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2023

WORKING PAPER #1: MESA TODAY

CITY OF MESA TRANSPORTATION MASTER PLAN

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1 PLAN OVERVIEW

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WHAT IS THE MESA TRANSPORTATION MASTER PLAN?

Mesa is changing – more people and businesses are moving here every day and the mobility needs of our residents are increasing. To provide our residents, visitors, and businesses with a transportation system that works, we need to face our transportation future head-on. The *Mesa Transportation Master Plan (TMP)* will serve as a roadmap for improving how we use our transportation system so everyone can safely and comfortably drive, walk, bike, or ride.

What Does the Transportation Master Plan Include?

While the Maricopa Association of Governments' (MAG) Regional Transportation Plan (RTP), sets forth a regional vision for transportation for all of the Phoenix metro area, the Mesa TMP focuses on mobility needs in the City of Mesa at a macro-level. Ultimately, the TMP reviews existing and emerging land use and transportation trends throughout Mesa to identify travel sheds (i.e., subareas); determine solutions to meet each travel shed's unique current and future transportation needs; and address the growing multimodal needs in the City. The following will be explored as part of this planning process:

- Develop complete multimodal networks that fill in system gaps and provide a more connected and safer transportation system for all users – drivers, transit riders, freight drivers, walkers, and bicyclists.
- For each travel shed, explore transportation improvement solutions to enhance quality of life, reduce traffic and congestion issues, provide comfortable travel options for all users, and better connect people to the places that matter to them.
- Examine and rethink the design of our streets to prioritize moving people and goods more safely and efficiently.
- Predict how well the transportation system will work in the future and suggest improvements.
- Establish new goals and policies to guide decision-making.
- Develop recommendations to address long-term and short-term, critical transportation needs.

The Mesa Transportation Master Plan will serve as a roadmap for improving how we use our transportation system so everyone can safely and comfortably drive, walk, bike, or ride.

GUIDING MESA INTO THE FUTURE

PLAN PROCESS

The development of the Mesa Transportation Master Plan will be a collaborative effort that brings together residents, the business community, regional and state partners, local stakeholders, and internal City departments to create a strategic transportation vision for Mesa. The Plan's process includes listening, complex technical analysis, as well as coordination with concurrent Mesa 2050 General Plan, Transit Master Plan, Balanced Housing Master Plan updates and community partners. The multi-phased process includes the following steps:

Evaluate Our System Today and Tomorrow	The Mesa Transportation Master Plan assesses how people and goods are traveling in and through Mesa, as well as the performance, safety, and comfort of the city's existing transportation network. The process provides a base for understanding the City's transportation challenges and needs.
Define the System We Want	To comfortably and conveniently move people and goods, a complete network will be developed that prioritizes transportation modes along corridors so that collectively every mode has a complete and interconnected system.
Determine How we Get There	A transportation network is only as good as its weakest link. Improvement strategies and policies will be developed to fill-in system gaps, mitigate or manage congestion and safety issues, and incorporate emerging technologies.

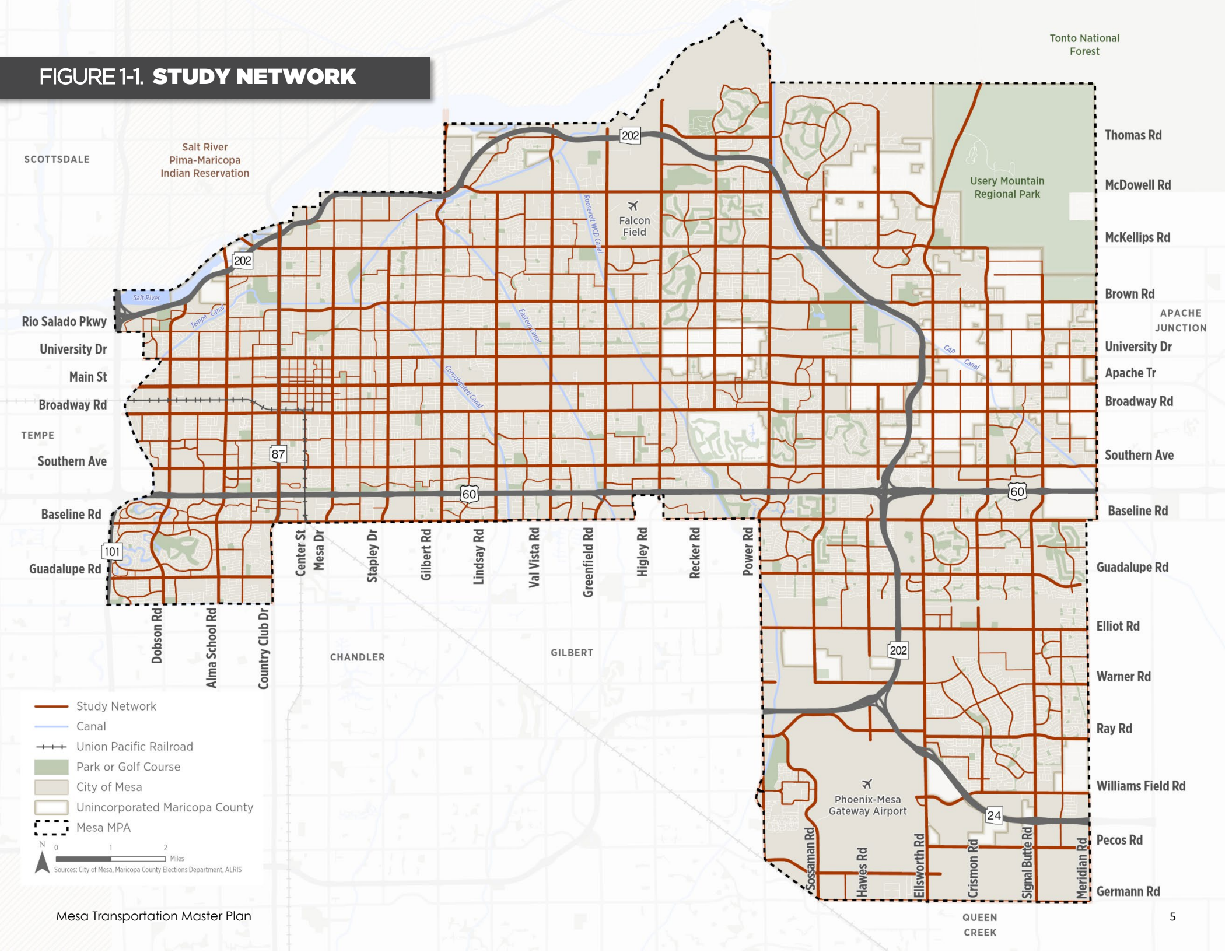
Study Network

Streets are the physical backbone of Mesa's transportation network and one of the largest public assets. Mesa's street network generally follows a grid pattern allowing the public to easily navigate in and through the city. Developing a complete and connected multimodal network begins with identifying a wider transportation network of city roadways called the "Study Network". The Study Network served as the basis for analyzing the performance and function of the city's transportation network. **Figure 1.1** illustrates the Mesa Transportation Master Plan study network.

Mesa Municipal Planning Area (Mesa MPA)

Beyond the incorporated jurisdictional boundary of the City, the TMP covers a larger area of influence called the Municipal Planning Area (MPA). Mesa's MPA includes the incorporated City limits and land in unincorporated areas within Maricopa County that could be annexed in the future. The Mesa MPA and unincorporated county areas, or "County Islands" are denoted in **Figure 1.1**. and proceeding maps.

FIGURE 1-1. **STUDY NETWORK**



HOW WE GOT HERE

Previous transportation plans, studies, and reports were reviewed to acknowledge recommendations and implemented plans that apply to the existing roadway, freight, transit, bicycle, and pedestrian network in the City of Mesa. A review of surrounding jurisdictions' previously completed studies and plans was completed to better understand the local, regional, and statewide network of transportation facilities that will directly or indirectly impact Mesa's transportation system.

Local Plans and Studies

Climate Action Plan (2022)

The Climate Action Plan provides a guide to reduce the City's impact on the environment by reducing carbon emissions and investing in renewable energy. In order to reach carbon neutrality, the City aspires to build a "carbon-free transportation system, with walking, biking, carpooling." The City recommends developing an EV charging master plan for the deployment of charging infrastructure throughout the City and especially where charging infrastructure is currently not available. In addition, the City will advocate for access to EVs for low-income people. In order to further decarbonize transportation, the plan recommends increasing access to healthy transportation options like active transportation, carpooling, and public transportation with the goal of reducing vehicle miles traveled in single occupancy vehicles. This can include strategies such as identifying pedestrian networks and increasing shade at transit stops.

Smart Mesa Today(2021)

The Smart Mesa Today Strategic Plan was developed to review smart city technologies and to consider their application in helping the City to support economic development and enhance the quality of life for its residents. Major recommended priorities from the report that could impact transportation in the City included, but not limited to:

- Expand and upgrade traffic data services and intelligent transportation systems. Sensors and the metadata they collect can provide insight into vehicle traffic data, pedestrian data, tourist travel patterns, and other information.
- Consider investing in parking system technology that can provide information about the number of parking spaces available, increase utilization of existing spaces, or make it easier to pay.
- Develop pilot opportunities for new multimodal transit and microtransit vehicles. Microtransit can be used to complement light rail and bus networks by providing access to populations that otherwise could not reach public transit.

Long Range Analysis and Prioritization of Select Intersections (2021)

This Plan evaluated and prioritized 85 intersections in the City of Mesa to aid in appropriately planning and funding infrastructure improvements to address safety, operations, deficiencies, and needs. Results found that a total of 39 out of the 85 intersections have existing and/or future capacity or safety levels that warrant intersection improvements. The top intersections include Southern Avenue/Country Club Drive, University Drive/Mesa Drive, University Drive/Country Club Drive; Brown Road/Gilbert Road; and Broadway Road/Higley Road.

2020 Mesa Moves Bond Program

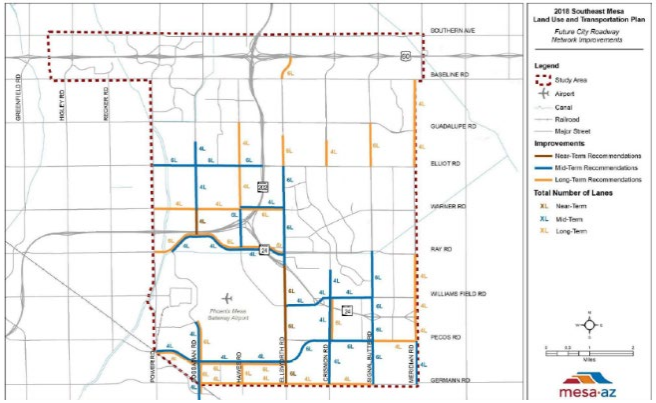
The Mesa Moves Bond Program was approved by voters in 2020 and created a $100 Million General Obligation Bond that included a list of potential transportation projects that fall into three categories:

- **Regional Roadway Improvements:** These projects widen existing streets, improve intersection capacity and safety, and/or construct new major street segments.
- **Arterial Road Reconstruction:** These projects reconstruct the existing pavement of major roads throughout Mesa.
- **Active Transportation:** These projects enhance Mesa's bike and pedestrian network by expanding Mesa's shared use path network.

While the Bond Program provides funding for new arterial road reconstructions, specific project segments are not listed in the bond and are left to be prioritized by the City's Transportation Department. Likewise, Active Transportation projects are not specifically identified within the Bond Program but notes that projects will be identified through a public feedback process led by the City's Transportation Department.

Southeast Mesa Land and Transportation Plan (2019)

The Southeast Mesa Land and Transportation Plan is intended to guide future transportation improvements in southeast Mesa by evaluating the current conditions and future projected needs of the area. The study encompasses portions of the Mesa MPA south of Southern Avenue and east of Highly Road. The report predominantly focused on the transportation needs of people who drive cars and maintaining an acceptable level of service. A list of recommended near-term (immediate need), mid-term (needed by 2030), and long-term (needed by 2040) projects are provided in the Appendix.



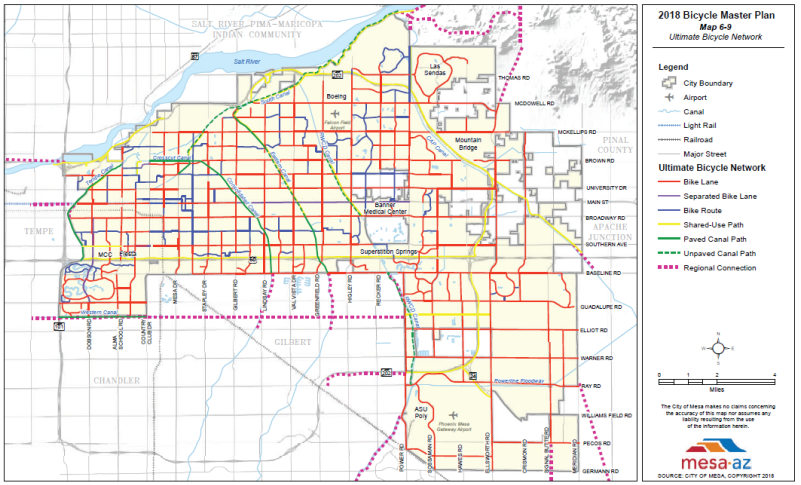
MESA MOVES
SHARED ACTIVE TRANSPORTATION VEHICLES

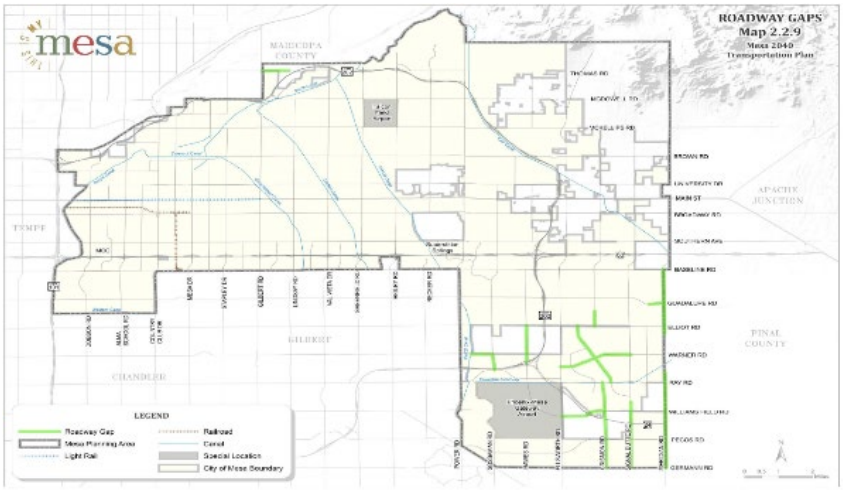
Shared Active Transportation Vehicles Pilot Program (2019)

On December 2, 2019, the City Council approved a pilot period of one year starting on February 1, 2020, to allow licensed providers of Shared Active Transportation Vehicles (SATV), including shared bicycles, e-bikes and scooters, to operate in Mesa if they abide by the City's Terms & Conditions. The program was renewed on February 1st, 2022, and can be renewed annually at the operators request. The City has discretion to renew an SATV license so long as the operator maintains compliance with the City's terms and conditions.

Mesa Bicycle Master Plan (2018)

The City of Mesa Bicycle Plan is part of the overall Mesa Transportation Plan update providing guidance in managing bicycle facilities and policy recommendations that meet the current and future demand within the public right-of-way. The 2018 Mesa Bicycle Plan also incorporates policy recommendations and project priorities, which serve as the basis for future funding requests. The Plan also developed a vision for a complete bicycle network, identified gaps and needs to bring this vision to life, and created a prioritized list of projects. In addition to the planned facilities, the plan proposes to expand programs as well. These include safety education for children, adults, bicyclists, and motorists; improving the existing Safe Routes to School Program within the Mesa Public Schools; reducing bicycle related citations through traffic diversion classes; establishing a viable media campaign to deliver bicycle related information to the public; and establishing a tourism campaign that will successfully promote Mesa as a bicycling destination and encourage travel to Mesa for bicycling.





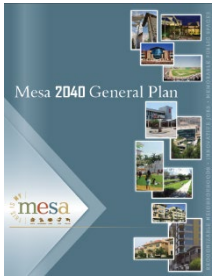
2040 Mesa Transportation Plan (2014)

The Mesa Transportation Plan provides the City a framework and direction for the future of its transportation network. Major goals identified for the future development of the City's transportation network are:

- Develop a safe and efficient transportation system that provides access to all public places by multiple modes of travel and by various users.
- Develop inviting streets that identify with the context of the surrounding neighborhood and help to create a sense of community and vibrant public space.
- Develop a transportation network concentrated around activity centers that encourages dense, diverse public places and fosters economic growth.

Mesa 2040 General Plan (2014)

The Mesa 2040 General Plan is a comprehensive plan created to help guide Mesa to a more "exciting, dynamic and holistic" city. The plan imagines new neighborhood and village centers with context sensitive design to reduce auto dependency and a transportation system that includes multi-modal and transit connections that provides for the movement of goods and people. The plan refers to the My Mesa 2040 Transportation Plan for developing the methodology, goals, objectives and elements for the planned transportation network.



Additional City of Mesa Plans and Studies Reviewed

- City of Mesa Traffic Calming Technical Memorandum (2021)
- City of Mesa Central Main Plan (2012)
- City of Mesa ADA Transition Plan
- Gateway Strategic Development Plan (2008)
- Broadway Road Corridor Study Report
- West Main Street Area Plan (2008)
- Falcon Field Sub-Area Plan
- City of Mesa Design Guidelines
- City of Mesa Fiesta District Design Handbook
- City of Mesa Desert Uplands Guidelines
- Ellsworth Road Operations Analysis Report

Regional Plans and Studies

These projects may impact transportation conditions of the City of Mesa and should be considered although may not be directly within the purview of this report.

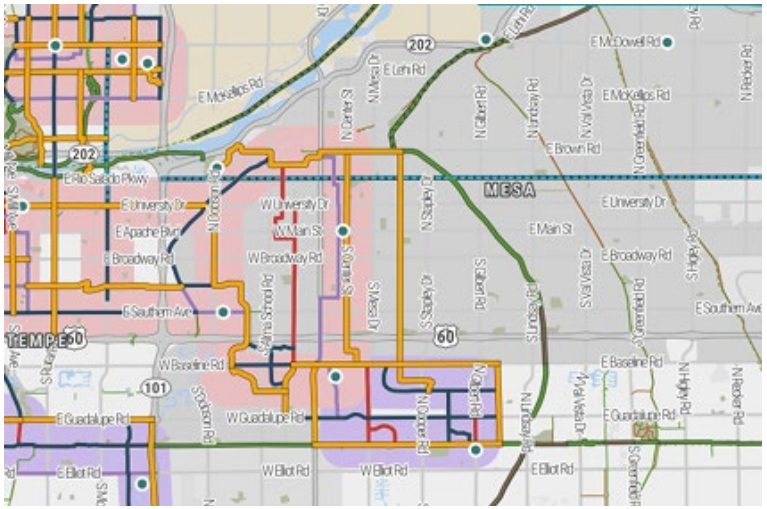
Maricopa Association of Governments (MAG) MOMENTUM Plan (2021)

MAG's Regional Transportation Plan (RTP) is updated every two to four years and guides transportation planning for the next 20 years and beyond. The dedicated sales tax that has been in place for 35 years will expire in 2025. In preparation for voters to consider its renewal, MAG developed the new Regional Transportation Plan, called "MOMENTUM." Ultimately, the RTP took a fresh look at the needs of the region and developed a long-term plan to guide major roadway and public transit system investments for the next 20 years and beyond. The MAG RTP also allocates funds to implement the MAG Active Transportation Plan which includes bicycle lanes, paths, sidewalks, and other projects.

MAG Active Transportation Plan (2020)

This plan serves as a guide for improving, expanding, and connecting the regional active transportation network to increase mode choices for people who walk, bike, and take transit. Strategies that were identified to bolster the region's active transportation network include the Active Transportation Grid, Regional Conduits, and Activity Centers. The western portion of Mesa is part of the regional conduit network, including a series of north-south corridors and canal trails to create a "Mesa Loop" bounded roughly by Dobson Road, Brown Road, Center Street, and Baseline Road.

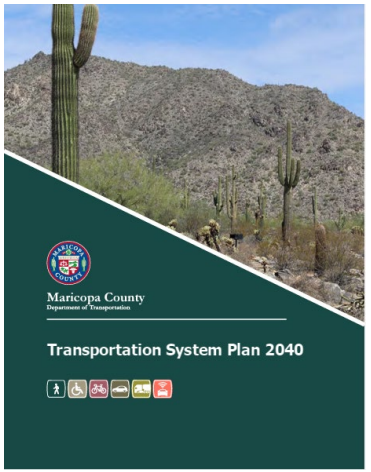
The identified "Mesa Loop" is in the Active Transportation Grid and includes a variety of high scoring alignments, including: Center Street, Horne, Brown Road, Tempe Canal, Baseline Road, Guadalupe Road, and Dobson Road. Furthermore, the MAG Active Transportation Toolbox provides guidance for developing this active transportation infrastructure to meet the needs of all people.



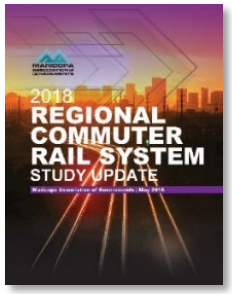
Phoenix-Mesa Gateway Airport Master Plan (2020)

The Phoenix-Mesa Gateway Airport Master Plan was completed in June 2020, updating the previously completed plan from 2009. This plan determines the long-range Airport development needs, examines viable and reasonable alternatives, and recommends a plan in consideration of potential environmental impacts. In addition to recommendations regarding aircraft operating areas of the Airport, this plan includes consideration of passenger terminal improvements to meet potential demand.

Maricopa County Department of Transportation (MCDOT) Transportation System Plan (TSP) 2040 (2020)



TSP 2040 reaffirms the goals, objectives, and strategies from TSP 2035 and strengthened them with guiding principles and performance measures for current and future transportation needs and investments, and compliments Maricopa County's Comprehensive Plan guidelines for transportation. With TSP 2040, MCDOT updated its approach to include complete projects, which comprehensively addresses transportation system needs beyond capacity, in addition to active transportation, safety, and Intelligent Transportation Systems (ITS). To achieve these goals, projects have been identified to address near-, mid-, and long-term needs for roadways maintained by MCDOT, including several corridor recommendations located in county islands within the Mesa MPA.



MAG Regional Commuter Rail System Study (2018)

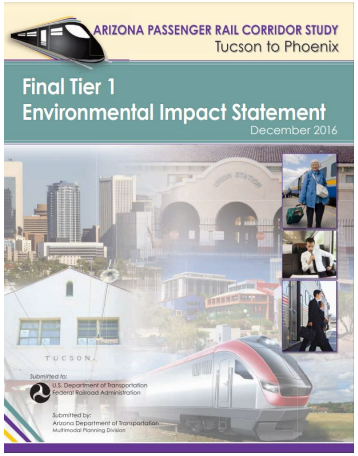
The 2018 Regional Commuter Rail System Study Update analyzed the feasibility, cost, and productivity of different commuter rail alignments from Wickenburg to Florence. The only alternative affecting the City of Mesa is the Estrella/ San Tan Line alignment alternative, running between Buckeye and Queen Creek. This study suggested two regional commuter rail stops in Mesa (one in Downtown Mesa and one at Price/SR 101 freeway.

MAG Regional Freight Transportation Plan (2017)

SMART MOVES
Freight Network for the Phoenix Metropolitan Area

MAG completed its Freight Transportation Plan in 2017. The overarching objective is to designate a forward-looking core roadway freight network for long-term protection and investment that will attract industry and support household needs through better performance in terms of speed, reliability, cost, productivity, and safety. The freight network developed through this study was used to establish "Critical Urban Freight Corridors", as required by the FAST Act. Based upon estimated existing and forecasted truck volumes, concentrations of industrial activities, and the flow of goods, the following freeways, highways, and roadways have been designated as part of the Freight Network within the City of Mesa:

- US-60
- Red Mountain Freeway (Loop 202)
- Broadway Road from US 101 to Country Club Drive
- Country Club Drive from Broadway Road until it becomes SR-87
- Higley Road from Loop 202 to McKellips Road
- McKellips Road Higley Road to Greenfield Road
- Greenfield Road from McKellips Road to Loop 202



Arizona Department of Transportation (ADOT) Passenger Rail Study: Tucson to Phoenix (2016)

The Passenger Rail Corridor Study was a five-year study that was conducted by the Arizona Department of Transportation in coordination with other federal agencies to determine the feasibility of passenger rail between Tucson and Phoenix. Although no funding or schedule is identified for the project, a Tier 1 Draft Environmental Impact Statement was published that considered two potential routes named "Orange" and "Yellow". Within the Mesa MPA each route takes a distinctive path. The Yellow route follows the existing UPPR freight lines operating within the City which would be the least disruptive, but provide the least connections to the City. Alternatively, the Orange route would run parallel to the US-60 ROW before turning south near the Loop 202 and add more potential stops within the City.

2MESA SNAPSHOT

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WE ARE MESA

Understanding mobility and land use trends and challenges happening today and tomorrow lays the foundation for the Mesa TMP. This chapter provides an overview of existing socioeconomics, land use patterns, and economic characteristics and trends that sets a baseline for evaluating the City's transportation system.

Mesa MPA at a Glance

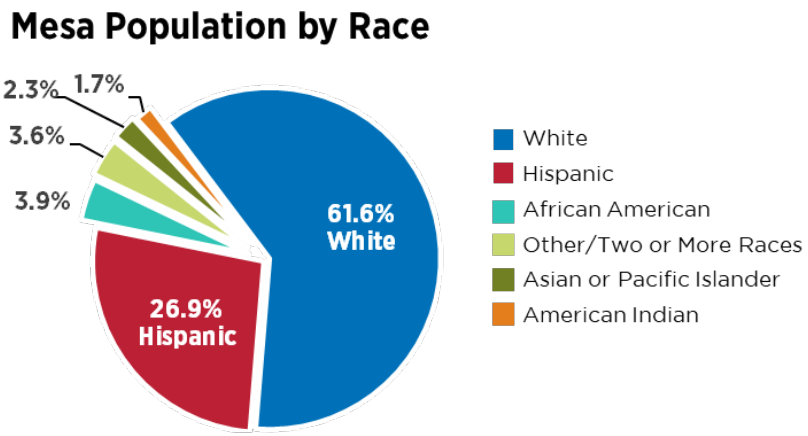
Today, Mesa is a thriving city transitioning growth from outward expansion of the past to infill developments. According to the US Census Bureau American Communities Survey (2021 5-Year ACS), the Mesa MPA has just over half a million residents.

