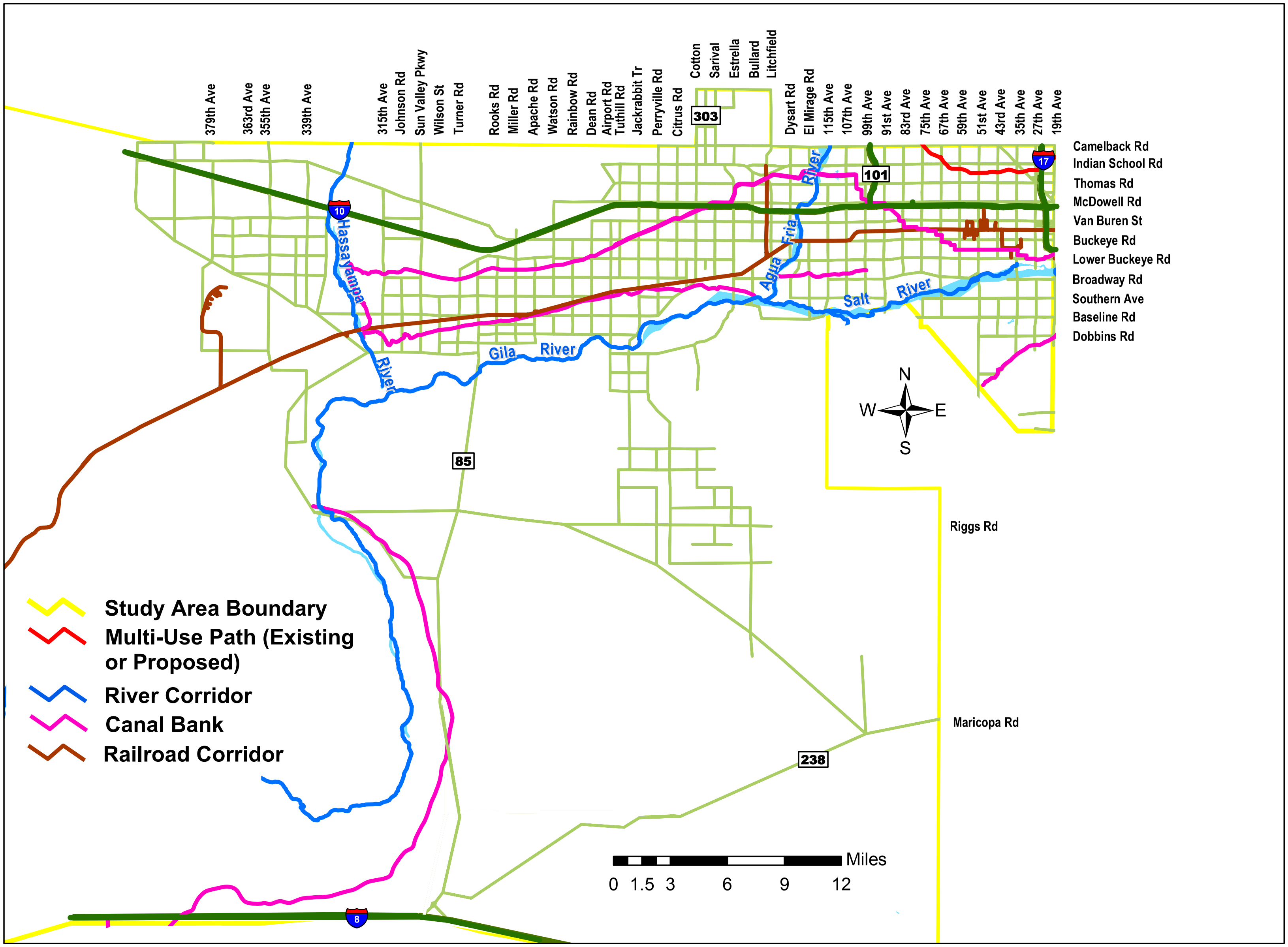
Litchfield Park

Litchfield Park has a designated retail downtown area, with many local destinations, canopy shade structures, and a thematic design to enhance the pedestrian environment. The city has implemented a system of multi-use paths, but there are no general policies concerning cycling and walking.

Southwest Phoenix

The City of Phoenix is divided into 14 urban villages. The following villages lie entirely or partly within the SWATS area: Ahwatukee Foothills, Estrella, Laveen, and South Mountain. Policies

Figure 3-32
Existing Off-Road Non-Motorized Facilities



regarding pedestrians and alternative transportation are addressed at the urban village level, as well as in the Phoenix General Plan. There is an existing paved, multi-use trail along the Western Canal.

Tolleson

Tolleson has work in progress to make Van Buren Street through the center of town more "pedestrian friendly." The city has no bicycle facilities at present.

Rural Areas

Outside of the urban areas, the SWATS study area is largely undeveloped. The number of miles of paved streets in the undeveloped areas is low; however there is an extensive network of dirt or gravel roads, canal banks, and dry washes that can be used by pedestrian, equestrians, and bicyclists. There are a variety of facilities and amenities for hiking and biking throughout these areas.

Gila Bend

The Town of Gila Bend has sidewalks along the curb on the main street, no bike lanes, and a 25-mph speed limit. Horse properties are in evidence. Gila Bend has a Town Museum, an airport and all facilities for a rest stop.

Sentinel

Sentinel is a very small town with a little general store, and a café closed in summer. There is no evidence of bicycle or pedestrian facilities.

Tonopah

Tonopah has no specific bicycle or pedestrian facilities at this time, but does have facilities for a rest stop.

Recreational and Cultural Areas

Many points of interest lie throughout area, such as wilderness areas, recreation areas, national monuments, mines, old towns, mountain ranges, natural washes, hot springs near Tonopah, etc. Most are accessible only by foot, off-road vehicles, mountain bikes, or horses. The Sonoran Desert National Monument can be accessed by a gravel road going south from SR-8, near Freeman. This road is suitable for hikers, mountain bikes, and horses.

The Town of Agua Caliente can be reached from the Old Agua Caliente Road running north from Sentinel. This apparently deserted town has a pioneer cemetery and interesting old buildings. The area in general has rolling terrain, views of Hyder Valley, and lava fields. The paved road stops near the Union Pacific Railroad tracks, a few miles north of the Town of Agua Caliente.

Following Painted Rock Road north from SR-8 leads to the Painted Rock Dam, through scenic, rolling terrain that ascends into the Painted Rock Mountains and offers views of Citrus Valley. The road is a fairly rough chip seal, and there are no public facilities at the dam, except hiking trails.

The BLM Rocky Point Campground and Petroglyphs contains an outstanding area of petroglyphs. The camp, ½ mile off Painted Rock Road, has shade, restrooms, and camping spaces, but no water.

Cotton Center Road (Old US 80) crosses the Gillespie Dam on the Gila River. Restoration work is planned for this historic iron bridge. The Arlington Wildlife Area is nearby.

For equestrian and mountain bike use, hiking, jogging, and recreational walking, unpaved surfaces are preferred. Routes along corridors with unpaved shoulders on roadways, canal banks, utility corridors, natural washes, etc., can provide excellent routes for these users. The following are of particular interest in the SWATS area:

- The Gila Bend Canal banks, from approximately Piedra east to Gila Bend and then north to the Arlington Canal near Arlington Valley.
- The power line corridors shown on Figure 3-32, including those from the Enterprise Canal past the Woolsey Peak Wilderness and from the Laveen area into the Gila River Indian Reservation.
- The Roosevelt Canal banks, from the Hassayampa River near the Buckeye Municipal Airport, east to New River and the Grand Canal.
- The Buckeye Canal banks, from the Hassayampa River, near Hassayampa. This canal roughly parallels the south side of the Union Pacific Railroad tracks, goes through the Town of Buckeye, and ends at the Agua Fria River, near the north side of the Estrella Mountain Park.

No rail-to-trail conversions of old railroad corridors were found in the study area.

3.1.3.3 Non-Motorized Transportation Policies and Planning

Typically, the larger incorporated urban areas in Maricopa County have developed policies and implemented capital projects to encourage travel by bicycle or on foot. Thus, in addition to the shared-streets, they have put in place specific facilities for cycling and pedestrians. Some of these are part of the roadway, such as bike lanes. Others are off-road, such as multi-use paths, and shared-use trails.

The State of Arizona, Maricopa County, and the Maricopa Association of Governments have developed specific policies and facilities for cyclists and pedestrians. Major documents are briefly described below.

Arizona Department of Transportation

On the Arizona Bicycle Map, written by the ADOT and the Governor's Bicycle Task Force, state and federal roads are identified as "more suitable" or "less suitable" for cycling. I-8 and Old US 80 are rated as "more suitable", while SR-85 is rated as "less suitable."

ADOT has also produced a policy document for bicycle planning and accommodation, the Arizona Statewide Bicycle/Pedestrian Plan. This plan is currently undergoing revision. ADOT Policy has been to allow bicycle travel on all roadway shoulders, except where expressly prohibited in urban areas. Another effort between ADOT and stakeholders is an attempt to resolve design issues for "rumble strips" on highway shoulders, because the presence, design, and implementation of these warning devices can seriously impact the rideability of a shoulder.

Maricopa County

The *Maricopa County 2020 Transportation System Plan, Eye to the Future* designates certain roadways as "scenic and recreational." This designation identifies the need to minimize impacts to the roadway and to preserve the natural characteristics of a road's environment. The plan recognizes a roadway's importance in providing access to recreational facilities. Identified corridors within the SWATS study area are Agua Caliente Road, Painted Rock Road, and Cotton Center Road.

The Maricopa County Flood Control District, with most of the west valley towns, is in the process of preparing a policy for recreation corridor links that would utilize their flood control facilities for off-street multi-modal transportation.

MCDOT urban street sections do not currently require bicycle lanes, but optional standards for both urban and rural cross-sections with bike lanes are included. The current *Transportation System Plan* recommends that the *MCDOT Roadway Design Manual* be amended to include urban cross-sections that incorporate on-road bicycle lanes as the recommended design standard, as opposed to being an optional treatment.

The *Maricopa County Department of Transportation (MCDOT) Bicycle Transportation System Plan, 1999*, addresses all aspects of bicycles as a transportation element, including recommended improvements and a plan for a countywide bicycle network.

Within the SWATS study area, the *MCDOT Bicycle Plan* designates certain sections of Old US 80, Salome Highway, Courthouse Road, 335th Avenue, Palo Verde Road, Baseline Road, Estrella Parkway, 51st Avenue, Dobbins Road, Cotton Lane, SR-85, Lower Buckeye Road, Dysart Road, and 99th Avenue as parts of a proposed bicycle network.

All county roads are open to bicycling. A number of paved roads are noted as being of particular interest to cyclists.

- Agua Caliente Road from the Town of Sentinel to Old Agua Caliente Road. The pavement ends a few miles north of the ghost town, near the Union Pacific Railroad tracks.
- Painted Rock Dam Road from I-8 (about Piedra) to the Painted Rock Dam, where the pavement ends.
- Salome Highway to Courthouse Road to Harquahala Valley Road. These roads form a connection from Cotton Center Road (Old US 80) to I-10 at Exit 81.
- Cotton Center Road (Old US 80) from the Town of Gila Bend to the area of Hassayampa and the Town of Buckeye.
- Watermelon Road, Citrus Valley Road, and Cotton Center Road form a loop in the area just north of Gila Bend suitable for cycling.
- A frontage road on the south side of I-8 from the Town of Gila Bend west to Painted Rock Road. Construction is underway to continue this frontage road to Sentinel.
- CR-85 from SR-85 (Olgesby Road) to downtown Phoenix. This connects Buckeye Road, Lower Buckeye Road, Broadway Road, Baseline Road, and Dobbins Road. Overall, these roads provide connections among southwest Phoenix, Avondale, Goodyear, Buckeye, South Mountain Park, and Estrella Mountain Park.

Transit Connections

In the SWATS study area, Greyhound has bus routes on I-8 and I-10. Cities served with Ticket Centers and/or Limited Service Bus Stops are Phoenix, Tolleson, Buckeye, and Gila Bend. Valley Metropolitan, all of whose buses have bike racks, operates the following routes that provide connections within the SWATS study area:

- Route 560 – Avondale Express, connecting central Phoenix with Avondale and Tolleson.
- Route 3 – Van Buren Street and the Green Line along Thomas Road, both connecting central Phoenix with points to the west in the vicinity of Avondale and Tolleson.
- Route 13 – Buckeye Road, connecting Phoenix out to 75th Avenue and providing a means

to make part of a trip west by bus.

Maricopa Association of Governments

The Maricopa Association of Governments (MAG) identifies off-street corridors suitable for multi-use paths such as canals, power line corridors, and river and wash corridors in the *Regional Off-Street System Plan, 2001* and *Phase 1, 2002* documents. Corridors in the SWATS study area include:

- The Agua Fria River Corridor, extending from its junction with the New River to the Gila River. This would connect Estrella Mountain Regional Park with a large area of Southwest Phoenix and other nearby communities.
- The Gila River Corridor, from its eastern junction with the Agua Fria River to its western connection with the Hassayampa River. At that junction, the corridor turns north and follows the Hassayampa River.

The *MAG Regional Bicycle Plan, 1999*, covers all aspects of planning for bicycling in the MAG region. A "Regional Bikeway Plan On-Road System Inventory" is presented, including potential facilities and recommendations for widening and/or striping. In the SWATS study area the following have been identified:

- Route 11, Cotton Lane between Buckeye Road and extending to Olive Avenue (outside of study area).
- Route 15, Litchfield Road from Estrella Mountain Park to Bell Road (outside of study area).
- Route 19, 91st Avenue from Buckeye to Glendale (outside of study area).
- Route 20, Baseline Road and Hardy Road from 51st Avenue to Power Road (outside of study area).
- Route 23, 51st Avenue south from Bell Road to Riggs Road. The section of Route 23 between Camelback Road and the Gila River Indian Reservation is in the SW Study Area.
- Route 26, Buckeye Road, beginning at SR-85, to study area boundary at 19th Avenue. Eventually Route 26 reaches Tortilla Flat.
- Route 29, 31st Avenue south from Union Hills Road to Washington/Jefferson, and thence to the study boundary at 19th Avenue. At 17th Avenue, Route 29 joins Route 26.
- Route 31, 23rd Avenue from Washington to Dunlap (outside of study area), and then follows 19th Avenue to Union Hills Drive.
- Route 44, follows Encanto Boulevard from 91st Avenue to 31st Avenue.
- Route 64 starts at SR-85 west of Buckeye, and follows the Sun Valley Parkway (outside of study area) around the White Tank Mountains to Bell Road.

Roadways within the study area that may be good candidates for bike facilities include:

- Jackrabbit Trail – between Olive Avenue and MC85.
- Cotton Lane and Loop 303 – from north of the study area boundary south to I-10.
- Dysart Road – from CR-85 north to the study area boundary.
- 99th Avenue – between I-10 and Baseline Road.
- 59th Avenue – north of I-10 to the study area boundary.
- 19th Avenue – from Baseline Road north to the study area boundary.

- Sun Valley Parkway – from I-10 north to the study area boundary.
- Indian School Road – from Jackrabbit Road east to the study area boundary.
- Maricopa County 85 – between SR-85 and I-17

Summary of Current Facilities, Policies, and Planning

Urban centers and larger jurisdictions such as the City of Phoenix and Maricopa County have facilities, policies, and plans generally supportive of building and acquiring bicycle routes. Pedestrians are better served in smaller communities such as Litchfield Park, Goodyear, and Tolleson's commercial areas. Smaller communities have few specific facilities for bicycle travel, but use of shared streets may be adequate for most purposes where vehicular traffic is light. Other jurisdictions and agencies show a need for policies, plans, and budgeting to encourage cycling and walking.

3.1.3.4 Future Non-Motorized Deficiencies

For non-motorized uses, physical deficiencies most often take the form of gaps in the route or system and barriers within the route itself. Pedestrian areas are generally present and adequate in most communities' central business districts, with improvements funded by various grants. Recreational walking and hiking have been planned in most jurisdictions.

Policy and planning deficiencies are most often found in requirements for bicycle transportation on-street and in budgeting priority. For pedestrians, the most common deficiency is recognition of walking as a mode of travel, other than recreational walking.

Gaps

Gaps can take the form of missing corridors, missing pieces of within a corridor, and missing connections between on-street and off-street facilities. Gaps between cities and rural areas have been identified in Figure 3-33. As the figure shows, gaps in existing and planned bicycle facilities are found in both the on-street and off-road categories.

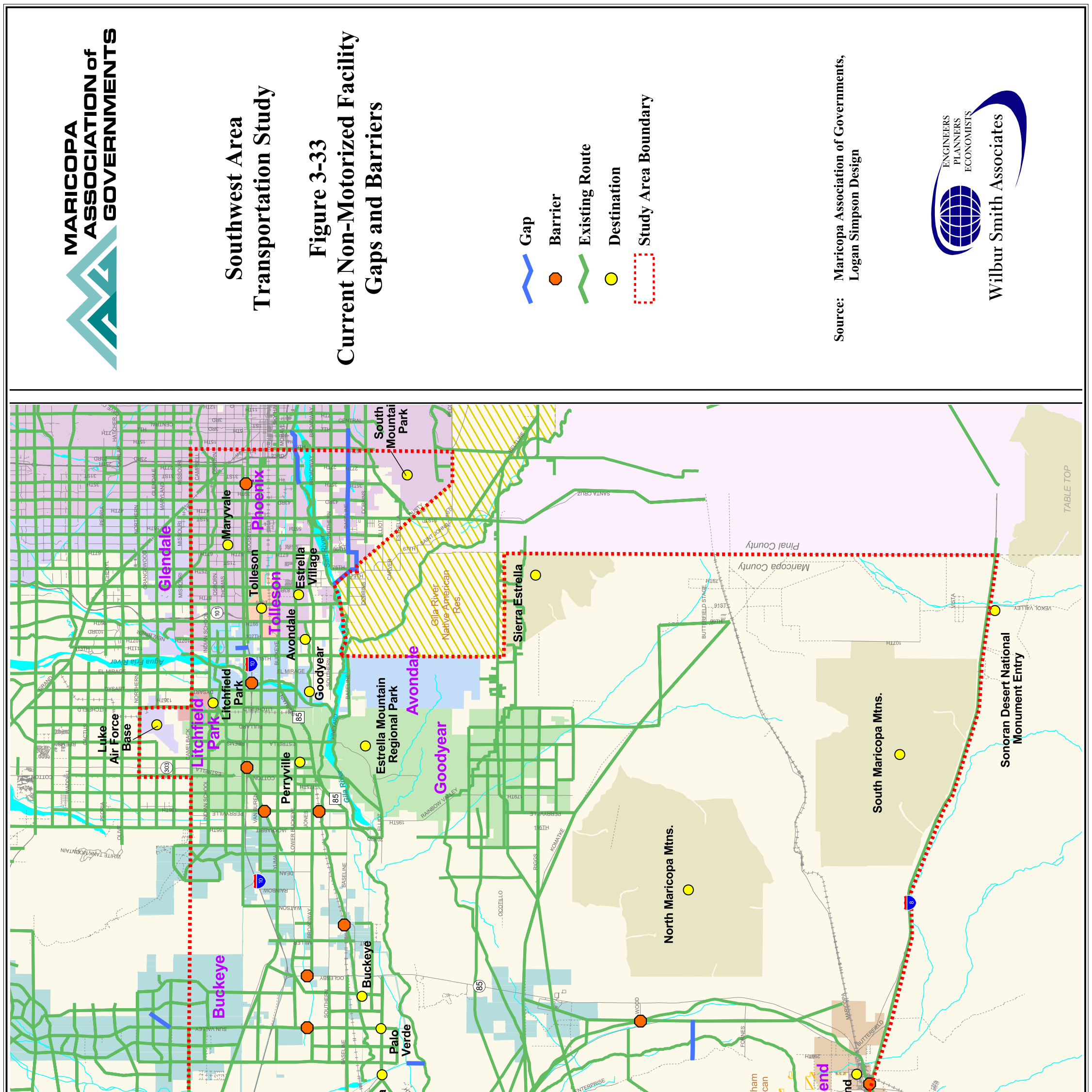
Several arterial streets have gaps within a jurisdiction's planning area and between jurisdictions. Examples are:

- Baseline Road, from Southern Avenue to the Salt River;
- 2nd Avenue, from Buckeye Road to Encanto Boulevard; and
- Perryville Road, from McDowell Road to the Salt River.

Several jurisdictions have planned for the Salt, Gila and Hassayampa Rivers to be an off-road non-motorized facilities. However, gaps occur in connecting these corridors to each other and the nearby arterials and other paved streets. Missing connections include:

- Lower Buckeye to the Salt River Corridor;
- The Hassayampa River to the Salt/Gila Rivers corridor; and
- SR-85 to the Gila River.

Along I-10 there is a gap between where it is permissible to ride on the shoulder and other local bike routes. There should be a connection between I-10 and an existing bicycle facility. Paved paths are needed for Sisson, and from Agua Caliente to the Harquahala Valley Road. The existing powerline



MARICOPA ASSOCIATION of GOVERNMENTS
Southwest Area Transportation Study
Figure 3-33
Current Non-Motorized Facility Gaps and Barriers
Gap
Barrier
Existing Route
Destination
Study Area Boundary
Source: Maricopa Association of Governments, Logan Simpson Design
ENGINEERS PLANNERS ECONOMISTS
Wilbur Smith Associates
Glendale
Phoenix
Maryvale
Tolleson
Avondale
Estrella Village
South Mountain Park
Luke Air Force Base
Litchfield Park
Goodyear
Perryville
Estrella Mountain Regional Park
Gila River Native American Res.
Sierra Estrella
Buckeye
Palo Verde
Hassayampa
Gillespie Dam
Tonopah
North Maricopa Mtns.
South Maricopa Mtns.
Sonoran Desert National Monument Entry
Gila Bend
Tohono O'odham Native American Res.
Woolsey Peak
Signal Mtn.
Painted Rock Dam
Rocky Point Campground and Petroglyphs
Eagletail Mtns.
Old Agua Caliente
Sentinel
BIG HORN MTNS.
TABLE TOP
Maricopa County
Pinal County
La Paz County
Yuma County
N
1 0 1 2 3 Miles
11 DEC 02 13:43
h:\planning\36980 - mag sw transportation study\gis\transportation-6b.apr (L:1.3.5A Current N-M Facilities Gaps and Barriers)

corridors just north of the study boundary should be connected.

Barriers

Barriers at a regional scale are usually present when an off-road or on-street facility comes up against a canal, riverbed or wash, freeway, or elevated railroad crossing. In the southwest region, barriers can be found at the intersections of:

- Paved routes and the UPRR;
- Arterial Streets and canals;
- Paved paths and I-10 and I-8; and
- Residential and commercial areas across SR-85 in Gila Bend.

Deficiencies in Policies and Planning

Planning for non-motorized transportation should be approached as conventional transportation planning, where the same factors of access, convenience, safety, cost, efficiency, travel demand, connections, and engineering apply. Integration of motorized and non-motorized facilities is a critical element of successful planning and design. This applies whether the non-motorized facility is on-street or off-road. For optimum outcomes, such integration needs to be accomplished in the earliest planning stages. Typically the larger incorporated urban areas in Maricopa County have developed policies and implemented capital projects to encourage travel by bicycle or on foot; so, in addition to the shared-streets, they have put in place specific facilities for cycling and pedestrians. Some of these are part of the roadway, such as bike lanes and sidewalks. Others are off-road, such as multi-use paths and shared-use trails.

Similarly, additions to the arterial grid network, improvements to existing arterials, and upgrades of a lower street classification to an arterial street should include buffered sidewalks bicycle lanes where feasible and where they can be made part of a regional system. These are not yet requirements.

At their destinations, recreational bicycle or equestrian travel groups will need facilities such as parking, water, shelter, and storage. Nodes such as these have not been identified.

Pedestrian policy is regulated at a federal level for access by the Americans with Disabilities Act (ADA) and its Accessibility Guidelines (ADAAG), but a policy for locating pedestrian areas other than recreational trails and multi-use paths, such as enforcement of a Safe Route to School, was not found at the state, county, or local levels. Similarly, while many communities have at least a role for a Bicycle Coordinator, no corresponding role was found for a Pedestrian Coordinator.

Pedestrian planning on a regional basis should focus on transit connections between origins/destinations, with bicycle and bike-on-bus as an alternative. For a pedestrian-by-necessity traveling regionally, getting to their ultimate destination is currently very difficult.

Three rivers exist in the more populated northeasterly sections of the study area and include the Salt River, the Agua Fria River, and the Gila River. Bridges over rivers should always be designed to accommodate non-motorized travel.

3.2 Summary and Conclusions

The growth in the population and employment in the SWATS area and metropolitan Phoenix expected over the next 25 years will over-tax the capabilities of the existing transportation system, even with the additions included in the region's current Long Range Transportation Plan.

3.2.1 Roads and Highways

The LRTP based network includes facilities and services based on the Long Range Transportation Plan and other improvements expected in the future. Traffic forecasts for 2030 for that network show severe levels of congestion. East of Airport Road it is difficult to find an intersection of arterials in the SWATS area that is forecast to operate with an acceptable level-of-service during the peak hour. East of Watson Road it is almost impossible to find sections of east/west roadway forecast to operate without heavy congestion. Some north/south arterials in this same portion of the study area are expected to operate with acceptable levels of congestion, particularly south of I-10. Crossings of the Agua Fria River and of the Gila River west of the Agua Fria show substantial congestion. West of Airport Road and in southern Goodyear the arterial grid is forecast with more isolated locations of congestion.

Major increases in the east/west capacity of the arterial and freeway systems will be necessary to reduce forecast congestion to acceptable levels. These major capacity increases will need to extend from central Phoenix at least as far west as SR-85. Some increases in north/south highway capacity will be needed, particularly north of I-10 and across the Gila River into southern Goodyear. Thus, major increases bridge capacity will be required over the Gila River west of the Agua Fria. Increases in bridge capacity will also be required over the Agua Fria.

The number of motor vehicle accidents is forecast to more than double by 2030. Freeways, with their access controls and lack of intersections, provide a much higher level of safety per vehicle mile of travel than do arterials and other lower class roadways. A concentration of highway capacity increases in freeways will reduce the number of accidents forecast for the SWATS area.

3.2.2 Transit

The increased population and employment in the SWATS area is expected to result in extensive new development as far west as the Hassayamp River and in southern Goodyear south of the Gila River. As development moves west and south, the demand for transit service can be expected to move. Because of the greater distances involved in commuting to downtown Phoenix and to other locations in the metropolitan area, demand for higher speed transit is also expected.

Expansion of the service area for fixed route transit services is forecast west of the Hassyampa River and south into southern Goodyear. Higher speed and higher capacity services, such as light rail in the I-10 corridor, commuter rail along the Union Pacific tracks, and bus-rapid-transit in freeway corridors are among the options requiring further consideration as the southwest valley develops.

3.2.3 Non-Motorized Facilities

The system of bicycle, pedestrian, and multi-use non-motorized facilities in the SWATS area is incomplete. There are currently substantial gaps in the continuity of non-motorized facilities.

Bicycle and pedestrian facilities are not fully integrated into the improvement process for the arterial system. A more fully functional network of bicycle and pedestrian facilities in the SWATS areas will be realized with the inclusion of bicycle and pedestrian facility provision in the improvement of the arterial system. Additionally, major facility upgrades and improvements afford the opportunity to provide parallel improvements to bicycle, pedestrian, and multi-use non-motorized facilities. Bridges over the major rivers in the study area are an example of such an opportunity.

Numerous opportunities also exist for formal creation of multi-use facilities along river banks, canals, power lines, railroads, and other linear facilities to remove gaps in existing formal and informal facilities.. Multi-use trails and paths require a variety of support facilities such as parking, water, shelter, and storage.

Bikes on transit and bicycle facilities at transit stations currently provide for increased transportation options in areas served by transit. Improving pedestrian access to transit should focus on removing barriers to effective pedestrian/transit connections. Provision for these connections and for pedestrian circulation between residential areas and nearby activity centers can be accommodated in the arterial and land development processes.

4 Major Transportation Issues in the SWATS Area

The purpose of this chapter is to identify and document the transportation issues existing and anticipated in the southwest portion of the Phoenix Metropolitan area. The purpose of this chapter is to inform the development of the Regional Transportation Plan for the greater Phoenix area. The conclusions of this chapter form part of the foundation for the identification of new facilities and services needed in the southwest valley to meet the future transportation demands of the area.

This chapter was developed as a Working Paper (WP) and contains data and information that is continuously updated, some of which may have changed or may have been superseded by the final Regional Transportation Plan (RTP). Information was current at the time of initial WP publication.

The study area is bounded on the west by the Maricopa County line. From the western county line, it is bounded on the north by a line parallel to I-10, one mile to the north of that highway, until that line reaches the projected alignment of Camelback Road. The alignment of Camelback Road forms the remainder of the study area's northern boundary, except where the boundary swings north around Luke Air Force Base, which is fully included in the study area. The eastern boundary of the study area is 19th Avenue north of the Gila River Indian Community (GRIC) and the eastern boundary of Maricopa County south of the GRIC. The eastern boundary swings west around the GRIC, which is fully outside the study area. The southern boundary of the study area is I-8.

Much of this study area is lightly populated with limited transportation services and facilities. The study focuses on those areas that are more heavily populated, closer to Phoenix, and expected to grow in the next 50 years, thereby requiring additional transportation facilities and services.

The chapter identifies the transportation issues that require attention in the remainder of the SWATS transportation planning effort. The majority of the transportation issues that must be addressed in order to mitigate future transportation problems result from expected increases in population and employment. As the population of the study area increases, demand for transportation facilities and services will increase. The SWATS transportation planning effort is focused on identifying that demand and recommending transportation facilities and services to address it. The underlying purpose of the effort is to mitigate future transportation problems. The transportation issues identified in this chapter are an integral step between acknowledging expected increases in demand for transportation and identifying transportation facilities and services to accommodate that demand.

Chapter Organization

The chapter starts with a summary description of the development expected for the study area, as the Phoenix metropolitan area increases in population. The travel patterns and transportation issues expected to arise from future development are summarized. These have been investigated through discussions and other activities with a variety of public and private agencies, through contact with the public and residents of the area, and through technical analysis. Each method of identifying transportation issues in the SWATS area is described and a list of expected issues presented.

4.1 Future Land Use and Travel Demand Patterns

The population of the Phoenix metropolitan area is approximately 3.2 million. Population is expected to grow significantly in the coming years. The SWATS transportation planning effort is dedicated to evaluating future transportation needs in the southwest valley in anticipation of substantial population by the year 2030.

4.1.1 Summary of Land Development Forecasts

Of the 3.2 million metropolitan population, just under 0.4 million, or about 12 percent, was in the SWATS area in 2000. The population in the SWATS area is forecast to be just over 900,000 in 2020 and represent a growing portion of the metropolitan area population. In the year 2030, the SWATS area is forecast to have over 1.4 million people, about 20 percent of the metropolitan. Two sets of land development forecasts have been prepared for the SWATS area. These two scenarios differ principally in the intensity of development activity expected to take place in southern Goodyear. If the increased levels of development take place in southern Goodyear, an additional 110,000 people are forecast in the SWATS area. Under either scenario, the population in the SWATS area will have increased 225 to 250 percent compared to 2000

In 2000 there were approximately 190,000 jobs located in the SWATS area. Upon the metropolitan population reaching 6.6 million, an employment base of 800,000 to 825,000 is expected for the SWATS area, depending upon the intensity of development in southern Goodyear. At that time, the employment in the SWATS area will have increased 325 percent over 2000.

In 2000 there were approximately 180,000 jobs located in the SWATS area. As the metropolitan population increases, the number of jobs in the SWATS area is expected to increase also. In the year 2020, an employment will surpass half a million. By 2030 an employment base of 800,000 to 825,000 is expected for the SWATS area, depending upon the intensity of development in southern Goodyear. At that time, the employment in the SWATS area will have increased 325 percent over 2000.

The population and employment growth forecast for the SWATS area will not be distributed evenly over the study area. The heaviest concentrations of current population are north of I-10 and east of Loop 101, with a number of smaller concentrations further to the west. Population growth is concentrated on both sides of I-10 from the Agua Fria River to Sun Valley Parkway, and south of the Gila River in southern Goodyear and Gila Bend. Population is forecast to push west along the I-10 corridor. Population densities in the growth areas will not be as dense as they are for current populations.

The heaviest concentrations of current employment are east of Loop 101 and north of Broadway Road, with other isolated concentrations at Luke Air Force Base and both east and west of the Phoenix-Goodyear Airport along Lower Buckeye Road. Employment is forecast to be dispersed more broadly along the I-10 corridor from central Phoenix to Sun Valley Parkway. Employment density will remain highest in the I-10 corridor east of the Phoenix-Goodyear Airport, between I-10 and Lower Buckeye Road, and along Grand Avenue and Loop 101.

4.1.2 Forecast Travel Demand Patterns

As the population of metropolitan Phoenix reaches 6.8 million, the population of the SWATS area will have tripled, from 0.4 million to approximately 1.3 million. Employment in the area will have quadrupled. Travel rates can expect to increase more than three fold, assuming the recent history of increasing travel per person continues. The lower employment and population densities anticipated for future development will tend to increase travel distances.

East/west travel in the study area will rise substantially. The preponderance of new development along the I-10 corridor as far west as Sun Valley Parkway will reinforce the existing strong east/west travel patterns exhibited by heavy I-10 traffic volumes during commuting hours. Job growth along the I-10 corridor will be strong and jobs will be concentrated east of the Agua Fria River.

North/south travel will also rise substantially. Some north/south travel will be used to access facilities serving the predominant east/west movements. However, the expansion of the northwestern suburbs concurrently with the southwestern suburbs will increase travel between the southwest and northwest along north/south axes. Population growth in southern Goodyear and Gila Bend will also result in increased north/south travel from these areas to locations north of the Gila River.

Higher employment in the eastern portion of the study area and the employment centers of downtown Phoenix and Sky Harbor Airport, coupled with the westward expansion of residential development, may result in strong directional splits of traffic volumes by time of day. However, as employment increasingly moves west of existing housing stock, directional splits may be diluted.

The rate of increase in employment in the SWATS area is forecast to be higher than the rate of increase in population. This will result in a growth of work travel from outside the study area, from the major residential areas located to the north and east.

4.2 Issues Identified through Agency Participation

A major effort in the identification of transportation issues for the SWATS area involved an outreach effort to gather opinions and ideas from a host of public and private agencies. A variety of agencies participated in several different ways including through forums, workshops, public meetings, or work progress meetings with MAG. Issues were also identified in letters from a number of the local jurisdictions to MAG.

Individual interviews were conducted with representatives of nearly all of the agencies listed above. Most of the interviews were conducted in person with the remaining conducted by telephone. Interviews were conducted with one or more representatives of the agency. During the interviews a standardized survey was administered, a copy of which is included in Appendix III. The results of the survey will be reported in the *MAG Regional Transportation Plan: Southwest Area Transportation Study Consultation Summary Report*.

4.2.1 Participating Agencies

The participating agencies included:

- Federal Highway Administration;
- Federal Transit Administration;
- Bureau of Land Management;
- Luke Air Force Base;
- Amtrak
- Arizona Department of Transportation;
- Arizona State Transportation Board;
- Arizona State Land Department;
- Arizona Game and Fish Department;
- Arizona Department of Corrections;
- Arizona Department of Public Safety;
- Maricopa County Department of Transportation;
- Maricopa County Flood Control District;
- Regional Public Transportation Authority (Valley Metro);
- City of Avondale;
- City of Gila Bend;
- City of Goodyear;
- City of Litchfield Park;
- City of Phoenix;
- City of Tolleson;
- Gila River Indian Community;
- Town of Buckeye;
- Burlington Northern and Santa Fe Railroad; and
- Union Pacific Railroad.

4.2.2 Issues Identified

A variety of transportation issues were identified. Many participants made reference to improvements they felt were needed on specific arterials located in the study area. This report presents such suggestions in a generalized way (such as continuity and capacity improvements to the arterial grid). Project specific suggestions have been organized into issues or problems, the solutions to which require further planning, investigation, and analysis. There is no significance to the order in which the issues are presented below. The following list identifies the more salient issues.

- Preservation of right-of-way for future transportation projects;
- Identification of future transportation services including local bus, express bus, light rail, commuter rail, bus-rapid-transit, park-and-ride facilities, and shuttles;
- Funds for transit improvements;
- Improvement of existing transit services;
- Provision of bus stop pullouts;

- Local community transit;
- Provision of rural transit service;
- Mobility needs of the elderly;
- Safety of small, light-weight, street legal vehicles such as golf carts and urban electric vehicles;
- Expansion of dial-a-ride services;
- Enhancement of transit technologies;
- Funds for I-10 corridor improvements;
- Additional capacity on I-10 west of central Phoenix beyond the White Tank Mountains;
- An I-10 reliever;
- Additional interchanges on I-10;
- Funds for Loop 303 improvements;
- The Loop 303 extension south;
- Additional HOV lanes on area freeways;
- Identification of truck routes;
- Improvements to the CANAMEX route;
- Improvements to the arterial grid network;
- Identification of major arterials;
- Arterial signal coordination and other traffic engineering improvements;
- Additional bridge crossings, including the Hassayampa River;
- Highway grade separations at railroad and pedestrian crossings;
- Funds for transportation studies and policy investigations;
- Air quality;
- Protection of Luke Air Force Base from encroaching development;
- Provision of additional bicycle routes;
- Continuity and expansion of non-motorized routes and facilities;
- Improved pedestrian cross walks and signalization;
- Inconsistent access control, noise control, and land developer responsibilities for transportation improvements; and
- Implementation of an impact fee to fund improvements to major facilities.

4.3 Issues Identified through Public Participation

The public was asked to assist in the identification of transportation issues needing attention in the SWATS effort. A public meeting was held on September 10, 2002, from 5:00 to 7:00 PM at the Estrella Mountain Community College. A public information flyer was developed in August 2002 and distributed to over 1000 recipients in the study area. The flyer provides information about the study including contact information for MAG and WSA staff and also refers to a website where interested parties can obtain additional information. The flyer is shown in Appendix IV.

4.3.1 Issues Identified

The public participation process identified a large number of issues. The following list identifies the salient issues. There is no significance to the order in which the issues are presented below.

- Additional capacity on I-10 west of central Phoenix;
- Additional interchanges on I-10 west of Phoenix;
- Completion of Loop 303 to I-10;
- North/south high speed capacity south of I-10 in the Loop 303 area to southern Goodyear;
- North/south high speed capacity south of I-10 in the South Mountain Bypass/Loop 101 area;
- Improvement of SR-85 to freeway status;
- Development south of I-10 will create transportation demand;
- Additional east/west high speed capacity parallel to I-10;
- Implementation of Intelligent Transportation Systems (ITS) corridors;
- Creation of super streets to serve as east/west relievers;
- Improvements to the arterial grid network;
- Additional river crossings;
- Implementation of light rail in several corridors;
- Commuter rail along Union Pacific Railroad tracks from Avondale to central Phoenix and along Burlington Northern and Santa Fe tracks;
- Provision of additional park-and-ride facilities;
- Expansion of existing bus routes to the west;
- Expansion of bicycle facilities;
- Creation of facilities for electric vehicles; and
- Truck traffic on the CANAMEX route.

4.4 Issues Identified through Technical Analysis

The technical analyses to identify transportation issues in the SWATS area include comparisons of land development forecasts with existing and committed transportation facilities. For highways these comparisons are based on expected increases in transportation demand in the study area with available capacity on the Long Range Transportation Plan Based Reference Network (LRTP), which consists of existing highway facilities and planned facilities whose implementation is expected. In general the growth in the population and employment in the SWATS area and metropolitan Phoenix expected over the next 25 years will over-tax the capabilities of the existing transportation system, even with the additions included in the region's current Long Range Transportation Plan.

The major transportation issues resulting from population and employment growth in the SWATS area are presented below. A more complete analysis and description of these issues is presented in Chapter 3. Additional detail is available on some topics in Chapter 5.

4.4.1 Roads and Highways

Major increases in east/west travel are expected as a result of growth in the study area. Traffic forecasts for 2030 for the Long Range Transportation Plan Based Reference Network of highways show severe levels of congestion. East of Airport Road it is difficult to find an intersection of arterials in the SWATS area that is forecast to operate with an acceptable level-of-service during the peak hour. East of Watson Road it is almost impossible to find sections of east/west roadway forecast to operate without heavy congestion. Some north/south arterials in this same portion of the study area are expected to operate with acceptable levels of congestion, particularly south of I-10. Crossings of the Agua Fria River and of the Gila River west of the Agua Fria show substantial congestion. West of Airport Road and in southern Goodyear the arterial grid is forecast with more isolated locations of congestion.

Major increases in the east/west capacity of the arterial and freeway systems will be necessary to reduce forecast congestion to acceptable levels. These major capacity increases will need to extend from central Phoenix at least as far west as SR-85. Some increases in north/south highway capacity will be needed, particularly north of I-10 and across the Gila River into southern Goodyear. Thus, major increases bridge capacity will be required over the Gila River west of the Agua Fria. Increases in bridge capacity will also be required over the Agua Fria.

I-10 is the major existing high speed facility serving east/west travel in the study area. As currently configured I-10 will be inadequate to serve the expected transportation demand. The concentration of population and employment growth south of I-10 to the Gila and Salt Rivers indicates strong demand for high speed east/west travel parallel to, and south of, I-10.

A number of arterials serve shorter east/west travel in the corridor. However, west of Estrella Parkway very few of the arterials are currently more than a single lane in each direction. Furthermore, there are substantial components of the grid network in that same area which do not yet exist. There are few east/west arterials south of I-10 or west of Loop 101 that currently provide three lanes in each direction. A major component of improving the east/west arterial network in the study area is bridge construction over the Agua Fria and Hassayampa Rivers.

Increases in north/south travel are expected as a result of growth in the study area. North/south travel consists of two components. First, north/south travel will provide access to facilities serving the more predominant east/west movement. Consequently, north/south arterials will need improved access to I-10 and any parallel I-10 relievers. Additional interchanges on I-10 will be needed to facilitate this access. Second, north/south travel itself is expected to increase. Population increases in the Gila Bend and southern Goodyear areas will result in increases in north/south movement between those areas and areas north of the Gila River. Serving these movements will require bridge construction over the Gila River. Population growth in the City of Phoenix west of 19th Avenue and south of the Salt River, coupled with employment growth north of the Salt River, indicate the need for additional Salt River bridge crossings. The ongoing study of the South Mountain Bypass may result in recommendations to serve such travel.

The faster increase in jobs than in population in the SWATS area will bring more commuters into the study area from the north and east. Major increases in these movements will overwhelm existing facilities. Increases in these movements can be expected both on the arterial system and the freeway system. East of Loop 101 the arterial system serving the north is largely built to three lanes in each direction. To the west of Loop 101 the arterial system serving the north is not fully built to three lanes in each direction. This is due in part to lower levels of development and traffic demand and in part to the constraints of the Agua Fria River, the New River, and the Glendale Municipal Airport. To the extent that the rivers preclude completion of the grid along 107th and 115th Avenues and El Mirage Road, alternative higher speed access to the north may be necessary.

Freeways, with their access controls and lack of intersections, provide a much higher level of safety per vehicle mile of travel than do arterials and other lower class roadways. A concentration of highway capacity increases in freeways should help to reduce the number of accidents forecast for the SWATS area.

4.4.2 Transit

Transit service west of 83rd Avenue is extremely limited in both the north/south and east/west directions. The increased population and employment in the SWATS area is expected to result in extensive new development as far west as the Hassayamp River and in southern Goodyear south of the Gila River. As development moves west and south, the demand for transit service can be expected to move. Expansion of regular route bus services along the arterial grid, as development expands that grid to the west, is essential. These services may be needed west of Sun Valley Parkway and in portions of southern Goodyear by 2030.

However, these services provide relatively low capacity and low speed service. Because of the greater distances involved in commuting to downtown Phoenix and to other distant locations in the metropolitan area, demand for higher speed transit is expected. Higher speed and higher capacity services, such as light rail in the I-10 corridor, commuter rail along the Union Pacific tracks, and bus-rapid-transit in freeway corridors are among the options requiring further consideration as the southwest valley develops. However, proposed future development densities are lower than those of existing development and may impede the effective provision of higher capacity, higher speed transit service. MAG's ongoing High Capacity Transit Study and the Regional Public Transportation Authority's Regional Transit System Study are currently examining these and other transit issues.

At the other end of the spectrum, demand for local, community transit services providing residents access to local services can be expected to rise. Currently, there is little local transit service within small population centers such as Litchfield Park, Tolleson, and Avondale. As these communities expand and are surrounded by relatively continuous development, demand for such services is expected to increase.

4.4.3 Non-Motorized Facilities

Increasing population in the study area will place increased demands on non-motorized facilities, such as bikeways and trails. The trail network in the study area will require expansion, along with connection of facilities to provide continuity for non-motorized travel. The system of bicycle, pedestrian, and multi-use non-motorized facilities in the SWATS area is incomplete. There are currently substantial gaps in the continuity of non-motorized facilities.

Bicycle and pedestrian facilities are not fully integrated into the improvement process for the arterial system. A more fully functional network of bicycle and pedestrian facilities in the SWATS areas will be realized with the inclusion of bicycle and pedestrian facility provision in the improvement of the arterial system. Additionally, major facility upgrades and improvements afford the opportunity to provide parallel improvements to bicycle, pedestrian, and multi-use non-motorized facilities. Bridges over the major rivers in the study area are an example of such an opportunity.

Numerous opportunities also exist for formal creation of multi-use facilities along river banks, canals, power lines, railroads, and other linear facilities to remove gaps in existing formal and informal facilities.. Multi-use trails and paths require a variety of support facilities such as parking, water, shelter, and storage.

Bikes on transit and bicycle facilities at transit stations currently provide for increased transportation options in areas served by transit. Improving pedestrian access to transit should focus on removing barriers to effective pedestrian/transit connections. Provision for these connections and for pedestrian circulation between residential areas and nearby activity centers can be accommodated in the arterial and land development processes.

4.5 Summary of Issues Identified

The issues identified through agency participation, public participation, and technical analysis have a great deal in common. Some of the issues identified reflect existing problems, while other issues reflect potential problems that will need to be addressed in the future. For example, I-10 already exhibits signs of congestion in the eastern portion of the SWATS area during peak hours. However, in the western portion of the study area there are few problems on I-10. As land development takes place further to the west in the coming years, congestion problems on I-10 to the west will increase..

The SWATS effort is focused on transportation issues in the study area with regional impact. Some of the issues identified above are of local, rather than regional, significance and are therefore not given further consideration here.

4.5.1 <u>Short-Term Transportation Issues</u>

A number of the issues identified in the sections above either indicate existing problems or impending ones. These are identified as short term transportation issues. Short-term transportation issues are those that will affect the SWATS area before the major areas of development have moved west of the Agua Fria River. The following are short-term issues and have not been prioritized:

- Capacity on I-10 east of Loop 101;
- North/south high speed capacity south of I-10 in the area of the proposed South Mountain Bypass and Loop 101;
- Transit service west of 87th Avenue in the developed portions of the study area;
- Additional park-and-ride facilities;
- Transit service to rural areas;
- Truck traffic in older town centers;
- Pedestrian conflicts with vehicles in older town centers;
- Arterial signal coordination;
- Right-of-way preservation for future transportation facilities;
- Widening of arterials south of I-10 east of Loop 101;
- Salt River crossings; and
- Continuity and expansion of bicycle and trail facilities.

4.5.2 Medium-Term Transportation Issues

Many of the transportation issues identified in the short-term are similar to the medium-term, but will be located further to the west consistent with the expansion of development to the west. Other issues may arise in areas not under intense development. Medium-term transportation issues are those that will affect the SWATS area when the major areas of development have moved west of the Agua Fria River but not yet reached SR-85. The following are medium-term issues and have not been prioritized:

- Capacity on I-10 west of Loop 101 to Loop 303;
- Access to I-10 west of Loop 101;
- East/west high speed capacity south of I-10;
- Additional east/west high speed HOV capacity;
- North/south high speed capacity west of Loop 101;
- Improvements to the arterial grid west of Loop 101;
- ITS, signal coordination, and other arterial street improvements;
- Bridge crossings over the Agua Fria River and Gila River;
- High speed, high capacity transit between central Phoenix and points west of the Agua Fria River;
- Additional park-and-ride facilities;
- Local and regional bus transit service west of the Agua Fria River;
- Improvements to the Canamex route; and
- Highway railroad grade separation.

4.5.3 Long-Term Transportation Issues

Many of the transportation issues identified in the short and medium-terms are similar to the long-term, but will be located further west consistent with the expansion of development to the west. Other issues may arise in areas not under intense development. Long-term transportation issues are those that will affect the SWATS are when major areas of development have moved west of SR-85. The following are long-term issues and have not been prioritized:

- Capacity on I-10 west of Loop 303 to Wickenburg Road;
- Access to I-10 west of Loop 303;
- East/west high speed capacity south of I-10 as far west as Wickenburg Road;
- Additional east/west high speed HOV capacity;
- North/south high speed capacity west of Loop 303;
- Improvements to the arterial grid west of Loop 303;
- Bridge crossings of the Hassayampa River;
- High speed high capacity transit between central Phoenix and points west of Loop 303;
- Additional park-and-ride facilities; and
- Local and regional bus transit service west of SR-85.

4.6 Evaluation Criteria for Alternatives

Addressing the transportation issues in the SWATS area noted above will require the implementation of a variety of potential transportation facilities and services. In order to evaluate individual transportation facilities and services for future implementation, information will be developed on each potential facility or service. Data will be developed primarily through MAG's travel demand forecasting model. The data will be used to determine the benefits and liabilities of the individual facilities under consideration for implementation. Potential data to be used could include:

- A general description of the roadway system in study area;
- Functional class and number of lanes (separately for HOV and general purpose lanes);
- HOV miles, center-line miles, lane-miles, and daily capacity miles by facility type;
- ITS implementation;
- Traffic volumes by vehicle class;
- Daily vehicle miles of travel by area and functional class;
- Congested highway speeds by functional class in the evening peak period;
- Level-of-service (LOS) on freeway links and at arterial intersections in the evening peak period;
- Safety impacts expected on arterials and freeways;
- Roadway deficiencies;
- A general description of the transit system in study area;
- Transit facilities, services, and coverage areas recommended in other transit studies;
- Locations of park and ride lots;
- A general description of non-motorized system in study area, including bike path and trail facilities; and
- Non-motorized system deficiencies.

4.7 Summary and Conclusions

A variety of transportation issues have been identified for consideration in the SWATS effort. Some of these issues reflect existing transportation problems in the study area, while others reflect problems which are expected to arise as the population and employment of the area increase in the coming decades. The purpose of identifying these transportation issues is to inform the planning process so that potential transportation problems can be addressed before they become actual transportation problems.

The transportation issues identified provide a basis for identifying potential new transportation facilities and services. These potential facilities and services can then be evaluated to determine how well they can be expected to address the potential problems. A set of data has been identified which will be used in the evaluation of these potential facilities and services. Following that evaluation, facilities and services will be identified for further evaluation and consideration in development of the Regional Transportation Plan covering the entire MAG area. Subsequent chapters document the potential transportation facilities and services identified for evaluation in the SWATS effort, the evaluation of the ability of those facilities and services to ameliorate transportation problems, and the facilities and services recommended for consideration in the Regional Transportation Plan.

5 Evaluation of Transportation Options in the SWATS Area

5.1 Introduction

This chapter summarizes the options examined for the southwest valley as part of the Southwest Area Transportation Study (SWATS). The chapter first concentrates on highway facilities that were subject to modeling using MAG's regional travel demand forecasting model. That modeling process first considers future (2020 and 2030) distributions of population and employment within the travel forecasting area. Different highway networks were modeled to evaluate future needs for highway improvements in the SWATS area.

This chapter was developed as a Working Paper (WP) and contains data and information that is continuously updated, some of which may have changed or may have been superseded by the final Regional Transportation Plan (RTP). Information was current at the time of initial WP publication.

The chapter presents an analysis of four different highway networks. The chapter briefly summarizes the data used to quantitatively describe and to analyze each network's performance in serving forecast traffic. A comparative analysis of the networks is presented, followed by an analysis of individual major highway improvements included in the modeled networks.

Transit and non-motorized options for the SWATS area are then identified. The analysis of the transit options is somewhat abbreviated because transit options have been more fully presented and analyzed in MAG's High Capacity Transit Study and the Regional Public Transportation Authority's (Valley Metro's) Regional Transit System Study.

This chapter is organized with descriptive information in Sections 5.2 through 5.6. These sections contain little in the way of analysis. Sections 5.7 through 5.12 present additional technical information and provide individual analysis of potential transportation facilities. Many of the projects included in the analytical sections are related to one another. The analysis presented in this chapter sets the stage for a set of conclusions regarding transportation facility needs in the SWATS area. Chapter 6 presents conclusions and recommendations based on information and analysis presented in this chapter and develops a set of transportation facility recommendations with a more complete set of costs.

5.2 Description of Highway Options

This chapter focuses on how well each of four potential future highway networks and the facilities included in each serve the land development, population, and employment expected in the southwest valley in the years 2020 and 2030, based on current land use plans. Potential changes in land use plans could change how well a potential network serves the area. For modeling purposes the networks include only the higher functional classes of roads including freeways, expressways, arterials, and collectors. Local streets and other minor roads are not included in these models because of the higher level focus of the study.

The four potential future highway networks modeled do not represent networks recommended for implementation. They are a means of studying and understanding individual highway facilities and groups of facilities in terms of the extent to which future travel demand is served. By evaluating the affects of individual facilities and groups of facilities a set of recommended highway and transportation improvements can be identified for potential implementation.

The four potential future highway networks modeled represent incremental improvements to the existing highway system. Each of the networks adds a layer of improvements onto the improvements included in the previous networks. The existing highway network ("Current Base" hereafter) represents the first network. This network is shown in Figure 5-1. It should be noted that, due to the technical requirements of the model, the Current Base includes some facilities that are unpaved roads or unimproved dedicated rights-of-way. Such facilities occur west of SR-85 and in southern Goodyear.

The four potential future highway networks are briefly described below in terms of the improvements each represents over the previous network. A more complete comparison of the networks and their forecast traffic characteristics is presented in the subsequent section.

5.2.1 2020 LRTP Based Reference Network ("Future Base")

The second network is the Long Range Transportation Plan Based Reference Network ("Future Base" hereafter), shown in Figure 5-2. This network represents the existing roadway network, improvements whose implementation is already committed, and improvements expected to be implemented before 2022. Those improvements include road and transit projects currently in the region's Long Range Transportation Plan and other projects whose implementation is expected based on existing plans of local governments and private developers. The principal exception is I-17 between Loop 101 and I-10, which is included in the Future Base in its current condition.

New facilities included in this network are shown in Figure 5-3. Among the new facilities in the SWATS area are the South Mountain Freeway, a freeway replacement of SR-85 from the Gila River north, a short southerly extension of Loop 303, numerous arterials, and some additional river crossings.

Widened facilities included in this network are shown in Figure 5-4. As the figure shows, a great many of the existing arterial roadways in the SWATS area are expected to be widened in the coming years. Many of the arterials not expected to be widened are in the northeast corner of the study area and have already reached their ultimate width. SR-85 is widened south of the Gila River.

Figure 5-1
Current Base Network

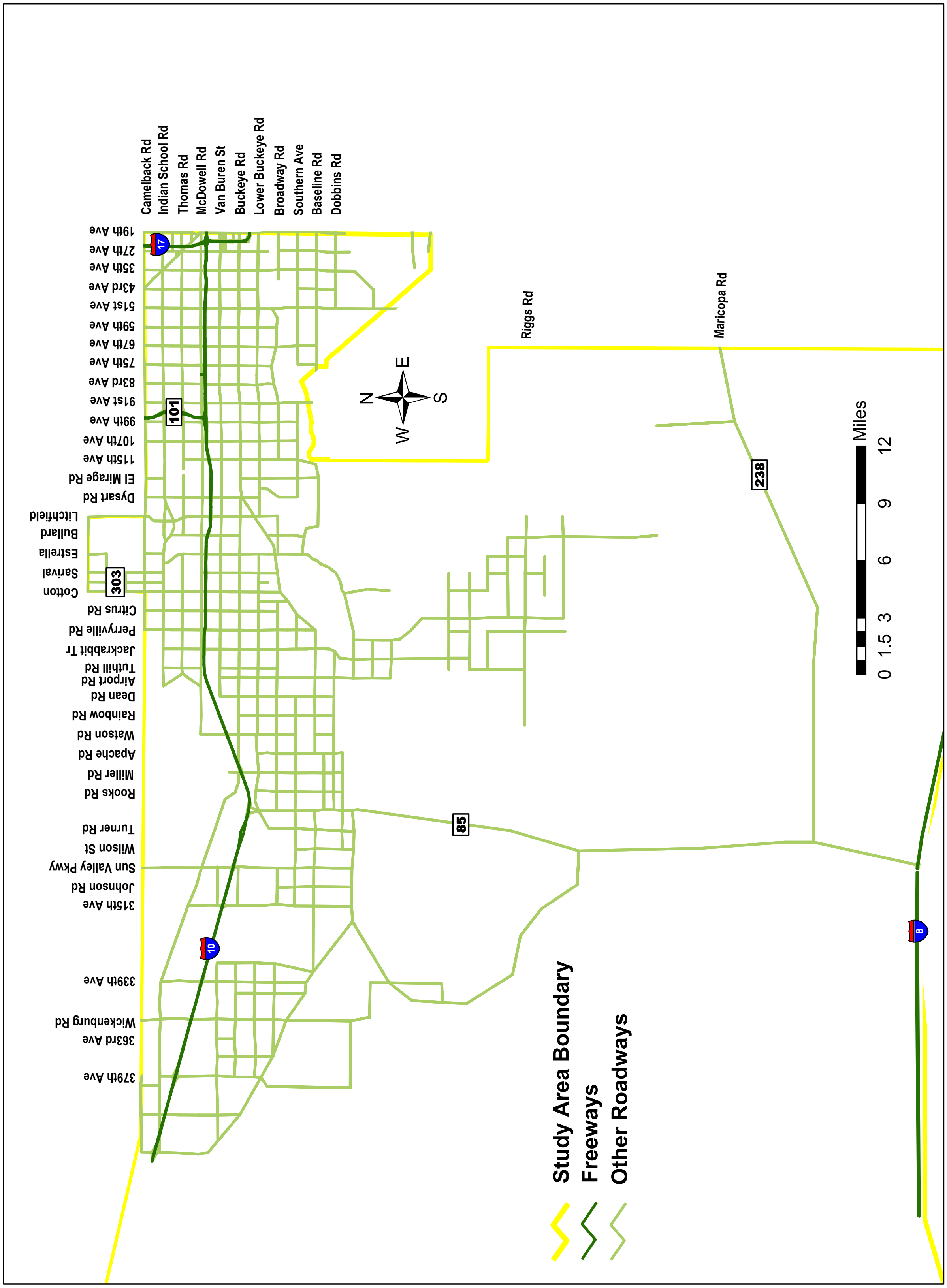


Figure 5-2
Future Base Network

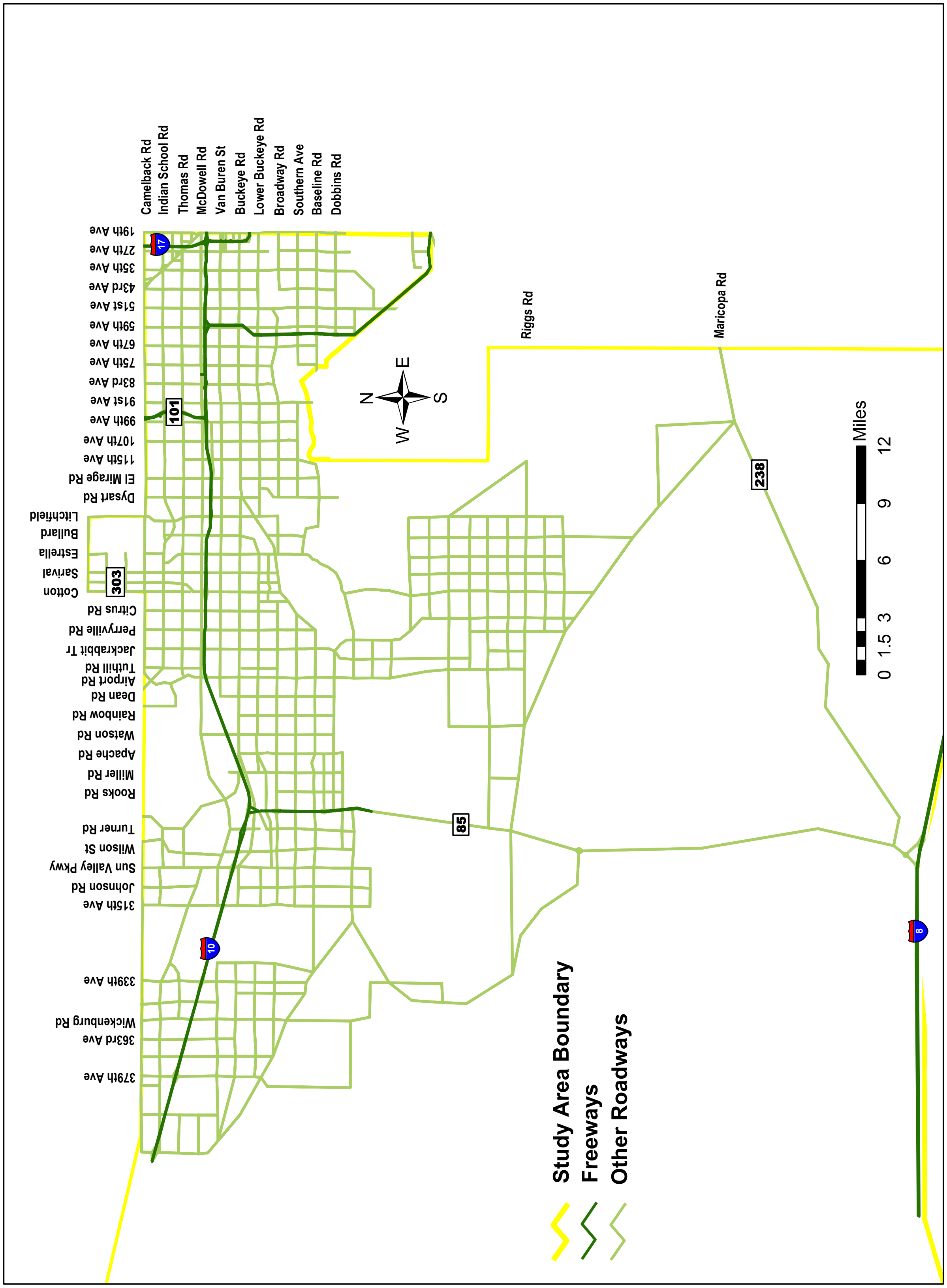


Figure 5-3
New Facilities in Future Base Network

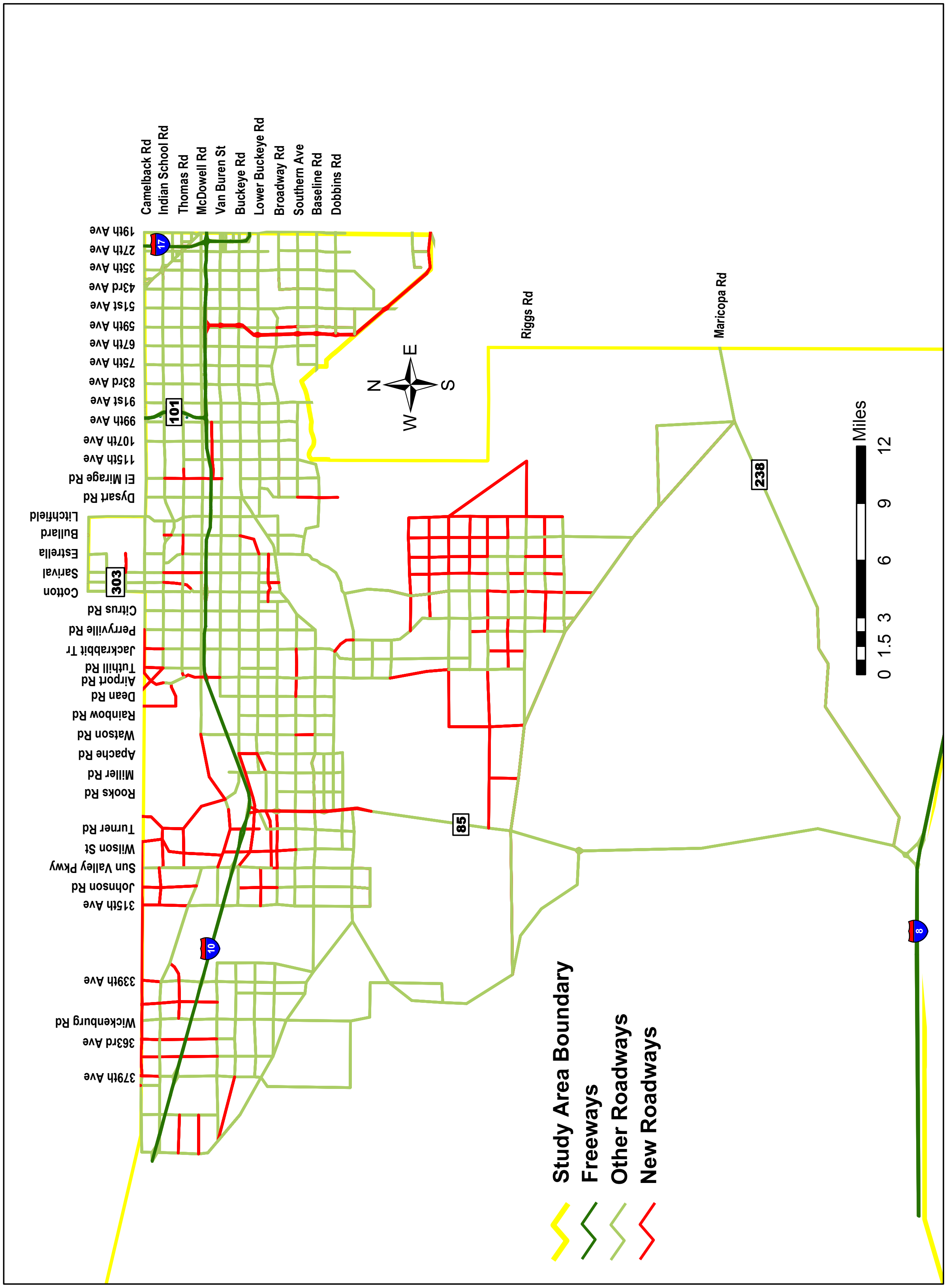
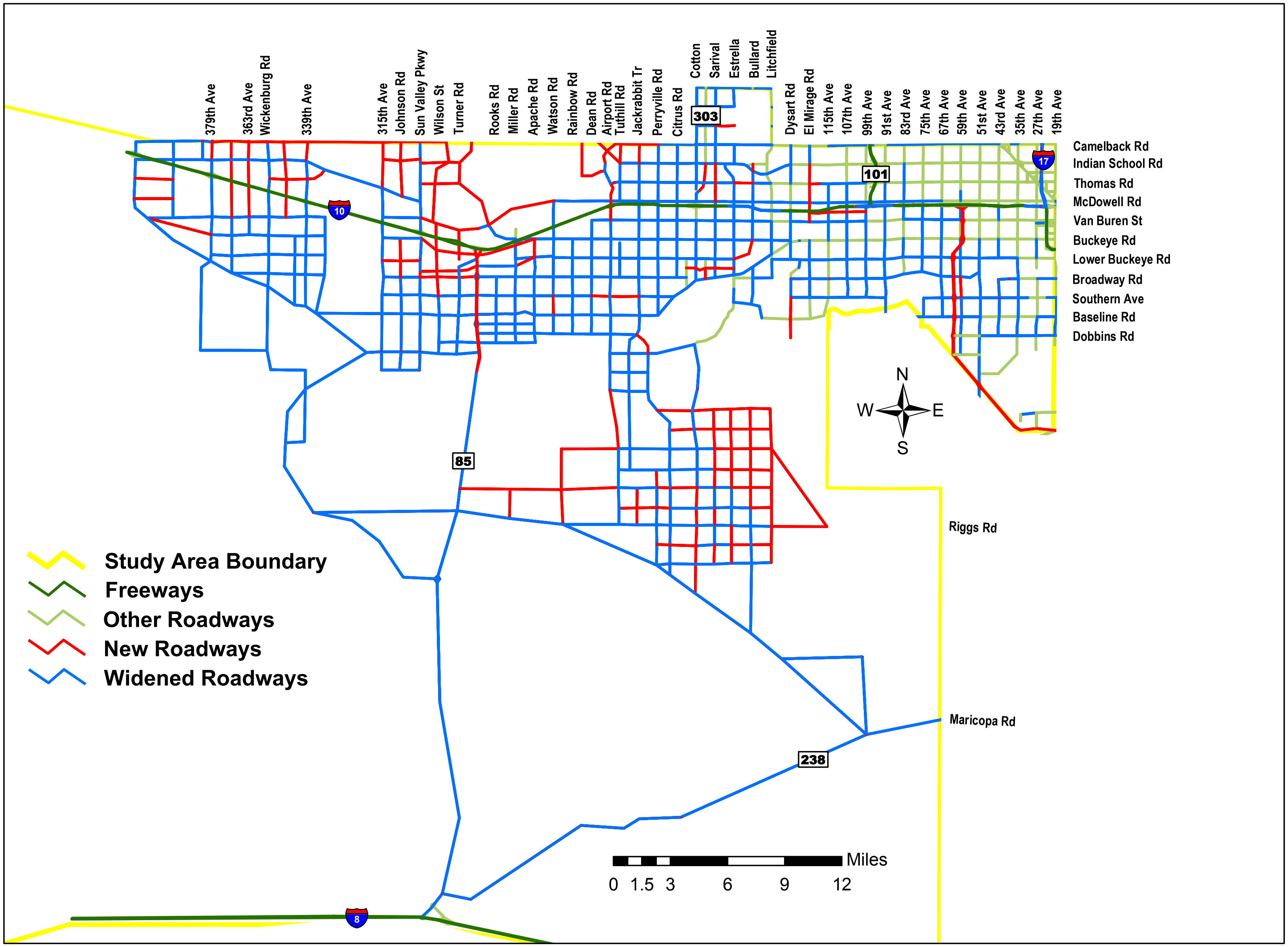


Figure 5-4
New and Widened Facilities in Future Base Network



5.2.2 Enhanced Network

The third network is the Enhanced Network, shown in Figure 5-5. This includes the facilities in the Future Base network plus the new facilities shown in Figure 5-6. Among these facilities are high-occupancy lanes (HOV or carpool lanes) on I-10 west of Loop 101, on I-17 south of I-10, and on Loop 101. Widenings included in this network include I-10 and SR-85 as shown in Figure 5-7.

