TABLE OF CONTENTS

Appendix

Table of Figures

Table of Tables

INTRODUCTION

This transportation plan has been undertaken because of the high rate of growth, changing demographics and land use within the City of Glendale. The City of Glendale Transportation Plan was last updated in December 2001, and this plan reflects the city's measures to understand current conditions and evaluate future needs. The purpose of this plan is to accommodate the transportation and mobility needs of the residents by evaluating roadways, transit, and alternative modes through comprehensive policy and planning.

Background

Glendale is the fourth largest city in the State of Arizona and the 72nd largest city in terms of population in the United States. The current 2009 population is 248,900, which represents a 13 percent increase from the 2000 Census. Like the region and state, Glendale has experienced long periods of high population growth. Commensurate with population growth is the need for additional infrastructure, which includes the transportation system.

Plan Process

This plan included a number of work tasks. Each task is presented here in the form of a chapter and will document the research, analysis, and findings related to each task.

The chapters will include:

- Existing Conditions
- Future Conditions
- Policy Guidelines
- Roadway Plan
- Transit Plan
- Alternate Modes Plan
- Aviation Plan
- Funding Plan
- Public Involvement

A Transportation Review Team, made up of staff from various City departments, guided the study, provided input through the course of the study, and reviewed deliverables. In addition, there was a series of public workshops held to obtain input from citizens and businesses.

1.0 EXISTING CONDITIONS

1.1 Introduction

The study area for the City of Glendale Transportation Plan comprises the area within the Glendale Municipal Planning Area. The incorporated city limits are roughly bounded at the north and south by Pinnacle Peak Road and Camelback Road and at the east and west by 43rd and 115th Avenues. The planning boundary extends to the west to include the Strip-Annex Area located along Northern Avenue, Perryville Road, Camelback Road, and adjacent to property lines. The City is not fully annexed, however, the full planning area is bounded on all sides except in the far west by existing cities and therefore is limited in geographic expansion. Most of the land in the planning area west of Glendale Municipal Airport is unincorporated. A few parcels west of 75th Avenue and south of Northern Avenue are still part of Maricopa County. To the west of the Airport, only Luke Air Force Base and a parcel at the northwest corner of Northern and Loop 303 have been incorporated. The predominate neighboring cities are Phoenix to the east and Peoria to the west. Once fully annexed, the City of Glendale will be approximately 100 square miles in size. The study area is shown in Figure 1-1.

1.1.a Physical Features

Glendale is relatively flat in terrain and has no mountain features. The White Tank Mountains lie one-mile west of the planning boundary. Three rivers flow through the city. Skunk Creek and New River traverse the northern section of Glendale and converge in the southern section. The Agua Fria River passes through Glendale near the Airport.

1.1.b Focus Areas

Due to the distinct characteristics of parts of the city, the City of Glendale has divided the study area into four focus areas: City Center, North Glendale, Loop 101 Corridor, and Loop 303 Corridor. The downtown area is the oldest part of the city, followed by North Glendale. The Loop 101 area has only recently been annexed into the city while the Loop 303 Corridor is still primarily County land. Geographic location, demographic and population, Title VI considerations, land use, and employment characteristics will be discussed for each focus area. The four focus areas are shown in Figure 1-2.

1.2 Demographics

Glendale is the fourth largest city in the State of Arizona and the 72nd largest city in terms of population in the United States. The estimated 2006 population is 246,529, which represents a 13 percent increase from the 2000 Census. Like the region and state, Glendale has experienced long periods of high population growth. There are an estimated 91,000 households and 94,000 dwelling units within the city limits as of 2006. Roughly 24 percent of the dwelling units are under 10 years old, 50 percent are between 10-20 years

old, and 26 percent are over 30 years old. According to the 2006 American Community Survey, of the total housing units in the city, 37 percent are renter occupied and 63 percent are owner occupied.

The median household income in Glendale is similar to that of the State of Arizona but slightly below that of Maricopa County, although there are variations within the City, depending on geographic location. Table 1-1 compares historical growth data of the population and income for Glendale, the County, and State while Figure 1-3 graphs population change from 1980. Table 1-2 provides a breakdown of the key demographic indicators by focus area. Median household income, population, and population density for the City are illustrated in Figure 1-4, Figure 1-5, and Figure 1-6, respectively. A discussion of demographics by focus area follows.

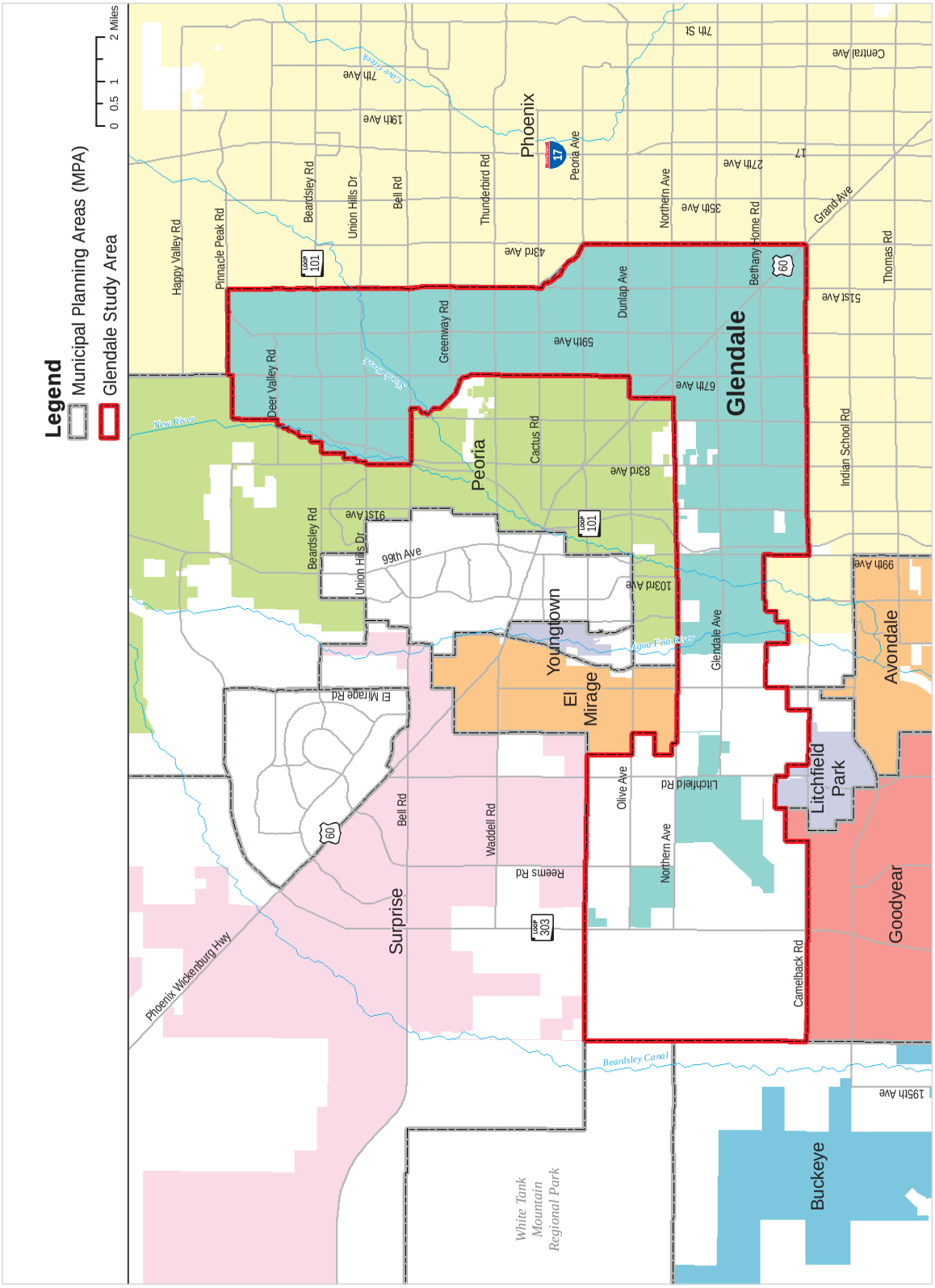


Figure 1-1 Glendale Study Area

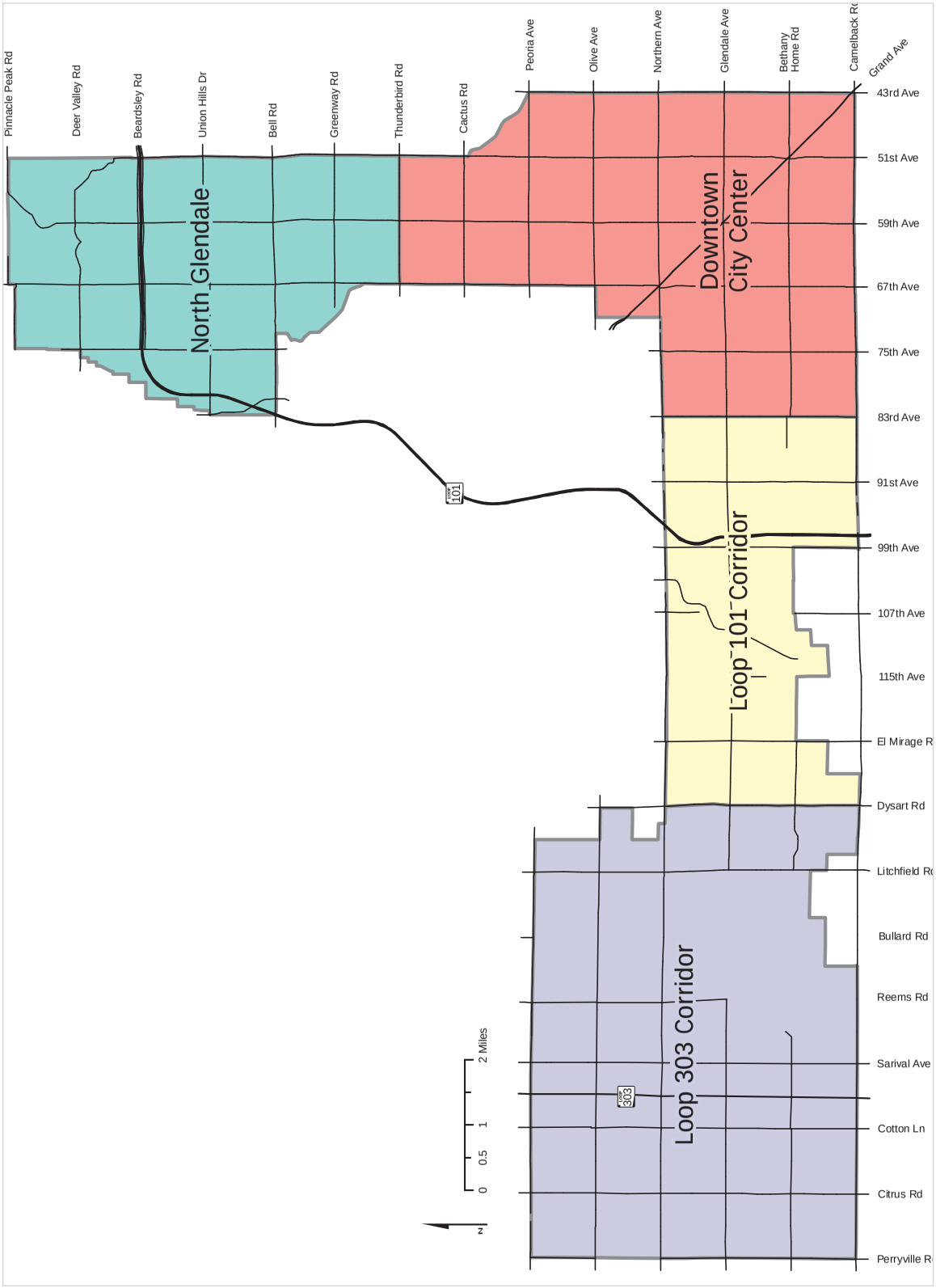
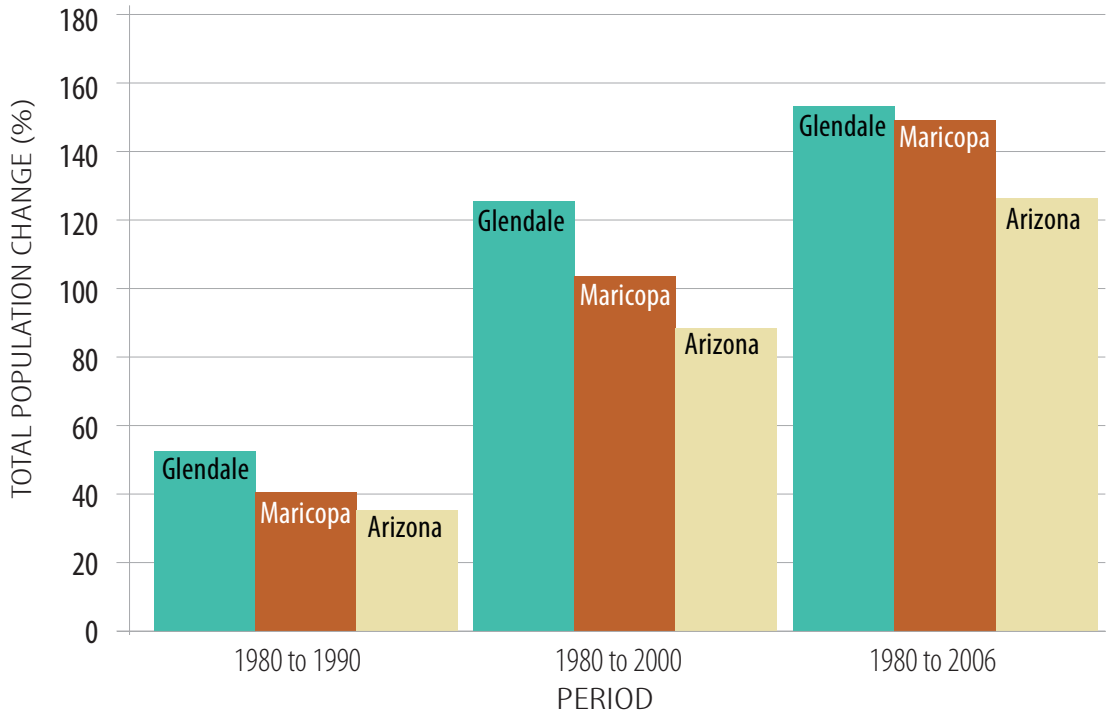


Figure 1-2 Focus Areas

Table 1-1 Historical Demographic Trends in Glendale and the Region, 1980-2006

Geographic Area	Glendale	Maricopa County	Arizona
Year	**Population**		
1980	97,172	1,509,052	2,718,215
1990	148,134	2,122,101	3,665,228
2000	218,812	3,072,149	5,130,632
2006	246,529	3,768,123	6,166,318
Change, 1980-1990	52%	41%	35%
Change, 1980-2000	125%	104%	89%
Change, 1980-2006	154%	150%	127%
Year	**Median Household Income (Current Dollars)**		
1980	$14,563	$17,728	$16,448
1990	$31,665	$30,797	$27,540
2000	$45,015	$45,358	$40,558
2006	$48,445	$52,521	$47,265
Change, 1980-1990	117%	74%	67%
Change, 1980-2000	209%	156%	147%
Change, 1980-2006	233%	196%	187%

Source: 2006 American Community Survey, US Decennial Census 1980, 1990, 2000



Source: 2006 American Community Survey, US Decennial Census 1980, 1990, 2000

Figure 1-3 Total Population Change (%) in Glendale and the Region, 1980-2006

Table 1-2 Demographic Profile in Glendale by Focus Area

	Glendale MPA	Downtown City Center Glendale Avenue & North 59th Avenue	North Glendale Union Hills Drive & North 63rd Avenue	Loop 101 Corridor Glendale Avenue & North 91st Avenue	Loop 303 Corridor Glendale Avenue & North Sarival Road
Income					
2000 Est. Median Household Income	$50,163	$42,141	$66,172	$55,114	$45,201
2000 Est. Per Capita Income	$19,347	$16,280	$26,201	$18,326	$17,306
Race					
2000 Est. White Population	75.7%	70.6%	88.0%	69.9%	77.5%
2000 Est. Black Population	4.6%	5.6%	1.9%	6.4%	5.1%
2000 Est. Asian & Pacific Islander Population	2.6%	2.2%	3.6%	2.2%	2.7%
2000 Est. American Indian & Alaska Native Population	1.1%	1.5%	0.4%	1.2%	1.1%
2000 Est. Other Races Population	15.9%	20.2%	6.0%	20.3%	13.5%
2000 Est. Hispanic Population	24.8%	32.0%	9.0%	29.9%	19.9%
Home Values					
2000 Median Home Value	$104,300	$92,400	$158,700	$101,900	$111,500
2000 Median Rent	$697	$630	$918	$722	$539
Transportation to Work					
2000 Drive to Work Alone	75.6%	72.8%	81.2%	75.8%	68.9%
2000 Drive to Work in Carpool	16.7%	18.9%	11.4%	19.7%	18.9%
2000 Travel to Work by Public Transportation	1.6%	2.4%	0.6%	0.8%	0.5%
2000 Drive to Work on Motorcycle	0.4%	0.3%	0.5%	0.4%	0.2%
2000 Walk or Bicycle to Work	2.2%	2.5%	1.7%	0.8%	6.4%
2000 Other Means	0.9%	1.1%	0.6%	0.7%	0.9%
2000 Work at Home	2.7%	2.0%	4.0%	1.8%	4.2%
Travel Time					
2000 Travel to Work in 14 Minutes or Less	19.9%	17.6%	22.1%	16.3%	43.9%
2000 Travel to Work in 15 to 29 Minutes	35.1%	36.9%	32.9%	36.2%	23.4%
2000 Travel to Work in 30 to 59 Minutes	37.3%	38.1%	36.0%	41.2%	26.0%
2000 Travel to Work in 60 Minutes or More	7.8%	7.4%	9.1%	6.3%	6.7%
2000 Average Travel Time to Work (minutes)	28.5	28.5	29.0	29.2	23.1

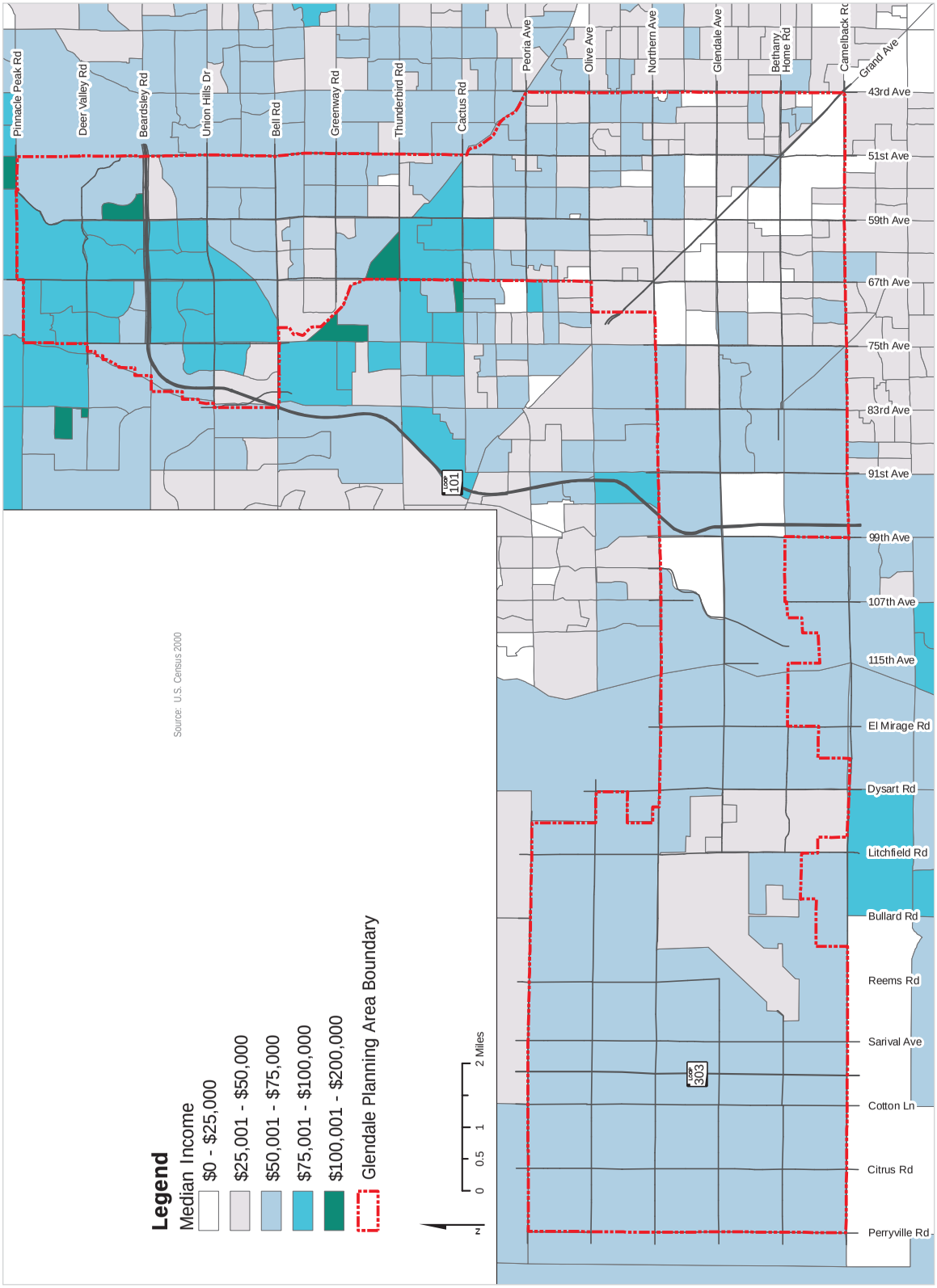


Figure 1-4 Median Household Income in 1999 by Census Block Groups

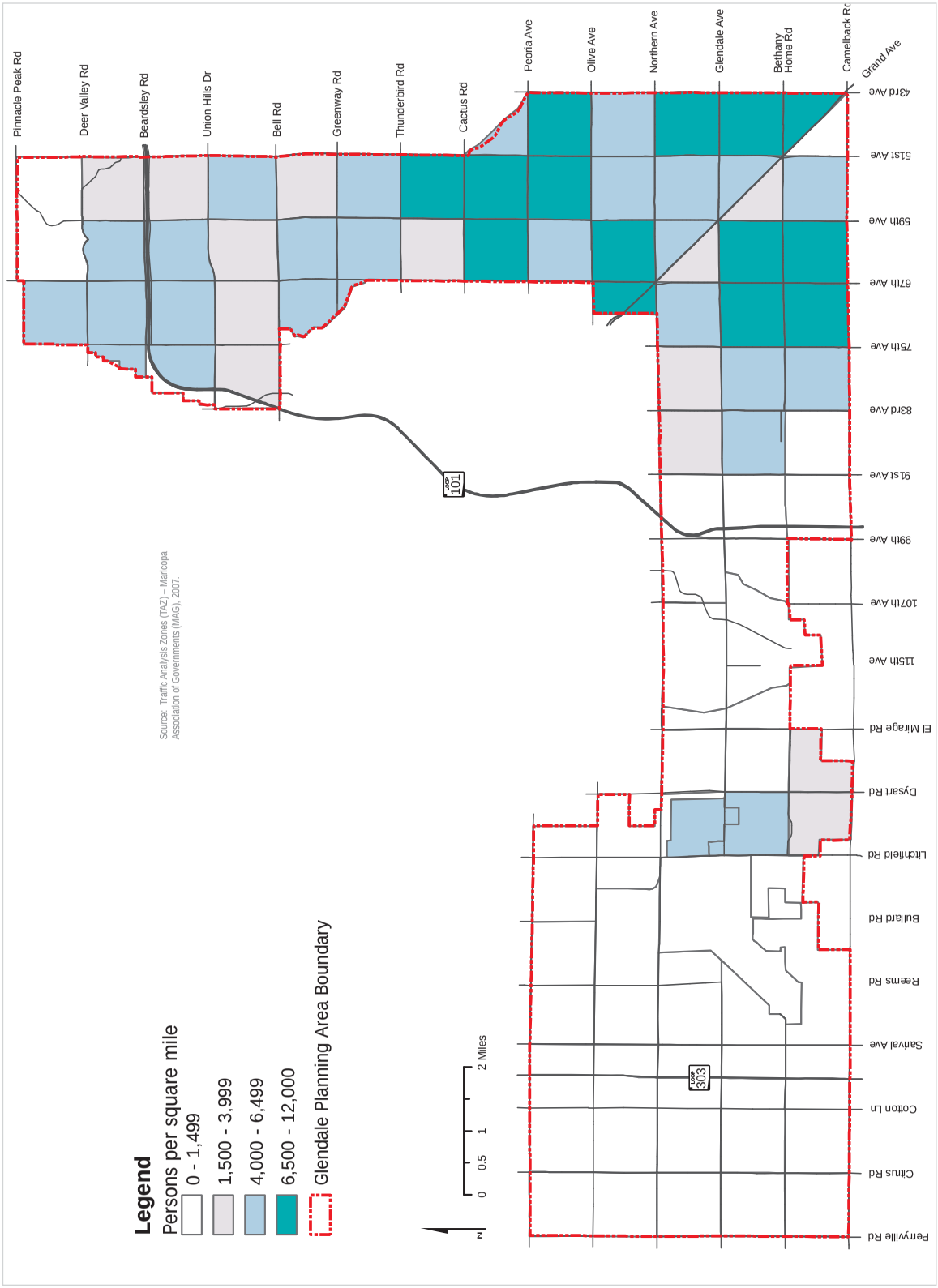


Figure 1-5 Population by Traffic Analysis Zones (TAZ) (2005)

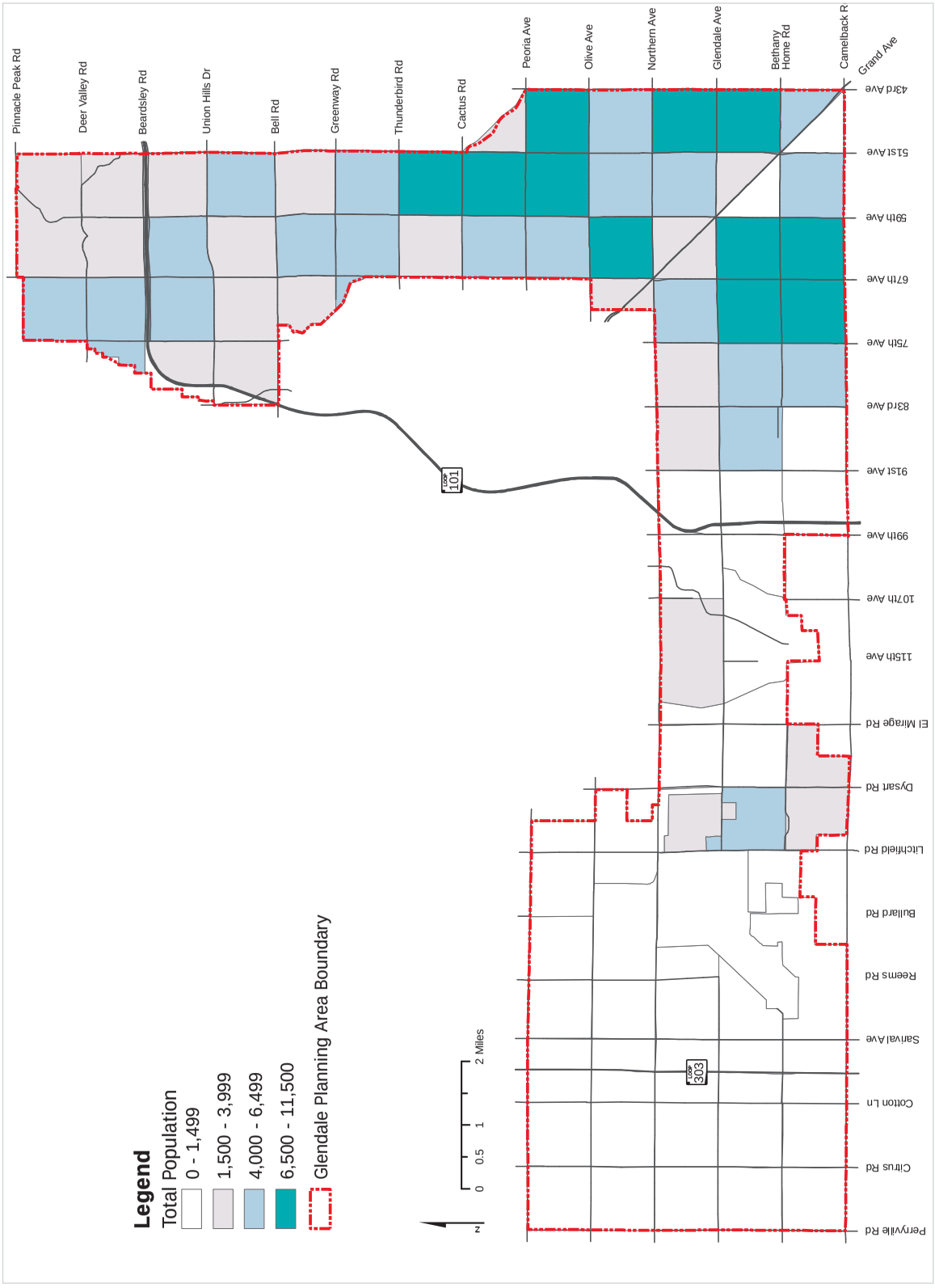


Figure 1-6 Population Density by Traffic Analysis Zones (TAZ) (2005)

1.2.a Downtown City Center

The Glendale City Center is in the general location of 59th Avenue and West Glendale Avenue and is bounded by 83rd and 43rd Avenues to the east and west, and Thunderbird and Camelback Roads to the north and south. The area is characterized by older neighborhoods surrounding the Downtown and Civic Center and is the most densely populated area of the City. Median income and home values in this focus area are the lowest in the City and the percentage of minority population is the highest. Individuals in the area utilize the highest rate of public transportation as a means of getting to work.

1.2.b North Glendale

North Glendale generally describes the area by West Union Hills Drive and North 63rd Avenue, which is bounded by 83rd Avenue and Dysart Road to the east and west, and Pinnacle Peak and Thunderbird Roads to the north and south. This area is developed but not densely populated and is characterized by newer homes in planned developments. Median household income is the highest in the City and commensurate with it are high median home prices. This area has the lowest proportion of minority population in the City. Workers in this focus area are most likely to drive to work alone.

1.2.c Loop 101 Corridor

The Loop 101 Corridor is generally described as the area near West Glendale Avenue and North 91st Avenue, bounded by 51st and 43rd Avenues to the east and west, and Northern Avenue and Bethany Home Road to the north and south. The area is generally less populated to the west of the Loop 101 corridor than to the east. This area has a high percentage of minority population and high median household income. The percentage of carpoolers is significant; however, usage of other alternative modes of transportation is low.

1.2.d Loop 303 Corridor

The Loop 303 Corridor, near West Glendale Avenue and North Sarival Road, is bounded by Dysart and Perryville Roads to the east and west, and Peoria and Camelback Roads to the north and south. This area is the least populated and represents the second highest home values of the four defined focus areas. The minority population is lower than the average for the City. There is a low rate of carpoolers but high number of home-based workers. Median travel time is the lowest in the City.

1.3 Title VI

This section addresses Title VI and environmental justice issues by examining the geographic distribution of the non-white population and the population with incomes below poverty level. Title VI was enacted as part of the Civil Rights Act of 1964 to ensure that recipients of federal funds do not contribute, encourage, or result in actions that discriminate based on race, color, or national origin. Executive Order 12898 on Environmental Justice decreed fair treatment of all people regardless of race, color, national origin, or income with respect to environmental laws. Fair treatment was defined as having no one group of people bear an undue share of the "negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies." Figure 1-7 and Figure 1-8 illustrate the percentage of non-white population and the percentage of the population with incomes below the poverty level by census tract. A discussion of Title VI and Environmental Justice conditions by focus area is presented below.

1.3.a Downtown City Center

The area around 59th Avenue and Glendale Avenue has the highest potential for Title VI and Environmental Justice concerns. It has one of the highest proportions of non-white populations in the City and is the only area in Glendale where the percent of persons living under the poverty level exceeds forty percent.

1.3.b North Glendale

The area around West Union Hills Drive and 63rd Avenue has limited Title VI and Environmental Justice concerns. There are very few non-white dominated census tracts and, while several tracts indicate that the percentage of persons living under the poverty level is within the twenty to forty percent range, none are over forty percent.

1.3.c Loop 101 Corridor

The area around Loop 101 and 91st Avenue has limited Title VI and Environmental Justice concerns. There is a large percent of non-white population near the Loop 101 Corridor but there are no census tracts where the percent below poverty level exceeds ten percent.

1.3.d Loop 303 Corridor

The area around Loop 303 and Sarival Avenue has limited Title VI and Environmental Justice concerns. The area adjacent to Luke Air Force Base has non-white populations in the twenty-five to over-fifty percent range but there are no census tracts where the percent below poverty level exceeds ten percent.

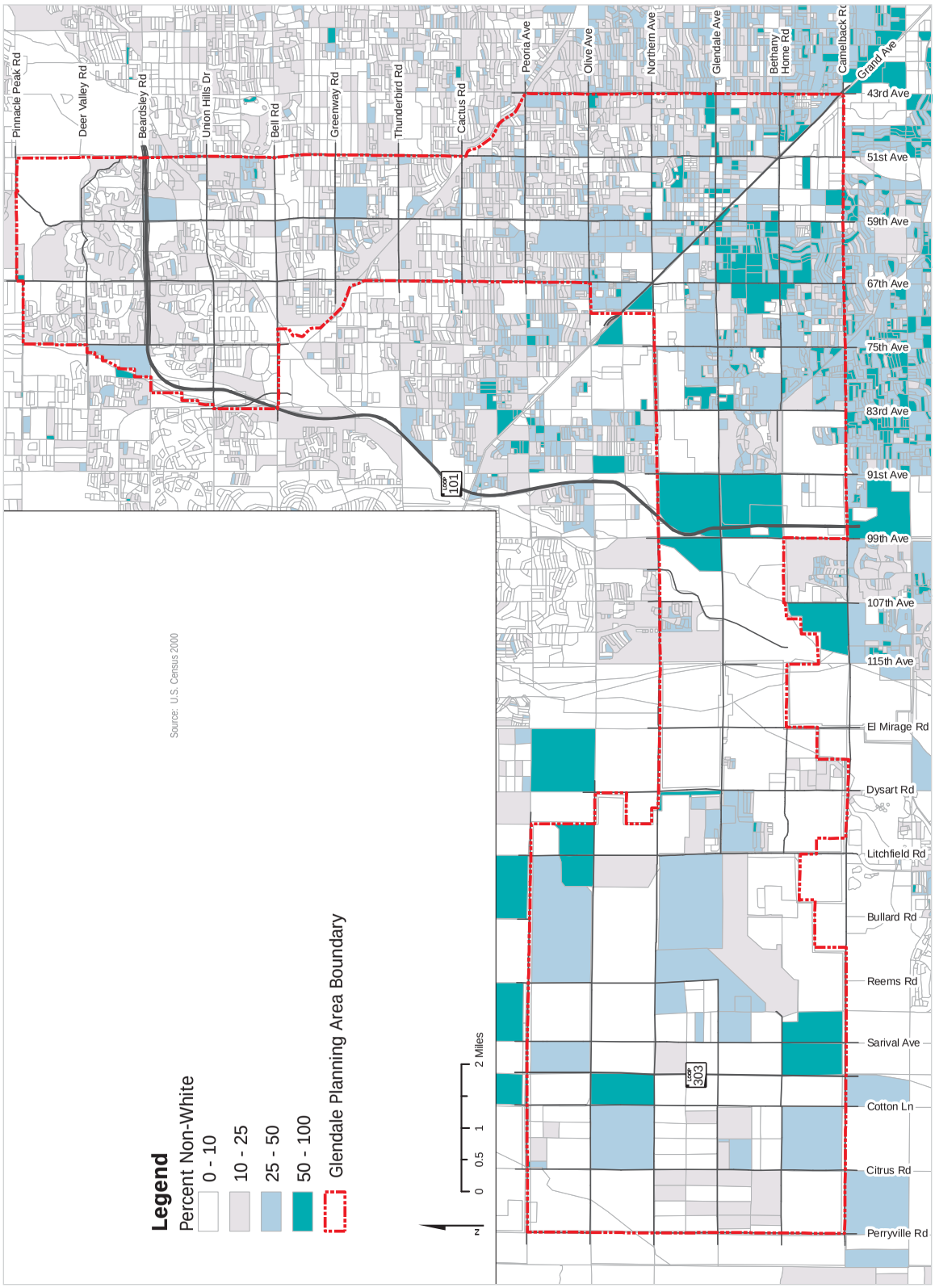


Figure 1-7 Percent of Population Non-white by 2000 Census Blocks

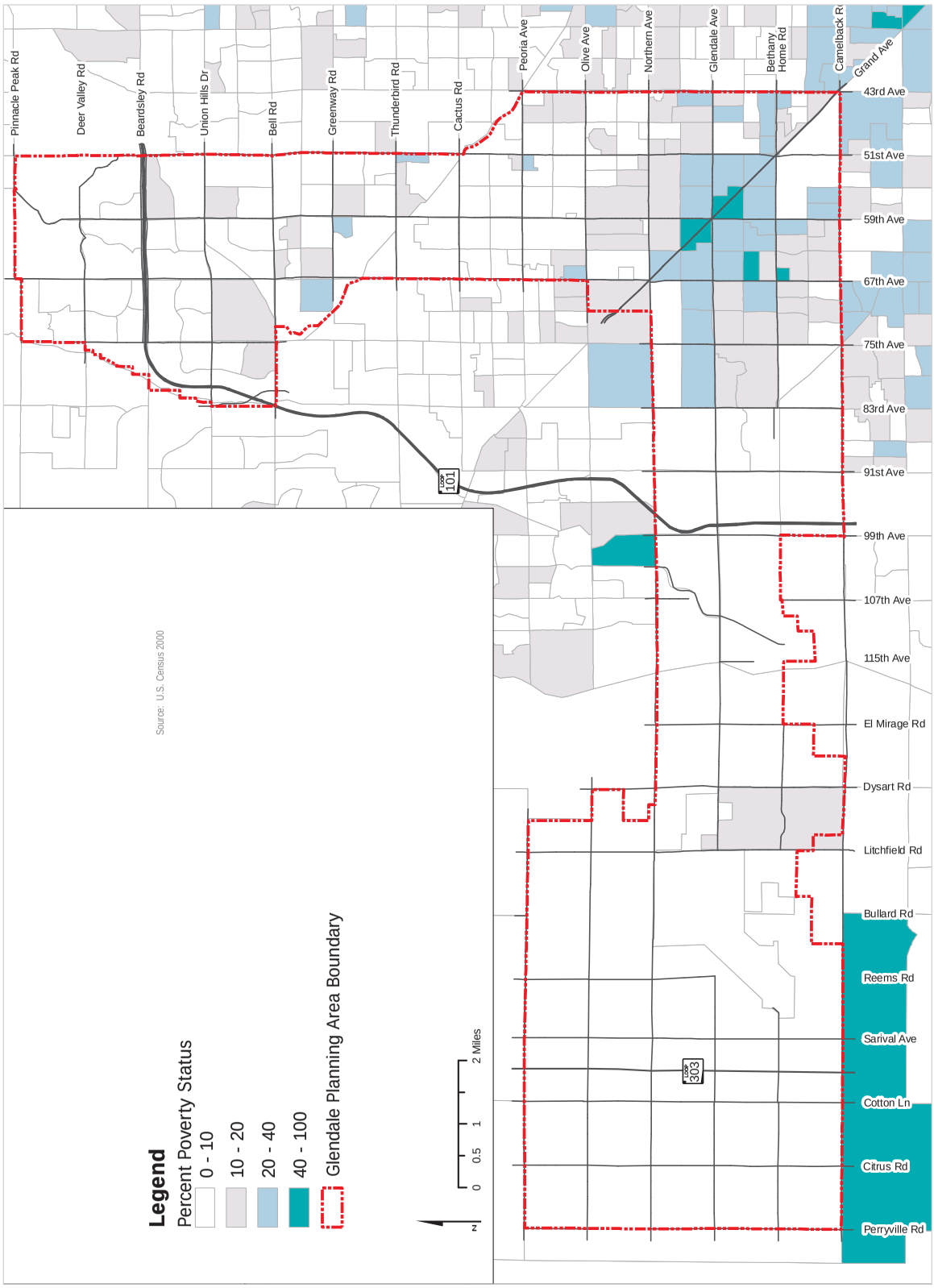


Figure 1-8 Percent of Population with Incomes in 1999 Below Poverty by Census Block Groups

1.4 Land Use

General land use patterns in the City of Glendale are delineated by Loop 101, with residential to the east and agricultural to the west. There is less undeveloped land in the east and northeast sections of the City while the west side of town is still dominated by agriculture and open space, especially in the unincorporated sections. Figure 1-9 illustrates land use in the City. The land use by focus area is described below.

1.4.a Downtown City Center

Land use in Downtown Glendale is perhaps the most diverse in the City, with employment along Grand Avenue, commercial along Glendale Avenue, public institutions at the center of downtown, and residential neighborhoods in the outskirts. While there are still small tracts of agricultural land use around the area, there is very little vacant land remaining.

1.4.b North Glendale

North Glendale was annexed in 1979 and until recently, was the most heavily utilized area of town outside of the downtown district. Land use here is primarily residential, with the commercial zones concentrated primarily along Bell Road. There is very little agricultural or vacant land remaining, however, there are several golf courses and large parks in the area which are dedicated to open space.

1.4.c Loop 101 Corridor

Until recently, the Loop 101 area was heavily utilized for agricultural production. The completion of the Loop 101 Freeway and development of Westgate and the stadiums has changed the landscape of the area. Currently, the most developed area is the Westgate development, however, there are additional large mixed-use projects planned. The airport and the adjacent airpark, another dominant form in the landscape, is also a commercial and employment district.

1.4.d Loop 303 Corridor

The area around Loop 303 is still predominately agricultural except for Luke Air Force Base and some isolated residential development. There is very little land allocated to commercial usage and there are almost no employment centers in this area.

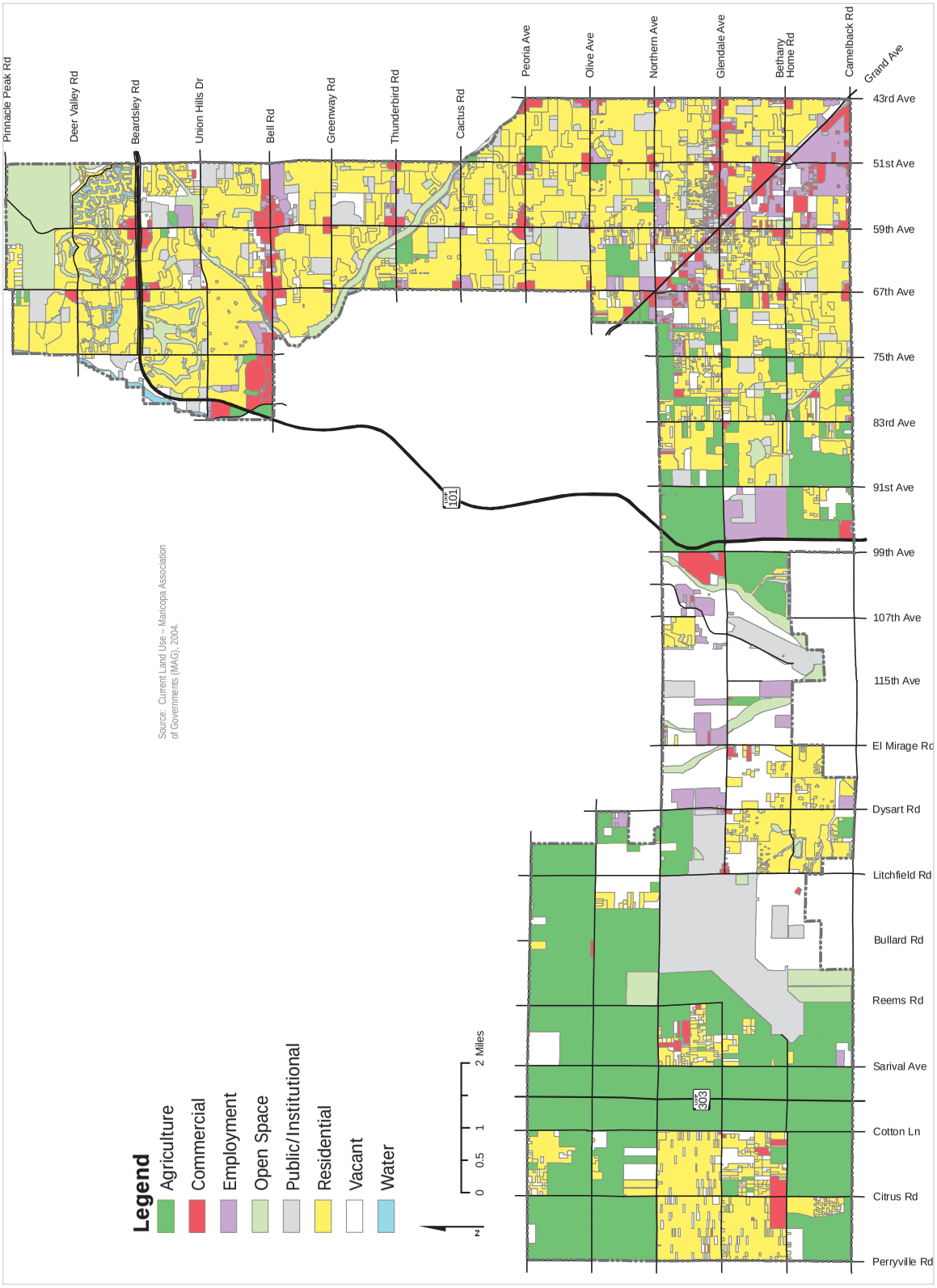


Figure 1-9 Current Land Use

1.5 Employment

In the past, Glendale has served primarily as a bedroom community for the Phoenix Metropolitan Area. Currently, employment in the City is generally centered around the four focus areas of City Center, North Glendale, Loop 101 Corridor, and Loop 303 Corridor. Employment and major activity centers are shown in Figure 1-10. Figure 1-11 and Figure 1-12 illustrate employment and employment density. Job to dwelling units ratios are fairly evenly distributed around the City as indicated in Figure 1-13. Currently, the largest employer in Glendale is Luke Air Force Base, which includes both military and civilian jobs. The two largest private employers are Arrowhead Towne Center and the Banner Health System. In 2006, AAA began moving its Operations Center to the Bell Road Corridor in North Glendale. It will eventually include 1,400 new jobs, making it one of the top five employers in the City. The major private and public employers in Glendale are listed in Table 1-3 and Table 1-4 and are discussed by focus area.

Table 1-3 Major Private Employers in the City of Glendale (continued on next page)

Private Employers	Employees	Description
Arrowhead Towne Center	2,500	Retail
Banner Health System	2,036	General medical and surgical hospitals
Schuck & Son's	1,150	Mfg prefab wood trusses & pre-hung doors
Corning Gilbert Engineering Co., Inc.	800	Electrical equipment and supplies
AAA	750	Auto services administrative office
Honeywell International–Space & Aviation Division	700	Satellite & space system components
Arrowhead Community Hospital	650	Health services
Younger Brothers Construction Co., Inc.	600	Cabinet and finish carpentry
Wal-Mart Supercenter	525	Department stores
Mitchell Electric	500	Electric contractors
Bechtel Corporation	430	Administrative office
Sanderson Ford, Inc.	425	New and used car dealers
Ranch Market	400	Grocery store
Thunderbird School of Global Management	354	Colleges and universities
Friendship Retirement Corp/Glencroft Care Center	345	General medical and surgical hospitals
Ace Building Maintenance Co.	330	Building and office cleaning services
Cabela's	325	Outdoor outfitters retail store
Wal-Mart Stores, Inc.	301	Department stores
Conair Corporation	300	Consumer products
Life Care Center of North Glendale	300	Medical/Long term care
Precision Research	285	Marketing research office

Table 1-3 Major Private Employers in the City of Glendale (contiued from previous page)

Private Employers	Employees	Description
Palo Verde Plastering Inc.	280	Plaster and drywall work
AfterMarket Company/Impulse Response Group	277	Business services
S C P Construction	275	Concrete work
Sands Motor Company	270	New and used car dealers
Costco Wholesale	250	Department stores
Legends Furniture, Inc.	200	Furniture

Table 1-4 Major Public Employers in the City of Glendale

Public Employers	Employees	Description
United States Air Force—Luke AFB	7,000 active military, 1,400 civilians	F-16 training base
City of Glendale	1,937	General government
GU High School District #205	1,862	Elementary and secondary schools
GE School District #40	1,684	Elementary and secondary schools
DVUSD #97	1,432	Elementary and secondary schools
Glendale Community College	1,220	Colleges and universities
United States Postal Service Encoding Center	600	United States mail
United States Postal Service	382	Post offices – 3 branches

1.5a Downtown City Center

The primary employment and economic base in this area are the Civic Center and the shopping and dining district in the historic downtown area. The Civic Center houses the majority of the City's governmental positions. The historic district surrounding the area includes specialty restaurants, retail, and antique shops. The neighborhood also hosts special events and festivals.

1.5.b North Glendale

Economic base and employment in the North Glendale area include retail, business, and educational institutions. Arrowhead Towne Center is the largest private employer in the City and the Bell Road Corridor also houses major retail and commercial centers. Talavi Business Park is an office complex whose tenants include AAA Operations Center, Bechtel Corporation, California Casualty Management Company, Federated Insurance, Progressive Casualty Insurance Company, Credit Union West, and Cosmopolitan Medical Services. Thunderbird School of Global Management, Midwestern University, and Arizona

State University–West Campus are nationally ranked institutions with over 10,000 enrolled students combined.

1.5.c Loop 101 Corridor

Major employment in this area is located at the Westgate City Center. Located at Loop 101 and Glendale Ave, it will be the core of the Sports and Entertainment District in Glendale and will span 225 acres to include retail, entertainment, restaurants, offices, residential, and hotels. Adjacent to the Center are the new sports arena, football stadium, media center, and expo hall. North of Westgate, located at Glendale and 91st Avenues, Zanjero is a mixed-use development that, at completion, will include 160 acres of residential, retail, and office space. West of Loop 101 is Glendale Municipal Airport and Glendale Airpark, and this area is also home to some major corporate tenants.

1.5.d Loop 303 Corridor

Currently, the Loop 303 Corridor is home to Luke Air Force Base, the largest employer in the City. Luke is an active duty F-16 training base and employs 7,000 active military and 1,400 civilian personnel. Future developments in this area will include the Woolf Commerce Center, which is a 1,500-acre industrial and business park site.

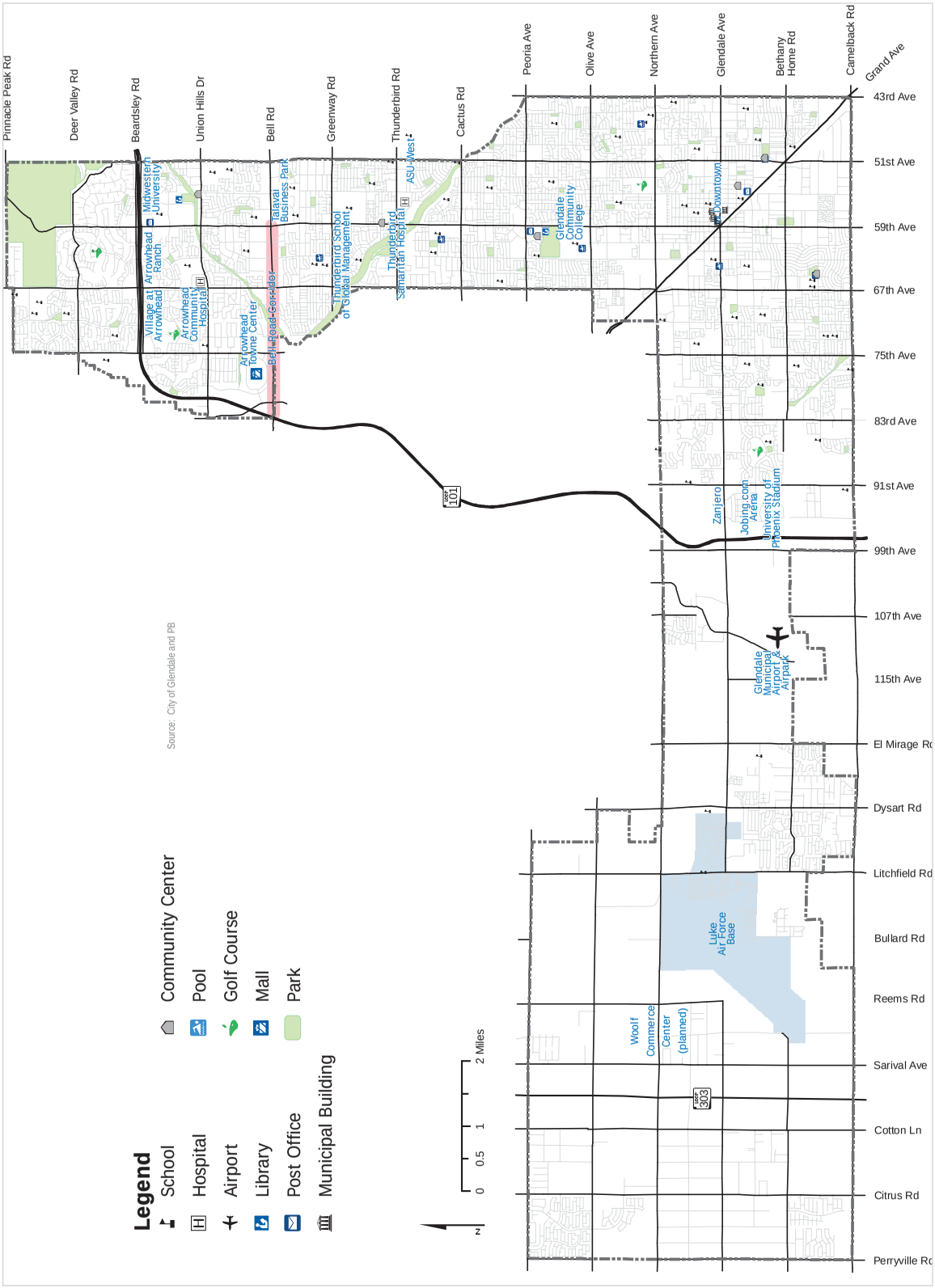


Figure 1-10 Major Economic and Activity Centers

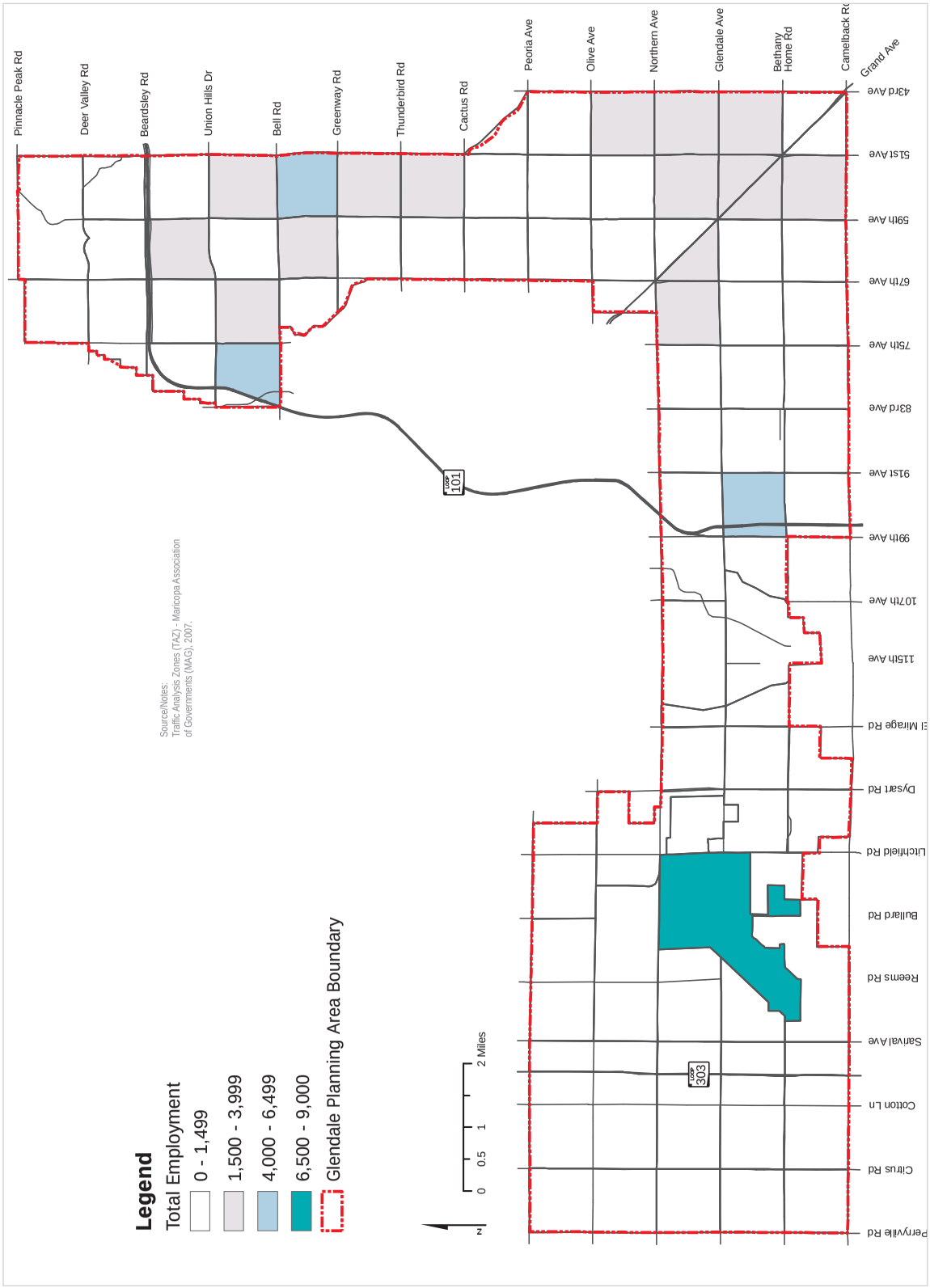


Figure 1-11 Employment by Traffic Analysis Zones (TAZ) (2005)

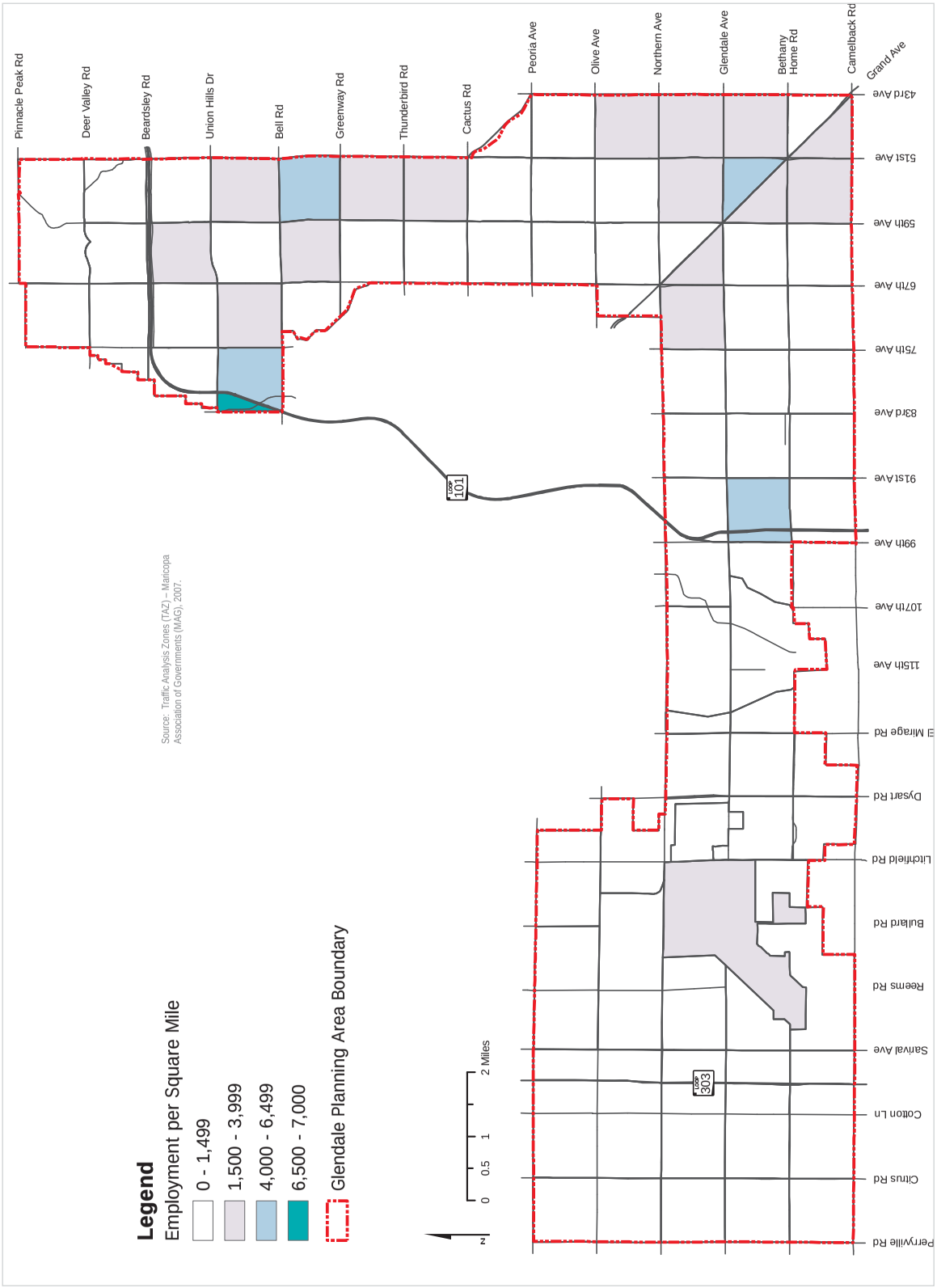


Figure 1-12 Employment Density by Traffic Analysis Zones (TAZ) (2005)

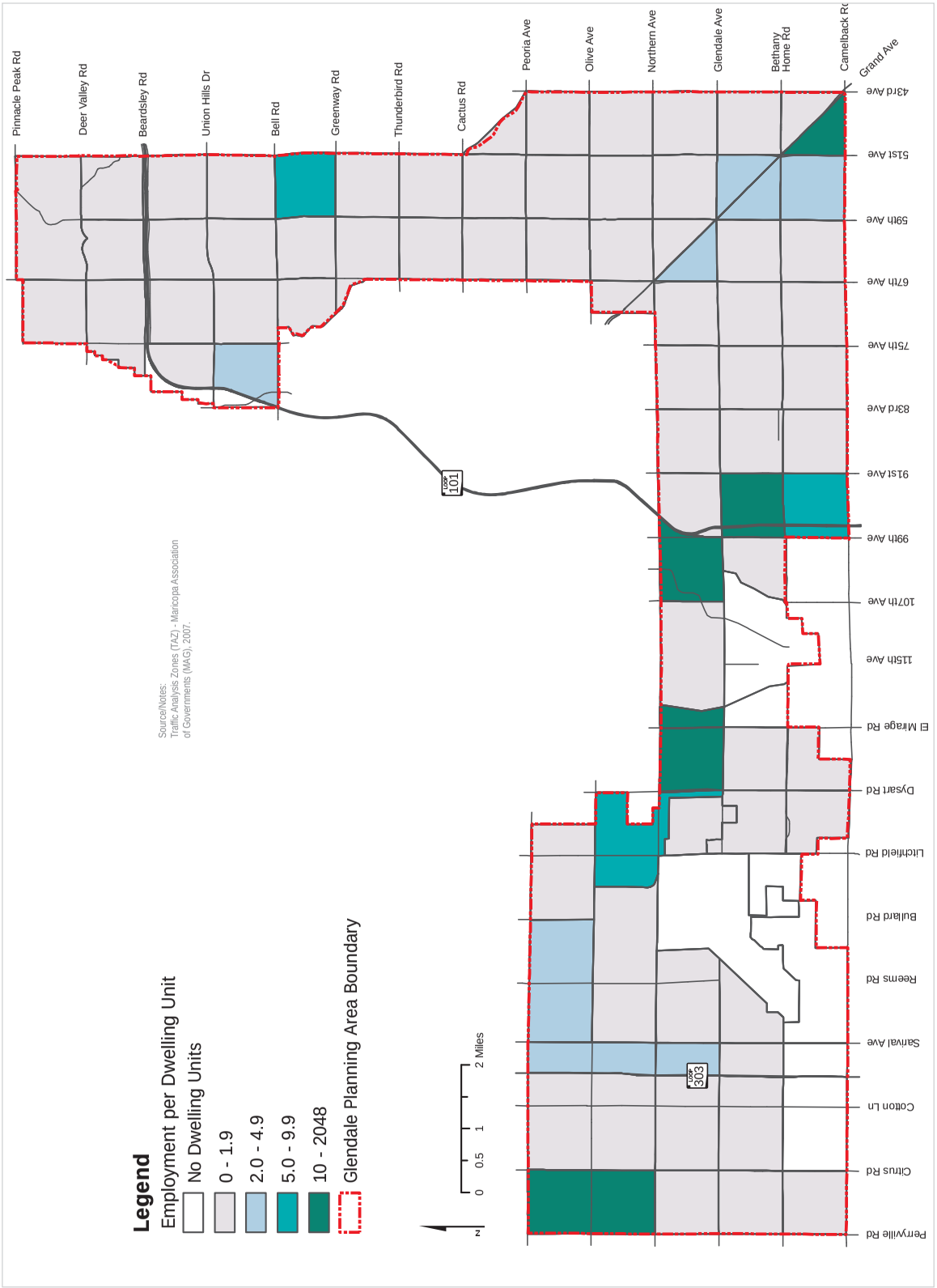


Figure 1-13 Ratio of Jobs per Household by Traffic Analysis Zones (TAZ) (2005)

1.6 BNSF Railroad

The Phoenix Subdivision of Burlington Northern Santa Fe Railway (BNSF) travels parallel to Grand Avenue within the City of Glendale. This line, also nicknamed the "Peavine," connects the transcontinental mainline route at Williams Junction and interchanges with Union Pacific at its most southern segment in Downtown Phoenix.

The Phoenix Subdivision interchanges with a total of four railroads: the Grand Canyon Railway at Williams, the Arizona Central Railroad at Drake, the Arizona and California Railroad at Mattie, and the Union Pacific Railroad at Phoenix. It is a major freight route connecting Phoenix with the main transcontinental line and Southern California via the Arizona and California Railroad.

BNSF operates a major intermodal facility in Glendale at 5281 Tom Murray Avenue just north of West Camelback Road and Northwest Grand Avenue. The facility operates twenty-four hours a day, seven days a week. The facility includes warehousing, two translifts, two portable end load ramps, and a permanent end load ramp. It has a capacity of 100,000 to 250,000 lifts per year.

The rail segment that operates in Glendale has five major crossings. ADOT has systematically been making improvements to the major Grand Avenue intersections by grade separating one of the three streets. Although the Grand Avenue grade separations have no impact on the railroad crossings, they still improve the overall intersection operation. All five locations within the City of Glendale have a grade separation for one street. Table 1-5 summarizes the grade separations for the Grand Avenue intersections.

The segment of the railroad line in Glendale has been identified as a potential route for commuter rail operation and service. However, the line is single tracked and a double tracked line would be required for commuter rail operation. Other issues include ownership of the rail, capacity conflicts between freight and passenger service, traffic disruptions from the at-grade crossings, and traffic impacts from new passenger stations.

Table 1-5 Major Railroad Crossings in Glendale

Intersection	Street—Grade
43rd Avenue/Camelback Road	Grand Avenue—Overpass
51st Avenue/Bethany Home Road	51st Avenue—Overpass
55th Avenue/Maryland Avenue	Maryland Avenue—Overpass
59th Avenue/Glendale Avenue	Grand Avenue—Underpass
67th Avenue/North Avenue	67th Avenue—Overpass

2.0 FUTURE CONDITIONS

2.1 Demographic and Socioeconomics

2.1.a National

Between 1950 and 1990, the population in the United States grew at a steady pace of roughly 25 million people per decade. The latest Census survey reported that between 1990 and 2000, the population grew by an unprecedented 33 million people; a 24 percent increase over previous decades. This increase has been attributed to higher rates of immigration to the United States. Not only is the population increasing rapidly, its demographic profile is also changing. Furthermore, there are geographic distinctions in the population growth. Most of the increase occurred in the southern and western states, and the suburban population increased more than the urban population.

This high population growth and changing demographic will lead to a different set of travel characteristics. The number of American's aged 65 and older will increase from 35 million people today, or roughly 12 percent of the population, to 62 million people by 2025, or approximately 18 percent of the population. Much of this population sector will have the mobility challenges that older individuals traditionally experience, including the inability to access and/or operate a vehicle. Other segments will represent a more active senior retiree population with both higher incomes and automobile ownership rates than previous generations.

The aging population will require greater resources for multimodal, transit, and paratransit services. Seniors with greater accessibility to goods, services, and resources will require fewer assisted trips as their ability to operate motor vehicles decline. Other options include more automated vehicles and neighborhood vehicles such as golf carts. Improved infrastructure such as better street design and signage will need to be addressed. Travel demand management solutions may include in-house shopping and recreation via the internet.

The number of American women living alone has increased commensurate with educational attainment and earnings. Women have different and more complex travel characteristics than men, which is often dependent on the age of their children and typically include a higher number of linked trips. The next generation of female retirees is expected to make more trips than the current one.

2.1.b Regional

The Greater Phoenix region is roughly defined by Maricopa County, 26 municipalities, and three Native American communities. According to the U.S. Census Bureau, the Phoenix Metropolitan Statistical Area includes both Maricopa and Pinal counties. This region has experienced tremendous population growth in the last decade and is projected to increase at a similar rate in the future. Currently, baby boomers, defined as individuals born between 1945 and 1963, represent 27 percent of the region's population, while their children represent 30 percent of the population. Although retiring baby boomers are better educated, have greater political clout, and live longer and are healthier than those in previous generations, they face several challenges. Increasing health costs, the loss of home equity, and a decrease in the value of retirement investments may lead to many baby boomers choosing to retire later than expected. The first baby boomers are retiring with many more to come in the next few years.

In the Greater Phoenix area, individuals age 21 to 35 are more likely to reside in the central city, baby boomers are more likely to reside in the suburbs, and retirees age 55 and older are more likely to reside in retirement communities. This pattern is expected to change as baby boomers retire and their children leave home. Surveys indicate that boomers who are no longer raising children will leave the suburban setting and seek lifestyles and amenities representative of more urban or rural communities.

A demographic shift in the Greater Phoenix area includes an increase in the immigrant Hispanic population. Between 1990 and 2000, the Hispanic population in the United States increased from 9 to 13 percent, while the Hispanic population in the Greater Phoenix area increased from 17 to 25 percent. The population increase occurs not only in the inner cities but also in the suburbs and urban fringe areas. Population increases due to immigration are significant because immigrants are typically immediate additions to the workforce whose travel and mobility concerns are immediate.

2.1.c Glendale

As the City of Glendale reaches build-out, the housing stock within City limits will become older and filter down to households with lower incomes. This is correlated with an older and lower-economic population. The need for transit service will increase, while the ability to pay will decrease. The trend is expected to fall along geographic lines. The older central neighborhoods will have the oldest housing stock and the lowest average incomes in the City. The western part of Glendale, which is not yet built out, will have the newest housing stock and a younger population. The housing and population in northern parts of the City will become older and will likely experience a relative decline compared to

the rest of the region. To meet the needs of the changing demographics, increased transit service into and around the central parts of the City will be necessary.

Although unincorporated areas within the Glendale planning area will eventually be developed, it is expected to lag in size and density in comparison to areas within the current City limits. The highest population and population density is expected to be in the downtown area, which currently has the highest population density. Figure 2-1 illustrates projected population density in the year 2030. Figure 2-2 illustrates population growth between 2005 and 2030.

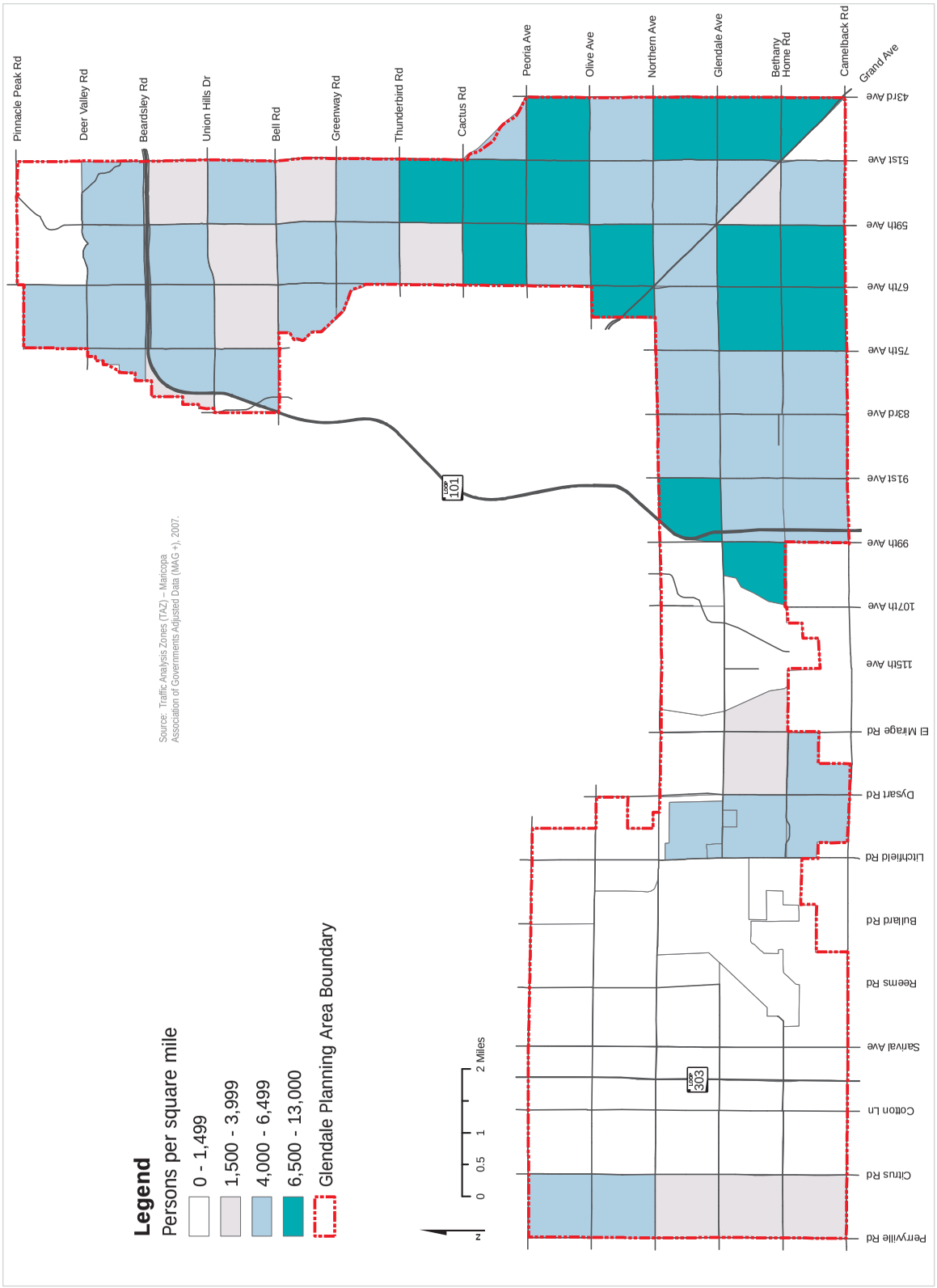


Figure 2-1 Population Density by Traffic Analysis Zones (TAZ) (2030)

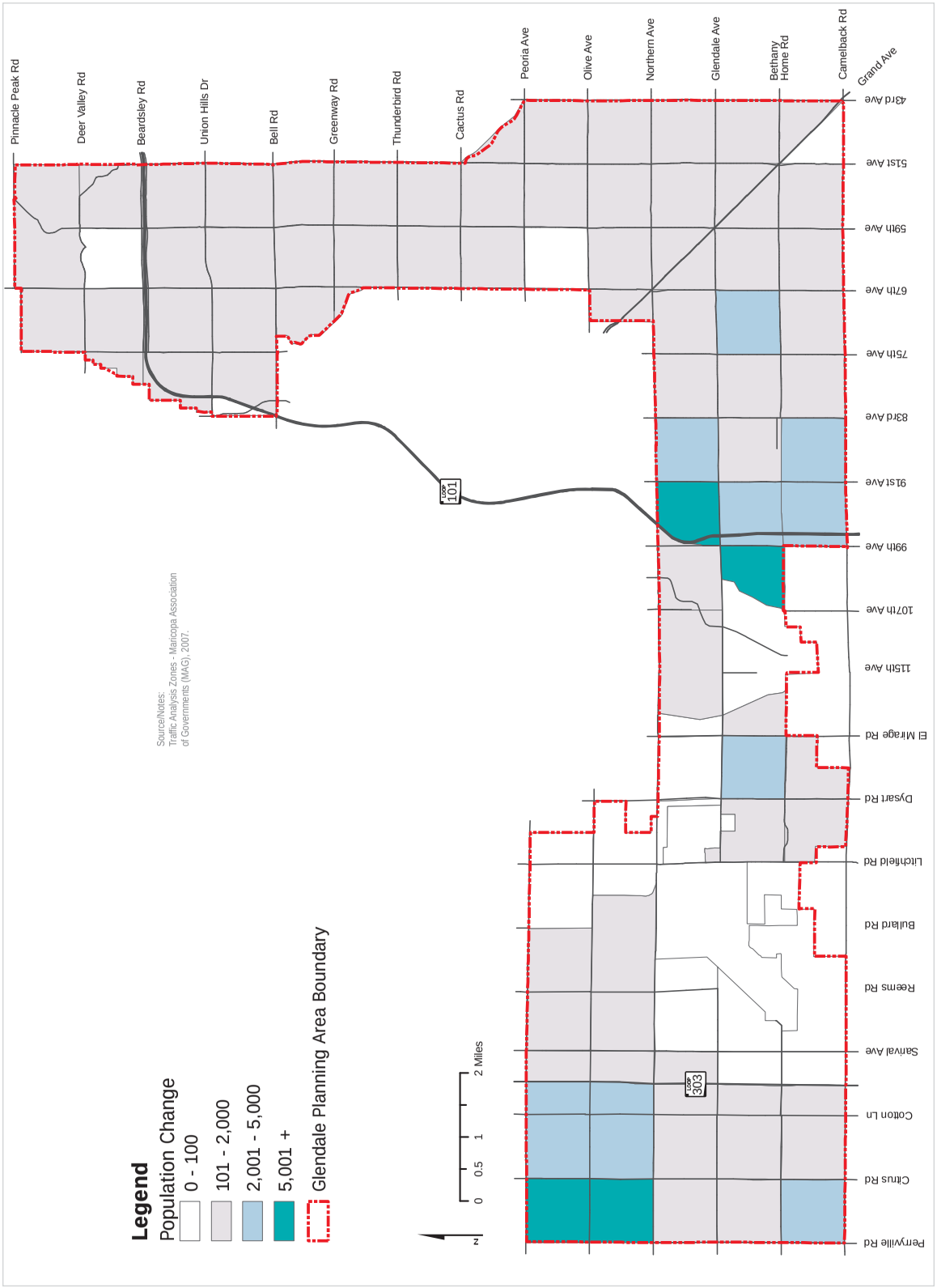


Figure 2-2 Population Change (2005-2030)

2.2 Employment and The New Economy

2.2.a National

Employment in the United States is moving toward a greater concentration of high-wage financial and business services as well as low-wage service jobs. This could, inevitably, lead to a diminishment of the traditionally middle income professions. Job growth will be driven by high-technology and service professions with an emphasis on New Economy industries. The New Economy is driven by professional services, technology, research, and education. When choosing a home location, workers in this sector are increasingly concerned with quality of life and access to quality education. Employers concerned with attracting and retaining quality employees are choosing to locate their businesses in areas where affordable housing is in proximity to amenities, restaurants, and mass transit. This is exemplified by Google's decision to choose Tempe for its Arizona office, rather than Phoenix or Scottsdale.