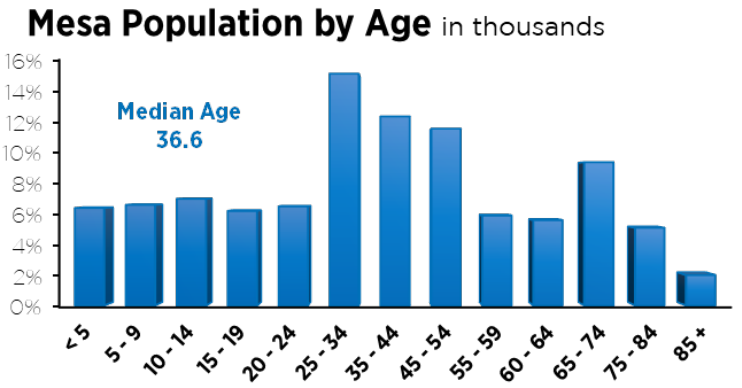
- **Total Population (2021)**: 544,976
- **Minority Population**: 38.4%
- **Total Housing Units**: 243,003

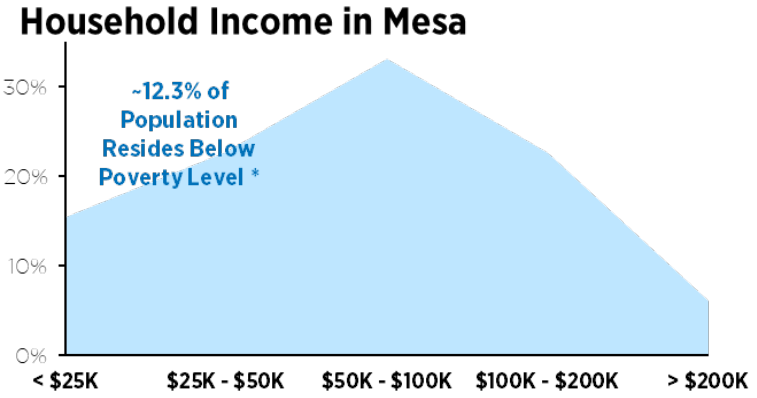
Trends and Changing

According to the 2021 5-Year ACS and 2010 US Census Data (2010 Census):

- **We are getting a tad older**. In 2010, the median age was 34.5, in 2021 the median age increased to 36.6. Just under half (48%) of the population is under 35 years of age.
- **We are getting more educated.** In 2010, 23.4% of Mesa residents 25 years or older had a bachelor's degree or higher. In 2021 29.5% of residents have attained a bachelor's degree or higher.
- **We are getting slightly wealthier**. In 2010, the median household income was $62,792 (adjusted to 2021 dollars) and increased 3.1% to $65,725 in 2021.







Source: U.S. Census Bureau, ACS 2021 5-year Estimates

* Poverty thresholds are defined by the Office of Management and Budget and varies based on family size

LAY OF THE LAND

Having a strong understanding of the land use context and development patterns is imperative to creating a transportation network that complements surrounding character and facilitates movement. Just as land use influences the transportation network, the transportation network influences land use. For example, a local roadway in a residential neighborhood serves a very different purpose than a major roadway that connects the freeway to an industrial park.

Land Use at a Glance

- **Residential**: 45.4%
- **Non-residential Uses**: 25.6%
- **Open Space:** 13.8%
- **Agricultural and Vacant:** 15.2%

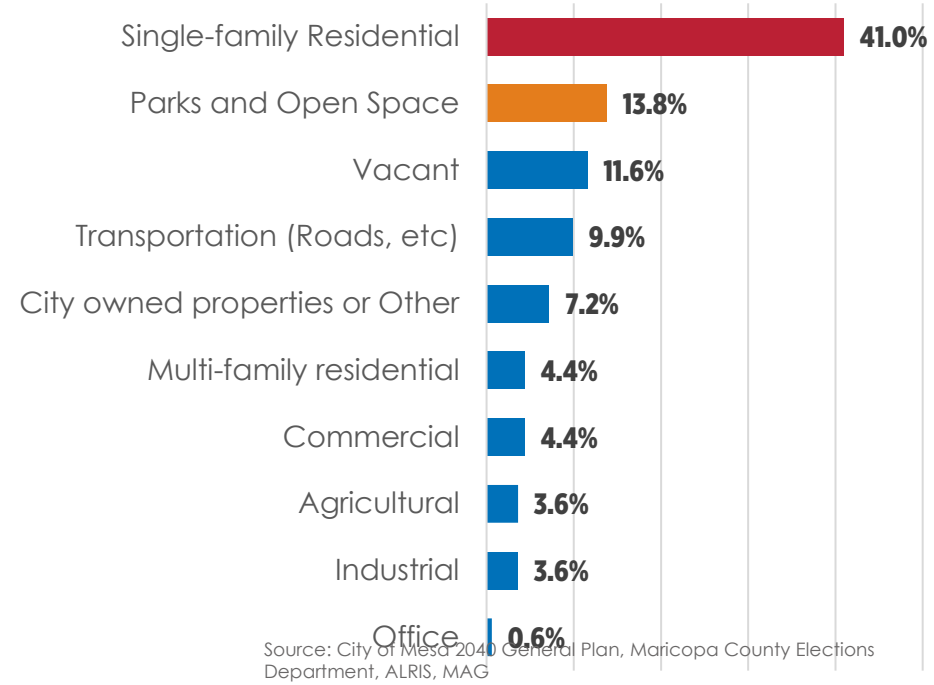
Land Use in the Mesa MPA

The Mesa MPA is predominantly made up of residential uses with just over 45% of the land dedicated to this use. The second major land use is park or open space with the Usery Mountain Regional Park contributing the most acreage to this category within the Mesa MPA. While Mesa is a well-established City, just over 11% of its land is still vacant providing opportunities for infill development.

Unincorporated County Islands

Throughout Maricopa County, unincorporated areas surrounded by incorporated cities or towns are called county islands. County islands are usually due to a city/town that grows and, for various reasons, the town/city omits to annex the particular area. Throughout east Mesa, there are several county islands that include roadways owned and maintained by Maricopa County Department of Transportation (MCDOT).

Snapshot of Land Use in the Mesa MPA (2021)

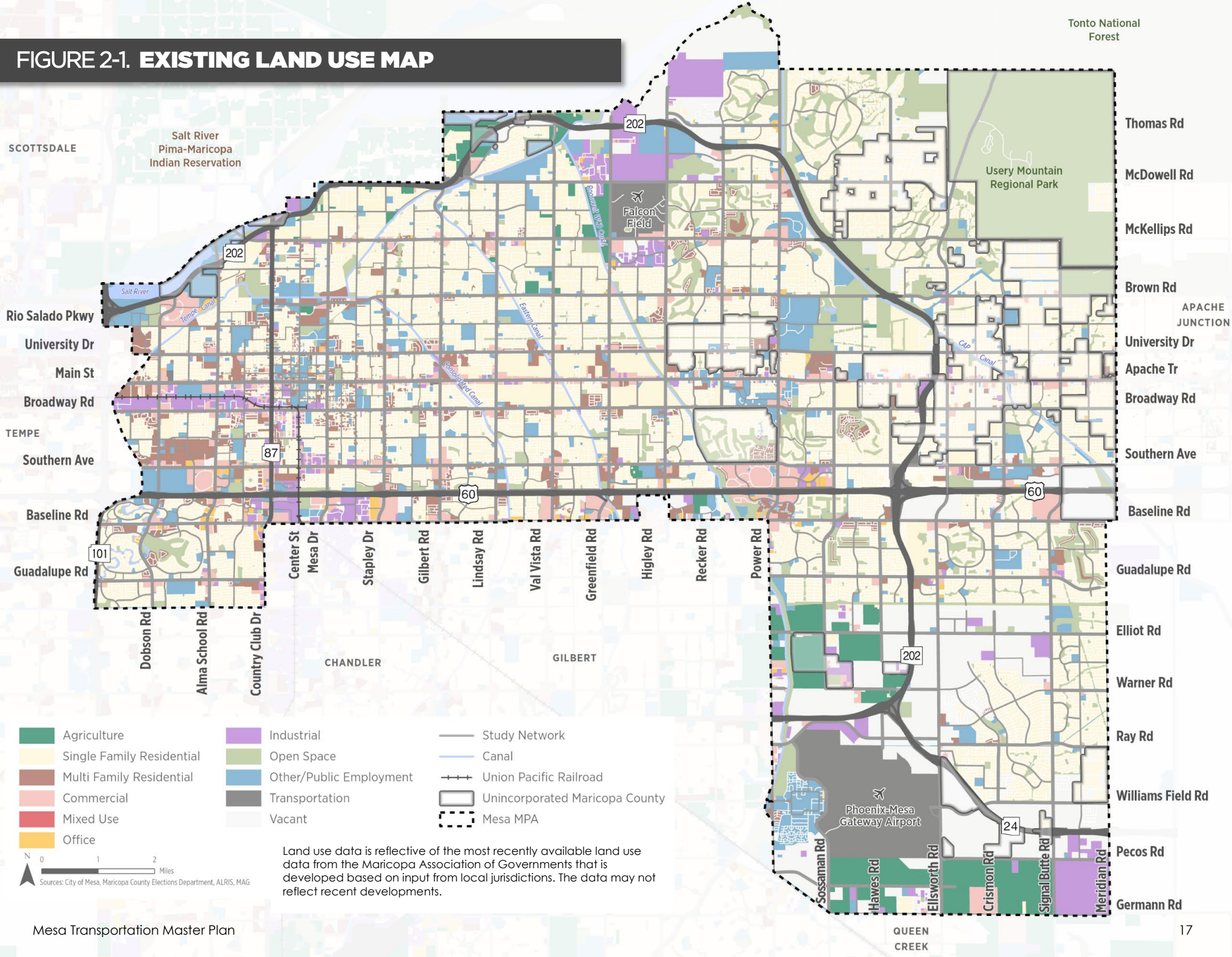


Source: City of Mesa 2040 General Plan, Maricopa County Elections Department, ALRIS, MAG

Development Trends

As a land locked community with little undeveloped land remaining, Mesa's ability to expand is limited. Much of Mesa's traditional suburban growth and development pattern is anticipated to continue to occur where undeveloped land exists today, largely in the eastern and southern portions of the City. However, as readily available land decreases, the City may experience a greater focus on infill and redevelopment project types.

FIGURE 2-1. **EXISTING LAND USE MAP**



Land use data is reflective of the most recently available land use data from the Maricopa Association of Governments that is developed based on input from local jurisdictions. The data may not reflect recent developments.

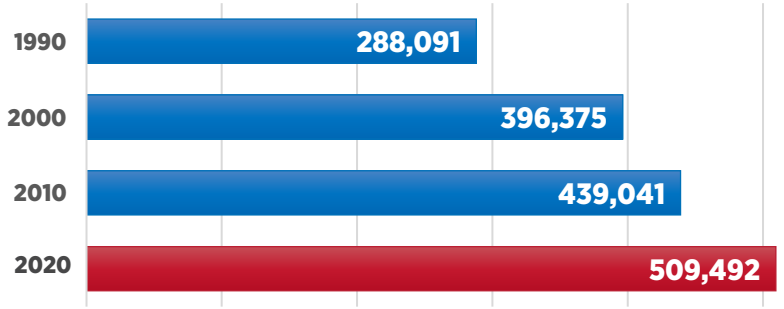
WHERE WE LIVE

Mesa is steadily growing and, while this creates opportunities, it poses challenges to our transportation network. Understanding where growth is greatest is imperative to creating a plan that manages the increased demands on our transportation system.

Mesa is Growing

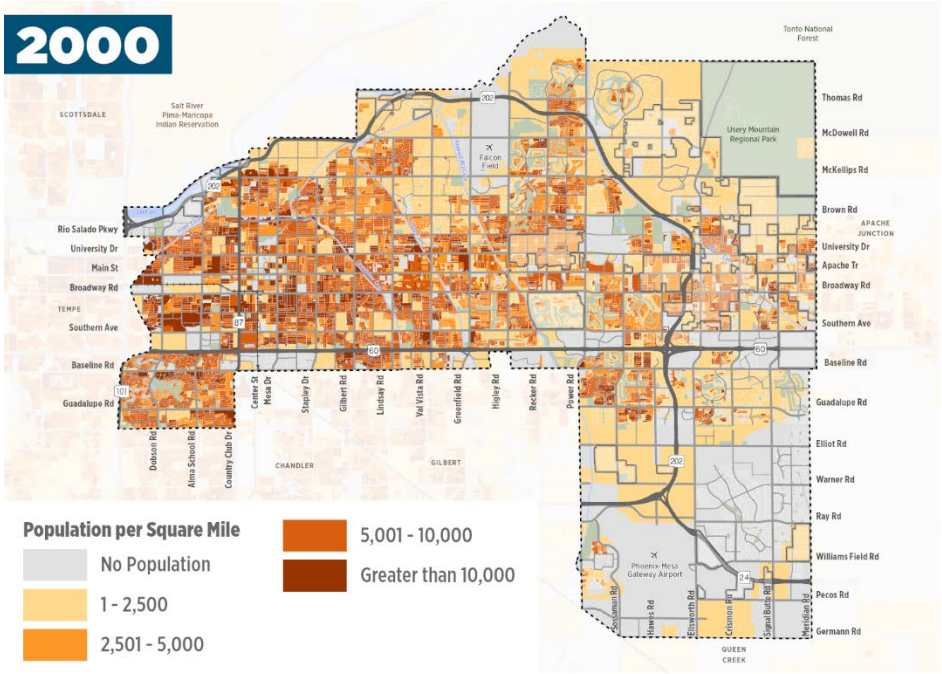
Since 1990, the City of Mesa's population has increased by 77%. As illustrated in Figure 2-2 and Figure 2-3, much of this growth has been in-fill development and the rapid growth south of US 60 in the southeast Mesa and the Eastmark areas.

City of Mesa Population Growth Through the Years



Source: US Census 2021 ACS, Arizona Commerce Authority

FIGURE 2-2. **POPULATION GROWTH THROUGH THE YEARS**



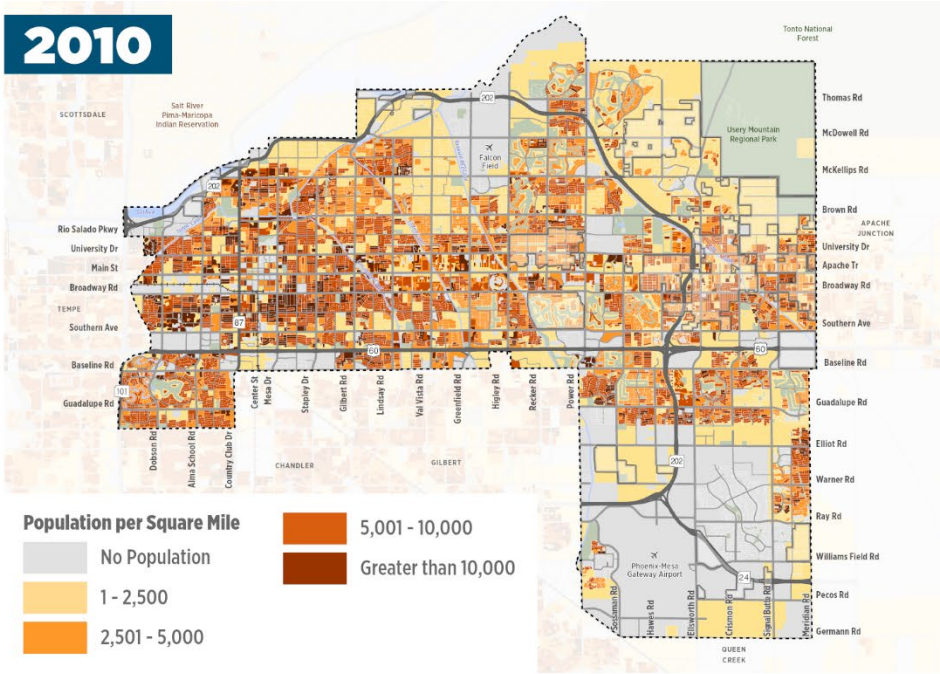
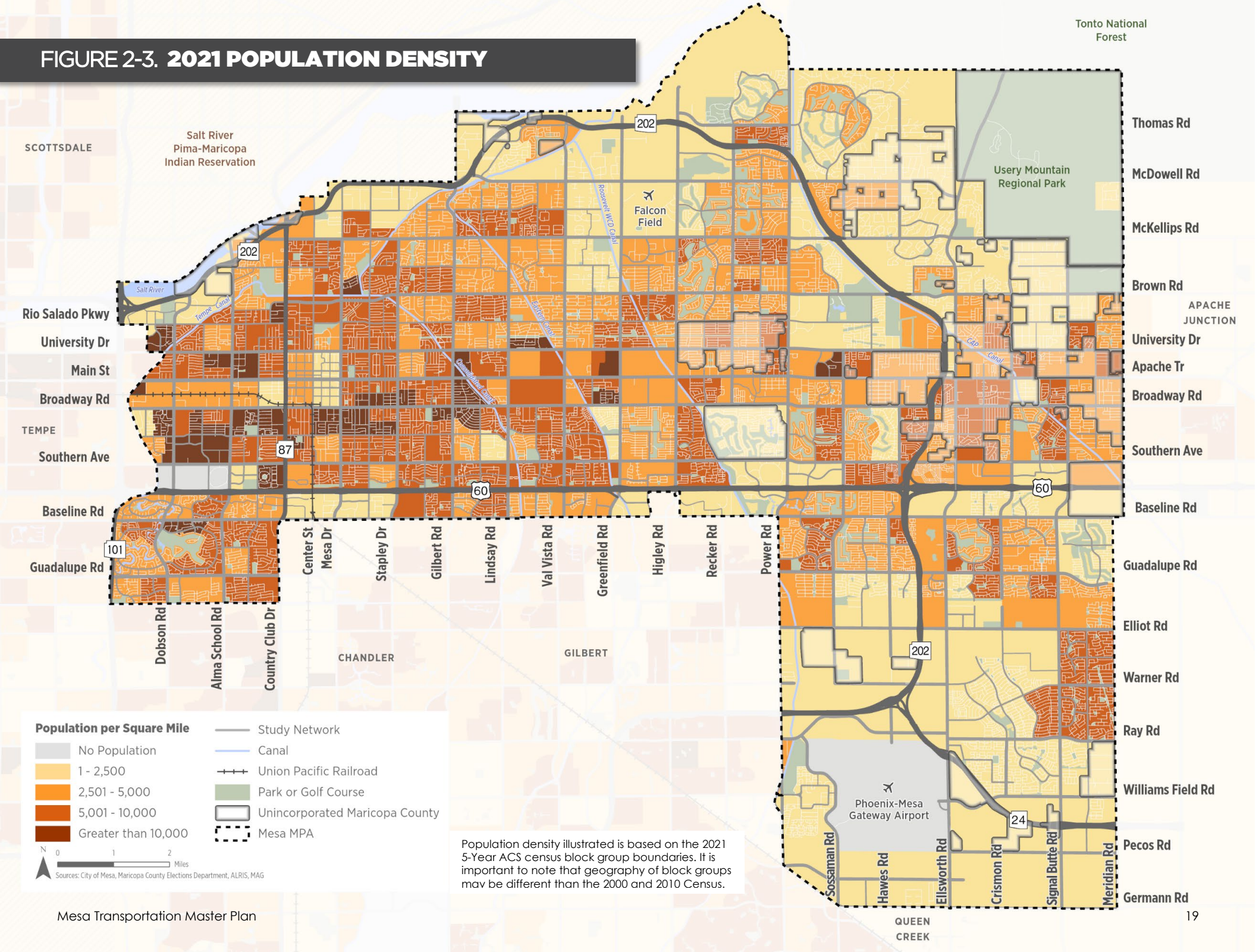


FIGURE 2-3. **2021 POPULATION DENSITY**



Population density illustrated is based on the 2021 5-Year ACS census block group boundaries. It is important to note that geography of block groups may be different than the 2000 and 2010 Census.

WHERE WE WORK

With over 158,230 people working in the City today, Mesa is one of the fastest growing job markets and economies in the Phoenix metropolitan area. As illustrated in **Figure 2-4,** employment opportunities can be found throughout the Mesa MPA. In addition to a strong job market, Mesa is home to the Arizona State University's Polytechnic Campus, Maricopa Community College, the Phoenix-Mesa Gateway Airport, and a variety of major employment centers.

Major Employers

Mesa is home to many of the top companies and brand names in the world. As illustrated in **Table 2-1**, major employers include the Boeing Company, Banner Desert Medical Center, and Maricopa Community College District. Healthcare, finance, manufacturing, aerospace are all thriving industries within the City today. Target growth opportunities for Mesa include healthcare, education, aerospace/aviation/defense, technology, and tourism.

Employment Centers

Major job centers are locations with a high density of jobs resulting either from a cluster of many different employers in a small geographic area or large individual employers with a high number of workers. Major job centers in Mesa, as shown in **Figure 2-4 and Figure 2-5** include:

- Downtown Mesa
- Falcon Field Airport
- Fiesta District
- Mesa Gateway Area
- Riverview

Additional employment centers exist throughout Mesa including the Superstition Freeway Corridor East, the Broadway Corridor, and along US 60.

Table 2-1. **Top Ten Employers in City of Mesa Today**

Employers	Employees
Mesa Public Schools	7,726
Banner Health (Multiple Locations)	6,826
The Boeing Company	4,428
City of Mesa	3,579
Maricopa Community College	2,191
Dexcom	1,700
Drivetime Automotive Group	1,367
Empire Southwest	852
Santander Consumer USA	828
United Parcel Service	709
AT&T	686

Source: Mesa Economic Development

FIGURE 2-4. **2021 EMPLOYMENT DENSITY**

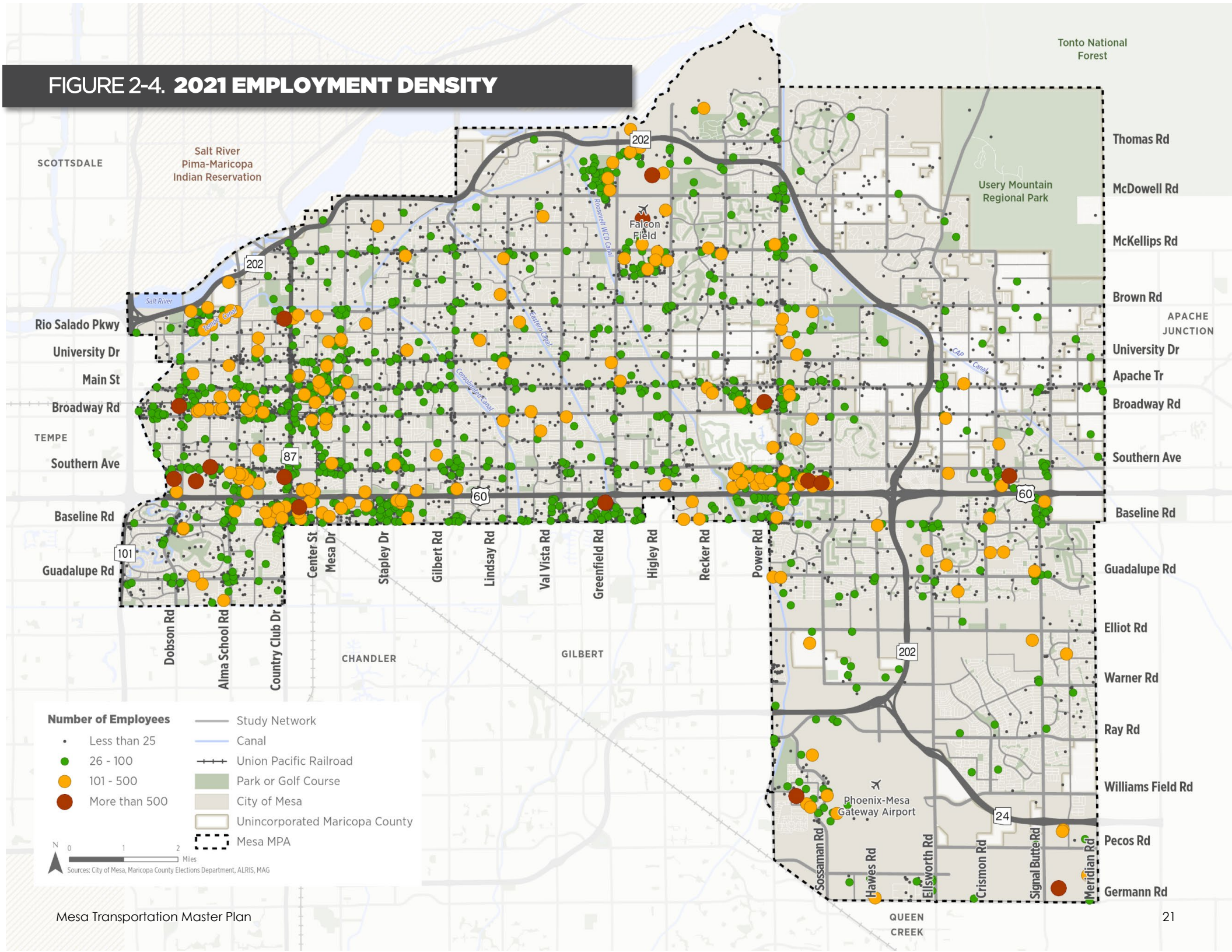


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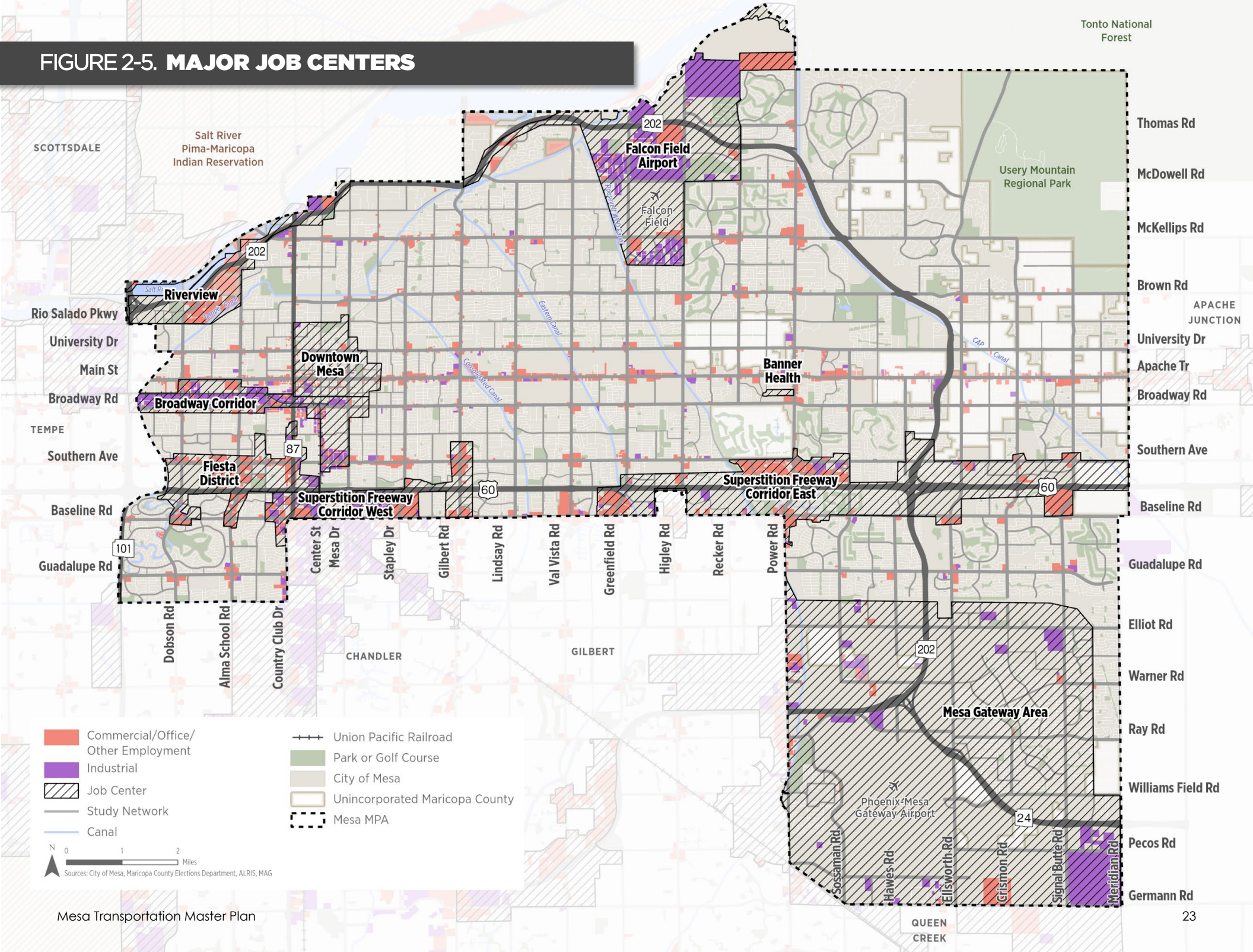
FIGURE 2-5. **MAJOR JOB CENTERS**