5.2.3 New Highway Corridors Options A and C

The fourth and fifth networks are the "New Corridors" networks, namely "Option A" and "Option C". These networks, shown in Figure 5-8, include a number of potential new highways in the SWATS area. (There is an "Option B" network, however within the SWATS area it contains no facilities different than those contained in Option A. It provides new facilities in other portions of the metropolitan Phoenix area covered by other studies.) The new highways are shown in the figure and include:

- an I-10 Reliever, a freeway running parallel to and south of I-10 from I-17 near the eastern SWATS area boundary to I-10 west of the Hassayampa River;
- a Loop 101 Extension (5 lanes in each direction) from I-10 to the new I-10 Reliever;
- the Rio Salado Parkway (3 lanes) from downtown Phoenix to the I-10 Reliever at the Loop 101 Extension;
- an extension of Loop 303 south of I-10 to Komatke Road; and
- the Riggs, Komatke, Maricopa Road Expressway (3 lanes) east of SR-85 to the study area boundary, overlapping with Riggs Road and Loop 303 in southern Goodyear.

These networks include widenings of I-17, Rainbow Valley Road, and other limited locations.

The major difference between Option A and Option C is the number of lanes on the I-10 Reliever and on Loop 303 south of the I-10 Reliever. In Option A, the I-10 Reliever is assumed to be 6 lanes in each direction for its entire length. In Option C, the I-10 Reliever has 7 lanes at its eastern end, 4 lanes between Loop 303 and SR-85, and only 3 lanes at its western end. Loop 303 has 5 lanes in Option A for its entire length. In Option C, it has 6 lanes south of the I-10 Reliever to Riggs Road. North of Thomas Road, Loop 303 is widened from the 4 lane expressway included in the Future Base network to a freeway.

Specific alignments for new facilities are not established in this report. If new facilities identified in this report are selected in the Regional Transportation Plan process for funding, then detailed location and design concept studies will be conducted in the future by the Arizona Department of Transportation to provide information on which to base decisions about preferred alignments.

Figure 5-5
Enhanced Network

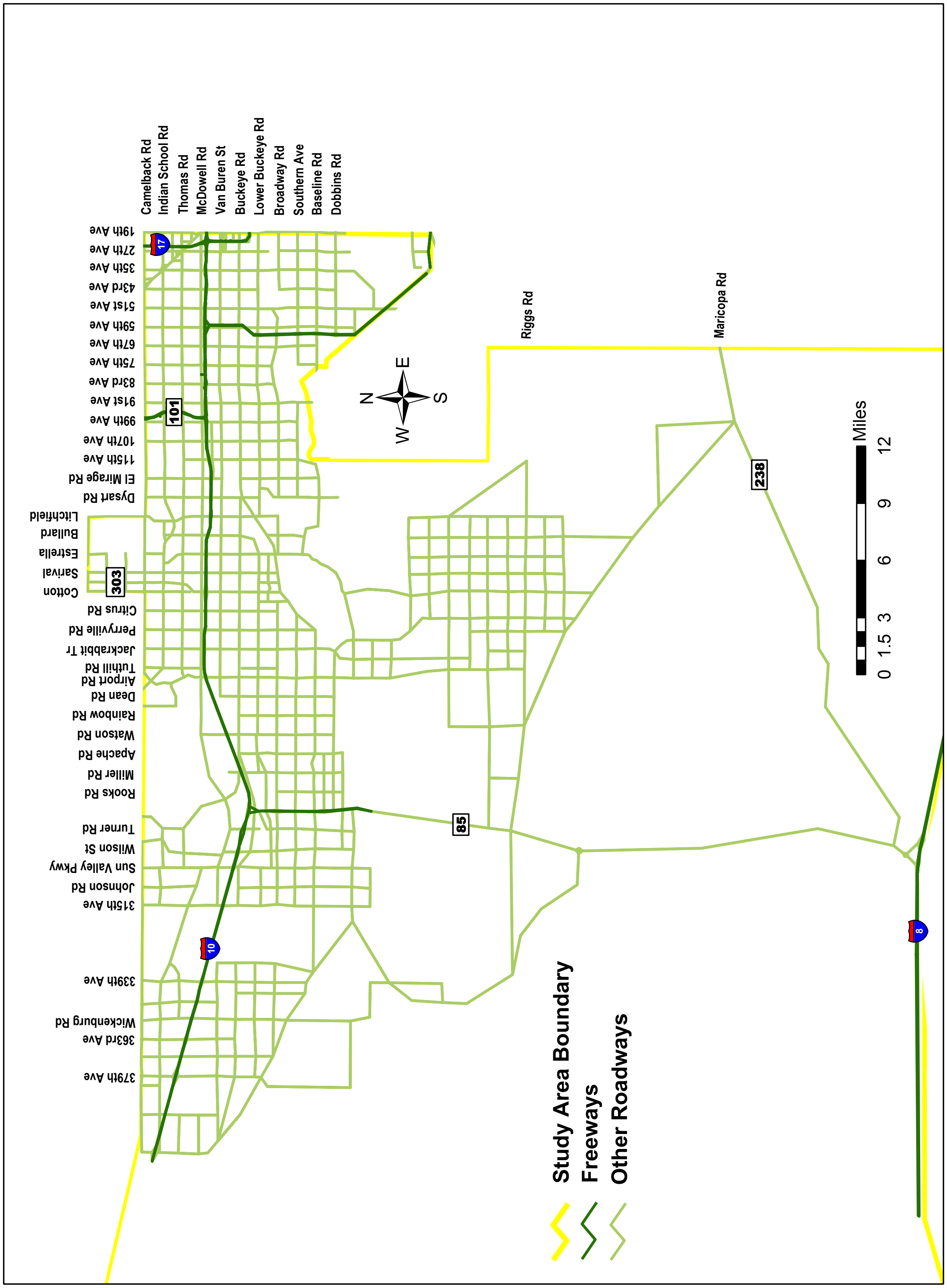


Figure 5-6
New Facilities in Enhanced Network

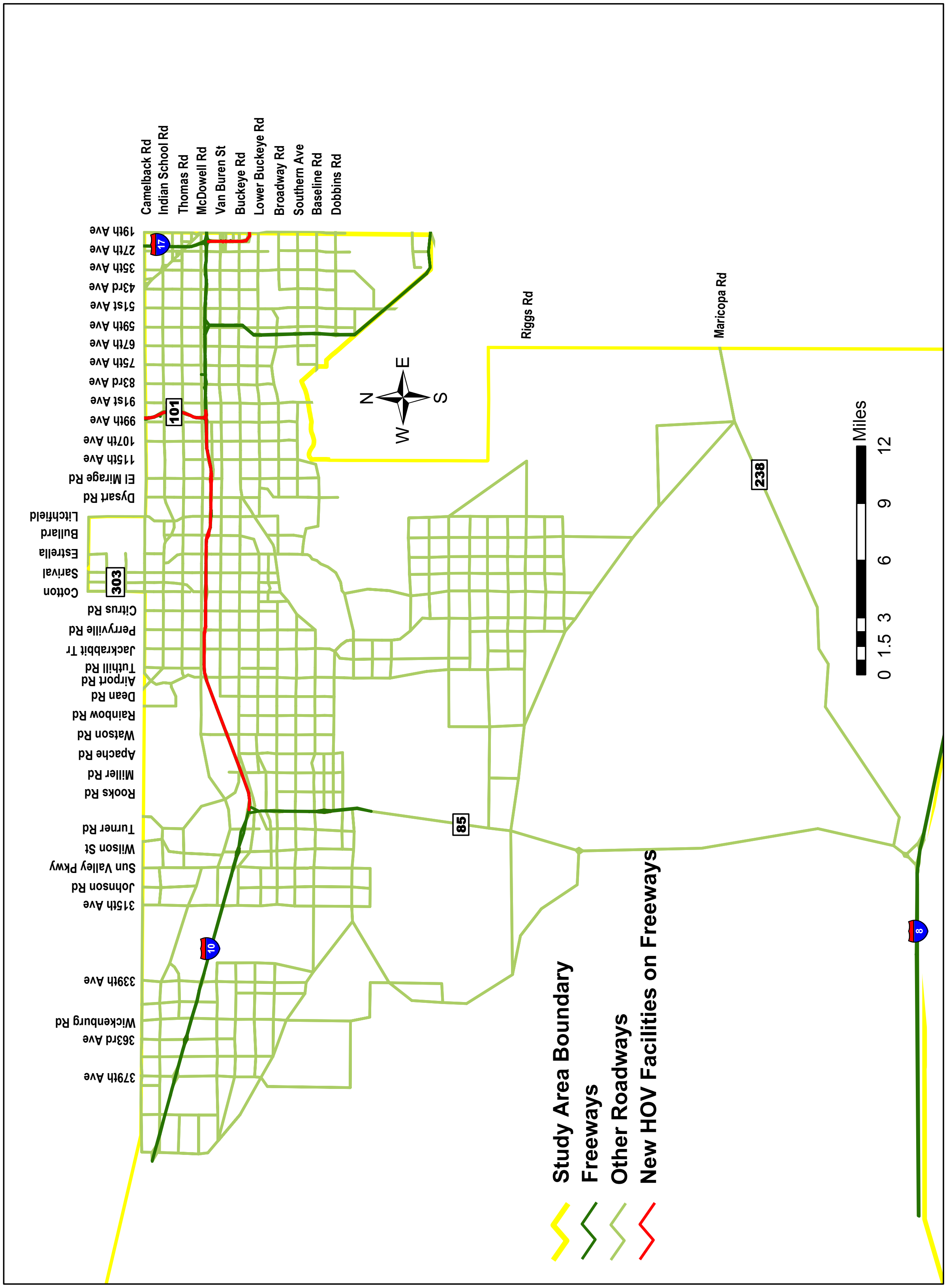


Figure 5-7
Widened Facilities in Enhanced Network

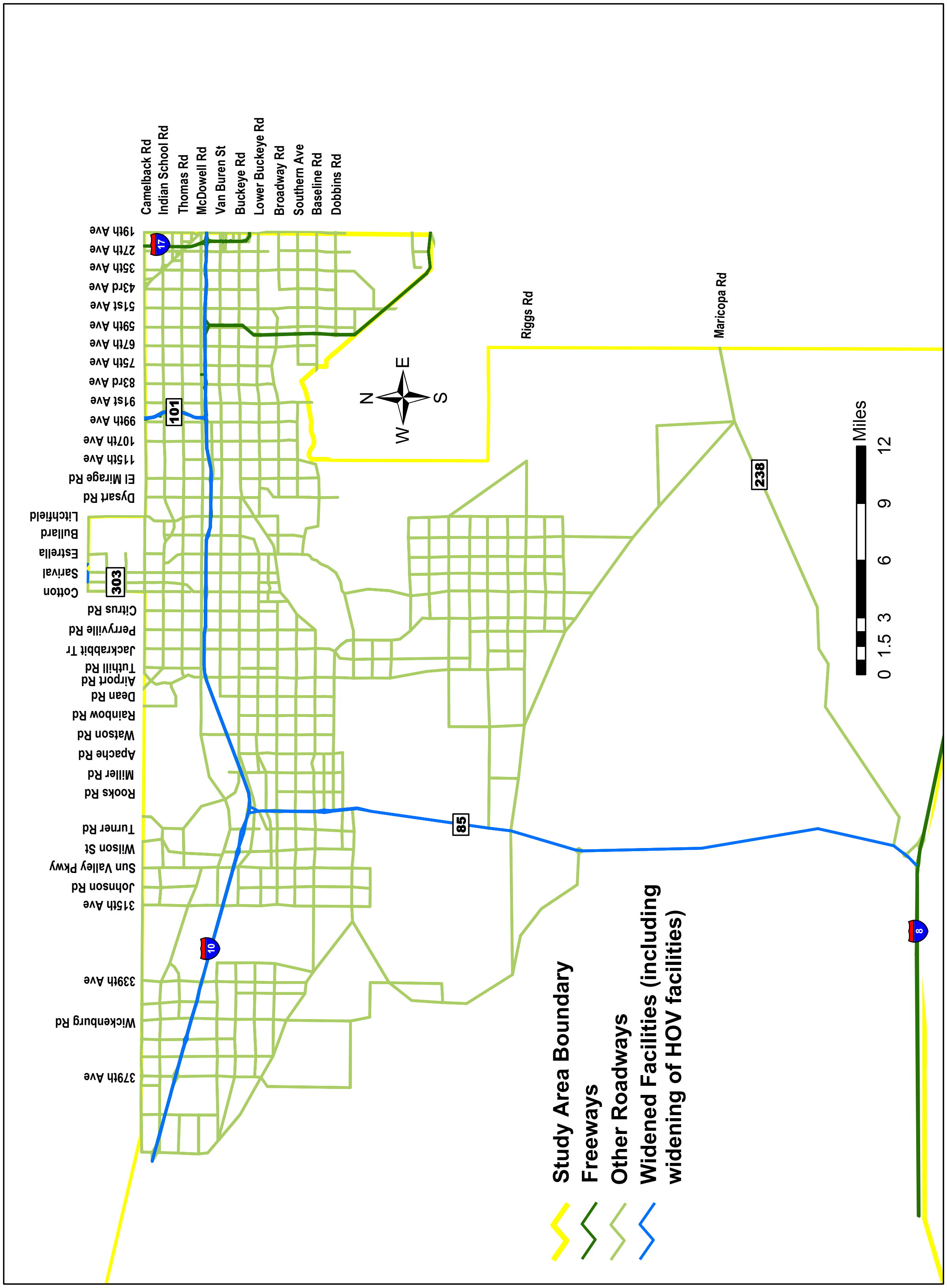
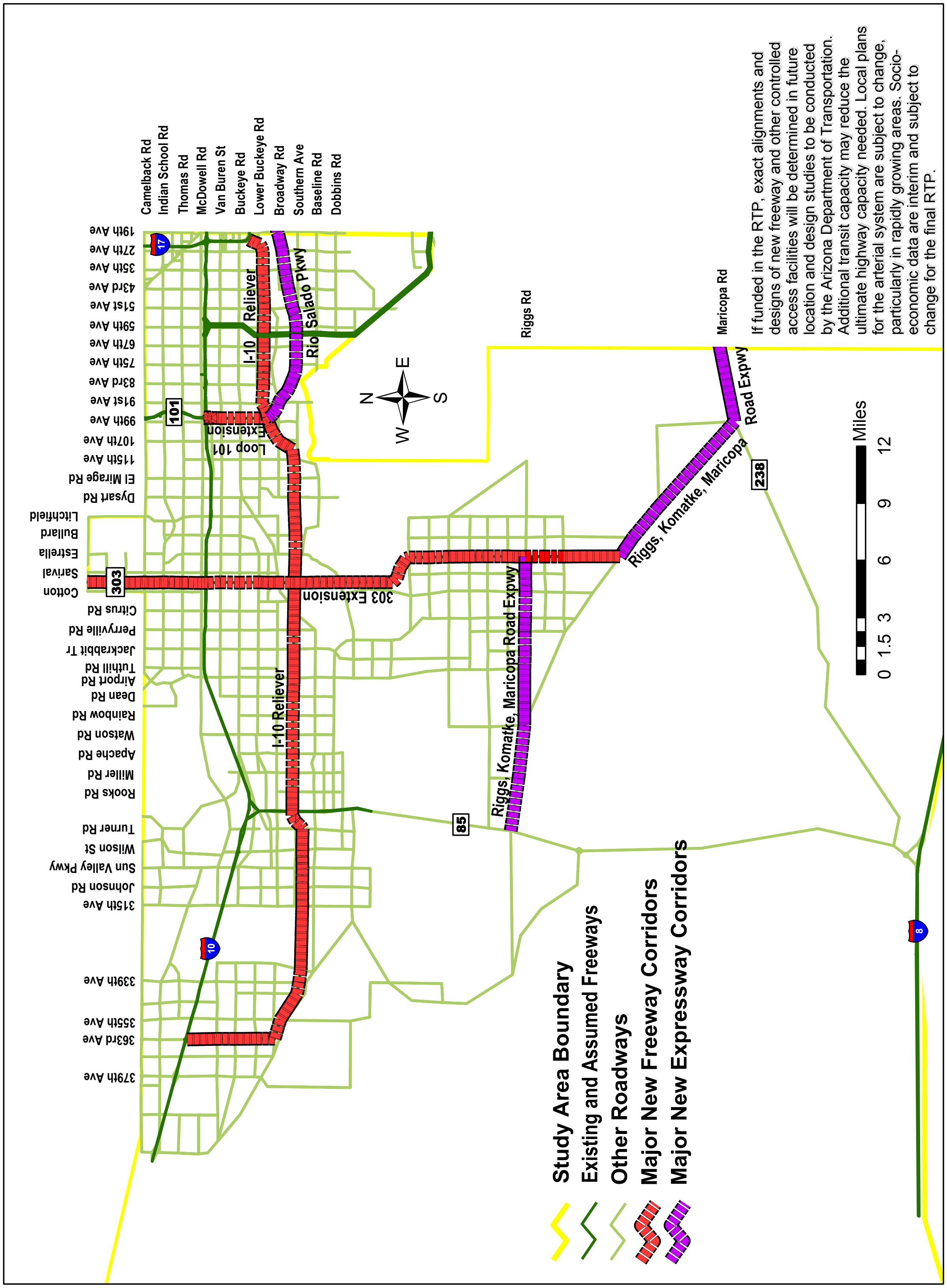


Figure 5-8
Major New Highway Corridors in Option A and Option C Networks



5.3 Evaluation Method

The following sections (5.4 through 5.6) compare the future highway networks at the system level in terms of roadway as well as forecast performance characteristics. General characteristics compared include centerline miles, lane miles, and capacity miles. Operating and performance characteristics include forecasts of vehicle miles of travel (VMT), truck VMT, peak hour VMT under congested conditions, miles of congested roadway in the peak hour, peak hour intersection congestion, and numbers of motor vehicle accidents.

Subsequently (in Sections 5.7 through 5.10), the new and widened facilities in each of the functional classes of freeways, expressways, and arterials are examined individually. That examination includes bridges across major rivers.

Based on the comparisons of the networks and the individual facilities included in them, a set of conclusions and planning recommendations are developed and presented in Chapter 6.

5.4 General Characteristics of Options

This section provides a comparison of the general characteristics of the networks described above. The centerline miles, lane miles, and capacity miles of each network are summarized and some comparisons made. Some brief information on intelligent transportation systems is included. This section provides descriptive information about the optional highway networks. It does not reach any conclusions.

5.4.1 Centerline Miles and Functional Class

Figure 5-9 (and Table 5A-1 in Appendix V) shows the centerline miles of highways by functional class represented in the Current Base, Future Base, Enhanced, Option A, and Option C models of the highway network in the SWATS area. Figures 5-10 through 5-13 show the functional classes of the highways in each of the networks. Figure 5-9 shows an increase of approximately 300 centerline miles between the Current Base and the Future Base networks. The largest component of this increase is in arterials. By comparison increases in other functional classes are small, including about 20 additional freeway miles and 20 additional expressway miles.

From the Future Base to the Enhanced network, the total centerline miles remain essentially unchanged. However, there is a small increase in expressway miles.

Options A and C are identical in centerline miles. The only difference between these options is the number of lanes on some major new freeways. Arterial mileage is somewhat lower in Options A and C compared to the Enhanced network. About 50 miles of arterials in the Enhanced network are converted to freeways or expressways in Options A and C. Additionally, 90 additional miles of freeways and expressways are added to the highway network under Options A and C.

Figure 5-9
Centerline Miles

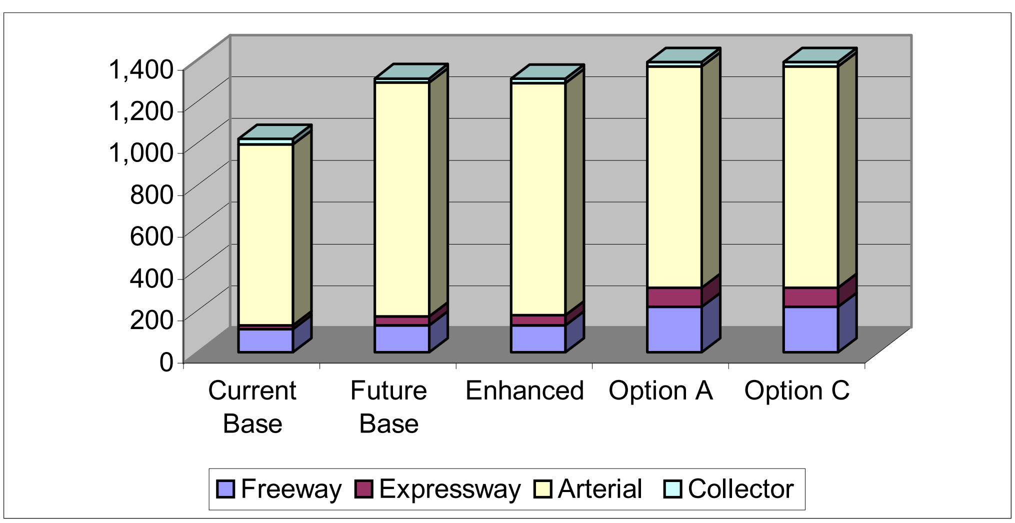


Figure 5-10
Current Base Highway Network Functional Classes

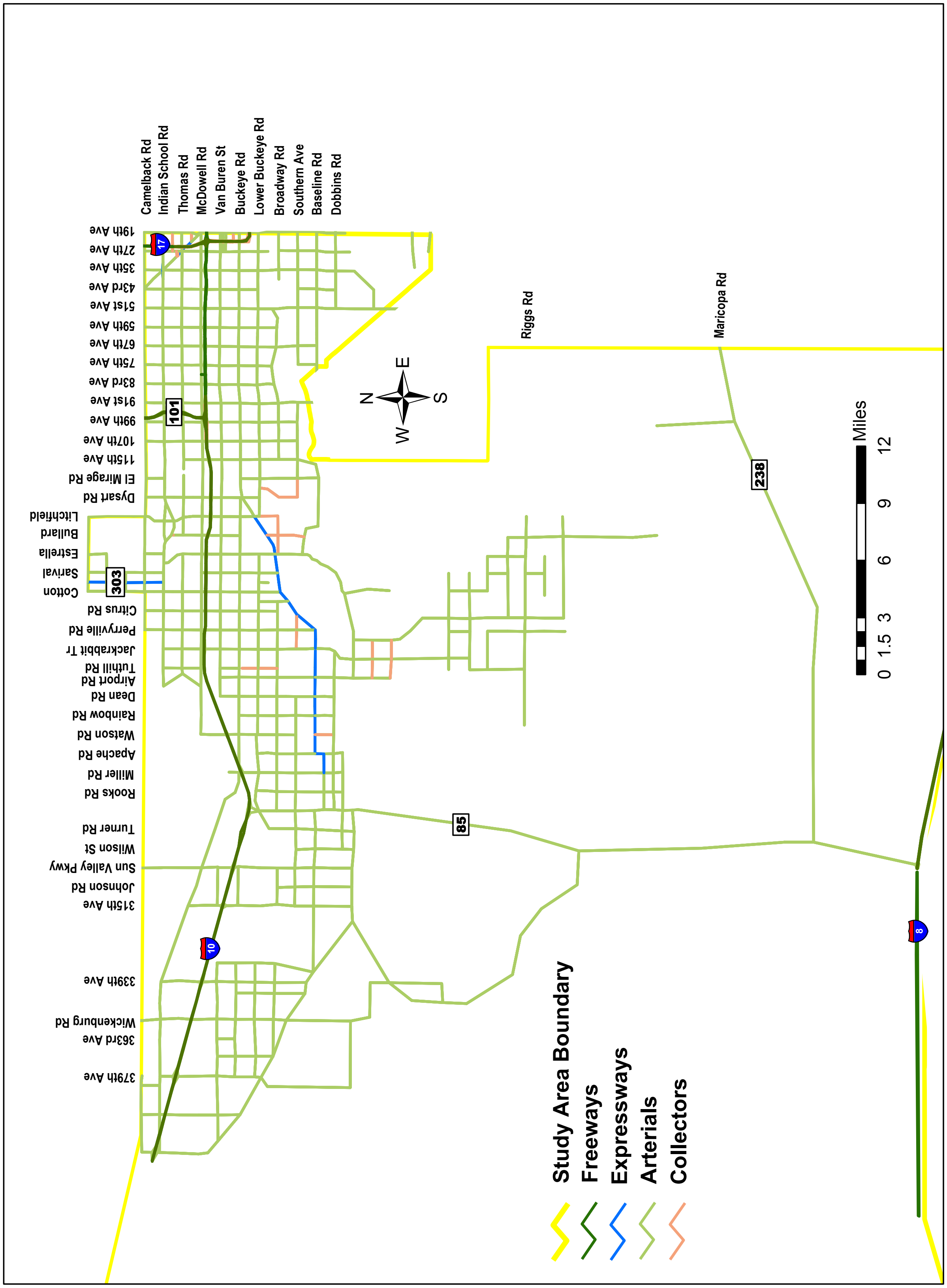
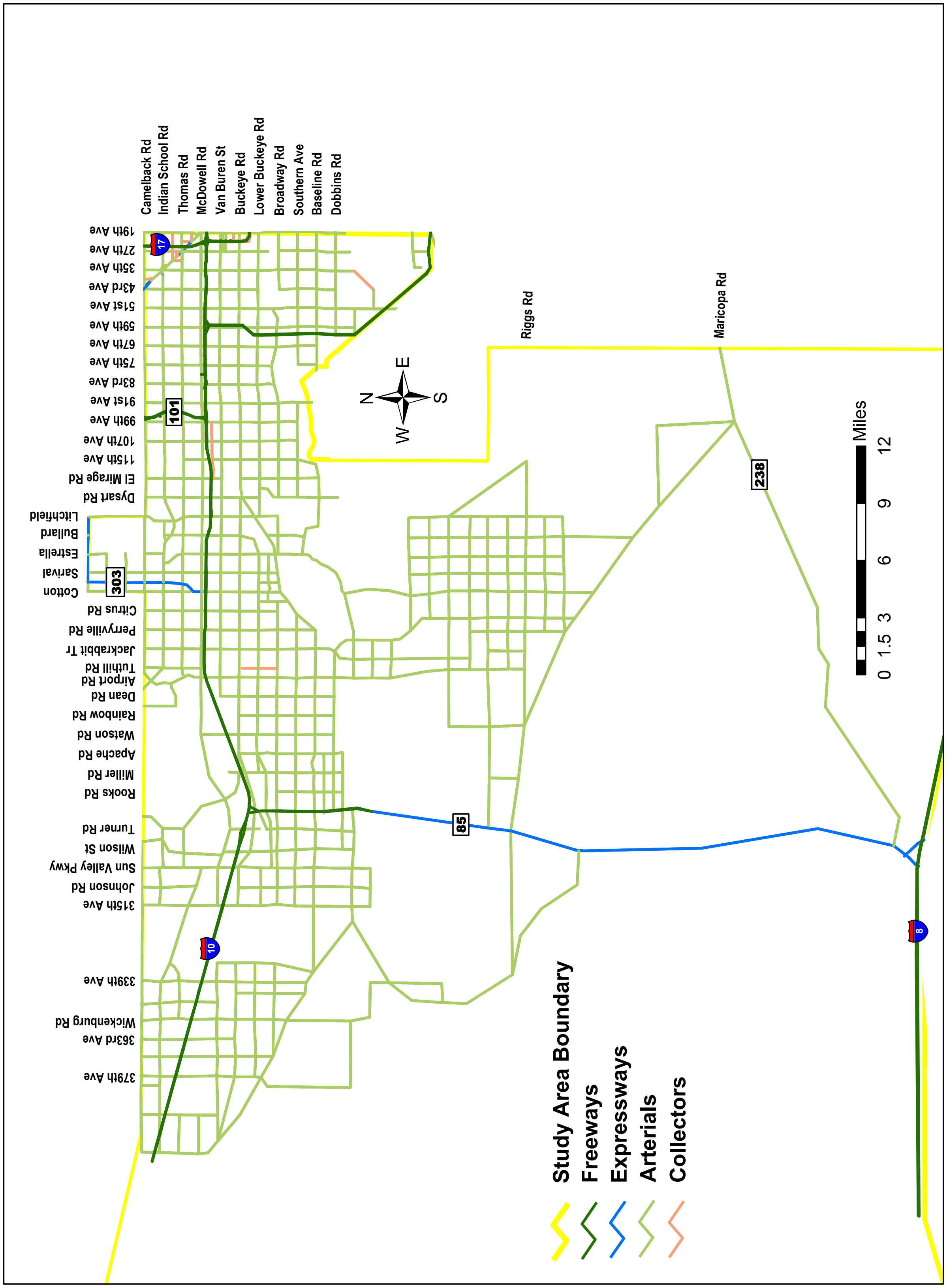


Figure 5-11
Future Base Highway Network Functional Classes



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ENGINEERS
PLANNERS
ECONOMISTS

Figure 5-12
Enhanced Highway Network Functional Classes

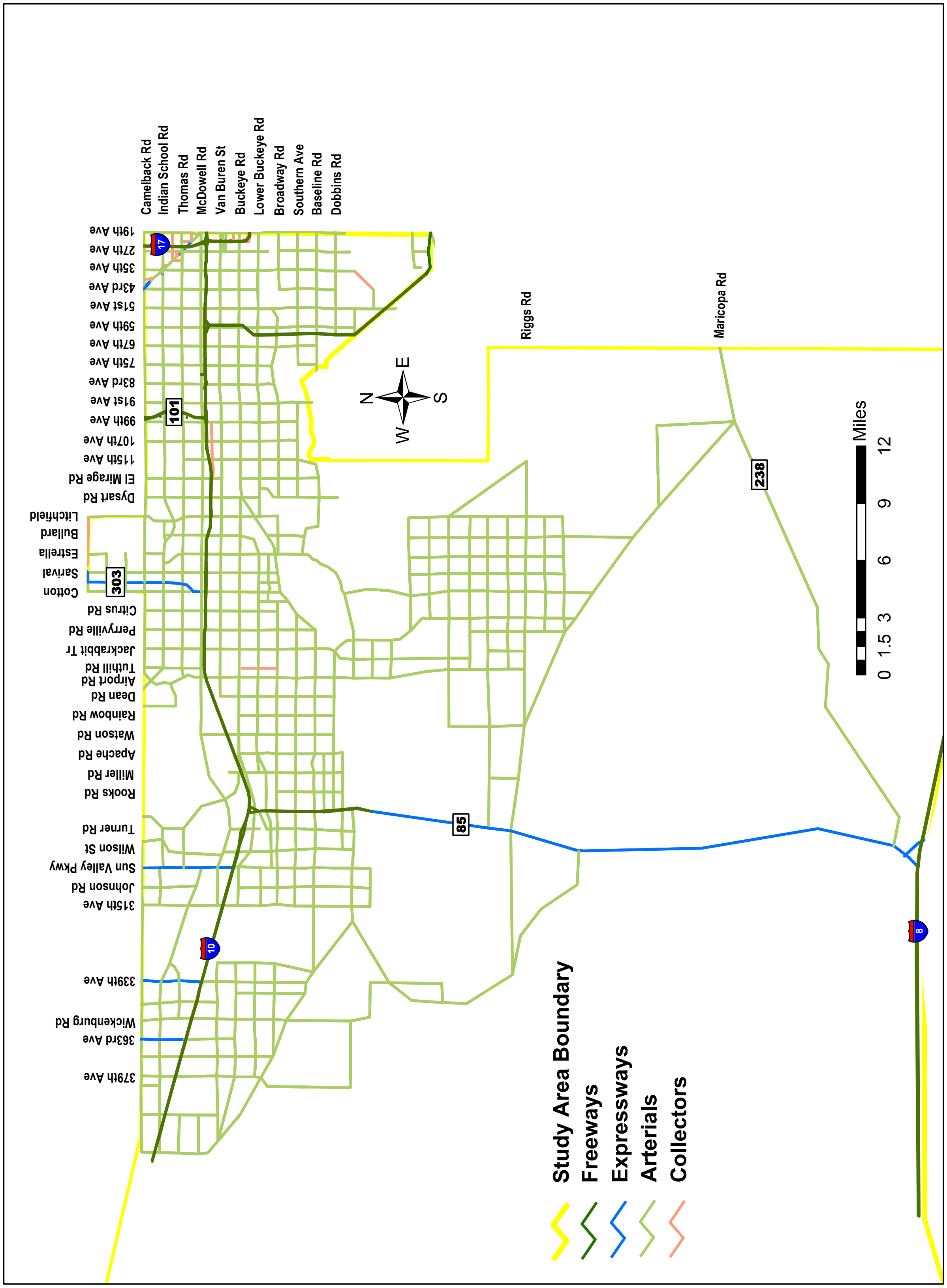
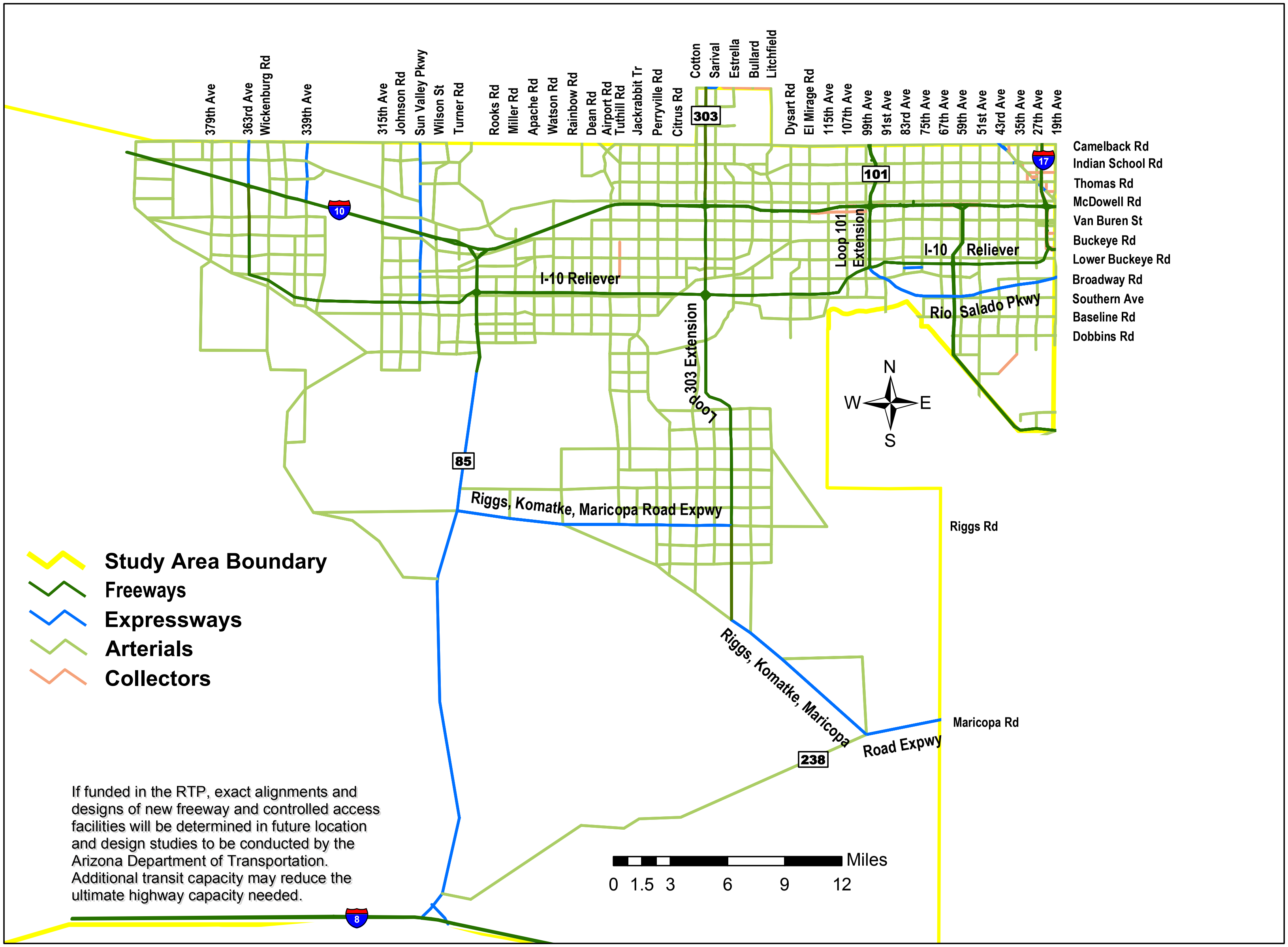


Figure 5-13
Option A and Option C Highway Networks Functional Classes



If funded in the RTP, exact alignments and designs of new freeway and controlled access facilities will be determined in future location and design studies to be conducted by the Arizona Department of Transportation. Additional transit capacity may reduce the ultimate highway capacity needed.

5.4.2 Lane Miles

Figure 5-14 (and Table 5A-2 in Appendix V) shows the lane miles of highways by functional class represented in the Current Base, Future Base, Enhanced, Option A, and Option C models of the highway network in the SWATS area. Figures 5-15 through 5-19 show the number of lanes on the highways in each of the networks. Figure 5-14 shows that lane miles of highway are doubled in the Future Base network as compared to the Current Base. There are increases in each of the functional classes. The largest increase is in the arterial class with an additional 2,400 lane miles. There are 130 additional lane miles of expressways and 49 additional lane miles of freeways, including both general purpose and HOV lanes.

From the Future Base to the Enhanced network, the total number of lane miles increases by 350. There are nearly 400 additional lane miles of freeway and expressway in the Enhanced network including conversion of about 50 lane miles of arterial to the higher class facilities.

From the Enhanced network to Option A approximately 1,100 lane miles are added. There are over 1,000 additional lane miles of freeway and 250 additional lane miles of expressway. There are about 200 fewer lane miles of arterials, most of which represent conversions to higher class facilities.

Option C is the same as Option A in all categories except freeways. There are 130 fewer lane miles of freeway in Option C. The I-10 reliever east of Loop 303 increases by a lane (from 6 to 7) in each direction. West of Loop 303 to SR-85 it decreases by two lanes (from 6 to 4) in each direction and west of SR-85 it decreases by 3 (from 6 to 3). Loop 303 increases by 1 lane in each direction (from 5 to 6) from the I-10 Reliever south to Riggs Road.

Figure 5-14
Lane Miles

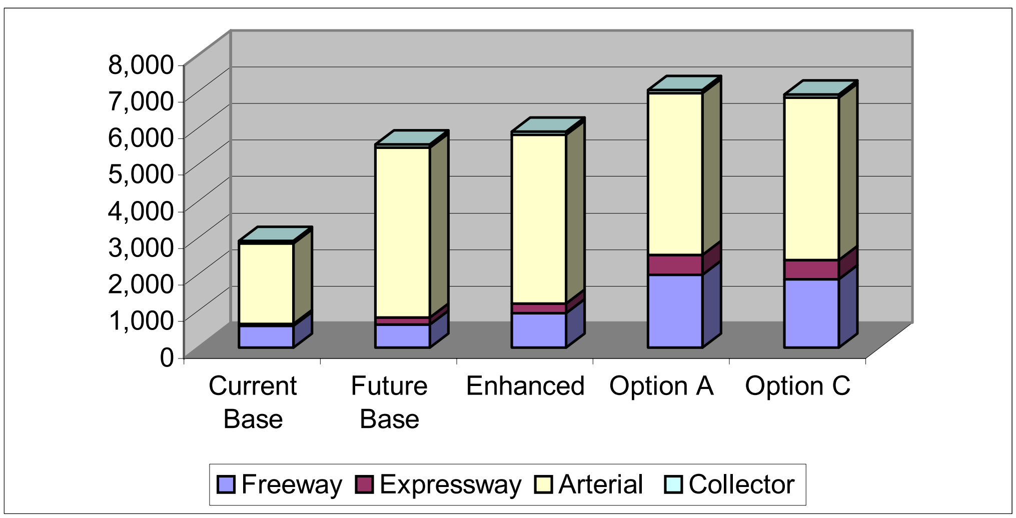


Figure 5-15
Number of Lanes in Current Base Network

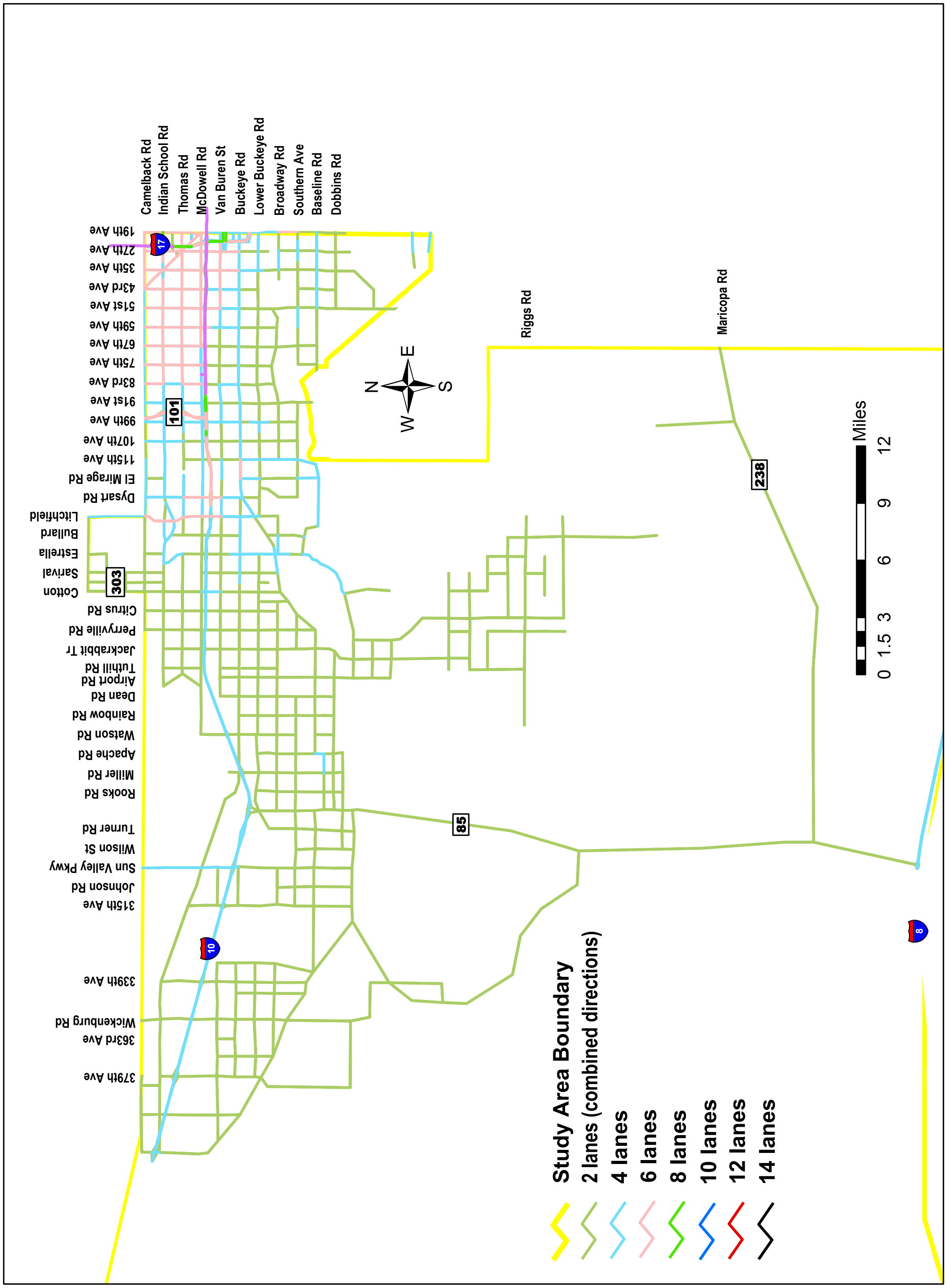


Figure 5-16
Number of Lanes in Future Base Network

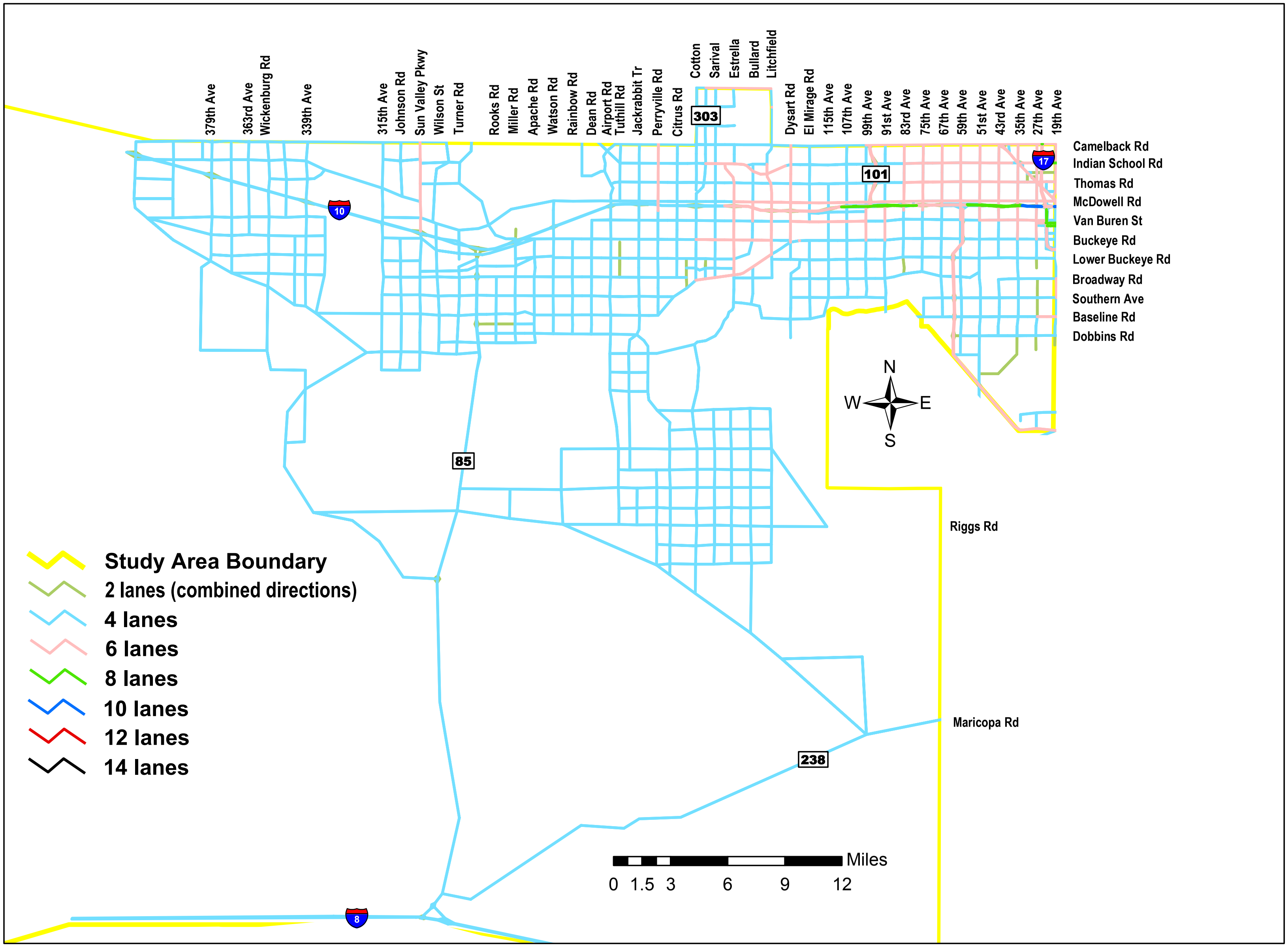


Figure 5-17
Number of Lanes in Enhanced Network

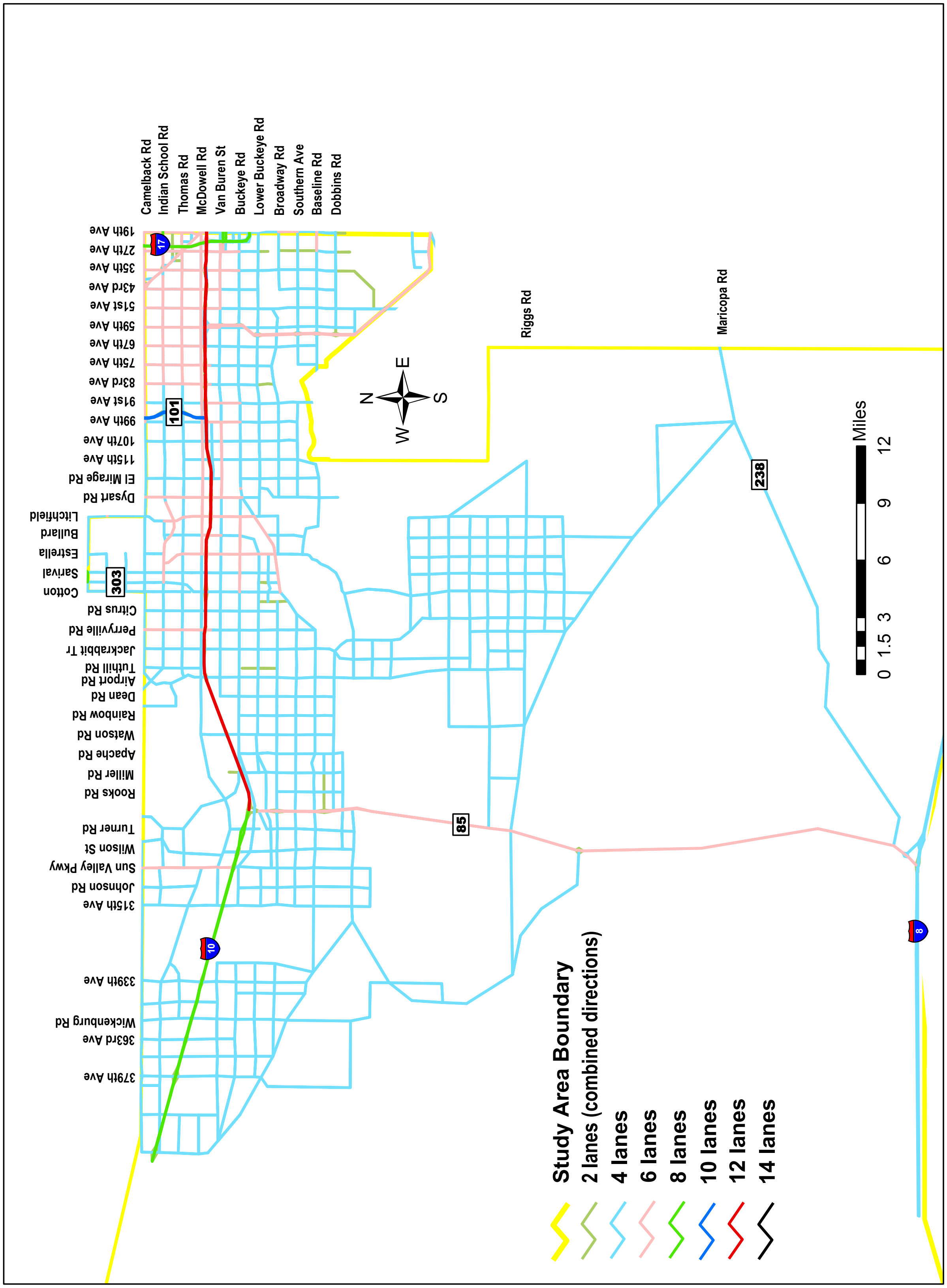


Figure 5-18
Number of Lanes in Option A Network

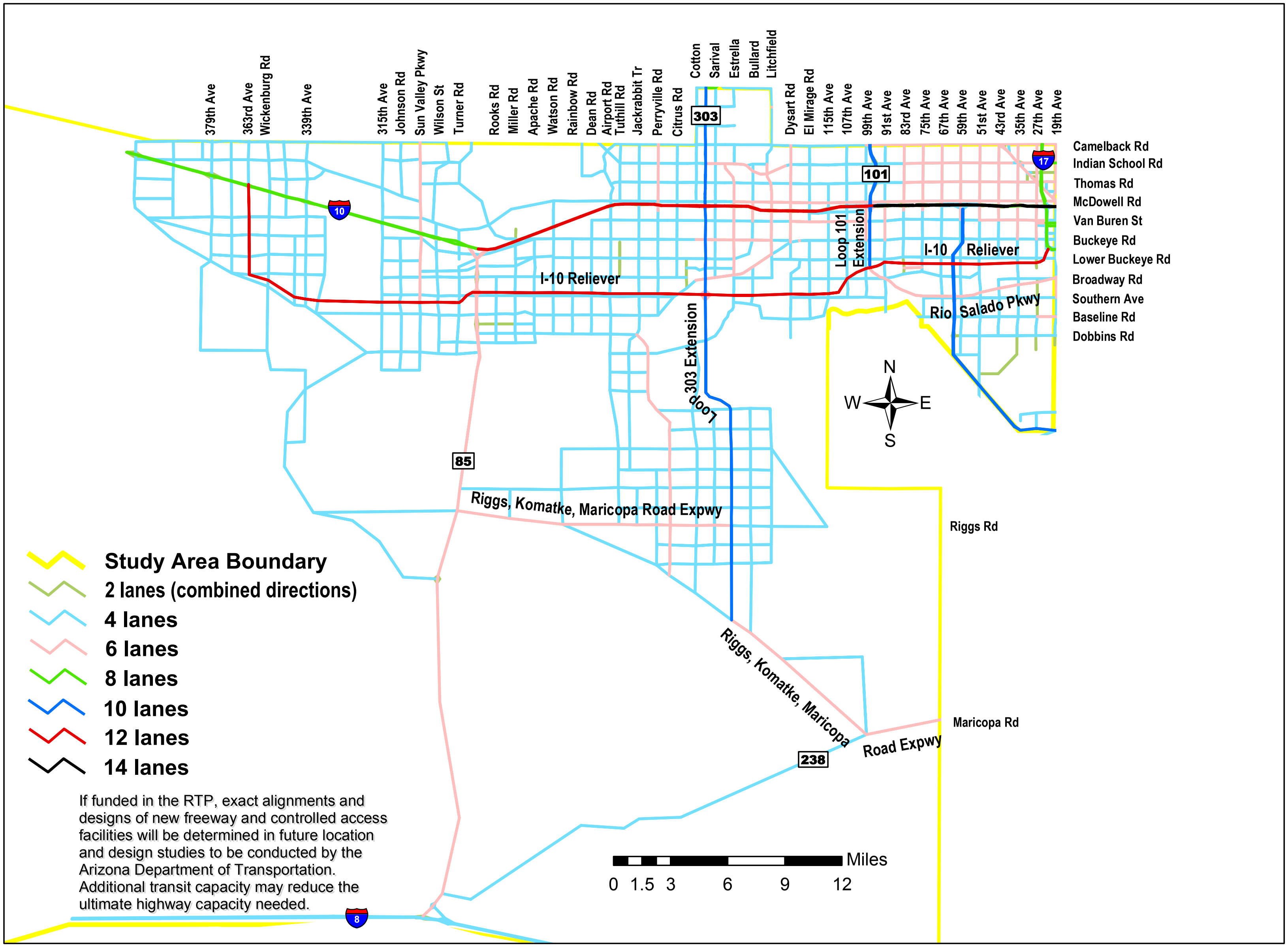
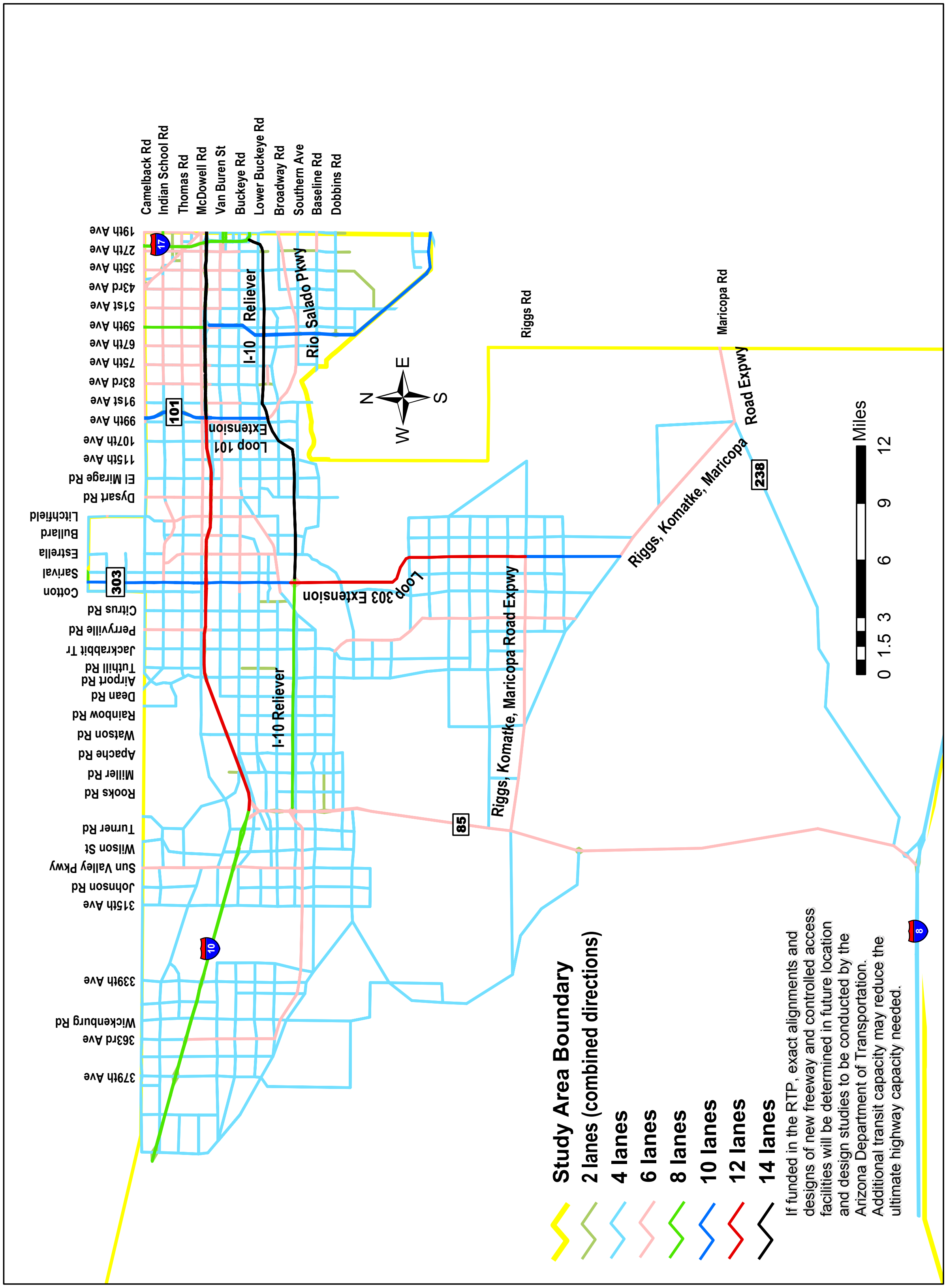


Figure 5-19
Number of Lanes in Option C Network



5.4.3 Capacity Miles

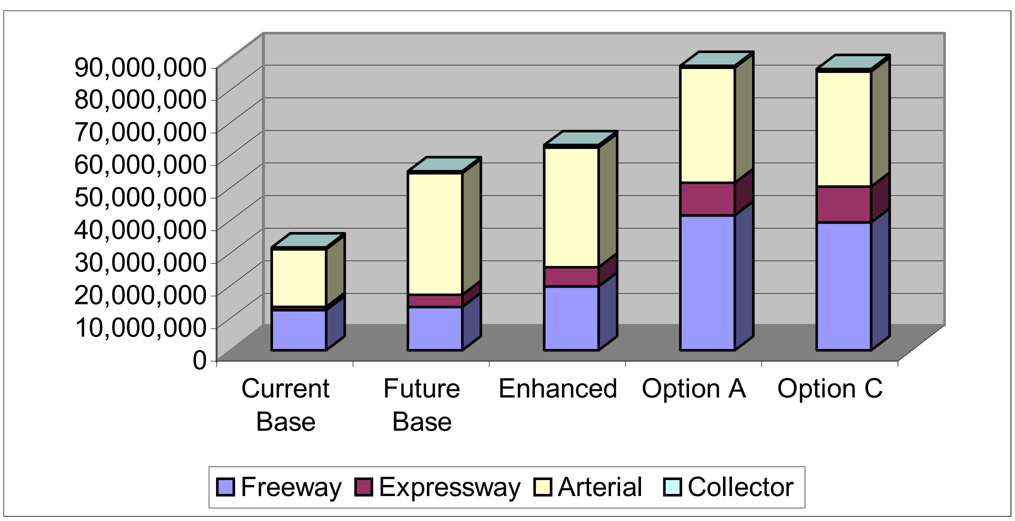
Using a daily capacity of 21,000 vehicles per lane for freeways and expressways and a daily capacity of 8,000 for arterials and collectors, capacity miles in the study area were calculated for each functional class. Capacity miles are a measure of the total amount of daily highway capacity in the study area. Because capacity miles are largely a function of lane miles, a comparison of the networks reveals similar observations to the observations about changes in lane miles themselves.

Figure 5-20 (and Table 5A-3 in Appendix V) presents the capacity miles for the highways represented in the Current Base, Future Base, Enhanced, Option A, and Option C models of the highway network. The figure shows that capacity miles nearly double in the Future Base network as compared to the Current Base. There are increases in each of the functional classes. The largest increase is in the arterial class with an additional 20 million capacity miles. There is an increase of 3.7 million capacity miles of expressways and freeways, including general purpose and HOV lanes.

The Enhanced network adds an additional 8 million capacity miles over the Future Base. Over 6 million capacity miles of freeway capacity are added along with about 2 million of expressway capacity.

Compared to the Enhanced network, Option A more than doubles freeway capacity miles and nearly doubles expressway capacity miles. Option C reduces freeway capacity miles by about 2 million compared to Option A, but increases expressway capacity miles by about 1 million.

Figure 5-20
Capacity Miles



5.5 Operating Characteristics of Options

This section provides some comparisons of the operating characteristics of the networks. Vehicle miles of travel and congestion expected on the networks in the years 2020 and 2030 are presented and compared. This section is restricted to operating characteristics of the SWATS highway system as a whole. Data specific to individual facilities are presented in subsequent Sections 5.7 through 5.10. This section is largely descriptive. Conclusions based on this descriptive information are reached and presented in the following summary section.

5.5.1 Vehicle Miles of Travel

Vehicle miles of travel (VMT) in the SWATS area are expected to nearly triple between 2002 and 2020, from about 14 to 40 million miles every weekday. Figure 5-21 (and Table 5A-4 in Appendix V) shows that VMT under the Future Base and Enhanced networks is similar, with 3 million miles more travel on freeways in the Enhanced network than in the Future Base network (including travel on both general purpose and HOV lanes). This is consistent with the greater presence of freeway lane miles in the Enhanced network as shown in Figure 5-14.

Under Option A and Option C VMT in 2020 is expected to be 15 to 20% greater than under the Future Base and Enhanced networks. Total VMT is about 6-7 million greater under Option A and Option C and freeway VMT is 12-16 million greater. This is largely explained by the substantially greater availability of freeway capacity in Option A and Option C than in the Future Base and Enhanced networks as shown in see Figure 5-20.

By 2030 VMT is expected to quadruple under the Future Base and Enhanced networks, and nearly quintuple under Option A and Option C. Figure 5-22 (and Table 5A-5 in Appendix V) again shows that VMT under the Future Base and Enhanced networks is similar, with 4 million miles more travel on freeways in the Enhanced network than in the Future Base network.

Under Option A and Option C VMT in 2030 is expected to be 20 to 25% greater than under the Future Base and Enhanced networks. As observed above, this is largely explained by the substantially greater availability of freeway capacity in Option A and Option C than in the Future Base and Enhanced networks as shown in Figure 5-20. While VMT is about 12 million greater under Option A and Option C, freeway VMT is about 22 million greater.

Peak hour VMT is expected to follow very similar patterns. Travel in the evening peak hour will triple by 2020 (see Figure 5-23 and Table 5A-6 in Appendix V) and quadruple to quintuple by 2030 (see Figure 5-24 and Table 5A-7 in Appendix V). The figures show that larger amounts of travel are expected under Option A and Option C than under the Future Base and Enhanced networks, consistent with the observations above for daily travel. Similarly, Option A and Option C have substantially larger amounts of travel on freeways than the Future Base and Enhanced networks.