2.2.b Regional

In the Greater Phoenix area, the growth of New Economy jobs such as biotechnology, aerospace, information technology, and software has concentrated around fringe corridors rather than urban centers. This trend could change as large cities like Phoenix and Scottsdale continue to redevelop their downtown areas.

Although employment in the Greater Phoenix area's high-technology sector is growing, it is not ranked among the top technology centers in the country. The region is ranked in the top 15 in various measures of technology output. However, it ranked lowest in terms of the percent of workers involved in knowledge industries[1]. Workers aged 20 to 39 are looking for a balance between quality of life and work so building a livable city will be integral to attracting employers and residents.

2.2.c Glendale

Glendale is expected to evolve from a bedroom community to a key employment center in the region. Figure 2-3 shows the population and employment balance trend from 1980 to 2030. By 2020, Glendale is expected to have one job for every two residents in the City. As Glendale continues to increase its employment base, high growth in Glendale is expected to occur in the area of Loop 101, Loop 303 and Luke Air Force Base. Current employment west of 91st Avenue is approximately 18,000. Based on Glendale build out estimates, total new employment between the years 2007 and 2030 is projected as:

- 101,000 east of 91st Avenue
- 30,000 between 91st and 115th Avenues
- 40,000 west of 115th Avenue

1. Greater Phoenix Regional Atlas, A Preview of the Region's 50-Year Future. 2003. Tempe, AZ: Morrison Institute for Public Policy School of Public Affairs, pg 57.

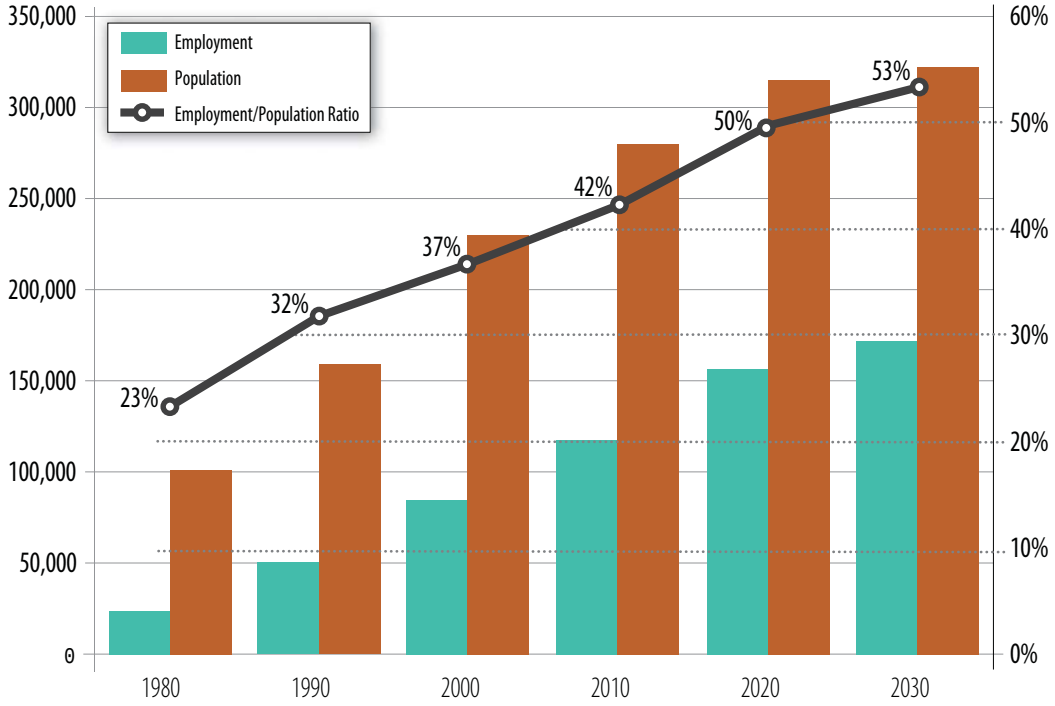


Figure 2-3 Population and Employment Trends from 1980-2030

The major employment center at Loop 101 is the Westgate City Center that includes a sports complex, entertainment district, and office, retail and residential space. Employment west of Loop 101 is projected to grow by 70,000 new jobs by 2030.

The Loop 303 area, which is currently unincorporated, has easy access to highways and, therefore, the potential for large-scale employment. One of the most critical employers in Glendale is Luke Air Force Base (Luke). It is the largest active military base in Arizona and one of the largest civilian employers in the City. The economic contribution of Luke is significant. It is critical as growth continues in the region, that it remain compatible with land uses and noise restrictions, which is required for the long-term operation of the base. Figure 2-4 illustrates projected employment density for the City of Glendale in 2030. Figure 2-5 illustrates employment change between 2005 and 2030.

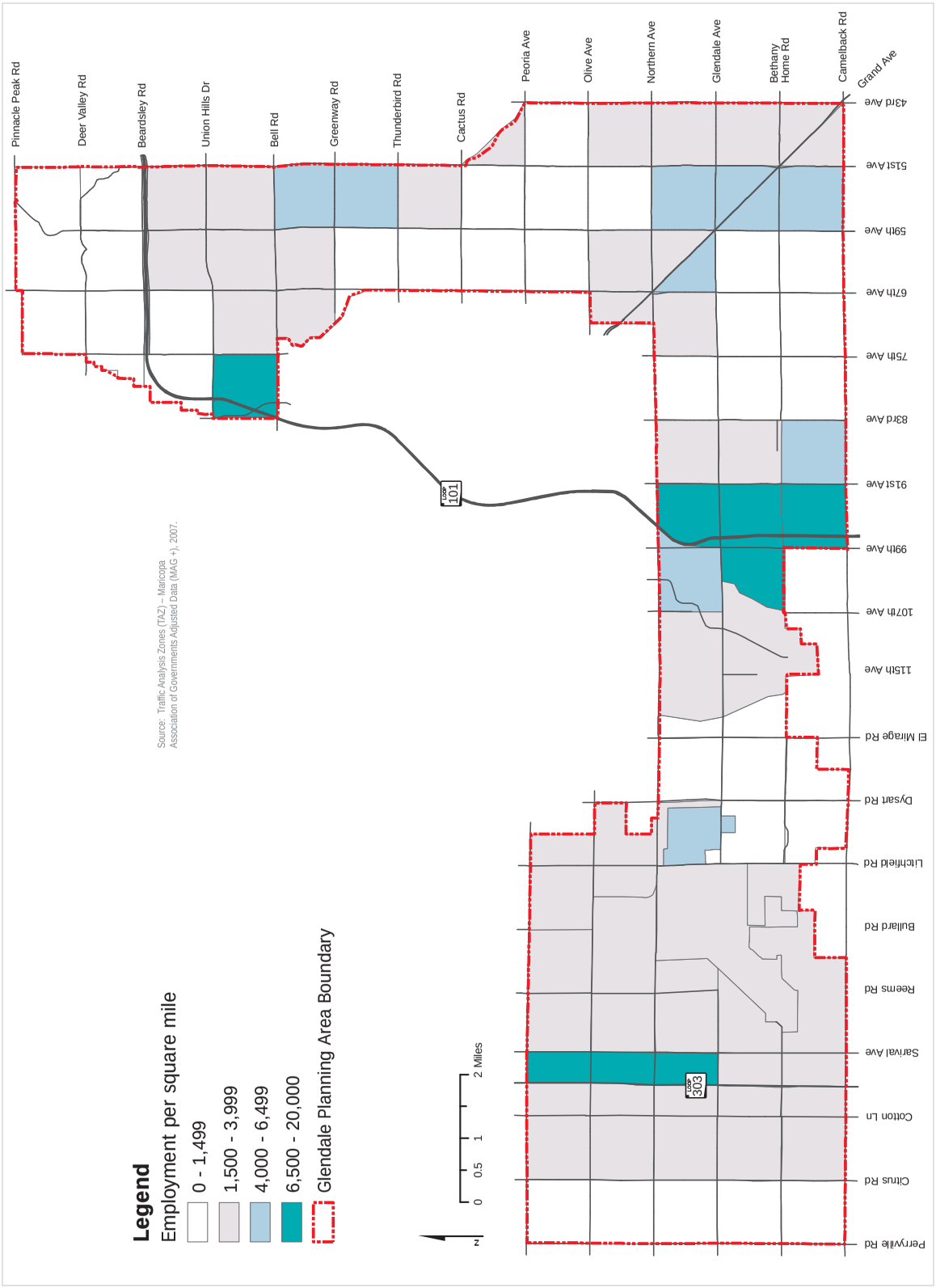


Figure 2-4 Employment Density by Traffic Analysis Zones (TAZ) (2030)

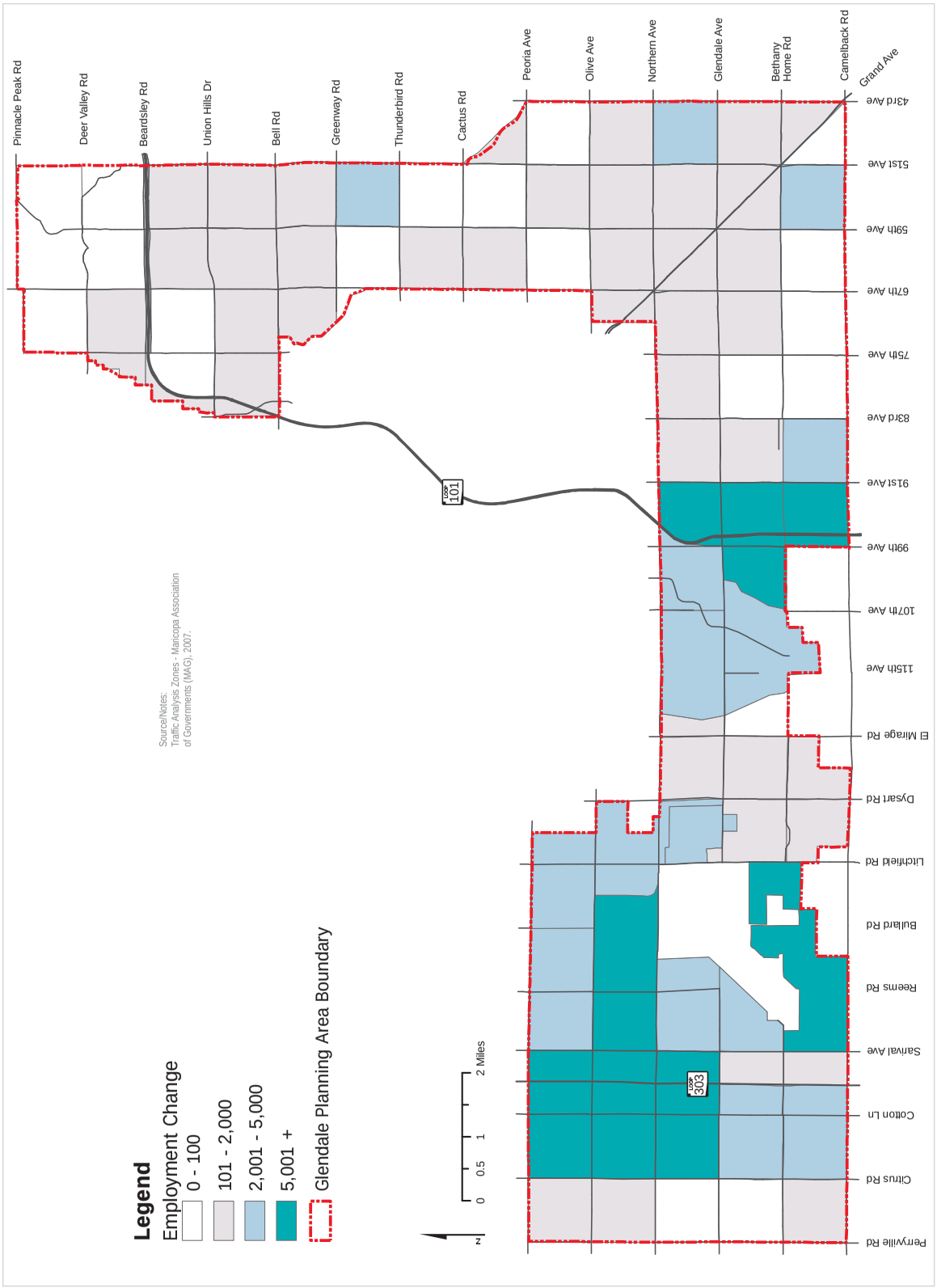


Figure 2-5 Employment Change (2005-2030)

2.3 Land Use and Urban Development

2.3.a Regional

The preservation of open space and the consequences of sprawling development are among the biggest land use and development concerns for residents in the Greater Phoenix area. There is a perception that Maricopa County is growing too fast and that the negative effects of growth are detrimental to a high quality of life. About half of the respondents to a survey conducted by the Morrison School of Public Policy believe that it is very important to preserve more open space. Approximately 30 percent of the respondents believe that the region does a good or excellent job of open space preservation.

Population density in Greater Phoenix continues to increase and currently ranks higher than other western cities such as Portland, San Diego, and Dallas, but lower than Los Angeles, San Jose and Denver. Between 1990 and 2000, the population density of the region increased from 153 to 222 people per square mile. While some of this growth is due to the conversion of open land into suburban development, existing urbanized areas also increased from 475 to 526 people per square mile. Population density is generally higher in the central region; however, pockets of high-density areas can be found throughout the region, such as at Arizona State University in Tempe or where there are high concentrations of multi-family housing.

2.3.b Glendale

Based on the General Plan 2025 land use map, the City will remain primarily residential with some aggregations of industry, commercial, and corporate commerce. The area around the Glendale Municipal Airport will function as a Business Park with a high concentration of corporate commerce. Most of the City east of 91st Avenue is designated for medium-density residential use, with the exception of high concentrations of commercial use along the Bell Road Corridor. Industrial use generally falls alongside Grand Avenue and the railroad track. The area around Luke Air Force Base is specifically designated as Luke Compatible Land Uses so as not to compromise the sustainability of the base. Currently, land west of the Luke Compatible Land Use area is primarily low-density residential. The county zoning of one house per acre is a placeholder until development plans emerge. New development in this area will be primarily low density industrial.

The City Center Master Plan is part of the efforts to enhance Glendale's downtown and civic center. The current plan was adopted in 2002 and there is a major effort underway to update the plan. The Master Plan also prioritizes the continued development of employment as a method of revitalizing the downtown area. This area is bounded by 43rd Avenue on the east, 67th Avenue on the west, and the midsection line streets of Orangewood Avenue on the north and Maryland Avenue on the south. Immediate developments in this area are restaurants and multi-family residential. Proposed mid-

term improvements include a performing arts center, special events facility, movie theater, shopping center, and offices. Long-term goals include a full-service hotel. The closing of auto dealerships between 43rd and 55th Avenue creates opportunities for redevelopment.

2.4 Socioeconomic Conditions for Transportation Model

Regional socioeconomic data is maintained by the Information Services Division of MAG and is used for a variety of purposes, including the travel forecasting model. Executive Order 95-2 requires the Arizona Department of Economic Security (DES) to develop state and county population estimates and projections for 50 years for each city and town with a population greater than 1,000 people. It authorizes Councils of Governments (COG) and Metropolitan Planning Organizations (MPO) to prepare subregional estimates and projections using the county population as a control total. MAG performs this task for Maricopa County in accordance with standards established by DES.

MAG prepares the subregional projections in a systematic manner. Maricopa County is divided into 28 Municipal Planning Areas (MPA), 148 Regional Analysis Zones (RAZ), and 1,955 Socioeconomic Analysis Zones (SAZ). MPAs include the corporate limits of a municipality plus any adjacent areas that are expected to become part of the corporate limits in the future. Prior to the development of new socioeconomic projections, MAG reviews the MPA boundaries with each member agency. If an area has been annexed or de-annexed, the MPA is adjusted accordingly. If a municipality requests a change to its MPA boundaries, MAG schedules a meeting with all the municipalities involved. If there are no objections, the change is made. If there are objections, the MPA boundary is not changed.

RAZs are subunits of MPAs and are the basic unit used in the spatial allocation model to prepare subregional projections. SAZs are the smallest unit for which MAG prepares projections. Their boundaries are generally defined using major streets and landmarks. Recently, MAG has added portions of Pinal County to the transportation modeling area. The transportation model uses a unit known as Traffic Analysis Zone (TAZ) which is similar to the SAZ, but is only in the modeling area. The socioeconomic projections were prepared to be consistent with the September 2005 Special Census Survey and have been prepared for 2010, 2020, and 2030. In May 2007, the MAG Regional Council approved the TAZ projections of population, housing, and employment for 2010, 2020, and 2030 for use in all regional planning activities.

2.4.a Model Set-Up

The existing population and employment data is utilized in the development of the transportation model. The data used in the validation model run for Glendale is summarized in Table 2-1. The data is summarized by Regional Analysis Zone (RAZ), which is a geographic subdivision of the Glendale planning area. Figure 2-6 shows the RAZ breakdown for Glendale.

Table 2-1 2006 Socioeconomic Data by Regional Analysis Zones (RAZ)

RAZ	Population	Other Employment	Public Employment	Retail Employment	Office Employment	Industrial Employment	Total Employment
222	51,712	21,34	3,267	10,775	1,298	897	18,371
240	46,598	3,638	2,913	5,519	2,694	2,397	17,161
254	5,748	311	183	216	0	188	898
255	12,582	201	559	599	18	320	1,697
256	3,254	0	8,612	0	0	14	8,626
257	44,836	1,213	1545	2,675	1,072	3,720	10,225
258	103,847	1,706	6,324	12,477	2,026	7,888	30,421
Total	268,577	9,203	23,403	32,261	7,108	15,424	87,399

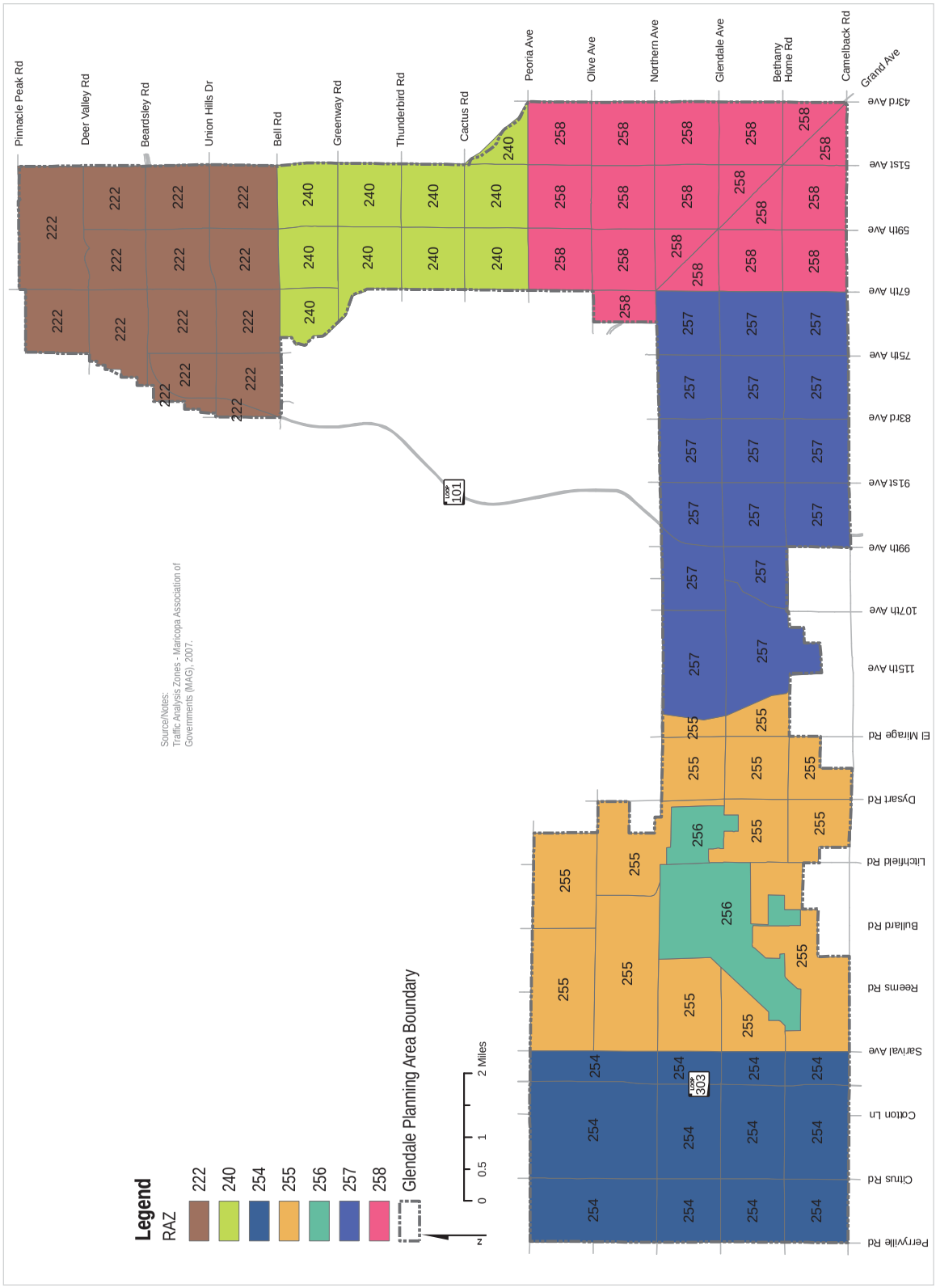


Figure 2-6 Regional Analysis Zone (RAZ) Breakdown for Glendale

2.4.b Socioeconomic Projections

As noted above, socioeconomic projections are prepared by MAG for future years based on county control totals developed by DES. The MAG approved socioeconomic projections by RAZ for 2030 for Glendale are shown in Table 2-2. These projections are typically used in the travel forecasting model. The RAZ breakdown for the Glendale area was shown in Figure 2-6.

Table 2-2 2030 Maricopa Association of Governments (MAG) Approved Socioeconomic Data

RAZ	Population	Other Employment	Public Employment	Retail Employment	Office Employment	Industrial Employment	Total Employment
222	54,494	2,580	3,764	11,494	4,167	1,207	23,212
240	48,623	3,735	3,008	5,862	4,746	3,898	21,249
254	23,494	2,595	2,056	6,205	7,270	1,733	19,859
255	21,656	437	754	2,287	65	5,297	8,840
256	3,264	0	8,612	0	0	65	8,677
257	66,080	3,845	2,936	8,902	14,592	8,001	41,359
258	109,801	1,823	9,855	14,125	3,359	11,956	41,118
Total	327,414	15,015	30,985	48,875	34,199	35,240	164,314

***population includes resident, transient, group quarters, and seasonal**

Because of the high growth in the Phoenix area, it is not uncommon for a municipality to review the projections for use in planning activities. Any revisions made to these socioeconomic projections do not change the official DES projections, but allow a municipality to evaluate growth impacts.

As part of the Glendale Transportation Plan update process, two areas were reviewed for possible revisions to the socioeconomic projections. The two areas were the Loop 101 Corridor and the Loop 303 Corridor. The City continues to receive proposed plans for new development along Loop 101 in the sports and entertainment district. Also, the City recently prepared a general plan amendment for the area along the Loop 303 Corridor. In both instances, the proposed plans were reviewed and discussed with City staff and new projections for population and employment were developed. These socioeconomic projections by RAZ for 2030 are shown in Table 2-3. These revised projections were used in the travel forecasting model.

Table 2-4 presents a comparison of the MAG approved socioeconomic data and the revised data used for the Glendale Transportation Plan. As can be seen in Table 2-4, three RAZs had revisions to population and four RAZs had revisions to employment. The population change ranged from a 5 percent to a 29 percent increase for a city-wide increase of 7 percent. The employment change ranged from a 56 percent to a 321 percent increase for a city-wide increase of 57 percent.

Table 2-3 2030 Glendale Transportation Plan Socioeconomic Data

RAZ	Population	Other Employment	Public Employment	Retail Employment	Office Employment	Industrial Employment	Total Employment
222	54,494	2,580	3,764	11,494	4,167	1,207	23,212
240	48,623	3,735	3,008	5,862	4,746	3,898	21,249
254	26,361	3,430	2,056	10,406	18,298	8,553	42,743
255	21,775	469	754	2,287	635	33,033	37,178
256	3,264	0	8,612	0	0	4,965	13,577
257	85,205	4,123	2,936	13,015	50,134	8,001	78,209
258	109,801	1,823	9,855	14,125	3,359	11,956	41,118
Total	349,523	16,160	30,985	57,189	81,339	71,613	257,286

*population includes resident, transient, group quarters, and seasonal

Table 2-4 Socioeconomic Data Percent Change

RAZ	2030 MAG Population	2030 Glendale Population	Percent Change	2030 MAG Total Employment	2030 Glendale Total Employment	Percent Change
222	54,494	54,494	0%	23,212	23,212	0%
240	48,623	48,623	0%	21,249	21,249	0%
254	23,494	26,361	12%	19,859	42,743	115%
255	21,656	21,775	5%	8,840	37,178	321%
256	3,264	3,264	0%	8,677	13,577	56%
257	66,080	85,205	29%	41,359	78,209	89%
258	109,801	109,801	0%	41,118	41,118	0%
Total	327,414	349,523	7%	164,314	257,286	57%

2.5 Travel Characteristics and Transportation Modes

2.5.a National

The national trend towards the suburbanization of population and jobs has led to a change in commuter travel patterns. Roughly half of the population now resides in the suburbs, 30 percent in the central cities, and 20 percent in non-metropolitan areas. Almost half of all added workers between 1990 and 2000 lived outside the county of their employment. This demographic shift has changed commuting patterns in most cities. The traditional suburb-to-central city commute is being replaced by suburb-to-suburb and central city-to-suburb "reverse commutes". Suburb-to-suburb commutes accounted for 64 percent of all growth between 1990 and 2000. The traditional suburb-to-central city commute contributed to 14 percent of the growth, but decreased in terms of percent of all commuters.

The aging of the baby boomers could also change the transportation infrastructure. By 2025, roughly one in five Americans will be 65 years or older. This represents an increase of 79 percent from 2002[2]. Many of these individuals have lived primarily in the suburbs where the only mode of reliable transportation has been the automobile. Automobile dependence is typically due to divided land use policies that have made other modes inefficient. Older drivers present a different challenge, as many limit their driving to daytime or exclusively on local streets. When older drivers are in an accident, they are more likely to be seriously injured than other segments of the population.

Many non-drivers 65 years and older, especially those with lower relative incomes and living in rural areas, are isolated from healthcare, opportunities for socialization, and other basic needs due to a lack of transportation options. Although seniors do shift some travel modes to walking, many do not live in areas that are safe or where there is access to goods and services. There is a divide between non-drivers who have low accessibility across geography and land uses. In higher density environments, seniors are less likely to stay home on a given day. Similarly, as density increases, the rate of public transportation usage increases dramatically and the percent of non-drivers over 65 years old who stay home decreases.

2.5.b Regional

The Greater Phoenix transportation network poses mobility challenges for many individuals. Due to a lack of mixed-used developments and designs that do not support pedestrian and transit travel, most trips outside the home require the use of an automobile. As residential growth continues to occur in fringe areas and attractive housing options remain lacking in downtown areas, commutes will remain long for city center workers. Currently, much of the region's land use patterns make public transit an unattractive option for the average commuter. Light rail service, which began operating in

2. Aging Americans: Stranded Without Options. 2004. Surface Transportation Policy Project, pg 3.

December 2008, is expected to encourage higher density housing options and increased transit usage along the corridor.

2.5.c Local

Table 2-5 shows travel characteristics in Glendale, the Greater Phoenix area, and the State based on census data from 1990 and 2000. Three out of four Glendale residents commute to work in a single occupancy vehicle, a rate that has remained consistent over the last ten years and is comparable to the region's average. The percent of Glendale's carpoolers is slightly higher than the region and the state, but transit usage is lower. Mean travel time to work is also higher relative to the region. When residents were asked what they considered the three most important transportation issues for Glendale's future, residents cited traffic congestion, unsafe driving, and a lack of transit options[3]. Other issues included inadequate freeways, traffic in neighborhoods, delays at traffic signals, and inadequate bicycle facilities. As Glendale continues to evolve from a bedroom community to an employment center, a regional job-housing balance is critical to reducing travel demand.

Table 2-5 Travel Characteristics by Geographic Area 1990, 2000

Geographic Area	Glendale		Maricopa		Arizona	
Year	1990	2000	1990	2000	1990	2000
Drove alone	75.3%	75.4%	75.0%	74.7%	73.6%	74.1%
In carpools	15.9%	16.3%	14.4%	15.2%	14.9%	15.4%
Using public transportation	1.6%	1.8%	2.1%	2.1%	2.1%	1.9%
Using other means	2.4%	2.0%	2.9%	2.3%	3.0%	2.3%
Walked or worked at home	4.9%	4.6%	5.6%	5.7%	6.4%	6.3%
Mean Travel Time to Work (minutes)	28.2	28.2	26.1	26.3	24.9	24.9

Source: American Community Survey

3. Glendale Transportation Plan Update, Public Comment as of 12/1/07.

This page intentionally left blank

3.0 POLICY GUIDELINES

3.1 Introduction

Community values serve as guidance for the evolution of the transportation system. The purpose of goals, objectives, and policies is to outline the framework for developing and implementing the transportation plan in a manner that reflects the overall transportation vision of the City.

Specifically, goals are statements concerning desirable long-range achievements. These goal statements are general in nature and describe the ideal future situation. Objectives are intermediate milestones that are essential to achieve the goals. These include both value-based (VB) and modal-based (MB) goals and objectives. Value-based goals are derived from community values as expressed in planning activities and public forums. Modal-based goals are derived from the operation of a multimodal transportation system and reflect specifically how the different transportation modes achieve the results expressed in the value-based goals.

Vision Statement:

The City of Glendale will provide a safe, multimodal transportation network that provides access and mobility equitably across the City, supporting economic development, regional connectivity, neighborhood character, quality of life and an integration of land use and transportation in a cost-effective and sustainable manner which includes ongoing public involvement.

3.2 Value- Based Goals

VB Goal 1 Provide for a safe transportation network.

VB Objective 1.1

Transportation systems will be designed, constructed, maintained and operated in accordance with all applicable safety standards.

VB Objective 1.2
A full range of safety programs will be funded and implemented including traffic enforcement and driver, bicycle and school education programs.

VB Objective 1.3
Enhance and promote Safe Routes to School program.

VB Objective 1.4
Review and update design standards to ensure appropriate safety measures in project design.

VB Goal 2 Ensure fair and equitable transportation financing across modes, demographics, and geography.

VB Objective 2.1
Identify dedicated, feasible funding sources such as dedicated sales tax revenues, highway user revenues to maintain roads, impact fees associated with new developments, and aviation user fees.

VB Objective 2.2
Leverage external funding sources and participate with other agencies at the federal, state, regional, and county levels for future transportation projects which extend across the region, as well as local projects which provide benefit to Glendale.

VB Objective 2.3
Use impact fees and development funds on new development to finance infrastructure improvements in growth areas and to offset impacts throughout the City.

VB Objective 2.4
Address capital requirements, maintenance, and operation of the transportation system in the funding plan.

VB Goal 3 Facilitate a strong economy by providing a transportation system that promotes economic development and vitality.

VB Objective 3.1
Improvements will be supported to minimize congestion and ensure access to employment and tourism opportunities within Glendale and throughout the region.

VB Goal 4 The Glendale transportation system will provide quality service in a cost-effective manner utilizing technological advances in transportation systems.

VB Objective 4.1
The multimodal transportation system will be constructed and maintained to help ensure a quality system, minimize congestion, and enhance access to tourism centers such as downtown, sports, and entertainment venues.

VB Objective 4.2
System investments will be assessed for cost effectiveness, appropriate project bundling and phasing.

VB Objective 4.3
Ensure right-of-way dedication for ultimate multimodal conditions for all facility improvements.

VB Objective 4.4
Explore and apply technologies such as Intelligent Transportation Systems (ITS) to help reduce travel demand on the transportation network.

VB Goal 5 Encourage quality neighborhoods in both existing and new developments which will incorporate a choice of transportation modes while preserving neighborhood character.

VB Objective 5.1
Planning, design, and construction of multimodal transportation infrastructure should enhance and preserve the character and integrity of Glendale's neighborhoods, central business district and historic areas.

VB Objective 5.2
Enhance the appearance of the City through actions such as enhancing the graffiti and litter removal programs.

VB Objective 5.3
Encourage new residential, commercial, and industrial development to incorporate future transit service into site design and transportation plans as appropriate.

VB Objective 5.4
Help build quality neighborhoods through transportation innovation.

VB Goal 6 Integrate land use and transportation system to reduce congestion and improve access.

VB Objective 6.1
Establish site planning criteria, guidelines and standards which relate vehicle movement, parking, bicycle and pedestrian connections to each other as a function of land use.

VB Objective 6.2
Promote integrated land uses, mixed use development and mode choice, in addition to Transit Oriented Development, to reduce vehicle trips by facilitating pedestrian, bicycle, and transit usage.

VB Objective 6.3
Seek to bring jobs and housing closer together to minimize the length of trips.

VB Goal 7 Promote sustainability within the community to recognize a balance of economic, social and environmental needs by providing a transportation system that supports the environment including minimizing air, water and noise pollution.

VB Objective 7.1
The City will support regional programs to improve air quality and assist in achieving and maintaining air quality standards through actions such as paving all dirt access points and shoulders and enhancing street sweeping.

VB Objective 7.2
Expand the City's low emissions and alternative fuel vehicle fleet.

VB Objective 7.3
Promote the use of recycled and environmentally friendly materials in transportation construction projects, such as crushed glass, rubberized asphalt, recycled asphalt, and pervious pavement.

VB Objective 7.4
Perform environmental assessments on projects and right-of-way acquisitions as appropriate.

VB Goal 8 Provide an open, objective, and credible process for planning and developing a transportation system that complies with state and federal regulations and includes a meaningful citizen participation process.

VB Objective 8.1
Involve citizens in planning the transportation system, ensuring plans address public values and have the flexibility to respond to changing needs, including education and information dissemination through such activities as public meetings, print media, and internet updates.

VB Objective 8.2
Provide regular opportunities to inform the public of transportation improvements and receive comments from the community.

VB Objective 8.3
Coordinate planning for the existing and future transportation system with adjacent communities and regional agencies.

VB Goal 9 Enhance access and mobility throughout the City and region for all modes of transportation including goods movement.

VB Objective 9.1
Operate a coordinated multimodal transportation system which provides integrated transportation options by advancing the development of multimodal transportation facilities and linkages between modes.

VB Objective 9.2
Ensure all transportation systems and facilities are accessible to all users and accommodate the needs of the disabled and elderly, including transit amenities and pedestrian systems.

VB Objective 9.3
Integrate the roadway, bicycle, pedestrian, and trail networks into the regional system to develop a comprehensive, continuous network.

VB Objective 9.4
Design the street network to accommodate trucks and freight movement.

VB Objective 9.5
Work with the railroad to accommodate the movement of goods throughout the city and region.

3.3 Modal-Based Goals

MB Goal 1 Build, operate and maintain an effective roadway system.

MB Objective 1.1
As travel demand grows, make incremental improvements to the existing roadway system including street widening, grade separations, intersection improvements and bus pull-outs.

MB Objective 1.2
Support regional facilities including completion of Loop 303 and Northern Parkway and enhancements to Loop 101 and Grand Avenue.

MB Objective 1.3
Continue and enhance neighborhood traffic calming programs such as speed cushions and roundabouts.

MB Goal 2 Expand transit services to meet demand and support with appropriate amenities, education and travel training while ensuring the system is accessible, easy to use and comfortable.

MB Objective 2.1
A transit system which is integrated into the regional transit network will be supported by the City.

MB Objective 2.2
The transit system will be available to all populations and will grow in conjunction with residential and employment growth.

MB Objective 2.3
A range of transit services will be supported as appropriate, including local circulators, arterial transit, express bus, bus rapid transit, light rail, commuter rail, and specialized transit services.

MB Objective 2.4
Provide appropriate transit amenities such as signage, shade, and seating commensurate with the level of service, usage, and location.

MB Objective 2.5
Support transit education and travel training.

MB Goal 3 Enhance bicycle facilities, programs and services throughout the City.

MB Objective 3.1
Provide a continuous bicycle system to ensure access to all parts of the City as well as connectivity to the regional bicycle and trail system.

MB Objective 3.2
Strive to make Glendale a bicycle friendly city with facilities designed for cyclists of all skill levels.

MB Objective 3.3
When feasible, provide grade separations and separate bicycle facilities.

MB Objective 3.4
Encourage bicycle supportive amenities including secure bicycle parking, such as racks and lockers, and bicycle facilities on transit.

MB Goal 4 Improve and expand pedestrian access, mobility and safety to create an efficient, inviting environment for pedestrians.

MB Objective 4.1
Maximize pedestrian access to employment, retail, educational and public facilities throughout the community.

MB Objective 4.2
Pedestrian design considerations such as curb cuts and pedestrian signal timing will be incorporated to accommodate the needs of the elderly and disabled.

MB Objective 4.3
Require a Pedestrian Access Plan for new Capital Improvement projects and new residential, commercial, and industrial development.

MB Objective 4.4
Include consideration for human scale design elements to create a safe and inviting pedestrian network.

MB Goal 5 Implement and support demand management strategies to reduce traffic congestion and encourage alternate modes of travel.

MB Objective 5.1
Continue to promote demand management strategies.

MB Objective 5.2
Lead by example by supporting work demand management activities within the City.

MB Goal 6 Support adopted Airport Master Plans.

MB Objective 6.1
Further develop intermodal transportation connectivity to and from the Glendale Municipal Airport and surrounding communities, supporting the airport's role as an employment center for the region.

MB Objective 6.2
Work closely with officials from Luke Air Force Base to increase connectivity between the base and community.

4.0 ROADWAY

4.1 Introduction

This chapter outlines the existing roadway conditions, projected future conditions, needs and deficiencies, and presents specific roadway recommendations as well as general suggestions to guide detailed planning efforts as the City grows. Overall, this roadway plan sets forth steps to create an integrated community, providing access and mobility throughout the City. Due to the growth history of the City, the diverse areas of the City have different needs and are each addressed separately to best enhance their unique characteristics.

4.2 Existing Conditions

The City of Glendale has a street system that is comprised of section line and mid-section line streets which form a grid network that is the backbone of the transportation system. The network includes streets that have 2, 4, 5, and 6 through lanes, a center two-way left-turn lane or raised medians, and various configurations at the major intersections.

An assessment of existing conditions helps to provide a baseline for the roadway element of the Transportation Plan. It provides for a review of the current operating conditions, as well as a basis for projecting future conditions. The features of existing roadway conditions that have been selected for documentation and analysis are:

- Street System
- Traffic Analysis
- Traffic Crashes

Each of these features is discussed in the following sections of this chapter.

4.2.a Street System Inventory

The existing street system can be described by a number of features such as roadway classification, number of lanes, number of traffic signals and crash experience, but roadway capacity is the most important factor. The key characteristics to understanding roadway capacity are functional classification and number of through lanes as discussed below. Information regarding existing traffic signals can be found in the Appendix.

Functional Classification

The roles and standards for each type of roadway must be established in order to develop an efficient and effective system. Functional classification defines the hierarchy of streets in a roadway system. Functional classification is the process by which streets and highways are grouped into systems according to the character of service they are intended to provide. Most travel involves movement through a network of roads of varying functional classification. Functional classification denotes the relationship of mobility, access, and trip length. For example, freeways provide limited access and high mobility and carry longer trips, whereas local streets provide a high level of access with limited mobility and carry short trips.

The following are general characteristics associated with the different classifications in an urban system.

Freeway/Expressway/Parkway (2-5% of system miles)

- Provides regional connectivity
- Mobility is the primary objective
- Limited access with capability of moving high volumes at high speeds

Arterials (5-10% of system miles)

- Higher speed than collector or local
- Serve the highest volume generators
- Longer trip length compared to collector and local
- Carry the majority of trips entering or leaving the area
- Do not usually connect to neighborhoods

Collectors (5-10% of system miles)

- Distribute traffic to/from arterials
- Collect traffic from local streets
- May access neighborhoods

Local (65-80% of system miles)

- Provide direct access to abutting land
- Discourage through traffic
- Lower speed limit than other classifications

In general, freeways, highways, parkways and arterial streets are intended to carry through traffic and provide a high level of mobility for the traveling public, with minimal allowance for access, while the collectors and local streets provide for residential and non-residential access.

Number of Lanes

The number of through lanes on the arterial street system is an indication of the traffic carrying capacity of the street system. Although there are other factors, such as access and traffic control devices that affect the capacity of a street, the number of through lanes is the most significant. From a historical perspective, most streets started as two-lane county roads and eventually were widened to four and six through lanes as development occurred and areas were annexed into the City.

The existing number of through lanes on freeways and arterials throughout the planning area is shown in Figure 4-1. As can be seen in this figure, the number of through lanes on arterials is predominantly four or five in the developed areas and two lanes in the undeveloped areas.

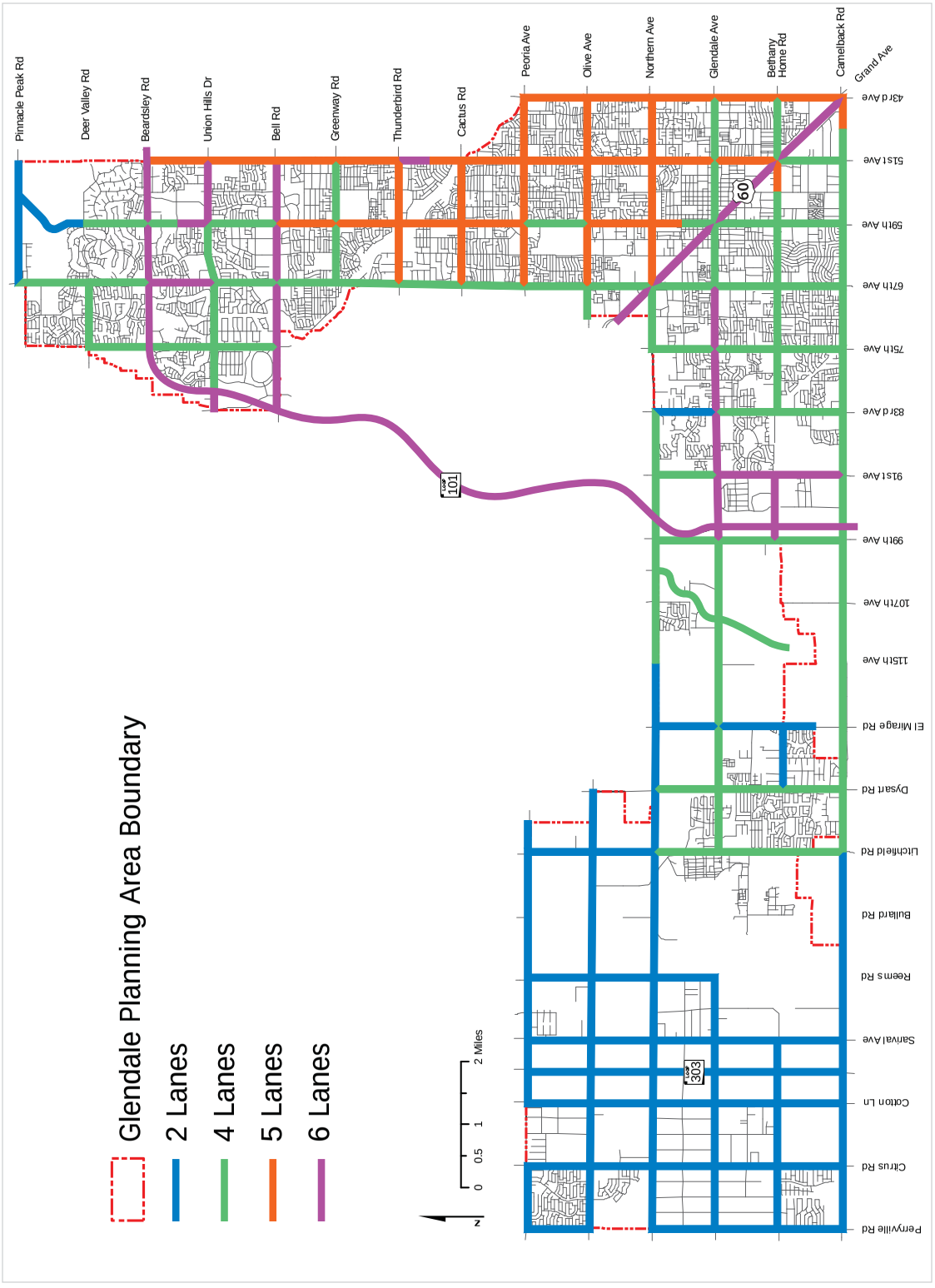


Figure 4-1 Existing Number of Through Lanes

4.2.b Traffic Volumes

Daily Volumes

The existing 24-hour traffic volumes are shown in Figure 4-2. These volumes represent a compilation of data from Maricopa County, the City of Glendale, the City of Phoenix, and ADOT. As can be seen, the highest volumes on the arterial streets occur in the eastern portion of the City, and generally the east-west volumes are higher than the north-south volumes. Table 4-1 lists the 10 street segments with the highest volumes.

Table 4-1 Highest Existing Traffic Volumes

Street	Limits	24-Hour Volume
Bell Road	Loop 101 to 75th Avenue	56,500
Union Hills Dr	83rd Avenue to Loop 101	49,200
Bell Road	75th Avenue to 67th Avenue	47,000
Thunderbird Road	59th Avenue to 51st Avenue	46,600
Bell Road	67th Avenue 59th Avenue	44,200
Thunderbird Road	67th Avenue to 59th Avenue	43,400
Northern Avenue	59th Avenue to 51st Avenue	42,200
59th Avenue	Greenway Road to Bell Road	38,900
Bell Road	59th Avenue to 51st Avenue	38,700
Olive Avenue	59th Avenue to 51st Avenue	38,500

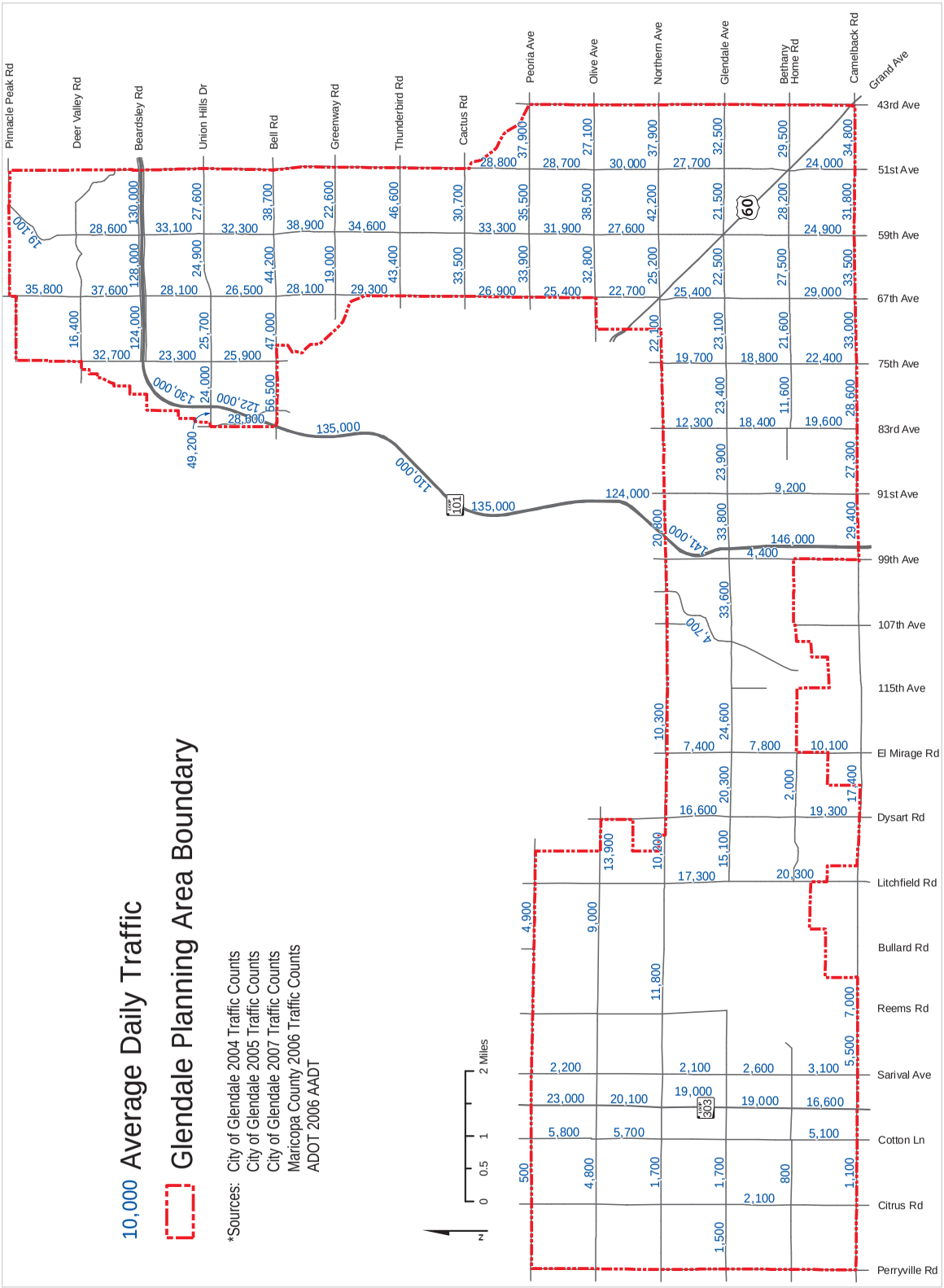


Figure 4-2 Existing 24-Hour Traffic Volumes

4.2.c Traffic Analysis

Level of Service (LOS) is a term that is used to describe the degree of traffic congestion and operating efficiency on the street system. LOS can be measured by various components of the street system, including street segments, signalized intersections, and unsignalized intersections. For this report the analysis was performed for the roadway segments.

The various levels of service are defined as follows.

- LOS A represents free flow.
- LOS B is in the range of stable flow, but the presence of other users in the traffic stream begins to be noticeable.
- LOS C is in the range of stable flow, but marks the beginning of the range of flow in which the operation of individual users becomes significantly affected by interactions with others in the traffic stream.
- LOS D represents high-density, but stable flow. Speed and freedom to maneuver are severely restricted, and the driver or pedestrian experiences a generally poor level of comfort and convenience.
- LOS E represents operating conditions at or near the capacity level. All speeds are reduced to a low, but relatively uniform value.
- LOS F is used to define forced or breakdown flow. This condition exists wherever the amount of traffic approaching a point exceeds the amount which can traverse the point.

An expanded version of these definitions can be found in the *2000 Highway Capacity Manual, Special Report 209, Transportation Research Board*, Pages 1-3 and 1-4.

To examine the operating conditions of roadway segments, the daily traffic volumes are compared to the capacity for the given number of through lanes. The vehicle capacity of a roadway segment can be defined as "the maximum number of vehicles that can pass a given point during a specified period under prevailing roadway, traffic, and control conditions." Capacity is normally considered the point where LOS changes from E to F.

The operating efficiency of a roadway segment is further defined by comparing volume to capacity. The ratio of the volume on a segment of road compared to the traffic capacity of the segment is known as the v/c ratio. This is calculated for each segment by simply dividing the traffic volume, or forecast for the segment, by the capacity of the segment. For this analysis, a 0.9 to 1.0 v/c ratio was assumed to be LOS E and greater than a 1.0 v/c ratio was assumed to be LOS F. As the v/c ratio approaches 0.9, travel speeds are greatly reduced and the ability to pass is restricted.

The segment volume levels for a 0.9, 1.0 and 1.2 v/c ratio for 2-, 4-, 5-, and 6-lane facilities are presented in Table 4-2.

Table 4-2 Service Volume and V/C Ratio Comparison

Number of Lanes & Facility Type	Service Volume for 0.9 to 1.0 V/C Ratio (vehicles per day)	Service Volume for 1.0 to 1.2 V/C Ratio (vehicles per day)	Service Volume for > 1.2 V/C Ratio (vehicles per day)
2-Lane Arterial	13,100–14,600	14,600–17,500	> 17,500
2-Lane Arterial Enhanced	18,500–20,600	20,600–24,700	> 24,700
4-Lane Arterial	27,800–30,900	30,900–37,100	> 37,100
4-Lane Arterial Restricted	20,900–23,200	23,200–27,800	> 27,800
5-Lane Arterial	34,800–38,700	38,700–46,400	> 46,400
6-Lane Arterial	41,800–46,400	46,400–55,700	> 55,700
6-Lane Expressway	88,700–98,600	98,600–118,300	> 118,300
8-Lane Expressway	118,300–131,300	131,300–157,600	> 157,600
6-Lane C-D Road	118,200–131,400	131,400–157,700	> 157,700
8-Lane C-D Road	157,700–175,100	175,100–210,100	> 210,100
6-Lane Freeway	118,200–131,400	131,400–157,700	> 157,700
8-Lane Freeway	157,700–175,100	175,100–210,100	> 210,100

It should be noted that the calculated v/c ratio represents an average condition throughout the year, as well as during the day. The operating conditions can be expected to be better during the off-peak periods and worse during the peak periods, including seasonal peaks and special events.

The last step in the analysis is to compare the actual traffic volume with the capacity for the number of through lanes to obtain the v/c ratio. The results of this analysis are presented in Figure 4-3, which shows the locations of v/c greater than 0.9. The street segments are divided into those that would operate between a 0.9 and 1.0 v/c ratio, between a 1.0 and 1.2 v/c ratio, and greater than 1.2 v/c ratio. This breakdown allows for a prioritization of improvement projects in the future. As seen in Figure 4-3, the majority of the segments with a v/c ratio greater than 0.9 are East of Loop 101.

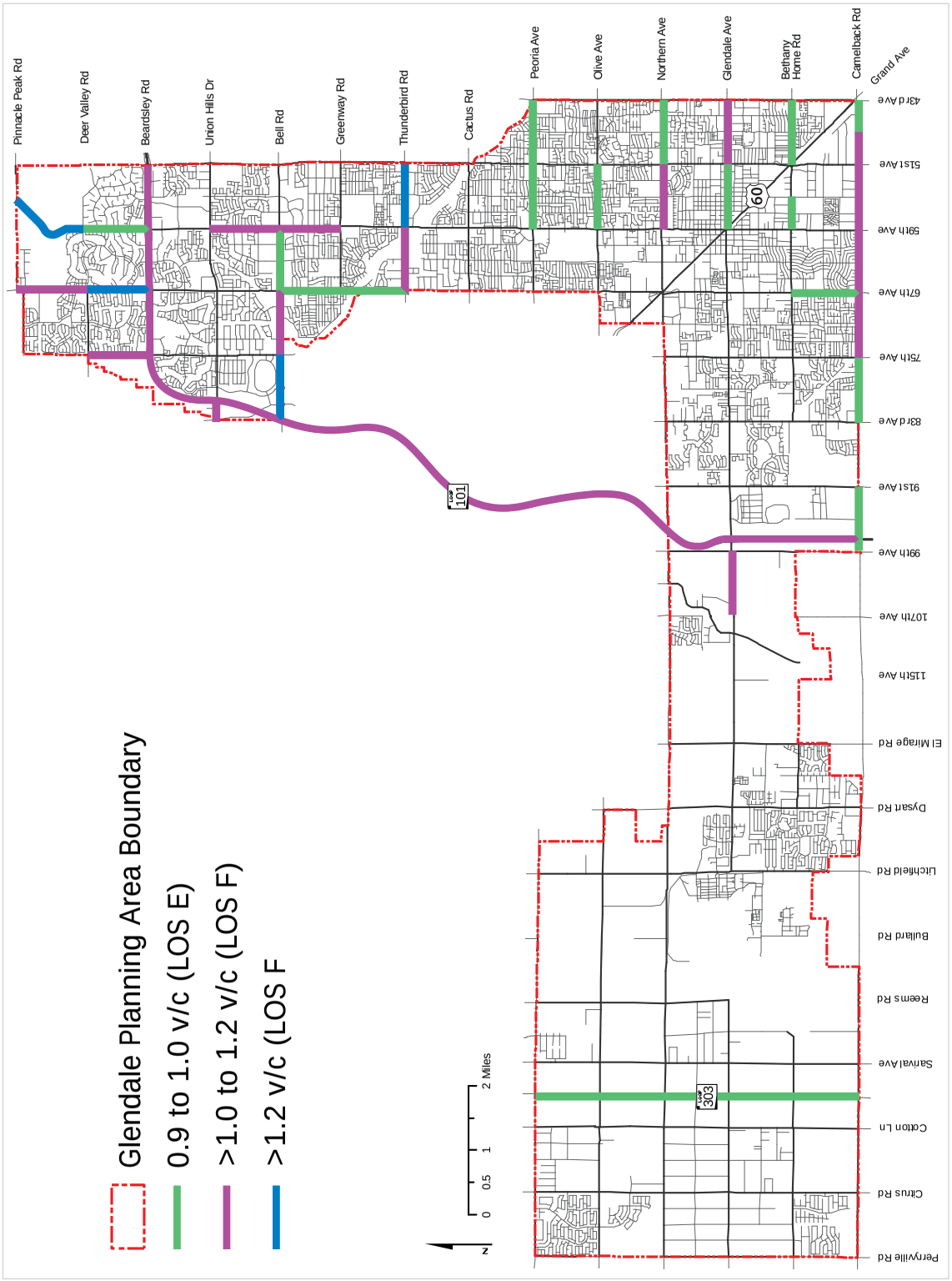


Figure 4-3 Roadway Segments with Existing V/C > 0.9

4.2.d Traffic Crashes

City of Glendale historical crash information was reviewed for the time period 1999-2006. Table 4-3 presents a summary of the crash severity for 1999 through 2006. Nearly 74% of the crashes for the reporting period were non-injury crashes and less than 1% were fatal crashes. Figures 4-4 graphically displays total annual crashes from 1999 to 2006. Additional historical crash data can be found in the Appendix.

Table 4-3 Traffic Crash Summary, 1999-2006

Year	Non-Injury Crashes		Injury Crashes		Fatal Crashes		Total
	#	%	#	%	#	%	
1999	2,962	65.6	1,536	34.0	19	0.4	4,512
2000	3,806	70.4	1,571	29.1	26	0.5	5,403
2001	3,696	71.8	1,435	27.9	15	0.3	5,146
2002	4,188	74.6	1,404	25.0	23	0.4	5,615
2003	4,146	76.9	1,233	22.9	13	0.2	5,392
2004	4,311	74.2	1,471	25.3	28	0.5	5,810
2005	4,463	73.2	1,593	26.1	38	0.6	6,094
2006	4,880	77.7	1,361	21.7	38	0.6	6,279
Total	**32,452**	**73.3**	**11,604**	**26.2**	**200**	**0.5**	**44,256**

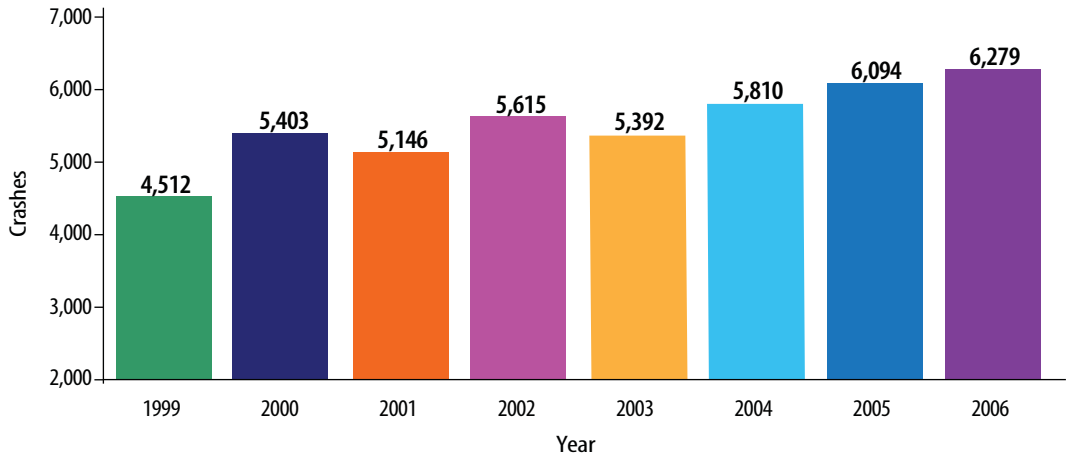


Figure 4-4 Total Crashes, 1999-2006

Figures 4-5 and 4-6 show the intersections with the highest crash rate and the highest number of crashes, respectively, for 2004. In addition to the standard practice of analyzing historical crash data for trends and probable causes, crash rates are also calculated for comparison purposes. Crash rates are an effective tool to present a complete picture of accident history at a particular location as they combine crash frequency with traffic volume. Crash rates at intersections are expressed as "Crashes per Million Entering Vehicles" (MEV).

The high crash rate and highest number of crashes generally occur in the eastern part of the City and at the intersections of arterial streets carrying high traffic volumes.

It should be noted that some of the intersections shown in Figures 4-5 or 4-6 were either improved or programmed for improvements as identified below.

Intersections Improved after 2004:

- 75th Avenue and Glendale Avenue
- 67th Avenue and Bell Road
- 67th Avenue and Glendale Avenue
- 51st Avenue and Peoria Avenue

Intersection Improvements Underway:

- 67th Avenue and Olive Avenue
- 51st Avenue and Northern Avenue
- 51st Avenue and Camelback Road

Programmed Intersection Improvements:

- 59th Avenue and Bell Road
- 59th Avenue and Greenway Road
- 59th Avenue and Thunderbird Road
- 59th Avenue and Peoria Avenue
- 59th Avenue and Olive Avenue
- 59th Avenue and Northern Avenue
- 59th Avenue and Bethany Home Road
- 59th Avenue and Camelback Road

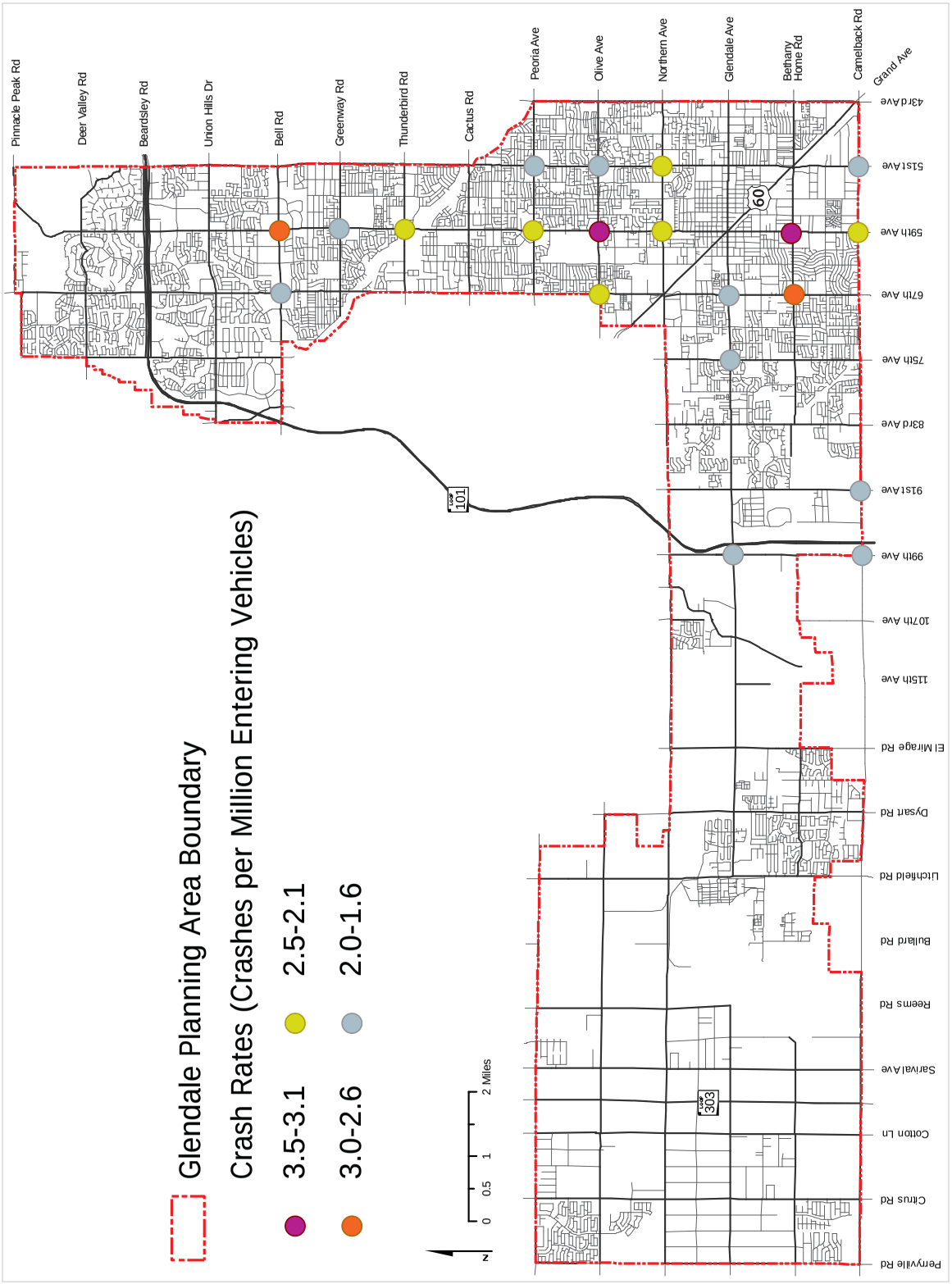


Figure 4-5 Intersections with High Crash Rates (2004 Crash Data)

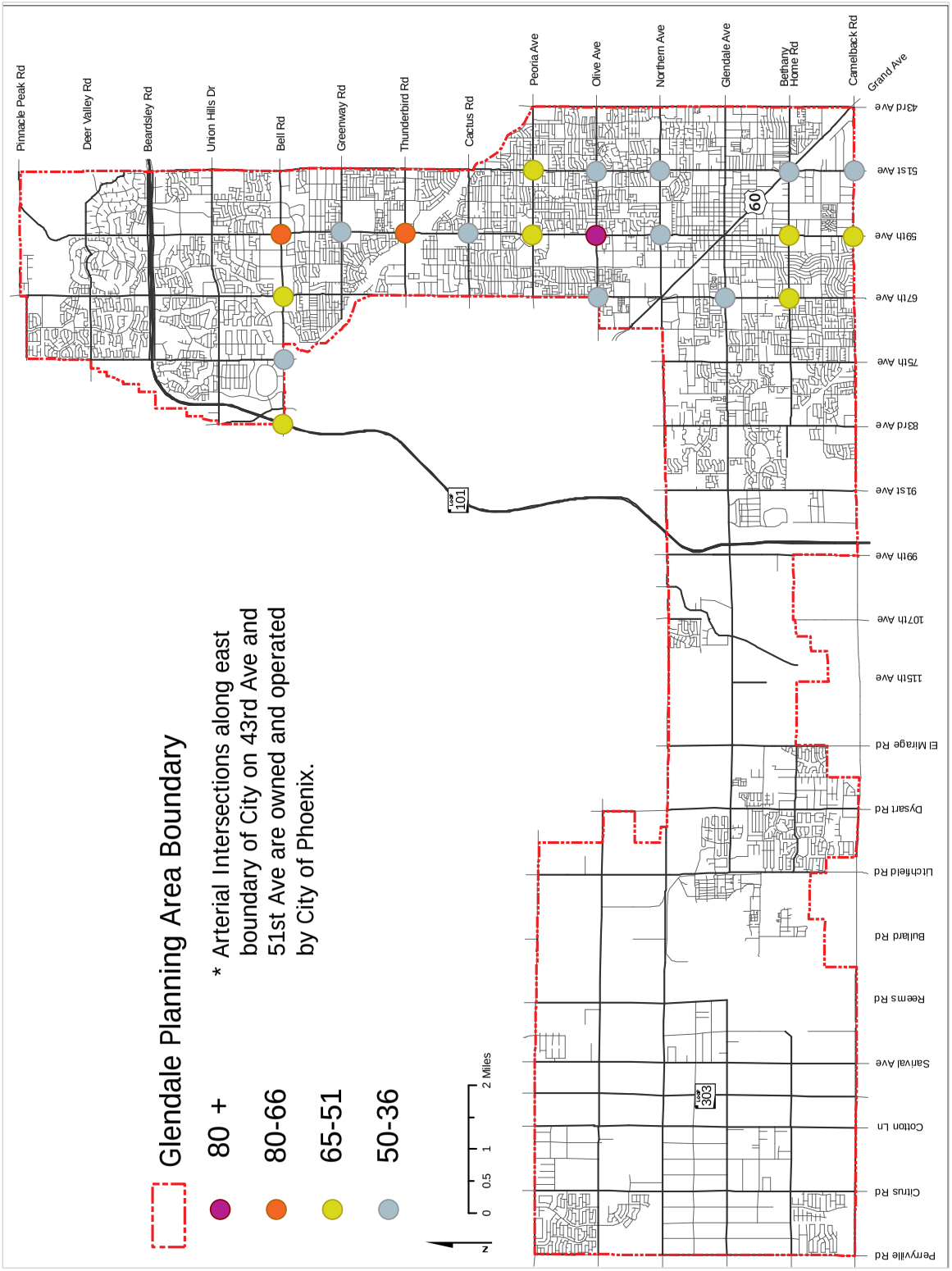


Figure 4-6 Intersections with Highest Number of Crashes (2004 Crash Data)

4.3 Future Conditions

Maricopa Association of Governments (MAG) is required to carry out a continuous, comprehensive and coordinated transportation planning process in cooperation with both ADOT and RPTA. MAG includes 25 incorporated cities, 2 Indian Communities, Maricopa County, and ADOT. The City of Glendale is within the Transportation Management Area (TMA) and the Glendale transportation system is part of the MAG planning process. City of Glendale's participation in the MAG transportation planning process ensures Glendale's plans are in accordance with federal transportation policies and requirements.

Each year MAG prepares a Transportation Improvement Program (TIP) that is a five-year program for funding various transportation projects such as arterial streets, highway, transit, bicycle, pedestrian, intelligent transportation systems, and transportation planning. The compilation of the TIP is performed through the MAG committee structure.

City of Glendale staff are members of various committees, provide input into MAG documents, and recommend federally funded projects to be evaluated through the MAG process. Final authority for adoption of the TIP and the associated federal funding recommendations is the MAG Regional Council.

The following sections include a discussion of the MAG travel forecasting model process, documentation of the future conditions utilized to run the future travel scenario, a discussion of traffic forecasts, and an analysis of future level of service.

4.3.a MAG Travel Forecasting Model Process

MAG prepares travel forecasts for the Maricopa County region using computer models. Key data for the models include system networks (both transit and roadway) and socioeconomic data such as population and employment. The existing network is based on current transit and highway facilities. The future base network is a composite of local street plans that are not necessarily committed or funded.

The MAG regional transportation models were developed originally in the 1960's and have been continuously improved since. Transportation modeling is performed using EMME/2 software for both highway and transit network assignments, although MAG is in the process of converting the travel forecasting model to TransCad software. The transportation models forecast daily and peak period vehicular traffic and transit ridership for the MAG transportation modeling area. A travel demand model update was completed in late 1994, using data from the 1989 household travel survey and the 1991 on-board transit survey.

4.3.b MAG Model Network Lanes

MAG maintains a future street network for use in the travel forecasting model. Generally, the future network builds upon the existing network, adding the projects that are planned including those identified in the MAG Regional Transportation Plan (RTP), Glendale Capital Improvements Program (CIP), Glendale Onboard (GO) Program and ADOT projects. The need for these projects, as well as others, will be verified in this plan.

A special 2030 Base Plan Network was created for this Plan update analysis. It builds on the future MAG model network and adds the following elements accepted as planned projects by the City of Glendale.

- Northern Parkway exists from Loop 303 to Grand Avenue as a 6-lane facility
- Northern Parkway is a grade-separated, access controlled bypass facility between Glenn Harbor Road and 89th Avenue. Northern Avenue provides access to north-south arterials and Loop 101 ramps in this segment
- Northern Avenue is separate from Northern Parkway between Loop 303 and Litchfield Road
- 95th Avenue extends north of Orangewood Avenue and intersects Northern Avenue
- Maryland Avenue is an arterial street between 91st Avenue and 95th Avenue
- 95th Avenue is an arterial roadway between Camelback Road and Northern Avenue
- New River Parkway (Baseball Blvd) was added between Maryland Avenue and Camelback Road

The resulting network of road through lanes is shown in Figure 4-7.