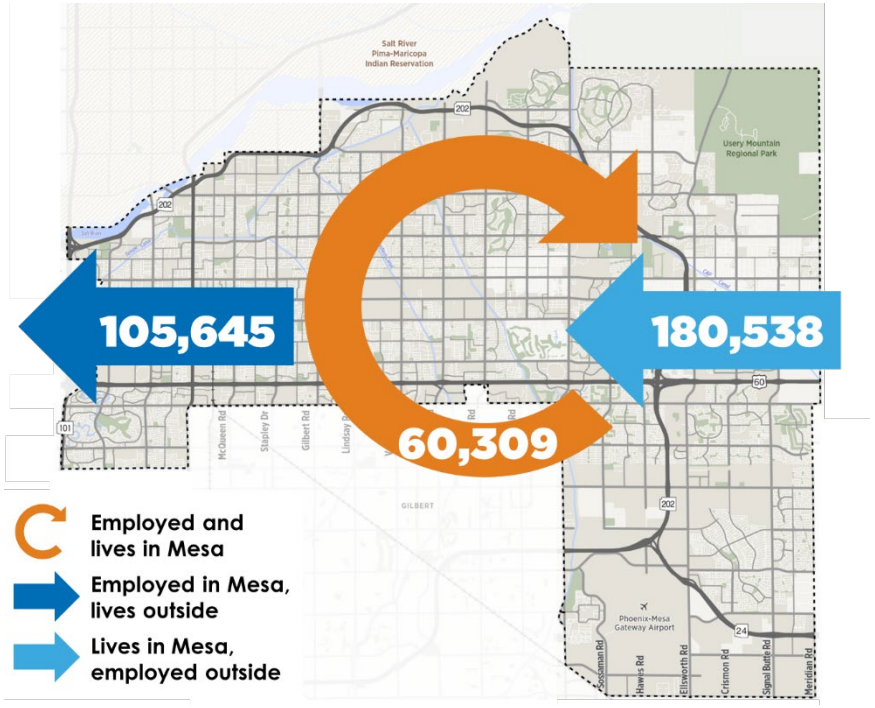
Where We Commute To

Utilizing the US Census Bureau's Longitudinal Employer-Household Dynamics (LEHD) OnTheMap application, regional commuting patterns can be identified. The portal is a nationwide database that reports where workers are employed and where they live. Understanding commuting patterns within Mesa and between cities helps us determine local and regional travel needs.

According to the LEHD, approximately 31.8% of Mesa workers live within the city limits. Another 30% of those that work in Mesa commute from Phoenix, Gilbert, or Chandler.

As illustrated in **Figure 2-6**, Mesa exports more workers than they import or retain internally. This illustrates the regional nature of commuter patterns for Mesa residents and workers. **Figure 2-7 and Figure 2-8** provide additional detail on commute patterns in Mesa today. Largely, Mesa residents either work in Mesa or travel to Phoenix for work.

Figure 2-6. **City of Mesa Commute Characteristics**



Source: US Census Bureau's Longitudinal Employer-Household Dynamics (LEHD)

Table 2-1. **Top 5 Places Where Mesa Residents Work**

Place	Percent Share
Phoenix	24.3%
Mesa	23.7%
Tempe	14.6%
Chandler	8.2%
Scottsdale	8.2%

Table 2-3. **Top 5 Places Where People Working in Mesa Live**

Place	Percent Share
Mesa	31.8%
Phoenix	12.2%
Gilbert	10.6%
Chandler	7.2%
San Tan Valley	4.1%

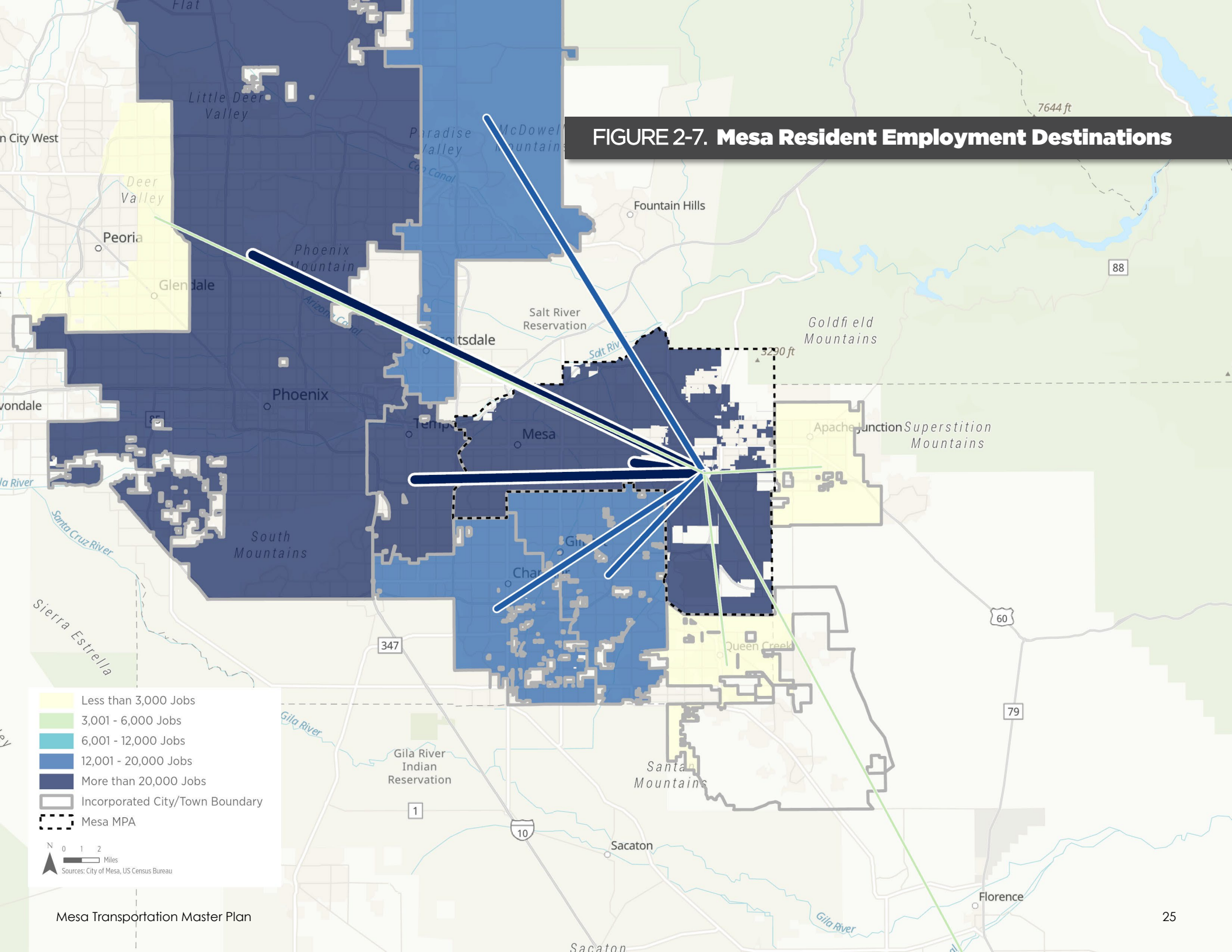


FIGURE 2-7. **Mesa Resident Employment Destinations**

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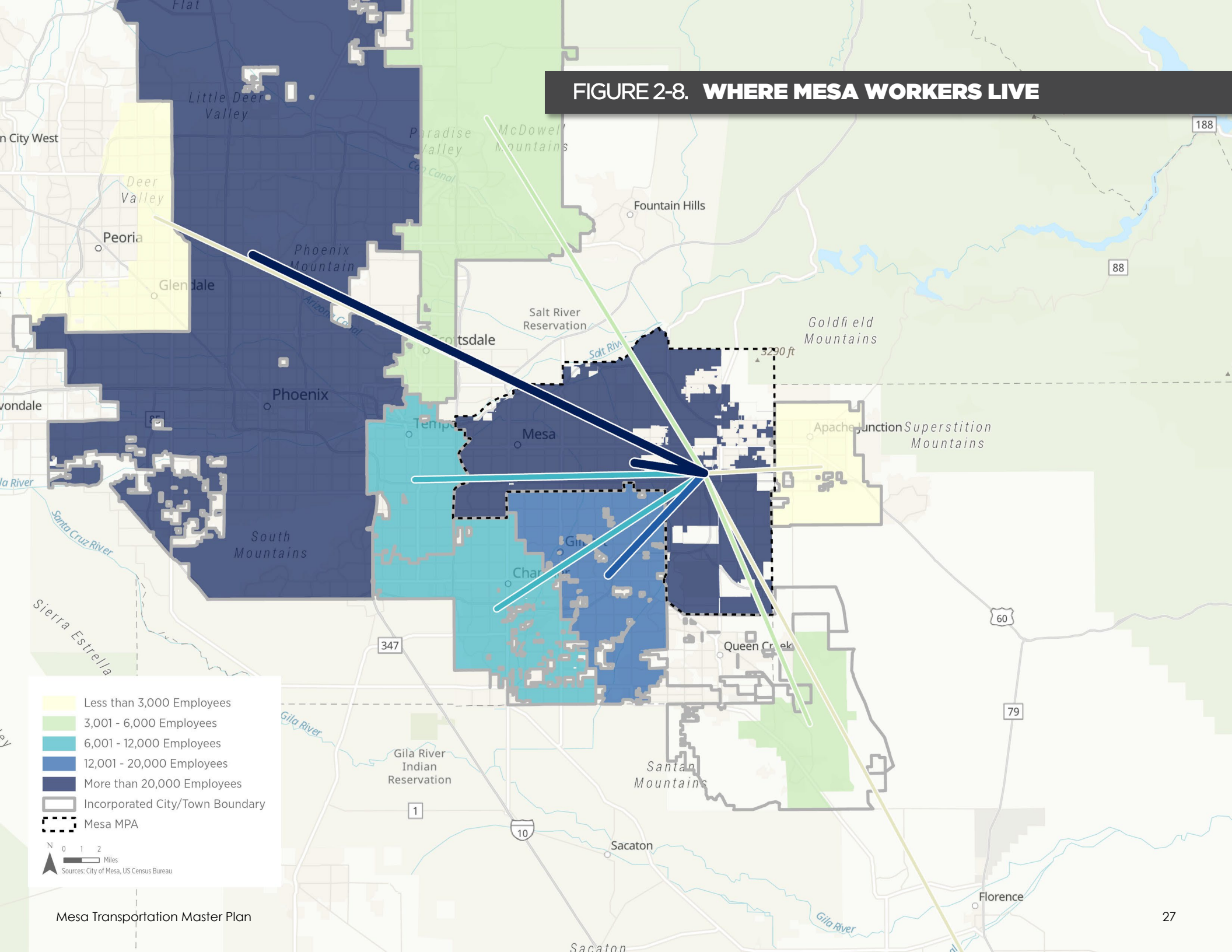
FIGURE 2-8. WHERE MESA WORKERS LIVE



WHERE WE SHOP, PLAY, AND LEARN

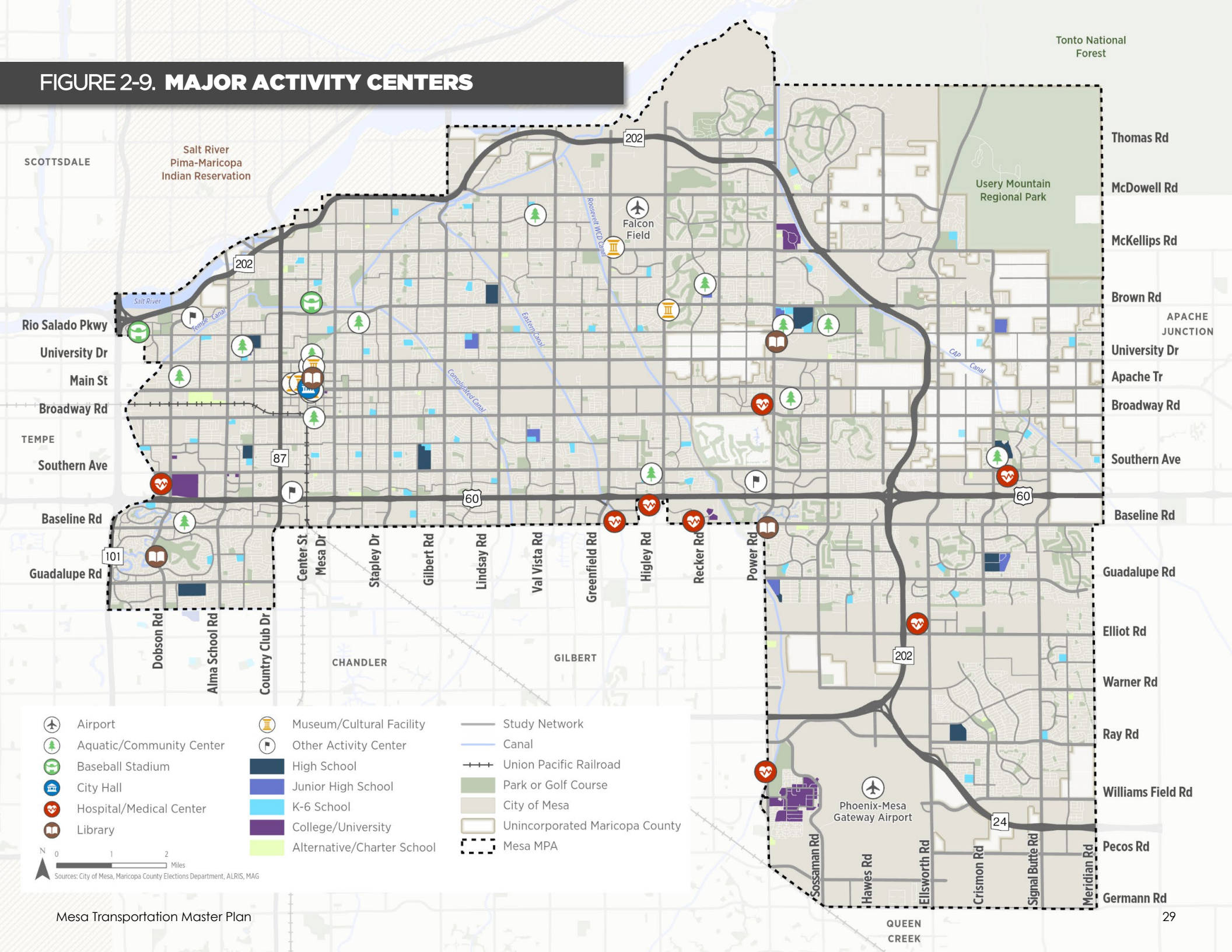
Activity centers represent key destinations that generate transportation trips for people looking to work, play, live, and learn. Activity centers are made up of a variety of land uses such as shopping and retail, commercial, hospitals, or education centers, etc. Understanding where key activity centers are located is imperative to developing a transportation system that conveniently connects major transportation generators through a variety of modes. **Figure 2-9** illustrates major activity centers and transportation generators in the City, including:

- **K- 12 Schools.** There are several school districts within City of Mesa: Mesa Unified School District 4, Gilbert Unified School District 41, and the Queen Creek Unified School District 95. Alone, the Mesa Unified School District represents 73 of the 87 combined public elementary, junior high, or high schools managed by these four districts.
- **Higher Education.** Those seeking higher educational opportunities within Mesa have many institutions to choose from. Mesa's largest secondary educational institutions are Mesa Community Colleges, Arizona State University Polytechnic Campus and Arizona State University at Mesa City Center. Additional private and trades schools such as Benedictine University Mesa, DeVry, and the Pima Medical Institute also reside within the City.
- **Health Care Facilities.** The largest medical institution within Mesa is Banner Health with multiple branches across the City including Desert Medical Center, Baywood Medical Center, and Gateway Medical Center. Other large hospitals include the Arizona Regional Medical Center and Mountain Vista Medical Center.
- **Civic, Arts, and Community Centers.** Mesa is home to eight aquatic centers and five community centers. Live performances can be seen at the Mesa Arts Center, Broadway Palm Dinner Theatre, and the Mesa Amphitheatre. There is a diversity of museums in Mesa including the Children's i.d.e.a. Museum, the Commemorative Air Force Museum, the Arizona Museum of National History, and the Mesa Historic Museum.
- **Commercial Centers.** Most commercial centers within Mesa take the form of strip malls anchored by large, nationally recognized big box stores and ample surface parking. An exception to this form is the Superstition Springs Center, a large indoor shopping mall, and Fiesta Mall, planned for redevelopment into a mixed-use development.
- **Recreation.** The Usery Mountain Regional Park overlaps with the northeastern portion of Mesa and is a 3,648-acre park offering outdoor activities such as camping and 29 miles of recreational trails. Within Mesa there are many urban parks such Riverview Park, Pioneer Park, and Red Mountain Park which offer amenities for adults and children to enjoy nature. In addition, Mesa boasts 80 miles of paved, shared use paths and another 42 miles of unpaved trails (mostly service roads along the canals) which provide off-street walking, jogging, and biking opportunities throughout the City.

Major Residential Areas

Providing direct and convenient transportation connections between major residential communities and key activity centers creates opportunities to connect people to the places they need to travel; however, large residential developments can often create barriers to access. Large developments with circuitous, disconnected internal roadways, walled permitters that limit access, and land uses that create large distances between individual homes and destinations, all create barriers to access. In Mesa, just over 45 percent of the area is zoned as residential with many following these residential development patterns.

FIGURE 2-9. **MAJOR ACTIVITY CENTERS**



HOW WE GET AROUND

Today, we have more choices than ever before to get to the places we want to go and the people we want to see. Understanding how we get around can help define needs and opportunities for the transportation system today and in the future, regardless of whether we choose to walk, bike, ride transit, or drive. This analysis considers average weekday and weekend days to gain an understanding of how we move around. The analysis uses data from Replica, a software that incorporates anonymized data from a variety of sources like the US Census Bureau, mobile location data, land use, economic activity, and others to create a simulation of an area to model how people get around, where they are going, and when they travel.

Where We Want to Go

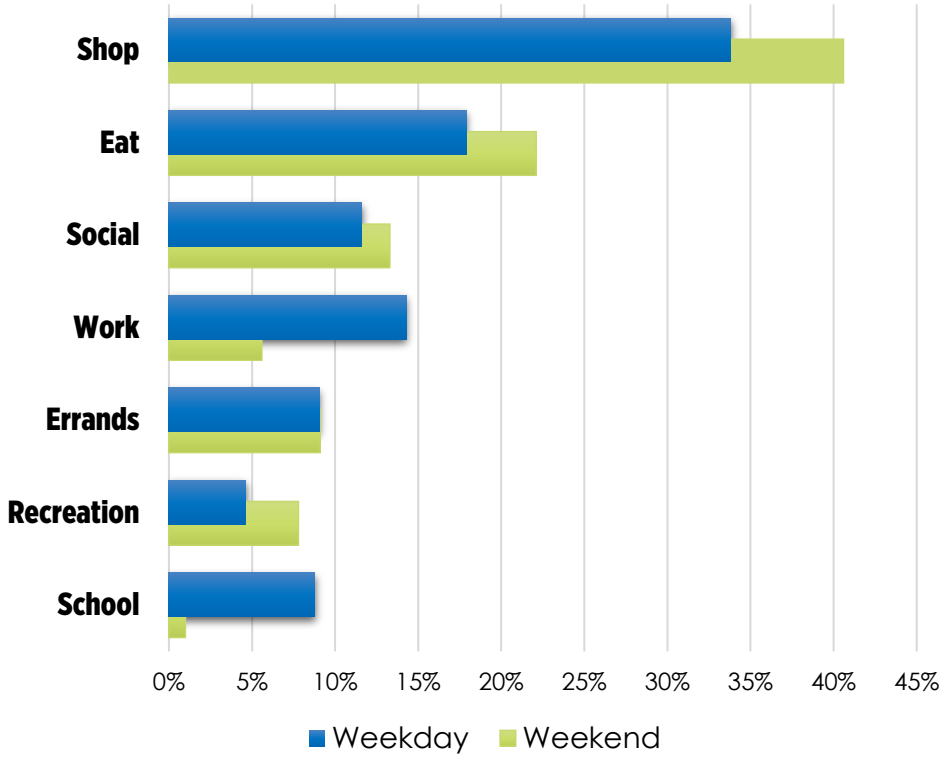
We travel for many reasons every day. This analysis considered several trips we might take:

- **Getting to Work:** all trips that end at a person's workplace (including commute trips and things like a trip back from lunch).
- **Getting to School:** all trips to a person's school or college.
- **Traveling for Daily Needs:** all social trips and trips to places where people shop, dine, and run errands.
- **Getting Outside:** all trips to recreational destinations like parks and trailheads (this does not include trips without a destination, like walking the dog or jogging).

As shown in **Figure 2-10,** more than 3 out of every 4 trips we take are to do the things that make up our quality of life, like shop, eat, socialize, and run errands. However, we travel differently on weekdays and weekends:

- While trips for shopping, eating, and socializing always make up most of our trips, we tend to do these things more on weekends than on weekdays.
- We travel much more for work and school on weekdays than on weekends. In fact, even when combining these trips, they make up the lowest percentage of weekend trips evaluated.
- We travel more for recreation on the weekends.

Figure 2-10. **Typical Trip Purpose (Destination)**



Source: Replica Southwest Fall 2022

How We Get There

We choose to travel in different ways depending on where we are going, as shown below. While we are more likely to drive longer distances to work, we are much more likely to walk or bike for our shorter trips to get to school, meet daily needs, and get outside for recreational activities. We also tend to choose to drive more for our trips on weekends than we do on weekdays.

Table 2-4. **How We Travel (Weekday / Weekend)**

	WEEKDAY							WEEKEND						
	Drive	Transit	Bike	Walk	Other	Average Travel Distance	Average Travel Time	Drive	Transit	Bike	Walk	Other	Average Travel Distance	Average Travel Time
Getting To Work	94%	0.5%	0.5%	3.5%	1.5%	25 mi	16 min	95%	0.5%	0.5%	2.5%	1.5%	23 mi	17 min
Getting to School	77%	0.5%	5.5%	16%	1%	8 mi	19 min	94.5%	0.5%	0.5%	1.5%	3%	20 mi	31 min
Travel for Daily Needs	85.5%	0.5%	1%	11.5%	1.5%	10 mi	16 min	87%	0.5%	0.5%	10%	2%	10 mi	15 min
Getting Outside	89.5%	0.5%	1%	7.5%	2.5%	11 mi	17 min	93%	0.5%	1%	4%	2.5%	11 mi	17 min

Source: Replica Southwest Fall 2022

Getting to Work:

- We mostly choose to drive alone to work, and our travel patterns are similar on weekdays and weekend days.