Figure 5-21
Weekday Vehicle Miles of Travel in Year 2020

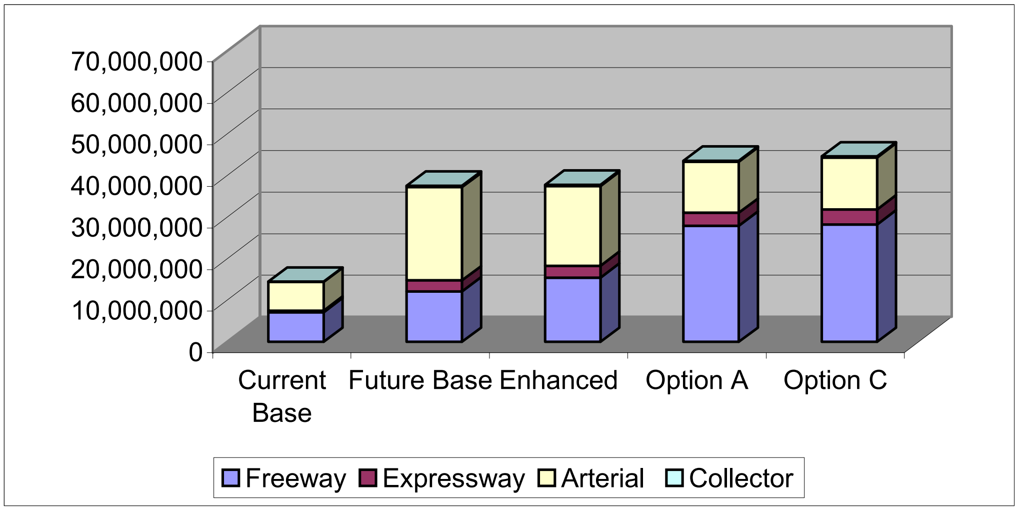


Figure 5-22
Weekday Vehicle Miles of Travel in Year 2030

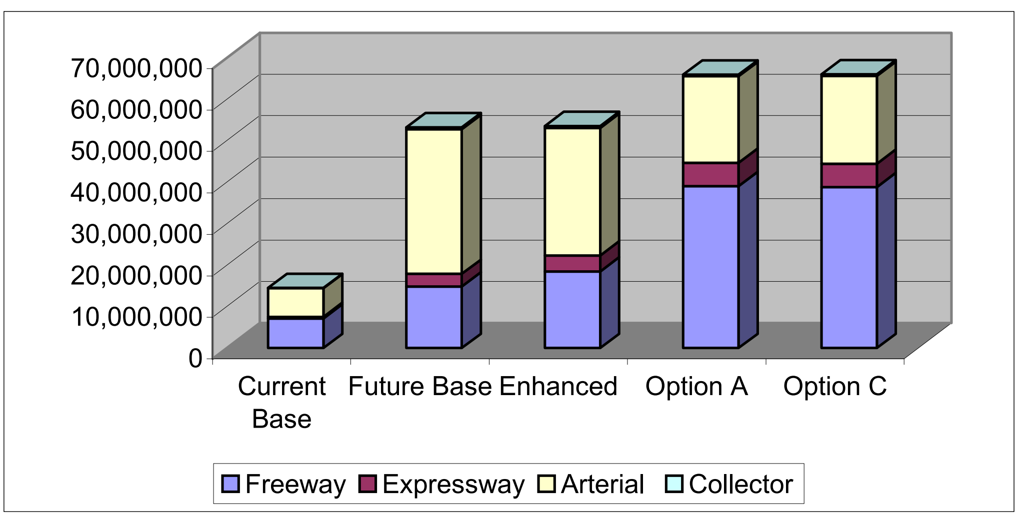


Figure 5-23
Peak Hour Vehicle Miles of Travel in Year 2020

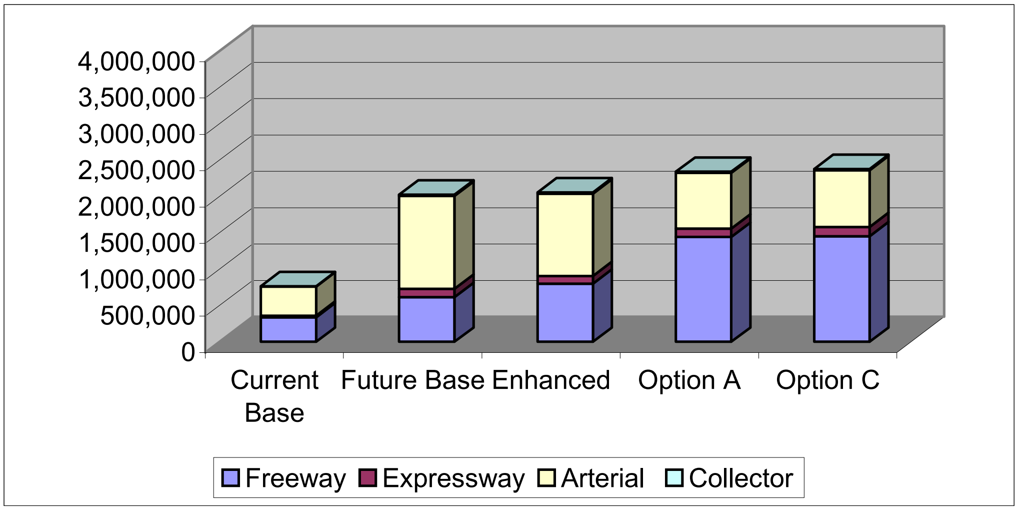
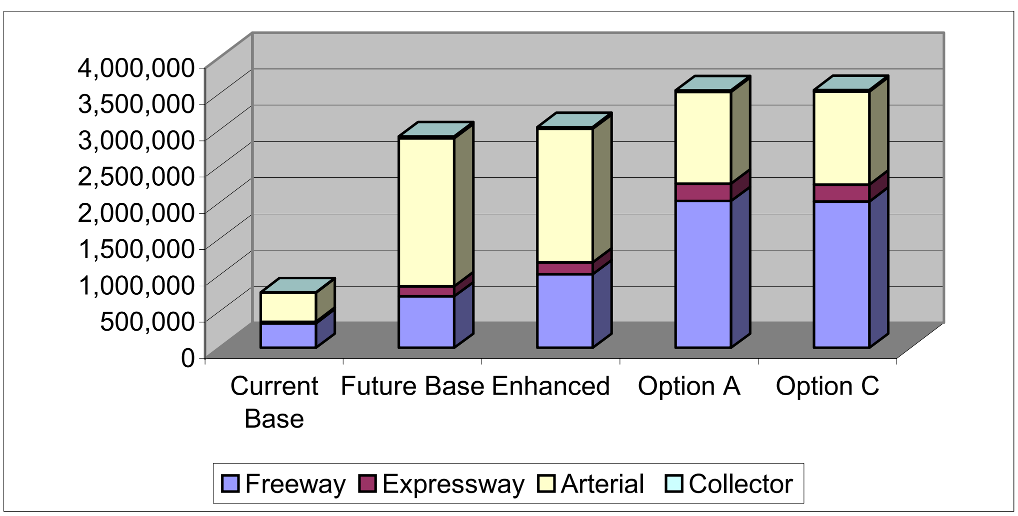


Figure 5-24
Peak Hour Vehicle Miles of Travel in Year 2030



5.5.2 Truck Vehicle Miles of Travel

Goods movement, as measured by truck travel, is expected to increase substantially in the future. Figure 5-25 (and Table 5A-8 in Appendix V) shows that daily truck VMT increases by about 6 million from 2002 to 2020 under the Future Base and Enhanced networks. The arterials in the Future Base and Enhanced networks carry slightly more truck travel than their freeways. With the additional freeways under the Option A and Option C networks (see Figure 5-14), an additional million miles of daily truck travel occurs and there is a substantial shift in that travel to the freeways. Under the Option A and Option C networks, nearly three times as much truck travel occurs on freeways as on arterials.

Figure 5-26 (and Table 5A-9 in Appendix V) shows that daily truck VMT is about 13 million in 2030 under the Future Base and Enhanced networks and 16 million under the Option A and Option C networks. This is 9-12 million more daily truck VMT than currently occurs. As under the 2020 forecasts, the 2030 forecasts for the Future Base and Enhanced networks show more truck travel on the arterial system than on the freeways, but a substantial change in this with the expansion of the freeway system under the Option A and Option C networks.

Figures 5-27 through 5-31 show the daily truck volumes for the Current Base network and the Future Base, Enhanced, Option A, and Option C networks in 2030. The 2020 truck volumes for these networks are shown on Figures 5-32 through 5-35, respectively.

Figure 5-25
Weekday Vehicle Miles of Truck Travel in Year 2020

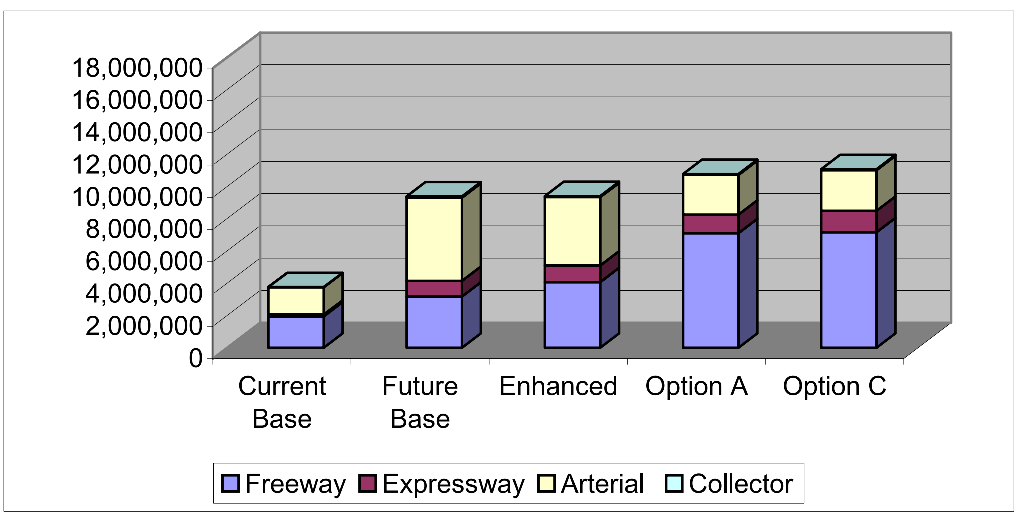


Figure 5-26
Weekday Vehicle Miles of Truck Travel in Year 2030

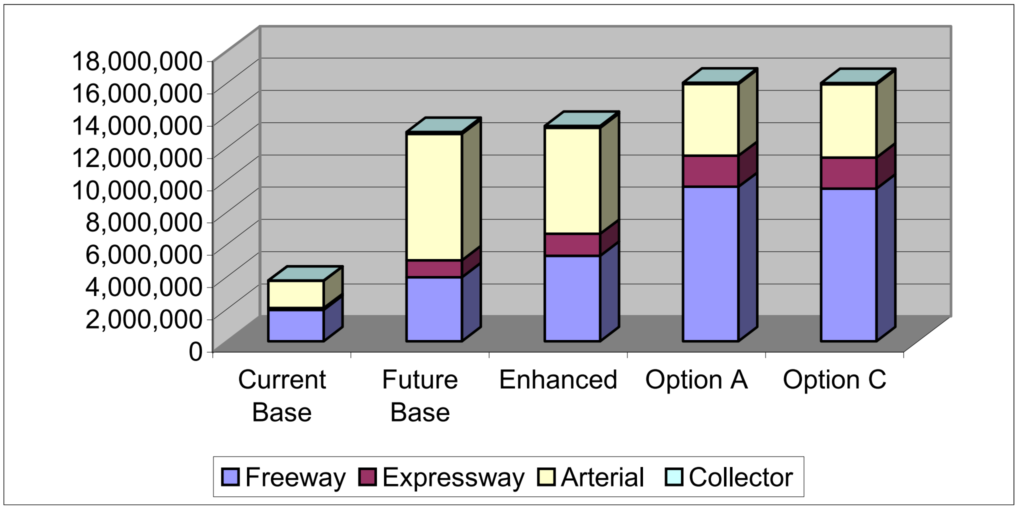


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Figure 5-27
Daily Truck Volumes: Current Base Network 2002

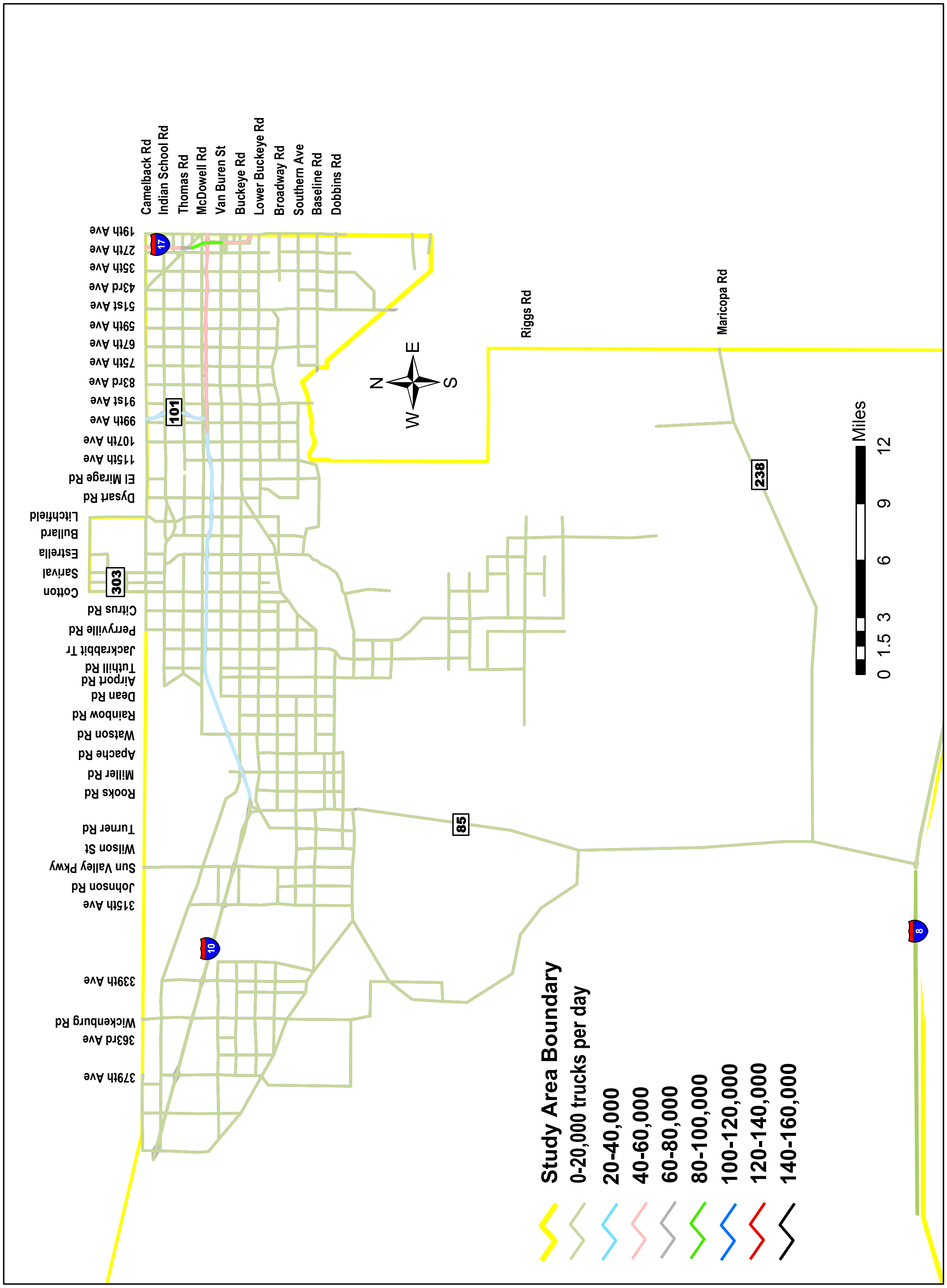


Figure 5-28
Daily Truck Volumes: LRTP 2030

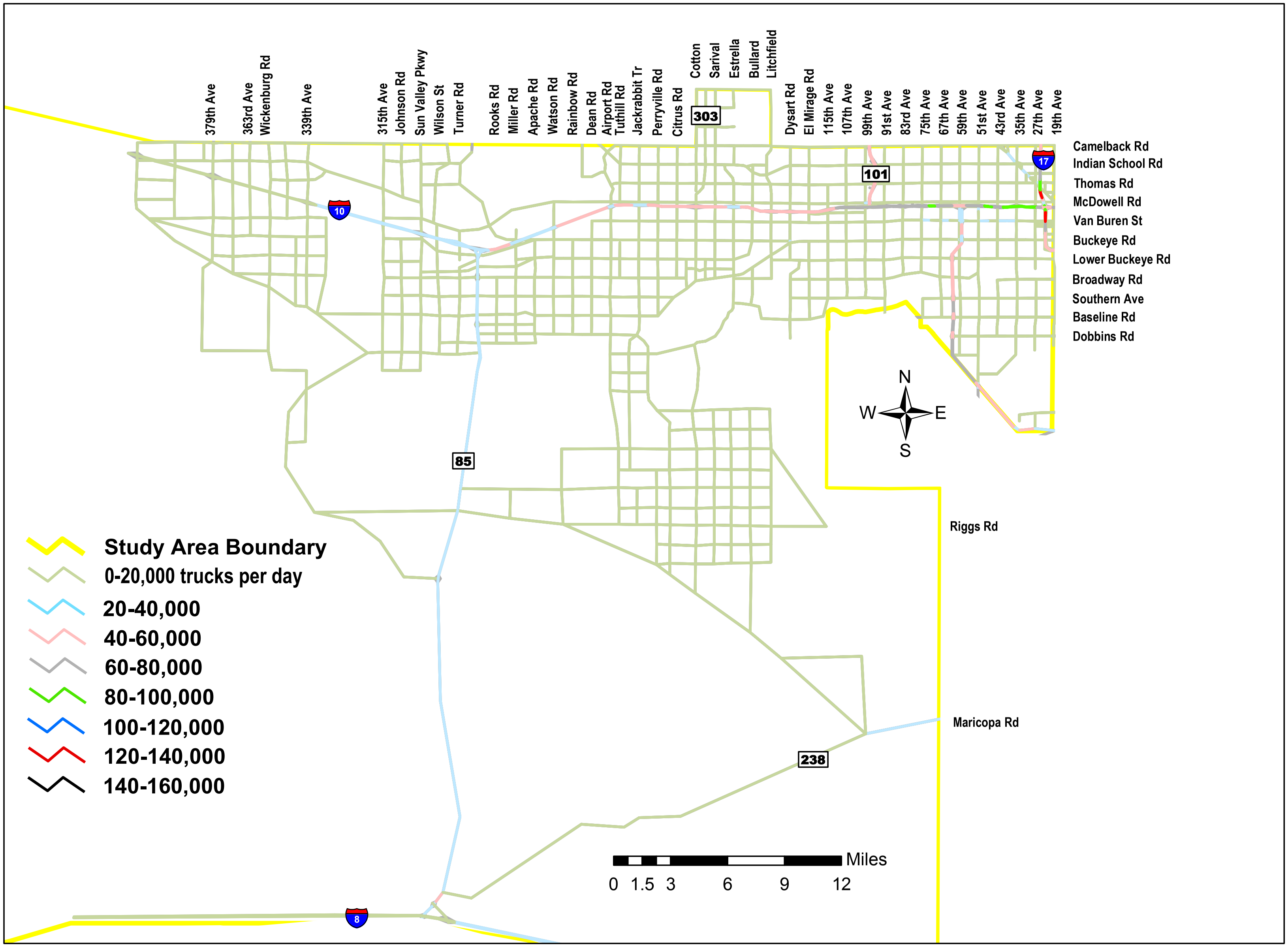


Figure 5-29
Daily Truck Volumes: Enhanced Network 2030

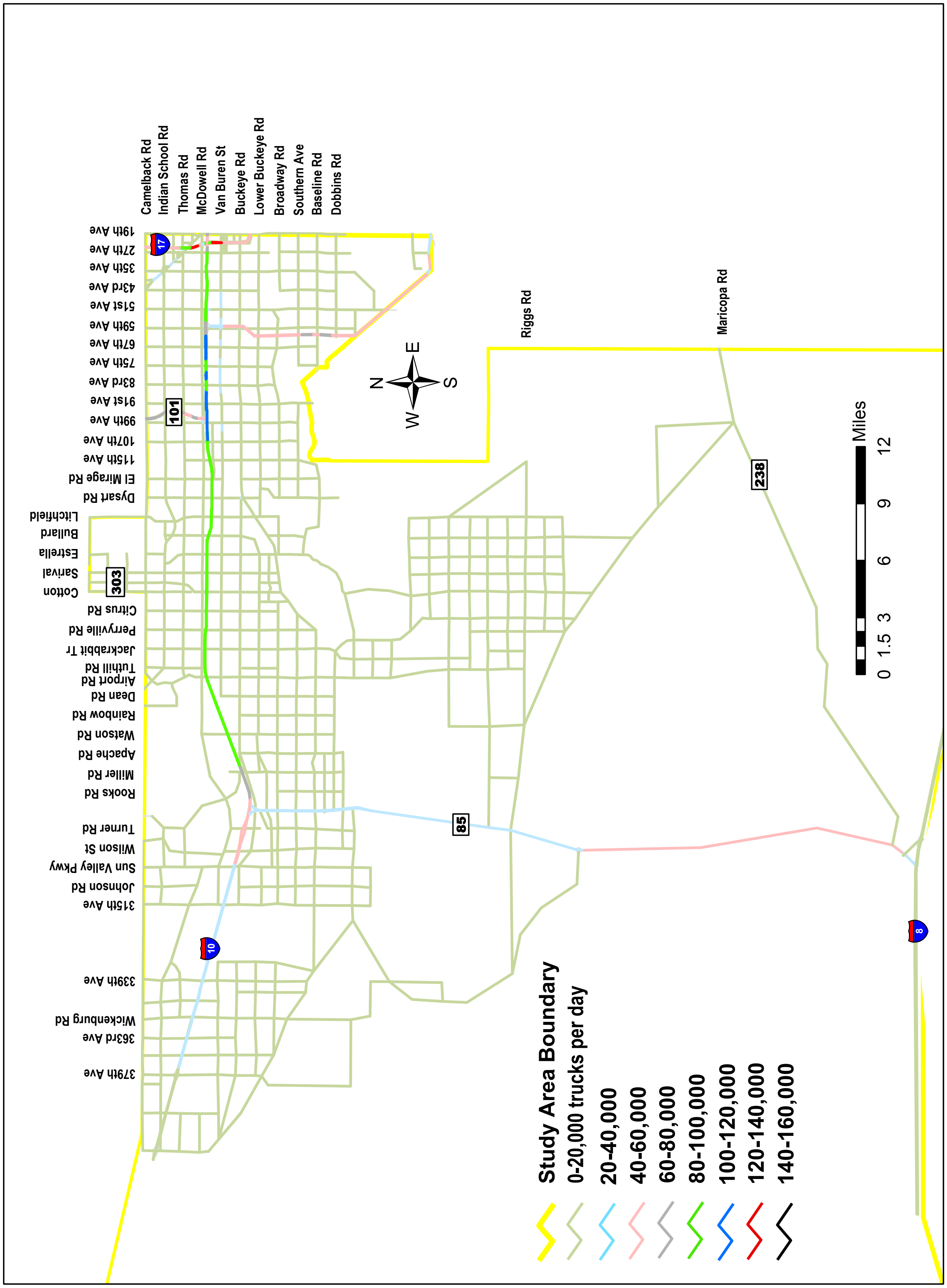


Figure 5-30
Daily Truck Volumes: Option A Network 2030

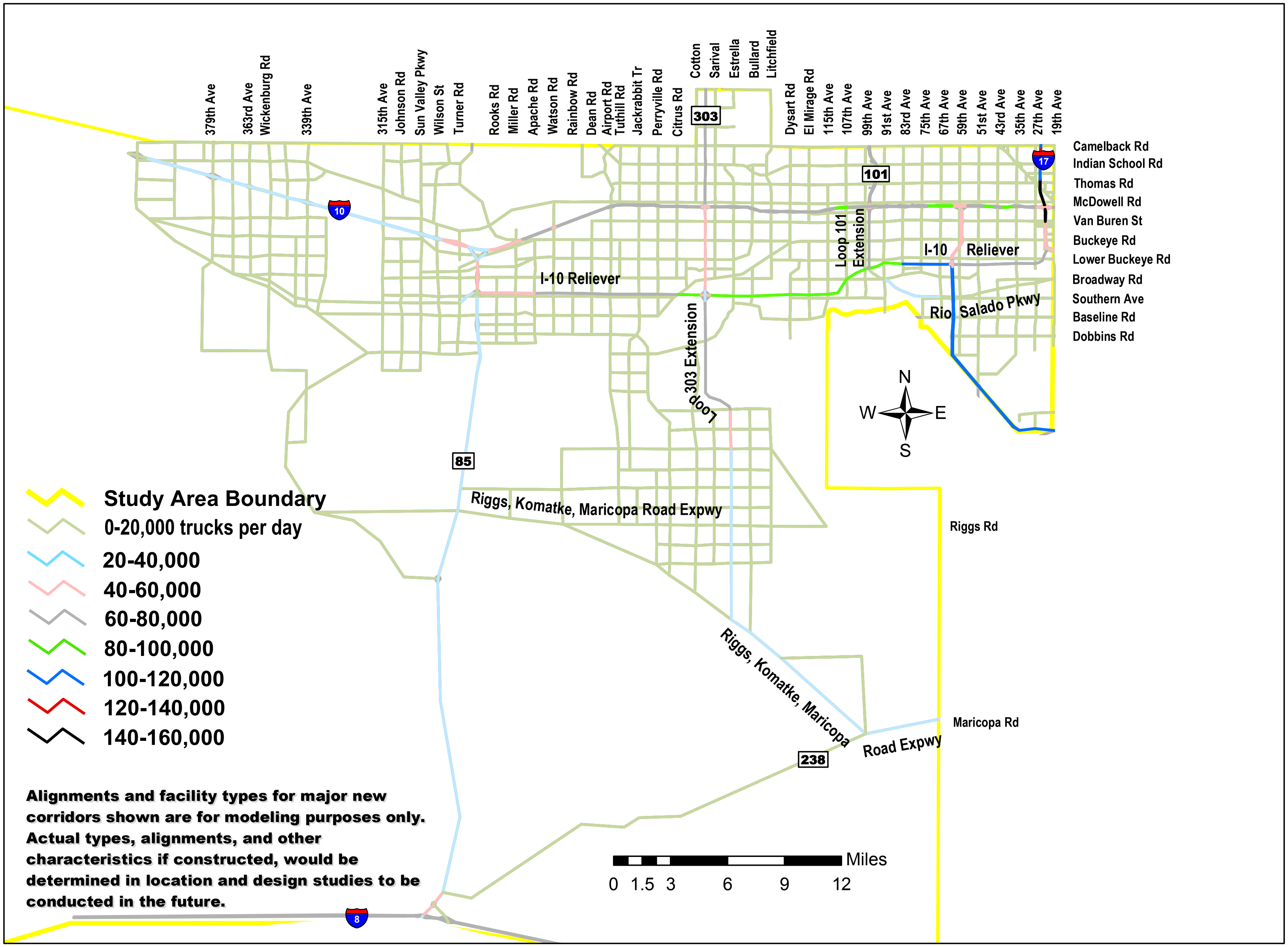


Figure 5-31
Daily Truck Volumes: Option C Network 2030

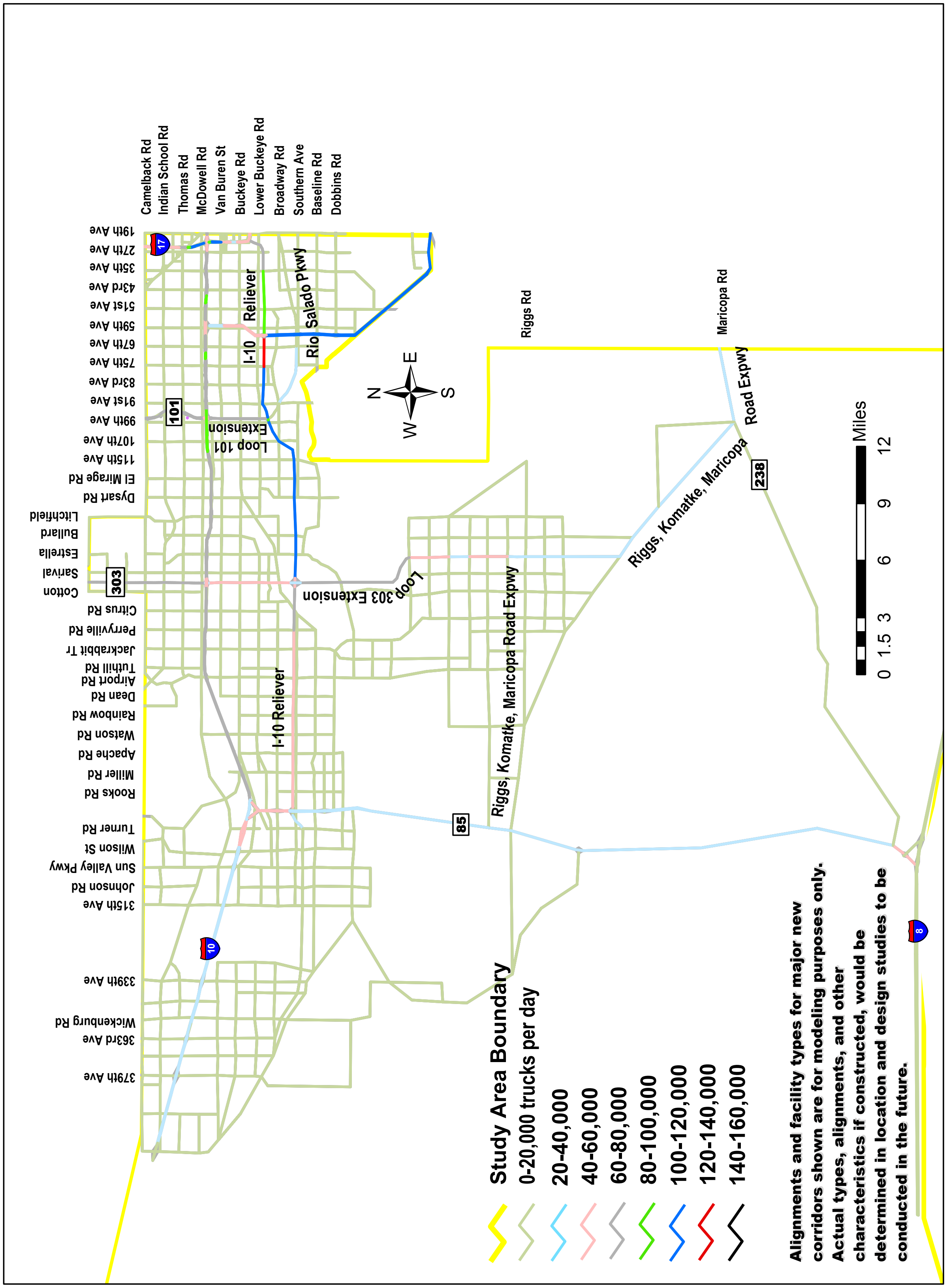


Figure 5-32
Daily Truck Volumes: LRTP 2020

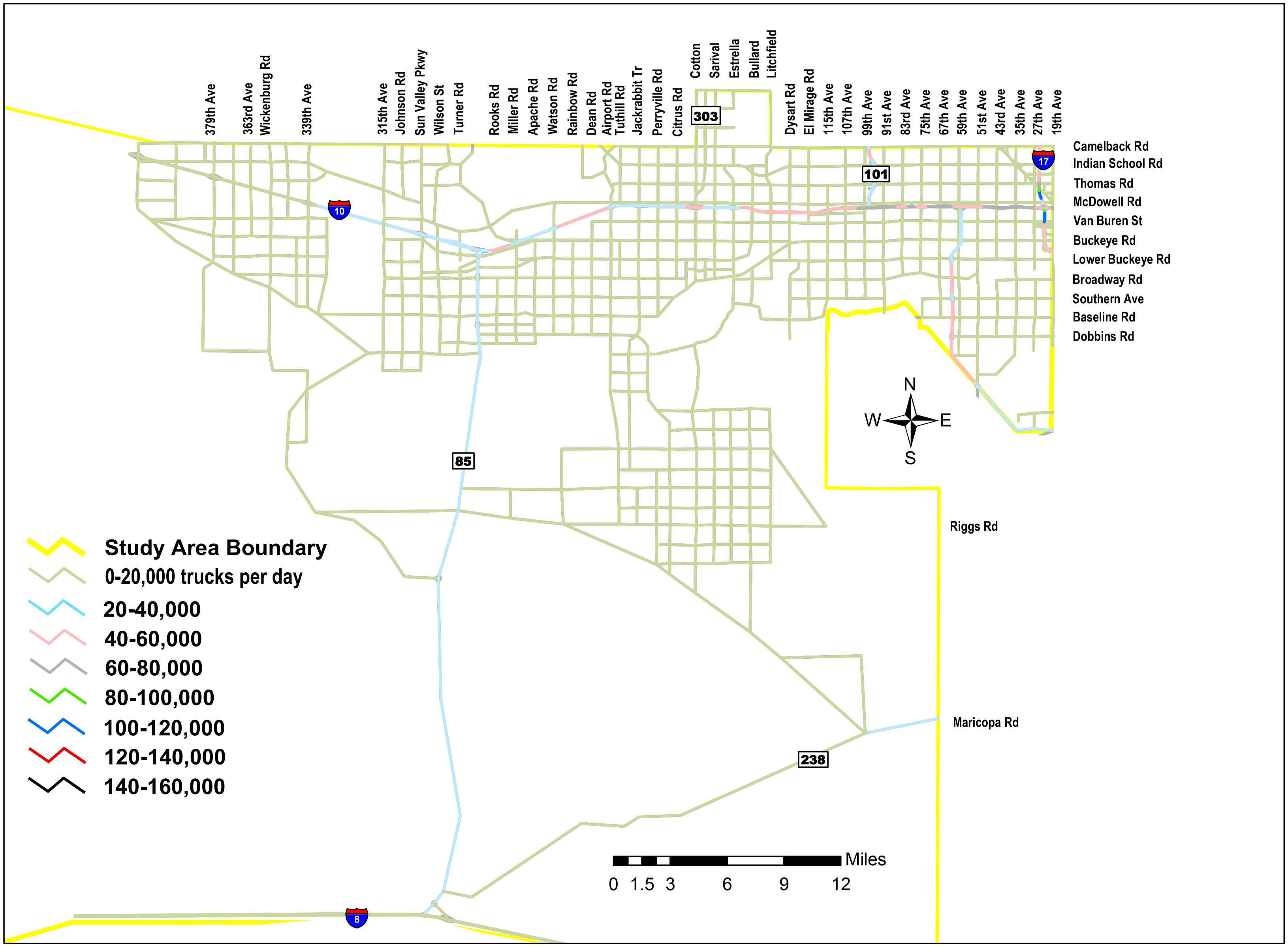


Figure 5-33
Daily Truck Volumes: Enhanced Network 2020

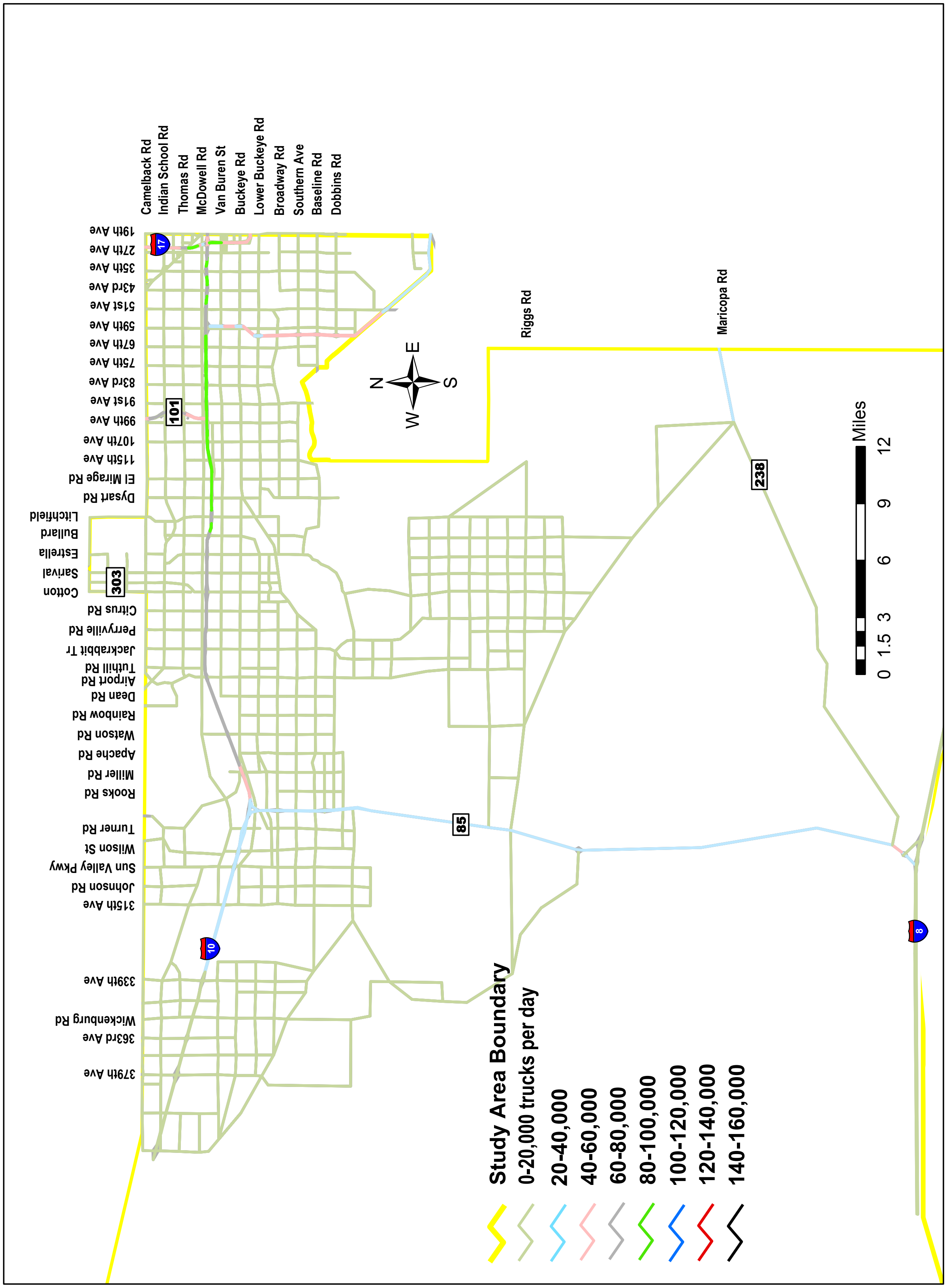


Figure 5-34
Daily Truck Volumes: Option A Network 2020

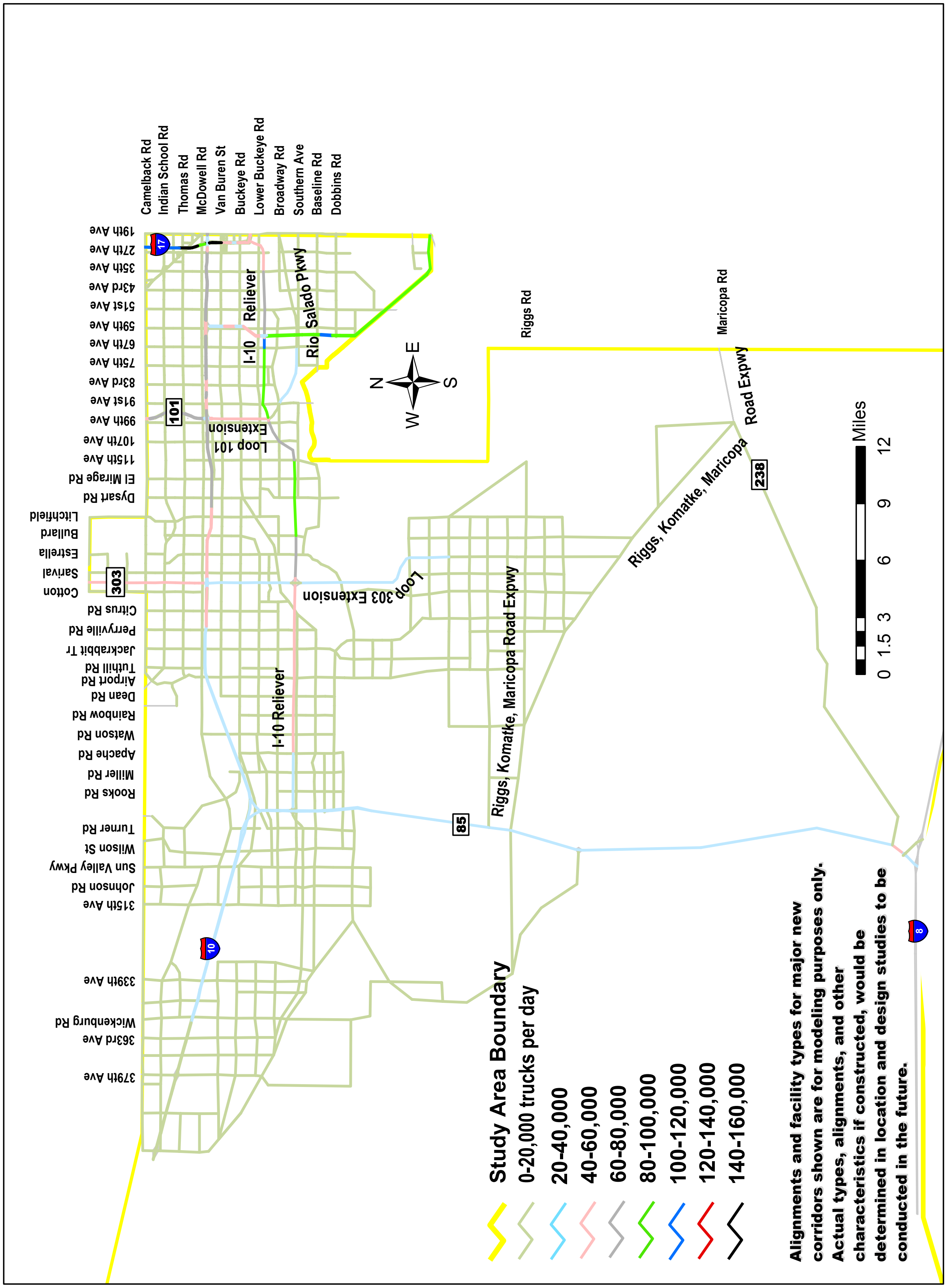
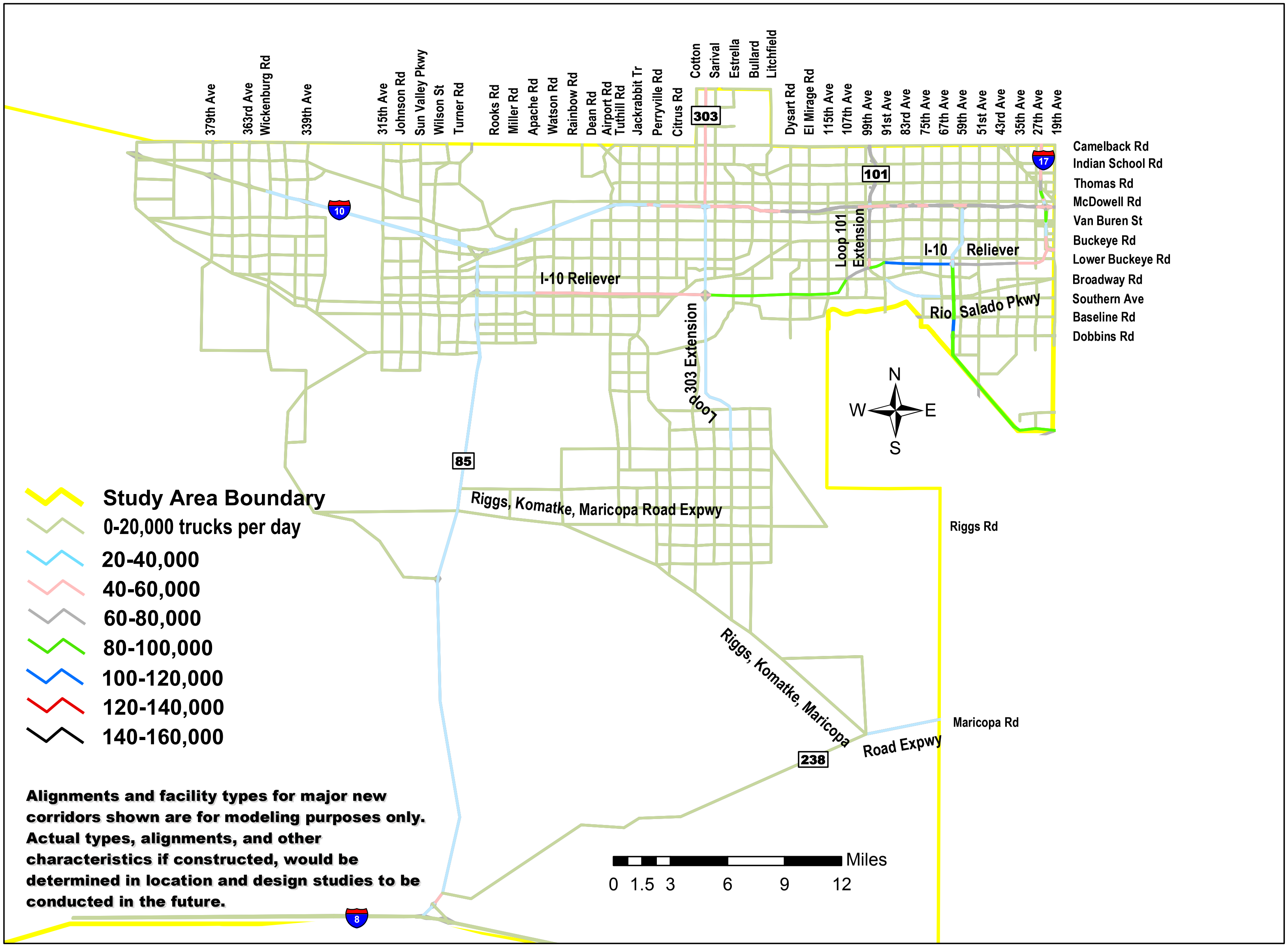


Figure 5-35
Daily Truck Volumes: Option C Network 2030



5.5.3 Congestion and Level-of-Service

Several measures of congestion or level-of-service are available to compare the expected performance of each of the potential future networks. These include the number of miles of roadway expected to be congested during the evening peak hour, the amount of peak hour travel expected to occur on congested roadways, and the number of intersections expected to be congested. To assist in the understanding of these congestion measures, Figures 5-36 through 5-45 show the traffic volumes for the Current Base network and for the Future Base, Enhanced, Option A, and Option C networks in 2030. The 2020 volumes for these networks are shown on Figures 5-46 through 5-53, respectively.

5.5.3.1 Peak Hour VMT under Congested Conditions

The amount of roadway travel in the peak hour under congested conditions is an indicator of the performance of the highway system. Level-of-service (LOS) E and F are indicative of traffic conditions in which there are unacceptable levels of delay due to congestion. Speeds are reduced and may include periods in which motorists are completely stopped or traveling at very slow speeds. In this analysis LOS E and F are defined as forecast traffic volumes in the evening peak hour exceeding 90% of roadway capacity.

Figure 5-54 (and Table 5A-10 in Appendix V) shows that about 90,000 miles of evening peak hour travel in the SWATS area is estimated to currently occur under congested conditions. This is about 12% of peak hour travel in the study area, as shown in Figure 5-55 (and Table 5A-11 in Appendix V).

Under the Future Base network in 2020, 0.56 million miles of evening peak hour travel (28%) is expected to occur under congested conditions in the SWATS area. By 2030 this triples to 1.55 million miles of peak hour travel (53%). (See Figures 5-56 and 5-57 and, in Appendix V, Tables 5A-12 and 5A-13.)

Under the Enhanced network, with its addition of 350 lane miles of highways, 0.33 million miles of 2020 peak hour travel (16%) is forecast to occur under congested conditions. By 2030 this rises to 1.26 million or 41% of all peak hour vehicle miles of travel in the evening peak hour.

Through its addition of over 1000 lane miles of highway in the SWATS area (compared to the Enhanced network), the Option A network reduces the forecast amount of peak hour travel in congestion to under 100,000 vehicle miles, or only 4% of total vehicle miles of travel in 2020. This represents a substantially lower percent of travel under congested conditions than is currently estimated to exist under the Current Base (12%). However, by 2030 the amount of peak hour travel in congestion increases to 0.63 million vehicle miles under Option A, or about 18% of all peak hour travel.

The Option C network (with the reduction of about 100 lane miles compared to the Option A network) is forecast to have 6% of travel under congested conditions in 2020. This increases to 17% in 2030. The slightly lower percent in 2030 for Option C compared to Option A is due to targeting lane miles of freeway under Option C to areas congested under Option A, such as the I-10 Reliever east of Loop 303.

Figure 5-36
Freeway Daily Traffic Volumes: Current Base 2002

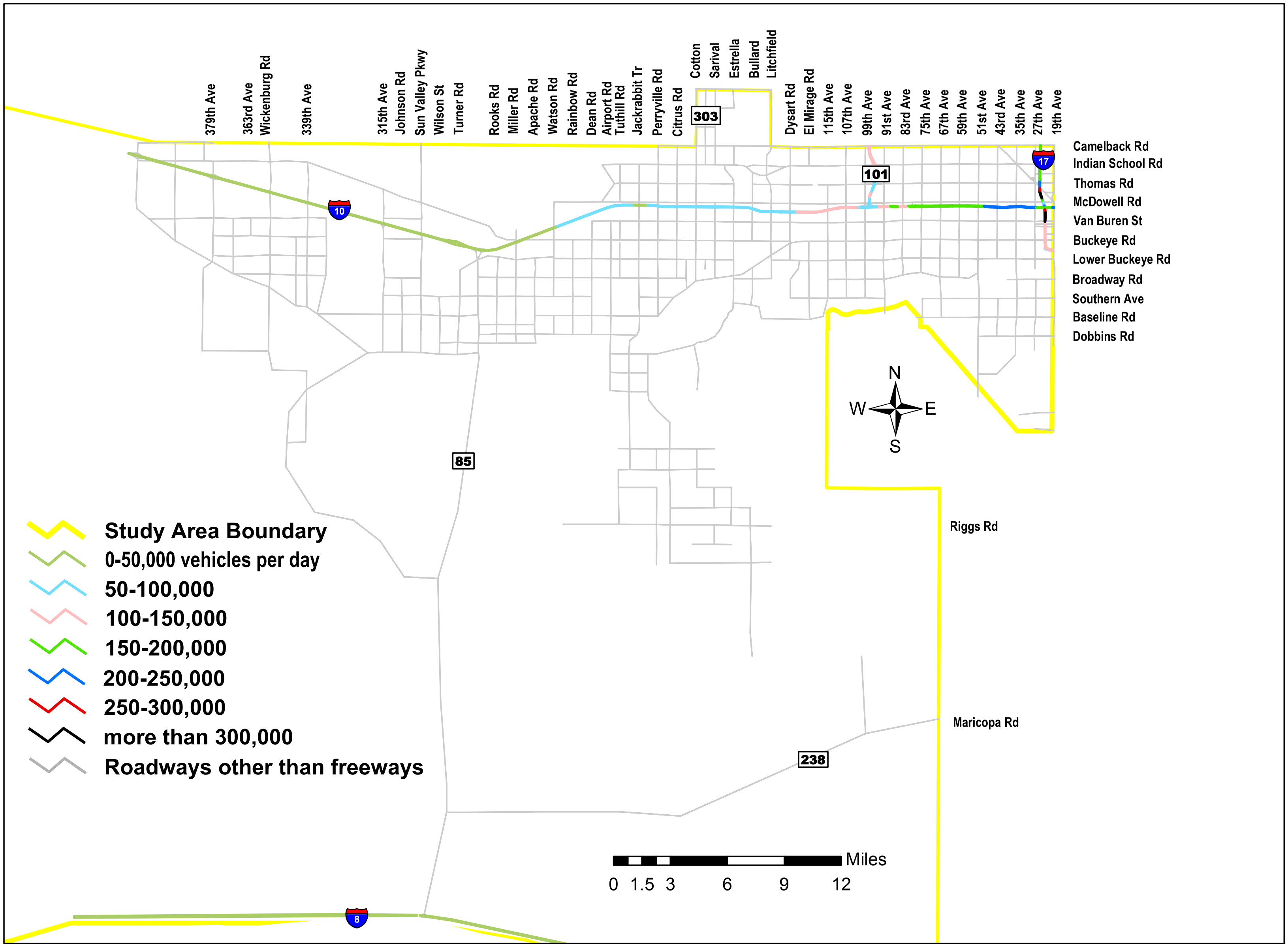


Figure 5-37

Off-Freeway Daily Traffic Volumes: Current Base 2002

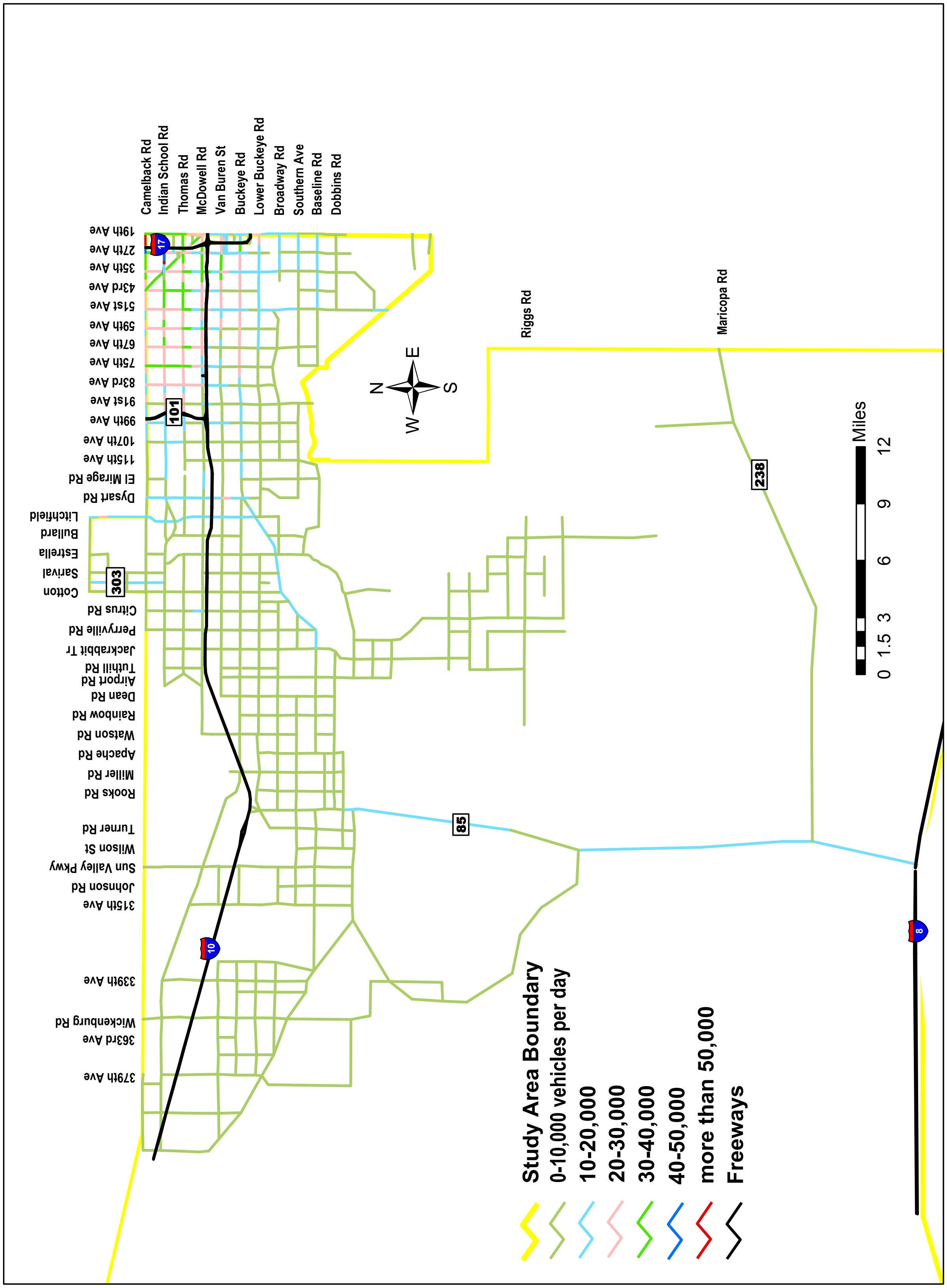


Figure 5-38
Freeway Daily Traffic Volumes: Future Base 2030

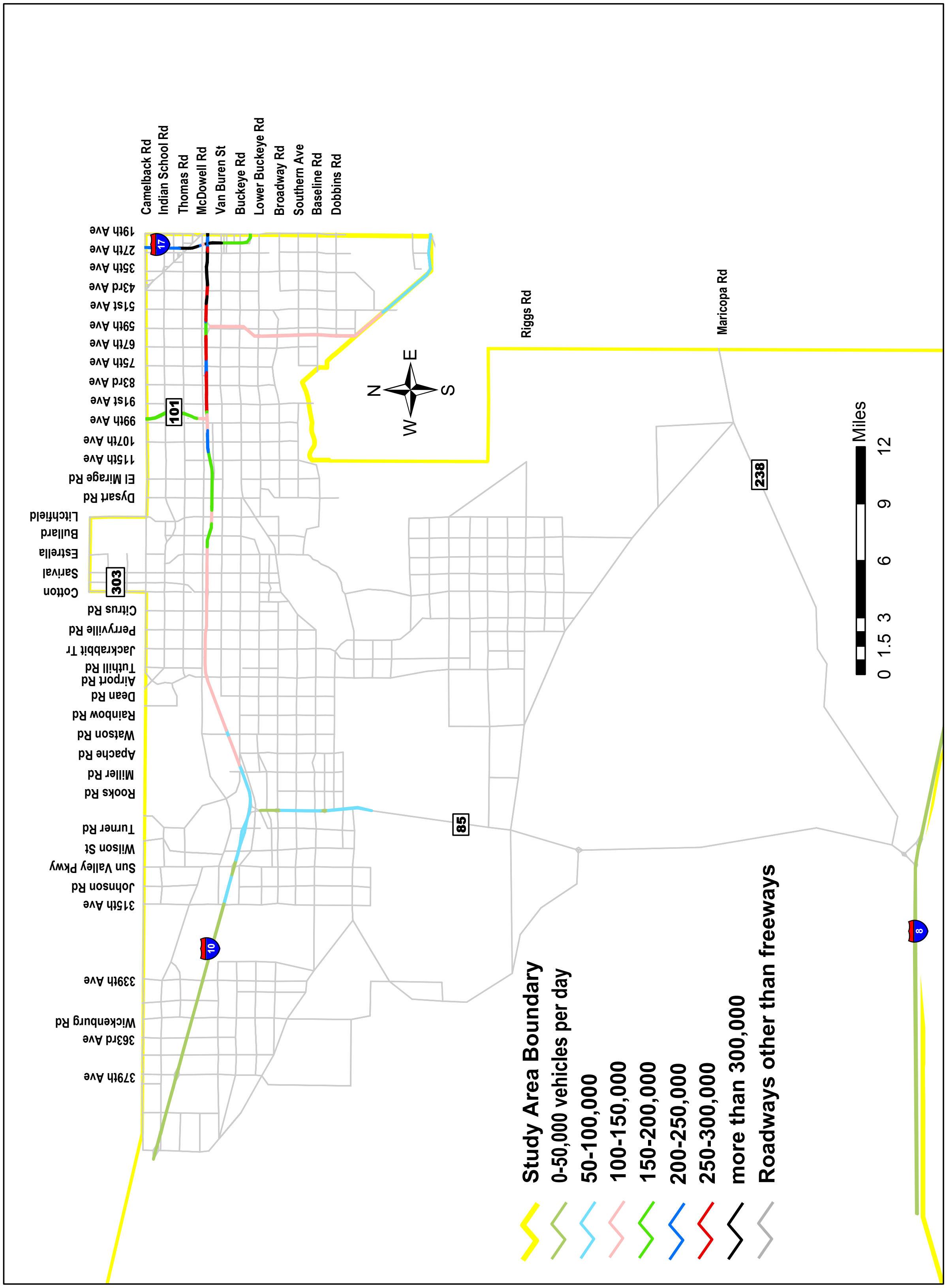


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Figure 5-39
Off-Freeway Daily Traffic Volumes: Future Base 2030