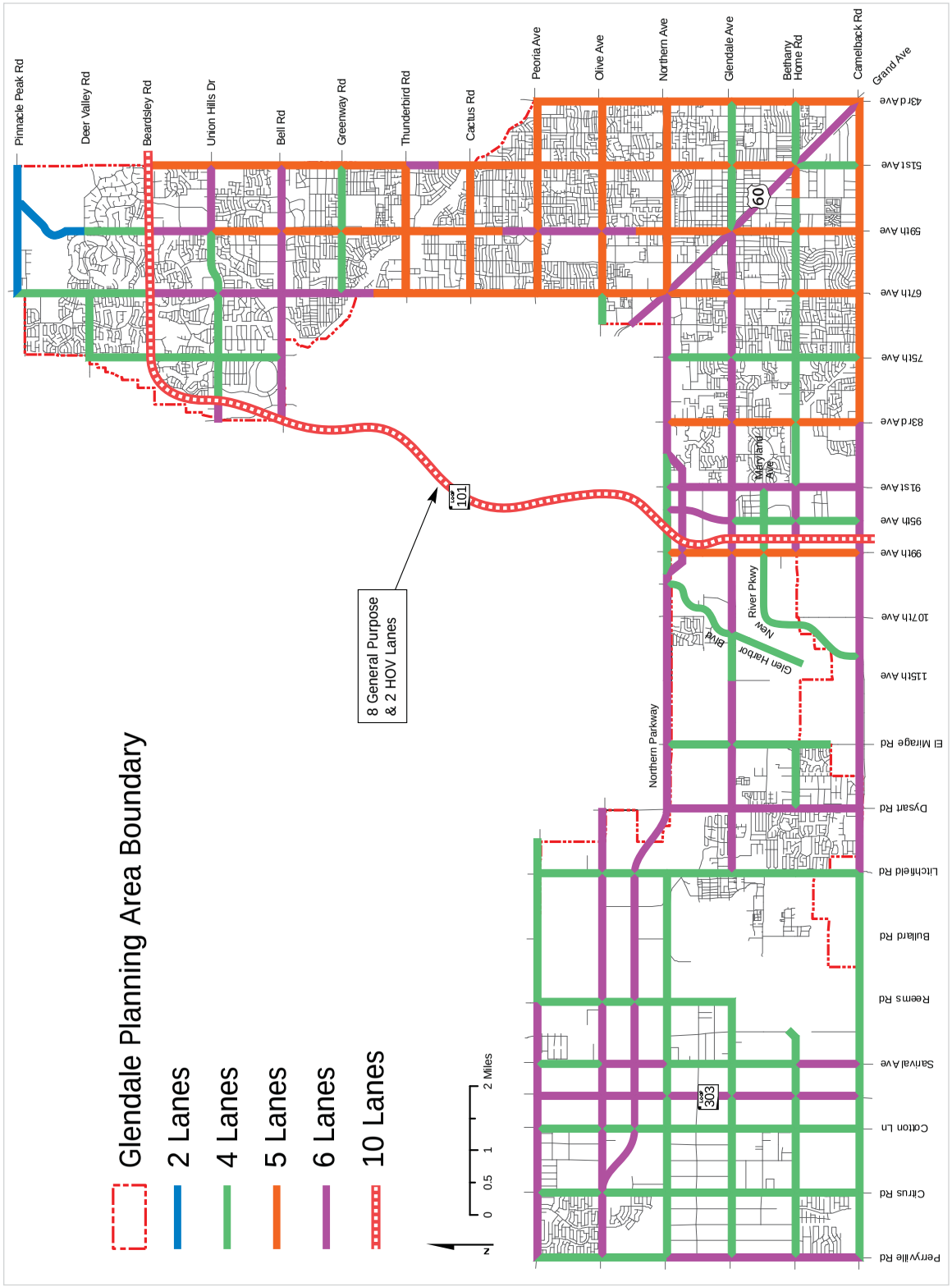


Figure 4-7 2030 Base Plan Network

4.3.c Traffic Forecasts

MAG prepared a 2030 traffic model run based on the enhanced socioeconomic data and the future base number of lanes previously described (MAG Model run: 2030CDA 2030 for Dan H Glendale AreaRR2008/11/0111:22 AM). The raw numbers obtained from the traffic model were examined and compared to the 2006 model validation run and actual counts. Based on these comparisons, the model numbers were adjusted to account for known estimation errors in the model using a screenline analysis. The screenline analysis is described in the Appendix. The forecasts were further adjusted to "smooth" out inconsistencies that are inevitable in model-generated numbers. The resulting forecasts for the year 2030 are shown in Figure 4-8. The forecasts are identified as year 2030, but more importantly, they represent the traffic forecasts when the population reaches approximately 350,000 and the employment approximately 257,000.

For comparison purposes, Table 4-4 presents the 2030 traffic forecasts for the ten highest existing count locations.

Table 4-4 Comparison of Select Traffic Forecasts and Existing Volumes

Street	Limits	24-Hour Existing Volume	2030 Base Plan Traffic Forecasts
Bell Road	Loop 101 to 75th Avenue	56,500	64,000
Union Hills Dr	83rd Avenue to Loop 101	49,200	51,000
Bell Road	75th Avenue to 67th Avenue	47,000	52,000
Thunderbird Road	59th Avenue to 51st Avenue	46,600	52,000
Bell Road	67th Avenue to 59th Avenue	44,200	48,000
Thunderbird Road	67th Avenue to 59th Avenue	43,400	50,000
Northern Avenue	59th Avenue to 51st Avenue	42,200	48,000
59th Avenue	Greenway Road to Bell Road	38,900	40,000
Bell Road	59th Avenue to 51st Avenue	38,700	43,000
Olive Avenue	59th Avenue to 51st Avenue	38,500	42,000

Similar to the existing conditions, the expected operating condition of the roadway segments in the future is estimated by comparing the 2030 traffic forecasts to the capacity of the facility type for the given number of through lanes. As discussed in the existing conditions section, a 0.9 to 1.0 v/c ratio was assumed to be LOS E and greater than a 1.0 v/c ratio was assumed to be LOS F. The LOS F condition was further separated at 1.2 v/c to help prioritize conditions and projects.

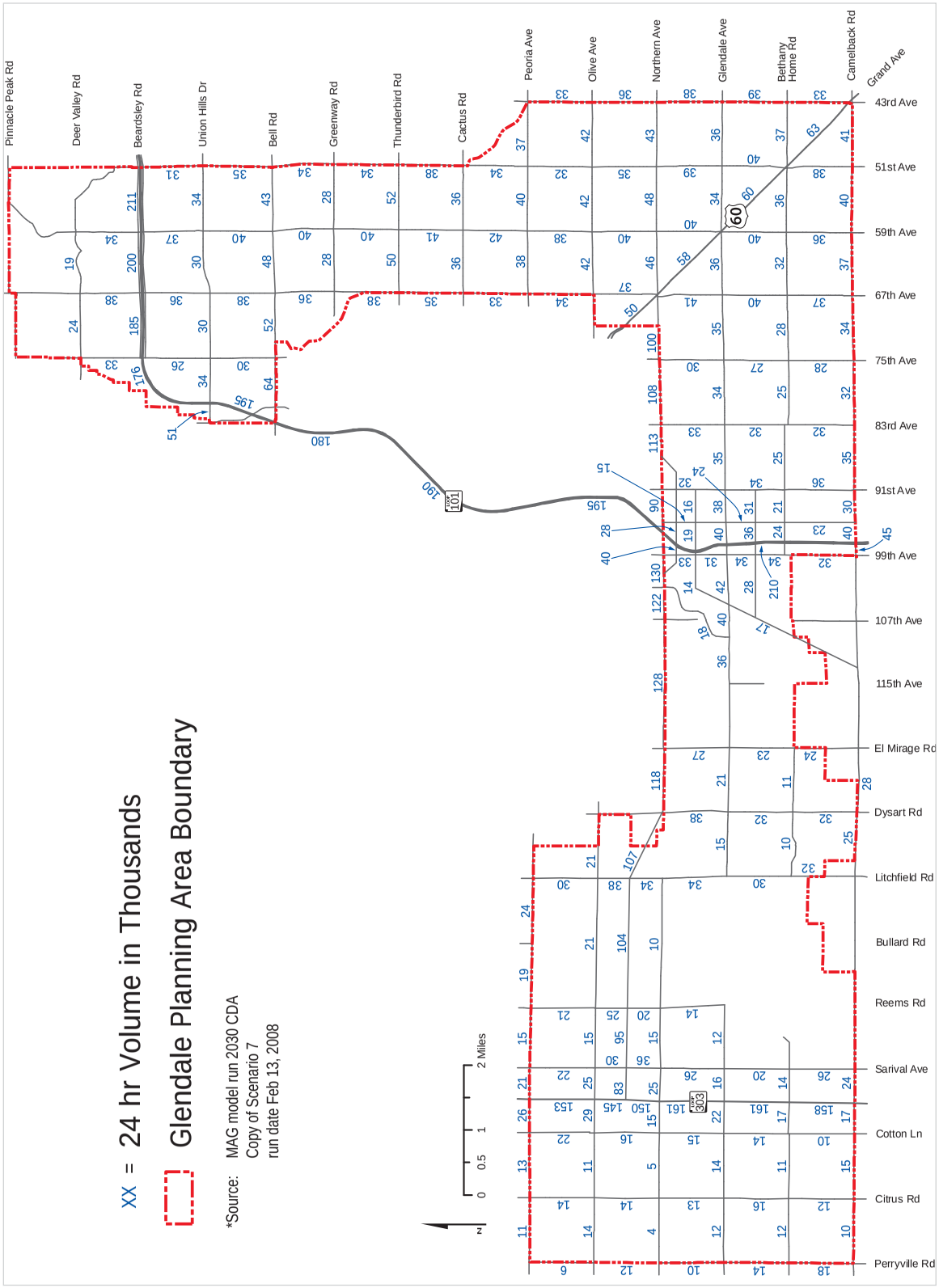


Figure 4-8 Traffic Forecasts, 2030

The segment volume ranges for a 0.9, 1.0, and 1.2 v/c ratio for each of the different facility types and number of lanes are presented again in Table 4-5.

Table 4-5 Average Daily Volume and V/C Ratio Ranges

Number of Lanes & Facility Type	Service Volume for 0.9 to 1.0 V/C Ratio (vehicles per day)	Service Volume for 1.0 to 1.2 V/C Ratio (vehicles per day)	Service Volume for > 1.2 V/C Ratio (vehicles per day)
2-Lane Arterial	13,100 – 14,600	14,600 – 17,500	> 17,500
4-Lane Arterial	27,800 – 30,900	30,900 – 37,100	> 37,100
4-Lane Arterial Restricted	20,900 – 23,200	23,200 – 27,800	> 27,800
5-Lane Arterial	34,800 – 38,700	38,700 – 46,400	> 46,400
6-Lane Arterial	41,800 – 46,400	46,400 – 55,700	> 55,700
6-Lane Freeway	118,200 – 131,400	131,400 – 157,700	> 157,700
8-Lane Freeway	157,700 – 175,100	175,100 – 210,100	> 210,100
6-Lane C-D Road	118,200 – 131,400	131,400 – 157,700	> 157,700
8-Lane C-D Road	157,700 – 175,100	175,100 – 210,100	> 210,100
6-Lane Expressway	88,700 – 98,600	98,600 – 118,300	> 118,300
8-Lane Expressway	118,300 – 131,300	131,300 – 157,600	> 157,600

For this study, the v/c ratio was examined for projected 2030 traffic conditions for two network conditions – 1) the existing street network and 2) the 2030 Base Plan Network. A comparison between these two conditions shows that, even with the improvements currently programmed in 2030 Base Plan Network, congestion is still expected and additional improvements are needed. It should be noted that this v/c ratio represents an average daily condition based on the 2030 traffic forecasts. Actual conditions will vary. For example, conditions may be worse than the daily average during the peak hours or during peak events and better than the average during non-peak times.

Figure 4-9 shows v/c ratios greater than 0.9 for the existing roadway network with 2030 volumes. This indicates deficiencies and needs within the existing system with no additional improvements. The v/c ratio for Loop 303 and Grand Avenue reflect the v/c for peak hour conditions due to unique peaking conditions on these facilities.

Figure 4-10 shows v/c ratios greater than 0.9 for the 2030 Base Plan Network with 2030 forecast volumes. This shows deficiencies and needs even with planned additional improvements. There are two particular points of note when comparing Figure 4-9 and 4-10: 1) there is little change in the congestion areas in the eastern portion of the City because the majority of the improvements have been made and 2) there is significant change in the congestion areas in the western portion of the planning area because few

improvements have been made. However, even with the planned improvements, the results of the analysis show that 31 miles of street would operate between a 0.9 and 1.0 v/c ratio, 40 miles would have between a 1.0 and 1.2 v/c ratio, and 11 miles would operate with a v/c ratio greater than 1.2.

Figure 4-11 identifies the intersections that are expected to operate at level of service E or F in the year 2030 with the 2030 Base Plan Network.

It is anticipated that the Entertainment District will have 67,000 new jobs by year 2030. The travel demand model shows less peak hour traffic congestion in the area around Loop 101. The reason might be a discontinuous grid roadway system due to the presence of Glendale Airport, Luke Air Force Base and the Landfill between Camelback Road and Northern Avenue and Loop 101. Additional contributing factors might be the additional arterial roadways such as New River Parkway, Orangewood Avenue, and 95th Avenue to offload event traffic and evenly spread employment centers around 4.5 square miles with a connected roadway network.

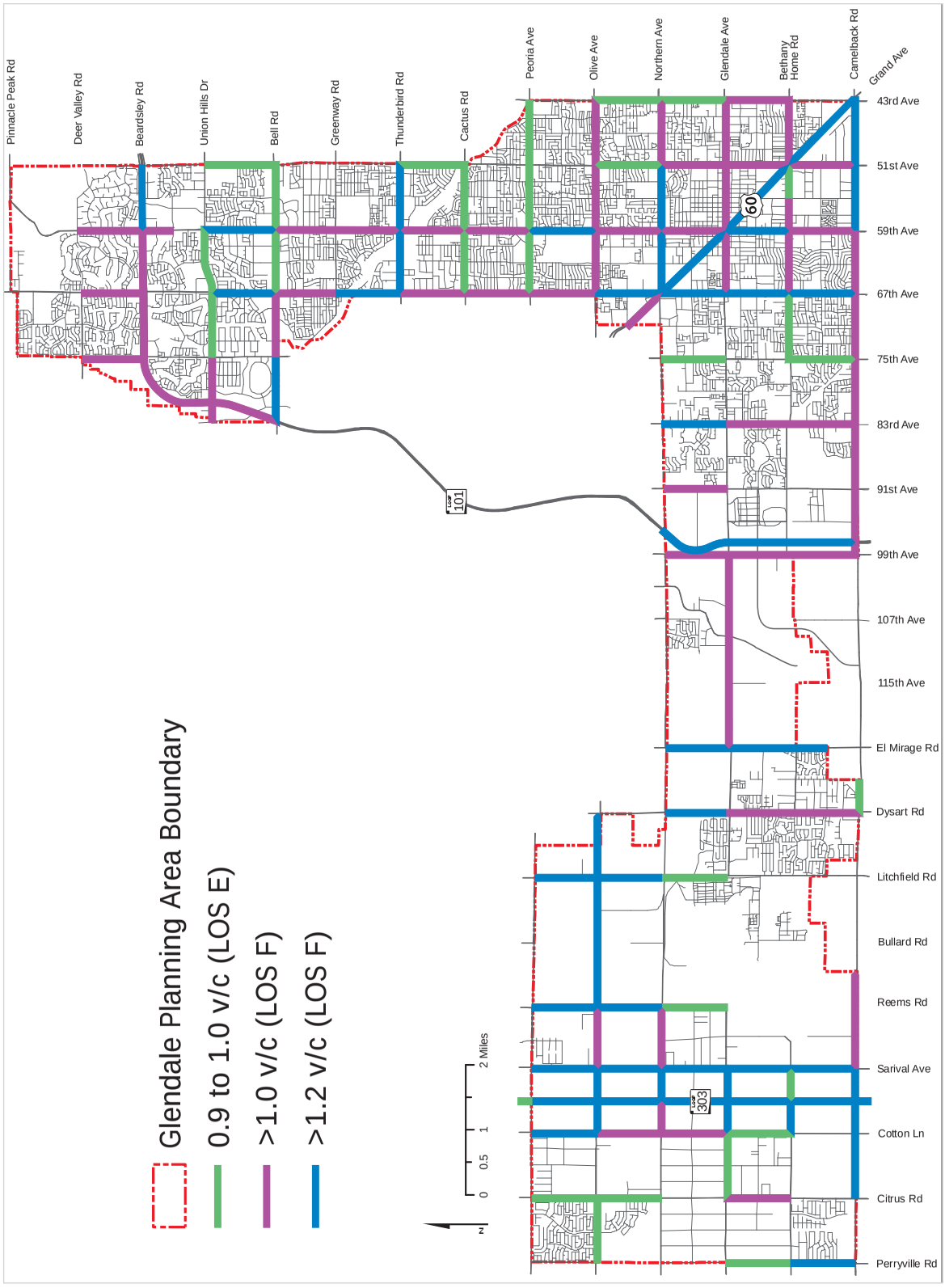


Figure 4-9 Roadway Segment with Year 2030 V/C > 0.9 Using Existing Through Lanes

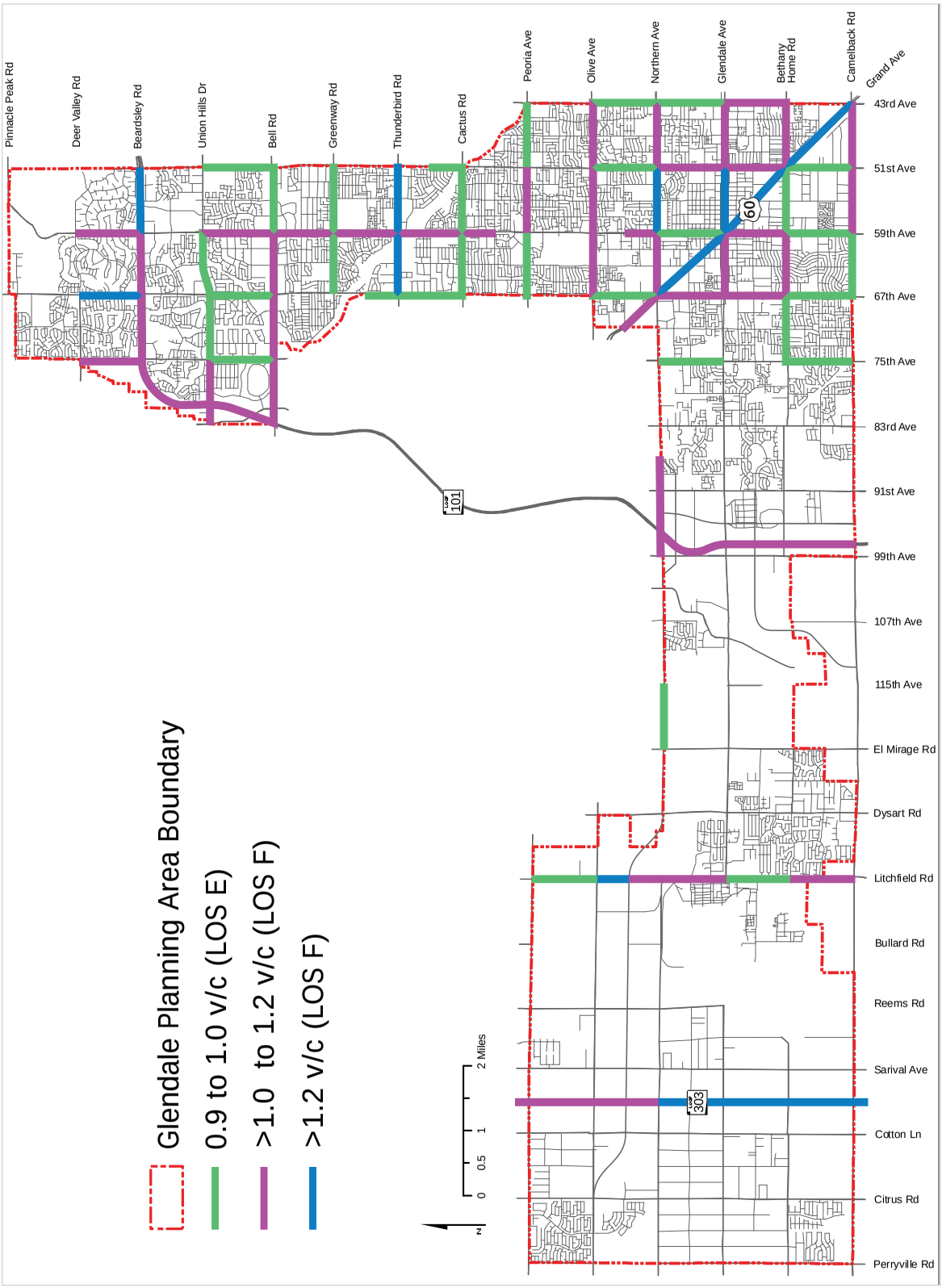


Figure 4-10 Roadway Segment with Year 2030 V/C > 0.9 (2030 Base Plan Network)

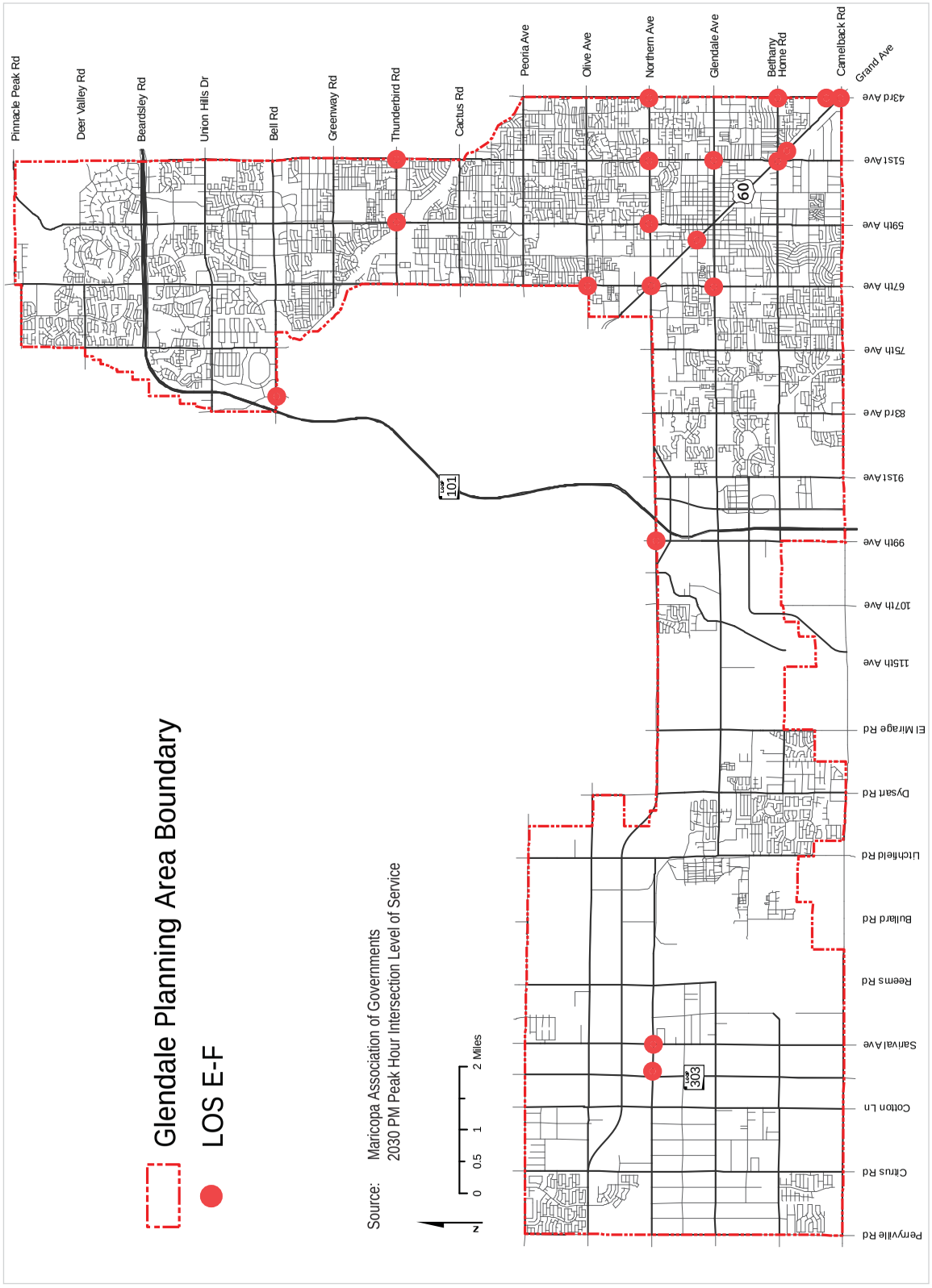


Figure 4-11 Intersection Congestion Map (2030 Base Plan Network)

4.4 Analysis

The previous section documented future base conditions. The future base adds to the existing system of planned projects that are included in the RTP. However, as was noted in Figure 4-11, even with these additional projects, there will still be street segments with level of service E or worse. This section describes the basis for improvement, definition of improvement types, and a listing of suggested improvements to supplement the future base.

4.4.a Basis of Improvements

The basis of improvement for the arterial street system considers a number of qualitative and quantitative factors including level of service, right-of-way, existing land use, future land use, and professional judgment. The traffic forecasts for the year 2030, the level of service and volumes were compared for each street segment. As a general rule, level of service D or better is considered acceptable in an urban area. Therefore, if the 2030 traffic forecast is less than the service volume for Level of Service E, then the number of lanes on the road segment is considered adequate. However, when the traffic forecast exceeds the level of service E volume, then the road segment should be examined to determine if improvements are warranted and feasible. In the older, developed areas of the City, land use and right-of-way are a major consideration and possible constraint when evaluating needed improvements.

4.4.b Definition of Improvements

There are a number of different types of street improvements that can be considered in the development of the street modal plan. Each is briefly described below. It should be noted that for the purpose of this analysis, it is assumed that an existing two-lane street would not meet the pavement requirements of an urban arterial street and would be completely reconstructed to a 4- or 6-lane street. An existing 4-lane street is assumed to meet urban arterial standards and would be widened to six lanes without complete reconstruction. However, a pavement overlay would be placed over the entire roadway. All the roadway cross-sections include 7-foot-wide landscape buffers between the roadway curb and sidewalk.

New 4-Lane Roadway/ Widen from Two to Four Lanes (four through lanes and a two-way left-turn lane)

This cross-section is comparable to the City's Arterial Section A-1 (City of Glendale Engineering Standard Detail G-302, adopted June 28, 2002) and includes wide curb lanes. The right-of-way for this cross-section is 110 feet and the roadway width is 68 feet from face of curb to face of curb. A 130-foot right-of-way is recommended so that additional right-of-way is not required if the street has to be widened to six through lanes at some future date. The cross-section includes one 16-foot and one 12-foot travel lane in each direction with a 12-foot center two-way left-turn lane. A variation of this cross-section

would be 74 feet wide and include 5-foot bike lanes. The outside features of the cross-section include curb, gutter, and sidewalk. A 4-lane street could include two left-turn lanes and one right-turn lane on each approach at major intersections if supported by traffic volumes. The estimated construction cost for one mile of this improvement is $8.0 million and includes the street section described, street lighting, traffic signals, drainage, and landscaping.

New 6-Lane Roadway/ Widen from Two to Six Lanes (six through lanes and a raised median)

This cross-section is comparable to the City's Arterial Section A-4 (City of Glendale Engineering Standard Detail G-303, adopted June 28, 2002). The cross-section for a 6-lane street is 94 feet wide and includes one 15.5-foot lane, one 11.5-foot lane, and one 12.5-foot lane in each direction with a 15-foot raised median. The right-of-way for this cross-section is 130 feet. The outside features of the cross-section include curb, gutter, and sidewalk. Six-lane streets could include two left-turn lanes and one right turn lane on each approach at major intersections if supported by traffic volumes. A 150-foot right-of-way is required at the intersections. The estimated construction cost for one mile of this improvement is $10.0 million and includes the street section described, street lighting, traffic signals, drainage, and landscaping.

Widen From Four to Six Lanes (six through lanes and a raised median)

This improvement does not change the cross-section of the existing street. This improvement modifies an existing four through lanes plus two-way left-turn lane street to a five plus two-way left-turn lane by adjusting lane widths and re-striping the street. This improvement will generally be applied in areas where existing development and/or right-of-way constraints preclude physical widening of the street. This cross-section is comparable to the City's Arterial Section A-2 (City of Glendale Engineering Standard Detail G-302, adopted June 28, 2002). The estimated construction cost per one mile of this improvement is $7.0 million.

Widen From Four to Five Lanes (five through and a two-way left-turn lane)

This improvement does not change the cross-section of the existing street. This improvement modifies an existing four through lanes plus two-way left-turn lane street to a five plus two-way left-turn lane by adjusting lane widths and re-striping the street. This improvement will generally be applied in areas where existing development and/or right-of-way constraints preclude physical widening of the street. This cross-section is comparable to the City's Arterial Section A-2 (City of Glendale Engineering Standard Detail G-302, adopted June 28, 2002). The estimated construction cost per one mile of this improvement is $4.0 million.

Intersection Improvements

The scope of an intersection improvement will vary depending on traffic volumes and crash history. The improvements may include additional or longer turn lanes, bus pull outs, raised medians and bus queue jumpers. On a 4-lane street approaching an intersection, the maximum improvement would include an additional through lane, a second left-turn lane, and a right turn lane. On a 6-lane street approaching an intersection, the maximum improvement would include a second left-turn lane and a right turn lane. An intersection improvement also includes traffic signal modifications and upgrades as needed. The estimated construction cost for an intersection improvement is $5.0 million. The intersection improvement is comparable to the City's Typical Arterial Intersection A-4 (City of Glendale Engineering Standard Detail G-323, adopted June 28, 2002).

Roadway Improvements

The scope of roadway improvement includes providing additional roadway capacity, turn lanes or access management. These roadway improvements will address traffic congestion and provide safety improvements. The majority of these are in the eastern parts of the City, as identified in the next section. The estimated construction cost of a mile of roadway improvement is $2.0 million.

4.4.c Sub-Planning Areas

The City planning area was divided into sub-areas to identify the roadway improvements with respect to the existing and future development in each sub-area. The areas are identified in Figure 4-12 and described below.

Entertainment District

The Entertainment District extends in general from 107th Avenue to 91st Avenue between Camelback Road and Northern Parkway. The area is home for three sports and entertainment venues requiring additional capacity improvements to meet the anticipated traffic demand in the area.

Western Growth Area

The Western Growth Area extends in general from 107th Avenue to the planning area boundary on the west side at Perryville Road. Growth is primarily concentrated along the Loop 303 corridor. The majority of the area is unincorporated today, but significant development is beginning to occur. This area is less restricted with regard to right-of-way and existing buildings.

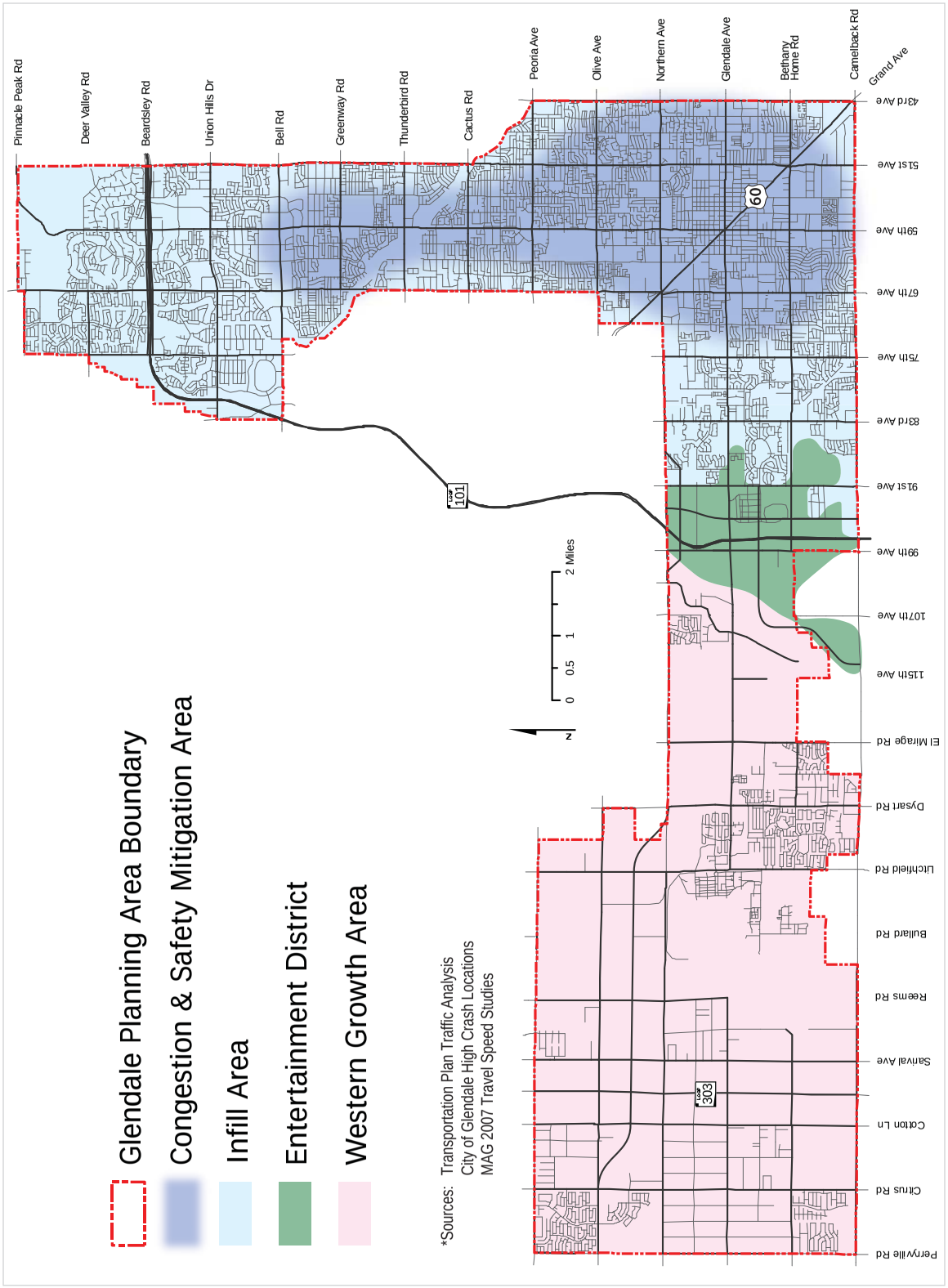


Figure 4-12 Sub-Planning Areas

Infill Area

The eastern part of the City (east of 91st Avenue) was considered as Infill Area consistent with the development in the area. The roadways to the east of 91st Avenue that require capacity improvements are identified in the Infill Area. The majority of the area is fully developed with limited available right-of-way for additional capacity improvements. The focus area is a subset of the infill area.

Congestion and Safety Mitigation Area

Based on the analysis of traffic forecasts, high collision locations, and intersection delay throughout the City, a focus area was identified in the eastern portion of the planning area. This area is typically more constrained than the western portion of the City. Right-of-way may be restricted and the ability to obtain additional right-of-way may be difficult because of the proximity of buildings or other factors.

4.4.d Operations and Maintenance

There are two primary components to an effective street system. One is the capital component, which is the construction or physical improvement to the street and includes associated features such as landscape, lighting, signals, and other enhancements. The other component is the operation and maintenance (O&M) of the street system, which includes pavement preservation and rehabilitation, traffic engineering, traffic safety education, street sweeping, and other routine activities. The costs are defined as part of the roadway plan in the next section.

4.5 Roadway Plan

The street improvement projects identified in this plan provide equitable coverage among the different geographic diversity throughout the City. They also provide for advancement in technology, access management, and neighborhood safety improvements to increase access and mobility throughout the City. Figure 4-13 depicts the functional classification of the roadway network.

The roadway plan is comprised of the following components.

- GO Program Arterial Street Improvement Projects
- GO Program System-wide Improvements
- Congestion and Safety Projects
- Arterial Street Improvements in
  - Entertainment District (107th Avenue to 91st Avenue)
  - Western Area (west of 91st Avenue)
  - Infill Area (east of 91st Avenue)
- Freeway, Expressway and Parkway Improvements
- Collector & Local Street Improvements

- Intelligent Transportation Systems (ITS)
- Neighborhood Traffic Mitigation
- Access Management
- Operations & Maintenance (O&M)

Each of these components is discussed in the following sections.

4.5.a Glendale Onboard (GO) Program Projects

In 2001, the voters of Glendale approved a ½-cent sales tax for transportation improvements throughout the City. Many projects have been completed since 2001 and this multimodal program continues to move forward in accordance with the commitments to the voters. The following street projects, as listed below and shown in Figure 4-14, remain to be completed:

One-time Improvements:

- 59th Avenue and Camelback Road intersection improvement
- 59th Avenue and Bethany Home Road intersection improvement
- 51st Avenue and Bell Road intersection improvement (Phase II)
- 59th Avenue roadway improvements: Grand Avenue to Loop 101
- Grand Avenue access management and beautification: 43rd Avenue to 71st Avenue
- Northern Parkway construction: 67th Avenue to Sarival Avenue

In addition to roadway improvements, the systemwide improvements provide the benefit of a safe and efficient roadway system at significantly lower cost compared to providing capacity improvements. The projects also include program management and administrative costs. These GO Projects include:

System-wide Improvement:

- ITS improvements (ITS deployment, Smart Traffic Signals, and Glendale Sport Facilities)
- Expanded Safety Program
- Neighborhood Traffic mitigation (Speed Cushions)
- Bus Pullouts
- Street Overlay (Arterial, Collector and Local street pavement management)
- Traffic Education
- Transportation Program Management
- Indirect Staff & Administration Costs
- Preliminary Engineering Consultants
- HURF Debt

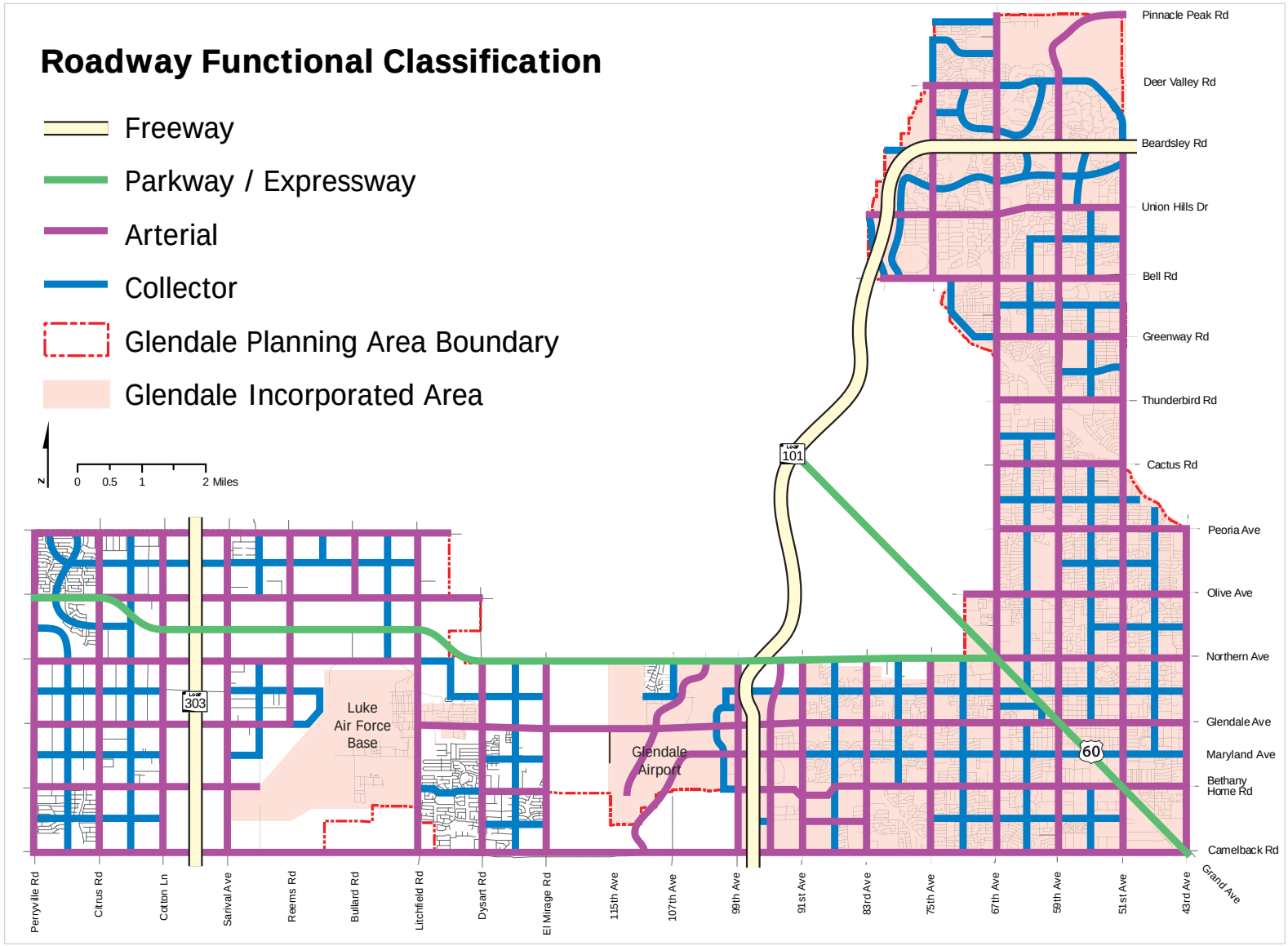


Figure 4-13 Roadway Functional Classification

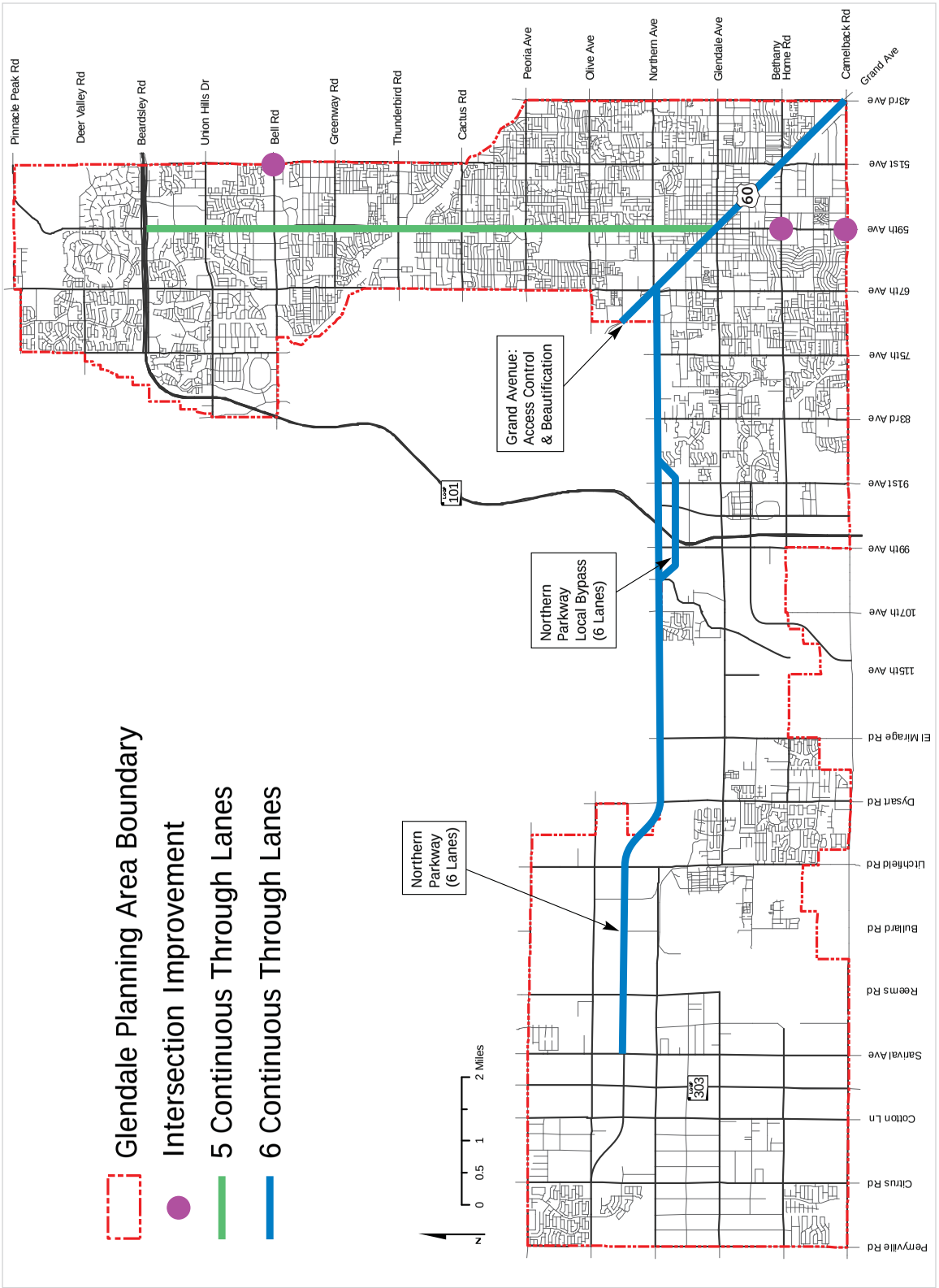


Figure 4-14 Glendale Onboard (GO) Program Improvements

4.5.b Congestion and Safety Projects

These projects are intended to address traffic safety issues and traffic congestion throughout the City. The roadway capacity improvements would provide additional throughput and reduce the intersection delay in the focus areas. The improvements may include additional through travel lanes and intersection widening to provide additional turn lanes. The specific improvements will be studied and implemented as needed where the existing roadway volume/capacity ratio or the existing intersection delay exceeds 1.0 and 60 seconds respectively. The intersections with high collision histories will be evaluated to provide additional improvements to address the safety concerns.

The primary focus area was identified in the eastern portion of the planning area based on preliminary analysis of traffic forecasts, high collision locations, and intersection delay. The specific projects have not been defined and will require additional study and analysis. It should be noted that many of the GO projects address these issues and it is expected that new projects will be a continuation of the GO program with an annual budget of $ 6.0 million as funding becomes available.

4.5.c Arterial Street Improvements

This category of projects will support growth in the western area, on-going development in the Entertainment District, and meet the traffic demands in the infill area east of 91st Avenue. The specific locations and projects are summarized below.

Entertainment District Arterial Street Improvements (107th Avenue to 91st Avenue)

This category of projects will support on-going development in the Entertainment District. The District is located in the vicinity of Loop 101 between Northern Parkway and Camelback Road, and in general, between 107th Avenue and 91st Avenue. The following projects have been identified to support this area. The new streets are depicted on Figure 4-15.

New 4-lane Roadway

- 95th Avenue: Camelback Road to Bethany Home Road
- 95th Avenue: ½ mile north of Glendale Avenue to Northern Avenue
- New River Parkway (Baseball Blvd): 99th Avenue to Camelback Road

Street Widening: 4 to 6 through lanes (Plus 2 through lanes)

- 99th Avenue: Camelback Road to Northern Avenue
- 91st Avenue: Glendale Avenue to Northern Avenue
- Camelback Road: 99th Avenue to 91st Avenue

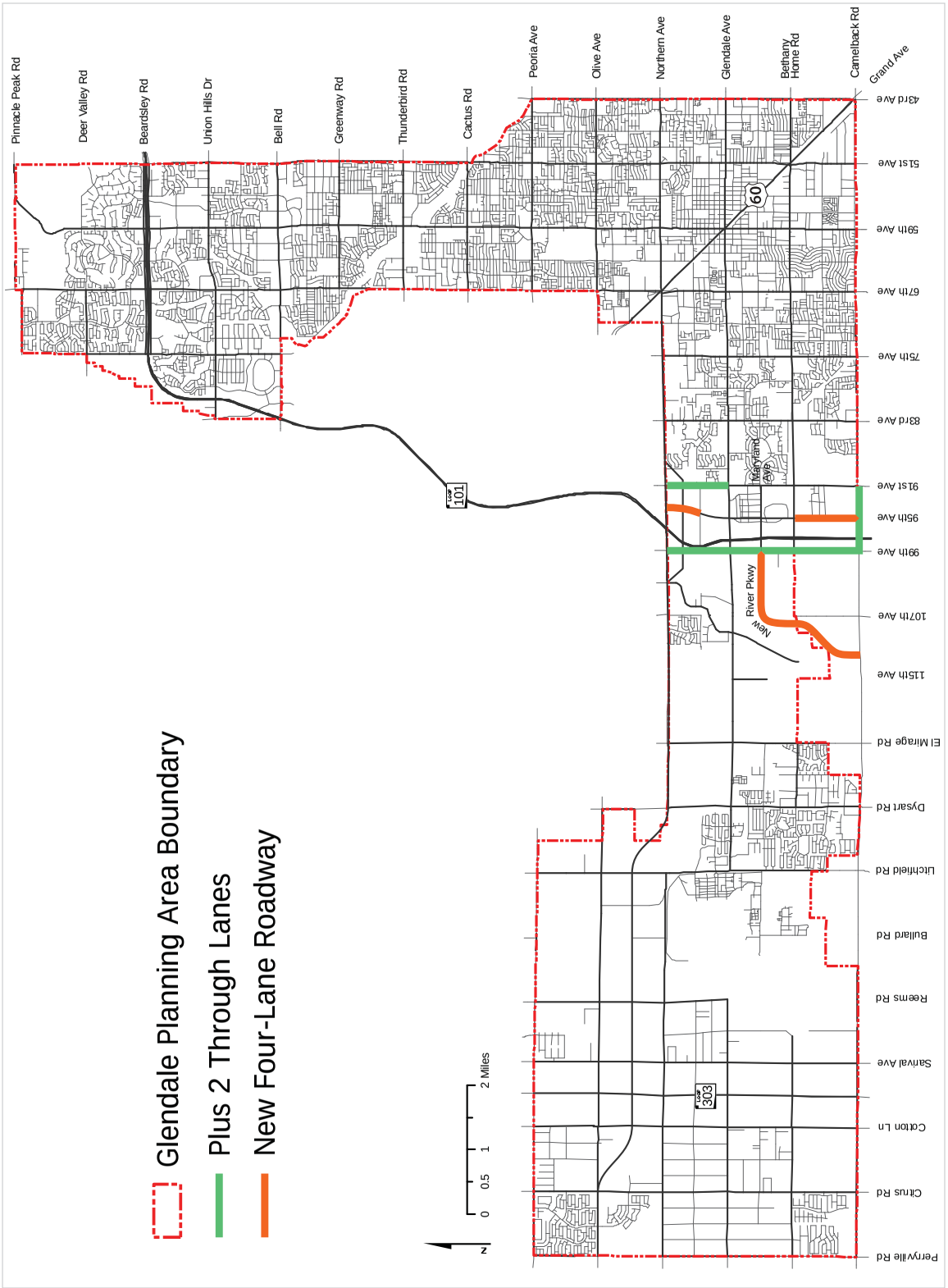


Figure 4-15 Entertainment District Arterial Street Improvements

Western Area Arterial Street Improvements (West of 107th Avenue)

This category of projects represents improvements in the areas west of the Entertainment District where little development has occurred and the areas are largely unincorporated. Loop 303, which is to be constructed by ADOT as a 6-lane freeway, lies within this area. It is expected that the Western Area will become a major development corridor with significant infrastructure needs. Because of the potential development that is expected in this area, the improvements listed below and shown on Figure 4-16 are included in the plan as policy for this emerging region of the City. According to City policy, all section line arterial streets will consist of six through lanes, three in each direction.

New 4-lane Roadway

- Northern Avenue: Sarival Avenue to Litchfield Road

New 6-lane Roadway

- Peoria Avenue: Citrus Road to Cotton Lane
- Perryville Road: Olive Avenue to Peoria Avenue

Street Widening: 2 to 6 through lanes (Plus 4 through lanes)

- Perryville Road: Camelback Road to Northern Avenue
- Perryville Road: Olive Avenue to Peoria Avenue
- Citrus Road: Camelback Road to Peoria Avenue
- Cotton Lane: Camelback Road to Peoria Avenue
- Sarival Avenue: Camelback Road to Peoria Avenue
- Reems Road: Glendale Avenue to Peoria Avenue
- Litchfield Road: Northern Avenue to Peoria Avenue
- El Mirage Road: ½ mile north of Camelback Road to Northern Avenue
- Camelback Road: Perryville Road to ½ mile east of Reems Road
- Bethany Home Road: Perryville Road to Sarival Avenue
- Glendale Avenue: Perryville Road to Reems Road
- Northern Avenue: Perryville Road to Sarival Avenue
- Olive Avenue: Perryville Road to Dysart Road
- Peoria Avenue: Perryville Road to Citrus Road
- Peoria Avenue: Cotton Lane to ½ mile east of Litchfield Road

Street Widening: 4 to 6 through lanes (Plus 2 through lanes)

- Litchfield Road: ½ mile north of Camelback Road to Northern Avenue
- Dysart Road: Camelback Road to Northern Avenue
- Camelback Road: ¼ mile east of Litchfield Road to ½ mile east of Dysart Road
- Glendale Avenue: Litchfield Road to 99th Avenue

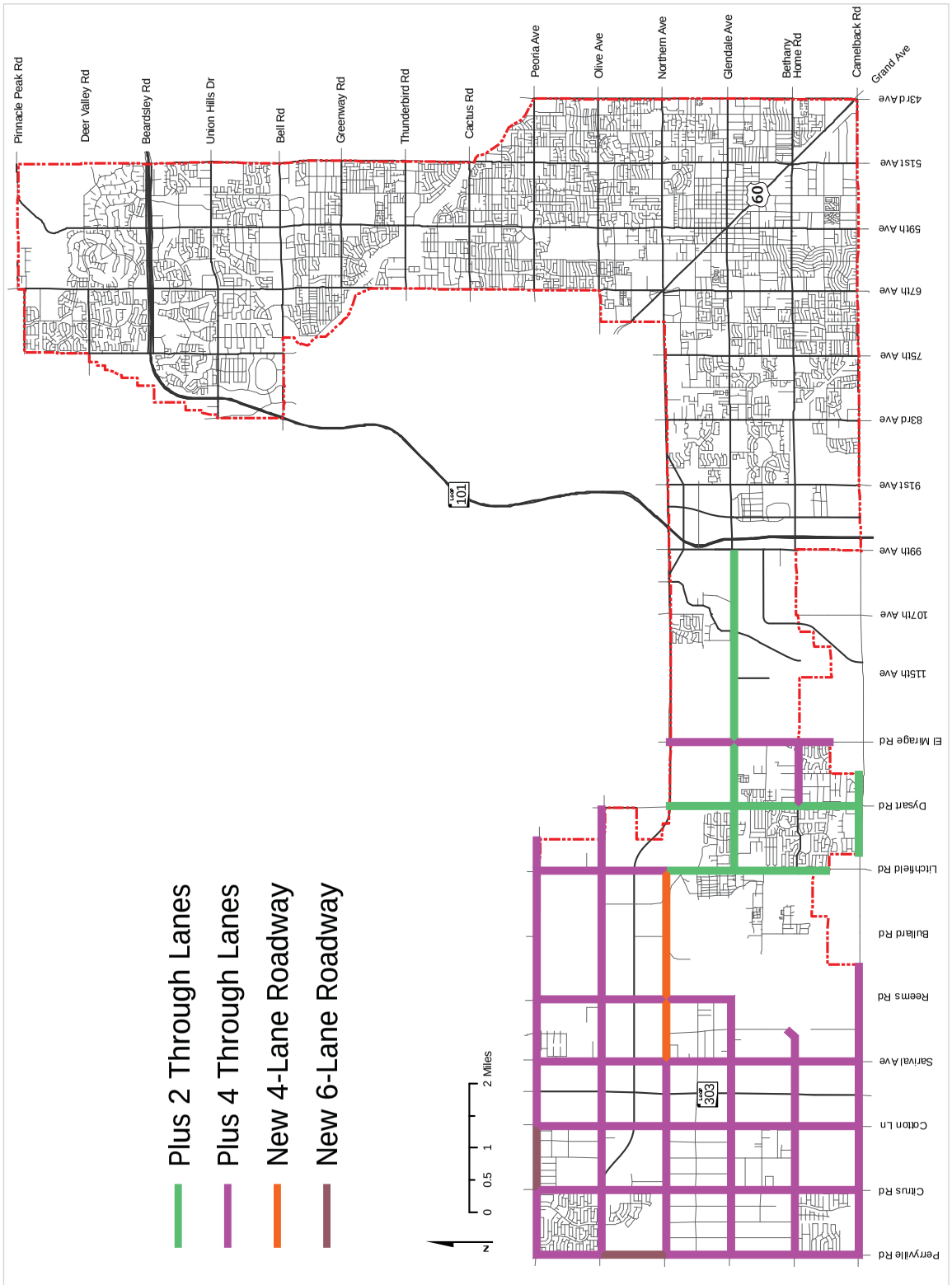


Figure 4-16 Western Area Arterial Street Improvements

Infill Area Arterial Street Improvements (east of 91st Avenue)

The improvements in the infill area are to improve access and mobility by providing additional roadway capacity at important connections. The locations are identified below and shown in Figure 4-17.

Street Widening: 2 to 6 through lanes (Plus 4 through lanes)

- 83rd Avenue: Glendale Avenue to Northern Avenue

Street Widening: 4 to 5 through lanes (Plus 1 through lane)

- Camelback Road: 83rd Avenue to ½ mile east of 51st Avenue
- Bethany Home Road: 59th Avenue to ½-mile east of 59th Avenue

Street Widening: 4 to 6 through lanes (Plus 2 through lanes)

- 83rd Avenue: Camelback Road to Glendale Avenue
- 67th Avenue: Camelback Road to Glendale Avenue
- 67th Avenue: ½ mile north of Thunderbird Road to Union Hills Drive
- 67th Avenue: Loop 101 to Deer Valley Road
- Camelback Road: 91st Avenue to 83rd Avenue
- Northern Avenue: 59th Avenue to 67th Avenue

Street Widening: 5 to 6 through lanes (Plus 1 through lane)

- 51st Avenue: ½ mile north of Cactus Road to Thunderbird Road
- Thunderbird Road: 67th Avenue to 51st Avenue

The roadway configuration in conjunction with Light Rail Transit in the downtown area between 43rd Avenue and 67th Avenue may be studied further.

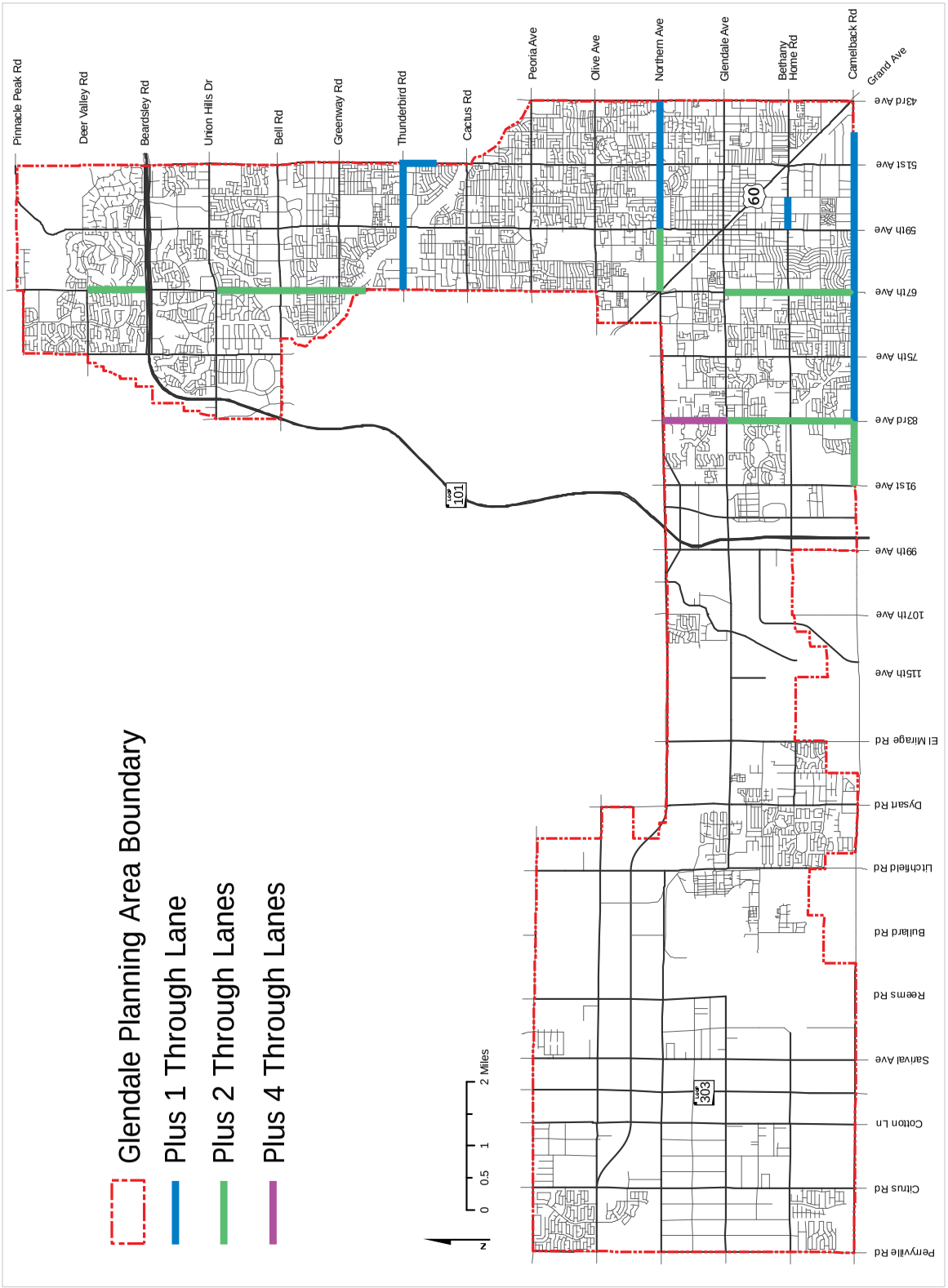


Figure 4-17 Infill Area Arterial Street Improvements

4.5.d Freeway, Expressway and Parkway Improvements

This category of projects represents improvements to the freeway system included in the RTP as well as the Northern Parkway, which is a multi-jurisdictional project. Northern Parkway is a limited access facility that is planned to connect Grand Avenue and Loop 303. The City has included funding for right-of-way protection and their share of the design and construction cost in the GO program. These projects are summarized below and in shown Figure 4-18.

Projects with available funding:

- **Northern Parkway:** right-of-way protection and Glendale's share of cost
- **Loop 303:** a new 6-lane freeway
- **Loop 101:** add one general purpose lane and one HOV lane in each direction
- **Grand Avenue and Bethany Home Road:** new Traffic Interchange (TI)
- **Grand Avenue:** Provide additional access control measures to optimize the traffic flow with minimal disruptions.

As growth continues and improvements are made to the freeway mainline, other improvements may be needed to maintain the integrity of freeway interchange operation. This could include dual left-turn lanes onto the freeway and additional lanes on the ramp terminals to the arterial streets. These specific improvements have not been defined and will require additional study and analysis to determine location and need.

These are planned projects that are either under-funded or are needed sooner than the current schedule provides the improvements. Changes to the current schedule or funding allocation will require legislative action.

Projects unfunded:

- **Northern Parkway:** under-funded due to cost increases and construction has been delayed.
- **Loop 101 and Maryland Avenue:** new HOV TI
- **Loop 101 and Missouri Avenue:** new HOV TI
- **Loop 101 and 83rd Avenue:** new HOV TI
- **Loop 101 TIs:** provide improvements at Camelback Road, Glendale Avenue, Northern Avenue, Bell Road, 75th Avenue, 67th Avenue, 59th Avenue, and 51st Avenue
- **Northern Parkway extension (Arizona Parkway):** from Loop 303 to Perryville Road

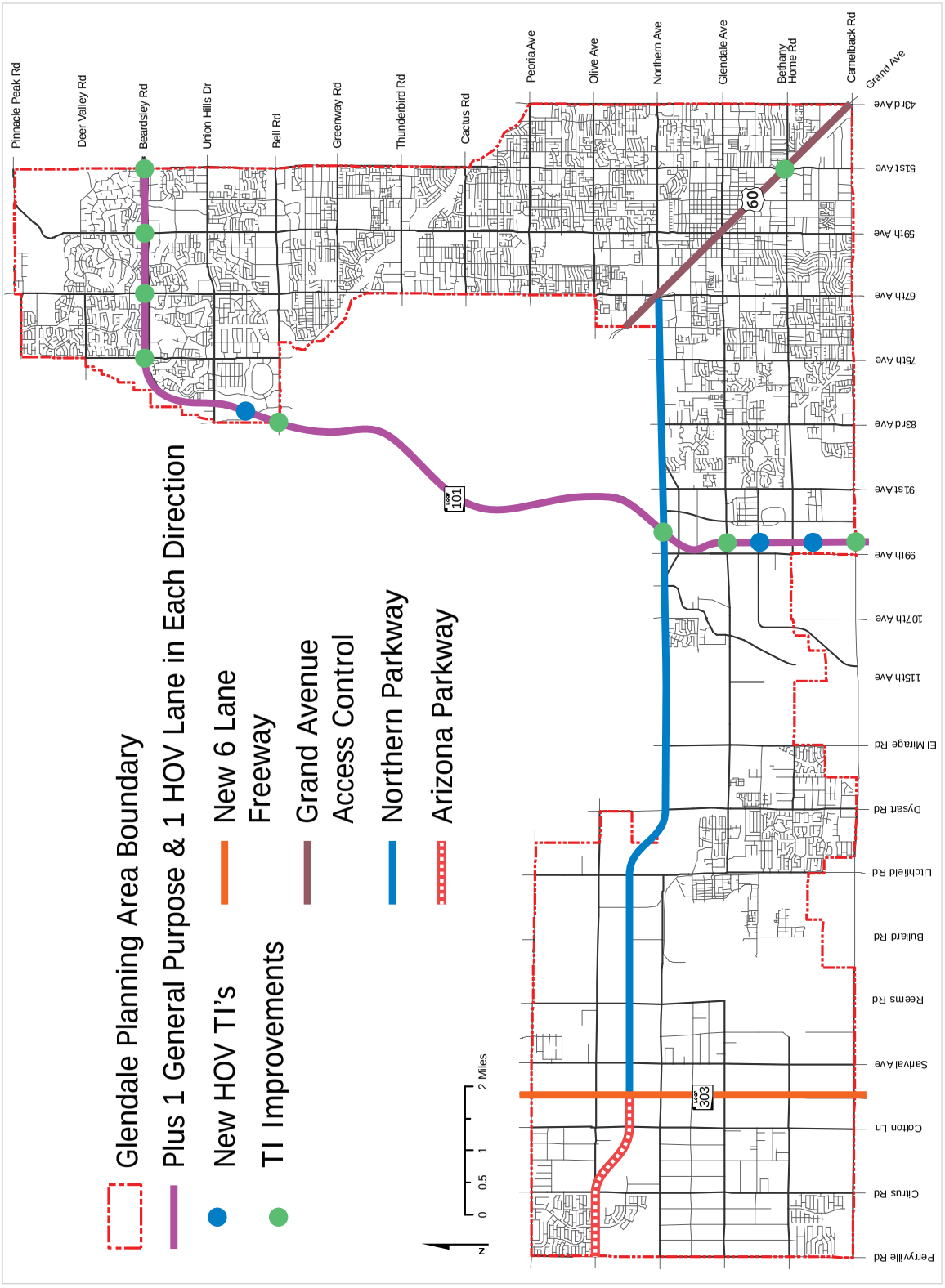


Figure 4-18 Freeway, Expressway and Parkway Improvements

4.5.e Collector and Local Street Improvements

The collector street system provides land access service and traffic circulation within residential neighborhoods, commercial and industrial areas by distributing the trips to and from the arterials through the area to the ultimate destination. An urban local street primarily provides direct access to the abutting land and connection to the higher order roadway system. A local street offers the lowest level of mobility and usually contains no bus routes.

A cost estimate was developed for the street improvements and annual maintenance needs by sub-planning areas. The infill area collector and local street system was assumed to be near build out and a minimum number of new collector and local roadways are anticipated. Conversely, the Western Area is primarily undeveloped at the present time. A detailed analysis was performed to determine the capital and operations and maintenance costs for the new roadways including collector and local streets. The capital costs for new streets and the streets to be upgraded in the Western Area were assumed to occur between 2010 and 2035.

The estimated average annual cost to maintain a mile of collector street is $48,022. The estimated average annual cost to maintain one mile of local street is $7,119.

4.5.f Intelligent Transportation Systems (ITS)

Intelligent Transportation System refers to a category of projects that improves the operation of the transportation system primarily with technology enhancements. The various categories include incorporating traffic signal communication into a city-wide system, variable message signs, 'smart' traffic signals, and enhancements in vehicle detection. The City is currently involved in several ITS activities and these will continue with the GO program and other funding sources. The annual budget for FY 2008/09 is listed below.

- Capital budget for Smart Traffic Signals is $2,735,931
- Capital budget for Smart Traffic Signal Equipment is $98,153
- Capital Budget for Sports Facilities Signs is $1,044,362
- Operating Budget for ITS is $723,780

Background

The City of Glendale has recognized that "building your way out of traffic congestion" is not economically or environmentally feasible. With the 2001 passing of the ½-cent sales tax for transportation projects and the creation of the GO Transportation Program, the City launched an aggressive effort to leverage technology to manage traffic. The primary focus of the technology-enhanced system was a better response to current and changing traffic conditions. The initial goals for the city-wide communications system are detailed in a 2000 Glendale Traffic Management System Design Concept Report.

Subsequent to the creation of the GO Transportation Program, the City became home to three sports and entertainment venues that were ideal candidates for the use of technology when managing event traffic. This identified the need to provide drivers with information on traffic conditions while on the road. ITS efforts planned for the sports facilities area are outlined in the 2004 Sports Facilities ITS Master Plan.

Current Infrastructure and Capabilities

Glendale currently uses fiber optic cable as the main form of communications with traffic signal, camera, and message sign equipment. A limited test of wireless radios along Glendale Avenue is currently operational and under evaluation for expanded or redundant use. The existing system, consisting of 49 miles of fiber optic cable and 8 radios, allows for communications with 90 of the city's 190 traffic signals, 30 closed circuit television (CCTV) cameras and one dynamic message sign (DMS). From the Traffic Management Center (TMC), staff can actively view traffic conditions and make changes to signal timing or sign messages as deemed appropriate. The TMC is staffed on weekdays and during major events.

Future Infrastructure and Capabilities Expansion

In the future, the overall goal is to communicate from a central location to all the traffic signals in the city as well as place CCTV cameras at every arterial-arterial intersection. Supplemental camera locations may be identified based on sight restrictions that limit the view of adjacent intersections or intersection approaches. The type of development and activity in the area may also require extra cameras to be installed. Dynamic message signs along major corridors in advance of key decision points are also planned. Full build out is expected to take 5 to 10 years depending on available funds.

The Transportation Department is actively working on several near-term projects that include a combination of federal and City funds to significantly enhance the monitoring and management system. The following expansions are planned by 2013:

- 23.5 additional miles of fiber optic cable
- Remote access to 59 signals from the central system
- 12 new permanent DMS Installations
- 60 additional CCTV Installations

As an extension to these projects, staff is also working to migrate the system from a serial communications interface and analog camera system to an Ethernet and digital system. This allows the available fiber to be more efficiently utilized and greatly enhances the ability to share camera images with other stakeholders. Redundancies in communications, including multiple fiber paths and connections to equipment, are also being added to limit down time during planned and unplanned communications losses.

4.5.g Neighborhood Traffic

Neighborhood traffic mitigation involves engineering strategies to implement features on local streets. These can typically be installed inexpensively and quickly, as a temporary or permanent measure to reduce travel speed and volume, thereby increasing safety. The City of Glendale currently has a neighborhood traffic mitigation program through the GO program, which often involves a public decision process by the neighborhood. Typical traffic calming devices can include speed cushions, raised medians, chicanes, traffic circles, and radar speed signs. The annual budget for FY 2008/09 is $785,000.

The benefits of traffic calming measures directly correlate with several of Glendale's goals and objectives. Traffic calming measures enhance the multimodal conditions of the transportation network, supporting goals and objectives detailed in Chapter 3. The benefits of traffic calming measures are detailed in Table 4-6.

Table 4-6 Traffic Calming Benefits

Benefits	Description
Increased comfort and mobility for non-motorized travel	Increased comfort and mobility for pedestrians and cyclists.
Reduced automobile impacts	Increased non-motorized travel substitutes for automobile trips, reducing congestion, expenses and pollution.
Increased community livability	Reduced noise and air pollution, and improved aesthetics.
Increased neighborhood interaction	More hospitable streets encourage street activities and community interaction.
Public Health	More opportunities for walking and other physical activity.

Source: Litman, 1999

It is important to balance the benefit and costs of these types of improvements, remaining cognizant of the appropriate implementation of traffic calming measures. Pedestrian, bicycle, and emergency vehicle movement can sometimes be impacted by traffic calming measures and it is important to integrate the measures into the specific neighborhood as appropriate. The associated consequences with traffic calming measures are outlined in Table 4-7.

The implementation of roundabouts is currently not a common practice in Glendale's approach to neighborhood traffic mitigation. However, it is an important tool to examine in the future, as it is an effective means of reducing vehicle speeds and increasing safety while being more cost effective than traffic signals.

Overall, traffic calming projects should be evaluated on an individual basis to ensure equity of improvements as well as impacts to the community. This includes residents, non-residents, and multimodal system users, as well as disadvantaged groups.

Table 4-7 Traffic Calming Consequences

Consequences	Description
Project expenses	Financial costs associated with implementing and maintaining Traffic Calming facilities.
Liability claims	Increased liability claims caused by Traffic Calming.
Vehicle delay	Reduced traffic speeds. Motorists either increase their travel time or reduce travel distance.
Traffic spillover on other streets	Traffic Calming on one street can shift traffic to other streets.
Problems for emergency and service vehicles	Delay to fire trucks, and problems for buses, and garbage trucks
Increased drivers' effort and frustration	Increased effort required for driving on traffic calmed roads and the resulting frustration.
Problems for bicyclists and visually impaired pedestrians	Some Traffic Calming strategies cause problems to bicyclists or visually impaired pedestrians.

Source: Litman, 1999

4.5.h Access Management

Access Management provides an important means of maintaining mobility. It incorporates effective ingress and egress to a facility and efficient spacing and design of access to preserve the functional integrity of the street.

Access Management is the proactive management of vehicular access points to land parcels adjacent to surface streets – primarily arterials and major collectors. Good Access Management restricts the number of direct access points to major surface streets, providing reasonable indirect access, effectively designing driveways, and enforcing safe and efficient spacing and location of driveways. Access Management promotes safe and efficient use of the transportation network through the use of a set of techniques to control access to arterial streets. These techniques include:

- **Signal Spacing:** Increase the distance between traffic signals to improve the flow of traffic on arterials, reduces congestion, and improve air quality.
- **Driveway Spacing:** Fewer driveways spaced further apart allow for more orderly merging of traffic. Locating driveways away from intersections helps reduce vehicular conflicts.
- **Safe Turning Lanes:** Dedicated left- and right-turn lanes, indirect left-turns and U-turns, and roundabouts keep through-traffic flowing. Roundabouts provide an opportunity to convert an intersection with many conflict points or a severe crash history to one that operates with fewer conflict points and less severe crashes.
- **Median Treatments:** Two-way left-turn lanes and raised medians are examples of some of the most effective means to regulate access and reduce crashes.

- **Right-of-Way Management:** A first step to control driveway and intersection spacing.

Access Management policies should address the following areas:

- Facility hierarchy
- Intersection and interchange spacing
- Driveway spacing and consolidation of driveways and service roads
- Traffic signal spacing
- Median treatments and median openings
- Turning lanes and auxiliary lanes
- Street connections

4.5.i Operations & Maintenance

The operations and maintenance component has three separate functions:

- Pavement management, which includes fog seal, overlay and reconstruction projects to maintain the integrity and life of the pavement
- Street operations and maintenance, which includes street sweeping, landscaping, shared-use paths, pedestrian enhancements, and in-house pavement and sidewalk projects
- Traffic operations and maintenance, which includes technical staff, administration, studies, planning, signals, signs, street lights, pavement markings, and traffic safety education

The City staff performs operations and maintenance of the roadway system to maintain safe driving conditions for the traveling public. The cost of operations and maintenance of a one-mile-long roadway was obtained from City staff. Table 4-8 lists various operations and maintenance activities performed by the City and the associated annual costs for each activity.

Table 4-8 Average Annual Operations and Maintenance Costs (in dollars)

Activity	Annual Cost for O&M for a mile of		
	Arterial	Collector	Local
Signing & Striping	1,173	1,173	1,173
Signals	17,992	—	—
ITS	6,431	—	—
Lighting	8,567	3,119	1,777
Pavement	79,527	36,058	3,742
Irrigation & Landscape	16,802	7,672	427

4.6 Plan Cost

The costs presented here are based on an evaluation by the study team and represent a planning level estimate. These costs will be reviewed annually as part of the City's budgeting process and updated as needed. There are a number of different types of street improvements that can be considered in the development of the street modal plan, such as widening an existing two-lane roadway to a 4-lane or 6-lane roadway, and intersection improvements. It should be noted that for the purpose of this analysis, it is assumed that an existing two-lane street would not meet the pavement requirements of an urban arterial street and would be completely reconstructed to a 4- or 6-lane street. An existing 4-lane street is assumed to meet urban arterial standards and would be widened to six lanes without complete reconstruction; however a pavement overlay would be placed over the entire roadway.