Getting to School

- Most students are driven to school, but one in 5 students walk or bike to school on weekdays.
- Although the average travel distance to school is 8 miles, it takes much longer to make the 8-mile trip when compared to our other types of trips. This may be due to AM/PM congestion approaching school or slower moving traffic in school areas.
- Weekend students tend to overwhelmingly drive and go to school significantly further away.

Traveling for Daily Needs

- We generally choose to travel in the same ways, go similar distances, and spend a similar amount of time on weekends and weekdays.
- One in 10 trips to meet daily needs are done by walking.

Getting Outside (Recreation)

- We tend to drive to get outside whether it is a weekend or weekday.

Making Short Trips

- We tend to travel longer distances and choose to drive for those trips. However, when we are traveling 2 miles or less to get to work, school, daily needs, or outside, our travel patterns look different. In fact, when traveling these shorter distances, we choose to walk one third of the time.

OUR SOCIAL NEEDS

Often, transportation and land use decisions place unfair burdens on disadvantaged communities. Conducting an analysis of traditionally underserved populations helps identify locations with high concentrations of people or groups who may not be physically or financially capable of owning or driving a vehicle and rely on walking, riding bicycles, and transit to meet their daily travel needs. Table 2-5 illustrates the current socioeconomic populations within the City of Mesa and the Mesa MPA.

Table 2-5. **Mesa Socioeconomic Conditions**

	City of Mesa	Mesa MPA	Arizona Statewide
Age 65 and Older	16.5%	17.8%	17.6%
Minority Population	39.5%	38.4%	46.6%
Population with a Disability (<65 years)	12.2%	-	13.2%
Population below the Poverty Level	12.6%	12.3%	13.5%
Limited English Proficient Persons (LEP)	6.8%	6.2%	8.1%
Households with no Vehicles	5.7%	5.4%	5.6%

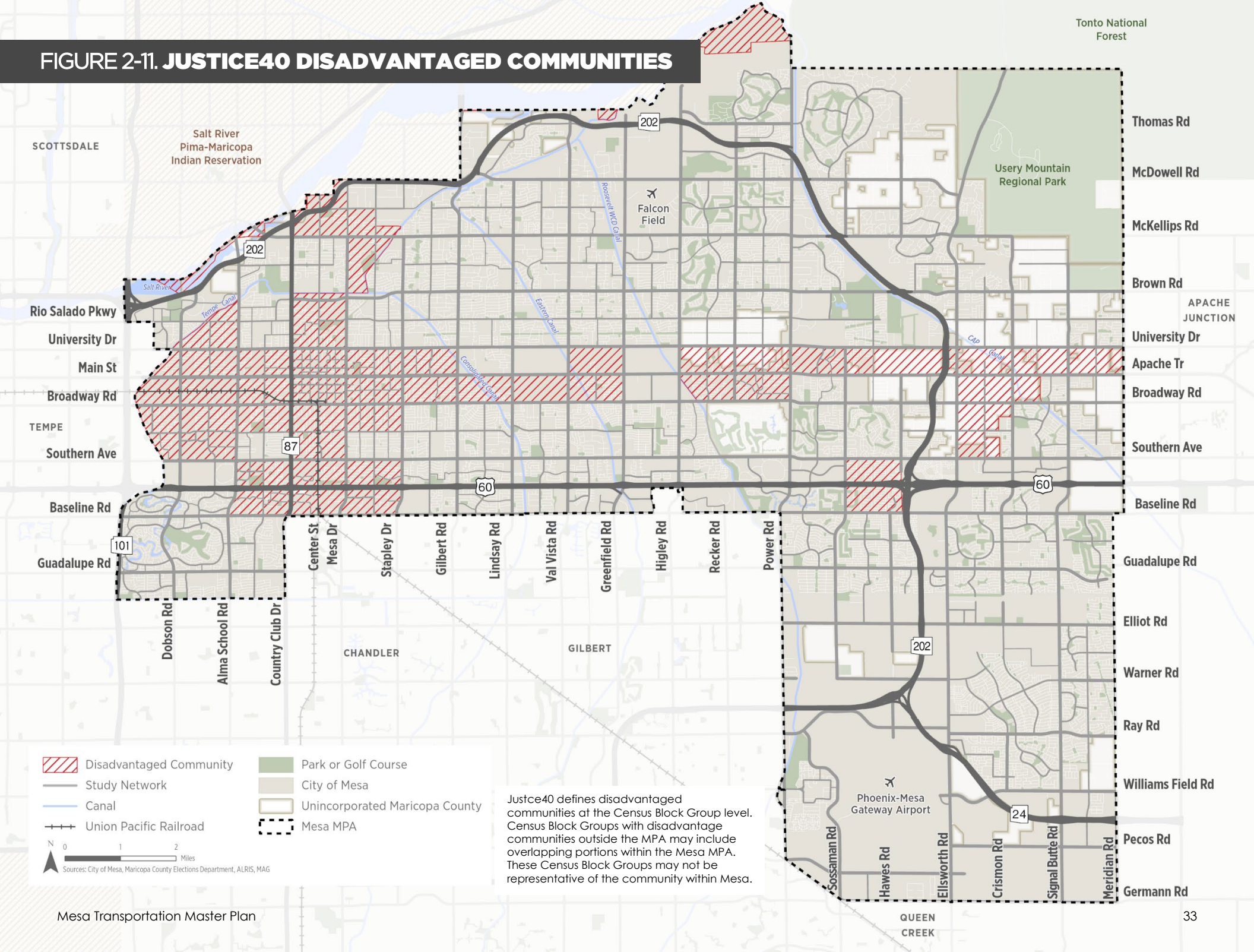
Source: US Census 2021 American Community Survey. Disability status is determined for the civilian noninstitutionalized population based on six types of difficulty: hearing, vision, cognitive, ambulatory, self-care, and independent living difficulty.

Justice40 Disadvantaged Communities

Justice40 is a federal initiative and policy goal that 40 percent of Federal investments should flow to disadvantaged communities. To define disadvantaged communities, the Climate and Economic Justice Screening Tool (CEJST) was developed that defines seven categories for which a community may be disadvantaged (including health, housing, transportation, workforce development, among others). Several areas within Mesa are considered disdvantaged failing one or more of the thresholds defined for each of the seven categories and are shown in **Figure 2-11**. Of the disadvantaged areas in Mesa, 27% of them failed on workforce equity, 26% failed on housing equity, 26% failed on health, 15% failed on transportation equity, and 6% failed due to climate and disaster risk burden.

- **Workforce.** Of the communities that met the workforce equity threshold 63% were due to households in poverty or median household incomes much lower than the area median income. Another 20% were communities facing linguistic isolation and 17% are experiencing disproportionately high unemployment rates.
- **Housing.** 54% of communities that are facing housing inequity are doing so due to the cost burden of housing. Another 33% of the communities that failed this category did so due to lack of greenspace—or the amount of area covered by impervious materials such as cement and asphalt. Finally, another 13% are disproportionally experiencing households without either indoor plumbing or kitchens.
- **Heath.** 47% of the communities facing health inequities are doing so due to disproportionate rates of heart disease, 21% have higher rates of diabetes, and 27% have a lower life expectancy. Finally, 11% have higher instances of asthma.
- **Transportation.** 70% of the communities facing transportation inequity in Mesa was due to disproportionate exposure to diesel particulate matter. The other 30% were faced with more nearby traffic speeds and volumes.

FIGURE 2-11. JUSTICE40 DISADVANTAGED COMMUNITIES



Justce40 defines disadvantaged communities at the Census Block Group level. Census Block Groups with disadvantage communities outside the MPA may include overlapping portions within the Mesa MPA. These Census Block Groups may not be representative of the community within Mesa.

HOW HEALTHY ARE WE?

Transportation networks shape how people move, and influence when, where, and what modes people use to travel. Because the transportation system is used by people daily, it can provide opportunities to incorporate physical activity into their daily lives. One opportunity to engage in daily physical activity is during a person's daily trips; however, driving is the predominant travel mode in Mesa. Providing opportunities for people to walk or bike for short, daily trips instead of using their car may help mitigate chronic public health concerns, such as diabetes, heart disease, stroke, and other chronic health conditions.

Public Health Trends

Table 2-6 provides key public health conditions in the City of Mesa in comparison to nationwide averages. Generally, residents of Mesa have similar health outcomes when compared to the United States as a whole. Rates of obesity and diabetes are within a percentile, but Mesa does have slightly higher rates of people experiencing physical distress and high blood pressure than the nation. Perhaps this similarity is due in part to Mesa having similar rates of smoking and limited physical activity among its population.

30.5%
MESA ADULTS ARE OBESE

24.8%
OF ADULTS IN MESA HAVE LIMITED ACTIVITY

Table 2-6. **City of Mesa Public Health Indicators**

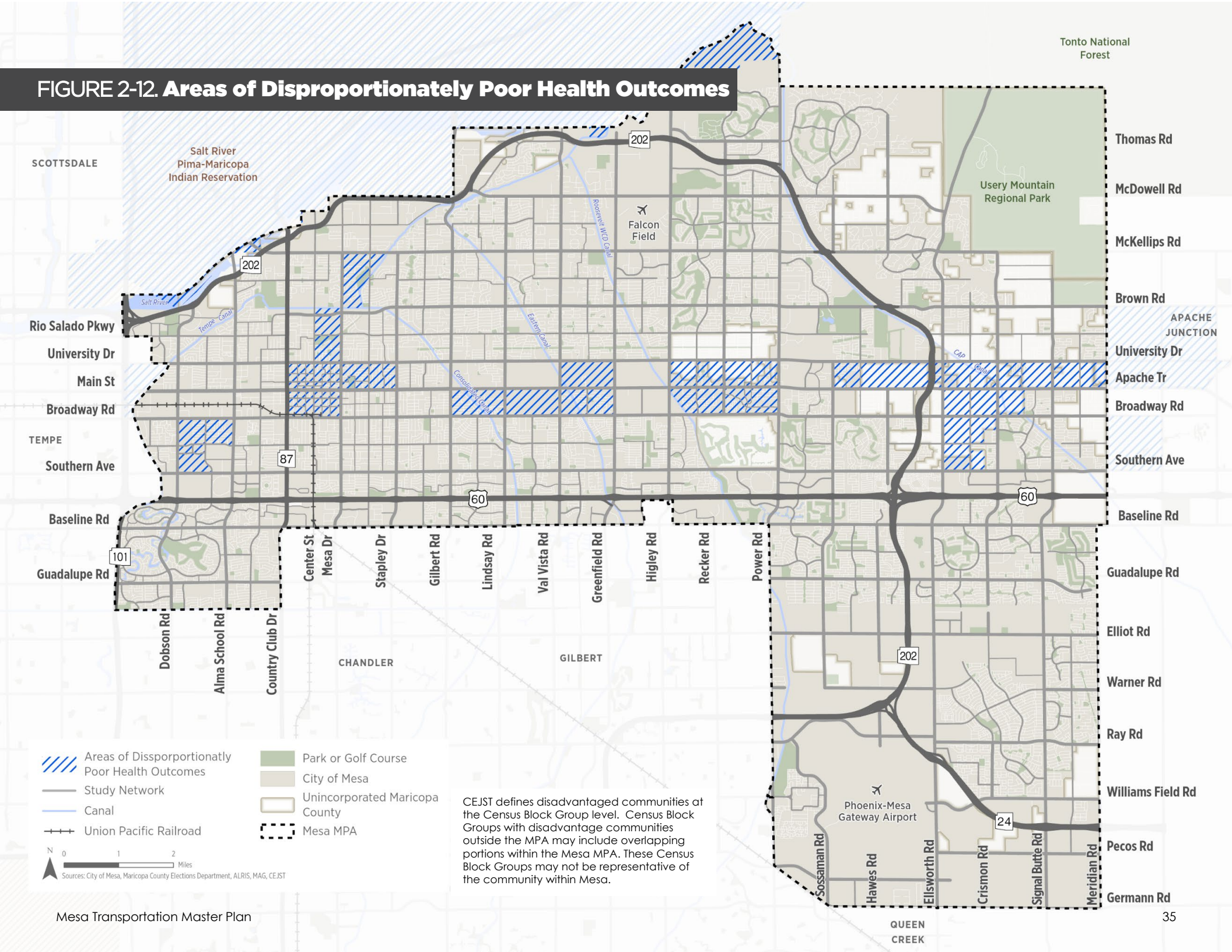
	City of Mesa	Nationwide
Obesity	30.5%	30.8%
Limited Physical Activity	24.8%	25.8%
Diabetes	9.9%	9.9%
Smoking	16.4%	16.2%
Life Expectancy	78.3 years	79.1 years
Frequent Physical Distress	12.9%	12.4%
High Blood Pressure	31.1%	29.5%
Air Pollution - Particulate Matter (PM2.5 per cubic meter)	7.9	9.1

Source: PLACES Project, Centers for Disease Control (2019) *Data is for the City of Mesa limits, not the Mesa MPA

Health Index

While Mesa overall has similar health metrics when compared to the nation, some areas of Mesa are much more likely to have poor health outcomes than others. The Climate and Economic Justice Screening Tool (CEJST) health category determines if communities are disadvantaged due to health outcomes. The index only considers communities that are low income burdened and if they are within the 90th percentile in the nation for one or more of the following: rate of adults with asthma, diabetes, heart disease, or low life expectancy. As previously mentioned in **Our Social Needs** section, just under half of the communities facing health disparities in Mesa are due to high rates of heart disease and another approximately 20% experience high rates of diabetes. These health outcomes are usually—in part—due to inactivity and rates of obesity within the community.

FIGURE 2-12. **Areas of Disproportionately Poor Health Outcomes**



CEJST defines disadvantaged communities at the Census Block Group level. Census Block Groups with disadvantage communities outside the MPA may include overlapping portions within the Mesa MPA. These Census Block Groups may not be representative of the community within Mesa.

3 DRIVING IN MESA

OUR STREET SYSTEM

This section outlines key characteristics and conditions of the Mesa roadway network.

Functional Classification

Functional classification is the process by which streets and highways are grouped into classes, or systems, according to the character of service they are intended to provide. All vehicle trips include two distinct functions: mobility and land access. Functional classification is a hierarchy of roadway classes based on their role in providing access and mobility. Arterial roadways provide high mobility but low access, collectors provide a balance between mobility and access, and local streets have lower mobility but the highest degree of access. **Figure 3-1** illustrates the functional classification of the TMP's study network. As noted in Table 3-1, the majority of the TMP's study network are collectors and arterials, as these facilities move the majority of people in Mesa.

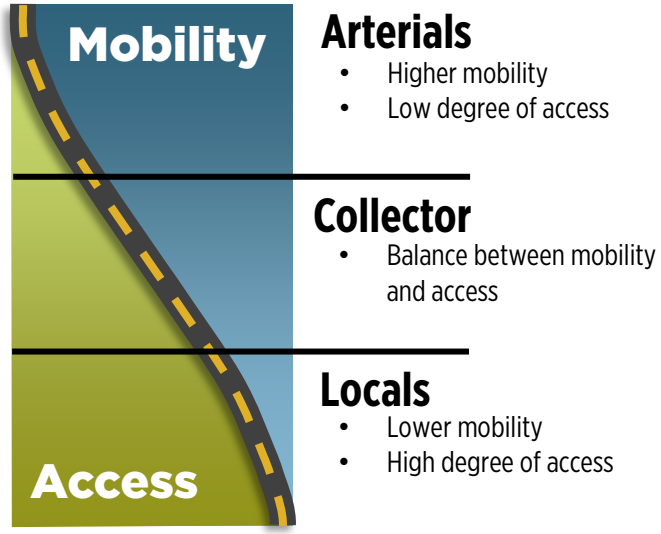


Table 3-1. Functional Classification of Study Network *

Classification	Study Network Mileage
Arterial	308.8
Collector	183.9
Local	59.3
Total	**552.0**

Source: ADOT, City of Mesa, MAG. *Does not include private roadways

Travel Lanes

As illustrated in **Figure 3-2**, the number of travel lanes on Mesa's streets varies from two lanes on local to eight lanes on major arterials. It is important to note that the figure represents the general number of through lanes and there may be short sections with more lanes where development has occurred or fewer lanes in a county island. The number of lanes provided at individual intersections also varies. There are locations where additional through and/or turn lanes exist to improve intersection capacity. Key findings show:

- **Arterials** are typically 4 lanes or greater
    - 5-8 lane: 40.4 percent of all arterial roads
    - 4 lane: 39.5 percent of all arterial roads
    - 49% percent of arterials streets have a two way left turn lane present
- **Collectors** in the MPA mostly have one through lane in each direction with some exceptions. 15% of collectors have 4 lanes.

While the number of lanes along corridors is fairly consistent, there are some areas with connection gaps, inconsistent lane configuration, and scalloped streets which are discussed later in this chapter.

FIGURE 3-1. **FUNCTIONAL CLASSIFICATION**

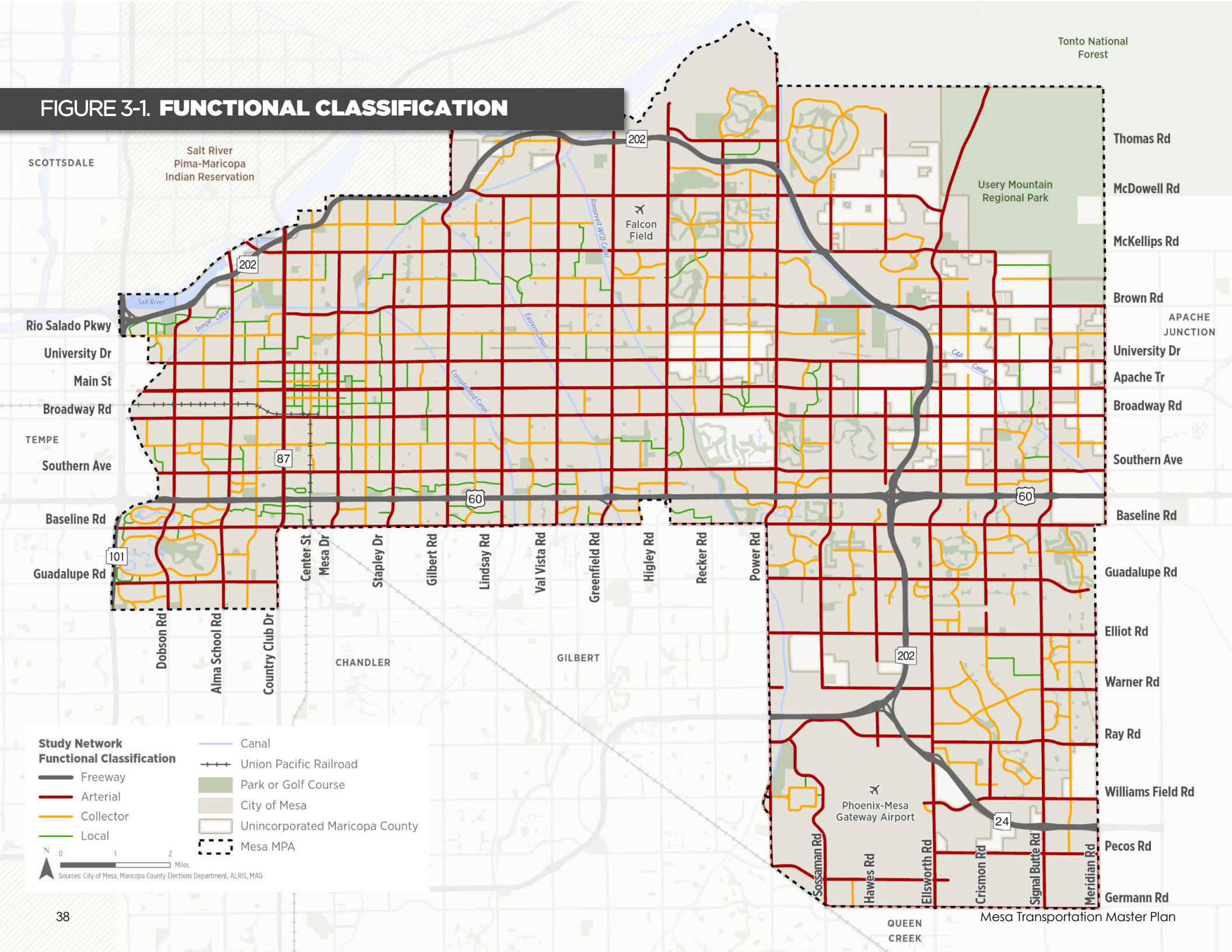
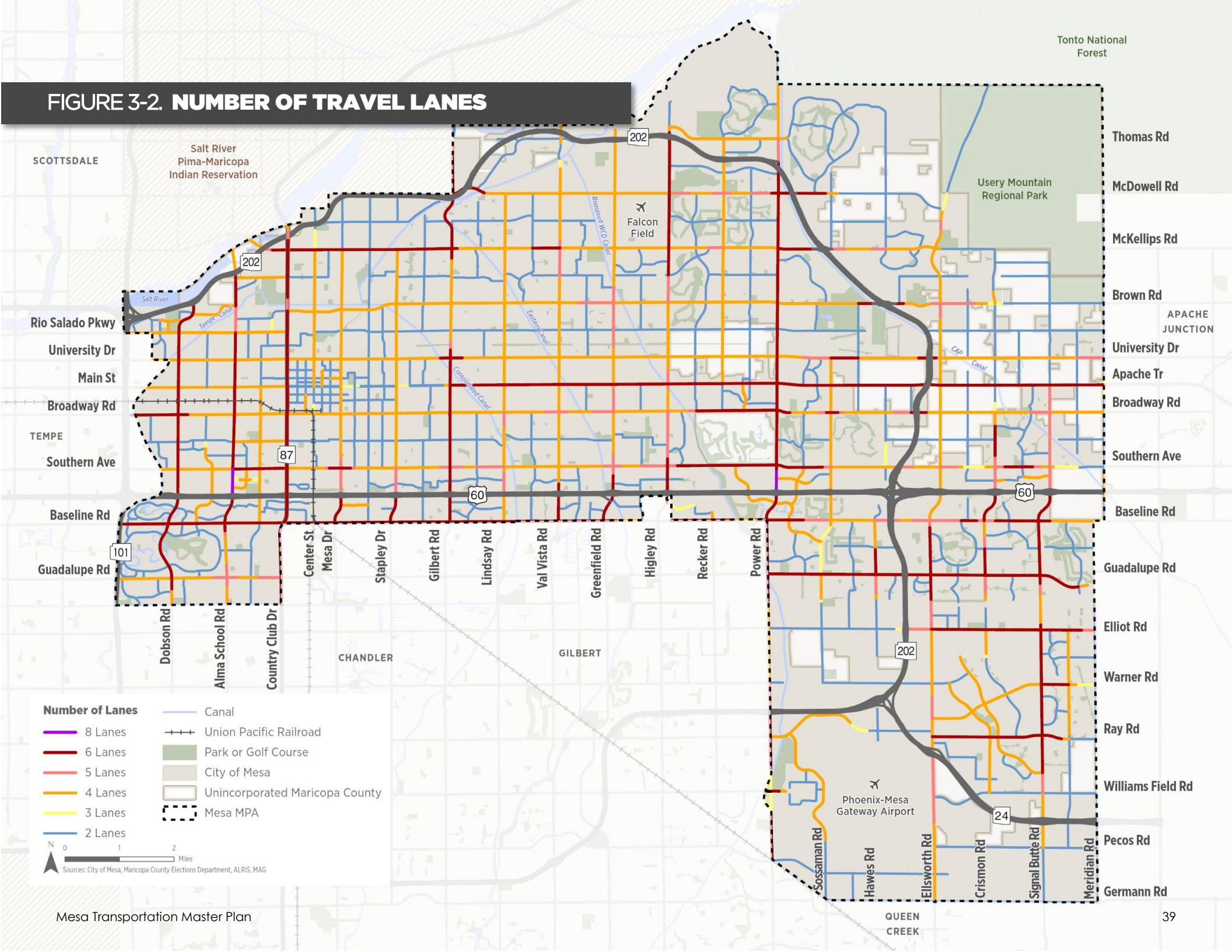
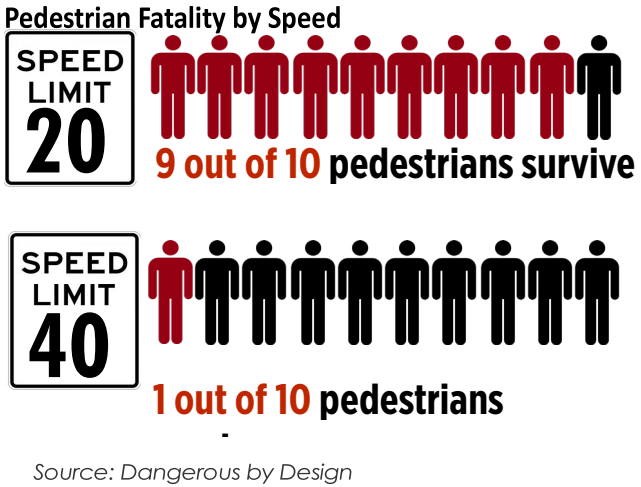


FIGURE 3-2. **NUMBER OF TRAVEL LANES**



Posted Speed Limit

The speed limit of a corridor not only impacts traffic flows, but also can be a critical factor in the number and severity of crashes. Speed impacts crash severity in many ways - at higher speeds, a driver's peripheral vision is reduced and a car's stopping distance is greater. As shown on the right, the likelihood that a pedestrian hit by a vehicle will survive sharply decreases when speeds increase.



Source: Dangerous by Design

To determine the posted speed limits of study corridors (which are largely comprised of arterial and collector streets), speed limits were compiled from readily available GIS data from the City and via a Google StreetView review of conditions. **Figure 3-3** and **Table 3-2** outlines current posted speed limits. Findings show:

- Posted speed limits vary from 25 to 50 MPH.
- Arterials largely have posted speed limits of 40 MPH or higher.
- 45% of collectors are 25 MPH and just over half have a posted speed of 30-35 MPH.