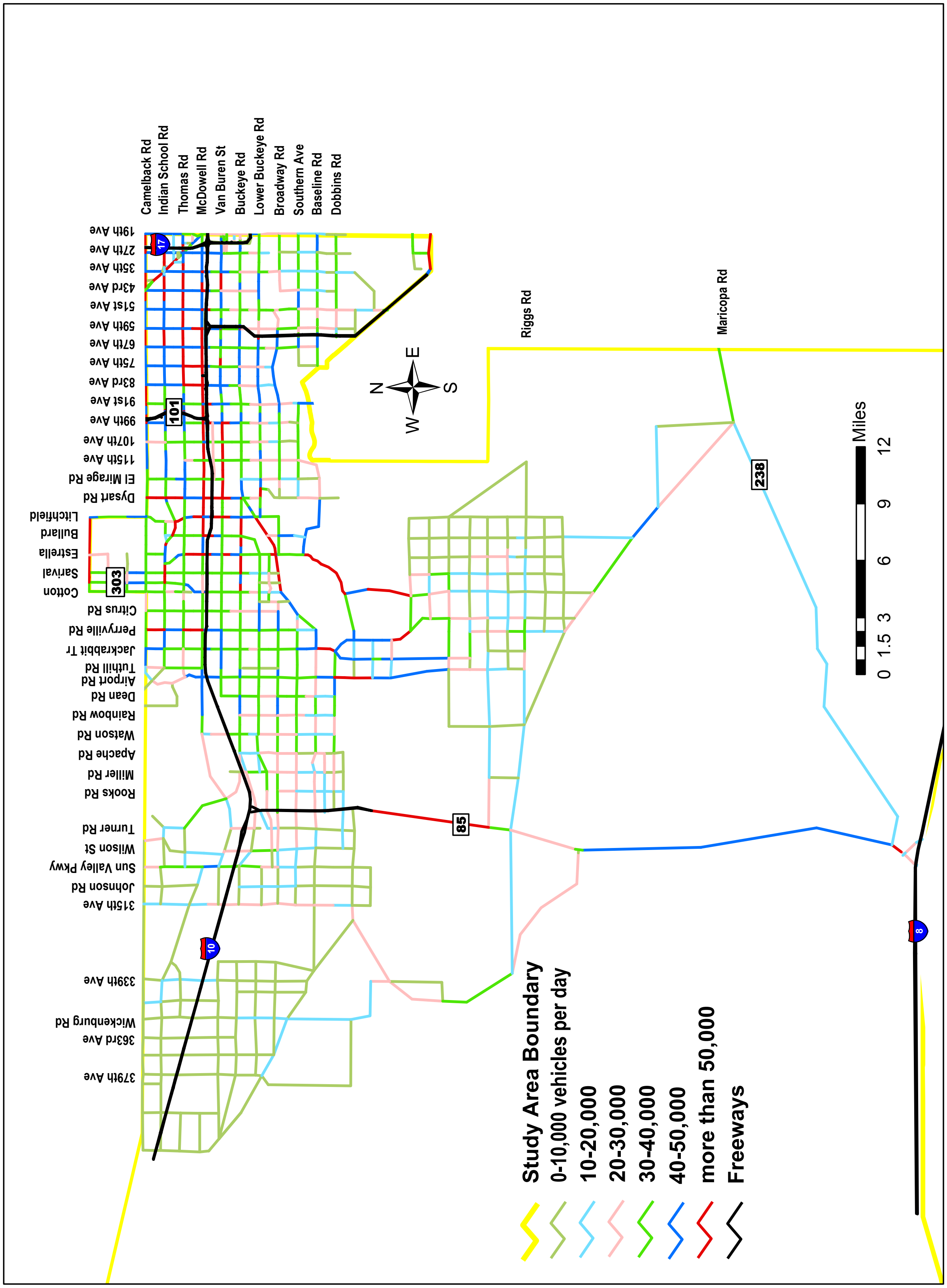

Figure 5-40
Freeway Daily Traffic Volumes: Enhanced 2030

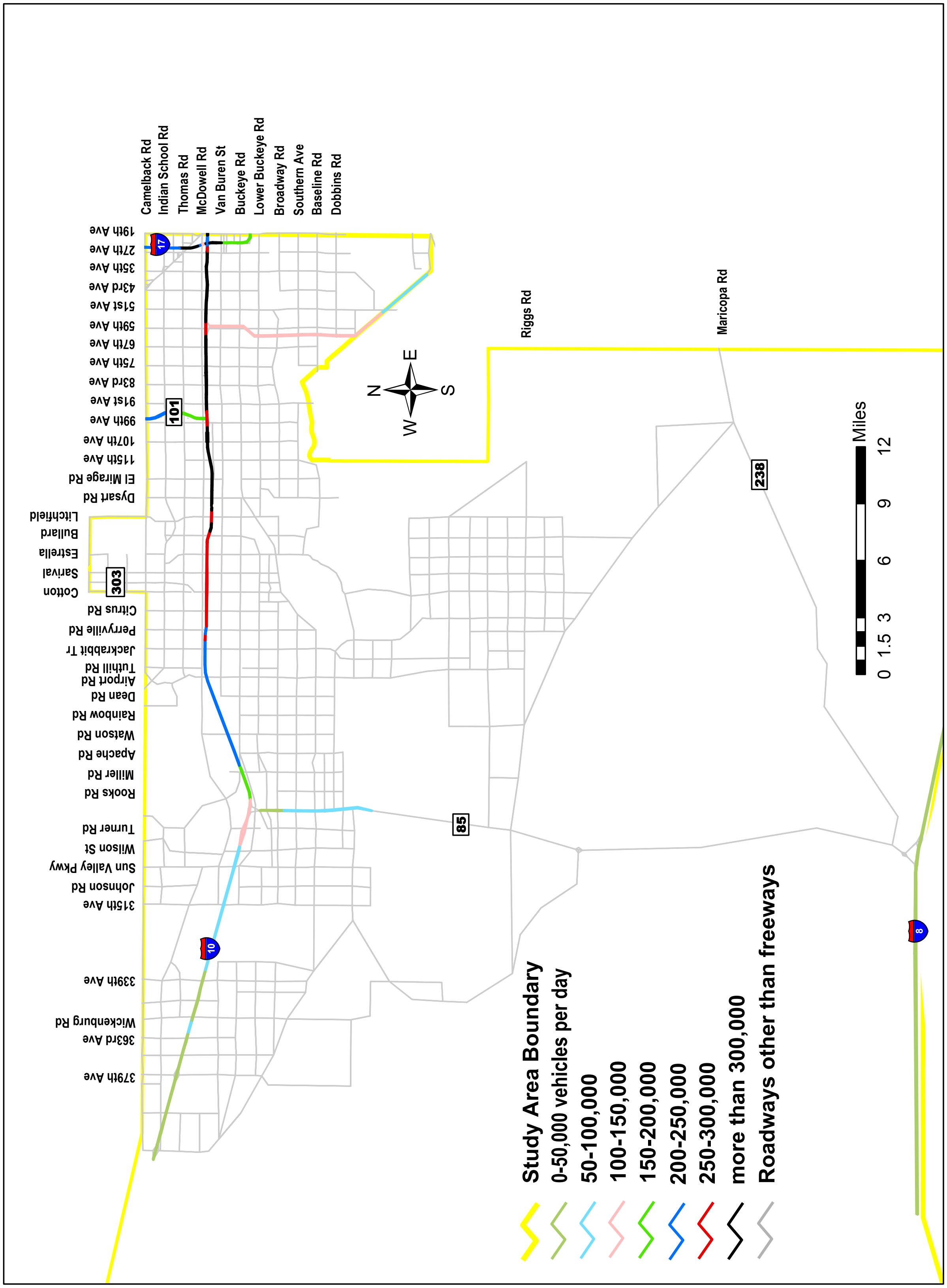

Figure 5-41
Off-Freeway Daily Traffic Volumes: Enhanced 2030

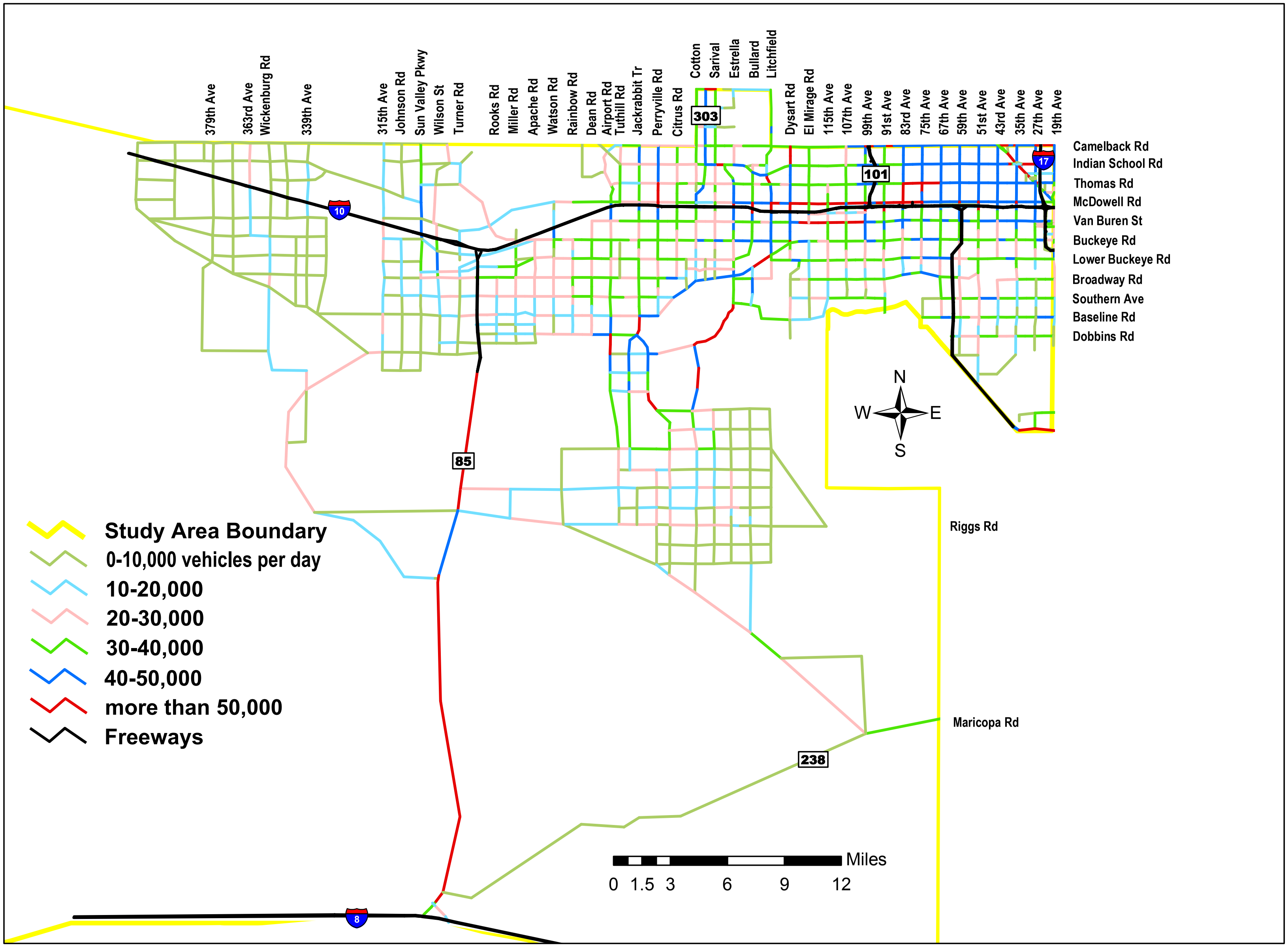

Figure 5-42
Freeway Daily Traffic Volumes: Option A 2030

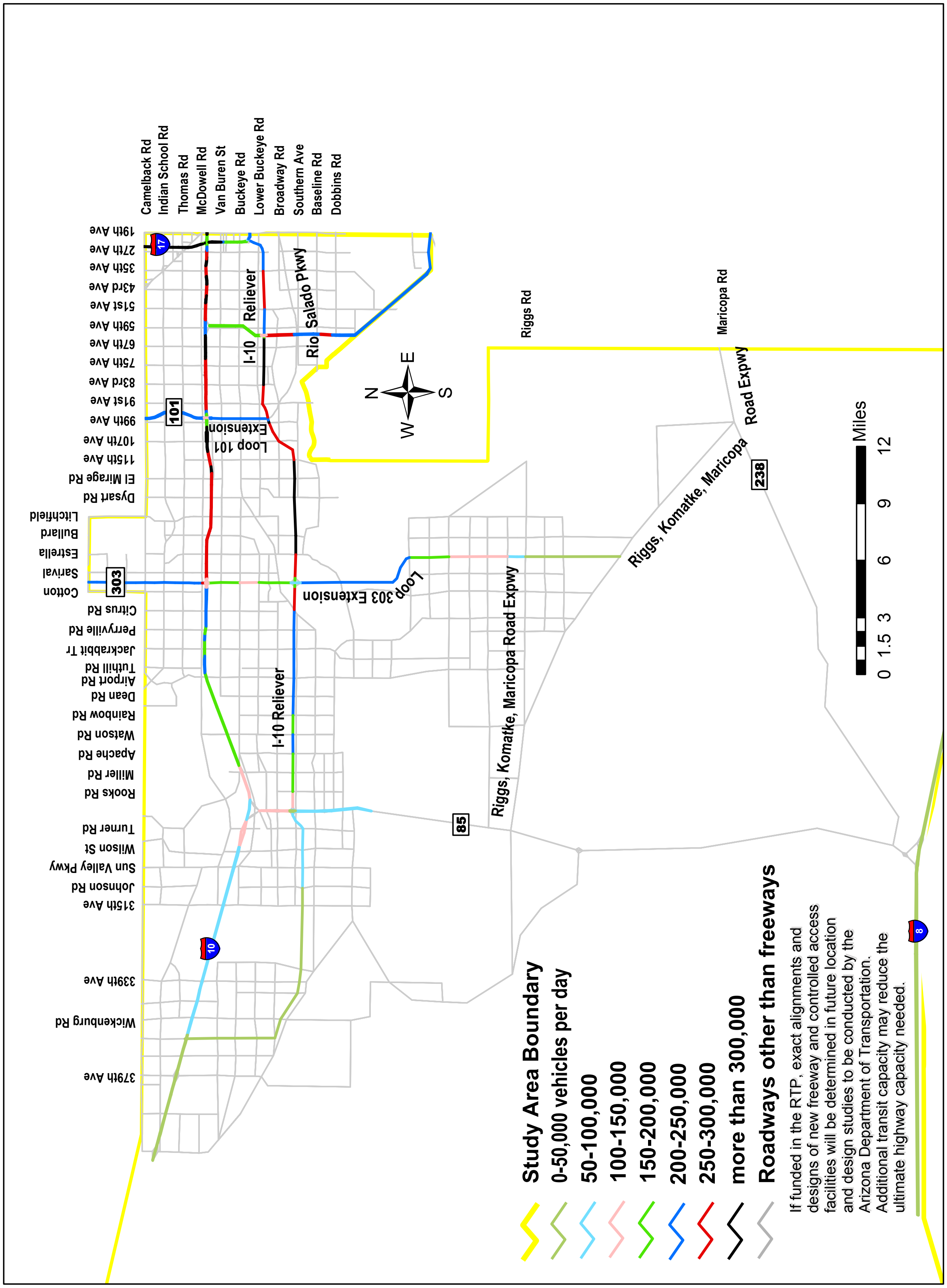

Figure 5-43
Off-Freeway Daily Traffic Volumes: Option A 2030

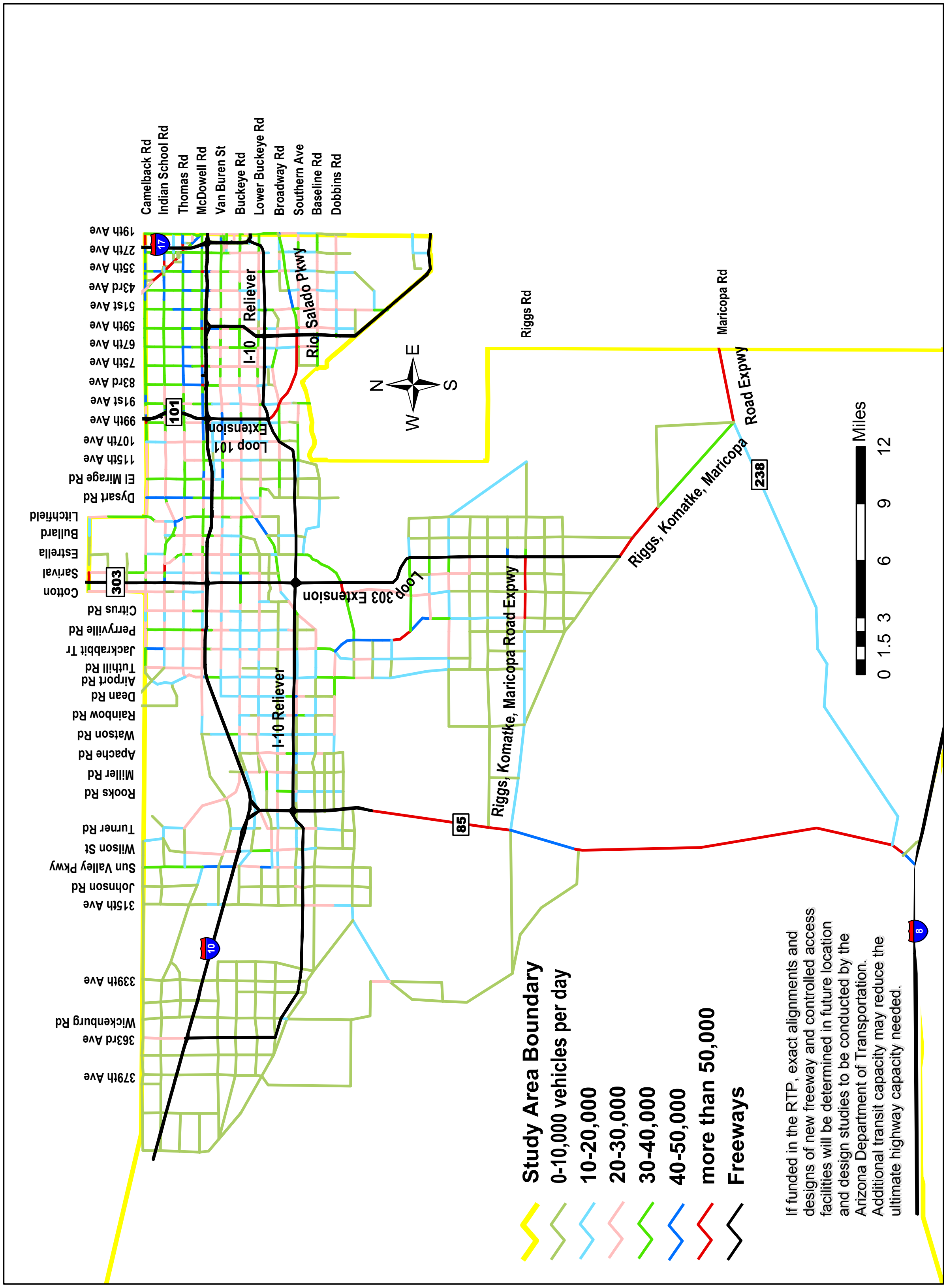

Figure 5-44
Freeway Daily Traffic Volumes: Option C 2030

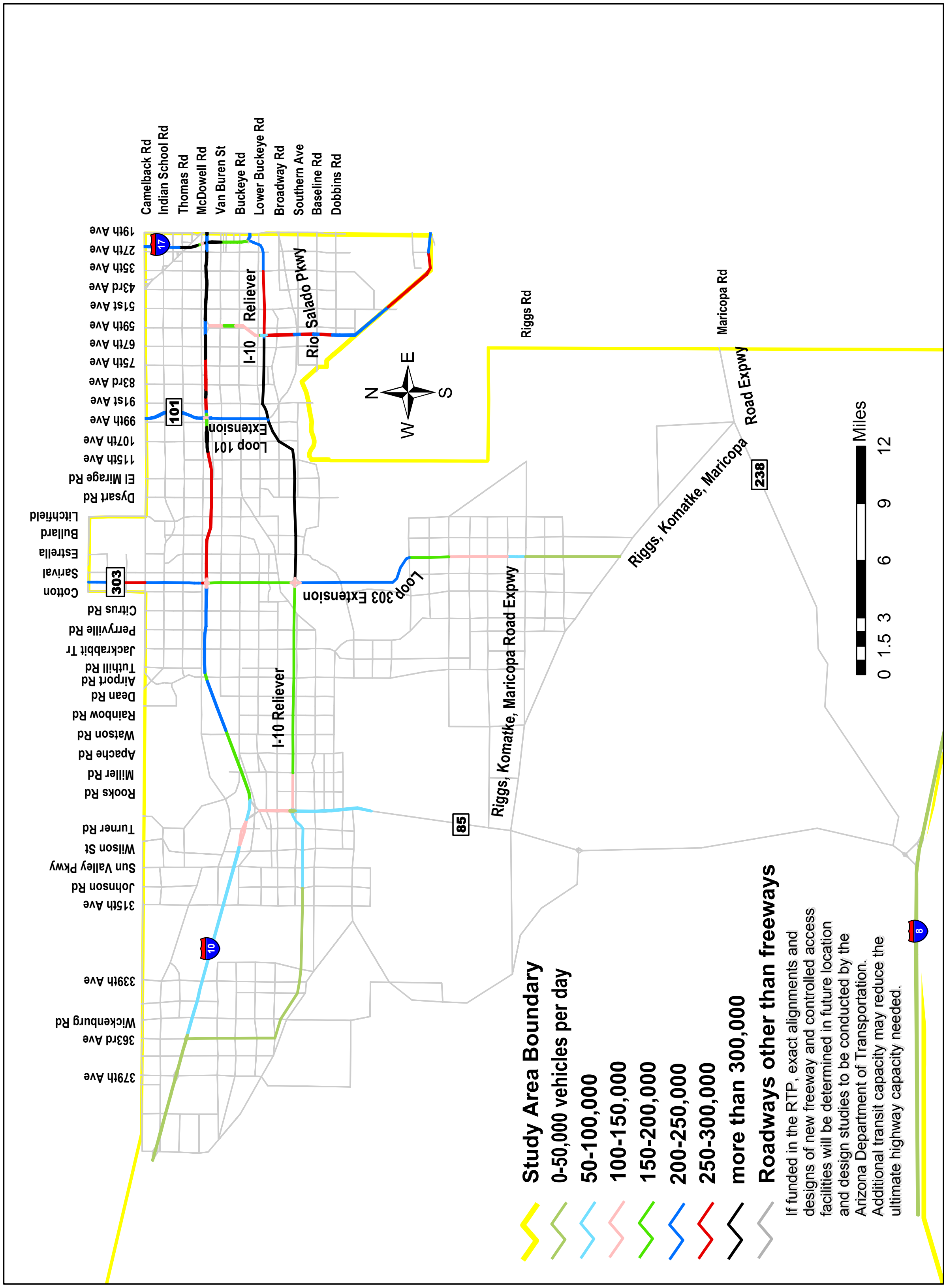

Figure 5-45
Off-Freeway Daily Traffic Volumes: Option C 2030

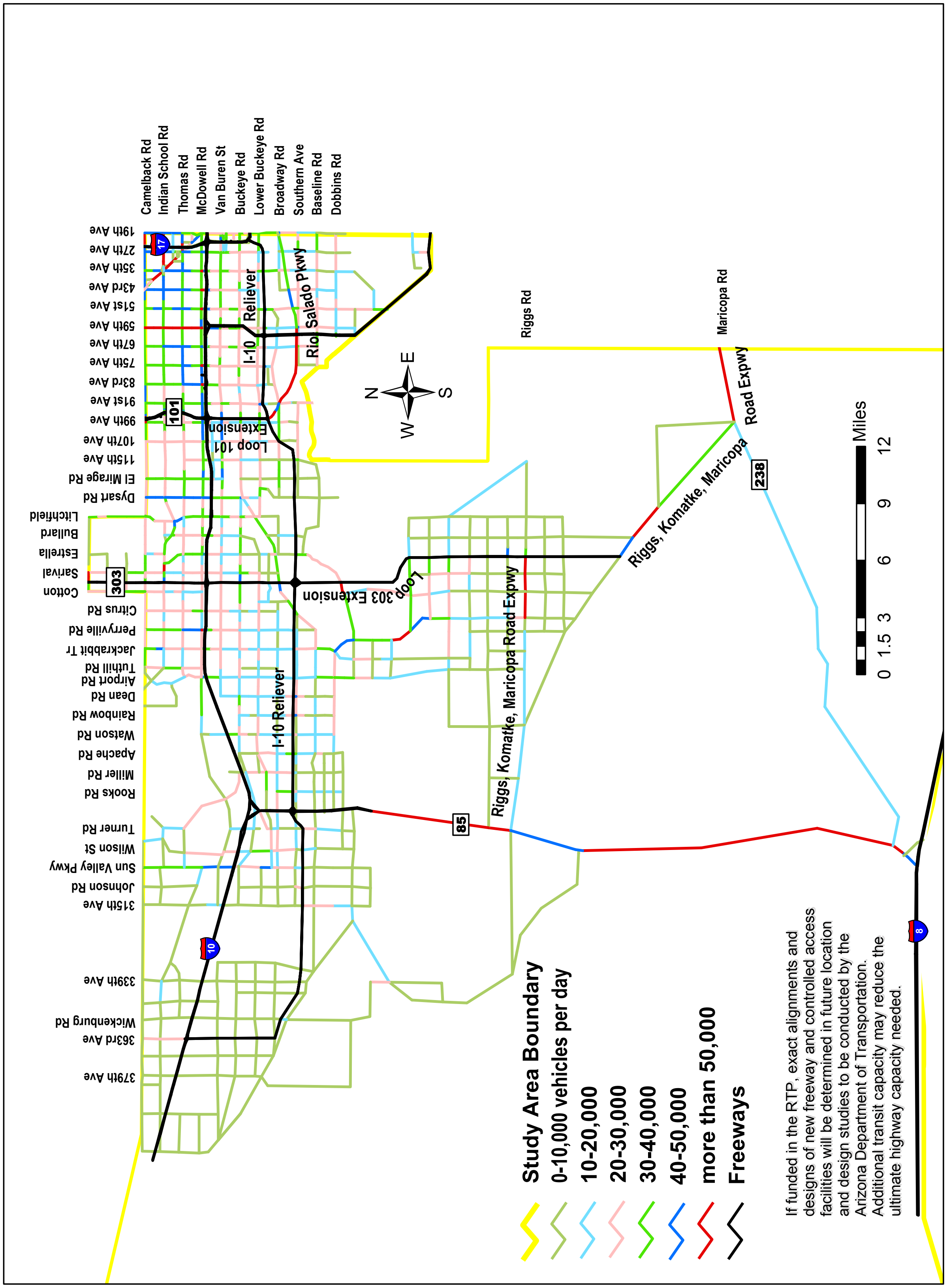

Figure 5-46
Freeway Daily Traffic Volumes: Future Base 2020

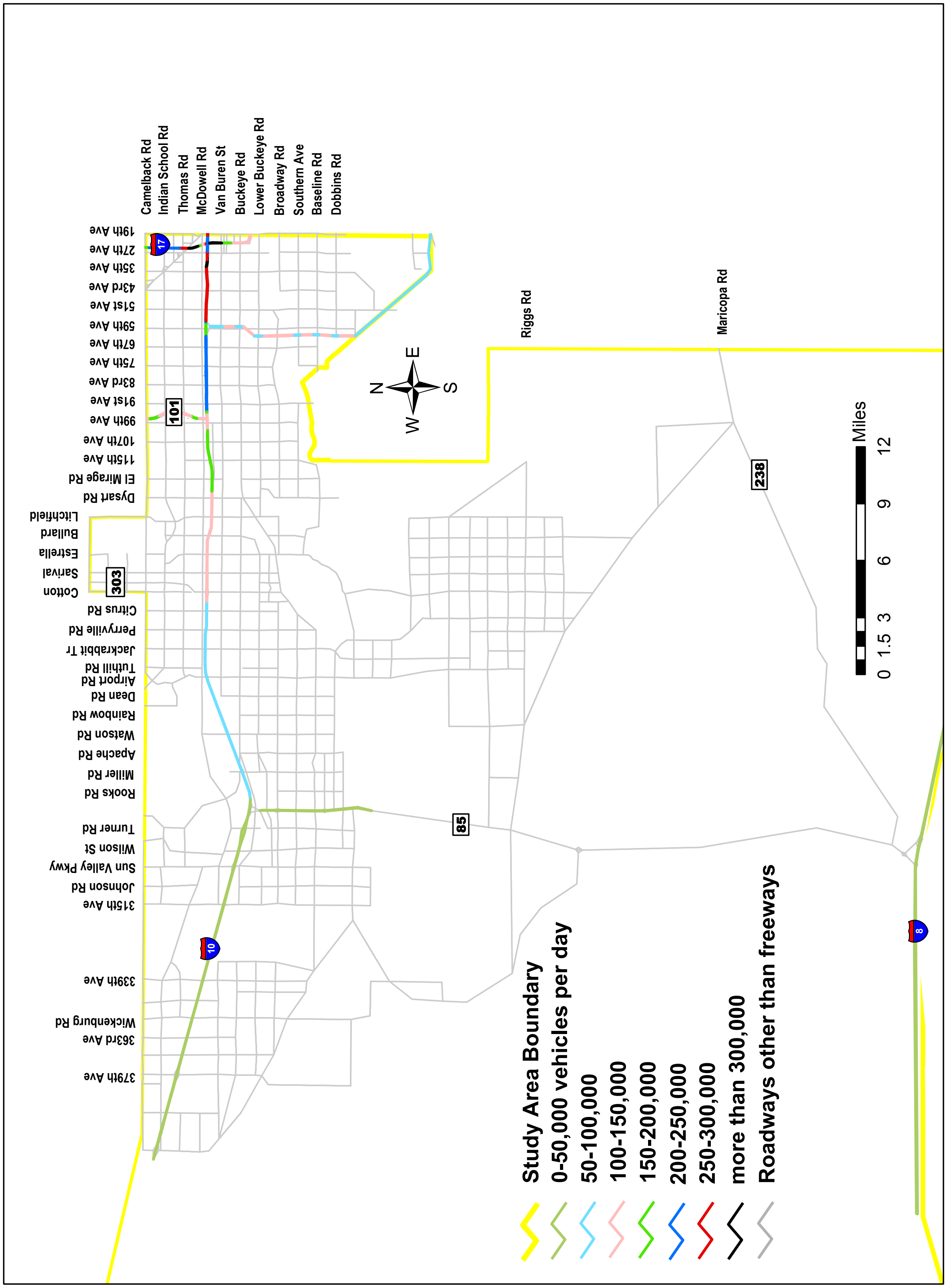

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Figure 5-47
Off-Freeway Daily Traffic Volumes: Future Base 2020

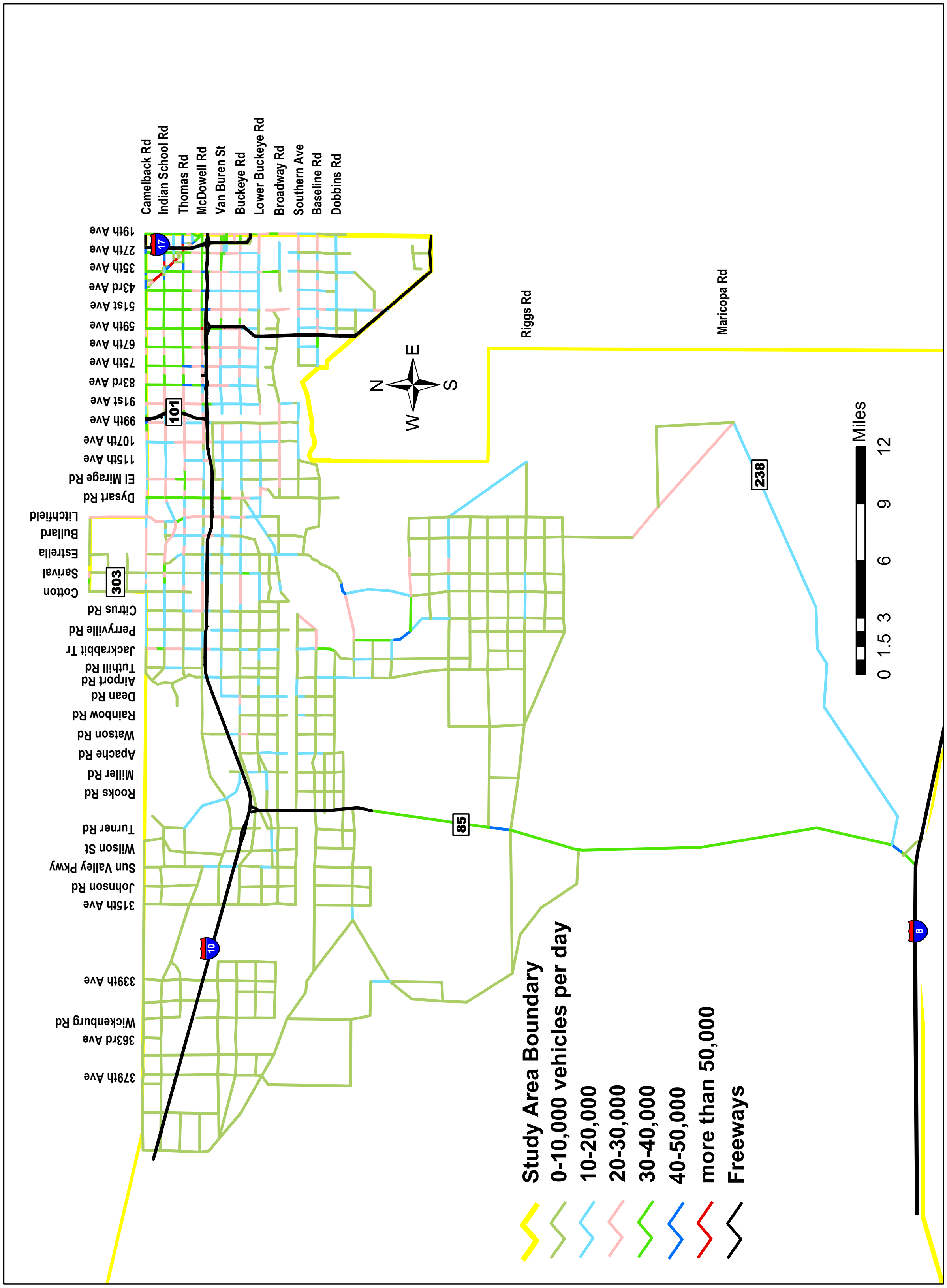

Figure 5-48
Freeway Daily Traffic Volumes: Enhanced 2020

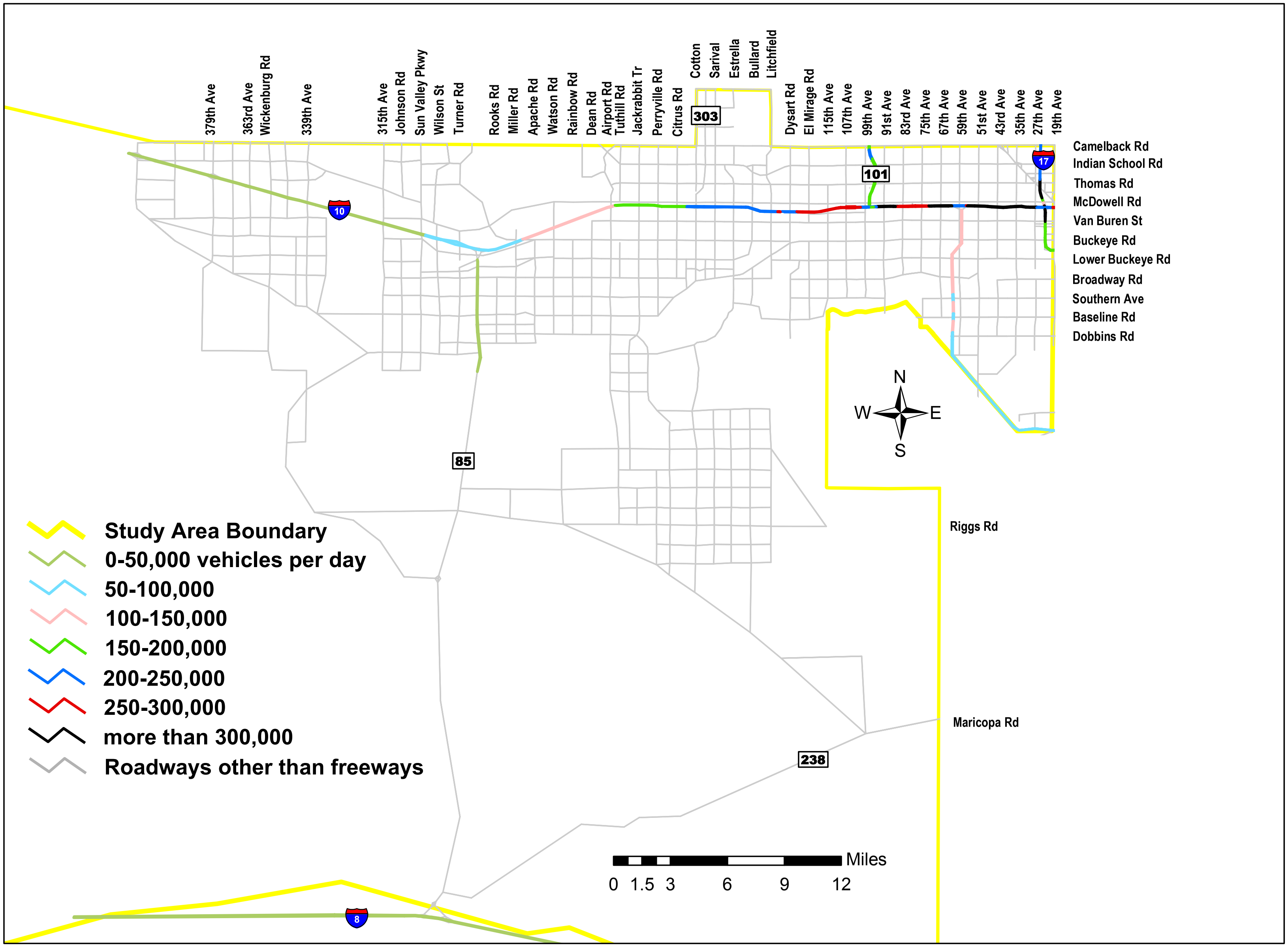

Figure 5-49
Off-Freeway Daily Traffic Volumes: Enhanced 2020

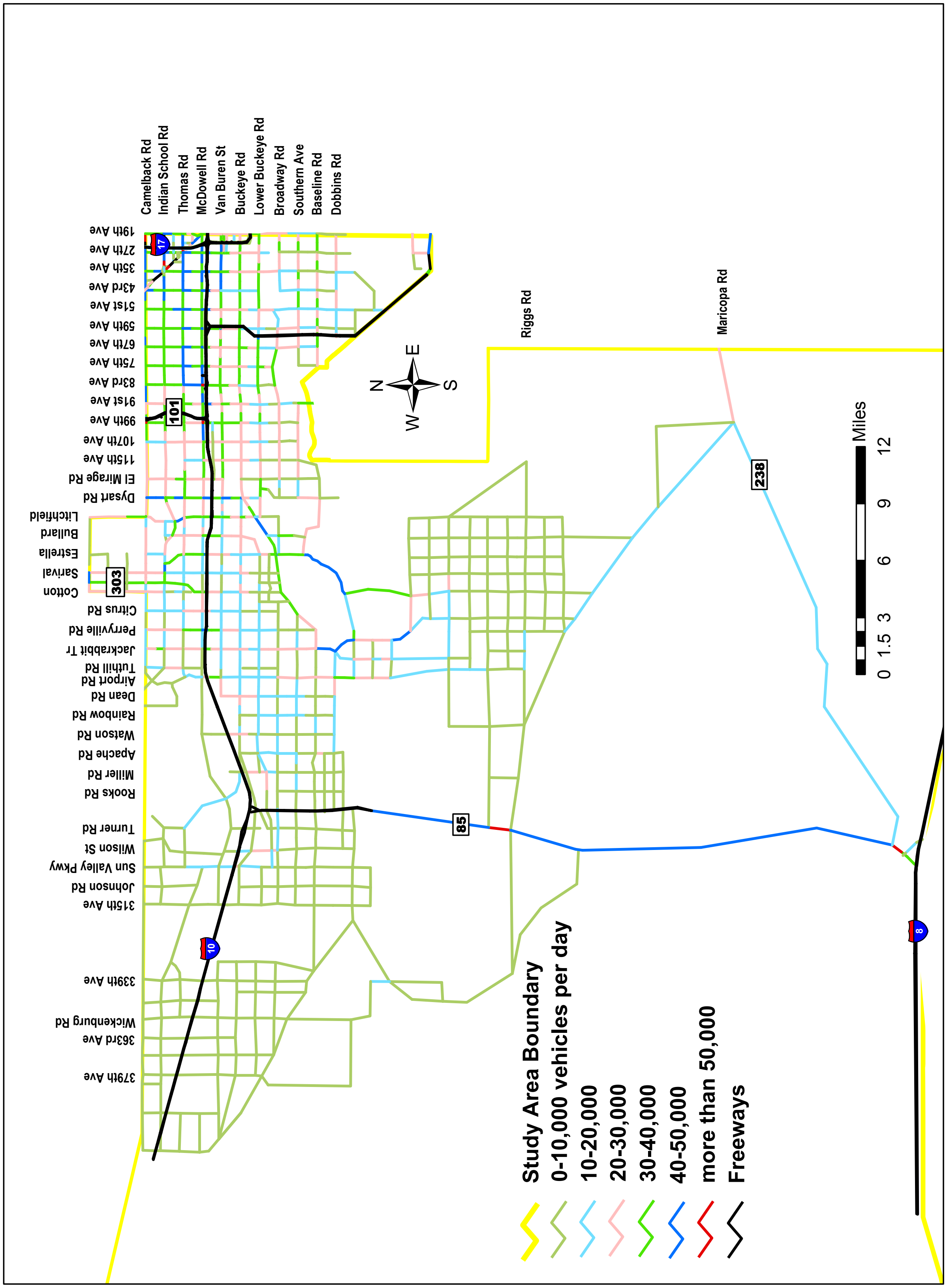

Figure 5-50
Freeway Daily Traffic Volumes: Option A 2020

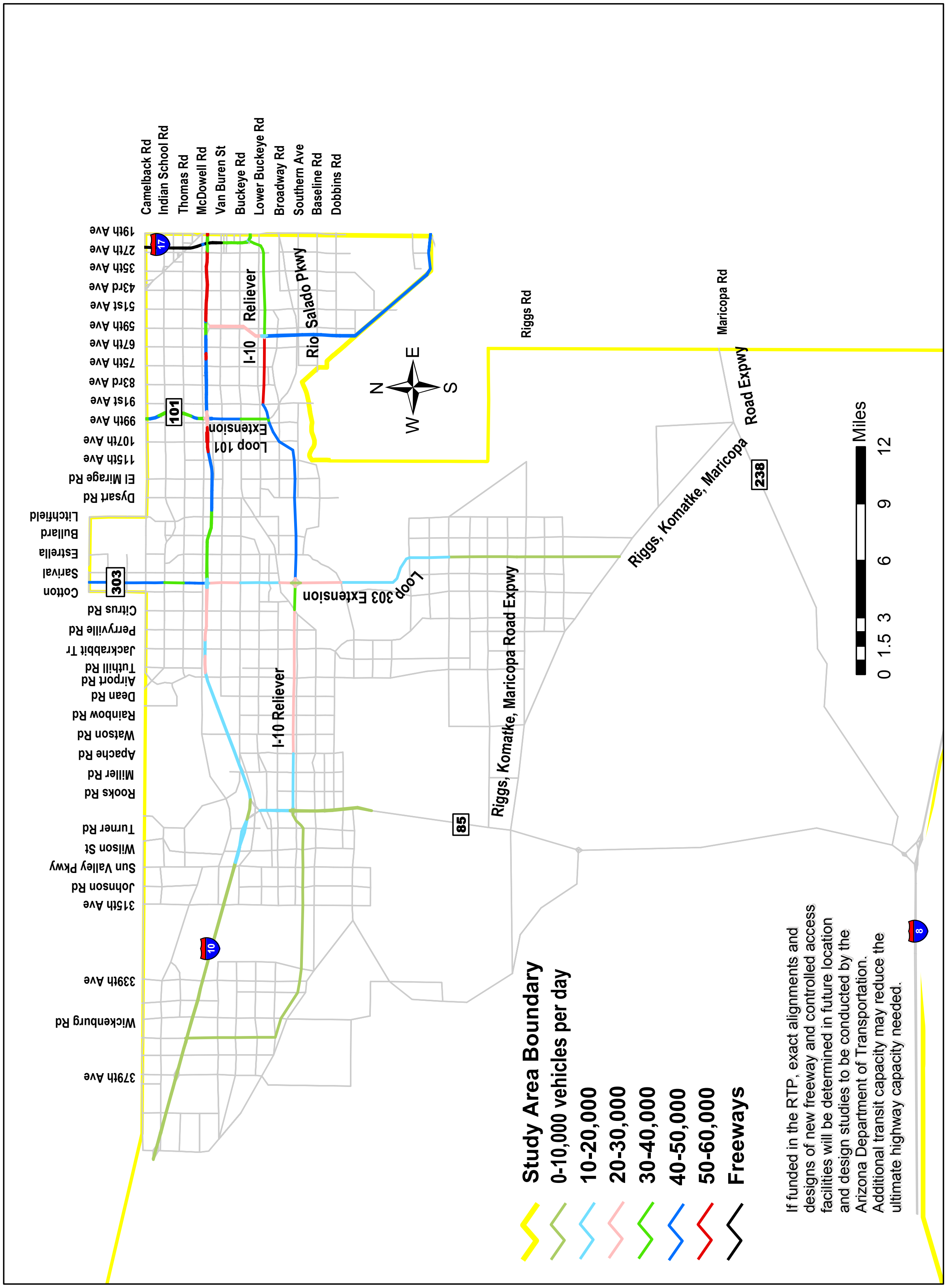

Figure 5-51
Off-Freeway Daily Traffic Volumes: Option A 2020

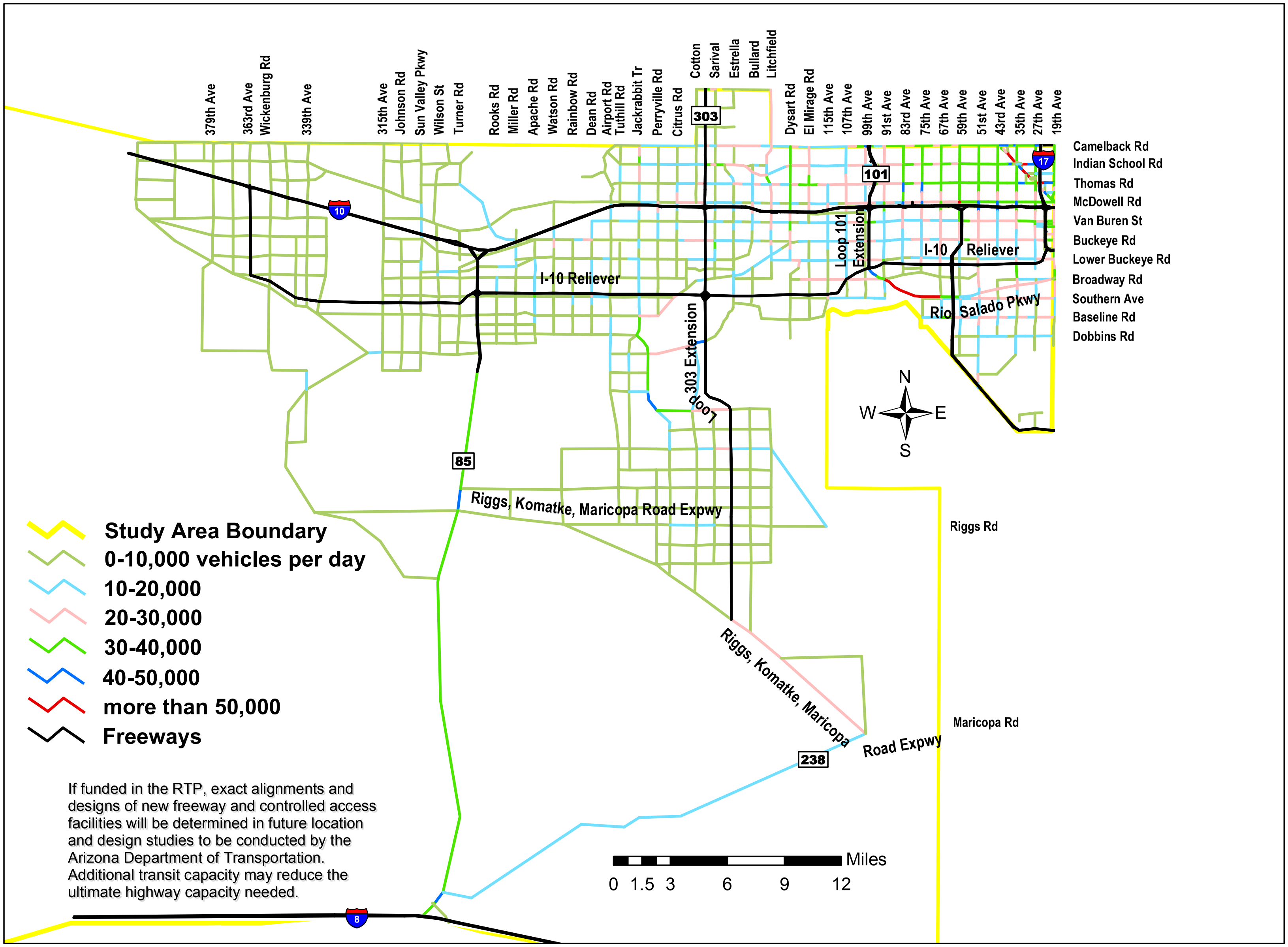

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Figure 5-52
Freeway Daily Traffic Volumes: Option C 2020

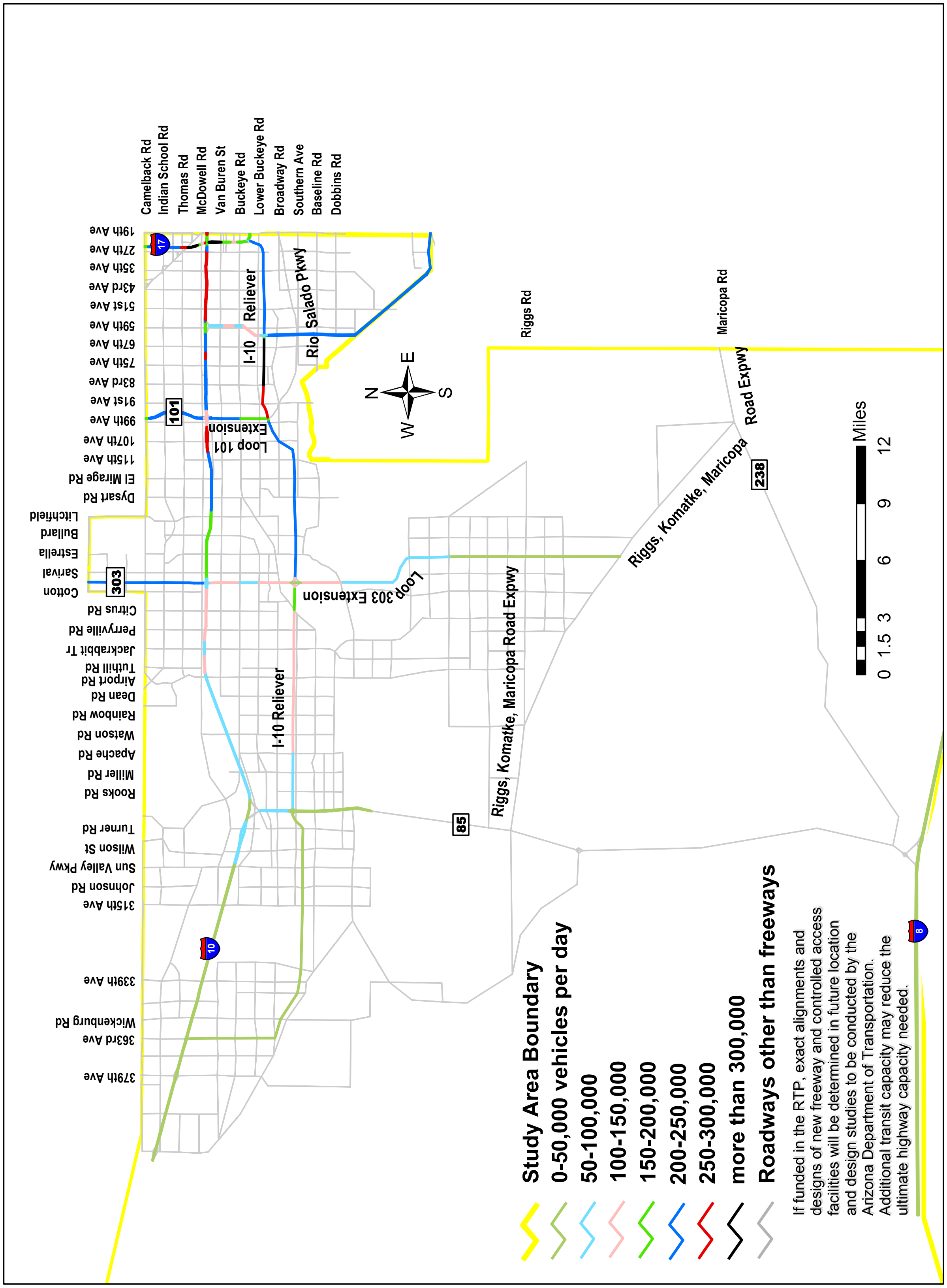


Figure 5-53
Off-Freeway Daily Traffic Volumes: Option C 2020

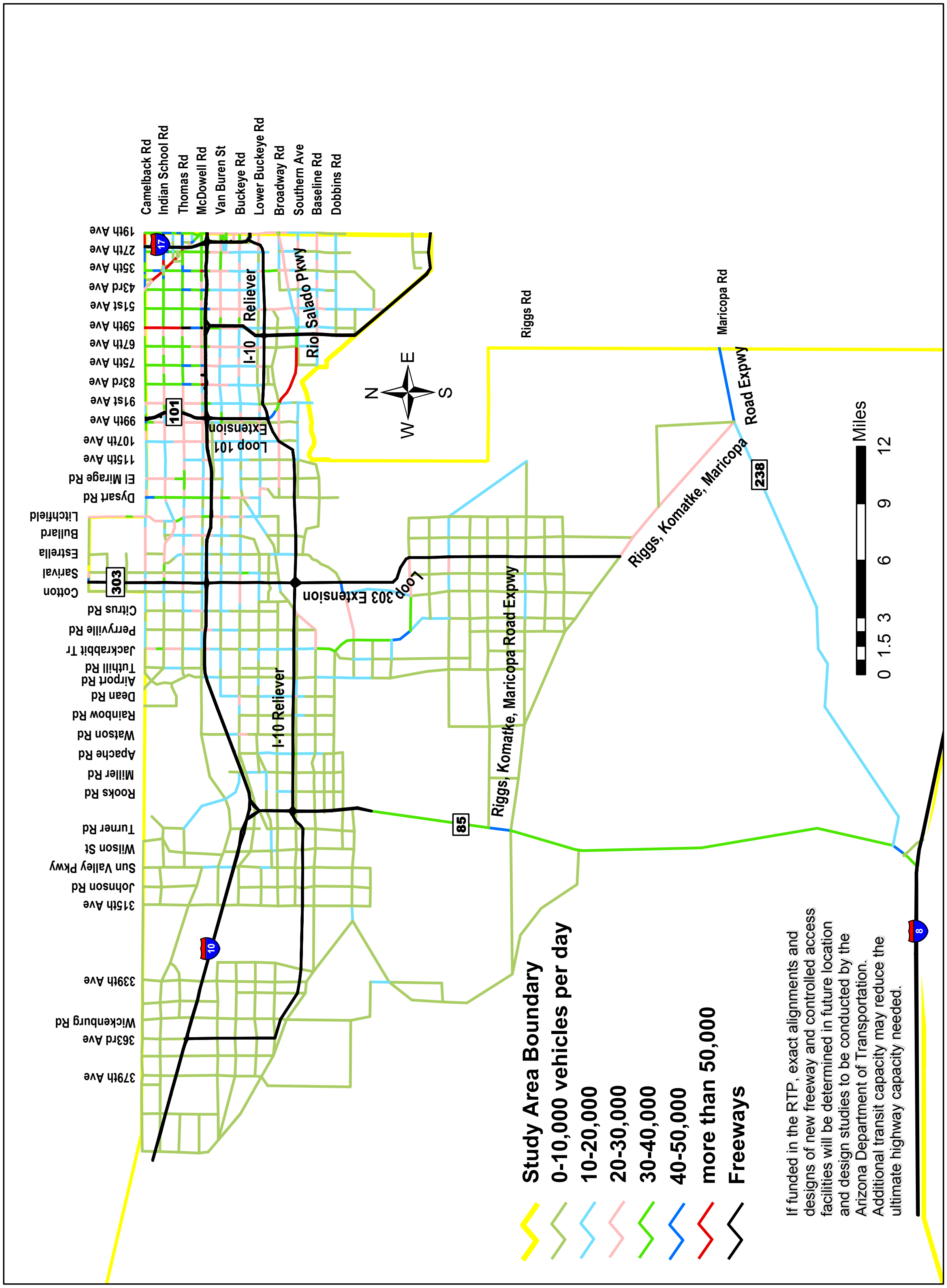


Figure 5-54
Peak Hour Vehicle Miles of Travel at LOS E or F in Year 2020

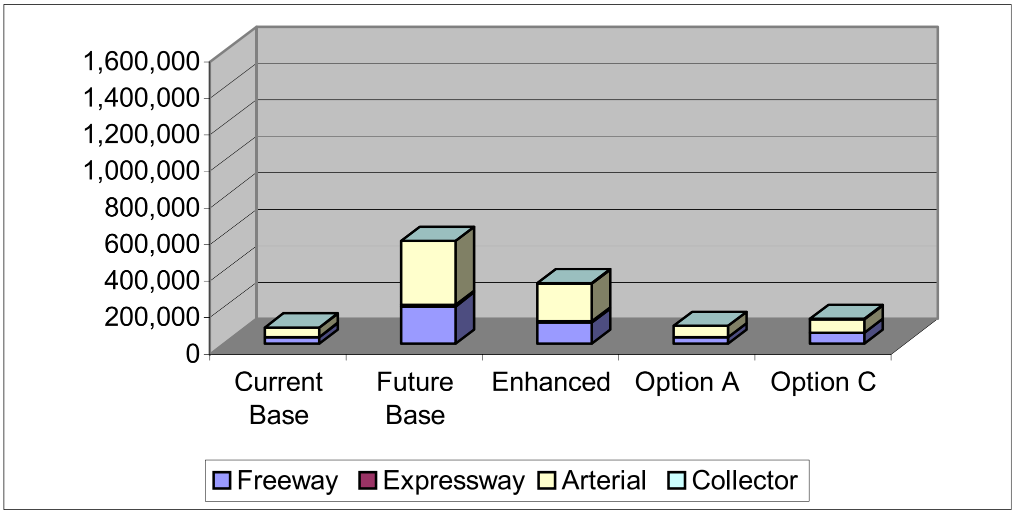


Figure 5-55
Percent of Peak Hour Vehicle Miles of Travel at LOS E or F in Year 2020

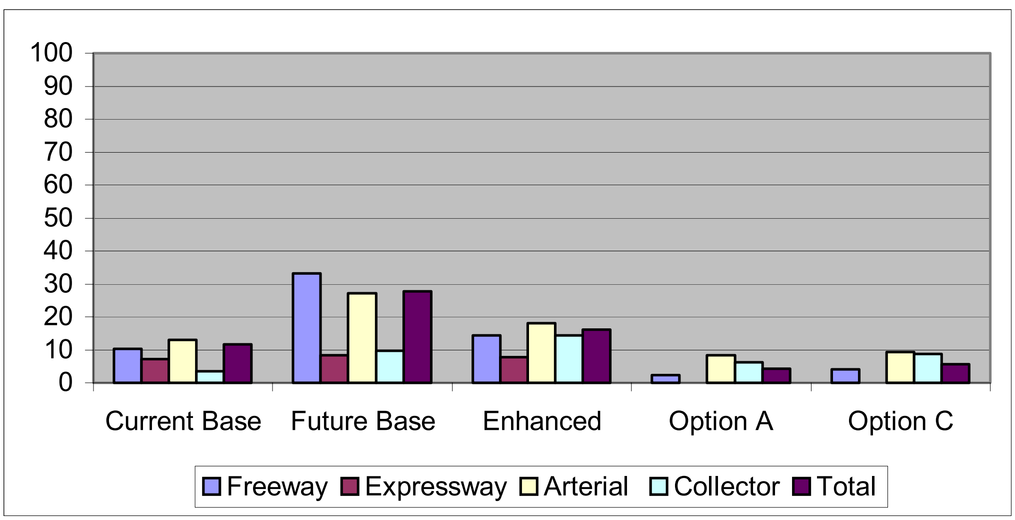


Figure 5-56
Peak Hour Vehicle Miles of Travel at LOS E or F in Year 2030

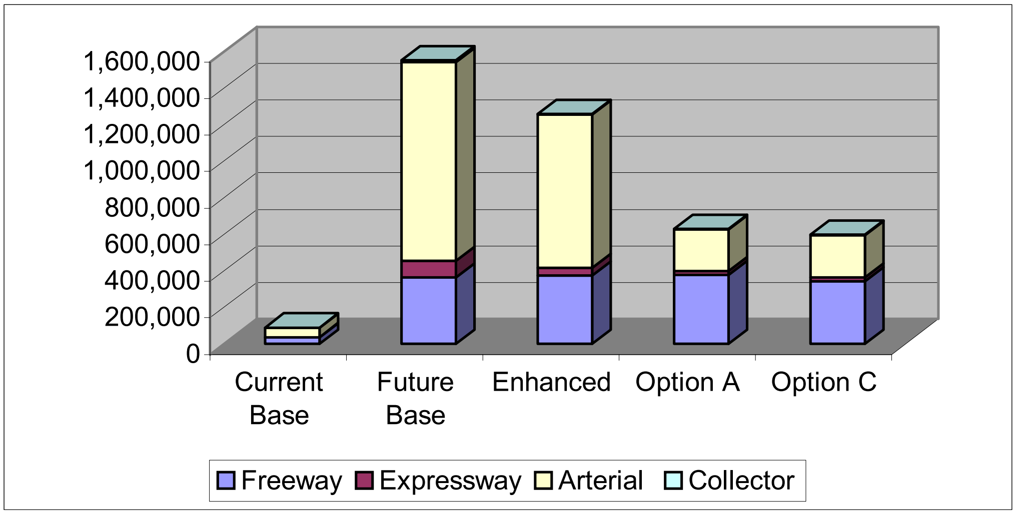
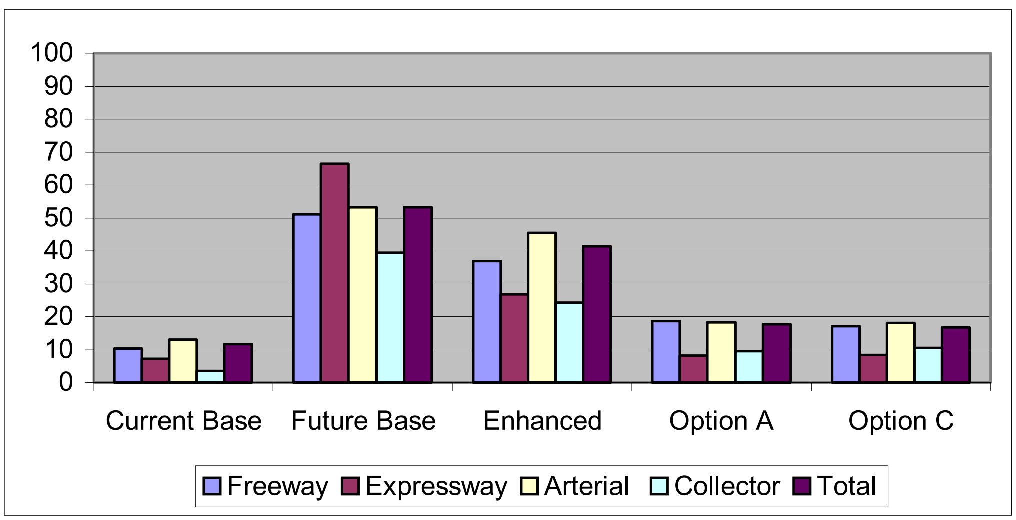


Figure 5-57
Percent of Peak Hour Vehicle Miles of Travel at LOS E or F in Year 2030



5.5.3.2 Miles of Congested Roadways in the Peak Hour

The number of miles of roadway expected to operate under congested conditions is another indicator of roadway performance. Figure 5-58 (and Table 5A-14 in Appendix V) presents the number of directional miles of roadway expected to operate at level-of-service (LOS) E or F during the evening peak hour in 2020 in the SWATS area under each of the modeled highway networks. Because evening peak hour traffic tends to be heavier in one direction than the other, each direction of travel on a roadway is treated independently in this analysis. A directional mile of roadway includes all lanes on a single roadway traveling in the same direction. Thus a six lane highway one mile in length with three lanes in each direction is two directional roadway miles in length.

Figure 5-58 indicates that there are 75 directional miles of roadway in the Current Base network operating under congested conditions in the evening peak hour. Figure 5-59 (and Table 5A-15 in Appendix V) shows that this is approximately 4% of all the directional miles of roadway included in the Current Base network. In 2020 under the Future Base network, 255 directional miles (or 10% all directional miles) are forecast to operate under congested conditions in the evening peak hour. Nearly 20% of freeway mileage is expected to be congested.

This situation improves remarkably under the Enhanced network. The number of directional miles of roadway operating under congested conditions in the evening peak hour in 2020 drops to 145 (6% of total roadway mileage). This is largely attributable to the addition of 70 lane miles of HOV lanes and 200 miles of general purpose freeway lanes. (See Figure 5-14.) The number of congested directional miles of arterials drops substantially, despite little change in the number of arterial lane miles. Travel is clearly being diverted from the congested arterials in response to the addition of freeway lane mileage. Nonetheless, the percentage of total directional miles operating under congested conditions still exceeds the Current Base.

Under Option A and Option C the number of directional miles of congested roadways in the evening peak hour in 2020 drops by about 100 compared to the Enhanced network. The percentage of congested roadway miles drops to 2%, below that of the Current Base. The number of congested directional miles of arterials shows the most dramatic improvement in response to the additional 1000 lane miles of roadway included in Option A and Option C compared to the Enhanced network.

The increases in traffic expected by 2030 result in a substantial increase in the number of directional miles of roadway forecast to operate under congested conditions in the evening peak hour. A comparison of Figures 5-58 and 5-60 (and Tables 5A-14 and 5A-16 in Appendix V) shows that from 2020 to 2030 the directional miles in the Future Base network operating under congested conditions in the evening peak hour triples to 749 miles. This is 29% of the directional mileage included in the Future Base network, as shown in Figure 5-61 (and Table 5A-17 in Appendix V).

The additional 350 lanes miles of roadway added to the Future Base network in the Enhanced network reduces the number of congested directional miles in 2030 to 582 or 22% of network mileage. This is a fourfold increase over the number of congested directional miles in 2020 on the same network. The subsequent addition of 1000 more lanes miles of roadway under the Option A and Option C networks leaves 200 miles of directional roadway mileage in these networks operating under congested conditions in the evening peak hour. The number of congested directional miles of roadway under the Option A and Option C networks in 2030 is about 4 times the number forecast for the year 2020. The percent of directional miles in the Option A and Option C networks forecast to operate under congested conditions in the evening peak hour is 7%, compared to the 4% in the

Current Base.

Figures 5-62 through 5-70 show levels of service for the Current Base, 2020, and 2030 forecasts for the Future Base, Enhanced, Option A, and Option C networks. These figures demonstrate that there are fewer locations of LOS E and F under the Option A and Option C networks than under the Future Base and Enhanced networks.

Figure 5-58
Directional Miles of Highway at LOS E or F in the Peak Hour - Year 2020

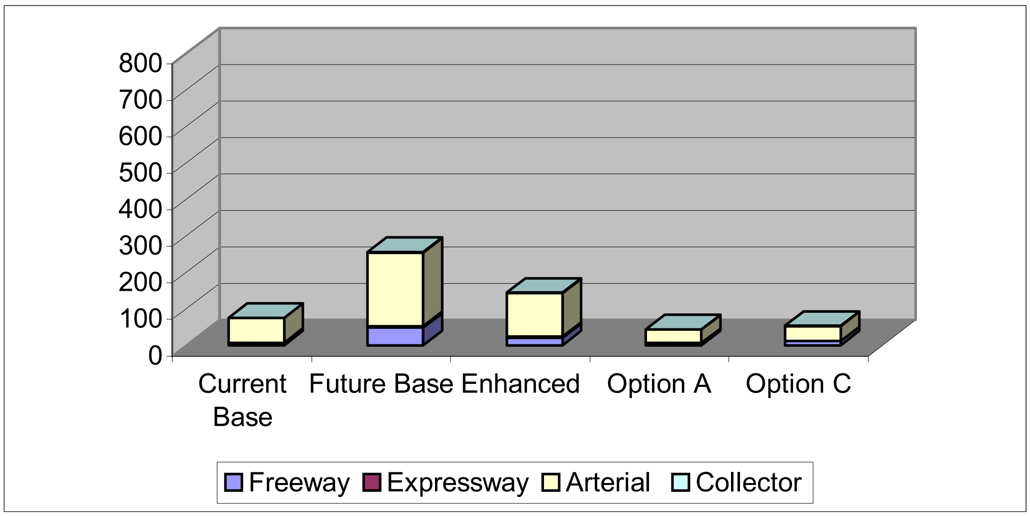


Figure 5-59
Percent of Directional Miles of Highway at LOS E or F in the Peak Hour - Year 2020

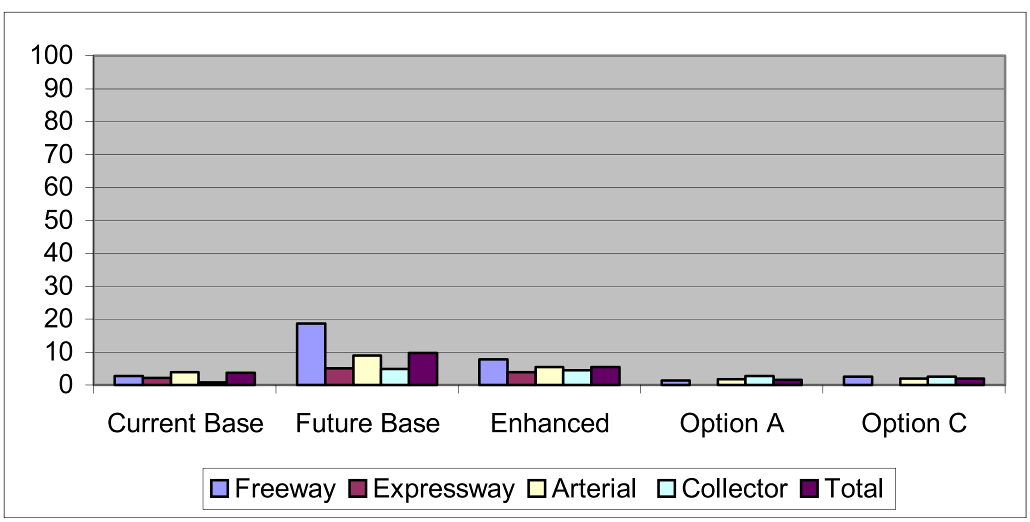


Figure 5-60
Directional Miles of Roadway at LOS E or F in the Peak Hour - Year 2030

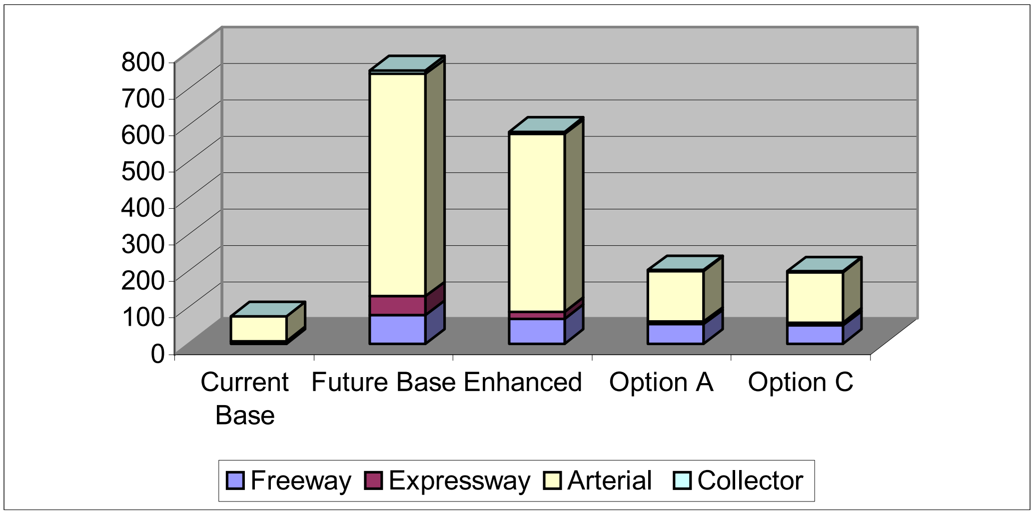


Figure 5-61
Percent of Directional Miles of Roadway at LOS E or F in the Peak Hour - Year 2030

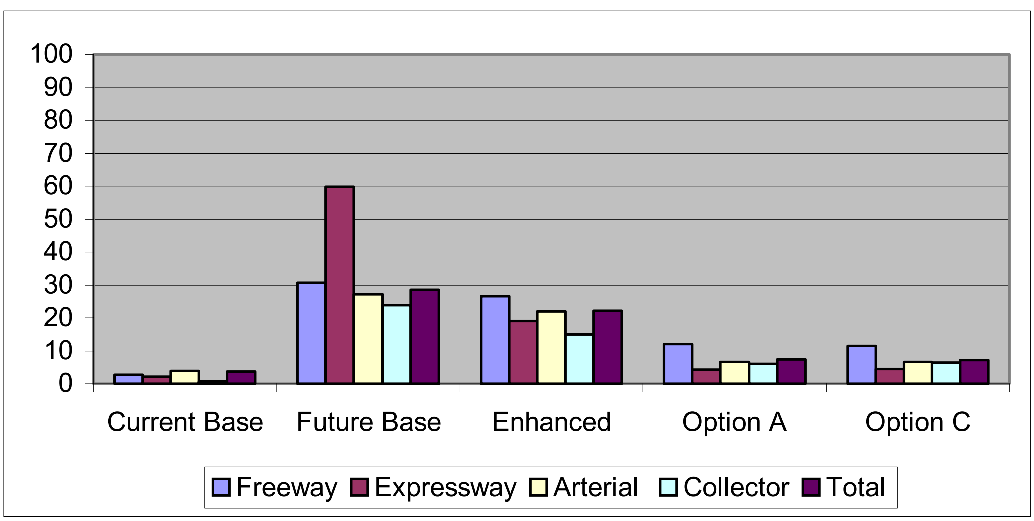


Figure 5-62
Roadway Level-of-Service: Current Base 2002

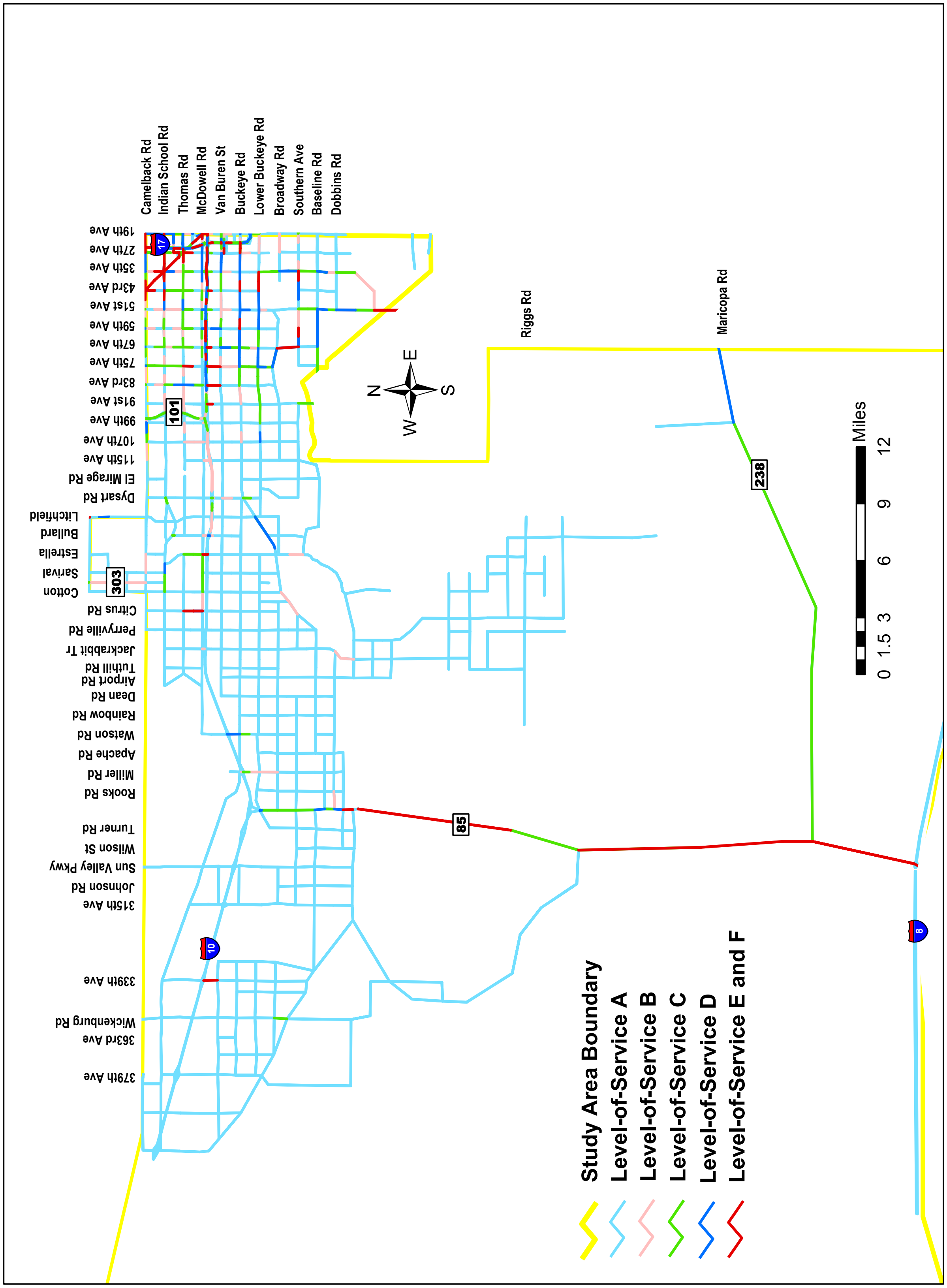


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Figure 5-63
Roadway Level-of-Service: Future Base 2030