Table 4-9 summarizes the unit cost assumptions used to estimate the costs of the roadway and intersection improvements.

Table 4-9 Unit Costs ($ in millions)

Type	Unit	Unit Cost ($ in Millions)
New 4-Lane Roadway	1 Mile of Roadway	8.00
New 6-Lane Roadway	1 Mile of Roadway	10.00
Widen from 4 to 5 Lanes	1 Mile of Roadway	4.00
Widen from 4 to 6 Lanes	1 Mile of Roadway	7.00
Widen from 5 to 6 Lanes	1 Mile of Roadway	4.00
Intersection Widening	1 Intersection	5.00
Roadway Improvements	1 Mile of Roadway	2.00

The GO program costs were previously developed by the City of Glendale. These costs were not reviewed or revised as part of the process. Tables 4-10 and 4-11 summarize the GO program costs for roadway and intersection improvements, maintenance and systemwide costs.

Tables 4-12 through 4-15 summarize the improvements for freeway, expressway and streets capital and maintenance costs.

Table 4-10 Roadway and Intersection Improvements GO Program FY 2010-2035 ($ in millions)

Project	Type of Improvement	FY 2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Total
59th Avenue & Bethany Home /59th Avenue & Camelback Road	Intersection Improvement	—	—	2.26	2.18	—	—	4.44
51st Avenue & Bell Road (Achen-Gardner Phase II)	Intersection Improvement	—	—	0.60	0.58	—	—	1.18
59th Avenue: Grand Avenue to Loop 101	Intersections, Lanes, Medians & Beautification	—	—	29.33	—	—	—	29.33
							Estimated total cost of the improvements ($ in Millions)	*$ 34.95*

Table 4-11 System-wide Improvements GO Program FY 2010-2035 ($ in millions)

Project	Type of Improvement	FY 2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Total
Capital								
Bus Pullouts	Bus Pullouts	—	—	0.57	1.43	1.43	0.86	4.29
Expanded Safety Program	Safety—Mitigation	0.40	1.35	2.00	2.00	2.00	2.00	9.75
Intelligent Transportation System	Smart Traffic Signals	—	1.33	—	—	—	—	1.33
	Glendale Sports Facilities Variable Message Signs (ITS)	1.35	0.53	—	—	—	—	1.88
	ITS Deployment	—	1.17	—	—	—	—	1.17
	Traffic Signals—Development Agreements (Unfunded)	0.11	0.46	—	—	—	—	0.57
	Fiber Optic Communications (Unfunded)	—	6.49	9.73	—	—	—	16.22
	Event Management Center Upgrades (Unfunded)	—	0.41	0.62	—	—	—	1.03
	Matching Funds for ITS projects	0.16	0.80	0.80	0.80	0.80	0.80	4.14
Union Hills/Loop 101 TI	Interest for Advancement of ADOT funds	0.07	0.14	—	—	—	—	0.21
Speed Cushions	Replace Modified Humps w/ Cushions	0.15	0.44	—	—	—	—	0.59
Collector/Residential Overlay	Pavement Management—1" Overlay	3.38	6.45	—	—	—	—	9.83
Arterial Overlay	Pavement Management—2" Overlay	7.74	14.74	—	—	—	—	22.47
Camelback Road/Litchfield Road/ Olive Avenue/Greenway Road/83rd Avenue/75th Avenue	Pave Dirt Shoulders	0.26	—	—	—	—	—	0.26
Bethany Home - 59th to 67th Avenues	Safety-Mitigation	—	—	1.26	—	—	—	1.26
General Engineering Consultant	Preliminary Engineering	1.69	1.14	—	—	—	—	2.83
Operations and Maintenance								
Indirect Staff & Administration Charges	—	0.90	4.49	4.49	4.49	4.49	4.49	23.35
Traffic Education	GO Program + Traffic Education ($30,930 + $163,444 per year)	0.19	0.97	0.97	0.97	0.97	0.96	5.04
Neighborhood Traffic Mitigation	Mitigation	0.37	1.86	1.86	1.86	1.86	1.86	9.65
Transportation - Program Management	Management	1.26	6.32	6.32	6.32	6.32	6.32	32.88
Transportation Administration		0.57	2.84	2.84	2.84	2.84	2.84	14.77
Transportation Planning		0.08	0.41	0.41	0.41	0.41	0.41	2.12
Traffic Mitigation & Studies		0.49	2.43	2.43	2.43	2.43	2.43	12.62
Traffic Design & Development		0.27	1.36	1.36	1.36	1.36	1.36	7.09
Entertainment District Transportation Operations		0.62	3.12	3.12	3.12	3.12	3.12	16.26
HURF Debt	Bonds for Transportation Projects	0.97	4.38	0.79	—	—	—	6.14
							Estimated total cost of the improvements ($ in Millions)	*$ 207.76*

Table 4-12a Entertainment District Arterial Street Improvements (99th Avenue to 91st Avenue)

Roadway	Limits		Number of Through Lanes		Segment Length (Miles)	Cost per mile (Millions)	Total Cost (Millions)	Program Year
	From	To	Existing	Ultimate				
New 4-Lane Roadways								
95th Avenue	Camelback Road	Bethany Home Road	0	4	1.00	$ 8.00	$ 8.00	2025-2030
95th Avenue	Glendale Avenue	Northern Avenue	2	4	1.00	$ 8.00	$ 8.00	2025-2030
New River Parkway	Camelback Road	99th Avenue	0	4	3.00	$ 8.00	$ 24.00	2025-2030
Street Widening: 4 to 6 through Lanes								
99th Avenue	Camelback Road	Northern Avenue	4	6	3.00	$ 7.00	$ 21.00	2025-2030
91st Avenue	Glendale Avenue	Northern Avenue	4	6	1.00	$ 7.00	$ 7.00	2025-2030
Camelback Road	99th Avenue	91st Avenue	4	6	1.00	$ 7.00	$ 7.00	2025-2030
						Estimated total cost of the improvements ($ in Millions)	***$75.00***	

Note: The program year is a planning level estimate only. The roadway improvements will be programmed based on anticipated budget and operational needs.

Table 4-12b Western Area Arterial Street Improvements (West of 99th Avenue)

Roadway	Limits		Number of Lanes		Segment Length (Miles)	Cost per mile (Millions)	Total Cost (Millions)	Program Year
	From	To	Existing	Ultimate				
New 4-Lane Roadways								
Northern Avenue	Sarival Avenue	Litchfield Road	2	4	3.00	$ 8.00	$ 24.00	2025-2035
New 6-Lane Roadways								
Perryville Road	Camelback Road	Peoria Avenue	2	6	5.00	$ 10.00	$ 50.00	2025-2035
Citrus Road	Camelback Road	Peoria Avenue	2	6	5.00	$ 10.00	$ 50.00	2025-2035
Cotton Lane	Camelback Road	Peoria Avenue	2	6	5.00	$ 10.00	$ 50.00	2025-2035
Sarival Avenue	Camelback Road	Peoria Avenue	2	6	5.00	$ 10.00	$ 50.00	2025-2035
Reems Road	Glendale Avenue	Peoria Avenue	2	6	3.00	$ 10.00	$ 30.00	2025-2035
Litchfield Road	Northern Avenue	Peoria Avenue	2	6	2.00	$ 10.00	$ 20.00	2025-2035
El Mirage Road	½ mile north of Camelback Road	Northern Avenue	2	6	2.50	$ 10.00	$ 25.00	2025-2035
Camelback Road	Perryville Road	½ mile east of Reems Road	2	6	4.50	$ 10.00	$ 45.00	2025-2035
Bethany Home Road	Perryville Road	Sarival Avenue	2	6	3.25	$ 10.00	$ 32.50	2025-2035
Bethany Home Road	Dysart Road	El Mirage Road	2	6	1.0	$ 10.00	$ 10.00	2025-2035
Glendale Avenue	Perryville Road	Reems Road	2	6	4.00	$ 10.00	$ 40.00	2025-2035
Northern Avenue	Perryville Road	Sarival Avenue	2	6	3.00	$ 10.00	$ 30.00	2025-2035
Olive Avenue	Perryville Road	½ mile east of Litchfield Road	2	6	6.00	$ 10.00	$ 60.00	2025-2035
Peoria Avenue	Perryville Road	½ mile east of Litchfield Road	0-2	6	6.00	$ 10.00	$ 60.00	2025-2035
Street Widening: 4 to 6 through Lanes								
Litchfield Road	Camelback Road	Northern Avenue	4	6	3.00	$ 7.00	$ 21.00	2025-2035
Dysart Road	Camelback Road	Northern Avenue	4	6	3.00	$ 7.00	$ 21.00	2025-2035
Camelback Road	¼ mile east of Litchfield Road	½ mile east of Dysart Road	4	6	1.25	$ 7.00	$ 8.75	2025-2035
Glendale Avenue	Litchfield Road	99th Avenue	4	6	5.00	$ 7.00	$ 35.00	2025-2035
						Estimated total cost of the improvements ($ in Millions)	***$ 662.25***	

Note: The program year is a planning level estimate only. The roadway improvements will be programmed based on anticipated budget and operational needs.

Table 4-12c Infill Area Arterial Street Improvements (east of 91st Avenue)

Roadway	Limits		Number of Lanes		Segment Length (Miles)	Cost per mile (Millions)	Total Cost (Millions)	Program Year
	From	To	Existing	Ultimate				
New 6-Lane Roadways								
83rd Avenue	Glendale Avenue	Northern Avenue	2	6	1.00	$ 10.00	$ 10.00	2025-2030
Street Widening: 4 to 5 through Lanes								
Camelback Road	83rd Avenue	½ mile east of 51st Avenue	4	5	4.50	$ 4.00	$ 18.00	2025-2030
Bethany Home Road	59th Avenue	1½ mile east of 59th Avenue	4	5	0.50	$ 4.00	$ 2.00	2025-2030
Street Widening: 4 to 6 through Lanes								
83rd Avenue	Camelback Road	Glendale Avenue	4	6	2.00	$ 7.00	$ 14.00	2025-2030
67th Avenue	Camelback Road	Glendale Avenue	4	6	2.00	$ 7.00	$ 14.00	2025-2030
67th Avenue	½ mile north of Thunderbird Road	Union Hills Drive	4	6	2.50	$ 7.00	$ 17.50	2025-2030
67th Avenue	Loop 101	Deer Valley Road	4	6	1.00	$ 7.00	$ 7.00	2025-2030
Camelback Road	91st Avenue	83rd Avenue	4	6	1.00	$ 7.00	$ 7.00	2025-2030
Northern Avenue	67th Avenue	59th Avenue	4	6	1.00	$ 7.00	$ 7.00	2025-2030
Street Widening: 5 to 6 through Lanes								
51st Avenue	½ mile north of Cactus Road	Thunderbird Road	5	6	0.50	$ 4.00	$ 2.00	2025-2030
Thunderbird Road	67th Avenue	51st Avenue	5	6	2.00	$ 4.00	$ 8.00	2025-2030
Safety and Congestion Mitigation Area Projects								
Multiple Locations							$ 86.00	2025-2030
						Estimated total cost of the improvements ($ in Millions)	***$ 192.50***	

Note: The program year is a planning level estimate only. The roadway improvements will be programmed based on anticipated budget and operational needs

Table 4-13 Freeway, Expressway and Parkway Costs ($ in millions) (continued on next page)

Project	Type of Improvement	FY 2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Total
Capital Costs								
Projects With Identified Funding								
Northern Parkway[1]	Parkway Construction	37.50	106.40	67.40	87.50	—	—	298.80
Grand Avenue: 43rd Avenue—71st Avenue		22.00	—	—	—	—	—	22.00
Loop 303[2]	New 6-lane freeway with Northern Parkway System TI	—	270.00	—	—	—	—	270.00
Loop 101[3]	General Purpose & HOV lanes	—	—	27.03	97.67	—	—	124.70
Grand Avenue & Bethany Home Road[4]	Traffic Interchange	—	—	—	32.69	—	—	32.69
Projects Unfunded								
Northern Parkway[1]	Parkway Construction	—	—	—	—	158.55	158.55	317.10
Grand Avenue: 43rd Avenue—71st Avenue		—	—	—	18.42	17.73	17.50	53.65
Arizona Parkway[5]	Loop 303 to Perryville Road	—	—	—	—	—	60.00	60.00
Loop 101 & Maryland Avenue	New HOV traffic interchange	—	—	—	—	20.00	—	20.00
Loop 101 & Missouri Avenue	New HOV traffic interchange	—	—	—	—	30.00	—	30.00
Loop 101 & 83rd Avenue	New HOV traffic interchange	—	—	—	—	30.00	—	30.00
Camelback Road	Loop 101 Traffic Interchange Improvements	—	—	—	—	5.00	—	5.00
Glendale Avenue		—	—	—	—	5.00	—	5.00
Northern Avenue		—	—	—	—	—	5.00	5.00
Bell Road		—	—	—	—	—	5.00	5.00
75th Avenue		—	—	—	—	—	5.00	5.00
67th Avenue		—	—	—	—	—	5.00	5.00
59th Avenue		—	—	—	—	—	5.00	5.00
51st Avenue		—	—	—	—	—	5.00	5.00

Table 4-13 Freeway, Expressway and Parkway Costs ($ in millions) (continued from previous page)

Project	Type of Improvement	FY 2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Total
							Estimated total cost of the improvements ($ in Millions)	*$ 1,298.95*
Operations & Maintenance Costs (FY 2010-2035)								
Northern Parkway Capital Maintenance	Maintenance	—	0.14	0.85	1.74	2.05	2.85	7.64
Freeway/Expressway Maintenance[6]	ADOT Maintenance	1.50	8.75	10.63	10.63	10.63	10.63	52.75
Arizona Parkway	Maintenance	—	—	—	—	—	0.63	0.63
							Estimated total cost of O&M ($ in Millions)	*$ 61.01*

Sources:
[1] URS, Northern Parkway Project Management Consultant, amount adjusted to 2009 dollars
[2] PB, Loop 303 Management Consultant, with a per mile estimate of $37 Millions. Cost of Northern Pkwy System Interchange was assumed as $85 Millions
[3] MAG Regional Transportation Program (FY 2008-2026) July 2007 Update, per mile dollar amount was used to calculate costs in Glendale
[4] Assumed to be built in phase IV of Grand Avenue Roadway Improvements.
[5] Arizona Parkway estimate derived from Northern Parkway average per mile cost.
[6] Freeway/Expressway maintenance costs were provided by ADOT District maintenance. An average cost of $125,000 per centerline mile was considered. Loop 101, Grand Ave and Loop 303 costs were considered. Loop 303 O&M costs were considered from FY 2014.

Note: An average of 17 centerline miles of freeway and expressways were considered to be maintained by Arizona Department of Transportation within City limits.

Table 4-14 Street Capital and O&M Costs

	Arterial Streets		Collector Streets		Local Streets		Total Cost
	Capital Cost	O&M Cost	Capital Cost	O&M Cost	Capital Cost	O&M Cost	per Area
Entertainment District	75,000,000	59,765,336	23,750,000	15,751,216	30,050,000	7,361,046	211,677,598
Infill Area	192,500,000	308,352,296	8,750,000	90,485,454	9,500,000	110,415,690	720,003,740
Western Area	662,250,000	36,668,252	160,937,500	13,494,182	109,915,000	6,464,052	989,728,986
Total	**$ 929,750,000**	**$ 404,786,184**	**$ 193,437,500**	**$ 119,730,852**	**$ 149,465,000**	**$ 124,240,788**	**$1,921,410,324**

Notes:
1. O&M costs are for FY 2010 through FY 2035.
2. Western Area Collector and Local Street Costs: Glendale Transportation Plan working paper "Documentation of Street Annexation Cost Methodology (area west of 115th Avenue)".
3. Entertainment District Costs: City of Glendale GIS Roadway Files were used to determine the existing number of miles of collectors and local streets.
4. Infill Area costs: GIS Roadway files were used to determine the existing number of miles of collectors and local streets.
5. It is assumed that there will be no new collector and local streets in Infill Area.
6. The estimated O & M cost includes street lighting, signing and pavement marking, pavement maintenance and landscaping activities.
7. Unit Costs of Operations & Maintenance elements (Cost Per Mile of Street), shown in Table 4-8, were used.

Table 4-15 Roadway Plan Total Costs 2010-2035

	Entertainment District	Infill Area	Western Area	Systemwide	Total
Capital Cost					
Arterial Streets	75,000,000	192,500,000	662,250,000	34,953,284	964,703,284
Collector Streets	23,750,000	8,750,000	160,937,500	-	193,437,500
Local Streets	30,050,000	9,500,000	109,915,000	-	149,465,000
Freeway/Expressway/ Parkways	—	—	—	1,298,947,100	1,298,947,100
Systemwide	—	—	—	77,834,806	77,834,806
Total	**$ 128,800,000**	**$ 210,750,000**	**$ 933,102,500**	**$ 1,411,735,190**	**$ 2,684,387,690**
O & M Cost					
Arterial Streets	59,765,336	308,352,596	36,668,252	—	404,786,184
Collector Streets	15,751,216	90,485,454	13,494,182	—	119,730,852
Local Streets	7,361,046	110,415,690	6,464,052	—	124,240,788
Freeway/Expressway/ Parkways	—	—	—	61,021,577	61,013,404
Systemwide	—	—	—	129,928,133	129,928,133
Total	**$ 82,877,598**	**$ 509,253,740**	**$ 56,626,486**	**$ 190,949,710**	**$ 839,699,361**
Grand Total					
				Capital Cost	**$ 2,684,387,690**
				O & M Cost	**$ 839,699,361**

4.7 Plan Summary

The roadway plan document includes data and analysis for the existing street system as well as the future base. Street system characteristics were documented and road segments that have a v/c ratio of 0.9 or greater were highlighted. Historical crash data was summarized by examining various trends and statistical data. The roadway improvement projects were grouped as future base, including GO Program projects, focus areas, growth areas, and Western Area. Current dollar cost estimates are prepared for both capital cost and operations and maintenance cost. Figures 4-19, 4-20, and 4-21 present the identified roadway improvements and the roadway network plan.

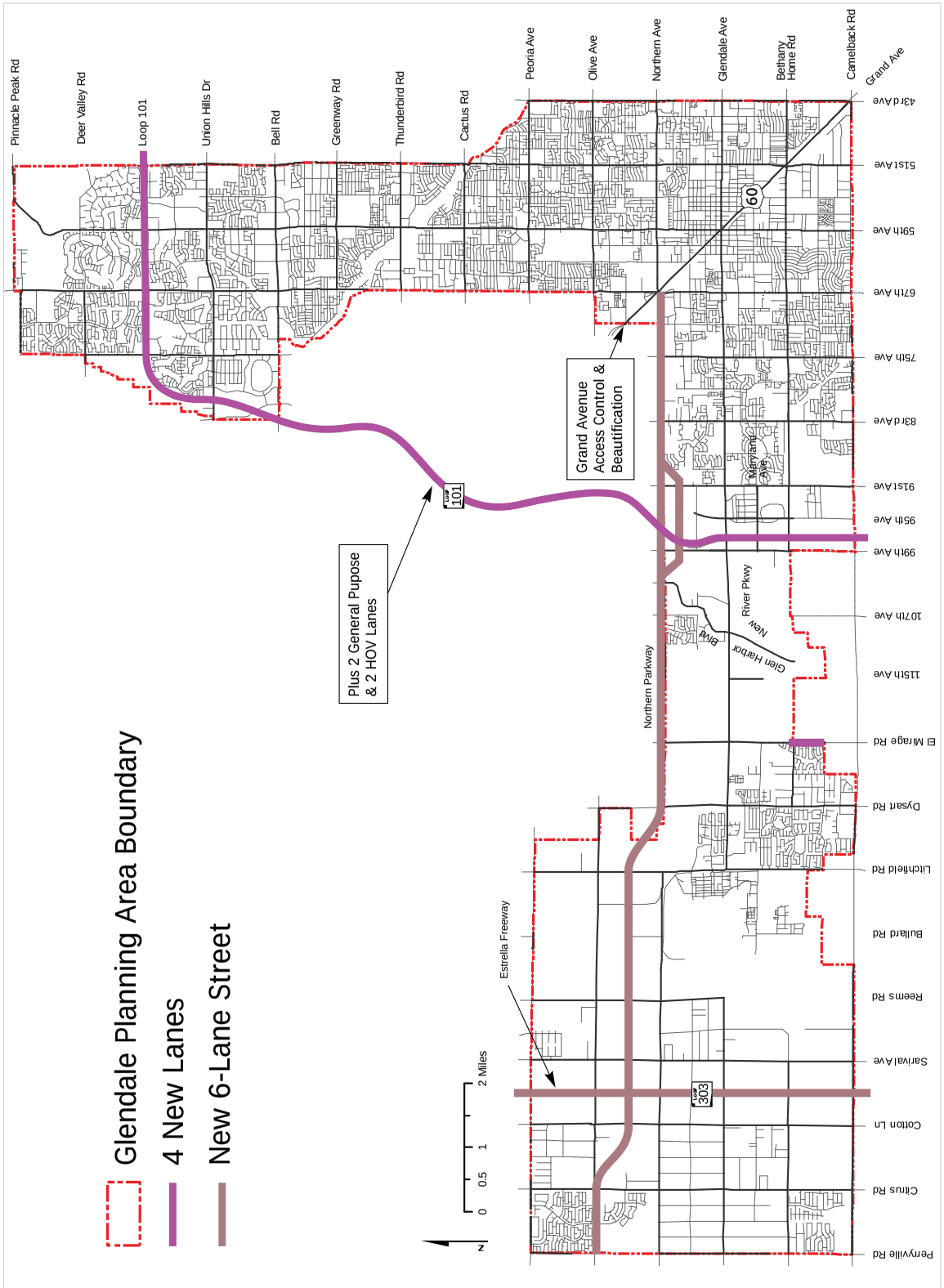


Figure 4-19 Future Roadway Improvements—Regional Facilities

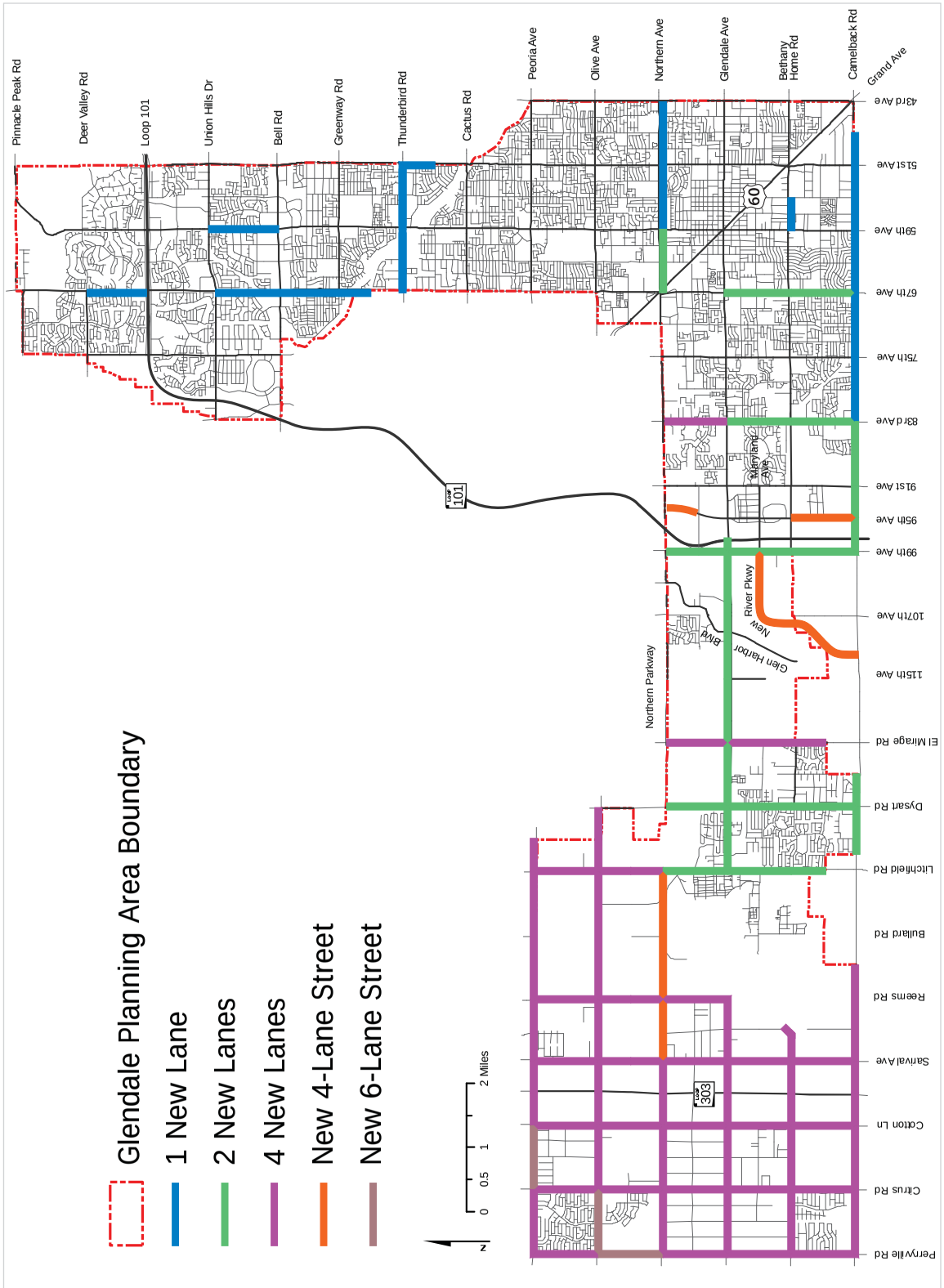


Figure 4-20 Future Roadway Improvements—Street Lane Widenings

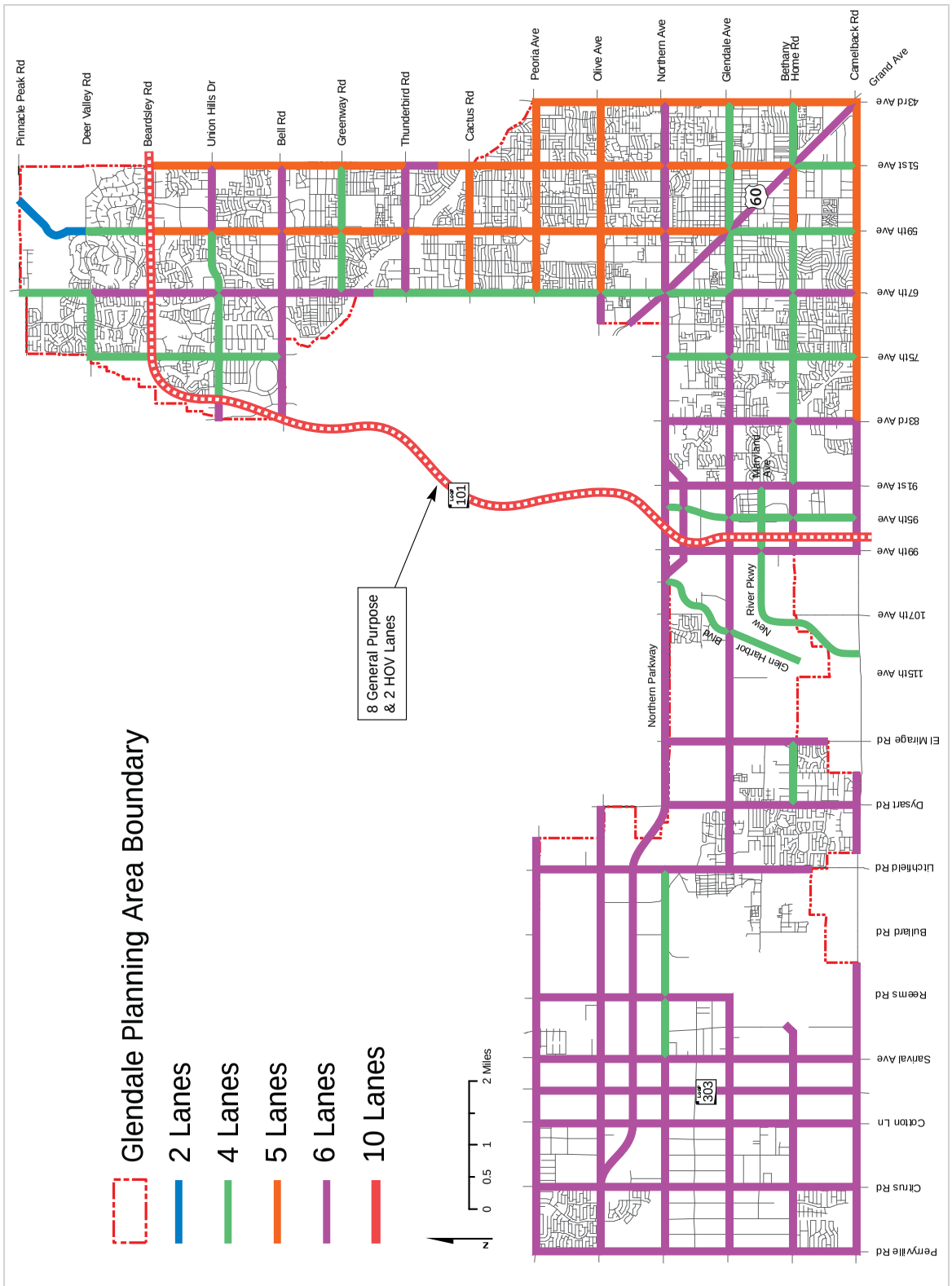


Figure 4-21 Roadway Network Plan

This page intentionally left blank

5.0 TRANSIT

5.1 Introduction

This chapter outlines the existing and planned transit within the City, detailed policies associated with transit, and recommendations for future transit service. It includes fixed-route, circulator, paratransit, fixed-guideway, and commuter rail. Existing, planned, and potential funding sources are also examined. Goals and objectives for the transit system were presented in Chapter 3.

5.2 Existing Conditions

The transit system in the City of Glendale consists of fixed-route and demand-responsive services and supporting infrastructure.

5.2.a Background

Transit service in Glendale is provided by the City, Valley Metro/RPTA (the regional public transportation authority for Maricopa County) and a variety of social service agencies. Like many metropolitan regions, cities in the Valley coordinate transit operations through a regional authority, the RPTA. Regional transit services operate under a common Valley Metro brand. However, the region is unique in that much of its transit service is supported by a combination of regional and local funds. This fiscal situation means that transit funding and service levels can – and often do – differ from city to city. Almost all transit service is operated by a private contractor but the contracting agency may be one of several cities or the RPTA.

The passage of Proposition 400 in November 2004 signaled increasing regionalization of transit service and funding in the Valley. Proposition 400 extended a county-wide, ½-cent sales tax and dedicated one-third of the revenues to transit projects that were identified in the RTP, which was developed by the MAG. The RTP enhances services on existing routes, creates new routes, and supports transit operations with capital funding for vehicles and facilities.

The development of the RTP and passing of Proposition 400 reflect an increased level of participation in transit planning by regional agencies. Cities, however, continue to play a major role in transit provision, service development, and in tailoring services to meet locally identified transit needs. The City of Glendale is no exception. Since City voters approved the 2001 Glendale Onboard ½-cent sales tax program, the City has made substantial improvements to its transit program. These improvements include

increased frequencies on fixed-route services, evening and weekend service, an expanded neighborhood circulator system, and enhanced paratransit services. This section provides details on the existing transit system. Additional detailed information on the existing transit system is provided in the Appendix.

The estimated cost for all transit services in FY2009 (as described in the *GO Program* budget) comprised operations and maintenance costs of $9.8 million and capital costs of $6.3 million.

5.2.b Fixed-Route Transit and Facilities

The fixed-route bus transit system within Glendale comprises 130 miles of local, express, and neighborhood circulator service. Figure 5-1 illustrates Glendale's existing bus system.

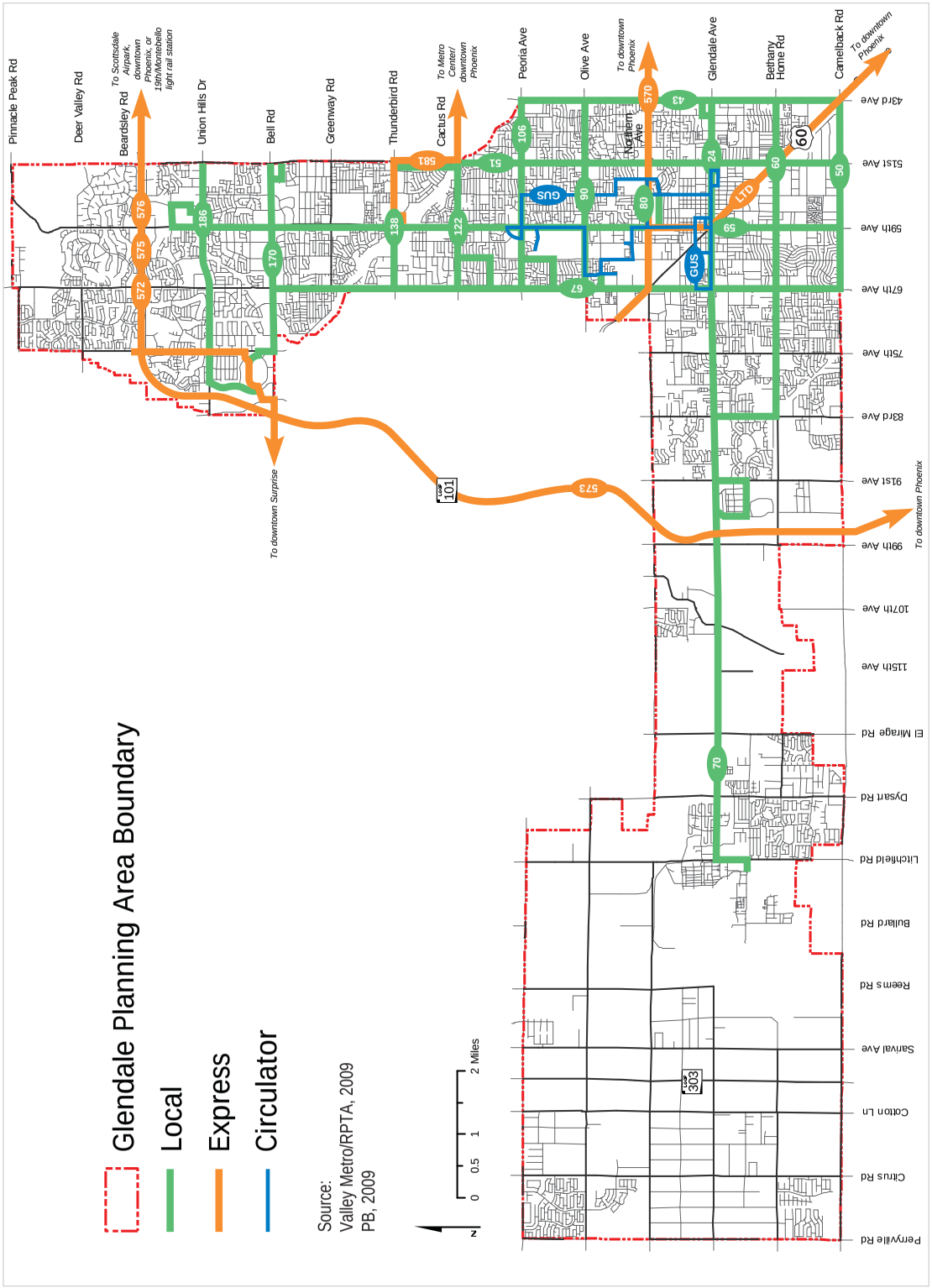
Local Service

The greatest proportion of service miles in Glendale is local fixed-route service, defined by vehicles stopping every block or two along a route. These local services operate as a vital part of the regional transit system, crossing city boundaries under a uniform fare structure. Local services are funded by a combination of regional, local, and federal dollars and fare revenue. Operations and maintenance functions are contracted out to private operators under contract with the City of Phoenix.

In general, Valley Metro routes serving Glendale operate on major arterials. Almost all of Glendale's major arterials in the more developed, eastern portion of the City currently have fixed-route transit service. All Valley Metro routes operating within the City of Glendale provide service seven days per week, with higher weekday service and more limited weekend service. Most of the routes connect Glendale with Phoenix to the east and south, but there is little local service to the west. (Because funding levels can vary from city to city in the Valley, service levels also vary on some routes.)

Local routes 43 (43rd Avenue), 51 (51st Avenue), 59 (59th Avenue), and 67 (67th Avenue) operate north-south and connect the City of Glendale with Phoenix south of Camelback Road. Currently, no routes operate beyond the City's northern border.

Local routes 50, 60 (Bethany Home Road), 70 (Glendale Avenue/24th Street), 80 (Northern Avenue), 90 (Dunlap Avenue), 106 (Peoria Avenue/Shea Boulevard), 122 (Cactus Road), 138 (Thunderbird Road), 170 (Bell Road), and 186 (Union Hills Drive) are east-west routes that primarily connect the City's narrow northern portion with Phoenix (to the east). Route 70 is the longest east-west route and provides service to Westgate and Luke Air Force Base in western Glendale. Route 106 operates west of the City's 67th Avenue boundary, providing service into the City of Peoria.



Source: Valley Metro (February 2009)

Figure 5-1 Fixed-Route Transit Service in Glendale

Local routes 43 (43rd Avenue) and 50 (Camelback Road) operate along the city's eastern and southern boundaries with Phoenix. Route 154 (Greenway Avenue) operates in the city of Phoenix, but terminates at the Glendale city limits.

Neighborhood Circulators

The Glendale Urban Shuttle (GUS) is a three-route neighborhood circulator system using smaller transit vehicles. These circulator bus routes operate exclusively within Glendale and are funded and operated by the City. The City uses smaller vehicles to provide service on local streets as well as major arterials. All three GUS routes operate on loops, with routes I and II serving downtown Glendale and other nearby destinations. These two routes travel the same path in opposite directions. GUS III serves several retirement centers, Manistee Manor, Glendale Community College, and the downtown library, among other destinations. The standard fare for a trip on GUS is 25 cents.

Express Routes

Glendale is served by several express bus routes that operate during peak a.m. and p.m. commute hours. To reduce travel times to the final destination, express routes make limited stops after the point of origin. The Grand Avenue Limited operates on Grand Avenue from the Surprise city government complex to downtown Phoenix in the morning, with one stop in Glendale. It travels back to downtown Surprise in the p.m. peak commute period. Routes 570 (Glendale Express) and 581 (North Mountain Express) provide service from northern Glendale to downtown Phoenix via I-17 in the a.m. and the reverse service to northern Glendale in the p.m. Route 572 (Surprise-Scottsdale Express) provides service from northern Glendale to the Scottsdale Airpark and to downtown Surprise via Loop 101, with service in both directions during the morning and evening commute periods. Route 573 (Arrowhead/Downtown) provides service between northern Glendale and downtown Phoenix via Loop 101, with trips in both directions in the a.m. and p.m. peak commute periods. The route originates/terminates at Church of Joy, with stops at Arrowhead Towne Center and the 99th Avenue/Glendale Park-and-Ride. Route 575 originates at Arrowhead Towne Center and terminates in downtown Phoenix. Route 576 originates at Arrowhead Towne Center and terminates at the 19th Avenue and Montebello light rail station (Note: Route 571 (Surprise Express) passes through Glendale on Grand Avenue but does not make any stops).

The Grand Avenue Limited, Route 570, and Route 581 primarily use local bus stops as pick-up/drop-off points in Glendale. By contrast, Routes 572, 573, 575, and 576 use only park-and-ride lots as pick-up/drop-off points in Glendale and travel on surface streets as little as possible.

5.2.c Paratransit

Paratransit is a type of transit service that operates in response to calls from passengers or their agents to the transit operator, who then dispatches a vehicle to pick up the passengers and transport them to their destinations. Paratransit operations do not operate over a fixed route or a fixed schedule; instead, a vehicle is dispatched to pick up several passengers at different pick-up points before taking them to their respective destinations and may even be interrupted en route to these destinations to pick up other passengers[1].

There are several types of paratransit services available to Glendale residents, including Americans with Disabilities Act (ADA) complementary service, Dial-a-Ride (demand-response) service, Special Transportation Services, and taxi (user-side) subsidy services. Table 5-1 provides a summary of the various paratransit services in Glendale.

Table 5-1 Paratransit Services in Glendale

Type of Service	Service Area	Service Days	Advance Reservation Required?	Operator	Service Audience	Fare
ADA Complementary Paratransit Service ("ADA Reservation Service")	Within ¾ mile of fixed route services	Same as Valley Metro fixed route operations	Yes	City of Glendale	Certified, eligible riders	$2
Glendale Dial-a-Ride	Within Glendale city limits to 115th Avenue	Every day	Weekdays – no Weekends & holidays - yes	City of Glendale	General public	$2; $1 for seniors, disabled
Glendale Taxi Subsidy Program	Within City of Glendale	Every day	No	Private taxi operators (funded by City of Glendale)	People with essential, repetitive medical trips; victims of domestic violence	Varies depending on length of trip

Source: City of Glendale, Maricopa County

ADA Complementary Paratransit Service

ADA Complementary Paratransit Service is required by federal law under the ADA of 1990 to accommodate persons with disabilities and others not able to use fixed-route services for all of their trip needs. ADA paratransit service is provided by a variety of different agencies and operators in the Phoenix metropolitan area.

1 Definitions of paratransit services are adapted from the American Public Transit Association's online glossary.

Within the Glendale city limits, the Glendale Transportation Department provides ADA Complementary Paratransit Service. Since trips must be reserved in advance, Glendale refers to its ADA complementary service as ADA Reservation Service. Glendale's ADA service, which is limited to the area required by the ADA, comprises all areas within ¾ of a mile of non-express fixed-route services (See Appendix). It operates during all days and times that respective fixed-route service is provided. Only people who are unable to use fixed-route bus service due to disability, and who are certified by the Valley Metro ADA Certification Office, are eligible for ADA service. Glendale's ADA Reservation Service provides trips only within the city limits; passengers needing to travel outside of Glendale may transfer to another ADA service. The one-way fare for ADA service is $2, with free transfers to neighboring ADA paratransit services.

When space is available, riders may bring a companion who pays the same passenger fare. Attendants – that is, personal care assistants who must accompany the ADA-certified passenger in order for that person to make the trip safely – ride free.

Glendale Dial-a-Ride (Demand-Response Service)

Demand-response service is not required by law and is not subject to the restrictions imposed on ADA Complementary Paratransit Service. In Glendale, the demand-response service is called Glendale Dial-a-Ride, a curb-to-curb service available to the general public within Glendale's city limits (excluding the Luke Air Force Base area—see Appendix).

The general public fare is $2.00. Seniors, persons with disabilities, and "juniors" (ages 6-13) pay $1.00. Children under the age of 6 ride free with an accompanying adult. Special group fares are also available. Riders must pay a fee to transfer to or from other dial-a-ride services or to or from fixed-route service.

Glendale Taxi Subsidy Programs (User-Side Subsidy Program)

User-side subsidy service is a transportation arrangement in which the rider's cost of transportation using private providers is partially subsidized by the transit agency. The user is the rider who pays a reduced or subsidized fare. The City's user-side subsidy program is a Taxi Subsidy program with two components: 1) provide trips for essential, repetitive medical trips, 2) provide trips for victims of domestic violence.

Glendale residents who take recurring essential medical trips including dialysis, pulmonary, stroke and cardiac treatments are eligible for up to 30 travel vouchers a month. Each voucher covers three-fourths of the cost of a taxi trip up to $15.00 and a 15% gratuity is paid by the program. The $15 cap means that the participants must pay full fare for trips over approximately eight miles. Rates charged are regular taxi rates and the program is open to all taxi and van companies, though currently only three companies are

providing trips. Participants may use this subsidy 24 hours a day, 7 days a week. Vouchers are provided by social workers to patients.

The procedures for the victim assistance program are different from the program for medical trips. Blank vouchers are given to police caseworkers who fill in the addresses at the time of use.

5.2.d Fixed-Route Services in Neighboring Cities

All of the transit routes that serve Glendale extend east and south into Phoenix. In Phoenix, transit service is present on all arterials, with service extending as far north as Happy Valley Road and as far west as Litchfield Road. Service in Peoria, Glendale's neighbor to the west, is more limited. Currently, only route 106 (Peoria Avenue) and the Grand Avenue Limited provide service in Peoria. More information on transit plans in Phoenix and Peoria is provided in the Appendix.

5.2.e Transit Infrastructure

This section provides details on the physical infrastructure that supports transit services and operations in Glendale, including park-and-ride and transit center facilities, HOV lanes and ramps, and transit vehicles. The Appendix shows where existing transit infrastructure is located in Glendale.

Park-and-Ride Facilities

Several park-and-ride facilities in Glendale and the surrounding area provide opportunities for residents to access longer-distance express bus services. Park-and-ride facilities allow for faster transit trips by having passengers assemble at a large parking lot. Passengers may drive their personal vehicles to a park-and-ride or access a lot using local transit routes. Park-and-ride lots may be dedicated or shared-use. A dedicated lot is solely for the use of transit passengers and/or carpoolers. A shared-use lot most often provides parking for transit passengers during peak commute periods and functions as parking for other purposes during non-commute periods. Shared-use parking lots are commonly located at shopping centers and churches.

Glendale currently has two dedicated park-and-ride lots, both of which are operated by the City:

- Southwest and northwest corners of 59th Avenue and Myrtle Avenue. Served by routes 59, 570, GUS 1 and 2, and the Grand Avenue Limited.
- Northwest corner of 99th Avenue and Glendale Road. Served by route 573 and route 70.

Glendale also has two shared-use park-and-ride lots:

- **Shopping Center:** At the northwest corner of Thunderbird Road and 51st Avenue. Served by routes 51, 138, and 581.
- **Church of Joy:** Located at 21000 North 75th Avenue and served by route 573.

In addition to using the park-and-ride lots within the City, Glendale residents are known to use park-and-ride facilities located in Phoenix at Bell Road/I-17 and 79th Avenue/I-10.

Transit Centers

A transit center is a coordination point for multiple transit services and provides passengers with a focal point and convenient facility to transfer between services. A transit center generally has limited passenger parking, but may be adjacent to a park-and-ride lot. Transit centers often provide passenger information and may provide additional transit amenities, such as ticket sales, restrooms, and operator layover locations.

Glendale is planning two transit centers:

- **The Arrowhead Towne Center:** To be located in the vicinity of Bell Road and 75th Avenue; will serve as a transit center for routes 67, 170, 186, 572, 573, 575, 576, and 660 (the Wickenburg connector).
- **The Downtown Glendale Transit Center:** Will be located adjacent to a future downtown park-and-ride.

Desert Sky Mall Transit Center is a major transit center in the southwest Valley, located south of Glendale at 79th Avenue/Thomas Road in Phoenix. The City of Peoria's transit center is located to the west of Glendale at Grand Avenue/Peoria Road.

HOV Lanes and HOV Ramps

High-occupancy vehicle (HOV) lanes are planned on both the northbound and southbound portions of the Loop 101 that pass through Glendale. On I-10, an HOV lane extends in both directions from Loop 101 through downtown Phoenix and to the Maricopa County border. On I-17, an HOV lane extends in both directions from Rose Garden Lane (just north of the Loop 101) to Thomas Road.

HOV ramps provide special access for high-occupancy vehicles either from freeway-to-freeway or from freeway-to-arterial road. There are currently no HOV ramps within the City of Glendale. An arterial-to-freeway ramp at 79th Avenue provides efficient access to and from I-10.

Transit Vehicles

The Glendale Transit Division owns and maintains a fleet of 38 vehicles used in providing transit services. Ten of the City-owned vehicles are used to provide GUS neighborhood circulator services, 25 are used for Dial-a-Ride service, and three are administrative vehicles. All transit vehicles used for Valley Metro local fixed-route and express services are owned by RPTA or the City of Phoenix.

5.2.f Light Rail Transit

Light rail transit operates lightweight passenger rail cars singly or in short trains on fixed rails in right-of-way that is not separated from other traffic for much of the way. Light rail vehicles are typically driven electrically with power being drawn from an overhead electric line. The Valley's first light rail line opened in December 2008 connecting downtown Phoenix, Tempe and Mesa. The City of Glendale is a member of the METRO Board of Directors and has plans to construct light rail extensions into Glendale.

5.2.g Commuter Rail

Currently no commuter rail service exists in Glendale or elsewhere in the Phoenix metropolitan area, although several commuter rail studies are underway. The Phoenix Subdivision rail line, owned and operated by BNSF, runs diagonally through Glendale along Grand Avenue. Passenger service on the Phoenix Subdivision was discontinued in 1969, and only freight service currently operates on this route.

5.3 Transit System Quality and Performance

Transit system success can be measured and evaluated in many different ways. This section examines Glendale's fixed-route transit services in terms of coverage, ridership, and cost. Paratransit services are evaluated in terms of ridership, cost, and reliability. A discussion on service quality and reliability, cost efficiency, farebox recovery ratio and operating cost per boarding for fixed-route transit services is in the Appendix.

5.3.a Fixed-Route Services

Amount of Service

The amount of transit service provided is measured in vehicle revenue miles (VRM). Table 5-2 shows how the amount of transit service provided in Glendale has grown over time. The table also shows a measure of transit availability – VRM per resident.

Table 5-2 clearly shows the impact of the City's 2001 *GO Program* on transit service: VRM increased by almost 60% between fiscal year 2001-2002 and 2002-2003. Gradual service increases have more than doubled the amount of service provided over the past seven years. Transit service has kept pace with the rapid population growth. In fiscal year 2001-2002, fewer than four VRM of transit was provided per resident. By fiscal year 2007-2008, the amount had approached seven VRM of transit service per resident.

Table 5-2 Vehicle Revenue Miles Over Time

Fiscal Year	Vehicle Revenue Miles	Percent Change from Prior Year	Vehicle Revenue Miles per Resident
2007-2008	1,704,308	18%	6.73
2006-2007	1,436,370	-0.3%	5.84
2005-2006	1,441,145	3.6%	5.92
2004-2005	1,390,845	7.5%	5.75
2003-2004	1,294,338	0.0%	5.53
2002-2003	1,294,338	58.8%	5.60
2001-2002	814,852	—	3.58

Source: Valley Metro/RPTA

Ridership Trends

Table 5-3 summarizes total annual boardings in the City of Glendale for the past seven years. As the table shows, ridership in Glendale has grown steadily in the past six years and, for the most part, has outpaced growth on the Valley Metro system as a whole. Ridership grew by 90% between fiscal years 2001 and 2008.

Table 5-4 summarizes recent fixed-route transit performance in terms of each route's average weekday boardings and boardings per VRM of service. (Only boardings and vehicle miles traveled within Glendale are included in this table.) Boardings per VRM is a measure of route productivity. Higher boardings per VRM indicates higher efficiency. To compare performance over time, boardings per VRM for the same month in the previous year are also shown. Finally, the table shows boardings per VRM for all Glendale service and for the Valley Metro system as a whole to compare each route to regional transit performance.

In October 2008, boardings on local services ranged from almost 2,000 per day on Routes 59 and 70 to fewer than 400 per day on route 186. Routes 59, 80, 90, and 106 had greater boardings per vehicle revenue mile than the Valley Metro system average. Several routes - 51, 70, 80, 90, 138, and 186 – experienced productivity increases from 2007 to 2008 (that is, their boardings per mile increased); however, three routes – 60, 67, and 106 – experienced decreases in productivity.

Express routes contain long route segments where boardings are not permitted; therefore, boardings per vehicle trip is used instead of boardings per VRM. Table 5-5 summarizes route productivity figures for Glendale's express routes.

Table 5-3 Total Annual Boardings and Change in Ridership

	Total Boardings (Glendale)	Percent Change from Prior Year (Glendale)	Percent Change from Prior Year (Valley Metro)
2007-2008	2,519,066	5%	3%
2006-2007[1]	2,400,184	-6%	-2%
2005-2006	2,564,286	5%	5%
2004-2005	2,453,029	7%	4%
2003-2004	2,287,402	16%	7%
2002-2003	1,976,239	38%	12%
2001-2002	1,432,503	8%	13%
2000-2001	1,322,114	—	—

Source: Valley Metro Annual Ridership Reports (online at www.valleymetro.org)

[1] Ridership figures show a decline in 2006-2007, but there is debate throughout the Valley transit community about the accuracy of those figures. New methods of collecting ridership data, including automated passenger counters, were used in 2006-2007.

Table 5-4 Average Weekday Boardings

Route	Description	Avg. Weekday Boardings (Oct. 2008)	Boardings per VRM (Oct. 2008)	Avg. Weekday Boardings (Oct. 2007)	Boardings per VRM (Oct. 2007)
51	51st Avenue	546	1.5	515	1.4
59	59th Avenue	1,928	2.6	1,956	2.6
60	Bethany Home Road	874	2.2	872	2.5
67	67th Avenue	1,196	2.1	1,347	2.4
70	Glendale/24th Street	1,911	1.8	1,339	1.3
80	Northern Avenue	533	3.7	254	1.7
90	Dunlap/Cave Creek	714	3.5	450	2.2
106	Peoria Avenue/Shea Boulevard	508	2.4	572	2.7
138	Thunderbird Road	411	2.1	289	1.5
170	Bell Road	479	1.9	470	1.9
186	Union Hills Drive	368	1.1	295	0.9
GUS		368	1.1	320	1.0
Total Boardings by Entity					
Glendale		n/a	1.86	n/a	1.6
Valley Metro		n/a	2.20	n/a	2.07

Source: Valley Metro/RPTA

Route 572 – a new express route serving new markets – reported an average of less than 1 boarding per trip in October 2008, but this is an increase from the previous year. Routes 573 and 575 serve the tested downtown Phoenix market and reported over 100 riders per day. Route 573 ridership more than doubled from the previous year. Routes 570, 581, and Grand Avenue Limited experienced flat ridership over the two years.

Table 5-5 Express Routes—Productivity

Route	Description	Average Weekday Boardings (October 2008)	Boardings per Trip (October 2008)	Average Weekday Boardings (October 2007)	Boardings per Trip (October 2007)
570	Glendale Express	22	5.5	16	4.0
572	Surprise/Scottsdale Express	4	0.3	0	0.1
573	North Glendale Express	108	9	50	4.2
575	Northwest Valley/Downtown	113	18.8	—	—
576[1]	Northwest Valley/Montebello	—	—	—	—
581	North Mountain Express	22	3.7	22	3.7
Grand Avenue Limited		9	1.1	18	2.25

Source: Valley Metro/RPTA

[1] Route 576 began operating in December 2008.

Bicycles on Transit

While many people walk to their stop or drive to a park-and-ride, bicycling to transit is another important means of transit access. In fiscal year 2007-2008, over 59,000 Glendale passengers loaded a bicycle onto bus vehicle racks.

Service Quality, Reliability, and Efficiency

Currently, almost all local fixed-route services meet the City's 2001 *GO Program* goal for service frequency (30 minutes on weekdays). The exceptions are route 51, which has trips approximately every 40 minutes, and route 122, with hourly service. Weekend service is more varied. Recent service cutbacks due to regional transit service cuts have resulted in short service spans on most routes both weekdays and weekends.

The Valley Metro system as a whole had an on-time performance[2] of 91.55% in fiscal year 2006-2007. As detailed in the Appendix, all but three routes in Glendale exceeded this Valley average.

Nearly all of Glendale's routes exceed the average farebox recovery ratio in the Valley; only the express routes and three local routes (122, 138, and 186) have a below-average ratio.

2 *"On-time performance" means that the bus departs at the scheduled time or up to five minutes after the scheduled departure time.*

These same routes also have higher operating costs per boarding than the Valley average. It should be noted that route 122 only recently began operating in Glendale and will take some time to establish ridership.

Since Glendale does not manage or operate any of its transit directly (apart from its circulator routes), the City has limited control over operating costs. However, efforts by the City to increase ridership would have positive effects on the farebox recovery ratio and the operating cost per boarding. (A discussion of efficiency is included in the Appendix.)

5.3.b Paratransit Services

Dial-a-Ride Services

Table 5-6 shows ridership on the City's paratransit services from fiscal year 1999-2000 through fiscal year 2005-2006. As with fixed-route services, the impact of the 2001 *GO Program* improvements is reflected clearly by the 15% jump in ridership in fiscal year 2001-2002. Paratransit ridership has continued to grow steadily in the years since the *GO Program* was implementated.

A recent Valley Metro/RPTA Regional Paratransit Study examined each of the Valley's paratransit systems in depth. According to this report, in fiscal year 2005-2006, Glendale Dial-a-Ride services had hourly higher costs than the regional average, but lower per-boarding costs. The City's Dial-a-Ride services also had higher productivity than the regional average. Table 5-7 summarizes some of the cost and productivity metrics for Glendale and the region.

Glendale had higher hourly operating costs than the regional average, but higher efficiency as well, with boardings per revenue hour of 3.0. The report speculated that Glendale's high productivity was due to shorter average trip lengths than in the region as a whole. The study reported that Glendale's Dial-a-Ride system has a stable and experienced staff and good quality service.

Taxi Voucher Program

The Regional Paratransit Study also examined Glendale's taxi voucher program, based on the first eight months of the program. During this time period, 2,686 vouchers were issued and 29 people took 877 one-way trips. The average subsidy cost was $13.23 plus tip and the user share was $4.13. The cost of the subsidy for the period was $27,912, which included a 29% administrative fee. Only two trips were made using vouchers for victims of domestic violence.

Additional system evaluation and analysis is included in the Appendix.

Table 5-6 Paratransit Ridership

Fiscal Year	Total Annual Boardings (Glendale)	Percent Change from Prior Year (Glendale only)	Percent Change from Prior Year (Valley Metro)
2005-2006	89,055	1%	-12%
2004-2005	87,831	2%	3%
2003-2004	86,132	5%	1%
2002-2003	81,768	7%	1%
2001-2002	76,622	15%	0%
2000-2001	66,536	-4%	2%
1999-2000	69,081	N/A	N/A

Source: Valley Metro/RPTA

Table 5-7 Paratransit Cost and Productivity (FY2005-2006)

	Glendale	Regional Average
Cost per boarding	$26.81	$29.90
Boardings per revenue hour	3.0	1.8
Cost per revenue mile	$6.11	$3.59
Hourly operating costs	$80.68	$52.38

Source: Valley Metro/RPTA

5.4 Transit Plan

Existing local and regional transit plans for the City of Glendale will result in an extensive arterial-based transit system in the area of Glendale than is currently developed. However, there is very little transit planned to support the growth areas within the City's planning boundary, particularly in the western-most portion of the City's planning area. In addition, because the regional transit network is focused on providing transit on major arterial streets, many potential riders remain farther than walking distance to the nearest transit route[3]. Finally, as the City grows denser and experiences more intense land development, and as traffic congestion grows on City streets and regional freeways, the need for higher-capacity forms of transit will develop. This combination of factors calls for a variety of additional projects, from expanded fixed-route arterial services with complementary paratransit systems, to additional neighborhood circulators, to high-capacity bus and rail services and supporting infrastructure.

3 *Walking distance to transit is generally accepted as a quarter mile, or roughly a ten-minute walk.*

These projects comprise the Transit Plan and are detailed in the sections that follow.

Note: The Phoenix metropolitan region is currently facing a sharp decline in sales tax revenues and, as a result, the Valley Metro system has undergone service cutbacks. This plan assumes transit service continues at the current levels for several years, followed by a period of rebuilding to 2008 levels. Plans for new or expanded services start in 2015.

Bus Transit Services

The City of Glendale's plans already call for the enhancement of service levels on the local fixed-route system to meet or exceed regional service goals. As the City grows westward, expansion of the arterial-based fixed-route bus network is a natural area of transit growth. Transit system expansion should support development to ensure mobility throughout the city. Service enhancements should be coordinated with adjacent cities.

Planned service is based on the following criteria:

1. Coordinating with neighboring cities and the regional network
2. Meeting or exceeding regional service levels
    a. Provide 30-minute frequency on weekdays
    b. Provide 15-minute peak-hour service on appropriate routes on weekends
    c. Provide 30-minute frequency on weekends
    d. Extend service hours and/or service area where appropriate
3. Expanding the network to support existing development and neighborhoods
4. Expanding transit services into future growth areas
5. Supporting all service with the appropriate level of capital and infrastructure
6. Providing innovative new services

Another enhancement of the fixed-route system is the introduction of limited-stop services, in which buses stop at mile (or greater) intervals rather than every few blocks. Many riders in the Valley travel long distances, and limited-stop services may be a way to reduced travel times. (The City of Phoenix has plans for limited stop services on Bell Road and Camelback Road in the near term.) Two candidates for limited-stop services are Route 67 (67th Avenue) and Route 59 (59th Avenue), which both enjoy high productivity and long trip lengths.

Neighborhood Circulators and Shuttles

The planned neighborhood circulators are based on providing services that link dense, low-income neighborhoods with services on arterial streets. Shuttles are planned based on the potential for public-private partnership and the ability to link multiple diverse land uses in a dense environment. The following neighborhood circulator/shuttle routes are planned although specific routings have not been identified.

- **67th Avenue Area:** Links low income and senior housing in Maryland and 63rd Avenue area with Wal-Mart, GUS I/II, Walgreens, and the MARY circulator in Phoenix
- **43rd Avenue Area:** Connects dense neighborhoods in Bethany Home Road/47th Avenue area with post office, GUS I/II, shopping, and additional services on Maryland Avenue
- **Westgate Shuttle:** Circulates within Westgate campus and to high capacity transit system
- **Entertainment District Shuttle:** Circulates throughout the Loop 101 Entertainment District; will connect to high capacity transit system

Paratransit

Planned service for dial-a-ride and ADA complementary paratransit services are based on meeting expansion of local services and meeting population growth.

Express Services

The City is geographically well-served with transit service, but growth on the express services in other parts of the Valley has been exponential. This plan recommends doubling the amount of express bus trips by 2025 with gradual increases to each express route over time.

Capital Infrastructure

All transit services should be supported with funding for bus stop amenities at the appropriate level for the expected ridership and transit user. (Bus stop pullouts, where needed for safety, heavy boarding, and/or layovers are included in streets.)

5.4.a Detailed Plan Elements

A summary of the transit plan elements, including RTP and *GO Program* improvements, are shown in Tables 5-8 through 5-11. An estimate of the cost for each element of the plan is included. These improvements are shown graphically by phase in Figures 5-2 through 5-5.

The transit plan builds on existing service to further develop mobility options for Glendale residents and visitors. The service options of the plan ensure that transit will be coordinated across city lines, that all transit services will operate on no less than 30-minute headways everyday, and that facilities are present to support transit services. Express bus services will be expanded to meet anticipated demand, and local circulators will serve neighborhoods and neighborhood destinations. High-capacity transit improvements are included in both the mid- and long-term plans.

5.4.b Summary of Plan Costs

The following sections show a breakdown in cost for the various components of the transit program, including existing and planned projects. Fixed- guideway cost information is included in the Appendix.

Table 5-8 Planned Service Improvements (2016-2020)

Planned Improvement	Year	Source	Additional Annual Cost (000's)
Service Enhancements			
Route 51 (51st Avenue) – Extend to Beardsley Road	FY2017	GO	$523
Route 59 (59th Avenue) – Supergrid	FY2020	RTP	$1,500
Route 60 (Bethany Home Road) – Service enhancements	FY2018	GO	$32
Route 67 (67th Avenue) – Service enhancements	FY2016	GO	$59
Route 67 (67th Avenue) – Service enhancements	FY2019	GO	$594
Route 90 (Olive Avenue/Dunlap Avenue) – Service enhancements	FY2017	GO	$21
Route 90 (Olive Avenue/Dunlap Avenue) – Service enhancements	FY2018	GO	$3
Route 138 (Thunderbird Road) – Service enhancements	FY2017	GO	$502
Route 138 (Thunderbird Road) – Supergrid[1]	FY2020	RTP	$0
Route 154 (Greenway Road) – Extend service from 51st to 67th Avenues	FY2017	GO	$330
Route 170 (Bell Road) – Service enhancements	FY2017	GO	$36
Route 170 (Bell Road) – Supergrid	FY2019	RTP	$20
Route 186 (Union Hills Drive) – Service enhancements	FY2016	GO	$5
New local bus service			
75th Avenue – implement service	FY2017	GO	$392
83rd Avenue – implement service	FY2020	New	$540
91st Avenue – implement service	FY2020	GO	$392
ADA and Dial-a-Ride Services			
Increases due to expansion of local service to west		New	$312
Capital Improvements			
Bus stops for 75th, 83rd, and 91st Avenue services		New	$394

[1] Funding switch only

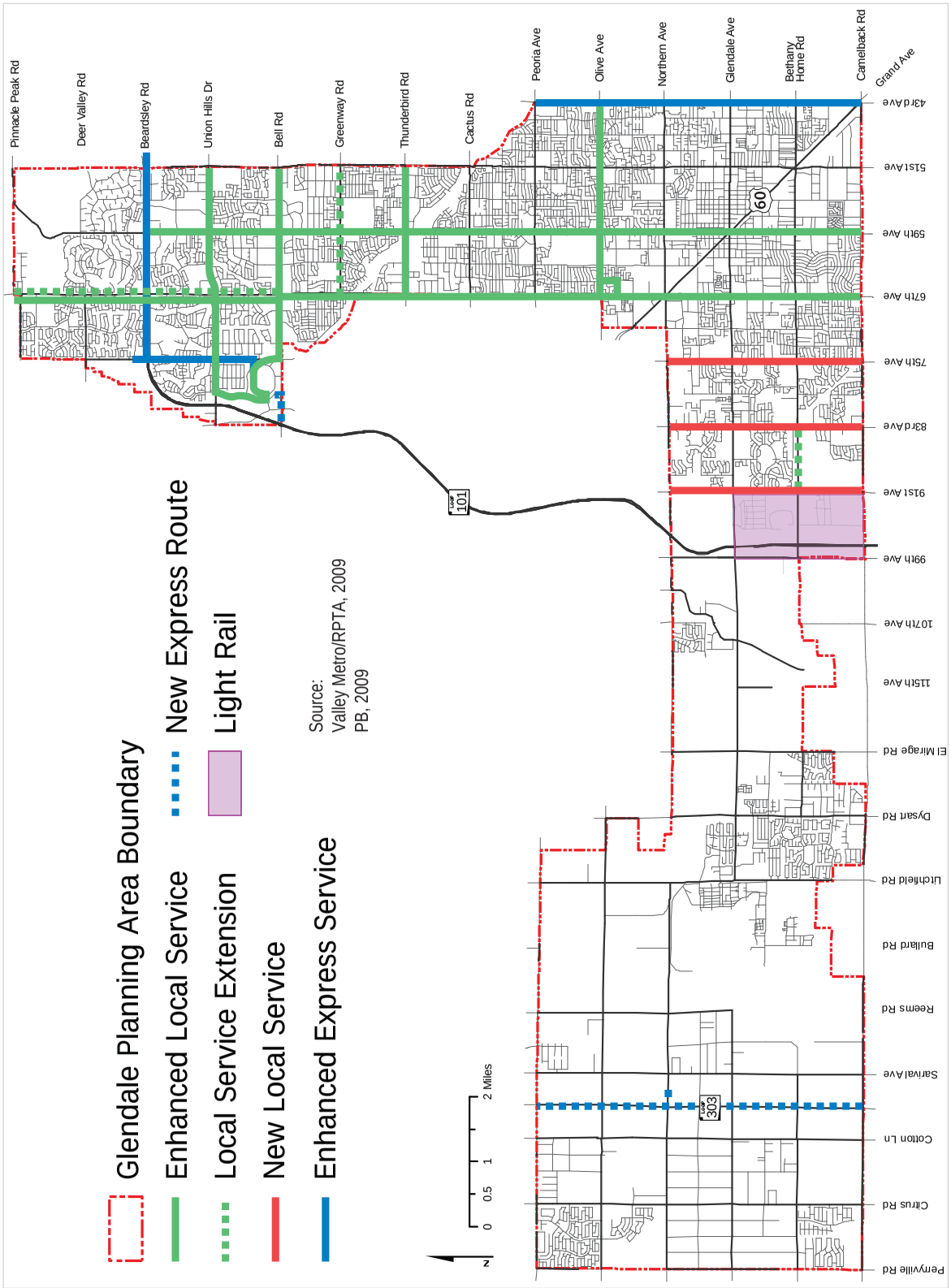


Figure 5-2 Planned Service Improvements 2016-2020

Table 5-9 Planned Service Improvements (2021-2025)

Planned Improvement	Year	Source	Additional Annual Cost (000's)
General Service Enhancements			
83rd Avenue – Supergrid	FY2023	RTP	$540
Route 90 (Dunlap Avenue/Olive Avenue) – Supergrid	FY2021	RTP	$200
Litchfield Road – Supergrid[1]	FY2024	RTP	$0
Provide 30-minute frequency on weekdays			
Route 122 (Cactus Road/39th Avenue)	FY2021	New	$137
Provide 15-minute peak-hour service			
Route 59 (59th Avenue)	FY2021	New	$332
Route 67 (67th Avenue)	FY2021	New	$235
Provide 30-minute frequency on weekends			
Route 51 (51st Avenue)	FY2022	New	$111
Route 67 (67th Avenue)	FY2021	New	$135
Route 122 (Cactus Road/39th Avenue)	FY2023	New	$44
Route 186 (Union Hills Drive)	FY2022	New	$58
Extend service hours			
Route 186 (Union Hills Drive)	FY2022	New	$107
Increase express bus trips			
Route 573 (North Glendale) – add two trips	FY2021	New	$71
Route 575 (Northwest Valley) – add two trips	FY2021	New	$73
New local bus service			
99th Avenue – Supergrid level of service	FY2021	RTP	$392
Litchfield Road – Advance implementation	FY2021	New	$585
New express bus service			
Loop 303 Express	FY2023	RTP	$97
New circulator services			
43rd Avenue/Grand Area	FY2021	New	$201
75th Avenue/Maryland Area	FY2021	New	$237
ADA and Dial-a-Ride Services			
Increase due to expansion of local service to west	FY2021	New	$197
Capital Improvements			
Bus Stop Amenities for 99th, Litchfield services, and Circulators		New	$290
Vehicles for new circulators		New	$150

[1] Funding switch only

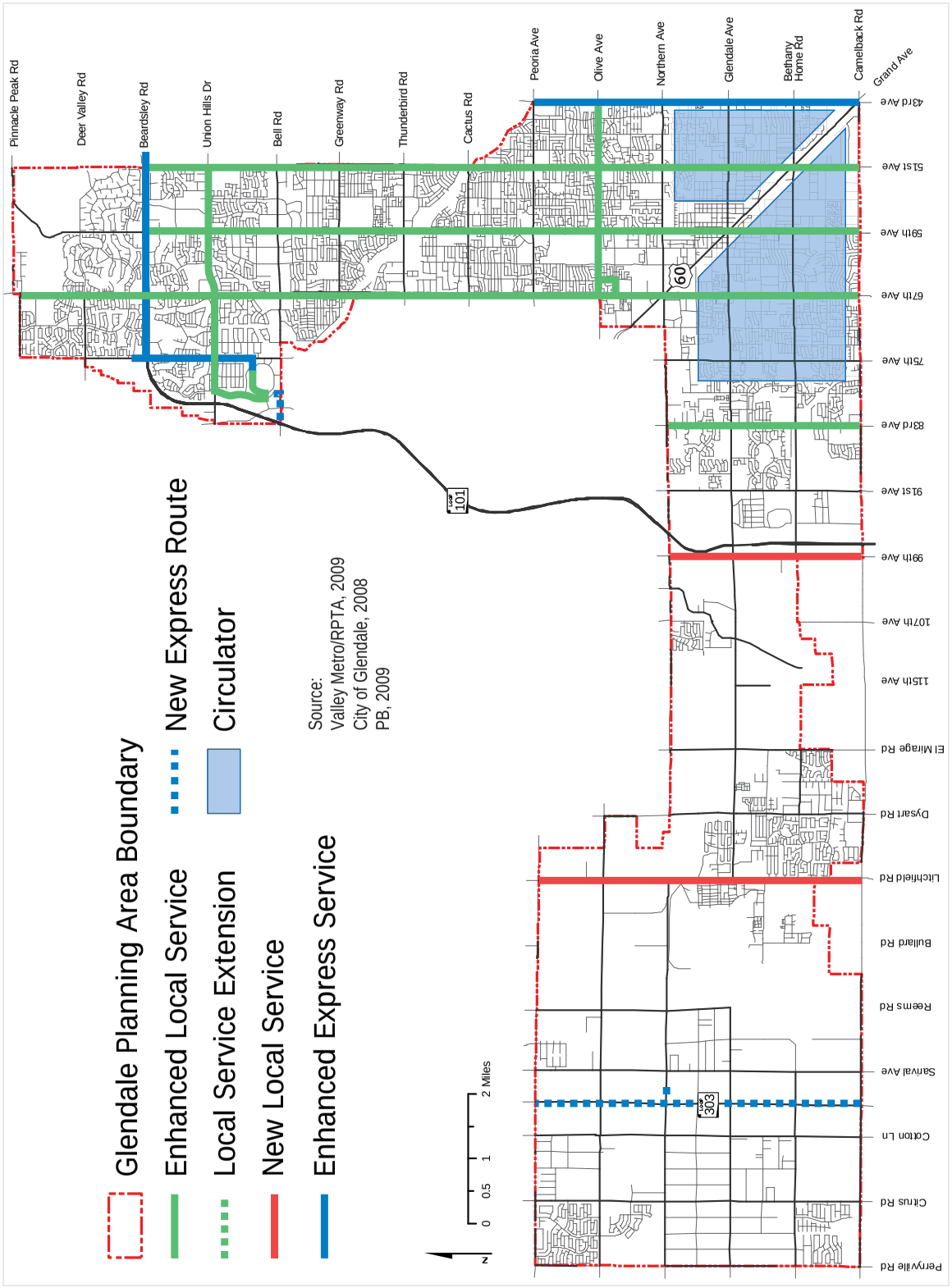


Figure 5-3 Planned Service Improvements 2021-2025

Table 5-10 Planned Service Improvements (2026 – 2030)

Planned Improvement	Year	Source	Additional Annual Cost (000's)
Provide 30-minute frequency on weekends			
Route 60 (Bethany Home Road)	FY2026	New	$69
Route 80 (Northern Avenue)	FY2026	New	$37
Extend service hours			
Route 60 (Bethany Home Road)	FY2026	New	$89
Increase express bus trips			
Route 573 (North Glendale) – add two trips	FY2026	New	$71
Route 575 (Northwest Valley) – add two trips	FY2026	New	$73
New local bus service			
Two north-south arterials (btw. 115th Avenue & Litchfield Road) in FY2025	FY2026	New	$1,400
All east-west arterials (btw. 115th Avenue & Litchfield Road) in FY2025	FY2026	New	$3,800
New express bus service			
Northern Express (NEW)	FY2026	New	$71
New circulator services			
Westgate Shuttle	FY2026	New	$292
ADA and Dial-a-Ride Services			
Increase due to expansion of local service to west	FY2026	New	$1,066
Capital Improvements			
Bus stops for Westgate		New	$27
Shuttle vehicles for Westgate		New	$150