Key Observations/Findings: Ellsworth Road north of SR 24 with a 50 MPH posted speed may be high considering the street context. Mesa is anticipated to reduce the speed limit on Ellsworth Road from Germann Road to Elliot Road to 45 MPH within the next year.

Table 3-2. Posted Speed Limits on the Study Network

Posted Speed Limit	Mileage	Percent of the Study Network
25 MPH or Less	135.4	24.5%
30 – 35 MPH	116.2	21.1%
40 MPH or Higher	300.4	54.4%

Traffic Control

Traffic control devices help manage the movement of people and goods in an efficient manner. Traffic control devices include:

- **Traffic Signals:** controls the flow of vehicles on the roadway network. Improving traffic signal timing can increase mobility and reduce overall congestion.
- **Pedestrian Hybrid Beacons (PHB):** designed to help pedestrians safely cross busy or higher-speed roadways at midblock crossings and uncontrolled intersections.
- **Rectangular Rapid Flashing Beacon (RRFB):** devices that users can manually activate flashing lights to increase driver awareness of pedestrians crossing at unsignalized intersections or midblock crosswalks.
- **Traffic Signs:** A STOP or YIELD sign alerts drivers to come to a complete stop or yield at intersections.

Figure 3-4 illustrates the location of traffic signals, PHBs, RRFBs, and other traffic control devices across the study network.

Key Observations/Findings: The City has about 500 traffic signals; 9 PHBs; and 8 RRFBs. Along Mesa's improved canal shared use paths, all major crossings are signalized. With exception of a few crossings planned for future pathway improvements, most other crossings are unsignalized.

FIGURE 3-3. **POSTED SPEEDS**

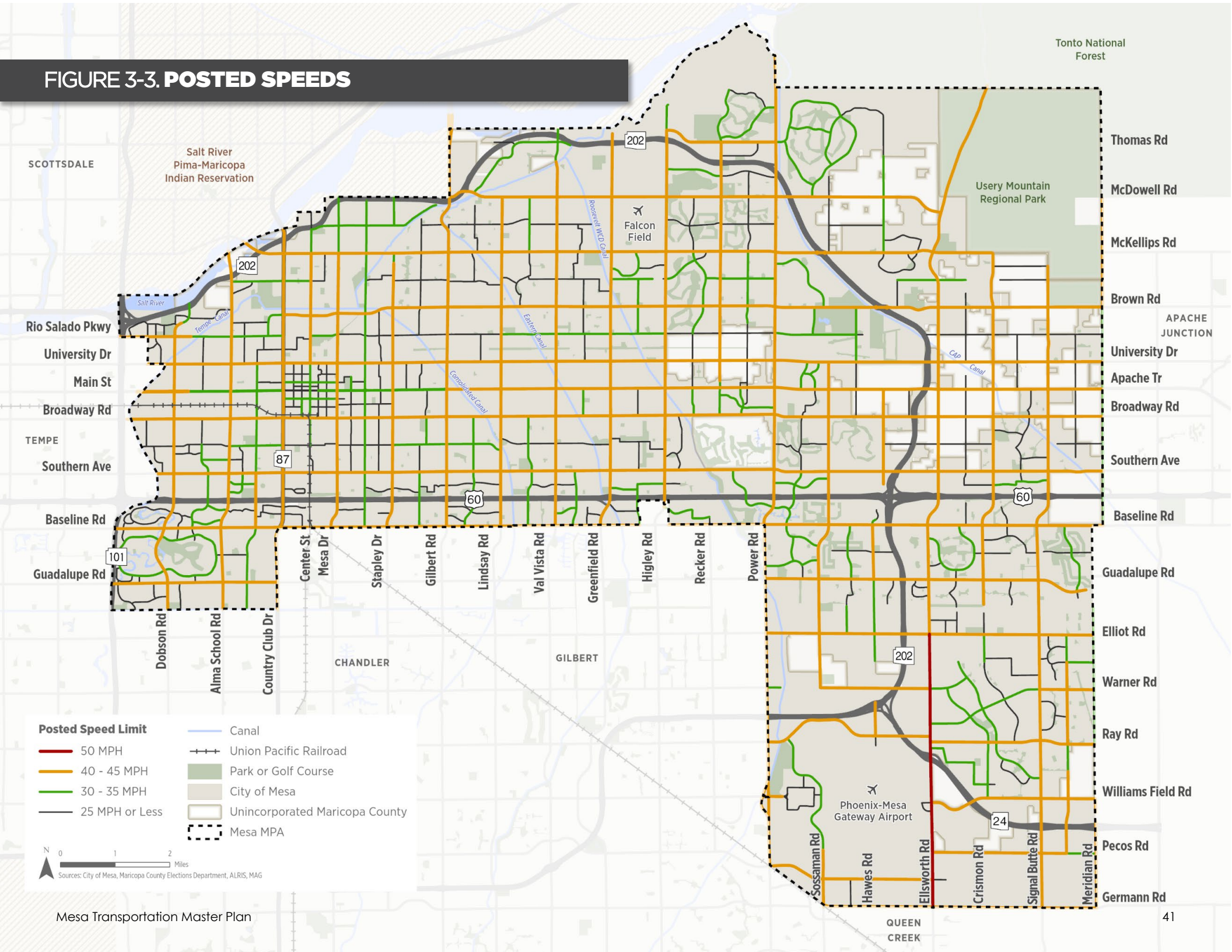
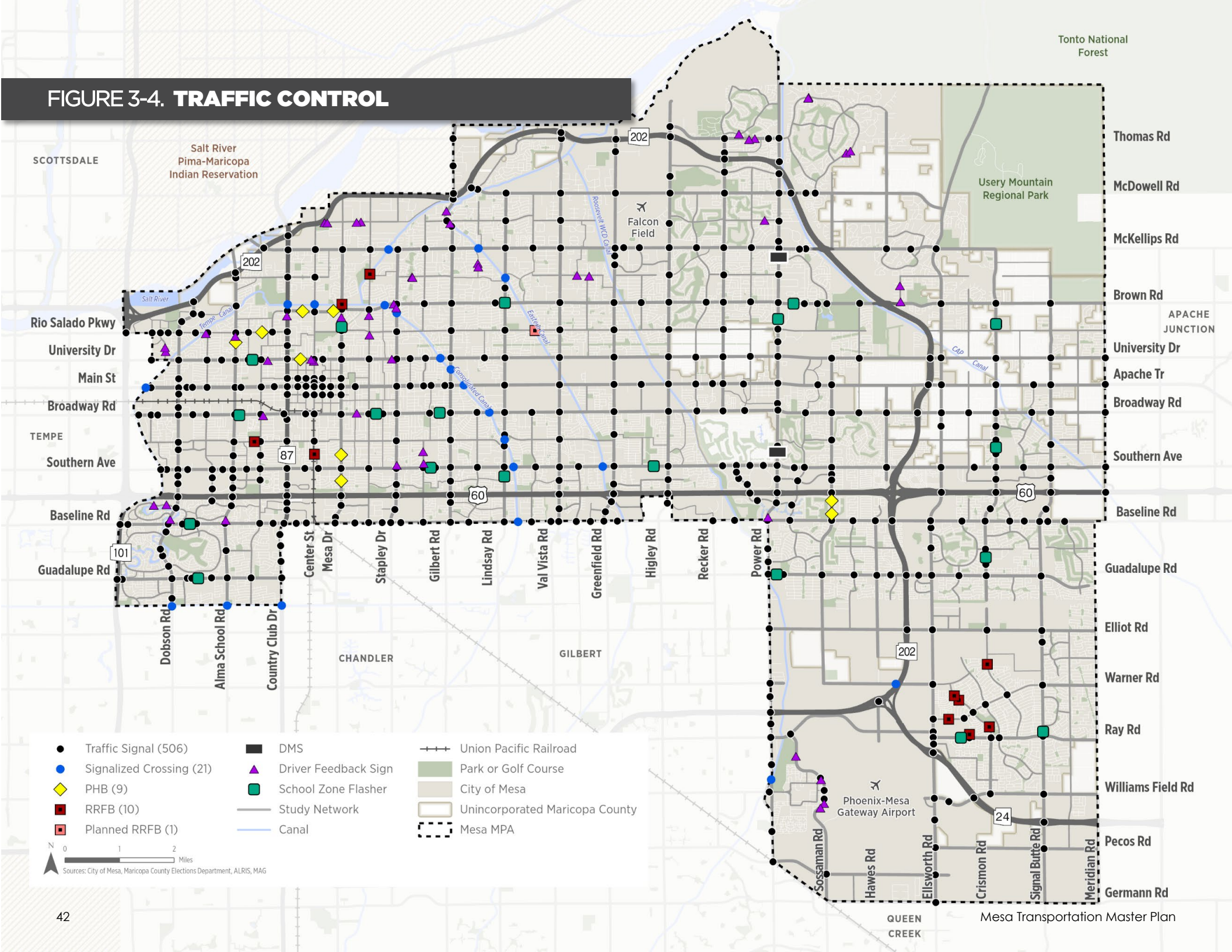


FIGURE 3-4. **TRAFFIC CONTROL**



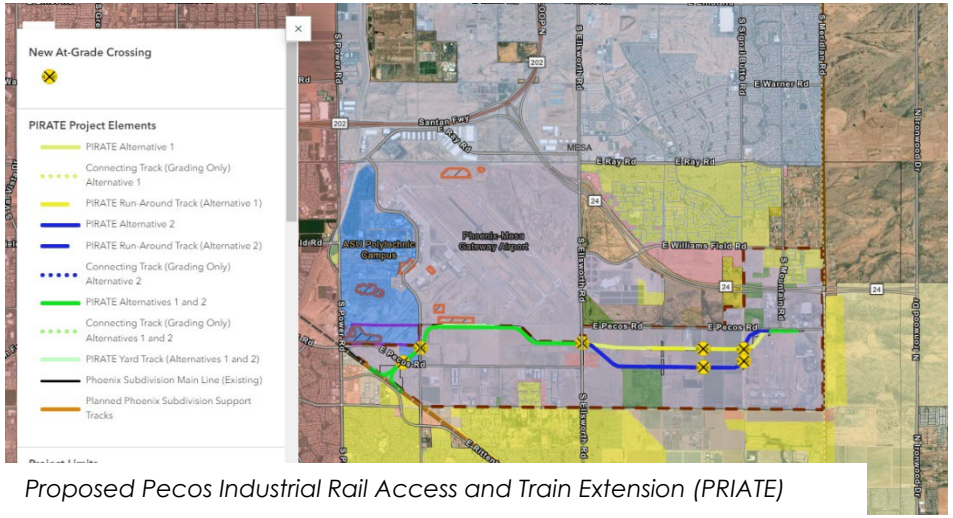
Medians

Figure 3-5 illustrates the location of medians on the study network. A majority of the arterials include a two-way left turn lane for median separation. Other key arterial corridors such as Ellsworth Road, Power Road, Main Street, and most of Baseline Road have raised medians. Most collector streets do not have a median separation.

Railroad Crossings

A small segment of the Union Pacific Railroad (UPRR) line traverses through west Mesa. This segment of UPRR is an active line with 4 trains each day. The rail corridor includes 10 at-grade street crossings, two grade separated crossings, and one at-grade pedestrian only crossing. The proposed Pecos Industrial Rail Access and Train Extension (PRIATE) is a 6-mile east-west freight line between CMC Steel in far east Mesa and the Union Pacific Phoenix Subdivision line at Rittenhouse and Sossaman Roads. This line proposes new at-grade crossings with Pecos Road, Elsworth Road, Crimson Road, and Signal Butte Road.

Key Observations/Findings: As shown in Table 3.3, traffic volumes at 7 of 12 at-grade crossings are significantly high (over 20,000 vehicles per day). If the number of trains each day increases in the future, it could impact the safety and mobility of the streets.

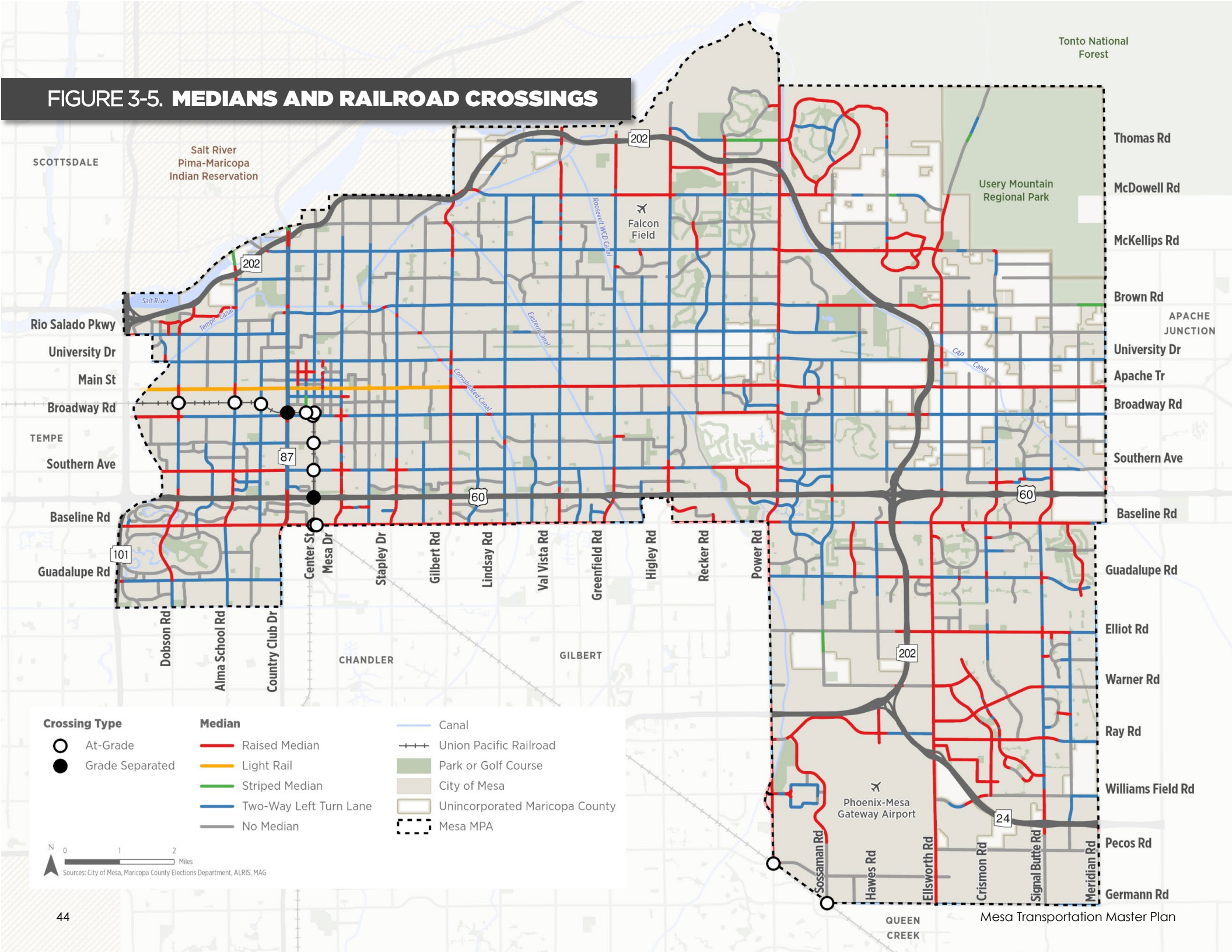


Proposed Pecos Industrial Rail Access and Train Extension (PRIATE)

Table 3-3. Traffic Volumes at Railroad Crossings

Street Crossing	Crossing Type	Train Crossings Per Day	2021 Traffic Count
Dobson Road	At-grade	4	20,812
Alma School Road	At-grade	4	29,075
Extension Road	At-grade	4	9,852
Country Club Drive	Grade-Separated	4	27,608
MacDonald Drive	At-grade	4	N/A
Center Street	At-grade	4	3,750
Broadway Road	At-grade	4	24,203
8th Avenue	At-grade	4	6,386
Southern Avenue	At-grade	4	23,019
10th Avenue/Center Street Pedestrian	At-grade	4	N/A
US 60	Grade-Separated	4	N/A
Baseline Road (2 crossings)	At-grade	4	24,827

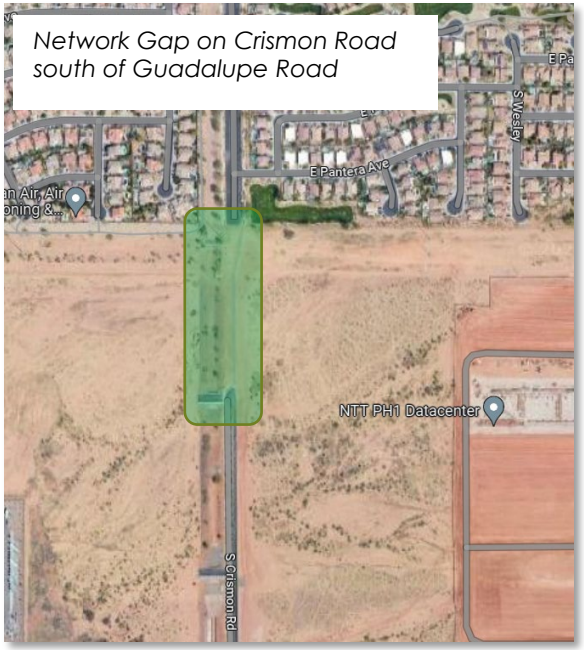
FIGURE 3-5. MEDIANS AND RAILROAD CROSSINGS



Network Gaps

The purpose of the roadway network gaps analysis is to identify physical connection gaps, roads with inconsistent number of lanes, and scalloped streets. Identification of these gaps helps with determining future roadway improvements that could address traffic bottlenecks and improve overall local and regional traffic circulation.

- **Physical connection gaps:** Gaps in roadway network may occur due to physical constraints, located in undeveloped areas, or other reasons. These gaps, if located in urban/suburban areas, often impede regional travel and increase emergency response times.
- **Roads with inconsistent number of lanes:** Inconsistent number of lanes may be a result of right of way constraints, adjacent land use context, or in some cases due to staggered development patterns. These locations may result in traffic bottlenecks and safety issues, especially during peak hours.
- **Scalloped streets:** Developers are often required by jurisdictions to build their portions of the roadway infrastructure. In areas of the City where staggered or uneven development patterns occur, this process results in inconsistent roadway configuration where only one side of the street exists, or a portion of the road is narrower compared to other areas. Scalloped streets on arterial roads create significant traffic flow issues.

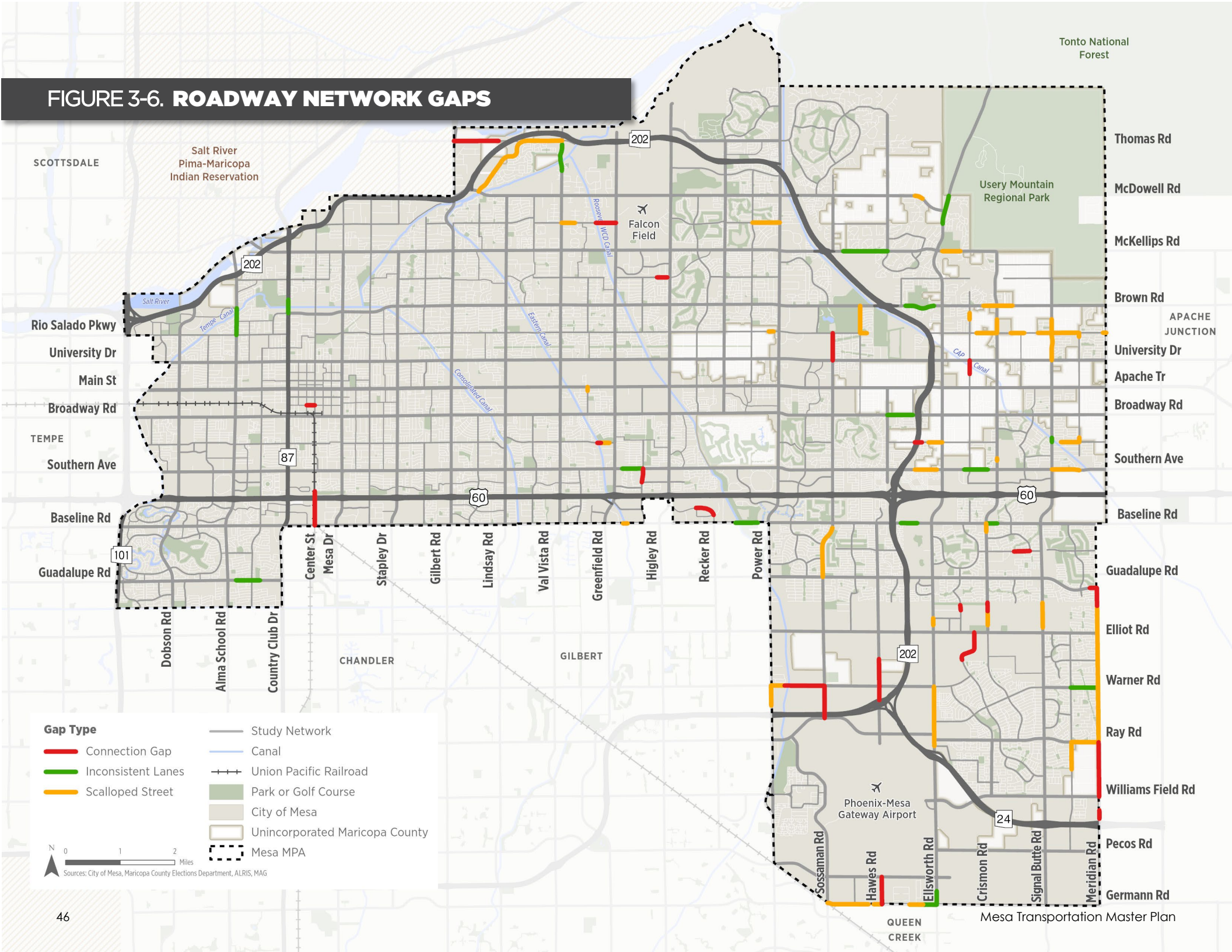


Network Gap on Crismon Road south of Guadalupe Road

Key Observations/Findings: Figure 3-6 illustrates network gaps across the roadway system. The Williams Gateway and Eastmark areas where staggered development patterns have occurred over the past 5-10 years has resulted in several arterial streets with scalloped configurations and network gaps. Meridian Road south of Guadalupe, Germann Road between Sossaman and Ellsworth, and Ellsworth Road between Warner and SR 24 are examples of scalloped road configurations that result in congested roadway conditions, especially during peak periods.

Roadway connection gaps exist on key arterials on Crismon Road between Elliot and Guadalupe, Hawes Road between SR 202 and Elliot Road, and Sossaman Road between Warner and SR 202. Closing these gaps may significantly improve overall mobility in these areas.

FIGURE 3-6. **ROADWAY NETWORK GAPS**



SYSTEM MANAGEMENT

Mesa has made a tremendous investment in our transportation network, and maintaining these facilities in good working order is no small task. But this essential maintenance not only provides the public with safe infrastrucutre but also reduces costly repairs.

Pavement Condition

The City has a robust pavement maintenance program to help keep the streets in the best possible condition and to extend their service life. Each year, the City conducts pavement condition surveys on over 1,200 miles of street and identifies specific areas for preventive maintenance treatments. **Figure 3-7** Illustrates the current pavement conditions based upon the City's Pavement Management System (PMS).

Key Observations/Findings: Most of the roadways that are in poor condition are located in Downtown Mesa and older areas in east Mesa. The deterioration may be due to ongoing repair and construction. Other key findings include pavement in

- **Good Condition:** 19.9 percent
- **Fair Condition:** 45.8 percent
- **Poor Condition:** 13.9 percent

Structures

Maintaining bridges and culverts in a state of good repair is essential for preserving mobility and connectivity. Weight limits or closures on structurally deficient bridges negatively impacts freight and traffic movement, while functionally obsolete structures that are inadequate to carry current traffic volumes may cause traffic congestion. To analyze structure conditions in the study network, bridge condition ratings were obtained from the City and the Arizona Department of Transportation (ADOT).

Figure 3-8 illustrates the location and condition of structures along the study network. It's important to note that the construction year and/or age of the structure does not reflect more recent reconstructions or bridge improvements.

Key Observations/Findings:

- **Total Structures within the Mesa MPA:** 137 structures
- **Good Condition:** 43 percent (57 total bridges)
- **Fair Condition:** 57 percent (76 structures)
- **Average Structure Age:** 40 years since the structure was built.
- The oldest structure was constructed in 1925; however, it was reconstructed in 1990.
- Bridges in fair condition were primarily constructured prior to 1988.