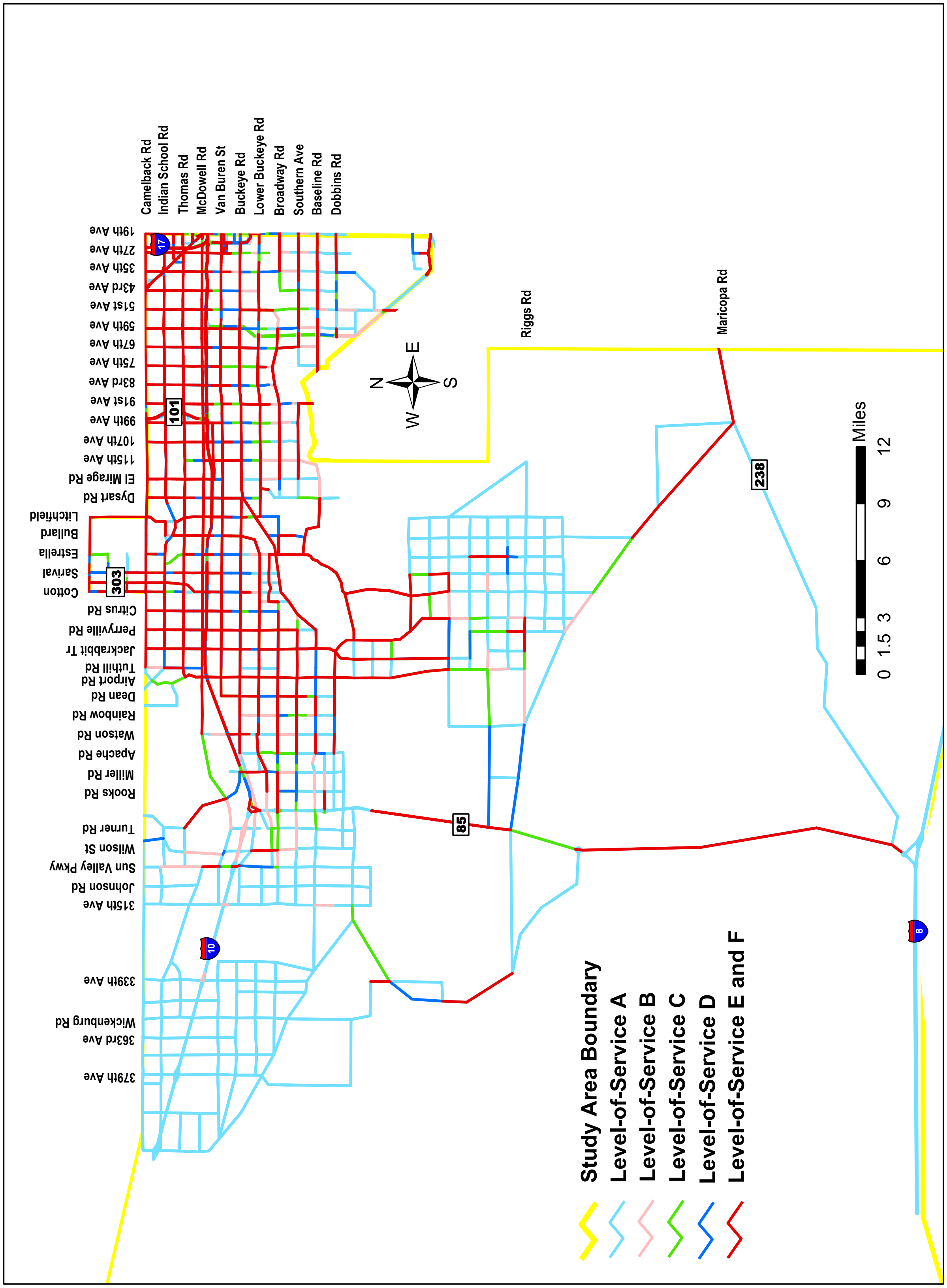

Figure 5-64
Roadway Level-of-Service: Enhanced 2030

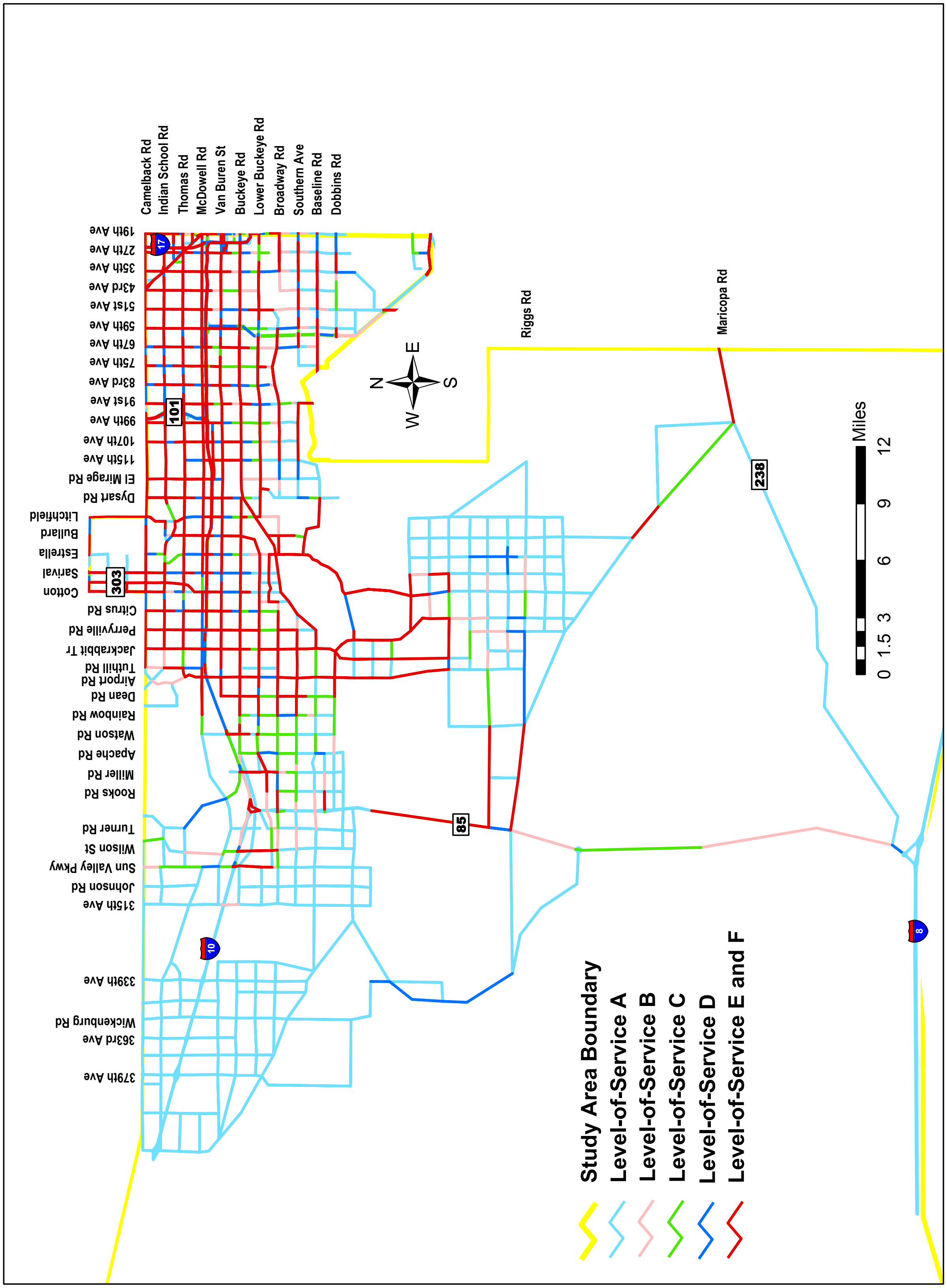

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Figure 5-65
Roadway Level-of-Service: Option A 2030

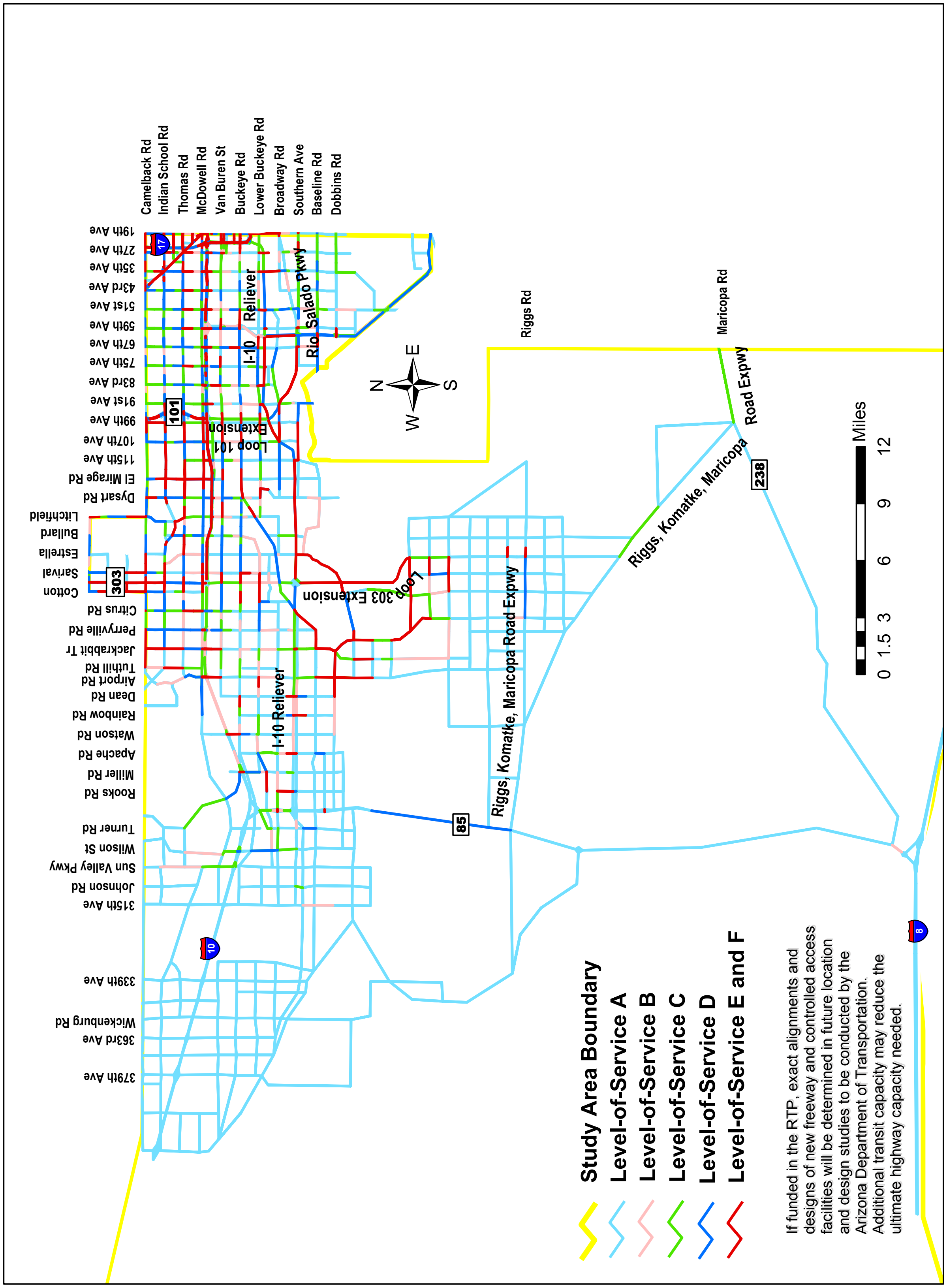

Figure 5-66
Roadway Level-of-Service: Option C 2030

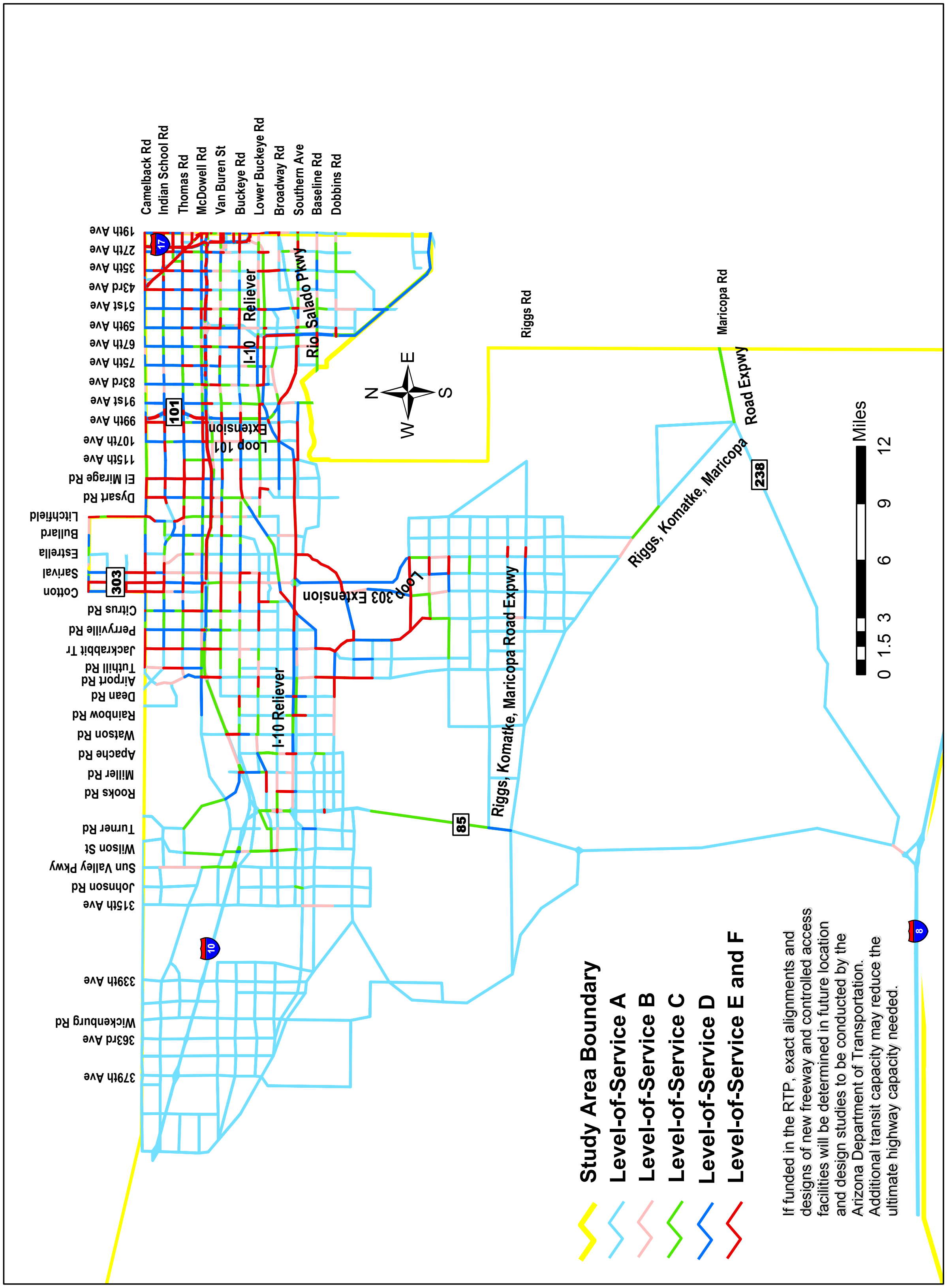

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Figure 5-67
Roadway Level-of-Service: Future Base 2020

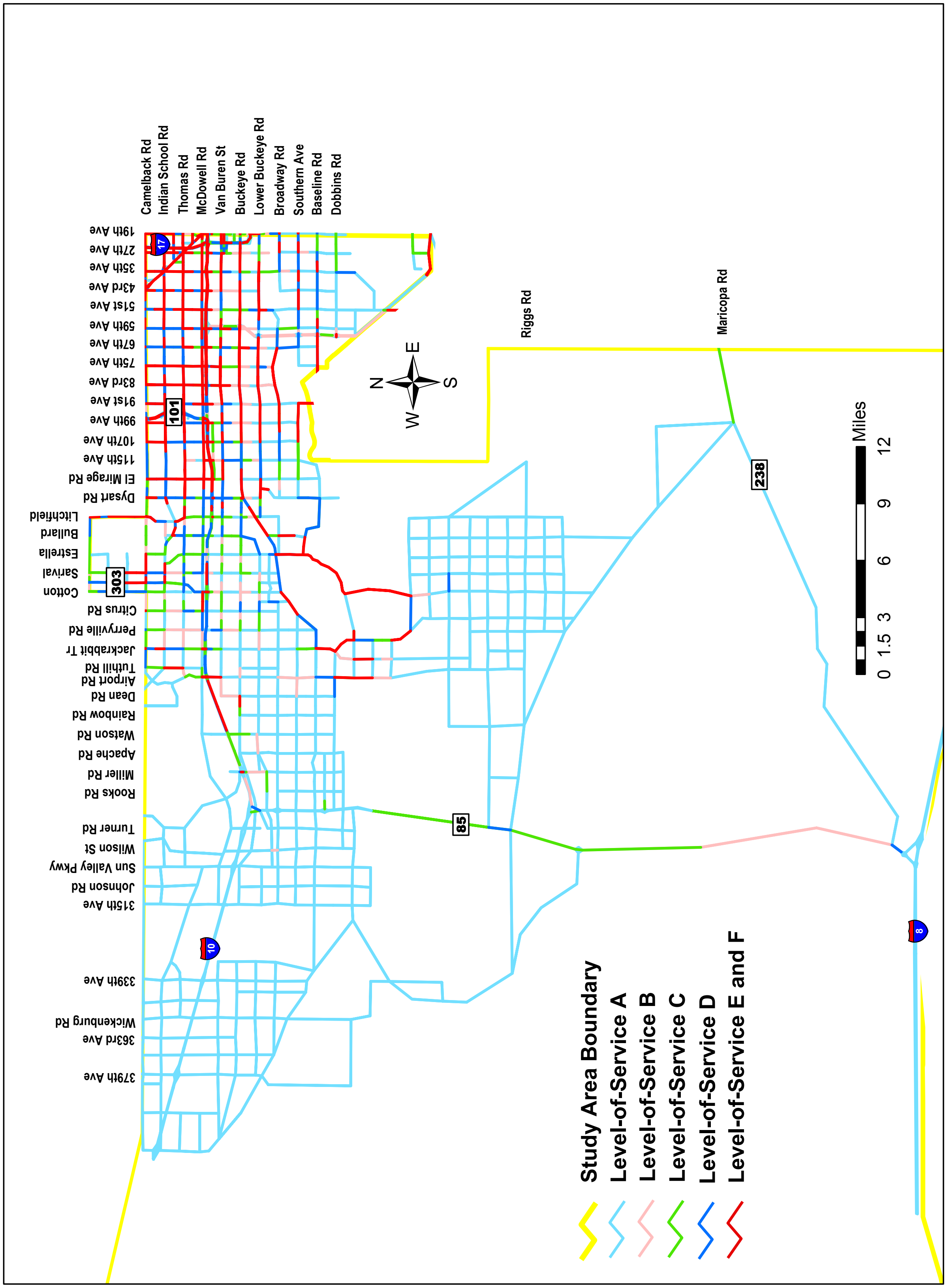


Figure 5-68
Roadway Level-of-Service: Enhanced 2020

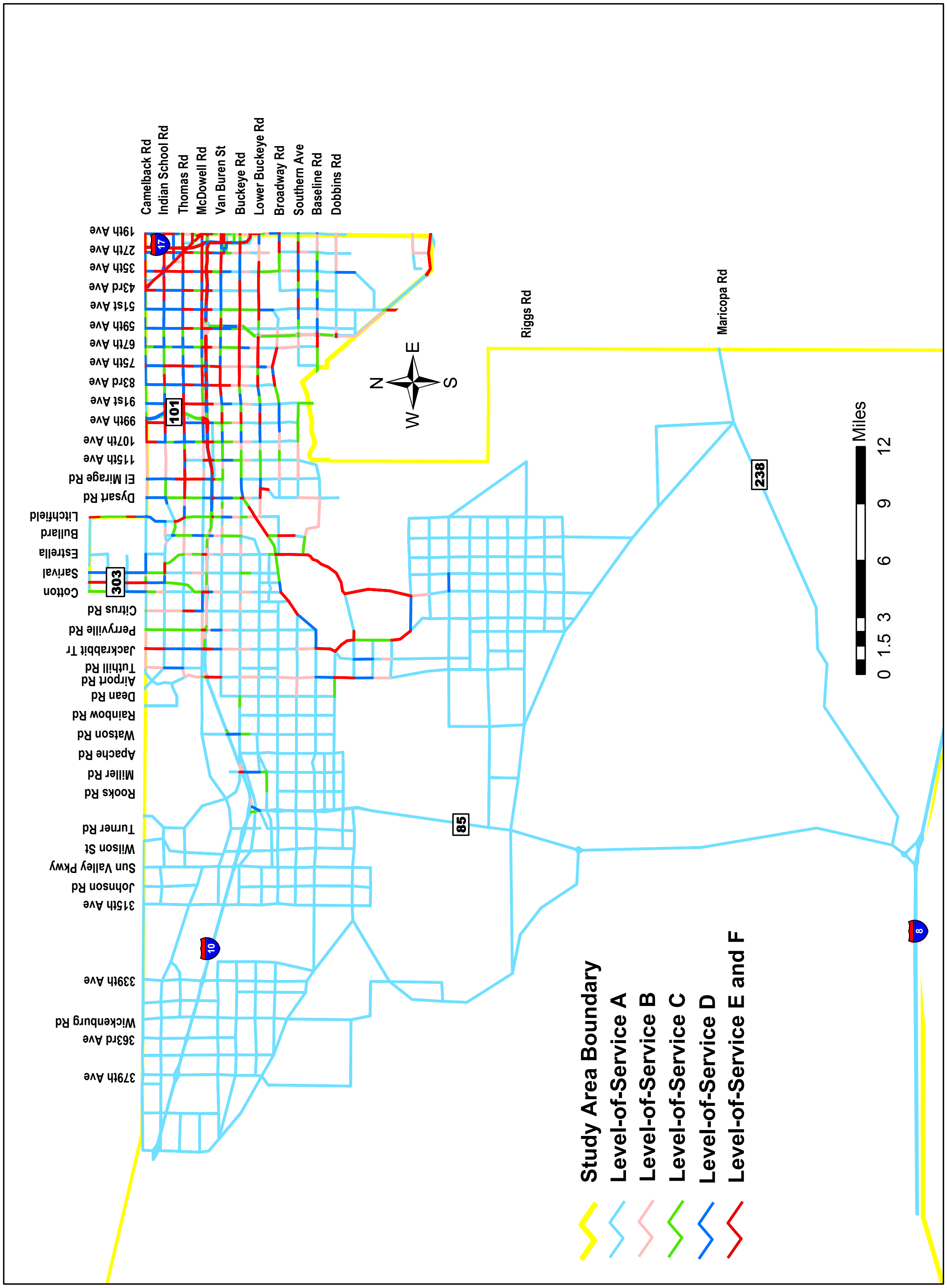


Figure 5-69
Roadway Level-of-Service: Option A 2020

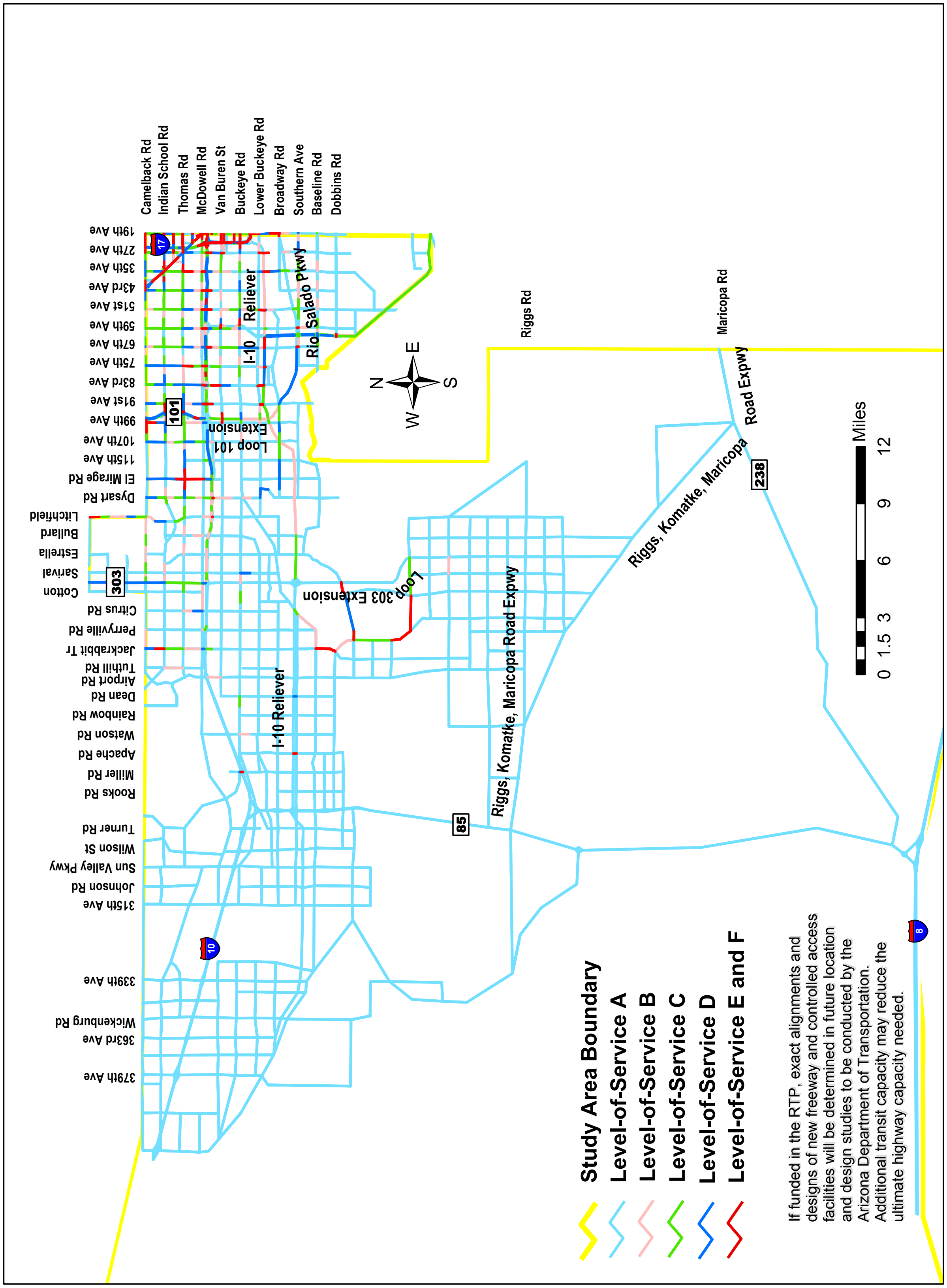
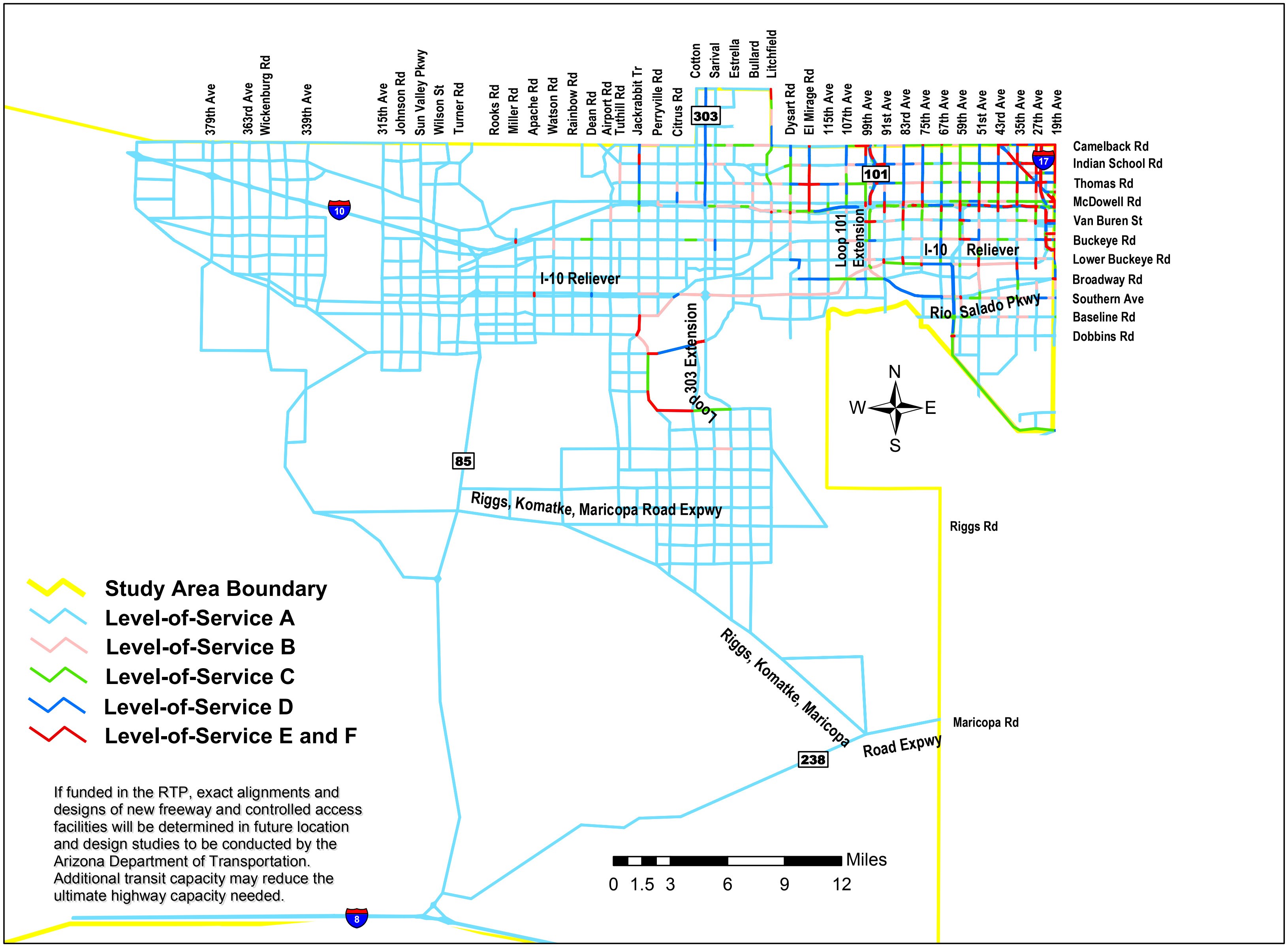


Figure 5-70
Roadway Level-of-Service: Option C 2020



If funded in the RTP, exact alignments and designs of new freeway and controlled access facilities will be determined in future location and design studies to be conducted by the Arizona Department of Transportation. Additional transit capacity may reduce the ultimate highway capacity needed.

5.5.3.3 Intersection Congestion

For streets other than freeways, the ability to move traffic in urbanized areas is generally limited by the capacity of intersections. Traffic conflicts result from vehicles traveling in different directions. These conflicts are most pernicious at intersections. Thus, traffic is most heavily controlled at intersections with consequential reductions in roadway capacity at intersections.

The level-of-service (LOS) was evaluated at a number of intersections in each of the highway networks modeled for the SWATS. The level-of-service is based on an estimate of the delay that the average vehicle entering the intersection will encounter, if the entering vehicle is on an approach subject to traffic control such as a traffic signal or stop sign. LOS E and F are considered to have unacceptable amounts of delay. Under LOS E average delay is between 55 and 80 seconds. Under LOS F average delay exceeds 80 seconds. For the SWATS, intersection levels-of-service E and F are considered unacceptable.

The study area was divided into four subareas for this analysis. The east subarea is the portion of the study area east of the Agua Fria River, where existing development and development pressure is the most intense. The central subarea is west of the Agua Fria River and represents the area primed for the most intense development after the east area approaches build out. The west subarea (west of SR-85) and the south subarea (west of the Agua Fria River and south of the Gila River) represent the subareas where intense levels of development pressure can be expected in the longer term as the central subarea approaches build out.

Figure 5-71 (and Table 5A-18 in Appendix V) shows that most of the intersections expected to experience unacceptable amounts of delay in 2020 occur in the east subarea, with a few in the central subarea. Hardly any occur in the west and south subareas. Figure 5-72 (and Table 5A-19 in Appendix V) shows that the percent of intersections expected to operate with unacceptable amounts of delay in 2020 is over 40% under the Future Base network, slightly below 40% under the Enhanced network and about 20% under the Option A and Option C networks. The Option A and Option C networks have higher amounts of travel taking place on freeways where there are no intersections.

Figures 5-73 and 5-74 (and Tables 5A-20 and 5A-21 in Appendix V) show the intersection data forecast for 2030. While there are a few in the south and west subareas, the bulk of the intersections forecast for unacceptable levels of delay are still located in the east and central subareas. Figure 5-74 shows that nearly 70% of the intersections in the east and central subareas are forecast to experience unacceptable levels of delay in the Future Base network. These percentages are somewhat improved under the Enhanced network, but the Option A and Option C networks enjoy substantial improvement, with only about 40% of the intersections in the east subarea and 20% in the central subarea experiencing unacceptable levels of delay.

Figures 5-75 through 5-79 show the level-of-service at intersections under the Current Base network in 2002 and under the Future Base, Enhanced, Option A, and Option C networks in 2030. The 2020 levels-of-service for these networks are shown on Figures 5-80 through 5-83, respectively. The figures demonstrate the higher preponderance of intersections with poor traffic service in the eastern and central subareas.

Figure 5-71
Number of Intersections Operating at Level-of-Service E or F in the Peak Hour in Year 2020

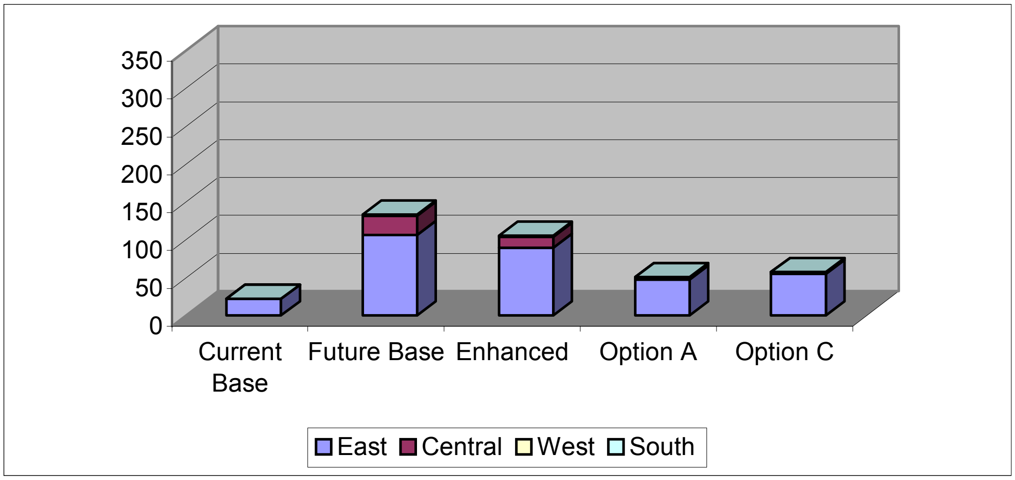


Figure 5-72
Percent of Intersections Analyzed Operating at Level-of-Service E or F in the Peak Hour in Year 2020

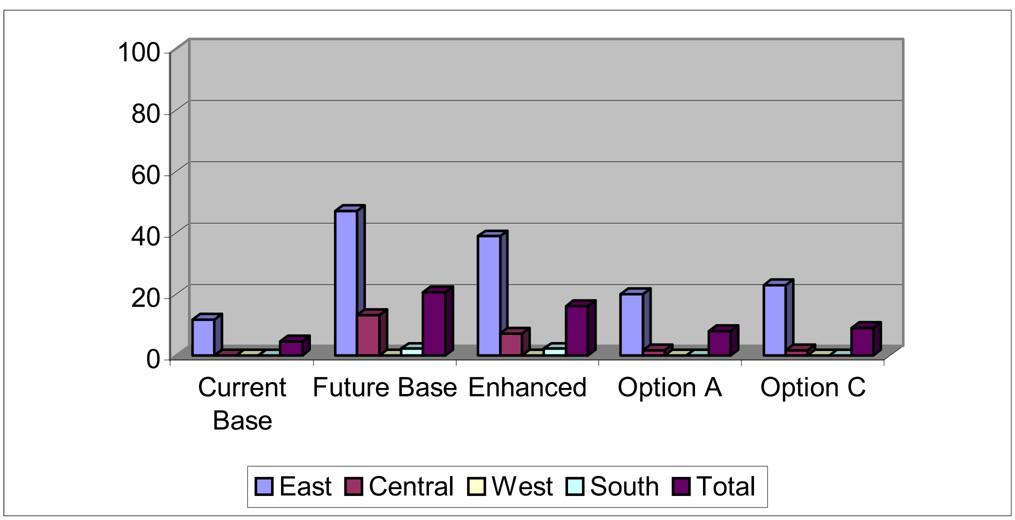


Figure 5-73
Number of Intersections Operating at Level-of-Service E or F
in the Peak Hour in Year 2030

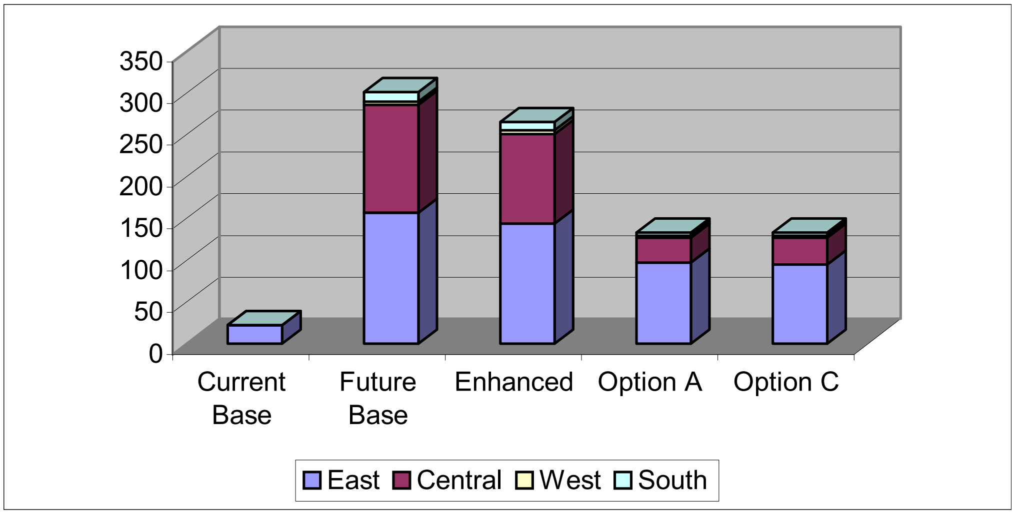


Figure 5-74
Percent of Intersections Analyzed Operating at Level-of-Service
E or F in the Peak Hour in Year 2030

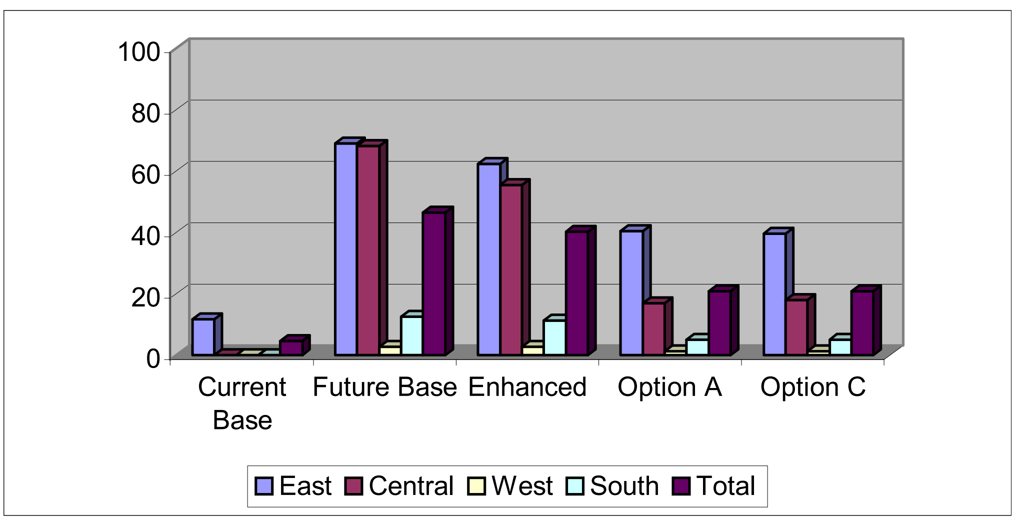


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Figure 5-75
Intersection Level-of-Service: Current Base 2002

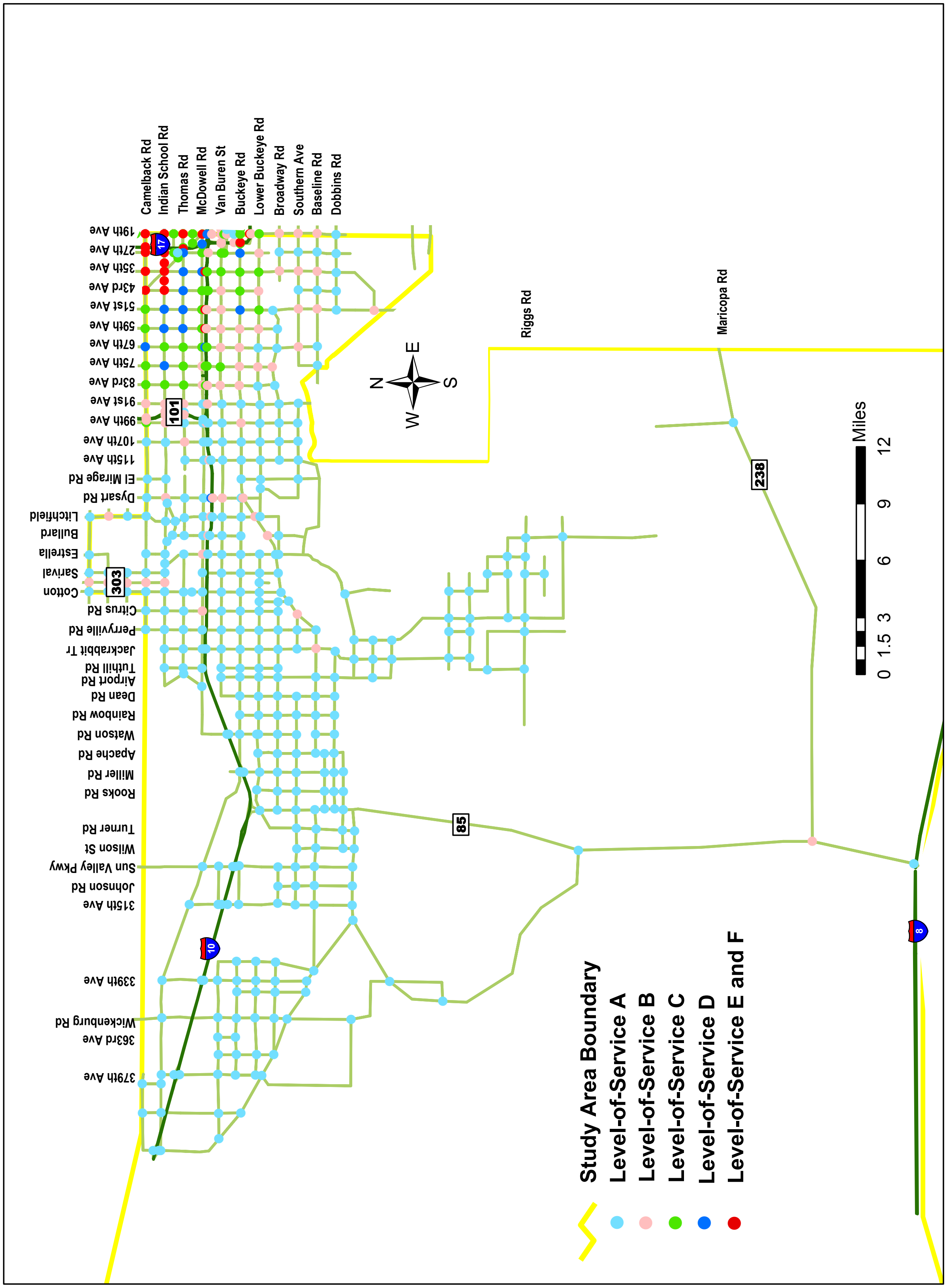

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Figure 5-76
Intersection Level-of-Service: Future Base 2030

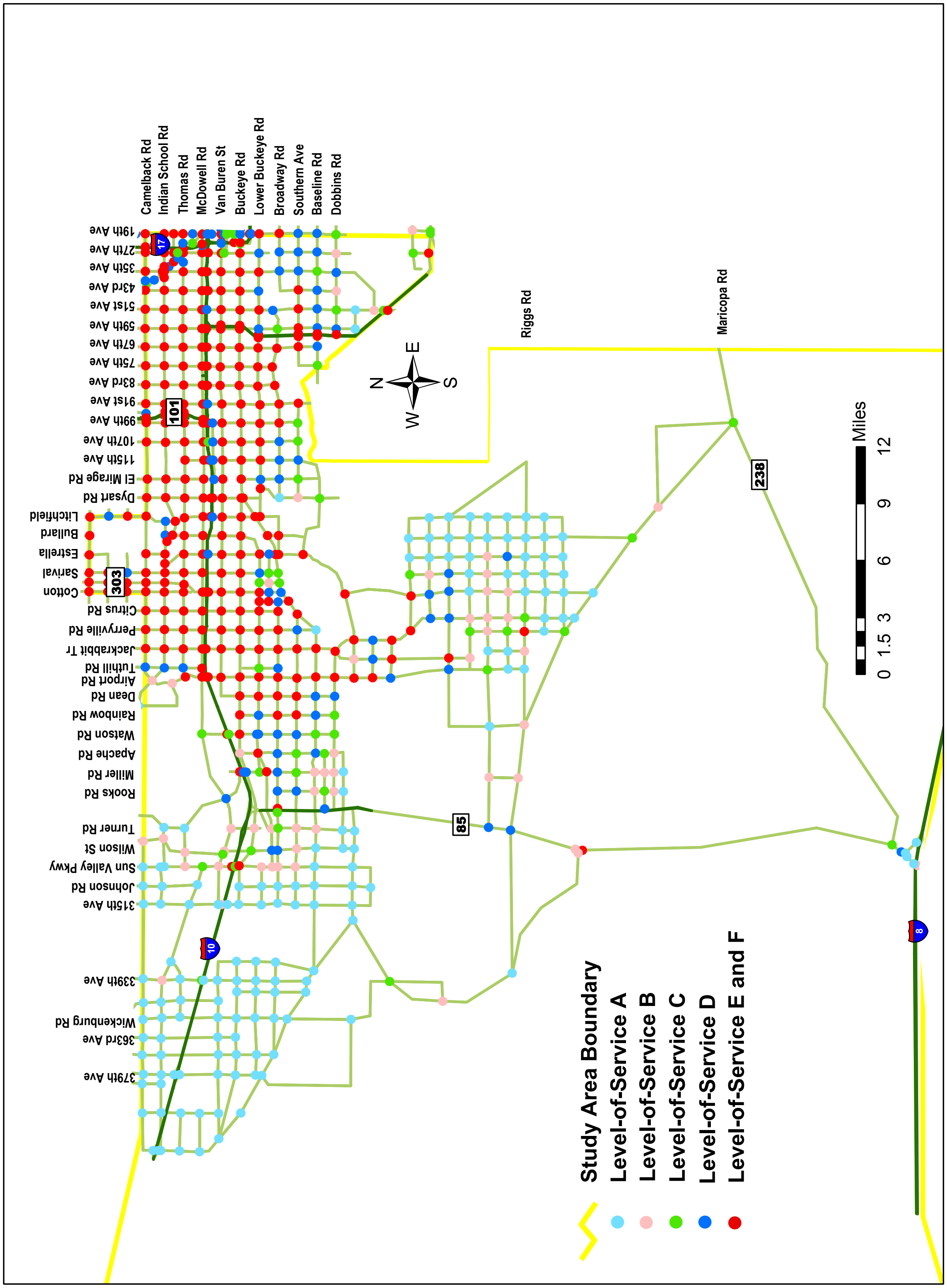

Figure 5-77
Intersection Level-of-Service: Enhanced 2030

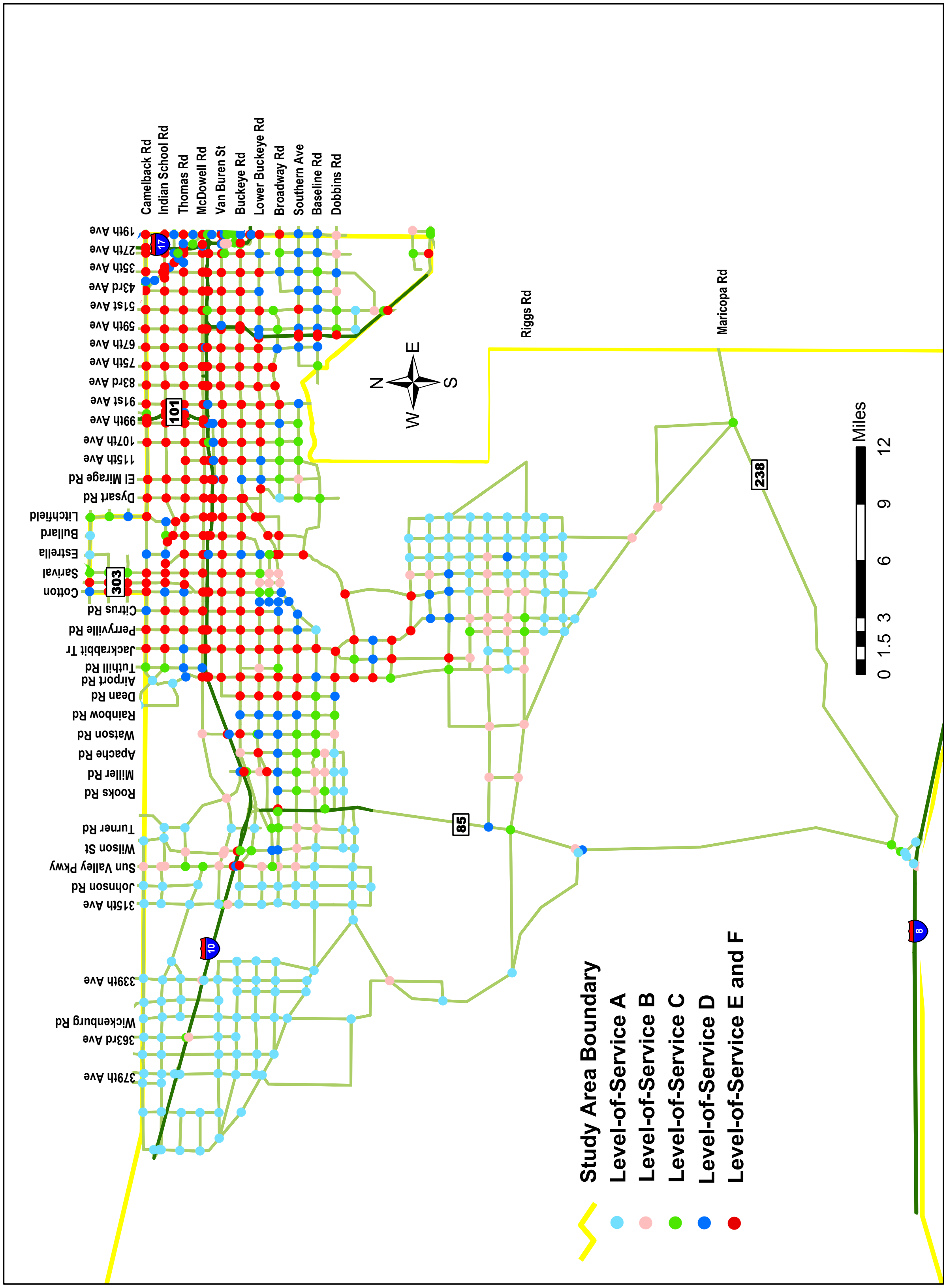

Figure 7-78
Intersection Level-of-Service: Option A 2030

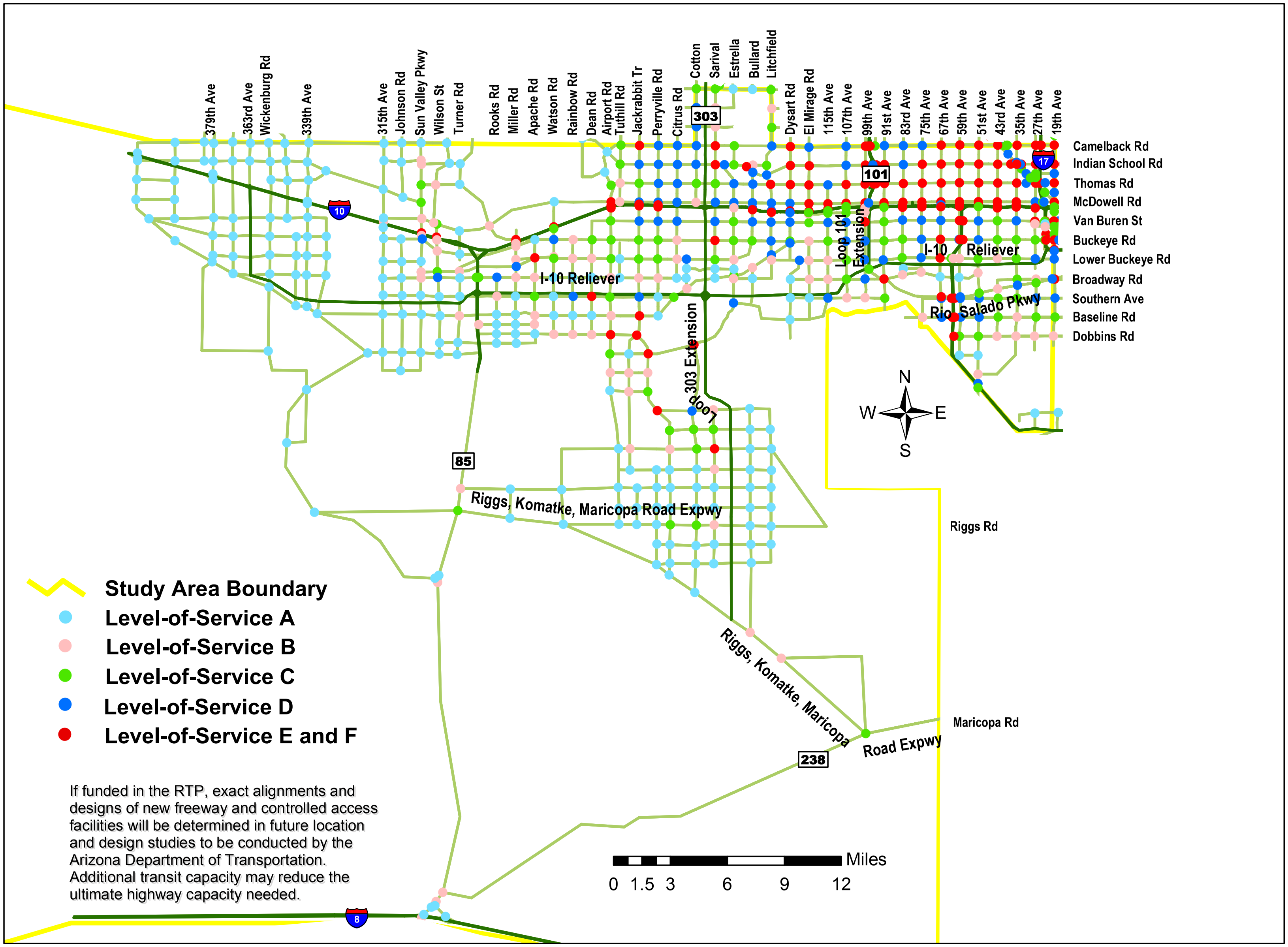

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Figure 7-79
Intersection Level-of-Service: Option C 2030

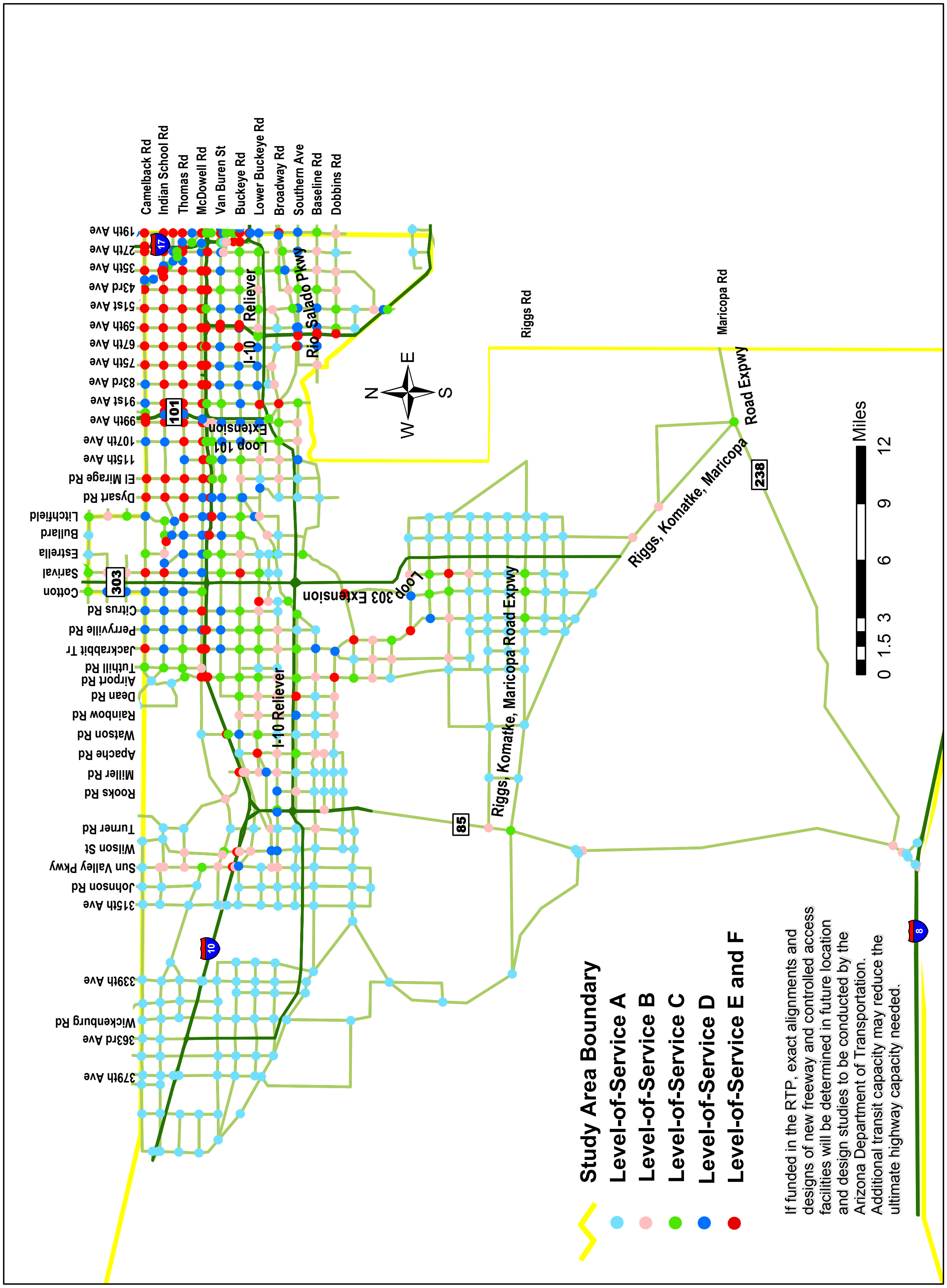

Figure 5-80
Intersection Level-of-Service: Future Base 2020

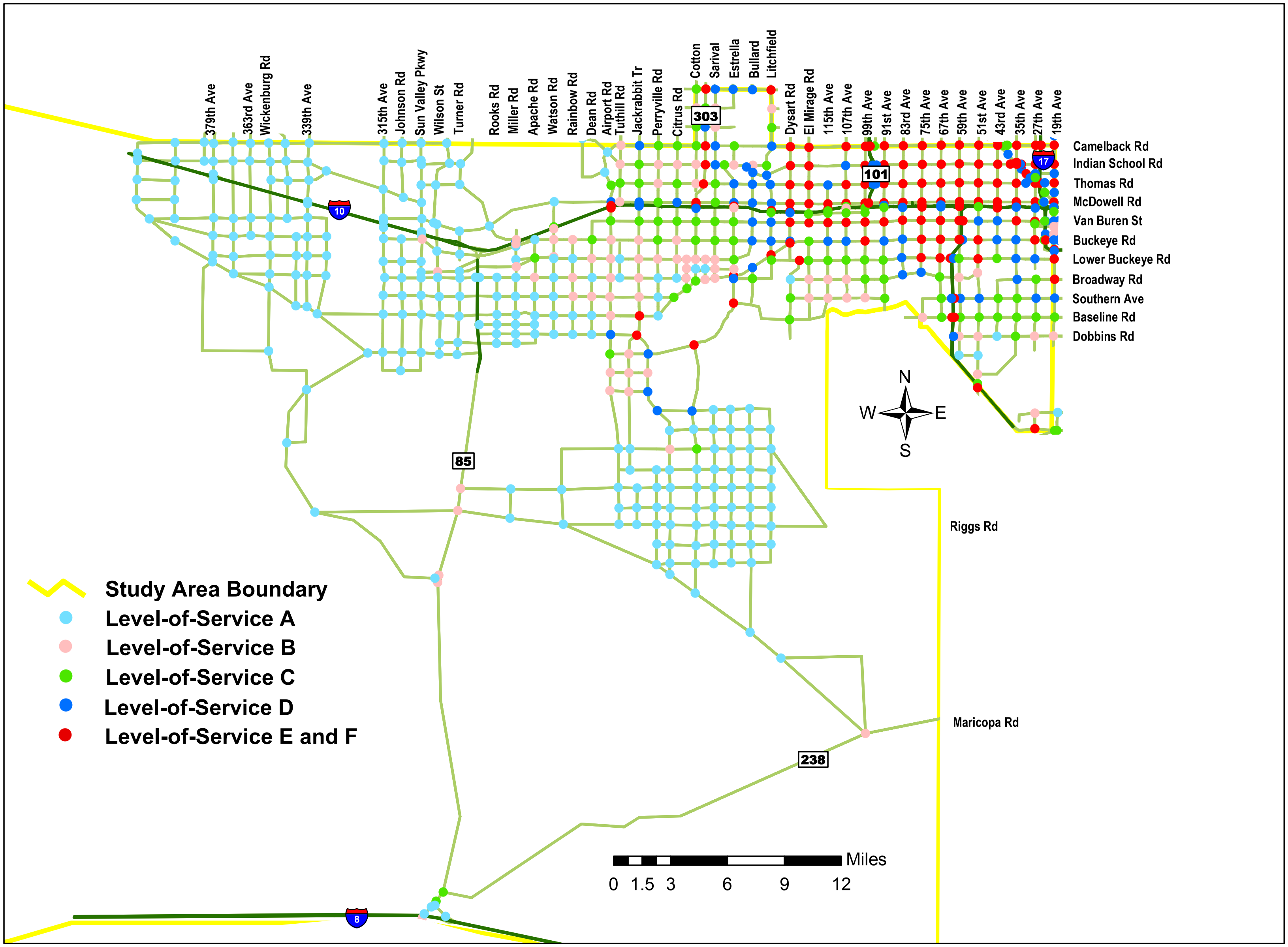

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Figure 5-81
Intersection Level-of-Service: Enhanced 2020

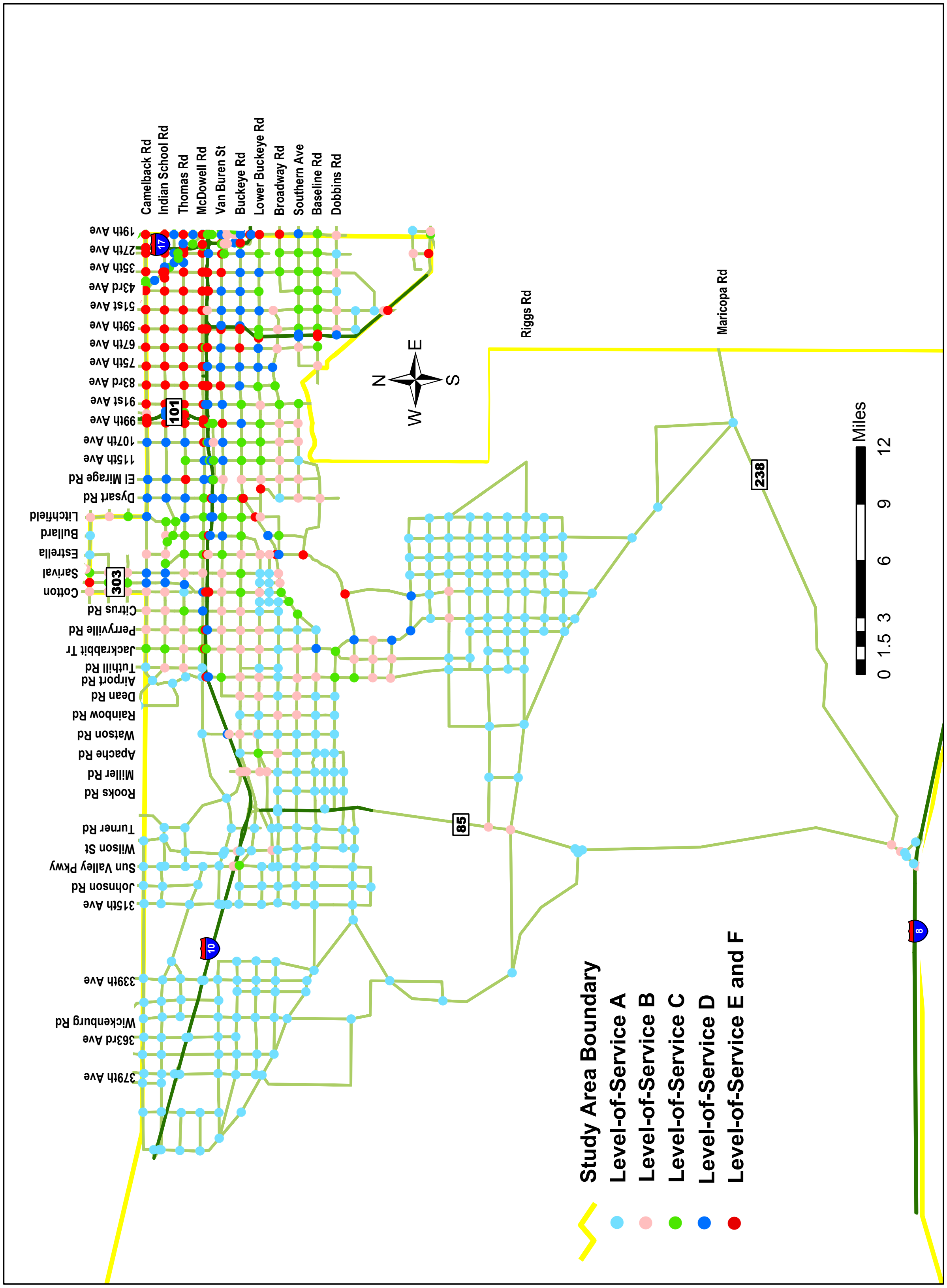

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Figure 5-82
Intersection Level-of-Service: Option A 2020

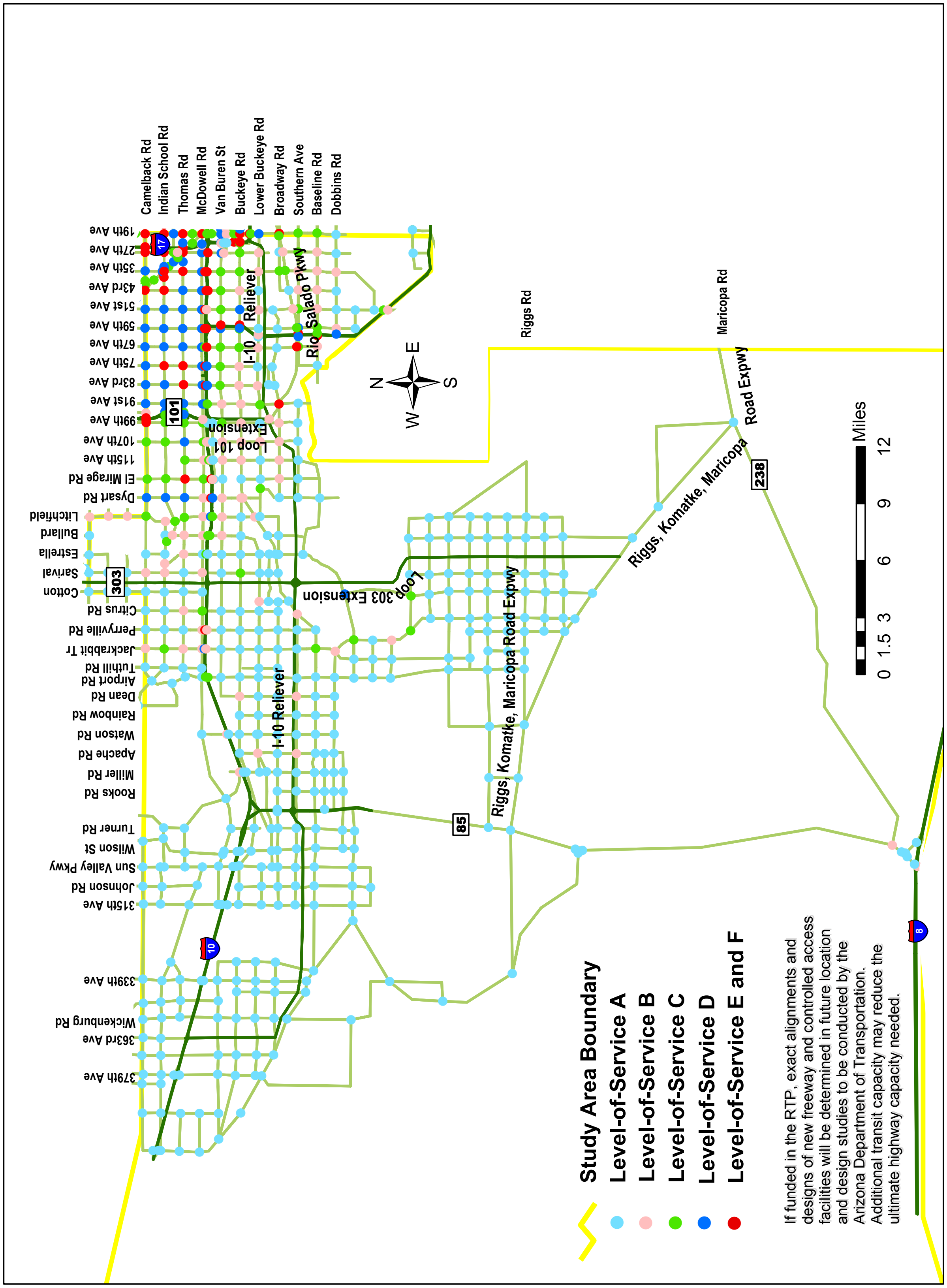
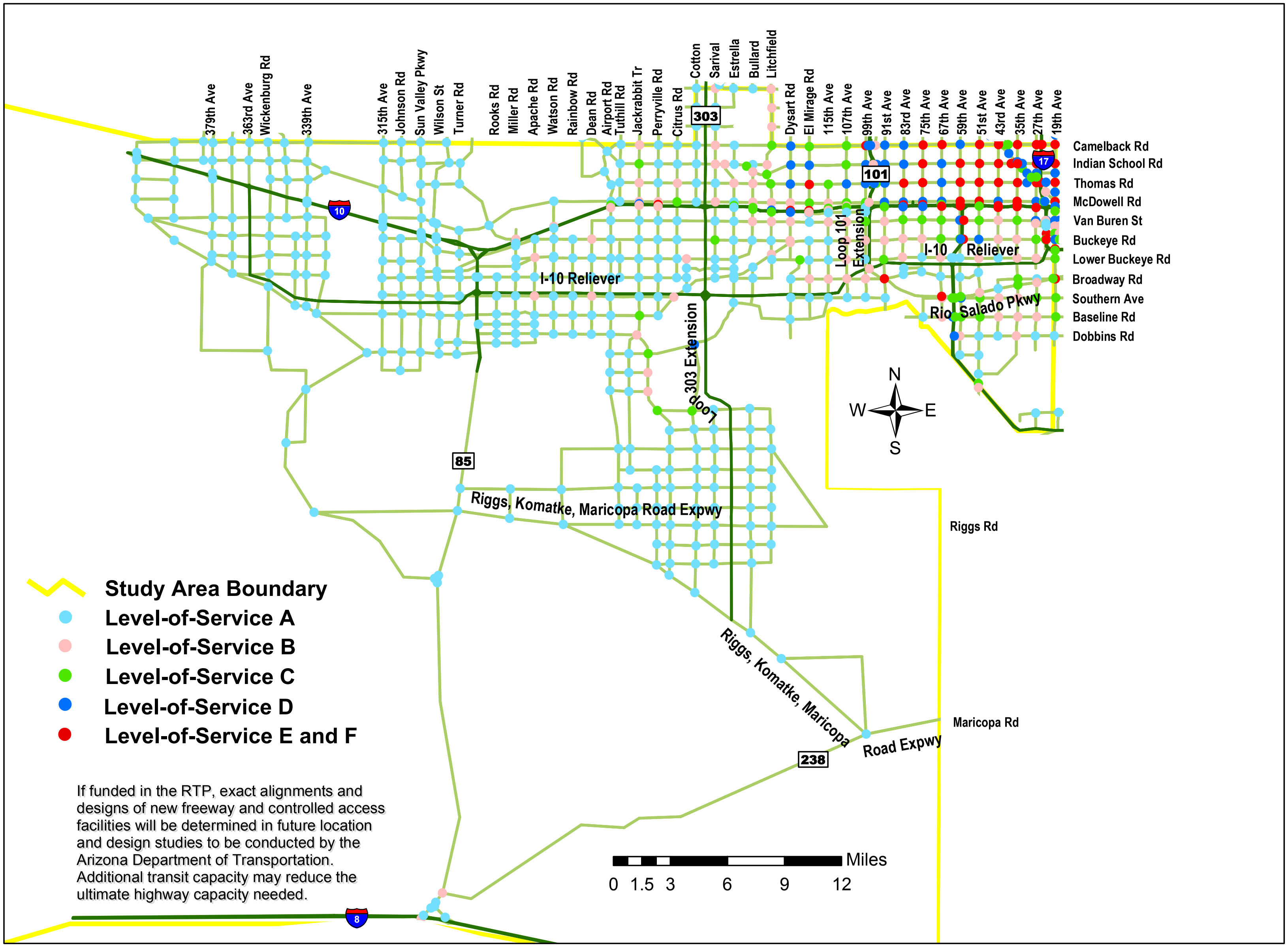


Figure 5-83
Intersection Level-of-Service: Option C 2020



5.5.4 Safety

Over the years, traffic count data and crash data have clearly indicated that the number of motor vehicle crashes increase proportionately with increasing vehicle miles of travel (VMT). Although, the relationship between the number of crashes and the amount of travel of exposure is not exactly linear, for a planning level safety assessment involving a comparison of the relative safety between planning options, a linear relationship is assumed to be adequate.