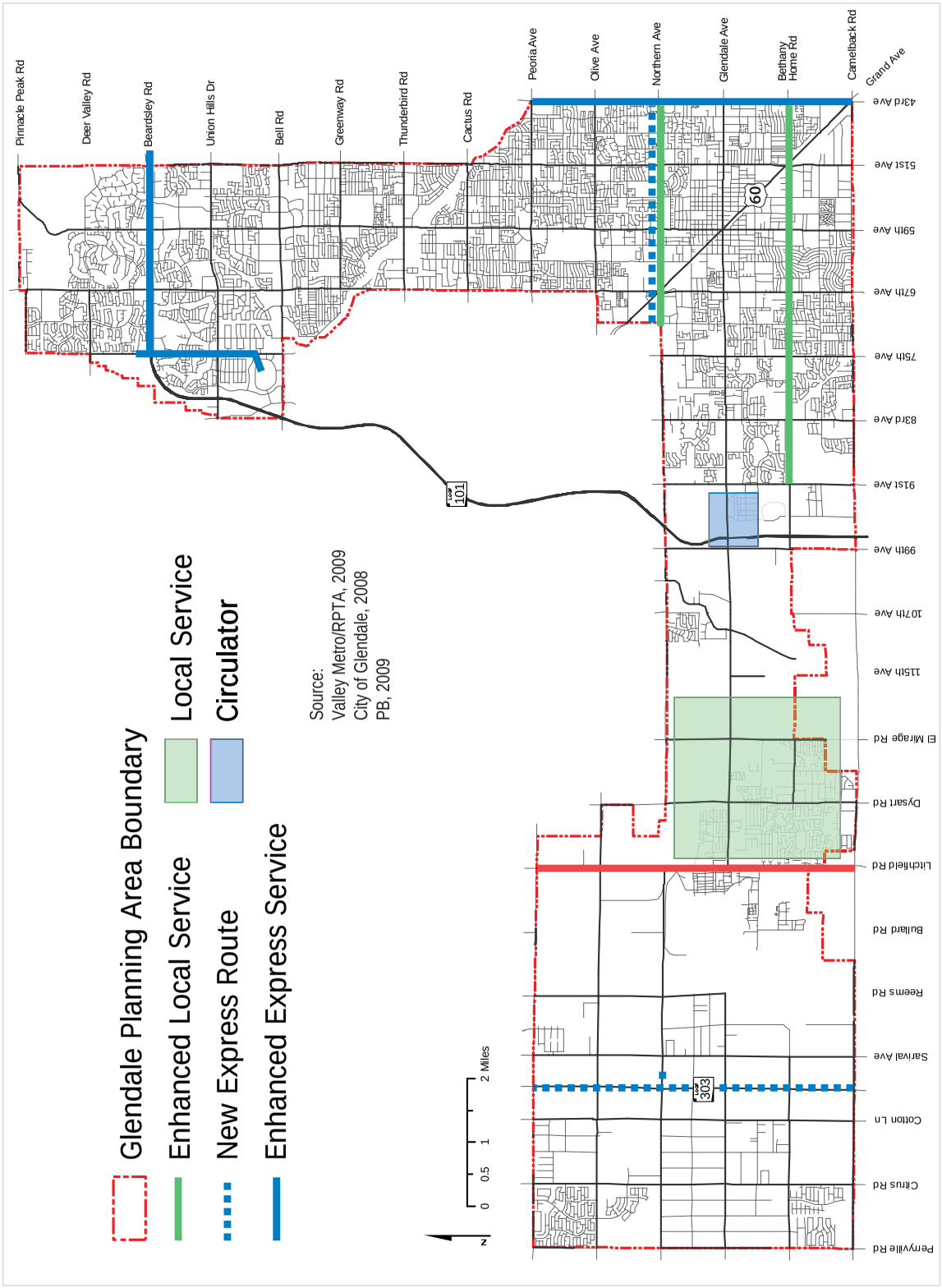


Figure 5-4 Planned Service Improvements2026-2030

Table 5-11 Planned Service Improvements (2031-2035)

Planned Improvement	Year	Source	Additional Annual Cost (000's)
Provide 15-minute peak-hour service			
83rd Avenue	FY2033	New	$64
New local bus service			
Service on two north-south arterials (btw. Litchfield Road & Perryville Road)	FY2032	New	$3,100
Service on three east-west arterials (btw. Litchfield Road & Perryville Road)	FY2032	New	$1,900
Increase express bus trips			
Route 573 (North Glendale) – add two trips	FY2031	New	$71
Route 575 (Northwest Valley) – add two trips	FY2032	New	$73
Loop 303 Express – add two trips	FY2031	New	$136
New limited-stop service			
Route 59L (59th Avenue Limited)	FY2033	New	$221
Route 67L (67th Avenue Limited)	FY2032	New	$157
New circulator services			
Entertainment District Shuttle in FY2031	FY2032	New	$292
ADA and Dial-a-Ride Services			
Increase due to expansion of local service to west	FY2032	New	$884
Capital Improvements			
Bus stops for new fixed-route services	FY2031	New	$1,400
Bus stops for Entertainment District shuttle	FY2031	New	$27
Vehicles for Entertainment District shuttle	FY2031	New	$150

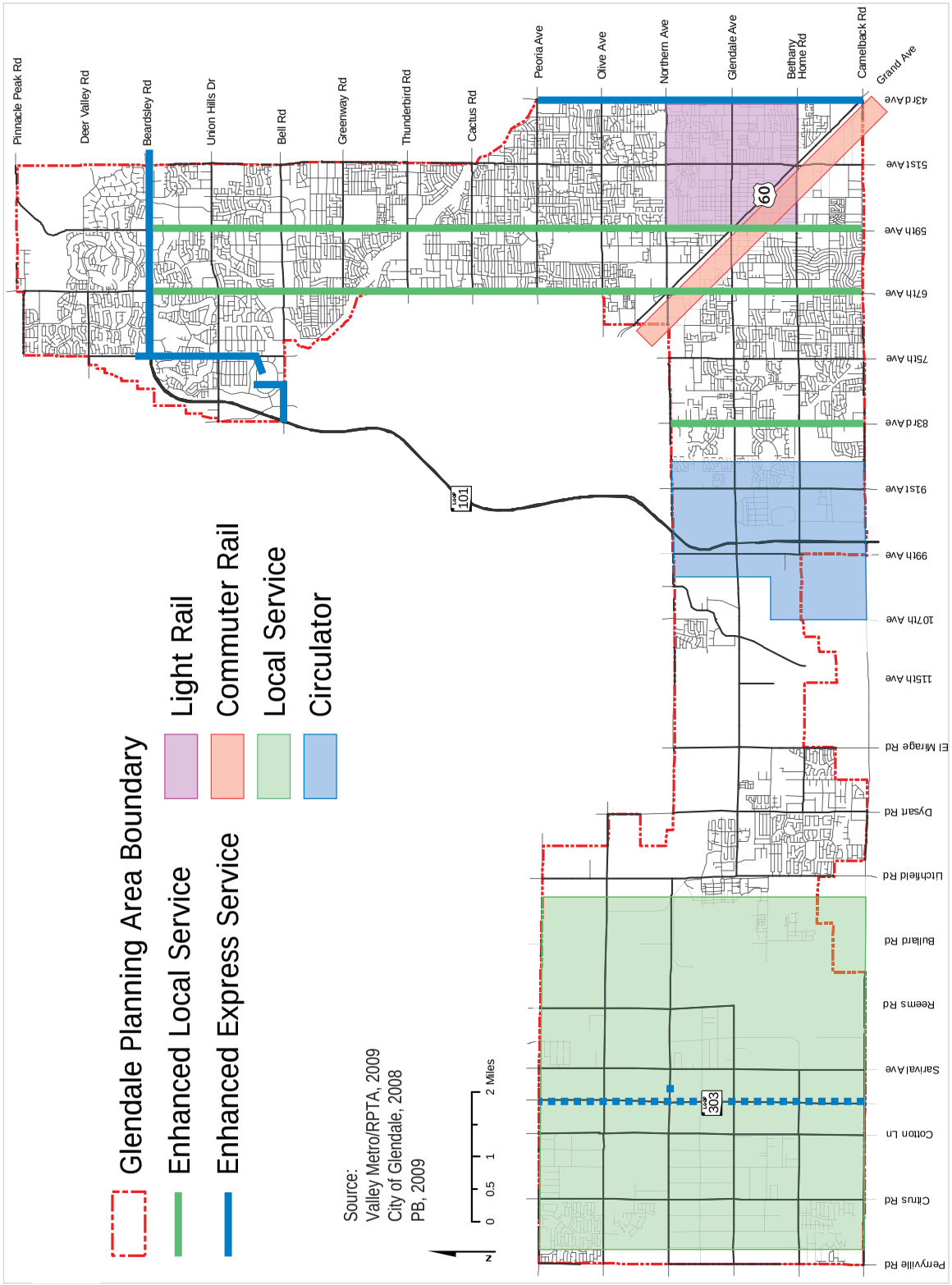


Figure 5-5 Planned Service Improvements 2031-2035

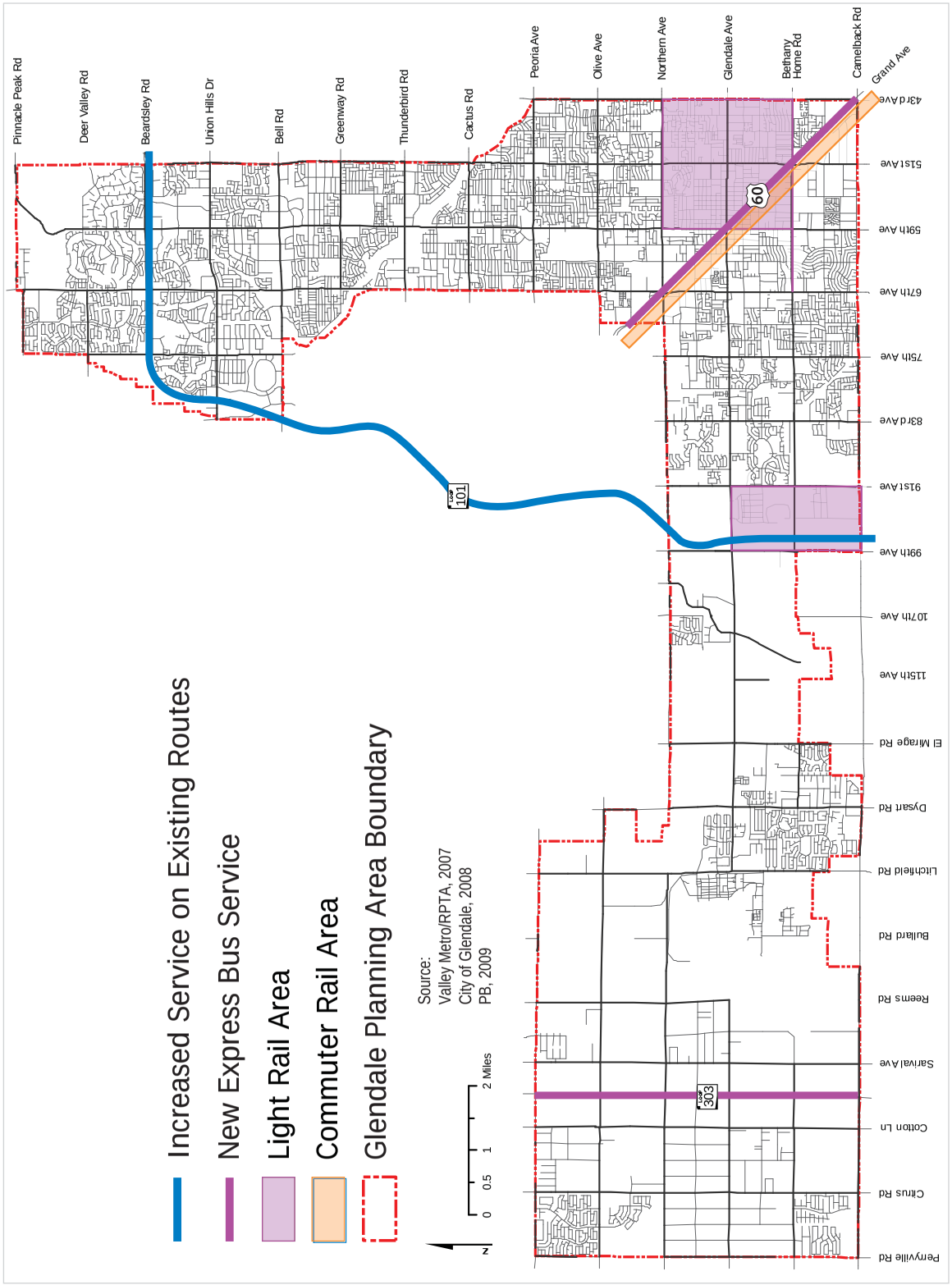


Figure 5-6 Transit Plan—Regional Service

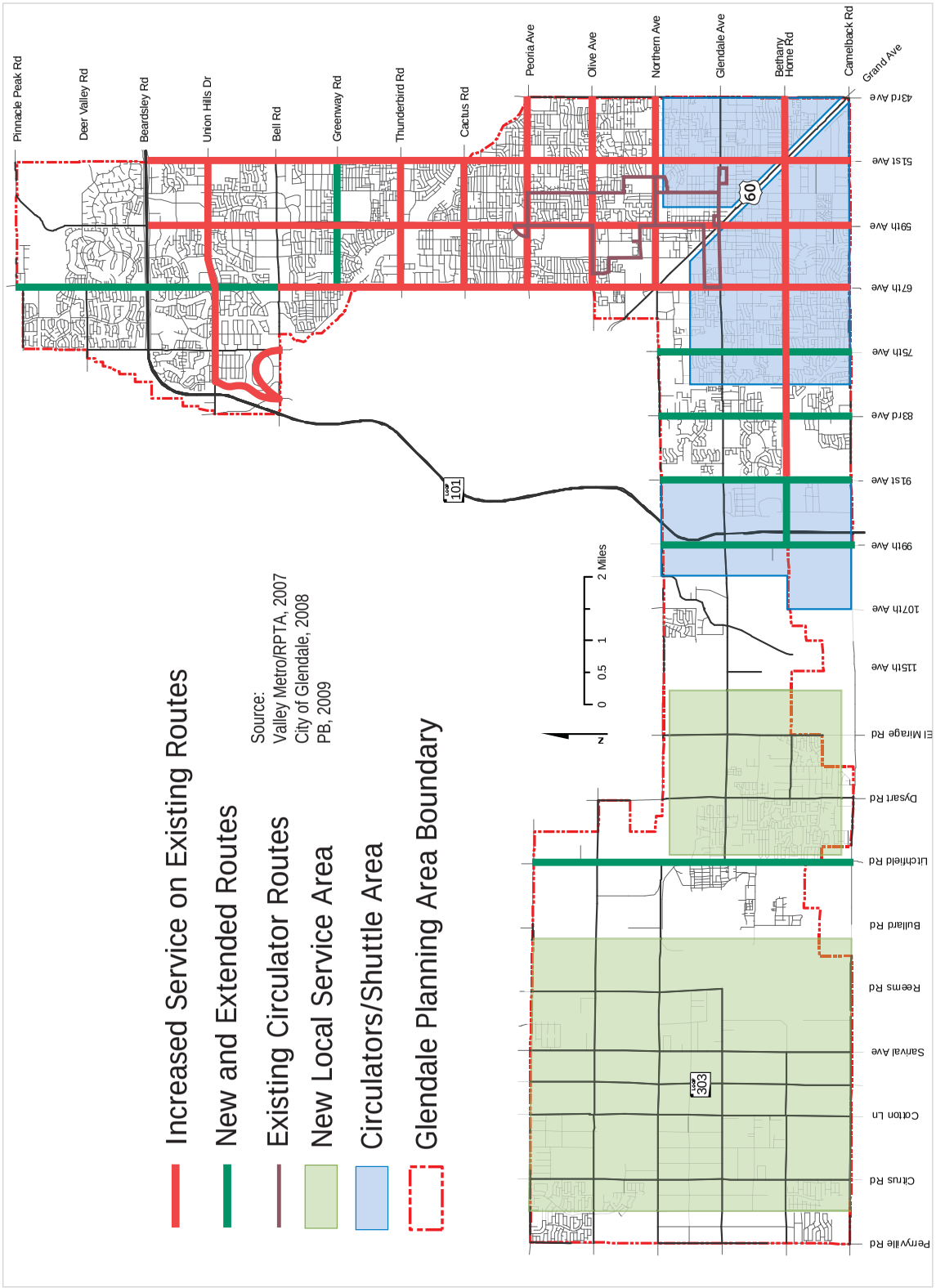


Figure 5-7 Transit Plan—Local Service

Fixed-Route Bus Transit Cost

A summary of the cost for existing and planned service on fixed-route services (including arterial, express, and circulator) is shown in Table 5-12.

Capital costs include vehicle replacements and bus stop amenities.

Table 5-12 Bus Transit Service—Estimated Costs (in millions of 2009 $)

	FY2011-15	FY2016-20	FY2021-25	FY2026-30	FY2031-35
Capital	$0.0	$3.0	$3.0	$3.8	$4.1
O&M	$52.8	$68.6	$96.5	$109.3	$134.7

Paratransit Cost

Paratransit service cost is summarized in Table 5-13. Cost includes ADA/Dial-a-Ride and ADA/Dial-a-Ride connections; capital costs are included in the fixed-route costs above.

Table 5-13 Paratransit Service—Estimated Costs (in millions of 2009 $)

	FY2011-15	FY2016-20	FY2021-25	FY2026-30	FY2031-35
Capital	$0.0	$0.0	$0.0	$0.0	$0.0
O&M	$14.7	$15.5	$18.7	$24.1	$29.5

Park-and-Ride and Transit Center Cost

Costs for park-and-ride and transit center facilities are shown in Table 5-14.

Table 5-14 Park-and-Ride and Transit Centers—Estimated Costs (in millions of 2009 $)

	FY2011-15	FY2016-20	FY2021-25	FY2026-30	FY2031-35
Capital	$9.2	$0.0	$6.2	$0.0	$0.0
O&M	$.6	$.7	$.8	$1.0	$1.0

Fixed-Guideway Capital Costs

This section estimates costs for the planned fixed-guideway corridors.

Loop 101, I-10 to Glendale Avenue

Costs for the Loop 101 fixed-guideway project are based on a route extending eight miles total, running north-south along Loop 101 between Glendale Avenue and I-10 an then east-west along I-10 to 79th Avenue. Two miles of this line are in the City of glendale; the remaining six miles are outside of Glendale. The proposed concept includes six stations, two park-and-rides, one freeway crossing, and eight grade separations at streets.

Costs for the portion of the Loop 101 route within Glendale are estimated as follows:

Total Capital Costs - Glendale's share is $284 million.

- Phasing for implementation is as follows
  - **FY 2016 - 2020:** $68.6 million
  - **FY 2021 - 2025:** $214.7 million

Operating Costs

- New annual operating costs is $2.4 million starting in FY 2020

Glendale Avenue - 19th to 59th Avenues

Costs for the Glendale Avenue fixed guideway project assume a total of five miles of guideway, with two miles in the City of Glendale and three miles in the City of Phoenix. this concept includes five stations, one park-and-ride, and one freeway crossing.

Costs for the portion of the Glendale Avenue route within Glendale are estimated as follows:

Total Capital Costs - Glendale's share is $282 million.

- Phasing for implementation is as follows
  - **FY 2026 - 2030:** $114.56 million
  - **FY 2031 - 2035:** $167.4 million

Operating Costs

- New annual operating costs is $2.4 million starting in FY 2035

Commuter Rail Cost

The MAG High Capacity Transit Study (HCTS) completed in May 2003 is the primary source of data for commuter rail cost. Both the MAG Northwest Transportation Study (September 2003) and the current MAG Commuter Rail Strategic Plan utilize the technical data and costs in the MAG High Capacity Transit Study.

In this MAG study, costs are estimated for the entire Grand Avenue/BNSF commuter rail corridor from downtown Phoenix to Loop 303 – a total of 26.18 miles. The section of the BNSF railroad within Glendale accounts for five miles of the entire commuter rail corridor.

Total Costs for Commuter Rail in Glendale

- Total Commuter Rail Capital Cost within Glendale
  - $140.9 million
- Commuter Rail Operating Cost
  - **Phase I:** $936,000 annually
  - **Phase III:** $4,249,427 annually
- Lease of Track Rights
  - **New Capital Cost:** $33.24 million
  - **New Annual Operating Cost:** $930,0000 annually

This page intentionally left blank

6.0 ALTERNATIVE MODES

6.1 Introduction

This chapter of the Transportation Plan includes bicycle, pedestrian, and transportation demand-management. The purpose of the Alternative Mode chapter is to provide meaningful alternatives to the automobile. This chapter examines existing conditions and community networks, considers future demand for alternative modes of transportation, discusses policy level solutions for alternative transportation modes, and prioritizes recommendations for implementation resulting in a plan for alternative modes.

Alternative modes of transportation, such as bicycling, walking, and transportation demand-management can reduce congestion on roadways while increasing the livability of a city or community. The City of Glendale, like most cities in the Valley, will face many of the transportation and mobility challenges that result from a growing population. This growth, in conjunction with congestion and air quality concerns, make commitment and investment in non-motorized modes of transport critical to meeting the City's transportation and mobility needs.

Within the City of Glendale, a bicycle network exists primarily on the collector street system in the eastern portion of the City, connecting some activity centers within the City but with limited connectivity to the regional system. Pedestrian facilities within the City were generally implemented in conjunction with development. Safety, connectivity and circulation remain an ongoing concern. The City also engages in transportation demand-management and an extensive travel education program.

Both bicycling and walking are forms of transportation that can help reduce roadway congestion, improve the environment and personal health, enhance quality of life, and increase the economic vitality of communities. In a growing number of communities, bicycling and walking are considered as indicators of a community's livability; a factor that has a significant impact on attracting businesses and workers, as well as tourism. Communities that are bicycle and pedestrian-friendly also create a more equitable society by providing transportation choices for all citizens. These places have a common feature; they place a high priority on planning and policy-making that favor alternative transportation modes. Goals and objectives which allow for bicycle and pedestrian supportive policy measures were presented in Chapter 3. These goals and objectives helped formulate the improvements presented in this plan.

Safety is an important element for the development of a bicycle- and pedestrian-friendly city. It is important to understand the factors which cause crashes and the potential countermeasures to prevent them. For example, it is intuitive that high pedestrian and bicycle activity would create greater exposure and could lead to more crashes. However, research in Portland, Oregon shows that an increase in ridership actually decreases the *rate* of crashes due to the increased exposure of bicyclists. Crash types and safety issues specific to Glendale were assessed to create customized bicycle and pedestrian recommendations.

6.2 Existing Conditions

6.2.a Bicycle Network

The City of Glendale currently utilizes an extensive on-street bicycle and off-street pathway system. This section outlines the existing bicycle network and key system data. Detailed crash statistics are included in the Appendix. This information is used in the analysis of needed system improvements.

Bicycle Network

The current bicycle network within the City of Glendale consists of both on- and off-street bicycle facilities, as well as below grade crossings. The City has also programmed funding for future facilities to expand the network. The existing bicycle network is shown in Figure 6-1. The on-street bike network offers bicyclists the greatest degree of connectivity to destinations and at optimal speeds. These facilities include bicycle lanes, signed bicycle routes (no striped bicycle lane), and paved off-street multiuse paths.

Programmed Bicycle Improvements

The City must meet short-term needs while pursuing long-term goals as part of its strategy to meet its performance measures. Short-term needs include bicycle or pedestrian improvements identified and funded by the Regional Transportation Improvement Program are shown in Table 6-1.

Bicycle System User

Arizona Revised Statutes §28-101, defines a bicycle as, "…a device, including a racing wheelchair, that is propelled by human power and on which a person may ride and that has either: (a) two tandem wheels, either of which is more than sixteen inches in diameter, or (b) three wheels in contact with the ground, any of which is more than sixteen inches in diameter."

The needs of a bicyclist vary based on the rider's age, interest, and skill level. Planning for bicycle facilities needs to account for those various attributes, as all riders seek specific destinations when initiating a trip. Bicyclists are classified by the American Association

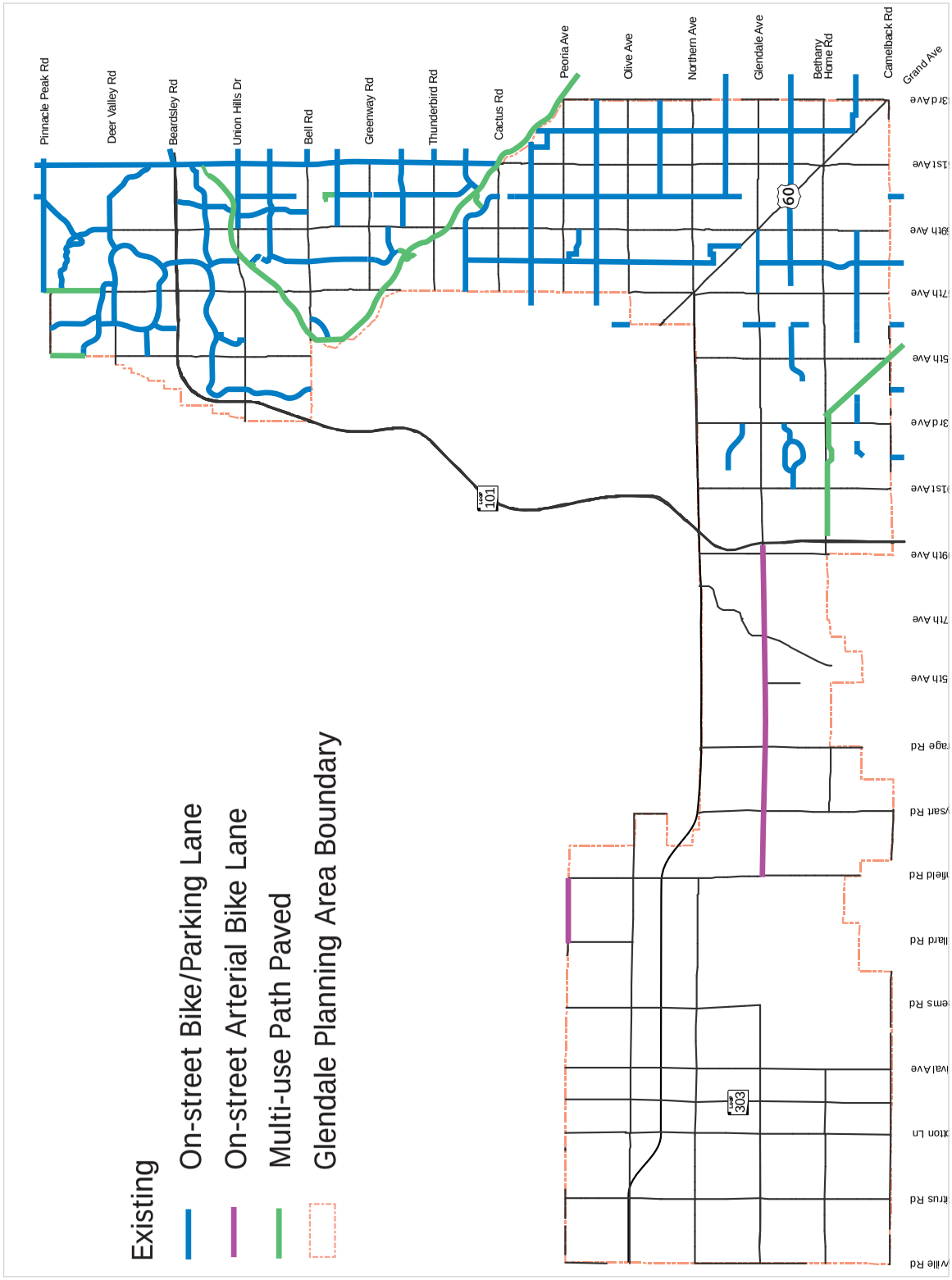


Figure 6-1 Existing Bikeways

Table 6-1 Multimodal Improvements—MAG Transportation Improvement Program

	Location	Type	Fiscal Year	Federal Source
GLN06-201	Bell Road at Skunk Creek (between 67th Avenue and 75th Avenue)	Multiuse	2010	CMAQ
GLN08-604	63rd Avenue at Loop 101 (Agua Fria Freeway)	Multiuse	2010	CMAQ
GLN09-609	Skunk Creek at Union Hills Drive	Multiuse	2010	CMAQ
GLN11-702	New River (East Bank): Northern Avenue to Bethany Home Road	Multiuse	2011	CMAQ
GLN08-606ADX	Glendale Sports Facilities	ITS	2010	CMAQ
GLN11-703	Various Glendale Sports Facilities	ITS	2011	CMAQ
GLN09-610	Downtown alley north of Glendale Avenue between 57th Avenue and 57th Drive	Pedestrian	2010	CMAQ
GLN11-704	Maryland Avenue, 67th to 69th Avenues and 79th to 83rd Avenues	Bicycle	2011	STP-TEA
GLN08-802	Grand Canal in West Glendale, Loop 101 to New River	Multiuse	2010	STP-TEA

of State Highway and Transportation Officials (AASHTO) *Guide for the Development of Bicycle Facilities* into three separate categories:

- **Group A**: Advanced or Experienced Bicyclists
- **Group B**: Basic or Less Confident Bicyclists
- **Group C**: Child Bicyclists

Group A riders are defined as riders who are generally using their bicycles as they would a motor vehicle. They are riding for convenience and speed and want direct access to destinations with minimum detours or delays. They are typically comfortable riding with motor vehicle traffic, however, they need sufficient operating space on the traveled way or shoulder to eliminate the need for either themselves or a passing motor vehicle to shift position.

Group B riders are defined as riders who use their bicycles for transportation purposes (e.g., to get to the store or to visit friends), but prefer to avoid roads with fast and busy motor vehicle traffic unless there is ample roadway width to allow easy overtaking by faster motor vehicles. Thus, basic riders are comfortable riding on neighborhood streets and shared use paths and prefer designated facilities such as bike lanes or wide shoulder lanes on busier streets.

Group C riders are defined as children who are riding on their own or with their parents, may not travel as fast as their adult counterparts, but still require access to key destinations in their community such as schools, convenience stores, and recreational

facilities. Residential streets with low motor vehicle speeds linked with shared use paths and busier streets with well-defined pavement markings between bicycles and motor vehicles can accommodate children without encouraging them to ride in the travel lane of major arterials.

Bicyclists have the legal right to operate on all roadways open to public travel, with the possible exception of fully controlled-access highways. Bicyclists may not use fully controlled-access highways in Arizona when specifically excluded by regulation and where posted signs give notice of a prohibition.

Bicyclists of all types utilize the bicycle facilities within the City of Glendale. The bicycle usage by all residents in Glendale is shown in Table 6-2. This shows the breakdown of bicycle trips by purpose, and shows a comparison with the regional average. In Glendale, the total number of bicycle trips is consistent with the usage for the region, although residents tend to use bicycles as a mode of transportation for shopping more than the regional average and less to travel to work and for trips not originating at home.

Table 6-2 Bicycle Usage

Bicycle Usage	Glendale % Total Trips	Region % Total Trips
Total Bicycle Trips	7.2%	7.4%
Home-based Work Bicycle Trips	0.9%	1.9%
Home-based Shopping Bicycle Trips	4.6%	3.7%
Home-based Other Bicycle Trips	10.9%	10.6%
Non-Home-based Bicycle Trips	5.7%	6.8%

Source: Maricopa Regional Household Travel Survey, 2001

6.2.b Pedestrian Network

The current pedestrian system within the City of Glendale consists primarily of on-street attached sidewalks. The City's adopted street design standards require that all new street construction include sidewalks, and a 7-foot buffer between sidewalk and curb. All new construction of sidewalks meets ADA requirements. Currently, some connectivity issues exist between neighborhoods and arterial pedestrian networks. Primary destinations for pedestrians include schools, grocery facilities and transit stops. Pedestrian crossings at intersections along arterial streets may pose a significant pedestrian safety hazard as they are wide crossings.

Programmed Pedestrian Improvements

The City is currently undergoing a Pedestrian Enhancement Program which focuses on pedestrian improvements. Current and recently completed projects include:

- Myrtle Avenue from 59th to 62nd Avenues: New sidewalks and pedestrian lighting.
- Downtown Core Area from 59th to 57th Avenues; from Myrtle Avenue to Lamar Road: Various electrical improvements for landscape and pedestrian lighting. In addition, landscape improvements and brick pavers have been placed to enhance sidewalk and crosswalk areas. There will also be aesthetic improvements such as planter pots, benches, newsstands, and trash receptacles.
- 51st Avenue from Grand Avenue to Camelback Road.
- Glendale Avenue Improvements between 43rd and 67th Avenues: Adding landscape improvements such as trees, bushes, and brick paved crosswalks.
- Grand Avenue Improvements between 43rd and 67th Avenues: This includes continuous sidewalk on the east side, new landscaped buffer between roadway and sidewalk, and landscape improvements and decorative concrete on various median islands.

There is also the emerging entertainment district along the Loop 101 Corridor which has a need for significant pedestrian facilities. This includes both connectivity to neighboring communities and other transportation facilities such as transit and multiuse pathways, as well as circulation within the district to encourage pedestrian activity. This would consist of additional pedestrian facilities, such as pedestrian bridges, signage and lighting.

Pedestrian System User

Arizona Revised Statutes §28-101, defines a pedestrian as, "….any person afoot. A person who uses an electric personal assistive mobility device or a manual or motorized wheelchair is considered a pedestrian unless the manual wheelchair qualifies as a bicycle." Pedestrians also include roller skaters, in-line skaters and skateboarders.

The needs of pedestrians vary based upon age, physical mobility, or purpose for travel. Everyone is a user of the pedestrian system at some point in a trip. Targeted user groups include children, seniors, and parents with strollers, or users of electric personal mobility devices and wheelchairs.

The choice to walk is based on locational and environmental factors. The locational factors are related to intersection geometry types, road attributes such as signs, signals and crosswalk markings, ADA compliance, and land uses. The environmental and other factors are related to climate, time of day, and day of week. Normally, inclement weather, darkness with no streetlights, and a.m. peak hours increase the probability of severe crashes. In terms of crossing behaviors, people tend not to use crosswalks if they find that the nearest crosswalk is too far away, they are running out of time, or they find the roadway clear to walk across safely.

6.2.c Transportation Demand-Management

Transportation demand-management includes programs that encourage changes in behavior to reduce travel, especially by automobiles, during peak periods of the day. Less travel reduces congestion, lowers transportation costs, and improves air quality.

In Maricopa County, all major employers are required to undertake travel reduction programs. This plan includes programs by the City to reduce the amount of travel by employees as well as programs to encourage Glendale residents and employees to reduce travel. These programs are currently being implemented as part of the Travel Green Program.

City Employee Programs: Encourage Glendale employees to reduce peak hour automobile travel. These programs include:

- **Smart Card Program:** Upon request, city employees are provided a Smart Card which provides subsidized transit.
- **Bike Program:** The City of Glendale provides free bikes to employees who agree to ride the bike once a week to work. The bikes are available from the Police Department recovery unit.
- **Carpool to Work:** City of Glendale employees are encouraged to carpool to work. As part of the program, carpoolers receive preferential parking.
- **Vanpool Subsidy Program:** The region has a vanpool program. The City covers 100% of the van's rental fee attributable to Glendale employees.
- **Staggered Work Hours:** The City of Glendale has staggered work hours for employees to spread out peak hour demand. This includes compressed work weeks such as 4-10 and 9-80.
- **Guaranteed Ride Home:** Glendale guarantees a safe ride home in case of emergencies.
- **Work at Home:** Work at home options allow City of Glendale employees to work at home. In some cases, this includes computer equipment, connections, and software.
- **Promotional Programs:** The City undertakes a variety of promotional activities to encourage employees to reduce travel. These include a newsletter and drawings for prizes.

Community Programs: The City engages in a variety of promotional and educational programs to encourage employees and residents throughout the City to reduce travel demand. These programs include:

- **Bus Buddies Program:** Bus Buddies is a Glendale program that teaches senior citizens how to use public transit. City staff visit senior centers and walk through the steps of how to use the bus and then provide field trips where the senior citizens actually apply what they have learned.

- **Safe Routes to School Program:** Glendale supports programs in school that encourage children to safely walk and bike to school.
- **Transportation Management Area:** Glendale staff participates with other major employers in periodic meetings of designated travel reduction coordinators.
- **Clean and Green:** This is a paper published twice a year that promotes "green themes" to the public, including travel reduction. Production is a shared responsibility with Sanitation, Water Conservation, SRP, and Transportation.
- **Promotional Programs:** The City of Glendale supports various promotional programs to encourage residents to reduce travel. The largest of these is the annual Family Bicycle Ride which typically attracts 800 bike riders.

6.2.d Traffic Safety Education

Education about safety, opportunities, and laws about bicycling are ways of gaining community involvement in bicycling. Both the cycling and non-cycling community need to be educated about the rules of the road.

The Traffic Education Program is specifically designed to support, create, plan, organize, implement and manage special events to increase traffic safety awareness and preparedness for Glendale residents. Traffic safety programs are designed to support a wide spectrum of age levels and backgrounds for the citizens within Glendale. Within the safety programs, a key component is to train, motivate, develop and supervise volunteers within the community, civic groups, school personnel, administrators, and agencies outside the City of Glendale to foster and maintain the integrity of the programs. Glendale's Traffic Education Program coordinates with internal and external agencies to support a variety of safety efforts.

Safe Routes to School is one such program that enables and encourages children, including those with disabilities, to walk and bicycle to school; to make bicycling and walking to school a safer and more appealing transportation alternative. These choices encourage a healthy and active lifestyle from an early age and facilitate the planning, development, and implementation of projects and activities that will improve safety. Reductions in traffic, fuel consumption, and air pollution in the vicinity of schools are the primary focal points of the Safe Routes to School program.

Currently, over 90% of the City of Glendale's K-8 schools have a Safe Routes to School map on file with the City Transportation Department. Each map displays preferred routes for walking and bicycle travel within the school districts' established boundaries.

6.3 Policy and Measures in the Plan

The next step in the process is to address gaps in the system, mitigate pedestrian and bicycle safety issues through physical improvements and education recommendations, and develop future circulation plans for growing areas. Future recommendations will also include how to incorporate demand-management and telecommuting into the City's future development.

6.3.a Bicycle

The Transportation Plan updates the bicycle network to be continuous throughout the city, providing connectivity both within the city and to the region. The plan also includes recommendations for training and safety programs being integrated into the development of the community to facilitate multimodal transportation options.

This section addresses the policy and design approach to improve bicycling facilities and proposes both on- and off-street improvements to the bicycle network. Detailed bicycle supportive goals and objectives were outlined in Chapter 3.

6.3.a.1 Design Concepts

Specific policies can be implemented by the City to support the goals and objectives outlined in Chapter 3. These consist of new philosophies and approaches to bicycle related facilities, as well as detailed design of bicycle facilities.

Bicycle facilities should conform to the *1999 AASHTO Guide for the Development of Bicycle Facilities* whenever possible, which is consistent with Arizona's *Statewide Bicycle and Pedestrian Plan (2003).* The ADOT *Statewide Bicycle and Pedestrian Plan* offers suggestions for improving the safety and efficiency of on-street bike routes including:

- Special route name, directional, and distance signing
- "Share the Road" signs along roadways where additional guidance is needed for motorists to share the road with bicycles, including locations where the bikeway narrows to substandard conditions. This approach is not encouraged, pavement markings are preferable where right-of-way is available.
- Wide curb lanes on collector roadways (14 feet to 16 feet wide)
- Routine pavement maintenance schedules
- Traffic signals timed for bicyclists and signalized crossings specifically for bicyclists and/or pedestrians, where high use warrants increased safety and accessibility across major roadways

Following are the recommended policies for the enhancement of the bicycle networks in the city:

1. Bicycle lanes should be included on all new roadway facilities classified as collectors.

2. For existing roadways, three approaches to improving Glendale's bicycle system are proposed: signage, restriping, or reconstruction. As they involve various capital cost and infrastructure development, the practicality of each varies throughout the City. The details of each approach are listed below.

   - **Signage:** Shared roadways are defined as "a roadway which is not officially designated and marked as a bicycle route, but which is open to both bicycle and motor vehicle travel. This may be an existing roadway, street with wide curb lanes, or a road with paved shoulders." (AASHTO, 1998) While all bicyclists are technically allowed on these roadways, some considerations could be taken before designating roadways as signed bike routes. The following criteria from the AASHTO Guide (1999) could be incorporated as applicable:
     - The route provides through and direct travel in bicycle-demand corridors.
     - The route connects discontinuous segments of shared use paths, bike lanes and/or other bike routes.
     - An effort has been made to adjust traffic control devices (e.g., stop signs, signals) to give greater priority to bicyclists on the route, as opposed to alternative streets. This could include placement of bicycle-sensitive detectors where bicyclists are expected to stop.
     - Street parking has been removed or restricted in areas of critical width to provide improved safety.
     - A smooth surface has been provided (e.g., adjust utility covers to grade, install bicycle-safe drainage grates, fill potholes, etc.).
     - Maintenance of the route will be sufficient to prevent accumulation of debris (e.g., regular street sweeping).
     - Wider curb lanes are provided instead of splitting curb lane into a vehicle and a bike lane.
     - Shoulder or curb lane widths generally meet or exceed width requirements included under Shared Roadways.

Additionally, all signage for bikeways and routes should conform to the signing standards in the Manual on Uniform Traffic Control Devices (MUTCD).

- **Restriping:** Restriping is often the most practical method in cases where bike facilities have to be accommodated in the existing curb-to-curb roadway width. Not all roadways are well suited for restriping; candidates would first need to be identified. A minimum 14 feet of usable outside lane width (measured from the longitudinal joint of the gutter pan) is needed for a shared lane roadway and a minimum four feet of usable lane width for a designated bike lane (also measure from guter pan joint). To avoid a reduction in vehicle level of service, motor vehicle travel speeds and volumes need to be considered.

- **Reconstruction:** Widening roadways specifically to add bicycle facilities is the most costly of the three methods. Securing the additional width required to add bicycle facilities would be considered feasible if bundled with other roadway improvements.

The use of sidewalks as bicycle facilities is not encouraged. Aside from the conflict that can arise between pedestrians and cyclists, cyclists are not in the direct vision of turning motorists, especially when they are riding counter to traffic flow. A bicycle network which consists of bicycle boulevards will encourage Group B and C ridership, allowing alternate facilities to the sidewalks. If no safe and comfortable facilities exist for Group B and C riders, they will continue to operate on the sidewalk system.

Other design considerations include the use of sidewalks and placement of drainage grates. Drainage grates can also create a hazard for bicyclists when placed in a bicycle lane. Curb inlet drain design is preferred. Where there are drainage grates located in bicycle lanes, existing grates should be replaced with bicycle-safe grates.

Off-Street System

Following are the general recommendations for improvements to the off-street system:

Lighting

Multiuse path lighting helps users avoid conflicts along paths and at intersections and allows users to better observe path direction, surface conditions and obstacles. Lighting also increases the sense of security along a multiuse path. Necessary lighting varies by the levels of use as well as by safety and security needs. Standards vary from no lighting on outlying surface multiuse paths to full coverage lighting in high usage areas.

Along fringe multiuse paths, lighting is recommended at multiuse pathheads, destination areas and multiuse path intersections. In the more heavily used urban areas, point-to-point lighting is recommended. In residential areas, the use of low rise or low light level lighting should be evaluated to avoid intrusion into the neighborhood.

Fencing

Multiuse paths should generally be designed and routed in a manner that eliminates the need for fences because the extensive use of fences can create ongoing maintenance obligations and visually constrain the multiuse path experience by walling in path users. Fences and walls may also limit access to multiuse paths and should be linked to nearby streets where possible.

Where they are necessary, fences should be of the minimum height to achieve their purpose (e.g., screening). Dark colored fences tend to be less visible than light ones. Fences should be set back from multiuse path edges to maintain horizontal clear zones.

Fences may be needed to provide privacy for landowners adjacent to a multiuse path or to discourage multiuse path users from entering a hazardous or sensitive area.

Crossings

Multiuse path crossings of roadways need to meet design standards to ensure safe crossings for users. The requirements for crossings vary depending on the classification and volume of traffic on the crossroad.

- Crosswalk striping
- Advance signing along arterial: requires a sign on the roadway indicating the crossing, as well as two advanced warning signs preceding the crossing.
- Use signal actuation as necessary at high roadway volume crossings where safety concerns are present. This is a pedestrian/bicyclist activated push button that will activate flashing yellow lights indicating motorists need to yield to pedestrians in the crosswalk.
- Street lighting along the arterial needs to be provided at the multiuse path crossing.

Signage

Multiuse path signage can serve many purposes, such as:

- Direction
- Multiuse path trailhead (multiuse path access points and parking lots)
- Information ("You are here")
- Guideposts (points of interest, distances, emergency response info)
- Regulatory (stop, yield, slow, dismount, dogs must be on leash)
- Interpretive/educational
- Signage should be of a uniform design to convey information effectively

6.3.a.2 Bicycle Friendly Amenities

In addition to the design of the physical bicycle infrastructure, other facilities and amenities, such as bicycle parking, changing facilities with showers, and storage lockers, can help make bicycling a desirable choice for travel. Lighting helps increase the cyclist's feeling of safety and security in using an end-of-trip facility. Developers should be encouraged to provide end-of-trip facilities.

1. Bicycle parking should be provided for all new developments and expansions of existing developments. It should be provided in a manner that does not block pedestrian walkways. The size of each bicycle parking space is specified as at least two feet wide by six feet long with an access aisle of five feet and a vertical clearance of at least six feet. Many commonly marketed bicycle parking racks have spaces narrower than two feet; these racks are not suitable.
2. Bicycle parking requirements can be fulfilled by lockers, racks or equivalent structures in or upon which the bicycle may be locked by the user. All racks must be securely anchored to the ground or building surface. Racks must be designed

to accommodate U-shaped locks. These high security locks are increasingly popular due to high bicycle theft levels and the rising price of new bicycles. U-shaped locks are designed to allow the user to lock one or both wheels (if the front wheel is removed) and the bicycle frame to a stationary object.

3. Bicycle parking needs to be located in a clearly designated, safe and convenient location, near a customer or employee building entrance. A safe location also ensures adequate separation of parked bicycles from motor vehicles. If related facilities are large buildings and/or in dense areas with heavy pedestrian traffic, indoor bike racks/parking/closets may be desirable to provide more secure storage.

6.3.a.3 Bicycle Safety Improvements

Certain countermeasures can be utilized to provide a safe and convenient environment for bicyclists. The countermeasures applicable to Glendale were chosen to address the major violations documented in the Appendix.

The majority of automobile motorists or automobile/bicycle crashes took place when drivers were going straight (33%), making turns (41%), or exiting alleys or driveways (11%), and cyclists were going straight (61%) or crossing roads (19%). As detailed in the Appendix, specific locations in Glendale with a high frequency of bicycle accidents are at the following locations:

- 63rd Avenue and Peoria Avenue
- 67th Avenue and Bethany Home Road
- 67th Avenue and Ocotillo Road
- 59th Avenue and Olive Avenue
- 43rd Avenue and Peoria Avenue

Further study should be conducted to determine if any countermeasures are applicable.

6.3.b Pedestrian

The decision for people to walk is dependent upon several factors. For some individuals, it is a choice. For others, it is their only form of mobility. It is important to remember that everyone is a pedestrian at one point during every transportation trip. When designing for pedestrian access, it is important to recognize the differing population segments and the needs of those populations.

Pedestrian decision factors, as outlined by the *AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities* (2004), include the distance of the trip, perceived safety of the route, and the comfort and convenience of walking versus an alternative mode. However, when planning for pedestrians, it is especially critical to address the needs of the population who either have no access to cars or cannot safely operate motor vehicles. The elements presented in this section help to realize the pedestrian supported policies presented in Chapter 3.

6.3.b.1 Design Approach

Properly designed sidewalks that comply with ADA requirements accommodate and provide a level of safety for all users and, most importantly, connect a pedestrian's trip origin to a specific destination within the sidewalk network. Helpful design elements in creating a positive pedestrian network are:

- Provide access for all people to activities throughout the community.
- Provide pedestrian access to work, shopping, schools, and other activity centers.
- Ensure that all pedestrian facilities meet the requirements of the ADA.
- Enhance the safety of pedestrians who travel on major arterials and minor collectors.

Lighting

Proper lighting of pedestrian pathways can create impressions of safety and comfort as well as increase the visibility of users. In urbanized areas, lighting is important in areas of high pedestrian traffic, such as schools, community centers, and places of worship. In areas dedicated to pedestrian access, such as downtown or shopping districts, lighting should be provided at the pedestrian scale to further increase the comfort and interest of users.

Intersection Designs

Intersections are critical to any roadway, and should be designed for not just the motorist but also for the safety and ease of use for the pedestrian. Some attributes of good design as outlined in the *AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities* (2004) include:

- **Clarity:** It should be obvious to motorists that there will be pedestrians present; it should be obvious to pedestrians where best to cross.
- **Predictability:** The placement of crosswalks should be predictable. Additionally, the frequency of crossings should increase where pedestrian volumes are greater as well as in areas where there is high potential for pedestrians, such as near key destinations and areas of high transit ridership.
- **Visibility:** The location and illumination of the crosswalk allows pedestrians to see and be seen by approaching traffic while crossing.
- **Short Wait:** The pedestrian should not have to wait unreasonably long for an opportunity to cross.
- **Adequate Crossing Time:** The time available for crossing accommodates users of all abilities.
- **Limited Exposure:** Conflict points with traffic are few, and the distance to cross is short or is divided into shorter segments with crossing islands.
- **Clear Crossing:** The crosswalk is free of barriers, obstacles, and hazards and is accessible to all users. Pedestrian crossing information is available in accessible formats.

Sidewalk Design

Sidewalks provide a safe environment for pedestrians along roadways and, when provided along with crossings, generally increase walking in the area. Sidewalk width should be a minimum of five feet to enable wheelchairs to clear and pass one another, and be wider on major streets to encourage comfortable pedestrian movement. The City street design standards requires seven- foot setbacks between sidewalk and curb. In areas of greater pedestrian traffic such as transit drop-off locations and business districts, higher widths are desirable. Creating a buffer between the sidewalk and roadway can enhance the safety of the pedestrian. Landscaping, bike lanes, and on-street parking all act as buffers.

Ambience, Shade, and Other Enhancements

Unlike motorists and cyclists, a comfortable and interesting environment is critical to the pedestrian. In Arizona, shade and cooling elements make a difference during the summer months. Elements of shade, such as trees and awnings, as well as cooling elements such as water features not only enhance the physical comfort of the user but also make the physical environment more inviting and welcoming.

6.3.b.2 Pedestrian Safety Improvements

The majority of pedestrian crashes took place when drivers were going straight (50%) and making turns (29%). Pedestrians were crossing the road (56%) when crashes occurred. Areas in Glendale with greater than three pedestrian accidents or where a pedestrian crash involved a fatality are illustrated in the Appendix. These areas are at or near the following locations:

- 59th Avenue and Olive Avenue
- 59th Avenue and Bethany Home Road
- 67th Avenue and Glendale Avenue
- 67th Avenue and Montebello Avenue
- 67th Avenue and Rose Lane

As detailed in the Appendix, countermeasures are recommended in areas with a high number of pedestrian crashes.

6.3.c Transportation Demand-Management

Transportation demand-management encourages alternatives to the single occupancy vehicle through alternative modes of transportation and reductions in travel miles. The goal is to better utilize existing resources rather than construct new infrastructure to meet the demands of growth. In addition to promoting alternative modes of travel such as transit, bicycling, and walking, travel demand-management encourages reduced vehicular miles on existing roadways through ridesharing, van pooling, alternative work schedules, and telecommuting. Four general travel demand strategies are:

- **Promote Alternatives to Single Occupancy Vehicle:** These include both motorized and non-motorized modes of mobility, such as transit, ridesharing, bicycling, and walking.
- **Promote Changes in Travel Behavior:** These include promotion of reduction in work related travel to reduce peak hour demand. This is typically offered by employers who offer telecommuting and alternative and compressed work schedules.
- **Create Incentives:** Offer incentives to promote use of alternative modes. Incentives can be monetary or non-monetary. Prizes, drawings, preferred parking, guaranteed ride homes, lockers, and showers reward individuals or make it more feasible to choose alternative modes. Car sharing is a shared form of auto-ownership where individuals pay on a prescription or per-use basis. This has been shown to reduce car ownership and increase individual mode share to transit, bicycling, and walking.
- **Promote Efficient Land Use Designs:** Land use designs which are interesting, safe, and convenient promote pedestrian, bicycling, and transit usage. Mixed-use designs that have good connectivity can replace short automobile trips with pedestrian and bicycling modes. Some design principles include comfortable transit stops, pedestrian friendly parking lots, buildings which are oriented toward the street and do not have long set-backs, 'cut-through' paths for bicyclists and pedestrians within subdivisions, and bicycle racks and storage.

6.3.d Traffic Safety Education

To reach the broadest audience, programs about cycling safety should be administered through various agencies, such as police departments, schools, libraries, cycling clubs, and parks and recreation departments.

6.4 Alternative Modes Plan

The alternative mode plan for the City of Glendale included a connected bicycle network, increase in bicycle and pedestrian safety, and an increase in transportation education and demand-management programs. The focus of detailed improvements is in the eastern area of this City, with planned complete streets to be developed in the emerging western area of the City.

6.4.a Bicycle System Plan

The bicycle network in Glendale is designed to provide a system of on- and off-street bikeways that allow people to choose an alternative way to make short or local travel trips. This choice allows for children making trips to school, adults commuting to work via bikeways and public transit, and people choosing to ride a bike to local destinations for socializing, retail shopping, medical centers, and other daily trip purposes.

On-Street Bikeways

The City of Glendale has planned improvements for many of the collector streets east of 99th Avenue. Planned improvements in the Arrowhead area concentrate primarily on providing better connectivity in the existing bikeway system. Planned improvements in the downtown area are mainly on the collector streets and focus on completing the collector network. The downtown area is composed of neighborhoods with higher rates of bicycling and walking. The additional projects recommended for the downtown area include:

1. Establishing connectivity to better serve bicyclists.
2. Amenities such as additional shading, rest areas, and refuge areas in bicycle facility improvements to facilitate year round use of the bicycle facilities.
3. Policies and design guidelines in this area to reflect greater emphasis on the Complete Street concept for collector streets. Complete Streets is a concept described as:

   "Complete streets are designed and operated to enable safe access for all users. Complete streets policies direct transportation planners and engineers to consistently design with all users in mind. They have been adopted by a few states and a number of regions and cities. Places that adopt complete streets policies are making sure that their streets and roads work for drivers, transit riders, pedestrians, and bicyclists, as well as for older people, children, and people with disabilities." (www.completestreets.org)

   Designing roadways that are inclusive of all users will reduce retrofitting costs, encourage bicycling, and increase safety for non-motorists. The suggested bicycle facility improvements include bike lanes, shared roadway, bicycle boulevards, and multiuse paths.

Off-Street Bikeways

The off-street bicycle network is comprised of paved shared-use paths and unpaved multiuse paths. Bicycles share these facilities with other recreational users such as pedestrians, roller-bladers, and joggers as well as providing an alternative for casual bicycle riders, families, children, and the elderly. Paths should be well lit and safe for the user. Roadway crossings at, above, or below grade should be made available when possible. The focus of the bicycle multiuse paths system should be to connect activity centers such as retail stores, grocery stores, schools, parks and churches with special emphasis on where high concentrations of people live, shop and recreate.

Specific areas for improvements to the off-street system include:

- New River bicycle path
- Agua Fria River bicycle path

- Skunk Creek Multiuse path
- Thunderbird Paseo
- Grand Canal Multiuse path

System Plan

Bicycle network continuity within the City and connectivity to adjacent cities is an important outcome of this Transportation Plan, as detailed in Objective 12.1. There are additional gaps in the network that are not addressed in the planned network. Gaps in the current system create a discontinuous network and inhibit long distance travel within the City and region. Addressing these gaps would increase connectivity to adjacent cities or connectivity within the City. The existing bicycle network, with recommended improvements, is outlined in Table 6-3 and shown in Figure 6-2.

The average cost per mile used to estimate total cost is $234,332 for a new on-street bike lane and $18,742 to sign a street as a bike route. The bicycle facilities west of Loop 101 will be built as part of the roadway improvements as they are included in the City's adopted collector street cross-sections.

Bicycle facilities need to be maintained and operated so that bicyclists can use them safely and comfortably. Table 6-3 includes assigned operation and maintenance cost. Maintenance costs are $1,800 per mile, which includes periodic restriping and sign maintenance costs.

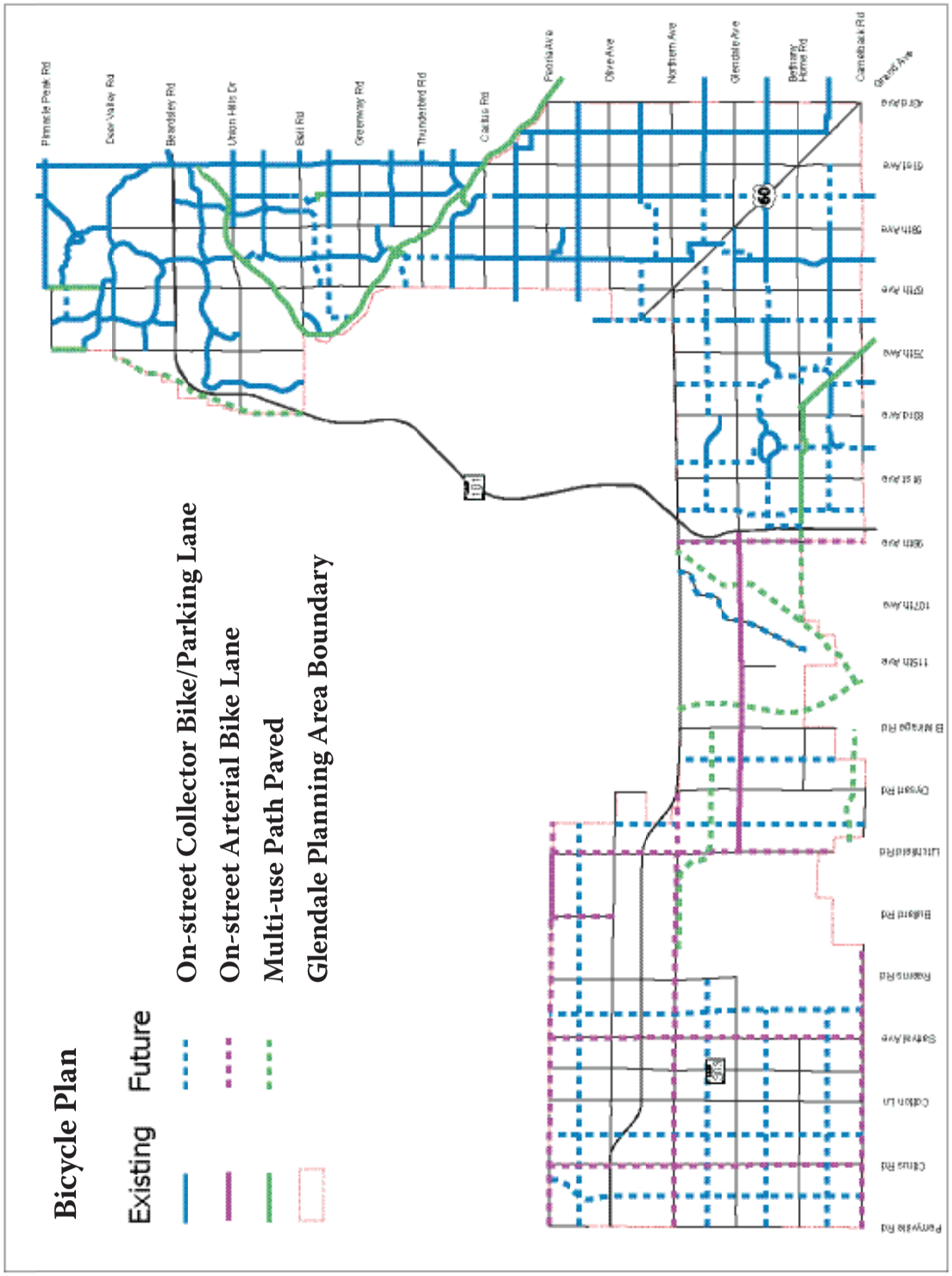


Figure 6-2 Bicycle Plan

Table 6-3 Planned Bicycle Improvements ($ in millions) (continued)

Capital		Fiscal Year						Total Cost
Project	Description	FY2010	FY11-15	FY16-20	FY21-25	FY26-30	FY31-35	
Between 57th Avenue & 57th Drive north of Glendale	Downtown Alley	0.37	0.00	0.00	0.00	0.00	0.00	0.37
250' north of Glendale Avenue between 58th Avenue and 57th Drive	Downtown Alley	0.17	0.00	0.00	0.00	0.00	0.00	0.17
Maryland Avenue Spot Improvements Between 67th and 83rd Avenues	Spot Improvements	0.02	0.20	0.00	0.00	0.00	0.00	0.22
Grand Canal - 91st Avenue to New River - Multi-use Pathway	Multi-use Pathway	0.88	0.00	0.00	0.00	0.00	0.00	0.88
New River - Missouri to Northern - Multi-use Pathway	Multi-use Pathway	2.77	2.57	0.00	0.00	0.00	0.00	5.34
Skunk Creek at Union Hills Road: Multi-use path Under Union Hills Road	Multi-use path Under Union Hills Road	0.23	0.00	0.00	0.00	0.00	0.00	0.23
Skunk Creek at Bell Road: Multi-use path Under Bell Road	Multi-use path Under Bell Road	0.42	0.00	0.00	0.00	0.00	0.00	0.42
63rd Avenue - Sweetwater Avenue connection to Thunderbird Park	Widen Street, Stripe bike/ parking lane	0.00	0.00	0.18	0.00	0.00	0.00	0.18
Redfield Road - 67th Ave and 63rd Ave	Stripe and sign as a bike route	0.00	0.00	0.00	0.01	0.00	0.00	0.01
Paradise Lane bike route – 60th Drive to 67th Avenue	Stripe and sign as a bike route	0.00	0.00	0.02	0.00	0.00	0.00	0.02
Paradise Lane bike route – 69th Avenue to 71st Avenue	Stripe and sign as a bike route	0.00	0.00	0.005	0.00	0.00	0.00	0.005
Paradise Lane Widening – 59th Avenue to 60th Drive	Widen street for at least 20′ curb lane. Stripe bike/park lane.	0.00	0.00	0.00	0.00	0.24	0.00	0.24
Paradise Lane Widening – 67th Avenue to 69th Avenue	Stripe and sign as a bike route	0.00	0.00	0.00	0.00	0.18	0.00	0.18
71st Ave bike route – Paradise Lane to Greenway Road	Stripe and sign as a bike route	0.00	0.00	0.006	0.00	0.00	0.00	0.006
71st Avenue – Camelback Road to Missouri Avenue	Stripe and sign as a bike route	0.00	0.00	0.009	0.00	0.00	0.00	0.009
71st Avenue – Missouri Avenue to Montebello Avenue	Stripe and sign as a bike route	0.00	0.00	0.004	0.00	0.00	0.00	0.004
71st Avenue – Maryland Avenue to Ocotillo Road	Stripe and sign as a bike route	0.00	0.00	0.005	0.00	0.00	0.00	0.005
71st Avenue connection to Thunderbird Paseo	Provide safe bike and ped access to the Thunderbird Paseo from 71st Avenue	0.00	0.00	0.00	0.00	0.08	0.00	0.08
71st Avenue – Myrtle Avenue to Northern Avenue	Stripe and sign as a bike route	0.00	0.00	0.00	0.009	0.00	0.00	0.009

Table 6-3 Planned Bicycle Improvements ($ in millions) (continued)

Capital		Fiscal Year						Total Cost
Project	Description	FY2010	FY11-15	FY16-20	FY21-25	FY26-30	FY31-35	
71st Avenue - Montebello Avenue to Clearmont St	Stripe and sign as a bike route	0.00	0.00	0.00	0.00	0.01	0.00	0.01
71st Avenue - Northern Avenue to Olive Avenue	Stripe and sign as a bike route	0.00	0.00	0.009	0.00	0.00	0.00	0.009
Kings Avenue – 59th Avenue to 67th Avenue	Stripe and sign as a bike route	0.00	0.00	0.02	0.00	0.00	0.00	0.02
Talavi Blvd. – 59th Avenue to 57th Avenue	Stripe and sign as a bike route	0.00	0.00	0.005	0.00	0.00	0.00	0.005
Talavi Blvd. – 56th Avenue to Bell Road	Stripe and sign as a bike route	0.00	0.00	0.003	0.00	0.00	0.00	0.003
Butler Drive – 55th to 61st Avenue	Stripe and sign as a bike route	0.00	0.00	0.02	0.00	0.00	0.00	0.02
Butler Drive - 61st Ave to 71st Ave	Stripe and sign as a bike route	0.00	0.00	0.02	0.00	0.00	0.00	0.02
Orangewood Avenue – 55th to 61st Avenue	Stripe and sign as a bike route	0.00	0.00	0.01	0.00	0.00	0.00	0.01
Orangewood Avenue – Grand Avenue to 83rd Avenue	Stripe and sign as a bike route	0.00	0.00	0.19	0.00	0.00	0.00	0.19
Orangewood Avenue - 89th Avenue to 95th Avenue	Stripe and sign as a bike route	0.00	0.00	0.18	0.00	0.00	0.00	0.18
Maryland Avenue – 69th Avenue to 72nd Drive alignment	Stripe and sign as a bike route	0.00	0.00	0.01	0.00	0.00	0.00	0.01
Maryland Avenue – 79th Lane to 83rd Avenue	Stripe and sign as a bike route	0.00	0.00	0.01	0.00	0.00	0.00	0.01
Maryland Avenue – 250 feet east of 75th Avenue	Widen street for at least 20' curb lane. Stripe bike/park lane. Install bike route signs.	0.00	0.00	0.00	0.00	0.07	0.00	0.07
Maryland Avenue – 91st Avenue to 95th Ave		0.00	0.00	0.02	0.00	0.00	0.00	0.02
Maryland Avenue – 72nd Avenue to 74th Avenue	Build multi-use path to connect Maryland to 75th Avenue	0.00	0.00	0.00	0.00	0.66	0.00	0.66
Missouri Avenue – 51st Avenue to 59th Avenue	Stripe and sign as a bike route	0.00	0.00	0.02	0.00	0.00	0.00	0.02
Missouri Avenue – 75th Avenue to 77th Lane	Stripe and sign as a bike route	0.00	0.00	0.007	0.00	0.00	0.00	0.007
Missouri Avenue – 79th Avenue to 80th Avenue	Stripe and sign as a bike route	0.00	0.00	0.00	0.03	0.00	0.00	0.03
Missouri Avenue – 83rd Avenue to 85th Avenue	Stripe and sign as a bike route	0.00	0.00	0.00	0.06	0.00	0.00	0.06

Table 6-3 Planned Bicycle Improvements ($ in millions) (continued)

Capital		Fiscal Year						Total Cost
Project	Description	FY2010	FY11-15	FY16-20	FY21-25	FY26-30	FY31-35	
Missouri Avenue – 87th Avenue to 95th Avenue	Stripe and sign as a bike route	0.00	0.00	0.00	0.23	0.00	0.00	0.23
Missouri Avenue – 73rd Avenue to 75th Avenue	Widen street for at least 20′ curb lane. Stripe bike/park lane. Install bike route signs.	0.00	0.00	0.00	0.00	0.00	1.32	1.32
55th Avenue – Camelback Road to Missouri Avenue	Stripe and sign as a bike route	0.00	0.00	0.009	0.00	0.00	0.00	0.009
55th Avenue – Missouri Avenue to Maryland Avenue	Stripe and sign as a bike route	0.00	0.00	0.02	0.00	0.00	0.00	0.02
55th Avenue – Glendale Avenue to Myrtle Avenue	Stripe and sign as a bike route	0.00	0.00	0.002	0.00	0.00	0.00	0.002
55th Avenue Widening – Glendale Avenue to Maryland Avenue	Stripe and sign as a bike route	0.00	0.00	0.00	0.00	0.02	0.00	0.02
55th Avenue Widening – Cactus Road to Poinsettia Drive	Widen street for at least 20′ curb lane. Stripe bike/park lane. Install bike route signs.	0.00	0.00	0.00	0.00	0.31	0.00	0.31
61st Avenue – Myrtle Avenue to Palmaire Avenue	Stripe and sign as a bike route	0.00	0.00	0.001	0.00	0.00	0.00	0.001
Palmaire Avenue – 61st Avenue to 62nd Avenue	Stripe and sign as a bike route	0.00	0.00	0.005	0.00	0.00	0.00	0.005
62nd Avenue – Palmaire Avenue to Ocotillo Road	Stripe and sign as a bike route	0.00	0.00	0.008	0.00	0.00	0.00	0.008
Ocotillo Road – 62nd Avenue to 63rd Avenue	Stripe and sign as a bike route	0.00	0.00	0.002	0.00	0.00	0.00	0.002
76th Drive – Missouri Avenue to San Miguel Avenue	Stripe and sign as a bike route	0.00	0.00	0.004	0.00	0.00	0.00	0.004
San Miguel Avenue – 76th Drive to 77th Avenue	Stripe and sign as a bike route	0.00	0.00	0.001	0.00	0.00	0.00	0.001
77th Avenue – San Miguel Avenue to Bethany Home Road	Stripe and sign as a bike route	0.00	0.00	0.005	0.00	0.00	0.00	0.005
79th Avenue – Claremont Street to Peppertree	Stripe and sign as a bike route	0.00	0.00	0.01	0.00	0.00	0.00	0.01
79th Avenue – Bethany Home Road to Claremont Street	Stripe and sign as a bike route	0.00	0.00	0.00	0.05	0.00	0.00	0.05
79th Avenue – Peppertree Lane to Northern Avenue	Stripe and sign as a bike route	0.00	0.00	0.00	0.26	0.00	0.00	0.26
79th Avenue - Camelback Rd to Missouri Avenue	Stripe and sign as a bike route	0.00	0.00	0.00	0.009	0.00	0.00	0.009

Table 6-3 Planned Bicycle Improvements ($ in millions) (continued)

Capital		Fiscal Year						Total Cost
Project	Description	FY2010	FY11-15	FY16-20	FY21-25	FY26-30	FY31-35	
87th Avenue – Camelback Road to Grand Canal pathway	Stripe and sign as a bike route	0.00	0.00	0.02	0.00	0.00	0.00	0.02
87th Avenue – Grand Canal pathway to Maryland Avenue	Stripe and sign as a bike route	0.00	0.00	0.006	0.000	0.00	0.00	0.006
87th Avenue – McLellan Road to Ocotillo Road	Stripe and sign as a bike route	0.00	0.00	0.000	0.002	0.00	0.00	0.002
Ocotillo Road – 87th Avenue to 89th Avenue	Stripe and sign as a bike route	0.00	0.00	0.000	0.004	0.00	0.00	0.004
89th Avenue - Ocotillo Road to Northern Avenue	Stripe and sign as a bike route	0.00	0.00	0.00	0.02	0.00	0.00	0.02
95th Avenue – Bethany Home Road to Glendale Avenue	Stripe and sign as a bike route	0.00	0.00	0.02	0.00	0.00	0.00	0.02
95th Avenue – Camelback Road to Bethany Home Road	Stripe and sign as a bike route	0.00	0.00	0.00	0.23	0.00	0.00	0.23
95th Avenue – Glendale Avenue to Northern Avenue	Stripe and sign as a bike route	0.00	0.00	0.00	0.22	0.00	0.00	0.22
Pinnacle Peak Rd - 67th Ave to 75th Ave	Stripe and sign as a bike route	0.00	0.00	0.02	0.00	0.00	0.00	0.02
Deer Valley Rd - 71st Ave to 75th Ave	Stripe and sign as a bike route	0.00	0.00	0.01	0.00	0.00	0.00	0.01
Glen Harbor Blvd. – Glendale Avenue to Northern Avenue	Stripe and sign as a bike route	0.00	0.00	0.03	0.00	0.00	0.00	0.03
Glen Harbor Blvd. – Glendale Avenue to Bethany Home Rd	Stripe and sign as a bike route	0.00	0.00	0.01	0.00	0.00	0.00	0.01
Patrick Lane Bike Route - 67th Avenue to 71st Avenue	Install bike route signs, re-stripe 67th Avenue approach for thru bike lane	0.00	0.00	0.00	0.00	0.009	0.00	0.009
New River, Patrick Lane alignment to Hillcrest Blvd.	Provide bridge over drainage ditch and ¼-mile of multi-use pathway	0.00	0.00	0.00	0.00	0.50	0.00	0.50
64th Drive connection to Skunk Creek	Provide safe bike and ped access to the Skunk Creek pathway from 64th Drive	0.00	0.00	0.00	0.00	0.08	0.00	0.08
Grovers Avenue Bike Lanes/Route – 63rd Avenue to 63rd Drive and 63rd Drive to Villa Rita.	63rd Avenue to 63rd Drive, stripe with shared bike/park lane. 63rd Drive to Villa Rita, post bike route signs.	0.00	0.00	0.00	0.00	0.02	0.00	0.02
Hearn Road connection to Thunderbird Paseo	Provide safe bike and ped access to the Thunderbird Paseo from Hearn Road.	0.00	0.00	0.00	0.00	0.08	0.00	0.08

Table 6-3 Planned Bicycle Improvements (continued)

Capital		Fiscal Year						Total Cost
Project	Description	FY2010	FY11-15	FY16-20	FY21-25	FY26-30	FY31-35	
Sweetwater Avenue connection to Thunderbird Paseo	Provide safe bike and ped access to the Thunderbird Paseo from Sweetwater Avenue	0.00	0.00	0.00	0.00	0.08	0.00	0.08
Butler Drive/Evergreen Road, 55th Avenue to 59th Avenue	Improve path access at Glendale Amer. E.S. and route to Royal Palm and 59th traffic signal	0.00	0.00	0.00	0.00	0.17	0.00	0.17
Grand Avenue, 61st Avenue and Myrtle Avenue, Multi-use bridge	Provide grade separated crossing of Grand Avenue at 61st Avenue and Myrtle Avenue	0.00	0.00	0.00	0.00	0.00	3.00	3.00
Westgate Sports Complex Access, from Grand Canal path	Provide access from the Grand Canal path into the Westgate/ Sports Complex just east of the Loop 101 freeway. Will include bridge and ¾-mile pathway.	0.00	0.00	0.00	0.00	0.00	1.21	1.21
99th Avenue and Grand Canal, Multi-use underpass	Provide grade separated crossing of 99th Ave. at the Grand Canal pathway alignment.	0.00	0.00	0.00	2.10	0.60	0.00	2.70
# 1 Loop 303 Multi-use bridge at ½-mile collector street location	Provide multi-use connection to ½-mile, east-west collector street on both sides of the Loop 303 freeway.	0.00	0.00	0.00	0.00	0.75	0.00	0.75
# 2 Loop 303 Multi-use bridge at ½-mile collector street location	Provide multi-use connection to ½-mile, east-west collector street on both sides of the Loop 303 freeway.	0.00	0.00	0.00	0.00	0.75	0.00	0.75
Patrick Ln. connection to Pinnacle Peak Rd through Thunderbird Park	Widen/stripe bike lane on street connecting Patrick Ln. to Pinnacle Peak Rd through Thunderbird Park	0.00	0.00	0.00	0.19	0.00	0.00	0.19
Bike Ongoing Program		0.08	0.49	0.53	0.53	0.53	0.32	2.48

Operation Cost	Fiscal Year						Total Cost
	FY2010	FY11-15	FY16-20	FY21-25	FY26-30	FY31-35	
Bike Ongoing Program (Match)	0.11	0.55	0.55	0.55	0.55	0.33	2.63
Bike GO Capital Maintenance	0.14	0.72	0.72	0.72	0.72	0.43	3.45

6.4.b Pedestrian Plan

Glendale has four primary areas within the City which are the focus of pedestrian activity. These areas either currently have high pedestrian activity or are expected to experience growth in population and employment, which requires supporting infrastructure to meet the demands of the growth. The four areas are the Downtown, Arrowhead Towne Center, Entertainment District, and the Western Growth Area, as defined in the subsequent sections.

Figure 6-3 Paved sidewalk with landscaped buffer in downtown Glendale

Downtown

The improvements in the downtown area should support the goals of the "Glendale City Center Master Plan". The existing plan was adopted in 2002 and includes the area bounded in the north and south by Myrtle Road and Lamar Road and in the east and west by 59th and 43rd Avenues. The district is designated as mixed-use, with Glendale Avenue serving as the center of the commercial and retail hub. Currently, the area is pedestrian-friendly, with human-scale shop fronts, shading, streetscape, and wide sidewalks. For the City Center to maintain its pedestrian friendly environment, it is critical that the design of any new development supports the comfort, safety, and interests of pedestrians.

Arrowhead Towne Center

The Arrowhead Towne Center is located at Loop 101 and Bell Road to the north of downtown Glendale. Pedestrian facilities in this area are limited to sidewalks on major arterial roadways. Retrofitting existing facilities to include substantial pedestrian facilities would provide the most effective means of creating a pedestrian network.

Entertainment District

The sports and entertainment district, roughly between 91st and 107th Avenues, is a major growth area for new retail, commercial and mixed-use developments, as shown in Figure 6-4. The area hosts national sporting events to local farmers markets and holiday-themed street parties. While its attractions will draw individuals who need to commute by car, a good pedestrian circulation plan can encourage local residents to walk to events as well as ensure safe and efficient circulation within the district. The development of a Pedestrian Circulation Plan for this area is recommended to outline guidelines and policies for on-

Figure 6-4 Westgate Center

going and future development as well as specific area projects and a detailed pedestrian network. The potential plan would link together major activities in this area with climate-controlled, grade-separated walkways.

Western Growth Area

The area west of Loop 101 is currently mostly undeveloped agricultural land. As the area becomes more developed, it will transition to a low density residential area with dispersed retail and commercial centers. As the region develops, it should be policy to include detached sidewalks for all new development and to provide connectivity between subdivisions, such as breaks in perimeter walls of subdivisions.

Table 6-4 presents the cost for the pedestrian improvement for the focus areas identified in this section. These funds are not distributed for specific improvements and can be used in general for any type of pedestrian improvements to enhance the respective focus areas.

Table 6-4 Focus Areas Pedestrian Improvement Cost

Focus Areas	Type of Improvement	Annual Cost	Total FY2016-2035
Downtown	Pedestrian Enhancement	$100,000	$2,000,000
Arrowhead Vicinity	Pedestrian Enhancement	$100,000	$2,000,000
Entertainment District	Pedestrian Enhancement	$100,000	$2,000,000
Western Growth Area	Pedestrian Enhancement	$100,000	$2,000,000

6.4.c Traffic Safety Improvements

Table 6-5 presents the proposed cost for the safety improvements for high crash locations. These funds are not tabulated for specific improvements and can be used in general for any type of intersection-related improvements for high crash locations.