FIGURE 3-7. **PAVEMENT CONDITIONS**

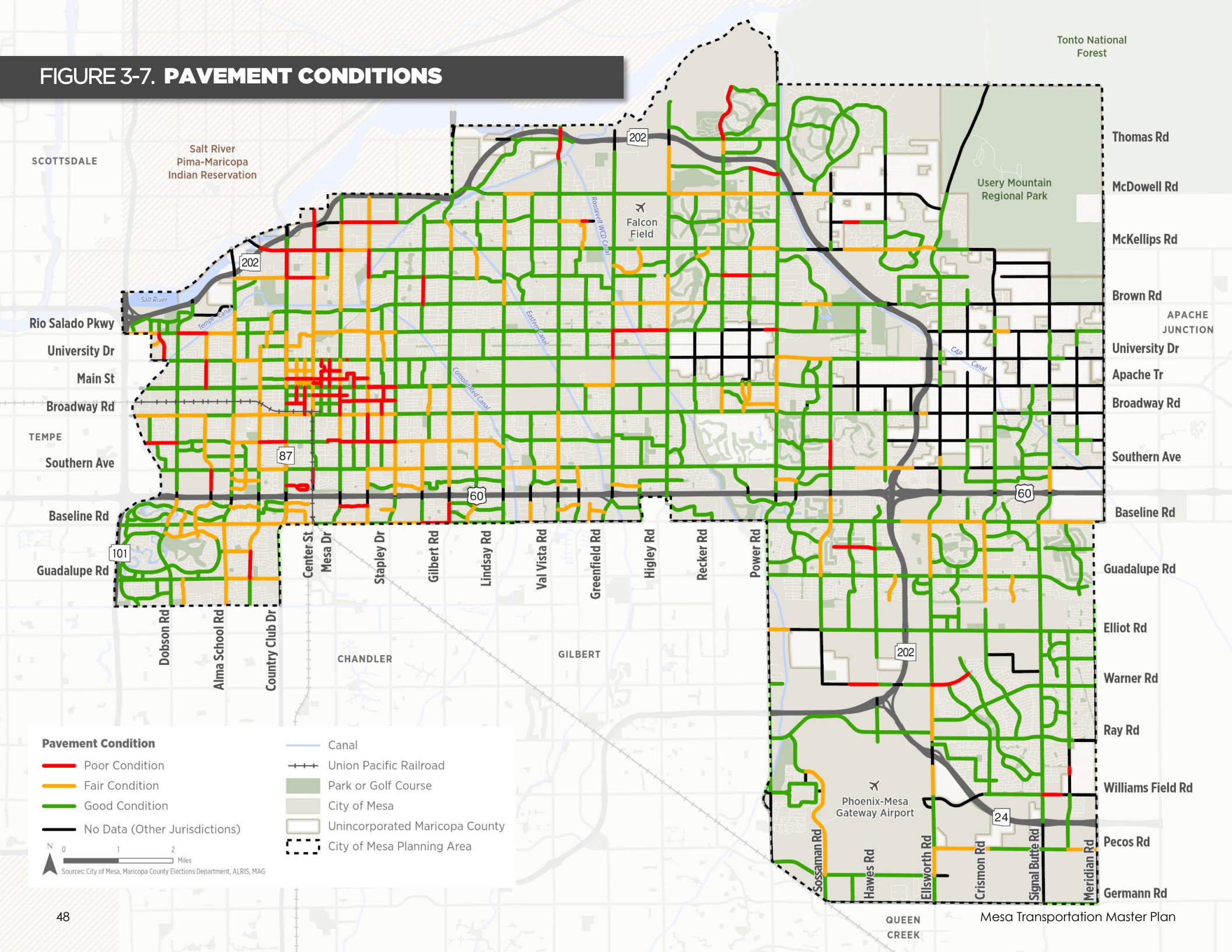
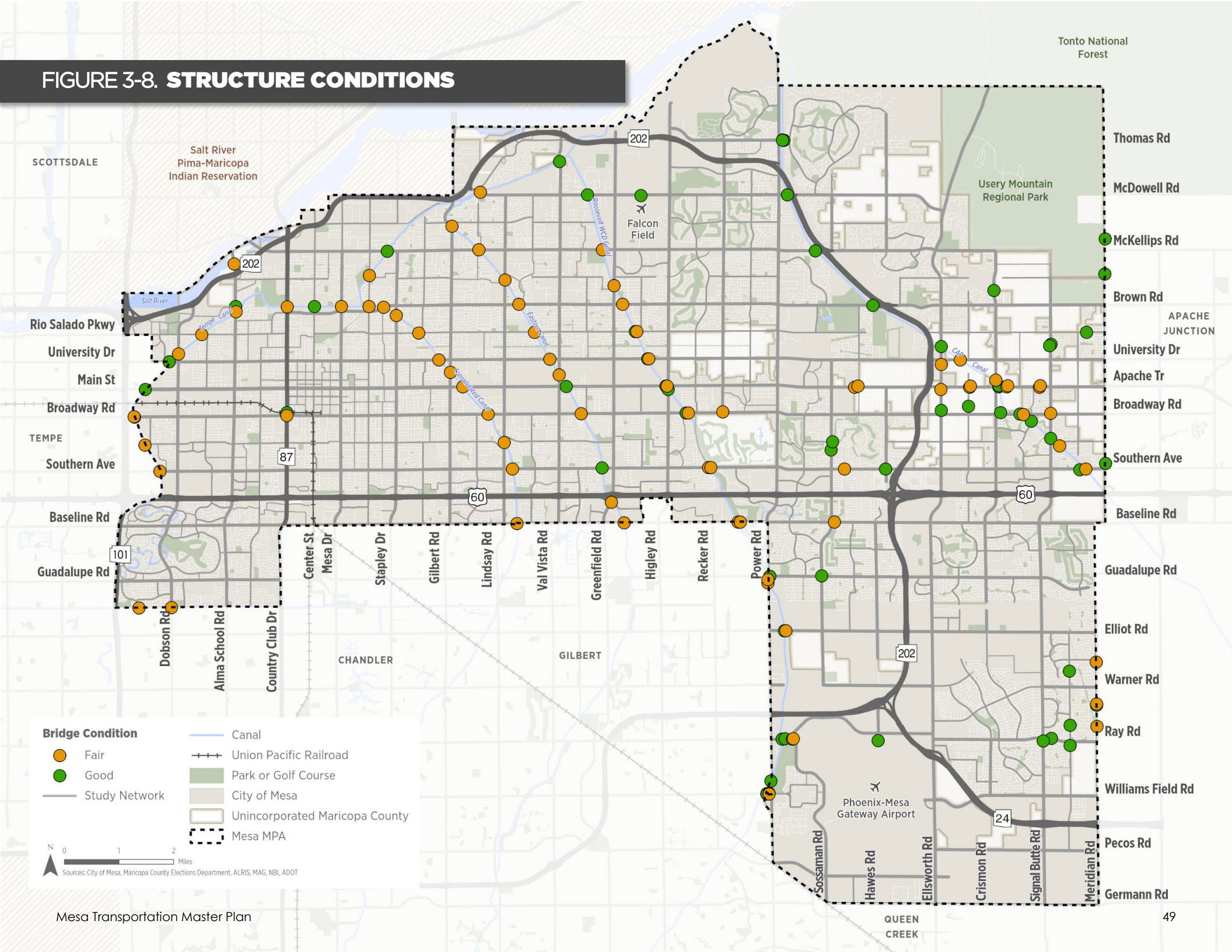


FIGURE 3-8. **STRUCTURE CONDITIONS**



SYSTEM PERFORMANCE

A road's traffic performance is often evaluated using *Level of Service* (LOS) methodology, a traditional metric that has been used by transportation professionals and agencies for several decades. LOS, however, is only reflective of relative vehicular traffic flow and is not an accurate predictor of how motorists feel when traveling on streets. For instance, a collector road with an active street environment surrounded by dense mixed use naturally attracts traffic, creating a poor LOS rating, whereas, a local roadway within an area with closed businesses and blight conditions may score a good LOS rating. This section reviews roadway performance using LOS and additional metrics that are reflective of user experience.

Traffic Volumes

Traffic volumes is an important variable in understanding the function of a corridor. Current daily traffic volumes were obtained from the City of Mesa and supplemented with traffic estimates from MAG's regional travel demand model. **Figure 3-9** illustrates existing daily traffic volumes in Mesa 2021.

Key Observations/Findings:

- Ellsworth Road, south of Ray Road has daily traffic volumes more than 50,000. Lack of adjacent continuous parallel corridors seems to be one of the contributing factors. Other roads with high traffic volumes includes portions of Country Club Drive, McKellips Road, and Gilbert Road.
- The highest traffic volumes are largely on arterials connecting drivers to the US 60 and SR 24 freeways.
- Arterial corridors in northeast and southeast Mesa have the lowest daily traffic volumes in the MPA.

Level of Service

Level of Service (LOS) is a term used to describe traffic operations. Level of Service can be calculated for the various elements of a street system including road segments, signalized intersections, and unsignalized intersections. The various levels of service range from LOS A (free flowing traffic) to LOS F (forced flow, or very congested), and are described as:

- **LOS A - C:** free or stable flow with low volumes and no to minor delays.
- **LOS D:** stable flow with speeds and maneuverability controlled because of higher volumes. Speed and maneuverability are severly restricted and the driver or pedestrian's experience is generally a poor level of comfort or convenience.
- **LOS E:** operating conditions at or near the capacity level. All speeds are reduced to a low but relatively uniform value. LOS E is unstable and can quickly deteriorate to LOS F.
- **LOS F:** Forced flow with very low speeds caused by traffic volumes exceeding the capacity of the corridor. Users experience long delays with stop-and-go traffic.

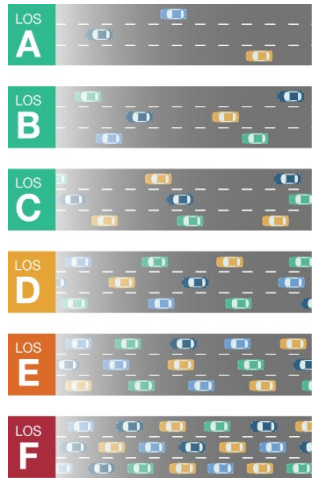
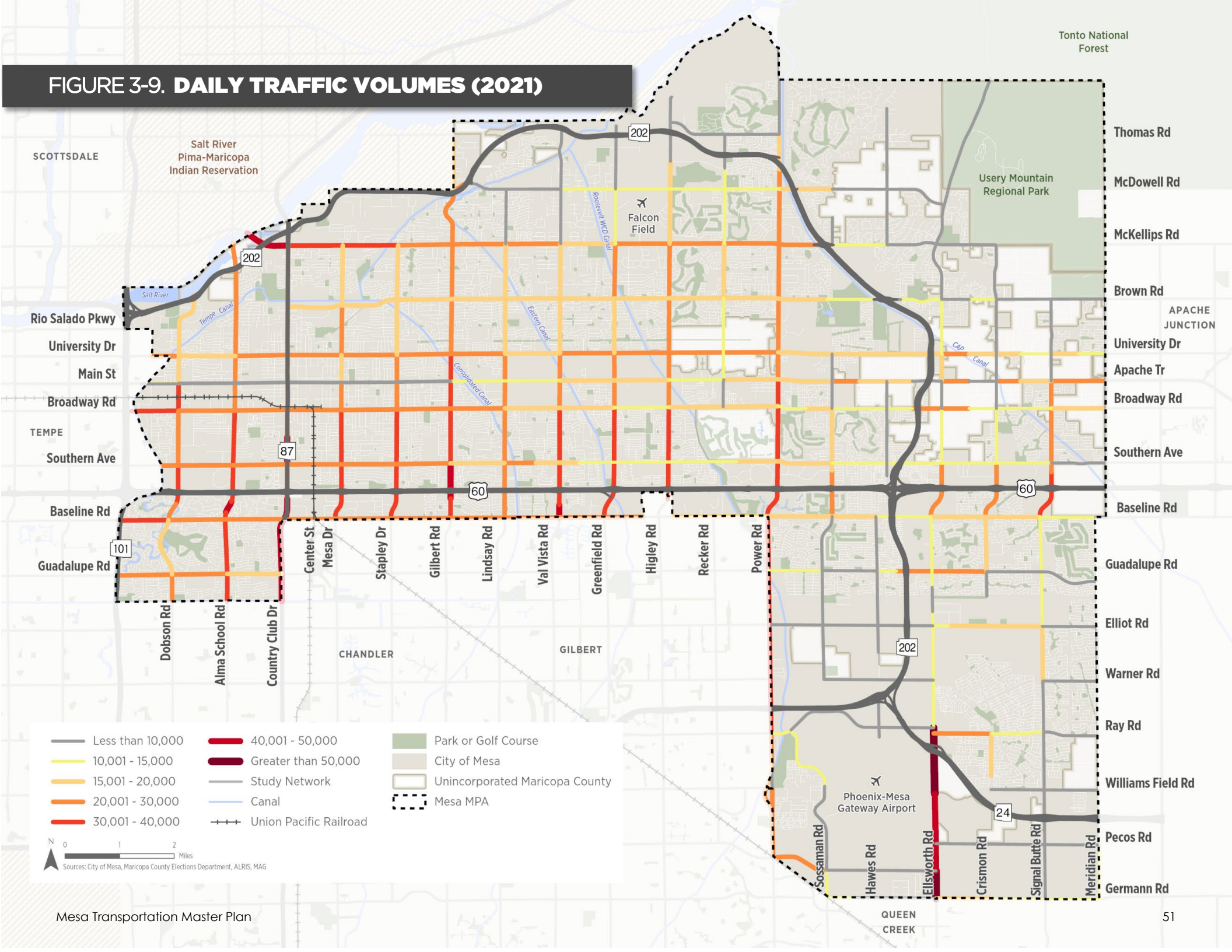


FIGURE 3-9. **DAILY TRAFFIC VOLUMES (2021)**



Corridor Segment Level of Service

Figure 3-10 illustrates existing (2021) LOS by corridor segment. Generally, LOS D is considered the threshold of acceptable conditions in an urban area. **Table 3-4** outlines corridor segments that currently operate at LOS E or F based on average daily traffic volumes. As the figure and table show, portions of Ellsworth Road, Main Street, Pecos Road, Power Road, McKellips Road, and McDowell Road have the highest congestion/worst operating conditions in the MPA. The major of congestion issues along corridors that connect to Downtown Mesa or a regional freeway.

Table 3-4. Corridor Segments Operating at a LOS E and LOS F

Corridor	Location	Level of Service
Ellsworth Road	Ray Road to Williams Field Road	F
	Williams Field Road to North of Pecos Road	E
	North of Pecos Road to Germann Road	F
Pecos Road	Power Road to Sossaman Road	F
Power Road	South of Williams Field Road	E
Val Vista Road	Southern Avenue to US 60	E
Mesa Drive	South of Broadway Road	E
	8th Avenue to Southern Avenue	E
Broadway Road	East of Dobson Road to Alma School Road	E
McKellips Road	West of SR 202 Loop near City Limits	F

Intersection Level of Service

To understand how intersections operate in Mesa, analysis was extracted from the Mesa Intersections Study, Ellsworth Road Corridor Study, and the Broadway Road Corridor Study to determine their LOS**. Figure 3-11 and Figure 3-12** illustrate existing LOS by intersection during the AM and PM peak periods, respectfully. As shown in the Figures and **Table 3-5**, the majority of intersections experience congestion issues in southeast Mesa. Ellsworth has three major intersections failing during AM or PM periods.

Table 3-5. Top Congested Intersections

Intersection	AM Peak Period	PM Peak Period
Ellsworth Road/Germann Road	F	E
Ellsworth Road/SR 24	F	E
Ellsworth Road/Pecos Road North	E	D
Ellsworth Road/Pecos Road South	B	F
Sossaman Road/Pecos Road	C	E

FIGURE 3-10. EXISTING CORRIDOR LEVEL OF SERVICE

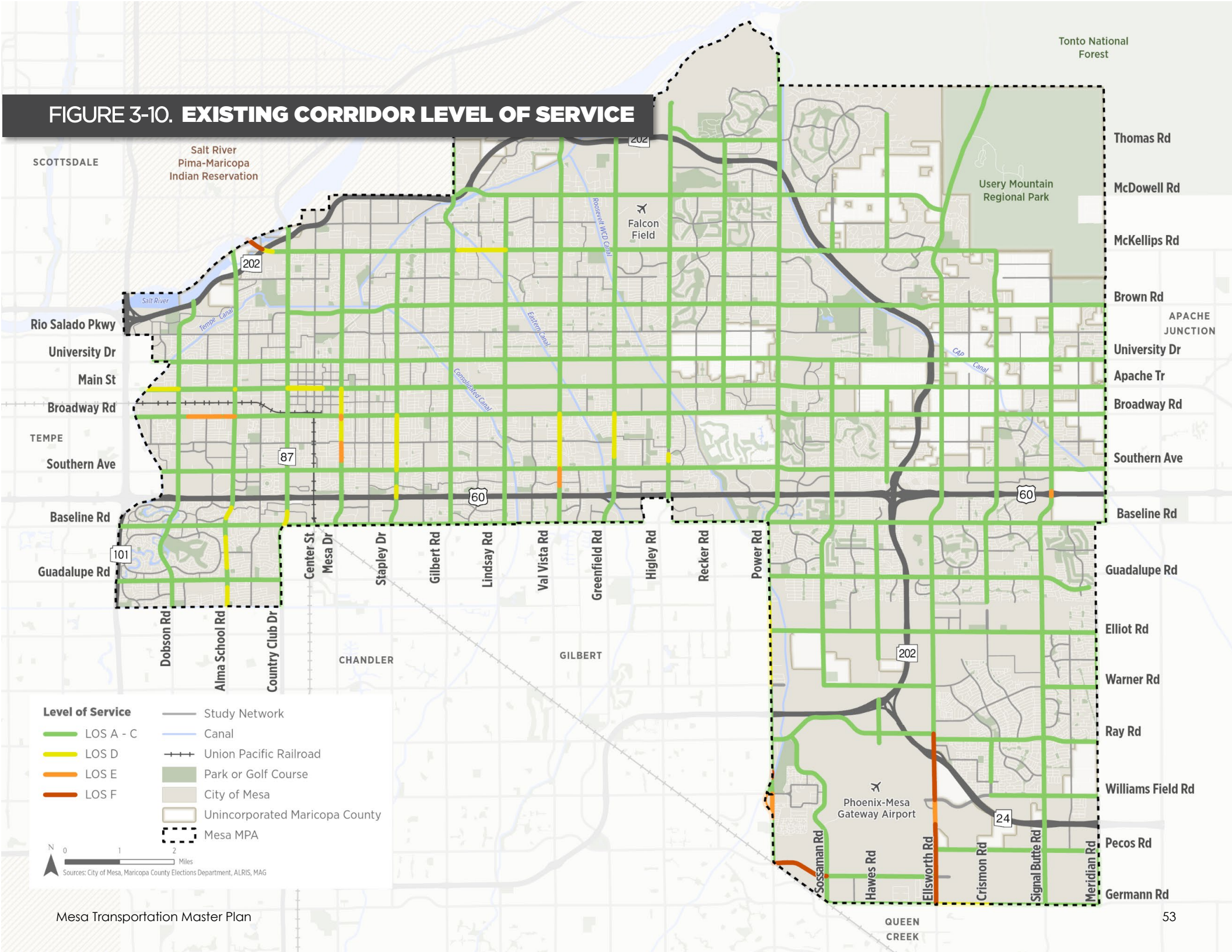


FIGURE 3-11. EXISTING INTERSECTION LEVEL OF SERVICE – AM PEAK

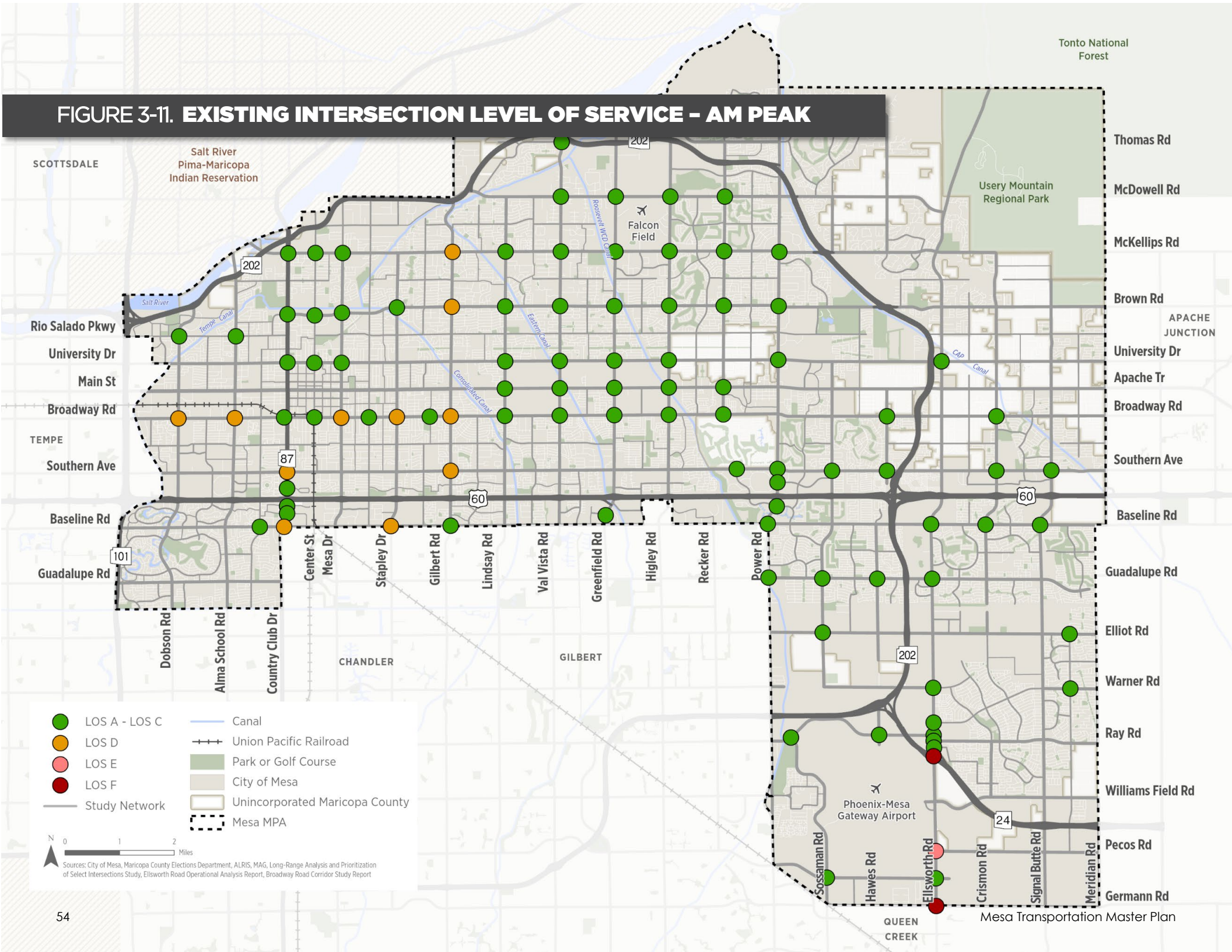
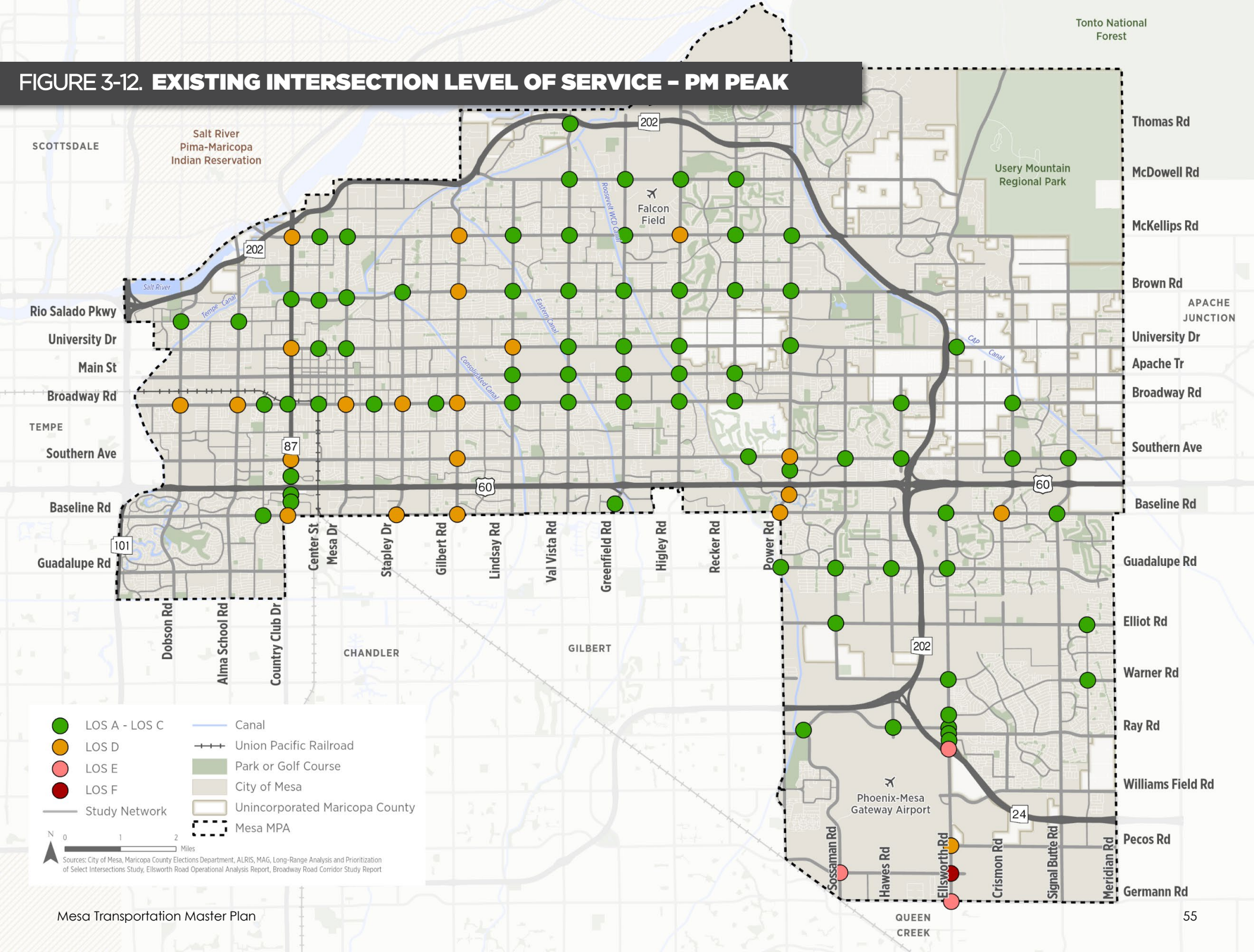


FIGURE 3-12. EXISTING INTERSECTION LEVEL OF SERVICE – PM PEAK



Travel Time Reliability and Speeds

Travel time reliability and travel speeds are generally better measures of examining congestion conditions and how motorists feel traveling across the network. While most drivers expect some form of congestion, particularly during peak hours, having predictable travel time is important for users so they can get to where they are going on time. Freight carriers also require dependable travel times to remain competitive.