This method utilizes, traffic crash rates, computed either as the number of crashes per 100 million VMT (on continuous highway segments) or crashes per 100 million entering vehicles (at intersections), to estimate the total number of crashes that we may expect occur in a future year based on a forecast for the amount of travel in that year. This analysis can be further refined by utilizing particular crash rates generated for different crash severities such as fatal, personal injury, and property-damage-only (PDO) accidents, and also for different types of highway facilities and intersections. Freeway and arterial crash rates used in this assessment to generate future expected crashes were obtained from published literature for other similar urban regions, since similar statistics for the MAG region are not available at the current time.

Figures 5-84 and 5-85 (and Tables 5A-22 and 5A-23 in Appendix V) show the estimated number of crashes and their severity distribution for each of the networks in 2020 and 2030, respectively. The Current Base is an estimate based on the same crash rates used to estimate future year crashes and does not reflect the actual current crashes in the MAG region. Estimates for the Current Base are only for comparative purposes. The percent change (shown in the tables) for each network is the percent change compared to the Current Base.

A comparison of the Future Base, Enhanced, Option A and Option C networks against the Current Base shows different impacts on roadway safety due to different improvements to the roadway system assumed for each network. As expected, there are substantial increases in the total number crashes and the number within each crash category (i.e., fatal, injury, PDO) due to increased VMT on the highway system. For example, for the Current Base and Future Base networks the total number of freeway crashes is expected to increase from 4,920 in 2002 to 8,761 in 2030, an increase of 78%. For the 2030 Future Base network the number of crashes is estimated to increase 122% over the Current Base.

An examination of Enhanced, Option A, and Option C networks clearly shows that each of these scenarios will produce an improvement in overall road safety in comparison to the Future Base. Most of these improvements are due to more travel occurring on the freeway system as opposed to the arterial system. Although the total number of crashes on freeways appear to have increased, significant reduction in crashes are affected on arterials and at intersections. This leads to the conclusion that, systemwide, the Future Base network leads to the worst crash scenario among all networks compared.

As measured by total crashes, systemwide safety improves as additional freeway and expressway capacity are included in the Enhanced, Option A, and Option C networks. The Enhanced network includes more arterial travel than the Option A and Option C networks. As reflected by the crash numbers this leads to more fatal, injury and PDO crashes on the arterial system as compared to Option A and Option C. In conclusion, a comparison of both total and fatal plus injury crashes for the Option A and Option C networks indicates that these two networks are the best options from a safety viewpoint.

Figure 5-84
Motor Vehicle Accidents Forecast for 2020

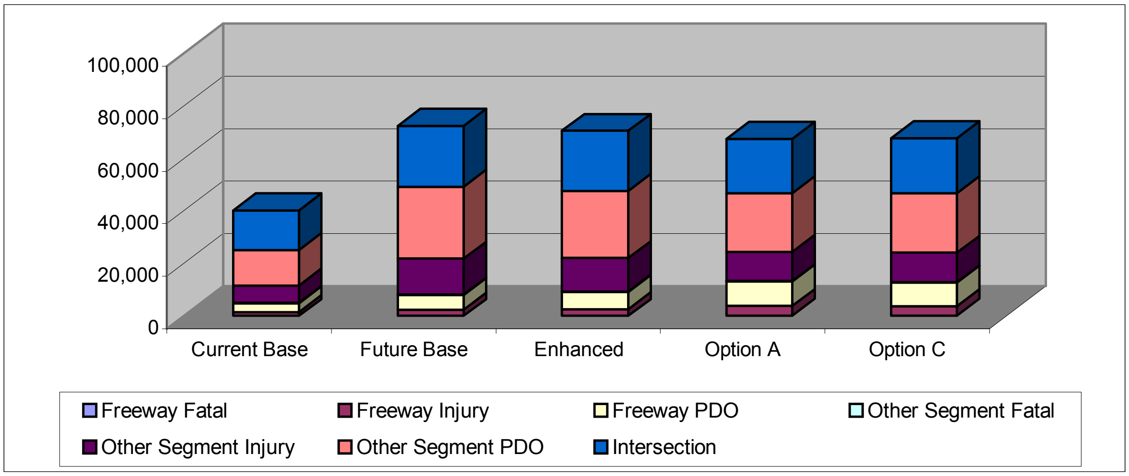
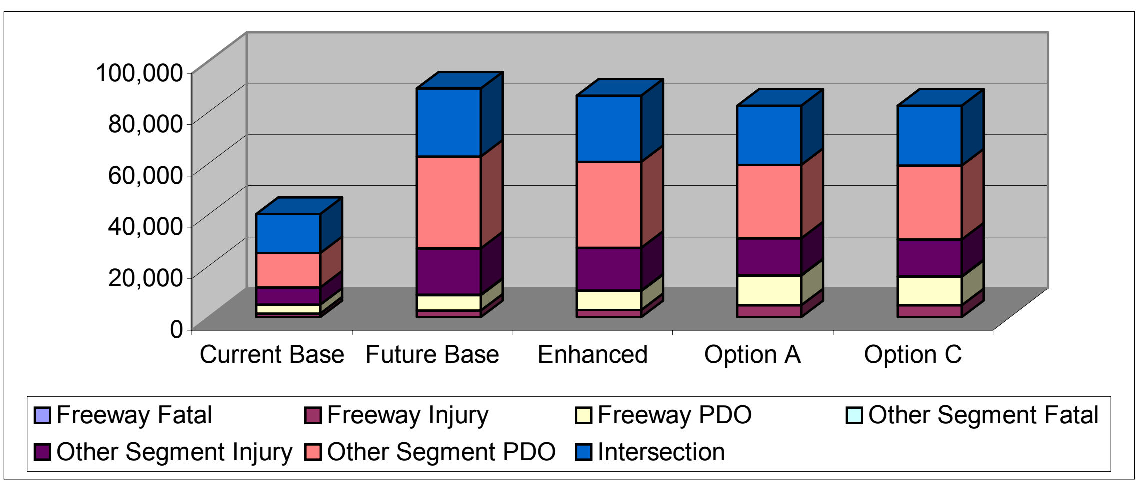


Figure 5-85
Motor Vehicle Accidents Forecast for 2030



5.6 System Summary and Conclusion

Table 5-1 presents, on a single table, much of the data described above. The physical data (centerline, lane, and capacity miles) on each network show that the major differences between the networks are the extent of the freeway system which is much more extensive under the Option A and Option C networks than under Future Base and Enhanced networks. The expressway system is also more extensive under Option A and Option C.

Operationally, the table shows that there is considerably more travel under Option A and Option C than under the Future Base and Enhanced networks both at the daily and peak hour level and for trucks. Because of the greater extensiveness of the freeway and expressway systems under Option A and Option C, there is much more travel on these systems under Option A and Option C and less on the arterial system.

In terms of congestion, there are many fewer miles of highway congested in the peak hour under Option A and Option C than under the Future Base and Enhanced networks. The number of intersections forecast to experience congestion is also smaller under the Option A and Option C networks than under the Future Base and Enhanced networks. The amount of travel in the peak hour expected to occur under congested conditions is greater under Option A and Option C than under the Future Base and Enhanced networks. However, this is in part due to the fact that there is substantially more travel overall under the Option A and Option C networks than under the other two. In percentage terms, there is a much smaller portion of total peak hour travel in congested conditions under the Option A and Option C networks than under the Future Base and Enhanced networks.

The number of motor vehicle accidents expected under the Option A and Option C networks is about 5% lower than under the Future Base and Enhanced networks. Freeway travel is generally safer than travel on lower class facilities with intersections, driveways, and other conflict zones.

Overall, the substantial increase in the number of freeway and expressway facilities in the Option A and Option C networks makes these networks generally more desirable in terms of congestion and safety. It is therefore concluded that a network is needed which includes substantial additions of freeway and expressway improvements.

After a brief review and comparison of arterial roadways and bridges under the four optional future highway networks, information on the individual new freeway and expressway facilities included in the networks is presented and analyzed. Following that presentation and analysis, transit and non-motorized transportation options are presented.

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Table 5-1
Network Performance Comparisons*

	Network								
Year	2002	2020				2030			
Network	Current Base	Future Base	Enhanced	New Corridor Option A	New Corridor Option C	Future Base	Enhanced	New Corridor Option A	New Corridor Option C
Centerline Miles									
Freeway	108	128	128	218	218	128	128	218	218
Expressway	21	43	50	90	90	43	50	90	90
Arterial	865	1,119	1,109	1,057	1,057	1,119	1,109	1,057	1,057
Collector	27	20	22	22	22	20	22	22	22
Total	1,021	1,310	1,309	1,387	1,387	1,310	1,309	1,387	1,387
Lane Miles									
Freeway	585	634	935	1,999	1,869	634	935	1,999	1,869
Expressway	54	184	276	526	526	184	276	526	526
Arterial	2,204	4,658	4,608	4,423	4,432	4,658	4,608	4,423	4,432
Collector	69	74	84	84	84	74	84	84	84
Total	2,913	5,550	5,903	7,032	6,912	5,550	5,903	7,032	6,912
Capacity Miles**									
Freeway	12,293,610	13,307,910	13,307,910	19,717,530	19,626,390	13,307,910	13,307,910	19,717,530	19,626,390
Expressway	1,129,800	3,854,760	3,854,760	5,794,320	5,794,320	3,854,760	3,854,760	5,794,320	5,794,320
Arterial	17,632,320	37,265,600	37,265,600	36,864,480	36,864,480	37,265,600	37,265,600	36,864,480	36,864,480
Collector	554,880	592,800	592,800	672,800	672,800	592,800	592,800	672,800	672,800
Total	31,610,610	55,021,070	55,021,070	63,049,130	62,957,990	55,021,070	55,021,070	63,049,130	62,957,990
Daily Vehicle Miles of Travel									
Freeway	6,958,146	11,586,434	14,420,107	27,269,662	27,484,309	14,188,130	18,446,314	37,820,996	37,545,683
Expressway	388,532	2,663,287	2,854,555	3,106,447	3,598,702	3,038,593	3,890,479	5,646,793	5,603,736
Arterial	6,870,346	22,435,342	19,190,450	12,290,813	12,520,980	34,870,689	30,748,799	20,910,225	21,245,244
Collector	86,303	350,646	302,706	224,848	256,971	452,913	458,313	337,952	359,209
Total	14,303,326	37,035,709	36,767,818	42,891,770	43,860,963	52,550,326	53,543,906	64,715,966	64,753,872
Daily Truck Vehicle Miles of Travel									
Freeway	1,951,141	3,182,836	4,065,007	7,107,940	7,160,477	3,974,190	5,299,251	9,572,807	9,462,723
Expressway	102,628	961,038	1,038,715	1,152,828	1,328,326	1,041,947	1,361,063	1,925,822	1,924,482
Arterial	1,692,490	5,160,140	4,234,261	2,461,570	2,530,692	7,849,686	6,581,317	4,454,160	4,541,169
Collector	17,810	81,358	71,873	47,606	54,609	112,593	112,542	79,408	83,001
Total	3,764,070	9,385,372	9,409,857	10,769,944	11,074,104	12,978,416	13,354,174	16,032,197	16,011,375
Evening Peak Hour Vehicle Miles of Travel									
Freeway	337,282	616,052	798,620	1,441,343	1,450,840	708,938	1,013,414	2,022,321	2,014,484
Expressway	22,013	113,879	106,401	114,382	127,615	140,093	162,693	240,572	236,049
Arterial	400,007	1,276,556	1,131,467	768,189	781,498	2,039,333	1,841,064	1,264,034	1,279,598
Collector	6,106	19,024	17,366	15,100	15,075	25,425	24,876	20,980	21,376
Total	765,409	2,025,510	2,053,855	2,339,014	2,375,027	2,913,789	3,042,047	3,547,906	3,551,506
Evening Peak Hour Average Vehicle Speeds									
Freeway	53	42	50	54	54	35	41	46	44
Expressway	42	39	43	44	44	27	36	42	42
Arterial	30	27	29	30	30	22	24	27	27
Collector	25	22	22	23	23	18	20	22	22
Directional Highway Miles under Congested Conditions (Level-of-Service E or F†) in the Evening Peak Hour									
Freeway	6	48	20	6	11	79	68	53	50
Expressway	1	4	4	0	0	52	19	8	8
Arterial	68	201	119	37	41	609	488	139	138
Collector	0	2	2	1	1	9	7	3	3
Total	75	255	145	44	53	749	582	202	199
Percent of Directional Highway Miles under Congested Conditions (Level-of-Service E or F†) in the Evening Peak Hour									
Freeway	3	19	8	1	3	31	27	12	11
Expressway	2	5	4	0	0	60	19	4	4
Arterial	4	9	5	2	2	27	22	7	7
Collector	1	5	4	3	2	24	15	6	6
Total	4	10	6	2	2	29	22	7	7
Evening Peak Hour Vehicle Miles of Travel under Congested Conditions (Level-of-Service E or F†)									
Freeway	34,943	204,265	114,791	33,226	59,715	708,938	1,013,414	2,022,321	2,014,484
Expressway	1,598	9,568	8,268	0	0	140,093	162,693	240,572	236,049
Arterial	52,198	347,440	204,723	63,617	73,395	2,039,333	1,841,064	1,264,034	1,279,598
Collector	212	1,829	2,511	941	1,325	25,425	24,876	20,980	21,376
Total	88,951	563,103	330,293	97,784	134,436	2,913,789	3,042,047	3,547,906	3,551,506
Percent of Evening Peak Hour Vehicle Miles of Travel under Congested Conditions (Level-of-Service E or F†)									
Freeway	10	33	14	2	4	51	37	19	17
Expressway	7	8	8	0	0	66	27	8	8
Arterial	13	27	18	8	9	53	45	18	18
Collector	3	10	14	6	9	39	24	10	10
Total	12	28	16	4	6	53	41	18	17
Evening Peak Hour Intersections under Congested Conditions (Level-of-Service E or F†)									
East Subarea***	22	107	90	48	55	227	231	239	239
Central Subarea***	0	25	14	3	3	189	193	177	177
West Subarea***	0	0	0	0	0	142	146	142	142
South Subarea***	0	2	2	0	0	88	88	79	79
Percent of Intersections under Congested Conditions (Level-of-Service E or F†) in Evening Peak Hour									
East Subarea***	12	47	39	20	23	69	62	41	40
Central Subarea***	0	13	7	2	2	68	55	17	18
West Subarea***	0	0	0	0	0	3	3	1	1
South Subarea***	0	2	2	0	0	13	11	5	5
Motor Vehicle Accidents - Annual									
Freeway Fatal	22	33	38	53	51	36	42	63	62
Freeway Injury	1,418	2,298	2,644	3,781	3,649	2,516	2,949	4,670	4,562
Freeway PDO****	3,480	5,668	6,521	9,340	9,012	6,209	7,277	11,559	11,292
Freeway Subtotal	4,920	7,999	9,203	13,174	12,712	8,761	10,268	16,292	15,916
Other Segment Fatal	74	148	142	121	123	192	184	155	156
Other Segment Injury	6,699	13,717	12,756	11,149	11,295	17,972	16,709	14,299	14,380
Other Segment PDO****	13,361	27,406	25,534	22,328	22,639	35,892	33,478	28,712	28,901
Other Segment Subtotal	20,134	41,271	38,432	33,598	34,057	54,056	50,371	43,166	43,437
Intersection	15,219	23,083	22,869	20,737	20,838	26,411	25,878	23,054	23,228
Total	40,273	72,353	70,504	67,509	67,607	89,228	86,517	82,512	82,581

*Results are preliminary given the interim nature of the underlying socioeconomic data and are subject to change in the RTP process.

**Capacity Miles: lane miles multiplied by daily vehicle capacity per lane of: 21,000 for freeways and expressways; 8,000 all other types

***Subareas: East is east of the Agua Fria River; central is west of the Agua Fria River, east of SR-85, and north of the Gila River; south is south of the Gila River and west of the Agua Fria River; west is west of SR-85.

****PDO: Property Damage Only

†Level-of-Service E and F are highly congested or jammed conditions. Level A is freeflow. Levels B to D are progressively deteriorating traffic service.

5.7 New Arterials

As shown in Figures 5-9, 5-14, and 5-20, there are more centerline mile, lane miles, and capacity miles of arterial roads than of all the other classes of roads in each network put together. This section focuses on the expansion of the arterial network. It provides information and analysis. Conclusions are presented in Section 5.13 following a thorough presentation of information and analysis for all of the networks and their potential new facilities.

The increases in lanes miles of arterials from the Current Base to the Future Base network includes 287 miles of new 4 lane arterial and 5 miles of new 6 lane arterial, as shown in Table 5-2. New facilities in the Future Base network are shown on Figure 5-3. Additionally, there are 600 miles of existing arterials that are widened in the Future Base network. Widened facilities in the Future Base network are shown on Figure 5-4. Nearly all of the arterial widenings in the Future Base are a single lane in each direction, with a very small number of widenings of two lanes in each direction.

Table 5-2
Centerline Miles of New and Widened Arterials

	Network		
	Future Base	Enhanced	Options A and C
New 4 Lane	287	3	0
New 6 Lane	5	1	0
Widen by 2 Lanes	594	0	13
Widen by 4 Lanes	18	0	0

Review of level-of-service information shown in Figures 5-63 to 5-66 shows that level-of-service on arterials in the western and southern portions of the study area are generally expected to be very good in 2030. In southern Goodyear south of the Gila River there are a very limited number of facilities operating near capacity. Similarly, west of SR-85 level-of-service the figures show that volume-to-capacity ratios are generally less than 0.60. East of the Agua Fria River volume-to-capacity ratios are generally higher, with some facilities operating at LOS E and F, indicating volume-to-capacity ratios in excess of 0.90. Under Option A and Option C, there are sufficient facilities operating at better levels of service to provide motorists with uncongested alternative routes.

The relative lack of congestion in the southern and western portions of the study area may be in part due to the land development conditions not approaching build out in 2030. In subsequent years as build out is approached, volume-to-capacity ratios can be expected to rise and approach those predicted for the central portion of the study area. In the portion of the study area bounded by Camelback Road, 19th Avenue, Lower Buckeye Road, and Airport Road on the west, build-out is likely to be much closer in 2030. In that area the depicted network provides about 30% of the arterial network in 6 lane facilities and the remainder in 4 lane facilities.

Table 5-3 shows the costs of the new and widened arterials in each of model networks. The costs assume that there are no right-of-way acquisition costs for new construction or widening of existing arterials, since most of the arterial right-of-way acquisition will take place through dedication. (Chapter 6 includes a more refined cost estimate for recommended facilities that includes an estimate of arterial right-of-way acquisition costs.) The table shows that over $3 billion of arterial improvements are included in the Future Base network. Improvements included in the Enhanced network are estimated to cost an additional $10 million and improvements in the Option A and Option C networks an additional $47 million. Much of the arterial network will be built by the private sector as part of the land development process.

Table 5-3
Arterial Costs in Millions of 2003 Constant Dollars

		Network		
	Cost per Mile	Future Base	Enhanced	Options A and C
New 4 Lane	3.0	860	8	0
New 6 Lane	4.0	18	2	0
Widen by 2 Lanes	3.5	2,079	0	47
Widen by 4 Lanes	4.5	80	0	0
TOTAL		$3,038	$10	$47

5.8 New Arterial River Crossings

Four major rivers, the Salt, the Agua Fria, the Hassayampa, and the Gila, flow through the more populated northerly section of the study area. Rivers are a natural impediment to travel. Overcoming this impediment opens up new lands for development, but requires substantial bridge investment.

The Future Base network shows six additional river crossings on the arterial network compared to the existing river crossings. These river crossings are assumed to be bridges. (Chapter 6 provides a more complete examination of arterial river crossings, including low-lying options subject to flooding during storm events.) These new bridges are located at:

- 59th Avenue over the Salt River;
- Dysart Road over the Gila River;
- Rainbow Valley Road over the Gila River;
- Camelback Road over the Hassayampa River;
- Thomas Road over the Agua Fria River; and
- El Mirage Road over the Agua Fria River.

All of these bridges have four travel lanes in the Future Base network. No additional arterial bridges are included in the Enhanced, Option A, or Option C networks. The estimated cost of these six bridges is $144 million as shown on Table 5-4. Almost half of this total cost is bridging Camelback Road over the Hassyampa River. Due to the river's width, a very long bridge would be required. A bridge at this location may be funded by nearby land developers.

Table 5-4
Estimated New Arterial River Bridge Costs in 2003 Constant Dollars

Bridge	Lanes	Width in Feet	Length in Feet	Cost per Square Foot	Cost
59th Avenue over the Salt River	4	78	1000	120	$ 9,360,000
Dysart Road over the Gila River	4	78	2000	120	$ 18,720,000
Rainbow Valley Road over the Gila River	4	78	2000	120	$ 18,720,000
Camelback Road over the Hassayampa River	4	78	5200	120	$ 48,672,000
Thomas Road over the Agua Fria River	4	78	1000	120	$ 9,360,000
El Mirage Road over the Agua Fria River	4	78	1000	120	$ 9,360,000
Total					**$ 114,192,000**

Table 5-5 shows the peak hour volume-to-capacity ratios for the peak direction on these six bridges under each of the networks modeled for 2030. Under the Future Base and Enhanced networks the 59th Avenue bridge over the Salt River has peak hour volume-to-capacity ratios in excess of 0.80. With the addition of 4 lanes to the adjacent South Mountain Freeway bridge under the Option A and Option C networks, these ratios fall substantially to less than 0.20. The overall volume-to-capacity ratio for Salt River bridges from 19th Avenue west is about 0.75 under Option A and Option C.

Table 5-5
Peak Hour Volume-to-Capacity Ratios on Major New Arterial River Crossings in 2020 and 2030

Bridge	Network			
	Future Base	Enhanced	Option A	Option C
	2020			
59th Avenue over the Salt River	0.74	0.59	0.03	0.03
Dysart Road over the Gila River	0.82	0.65	0.14	0.14
Rainbow Valley Road over the Gila River	1.17	1.13	0.63	0.64
Camelback Road over the Hassayampa River	0.01	0.01	0.01	0.01
Thomas Road over the Agua Fria River	1.10	1.01	0.95	0.96
El Mirage Road over the Agua Fria River	0.94	0.91	0.94	0.95
	2030			
59 Avenue over the Salt River	0.85	0.83	0.12	0.17
Dysart Road over the Gila River	0.80	0.83	0.62	0.53
Rainbow Valley Road over the Gila River	1.49	1.52	1.03	0.94
Camelback Road over the Hassayampa River	0.07	0.07	0.07	0.07
Thomas Road over the Agua Fria River	1.39	1.37	1.22	1.15
El Mirage Road over the Agua Fria River	1.09	1.04	0.94	1.00

The Dysart Road bridge over the Gila River has a 2030 forecast peak hour volume-to-capacity ratio in the peak direction under the Future Base network of 0.80. Under the Option A and Option C networks this falls to 0.62 and 0.53, respectively, with the nearby bridges at 115th Avenue, El Mirage Road, and Bullard Avenue all forecast to operate at LOS A, as shown in Figures 5-65 and 5-66. Under the Enhanced network these nearby bridges will operate at LOS A, except for the Bullard Avenue bridge which will operate at LOS C, as shown in Figure 5-64. Under the Future Base 2030 forecast, the Bullard Avenue bridge operates at LOS D, the El Mirage Road bridge at LOS C, and the 115th Avenue bridge at LOS B, as shown in Figure 5-63.

The Rainbow Valley Road bridge over the Gila River shows 2030 forecast volume-to-capacity ratios in excess of 0.90 under all of the networks. The lowest value occurs under Option C under which the Loop 303 Extension bridge over the Gila River is the widest. Collectively, the Rainbow Valley Road bridge and the two nearby river crossings at Tuthill Road and Airport Road show peak hour volume-to-capacity ratios which greatly exceed capacity under the Future Base and Enhanced networks, but which match capacity under the Option A and Option C networks. The inclusion of the I-10 Reliever freeway just to the north of these bridges in the Option A and Option C networks increases the amount of travel across the bridges.

The Camelback Road bridge over the Hassayampa River has peak hour peak direction volume-to-capacity ratios of less than 0.10 under all of the networks. To its south, the Tonopah-Salome Highway also has a volume-to-capacity ratio of less than 0.10 under all of the networks.

The two new arterial bridges over the Agua Fria River show peak hour peak direction volumes which exceed 0.90 under all networks. There is an existing housing development on the grid alignment of El Mirage Road south of Thomas Road to the Agua Fria River.

5.9 New Freeways and Freeway Widenings

Freeways provide the means for high speed automobile and truck travel. The data associated with Figure 5-9 (presented in Table 5A-1 in Appendix V) show that between 10 and 16% of highway centerline miles in the SWATS area are freeways. The data associated with Figures 5-21 and 5-22 show that 26 to 63% of vehicle miles of travel in 2020 and 2030 are expected to be on the freeway system.

The increase in centerline miles of freeways from the Current Base to the Future Base network includes the 14 mile South Mountain Freeway with 6 lanes, about 3 miles of new HOV lanes on I-17 and I-10, about 6 miles of 4 lane freeway replacing the northernmost portion of SR-85, and about 5 miles of I-10 widening by 2 lanes. These data are shown on Table 5-6.

Table 5-6
Centerline Miles of New and Widened Freeways

	Network			
	Future Base	Enhanced	Option A	Option C
New HOV lanes	3	28		
New 6 lane - South Mountain Bypass	14			
New 4 lane - Northerly Section SR-85	6			
New 12 lane - I-10 Reliever: entire length			48	
New 14 lane - I-10 Reliever: east of Loop 303 Ext				19
New 8 lane - I-10 Reliever: Loop 303 Ext to SR-85				12
New 6 lane - I-10 Reliever: West of SR-85				17
New 10 lane - Loop 101 Extension: south of Riggs Rd			4	4
New 10 lane - Loop 303 Extension: north of Riggs Rd			27	
New 12 lane - Loop 303 Extension: north of I-10 Reliever				13
New 10 lane - Loop 303 Extension: Riggs Rd to I-10 Relvr				14
Widen 2 lane	5	14		
Widen 4 lane		26	14	14
Widen 6 lane		18	4	4

Freeway mileage increases from the Future Base to the Enhanced network with new HOV lanes on I-17 south of I-10, on Loop 101, and on I-10 west of Loop 101 to SR-85, as well as an increase from 2 to 4 HOV lanes on I-10 east of Loop 101. The entire length of I-10 in the study area is widened by up to 6 lanes and the northerly section of SR-85 is widened from 4 to 6 lanes. Six new interchanges are added along I-10 in the Enhanced network.

Option A and Option C provide dramatic increases in the amount of freeway serving the study area. Figure 5-8 shows the major new freeway corridors included in these networks. The number of centerline miles under these options is the same (see Table 5A-1 in Appendix V), but differing freeway widths yield somewhat different amounts of freeway lane mileage (see Table 5A-2 in

Appendix V). Major new freeways are listed above in section *5.2.3 New Highway Corridors Options A and C.* In addition to major new freeways in the study area, the South Mountain Freeway is widened from 6 to 10 lanes under Option A and Option C. The estimated costs of the freeway improvements are shown on Table 5-7 by the network in which each improvement is included in the networks.

Table 5-7
Freeway Costs in Millions of 2003 Constant Dollars

		Network			
	Cost per Mile	**Future Base**	**Enhanced**	**Option A**	**Option C**
New HOV lanes	6	18	168	-	-
New 6 lane - South Mountain Bypass	40	560	-	-	-
New 4 lane - Northerly Section SR-85	25	150	-	-	-
New 12 lane - I-10 Reliever: entire length	55	-	-	2,640	-
New 14 lane - I-10 Reliever: east of Loop 303 Ext	60	-	-	-	1,140
New 8 lane - I-10 Reliever: Loop 303 Ext to SR-85	45	-	-	-	540
New 6 lane - I-10 Reliever: West of SR-85	40	-	-	-	680
New 10 lane - Loop 101 Extension: south of Riggs Rd	50	-	-	200	200
New 10 lane - Loop 303 Extension: north of Riggs Rd	50	-	-	1,350	-
New 12 lane - Loop 303 Extension: north of I-10 Reliever	55	-	-	-	715
New 10 lane - Loop 303 Extension: Riggs Rd to I-10 Relvr	50	-	-	-	700
Widen 2 lane	8	40	112	-	-
Widen 4 lane	16	-	416	224	224
Widen 6 lane	24	-	432	96	96
Total		**$768**	**$1,128**	**$4,510**	**$4,295**

New freeway facilities included in the Future Base network will cost $768 million, most of which is for construction of the South Mountain Freeway. New HOV lanes and freeway widenings account for the $1.1 billion needed to provide the additional freeway facilities included in the Enhanced network. Option A and Option C require an additional $4.3 to 4.5 billion, depending upon the number of lanes included on sections of the I-10 Reliever and the Loop 303 Extension. The level of potential investment required for future freeways is quite large. Each new freeway facility is described below with a brief description of forecast traffic and other characteristics.

Some of the major new freeways include major river crossings. The costs of these major bridges are shown in Table 5-8. These costs are in addition to those noted above for each of the networks. With the exception of the South Mountain Freeway bridge which is included in the Future Base network, all of the new bridges are developed under the Option A and Option C networks. The South Mountain Freeway bridge cost estimate includes the full 10 lane facility included in the Option C and Option A networks. The Loop 303 Extension and I-10 Reliever cost estimates over the Gila and Agua Fria Rivers, respectively, include the wider facilities included in the Option C network. The I-10 Reliever cost estimate for the Hassayampa River bridge is for the Option C network facility.

Table 5-8
Estimated New Freeway and Expressway River Bridge Costs in 2003 Constant Dollars

Bridge	Lanes	Width in Feet	Length in Feet	Cost per Square Foot	Cost
South Mountain Bypass over the Salt River	10	156	1000	120	$ 18,720,000
I-10 Reliever over the Agua Fria River	14	204	1000	120	$ 24,480,000
Loop 303 Extension over the Gila River	12	180	2000	120	$ 43,200,000
I-10 Reliever over the Hassayampa River	6	108	5200	120	$ 67,392,000
Rio Salado Expressway over the Salt River	6	102	2000	120	$ 24,480,000
Total					**$ 178,272,000**

Each potential new freeway facility is described below with a brief description of forecast traffic and other characteristics. The facilities are shown in Figure 5-86. The information presented is used in the subsequent section to draw conclusions concerning each facility. Several of the facilities are closely interrelated, so a complete review of the information is necessary before conclusions can be drawn. This includes information on widening of I-10. Widening of Loop 101 and I-17, as noted above, are at the edge of the SWATS area and are covered under the Northwest Area Transportation Study.

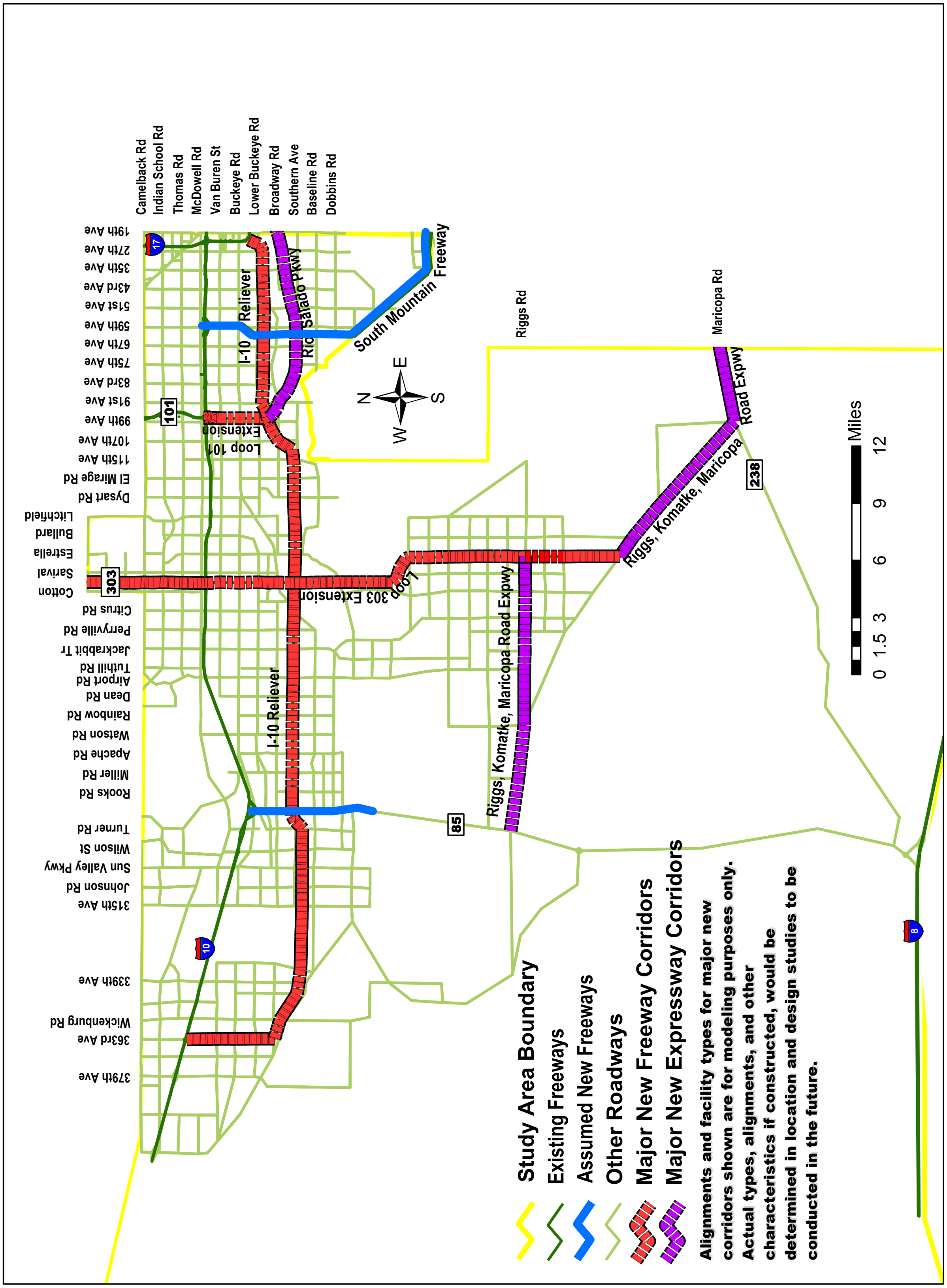
Under the Future Base network I-10 is widened by one general purpose lane (from 4 to 5) in each direction west of I-17 to 35th Avenue and the existing HOV lane is extended through the Loop 101 interchange. An additional general purpose lane is added west of Dysart Road to Estrella Parkway, providing 3 lanes in each direction. Figure 5-63 shows that I-10 is expected to operate under congested conditions of LOS E or F east of Miller Road in 2030.

Under the Enhanced, Option A, and Option C networks I-10 is widened to 7 lanes (5 general purpose and 2 HOV) east of Loop 101, 6 lanes (5 general purpose and 1 HOV) west of Loop 101 to SR-85, and 4 general purpose lanes west of SR-85. Under the Enhanced network I-10 is expected to operate with congested conditions of LOS E or F east of Airport Road to downtown Phoenix in 2030, as shown in Figure 5-64. West of Airport Road volume-to-capacity ratios remain over 0.80, but drop to about 0.69 west of Watson Road. West of SR-85 volume-to-capacity ratios fall to 0.66 and west of Sun Valley Parkway to 0.36.

Figures 5-65 and 5-66 show that under Option A and Option C congested conditions along I-10 improve. There are some locations with congested conditions expected in 2030, particularly in the section between Loop 101 and Loop 303. East of Loop 101 to downtown Phoenix there are some short sections expected to experience LOS E or F congested conditions in 2030.

West of Loop 303 there are no sections expected to operate under LOS E or F conditions under Option A and Option C. Volume-to-capacity ratios are slightly higher under Option C than under Option A west of Loop 303 and drop to 0.70 west of Jackrabbit Trail and to 0.57 west of Watson Road. West of SR-85 volume-to-capacity ratios are 0.57 and 0.31 west of Sun Valley Parkway. (Volumes are shown on Figures 5-36 through 5-45 and volume-to-capacity ratios on Figures 5-62 through 5-66.)

Figure 5-86
Potential New Freeways and Expressways



5.9.1 South Mountain Freeway

The South Mountain Freeway included in the Future Base highway network model runs from I-10 near 59th Avenue to the western terminus of the Santan Freeway. The portion of the facility in the SWATS study area is about 14 miles. The facility is modeled with 6 lanes (3 in each direction) in the Future Base and Enhanced and with 10 lanes in the Option A and Option C networks. For simplicity, HOV lanes were not included in the modeling of any of the new freeways included in the Option A and Option C networks. Regional policy is to include HOV lanes on the freeway system.

The South Mountain Freeway is currently undergoing environmental study to determine its location, width, and other potential characteristics. The facility is intended in part to provide a bypass for traffic currently using I-10 and I-17 to move between areas south and east of downtown Phoenix and areas to its north and west. This facility includes a bridge over the Salt River.

Forecast daily traffic volumes for this facility are in the 125-150,000 range in 2030 in the Future Base network with peak hour volume-to-capacity ratios in the 0.70 to 0.80 range. Volumes are similar under the Enhanced network. Under Option A and Option C volumes are substantially higher south of the I-10 Reliever at about 250,000, with volume-to-capacity ratios in the 0.80 to 0.90 range. North of the I-10 Reliever, volumes are on the order of 160,000 vehicles per day and volume-to-capacity ratios substantially lower in the 0.50 to 0.60 range.

5.9.2 SR-85

In the Future Base network SR-85 south of I-10 for 6.5 miles is upgraded to a 4 lane freeway. This facility is currently planned for upgrading from the existing 2 lane rural arterial in order to accommodate increasing traffic volumes.

Traffic volumes forecast for 2030 on the Future Base network are on the order of 50,000 vehicles per day with volume-to-capacity ratios on the order of 0.60. Under the Enhanced network this section is widened from 4 to 6 lanes. Volumes increase to about 70,000 vehicles per day with peak hour volume-to-capacity ratios still on the order of 0.60. Under Option A and Option C volumes south of the I-10 Reliever remain about 70,000 vehicles per day with volume-to-capacity ratios under 0.60. However, north of the I-10 Reliever to I-10 volumes increase to 120,000 and volume-to-capacity ratios are forecast in the 0.70 to 0.80 range.

5.9.3 I-10 Reliever

The I-10 Reliever is included in the Option A and Option C networks. It is 48 miles long and parallels I-10 between I-10 and the Salt and Gila Rivers. It starts at I-17 near 19th Avenue and proceeds west across the Hassayampa River where it turns north ending at I-10. The purpose of this facility is to provide for high speed travel in the east/west direction and to relieve forecast congestion on I-10. HOV lanes were not included in the modeling of this facility, but they would be included in its construction.

Under the Option A network the I-10 Reliever is 12 lanes for its entire length. East of the South Mountain Freeway forecast daily traffic volumes in 2030 are in the 240-250,000 range with peak hour volume-to-capacity ratios on the order of 0.80. West of the South Mountain Freeway to the Loop 303 Extension volumes are somewhat higher in the 280-335,000 range with volume-to-capacity ratios generally exceeding 0.90 and sometimes exceeding 1.00. From the Loop 303 Extension west to SR-85 forecast daily volumes fall from about 240,000 near the Loop 303 Extension to 150,000 at SR-85. Volume-to-capacity ratios in this section are in the 0.50 to 0.80

range. West of SR-85 forecast volumes fall off quickly from 100,000 vehicles per day (with peak hour volume-to-capacity ratios near 0.30) just west of SR-85 to less than 15,000 daily vehicles (with volume-to-capacity ratios less than 0.10) across the Hassayampa River and to its west.

Under the Option C network the I-10 Reliever has 14 lanes east of the Loop 303 Extension, 8 lanes from there to SR-85, and 6 lanes west of SR-85. East of the South Mountain Freeway forecast daily traffic volumes in 2030 are about 275,000 with peak hour volume-to-capacity ratios on the order of 0.80. West of the South Mountain Freeway to the Loop 303 Extension volumes are somewhat higher in the 310-360,000 range with volume-to-capacity ratios generally exceeding 0.90 and sometimes exceeding 1.00. From the Loop 303 Extension west to SR-85 forecast daily volumes fall from about 200,000 near the Loop 303 Extension to 135,000 at SR-85. Volume-to-capacity ratios in this section are in the 0.60 to 0.95 range. West of SR-85 forecast volumes fall off quickly from 100,000 vehicles per day (with peak hour volume-to-capacity ratios near 0.60) just west of SR-85 to less than 15,000 daily vehicles (with volume-to-capacity ratios less than 0.10) across the Hassayampa River and to its west.

5.9.4 Loop 101 Extension

The Loop 101 Extension from I-10 south to the I-10 Reliever provides freeway service on 10 lanes into the developing areas south of I-10. It connects to the Rio Salado Parkway which continues easterly along the Salt River toward downtown Phoenix. Under Option A the Loop 101 Extension is forecast in 2030 to carry about 215,000 vehicles per day with volume-to-capacity ratios between 0.70 and 0.80. Under Option C the facility is forecast to handle 220,000 vehicles per day with volume-to-capacity ratios between 0.75 and 0.85.

HOV lanes were not included in the modeling of this facility, but they would be included in its construction.

5.9.5 Loop 303 Extension

The Loop 303 Extension provides freeway service between the outer suburbs expected to develop in the northwestern and southwestern sections of the valley. Portions of this facility already exist from US 60 south to a point a mile north of I-10. The current facility is not built to the freeway standard included in the Option A and Option C networks. In the SWATS study area the Loop 303 Extension covers 31 miles from Northern Avenue to Komatke Road in southern Goodyear.

Under Option A the entire facility provides 10 lanes. North of I-10 traffic forecast for the year 2030 is in the 240-250,000 range with peak hour volume-to-capacity ratios from 0.85 to 0.95. Between I-10 and the I-10 Reliever, daily forecast volumes range from 160-190,000 with peak hour volume-to-capacity ratios in the 0.65 to 0.75 range. Immediately south of the I-10 Reliever and across the Salt River volumes in the 220-240,000 range are forecast with peak hour volume-to-capacity ratios in excess of 0.90. Within the developed section of southern Goodyear forecast volumes fall rapidly as one progresses south. In the northernmost sections a daily volume of 180,000 (with a peak hour volume-to-capacity ratio under 0.80) is forecast for 2030, 90,000 (volume-to-capacity ratio 0.35) just north of Riggs Road and 45,000 (volume-to-capacity ratio less than 0.20) at the southern terminus of the Loop 303 Extension at Komatke Road.

Under Option C the facility's 10 lanes are expanded to 12 lanes between the I-10 Reliever and Riggs Road. North of the I-10 Reliever traffic forecasts vary little from the traffic forecast under Option A for the year 2030. Immediately south of the I-10 Reliever and across the Salt River volumes of 230-

250,000 are forecast with peak hour volume-to-capacity ratios between 0.80 and 0.90. Within the developed section of southern Goodyear forecast volumes fall rapidly as one progresses south. In the northernmost sections a daily volume of 190,000 (with a peak hour volume-to-capacity ratio of 0.70) is forecast for 2030, 90,000 (volume-to-capacity ratio 0.30) just north of Riggs Road, and 45,000 (volume-to-capacity ratio less than 0.20) at the southern terminus of the Loop 303 Extension at Komatke Road.

5.10 New Expressways

Expressways provide the means for somewhat higher speed automobile and truck travel than provided by arterials roads, but somewhat slower speed travel than found on freeways. Expressways have some at-grade intersections but restricted access from abutting properties.

Table 5A-1 (in Appendix V) reveals that there are only 21 existing centerline miles of expressway in the SWATS area and that number increases to 90 under the Option A and Option C networks. The existing expressways are MC-85 west of Litchfield Road to Miller Road in Buckeye and Loop 303. Under the Future Base network MC-85 is downgraded to an arterial. However, SR-85 from Gila Bend north to a point just south of the Gila River is upgraded to an expressway facility. Under the Enhanced network Sun Valley Parkway, 339th Avenue, and 355th Avenue north of I-10 are upgraded to expressway facilities and SR-85 is modeled with 6 lanes. The Option A and Option C networks add the Rio Salado Parkway and the Riggs-Komatke Road Expressway. These are major new potential expressway corridors and are shown in Figure 5-86. The expressway improvements in each network are shown in Table 5-9.

Table 5-9
Centerline Miles of New and Widened Expressways

	Network		
	Future Base	Enhanced	Options A and C
SR-85 - 4 lanes	31		
SR-85 - 6 lanes		31	
US 60 - 6 lanes	2		
Sun Valley Parkway - 6 lane		5	
339th Avenue - 4 lanes		3	
363rd Avenue - 4 lanes		2	
Rio Salado Expressway - 6 lanes			10
Rigg, Komatke, Maricopa Roads Expressway - 6 lanes			31

Table 5-10 shows the estimated costs associated with the expressways in each of the model networks. SR-85 is shown in both the Future Base and Enhanced networks. The costs are not cumulative, but assume each project upgrades the existing facility.

5.10.1 SR-85

The SR-85 conversion from a 2 lane rural highway to an expressway is one of the two most expensive expressway projects because of its comparatively long length. Under the Future Base network with a 4 lane expressway, volumes forecast for 2030 exceed 50,000 vehicles per day and peak hour volume-to-capacity ratios are greater than 0.90. Under the Enhanced network with 6 lanes, volumes of 60,000 and volume-to-capacity ratios of 0.70 are found south of Komatke Road. North of Komatke Road volumes exceed 70,000 and volume-to-capacity ratios exceed 1.00. Under the Option A and Option C networks volumes are generally below 60,000 with volume-to-capacity ratios over 0.80 north of Komatke Road, while volume-to-capacity ratios less than 0.55 are found south of Komatke Road. (Volumes are shown on Figures 5-36 through 5-45 and volume-to-capacity ratios on Figures 5-62 through 5-66.)

Table 5-10
Expressway Costs in Millions of 2003 Constant Dollars

		Network		
	Cost per Mile	Future Base	Enhanced	Options A and C
SR-85 - 4 lanes	4	124	-	-
SR-85 - 6 lanes	5	-	155	-
US 60 - 6 lanes	5	10	-	-
Sun Valley Parkway - 6 lane	3	-	15	-
339th Avenue - 4 lanes	4	-	12	-
363rd Avenue - 4 lanes	4	-	8	-
Rio Salado Expressway - 6 lanes	6	-	-	60
Rigg, Komatke, Maricopa Roads Expressway - 6 lanes	5	-	-	155
Total		**$134**	**$190**	**$215**

5.10.2 Sun Valley Parkway

In the Future Base network Sun Valley Parkway is widened from a 4 to a 6 lane arterial. In the Enhanced network it is further upgraded to a 6 lane expressway. On the 4 lane road in the Future Base network, traffic volumes are highest north of the Tonopah-Salome Highway where daily volumes in 2030 are forecast at about 45,000 with peak hour volume-to-capacity ratios near 0.90. These volumes fall to less than 30,000 with volume-to-capacity ratios under 0.60 south of Camelback Road. Under the 6 lane Enhanced, Option A, and Option C networks the heaviest volumes on the facility increase to 50,000 with volume-to-capacity ratios of about 0.80.

5.10.3 339th Avenue and 355th Avenue

In the Enhanced network these two facilities are upgraded to 4 lane expressways. In the Future Base they are 4 lane arterials. In the Future Base network 339th Avenue has an interchange with I-10 but 355th Avenue does not. It should be noted that 355th Avenue in the SWATS area is to become a portion of the CANAMEX highway, connecting to Wickenburg Road north of the study area. Volumes forecast for 2030 on 339th Avenue are about 20,000 with peak hour volume-to-capacity ratios of 0.50, while 355th Avenue has even lower values. Under the Enhanced, Option A, and Option C networks 339th Avenue has an interchanges with I-10. Under the Enhanced, Option A, and Option C networks, daily volumes on 339th Avenue drop to 10,000 (volume-to-capacity ratios of 0.25), while volumes on 355th Avenue are extremely minor on the order of 2,000.

5.10.4 Rio Salado Parkway

The potential 6 lane Rio Salado Parkway enters the study area from downtown Phoenix and parallels the Salt River to the river's south as far west as 75th Avenue where it crosses the river and turns north ending at the interchange of the Loop 101 Extension and the I-10 Reliever. This new facility is included in the Option A and Option C networks. It includes a major bridge over the Salt River whose cost is shown in Table 5-8. In 2030 under both networks the facility is forecast to carry about 65,000 vehicles per day west of 59th Avenue and about 40,000 east of 59th Avenue, with peak hour volume-to-capacity ratios of 0.95 and 0.65, respectively.

5.10.5 Riggs, Komatke, and Maricopa Roads

A potential expressway was included in the Option A and Option C highway networks. The expressway would start at SR-85 and continue east along Komatke Road to Riggs Road, which it then follows to the Loop 303 Extension in southern Goodyear. The potential expressway overlaps the Loop 303 Extension south and rejoins Komatke Road and Maricopa Road east into Pinal County. In the Future Base network and Enhanced networks these facilities are 4 lane arterials.

Under the Future Base and Enhanced networks daily volumes forecast for 2030 east of SR-85 to the Loop 303 Extension are in the 20-30,000 range with peak hour volume-to-capacity ratios of 0.85 to more than 1.00. Volumes are about 10,000 in the north/south section of the facility overlapping the Loop 303 Extension with volume-to-capacity ratios of 0.50. On the southerly section along Komatke and Maricopa Roads volumes are 40,000 with volume-to-capacity ratios of 0.95 and higher.

Under the Option A and Option C networks volumes drop west of Rainbow Valley Road to 11,000 vehicles per day forecast for 2030 with peak hour volume-to-capacity ratios of 0.40. Further east between Rainbow Valley Road and the Loop 303 Extension volumes are 50,000 with volume-to-capacity ratios of 0.75 to 0.85. The section of overlap with the Loop 303 Extension has volumes of 45,000 and volume-to-capacity ratios less than 0.20. South of the Loop 303 Extension volumes are in the 50-60,000 range with volume-to-capacity ratios of 0.80.

5.11 Transit

Potential future transit improvements in the SWATS area have been identified through the MAG High Capacity Transit Study and the RPTA Regional Transit Systems Study (RTS). Those studies are the basis for the information included in this section.

5.11.1 High Capacity Transit Study

The MAG High Capacity Transit Study (HCTS) investigates the potential for transit with higher capacities than traditional transit buses and includes consideration of light rail transit (LRT), bus-rapid-transit (BRT), and commuter rail. LRT, also commonly referred to as a trolley, is currently under advancement in Phoenix and Tempe. Two types of BRT are included in the HCTS. Dedicated BRT would generally operate on separate rights-of-way but could operate on streets in mixed traffic. Express BRT would operate along freeways in HOV lanes and be similar to express bus service. Commuter rail service is operated on traditional railroad tracks with equipment similar to Amtrak passenger cars.

The draft HCTS report recommends a number of corridors in the SWATS area where high capacity transit should be given further consideration in response to growing highway congestion and the need for alternative modes of transportation.

The draft HCTS recommends a set of corridors in which services should be further investigated. Corridors are identified based on the nearby roadways. That identification does not indicate a specific alignment, but rather a general location in which high capacity transit may be needed.

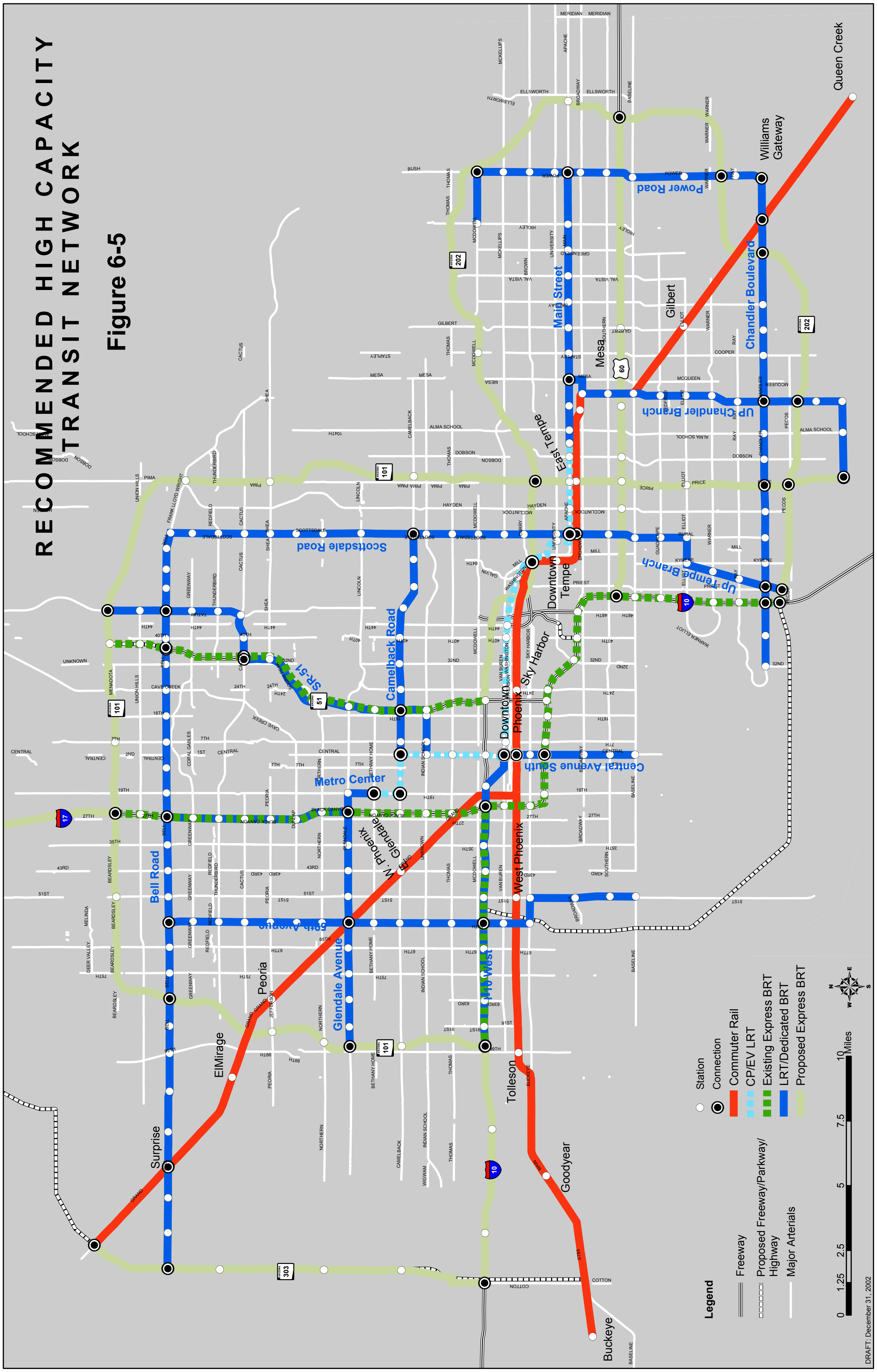
The draft HCTS recommends the following corridors in the SWATS area for further consideration:

- LRT or Dedicated BRT in the I-10 corridor from downtown Phoenix to Loop 101;
- Express BRT in the I-10 corridor to from Loop 101 to Loop 303;
- Express BRT in the Loop 101 corridor north of I-10;
- Express BRT in the Loop 303 corridor north of I-10;
- LRT or Dedicated BRT in the 51st/59th Avenue corridor north of Baseline Road; and
- Commuter rail along the Union Pacific corridor from downtown Phoenix to Buckeye.

Figure 5-87 presents the location of these potential transit facilities in the SWATS area.

5.11.2 Regular Fixed Route and Demand Responsive Bus Transit

The RPTA Regional Transit Systems Study (RTS) shows a substantial increase in the service area of regular route and demand responsive transit services in the SWATS area. Figure 5-88 shows the service area for fixed route and demand responsive transit recommended in the RTS Final Report for the SWATS area. The figure shows the transit service area expanding west of the White Tank Mountains and south of the Gila River into southern Goodyear. The current transit service area does not extend west of 83rd Avenue except for limited service to Tolleson, Avondale, and Litchfield provided by the 560, 561, and 131 START routes.


RECOMMENDED HIGH CAPACITY TRANSIT NETWORK
Figure 6-5
Legend
Freeway
Proposed Freeway/Parkway/Highway
Major Arterials
Station
Connection
Commuter Rail
CP/EV LRT
Existing Express BRT
LRT/Dedicated BRT
Proposed Express BRT
0
1.25
2.5
5
7.5
10
Miles
DRAFT: December 31, 2002
* Source: MAG High Capacity Transit Plan, 2003
Bell Road
Scottsdale Road
Camelback Road
SR-51
Metro Center
Glendale Avenue
59th Avenue
I-10 West
Central Avenue South
Main Street
Power Road
Chandler Boulevard
UP Chandler Branch
UP Tempe Branch
Downtown Phoenix
West Phoenix
W. Phoenix Glendale
Sky Harbor
Downtown Tempe
East Tempe
Surprise
ElMirage
Peoria
Tolleson
Goodyear
Buckeye
Mesa
Gilbert
Williams Gateway
Queen Creek

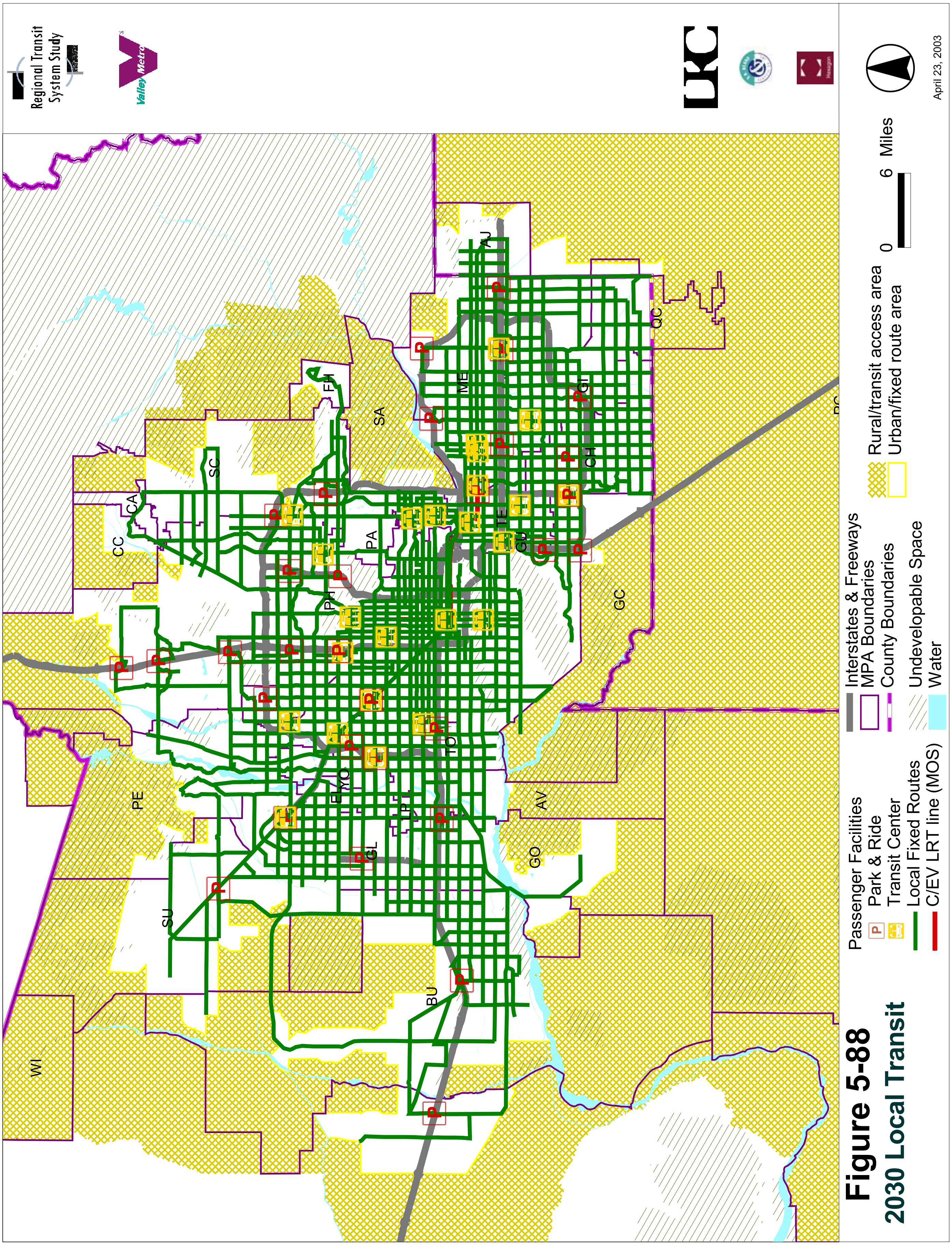


Figure 5-88
2030 Local Transit

In general future fixed route services would follow the arterial grid (as shown on Figure 5-88), consistent with the current practice, and the demand responsive service would serve the same area as served by the fixed route service.

The draft RTS identifies a set of Regional Transit Routes designed to replace existing express and bus-rapid-transit services. These routes would operate on a limited number of freeways and arterials and provide longer distance, higher speed services with limited stops. Figure 5-89 shows the routes recommended in the draft RTS in the SWATS area.

The draft RTS estimates the amount of service needed in each jurisdiction. Table 5-11 shows the number of revenue miles of service needed every day in each of the jurisdictions in the SWATS area in 2000 and in 2030. The estimate includes each jurisdiction in its entirety, including portions outside of the SWATS area. The estimate shows that transit service needs will grow substantially between 2000 and 2030.

The RTS proposes two new park-and-ride facilities in the SWATS area in addition to the one already planned along I-10 near Litchfield Road. The additional park-and-ride facilities are to be located along I-10 near Miller Road and 339th Avenue, as shown in Figure 5-88. The only existing formal park-and-ride facility in the study area is located along I-10 at 79th Avenue.

Table 5-11
Vehicle Revenue Miles of Transit Service Needed in 2030
(source Draft RTS)

	2000	2030			
Jurisdiction	**Total**	**Total**	**Fixed Route**	**Circulator**	**Other**
Avondale	1,052.0	4,367.0	3,930.0	257.0	180.0
Buckeye	564.0	16,510.0	15,625.0	-	1,929.0
Gila Bend	81.0	763.0	-	-	763.0
Goodyear	778.0	12,371.0	6,515.0	2,400.0	3,456.0
Litchfield Park	103.0	376.0	444.0	-	-
Phoenix	50,844.0	82,271.0	71,916.0	8,986.0	1,369.0
Tolleson	485.0	1,075.0	1,176.0	-	-
Maricopa County - unincorporated portions	2,876.0	5,356.0	4,290.0	-	1,811.0

Note: Includes complete jurisdictions, including portions outside the SWATS area.

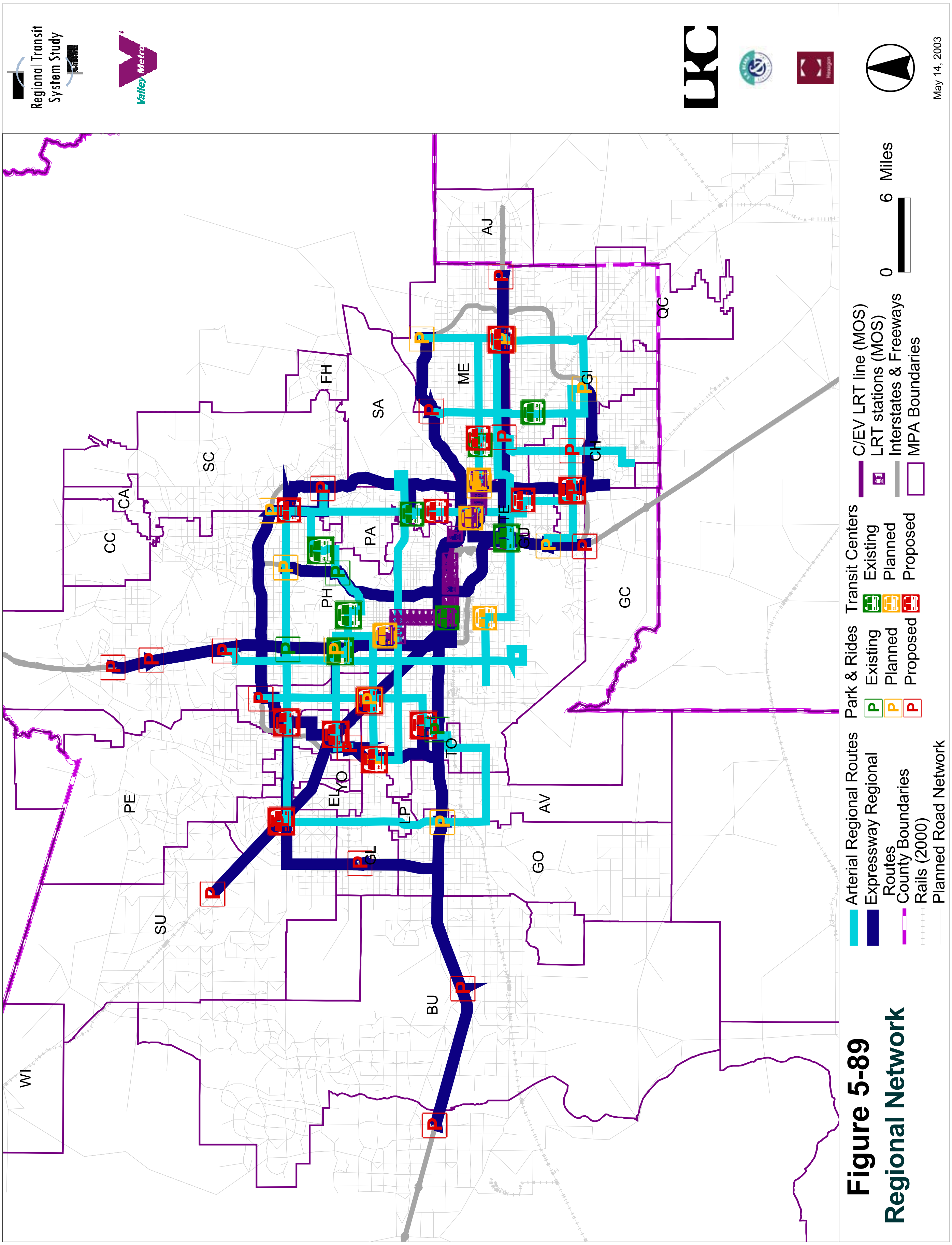


Figure 5-89
Regional Network

5.11.3 Transit Capital Costs

Table 5-12 summarizes the capital costs of the projects noted above from both the HCTS and RTS. The costs for the projects included in the table are estimates derived from the HCTS and RTS. The HCTS recommends LRT or BRT in the I-10 corridor west of downtown Phoenix. Since the HCTS provides no BRT cost estimate for this corridor, an estimate of half of the LRT capital cost is shown on the table consistent with a similar relationship in other corridors.