Table 6-5 Bicycle and Pedestrian Safety Enhancements Cost

Project	Type of Improvement	Annual Cost	Total FY2016-2035
Bicycle and Pedestrian Safety Enhancements	Safety	$100,000	$2,000,000

6.4.d Traffic Education

The Traffic Education Program will continue to support the safety needs of the citizens of Glendale first and foremost. Programs will continue to develop and evolve to advocate safety with regard to specific needs and age-specific audiences.

One of the future goals of the Traffic Education Division is to create partnerships with school districts and local businesses and to submit applications for federal funding (SAFETEA-LU) for schools and communities to implement infrastructure programs (sidewalk improvements, traffic calming devices) and non-infrastructure programs (education campaigns). Table 6-6 and 6-7 presents the proposed cost assigned to the education programs and the Safe Routes to School program respectively.

Table 6-6 Education Program Cost

Program	Annual Cost	Total FY2010-2035
GO Program Education	$28,551	$742,320

Table 6-7 Safe Routes to School Program Cost

Program	Annual Cost	Total FY2016-2035
Safe Routes to School	$30,000	$600,000

6.4.e Transportation Demand-Management

The City of Glendale will maintain a transportation demand-management program to reduce the travel demand on roadways. Table 6-8 presents Transportation Demand-Management costs.

Table 6-8 Transportation Demand-Management Cost

Program	Annual Cost	Total FY2010-2035
Transportation Demand-Management	$60,286	$1,567,440

This page intentionally left blank

7.0 AVIATION

7.1 Introduction

This section of the Glendale Transportation Plan will discuss the identified roles of both Glendale Municipal Airport (GEU) and Luke Air Force Base (Luke AFB) within the municipal planning area and each airport's landside access needs for each facility will also be addressed. This includes a summary of the approved Glendale Municipal Airport (GEU) Master Plan adopted on May 12, 2009.

7.2 Background

The City of Glendale owns and operates Glendale Municipal Airport which is located on the western edge of the City's municipal planning area. The City of Glendale has owned and operated the airport since 1986, and the City is responsible for all operational, safety, and capital improvements for the airport. The airport is home to more than 300 based aircraft and has averaged 118,000 annual aircraft operations over the past 10 years. The airport is located six miles west of the business district, south of Glendale Avenue on Glen Harbor Boulevard and is situated on approximately 427 acres of land. It is surrounded by a variety of land uses to include business park, public facility, industrial, commercial, and residential.

One of the airport's development goals is aimed at supporting and increasing growth in the area's local economy. This goal is supported through the continued development of the business park to the north, development of the 70 plus acres of restricted use on-airport property, and a focus on corporate aviation to assure further economic development and increased revenue.

Access to the airport is provided via the intersections of Glendale Avenue and Glen Harbor Boulevard on the north side of the airport. Approximately 1.5 miles to the east is State Route 101 (the Agua Fria Freeway), which provides the main freeway access to Glendale Avenue. Other regional access is provided via Interstate 10 (Papago Freeway), approximately 5 miles to the south, and U.S. 60, approximately four miles to the north. Proposed Loop 303 (Estrella Freeway) is located 7.5 miles to the west and in the future will provide the City and the airport with additional points of access.

GEU's previous master plan was approved in 1998. Due to the tremendous economic growth that has occurred over the past few years, the City updated the Airport Master Plan to ensure the airport's ability to accommodate future demand for corporate,

general aviation, and recreational users. The ultimate goal of the master plan is to develop a comprehensive development plan to address the various needs of its users and stakeholders.

Approximately four miles directly west of GEU is Luke AFB, which is home to the 56th Fighter Wing (FW) and the Air Force Reserve. Luke AFB is one of the largest economic engines in the region and is an integral part of the identity of Glendale and the greater Phoenix metropolitan area. The primary mission of Luke AFB is to provide advanced flight training to F-16 pilots, provide for the community, and deliver responsive combat support anytime, anywhere.

Luke AFB is located at the intersections of Glendale Avenue and Litchfield Road and is situated on approximately 4,200 acres. Various land uses surround Luke AFB including residential, open/agricultural/water, industrial, and vacant land. The 56th FW is the largest fighter wing in the world, training all United States F-16 pilots. The Base has a population that includes over 7,500 active military members and 15,000 family members. Luke AFB has approximately 38,000 annual sorties (deployment) from its more than 200 F-16 based jets.

7.2.a The Role of Glendale Municipal Airport

GEU is one of 3,344 airports included in the National Plan of Integrated Airport System (NPIAS) and is classified as a general aviation airport. The airport is one of 47 other general aviation airports in Arizona included in the NPIAS. GEU is also identified in the State and Regional aviation systems plan whose role continues to serve the general aviation community.

The primary role of GEU is to provide general aviation services to the surrounding community and various users of the airport. General aviation refers to all private and commercial flights other than military and scheduled commercial service. General aviation covers a wide range of activities to include recreational, private and corporate aviation. The majority of the world's air traffic falls into the general aviation category, and most of the world's airports exclusively serve the general aviation community. Services offered at GEU include aircraft rental and storage, aircraft maintenance (airframe and powerplant), charter operations, fueling, and flight training.

The Arizona State Aviation Systems Plan is currently being updated by the Arizona Department of Transportation—Aeronautics Division. It is not anticipated that the role of GEU will change as a result of the updated study.

7.2.b The Role of Luke AFB

Luke AFB is located four miles west of GEU and serves as a major tactical jet training base for the U.S. Air Force. The primary mission of Luke AFB is to provide advanced flight training to F-16 pilots, provide for the community, and deliver responsive combat support anytime, anywhere. Luke AFB has 200 based aircraft and conducts over 38,000 annual sorties. The Base is equipped with two parallel runways oriented in a northeast to southwest direction. Vehicle access to the Base is provided through the South Gate via Litchfield Road and West Super Sabre Street, the North Gate via Litchfield Road and West Lightning Street, and the Main Gate via Litchfield Road and Thunderbird Street. Luke AFB is a military facility and closed to the public.

RPTA provides a local bus service that extends from Luke Air Force Base through the Glendale central business district. There is a stop on this route at the intersection with Glen Harbor Boulevard.

7.3 Existing Airport Facilities

Facilities at an airport are functionally classified into two broad categories: airside and landside. Airside facilities include those facilities needed for the safe and efficient movement of aircraft, such as runways, taxiways, lighting and navigational aids. Landside facilities include those facilities necessary to provide a safe transition from surface to air transportation and support aircraft servicing, storage, maintenance, and operational safety on the ground.

7.3.a Airside

Existing airside facilities at GEU include the runway and taxiway system, pavement markings, airfield lighting, weather and communication aids, and navigational aids. These facilities are further discussed below:

- Runway 1-19 is constructed of asphalt and is 7,150 feet long by 100 feet wide. The pavement has been strength rated at 40,000 pounds single wheel loading and 60,000 pounds dual wheel loading.
- Taxiway A is a 35-foot-wide, full-length asphalt taxiway that runs parallel to Runway 1-19. There are nine entrance/exit taxiways from the runway, two of which are high-speed exits to allow aircraft to exit the runway at a greater speed than if the taxiway were at a right angle. Both ends of Taxiway A provide aircraft hold aprons where pilots can perform preflight checks including engine run-ups, and where airport traffic control tower personnel can instruct pilots to wait for clearance to enter the runway.
- A rotating beacon is located atop the air traffic control tower to identify GEU. Each end of Runway 1-19 is equipped with runway end identification lighting and the runway is also equipped with medium intensity runway edge lighting. The

airport has installed medium intensity taxiway lighting for the taxiway. On the left side of Runway 1-19 is a two-box precision approach path indicator (PAPI-2L) to assist pilots in determining the correct glide slope. The airport also has installed a pilot-controlled lighting system when the air traffic control tower is closed.

- GEU has three lighted wind cones, one inside the segmented circle and one closer to each end of the runway to provide pilots with information regarding wind conditions. The airport also has an Automated Weather Observation System III (AWOS-III) to record weather conditions and is also equipped with an Automated Terminal Information Service (ATIS) to provide information to arriving and departing aircraft of the current surface weather conditions, runway and taxiway conditions, communication frequencies, and other information of importance to arriving and departing aircraft.
- A helipad was constructed in 1995 to accommodate helicopter operations and is located on the southside of the terminal building.
- Navigational aids at GEU currently include non-directional beacons, a very high frequency omnidirectional range facility, Loran-C, and a global positioning system.

7.3.b Landside

Existing landside facilities at GEU include the terminal building, fixed base operators, apron and hangar facilities, vehicle parking, fueling facilities, aircraft rescue and fire fighting, and the air traffic control tower. These facilities are further discussed below:

- GEU has a two-story, 21,900-square-foot terminal building that was constructed in 1986. The building is in excellent condition and on the first floor of the building is a flight planning room, restaurant, pilot supplies shop, public lounge area, restrooms, and office space. Airport administration offices and additional office space are located on the second floor of the terminal building.
- Several vehicle parking lots exist at various locations on and adjacent to the airport. (There are approximately 80 vehicle parking spaces adjacent to the terminal building. The FBO building provides approximately 30 spaces and approximately 120 additional spaces are located along Glen Harbor Boulevard to accommodate other airport users. The air traffic control tower and other individual aircraft hangars also offer vehicle parking.
- The apron is constructed of asphaltic concrete and totals approximately 130,000 square yards. The main apron provides for 190 aircraft tiedown positions and 46 of those are leased to Glendale Aviation.
- Hangar facilities at Glendale Municipal Airport are comprised of conventional hangars (9), box hangars (8), connected box hangars (123), t-hangars (104), and shade hangars (111).

- There are presently no aircraft rescue and fire fighting facilities located on airport property. City of Glendale Fire Station No. 158 is located approximately three miles to the east of the airport and responds to airport emergencies within approximately five minutes.
- The airport has four underground storage tanks, two of which have 10,000-gallon capacities, and the remaining two have 4,000-gallon capacities. Jet A storage totals 10,000 gallons and AvGas storage totals 14,000 gallons. A 4,000-gallon tank is used for automotive fuel. In addition, Glendale Aviation owns and maintains a 5,000-gallon aboveground AvGas fuel tank to provide self-service fueling.

7.4 Projected Activity Levels

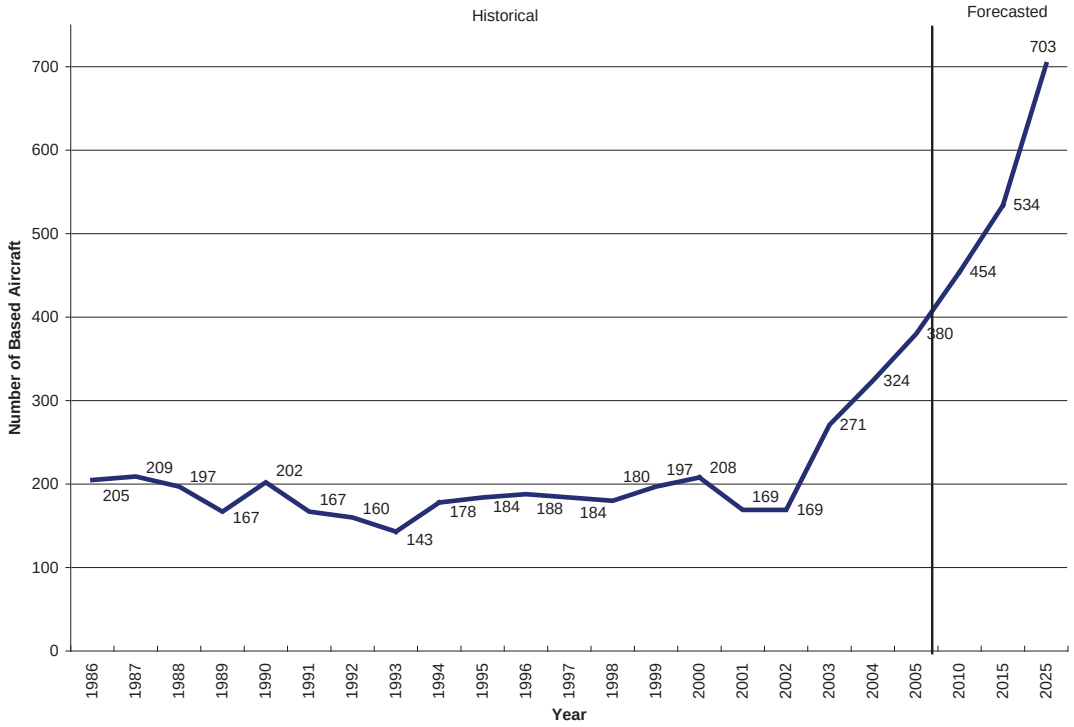
At general aviation facilities, two primary indicators characterize activity levels: the number of based aircraft and the total number of annual operations (takeoffs and landings). The based aircraft and operations forecasts developed for GEU indicate a steady increase in aviation activities at the airport and each are discussed in the following sections.

7.4.a Based Aircraft

Since GEU's opening in 1986, the airport has seen a relatively steady fluctuation in the numbers of based aircraft through calendar year 2001. From calendar year 2001 through 2005, a steady increase in the numbers of based aircraft occurred at the airport following national trends at similar sized airports. The based aircraft forecast indicates a continual increase in the numbers of based aircraft, from 380 based aircraft in 2005 to 703 based aircraft in 2025. Figure 7-1 provides historical and forecasted based aircraft figures for the airport.

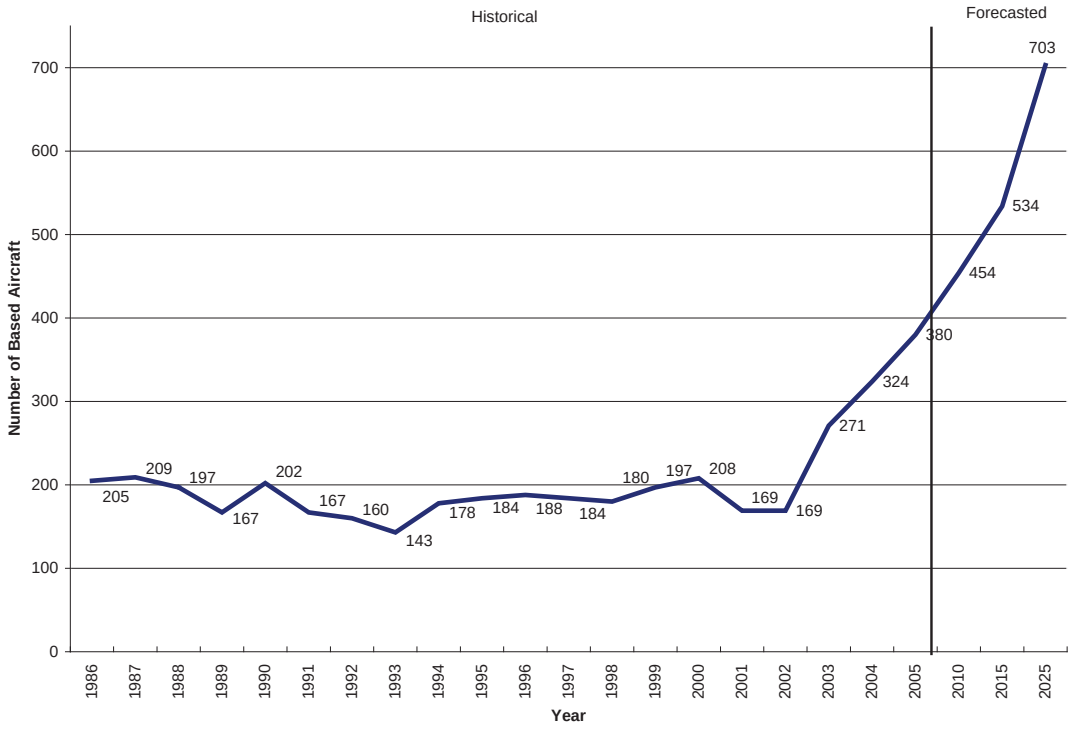
7.4.b Aircraft Operations

Mirroring the trend on based aircraft, annual aircraft operations at GEU fluctuated up to calendar year 1999, but saw a steady decrease up to calendar year 2003. From calendar year 2003 to calendar year 2005, a steady increase occurred in the number of aircraft operations. The aircraft operational forecast indicates a steady increase of aircraft operations through the planning period, with aircraft operations almost doubling by 2025. Figure 7-2 provides historical and forecasted aircraft operational figures for the airport.



Source: City of Glendale, Glendale Municipal Airport: Draft Airport Master Plan, Coffman & Associates, 2007.
Note: Photo reprinted with permission from the City of Glendale.

Figure 7-1 Based Aircraft Forecast



Source: City of Glendale, Glendale Municipal Airport: Draft Airport Master Plan, Coffman & Associates, 2007.
Note: Photo reprinted with permission from the City of Glendale.

Figure 7-2 Aircraft Operational Forecast

7.5 Airport Ground Access and Vehicle Parking

Providing for safe and efficient ground access to and from an airport is critical to an airport's continued development and subsequent economic impact to the local community. If airport users are unable to access the facility in a timely and efficient manner, potential future growth could be jeopardized. Each airport's ground access and vehicle parking are discussed in the following paragraphs.

7.5.a Glendale Municipal Airport

GEU is accessed through the local transportation network via a signalized intersection at Glendale Avenue and Glen Harbor Boulevard Glen Harbor Boulevard runs along the west side of the airport and serves as the main access road to and from the airport. No improvements are required at the intersection of Glendale Avenue and Glen Harbor Boulevard to accommodate vehicle access. It is important to note that as the business/commercial properties are further developed to the north and on airport property, this may require additional access from Glendale Avenue or improvements to the existing intersection to accommodate demand.

There are approximately 80 vehicle parking spaces adjacent to the terminal building, the FBO building provides approximately 30 spaces, and approximately 120 additional spaces are located along Glen Harbor Boulevard in order to accommodate other airport users. The air traffic control tower and other individual aircraft hangars also offer vehicle parking. As future facilities are developed, additional vehicle parking will need to be considered.

7.5.b Luke AFB

Access to Luke AFB is provided by the local transportation network via Litchfield Road to one of three access gates, two of which are accessed directly from Litchfield Road. The other access gate (the South Gate) is accessed via Litchfield Road and West Super Sabre Street. No improvements are required at the intersections of the access gates and Litchfield Road to accommodate future vehicle access.

Luke AFB is a military facility and closed to the public. An assessment of its vehicle parking needs is not included as part of this study.

7.6 Airport Layout Plan – Glendale Municipal Airport

An Airport Layout Plan (ALP) depicts existing airport facilities and required facility developments, on both the airside and landside of an airport. The ALP provides guidelines by which the airport sponsor (City of Glendale) can ensure that any proposed development around the airport maintains specific design standards, meets safety requirements, and is consistent with community land use plans. An ALP is a public document which depicts

aeronautical requirements, both present and future, and serves as a reference for the community on land use proposals and budget resource planning. The ALP helps ensure the safety, utility and efficiency of the airport. Figure 7-3 depicts the current Federal Aviation Administration approved ALP for GEU.

7.6.a Airside

Proposed improvements to the airport's airside facilities are related to improving the airport's ability to meet specific aviation design standards for the identified critical aircraft represented by Airport Reference Code C-II. Projects of this nature include ensuring runway to taxiway separation standards, improvements to the runway safety area, object free area, obstacle free zone, and runway protection zone.

Other projects potentially include capacity enhancements such as additional taxiways, additional runway/taxiway exits, improved instrument approaches, and strategic land acquisition for airport protection and economic development.

7.6.b Landside

Proposed future improvements to the landside facilities include development of additional t-hangars, shade hangars, box hangars, conventional hangars, and corporate aviation parcels. Consideration will be given to projects that related to the separation of airside and landside activities, separating vehicles and aircraft, providing for a higher level of safety, site selection for a helipad and replacement of the air traffic control tower. Development options for the former Camelback Ranch property include additional access from the property immediately west of Glen Harbor Boulevard.

This page intentionally left blank

8.0 FUNDING PLAN

8.1 Introduction

The purpose of this chapter is to identify the financial resources needed to fund the Plan. The City of Glendale has limited transportation funding to build, operate, and maintain roadways, walkways, bicycle and pedestrian facilities, and transit services necessary to meet the needs of the travelling public. Financial sources of information for the Plan include:

- FY 2009-2033 GO (Glendale Onboard) Program of Projects
- FY 2008-09 City of Glendale Budget Book
- FY 2008-2012 Maricopa Association of Governments (MAG) Transportation Improvement Program (TIP)
- MAG 2007 Regional Transportation Plan (RTP)
- FY 2009-2018 ADOT (Arizona Department of Transportation) HURF (Highway User Revenue Fund) Forecasting Process and Results

Due to uncertainty in duration and effect of the crisis, the ongoing changes in the current economy are not factored into this Plan.

8.2 Summary of Costs

The total cost of the Glendale Transportation Plan is $5.01 billion over 26 years (2010-2035). The Plan costs are divided into four parts by mode:

- Streets
- Transit
- Alternate Modes
- Other Programs

Table 8-1 and Figure 8-1 show costs broken down by capital and operations for each mode. Cost of each mode is discussed further in the following paragraphs. All costs and funding are in 2009 dollars.

The costs of individual plan elements were provided in previous chapters. An exception is the Other category which includes miscellaneous cross-modal programs such as management costs and the cost of the Transportation Safety Education Program.

Table 8-1 Summary of Costs

Summary of Costs	26-Year Totals	
Street Capital	$	2,684,375,000
Street Operations	$	749,028,000
Transit Capital	$	787,482,000
Transit Operations	$	654,819,000
Alternate Mode Capital	$	35,182,000
Alternate Mode Operations	$	7,644,000
Other	$	89,368,000
Total	**$**	**5,007,898,000**

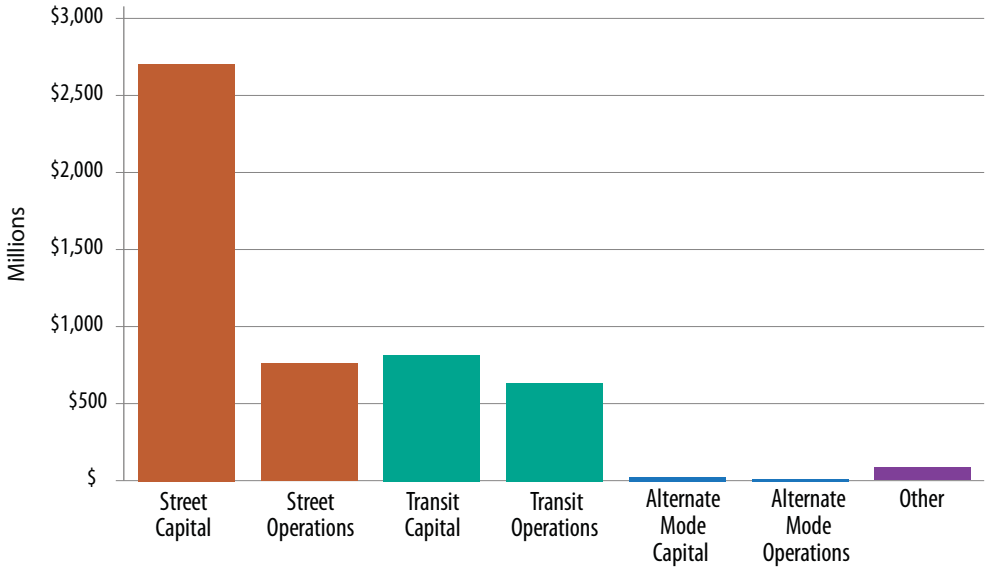


Figure 8-1 Summary of Costs

8.2.a Streets

The cost of building new streets, improving existing streets, and maintaining them is $3.43 billion, which is about 68.6% of the total cost of the Plan. Regional capital projects include Northern Parkway, Loop 303, Loop 101, and Grand Avenue. Developer built facilities is the largest share of local costs for capital, which include arterial, collector, and local streets. The costs of capital and operations are shown in Table 8-2 and Figure 8-2.

Table 8-2 Street Costs

Roads	26-Year Totals
Capital—Local	$ 1,568,360,000
Capital—Regional	$ 1,116,015,000
Operations—Local	$ 696,278,000
Operations—Regional	$ 52,750,000
Total	**$ 3,433,403,000**

Note: Totals may not add due to individual rounding

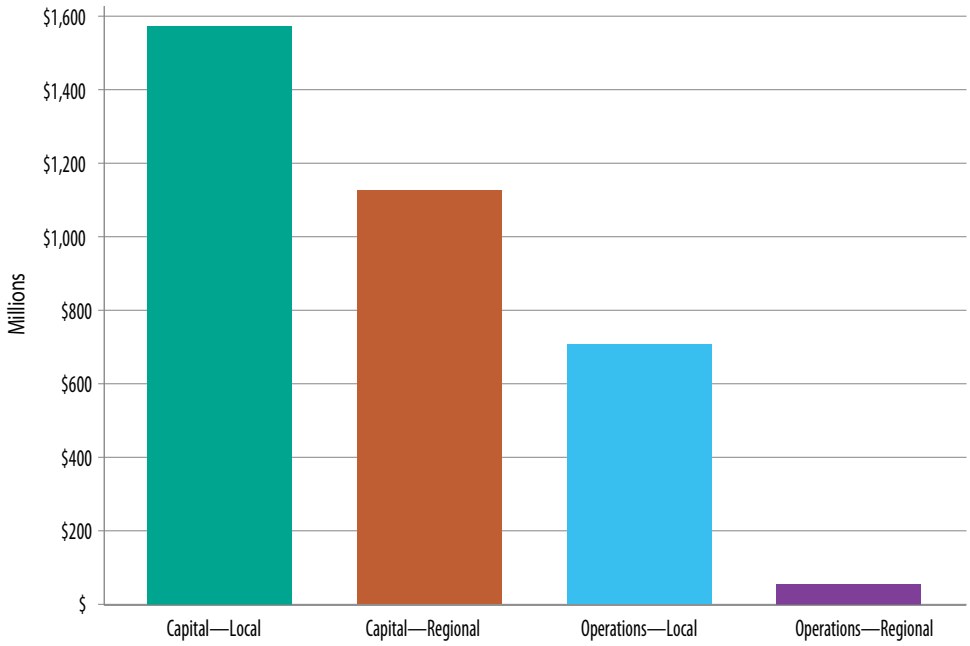


Figure 8-2 Street Costs

8.2.b Transit

The cost of transit capital, operations, and maintenance is $1.44 billion, which is about 28.8% of the total cost of the Plan. Capital projects include transit centers, park-and-ride lots, light rail facilities, commuter rail facility, buses, vans, and other related equipment. Rail facilities, which include two light rail lines with stations and park-and-ride lots, and a commuter rail line are the largest capital cost. The capital costs for light rail included in the Plan are the regional and local shares for 3.5 miles along loop 101 and 2 miles along Glendale Avenue. The costs of capital and operations are shown in Table 8-3 and Figure 8-3.

Table 8-3 Transit Costs

Transit	26-Year Totals
Capital—Regional	$ 592,869,000
Capital— Local	$ 194,613,000
Operations—Regional	$ 27,769,000
Operations— Local	$ 627,050,000
Total	**$ 1,442,301,000**

Note: Totals may not add due to individual rounding

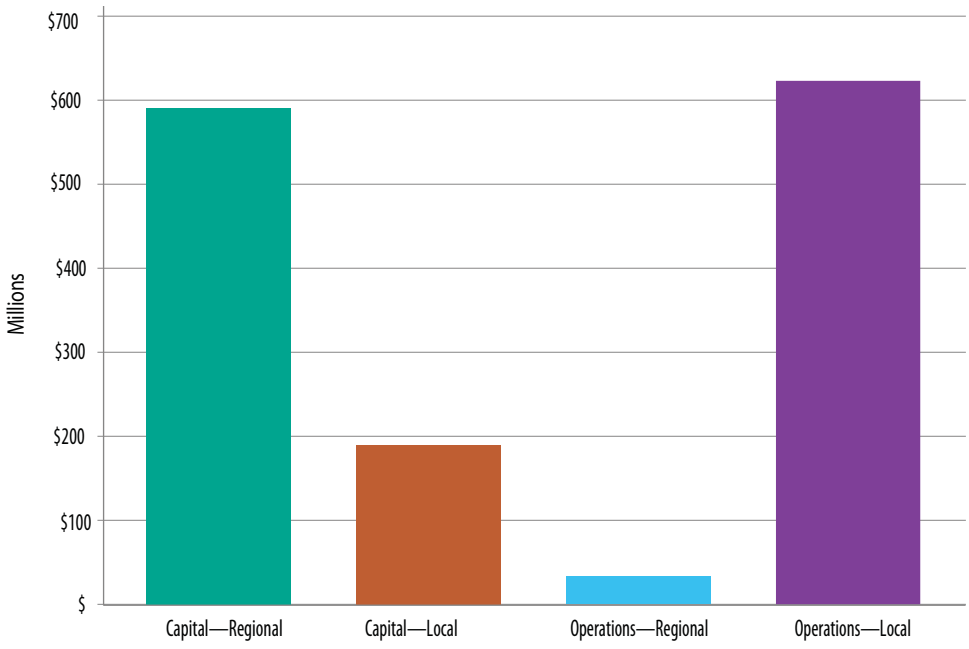


Figure 8-3 Transit Costs

8.2.c Alternative Modes

The cost of Alternative Modes is $42.83 million, which is about 0.9% of the total cost of the Plan. Alternative modes capital cost includes bicycle and pedestrian facilities. Operation and maintenance cost include programs like traffic education and demand management. The costs of capital and operations are shown in Table 8-4 and Figure 8-4.

Table 8-4 Alternative Mode Costs

Transit	26-Year Totals
Capital—Local	$ 32,205,000
Capital—Regional	$ 2,976,000
Operations—Local	$ 7,644,000
Operations—Regional	$ —
Total	**$ 42,825,000**

Note: Totals may not add due to individual rounding

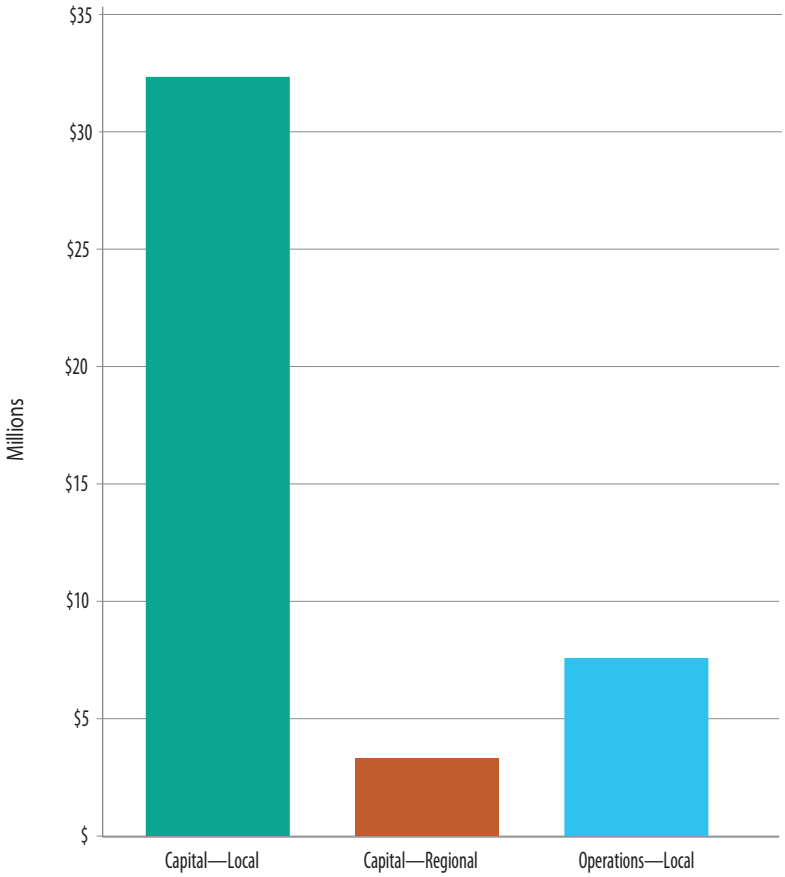


Figure 8-4 Alternative Modes Costs

8.2.d Other Programs

The cost of Other Programs is $89.37 million, which is about 1.8% of the total cost of the Plan. Other Programs include Program Management, Indirect Staff and Administrative Charges, and General Engineering contract. All the Plan costs under Other Programs are to be paid by local funding. Most of these costs are part of the 25-year GO Program. The cost of capital and operations are shown in Table 8-5 and Figure 8-5.

Table 8-5 Other Program Costs

Other Programs	26-Year Totals
Operations	$ 89,368,000
Capital	$ —
Total	**$ 89,368,000**

Note: Totals may not add due to individual rounding

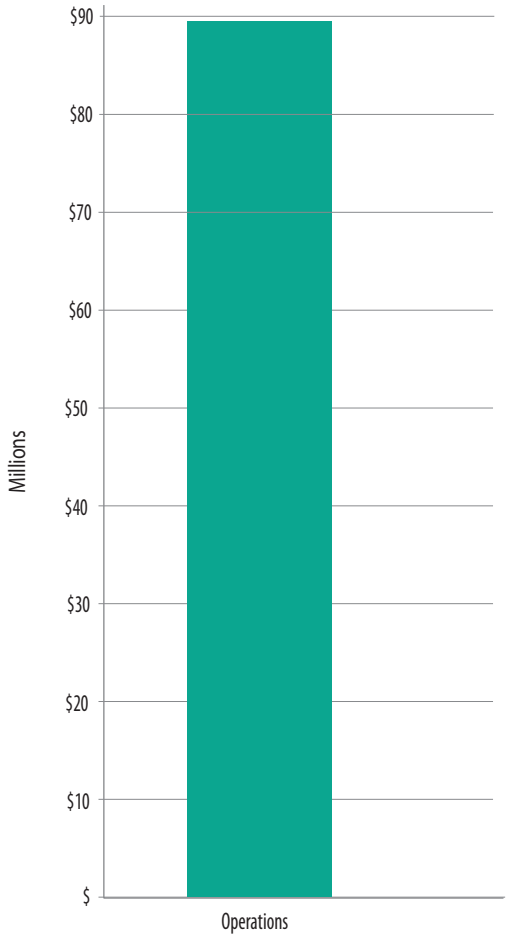


Figure 8-5 Other Program Costs

A summary of the plan costs by five-year increments is shown on Figure 8-6.

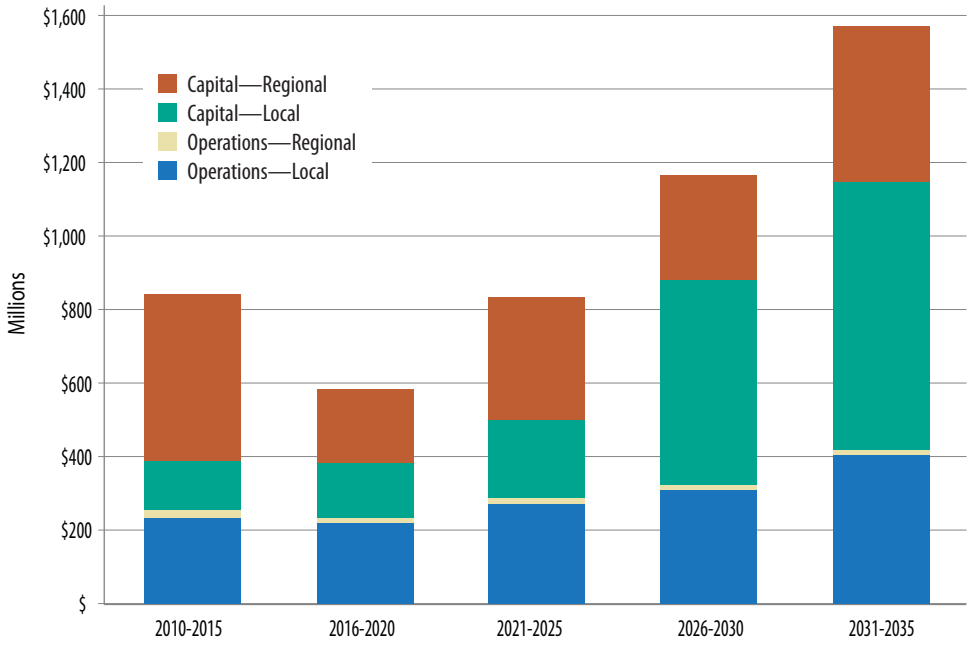


Figure 8-6 Summary of Costs by Source

8.3 Revenues

The following sections present a summary of the methodology as well as details of each funding source.

8.3.a Methodology

A revenue forecast has been prepared using existing revenues and the assumption of reasonable extensions, and adjustments to revenues over the 26 years of the Plan. Where there are existing debt obligations, revenues have been adjusted to show available funds after debt service. Total funding available for the Glendale Transportation Plan is $5.01 billion from 2010 through 2035. The forecast of funding by source from 2010 through 2035 is presented in Table 8-6 and Figure 8-7. Funding for the plan is shown by agency for regional funding and by category for local funding.

Table 8-6 Summary of Revenues

Source	26-Year Totals
Developer Exactions	$ 1,273,223,000
HURF	$ 1,060,408,000
GO Transportation	$ 809,354,000
ADOT	$ 642,899,000
RPTA	$ 477,769,000
MAG	$ 467,261,000
Farebox	$ 98,466,000
Others	$ 124,707,000
LTAF	$ 28,392,000
General Fund	$ 15,970,000
DIF	$ 14,820,000
Total	**$ 5,013,267,000**

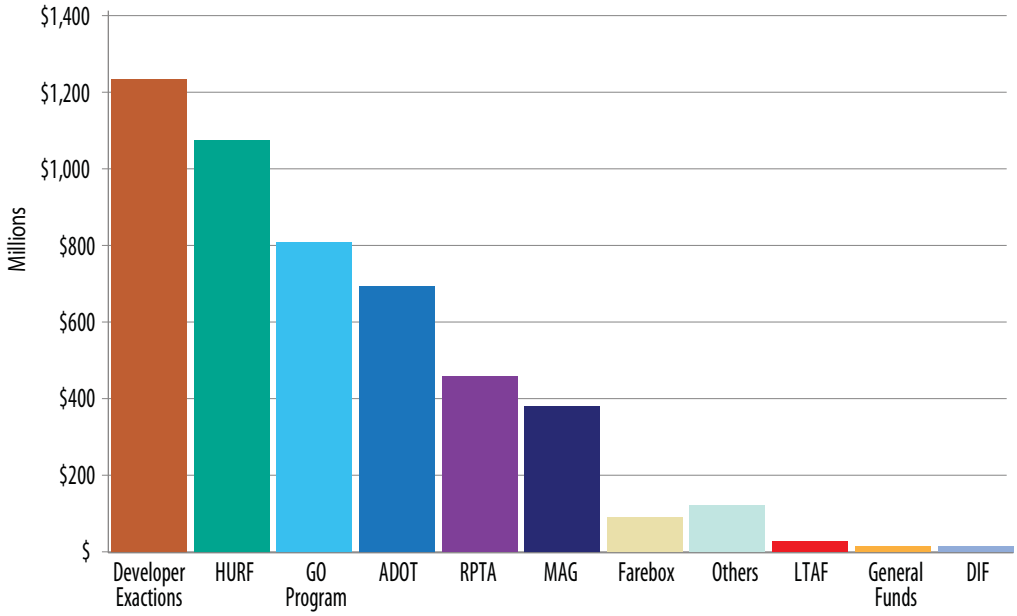


Figure 8-7 Summary of Revenues

8.3.b Debt Service

Bonding has not been used to fund the Plan since the exact timing of the projects is not known. It is assumed that when the projects need to be constructed, bonds may be issued based on timing of the capital needs. Existing debt service due to bonds issued in the past are a part of the Plan. Glendale Transportation Sales Tax and HURF are funds in the Plan, but they have been reduced for debt service. Debt service for Glendale Transportation Sales Tax is $120.07 million, and HURF Debt Service is $25.36 million.

8.3.c City Funds

Glendale Transportation Sales Tax ($809.35 million)

The Glendale Transportation Sales Tax is the second largest source of local funds in the Plan. This voter approved tax (November 2001) is a half-cent excise and privilege tax on all sales in Glendale. These funds are restricted to transportation projects and programs. The tax provides local match for Northern Parkway, Light Rail Transit facilities, Park-and-Ride lots, Transit Centers, and other capital improvements. These funds also pay for a majority of transit operations in Glendale which include fixed route, dial-a-ride, GUS, and future LRT services.

Highway User Revenue Fund ($793.36 million)

Highway User Revenue Fund (HURF) consists of gasoline and other fuel taxes, driver's license and vehicle registration fees, and other transportation-related fees and taxes. HURF funding is restricted to street projects and operations. Annually ADOT prepares HURF revenue forecasts. The September 2008 HURF forecast is for revenue projections from 2009 through 2017. Based on these forecasts, estimates of HURF revenues were developed for 2018-2035. HURF revenues are distributed to the state, cities, and counties based on population and fuel sales. Based on the statewide HURF forecast, Glendale's share is estimated to be $542.44 million.

Growth in this revenue is expected to slow down for Glendale due to reduced population growth, with one significant increase in 2016 when Glendale reaches the population mark of 300,000. In Glendale HURF is primarily used for operations though there are a few projects funded with HURF through bonding. HURF funding after debt service is $517.08 million from 2010 through 2035.

HURF Adjustment

Gasoline tax is based on the volume sold and not the price of fuel. In 1992, the last increase in gasoline tax was approved by the state legislature. This Plan provides for an increase in state tax revenues, resulting in an increase of HURF funds shared with cities and counties. The amount is equivalent to approximately a half-cent sales tax and is the amount to correct the 1992 HURF revenues for growth and inflation. This increase is included starting in 2016, and results in $276.28 million of additional state shared HURF

revenues for Glendale through 2035. State shared HURF is anticipated for both transit and highway use. The rest of the HURF adjustment which is $276.28 million is for ADOT to program, mostly on regional projects within Glendale city limits. Total HURF for Glendale including HURF adjustment is $793.36 million from 2010 through 2035, which is 15.8% of total Plan funding.

Transit Fare Box ($98.47 million)

Transit farebox revenue includes collections from fixed route, dial-a-ride, GUS, LRT, and other shuttles. Total transit farebox recovery from 2010 through 2035 is about 2.0% of total Plan funding. All farebox revenues are based on the share of services that are provided within Glendale city limits. The estimated farebox recovery of operating costs from various services is listed below:

- Fixed route bus – 20%
- GUS – 6%
- Dial-A-Ride – 6%
- LRT – 25%
- Commuter rail – 33%

Local Transportation Assistance Fund (LTRF) ($28.39 million)

Local Transportation Assistance Fund (LTAF I and LTAF II) are funded from state lottery revenues. These revenues are distributed statewide for assisting communities with their transportation needs. LTAF I revenues can fund roadway, transit, bicycle and pedestrian facilities in jurisdictions under 300,000 population. LTAF II revenues are restricted for transit purposes in all Arizona jurisdictions. These revenues partially fund transit operations in Glendale. LTAF I and LTAF II revenue is about 0.6% of total Plan funding. This assumes an anticipated extension of the LTAF funding through 2035.

General Funds ($15.97 million)

The City of Glendale currently provides $900,000 a year in General Fund contribution for transportation. The City has chosen to continue its level of General Fund contribution for transportation after the sales tax initiative that voters passed in 2001. The General Fund revenue is 0.3% of total Plan funding from 2010 through 2035. Glendale's General Fund is comprised of City Sales Tax, State-Shared Revenues, Primary Property Tax, Development Fees, Franchise Fees, License and Fee Revenues, Court Revenues, and other revenues.

8.3.d Developer Funds

Developer Exactions ($1.27 billion)

Developer exactions are the largest source of local funds totaling about 25.4% of Plan funding. These funds pay for all new streets in Glendale and improvements to streets due to developments. These funds include the cost of developer built streets.

Development Impact Fee ($14.82 million)

Development Impact Fee (DIF) revenue is a fee per unit of development based on the trips generated for roadway improvements. This source is about 0.3% of the total Plan funding from 2010 through 2035. These revenues are restricted to capital improvements along roadways identified in the DIF study. The general nature of projects funded by this revenue source is street construction, signal installation, intelligent transportation systems, and other improvements.

8.3.e ADOT Funds ($909.95 million)

ADOT Funds, which are a combination of federal, HURF, and RARF revenues, are allocated for transportation projects and programs, These funds are programmed and expended based on ADOT's statewide transportation improvement program. The Plan assumes that ADOT Funds will be used to build, operate, and maintain Loop 303, Loop 101, Grand Avenue, and a commuter rail facility. ADOT Funds contribute about 18.2% of total Plan funding.

HURF ($267.05 million)

The Plan anticipates this funding to be available when HURF is adjusted for depreciation in 2016. ADOT portion of HURF funding for Plan is about 5.3% of total Plan funding. This source of funding is expected to pay for about one fourth of all regionally significant projects in Glendale.

Federal

ADOT portion of federal funds in the Plan add to $214.3 million, which is about 4.3% of total funding. This funding is mostly for freeway and expressway projects like Loop 101 and Loop 303. This source of funding is expected to pay for about one fourth of all regionally significant projects in Glendale.

Regional Area Road Fund (RARF)

The regional half-cent sales tax for transportation is divided with 70% (RARF) going to the regional street system and 30% (PTF) to the regional transit system. This includes an anticipated extension of the half-cent regional sales tax for transportation from 2026 through 2035. RARF funding for regional roadways in Glendale adds to $428.6 million, which is about 8.5% of total Plan funding. ADOT RARF is expected to pay for about half of all regionally significant projects in Glendale, which are freeway and expressway projects.

8.3.f MAG Funds

MAG funds include federal Surface Transportation Program (STP), Congestion Mitigation and Air Quality (CMAQ) and RARF funds. MAG projects in Glendale are federally funded.

Federal ($467.26 million)

Federal under MAG funds make up about $467.26 million from 2010 through 2035, which is about 9.3% of total Plan funding. This funding is for regionally significant projects like Northern Parkway. Local matching funds for Northern Parkway are included from Glendale, Maricopa County, Peoria, and El Mirage. This source also funds most of the regional bicycle and pedestrian improvement projects.

8.3.g RPTA Funds

RPTA funding is for transit capital and operations that are part of the Transit Life Cycle Program (TLCP). Regional half-cent sales tax and federal funds make up the RPTA funds. Extension of the regional half-cent sales tax for transportation from 2026 through 2035 is assumed for Plan funding. Some of the projects funded with RPTA funds are:

- Regional park-and-ride
- Regional transit center
- Light rail transit
- Regional bus service
- ADA (Americans with Disability Act) paratransit service

Public Transportation Fund (PTF) ($125.53 million)

PTF funding for regional transit in Glendale is $125.53 million, which is about 2.5% of total Plan funding. This includes funding for capital projects like transit centers, park-and-rides, and operations like regional super grid transit service.

Federal ($352.24 million)

Federal funding for regional transit in Glendale totals $352.24 million, which is about 7.0% of total Plan funding. This includes funding for capital projects like light rail transit, purchase of buses, and associated capital maintenance.

8.4 Summary

The total cost of the Glendale Transportation Plan is $5.01 billion, and the funding for the Plan is $5.01 billion. There is a surplus of $5.37 million in 2035, which is approximately 0.1% of total funding. The summary of cost by modal capital and operations is presented in Figure 8-9. The summary of funding by source is presented in Figure 8-10.

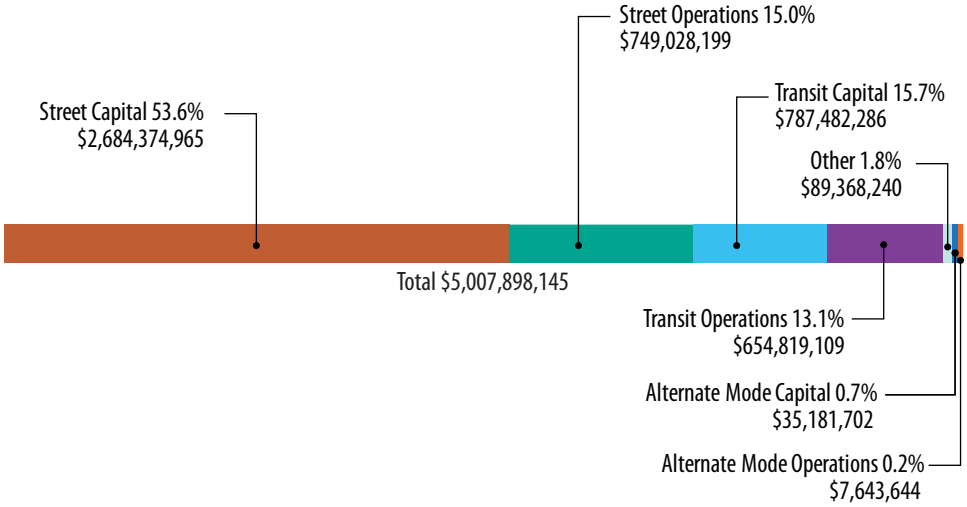


Figure 8-9 Summary of Costs

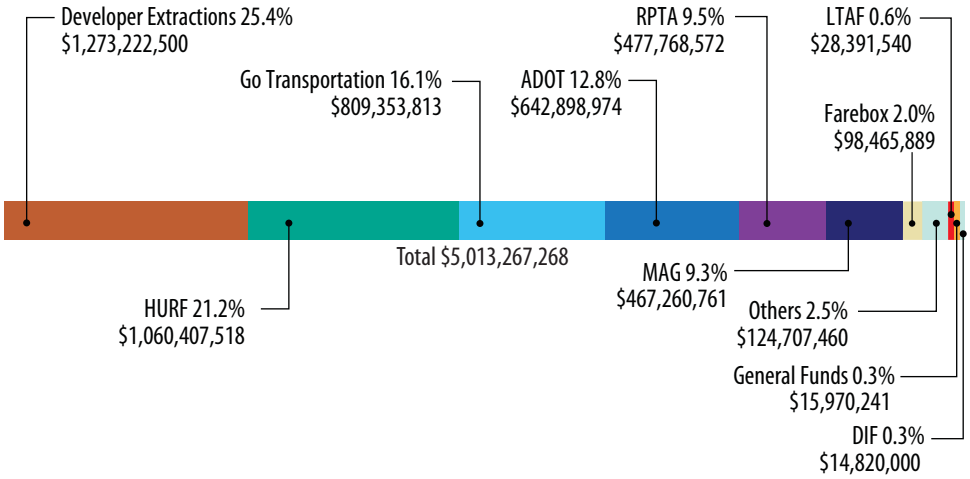


Figure 8-10 Summary of Funding

This page intentionally left blank

9.0 PUBLIC INVOLVEMENT

9.1 Introduction

This chapter summarizes comments received during *Phase 1: Early Input of the City of Glendale Transportation Plan Update* from July 2007 through January 2008 and *Phase 2: Input on Draft Plan* from April to June 2009.

The purpose of the first phase of public involvement was to notify the community that the plan update was underway. Residents were asked to identify the most important future transportation issues and suggest improvements to existing streets, public transit, and bicycle and pedestrian programs.

The purpose of the second phase of public involvement was to provide an overview of the plan and ask residents which elements were the most important to them.

Section 9.1 includes the input received through each of the Phase 1 activities, which included the following:

- Telephone survey conducted in July 2007
- Interviews of Glendale transit passengers in October 2007
- Public meeting held on November 7, 2007
- Briefings to City Commissions and community organizations from October 2007
- to January 2008
- Online survey responses from October 25, 2007 to January 30, 2008
- Annual GO Meeting held on
- Briefings to City Commissions and community organizations from May to June 2009
- Online survey responses from May 2009

Section 9.2 provides a comparison of the input received through the different methods and provides a cumulative summary of the most important transportation issues identified during Phase 1. The most recommended future improvements are also summarized in this chapter. Subsequent sections summarize the telephone and transit passenger interviews and detailed reports of the comments received during the public meeting, group briefings and online surveys.

An overview of the comment received during Phase 2 begins in Section 9.12, which also includes a listing of the most important elements of the transportation plan. Subsequent

sections included detailed reports of the comments received during the Annual GO meeting, group briefings and online surveys.

9.2 Phase 1 Public Involvement

During Phase 1, Glendale residents were asked to identify future transportation issues and to suggest future improvements. Residents provided input through telephone and in-person interviews, discussions at meetings and an online survey.

9.2.a Future Transportation Issues

The most important transportation issues identified by residents were traffic congestion, unsafe drivers, inadequate freeways and not enough transit. Other important issues were neighborhood traffic and delays at traffic signals.

Phone survey respondents were more likely to state that inadequate freeways were an important issue while online survey respondents felt not enough transit was a much more important issue. During the public meeting, the participants cited intersection efficiency (improving traffic congestion at intersections), making Glendale a bicycle friendly city and providing alternatives to driving as the most important issues.

9.2.b Suggested Improvements by Mode

Road/Street Projects

The online and phone survey participants seemed to agree and suggested the following road and street improvements.

- Wider streets
- More bus pullouts
- Traffic signal synchronization and more left- and right-turn lanes
- Improved street maintenance
- More street lighting, landscaping and signage
- More freeways including Northern Parkway and improvements to Grand Avenue and Loop 101

Traffic calming in neighborhoods seems to be a primary issue especially in the Arrowhead area. However, residents seem to disagree on how to mitigate the concern, with some suggesting more speed bumps and others recommending the removal of existing speed bumps.

Online survey participants also recommended additional enforcement of speed limits and other traffic laws. Red light cameras were suggested as a method of enforcement.

Public Transit

More local bus routes, longer hours of service and more frequency were mentioned by survey participants and by the transit passengers interviewed by PB. There were also several comments in support of light rail to the downtown and stadium areas. Other requests included benches and shade at bus stops, more express bus service to downtown, and additional service to north Glendale and the west and southwest Valley.

Expansion of the GUS Bus was mentioned frequently during the online survey and also during the transit passenger interviews. It appears people like the smaller buses and frequency (especially seniors) and would like to have more GUS Bus routes and stops. Numerous requests were received for service to Kachina Village and Vista Alegre.

Bicycle/Pedestrian Projects

More bike lanes, connectivity of the bike paths and completion of the Canal Trail were common suggestions for improving the bicycle and pedestrian systems in Glendale. Requests were made for bicycle lockers at key activity centers and bike lock-ups at bus stops. At the public meeting, one small group discussed the feasibility of having Glendale identified as a Bicycle Friendly City.

Other

Comments were also received that related to limiting both residential growth and commercial development to reduce the future demand for transportation infrastructure. One of the small groups at the public meeting discussed alternatives to driving including incentives to businesses to encourage their employees to work closer to home.

9.3 Telephone Survey

The City of Glendale, via its planning consultant Parsons Brinkerhoff, commissioned WestGroup Research, Inc. of Phoenix to conduct a telephone survey with Glendale heads of households who were over the age of 18. The purpose of the study was to gauge the public's attitude toward various transportation issues facing the City. This report represents the results of 411 interviews conducted with current Glendale residents in June of 2007. At a 95% level of confidence, the margin of error for the total sample is $\pm$4.9%.

9.3.a Summary

Traffic Congestion: Transportation-related issues, particularly traffic congestion, were the primary concern for Glendale residents. Traffic congestion was the most frequently named "most important issue" for the City and two in five classified it as a "big" problem for the City.

Street Improvements: Specific street improvements that residents identified as important and that they felt should be a priority for Glendale included bus pull-outs, more left-turn

signals, more/wider streets, traffic-calming efforts to reduce neighborhood traffic, and more freeways. Residents also placed a high degree of importance on street maintenance in general.

Public Transit: Transit-related improvements also appeared to be a high priority for many Glendale residents. This includes extending local bus service, adding light rail service and building more bus shelters for riders. A notable portion of residents also indicated they would consider using public transit if the amount and frequency of transit service provided was increased.

Demographic Differences: Not surprisingly, improvements to the Dial-a-Ride system were primarily a concern of older residents, whereas improvements to bicycle and pedestrian facilities were more important to younger residents, particularly with those most likely to have children.

9.3.b Most Important Transportation Issues

- Residents cited crime, traffic congestion, and overpopulation related to growth as the most important issue facing the City of Glendale (17%, 16% and 15% respectively).
- When the top two issues are combined, transportation/roads was often named as the most important issue facing the City of Glendale (30% total mentions).
- Overall, there were six broad categories of response that encapsulate the majority of responses –Transportation/roads (30%), Public safety (23%), Growth (23%), Education (11%), Cultural (10%), and Environmental (7%).

General Transportation Issues and Attitudes

- Six out of seven residents rated unsafe drivers and traffic congestion as "big" or "moderate" problems facing Glendale (86% and 87%), with almost three in five citing unsafe drivers as a "big" problem (57%). More than half of those surveyed indicated that inadequate freeways, traffic in neighborhoods and delays at traffic signals are an issue (58% "big" or "moderate" issue for all three).

Most Important Improvements to the Transportation System

- Topping the list of most important transportation improvements to be considered by the City were bus pullouts (80% giving a "4" or "5" rating where "5" means "very important"), removing graffiti (75%) and promoting road safety education programs for children (70%).
- The second tier of improvements, rated as important by at least three in five residents, included extended bus routes (66%), street maintenance (66%), more bus shelters (60%), and more left-turn signals (59%).

- Rounding out the top 10 most important transportation improvements were express bus service to downtown Phoenix (53%), wider streets/more lanes (53%) and extending light rail service into Glendale (51%).

Prioritization of Transportation Improvements

- Almost two out of three residents surveyed indicated they believe the City of Glendale should place the highest priority for transportation improvements on better maintained streets (65% giving a "4" or "5" rating where "5" means a "very high priority"). This is followed by adding traffic lanes (57%), reducing and slowing neighborhood traffic (53%), and increasing bus service (50%).
- Expanding light rail service (46%), Dial-a-Ride service (46%), and adding bicycle and pedestrian facilities (45%) received the lowest proportion of high priority ratings.

Motivations for Using Public Transit

- Overall, residents reported that if limitations with the current public transit system were addressed, they would consider using the service (e.g., expand service and routes 15%, more buses and frequency 12%, more bus stops 10%, faster service 9%, or more/easier access 8%).
- Approximately one in seven residents indicated that there was nothing that would motivate them to use public transit (14%). For others, the decision to use transit was based on lifestyle or situation circumstances (e.g., if I didn't have a car 8%, more convenient 8%, higher gas prices 6%, different job 3%, if I couldn't drive 3%).

9.4 On-Board Interviews

PB conducted short, informal interviews with passengers on-board several Valley Metro and GUS routes. The purpose of these on-board interviews was to gain an understanding of the transit needs of people currently using the Valley Metro and GUS systems in Glendale.

All interviews were conducted on October 18, 2007. PB team members interviewed 37 passengers on 11 different routes that operate within the City of Glendale. In cases where very few passengers were present, team members spoke with the bus operator to understand issues specific to the route. A Spanish-speaking member of the PB team was available to conduct interviews in Spanish if needed.

Three members of the PB team spent the day traveling on Glendale transit routes, starting at 5:30 a.m. with the express commuter routes. An interview script was prepared for the interviews and used to guide the conversation. Questions included:

- Trip purpose
- Reasons for taking transit

- What the passenger liked and disliked about using the transit system
- What improvements, if any, they would like to see for Glendale and Valley transit

Please note that due to the informal nature of the interview process, participants were not drawn from a scientifically selected sample of current transit riders. As a result, the input and comments should not be interpreted to represent the views of the larger population of transit riders.

9.4.a Summary

Passenger messages consistent across several different transit routes follow.

Crossing Destination Barriers: Transit service to destinations in the west and southwest portions of the Valley, "past the 67th Avenue barrier," was a popular request among those interviewed. This was the most consistent message heard across all bus lines, and it came without prompting from interviewers. While outside of the control of the City of Glendale, these requests for service to the west and southwest reinforce the need for coordination of transit planning across city boundaries. There were also some requests for services north of Union Hills.

Increased Transit Service: Transit riders would like more transit service in general, with longer service hours, especially later at night. There were roughly an equal number of requests for longer service hours and more frequent trips. Passengers would also like larger buses.

Transfer Coordination: Passengers have experienced some problems trying to transfer between routes. Many interviewees described a situation in which the destination bus would pull away just as the bus they were currently on was approaching the intersection.

Increased GUS Service: Generally, transit riders on the Valley Metro fixed-route services were aware of the GUS circulator buses and liked the service. People who rely on transit for their primary means of transportation especially like GUS services and would like to see it expanded.

Passenger Amenities: Passengers would like benches and/or shade at bus stops.

Appreciation of Service: While passengers had many ideas for improvements to the bus system, they expressed an overall appreciation for bus service. Riders commented that they were grateful for the presence of the bus system, relied on the service provided, and appreciated the friendliness and helpfulness of drivers. One person indicated that drivers were his best source of information about service changes and improvements.

Demographics: Generally, the transit passengers interviewed used transit as their primary means of transportation because they were without a car. The most popular type of trip was a work trip. However, among those who use transit as their primary means of transportation, the bus system was used for all types of trips. The exception was the commuter express routes, where some of the passengers do own cars but prefer the convenience or cost-savings that transit provides.

9.4.b Highlights

Highlights of feedback regarding specific routes are shown below:

Route 59

- Would like more service north of Union Hills
- Would like more frequent weekend service for people who work on weekends

Route 67

- According to one passenger, this route tends to run behind schedule
- There seemed to be many passengers who traveled long-distance on this route; it may be a candidate for limited-stop services

Route 106

- Some passengers had the impression that this route experiences frequent breakdowns, leading to unreliable service on the route

Route 573 (Express)

- Passengers wanted more buses or larger buses due to crowded conditions

Route 581 (Express)

- The service is reliable in the morning, but often late in the evening
- Some passengers felt that more marketing of transit services should be done, such as on Channel 11

GUS Service

- GUS was popular due to its convenient service and low price. The price difference between GUS and Valley Metro was significant for some riders.
- Requests for GUS services to the 51st Avenue and Thunderbird Road area; to the 75th Avenue area; and to the "little Wal-Mart" (at 75th Avenue and Glendale Avenue)

Terry Johnson introduced City staff members and recognized Citizens Transportation Oversight Commission members

9.5 Public Meeting

The City of Glendale hosted an open house on November 7, 2007. The purpose of the meeting was to provide attendees with information about the Glendale Transportation Plan and provide a forum to discuss the future of transportation in Glendale.

A total of 18 people attended the open house. Residents were invited to attend the meeting through the project newsletter, which was emailed to City residents and delivered to City libraries, senior centers and recreational facilities. Meeting advertisements appeared in the *Glendale Star*, *Glendale Today*, and Glendale zones of *The Arizona Republic*.

Attendees were encouraged to complete the transportation plan survey either during the meeting or online at their convenience.

Gunn Communications, Inc. facilitated the meeting and PB provided an overview of the transportation study. Staff members facilitated active small group discussions. Topics included determining the top three transportation issues facing Glendale, as well as potential solutions to problems identified during the discussion.

9.5.a Future Transportation Issues

Road/Street Projects:

A variety of roadway and driving-related issues were discussed including intersection efficiency, lanes, signal timing, left-turns and fewer signals, pavement deterioration, neighborhood speeding, and the use of red light cameras.

Public Transit:

Both the availability of transit and convenience of service were mentioned as future transportation issues to be addressed. Attendees also mentioned the need for additional bus pull-outs.

Bicycle/Pedestrian Projects:

Education to assist in bicyclist/motorist interactions was recommended. Other suggestions included turning Glendale into a bike friendly city and offering pedestrian friendly development.

Other:

Other suggestions ranged from providing alternatives to additional roads, creating driver restrictions, offering employer incentives to working closer to home, and implementing more alternatives to driving.

9.5.b Potential Solutions

After selecting the top three transportation issues, the attendees were divided into three small groups where they brainstormed potential solutions and recorded their ideas on flip charts. Potential solutions are listed below.

Potential Solutions to Improve Intersection Efficiency

- Lighted signs at major intersections
- Signal sequencing
- Fewer signals, priority to major signal streets
- Longer left-turn lane
- Right-turn lane
- Bus pullouts
- Texas U-turn and Michigan lefts
- Round-a-bouts
- ITS smart signals, more cameras
- Coordinated timing/time of day use
- Grade-separated intersections where appropriate
- Consistency in applications, i.e., left-turn (lead/lag)
- One-way-couples at mile intervals

Potential Solutions to make Glendale a Bike Friendly City

- Make a commitment with a short-term action plan
- Bike friendly community workshop
- See cities that have one
- Create measurable goals
- Bike lanes on arterial streets
- Lighted bike paths
- Complete streets policy (car, bicycles, pedestrians)
- Extensive bikeway network
- Enforcement (law) i.e. – 3-foot law
- Commuter trip reduction plan

Potential Alternatives to Driving

- Incentives to businesses to assign employees closer to home
- Have developers build infrastructure
- Light rail for destination trips and major employment corridors

- Aging population needs for Dial-a-Ride and GUS the Bus
- Bicycling
- Working from home, encourage CEO's to promote
- Walking, more pedestrian friendly neighborhoods
- Alternative fuels
- More safety for kids walking to school

9.6 Briefings to City Commissions and Community Groups

Briefings to City commissions and community groups were made between October 2007 and January 2008. The purpose of the briefings was to provide information on the Transportation Plan Update and obtain additional input on the key transportation issues. Input was received from more than 100 people including the commissioners and group members and the public attending the meetings. The comments and questions below reflect input recorded on flip charts during the briefings.

9.6.a Parks and Recreation Advisory Commission – October 15, 2007

Questions were asked about the status of the following projects and programs:

- Light Rail
- Northern Parkway
- Airport improvement/expansions
- 59th Avenue from Deer Valley Road to Pinnacle Peak Road

Suggested Future Improvements:

- Bus shuttle between Senior facilities
- Regional park at 83rd Avenue and Bethany Home Road - direct access to stadium and area south could replace Brown parking lot
- 83rd Avenue north of Bethany Home Road needs improvement
- Need to include maintenance of streets

9.6.b Arts Commission – October 17, 2007

Questions were asked about the status of the following projects and programs:

- Grand Avenue expansion coordination with neighbors

Suggested Future Improvements:

- Beautification of existing freeways including new pedestrian bridge
- More bus pullouts to help traffic flow
- Art project to create a prototype bus stop with a Glendale signature but easy to maintain
- Special lighting to enhance streetscape
- Second gateway to downtown
- Way-finding building and pedestrian improvements in downtown

- Use alleys for pedestrian and bicycles in downtown
- More bus service
- Equestrian trails to the north
- Landscaping between sidewalk and curb to encourage walking
- More shade
- Repair of irrigation systems and replacement of dead landscaping along streets

9.6.c Mayor's Youth Advisory Commission – October 25, 2007

Transportation concerns identified by the youth:

- Construction and detours
- Bell Road congestion
- Drivers who slow down for school zones don't speed back up
- Police officers in cars without lights
- Don't want to drive to a transit stop

Suggested Future Improvements:

- 67th Avenue needs improvement
- More bus pullouts
- More timed lights and crosswalks
- More left- and right-turn arrows
- Finish sidewalks and more crosswalks
- Bike lines on street to help drivers
- Higher speed limits
- Longer yellow lights
- Synchronize lights crossing Loop 101 at 67th and 75th Avenues

Public Transit:

The students did not talk about public transit during the open discussion. After prompting by the facilitator, the group made the following comments.

- OK to take out of town
- Need more park-and-rides
- Not a high priority for a majority of students

9.6.d Chamber of Commerce Board of Directors – November 29, 2007

Questions were asked about the status of the following projects and programs:

- Light Rail
- Security of State Funding
- Impact of increase in alternative fuels use on gasoline tax

Suggested Future Improvements:

- Education to help employers comply with Trip Reduction Program
- Bus pullouts

- Coordinated planning of West side airport expansions with Luke AFB
- Light rail to north Glendale, west Glendale and downtown with west Glendale being priority
- Educate community about light rail
- Need paths everywhere for bikes, Segways and etc.
- Need definitive decision on accepted alternative fuel before investing in infrastructure

9.6.e Commission on Persons with Disabilities – December 18, 2007

Questions were asked about the status of the following projects and programs:

- What will be the impact of the aging baby boomer?
- Are all fixed route busses handicap accessible?

Suggested Future Improvements:

- Be better than average with service
- More bus pullouts
- Lag left-turn signal and uniform left-turn signals in the valley
- Slants (curb cut) needed at bus stops for wheelchairs
- Notification for blind/hearing impaired at bus stops
- Bus stops/crosswalk with brick/cobble is difficult to traverse
- Covers/shelters over stops are too narrow – wheelchair can't use
- Put City logo on street signs so you know where you are
- Temporary path (Peoria 75th-67th Avenues Northside) – needs stripelines/ markings for night vision
- Dial-a-Ride – use by entire city not just ADA

9.6.f Planning Commission – January 3, 2008

Questions were asked about the status of the following projects and programs:

- What was light rail commitment to the voters?
- What is status and finish date of Northern Parkway?

Comments Suggested Future Improvements:

- Don't think light rail services North Glendale well, it will better serve the southern part of community or the west for tourists
- Need to quantify "who" is going to use light rail
- North Glendale would work for a park-and-ride function as well as west Loop 101 area
- Improve bus service by providing more commuter bus service
- Dots on the maps in the brochure are not clear that they represent intersection improvements

9.7 Online Survey

The City of Glendale provided an online transportation survey on October 25, 2007. A total of 154 responses were received between October 2007 and February 2008.

Residents were informed of the survey through a link on the front page of the City's website, an invitation to participate e-mailed to residents, newspaper advertising promoting the use of the survey, and the project newsletter. In addition, hard copies of the survey were distributed to residents at senior residential facilities. These responses were included with the online survey responses.

9.7.a Most Important Future Transportation Issues

Residents responding to the survey were asked to select the three most important future transportation issues from the following list. Space was also provided to write in other issues.

- Unsafe drivers
- Traffic congestion
- Inadequate freeways
- Traffic in neighborhoods
- Delays at traffic signals
- Not enough transit
- Inadequate bicycle facilities
- Too many driveways along major street

As shown in Figure 9-1, traffic congestion, not enough transit and unsafe drivers were the three most mentioned transportation issues.

Respondents also identified the following as important future transportation issues.

- Lengthy construction projects
- Speeding in neighborhoods
- Poorly timed signal lights
- Speed limits versus traffic flow
- Not enough residents working within the zip code where they live
- Small street name signs
- Not enough bus stops
- Not enough regularly scheduled transit for elderly
- Speed bumps
- Jay walking
- People standing in yellow safety zone
- Lack of motorcycle awareness
- Need for inexpensive and convenient transportation for elderly
- Lights that turn red for small side streets when no vehicle is present

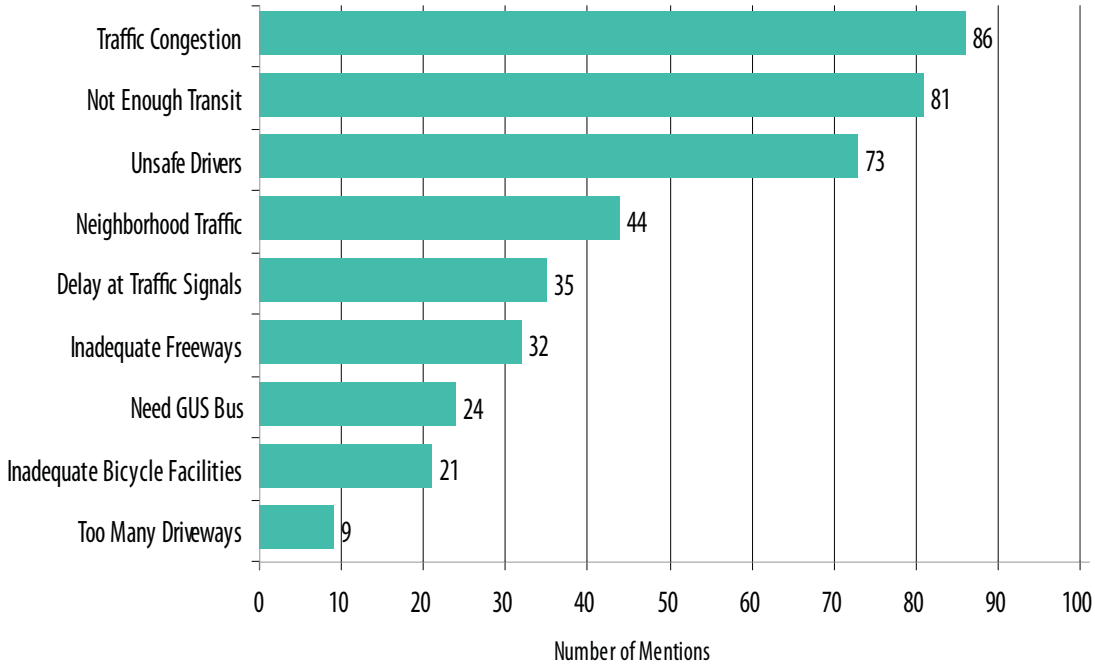


Figure 9-1 Most Important Future Transportation Issues

9.7.b Suggested Improvements by Mode

Residents were asked to identify future street and road, public transit and bicycle and pedestrian projects needed to improve the transportation system within the City of Glendale.

Future Road/Street Projects

The suggested road and street projects were sorted into the following categories. The listed improvements are verbatim from the survey responses.

General Street Improvements: Widening streets, adding landscaping, improving lighting and signage and adding more left- and right-turn lanes were the most common suggestions to improve local streets.

Street Maintenance and Repair: Fixing potholes and repairing rough streets were mentioned as needed improvements.

Traffic Signals and Lights: Several comments were received regarding the synchronization of traffic signals to improve traffic flow through intersections.

Specific Street Projects: – Residents provided suggestions for improvements to Bethany Home Road, 59th Avenue, 83rd Avenue, Olive Avenue, 51st Avenue, Ocotillo Road and 63rd Avenue.

Neighborhood Traffic and Speed Bumps: Many comments were received about speeding in Arrowhead Lakes and Thunderbird Mountain Park, but the respondents disagreed on how to resolve the problem. Some want more speed bumps and others want speed bumps removed.

Speeding and Enforcement: Unsafe drivers appear to be a major concern and resulted in suggestions for enhancing enforcement of speed limits and other traffic laws.

Freeways: Residents requested more freeways including widening and improvements to Loop 101.

Northern Parkway: Comments were received in support of the parkway and a recommendation for altering the design was received.

Grand Avenue: Limiting access to Grand Avenue and building more over/under passes were included in the comments received.

General Street Improvements

- Raised landscaped median in the major arterial roads
- Right turn lanes and/or right turn arrows. Elongated left turn staging lane to prevent blocking of outside lane
- Many of the street name signs in Glendale are faded too small or hidden away behind trees. At intersections the internally illuminated street signs are too small to read. Every other valley city has much bigger ones and are nicer looking. Also maybe put the city logo on all street name signs. Adds to community pride
- Wider streets (3 responses)
- Caution sign where pedestrians are crossing
- Roads needed to be wider - add more lanes and better marked crosswalks
- More one way streets (2 responses)
- We need more red light cameras and more left turn on arrow only at all major intersections
- More left turn lanes
- We desperately need east/west transportation to alleviate the congestion on Bell Road
- Need to create better flow on the north and south roads through Glendale. East west routes are good but I often run into more delays with less traffic on the north south roads
- Street lights are bad, not lighted
- Road widening, not just at the point of the business but miles in each direction should be part of the big picture.
- Continue to widen several streets to increase the options going East/West between the 101 and the 17, don't just focus on one route

- Stop building medians at all the intersections
- Make left turn lanes with simulated islands (gore zone etc.) to the immediate right of the traffic turning left (between the left turn traffic and the thru traffic. This would stagger the left turn traffic coming from opposite directions thus allowing drivers making left turns to see past the left turning driver on the opposite side of the intersection (allowing drivers to see when it is safe to turn allowing for quicker and safer left turns)
- More turn lanes
- North/South convertible lanes
- Right hand turn only lanes
- On heavily traffic areas have two turning lanes, especially during rush hour
- Glendale is a very bland looking city. Look at Tempe and Scottsdale. They look nice because of the little things they do i.e. nicer looking traffic signals nicer signs...better landscaping
- Notice for projects in all areas
- One way streets
- Frontage road without businesses

Street Maintenance and Repair

- The roads in the City of Glendale are in need of major help. More rubber overlay and repaving of neighborhoods
- Repair rough and potholed streets in the southern parts of Glendale (south of Glendale Ave.)
- Nicer streets
- The streets have been torn up for a long time now; which is totally understandable I have no problem with that. It's needed. I would not want to think of more projects to add to the already burgeoning street maintenance schedule
- Fill potholes, fix bus stop seats and add seats
- Not having every major road torn up at the same time; and fix potholes
- Pick up the barricades when no one is working if it is safe to do so
- Stop putting barricades up on 4 main streets at one time with no one working on the streets for a month or more

Traffic Signals and Lights

- Better light timing
- Traffic light timing
- More lights
- Change the turn signal to after the green light-just like Scottsdale and Tempe
- We need traffic light synchronized between neighboring cities, more lagging left turn arrows

- Time traffic lights when they are installed
- To not give one car sitting in a left hand turn lane a green arrow. Green arrows should only be given if there are three or more cars. Also, the better timing of traffic signals
- Synchronize lights on major streets according to posted speed limits
- Set the stoplights to allow flow and regulate traffic by demand
- Lights timed at a speed that makes sense
- Better lights working with speed limit
- More left turn lights like the one at Cactus
- Traffic signal coordination
- Lagging left arrow lights are safer
- More time is needed at signal lights when taking a left turn
- Signal lights for turns on left arrow only
- More speed limit timed lights
- Less traffic signals
- The stoplights do not stay green long enough for people who are disabled and elderly. 51st Ave and Olive and other places along 51st
- Work with surrounding cities with regard to synchronizing traffic signals as well as logistics (make them all either leading left turns or all lagging left turns not both)

Specific Street Projects

- Bethany Home Rd 59th to 67th Ave...Plant trees...make that stretch more eye appealing!
- 59th Avenue widening
- The widening of 83rd Ave between Glendale and Northern - Also a right turn lane for southbound traffic at 51st and Olive avenues
- More street lights along Olive Avenue and 51st avenue. Those are very dark streets with inadequate lighting
- Fewer traffic lights on major arteries - 59th Ave
- Traffic light at 53rd Ave
- Ocotillo 59th Ave to 51st Ave
- 51 Ave and Camelback
- Lights at 57th Ave and Olive
- Widen 59th Ave.
- Do something about 59th Avenue
- The signal at Utopia and 59th Ave needs to be adjusted to take into account the church traffic on Sunday mornings. The red light is extremely long for drivers on Utopia and it is only green long enough to allow 4 cars through. It would be wonderful if this light would allow 10 or 15 cars through on Sunday mornings.