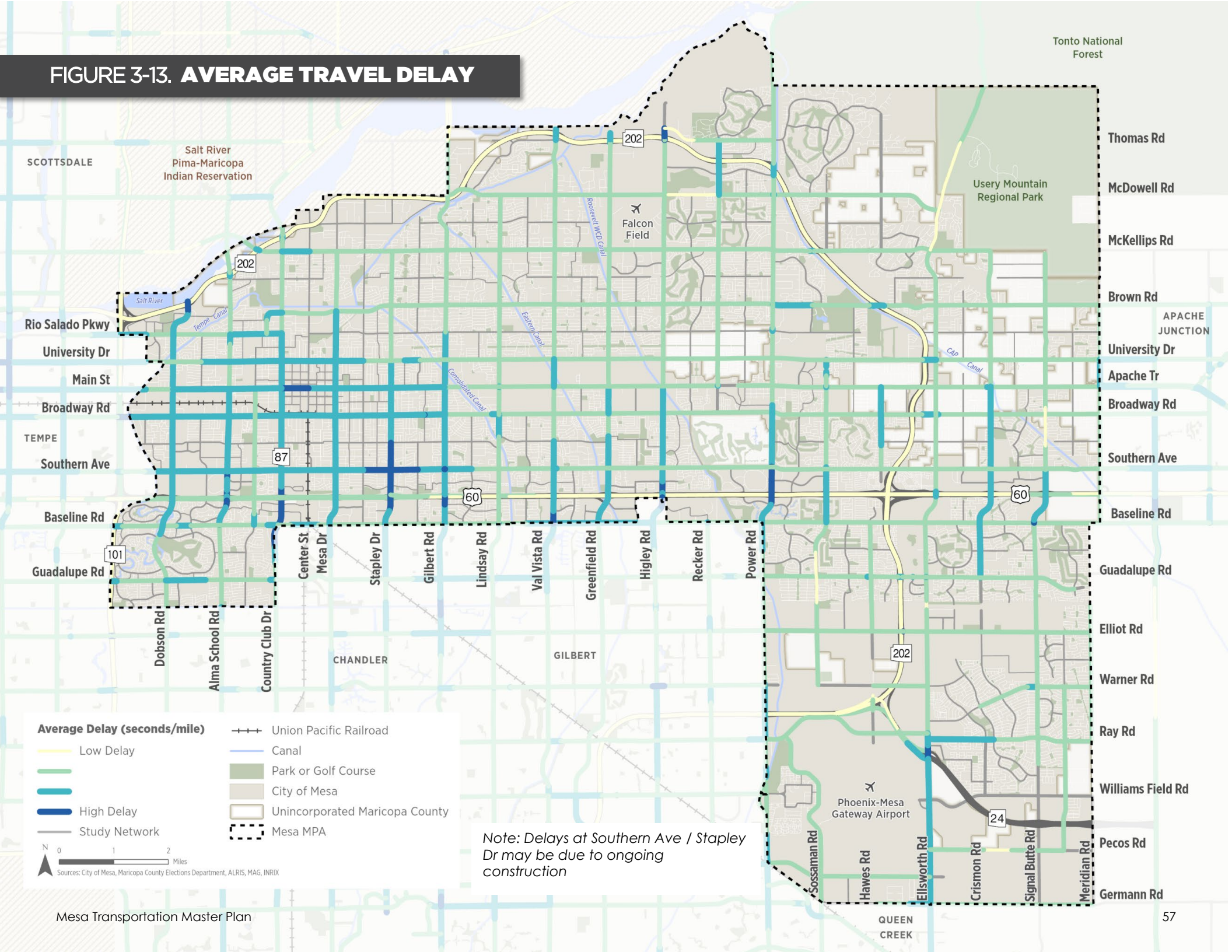
Travel Delay

Another metric often used to quantify travel time reliability is Delay. Delay is the average amount of additional time (in seconds per mile travelled) that it will take a motorist to traverse a road segment during a peak period in comparison to free-flow conditions. A delay value of 20 indicates that travel times are slower by 20 seconds for each mile compared to free-flow conditions. As illustrated in **Figure 3-13**, arterials with higher delays are located largely in west Mesa, north-south corridor segments connected to US-60, and along Ellsworth Road.

Making it There On time, All the Time

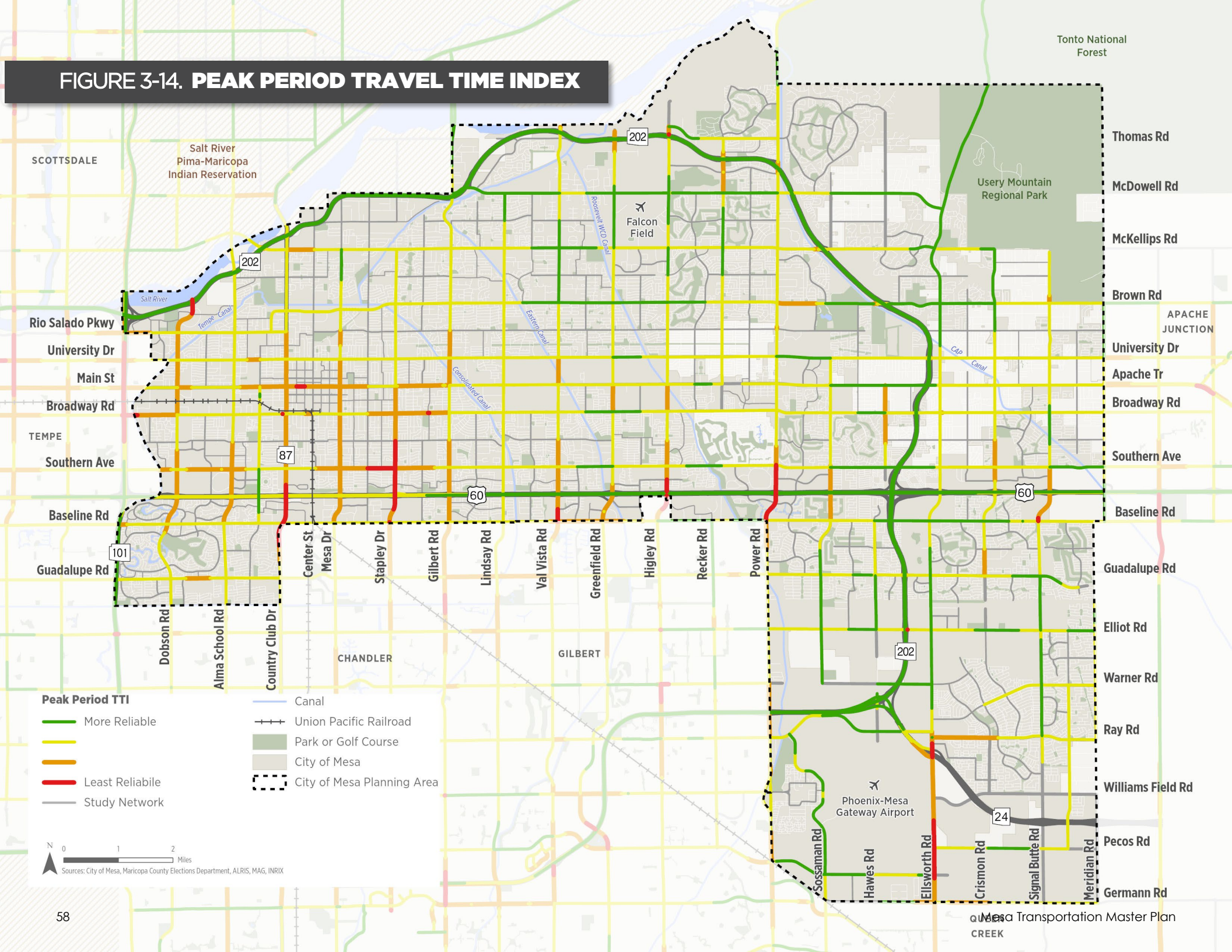
Travel time reliability provides a valuable metric for assessing roadway performance. While congestion and travel times can vary greatly from day to day, motorists depend on having a consistent, predictable travel route to get to where they are going on time, all the time. Travel Time Index provides a metric for quantifying how reliable travel times are on a given corridor. The Travel Time Index represents a ratio of travel time in the peak period to the travel time at free-flow conditions. A Travel Time Index of 1.3 indicates that a 30-minute free-flow trip takes approximately 39-minutes during peak periods. As shown in **Figure 3-14**, Travel Time Index values are the highest on many north-south arterials in Mesa, primarily those connected to US 60, SR 24, SR 202, and in Downtown Mesa.

FIGURE 3-13. **AVERAGE TRAVEL DELAY**



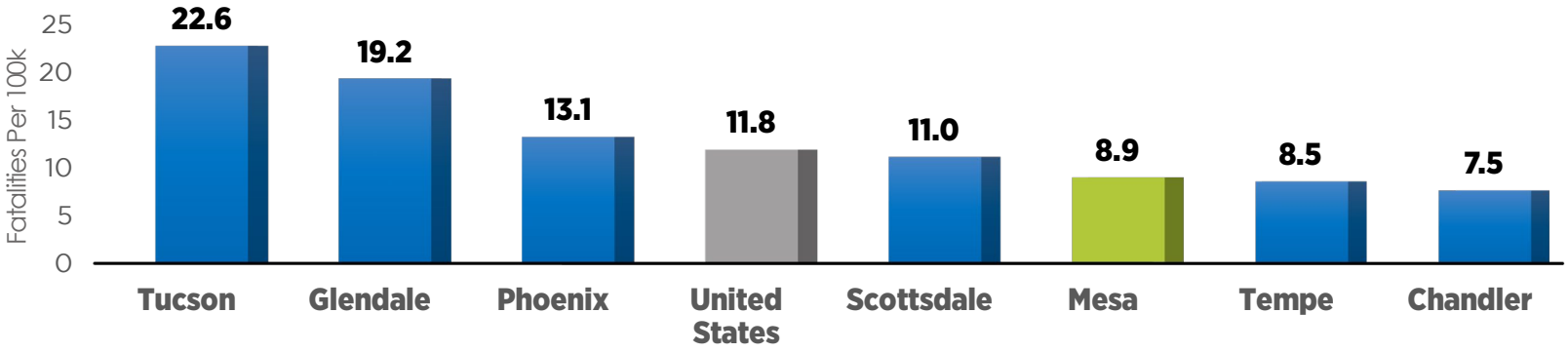
Note: Delays at Southern Ave / Stapley Dr may be due to ongoing construction

FIGURE 3-14. **PEAK PERIOD TRAVEL TIME INDEX**



HOW SAFE ARE OUR STREETS?

Street safety is a top concern for Mesa. Street safety for all users – motorists, transit riders, pedestrians, and bicyclists. According to the National Highway Traffic Safety Administration (NHTSA), Arizona has one of the highest pedestrian fatality rates and the Phoenix metropolitan area consistently ranks as one of the highest regions in the nation for collision deaths. As illustrated below, however, Mesa has one of the lowest fatality rates among peer communities.



Historical Crash Trends

Crashes data analysis helps identify trends, patterns, predominant crash types, and high crash rate corridors and intersections. This analysis also helps identify potential safety improvements to reduce the frequency and severity of crashes. Crash analysis presented in this section is based on the City of Mesa 2021 Annual Crash Report and reflects the years 2017 to 2021.

According to the report, between 2017 and 2021, a total of 27,744 crashes were reported within Mesa city boundaries. As the chart on the right illustrates, total crashes have increased over the five-year time period. **Figure 3-15** illustrates locations with the highest density of crashes. As the figure shows, crashes occur throughout the City but are largely located at major intersections.

The following section outlines key crash characteristics to help better understand the "who," "what," "when," "where," and "how" of transportation safety in Mesa.

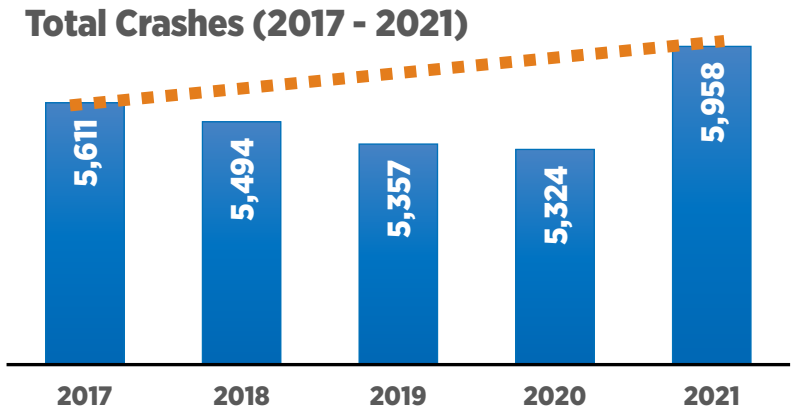
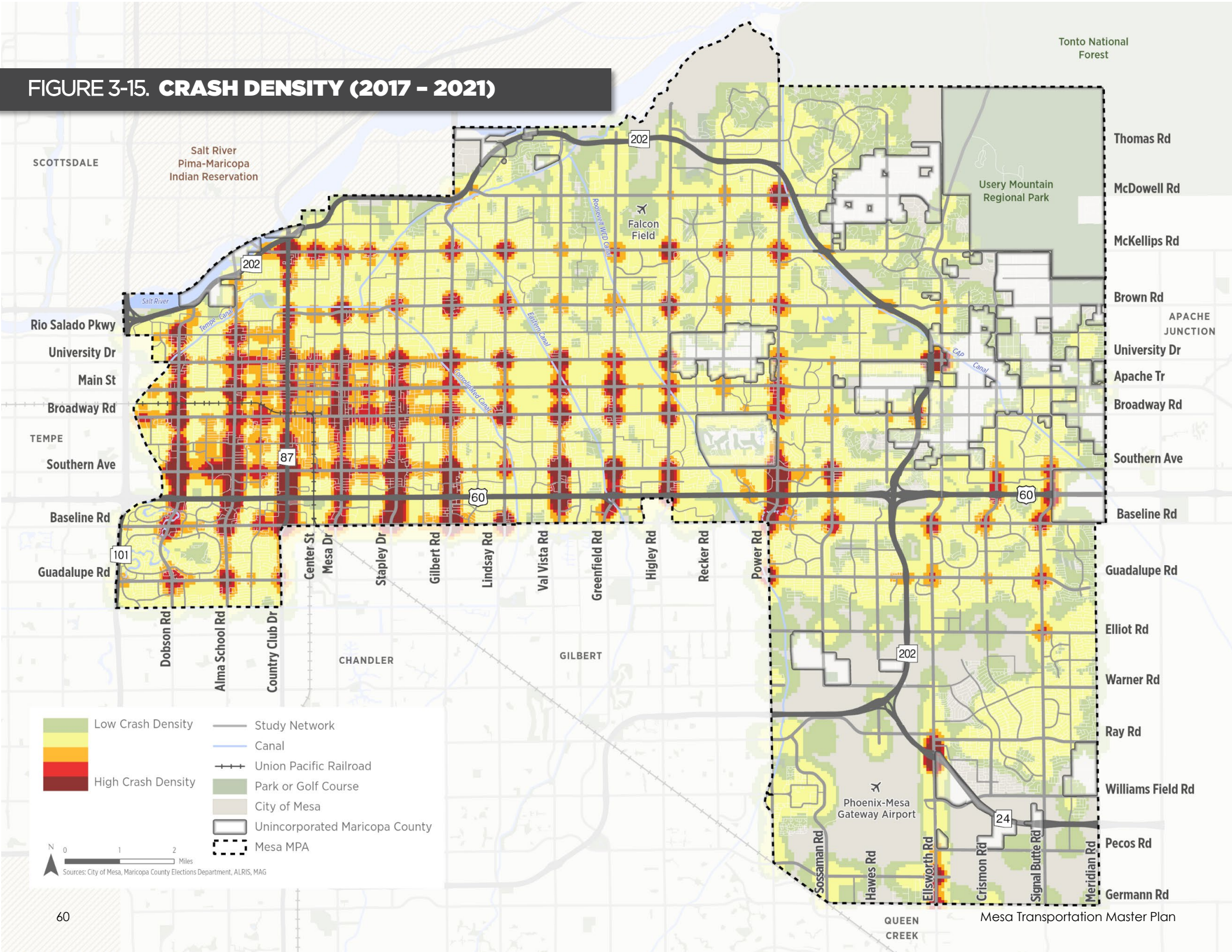


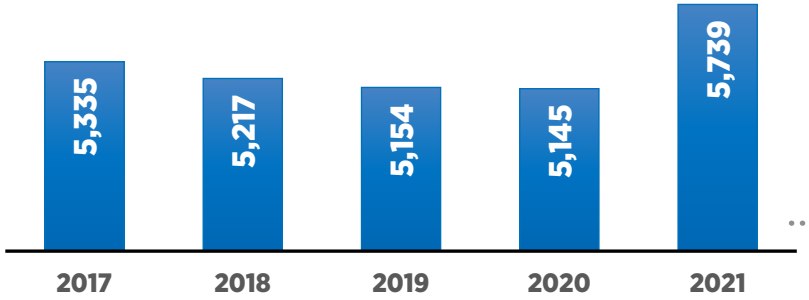
FIGURE 3-15. **CRASH DENSITY (2017 – 2021)**



Who is Involved?

In a traditional crash data report, passenger vehicles and freight vehicles are grouped together in the crash database as vehicles. Vehicles make up the largest percentage of user types involved in crashes in Mesa.

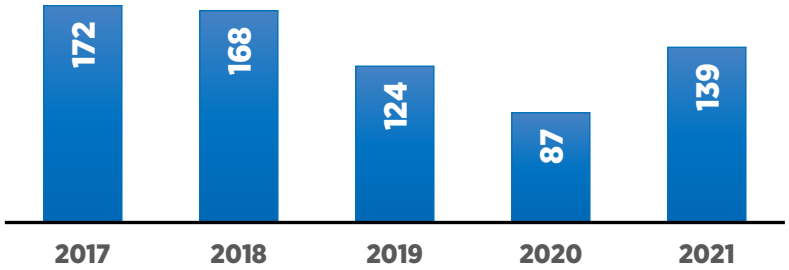
Vehicle Crashes (2017 - 2022)



96% of crashes involved vehicles only.

According to the report, vehicle crashes significantly increased in 2021, which may be reflective of limited single vehicle travel during the COVID 19 pandemic in 2020.

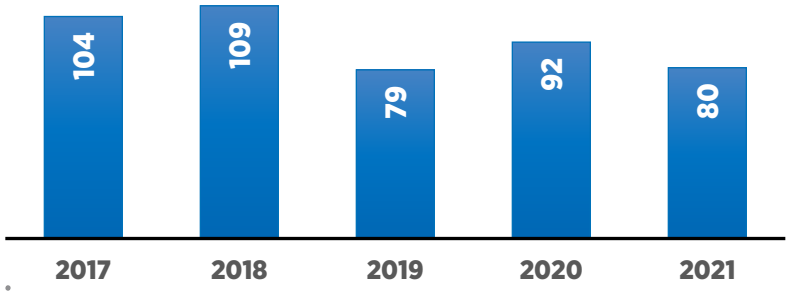
Bicycle-Related Crashes



Bicyclist involved crashes significantly increased from 2020 to 2021.

2.3% of all crashes in 2021 involved a bicyclist.

Pedestrian-Related Crashes

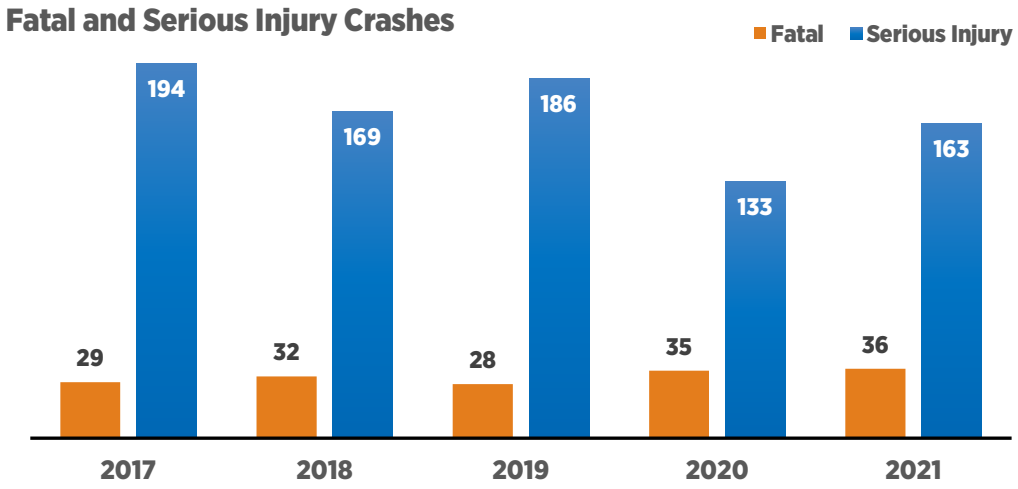


1.7% of all crashes from 2017 to 2021 involved a pedestrian.

Pedestrian-related crashes decreased by 13% from 2020 to 2021.

How Severe Are the Crashes?

Figure 3-16 illustrates locations of fatal and serious injury crashes in Mesa. As the figure shows, fatal and serious injury crashes occur throughout the City, but are largely located along arterial corridors. In 2021, Mesa has experienced an increase in fatal and a decrease in serious injury crashes compared to year 2017.



Mesa by the Numbers

(January to December 2021)

5739
total crashes reported

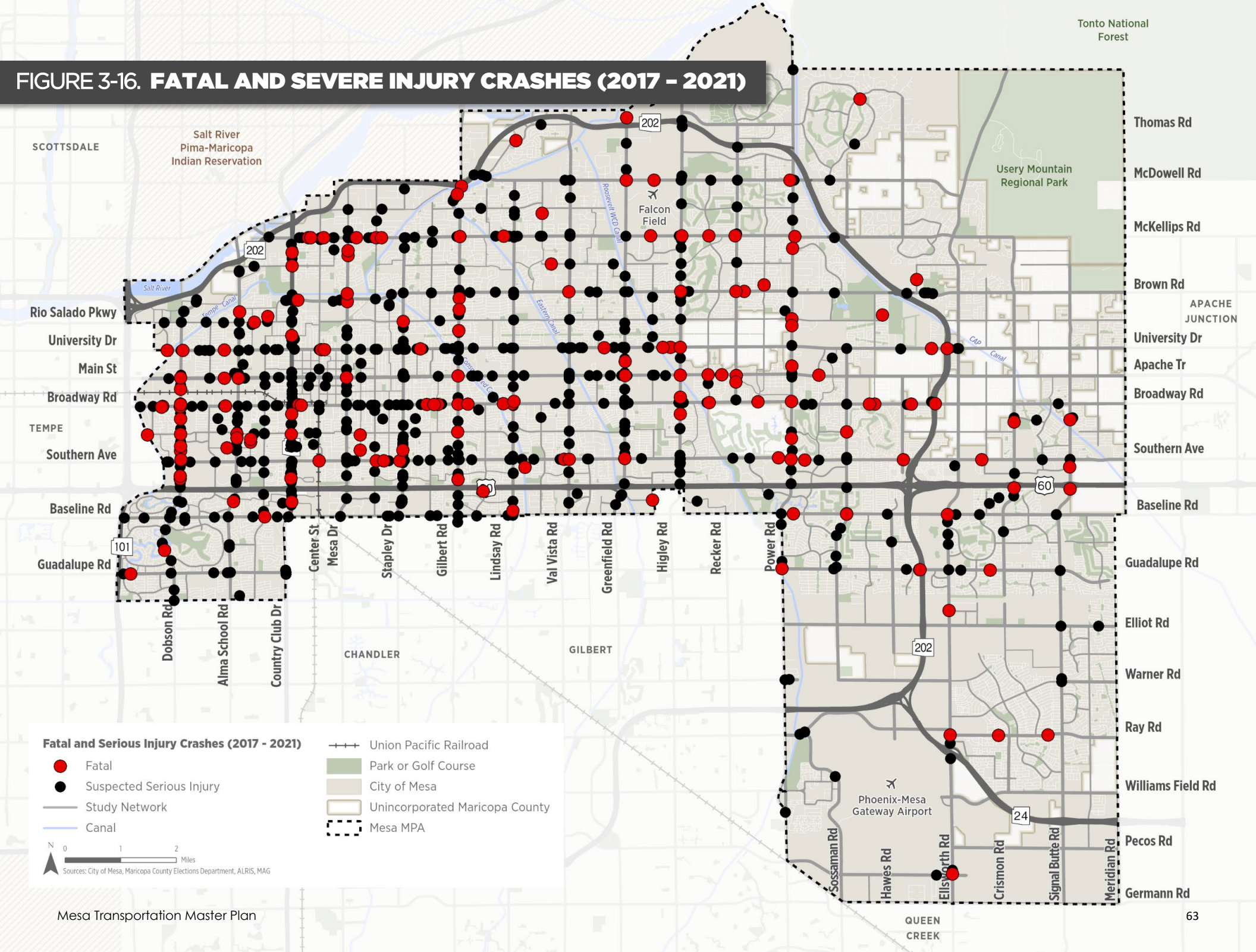
36 fatal
crashes

163
serious injury crashes

- Fatal crashes increased by 24% since 2017.
- Fatal crashes accounted for 0.6% of all crashes reported.
- Fatal crashes slightly increased from 2019 to 2021.