Figure 5-87 shows that the rail facilities whose costs are included in Table 5-12 extend beyond the boundaries of the SWATS area. The table includes costs for entire projects, not just portions within the SWATS area.

The principal capital costs associated with regular fixed route, demand responsive, and express BRT services are the costs of the buses themselves and their maintenance facilities. The RTS estimates the total capital funding needed for buses over the period 2002 to 2030 at $1.4 billion. The total local transit revenue miles needed for the SWATS area jurisdictions shown in Table 5-11 is 51% of the total required for the Phoenix metropolitan area. Thus an investment of $700 million in buses is needed over the next 30 years. It should be noted that much of that investment will serve areas outside of the SWATS area, since Table 5-11 includes major portions of Buckeye, Goodyear, and Phoenix that are outside the SWATS area.

Table 5-12
Transit Capital Costs
(in millions of 2002 constant dollars)

Project	Cost	BRT
LRT: I-10 from downtown Phoenix to Loop 101	$400	$200
LRT: 51st/59th Avenue corridor north of Baseline Road	730	360
Commuter rail: downtown Phoenix to Buckeye	450	
Park-and-ride - 3 facilities	9	
Buses	700	

Notes: Except for the park-and-ride facilities, all projects include portions outside the SWATS area.
The first two projects are under consideration as either LRT or BRT.

5.12 Non-Motorized

Existing non-motorized facilities are shown on Figures 5-90 and 5-91. Few of the off-road facilities are paved and many are informal. Figure 5-92 shows the draft Regional Off-Street System Plan. The plan shows a variety of facilities in the SWATS area, dominated by potential facilities along river banks, canals, power lines, and railroads. MAG's West Valley Rivers Master Plan recommends multi-use facilities along the Agua Fria River.

Policies that would encourage an orderly expansion of the non-motorized system of facilities include:

- inclusion of bicycle lanes (either on or off-road) in conjunction with construction or widening of arterials where feasible and where part of a regional bike plan;
- identification and adoption of a backbone of regional off-road multi-purpose paved facilities to which local and on-road facilities could be connected to form a complete system of continuous non-motorized facilities serving the SWATS area; and
- provision of bicycle facilities at all transit centers and on all transit vehicles.

Figure 5-90
Existing Off-Road Non-Motorized Facilities

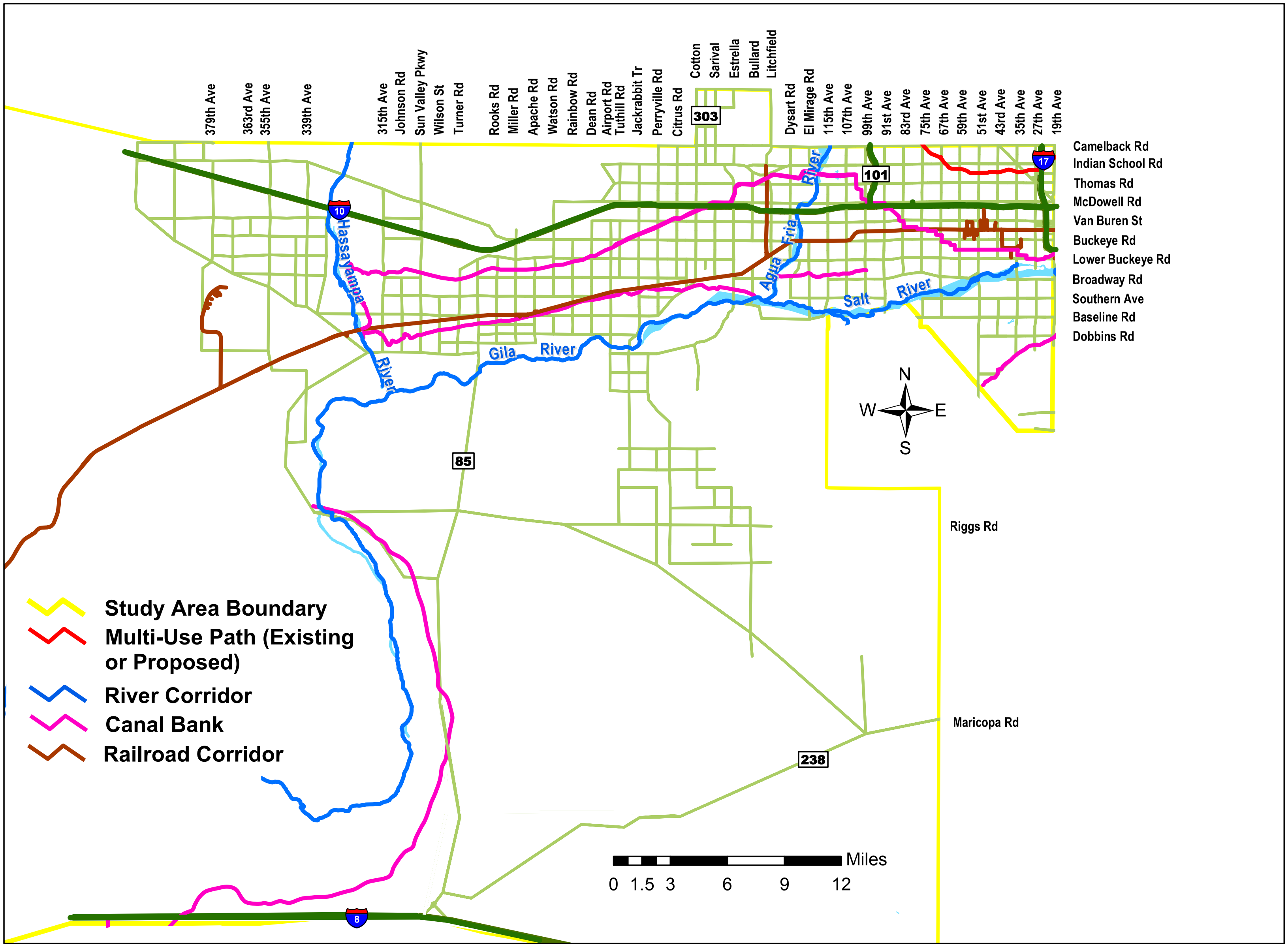
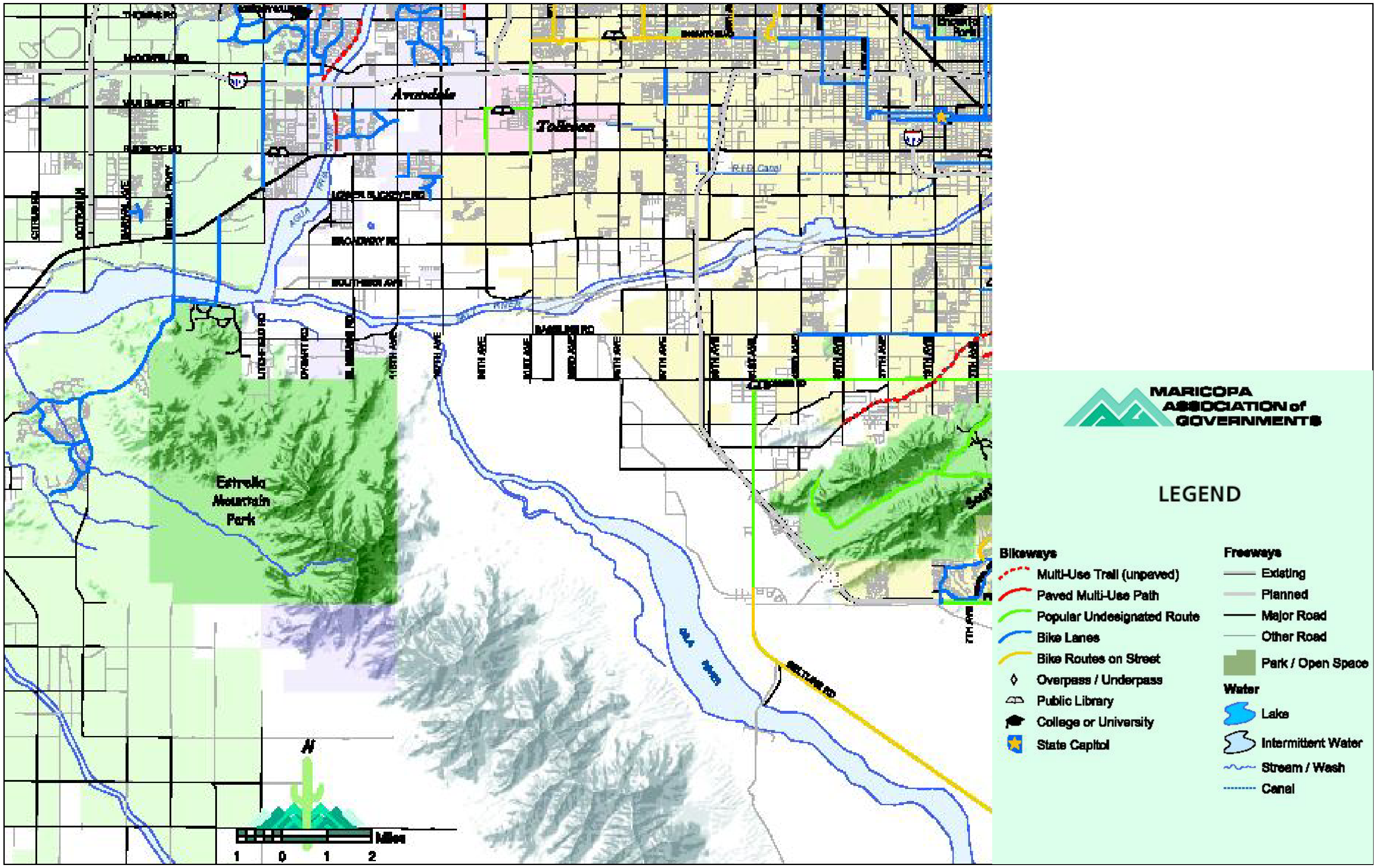


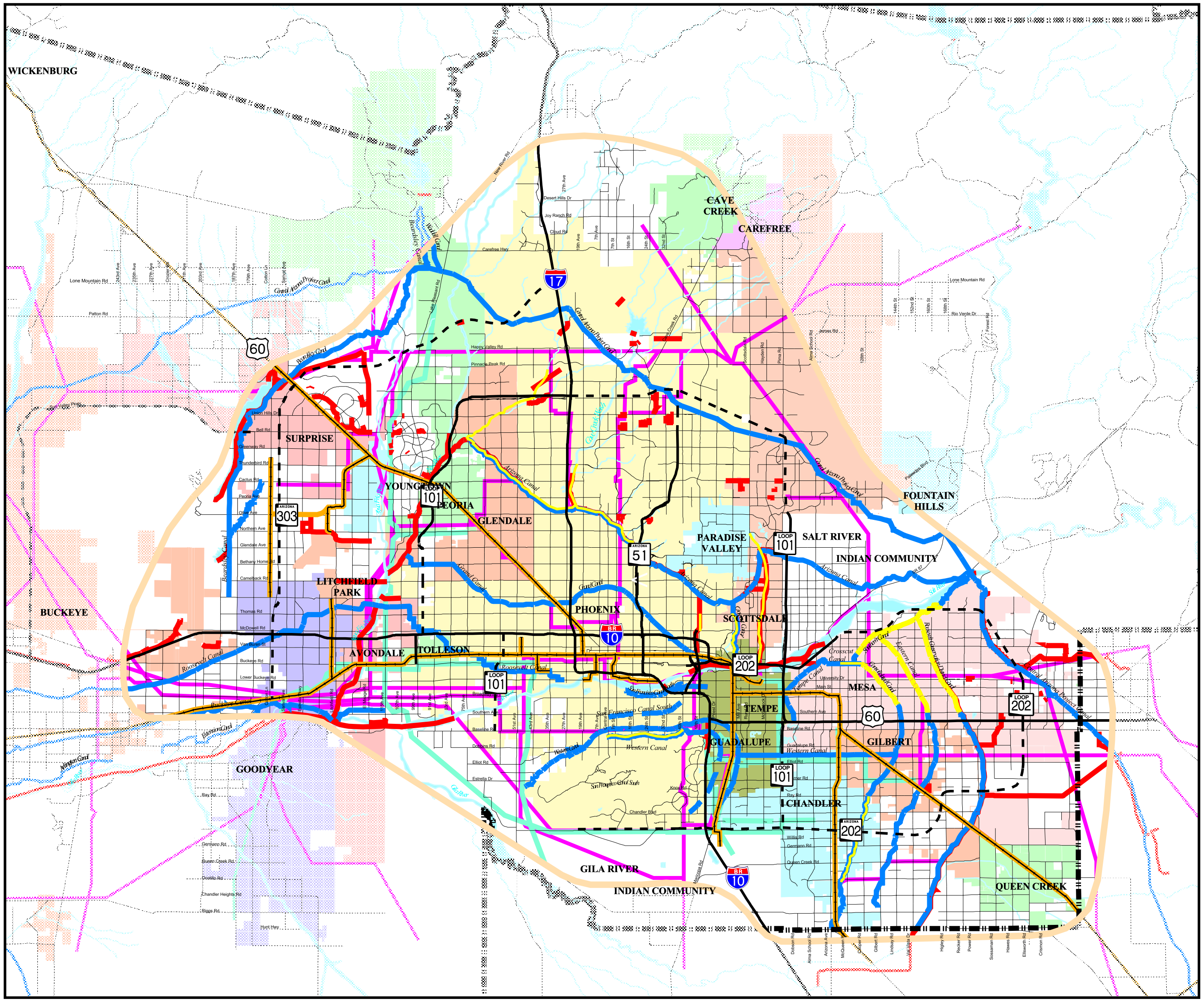
Figure 5-91
Bikeways and Other Non-Motorized Facilities



* Source: MAG Bikeways Map, 2003

Regional Off-Street System Plan

Potential Corridors



Study Area Boundary
Canals
Flood Control Projects
Gas Lines
High Voltage Power Lines
Railroads
Rivers, Streams, and Desert Washes
Existing paved routes within corridors
County Boundary
City Boundaries
Existing Freeways
Planned Freeways
Arterial Roads

N

20000 0 20000 Feet

June 20, 2000

MARICOPA ASSOCIATION of GOVERNMENTS

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6 Ultimate Concepts for Transportation Facilities

6.1 Introduction

This chapter presents the recommendations for transportation improvements in the southwest valley to be considered for inclusion in the MAG Regional Transportation Plan (RTP). The purpose of this paper is to provide recommendations for the ultimate concepts for new and existing facilities. The RTP will consider these recommendations and identify specific facilities for funding over the next twenty years. Facility concepts that are not selected for funding or only for partial funding and constructed in the RTP process will remain as ultimate concepts. In addition to recommending facilities for further consideration as the RTP process proceeds, this paper presents estimated costs for each major facility improvement.

Specific alignments and design of facilities recommended for inclusion in the RTP are not established by this paper. If new facilities that are recommended for funding in this paper are selected for inclusion in the RTP, detailed location and design concept studies will be conducted in the future by the Arizona Department of Transportation (ADOT) to provide information in determining precise alignments and design. It is possible that lower functional classification facilities could be built initially in corridors recommended for major new freeways or expressways, with upgrading to higher class facilities considered subsequently.

The costs of the projects recommended for consideration in the next steps of development of the RTP are based on the application of unit costs to the recommended projects. In the case of transit projects, costs are taken from MAG's High Capacity Transit Study (HCTS) and from the the Regional Public Transportation Authority's (Valley Metro's) Regional Transit System Study (RTS). In the case of highway bridges a cost per square foot is used. In the cases of other highway and non-motorized projects a cost per linear mile is used, unless more detailed estimates for the project are available. Costs are in current dollars and are based on recent construction. Each section below provides an explanation of the details of cost estimation in the section. Unit costs are consistent with MAG's Northwest and Southeast area studies.

Crossings of major rivers are included among the recommendations because of the number of rivers in the study area and the higher calculable costs of providing bridges across them. Cost estimates are included for the major river crossings of the Salt River, the Gila River, the Agua Fria River, and the Hassayampa River.

This chapter concludes with a summary of the estimated costs of the facilities recommended for further action in the development of the RTP.

6.2 Highway Facilities

This section presents a summary of the highway facilities recommended for further consideration in the process of developing the metropolitan RTP. It identifies the recommendations for highway improvements and the costs associated with each recommendation. The recommendations have their foundation in the previous chapter, to which the reader is referred for information and analysis supporting each recommendation.

6.2.1 Arterials

Evaluation of the model outputs indicated that 30 percent of the arterial network should have 6 lanes and the remainder 4 lane. That mixture is recommended for the arterial network shown in Figure 6-1. The figure shows some, but not all, of the 6 lane arterial facilities needed, particularly in the areas west of Airport Road and in southern Goodyear.

The arterial system will be implemented by local jurisdictions. Therefore, it is subject to change following further study, particularly in Goodyear where arterial planning is on-going. For example, the locations of the Arterial Roadway Corridors (ARCs) shown in Figure 6-1 could change or the arterial system serving the Estrella Mountain Ranch development could be updated. The phasing of improvements is dependent on both land development and traffic demand.

It is recommended that the basic grid configuration of the network of the existing arterial system be continued in the undeveloped portions of the study area. Some deviations from the grid, for topographic and other reasons, are expected. The minimum basic arterial cross section recommended is a 4 lane standard.

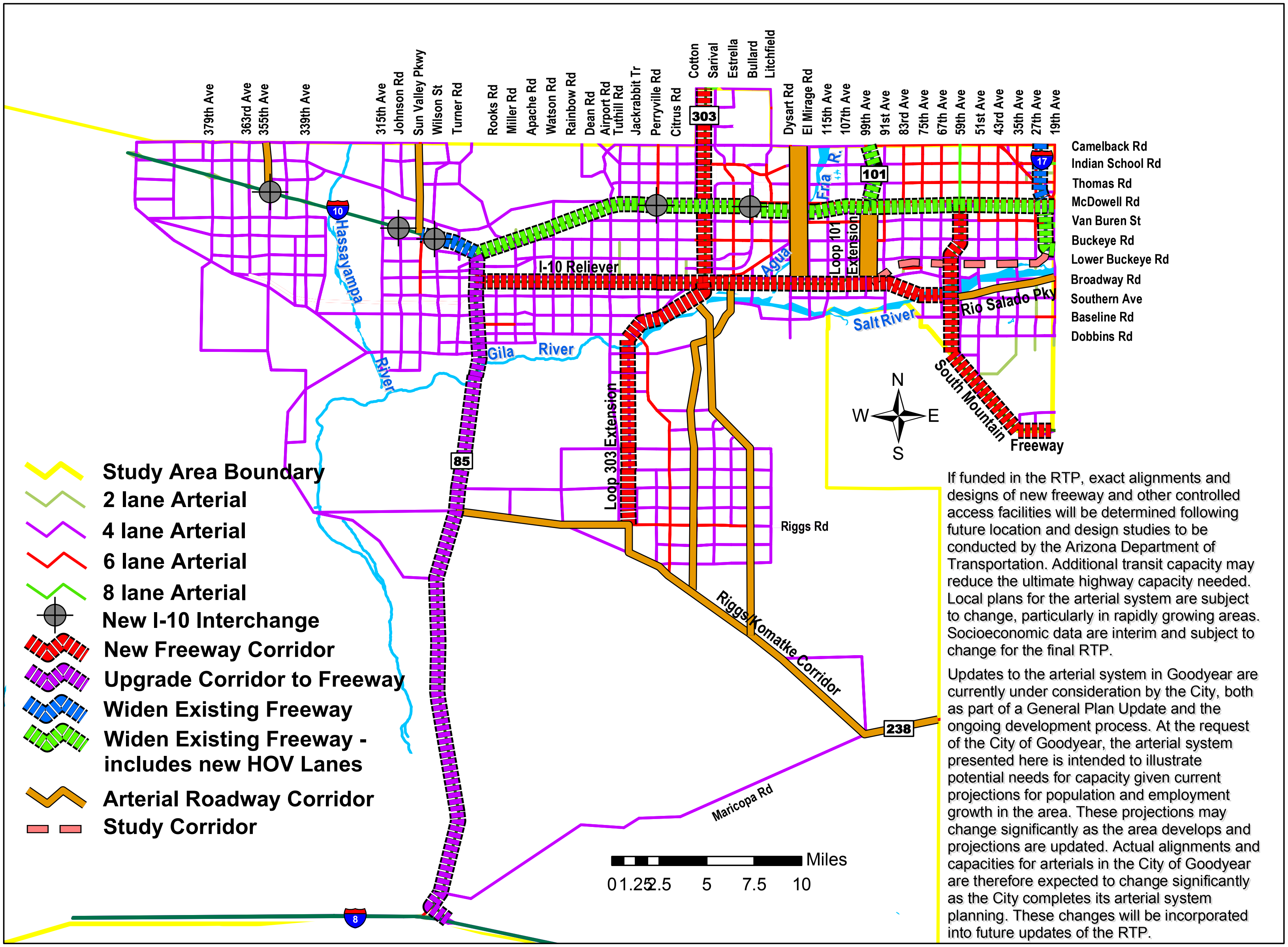
6.2.1.1 Cost Estimate

Arterial costs are shown in Table 6-1. The unit costs are based on recent construction. The costs include $200,000 per mile for bike facilities, either on a widened shoulder or on a separate path paved with asphalt. The costs also include $200,000 per mile for 30 percent of the arterial mileage to provide ITS enhancements for signal coordination and speed and capacity improvements. The estimated arterial mileage and associated cost for the ITS enhancement is beyond the expanded Smart Corridor System developed by MAG.

The costs shown in Table 6-1 are for the network shown in Figure 6-1. The costs assume that 30 percent of the new arterials in the network will be built with 6 lanes and 70 percent with 4 lanes. The costs also assume that 70 percent of arterial widenings include 2 lanes and 30 percent include 4 lanes. This would provide the desired 30 percent of arterials with 6 lanes if all arterials being widened were 2 lane facilities before widening. Thus the estimate overstates the total costs of arterial widening to the extent that 4 lane arterials are widened to 6 lanes. The costs assume that land for all new arterials will be acquired by dedication at no public cost. The costs assume that widenings from 2 to 4 lanes will require no additional right-of-way, but that widenings from 4 to 6 lanes will require additional right-of-way costing $1 million per mile.

The distribution of arterial improvement costs among private land developers, municipalities, and Maricopa County is not discernible and has therefore not been estimated. Two major factors that

Figure 6-1
Ultimate Concept for Lanes on the Arterial Network



If funded in the RTP, exact alignments and designs of new freeway and other controlled access facilities will be determined following future location and design studies to be conducted by the Arizona Department of Transportation. Additional transit capacity may reduce the ultimate highway capacity needed. Local plans for the arterial system are subject to change, particularly in rapidly growing areas. Socioeconomic data are interim and subject to change for the final RTP.

Updates to the arterial system in Goodyear are currently under consideration by the City, both as part of a General Plan Update and the ongoing development process. At the request of the City of Goodyear, the arterial system presented here is intended to illustrate potential needs for capacity given current projections for population and employment growth in the area. These projections may change significantly as the area develops and projections are updated. Actual alignments and capacities for arterials in the City of Goodyear are therefore expected to change significantly as the City completes its arterial system planning. These changes will be incorporated into future updates of the RTP.

Table 6-1
Arterial Network Costs
(in millions of constant 2003 dollars)

	Cost per Mile	Centerline Miles	Estimated Cost
New 4 Lane	$3.0	206.3	619
New 6 Lane	4.0	88.4	354
Widen by 2 Lanes	3.5	437.6	1,532
Widen by 4 Lanes	4.5	187.5	844
Bike Facilities	0.2	1,057.1	211
ITS	0.2	317.1	63
Total			**$3,623**

Note: These estimates are preliminary and may be superseded by estimates in the RTP.

will affect the distribution of these costs between the private and public sectors are the type of land development, the size of individual developments, and the extent to which development is contiguous. Whether land is developed for residential, commercial, industrial, or recreational purposes strongly influences the amount of traffic the land use will create on adjacent streets and highways. Development with more intense traffic generation will result in more private sector contribution to the development of arterial system upon which much of the traffic generated can be expected to travel. Development of uses with less intensive traffic generation results in less impact to the arterial system and thus less demand upon developers to provide arterial improvements.

Similarly, small developments will have smaller levels of traffic generation. Development of smaller uses with smaller amounts of traffic generation results in less impact to the arterial system and thus less demand upon developers to provide arterial improvements. However, the cumulative impacts of smaller developments can be greater than larger developments, thus increasing the need for the public sector to fund arterial improvements.

Development which is not contiguous can create arterials of varying width (known as "scalloped streets" because of the changing curb location). As the development of land whose access depends upon the narrow sections of an arterial roadway increases, the ability of the narrow sections to handle traffic demand may deteriorate to the point that the public sector is pressured to remove the traffic bottlenecks created by the narrow sections.

In order to address the "scalloped streets" issue, it is recommended that local jurisdictions create a local or cross-jurisdictional policy for contiguous, standard roadway cross-sections along with an identified funding source such as impact fees.

6.2.2 Major Arterial River Crossings

Three new arterial major river bridge crossings are needed:

- Rainbow Valley Road over the Gila River;
- Thomas Road over the Agua Fria River; and
- Camelback Road or Tonopah-Salome Highway over the Hassayampa River.

The Tonopah-Salome Highway bridge over the Hassayampa River is recommended for the third location since it will require a shorter span, and thus lower cost, than a bridge on Camelback Road.

The Camelback Road location could be improved with a low lying river crossing that would flood during storm events. These two Hassayampa River crossings could be funded by nearby land developers.

Construction of these three new arterial bridges is shown in Figure 6-2 along with actions recommended at each river crossing location. An arterial bridge at 59th Avenue to serve local traffic may also be needed ultimately, especially if the final location determined in the ongoing Design Concept Study for the South Mountain Freeway is not in the 59th Avenue corridor. These 4 bridges are recommended and are included in the cost estimate for projects to include in the continuing development of the RTP.

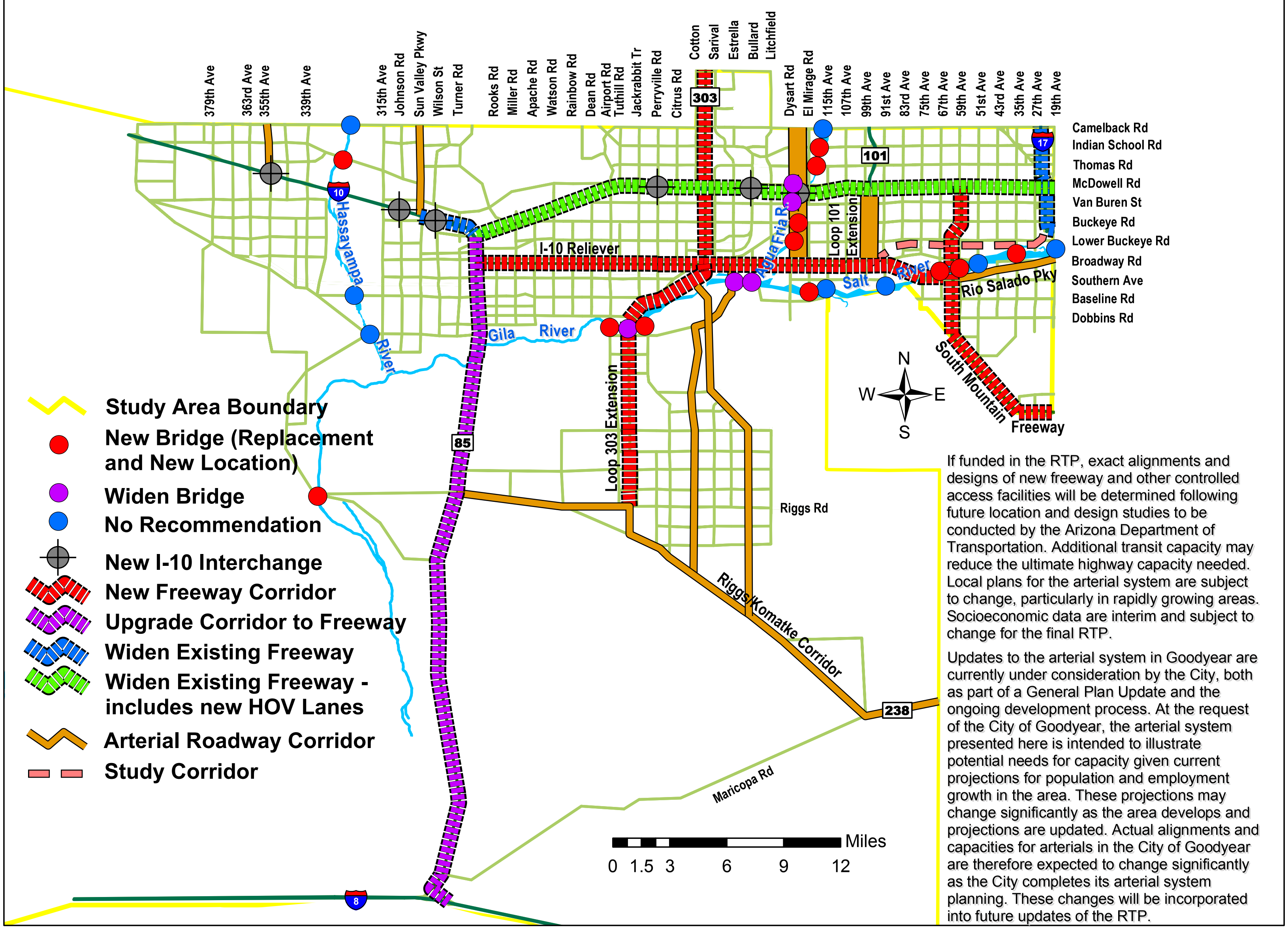
A number of existing major arterial river crossings will require widening. In some cases the existing bridge can be expected to be demolished and a new bridge constructed. In other cases, the existing bridge may be widened. In a number of cases existing river crossings do not involve a bridge, but low-lying roads that may flood during storm events. All of the existing arterial river crossings are

Table 6-2
Arterial Crossings of Major Rivers: Improvements and Cost Estimates
(in millions of constant 2003 dollars)

Road	River	Current Lanes	Future Lanes	Add'l Lanes	Current Condition	Action	Est'd Cost
19th Ave	Salt	4	4	0	Not Deficient	None	
35th Ave	Salt	2	4	2	Deficient	Build	$4.7
51st Ave	Salt	2	4	2	Not Deficient	None	
59th Ave	Salt	0	4	4	No Crossing	Build	9.4
67th Ave	Salt	2	4	2	Road	Build	9.4
91st Ave	Salt	2	4	2	Road	None	
115th Ave	Gila	4	4	0	Not Deficient	None	
El Mirage	Gila	4	4	0	Road	Build	46.8
Bullard	Gila	2	4	2	Not Deficient	Widen	7.3
Estrella Parkway	Gila	2	4	2	Not Deficient	Widen	11.5
Rainbow Valley	Gila	0	4		No Crossing	Build	24.0
Tuthill	Gila	2	4	2	Not Deficient	Widen	8.3
Airport	Gila	2	4	2	Road	Build	18.7
Old US 80	Gila	2	4	2	Deficient	Build	15.6
Camelback	Agua Fria	4	4	0	Not Deficient	None	
Indian School	Agua Fria	4	4	0	Deficient	Build	15.2
Thomas	Agua Fria	0	6		No Crossing	Build	13.6
McDowell	Agua Fria	4	6	2	Not Deficient	Widen	5.8
Van Buren	Agua Fria	4	6	2	Not Deficient	Widen	3.1
CR-85	Agua Fria	4	4	0	Not Deficient	Build	11.3
Lower Buckeye	Agua Fria	2	4	2	Road	Build	23.4
Tonopah Salome	Hassayampa	2	4	2	Road	Build	11.0
Baseline	Hassayampa	2	4	2	Road	None	
Old US 80	Hassayampa	2	4	2	Not Deficient	None	
Total							**$239.0**

Note: This table mainly reflects improvements to existing bridges. Additional highways may need bridges. Therefore these estimates are low. These estimates are preliminary and may be superseded by estimates in the RTP.

Figure 6-2
Recommended Bridge Actions at Major River Arterial Crossings



If funded in the RTP, exact alignments and designs of new freeway and other controlled access facilities will be determined following future location and design studies to be conducted by the Arizona Department of Transportation. Additional transit capacity may reduce the ultimate highway capacity needed. Local plans for the arterial system are subject to change, particularly in rapidly growing areas. Socioeconomic data are interim and subject to change for the final RTP.

Updates to the arterial system in Goodyear are currently under consideration by the City, both as part of a General Plan Update and the ongoing development process. At the request of the City of Goodyear, the arterial system presented here is intended to illustrate potential needs for capacity given current projections for population and employment growth in the area. These projections may change significantly as the area develops and projections are updated. Actual alignments and capacities for arterials in the City of Goodyear are therefore expected to change significantly as the City completes its arterial system planning. These changes will be incorporated into future updates of the RTP.

shown in Table 6-2 along with the 4 new crossings noted above. The costs of widening, replacing, or constructing bridge facilities at these locations are included in the cost estimate for projects recommended for inclusion in the RTP.

Table 6-2 shows the current number of lanes at each major arterial river crossing along with the number of lanes needed in the future. The current condition of bridges at these crossings is also shown, derived from available NBIS data which typically provides: year built, sufficiency rating, deck width, bridge length, and other details. Actual condition evaluations are not included in this planning study, nor are normal maintenance or emergency repair costs. It is further assumed that all existing and proposed bridges will require normal maintenance over time and may require repairs or replacement for conditions not considered in this study. The categories of current bridge condition are:

- Not deficient – a bridge with no major deficiencies, but which may be scour critical or not meet current rail safety standards;
- Deficient – a bridge with a sufficiency rating indicating that the bridge is functionally obsolete;
- No crossing – a location with no river crossing currently; and
- Road – a location with a low-lying road that may flood during storm events.

The table shows the action needed at each major arterial river crossing:

- Widen – the existing bridge is not functionally obsolete but is too narrow to accommodate future traffic demand;
- Build – construction of a bridge at this location is needed either because there is no existing bridge or the existing bridge is functionally obsolete; and
- None – the existing bridge has not functionally obsolete and is wide enough to handle the number of future lanes, or the existing crossing is a low-lying road for which a bridge replacement is not indicated.

No bridge construction is indicated at two low-lying crossings. These are 91st Avenue across the Salt River and Baseline across the Hassayampa River. In each case, the forecast traffic volumes are too low to justify widening of the existing facility or bridge construction before 2030. As noted above, the use of 2030 as the planning horizon may be too short a time frame upon which to base the need for a bridge at these locations.

6.2.2.1 Cost Estimate

Table 6-2 shows the estimated costs for arterial bridges crossing major rivers in the study area. The table shows the number of lanes to be added for bridge widening and the number of lanes for new construction. Completed width will be 78 feet for 4 lane bridges and 100 feet for 6 lane bridges. Bridge length was estimated based on the length of existing facilities, nearby facilities, and aerial photography. A unit cost of $120 per square foot was used to estimate costs at each crossing. The cost estimate for widening of the Estrella Parkway bridge over the Gila River is based on construction of a second parallel 44 foot wide bridge, rather than a widening of the existing bridge. There are no separate cost estimates included for the demolition of existing bridges where new replacement bridges would be constructed.

6.2.3 Freeways, Expressways, Parkways and ARCs

The following sections present the individual freeway, expressway, parkway and arterial roadway corridor (ARC) facilities recommended for inclusion in the RTP. The recommended corridors are shown in Figure 6-3. Facilities needed to meet 2030 forecast traffic demand are shown in Figure 6-3 and their estimated costs are presented in Table 6-3. It is important to note that although this study could not quantify the effects of additional transit capacity, ultimate roadway capacity needed may be reduced with additional transit capacity.

Facilities categorized as freeways generally are high volume, high speed, and limited access via specific access points such as interchange ramps, with non-motorized restrictions. New expressways have partial access control and to be upgradeable to freeway standards at a later time.

Parkways are similar to expressways relative to operations, with enhanced aesthetics such as landscaping and beautification. Parkways may or may not be upgradeable to full freeway standards. Arterial roadway corridors (ARCs) are enhanced arterials, and are defined in this study as a minimum 4 lane facilities, primarily in the urban area. ARCs may or may not be upgradeable to expressways, parkways, or freeways at a later time. Upgrading facilities from one category to another will depend on such criteria as capacity demand, available funding, and local and regional support. Alignments and designs of any new freeway, expressway, parkway or ARC will be determined in location and design studies to be conducted by ADOT in the future.

6.2.3.1 Cost Estimation

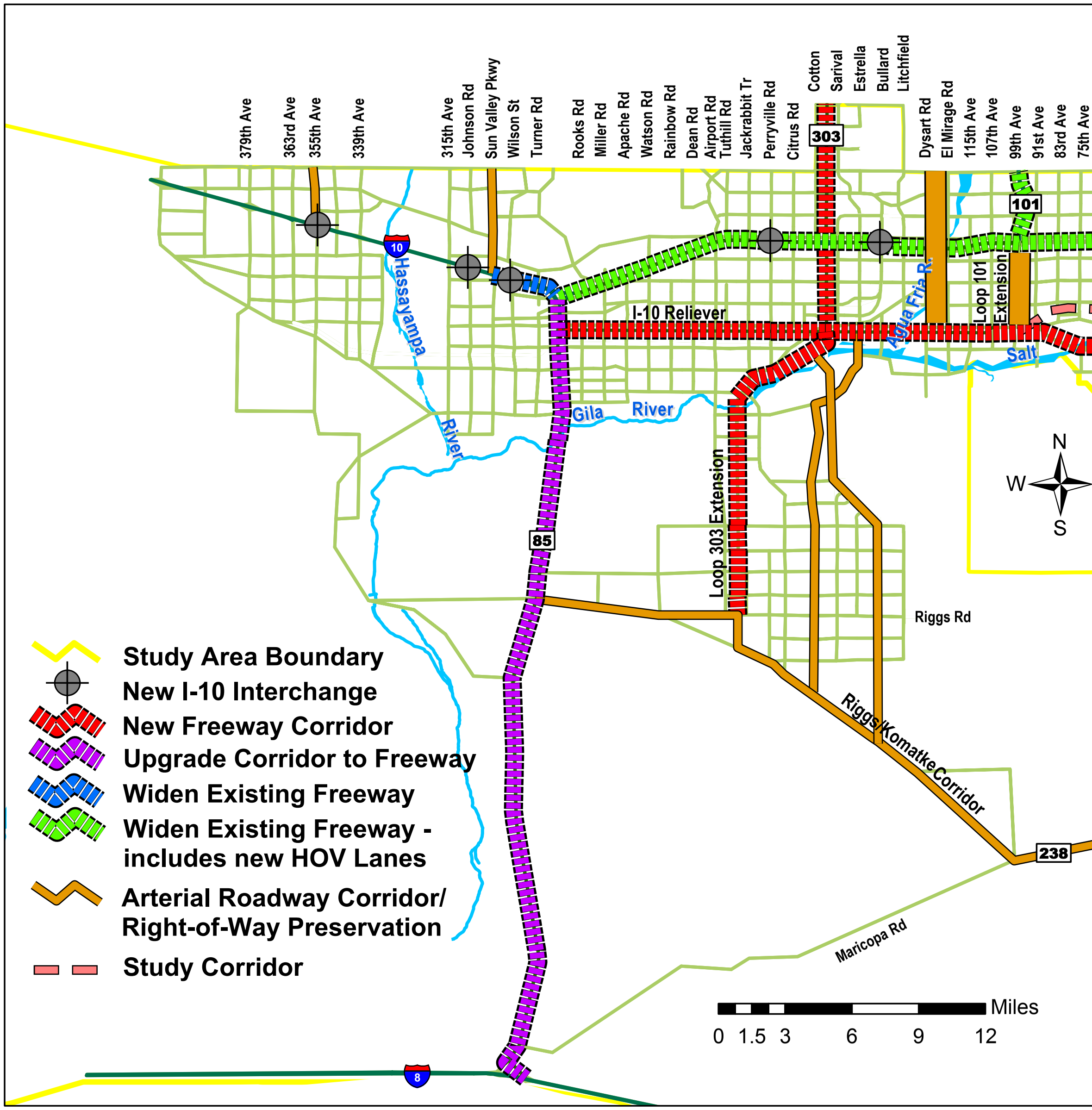
The estimated costs of the freeway and expressway facilities recommended for further consideration in development of the RTP are presented in Table 6-3. Freeway and expressway costs per mile for widening and new construction are shown in Table 6-4. The table shows the estimated cost of new freeway and expressway facilities of various widths and under three right-of-way acquisition scenarios in which no right-of-way acquisition is required, half of the right-of-way must be acquired by purchase, and all of the right-of-way must be acquired by purchase. Right-of-way acquisition estimates must be treated with extreme caution because these costs vary widely.

Costs for new construction of freeways are extrapolated from recent construction costs for a 6 lane freeway and include typical interchanges, overpasses and underpasses, and other standard freeway facilities. Because of their high cost, freeway to freeway interchanges (system interchanges) are a separate cost item at $100 million each for a full interchange between two freeways neither of which ends at the interchange. System interchange costs for an interchange at which one freeway terminates are estimated at $50 million. System interchange costs for separate HOV lane improvements are estimated at $35 million, with the only such occurrence in the SWATS area at the interchange of I-10 and Loop 101 calculated at $17 million due to the northerly termination of the Loop 101 Extension at I-10.

Costs for freeway widenings are extrapolated from recent construction costs for adding two lanes (one in each direction). The addition of multiple lanes in a direction is estimated to enjoy an economy of scale reflected in Table 6-4. Existing right-of-way is assumed to be sufficient to accommodate widenings up to 4 lanes. Right-of-way acquisition is assumed to be required for widenings of more than 4 lanes. Based on recent construction, costs for additional interchanges along existing freeways are estimated at $16 million per interchange including right-of-way.

Freeway widening and new freeway construction include $1 million per mile to provide instrumentation for traffic management, as shown in the ITS column of Table 6-3.

Figure 6-3
Ultimate Concepts for Major Highway Infrastructure Based on 2030 Demand Estimates



If funded in the RTP, exact alignments and designs of new freeway and other controlled access facilities will be determined following future location and design studies to be conducted by the Arizona Department of Transportation. Additional transit capacity may reduce the ultimate highway capacity needed. Local plans for the arterial system are subject to change, particularly in rapidly growing areas. Socioeconomic data are interim and subject to change for the final RTP.

Updates to the arterial system in Goodyear are currently under consideration by the City, both as part of a General Plan Update and the ongoing development process. At the request of the City of Goodyear, the arterial system presented here is intended to illustrate potential needs for capacity given current projections for population and employment growth in the area. These projections may change significantly as the area develops and projections are updated. Actual alignments and capacities for arterials in the City of Goodyear are therefore expected to change significantly as the City completes its arterial system planning. These changes will be incorporated into future updates of the RTP.

Table 6-3
Estimated Costs* of Ultimate Concepts

(all costs in millions of constant 2003 dollars)

Facility	Miles in SWATS Area	New	Widen	Additional Interchanges & Intersection Improvements	Freeway System Interchanges	Major Bridges	ITS	Bikeway	Total
Arterial Roadways									
Arterials	295	$972	$2,376				$63	$211	$3,623
Major River Arterial Bridges						239			239
Subtotal Arterial Roadways		**$972**	**$2,376**	**$0**	**$0**	**$239**	**$63**	**$211**	**$3,862**
Freeways									
I-10: I-17 to Loop 101	9		734		23		**		757
I-10: Loop 101 to Loop 303	9		254	32		***	**		286
I-10: Loop 303 to SR-85	12		346	16			**		362
I-10: SR-85 to Sun Valley Parkway	3		77	16			**		93
I-10: SR-85 to County Line	39			35					35
I-17: I-10 (west) to Camelback†****	3		230						230
I-17: I-10 (west) to 19th Avenue	3		33						33
South Mountain Freeway†	15	755			50	33	15		853
SR-85 north of Gila River	7	50			50	26	7		133
SR-85 south of Gila River	30	40			50		30		120
I-10 Reliever: I-17 to Loop 101 Extension	10	666			200		10		875
I-10 Reliever: Loop 101 to Loop 303	9	644			50	73	9		776
I-10 Reliever: Loop 303 Extension to SR-85	12	553			100		12		665
Loop 101 Widening: I-10 to Camelback†	3	46			35				81
Loop 303 Extension: Northern to I-10†	6	285			45		6		336
Loop 303 Extension: I-10 to I-10 Reliever	5	235			50		5		290
Loop 303 Extension: I-10 Reliever to Riggs Rd	13	602			50	47	13		712
Subtotal Freeways		**$3,875**	**$1,674**	**$99**	**$703**	**$179**	**$107**	**$0**	**$6,638**
Expressways/Parkways									
Loop 101 Extension††	3	21		16			1	1	39
Sun Valley Parkway: I-10 to Camelback†	5		17	13			1	2	32
Rio Salado Parkway†	10	37					**	4	41
Subtotal Expressways/Parkways		**$58**	**$17**	**$29**	**$0**	**$0**	**$2**	**$7**	**$112**
Transit (based on HCTS and RTS)									
LRT: I-10 from downtown Phoenix to Loop 101		400							400
LRT: 51st/59th Ave corridor north of Baseline Rd		730							730
Commuter rail: downtown Phoenix to Buckeye		450							450
Park-and-ride, I-10 @ Litchfield Road		3							3
Park-and-ride, I-10 @ Miller Road		3							3
Park-and-ride, I-10 @ 339th Avenue		3							3
Bus Rolling Stock		700							700
Subtotal Transit		**$2,289**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$2,289**
Multi-Purpose Paved Trails									
Grand Canal: 19th Ave to 75th Ave†	8							3	3
Agua Fria River Bank†	10							3	3
Gila-Salt River: Agua Fria to Rio Salado Expwy	9							3	3
Gila River Bank: Agua Fria to SR-85	17							6	6
Gila River Bank west of SR-85	6							2	2
Roosevelt Canal: Agua Fria to SR-85	20							7	7
Roosevelt Canal: SR-85 to Hassayampa	8							3	3
Waterman Wash	13							5	5
Hassayampa River†	14							5	5
Subtotal Multi-Purpose Paved Trails		**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$37**	**$37**
GRAND TOTAL		**$7,194**	**$4,067**	**$128**	**$703**	**$418**	**$172**	**$256**	**$12,937**
Percent of Total		56	31	1	5	3	1	2	100

**These estimates are preliminary and may be superseded in the RTP.*
***Included in "New" or "Widen" cost.*
****Major expansion or replacement of the I-10 bridge over the Agua Fria River will be required to accommodate I-10 widening.*
*****Specific improvements to be determined.*
†Project crosses the SWATS area boundary. Estimated cost includes only the portion within the SWATS area.
††Cost estimate is for a 6-lane parkway facility.
LRT projects would cost approximately half as much if developed as BRT projects on exclusive right-of-way.
LRT, Bus Rolling Stock, and Commuter Rail include costs for portions of projects outside the SWATS area.
Bikeway and ITS costs on major bridges are included in the bridge costs.
Some bridge costs for new roadways are included in new roadway costs and some are shown separately in the bridge column.

Table 6-4
Estimated Freeway and Expressway Improvement Costs per Mile including Right-of-Way Acquisition
(in millions of constant 2003 dollars)

		Right-of-Way		
Improvement Type	**Lanes**	**No Cost**	**Full Purchase**	**Half Purchase**
Expressway				
New	4	$3.5	$5.5	*$5.0*
	6	*4.5*	6.5	6.0
Widen	2	3.5		
Freeway				
New	4	*20.0*	*35.0*	27.0
	6	*25.0*	*40.0*	32.0
	8	*35.0*	45.0	40.0
	10	*40.0*	50.0	45.0
	12	*45.0*	60.0	52.0
	14	*50.0*	65.0	*57.0*
	16	*55.0*	70.0	*62.0*
Widen	*2,0	8.0		
	2,2	14.0		
	4,0	*14.0*		
	2,4		25.0	
	4,2		25.0	
	4,4		*31.0*	
	6,0		*25.0*	
	6,2		31.0	
Parallel Separate Bikeway		0.36		

Notes:
**General purpose lanes, HOV lanes*
Italic values are not actually used in any estimate but make the table comprehensive.
These estimates are preliminary and may be superseded by setms in the RTP.

Major freeway and expressway river crossings are estimated as additional costs. Bridge length is estimated based on the length of upstream and/or downstream bridges. Freeway bridges are assumed to be separately constructed for each direction. Freeway bridge width is 12 feet per lane plus 24 feet for shoulders on both sides. An additional 2 feet of width is provided on freeway bridges carrying 4 or more lanes to accommodate separation between HOV and general purpose lanes.

Expressway bridge width is 12 feet per lane plus 40 feet for two 12 foot shoulders and 16 feet of sidewalk and railings. Separate multi-purpose paths parallel to expressways are assumed to cross major rivers on shoulders or sidewalks or on low-lying roadbeds with culverts which would be expected to flood during storm events.

Costs for new construction of expressways are based on recent construction cost estimates for arterial roadways. Right-of-way costs are additional as shown in Table 6-4. Intersection improvements are included for expressways at $2.5 million per intersection plus $0.75 million per intersection where right-of-way purchase is required. These cost estimates are based on recent arterial intersection construction and right-of-way costs. Costs for new expressways and arterials upgraded to expressways, include costs for providing a separate, parallel, and paved bikeway or multi-purpose path at $360,000 per mile. The costs also include $200,000 per mile for 30 percent of the arterial mileage to provide ITS enhancements for signal coordination and speed and capacity improvement.

6.2.4 I-10

For the ultimate concepts, widenings are necessary along much of I-10 in the study area. Traffic forecast for 2030 indicates demand for 14 lanes (10 general purpose lanes and 4 HOV lanes) east of Loop 101 to I-17 and 12 lanes (10 general purpose lanes and 2 HOV lanes) west of Loop 101 to SR-85. West of SR-85 to Sun Valley Pkwy demand is forecast for 10 general purpose lanes. West of Sun Valley Parkway no need for widening is forecast. These lane configurations are used as the basis for the cost estimate for I-10 improvements is shown on Table 6-5.

Table 6-5
Widenings Recommended on I-10

		Lanes			
		Existing		Recommended	
Section Endpoints	Length in Miles	Genl Purpose	HOV	Genl Purpose	HOV
I-17 to 59th Avenue	4.5	4	1	5	2
59th Avenue to 83rd Avenue	3.0	3	1	5	2
83rd Avenue to Loop 101	1.8	4	0	5	2
Loop 101 to Dysart	4.2	3	0	5	1
Dysart to Loop 303	4.6	2	0	5	1
Loop 303 to Jackrabbit Trail	3.4	2	0	5	1
Jackrabbit Trail to Watson Road	4.7	2	0	5	1
Watson Road to SR-85	4.2	2	0	5	1
SR-85 to Sun Valley Parkway	3.1	2	0	5	0
Sun Valley Parkway to County Line	39.0	2	0	2	0

Despite these widenings, congestion on I-10 is forecast east of Loop 303. Additional east/west capacity on the I-10 Reliever and the Rio Salado Parkway, as noted below in their respective sections, will be needed to provide adequate high speed east/west capacity.

Six new interchanges are included in the cost estimate for I-10. A new interchange is currently under construction at Watson Road and no cost is included here. A new interchange is planned at Sarival Avenue as part of the Loop 303 Extension, where its costs are included. The Loop 303 Extension will also require replacement of the Cotton Road interchange with I-10 and those costs are included in the Loop 303 Extension. The interchange at El Mirage Road is recommended for further study, due to the length of bridge required to cross the Agua Fria River north of the interchange and the presence of a subdivision along its potential alignment north of the interchange. The 6 new interchanges along I-10 included in the cost estimate are located at:

- El Mirage Road (depending on local development plans);
- Bullard Road;
- Perryville Road;
- Wilson Avenue;
- Johnson Road; and
- 355rd Avenue (the future CANAMEX Highway).

Completion of a full HOV interchange at 79th Avenue and implementation of an HOV interchange at 55th Avenue are also recommended.

6.2.4.1 Cost Estimate

Table 6-3 includes the estimated costs of implementing the improvements shown in Table 6-5. The estimate includes costs for the 6 new general purpose interchanges noted above, as well as the HOV interchanges identified. An estimate for construction of the HOV ramps between the I-10 and Loop 101 HOV lanes in also included. In addition, bridge improvements over the Agua Fria will be required to carry the widened highway. A cost of about $35 million for two new bridges, each carrying 5 general purpose lanes and 1 HOV lane, has been estimated, but has not been included in Table 6-3 because the need to replace the existing bridges and the required cross sections of the bridges has yet to be determined.

Major new freeway interchanges with the South Mountain Freeway, Loop 101 Extension, Loop 303 Extension, and SR-85 are not included in the I-10 costs, but in the estimate for each of those intersecting facilities. An estimate of improvements for HOV lane connections at the Loop 101 interchange is included in the estimate.

The cost estimate shows the improvements in five sections from east to west.

6.2.5 I-10 Reliever

The I-10 Reliever is a future freeway corridor between the Salt/Gila river corridor and I-10 serving east/west traffic. Travel forecast for 2030 do not indicated the need for this facility west of SR 85. The eastern terminus, currently shown as a connection to I-17, will require a feasibility study to be performed by ADOT. In addition, a connection to I-10 at the Superstition Freeway (US-60) remains an option for further study. A Major Investment Study (MIS) is recommended to study the corridor for I-10, the I-10 Reliever and High Capacity Transit (HCT).

Travel forecast for 2030 shows demand for a 14 lane facility east of the South Mountain Freeway, a 16 lane facility west of the South Mountain Freeway to the Loop 303 Extension, 10 lanes between the Loop 303 extension and Perryville Road, and an 8 lane facility west to SR-85. It is recommended that the I-10 Reliever have a western terminus at SR-85. These characteristics form the basis for the cost estimate for the I-10 Reliever.

6.2.5.1 Cost Estimate

The cost estimate for the I-10 Reliever is shown on Table 6-3. The costs are presented in three sections: from I-17 to the Loop 101 Extension, from the Loop 101 Extension to the Loop 303 Extension, and from the Loop 303 Extension to SR-85. The costs represent the ultimate width in each section as indicated above. The cost estimate for the section between the Loop 101 Extension and the Loop 303 Extension includes a major river crossing of the Agua Fria River.

The cost estimate includes a major freeway system interchange with I-17. Because the I-10 Reliever will end at I-17, the interchange cost is estimated at half the cost of a major interchange. A full cost major interchange is included at the South Mountain Freeway. A full cost major interchange is also included at the Loop 101 Extension, but its costs are split evenly between the I-10 Reliever's two most easterly sections, since the Loop 101 Extension may represent a temporary western terminus of the freeway.

The costs for the major interchange with the Loop 303 Extension are split between the Loop 303 Extension section south of the I-10 Reliever and the I-10 Reliever section west of the Loop 303 Extension. The costs for half a major freeway system interchange with SR-85 are included in the westerly section of the I-10 Reliever on Table 6-3.

6.2.6 I-17

HOV or "carpool" lanes are needed along I-17 south of I-10 west. The cost estimate for the portion of the carpool lanes west of 19th Avenue (in the SWATS area) is shown on Table 6-3.. North of I-10 west I-17 requires additional capacity, but the configuration of that capacity requires further study. Table 6-3 shows funds set-aside for improvements along the section of I-17 north of I-10 to Camelback Road (the SWATS area boundary). Additional study will be required before decisions can be made with respect to improvements in this corridor.

6.2.7 Loop 101 (Agua Fria)

Loop 101 north of I-10 is recommended for widening. Forecast demand is projected for an additional general purpose lane as well as an HOV or "carpool" lane in each direction. The cost of these improvements for the portion of Loop 101 in the SWATS area is shown in Table 6-3.

6.2.8 Loop 101 Extension (Agua Fria)

While a 10-lane freeway facility from I-10 south to the I-10 Reliever appears to be warranted based on demand, this roadway will require more study before the type of facility and number of lanes can be decided, given concern over potential local impacts. At this time, a parkway facility or higher level arterial facility acceptable to local jurisdictions is recommended for consideration in the RTP.

6.2.8.1 Cost Estimate

The cost for this facility is shown in Table 6-3. The estimate is based on a 6 lane parkway facility. An arterial would have slightly lower costs and a freeway substantially higher costs. The estimate includes provision for a bike facility and ITS improvements such as advanced traffic signal coordination.

6.2.9 Loop 202 (South Mountain Freeway)

The South Mountain Freeway connects the Santan Freeway to I-10 by looping around central Phoenix to the south and west as shown on Figure 6-3. Travel forecast for the year 2030 indicates demand for 10 lanes on the South Mountain Freeway. This configuration is recommended for inclusion in the RTP, pending completion of ongoing studies. The recommendations presented here are planning level representations. Actual alignment and design elements will be determined by project specific studies managed by ADOT.

6.2.9.1 Cost Estimate

The estimated costs for the South Mountain Freeway included in Table 6-3 include only the 15.1 mile portion of the facility in the SWATS area. The estimate is for the facility assuming implementation in a single project. The cost estimate includes bridges over the Salt River. The cost estimate also includes a major freeway system interchange with I-10. The I-10 interchange cost is estimated at half the cost of a major interchange.

6.2.10 Loop 303 Extension (Estrella)

The Loop 303 Extension includes the implementation of a freeway on the alignment of the existing Loop 303 and extending that facility south across I-10 and the Gila River into the southern portion of Goodyear. The Loop 303 Extension is needed into southern Goodyear to provide capacity for high speed north-south travel in the area. Travel forecast for the year 2030 indicates demand for 10 lanes from Northern Avenue south into southern Goodyear, and a diminishing number of lanes in southern Goodyear as the facility approaches its southern terminus at Riggs Road.

The recommendation is for inclusion of the Loop 303 Extension in the RTP. This study does not determine the actual alignment of Loop 303. The recommendation is for an additional study, such as a Design Concept Report (DCR), to be conducted by ADOT for alignment and design elements. The Loop 303 Extension, should it be funded, would be expected to be designated a state highway. This DCR would require close consultations with the local communities to fully identify the local issues and needs. The DCR should include consideration of an alignment in the westerly area of southern Goodyear with Arterial Roadway Corridors serving the eastern area.

A cost estimate was developed based on the following 6 sections:

- 10 lanes from Northern Avenue to approximately 10 miles south of the I-10 Reliever;
- 8 lanes for the next 2 miles; and
- 6 lanes for the last mile to Riggs Road.

6.2.10.1 Cost Estimate

The cost estimate for the Loop 303 Extension is shown on Table 6-3. The costs are presented in three sections: north of I-10, I-10 to the I-10 Reliever, and south of the I-10 Reliever. The costs represent the ultimate width in each section as indicated above. The cost estimate for the section south of the I-10 Reliever includes a major river crossing of the Gila River.

The cost estimate also includes major freeway interchanges at I-10 and the I-10 Reliever. The cost of the I-10 interchange is divided between the sections north and south of I-10. Only half the cost of the I-10 Reliever interchange is included in the section south of the I-10 Reliever; the other half is included in the I-10 Reliever section west of the Loop 303.

The cost estimate for the section north of I-10 assumes that additional right-of-way acquisition is necessary north of Thomas Road and that little or none of the existing facility will be of continuing use. In the most southerly section south of the Gila River in southern Goodyear, the cost estimate assumes that half of the right-of-way will be acquired through dedication during the land development process.

6.2.11 SR-85

SR 85 is recommended ultimately to be a freeway from I-10 to I-8 to address demand and potential safety concerns. However, because of the high costs of freeway construction, an interim facility is recommended, consisting of a freeway north of the Gila River and an expressway south of the river. Travel forecasts for 2030 indicate demand for a 6 lane freeway (3 lanes in each direction) from I-10 south across the Gila River. South of the Gila River crossing, demand for a 6 lane expressway is forecast as far as Komatke Road. Demand is forecast for a 4 lane expressway south of Komatke Road to Gila Bend.

The interim facility recommendation is based on information not including complete consideration of the needs of the CANAMEX highway, a major future truck route between Mexico and Canada. That new route is currently planned to enter the study area in the southeast along I-8, travel north along SR-85, continue west along I-10, and leave the study area to the north along 355th Avenue, continuing on Wickenburg Road and Vulture Mine Road. A high speed freeway is ultimately needed to provide an alternative path for through trucks that would otherwise use I-10 through the central Phoenix area. Therefore, a 6 lane freeway is recommended north of Gila River to I-10 and a four lane freeway is recommended south of the Gila River to I-8. This facility, categorized as a freeway, would specifically function as a 'Rural Controlled Access' highway or freeway, and would be built to interstate standards, with frontage roads and interchanges. Frontage roads would provide the local access that would still be needed, as appropriate. Prior to completion of the CANAMEX Highway, the recommended interim facility could be implemented with the expectation of eventual upgrading to a freeway. Again, ADOT would need to be perform studies in the future to determine alignments and design elements.

6.2.11.1 Cost Estimate

The estimated costs for the interim improvements to SR-85 are shown on Table 6-3. Costs for the northernmost 6.5 miles of the freeway, including a bridge over the Gila River, are separated from the remaining portion south to I-8. The cost estimate includes major freeway system interchanges with I-10 and I-8. Because the freeway improvements to SR-85 are planned to end at I-10 and I-8, the interchange cost at each location is estimated at half the cost of a major interchange. A single bridge over the Gila River is included in the cost estimate to carry traffic lanes in one direction. Lanes in the other direction are assumed to use the existing bridge. A cost for the ultimate freeway facility in this corridor, including the Gila River bridge and system interchanges at I-10 and I-8, is estimated at approximately $1.2 billion. This estimate is not shown on Table 6.3.

6.2.12 Sun Valley Parkway

Travel forecasts for 2030 indicate the need to widen and upgrade the Sun Valley Parkway from 4 lanes to 6 lanes. Sun Valley Parkway is recommended to be an ARC, which may or may not be upgraded to a freeway in the future. Sun Valley Parkway, for operations, would need to be upgraded from an arterial to an expressway south of Camelback Road.

6.2.12.1 Cost Estimate

The cost estimate shown in Table 6-3 is based on a widening from 4 to 6 lanes for the 4.9 miles of parkway between I-10 and Camelback Road. The estimate includes upgrades for 5 intersections along the section to be improved. The estimate assumes that any land acquisition will be through dedication during the land development process. The cost estimate includes provision for ITS improvements to coordinate traffic signals and improve speed and capacity.

6.2.13 CANAMEX Corridor

The CANAMEX Corridor is one of 43 national "high priority" corridors identified in the Intermodal Surface Transportation Efficiency Act (ISTEA); the 1995 National Highway System (NHS) Designation Act; and the Transportation Efficiency Act for the 21st Century (TEA-21). It was conceived as a major commercial and trade route between Mexico and Canada.

In April of 2001, following completion of a study, the MAG Regional Council passed a resolution specifying the corridor within Maricopa County to include: I-8, SR 85, I-10 from SR 85 to the Wickenburg Road/Vulture Mine Road connection, an alignment in the general vicinity of Wickenburg Road/Vulture Mine Road connecting to the future Wickenburg Bypass, and the Wickenburg Bypass from that point west to US 93. Wickenburg Road is generally aligned with 355th Avenue at I-10.

Early preservation of right-of-way is recommended for the portion of the route north of I-10 and within the SWATS area. The route would connect to I-10 at or near 355th Avenue. It is recommended that right-of-way preservation be undertaken as part of the land development process. Costs and improvements to SR 85 and I-10 are included in this study. Costs for improvements for the CANAMEX Corridor north of the SWATS area are included in the NWATS.

6.2.14 Rio Salado Parkway

The Rio Salado Parkway enters the study area from downtown Phoenix and parallels the Salt River to the river's south as far west as 75th Avenue where it crosses the river and turns north ending at the interchange of the Loop 101 Extension and the I-10 Reliever, as shown in Figure 6-3. This new facility includes bridging a major river. There is a need for the Rio Salado Parkway. Travel forecasts indicate demand for a 6 lane facility. Its early implementation may postpone the need for the I-10 Reliever, while early implementation of the I-10 Reliever may postpone or obviate the need for the Rio Salado Parkway. The timing, planning, and implementation of these nearby parallel facilities will require careful coordination.

6.2.14.1 Cost Estimate

The cost estimate for the Rio Salado Parkway is shown in Table 6-3. The estimate includes a major river crossing of the Salt River. Because of the parkway's general east/west orientation a longer bridge is assumed. The interchange costs associated with the major freeway system interchange at the western terminus of the Rio Salado Parkway are included in the cost estimates for the I-10 Reliever. Half of that interchange cost is included in the I-10 Reliever section east of the Loop 101 Extension and the other half in the section from the Loop 101 Extension to the Loop 303 Extension. Only the portion of the Rio Salado Parkway in the SWATS area is included in the estimate.

Improved intersections are included in the cost estimate with right-of-way costs. The cost estimate includes provision for ITS improvements to coordinate traffic signals and improve speed and capacity.

6.2.15 Riggs, Komatke, and Maricopa Parkway

Traffic forecast for the year 2030 does not necessitate an expressway or rural highway along the Rigg, Komatke, Maricopa Road corridor. However, the year 2030 does not represent the build-out year for this portion of the study area. It is recommended that the facility be an ARC, with right-of-way preservation along this corridor to provide a 6 lane expressway or arterial as shown in Figure 6-3. The facility could be upgraded from an arterial to a higher level facility, such as an expressway or rural highway, when conditions warrant, and could be developed further east along Riggs Road.

No costs are included for this right-of-way preservation. It is recommended that right-of-way preservation be undertaken as part of the land development process.

6.3 Transit

This section presents a summary of transit recommendations for inclusion in the RTP. The recommendations include both operating and capital improvements needed to provide effective transit alternatives in the SWATS area.

6.3.1 Regional Fixed Route Bus Transit

The service areas for regional fixed route and demand responsive bus service need to expand as the developed portions of the SWATS area expand westward. It is recommended that service area expansion be included in the RTP consistent with the Regional Public Transportation Authority's Regional Transit Systems Study (RTS), based on expansion of continuous areas of development and fixed route service provided primarily on the arterial network. Figure 6-4 shows the area forecast for service through 2030.

For areas of development beyond the continuous development from the center of Phoenix, peak hour commuter service and other limited services are recommended, similar to the services currently provided to Tolleson and Litchfield Park by the 560, 561, and START bus routes.

The implementation of these services should be timed to match the gradual westward (and southward into southern Goodyear) expansion of development in the SWATS area. The largest capital cost for such services is the acquisition of rolling stock. Rolling stock acquisition depends upon the types of services to be implemented, ridership, headways, route length, and other factors. An estimated $700 million will be needed for rolling stock to serve jurisdictions in the SWATS area. The estimate does not remove portions of jurisdictions, including Buckeye, Goodyear, and Phoenix that are outside of the SWATS area. The estimate is therefore somewhat higher than what would be required to serve the SWATS area itself. That estimate is shown in Table 6-3.

6.3.2 High Capacity Transit

In addition to regional bus service operating on the arterial network, higher speed transit will be needed to respond to the greater distances between developed portions of the SWATS area and the rest of the metropolitan Phoenix area. Consistent with MAG's High Capacity Transit Study (HCTS), it is recommended that light rail (LRT) or bus-rapid-transit (BRT) on a dedicated right-of-way be included in the RTP in a north/south corridor paralleling 51st and 59th Avenues north of Baseline Road and also along the I-10 corridor west of downtown Phoenix to Loop 101. The I-10 corridor route will contribute to congestion relief on I-10 itself forecast for 2030, as noted above.

To serve longer distance trips commuter rail along the Union Pacific railroad tracks from downtown to Buckeye is recommended for inclusion in the RTP. Also recommended is express bus-rapid-transit service on I-10 west of Loop 101 and on Loop 101 and Loop 303 north of I-10, consistent with the HCTS. Figure 6-5 shows these recommended high capacity transit facilities.