- Relieve traffic congestion along Bell Rd. between the 101 and 67th Ave.
- Improve congestion on 63rd Ave coming from GCC

Neighborhood Traffic and Speed Bumps

- Neighborhood traffic mitigation
- Arrowhead solution without speed bumps
- Innovative ways to slow traffic. Speed cushions do not work!
- Remove the speed bumps on 51st Ave
- Need speed bumps in Arrowhead Lakes
- Eliminate cut through traffic coming from 51st to 59th through Arrowhead Lakes. Signage etc.
- Arrowhead lakes area speeding issues
- Slow traffic down over Thunderbird Mountain Park
- Mitigation of traffic and high speeds in neighborhood streets
- Remove speed humps from residential areas or at least the frequency of them. You cannot go the speed limit over the speed bumps without bottoming out or severe jarring. The speed limit might as well be 15 mph
- Parking of semi trucks overnight in neighborhoods
- Do away with speed bumps
- Remove the speed bumps on 51st Ave
- Get traffic congestion out of residential neighborhoods

Speeding and Enforcement

- Lower speed limits - enact harsher criminal penalties for traffic violations; and increase enforcement
- Traffic speed zones/lights to deter drivers from exceeding the speed limit by 20 mph and higher!!
- People on 51st Ave speeding and near Waymark Gardens speeding motorcycle
- Monitor 4-way stops - vehicles do not stop daily on 71st Ave
- Get rid of illegal drivers
- Cameras for speeders
- Clear accidents (non-recurring congestion) off roadway faster - educate PD and FD to gain support
- Speed mitigation
- Enact new traffic laws heavily penalizing those who speed for any amount over posted speed limit those with out insurance - registration restricting neighborhood traffic only to residents making cut through traffic illegal except on identified routes.
- More police looking at speeders and impaired drivers
- More law enforcement!!
- Enforcement of laws

- Enforce use of signaling lane changes and all turns!
- Lower speed limit
- Make driver stop running red lights. Drivers more aware of people crossing at cross walks
- Make drivers stop running red lights, more drivers aware of people crossing streets.
- Drive slower make sure they stop
- Better drivers
- First to educate the drivers that are irresponsible and don't care about others
- Drivers education classes
- Timed lights cameras for reckless and speeding drivers

Freeways

- Expansion of loop 101 to five lanes in each direction
- Improve 59th Ave. intersection with the 101. South bound left turn lane needs additional space, the median is too wide and unnecessary!
- HOV lane on the 101
- 101 needs more lanes NOW
- I-10 need more lanes NOW. To CA
- I-17 north of the 101 needs more Lanes now. All need the now not in the future NOW
- Something needs to be done to reduce the speed on Beardsley (101 access). Drivers go 55-60 mph and fail to yield to people exiting 101. Perhaps some painted YIELD signs in the road at the gore-points to reinforce the fact that drivers on Beardsley have to yield to 101 exiting traffic
- Loop 101 widening. 59th and Loop 101 bridge widening
- Improve freeway access and limited access parkways
- More real freeway lanes
- We are behind on freeways need more and widen
- Expand loop 101 to five lanes in each direction
- Work with the City of Phoenix to put an additional north /south two lane road through the preserve down to the 101 at approximately where the single lane road comes over the mountain at 47th Ave or what ever it is
- Add lanes to 101
- More real freeway lanes. Not the stupid HOV lanes, but real lanes
- Make more lanes on all the major highways going out of town
- More bypass
- More one ways
- More freeways
- Add more freeways by the stadium

Northern Parkway

- Alter Northern Parkway plan. Northern has some good development happening close to the 101 and it would be absurd to sacrifice future development and high end homes just to funnel traffic to a dead downtown that has no hope of generating the revenue that property close the 101 can. End the parkway before Park West
- Northern Parkway (2 responses)
- Expedited completion of the east/west corridor (Northern)

Grand Avenue

- Turn Grand Ave into a limited access parkway or freeway. Lengthen turn lanes
- Turn Grand Avenue into a freeway
- An Overpass over Grand Avenue and 51st
- Under pass at RR crossing
- Some train crossings during peak hours
- Restrict train from operating during peak hours
- Double turn lanes Bethany to Grand and Grand to Bethany
- Under pass at RR

Future Public Transit Projects

The suggested public transit projects were sorted into the following categories. The listed improvements are verbatim from the survey responses.

GUS Bus: Several requests were received for more GUS Bus service and for service to Vista Alegre and Kachina Place.

- GUS bus on 63rd Ave that goes by Kachina Place (5 responses)
- GUS bus thru Vista Alegre (23 responses)
- GUS on the South side of the city
- GUS the Bus - more practical door to store in AZ heat than distance from neighborhood to light rail
- GUS Bus needed very desperately
- More GUS Bus service (4 responses)
- GUS bus in southern area off Glendale Ave
- Make the GUS Bus available to the people who need it. The poor and the elderly. Not just to the people who can afford to shop downtown Glendale
- A GUS bus from senior housing to adult center, shopping and bingo would be nice
- GUS Bus should go to Wal-Mart and eliminate stop at the YMCA
- More GUS Bus stops along their routes
- GUS Buses are late
- GUS bus would take us and be safer for us seniors (2 responses)

- Get cars off the road as we need better transportation with GUS Bus
- Better driving systems through GUS Bus. We are seniors

Dial-a-Ride: Suggestions included service for seniors only, better transfers to other systems and improved service.

- Dial-a -ride should be for seniors only
- I am sight impaired. Dial-a-ride is my only option
- We need more dial a ride vans to transport our aging population
- Dial a Ride should interface with all other Valley cities. It is VERY Difficult to go to a medical appt in another city using Glendale's system. Dial a Ride is NOT the Cadillac of transit systems. Much improvement is needed. You can wait up to 2 hrs on the phone to schedule a ride. This is ridiculous. My husband uses the bus when he can but he is handicapped so needs Dial a Ride. Glendale has made some great strides in a lot of areas but this needs some Immediate attention
- Need to go out of area at least 1 mile or more for handicap Dial-a-Ride
- Local (Glendale) on the south side of Glendale (S. of RR tracks) The Dial-a-Ride needs to be called in advance 24 hours to take people to the store then allow 15 to 20 minutes before they come to pick you up or you wait 2 or 3 hours for them to take you home. If it is impossible to keep a Dr. appointment except to leave 3 or 4 hours in advance
- Dial-a-ride is always late
- Dial-a-ride could be more on time
- Dial-a-ride in more areas

Bus Service: More bus routes and extended days and hours of service was suggested. Comments also included requests for more bus service in the north portion of the city and on Bethany Home, Bell Road and Maryland.

- More schedules on Sunday
- Bus from 59th Ave to 67th Ave. There is none now
- More buses and routes (18 responses)
- Bring back city bus on Maryland
- We appreciate that they have wheelchair and walker accessibility
- More bus connections with Phoenix
- Busses that travel further north
- More transit routes north of the 101 (2 responses)
- Increased Express Bus routes and expanded into North Valley
- More buses. I would use the bus and ride into the city but it currently is too time consuming
- More bus routes/ more stops in highly populated areas - specifically employers and locations with higher concentration of employees and/or patrons
- Routes that align with larger employers within Glendale

- Transit route on Missouri Ave. from 55th Ave-as far west Missouri extends.
- Multiple energy efficient vans to pick up at residences and transport to transit hubs
- More busses to run each east west road every mile and each north/south road every mile
- Bus 51 go all the way to Bell Road
- Bethany Extension
- More frequent local bus service; more true Express buses going downtown. There are many working individuals who have to travel downtown from Glendale. There are only two Express busses in the morning and two at night. I take the early one at 6 a.m. and take the early one home at 5 p.m. but because there's no other option I work 10 hour days; 5 days per week. 50 hours at work is not what I would rather do with my time
- More bus routes and more buses on routes to run 15 to 20 minutes
- Senior discounts, more local service
- Extend bus hours (2 responses)
- Transit system that runs later hours and on weekends
- Average 15 minute bus pick up everyday
- Public transit out to the 101 around Arrowhead
- Smaller buses more frequency
- Have more public transportation (9 responses)
- Better transit
- More public transportation so we can get to more places
- Better transit system
- A better public transit plan
- Bus will always help
- Have public transportation make trips every 15 minutes
- Make it free
- Make it easier to take public transit
- Easier and more convenient public transportation
- Add incentives for the use of public transportation
- Education of the public on public transit but the transit system has to be more convenient and frequent for people to consider using it
- Actually get a RAPID bus to run from Glendale to downtown Phoenix downtown. No stopping, just pick up and drop off when we get there. Business people would love it. I would be more than happy to drive my car to the park n ride Myrtle Ave and 59th. if I could be assured of getting on a RAPID bus and getting downtown without all of the miserable stops that we have to make along Northern using Bus Route 570

Bus Stops, Pullouts and Park-and-Rides: Adding pullouts, stops and park-and-rides were included in the suggestions. Also suggested were improvements to bus stops include more seating and shade.

- Bus pullouts on major streets to help control traffic backups (2 responses)
- Additional bus and park and ride areas (2 responses)
- Need more (better spaced) bus stops along Thunderbird west of 59th Ave.
- Bus stop signs so you can see them on a post
- Good covered bus pick up areas
- Add bus seats at bus stops and fix bus stops
- Covered bus shelters
- A place to sit while waiting for the bus on 51st Ave. Bus stop to far down the street should be closer to corner
- More bus shelters for pedestrians
- More places where buses can pull over out of traffic for pickups
- Bus turn-ins i.e. Peoria Ave just E of 43rd Ave -- Every morning all in right lane stuck in a major jam!

Rail Service: Suggestions included extending light rail into downtown Glendale and the stadium. Other recommendations included commuter rail and underground or subway rail service.

- We need train underground
- Extension of light rail into Glendale
- Light rail project thru Phoenix
- Light rail with its own corridor so it won't have to stop at traffic signals
- Light rail to the Stadium and Arrowhead Mall
- Light rail along Bethany Home Rd
- More light rail
- Light rail and heavy rail connectivity to central core of Phoenix
- Light Rail to Westgate via Loop 101/I-10
- Commuter rail -- not slow light rail!
- Light rail system to be safe, clean, quiet, and convenient
- The rail needs to be added to Glendale from downtown
- I think it would be great to hook Glendale up with the Phoenix light rail system. It would be ideal to have light rail down the center of our freeways
- Light rail into downtown Glendale, then to Glendale/Loop 101 area. NOT along I-10.
- Light rail downtown to stadium and arena
- Light rail
- Light rail to the Westgate center and shuttle service between Westgate and Catlin Court downtown

- Need to expand rail system
- Subway system like they have in Boston
- Since we are forced to have the light rail we should have it go out I-10 to the north bound 101 to the stadium and use the stadium parking lots for FREE park and ride service
- If the light rail would run anywhere close to were I live I would use it as often as possible. I think it is a great form of transportation and actually prefer it to the bus system
- Subway system

General Comments: Included comments supporting current plans and a few comments stating that money should not be spent on public transit. A comment was also received to bring back the Luke Link.

- None; buses are not used near capacity and light rail is not flexible so that it can change as development moves
- Bring back the Luke Link!
- Continue with current plans. I think they are moving in the right direction.
- I don't want or use public transportation
- None - spend the money on getting the streets flowing and congestion removed from existing streets
- Give the people who ride the bus a break on the cost of a monthly pass instead of raising the price
- Transit timing exchange with other cities
- Require residents to carpool/ride bus more
- Tax break to telecommute
- Make mass transit more appealing than driving a car with one person in it!
- Incentive for retails to employee workers within zip or adjacent zip code
- Commuting to and from work and shopping trips
- Work From Home
- Staggered work week
- Perhaps a free day; well publicized so that people could become acquainted with bus travel

Future Bicycle/Pedestrian Projects

The suggested bicycle and pedestrian projects were sorted into the following categories. The listed improvements are shown verbatim as received from survey respondents.

Bike Lanes and Paths: Bike lanes on all arterial and neighborhood streets were suggested by the survey respondents. Connectivity of the bicycle system and completion of the canal trails were also suggested.

- Neighborhood lanes
- Bike lanes running north south
- Routes that align with schools in the Peoria district
- Addition of striped bike lanes on arterials
- More striped bike lanes
- Continue efforts to create bicycle facilities
- Safe biking paths
- More bike lanes and signs designating bike routes/paths so motorists will be more aware
- More bike lanes
- Safer bike lanes
- Safe paths so bicyclist can use this means of transportation to get to church, some errands and pleasure riding
- More and improved bike lanes (5)
- Need to add bicycle paths that you can get around Glendale but they need to be off the main roads
- Make existing bike paths like Phoenix's
- Completion of pedestrian/bicycle/equestrian paths under major roadways along the Arizona Canal. Additional bike paths along major streets
- Easing the incline from 55th Ave
- Insure that city bike trails connect with adjoining cities
- Extend lanes farther south and north east-west
- Bike lanes on arterial streets. More connectivity with bike lanes and paths
- Connectivity of bike system
- Stripe all arterials and match up with existing bike trails into Peoria and Phoenix
- Widen Grand and install bike lanes - 67th Ave to 91st Ave.
- More safe bike paths across major streets
- Grand Canal
- Have a bike lane on Maryland
- All major roads need bike lanes
- Better marked trails and crossings. More visible color code
- Streets in neighborhoods
- More bike ways to ride (2)
- Have bicycle lanes also signs for pedestrian crossing
- Need more bicycle routes to get them off the busy streets
- Better control of bicycle riders on sidewalks
- Maintain bike paths/while creating more of them
- How about making Glendale a Bicycle Friendly City which will draw more bicyclists

Sidewalks and Pedestrian Facilities – Pedestrian over/under passes over major streets, Grand Avenue and Loop 101 were suggested. A sidewalk along 91st Avenue for Canyon High School students was also recommended.

- Over pass/under at Myrtle and Grand for Glendale HS
- Mid block pedestrian under/over passes and/or pedestrian bridges over Thunderbird
- Everywhere possible
- Over/Under passes
- Current wide intersections are not ped/bike/family friendly or safe
- Create more walk ways. Possible a pedestrian bridge over Bell Road and other main roads.
- More pedestrian bridges over busy roads like Thunderbird
- Better pedestrian access from neighborhoods into adjacent commercial areas, such as access between Peoria and Glendale across 101 north near Bell Road
- Longer pedestrian walk lights
- There needs to be a sidewalk along 91st Avenue northbound from Camelback Avenue for the high school students walking and riding their bikes to Copper Canyon High School. Please consider adding this for the student's safety. I have seen bicyclists going to school on 91st avenue (in the street) with very dangerous traffic because there is no sidewalk for them
- When you walk on sidewalk, you hope you don't meet fast moving bicycle that barely misses you
- More sidewalks
- Pedestrian side walks too close to streets
- More Pedestrian overpasses

Bicycle Facilities: Respondents suggested bicycle lockers at Westgate, Civic Center and downtown and bike lock ups at bus stops.

- More bike lockers in public areas - Westgate stadiums and downtown
- Stop signs for bikes on Glendale so that riders would know the rules
- Civic Center does not have a bike rack
- Other than bike racks on busses
- Have a secure bike lock ups at bus stops

General Comments

- Bicycles and pedestrians need to obey traffic signals
- Pedestrian should wear lighter clothing at night
- Spend the money on vehicle traffic issues and worry about bicycles later if funding is available!

- Not a high concern for me
- Too expensive for the impact
- Most bicycle and pedestrian activity is limited by heat and age of residents
- Doing good job
- Better education on where and how bicycle can be ridden

Other Comments Related to Growth Comments

- Stop building more shopping centers. Stop uncontrolled residential construction.
- Don't allow businesses to continue to be built when existing roads are already over congested.
- Keeping very high density to limited areas and adding more low density in some existing older neighborhoods. High density in Loop 101/Westgate and medium density in downtown Glendale. Lower density in established SF home areas
- Create residential/business areas where people can live and work within the same square mile and do much of their shopping
- Stop illegals from entering our country. That is your main problem of congestion. Problems on our streets are populating our city
- Too many people no more new residents close the gates!!
- One day a month each person must keep their vehicle off the roadways. Use odd/even license plates to determine who/when
- Restrict unnecessary travel during rush hours especially on main routes

9.8 Annual GO Program Open House

The City of Glendale hosted the annual GO Program Open House on April 16, 2008. Nine stations with information on each element of the transportation program were arranged around the room. Team members were available at each station to answer questions and provide updated information. Nineteen people attended the open house. The following is an overview of comments made during the meeting.

Grand Avenue Improvements: The following concerns were identified by business and property owners.

- Maintaining business access
- Impact to property value
- Ability to continue current business operations
- Beautification of existing freeways including existing pedestrian bridge

Safety/Education: Residents asked questions about the following programs:

- Bus Buddies Program which educates senior residents on how to plan a trip and ride the bus
- Proper helmet fitting – how does the City spread the word?
- What type of signage will be used for the Motorcycle Awareness Campaign?

Northern Parkway: Questions asked included:

- What is the project?
- How will it help traffic congestion?
- How soon it will be built.

Transit Programs: Comments and questions received included:

- How does the RPTA Regional Paratransit Study affect Glendale's Dial-A-Ride?
- Like GUS bus and want more GUS routes and/or extensions.
- What is the status of the Glendale extension for the Light Rail Transit? What are other alignments being studied?

Transportation Plan Update: Comments and questions received included:

- Pleased with the projects in the current program
- Most residents were unable to come up with additional transportation needs.
- Need a right turn lane from north 67th Avenue to east Northern.
- What is the status of the update and when the plan would be presented to public for review and comment?

Street Programs

- One citizen stated they liked speed humps. Another stated he did not like the humps because they do not slow down people who want to speed through a neighborhood.
- Residents asked about the schedule and objectives of current construction projects in the GO program.

9.9 Briefings to City Commissions and Community Groups

Additional briefings to community groups were made between February and March 2008. The purpose of the briefings was to provide information on the transportation plan update and obtain additional input on the key transportation issues. Input was received from more than 40 people. The comments and questions below reflect input recorded on flip charts during the briefings.

9.9.a West Maricopa Board of Realtors – February 5, 2008

Questions were asked about the status of the following projects and programs:

- Safety on the existing Loop 303

9.9.b Kachina Rotary – February 19, 2008

Questions were asked about the status of the following projects and programs:

- Durability of rubberized asphalt
- Speed bump program

- Construction barriers not being removed in a timely manner
- 99th Avenue Park-n-Ride lot

Suggested Future Improvements:

- Street signs need to be lighted
- Need street signs prior to major intersections to indicate upcoming street name
- Bethany Home Road – need to connect throughout the city
- Need more red light cameras

9.9.c Glendale Rotary – February 28, 2008

Suggested Future Improvements:

- Construct light rail next to freeway for faster speeds instead of near roads/streets
- Aging population needs more frequency later hours of bus service
- More bus shelters
- Technology to assist dispatching dial-a-ride to shorten wait times
- Technology to monitor traffic such as red light cameras

9.9.d Glendale-Longhaven Evening Lions Club – March 27, 2008

Questions were asked about the status of the following projects and programs:

- Why are all east and west streets being improved at the same time?
- Are there any streets that are not being improved at this time?
- Why are some streets such as 67th Avenue under construction for several years
- Traffic mitigation programs – how do you obtain speed bumps and who pays the cost?
- Red light camera locations

Suggested Future Improvements:

- Lagging left turn signals like at 51st and Olive
- More red light cameras (67th Avenue and Bell Road; 67th Avenue and Peoria Avenue)
- More enforcement especially in southern portion of city
- Improvements to 55th and Camelback intersection – left and right turn lanes are confusing

Comments:

- It takes one hour to travel from Loop 101 and Glendale Avenue to SR51 and I-10.
- When construction barriers are placed on streets, lanes are too narrow and can't get through with travel trailer

- Can't see traffic lights because of sun glare
- Camelback Road overpass at Grand Avenue has made a big difference in reducing congestion on Camelback Road
- Hats off to City of Glendale and its staff for its great showing during the Super Bowl. Have heard nothing but good things when we are traveling across the country.

9.10 Senior Surveys

Residents at senior living facilities were provided with hard copies of the online survey questionnaire so the residents would have an opportunity to provide input. An additional 12 surveys were returned after February 2008. Ten of the respondents live in zip code 85301 and two reside in zip code 85302.

9.10.a Most Important Future Transportation Issues

Residents responding to the survey were asked to select the three most important future transportation issues from the following list. Space was also provided to write in other issues.

Issues identified as the most important were:

- Not enough transit – 11
- Traffic congestion – 2
- Delays at traffic signals – 2
- Too many driveways along major streets – 1
- Traffic in neighborhoods – 1
- Other Issues:
  - We need the Gus Bus
  - Combine the existing transits and use the money to establish a real city system
  - Things look OK to me – only in city 2 years
  - Get rid of Dial-A-Ride
  - More covered bus stops; shaded
  - Dependability – can't rely on when they will be there

9.10.b Suggested Improvements by Mode

Residents were asked to identify future roadway, public transit and bicycle and pedestrian projects needed to improve the transportation system within the City of Glendale.

Future Road/Street Projects

- Need more options
- Need more transportation
- Consideration for ADA or pedestrians

- Not sure – most road and street I use look good
- Clean up the city streets and clean the sewers
- Side streets should have more cul-de-sac cutoffs
- Repair potholes quickly

Future Public Transit Projects

- We need the Gus – the senior rides are not adequate, especially as far as having to reserve, etc.
- Gus bus – 3 responses
- (Gus bus) 6001 W Missouri Avenue to bus stop
- Gus bus to Missouri to pick us up
- I would like to see a Gus #4 – come south, possible on 63 Ave to Missouri East to 59th Ave back to 59th & Glendale stopping at 6001 W. Missouri Ave.
- On schedule buses at permanent bus stops
- Rush hour bus service—6-9 a.m and 4-6 p.m. More frequent service during those hours
- More Gus busses to cover wider area and to serve 7 days a week
- Buses on major routes should have longer schedule (12pm). People need transit to and from work. Also, routes in Glendale stop earlier so going to games in Phoenix makes it harder to get home.

Future Bicycle/Pedestrian Projects

- Do not know
- Respect for old people and ADA
- Crossing lights too short
- Bus rack to hold 6 bikes
- Traffic lights with timer to let pedestrians know how long it takes to cross street: 27 second for example
- More crosswalks and more signs

Other Comments

- Take cars off the streets
- Residents felt all of the transportation improvements in the draft plan update were important. However, the extension of METRO light rail seemed to generate the most responses. The extension of light rail was by far the most important proposed improvement, but the residents differed in where the extension should be built. Some favored the I-10 to Loop 101 to the entertainment district while others stressed the importance of not bypassing downtown and the historic district.
- Other important improvements include new commuter rail service, intersection improvements, more frequent bus service and pedestrian improvements. Less

important was new streets west of 91st Avenue, increased Dial-a-Ride service, on-street bike paths and traffic education.

- The general comments provided as part of the online survey shows a trend in the number of residents requesting laws governing the use of cell phones and a continued increase in comments expressing a need for additional traffic enforcement. Local neighborhood traffic mitigation seemed to be less of a concern during Phase 2 than in Phase 1.
- Get rid of Dial-a-Ride
- With more people moving to Westside, I think not much unless we ban cars!
- Better public transportation
- More Generate "Bus lanes only" on very busy streets (Glendale Ave) for one.
- More traffic signals with turning arrow that relieves some traffic during rush hours 7-9 am and 4-6 pm no turns. Also, traffic aids can help with traffic congestion
- Regulate lights and more left turn signals
- I have doctors in Phoenix. Dial-a-Ride does not go there. What can I do?
- Why when buses going east or west and north and south, the driver see bus approaching but will not wait on riders. They see people trying to cross the street and some people or seniors or on cane and cannot walk fast. Driver still pulls off. Sometimes riders tell driver someone is coming fur bus and driver still pulls off.
- Many people stand in heat and rain waiting for the bus.

9.11 Online Survey

The City of Glendale provided an online transportation survey on October 25, 2007. An additional six surveys were completed after February 2008.

Residents were informed of the survey through a link on the front page of the City's website, an invitation to participate e-mailed to residents, newspaper advertising promoting the use of the survey, and the project newsletter. In addition, hard copies of the survey were distributed to residents at senior residential facilities. These responses were included with the online survey responses.

ZIP Codes – The following are the zIP codes were the survey respondents reside:

- 85301 – 2
- 85306 – 2
- 85308 - 2

9.11.a Most Important Future Transportation Issues

Residents responding to the survey were asked to select the three most important future transportation issues from the following list. Space was also provided to write in other issues.

Issues identified as the most important were:

- Unsafe drivers – 4
- Traffic congestion – 4
- Delays at traffic signals – 2
- Inadequate bicycle facilities – 2
- Not enough transit – 2
- Inadequate freeways – 2
- Too many driveways on major streets – 1

9.11.b Suggested Improvements by Mode

Residents were asked to identify future roadway, public transit and bicycle and pedestrian projects needed to improve the transportation system within the City of Glendale.

Future Road/Street Projects

- Exit West from 101 to Beardsley!! Get this one built ASAP it is the most bang for the buck.
- Repave 43 Ave from Camelback Ave to Peoria Ave.
- Problems with 3 down to 2-lane merging at major intersections; additional bus pull-outs along major streets.
- Continuity of bicycle facilities
- Non major intersections with a street light should not interrupt the flow of traffic when major intersections street lights are timed

Future Public Transit Projects

- Encourage electric cars and provide charging stations
- Light Rail From Park and Ride at 99th Ave to connect with light rail at 19th Ave Bethany Home.
- Public transportation causes more traffic congestion
- Continued expansion of bus service
- Have Valley Metro run more Express routes throughout the day like every hour during non peak times and start as early as 4AM.

Future Bicycle/Pedestrian Projects

- Continuity of bicycle facilities

Other Comments

- Traffic enforcement
- Stop putting so much landscaping in. This adds way too much to the cost and makes it harder to see obstructing driveways and signs slowing traffic and contributing to accidents.
- Two things mentioned above concerning lane mergers and bus pull-outs.
- More mass transit and better access to the major corners for bicyclist.

9.12 Phase 2 Public Involvement

Residents felt all of the transportation improvements in the draft plan update were important. However, the extension of METRO light rail seemed to generate the most responses. The extension of light rail was by far the most important proposed improvement, but the residents differed in where the extension should be built. Some favored the I-10 to Loop 101 to the entertainment district while others stressed the importance of not bypassing downtown and the historic district.

Other important improvements include new commuter rail service, intersection improvements, more frequent bus service and pedestrian improvements. Less important was new streets west of 91st Avenue, increased Dial-a-Ride service, on-street bike paths and traffic education.

The general comments provided as part of the online survey shows a trend in the number of residents requesting laws governing the use of cell phones and a continued increase in comments expressing a need for additional traffic enforcement. Local neighborhood traffic mitigation seemed to be less of a concern during Phase 2 than in Phase 1.

9.13 Annual GO Meeting

The Annual GO Meeting was held on Wednesday, April 29, 2009 at the Glendale Civic Center. During the meeting, PB and GCI staffed a booth with display boards highlighting the key elements of the Transportation Plan Update.

Ten residents attended the meeting and three comments on the plan were submitted. The comments were:

- If light rail is approved, elevate in high traffic areas
- Would like to see Gus Bus at Ocotillo between 47th and 49th. Would like to use bus more often but not able to walk the 3-4 blocks to stop
- Direct shuttle between Westgate and Downtown. Regular schedule 7 days per week

9.14 Briefings to City Commissions and Community Groups

Briefings to City commissions and community groups were made from May to June 2009. The purpose of the briefings was to provide an overview of the transportation plan update and identify which elements were most important to the residents. Input was received from more than 50 people including the commissioners and group members and the public attending the meetings. The comments and questions below reflect input recorded during the briefings.

9.14.a Arts Commission - May 6, 2009

Terry Johnson, Deputy Transportation Director, provided an overview of the draft transportation plan update. The following are the questions asked during the presentation.

- ***Question*** – Is landscaping a priority?
  Landscaping is not specifically a priority, but it is something that comes with the construction component of projects.
- ***Question*** – Is there going to be any art feature at the Park-and-Ride?
  We do have art work scheduled for the Park-and-Ride. It is currently on hold due to money constraints.
- ***Question*** – Who else helps with the regional financing of the Northern Parkway?
  Federal funds will share the cost as well as Peoria. There will be multiple jurisdictions that will fund this project.
- ***Statement*** – For the Northern Parkway we might want to look into the model that was used with the light rail. When it comes to dealing with so many jurisdictions, they can share how they were successful.

9.14.b Parks and Recreation Advisory Commission - May 11, 2009

Bob Darr, Transportation Planning Manager, provided an overview of the draft transportation plan update. The following are the questions asked during the presentation.

- ***Question*** – 67th Avenue has had a great deal of construction over the last 10 years. Why not do it all at once?
  Normally the money isn't there. We have to do the work when we have the resources. Two funding sources – GO and HURF.
- ***Question*** – What is going on at the 101 and Thunderbird?
  The City of Peoria is widening the street.
- ***Question*** - Where is the light rail going?
  At this point, there is a lot of discussion to bring the light rail up the 101 and to the stadium. Plans change as needs change.
- ***Question*** - In regard to funding of plan costs, is funding all subject to future revenues?
  Yes, due to this we have had to push out programs.
- ***Question*** – What is the distribution of the stimulus money?
  We will receive just over six million dollars. This money is programmed to fund seven projects.
- ***Question*** – What percentage of controlled signal lights do we have in the city?
  I am not sure with the percentage number, but I can tell you it is in the range of 38 signals. This effort requires cable to be placed to the lights.
- ***Question*** – With new street development are we looking into having sidewalks set back?

Generally yes. Each roadway is different. We are always trying to make the effort to enhance sidewalk usage.

9.14.c Kachina Rotary - May 12, 2009

Bob Darr, Transportation Planning Manager, provided an overview of the draft transportation plan update. The following are the questions asked during the presentation.

- ***Question*** – Is there current bus service on Litchfield Road or is that in the future?
  Currently, there is not service on Litchfield Road. It is on future plans to have service in that area.
- ***Question*** – How much of the federal stimulus money did we get?
  We will receive 6.058 million and these funds are programmed to cover seven projects.
- ***Question*** – Are you planning on tearing up Grand Avenue?
  Hopefully not. We will be closing the turning in and outs of businesses on Grand Avenue to make it safer to travel and to keep traffic flowing. Bethany Home will have an underpass.
- ***Question*** – How does the light rail plan to fit into Glendale?
  There are two corridors that are being looked at. One is Glendale Avenue and the other is I 10 to the stadium. We have to get local and federal approval. The monetary support is vital to support the program. The length of the approval is approximately 10 years.
- ***Question*** – Why don't we have more bus pull outs so the traffic doesn't get backed up and stopped in the intersection?
  We have programs that continually address the ability to put pulls out when the funding is available.

9.14.d Commission on Persons with Disabilities - May 19, 2009

Terry Johnson, Deputy Transportation Director, and Cathy Colbath, Transit Administrator, provided an overview of the draft transportation plan update. The following are the questions asked during the presentation.

- ***Question*** – What can be done about the erratic driver?
  There are programs such as traffic mitigation, enforcement (turn in drivers) and a red light camera. Although the city only has one red light camera, the general idea helps serve as a reminder. Drivers tend to slow down knowing there could be more.

- ***Question*** – Are there more red light cameras in the works?
  I don't know.
- ***Question*** – Traffic congestion will often give drivers the idea of cutting through neighborhoods and going through private property. What can we do to reduce this activity?
  Utilize the traffic mitigation program within the city. You must have 75% of the neighborhood sign up for the program to be considered.
- ***Question*** – On speed humps, why are there two cut areas and a bump in the middle of the cuts?
  It is designed to be a wedge for fire trucks to be able to travel through the area and not have to slow down. The bump in the middle is designed to keep cars from using the two cut areas and crossing into opposite lane of traffic.
- ***Question*** – Why are traffic humps different heights in different neighborhoods?
  I don't know – we need to ask traffic engineering.
- ***Question*** – Do we, as a city, have the sound activated signals at crosswalks for the visually impaired?
  Yes we do. It needs to be requested by the neighbor or neighborhood where the visually impaired citizen resides.
- ***Awareness Issue*** – People in power chairs cannot get over the speed humps and the cut out areas are too narrow. Some humps don't have any cut out areas. This is an issue during trash day when the sidewalks are blocked. (Cholla @ 59/57 Avenue) Manual powered chairs don't seem to have this issue/concern. Make traffic engineering aware of this concern.

9.14.e West Maricopa Board of Realtors - June 16, 2009

Bob Darr, Transportation Planning Manager, provided an overview of the draft transportation plan update. The following are the questions asked during the presentation.

- ***Question*** – What are the six intersections at the 303 going to look like?
  They will either be over or under – the decision has not been made yet.
- ***Question*** – Where are the light rail areas?
  The two shaded areas are two possibilities in discussion (referring to a map in the PowerPoint).
- ***Question*** – What is the city's position on commuter rail-is it competitive or supportive?
  These are two different types of services. Commuter serves a longer distance and had fewer stations. Light rail covers short distances with more stations.
- ***Question*** – If developers are going to put money out to be a part of Glendale, what do we do to draw them in?
  Glendale has created a desirable place for businesses. The city's Economic Development Department works with businesses to draw them in.

- ***Question*** – How was the ridership survey laid out?
  The survey had issues that could be ranked, open ended questions, and an area for comments.

9.15 Online Survey

A survey instrument was drafted and posted online. Each Glendale Councilmember emailed an announcement to residents within their districts along with a request to participate in the survey. Hard copies of the survey were also distributed and collected during briefings to the commissions and community groups. Eighty-four people participated in the survey.

The survey asked residents to rate how important each key element of the transportation plan was to them and to list any other suggestions for improving transportation in Glendale.

9.15.a Most Important Transportation Improvements

The transportation improvements included in the survey included the following.

- Intersection improvements
- New streets west of 91st Avenue
- Widening existing streets
- Freeway and parkway improvements
- More frequent local bus service
- More express bus trips
- Increased Dial-a-Ride service
- Extension of METRO light rail
- New commuter rail service
- More on-street bikeways
- Improve off-street bicycle network
- Pedestrian improvements
- Continue traffic education program
- Neighborhood traffic mitigation

The residents rated all of the transportation improvements as being important. Overwhelmingly, the most important transportation element to the survey respondents was the extension of METRO light rail and new commuter rail service. Also very important were intersection improvements, more frequent local bus service and pedestrian improvements. Less important to the survey participants was new streets west of 91st Avenue, increased dial-a-ride service, more on-street bikeways, and continuing traffic education program. The following table includes the actual ratings provided by the survey respondents.

9.15.b Other Suggestions for Transportation Improvements

The final question on the survey asked respondents, "What else can be done to improve transportation in Glendale?". Responses to this question are listed below.

Bicycle Improvements

- Worry about bike lanes on streets
- Spend less money on bicycle improvements and use it to provide more CONVENIENT bus and rail service.

Table 9-1 Survey Responses

Transportation Improvement	Not Important	Somewhat Important	Important	Very Important
Intersection improvements	9	15	30	28
New streets West of 91st Avenue	15	30	21	14
Widening existing streets	12	25	28	19
Freeway and Parkway Improvements	9	22	29	20
More frequent local bus service	6	28	17	31
More express bus trips	9	28	20	25
Increased Dial-a-Ride service	14	29	21	17
Extension of METRO light rail	7	9	14	54
New commuter rail service	7	13	19	41
More on-street bikeways	16	24	20	23
Improve off-street bicycle network	15	24	18	24
Pedestrian improvements	7	22	26	26
Continue traffic education program	15	23	26	19
Neighborhood traffic mitigation	11	22	22	26

- The bike plan is great.
- A significant piece of the bike plan is in place. Connecting the dots is needed on the bike plan.
- Improve all options for bicycles

Street and Freeway Improvements

- Bus Pullouts
- Aesthetic and landscape improvements
- Appearance of Grand Avenue
- Art along 101
- Need more greenbelt way
- Put in more turn outs for buses to stop for passengers
- Signal flow on Glendale Avenue
- Eliminate the concept of widening streets and then narrowing them
- Lanes that go from 3 to 4 or vice versa
- Continued maintenance of existing roadways, to prevent pot holes, delete scallops etc..
- I think that widening of our existing streets is the most important out of all the above.
- 59th Ave widening between Bell Rd. and Union Hills seems very unimportant as there are no traffic backups there. The widening needs to be the left turn lane onto 101 north of Beardsley where traffic backs up so far that cars going north are blocked.
- Standardize left turn signals. You can't have some before and some after, it is too confusing. Make them long enough for the traffic to get through. Time lights so those going consistent speed make the lights, especially in morning and afternoon rush hour traffic. Put traffic signals on circuits so a control center can monitor them and they can be activated remotely to remove congestion at particularly bad intersections. Use technology to improve our traffic control.
- More bus pull outs!
- Make each main artery a one way street. Every other mile north and south go opposite direction, the same with east and west. I know this would have to be done with the cooperation with neighboring cities, but the efficiency and safety of traffic flow would greatly increase, not to mention lower emissions. Glendale could do this with 59th one way northbound from Grand to the Loop and 51st from Loop to Grand one way southbound. Glendale could be the "grassroots" of a major change to the valley.
- Make the community 'La Buena Vida, ' which is located Southeast of 91st Ave and Glendale Ave a Gated community. This will minimize the use of manpower and Police Officers during large events and sporting events. Nothing extravagant, just

a gate in the main areas with a pass on the windshield of the vehicle. This would be a nice improvement to use our tax money on.

- Maintain existing roads a little better. The city does a fairly decent job now, but 67th Avenue north of Peoria needs attention. Also, making medians more desert friendly with proper desert plants helps keep the city looking great.
- 303, Northern Parkway completion and fix the tracks at Olive and Cotton. West, west, west. Needs major help.
- Time the stoplights better, especially on Bell.

Traffic Education and Enforcement

- Enforce speed limits
- Survey the number of cell phone users at heavily used intersections.
- Create and enforce a new city ordinance for the non-use of cell phones while driving.
- We need no cell phone usage to protect innocent drivers.
- Safety first.
- This will improve traffic movement, just by paying attention to driving and not speaking or texting with the cell phone. This will help for quicker driving decisions. Cell phone users delay traffic during high volume times in all examples.
- U-Turns should be illegal when right turns on red are allowed, and vice versa. Continual near accidents occur under current conditions and pedestrians are in jeopardy.
- Semi-trucks coming down 59th Ave from the 101 to the Wal-Mart on Bell Road drive alarmingly fast and make a lot of noise for local residences. Wal-Mart told us the trucks would only come up from 10!
- An active and complete traffic enforcement program, with numerous radar equipment Installed, especially on heavily traveled streets, like 51st Ave, Olive and Peoria Aves. The speed limits are almost never enforced on major streets. A good example is Orangewood Ave, which has a speed limit of 25 mph, and is never enforced.
- Continue and extend photo enforcement of speed laws.
- Incentives for electric cars, greatly improve safety!!!,

Pedestrian Improvements

- To continue putting up or installing the 'countdown' second lights that helps to know how much time is left before the light changes. It's been helpful along 59th Avenue.
- More handicap amenities to be or accessible
- How about some focus on the older parts of town, around the old Glendale there are many neighborhood intersections with no disabled cut outs and you cannot

get off at driveways either even if rounded they are to step, completely unfriendly to people in wheel chairs...any questions call me I will show you. I am disabled.

Transit Improvements

- I use Glendale Dial-a-Ride almost daily. The service has been excellent. Drivers are most helpful on my behalf. Thank You
- Dial-a-ride to cross city lines
- Better / safer / more transportation for the disabled. buses with working / well maintained 'lifts'(preferably the pullout lift that are flush with the sidewalk as they are less likely to break. light rail connecting Glendale to east valley cities - would be not only convenient but also help get people out here for games / entertainment. Glendale is great - we need to get more people out here to see that!!
- Need more City bus routes like 51st Ave there is no routes after 51st Ave and Thunderbird going north and need routes that u need to think twice many people don't have cars and what if there is no bus routes in their area, would be harder like me in some way
- Get The Route 51 Bus going HIGHER than Thunderbird Road at ASU West. I currently have to take three buses to get my workplace & waste another hour all because Route 51 only goes up to Thunderbird Road. It should go as high as Bell Road at the very least. Of course, if it went up to Union Hills that would be an even better idea.
- Dial-a-ride needs to cross city boundaries so that elderly people from Phoenix (for example) can get to medical facilities (doctors, dentists, hospitals) in Glendale. We seem to ignore the needs of the elderly these days.
- Longer service hours are needed on the buses. The buses do not work well for second shift commuters. Some bus schedules work poorly for staggered day shift.
- Comparing Tempe Flash to Glendale GUS - Flash is free, runs every 15 minutes both directions, stops at Gammage as well as Mill and light rail station, runs until 1 am in the morning - GUS costs, is hourly, stops at 5, does serve our historic district, does not serve the coliseums, Westgate.
- Extend bus service into neighborhoods. Get people out of cars, into public transportation for routine trips, thereby reliving street traffic for occasional trips. Look at Portland, Oregon.
- All bus stops must have some kind of over head shade. Somehow reduce speeding in our neighborhoods

Expansion of METRO light rail and Commuter Rail Service

- I want light rail to go into the old part of Glendale (59th Ave & Glendale) and connect to the rest of the light rail.
- Bring Light Rail into the heart of Glendale, downtown area, Grand Ave etc., not the stadium area. We are not paying for it so others can come out here, we need

the transportation to get to jobs out of the near area. Increase Express Service from South Glendale to Scottsdale. An express from the Glendale Transit Center to Scottsdale (101/Raintree/Airpark) through Arrowhead would be nice! Having to work in Scottsdale is expensive! Those in the north have cars, we don't and can't afford the gas. We are in greater need of transportation than those that have the money. Increase job opportunities in Glendale, esp. in the South/older area. We are sacrificing everything from jobs, to home values, to availability of books at even the main library for those who are in the north/well-to-do area. All these things could bring a better Glendale. Instead you focus on all the new areas at the loss of the older more established areas. Leaving these areas out and cutting or not giving transportation to these areas in lieu of the newer areas will only cause more trouble for Glendale down the road.

- Complete the original Light Rail plan that was approved by the voters like myself. Phase 1 could be 19th Ave to downtown Glendale. Phase 2 could be downtown Glendale to the sports and entertainment center. Phase three could be sports and entertainment center connecting with the I-10 extension.
- Glendale should put extreme effort into developing commuter rail along the existing train tracks along Grand Ave. This route passes through the downtown of almost every city in the valley. On the other hand Glendale should stop pushing the extension of Metro Light Rail. This system does nothing more than a bus can accomplish.
- Light rail along I-10 then north along Loop 101 to Westgate
- The current announced light rail plan in Glendale seeks to bypass Glendale residential and historic area servicing, giving this service instead to Phoenix, except for Westgate. I disagree with this position. I voted for light rail in Glendale. Voters passed the Glendale light rail proposition. We, Glendale residents are paying for it - so give it to us!
- The proposed commuter rail restoration on the BNSF is valuable.
- If you put rail in don't tie up the streets. Run it along the highway or elevate the rail above the streets. It is rediculous to tie up traffic for rails and also the possibility of hitting pedestrians or cars. Look at Denver Colorado rail. It doesn't tie up any traffic.

Regional Coordination

- First issue is to have a comprehensive interface with all the other cities that Glendale connects with to insure that the cross town travel is the same and that all mass transportation like the light rail needs is what is required for all people not just the weekend Westgate football fan but the everyday worker from all aspects and areas like the ASU west on Thunderbird Avenue

- I like the projected plan. As Glendale is growing so much, the light rail would be great improvement for many who commute to downtown Phoenix, Tempe and Mesa.
- Build light rail to downtown Glendale. It would help revitalize our downtown.
- Extend light rail through downtown Glendale and out to Westgate.
- Suggest that light rail come through downtown and continue to Westgate via LINK-type bus.
- Keep on working with the city of Phoenix and MAG to hopefully change the routing of the future extension of light rail to go into Glendale's entertainment district instead of downtown.
- Increase bus and light rail/rail services!!!!

Neighborhood Traffic Mitigation

- More focus on neighborhood traffic mitigation!!!!!!

APPENDIX

This Appendix provides supplementary information and data to Chapters 4, 5 and 6 of the plan.

Appendix A - Roadway

This section includes information regarding traffic signals, screenline analysis, and historical vehicle crash data.

Traffic Signals

Traffic signals provide a positive means to control conflicting traffic movements at an intersection. The location of the existing traffic signals within the City Planning Area is shown in Figure A-1. The traffic signals are categorized as owned and operated by the City or owned and operated by others, such as the City of Phoenix, Arizona Department of Transportation (ADOT), or Maricopa County. It is likely that signals owned and operated by the County will become City signals once the County area is annexed.

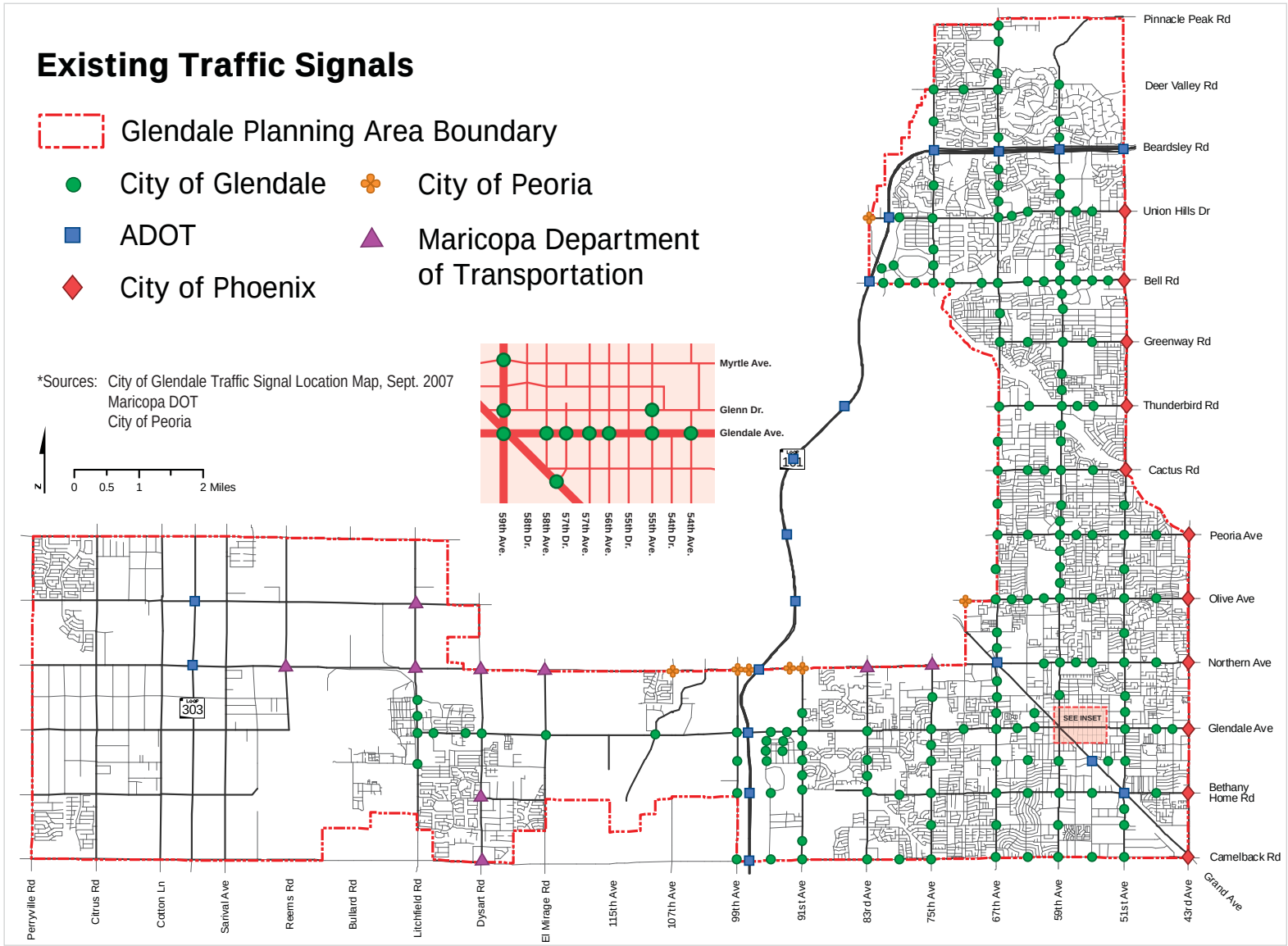


Figure A-1 Existing Traffic Signals

Screenline Analysis

As part of the travel forecasting process described in detail in Chapter 4, existing socioeconomic data is used to develop a simulation of existing travel demand and validation run of the travel forecasting model. The validation run provides a baseline for verifying that the model is simulating existing conditions and indicates where discrepancies between actual and simulated volumes may exist. This analysis provides a basis for examining and adjusting traffic forecasts where necessary.

A screenline is an imaginary line that bisects several streets. Daily traffic volumes can be examined across a geographic area using screenlines. Screenlines are a tool used to examine travel in a particular direction along more than one roadway. Screenlines are also used to calibrate the accuracy of a travel forecasting model by comparing existing data with an existing model validation run. The volume on the streets that cross the screenline can be summed and compared with other screenlines in the same year or the same screenline in different years. A north-south screenline examines east-west volumes and an east-west screenline examines north-south volumes. The screenlines used in this study are shown in Figure A-2.

Table A-1 shows a comparison between the actual traffic counts and the 2006 MAG validation run for the individual screenlines. This data was used to adjust the 2030 forecasts as appropriate.

Table A-1 Screenline Comparison

Screenline	Current Traffic Volume (1,000 veh/day)	MAG 2006 Validation Run (1,000 veh/day)
EW-1	406	395
EW-2	89	89
EW-3	261	201
NS-1	50	56
NS-2	72	68
NS-3	515	473

Table A-2 shows a comparison between the current traffic volumes and the 2030 Base Plan adjusted traffic forecasts. The percent growth in volume across the screenline is also provided. As can be seen, the percent growth ranges from 22 percent to 254 percent. The smaller percent growth occurs in the older, established areas of the City. The higher growth occurs in the western portion of the planning area where development is yet to occur. One other area of note is that the highest percent growth occurs on screenlines that include Northern Parkway and Loop 303. These are both arterials streets today, but limited access facilities in the future and substantial volume growth is expected.

Table A-2 Screenline Comparison

Screenline	Current Traffic Volume (1,000 veh/day)	2030 Base Plan Adjusted Traffic Forecasts (1,000 veh/day)	Percent Growth
EW-1*	406	907	123%
EW-2	89	109	22%
EW-3	261	394	51%
NS-1**	50	177	254%
NS-2**	72	208	189%
NS-3	515	704	37%

* Loop 303 is converted to a freeway in 2030 Base Plan Network (currently an expressway)
**Northern Avenue is converted to an expressway/parkway in 2030 Base Plan Network (currently an arterial street)

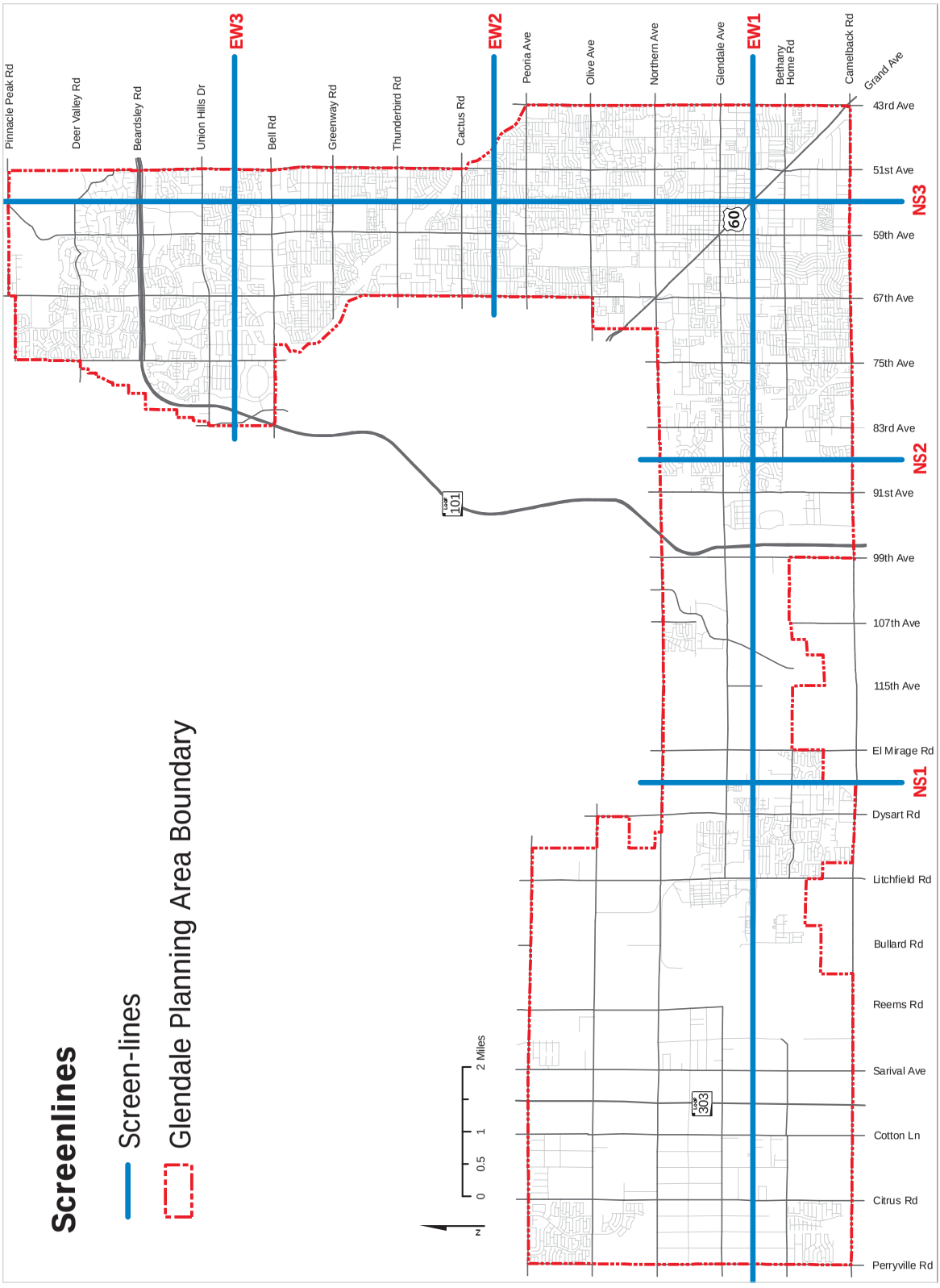


Figure A-2 Screenlines

Historic Crash Data

Figures A-3 through A-11 depict crash statistics for vehicular crashes in Glendale. Included is an examination by severity, time of day, day of week, and month of year.

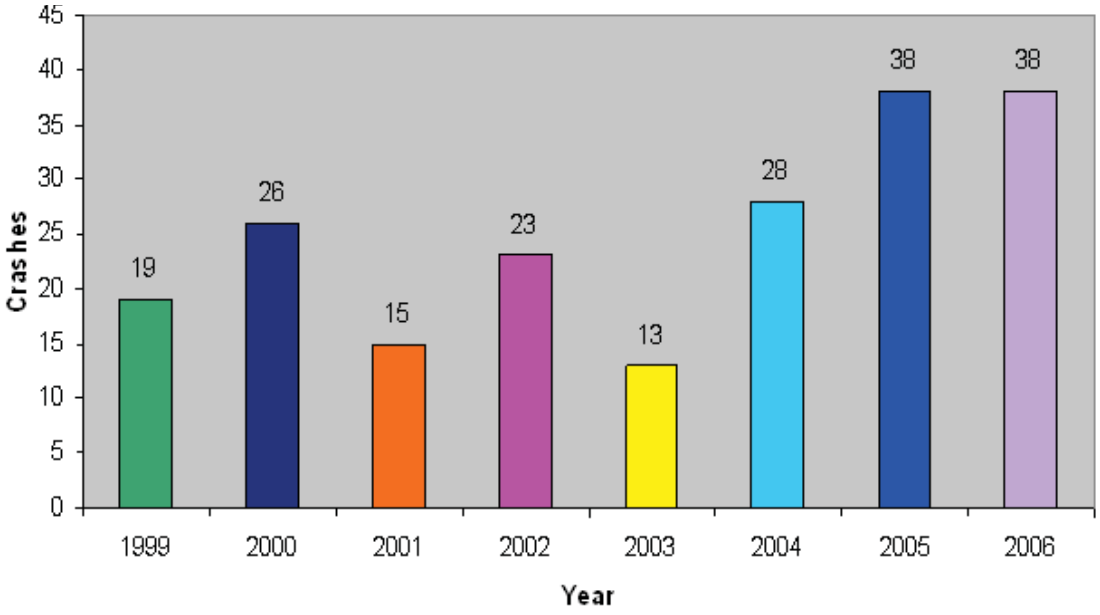


Figure A-3 Fatal Crashes, 1999-2006

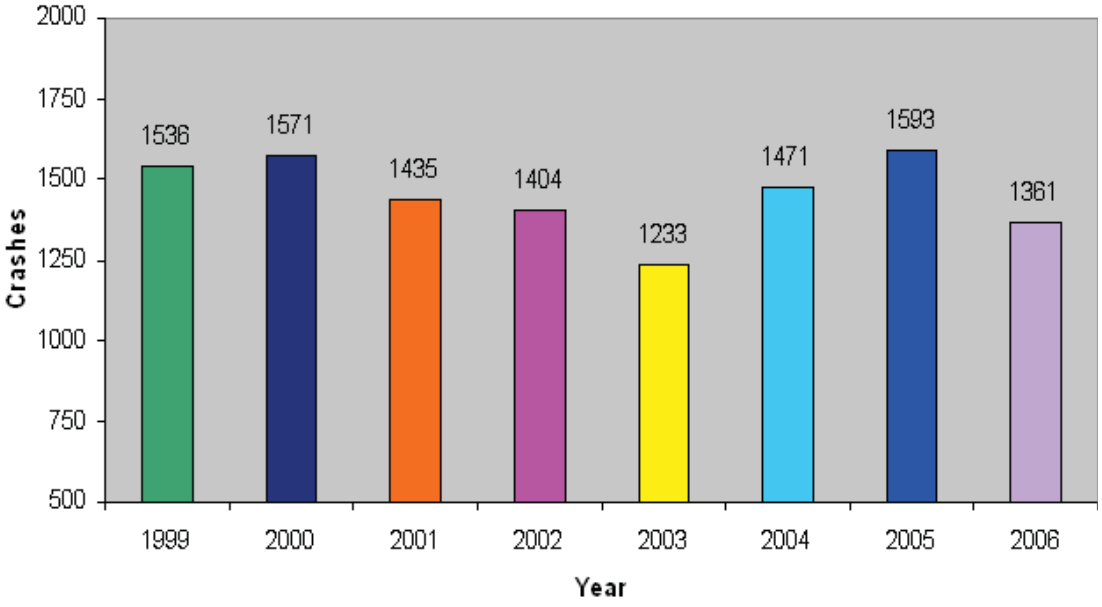


Figure A-4 Injury Crashes, 1999-2006

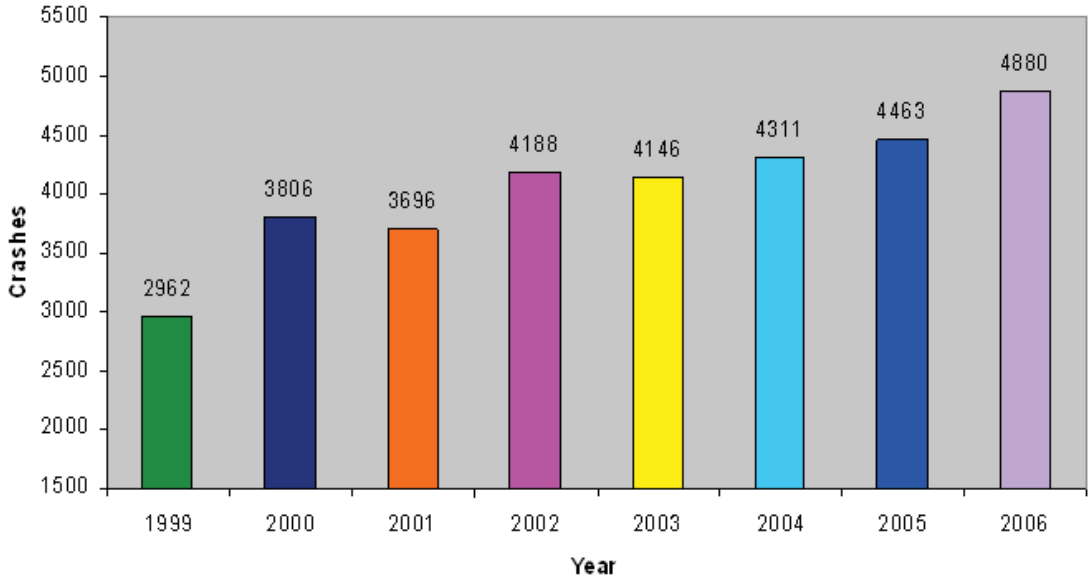


Figure A-5 Non-Injury Crashes, 1999-2006

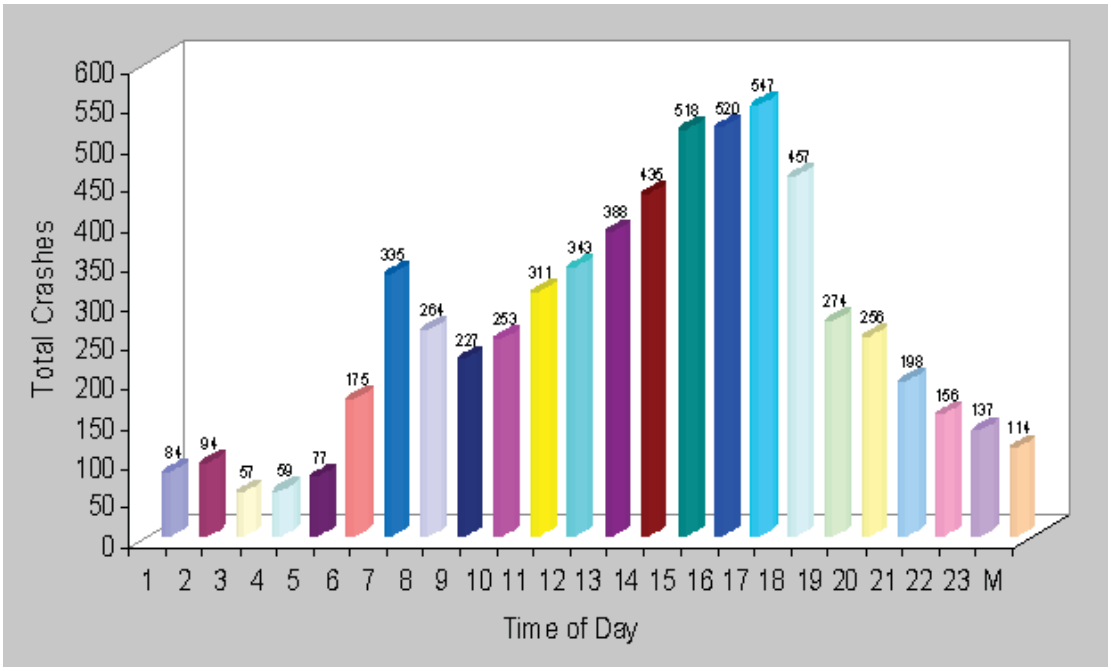


Figure A-6 Crashes by Time of Day, 2006

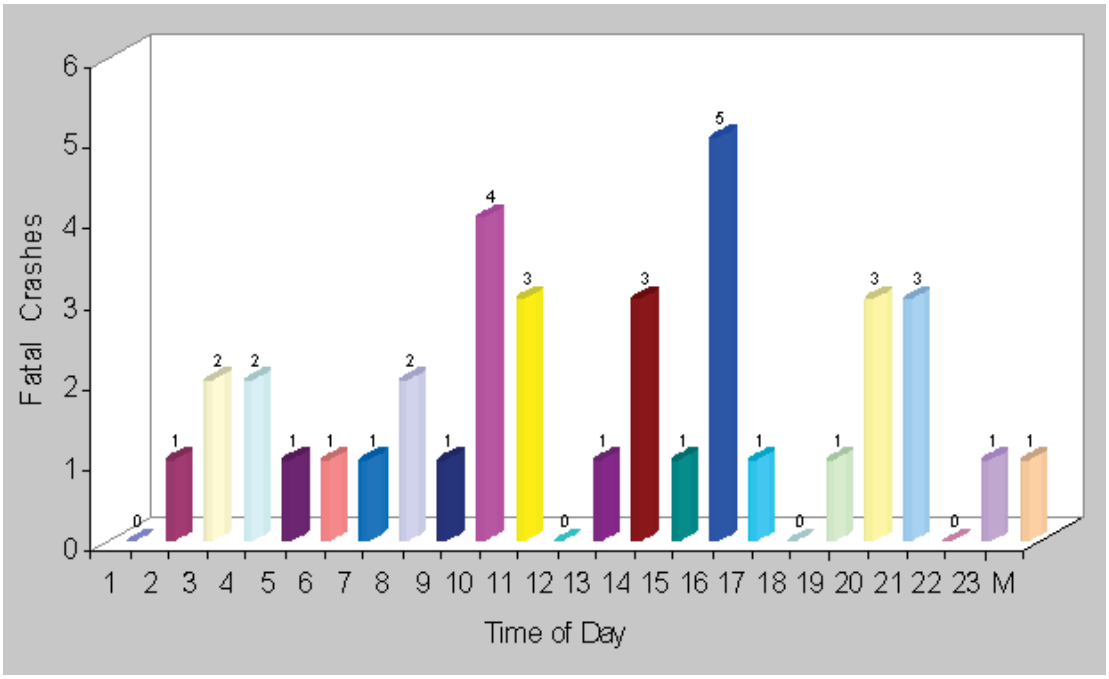


Figure A-7 Fatal Crashes by Time of Day, 2006

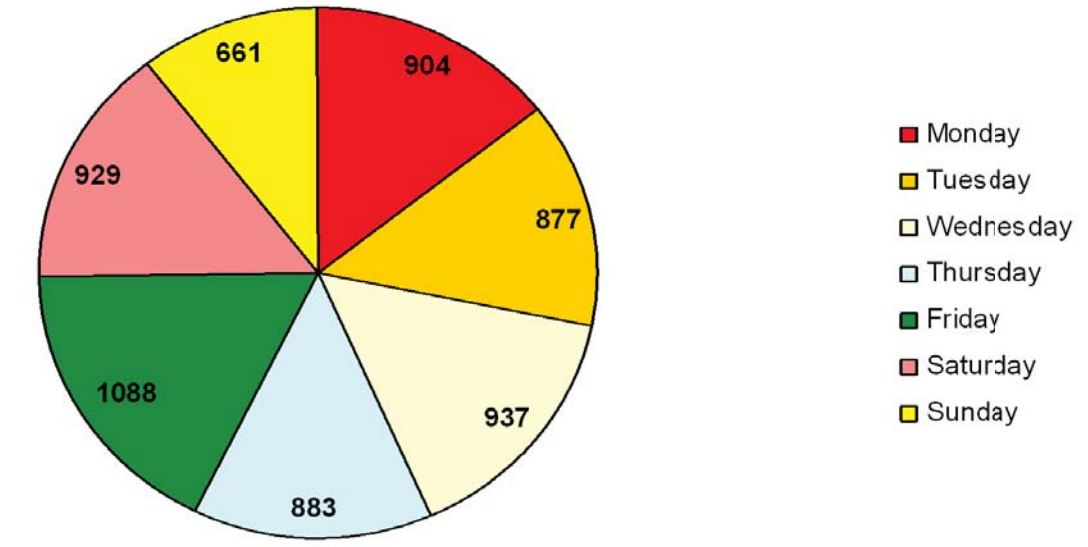


Figure A-8 Crashes by Day of Week, 2006

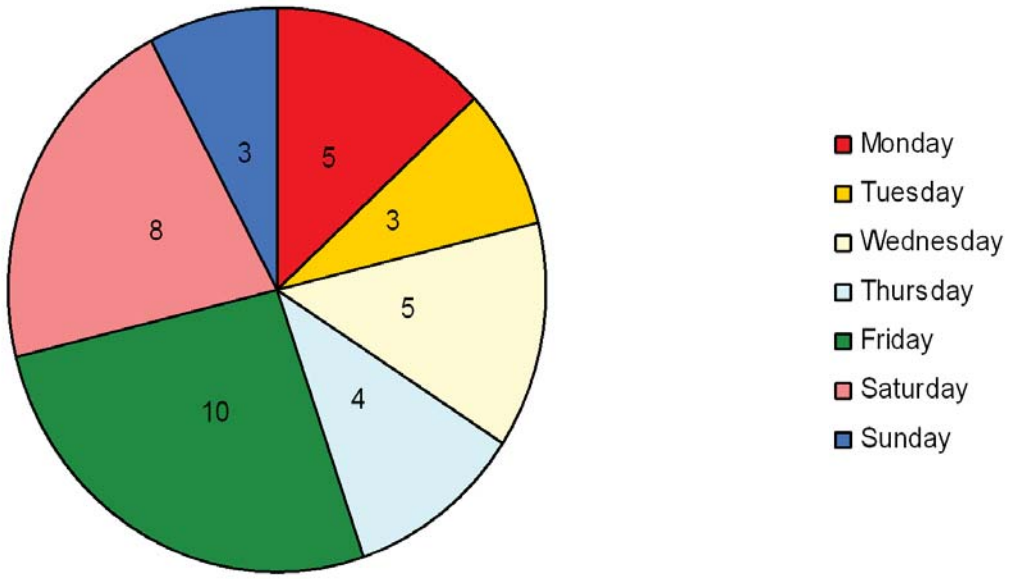


Figure A-9 Fatal Crashes by Day of Week, 2006

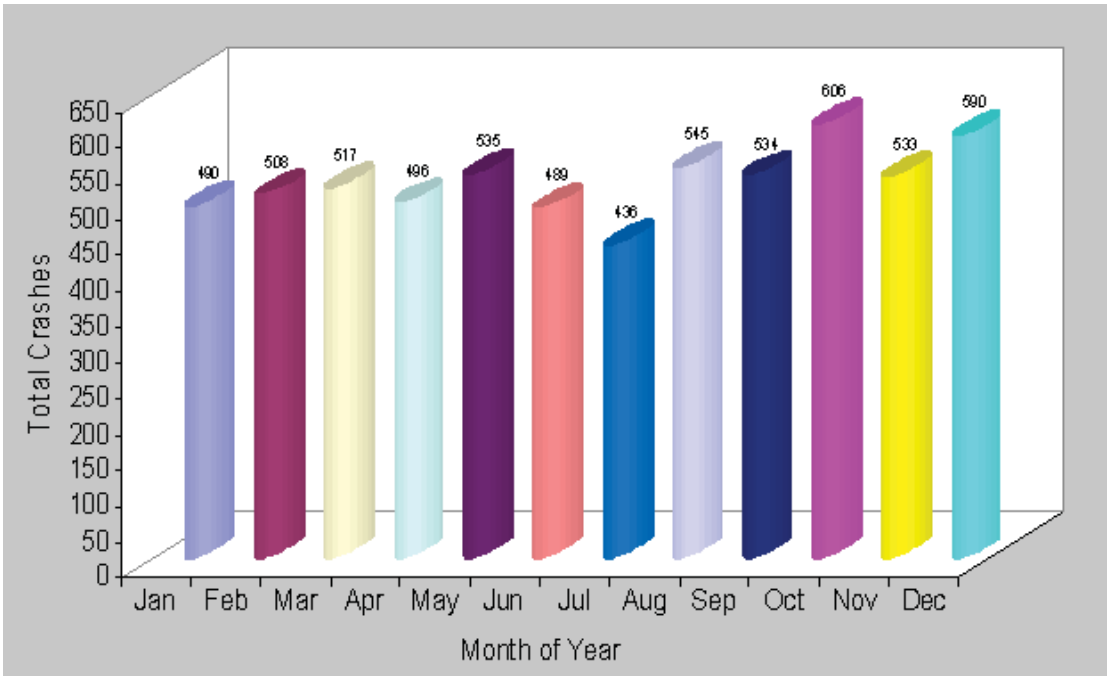


Figure A-10 Crashes by Month of Year, 2006

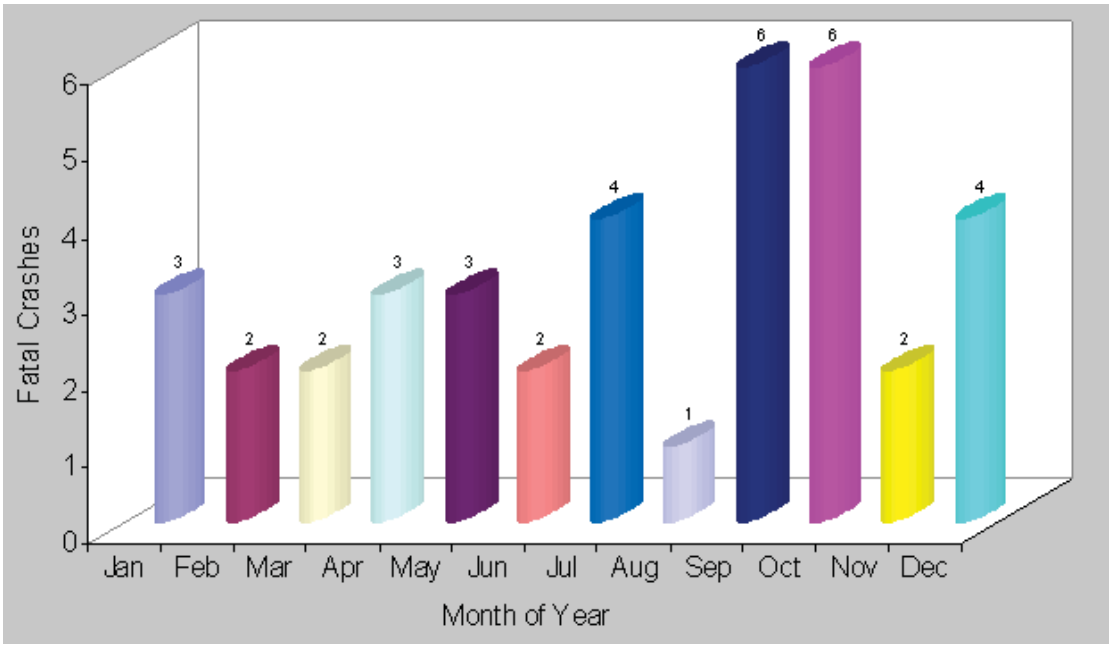


Figure A-11 Fatal Crashes by Month of Year, 2006

Appendix B - Transit

This section provides detailed information on existing transit. Table B-1 presents detailed service information on each of the local routes operating in Glendale.