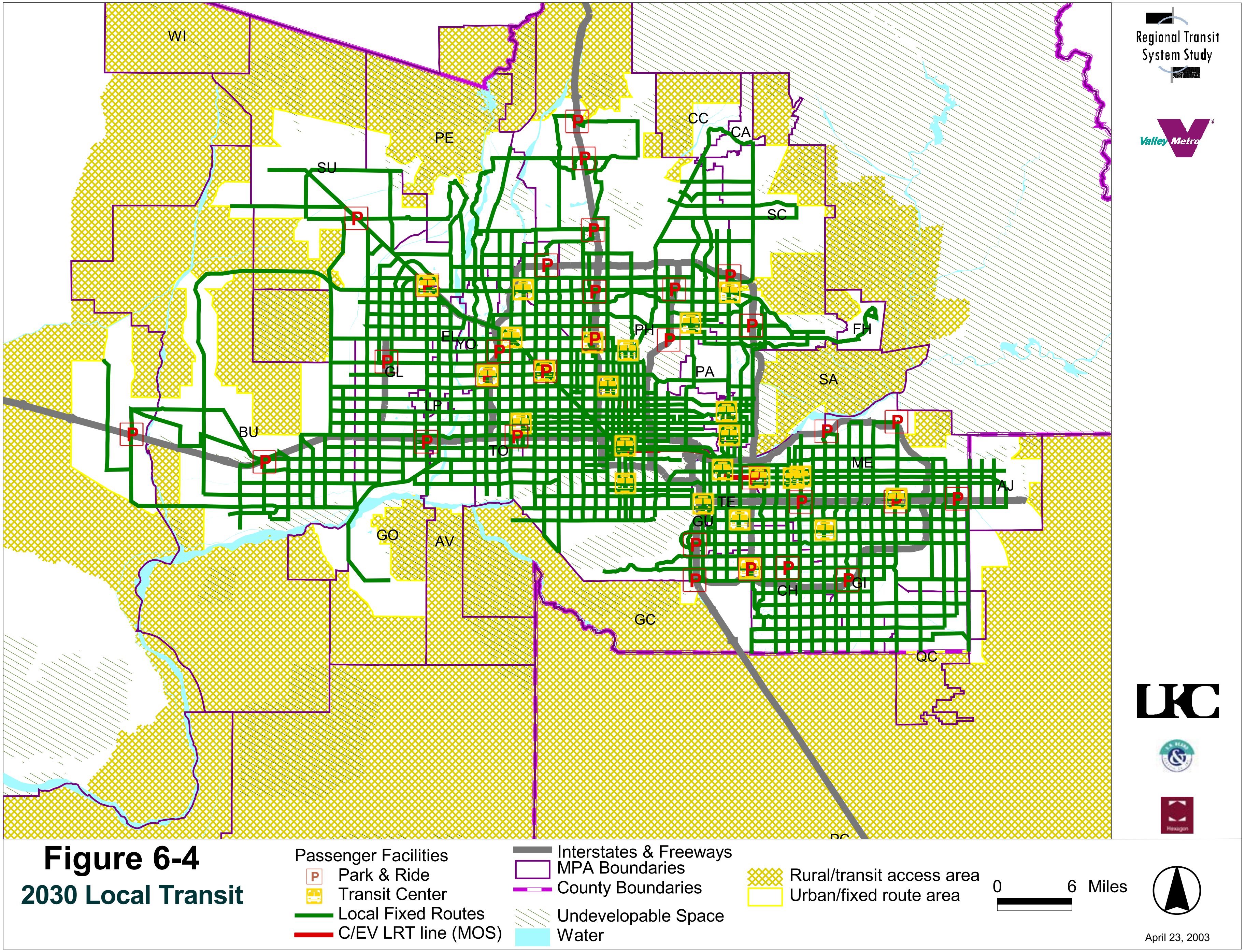
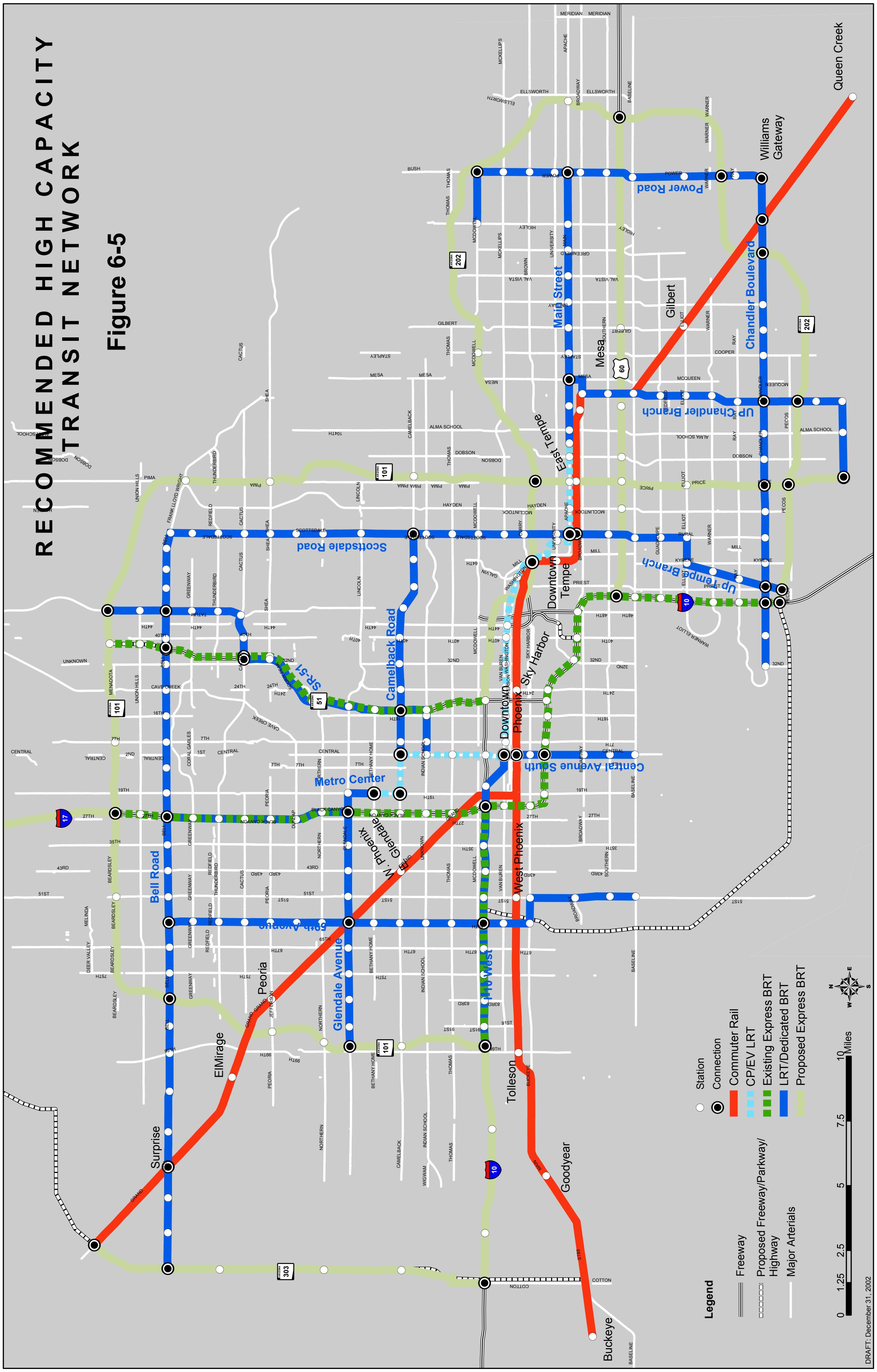


Figure 6-4
2030 Local Transit



* Source: MAG High Capacity Transit Plan, 2003

6.3.2.1 Costs

The capital costs of the recommended LRT and BRT projects with dedicated right-of-way in the I-10 corridor east of Loop 101 and along the 51st and 59th Avenue corridors north of Baseline Road are shown in Table 6-3. The capital cost of commuter rail service between Buckley and downtown Phoenix along the Union Pacific railroad tracks is also shown on the table.

Because they would operate in mixed traffic, the principal capital costs of express bus-rapid-transit service along I-10 west of Loop 101 and along Loop 101 and Loop 303 are the costs of the vehicles themselves. These capital costs of buses are included above under the costs of providing rolling stock for regional fixed route bus transit.

6.3.3 Other Facilities

Additional park-and-ride facilities are recommended for the SWATS area along I-10. There is an existing formal facility along I-10 at 79th Avenue. The RTS proposes three new park-and-ride facilities in the SWATS area. As shown in Figure 6-4, these additional park-and-ride facilities will result in facilities along I-10 at:

- 79th Avenue (existing);
- Litchfield Road;
- Miller Road; and
- 339th Avenue.

6.4 Non-Motorized Facilities

This section presents a summary of the non-motorized facilities recommended for inclusion in the RTP. It identifies a network of paved multi-purpose regional facilities serving the study area. Specific off-road facilities are needed to provide a regional trunk network of paved facilities linking the SWATS area together and providing alternatives to facilities either on or adjacent to streets and highways. Cost topics are also covered. Costs are based on recent construction costs.

A formal functional hierarchy of non-motorized facilities is needed, including both regional trunk facilities and local facilities providing access to activity centers and connectivity with the regional trunk facilities. It is recommended that bike facilities, either on-road using bike lanes or off-road using separate parallel facilities, be included in the RTP for all new and widened arterials. The cost estimate for improvements recommended above for the SWATS area includes the costs of paved bikeway facilities within the rights-of-way.

It is recommended that existing arterials that are not to be widened for motor vehicles be retrofitted where feasible to include a bicycle facility. Costs for such retrofitting are included in the cost estimate for bicycle facility improvements along with all new arterials and existing arterials to be widened. Table 6-1 includes the costs of providing these facilities on arterials, at $200,000 per mile.

Generally these facilities will be provided in the roadway in separate bike lanes. However, separate parallel roadways for non-motorized traffic could be provided in some cases and the cost estimate is based on a path paved with asphalt. The costs of bridges carrying arterials over major rivers have been estimated including wide shoulders to facilitate bicycle traffic.

6.4.1 Non-Motorized Facilities Outside Highway Rights-of-Way

Figure 6-6 shows existing non-motorized facilities not located within a highway right-of-way. Few, if any, of these facilities are improved or explicitly designed as facilities for bicyclists, pedestrians, equestrians, and so forth. A regional system of improved, multi-purpose non-motorized facilities is recommended for inclusion in the RTP.

The facilities shown in Figure 6-7 provide a trunk system of multiple use facilities independent of highway rights-of-way. These facilities are recommended for inclusion in the RTP. Four of these facilities follow rivers in the study area:

- Salt River;
- Gila River;
- Agua Fria River; and
- Hassayampa River.

Except for the Gila River facility, facilities follow the rivers over their entire courses in the study area. Other facilities follow:

- the Grand Canal near Indian School Road in the northeast corner of the study area joining the Agua Fria facility north of the study area boundary;

Figure 6-6
Existing Off-Road Non-Motorized Facilities

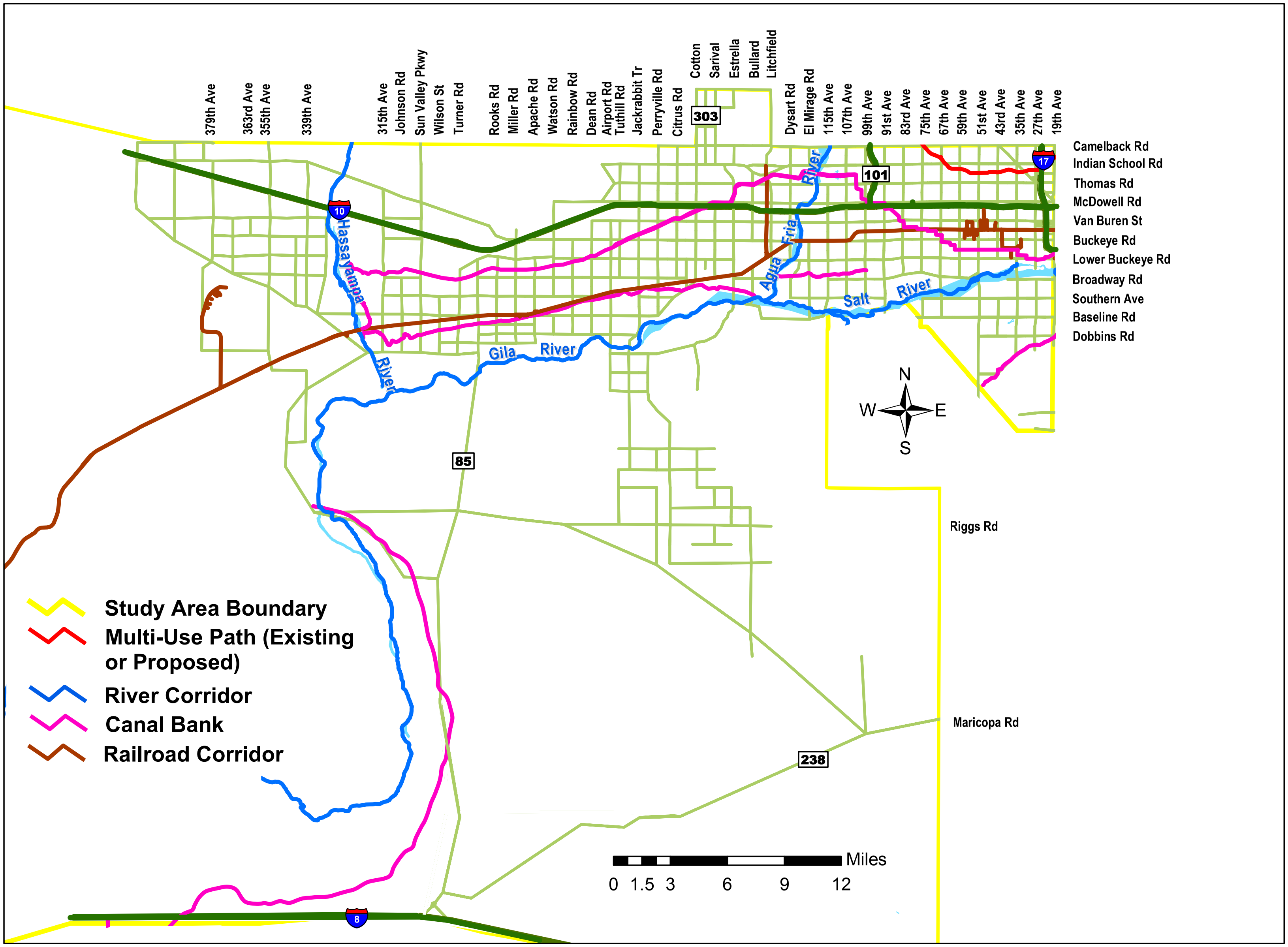
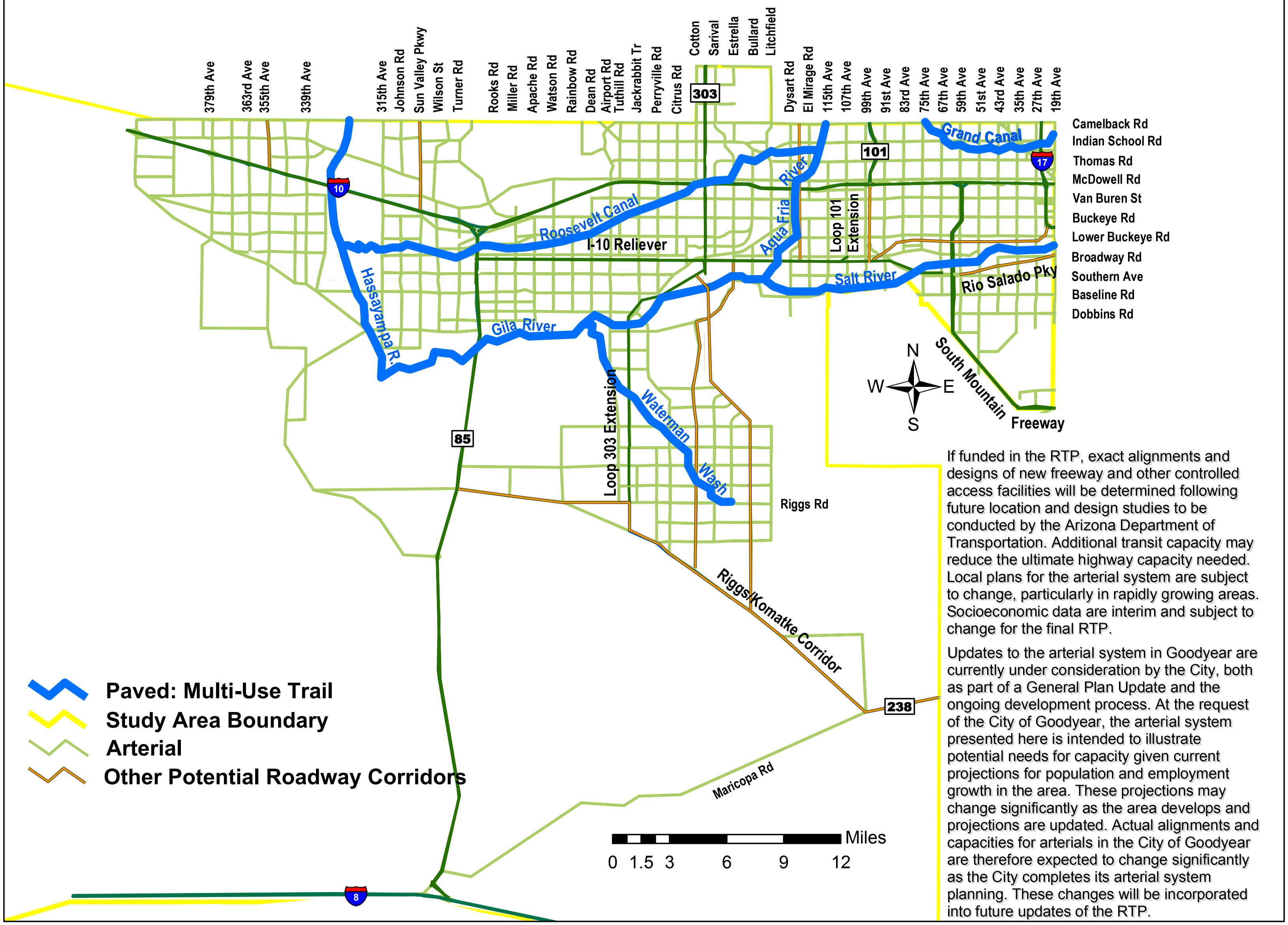


Figure 6-7
Ultimate Trunk System of Paved Off-Road Non-Motorized Facilities



If funded in the RTP, exact alignments and designs of new freeway and other controlled access facilities will be determined following future location and design studies to be conducted by the Arizona Department of Transportation. Additional transit capacity may reduce the ultimate highway capacity needed. Local plans for the arterial system are subject to change, particularly in rapidly growing areas. Socioeconomic data are interim and subject to change for the final RTP.

Updates to the arterial system in Goodyear are currently under consideration by the City, both as part of a General Plan Update and the ongoing development process. At the request of the City of Goodyear, the arterial system presented here is intended to illustrate potential needs for capacity given current projections for population and employment growth in the area. These projections may change significantly as the area develops and projections are updated. Actual alignments and capacities for arterials in the City of Goodyear are therefore expected to change significantly as the City completes its arterial system planning. These changes will be incorporated into future updates of the RTP.

- the Roosevelt Canal from the Agua Fria west to the Hassayampa River facility; and
- Waterman Wash south from the Gila River facility.

These facilities provide the extensive network of off-road facilities shown in Figure 6-7. Power lines, gas lines, railroad rights-of-way, and other physical features may also represent potential non-motorized corridors and further study will be needed to identify appropriate facilities at these locations. The cost estimate for the facilities shown on Figure 6-7 is presented on Table 6-3. The cost of these facilities is estimated at \$360,000 per mile. The estimate for the Grand Canal facility is only that portion in the SWATS area. The estimate for the Gila-Salt River facility east of the Rio Salado Parkway crossing of the Salt River (at approximately 75th Avenue) is included in the cost estimate for the Rio Salado Parkway, which will parallel the southern bank of the Salt River east of 75th Avenue.

6.5 Summary of Costs

Table 6-3 shows that $12.9 billion is needed to meet the recommended highway and non-motorized facility needs of the SWATS area over the next 30 years. About $3.9 billion of that total is needed for the arterial system. It is likely that well over half of the investment in arterial highways will be provided by the private sector as a part of land development. If $3.0 billion were provided by the private sector for the arterial system, an investment of $9.9 billion will be necessary by the public sector for highways, transit, and non-motorized facilities in the SWATS area.

Table 6-3 shows that rolling stock for expansion of the regional fixed route bus system to serve the SWATS area in 2030 will require an investment of $700 million. Of the $12.9 billion needed to fund the recommended transportation facility needs of the SWATS area over the next 30 years, 56% is needed for investment in new facilities. About a third (31%) of the funding is needed to widen existing roadways. The remaining funding is needed to improve and add intersections and interchanges, improve major river crossings, provide ITS capabilities throughout the highway system and roadway network, expand the current transit system, and provide bicycle and other facilities for non-motorized uses.

6.6 Policies

6.6.1 Variable Width Roadways ("Scalloped Streets")

Variable width roadways, often referred to as "scalloped streets," occur as a result of roadway segments being constructed at different times. The scalloped street may not be constructed according to the jurisdictional standards. The scalloped streets problem affects the efficiency of the arterial grid network by reducing capacity, causing congestion, and reducing levels of service. It is recommended that a Scalloped Streets Policy be adopted by the local jurisdictions along with a mechanism for funding the roadway improvements. One suggestion is to collect impact fees from developers and then create a fund that can be used as needed.

6.6.2 Arterial Grid Continuity

Regionally, the arterial grid system acts as an overflow for congested freeways, expressways, and other higher level facilities in addition to accommodating local traffic. The existing arterial grid network also provides the basic access and connections for non-motorized (bicycle and pedestrian) modes of travel. New communities continue to be developed and the street systems may not be consistent with the grid system or may not provide adequate connectivity to the existing grid system. Closing the gaps in the arterial grid network and mitigating the obstructions to constructing the grid network should continue to be a fundamental regional objective.

6.6.3 Preservation of Right-of-Way

The early protection of rights-of-way for all modes of travel should become a regional policy supported by all cities. It is recommended that rights-of-way of planned, future facilities be protected or preserved, where possible, before development takes place.

A prerequisite for selecting corridors for preservation is the presence of a Transportation Plan, such as the RTP. Agencies and groups that should be included in corridor preservation activities include the Federal Highway Administration (FHWA) and Federal resource agencies (EPA, Corps of Engineers, etc.); ADOT, the state legislature, and state resource agencies; County, City Council, mayors and executives, planning commissions, city planning, and public works departments; Land owners, developers, chamber of commerce, and bankers; Corridor neighborhood and civic groups, umbrella public interest groups, and environmental activists.

Means that can be employed to assist in the successful planning and implementation of roadway improvements include two basic categories:

1) **Interim protection techniques**, such as official maps of reservation, and options to purchase at a later date, strive to hold land out of development until right-of-way purchases can be made or land titles transferred.

2) **Preservation techniques** to ensure that right-of-way is, or will be, available for a transportation facility when needed. Preservation techniques include such measures as fee simple acquisition, landowner donations, and development easement acquisitions.

6.6.4 Avoid Creation of T-Intersections

The creation of T intersections should be avoided. Currently major T intersections occur at I-10 and SR 85 and at Sun Valley Parkway and I-10.

6.6.5 Safety and ITS

Projects that improve the safety and efficiency of the transportation system should be high regional priorities.

Appendix I

Data Collection Letters and Forms

November 30, 2001

Mr. or Mrs.
Town or City of
Address
City, State, Zip Code

Re: Maricopa Association of Governments Southwest Area Transportation Study

Dear Agency:

The Maricopa Association of Governments (MAG) Southwest Area Transportation Study is under way. Kimley-Horn and Associates, Inc. has the task of collecting information on all transportation elements in the southwest valley area for the study. We would appreciate your assistance in identifying existing and currently on-going studies, documents and information pertinent to the preparation of the MAG Southwest Area Transportation Study. The attached data collection sheet summarizes the type of documents and information we are looking to obtain from your agency. It would also be greatly appreciated if you could provide us with a copy of any documents identified by your agency.

The following documents have already been identified for the MAG Southwest Area Transportation Study. We know that this is only a partial list and are asking for your assistance by:

- making us aware of OTHER documents that would be of value and-
- providing complete information on the documents below.

Town of Buckeye

Sundance

Rosten Buckeye

Catapillar CMP

General Plan

City of Avondale

General Plan

City of Goodyear

General Plan Update

Estrella Mountain Vista CMP

ADOT

SR 85 Design Concept Report

High Capacity Corridor Study

I-10 Profile Study

RPTA

I-10 Railroad Corridor Study

MCDOT

McDowell Road Corridor Study

Maricopa County

White Tanks Land Use Plan

Rainbow Valley Area Plan

Other County Area Plan

Tonopah Area Plan

All Agencies

5 year CIP

Traffic Count Information

Circulation General Plan

Please return the completed data collection check sheet by December 7, 2001. For questions regarding the check sheet please call Charles Wright at 602-944-5500. Thank you in advance for your help and time.

Very truly yours,

KIMLEY-HORN AND ASSOCIATES, INC.

Charles R. Wright

Charles Wright, P.E.

Vice President

Mhg/mhg

Enclosures: Data Collection Check Sheet

Data Collection Check Sheet

Jurisdiction ______________________________

1. Title of Document ____

2. Type of Study

(a) Land Use: Land Use Plan ☐ General Plan ☐
Development Master Plan (Community Master Plan) ☐

(b) Transportation: Traffic Analysis ☐ Corridor Study ☐
Vehicular Circulation Plan ☐ Traffic Counts ☐
Street Classification Map ☐
Transportation Demand Management ☐
Capital Improvement Program ☐

(c) Transit: Local Bus System ☐ Rail Facilities ☐
Dial-A-Ride ☐ HOV/Carpool ☐

(d) Peds: Trails Plan ☐

(e) Bikes: Non-Vehicular Circulation Plan ☐

(f) Other: ____

3. Author of the study ____

4. Completion date of the study ____

5. Name of the sponsoring agency or group for the study ________________________

6. Contact person ___________________ Phone number _________________

7. Comments ____

Wilbur Smith Associates
ENGINEERS
PLANNERS
ECONOMISTS

December 20, 2001

Mr. or Mrs.
Town or City of
Address
City, State, Zip Code

Re: Maricopa Association of Governments Southwest Area Transportation Study

Dear Agency:

Subsequent to our November 30 request for data for use in the Maricopa Association of Governments (MAG) Southwest Area Transportation Study, we have compiled a more extensive list of identified projects within your jurisdiction. A copy of the listing is attached. If possible, could you incorporate any available data relating to these specific projects into your response for data and documents.

Please return the completed data collection check sheet as soon as possible. For questions regarding the check sheet please call Charles Wright at 602-944-5500. Thank you in advance for your help and time.

Very truly yours,

KIMLEY-HORN AND ASSOCIATES, INC.

Charles R. Wright

Charles Wright, P.E.
Vice President

Mhg/mhg

Enclosure: Project List

Appendix II
Census Data

1990 Field Definitions

Field	Definition
PERSONS	Persons
HOUSHOLD	Households
AGEGE_16	Persons 16 years and over
AGEGE_25	Persons 25 years and over
ELEMSCND	Elementary and High School Students
NODIPLOM	No High School Diploma
HIGHSCHL	High School Graduates
SOMECOLG	Attended College
COLGGRAD	College Graduates
GRADSCHL	Attended Graduate School
CHILDPOV	Children in Poverty
INPOVRTY	Persons in Poverty
NOVEHICL	No Vehicles in Household
HHI95_10K	Household Income in 1995 < 10,000
HHI95_10_15	Household Income in 1995 10,000-15,000
HHI95_15_30	Household Income in 1995 15,000 -30,000
HHI95_30_4	Household Income in 1995 30,000 - 40,000
HHI95_40_6	Household Income in 1995 40,000-60,000
HHI95_OVER	Household Income in 1995 > 60,000
NOT_REPD	Not Reported
OCCUPIED_H	Occupied Housing Units
DIPLOMA_LW	Educational Attainment - High School or Less
HHI95_LT15	Household Income in 1995 < 15,000
NUM_HH95	Households in 1995
DIS_NUM2	Disability
MOB_DIS2	Mobility Disability

1990 Census Data

TRACT	PERSONS	HOUSHOLD	AGEGE_16	AGEGE_25	ELEMSCND	NODIPLOM	HIGHSCHL	SOMECOLG	COLGGRAD	GRADSCHL	CHILDPOV	INPOVRTY	NOVEHICL	HHI95_10K
0506	7740	2465	5483	4556	1817	1596	1426	1064	369	98	607	1584	83	190
0507	4585	1533	3125	2555	1012	947	840	557	128	68	541	1247	149	326
061002	3307	1279	2655	2348	608	119	347	879	635	267	34	121	0	14
061003	973	303	658	519	180	106	112	208	66	0	113	218	61	25
061004	1290	320	987	686	250	127	230	242	109	49	37	90	0	14
061005	2949	344	2632	2107	483	706	530	739	82	25	105	336	6	53
061006	5005	1580	3580	2813	1089	572	727	981	331	121	292	692	30	79
0611	4371	983	2881	1813	722	82	473	985	212	53	180	353	35	11
0612	5575	1766	3718	2866	1377	997	771	829	118	83	867	1634	303	238
0613	2047	697	1393	1128	311	212	509	247	139	61	147	288	73	39
0614	5102	1541	3349	2525	1202	1454	668	329	61	41	966	2012	330	277
082002	3960	1438	2817	2458	760	161	617	1161	346	171	110	251	53	46
082003	5654	1700	3722	3012	1288	553	1109	1120	194	67	213	472	65	72
082004	6493	2001	4393	3474	1556	593	1092	1625	124	63	109	359	39	44
082005	3818	1219	2655	2265	791	210	579	1010	397	116	70	139	0	22
082006	2324	700	1611	1335	455	192	311	473	191	66	47	178	0	36
0821	4422	1215	2986	2335	1050	1121	600	527	41	31	369	801	172	137
082201	3541	937	2399	1894	880	990	346	518	79	6	275	718	89	101
082202	2808	724	1907	1430	676	1008	246	149	0	45	296	654	38	154
1090	9821	4163	7357	5226	1610	1126	1429	1944	479	224	758	2390	501	676
1091	6252	2389	4739	3917	958	1040	1338	1292	251	47	691	1465	252	247
1092	3196	1360	2485	1794	436	496	441	681	143	37	318	790	313	122
1093	3450	1068	2492	2041	745	770	729	513	41	24	236	544	9	103
1094	6008	2310	4696	3867	1012	992	1283	1292	210	75	243	684	347	220
1095	3719	1232	2879	2410	681	317	885	873	213	127	69	183	45	30
109601	8215	2472	5313	4331	2113	660	1305	1934	289	93	203	556	73	74
109602	7883	2474	5348	4099	1624	1198	1253	1449	134	70	698	1260	159	212
109701	6571	2416	4539	3361	1136	665	1095	1234	343	39	337	768	221	207
109702	7795	2276	5378	4349	1832	1134	1566	1364	232	67	408	886	37	124
1098	7184	2172	5127	4045	1509	1300	1318	1215	184	55	376	929	32	123
1099	4955	1565	3607	2871	1121	845	895	914	107	103	279	640	69	96
1100	6675	2053	4766	3808	1360	1075	1432	1039	126	88	529	1182	152	171
1101	5019	1656	3620	2766	885	1024	866	814	77	82	522	1075	200	219
1102	372	191	327	303	7	117	115	49	0	0	29	96	59	51
1103	6130	2643	4851	3881	760	870	1137	1298	498	152	273	905	474	302
1120	1818	757	1451	1278	248	251	339	410	205	89	77	195	74	78
1121	3363	954	2268	1725	789	922	426	318	30	18	309	762	104	142
1122	7206	2369	5153	4207	1495	1978	1185	846	104	51	636	1468	348	278
1123	9567	3155	6627	5089	2098	2133	1307	1489	115	64	792	1892	386	595
1124	8484	2590	5944	4650	1827	1470	1539	1425	219	51	557	1092	247	169
112502	7003	2118	4725	3546	1689	862	1277	1250	120	67	498	1037	89	163
112503	6367	1856	4128	3330	1594	967	1094	1125	150	7	179	459	61	127
112505	4516	1585	3094	2375	900	598	890	748	128	37	322	600	80	139
112506	6617	2483	4752	3565	1052	847	1274	1268	165	68	417	1045	217	145
1126	7653	2687	5352	4194	1632	2030	1306	772	98	49	917	2014	445	416
1127	6203	1679	4008	3024	1550	2054	573	396	43	7	921	1891	221	304
1128	711	253	496	391	222	222	99	16	0	0	228	395	102	83
1144	3845	1176	2527	1994	933	1340	293	297	20	19	692	1439	304	175
1145	4902	1348	3164	2319	1170	1534	524	299	22	20	1030	2020	288	510
1146	1199	321	781	610	316	361	92	77	0	0	242	427	21	50
1147	4786	825	3487	2408	1023	1231	529	607	85	33	854	1608	230	109
1155	3607	899	2402	1816	1016	1192	293	250	19	17	373	784	26	79
1156	2223	557	1404	1032	603	378	278	249	34	26	294	535	64	83
116601	7295	2252	5146	4206	1368	1372	1349	1174	218	139	539	1284	49	115
116705	58	20	44	38	0	0	0	21	14	10	0	0	0	
116714	6235	2276	4576	4178	951	106	514	1483	1437	675	45	141	7	47
7233	5300	1638	3599	2916	1157	1337	617	672	133	79	559	1254	166	254
Total	**278167**	**88983**	**195603**	**154079**	**57929**	**48560**	**44418**	**46740**	**10308**	**4240**	**21828**	**48842**	**7998**	**8916**

1990 Census Data

TRACT	HHI95_10_15	HHI95_15_30	HHI95_30_4	HHI95_40_6	HHI95_OVER	NOT_REPD	OCCUPIED_H	DIPLOMA_LW	HHI95_LT15	NUM_HH95	DIS_NUM2	MOB_DIS2
0506	170	342	212	326	253	1216	2465	3022	360	2709	622	135
0507	185	299	130	114	58	604	1533	1787	511	1716	459	129
061002	17	81	89	204	363	672	1279	466	31	1440	252	74
061003	16	63	55	166	145	193	303	218	41	663	25	0
061004	13	36	41	100	52	113	320	357	27	369	84	19
061005	56	111	83	129	122	233	344	1236	109	787	129	30
061006	135	412	246	293	289	662	1580	1299	214	2116	312	45
0611	21	209	142	96	28	304	983	555	32	811	49	17
0612	152	342	146	146	55	718	1766	1768	390	1797	543	169
0613	51	144	88	79	52	256	697	721	90	709	147	34
0614	154	219	76	61	21	744	1541	2122	431	1552	781	262
082002	70	284	263	404	225	359	1438	778	116	1651	219	20
082003	98	391	318	418	145	534	1700	1662	170	1976	381	111
082004	94	329	323	395	149	731	2001	1685	138	2065	425	113
082005	25	126	209	517	696	697	1219	789	47	2292	224	75
082006	23	103	172	288	190	609	700	503	59	1421	148	48
0821	92	174	92	122	60	599	1215	1721	229	1276	539	168
082201	83	163	61	91	50	505	937	1336	184	1054	466	127
082202	93	154	48	51	21	277	724	1254	247	798	321	75
1090	606	830	295	262	110	1825	4163	2555	1282	4604	947	267
1091	187	363	201	174	60	1251	2389	2378	434	2483	672	185
1092	112	229	88	91	34	799	1360	937	234	1475	480	160
1093	102	294	149	120	30	318	1068	1499	205	1116	366	115
1094	205	397	219	214	63	1106	2310	2275	425	2424	893	287
1095	48	187	153	233	121	499	1232	1202	78	1271	361	75
109601	91	404	299	378	135	1161	2472	1965	165	2542	459	144
109602	190	548	336	293	82	1036	2474	2451	402	2697	842	154
109701	250	635	326	311	95	916	2416	1760	457	2740	572	116
109702	128	393	221	250	99	1103	2276	2700	252	2318	666	170
1098	160	420	205	251	80	978	2172	2618	283	2217	664	233
1099	129	347	186	192	44	675	1565	1740	225	1669	485	82
1100	197	412	217	209	74	932	2053	2507	368	2212	927	311
1101	213	406	153	180	89	596	1656	1890	432	1856	656	156
1102	30	35	13	8	0	33	191	232	81	170	117	29
1103	297	494	264	241	149	817	2643	2007	599	2564	765	256
1120	67	140	79	86	75	204	757	590	145	729	191	54
1121	123	156	54	39	16	445	954	1348	265	975	315	96
1122	306	472	165	147	46	1048	2369	3163	584	2462	966	403
1123	363	509	238	224	98	1768	3155	3440	958	3795	1013	230
1124	249	558	321	306	126	992	2590	3009	418	2721	897	143
112502	181	454	243	254	90	740	2118	2139	344	2125	574	169
112503	133	428	306	263	86	627	1856	2061	260	1970	499	113
112505	128	290	181	134	40	516	1585	1488	267	1428	280	66
112506	250	597	288	290	71	1184	2483	2121	395	2825	545	130
1126	227	343	108	92	29	1494	2687	3336	643	2709	1036	310
1127	258	307	93	61	19	811	1679	2627	562	1853	658	240
1128	52	50	7	6	0	116	253	321	135	314	139	54
1144	114	101	32	39	11	659	1176	1633	289	1131	449	111
1145	150	157	40	25	12	398	1348	2058	660	1292	451	161
1146	40	53	11	12	1	236	321	453	90	403	148	94
1147	62	78	29	14	8	493	825	1760	171	793	458	43
1155	77	132	52	39	19	530	899	1485	156	928	413	116
1156	70	125	34	36	15	233	557	656	153	596	193	71
116601	102	265	167	256	192	1155	2252	2721	217	2252	787	238
116705							20	0			10	0
116714	39	234	368	1737	4684	2495	2276	620	86	9604	172	38
7233	171	266	129	215	205	630	1638	1954	425	1870	513	138
Total	**7655**	**16091**	**9064**	**11682**	**10082**	**40845**	**88983**	**92978**	**16571**	**104335**	**26705**	**7409**

2000 Field Definitions

Field	Definition
TOTAL_POP	Persons
WH_NOTHISP	Non Hispanic White
TOTAL_HH	Households
FHH_SING	Female Headed Households, No Husband Present (2 or more person households)
FHH_KIDS	Female Headed Households, With Children Under 18 (2 or more person households)
POP_60_OVE	Persons Over 60 Years of Age
WHITE_POP	White
BLACK_POP	Black
AM_IND_POP	American Indian or Alaska Native
ASIAN_POP	Asian
HI_PI_POP	Native Hawaiian, Pacific Islander
OTHER_POP	Other Race
MULTI_POP	Two or More Races
HISP_ORIGI	Hispanic Origin
MINORITY_P	Minority Population
F_15_24	Females 15-24 Years Of Age

2000 Census Data

TRACT	TOTAL_POP	WH_NOTHISP	TOTAL_HH	FHH_SING	FHH_KIDS	POP_60_OVE	WHITE_POP	BLACK_POP	AM_IND_POP	ASIAN_POP	HI_PI_POP	OTHER_POP	MULTI_POP	HISP_ORIGI	MINORITY_P	F_15_24
50601	6993	4639	1616	136	81	644	5472	352	148	16	10	821	174	1785	2354	321
50602	4838	3451	1545	126	70	598	3942	64	68	16	11	570	167	1176	1387	286
50603	2196	1379	729	46	26	306	1640	41	40	3	0	417	55	712	817	133
50700	5726	2780	1854	316	213	697	3844	174	99	24	1	1433	151	2646	2946	420
61002	4104	3579	1606	112	65	1073	3742	73	15	119	8	76	71	271	525	184
61003	10395	6963	3465	242	168	641	7997	566	93	337	22	1029	351	2203	3432	553
61004	4309	3010	1311	114	82	280	3468	197	22	30	1	445	146	979	1299	298
61005	6458	4641	1955	45	20	1945	5135	465	120	37	5	579	117	1177	1817	288
61006	8067	5439	2749	234	146	852	6475	183	83	157	16	901	252	2065	2628	582
61009	96	73	31	3	1	19	80	0	0	4	0	11	1	22	23	5
61100	3851	2532	860	46	45	9	2794	550	25	106	17	175	184	507	1319	318
61200	6021	2049	1838	358	247	587	3397	294	123	41	15	1899	252	3520	3972	492
61300	2011	1016	667	109	69	209	1364	29	20	22	4	486	86	886	995	168
61400	5995	1080	1636	350	214	559	3089	284	120	26	7	2245	224	4529	4915	468
82002	5256	3546	1804	271	190	386	3998	331	40	97	10	611	169	1175	1710	397
82007	4100	1891	1226	212	133	226	2581	248	64	44	2	1019	142	1823	2209	312
82008	5049	1839	1447	208	134	249	2596	405	88	102	6	1645	207	2564	3210	359
82009	4250	1688	1174	177	124	208	2317	342	47	49	4	1331	160	2096	2562	322
82010	3880	1541	1098	180	125	233	2247	365	76	79	13	919	181	1743	2339	333
82011	7957	2934	2282	291	201	331	4231	898	138	278	13	1962	437	3554	5023	552
82012	3301	1834	1021	121	91	108	2165	173	23	73	6	706	155	1152	1467	322
82013	9004	5928	2814	231	133	608	6632	664	51	346	13	936	362	1799	3076	627
82014	3695	2185	1275	102	55	225	2697	213	28	113	0	518	126	1108	1510	217
82015	9	0	2	0	0	0	0	0	0	0	0	9	0	9	9	0
82100	4963	945	1429	284	135	695	2597	71	61	21	8	2020	185	3869	4018	401
82201	4190	1599	1079	129	68	401	2577	29	66	14	3	1319	182	2479	2591	320
82202	3217	404	782	122	50	366	1261	22	45	3	1	1805	80	2763	2813	235
109000	15652	3684	4983	927	689	760	7202	1189	1399	410	33	4596	823	8767	11968	1485
109100	9085	2593	2526	386	233	885	4618	304	167	352	28	3158	458	5504	6492	713
109200	4724	1153	1565	237	168	311	2112	299	131	137	6	1769	270	2953	3571	455
109300	4707	1196	1122	205	106	455	2757	188	89	54	3	1374	242	3153	3511	396
109400	7814	2818	2456	407	251	1145	4849	488	201	105	9	1812	350	4092	4996	677
109500	4496	2108	1333	176	87	717	2947	374	102	82	3	835	153	1769	2388	358
109601	5144	1785	1372	258	187	228	2706	422	41	78	6	1643	248	2728	3359	447
109602	6050	1696	1637	423	308	313	3337	615	172	79	11	1562	274	3462	4354	560
109603	4558	1615	1218	186	129	263	2386	382	81	91	5	1375	238	2333	2943	363
109604	4047	1534	1078	218	134	363	2600	253	40	44	1	973	136	2166	2513	321
109701	6918	1614	2179	569	448	271	3832	792	185	120	16	1700	273	4191	5304	688
109702	4989	1720	1276	202	121	486	2749	272	73	48	7	1634	206	2822	3269	350
109703	2531	609	775	124	89	112	1237	185	50	39	10	863	147	1629	1922	235
109704	2307	762	591	91	51	250	1443	116	34	17	4	587	106	1363	1545	167
109705	1842	591	489	90	55	133	1048	178	17	42	1	479	77	996	1251	157
109801	3880	962	1004	217	149	281	1894	326	74	38	3	1346	199	2468	2918	316
109802	4543	1401	1167	194	100	490	2384	239	62	68	3	1606	181	2756	3142	330
109900	6434	1854	1696	329	204	660	4052	340	99	119	12	1582	230	4001	4580	521
110001	4329	1041	1023	167	99	454	1923	177	73	44	5	1938	169	2979	3288	364
110002	4494	1108	1199	176	102	414	2070	140	67	25	5	1957	230	3125	3386	371
110100	7592	1067	1893	319	209	524	3150	200	177	159	9	3617	280	6000	6525	630
110200	469	170	181	11	6	52	274	8	7	0	0	159	21	272	299	35
110300	8170	2421	2770	411	259	805	4868	408	349	328	8	1843	366	4613	5749	639
112000	1856	1053	766	78	41	371	1416	45	29	13	0	299	54	707	803	85
112100	4204	488	958	184	115	293	2484	50	63	15	12	1421	159	3589	3716	368
112201	4734	507	1102	213	107	465	2568	119	70	11	4	1757	205	4061	4227	391
112202	4617	866	1410	167	81	804	2828	148	50	85	6	1344	156	3482	3751	326
112301	5961	547	1707	256	166	463	2030	250	78	47	4	3281	271	5031	5414	545
112302	7744	1243	2103	440	303	555	2622	747	166	193	14	3623	379	5321	6501	701
112401	5729	1078	1507	233	151	421	2247	365	117	112	0	2691	197	4070	4651	504
112402	5210	857	1255	206	128	331	2276	345	65	44	10	2250	220	3892	4353	450
112502	5325	1120	1263	233	149	290	2222	376	127	54	23	2266	257	3628	4205	427
112503	7892	2129	2012	357	243	430	3764	452	132	88	12	3101	343	5068	5763	625
112504	3494	625	984	199	156	117	1555	339	58	32	11	1309	190	2395	2869	361
112505	6867	1406	1976	326	242	238	3643	412	136	39	5	2326	306	4870	5461	665
112506	5281	1491	1748	286	198	347	2743	358	119	54	11	1681	315	3223	3790	523

2000 Census Data

TRACT	TOTAL_POP	WH_NOTHISP	TOTAL_HH	FHH_SING	FHH_KIDS	POP_60_OVE	WHITE_POP	BLACK_POP	AM_IND_POP	ASIAN_POP	HI_PI_POP	OTHER_POP	MULTI_POP	HISP_ORIGI	MINORITY_P	F_15_24
112507	2699	288	735	195	161	33	1024	314	48	14	10	1147	142	2029	2411	297
112508	2074	887	672	87	56	352	1298	97	35	25	0	547	72	1033	1187	138
112601	3147	384	951	192	127	314	1352	182	54	14	3	1406	136	2527	2763	320
112602	7382	1005	1899	313	206	554	3748	62	139	9	7	3127	290	6137	6377	618
112700	7826	531	1782	314	211	491	2431	137	133	28	2	4859	236	7043	7295	674
112800	1030	261	319	49	34	70	769	8	24	2	0	166	61	732	769	84
114401	2152	179	588	115	59	234	738	384	37	13	0	885	95	1577	1973	171
114402	2381	255	587	109	58	188	1092	151	59	23	3	924	129	1911	2126	202
114500	6203	1041	1295	242	160	338	2283	247	107	26	0	3363	177	4828	5162	453
114600	2109	193	457	69	48	137	749	32	44	10	5	1179	90	1855	1916	194
114701	947	79	225	51	32	78	267	24	5	0	0	594	57	853	868	86
114702	862	30	228	149	136	42	215	55	32	0	0	540	20	748	832	78
114703	6838	2915	347	52	28	149	3328	624	289	23	1	2486	87	2997	3923	407
115500	3979	831	959	181	77	362	2420	195	79	25	3	1114	143	2954	3148	335
115600	2672	82	630	179	97	224	949	1050	47	13	0	543	70	1558	2590	250
116601	5788	2819	1805	193	87	778	4085	140	130	42	10	1194	187	2637	2969	391
116705	3235	1509	1025	158	81	376	2165	154	69	31	9	691	116	1449	1726	210
116726	2908	2347	990	50	36	109	2504	127	19	145	0	35	78	211	561	102
723301	2911	2361	1023	43	31	294	2564	98	18	40	4	91	96	324	550	144
723302	5417	2620	1697	193	124	613	3202	89	558	8	4	1362	194	2093	2797	404
Total	**396180**	**138494**	**111833**	**17000**	**10999**	**33688**	**224357**	**23104**	**8529**	**5914**	**557**	**117897**	**15822**	**217587**	**257686**	**31020**

Appendix III

SWATS Survey

MAG RTP SOUTHWEST AREA TRANSPORTATION STUDY

Survey Date:______________________

(Please Print.)

Issue	Very Important	Important	Not Important
Add'l I-10 interchanges needed	5	3	1
Rate the locations:			
Bullard Avenue	5	3	1
Citrus Road	5	3	1
Perryville Road	5	3	1
Rainbow Road	5	3	1
Airport Road	5	3	1
Watson Road	5	3	1
Other: ____________________	5	3	1
Improvement to I-10 interchanges	5	3	1
Rate the locations:			
91st Avenue	5	3	1
115th Avenue	5	3	1
Dysart Road	5	3	1
Litchfield Road	5	3	1
Cotton Lane	5	3	1
Jackrabbit Trail	5	3	1
Miller Road	5	3	1
Sun Valley Parkway	5	3	1
Other: __________________	5	3	1

I-10 capacity improvements	5	3	1
(*provide*) between ______________________ and ________________________			
HOV Lanes on I-10:			
west of Dysart Road	5	3	1
west of Jackrabbit Trail	5	3	1
Loop 303 Improvements	5	3	1
Loop 303 south to I-8	5	3	1
Loop 303 connection to SR85	5	3	1
Identify truck routes	5	3	1
Goods movement	5	3	1
ID major arterial routes	5	3	1
Rate the locations:			
North-South:___________________	5	3	1
East-West:_____________________	5	3	1
New grade separations for vehicles and/or pedestrians needed	5	3	1
Rate the locations:			
Cotton Lane/MC85	5	3	1
Cotton Lane/Estrella Parkway	5	3	1
Other:________________________	5	3	1
Other:________________________	5	3	1
Other:________________________	5	3	1
Luke Air Force Base and surrounding area (land use, employment, housing)	5	3	1
Rate the existing major river crossing locations for handling ***current*** traffic volumes:			
115^{TH} Avenue	5	3	1
Bullard Avenue Bridge	5	3	1
Estrella Parkway Bridge	5	3	1
Tuthill /Jackrabbit Road Bridge	5	3	1

Rate the existing major river crossing locations for handling ***future*** traffic volumes:			
115TH Avenue	5	3	1
Bullard Avenue Bridge	5	3	1
Estrella Parkway Bridge	5	3	1
Tuthill /Jackrabbit Road Bridge	5	3	1
Rate the need for additional major river crossings – *give locations*:	5	3	1
______________________________	5	3	1
______________________________	5	3	1
Rate the need for new railroad crossings/separations – *give locations*	5	3	1
______________________________	5	3	1
______________________________	5	3	1
Rate the need for upgraded railroad crossings/separations – *give locations*	5	3	1
______________________________	5	3	1
______________________________	5	3	1
Current transit service needs	5	3	1
Future transit service needs	5	3	1
Identify bus and rail corridors	5	3	1
Identify bus pullout locations for future developments	5	3	1
Neighborhood circulators	5	3	1
Shuttles to business centers	5	3	1
Expansion of Dial-a-ride services	5	3	1
Park-n-Ride for BRT/Express Bus	5	3	1
Use of existing UPRR rail (Arlington to Phoenix)	5	3	1
Use of new transit technologies for vehicles (beyond buses and trains)	5	3	1
Light Rail	5	3	1
Commuter Rail	5	3	1
Rural Transit	5	3	1

Preserving/dedicating ROW for future corridors	5	3	1
Funding I-10 improvements	5	3	1
Funding Loop 303 improvements	5	3	1
Funding studies & changes of policies	5	3	1
Funding Transit expansion in SW valley	5	3	1
Elderly mobility enhancements	5	3	1
Common noise policy/ordinance	5	3	1
Common policy for developers' responsibilities	5	3	1
Common policy for access control	5	3	1
Improving aesthetics/landscaping on major corridors	5	3	1
Providing non-motorized access and facilities (continuity)	5	3	1
Policies/plans for pedestrian facilities like crosswalks and signals	5	3	1
Provide bike lanes at .5 to 1. mile grid spacing	5	3	1
Provide good bike routes on low volume streets or wide curb lanes	5	3	1
Dedicated lane for street legal vehicle (golf cart type urban electric vehicle)	5	3	1

What character of development is expected (industrial, commercial, residential [retirement, families, seasonal, resort])?

What suggestions do you have for addressing the problems or impacts of those expected or anticipated transportation problems?

What planning studies are available for your area/community? Please provide the title and date of each study, and a copy if available.

Appendix IV
SWATS Public Information Flyer

ENGINEERS
PLANNERS
ECONOMISTS
Wilbur Smith Associates

WHAT'S NEXT

Wilbur Smith Associates, as the lead consultant, is currently gathering data and information as part of Phase 1 of this project. Public events will be periodically scheduled to review findings and receive feedback from the public and stakeholders. Please keep checking our Web site for updates.

PROJECT WEBSITE

All documents will be posted on the project Web site, which will be accessible through the MAG Web site www.mag.maricopa.gov, (under "Transportation", under "Regional Transportation Plan (RTP)"). The Web site will contain project materials including the scope of work, contact information, mailing list, sign-up information, newsletters, meeting agenda packages and draft project documents as they become available. An on-line survey will be available for interested persons to complete and return.

If you have any questions or comments, please contact:

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Phoenix, Arizona 85003

SOUTHWEST AREA TRANSPORTATION STUDY

SR 85 North of Gila Bend

MARICOPA ASSOCIATION of GOVERNMENTS

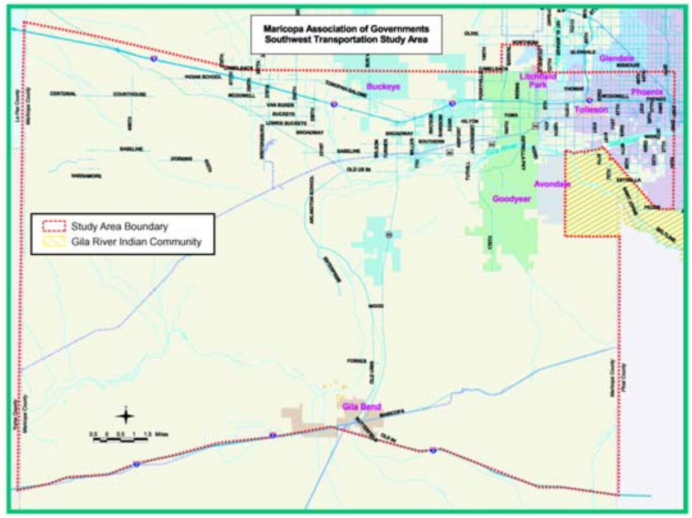
Tri-Fold (Front)

STUDY PURPOSE

The Maricopa Association of Governments (MAG) addresses regional planning issues faced by the cities, towns, Indian communities, and the county in the Maricopa Region. MAG is in the process of developing a new Regional Transportation Plan (RTP), for which background area studies are being conducted. One such study is the Southwest Area Transportation Study (SWATS). This newsletter is a first of a series designed to highlight key issues and possible solutions for transportation needs in the Southwest Valley.

The SWAT Study area is presented on the map, and generally includes the jurisdictions of Avondale, Buckeye, Gila Bend, Goodyear, Litchfield Park, Phoenix (Southwest), Tolleson, and unincorporated portions of Maricopa County. The study will also be closely coordinated with the Gila River Indian Community. Within this area, the study will identify potential multi-modal (roadways, transit, bicycle, pedestrian) transportation projects to address specific transportation-related conditions and concerns in this area. The identified needs and supporting background information from the study will help guide regional and local transportation planning in the future. The study is scheduled to be complete by the end of 2002.

STUDY AREA



STUDY PHASES

There are three major phases to the project:

1. Review existing conditions, look at the trends, and identify key transportation-related issues.
2. Develop and evaluate transportation improvements and investment options to address the issues and needs that we identified in Phase 1.
3. Develop multi-modal packages of investments that best meet the needs of the Southwest area, based on analysis of the options and considering consultation results.

Public and stakeholder consultation will be a critical ongoing element of the area study. To be a part of the ongoing efforts, call Wilbur Smith Associates at (480)775-4344, email us through the project Web site or fill out the online form and mail it to us.

Tri-Fold (Back)

Appendix V
Data Tables for Bar Charts in Chapter 5

The data presented in the following tables were used to develop the bar chart figures with the same number in Chapter 5. For example, the data shown in Table 5A-1 were used to develop Figure 5-1.

Table 5A-1
Centerline Miles

	Network				
Functional Class	**Current Base**	**Future Base**	**Enhanced**	**Option A**	**Option C**
Freeway	108	128	128	218	218
Expressway	21	43	50	90	90
Arterial	865	1,119	1,109	1,057	1,057
Collector	27	20	22	22	22
Total	**1,021**	**1,310**	**1,309**	**1,387**	**1,387**

Table 5A-2
Lane Miles

	Network				
Functional Class	**Current Base**	**Future Base**	**Enhanced**	**Option A**	**Option C**
Freeway	585	634	935	1,999	1,869
Expressway	54	184	276	526	526
Arterial	2,204	4,658	4,608	4,423	4,432
Collector	69	74	84	84	84
Total	**2,913**	**5,550**	**5,903**	**7,032**	**6,912**

Table 5A-3
Capacity Miles

	Network				
Functional Class	**Current Base**	**Future Base**	**Enhanced**	**Option A**	**Option C**
Freeway	12,293,610	13,307,910	19,717,530	41,510,490	39,252,780
Expressway	1,129,800	3,854,760	5,794,320	10,069,080	11,053,140
Arterial	17,632,320	37,265,600	36,864,480	35,235,520	35,457,440
Collector	554,880	592,800	672,800	672,800	672,800
Total	**31,610,610**	**55,021,070**	**63,049,130**	**87,487,890**	**86,436,160**

Table 5A-4
Weekday Vehicle Miles of Travel in Year 2020

	Network				
Functional Class	**Current Base**	**Future Base**	**Enhanced**	**Option A**	**Option C**
	2002	**2020**	**2020**	**2020**	**2020**
Freeway	7,151,995	12,137,227	15,480,049	27,957,531	28,260,396
Expressway	388,532	2,663,287	2,854,555	3,106,447	3,598,702
Arterial	6,870,346	22,435,342	19,190,450	12,290,813	12,520,980
Collector	86,303	350,646	302,706	224,848	256,971
Total	**14,497,175**	**37,586,502**	**37,827,759**	**43,579,639**	**44,637,050**

Table 5A-5
Weekday Vehicle Miles of Travel in Year 2030

	Network				
Functional Class	**Current Base**	**Future Base**	**Enhanced**	**Option A**	**Option C**
	2002	**2030**	**2030**	**2030**	**2030**
Freeway	7,151,995	14,856,310	18,446,314	39,035,412	38,816,583
Expressway	388,532	3,038,593	3,890,479	5,646,793	5,603,736
Arterial	6,870,346	34,870,689	30,748,799	20,910,225	21,245,244
Collector	86,303	452,913	458,313	337,952	359,209
Total	**14,497,175**	**53,218,505**	**53,543,906**	**65,930,382**	**66,024,772**

Table 5A-6
Peak Hour Vehicle Miles of Travel in Year 2020

	Network				
Functional Class	**Current Base**	**Future Base**	**Enhanced**	**Option A**	**Option C**
	2002	**2020**	**2020**	**2020**	**2020**
Freeway	337,282	616,052	798,620	1,441,343	1,450,840
Expressway	22,013	113,879	106,401	114,382	127,615
Arterial	400,007	1,276,556	1,131,467	768,189	781,498
Collector	6,106	19,024	17,366	15,100	15,075
Total	**765,409**	**2,025,510**	**2,053,855**	**2,339,014**	**2,375,027**

Table 5A-7
Peak Hour Vehicle Miles of Travel in Year 2030

	Network				
Functional Class	**Current Base**	**Future Base**	**Enhanced**	**Option A**	**Option C**
	2002	**2030**	**2030**	**2030**	**2030**
Freeway	337,282	708,938	1,013,414	2,022,321	2,014,484
Expressway	22,013	140,093	162,693	240,572	236,049
Arterial	400,007	2,039,333	1,841,064	1,264,034	1,279,598
Collector	6,106	25,425	24,876	20,980	21,376
Total	**765,409**	**2,913,789**	**3,042,047**	**3,547,906**	**3,551,506**

Table 5A-8
Weekday Vehicle Miles of Truck Travel in Year 2020

	Network				
Functional Class	**Current Base**	**Future Base**	**Enhanced**	**Option A**	**Option C**
	2002	**2020**	**2020**	**2020**	**2020**
Freeway	1,951,141	3,182,836	4,065,007	7,107,940	7,160,477
Expressway	102,628	961,038	1,038,715	1,152,828	1,328,326
Arterial	1,692,490	5,160,140	4,234,261	2,461,570	2,530,692
Collector	17,810	81,358	71,873	47,606	54,609
Total	**3,764,070**	**9,385,372**	**9,409,857**	**10,769,944**	**11,074,104**

Table 5A-9
Weekday Vehicle Miles of Truck Travel in Year 2030

	Network				
Functional Class	**Current Base**	**Future Base**	**Enhanced**	**Option A**	**Option C**
	2002	**2030**	**2030**	**2030**	**2030**
Freeway	1,951,141	3,974,190	5,299,251	9,572,807	9,462,723
Expressway	102,628	1,041,947	1,361,063	1,925,822	1,924,482
Arterial	1,692,490	7,849,686	6,581,317	4,454,160	4,541,169
Collector	17,810	112,593	112,542	79,408	83,001
Total	**3,764,070**	**12,978,416**	**13,354,174**	**16,032,197**	**16,011,375**

Table 5A-10
Peak Hour Vehicle Miles of Travel at LOS E or F in Year 2020

	Network				
Functional Class	**Current Base**	**Future Base**	**Enhanced**	**Option A**	**Option C**
	2002	**2020**	**2020**	**2020**	**2020**
Freeway	34,943	204,265	114,791	33,226	59,715
Expressway	1,598	9,568	8,268	0	0
Arterial	52,198	347,440	204,723	63,617	73,395
Collector	212	1,829	2,511	941	1,325
Total	**88,951**	**563,103**	**330,293**	**97,784**	**134,436**

Table 5A-11
Percent of Peak Hour Vehicle Miles of Travel at LOS E or F in Year 2020

	Network				
Functional Class	**Current Base**	**Future Base**	**Enhanced**	**Option A**	**Option C**
	2002	**2020**	**2020**	**2020**	**2020**
Freeway	10	33	14	2	4
Expressway	7	8	8	0	0
Arterial	13	27	18	8	9
Collector	3	10	14	6	9
Total	**12**	**28**	**16**	**4**	**6**

Table 5A-12
Peak Hour Vehicle Miles of Travel at LOS E or F in Year 2030

	Network				
Functional Class	**Current Base**	**Future Base**	**Enhanced**	**Option A**	**Option C**
	2002	**2030**	**2030**	**2030**	**2030**
Freeway	34,943	361,608	373,306	377,519	343,402
Expressway	1,598	93,091	43,588	19,593	19,856
Arterial	52,198	1,086,570	836,456	229,658	230,420
Collector	212	10,019	6,030	2,001	2,237
Total	**88,951**	**1,551,288**	**1,259,379**	**628,772**	**595,915**

Table 5A-13
Percent of Peak Hour Vehicle Miles of Travel at LOS E or F in Year 2030

	Network				
Functional Class	**Current Base**	**Future Base**	**Enhanced**	**Option A**	**Option C**
	2002	**2030**	**2030**	**2030**	**2030**
Freeway	10	51	37	19	17
Expressway	7	66	27	8	8
Arterial	13	53	45	18	18
Collector	3	39	24	10	10
Total	**12**	**53**	**41**	**18**	**17**

Table 5A-14
Directional Miles of Highway at LOS E or F in the Peak Hour - Year 2020

	Network				
Functional Class	**Current Base**	**Future Base**	**Enhanced**	**Option A**	**Option C**
	2002	**2020**	**2020**	**2020**	**2020**
Freeway	6	48	20	6	11
Expressway	1	4	4	0	0
Arterial	68	201	119	37	41
Collector	0	2	2	1	1
Total	**75**	**255**	**145**	**44**	**53**

Table 5A-15
Percent of Directional Miles of Highway at LOS E or F in the Peak Hour - Year 2020

	Network				
Functional Class	**Current Base**	**Future Base**	**Enhanced**	**Option A**	**Option C**
	2002	**2020**	**2020**	**2020**	**2020**
Freeway	3	19	8	1	3
Expressway	2	5	4	0	0
Arterial	4	9	5	2	2
Collector	1	5	4	3	2
Total	**4**	**10**	**6**	**2**	**2**

Table 5A-16
Directional Miles of Roadway at LOS E or F in the Peak Hour - Year 2030

	Network				
Functional Class	Current Base	Future Base	Enhanced	Option A	Option C
	2002	2030	2030	2030	2030
Freeway	6	79	68	53	50
Expressway	1	52	19	8	8
Arterial	68	609	488	139	138
Collector	0	9	7	3	3
Total	**75**	**749**	**582**	**202**	**199**

Table 5A-17
Percent of Directional Miles of Roadway at LOS E or F in the Peak Hour - Year 2030

	Network				
Functional Class	Current Base	Future Base	Enhanced	Option A	Option C
	2002	2030	2030	2030	2030
Freeway	3	31	27	12	11
Expressway	2	60	19	4	4
Arterial	4	27	22	7	7
Collector	1	24	15	6	6
Total	**4**	**29**	**22**	**7**	**7**

Table 5A-18
Number of Intersections Operating at Level-of-Service E or F
in the Peak Hour in Year 2020

	Network				
Subarea	Current Base	Future Base	Enhanced	Option A	Option C
	2002	2020	2020	2020	2020
East	22	107	90	48	55
Central	0	25	14	3	3
West	0	0	0	0	0
South	0	2	2	0	0
Total	22	134	106	51	58

Table 5A-19
Percent of Intersections Analyzed Operating at Level-of-Service E or F in the Peak Hour in Year 2020

	Network				
Subarea	**Current Base**	**Future Base**	**Enhanced**	**Option A**	**Option C**
	2002	**2020**	**2020**	**2020**	**2020**
East	12	47	39	20	23
Central	0	13	7	2	2
West	0	0	0	0	0
South	0	2	2	0	0
Total	5	21	16	8	9

Table 5A-20
Number of Intersections Operating at Level-of-Service E or F in the Peak Hour in Year 2030

	Network				
Subarea	**Current Base**	**Future Base**	**Enhanced**	**Option A**	**Option C**
	2002	**2020**	**2020**	**2020**	**2020**
East	22	157	144	97	95
Central	0	129	107	30	32
West	0	4	4	2	2
South	0	11	10	4	4
Total	22	301	265	133	133

Table 5A-21
Percent of Intersections Analyzed Operating at Level-of-Service E or F in the Peak Hour in Year 2030

	Network				
Subarea	**Current Base**	**Future Base**	**Enhanced**	**Option A**	**Option C**
	2002	**2020**	**2020**	**2020**	**2020**
East	12	69	62	41	40
Central	0	68	55	17	18
West	0	3	3	1	1
South	0	13	11	5	5
Total	5	47	40	21	21

Table 5A-22
Motor Vehicle Accidents Forecast for 2020

	Network								
	Current Base	Future Base		Enhanced		Option A		Option C	
Accident Type	**2002**	**2020**	**%Ch**	**2020**	**%Ch**	**2020**	**%Ch**	**2020**	**%Ch**
Freeway Fatal	22	33	50	38	73	53	141	51	132
Freeway Injury	1,418	2,298	62	2,644	86	3,781	167	3,649	157
Freeway PDO	3,480	5,668	63	6,521	87	9,340	168	9,012	159
Freeway Subtotal	**4,920**	**7,999**	63	**9,203**	87	**13,174**	168	**12,712**	158
Other Segment Fatal	74	148	100	142	92	121	64	123	66
Other Segment Injury	6,699	13,717	105	12,756	90	11,149	66	11,295	69
Other Segment PDO	13,361	27,406	105	25,534	91	22,328	67	22,639	69
Other Segment Subtotal	**20,134**	**41,271**	105	**38,432**	91	**33,598**	67	**34,057**	69
Intersection	15,219	23,083	52	22,869	50	20,737	36	20,838	37
Total	**40,273**	**72,353**	80	**70,504**	75	**67,509**	68	**67,607**	68

Note: %Ch is percent of change compared to 2002.

Table 5A-23
Motor Vehicle Accidents Forecast for 2030

	Network								
	Current Base	Future Base		Enhanced		Option A		Option C	
Accident Type	**2002**	**2030**	**%Ch**	**2030**	**%Ch**	**2030**	**%Ch**	**2030**	**%Ch**
Freeway Fatal	22	36	64	42	91	63	186	62	182
Freeway Injury	1,418	2,516	77	2,949	108	4,670	229	4,562	222
Freeway PDO	3,480	6,209	78	7,277	109	11,559	232	11,292	224
Freeway Subtotal	**4,920**	**8,761**	78	**10,268**	109	**16,292**	231	**15,916**	223
Other Segment Fatal	74	192	159	184	149	155	109	156	111
Other Segment Injury	6,699	17,972	168	16,709	149	14,299	113	14,380	115
Other Segment PDO	13,361	35,892	169	33,478	151	28,712	115	28,901	116
Other Segment Subtotal	**20,134**	**54,056**	168	**50,371**	150	**43,166**	114	**43,437**	116
Intersection	15,219	26,411	74	25,878	70	23,054	51	23,228	53
Total	**40,273**	**89,228**	122	**86,517**	115	**82,512**	105	**82,581**	105

Note: %Ch is percent of change compared to 2002.