Table B-1 Local Fixed Route Services

Route #	Name	Origin to Destination	Weekday				Saturday		Sunday	
			Trips/ day (OB/IB)	Glendale Operating Hours	Peak frequency (minutes)	Off-peak frequency (minutes)	Trips/day (OB/IB)	Operating hours	Trips/day (OB/IB)	Operating hours
43	43rd Avenue	From Union Hills Drive to Buckeye Road via 43rd Avenue	34/34	5am – 10pm	30	30	16/16	6am – 9:30pm	16/16	6am – 9:30pm
50	Camelback Road	From Scottsdale Comm. College to 67th Avenue, via Camelback Road	49/49	5:30am – 10:30pm	15	30	29/29	6am – 8:30pm	29/29	6am – 8:30pm
51	51st Avenue	From 47th Avenue & Thunderbird Road to 53rd Avenue & Roosevelt, via 51st Avenue	28/28	4:30am - 9pm	35	35	14/14	5:30am - 7pm	14/14	5:30am - 7pm
59	59th Avenue	From 59th Avenue & Utopia Road to 55th Avenue & Buckeye Road, via 59th Avenue	33/32	5am - 10:30pm	30	30	32/32	5:45pm - 10:15	16/16	6am - 10pm
60	Bethany Home Road	83rd Avenue & Glendale Road to 40th Street & Camelback Road, via Bethany Home Road	34/33	5am - 9:30pm	30	30	16/16	6am - 10pm	16/16	6am - 10pm
67	67th Avenue	75th Avenue & Bell Road to 65th Avenue & Buckeye Road, via 67th Avenue	32/31	5:45am - 10pm	30	30	15/14	6:30am - 9:30pm	15/14	6:30am - 9:30pm
70	Glendale/24th Street	Luke AFB to South Mountain Avenue & 24th Street, via Glendale Avenue & 24th Street	48/46	5am - midnight	15* *(30 min. for Luke AFB service)	30	32/31	4:30am - 9pm	28/28	5:40am- 9pm
80	Northern	59th Avenue & Northern Avenue to 3rd Street & Dunlap Avenue, via Northern Avenue & Central Avenue	34/33	5am - 10pm	30	30	34/32	5am - 10pm	15/15	6:30am - 9pm
90	Dunlap Avenue	67th Avenue & Olive to 28th Street & Beardsley, via Olive/ Dunlap and Cave Creek Road	32/32	5am - 10pm	30	30	30/30	5am - 10pm	14/14	6:15am - 9pm
106	Peoria/Shea	103rd Avenue & Thunderbird Road to Shea & 134th Street, via Olive/Cactus/Shea	33/32 (within Glendale limits)	(within Glendale) 4:30am - 9pm	30	30	30/30	6am – 8:30pm	14/14	6:30 - 8pm
122	Cactus Road	67th Avenue to 19th Avenue via Cactus; then service south to Bethany Home & 43rd Avenue via 39th Avenue (in Phoenix)	16/16	5:30am - 9:30pm	60	60	14/14	6:30am - 8:15pm	14/14	6:30am - 8:15pm
138	Thunderbird Road	71st Avenue & Acoma to Thunderbird & Tatum Road, via Thunderbird/Cactus	33/33	5am - 9pm	30	30	15/15	6am - 8pm	15/15	6am - 8pm
170	Bell Road	75th Avenue & Bell Road to 83rd Street & Northsight, via Bell	34/33	5am - 9:30pm	30	30	30/30	5:30am – 8:15pm	15/14	6am - 8:45pm
186	Union Hills Drive	79th Avenue & Bell Road to Mayo Boulevard & 56th, via Union Hills	34/33	5am - 10pm	30	30	15/15	6am – 8pm	15/15	6am - 8pm

Source: Valley Metro Online Map and Schedule Information (accessed February 2009)

GUS details are shown in Table B-2.

Table B-2 GUS Circulator Routes

Route	Weekday		Saturday Operating hours	Sunday Operating hours
	Operating hours	Frequency (minutes)		
GUS I	7 am - 6:30 pm	30	7 am - 6:30 pm	8 am – 6 pm
GUS II	9 am - 5:40 pm	30	none	none
GUS III	8 am – 5 pm	60	none	none

Source: Valley Metro Bus Book (January 2008)

Express Routes and service details are shown in Table B-3.

Table B-3 Express Routes

Route #	Name	Route Origin and Destination	Trips per Day (am/pm)
Grand Avenue Limited		Bullard Avenue & Greenway Road to Downtown Phoenix, via Grand Avenue	4/4
570	Glendale Express	59th Avenue & Myrtle PNR to downtown Phoenix via Northern Boulevard & Central Avenue	2/2
572	Surprise/Scottsdale Express	Downtown Surprise to Scottsdale Airpark via Bell Road & 101 (bi-directional)	6/6
573	Arrowhead-Downtown Phoenix Express	75th Avenue & Beardsley to Downtown Phoenix via 101 (bi-directional)	6/6
575	Northwest Valley/ Downtown	Arrowhead Towne Center to Downtown Phoenix via Loop 101/I-17	3/3
576	Northwest Valley/ Montebello	Arrowhead Towne Center to 19th Avenue & Montebello via Loop 101/I-17 (bi-directional)	5/5
581	North Mountain Express	59th Avenue & Thunderbird to downtown Phoenix via Cactus & I-17	3/3

Source: Valley Metro Bus Book (January 2007)

Table B-4 shows funding source(s), contracting entity, and service provider for all transit routes.

Table B-4 Route Contractor and Operator

Route	Service Type	Funded By	Contracted By	Service Provider
43	Local	Phoenix	Phoenix	First Transit
50	Local	Phoenix, Scottsdale, RPTA	Phoenix	Veolia Phoenix
51	Local	Glendale, Phoenix	Phoenix	First Transit
59	Local	Glendale, Phoenix, RPTA	Phoenix	First Transit
60	Local	Glendale, Phoenix	Phoenix	Veolia Phoenix
67	Local	Glendale, Phoenix, RPTA	Phoenix	First Transit
70	Local	Phoenix, RPTA	Phoenix	First Transit
80	Local	Glendale, Phoenix	Phoenix	Veolia Phoenix
90	Local	Glendale, Phoenix	Phoenix	Veolia Phoenix
106	Local	Glendale, Phoenix, Scottsdale, RPTA	Phoenix	Veolia Phoenix
122	Local	Glendale, Phoenix	Phoenix	Veolia Phoenix
138	Local	Glendale, Phoenix	Phoenix	Veolia Phoenix
170	Local	Glendale, Phoenix, Scottsdale	Phoenix	Veolia Phoenix
186	Local	Glendale, Phoenix	Phoenix	Veolia Phoenix
GUS I	Cir/Shut	Glendale	Glendale	City of Glendale
GUS II	Cir/Shut	Glendale	Glendale	City of Glendale
GUS III	Cir/Shut	Glendale	Glendale	City of Glendale
570	Express	RPTA	Phoenix	First Transit
572	Express	RPTA	RPTA	Valu Trans
573	Express	RPTA	RPTA	Valu Trans
575	Express	RPTA	RPTA	Valu Trans
576	Express	RPTA	RPTA	Valu Trans
581	Express	RPTA	Phoenix	Veolia Phoenix

Source: Valley Metro/RPTA (2009), City of Glendale (2009)

Figure B-1 shows the existing paratransit system in Glendale.

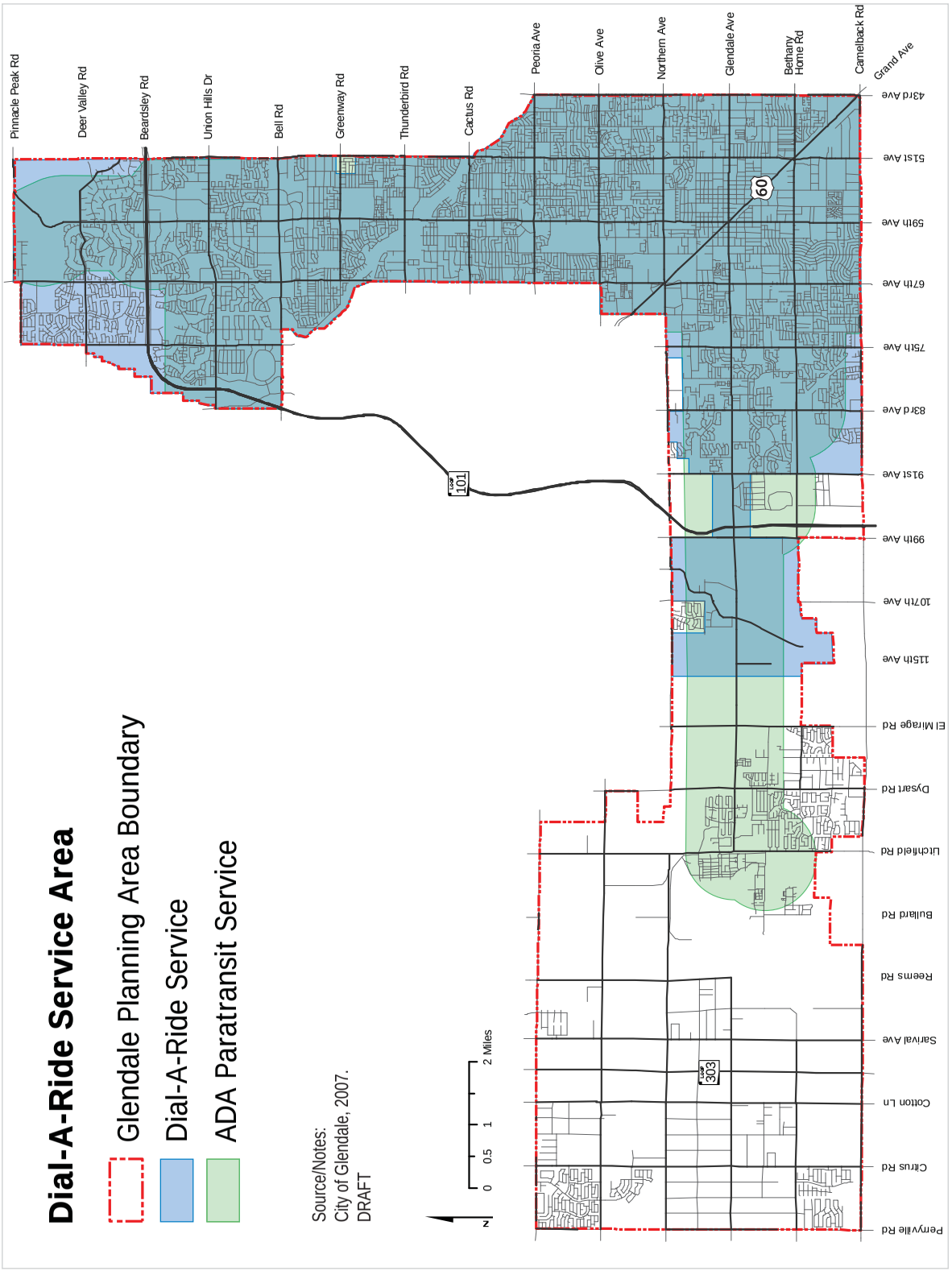


Figure B-1 Existing Paratransit Service in Glendale

Figure B-2 shows the park-and-ride facilities in Glendale.

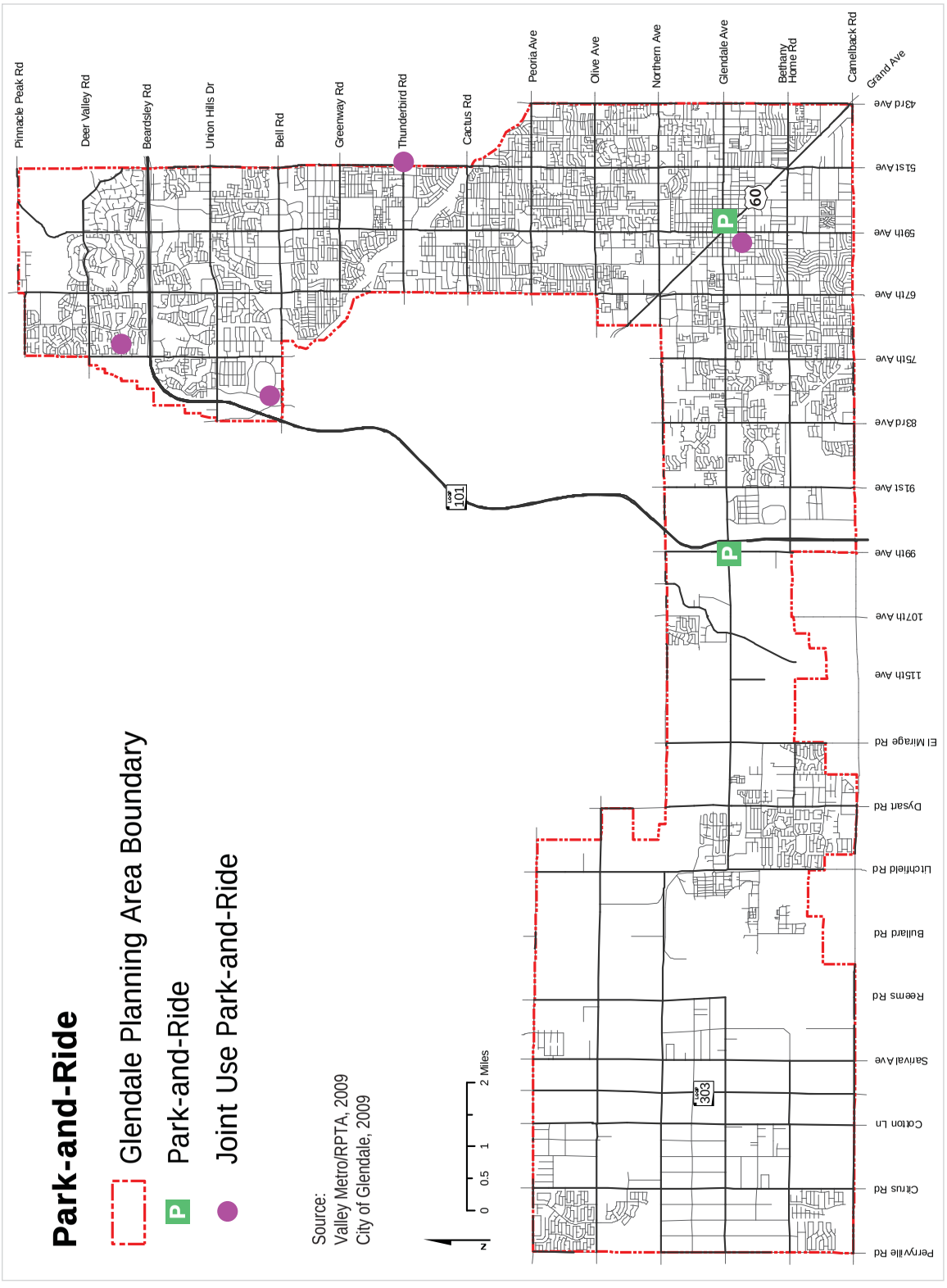


Figure B-2 Existing Transit Infrastructure

System Evaluation and Analysis

The City of Glendale has dedicated substantial financial resources to building and expanding transit within its city boundaries. Many transit improvements are already planned for Glendale in the years to come. These plans include projects conceived of in the 2001 *GO! Program* and regional transit services and projects from the 2003 Regional Transportation Plan (RTP).

The goals, objectives, and policies that the City has developed for its transit system lead naturally to evaluation criteria that can be used to analyze the existing and planned transit system for needs and deficiencies. This section provides analysis for planned transit improvements which support mobility for City of Glendale residents, workers and visitors.

Cost Efficiency

Valley Metro/RPTA produces an annual summary of route performance measures in its annual Transit Performance Report. The report details a number of fiscal measurements for each of the Valley Metro routes, and provides a summary for Glendale routes. Each measurement provides a different way of evaluating the route.

Table B-5 On-time performance

Route	On-Time Performance
43	93.90%
50	93.15%
51	88.61%
59	94.27%
60	94.98%
67	93.54%
70/24	89.88%
80	97.45%
90	92.52%
106	91.12%
122	94.55%
138	96.07%
170	93.78%
186	96.71%
570	91.71%
581	96.48%

Source: Valley Metro/RPTA, 2008

Farebox recovery ratio measures the percentage of operating costs that are paid for by passengers through fare collection. A higher farebox recovery ratio means that more of the costs of providing transit are borne by passengers, and can be a result of higher route productivity, higher fares paid, or fewer passengers using discount fares or passes, among other reasons.

Operating cost per boarding measures the cost of each boarding. (*Net operating costs* measures costs of each boarding minus fares paid.) *Cost per revenue mile* is the cost to provide each mile of service. In the Phoenix metropolitan area, this cost is negotiated with each service provider.

Table B-6 Cost Efficiency Measures

Route	Farebox Ratio	Operating Cost per Boarding	Subsidy (Net Op. Cost) per Boarding	Cost per Revenue Mile
43	34.98%	$2.02	$1.31	$4.51
50	29.48%	$2.16	$1.52	$6.38
51	24.56%	$2.69	$2.03	$4.51
59	34.54%	$2.11	$1.38	$4.51
60	37.86%	$1.76	$1.09	$4.49
67	31.68%	$2.21	$1.51	$4.52
70	27.80%	$2.09	$1.51	$6.28
80	32.75%	$1.91	$1.28	$5.05
90	29.60%	$2.32	$1.63	$5.12
106	25.51%	$2.95	$2.19	$4.52
122	11.18%	$6.77	$6.01	$4.52
138	15.64%	$4.46	$3.76	$4.51
170	33.28%	$2.38	$1.59	$4.50
186	11.81%	$6.04	$5.32	$4.51
570	15.40%	$8.64	$7.31	$7.07
581	20.50%	$6.43	$5.11	$7.07
Systemwide				
Valley Metro	24.29%	$2.62	$1.98	$5.28

Source: Valley Metro/RPTA, 2008

Fixed-Route Services

Improvements to fixed-route services are included in both the *GO! Program* and the RTP. The *GO! Program* includes a range of improvements:

- Longer service hours and increased service frequency on all existing fixed-route service
- Extension of routes 60 (Bethany Home Road), 67 (67th Avenue), 80 (Northern Avenue), and 154 (Greenway Road)
- Implementation of transit service on 75th, 83rd, and 91st Avenues

The RTP also addresses fixed-route services, mainly through the implementation of "supergrid" routes, in which the regional funding source from Proposition 400 sales tax revenues replaces local funding for routes that are considered regionally significant and which cross city lines. Although most supergrid routes replace existing local service, some supergrid routes will be brand new routes. As much as possible, supergrid services will coordinate service levels across city boundaries.

- Regional funding for existing routes:
  - Route 106 (Peoria Avenue/Shea Boulevard)
  - Route 170 (Bell Road)
  - Route 59 (59th Avenue)
  - Route 138 (Thunderbird Road/Waddell Road)
  - Route 90 (Dunlap Avenue/Olive Avenue)
- New fixed-route supergrid services
  - 99th Avenue
  - 83rd Avenue/75th Avenue
  - Litchfield Road

Neighboring City Plans

Plans in Glendale's neighboring cities should also be taken into account as the City examines transit needs to ensure coordination and recognize the opportunities presented to Glendale residents by other cities. The City of Peoria plans a new route on 83rd Avenue in the near term, and has expressed the desire to coordinate with Glendale plans. (Glendale currently plans to initiate service on 83rd Avenue in 2020.) The 83rd Avenue route will serve Peoria's downtown along its most important north-south arterial, and will provide service to Arrowhead Towne Center in Glendale. The City of Phoenix has ongoing plans to enhance transit service levels on the Valley Metro system; these plans should be coordinated with Glendale's service enhancements. In addition, the City of Phoenix has plans to implement a park-and-ride facility in the vicinity of the Loop 101 and Camelback Road, just south of the border with Glendale.[1]

Deficiencies

As noted previously, the Valley supports transit operations by a combination of regional and local funds. Since funding levels can vary from city to city, this means that services on the same route can differ based on the city in which it operates. While this may reflect regional fiscal realities, it is confusing for riders and results in the need for operational turnarounds, which wastes service miles and can disturb residents if the turnarounds occur in neighborhoods. Table B-7 shows service disparities that exist on the following routes, or will result in the future from planned transit improvements.

Neighborhood Circulators

Plans

The City's GUS bus neighborhood circulator service continues to be popular, enjoying a 97% satisfaction rating with riders[2] and relieving pressure on the arterial fixed-route bus network. A new circulator is planned for the Arrowhead area along Bell Road.

1 This park-and-ride within five miles of Glendale's existing 99th Avenue park-and-ride and would likely serve a similar market. Depending on demand at the 99th Avenue facility, the Phoenix park-and-ride may be redundant or may help absorb additional demand.

2 See 2004 GUS Rider Satisfaction Intercept Survey.

Table B-7 Routes with Service Disparities

Route	Current Disparities	Future Disparities
Route 50 (Camelback)	Fewer trips in Scottsdale on weekdays and weekends	• No known future disparities
Route 59 (59th Avenue)	None	• Phoenix plans service to midnight in Jan 2010 • GO plan calls for midnight service in FY2013
Route 60 (Bethany Home)	None	• Phoenix plans service to midnight in Jan 2010 • GO plan does not call for midnight service
Route 67 (67th Avenue)	Additional weekend trip in Phoenix	• Phoenix plans service to midnight in Jan 2010 • GO plan calls for midnight service in FY2014
Route 70 (Glendale)	More trips in Glendale on Saturdays	• No known disparities
Route 80 (Northern)	None	• GO plan calls for midnight service in FY2011 • Phoenix plans midnight service in FY2012
Route 90 (Dunlap/Olive)	30-minute weekend service in Phoenix (60-minute service in Glendale)	• Phoenix plans service to midnight in FY2011 • GO plans call for midnight service in FY2013
Route 106 (Peoria/Shea)	Service levels vary greatly depending on city. Phoenix, Glendale services levels generally aligned; additional weekday trips and 30-minute Sunday service in Phoenix.	• Phoenix plans service to midnight in FY2010 • GO plan does not call for midnight service
Route 122 (Cactus/39th Ave)	None	• Phoenix plans 30-minute Sunday service in FY2012 • GO plans do not address 30-minute service
Route 138 (Thunderbird/Waddell)	None	• Phoenix plans 30-minute Sunday service in FY2012 • Phoenix plans service to midnight in FY2012 • No commensurate GO plans
Route 170 (Bell Road)	Additional Sunday service in Phoenix	• Phoenix plans service to midnight on Saturdays in FY2011 • Phoenix plans limited-stop service in FY2011 • No commensurate GO plans
Route 186 (Union Hills)	None	• Phoenix plans service to midnight in FY2012 • Phoenix plans 30-minute Sunday service in FY2012 • GO plan calls for service to 10 pm on Sundays in FY2011
New Service		
75th Avenue	None (service does not currently exist)	• Peoria plans service implementation in FY2010 • GO plan calls for service in FY2012
83rd Avenue	None (service does not currently exist)	• Peoria plans service implementation in FY2010 • GO plan calls for service in FY2020

Deficiencies

Like transit services in general, neighborhood circulators enjoy the greatest ridership in areas of high-density population or employment, areas with low-income residents, areas where residents tend not to own automobiles, and areas with a diverse mix of land uses. The southeastern area of Glendale has higher density development and areas with relatively higher proportions of low-income people and seniors. This area of the City can connect dense residential neighborhoods with services and downtown Glendale. The growing Westgate area represents a highly mixed-use area of town that is also relatively densely developed, and may provide an opportunity for a different type of circulator, more oriented towards transporting workers and visitors between sites within the Westgate campus.

Paratransit

Plans

Dial-a-Ride and ADA services provide important service for people who cannot be accommodated on the fixed-route system. The *GO! Program* provides for expansion of the Dial-a-Ride program to provide longer hours and service on more days, and to more Glendale residents. In addition, as the fixed-route network expands, funding is available

Table B-8 Existing Routes and Service Levels

Route	Service Deficiency
Route 43 (43rd Avenue)	• 60-minute headways on weekends
Route 51 (51st Avenue)	• Short weekday and weekend service span • 60-minute headways on weekends
Route 59 (59th Avenue)	• 60-minute headways on Sunday
Route 60 (Bethany Home)	• Short weekday service span • 60-minute headways on weekends
Route 67 (67th Avenue)	• Short weekday and weekend service span • 60-minute headways on weekends
Route 70 (Glendale/24th)	• 15-minute peak service not present on entire route
Route 80 (Northern Avenue)	• Short Sunday service span • 60-minute headways on Sunday
Route 90 (Dunlap/Olive)	• Short weekday and Sunday service span • 60-minute headways on Sunday
Route 106 (Peoria/Shea)	• Short weekday and weekend service span • 60-minute headways on Sundays
Route 122 (Cactus/39th Avenue)	• Short weekday and weekend service span • 60-minute headways on weekdays and weekends
Route 138 (Thunderbird/Waddell)	• Short weekend service span • 60-minute headways on weekends
Route 170 (Bell Road)	• Short weekday and weekend service span • 60-minute headways on Sunday
Route 186 (Union Hills)	• Short weekday and weekend service span • 60-minute headways on weekends

Table B-9 Arterials Roads, Plans for Transit, and Development Projections

Major Arterial	Plans for Transit	Density Projections[1]
75th Avenue	• Peoria plans service in FY2010 • GO plan calls for service in FY2012	• Currently, low- to mid-density • Mid- to high-density by 2015
83rd Avenue	• Peoria plans service in FY2010 • GO plan calls for service in FY2020	• Currently, low density • Mid-density by 2015
91st Avenue	• GO plan calls for service in FY2019	• Currently, low density • Mid-density by 2015
99th Avenue	• RTP supergrid service in FY2021	• Currently, low density • Mid-density by 2015
107th Avenue	• No plans for service	• Currently, low density • High density by 2030
115th Avenue	• No plans for service	• Currently, low density • Low-density through 2030
El Mirage Road	• No plans for service	• Currently, low density • Low density through 2030
Dysart Road	• No plans for service	• Currently, low density • Low- to mid-density by 2030
Litchfield Road	• RTP supergrid service in FY2024	• Currently, low- to mid-density • Mid-density by 2015
Bullard Road	• No plans for service	• Currently, low density • Mid-density by 2030
Reems Road	• No plans for service	• Currently, low density • Mid-density by 2030
Sarival Road	• No plans for service	• Currently, low density • Mid- to high-density by 2030
Cotton Lane	• No plans for service	• Currently, low density • Mid-density by 2030
Citrus Road	• No plans for service	• Currently, low density • Low to mid-density by 2030
Perryville Road	• No plans for service	• Currently, low density • Low density through 2030

Source: City of Glendale General Plan

[1] Low density is defined as fewer than 5 dwelling units per acre; mid density is 5 to 6 dwelling units per acre; and high density is greater than 6 dwelling units per acre.

to ensure that the ADA complementary service expands commensurately. The RTP reimburses Glendale for ADA complementary paratransit services that it provides.

Glendale's Dial-a-Ride service is subject to less strict requirements than ADA complementary paratransit service; it similarly fills a mobility gap for those who do not meet ADA requirements but are not able to use the fixed-route system. The Dial-a-Ride service is open to anyone in Glendale, but the majority of riders are over 60 years of age and two-thirds have a disability. [3]

Deficiencies

ADA complementary paratransit service is required under the 1990 Americans with Disabilities Act, and is intended to serve individuals who are unable to use the fixed-route system due to disability. Transit agencies operating fixed-route services are required to provide complementary paratransit service within three-fourths mile of each fixed-route service, during all of the days and hours that fixed-route services operate. Any expansion of the fixed-route system, whether geographically or temporally, must be accompanied by a commensurate expansion of ADA complementary transit services. In addition, as the population of Glendale grows, the ADA complementary service must keep pace, ensuring that service levels remain acceptable.

National demographic trends indicate that the population is aging as the baby boom generation reaches retirement age; this trend holds true for the City of Glendale. Research indicates that the percentage of the population that is older or disabled does not seem to affect the demand for ADA services. However, as the sheer numbers of older people grows, the demand for both ADA and Dial-a-Ride services may also grow. The City's paratransit service enjoys excellent customer satisfaction and is one of the lowest cost per passenger alternatives. The City will need to contend with growing demand and high costs. In addition, if the Valley pursues a regional ADA paratransit service approach, changes in eligibility or fare policy may also affect the demand for ADA services. The City's approach to travel training, which encourages the use of the fixed-route system, is one of many efforts to control growing costs on paratransit. The City may also wish to pursue other strategies such as fare incentives.

Express Bus Services

The express routes currently serving the City of Glendale are all funded from regional sales tax revenues. With seven different routes originating in different areas of the City, Glendale enjoys a high level of coverage for commuter services into downtown Phoenix and to light rail. In addition, two routes provide peak-period, reverse-commute services from downtown Phoenix to downtown Glendale, which is unusual in the Valley. Commuter express services that have very limited stops have proven popular both in

3 *Glendale Dial-a-Ride Telephone Research Results, 2004, WestGroup Research*

Glendale and in other parts of the Valley, with extremely high productivity and growing demand.

Future plans add service to the Grand Avenue Limited in FY2013 (see Bus Rapid Transit section, below). The RTP will provide new express bus services in the future, providing Glendale residents with fast commute-hour travel and providing the region access to Glendale's downtown and developing activity centers to the west. In the long-term, an additional express route in the Loop 303 area (scheduled to start in FY2023) will provide service in the westernmost portion of the City. The following express routes will be implemented under the RTP:

- Grand Avenue Limited: A study is currently underway with RPTA to establish levels of service and operational characteristics for the Valley-wide arterial bus rapid transit network, including stop locations.
- Peoria Express (along Loop 101)
- Loop 303 Express (FY2023)

To support express bus services, the City has recently opened a park-and-ride near the Loop 101 and Glendale Avenue and has plans for a second park-and-ride facility along the north Loop 101. In addition, a park-and-ride in the vicinity of the Loop 303 is planned to support western area growth and transit use.

High-Capacity Transit Services

Bus Rapid Transit

BRT uses a variety of technological, capital, and operational treatments to achieve faster travel speeds by prioritizing transit while retaining the flexible nature of rubber-tired service. [Note: Although referred to as "Arterial BRT" in the RTP, the Grand Avenue Limited BRT functions as a commute-hour express bus service, which is appropriate for the development conditions in the area, including restricted access to the corridor with the rail line on its south side. RTP funding applies only to operations; there is no funding for BRT capital improvements along the Grand Avenue corridor in the RTP.]

Fixed-Guideway

A fixed-guideway transit system was first added to the MAG Long Range Transportation Plan in 1993. The principal corridor extended from downtown Glendale to Central Phoenix, continuing to downtown Tempe and downtown Mesa. In 1998, the Regional Transit System Corridor Studies and the Phoenix/Glendale Major Investment Study more directly defined the West Valley fixed-guideway corridor as being on Glendale Avenue. The study notes that the preferred alignment is on Glenn Drive and Lamar Road between 51st and 59th Avenues due to limited right-of-way along Glendale Avenue. The 1999 update of the MAG Long Range Transportation Plan includes a regional fixed-guideway system with a corridor on Glendale Avenue between 19th and Grand Avenues.

In 2001, Glendale voters approved a half-cent sales tax to support transportation projects in the City of Glendale. One of these projects was light rail between 19th Avenue and downtown Glendale. The ballot map shows a location between Northern Avenue and Bethany Home Road with a footnote stating: "Light Rail in Glendale will extend from 43rd Avenue to Downtown Glendale and will be based on arterial streets, but will not be located on Glendale Avenue. Construction of light rail in Glendale is subject to completion of a light rail connection in Phoenix."

As part of study efforts to define the location of LRT in the downtown area and improve downtown circulation, Glendale Transportation staff completed a report in 2003 entitled *Grand Avenue Design Concept Study, Downtown Circulation Concepts*. The preferred concept included diverting LRT from Glendale Avenue to Lamar Road between 51st and 61st Avenues. This concept includes a tunnel under Grand Avenue and the BNSF railroad. This concept includes four westbound lanes on Glendale Avenue and four eastbound lanes on Lamar Road.

In 2004, the voters of Maricopa County approved funding for a 57-mile light rail transit system in the region. The first section of this system between Mesa and Christown Mall (in Phoenix) opened December 2008. The Glendale LRT corridor is targeted for completion in 2017. The general alignment in this regional plan is shown on Bethany Home Road between 19th and Grand Avenues and then follows Grand Avenue to downtown Glendale.

In 2008, METRO, in cooperation with the Cities of Glendale and Phoenix, completed the Glendale Subregional Corridor Study. The study analyzed the following four alternative LRT corridors serving the Glendale area:

- **Glendale Avenue, 19th to 59th Avenue:** Because of limited ROW, this concept diverts LRT to Lamar Road from 51st to 61st. This corridor serves downtown Glendale.
- **Loop 101, I-10 to Glendale Avenue:** The concept is a high speed LRT option which directly parallels Loop 101 and serves the Glendale Entertainment District.
- **Glendale Avenue, 59th Avenue to Loop 101:** This corridor is a long term concept to extend the LRT corridor on Glendale Avenue This corridor connects downtown Glendale and the Glendale Entertainment District.
- **I-17/Thunderbird Road, Metrocenter to ASU West and the Glendale Medical Complex:** This corridor is primarily located in the City of Phoenix.

The first extension to the existing light rail system will bring light rail farther north along 19th Avenue to Dunlap Avenue, allowing greater connectivity for Glendale residents

and visitors in the near future. Future extensions to and within the City of Glendale are planned, and specific alignments are under study.

Both the Glendale Avenue and the Loop 101 Corridors show merit in terms of ridership and economic development for fixed-guideway service. Therefore both of these high capacity transit corridors are included in this update of the Glendale Transportation Plan for further analysis.

Construction priorities remain to be defined, and formal Alternative Analyses are needed to define specific alignments and technologies. An extension from Metrocenter to ASU West and the Glendale Medical complex is not included in this Plan because it is almost entirely located in the city of Phoenix. It has little impact on the City of Glendale; development of this corridor is primarily a City of Phoenix decision.

Fixed-Guideway Corridor Discussion

Glendale Avenue Corridor

Fixed-guideway service on Glendale Avenue between 19th Avenue and downtown Glendale has more promise on either Northern Avenue or Bethany Home Road. There are large lots of vacant land along Glendale Avenue between 43rd and 59th Avenues and transit could serve as a stimulus for the redevelopment of this land.

The commercial nature of land along Glendale Avenue is more compatible with fixed-guideway transit than the land uses along parallel corridors. The downtown area has larger concentrations of employees than other corridors, and it is a pedestrian-friendly environment. In the downtown area, the right-of-way along Glendale Avenue is more restricted than along parallel arterials; however, alternative alignments (such as along Lamar Road) are feasible.

The extension of the Glendale Avenue corridor from 59th Avenue to Loop 101 is a natural long-term extension of planned service. It serves the emerging Entertainment District and provides a vital connection between the Entertainment District and downtown.

Regularly spaced stops create longer travel times but ensure good access for business development and access to LRT by Glendale residents.

Loop 101 Corridor

A planned fixed-guideway corridor extends from downtown Phoenix to 79th Avenue. It is located in the center of the I-10 freeway which has few traffic conflicts and widely spaced stops. This creates a rapid and reliable commuter type transit service. The goal is to extend this type of high-speed commuter service along Loop 101 to Glendale Avenue.

This high level of transit service would enable connections to central Phoenix, Sky Harbor International Airport and the East Valley. It will strengthen the Entertainment District as a regional activity node. This fixed-guideway connection will expand the labor pool (and extend the effective entertainment market) for business in the Entertainment District.

By 2030 the Entertainment District is projected to have 67,000 jobs over 4.5 square miles. These jobs, along with entertainment activities, will ensure a high level of transit demand for the Loop 101 Corridor. On the other hand, the size of this District will require an extensive transit circulator system, and the end of the line location will require substantial amounts of parking.

Commuter Rail

Interest in using existing freight rail track for commuter rail service has been developing in the Valley, culminating in several recent and ongoing commuter rail studies led by MAG and ADOT. Commuter rail is defined by the American Public Transit Association as follows:

Local and regional passenger train operations between a central city, its suburbs and/or another central city. It may be either locomotive-hauled or self-propelled, and is characterized by multi-trip tickets, specific station-to-station fares, railroad employment practices and usually only one or two stations in the central business district.[4]

The presence of railroad tracks paralleling Grand Avenue means that Glendale would be a likely part of a future commuter rail network. Commuter rail along the Grand Avenue alignment could provide access to Glendale's downtown from the far reaches of the Valley, and could allow Glendale residents access to regional destinations. The impacts and cost of commuter rail are currently under examination, and commuter rail operations along Grand Avenue would need to be coordinated with planned Grand Avenue BRT and express bus operations. Whether commuter rail services would supplement or replace existing and planned express bus and BRT operations should be examined in future commuter rail studies.

While supportive of the ongoing commuter rail studies, the City has concerns about implementing commuter rail along the Grand Avenue corridor, as follows:

- Safety issues
  - Accidents involving motorists or pedestrians at at-grade crossings
  - Use of rail tracks by both freight and passenger traffic
- Preference for future grade separation and intelligent transportation systems (ITS) to manage crossings safely
- Funding to support commuter rail associated improvements
  - The City currently has no funding to support such improvements

4 *From APTA's online glossary of transit terminology: http://www.apta.com/research/info/online/glossary.cfm*

- Coordination with other roadway improvements
- Coordination with existing and planned transit services and infrastructure, including Grand Avenue BRT, fixed-route arterial service, and the downtown transit center planned for 59th Avenue and Glendale Avenue

The City encourages further study of commuter rail, especially its potential to reduce through traffic on City streets and provide a high-speed connection to Downtown Phoenix, Sky Harbor International Airport, downtown Tempe, the Southeast Valley, and Tucson.

Three phases of commuter rail implementation are:

- **Phase I: Start Up/Introductory Service:** Limited peak hour, peak direction service composed of trains inbound in the a.m. peak and outbound in the p.m. peak on each of the routes.
- **Phase II: Intermediate Service:** Headway of 20 minutes during the peak hour will be examined together with limited counter-flow service. Midday service would consist of hourly trains in each direction.
- **Phase III: Full Commuter Train Operation:** In this phase, trains would operate on 15-minute headways during peak hours and at 30-minute headways during the off-peak. During the peak periods, there would be 30-minute interval counter flow services.

In the MAG HCTS, it was determined that only the Phase I and Phase III levels of service would be carried forward for full evaluation. Phase I service represents the minimum level of service that needs to be provided to operate viable commuter rail service, with three trains operating during the peak commute. Phase III service would be the ultimate operation of commuter rail service, providing frequent and reliable service throughout the day during both peak and off-peak commute times. Phase II (Intermediate Service) was not **specifically** evaluated.

Capital and Infrastructure

The *GO! Program* and the RTP together provide funding to support the following transit capital infrastructure in Glendale:

- Transit center at Arrowhead Mall
- Transit center in downtown Glendale
- Park-and-ride facility in downtown Glendale
- Park-and-ride facility along the north Loop 101[5]
- Bus stop improvements
- Bus pullouts
- Vehicle replacement

5 *Note: this park-and-ride facility has not yet been approved by the RPTA board. Currently, a park-and-ride facility at Northern/303 is scheduled for construction instead.*

The City's policy on bus stop amenities is to support all bus stops with seating wherever possible. The City wishes to provide a bench, trash can, and a solar-powered light fixture at each bus stop. All new bus stops are ADA compliant.

Although often seen as a way to make roadway operations more efficient, bus pullouts can cause an impedance to transit movements and may actually make bus operations more costly. In general, bus pullouts are not considered an enhancement of the transit system and are therefore part of the roadway budget. Guidelines for determining whether a bus pullout may be warranted are shown in Table B-10.

The cost of funding the system in its current state and with the planned improvements is as follows:

- **Operations and maintenance:** $394,669,372
- **Capital:** $340,964,956

Table B-10 Guidelines for Bus Pullouts[1]

Bus pullout is appropriate and warranted	Bus pullout may be warranted and considered
Timed transfer point	Dwell times of 15 seconds or more per stop (not including wheelchair lift deployment)
Route layovers	Posted speed limits in excess of 40 mph
	No parking in curb lane
	High traffic volumes in curb lane
	Where sight distances prevent vehicular traffic from stopping safely behind a stopped bus

[1] From Tri-Met Bus Stop and Passenger Amenities Guidelines (1995)

Fixed Guideway: Cost and Funding

This section estimates costs for the above-mentioned planned fixed-guideway corridors. The timing of these corridors remains to be determined. However, for purposes of a financially balanced plan, timing placeholders are used as follows: The Glendale Avenue section from 19th Avenue to downtown Glendale is assumed to be completed by 2019 in accord with adopted plans. The section of fixed-guideway along Loop 101 is assumed to be constructed in the 2025 to 2035 time period.

Fixed-Guideway Funding

The current GO Program and regional Transit Life Cycle program includes funding for a LRT corridor between 19th Avenue and downtown Glendale. Any additional fixed-guideway corridors will require new funding. Reasonable additional funding for a fixed-guideway in Glendale could come from an extension of the existing regional tax after 2025 or from the share of a new statewide transportation tax. In this analysis, new funding is assumed to be adequate to support a fixed-guideway extension along Loop 101

to the Glendale Entertainment District. Due to funding limitations the extension along Glendale Avenue between downtown Glendale and the Entertainment District is deferred past the 2035 time horizon to maintain a financially balanced plan.

Glendale Avenue – 19th to 59th Avenues

This project is for a LRT line along Glendale Avenue between 19th Avenue and downtown Glendale. The line is five miles long with two miles in the City of Glendale and three miles in the City of Phoenix. This concept includes five stations, one park-and-ride, and one freeway crossing. The Glendale portion of capital costs is estimated at $282 million in existing dollars (engineering, utility relocation, right-of-way and construction) for the 3.5 miles of this line west of 31st Avenue. Glendale's share of operating costs is only for the portion of the line in the City of Glendale -- two miles. O&M costs are estimated at two million dollars per mile per year. Glendale related costs are listed in the Table B-11 in millions of constant 2009 dollars.

Table B-11 Estimated Costs for Glendale Avenue- 19th to 59th Avenues Fixed-Guideway Transit (Glendale Portion, in millions of 2009 $)

	FY 2011-15	FY 2016-20	FY 2021-25	FY 2026-30	FY 2031-35	Total
Capital	$-	$-	$-	$114.5	$167.4	$281.9
O&M	$-	$-	$-	$-	$13.9	$13.9

Loop 101 – I-10 to Glendale Avenue

This project is for the line along Loop 101 between Glendale Avenue and I-10 and then east along I-10 to 79th Avenue -- a distance of eight miles. Two miles of this line are in the City of Glendale and six miles outside of Glendale. The proposed concept includes six stations, two park-and-rides, one freeway crossing, and eight grade separations at streets. The Glendale portion of capital costs is estimated for 3.5 miles of this line north of Osborn Road for a total cost of $284 million in existing dollars including engineering, utility relocation, right-of-way and construction. Glendale O&M costs are limited to the two miles in the City of Glendale at two million dollars per mile per year. Glendale related costs in millions of 2009 constant dollars are shown in Table B-12.

Table B-12 Estimated Costs for Loop 101-I-10 Fixed Guideway Transit (Glendale portion, in millions of 2009 $)

	FY 2011-15	FY 2016-20	FY 2021-25	FY 2026-30	FY 2031-35	Total
Capital	$0.4	$68.6	$214.7	$-	$-	$283.7
O&M	$-	$-	$-	$13.5	$13.5	$27.0

Glendale Avenue – 19th to 59th Avenues

Funding for this corridor is included in the Glendale GO program and in the regional Transit Life Cycle program. Funding for the capital part of the project includes federal (50%), regional (15%), and local (35%). Two out of the five-mile project will be in Glendale city limits, but plans call for Glendale to contribute the local match for 1.5 miles of the project in Phoenix city limits west of 31st Avenue. Funding to operate and maintain the project includes fare box (25%), as well as local funds for the portion of the fixed-guideway in each jurisdiction -- Phoenix (45%), and Glendale (30%). Funding for the Glendale portion of this corridor is listed in Table B-13.

Table B-13 Estimated Funding Availability for Glendale Avenue Fixed-Guideway Transit (in millions of 2009 $)

		2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Total
Capital in Glendale	Federal	$-	$-	$-	$57.3	$83.7	$141.0
	Regional	$-	$-	$-	$17.2	$25.1	$42.3
	Glendale	$-	$-	$-	$40.1	$58.6	$98.7
Operating in Glendale	Farebox	$-	$-	$-	$-	$3.4	$11.5
	Glendale	$-	$-	$-	$-	$10.5	$34.5
Total		$-	$-	$-	$114.5	$181.3	$329.1

Loop 101 – I-10 to Glendale Avenue

Funding for the capital portion of this project is proposed as federal (45%), regional (45%), and local (10%). Glendale capital matching funds are proposed for the 3.5 miles north of Osborn. Fair box revenues are estimated to pay for 25% of the operating costs. For the balance of operating costs it is proposed that other regional sources pay for six miles outside of Glendale and Glendale pay for the two miles in the City of Glendale. Glendale related funding is listed in Table B-14.

Table B-14 Estimated Funding Availability for Loop 101 – I-10 Fixed-Guideway Transit (in millions of 2009 $)

		2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Total
Capital in Glendale	Federal	$0.2	$127.5-	$-	$-	$-	$127.7
	Regional	$0.2	127.5	$-	$-	$-	$127.7
	Glendale	$-	$28.4	$-	$-	$-	$28.4
Operating in Glendale	Farebox	$-	$-	$3.4	$3.4	$3.4	$10.2
	Glendale	$-	$-	$10.1	$10.1	$10.1	$30.3
Total		$0.4	$283.4	$13.5	$13.5	$13.5	$324.3

Appendix C - Alternate Modes

Appendix C includes detailed bicycle and pedestrian crash data as well as countermeasures.

Bicycle Crash Data

The City of Glendale retains a crash database which collects all police reports concerning bicycle accidents. The crash information contained in this database was assessed for this study for the years 2004 through 2007 based on type of crash, fault (if determined) and other available crash characteristics. An overview by crash type is detailed in this section. The crashes are grouped by type and fault, using classifications of the FHWA. This information is used to evaluate what types of mitigation and prevention measures should be made in the system to increase safety of the bicycle network within the Glendale.

From April 2004 to March 2007, there were a total of 237 bicycle crashes within the City of Glendale. These crashes are detailed by type of violation, when known, in Table C-1. This table also shows who was cited at fault, either the bicyclist, vehicle driver, or in some cases both. Crashes where an unknown violation occurred are not included in this table.

The most common crash types when the driver was at fault were failure to yield to bicyclist's right-of-way or driver inattention. The most common when the bicyclist was at fault were failure to yield to the driver's right-of-way, riding in the opposite traffic lane or bicyclist inattention. Figure C-1 shows locations of these types of bicycle crashes.

Table C-1 Bicyclist Crashes by Violations

Type of Violation	Bicyclist's Violation		Driver's Violation	
	Number of Crashes	Percentage of Crashes	Number of Crashes	Percentage of Crashes
No Violation	62	26.84%	130	52.21%
Fail to Yield Right-of-way	45	19.48%	46	18.47%
Drove in Opposite Traffic lane	34	14.72%	0	0.00%
Inattention	23	9.96%	19	7.63%
Disregarded Traffic Signal	10	4.33%	1	0.40%
Did Not Use Crosswalk	4	1.73%	0	0.00%
Knowingly Operated	4	1.73%	0	0.00%
Speed Too Fast	3	1.30%	9	3.61%
Ran Stop Sign	1	0.43%	0	0.00%
Walked on Wrong	1	0.43%	0	0.00%
Exceeded Lawful Speed	0	0.00%	1	0.40%
Followed Too Closely	0	0.00%	2	0.80%

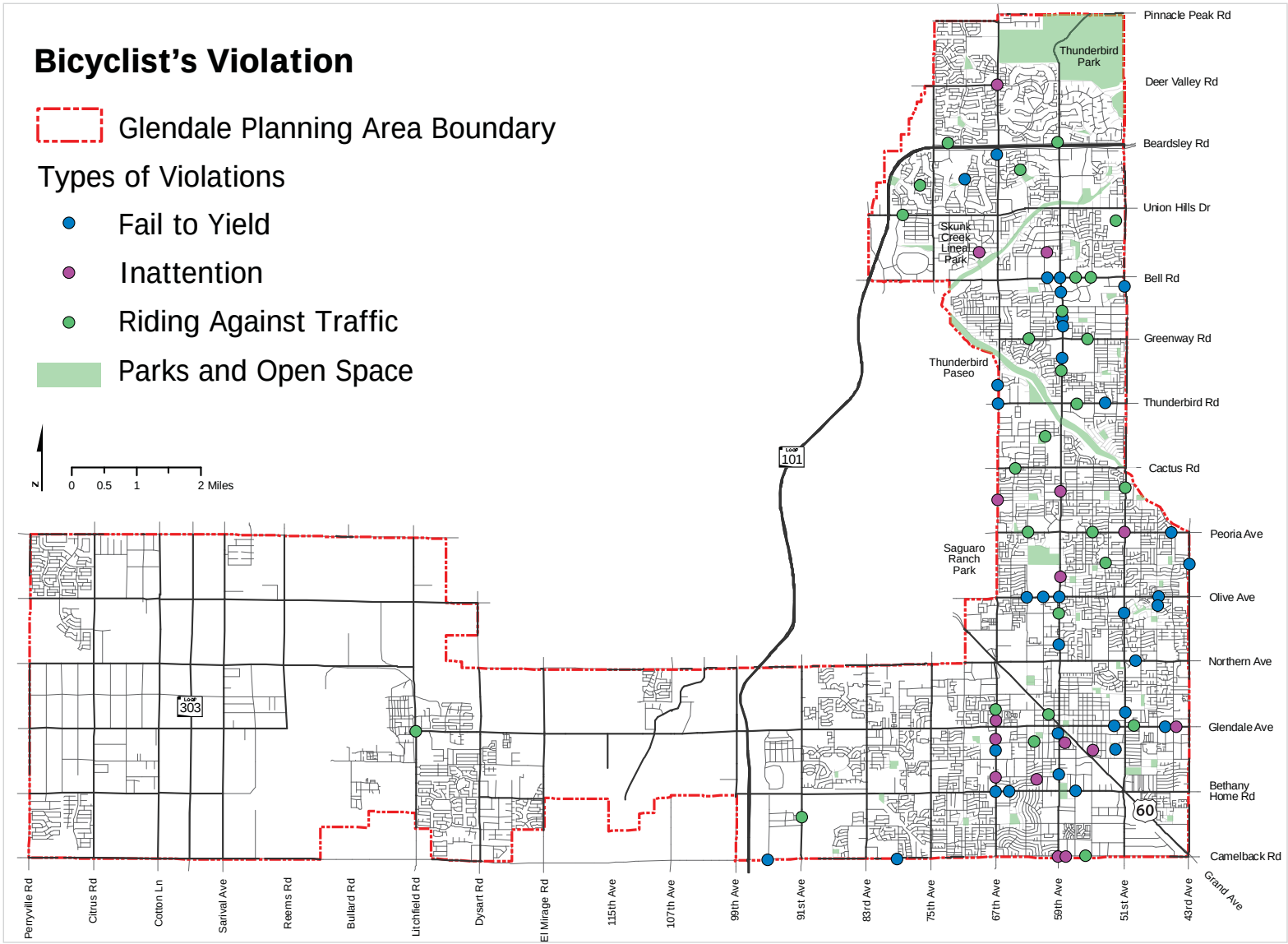


Figure C-1 Bicycle Crashes by Types

Table C-2 Bicycle Crash Countermeasures

Violation	Countermeasures	
Failed to Yield/ Inattention	• Bike-activated Signals • Intersection Markings • Intersection Warning Treatments • On-road Bike Facilities • Access Management • Advance Stop/Yield Line • Countdown Signals	• Curb Extensions • Crosswalk Enhancements • Refuge Island • Staggered Median • Speed Tables/Humps/ Cushions • Reduce Curb Radii • Traffic Diversion
Riding Against Traffic	• On-road bike facilities • Access Management • Curb Extensions	• Refuge Island • Staggered Median • Education for motorists and cyclists

Countermeasures Description

- **Bike-Activated Signal:** The bike-activated signals are signals with pushbutton detectors capable of activating a green signal phase for bicyclists. The detectors should be conveniently located near each end of the crosswalk.
- **Intersection Markings:** Intersection markings can help to enhance intersections or other junctions, such as driveways where bicycle crashes are more likely to occur. The placement of bike lane striping for various kinds of intersection is discussed in *AASHTO Guide for the Development of Bicycle Facilities*.
- **Intersection Warning Treatments:** Advance warning treatments are useful to alert bicyclist path users of the approaching intersection with a roadway, another path, a railway, or other crossing. It is recommended to use sight and stopping distance, signs, and intersection design guidelines for bicyclists in designing shared-use paths, including intersection approaches. Passive warning devices including pavement markings, special pavement alerts, such as textured treatments, and warning signs can also be used.
- **On-Road Bike Facilities:** Bicycles are vehicles and need to be safely accommodated on our streets and roadways. Facilities that are safe, accessible and aesthetically pleasing attract bicyclists. Evidence suggests that bicyclist safety improves as more bicyclists are part of the traffic stream. Some of the recommended on-road bike facilities are bike lanes, paved shoulders, wide curb lanes, and counterflow lanes.
- **Access Management:** Access management is important to reduce conflicts between those traveling along the corridor and those entering or leaving the corridors. Access management strategies, such as providing raised/non-traversable medians and limiting driveway access, may be useful in promoting a safe pedestrian and bicycle environment, particularly on arterial or major collector streets, since they help reduce the number of potential conflict points.

- **Advance Stop/Yield Line:** At signalized intersections and midblock crossings, the vehicle stop line can be moved farther back from the pedestrian crosswalk for improving safety and visibility of pedestrians. Moving back the stop line by 15 to 30 feet relative to the marked crosswalk was found in some places to have considerable safety benefits for pedestrians. Advanced stop lines are also applicable for non-signalized crosswalks on multi-lane roads to ensure that drivers in all lanes have a clear view of a crossing pedestrian.
- **Countdown Signals:** Countdown signals are provided to prevent pedestrians from starting their crossing when there is not sufficient time remaining on the traffic signal for them to complete their crossing safely. This signal gives pedestrians direct feedback as to the number of seconds remaining before the amber vehicle signal will appear.
- **Curb Extensions*:*** Curb extensions can be used where there is an on-street parking lane. Curb extensions improve pedestrian crossings by reducing the pedestrian crossing distance. Extending a sidewalk or curb line out into the parking lane narrows down the roadway, improves the ability of pedestrians and motorists to see each other, and reduces the time pedestrians are on the street.
- **Crosswalk Enhancements:** Marked crosswalks alone are unlikely to increase pedestrian safety in high crash areas. It is recommended to use crosswalks in conjunction with other measures that can physically reinforce crosswalks and reduce vehicle speeds, such as stop signs, warning signs, curb extensions, etc. In some cases, crosswalks could be raised to visually alert motorists.

  It is important to ensure that crosswalk markings be visible to motorists, particularly at night. Different markings can be utilized to enhance crosswalk visibility to motorists. Various crosswalk marking patterns are given in the MUTCD. Crosswalks should not be slippery, create tripping hazards, or be difficult to traverse by those with diminished mobility or visual capabilities. One of the best materials for marking crosswalks is inlay tape, which is installed on new or repaved streets. Inlay tape is recommended for new and resurfaced pavement, while thermoplastic may be a better option on rougher pavement surfaces. Both inlay tape and thermoplastic are more visible and less slippery than paint when wet.
- **Refuge Island/Raised Median:** Medians are raised barriers in the center portion of the street that can serve as a place of refuge for pedestrians while crossing a street. Raised medians are most useful on high-volume, high-speed roads, and should be designed to provide tactile cues for pedestrians with visual impairments to indicate the border between the pedestrian refuge area and the motorized vehicle roadway.

- **Staggered Median:** A staggered median is a split crosswalk with a fenced pedestrian refuge median, installed in the center turning lane. The crosswalk is made staggered so that crossing pedestrians can look at on-coming traffic while walking down the fenced median.
- **Speed Tables/Humps/Cushions*:*** A speed table is a modified version of a speed hump. A speed table is a term used to describe a very long and broad speed hump, or a flat-topped speed hump, where sometimes a pedestrian crossing is provided in the flat portion of the speed table.
- **Curb Radii Revisions:** Wide curb radius, which typically results in high-speed turning movements by a right-turning vehicle at an intersection, poses problems for pedestrians as well as bicyclists. It is recommended to reduce radii at locations where the routes are used by school children, and at particular intersections that are known to have a safety problem.
- **Traffic Diversion:** Diverters can be used to prevent certain through and/or turning movements in residential areas. Diverters should be considered only when less restrictive measures are not appropriate. They can be designed for bicycle and pedestrian access. It is recommended to use diverters in conjunction with other traffic management tools.

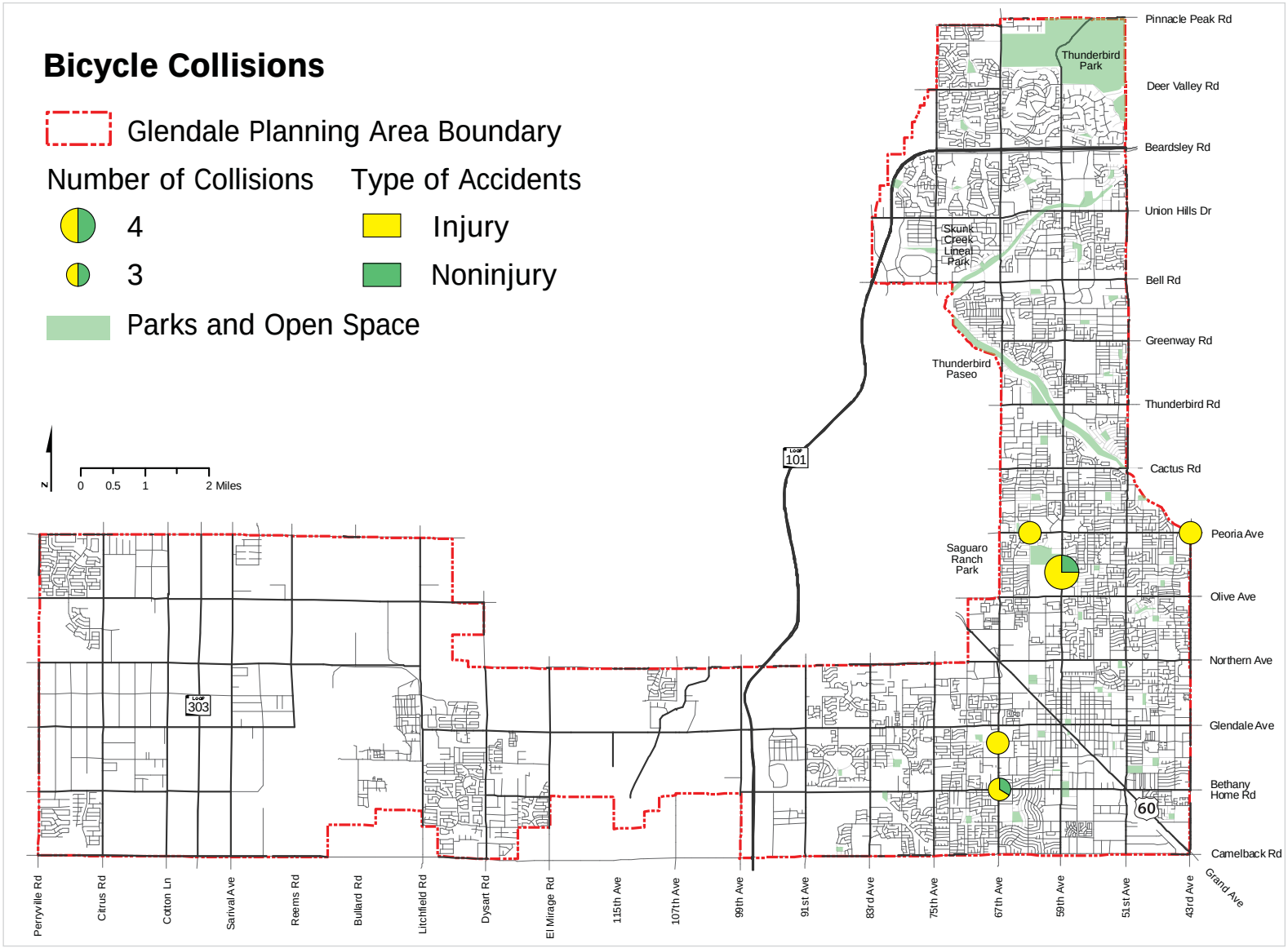


Figure C-2 High Frequency Bicycle Collisions

Bicycle Crash Statistics

Figure C-3 shows that over half of all bicycle crashes are found to be the fault of the motorist; while less than one-third of crashes are the fault of the bicyclist.

Figure C-4 indicates that a majority of the crashes occur in the late afternoon and early evening hours while it is daylight, which indicates that darkness is not a contributing factor to a majority of the crashes.

Most of the bicycle crashes reported resulted in injury; although most were not severe or fatal. Figure C-5 shows that of the 77 reported bicycle crashes, 69 resulted in bicyclist injury.

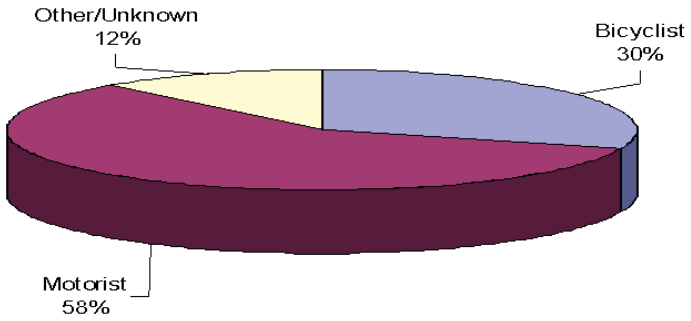


Figure C-3 Bicyclist Crash by Fault, 2006

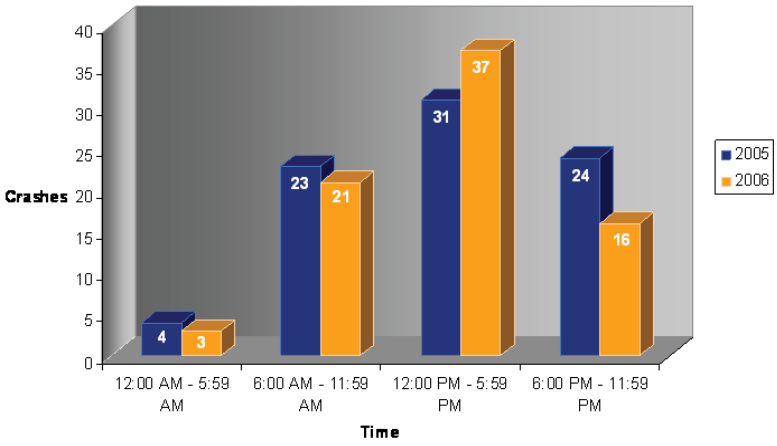


Figure C-4 Bicyclist Crash by Time of Day

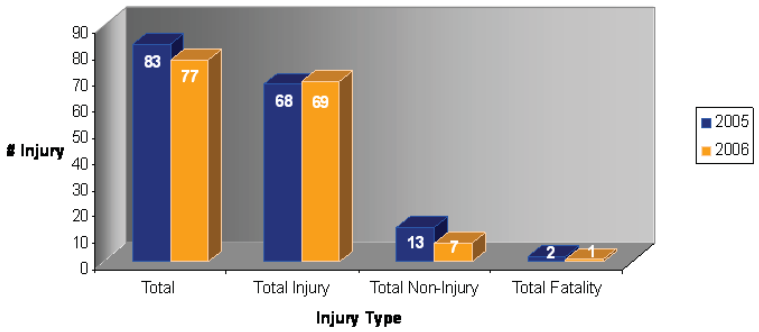


Figure C-5 Bicyclist Crash by Crash Type

Pedestrian Crash Statistics

In Glendale, from April 2004 to March 2007, there were 272 pedestrian crashes as summarized by type of violation and who was cited in Table C-3. Crashes where type of violation is unknown have not been included in this table.

The most common driver errors were failure to yield to the pedestrian or driver inattention. The most common pedestrian errors cited were not using a crosswalk or pedestrian inattention. Figure C-6 shows locations of these types of pedestrian crashes.

Table C-3 Pedestrian Crashes by Violations

Type of Violation	Pedestrian's Violation		Driver's Violation	
	Number of Crashes	Percentage of Crashes	Number of Crashes	Percentage of Crashes
No Violation	102	42.68%	112	42.91%
Did Not Use Crosswalk	54	22.59%	1	0.38%
Inattention	33	13.81%	28	10.73%
Fail to Yield Right-of-Way	15	6.28%	58	22.22%
Disregarded Traffic Signal	6	2.51%	1	0.38%
Speed Too Fast	2	0.84%	8	3.07%
Walked on Wrong Side	2	0.84%		0.00%
Drove in Opposite Traffic Lane	1	0.42%	2	0.77%
Exceeded Lawful	0	0.00%	4	1.53%
Made Improper Turn	0	0.00%	2	0.77%

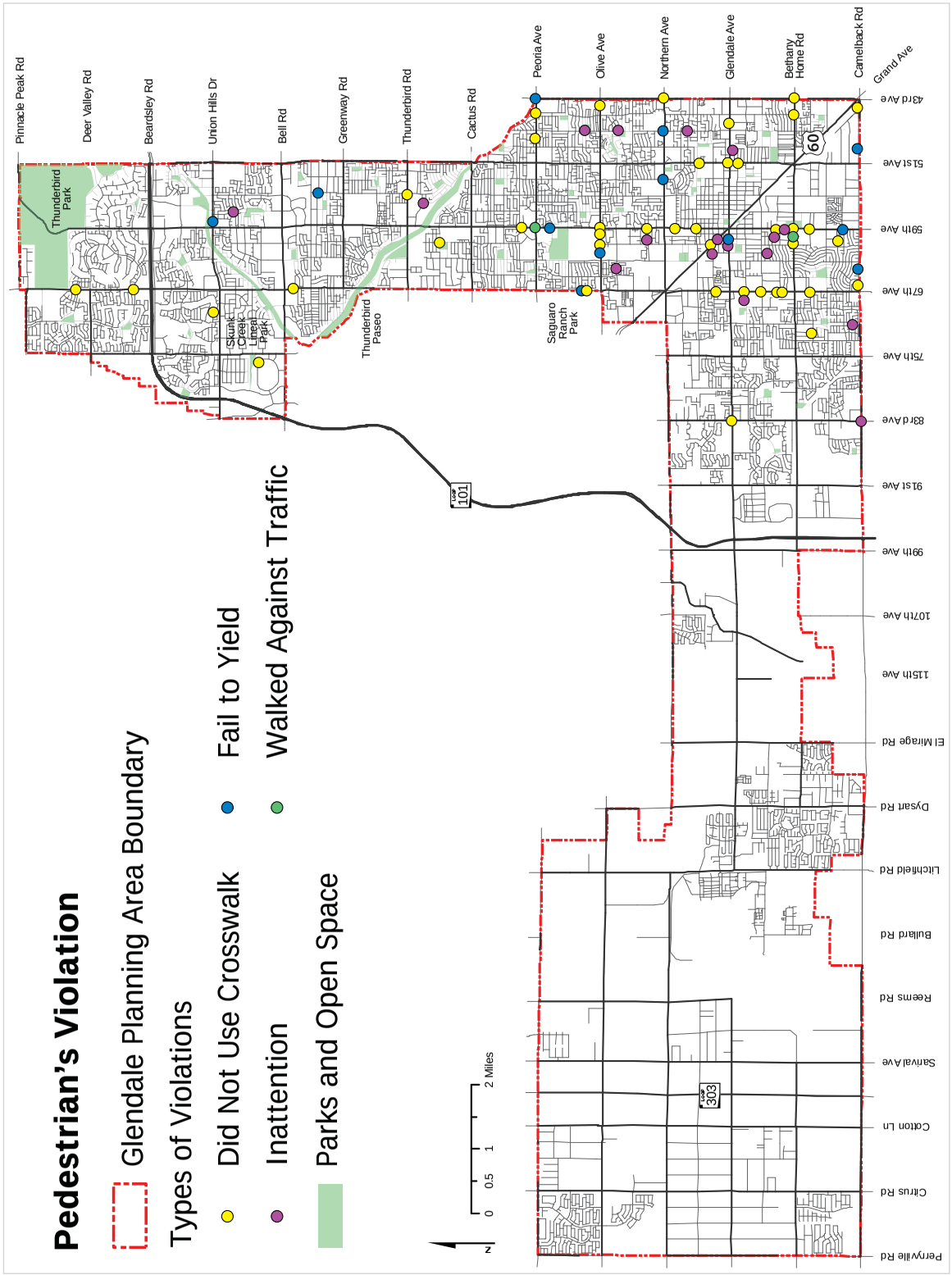


Figure C-6 Pedestrian Crashes by Type

In addition to the specific countermeasures presented in the Table C-4, Safety Education, Police Enforcement, Assistance Programs, Neighborhood Identity Programs, Streetlight Improvements, Traffic Sign Improvements, and Repetitive Short-term Maintenance are some of the general countermeasures applicable to enhance pedestrian safety at large.

Table C-4 Pedestrian Crash Countermeasures

Violation	Countermeasures	
Failed to Yield/ Inattention	• Pedestrian-activated Signal • Marked Crosswalks • Pedestrian Countdown Signals • Access Management • Advance Stop/Yield Line • Countdown Signals • Curb Extensions	• Crosswalk Enhancements • Refuge Island • Staggered Median • Speed Tables/Humps/ Cushions • Reduce Curb Radii • Traffic Diversion
Did not use Crosswalk	• Marked Crosswalks • Curb Extensions • Refuge Island	• Staggered Median • Exclusive Walking Phase
Walking/ Against Traffic	• Provide Sidewalk in both directions • Access Management • Curb Extensions	• Refuge Island • Staggered Median

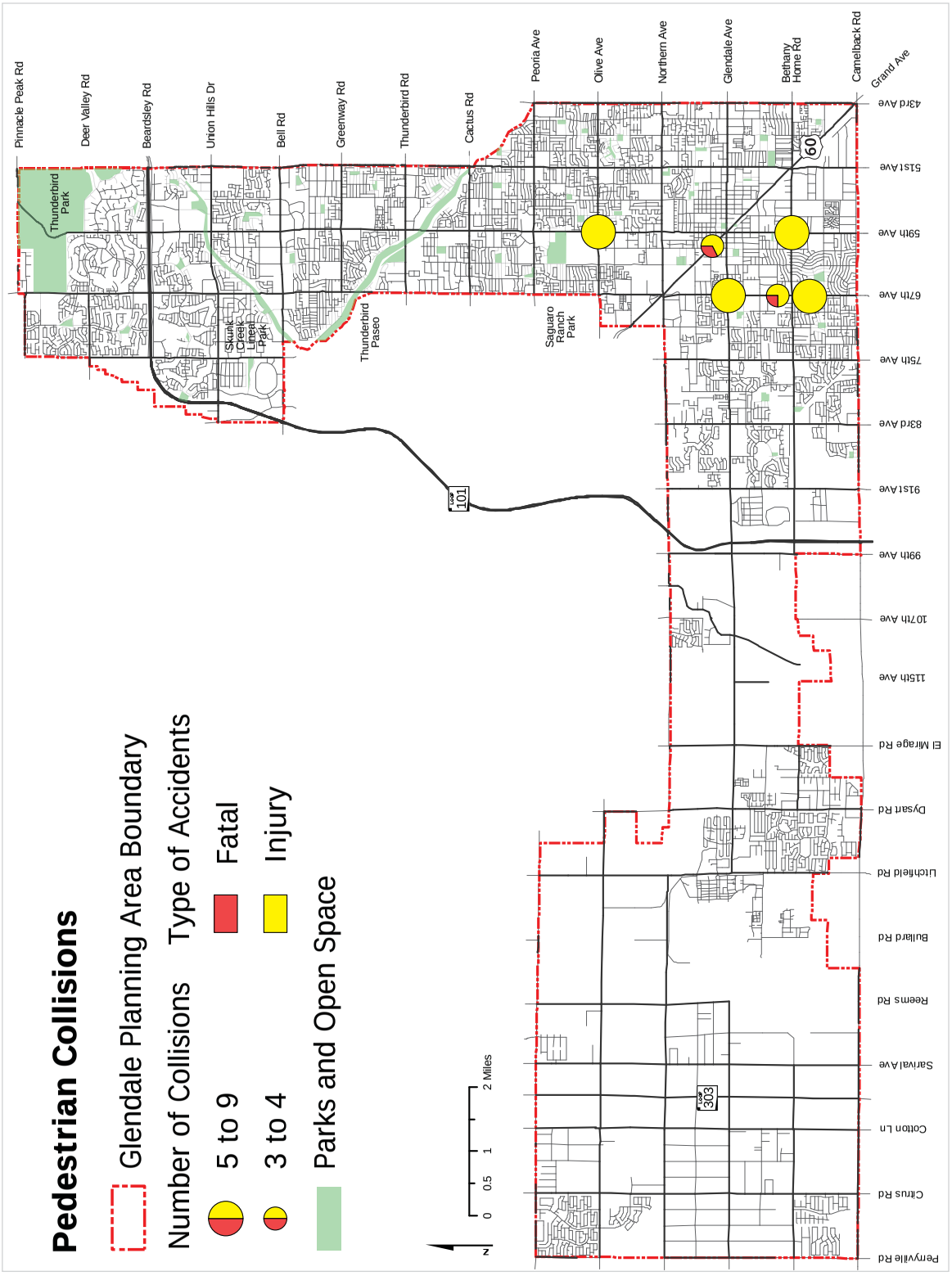


Figure C-7 High Frequency Pedestrian Collisions

Just over half of the accidents were found to be the fault of the motorist. Figure C-8 shows a breakdown, by percentage, of pedestrian crashes by fault.

As shown in Figure C-9, pedestrian accidents increase throughout the day, with most accidents in 2005 and 2006 occurring between the hours of 6:00 p.m. and 11:59 p.m. Darkness does seem to be a factor in many pedestrian accidents. This implies that improved lighting is needed in high pedestrian areas.

During the analysis years, 2005 and 2006 most of the pedestrian accidents caused injury, although none were fatal. Of the 85 pedestrian accidents recorded by the City of Glendale, 78 of them involved injury of the pedestrian. Figure 6C-10 shows pedestrian crashes by injury type.

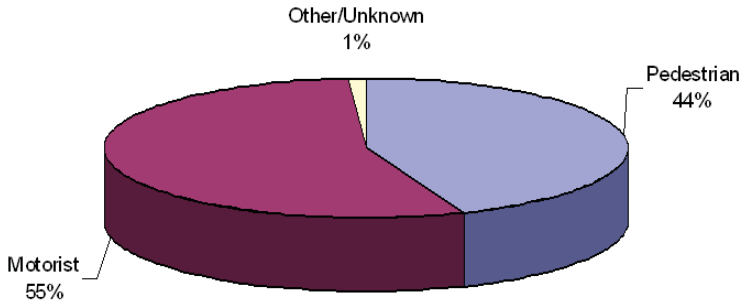


Figure C-8 Pedestrian Crash by Fault, 2006

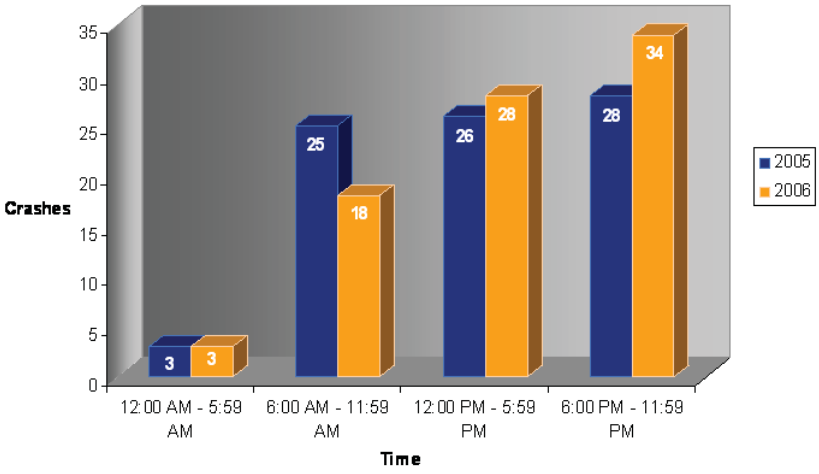


Figure C-9 Pedestrian Crash by Time of Day

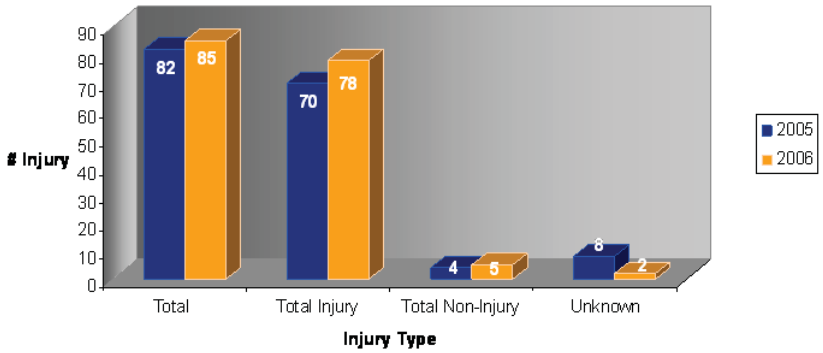


Figure C-10 Pedestrian Crash by Injury Type