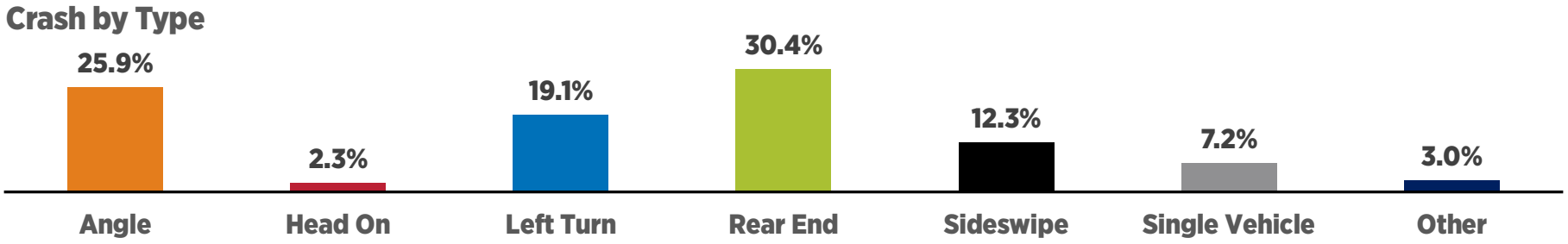
- Since 2017, serious injury crashes are generally trending down.
- 22.5% decrease in serious injury crashes since 2019.

FIGURE 3-16. FATAL AND SEVERE INJURY CRASHES (2017 – 2021)



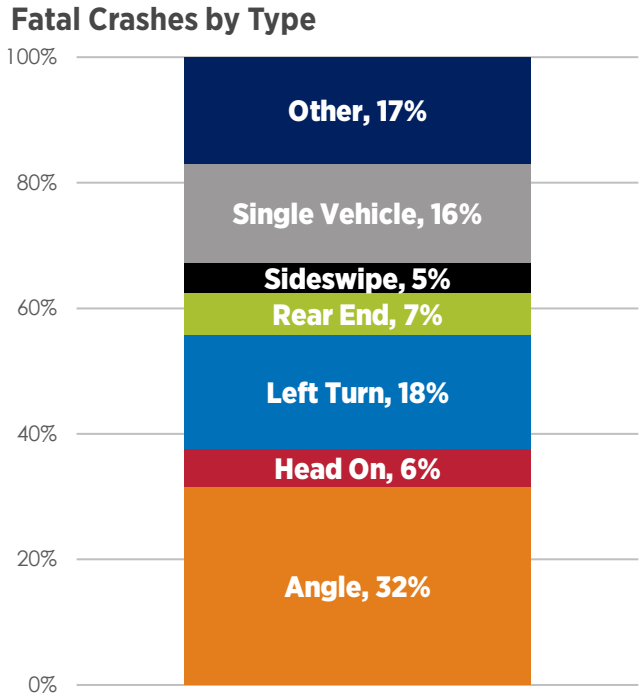
What Type of Crashes are Occurring?

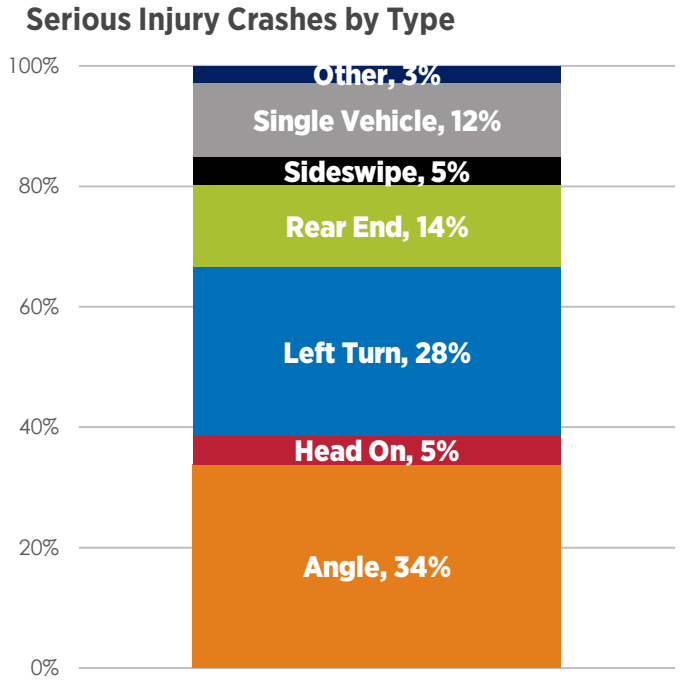
While every crash is unique, they are often categorized according to the circumstances of the crash. Each vehicle crash can be grouped into different collision types, including rear-end crashes, angle crashes, left turn crashes, and head on crashes. Each crash type can indicate a particular problem that may be addressed through a targeted engineering, enforcement, or behavioral countermeasure. As illustrated below, rear-end and angle crashes make up over 56% of all crashes in Mesa historically.



What Types of Crashes Resulted in Serious Injuries and Fatalities?

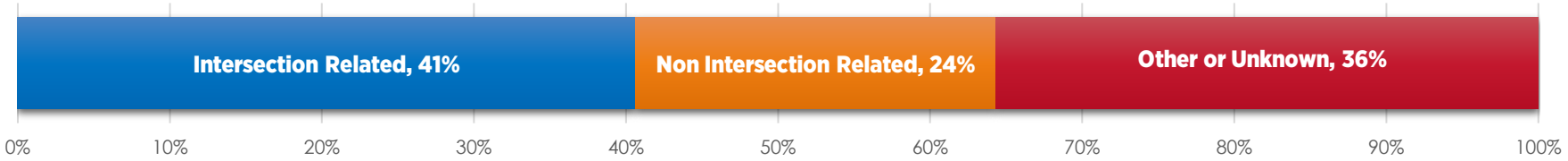
The graphs below illustrate the distribution of fatal crashes and serious injury crashes by crash type, respectively. Pedestrian and bicyclist fatalities account for 37% of all fatal crashes in Mesa, in addition to another 21% of serious injury crashes.





Where are the Crashes Happening?

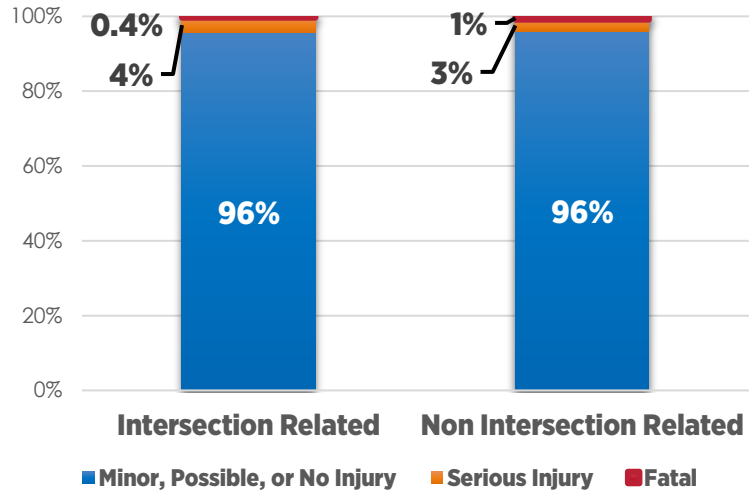
Understanding the locational context of crashes is an important step in identifying location specific safety issues that may be addressed through targeted engineering, enforcement, or behavioral countermeasures. Within Mesa, there is a disproportionate split between crashes occurring at intersections and along corridors, with nearly 41% of all crashes occurring at intersections.



Crash Severity by Location

According to the Arizona Strategic Traffic Safety Plan, between 2016 and 2018, 28% of all fatalities and 44% of all serious injuries in Arizona occurred at or were related to an intersection. Historically, crashes in Mesa fall in line with these statewide averages with 22% of fatal and 46% of serious injury crashes occurring at or related to an intersection.

To gain a better understanding of why high severity crashes may be occurring and possible mitigation strategies, high severity crashes at intersections and roadways were broken down by crash types, see below.



Injury Classification on Crash Type by Location

	Not Intersection Related		Intersection Related	
	Serious Injury	Fatal	Serious Injury	Fatal
Angle	32%	35%	36%	19%
Head On	5%	8%	4%	0%
Left Turn	23%	10%	34%	47%
Rear End	14%	5%	13%	11%
Sideswipe	4%	5%	6%	3%
Single Vehicle	18%	19%	6%	3%
Other	5%	17%	1%	17%

22% of all fatal crashes were intersection related

46% of all serious injury crashes were intersection related

Equivalent Property Damage Only (EPDO)

The Equivalent Property Damage Only (EPDO) performance measure assigns weight to individual crashes based on the severity of the crash. The weighting is based on the cost of a property-damage-only (PDO) crash, giving each crash a relative severity score in terms of a PDO crash. The weighting factors used for the network screening are based on the crash costs by severity and derived from ADOT. **Table 3-6** illustrates the crash cost for each crash severity type and the corresponding EPDO weights. The weights generally reflect an order of magnitude difference between the societal costs of fatal, severe injury, minor injury, and no-injury crashes.

Table 3-6. Crash Costs and Weights by Severity

Crash Severity Type	Crash Cost	EPDO Weights
Fatal	$9,515,371	890.9
Severe Injury	$550,499	51.5
Minor Injury	$149,132	13.9
Possible Injury	$103,145	9.6
No Injury	$10,680	1.0

High Injury Crash Intersections

EPDO weights for each crash severity type as illustrated in Table 3-6 was utilized to determine high injury crash intersections. The EPDO score for intersection was calculated by multiplying the number of crashes for each severity type with the corresponding EPDO weights and aggregating the results using the formula below:

EPDO Score = Fatal EPDO Weight x Number of Fatal Crashes
+ Severe Injury EPDO Weight x Number of Severe Injury Crashes
+ Minor Injury EPDO Weight x Number of Minor Injury Crashes
+ Possible Injury EPDO Weight x Number of Possible Injury Crashes
+ No Injury EPDO Weight x Number of No Injury Crashes

EPDO score for each intersection was then annualized by dividing the score by the number of years used in the analysis. **Figure 3-17** illustrates the locations of the top 30 high injury intersections in the City of Mesa. **Table 3-7** lists the top 10 high injury crash intersections in the City based on their EPDO score.

Table 3-7. Top 10 High Injury Intersections

Intersection	Crashes						EPDO Score
	Fatal	Incapacitating	Non Incapacitating	Possible Injury	Property Damage Only	Total Crashes	
Guadalupe Road / Power Road	2	1	13	16	39	71	442
Baseline Road / Sossaman Road	2	1	12	12	35	62	430
Higley Road / University Drive	2	2	5	12	52	73	425
Greenfield Road / Southern Avenue	1	6	10	10	43	70	296
Broadway Road / Mesa Drive	1	5	6	16	69	97	291
Higley Road / McKellips Road	1	5	8	14	41	69	287
Alma School Road / Main Street	1	3	8	20	56	88	281
Greenfield Road / Main Street	1	6	5	4	38	54	269
Higley Road / Main Street	1	3	11	12	30	57	269
Broadway Road / Dobson Road	1	2	6	17	54	80	259

High Injury Crash Network Segments

The EPDO score for roadway segments was calculated by multiplying the number of crashes for each severity type with the corresponding EPDO weights and aggregating the results using the formula below:

EPDO Score = Fatal EPDO Weight **x** Number of Fatal Crashes
+ Severe Injury EPDO Weight **x** Number of Severe Injury Crashes
+ Minor Injury EPDO Weight **x** Number of Minor Injury Crashes
+ Possible Injury EPDO Weight **x** Number of Possible Injury Crashes
+ No Injury EPDO Weight **x** Number of No Injury Crashes

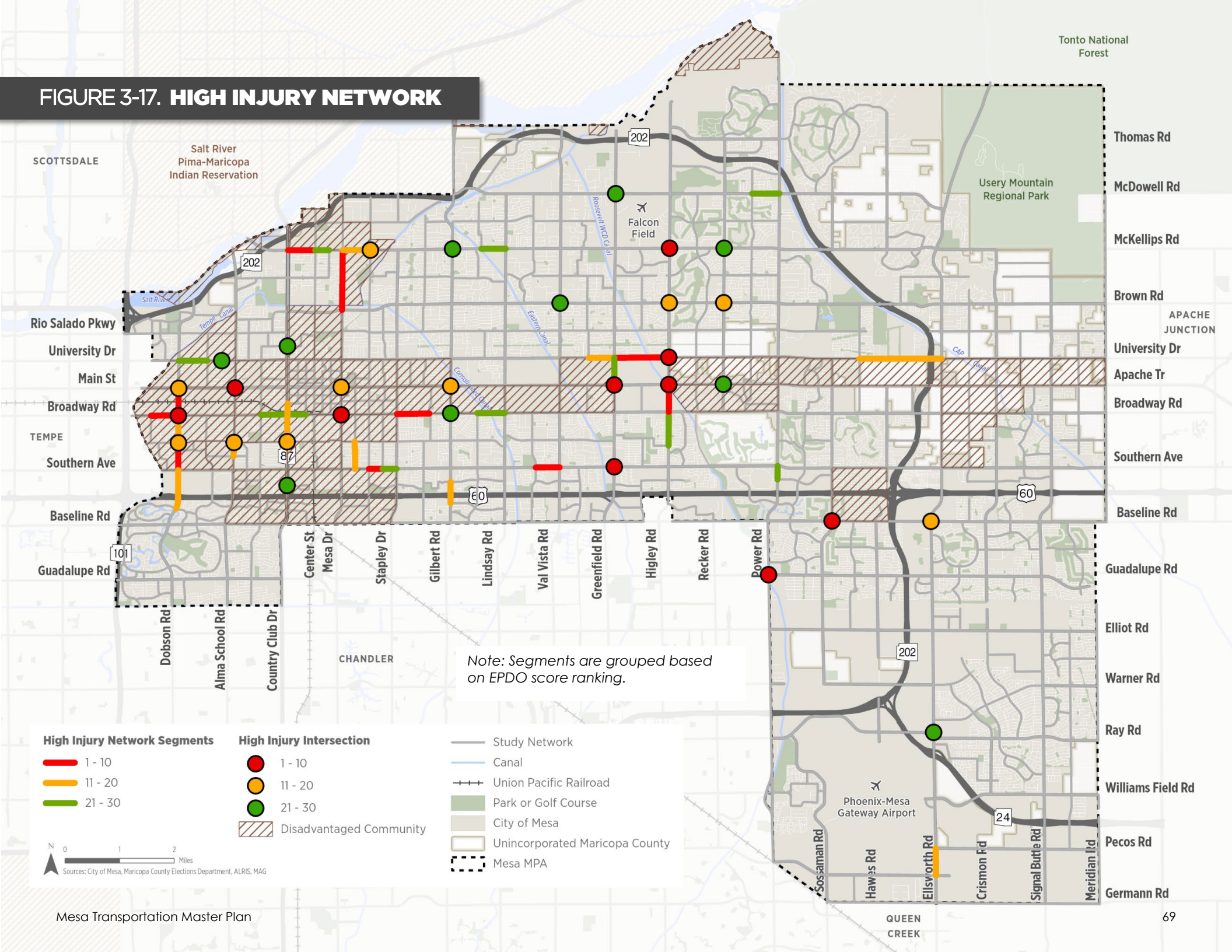
EPDO score for each segment was then annualized by dividing the score by the number of years of crash data used in the analysis. **Figure 3-17** illustrates the locations of the top 30 high injury network segments in the City of Mesa. **Table 3-8** lists the top 10 high injury crash segments in the City based on their EPDO score.

Key Observations/Findings: Dobson Road between Main Street and US 60; University Drive between Higley Road and Nassau St; and Higley Road between Broadway and McKellips stand out as corridor segments/intersections that experience high number of crashes resulting in serious injuries. Majority of the high injury intersections and network segments also seem to occur in areas with high concentrations of disadvantaged population groups.

Table 3-8. Top 10 High Injury Corridors

Intersection	Crashes						EPDO Score
	Fatal	Incapacitating	Non Incapacitating	Possible Injury	Property Damage Only	Total Crashes	
Dobson Road: Southern Avenue to 8th Avenue	3	2	10	12	55	82	617
Mesa Drive: Brown Road to McKellips Road	3		5	5	21	34	562
Dobson Road: Broadway Road to Main Street	3		5	5	18	31	562
McKellips Road: Country Club Drive to Center Street	2	3	5	6	40	56	421
Broadway Road: Stapley Drive to Williams Street	2	3	1	8	25	39	411
University Drive: Greenfield Road to Higley Road	2	3	5	2	15	27	408
Southern Avenue: Val Vista Road to 32nd Street	2	2	4	2	7	17	393
Broadway Road: Dobson Road to Roosevelt Road	2		1	10	27	40	384
Southern Avenue: Horne Street to Stapley Drive	2	1	2	3	7	15	379
Higley Road: Broadway Road to Main Street	2	1		2	19	24	374

FIGURE 3-17. **HIGH INJURY NETWORK**



Note: Segments are grouped based on EPDO score ranking.

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4 ACTIVE TRANSPORTATION IN MESA TODAY

WALKING IN MESA

Mesa is transitioning from a City that is expanding to one that is growing from within. The resulting mixed use infill development increases opportunities for people to walk and bike as the distances between their destinations decrease. As Mesa develops, the demand for transportation options are increasing.

To address these changing needs and desires, it is important to understand what makes a place safe and comfortable for walking. People walking are:

- Sensitive to detours that increase the time or distance to their destination;
- More comfortable when routes provide shade, water, and places to rest; and
- In need of walkways with safety and comfort designs for people who use mobility devices and people with hearing and visual impairments.

Building on Success

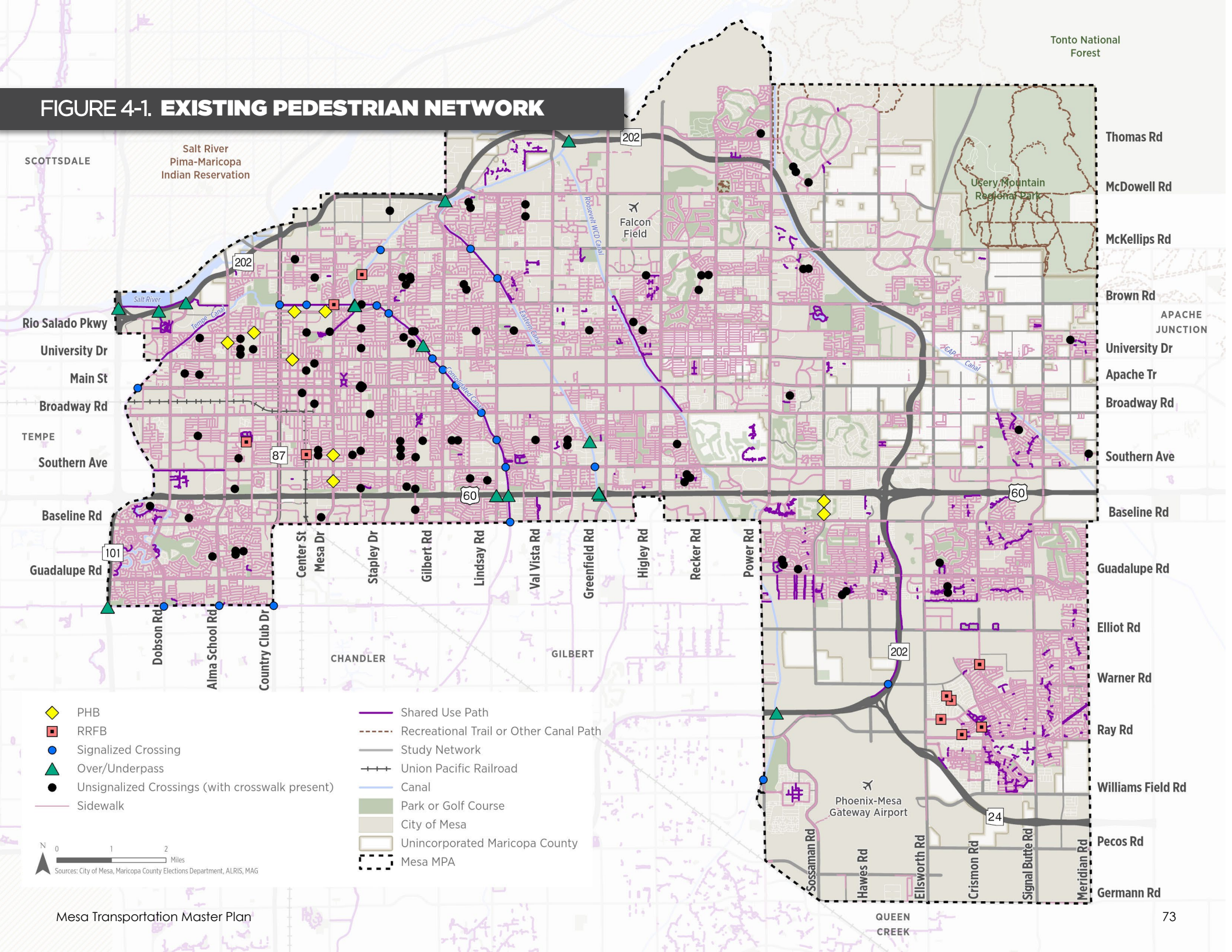
Figure 4-1 illustrates the City's expansive network of sidewalks, unsignalized crossings (with crosswalks present), and off-street shared use paths that help connect people and places. While new developments are installing high-quality sidewalks, the existing sidewalk network may no longer meet the growing needs of the City. Many existing sidewalks are the basic 4-5-foot width, which may not be wide enough to comfortably accommodate increased pedestrian traffic. In addition, there is a lack of vegetative buffer on fast-moving and high-volume streets which may not feel comfortable for people walking. Fast moving traffic can also contribute to noise making it difficult to hold a conversion and dissuade groups from choosing to walk. Despite these challenges, the City of Mesa already has a successful history of improving walking experiences in urbanizing environments as is apparent along Main Street in Downtown.

Sidewalk terminates at an undeveloped lot in eastern Mesa along Main Street

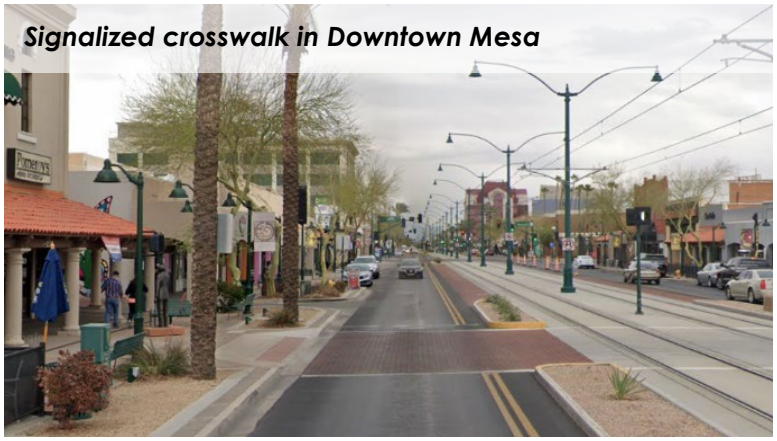
Pedestrian walking along Country Club Drive with no vegetative buffer between them and fast moving traffic

Main Street in Downtown with wide sidewalks, shade trees, and places to rest

FIGURE 4-1. **EXISTING PEDESTRIAN NETWORK**



Signalized crosswalk in Downtown Mesa



Unmarked crossing of Eastern Canal and University Drive

Crossing the Street

One of the most significant barriers to walking is how frequently and comfortably someone can cross the street to get to their destination. Having frequent crossings and pedestrian access points can significantly decrease the distance needed to walk to a destination. Downtown Mesa has a high density of crosswalks along Main Street which allows people walking to more easily and spontaneously visit a shop or business that they see across the street or to make it to a transit stop on time. In addition to providing frequent crossing opportunities, Main Street also provides high quality and comfortable crossings by using signalized crossings for mid-block crosswalks.

Outside of Downtown, there are several blocks in Mesa that would require someone walking to travel a half mile or more to reach a signalized crossing. This can lead to people choosing to cross at unsafe locations to avoid excessive walking distances or time delays to get to their destinations—including some crossings along

Many of Mesa's crosswalks in school zones have additional features to increase visibility and comfort for people walking. Mesa uses RRFBs, pedestrian warning signs, PHBs, and traffic calming treatments, such as pinch points, and crossing guards during school hours to encourage drivers to yield to people walking in school zones. While treatments like signs and paint may increase visibility, they may not create a comfortable place for people to cross. Some school zone crosswalks require crossing guards and children to navigate high-speed and multilane roads without a traffic signal. One example is the crosswalk at Lowell Elementary which requires staff and students to cross a four-lane road with a two-way left turn lane (TWLTL) and a posted speed limit of 40MPH (15 MPH when school is in session).

Crosswalk with pinch point that encourage drivers to slow when approaching the crosswalk and reduces the distance and time needed for people to cross

Unsignalized school crosswalk to Lowell Elementary across Broadway Road

Where are People Walking?

Understanding how our streets are used today is a critical first step in determining transportation improvement needs and can ultimately help to prioritize investments in areas where they might be used most.

Strava Data

To understand usage patterns, walking, running, and bicycling information was extracted from Strava. Strava is a mobile fitness application that allows people walking and biking to track their activities using Global Positioning System (GPS)-enabled mobile devices. As Strava predominantly markets to athletes, it is likely to represent people walking or jogging for fitness purposes over other trip purposes – even if users can track commute trips. However, it is expected that people who walk or jog for fitness do so on walking facilities where they feel the least amount of stress from traffic and that Strava can help identify places where others may prefer to walk.

As shown in **Figure 4-2,** recreational walking trips are heavily canal paths, recreational trails in Usery Mountain Regional Park, and residential roads and walking paths. Additionally, east-west connections in the north like McDowell Road, Brown Road, Adobe Street and in the south, in nearby communities of Gilbert and Chandler, the Western Canal and Guadalupe Road are popular with people walking and jogging.

Replica Data

Replica is a software that incorporates data from a variety of sources like the US Census Bureau, mobile location data, land use, economic activity, and others to create a simulation of an area to model how people travel and why. To further understand walking trips, Replica data was used to determine where non-recreational walking trips (trips which have a destination, as opposed to looping trips like on trails or canal paths, going for a run, or walking the dog) are being taken. As shown in **Figure 4-3**, significant activity is concentrated near K-12 schools, colleges and universities, and the most densely populated and developed areas of Mesa see the highest number of walking trips.

When considering the two datasets together, it is apparent recreational trips tend to occur more so on trails with concentrations on certain roadways; whereas utility trips are more dispersed across Mesa with slightly more concentration in the more developed western portion.

FIGURE 4-2. STRAVA WALKING AND JOGGING DATA

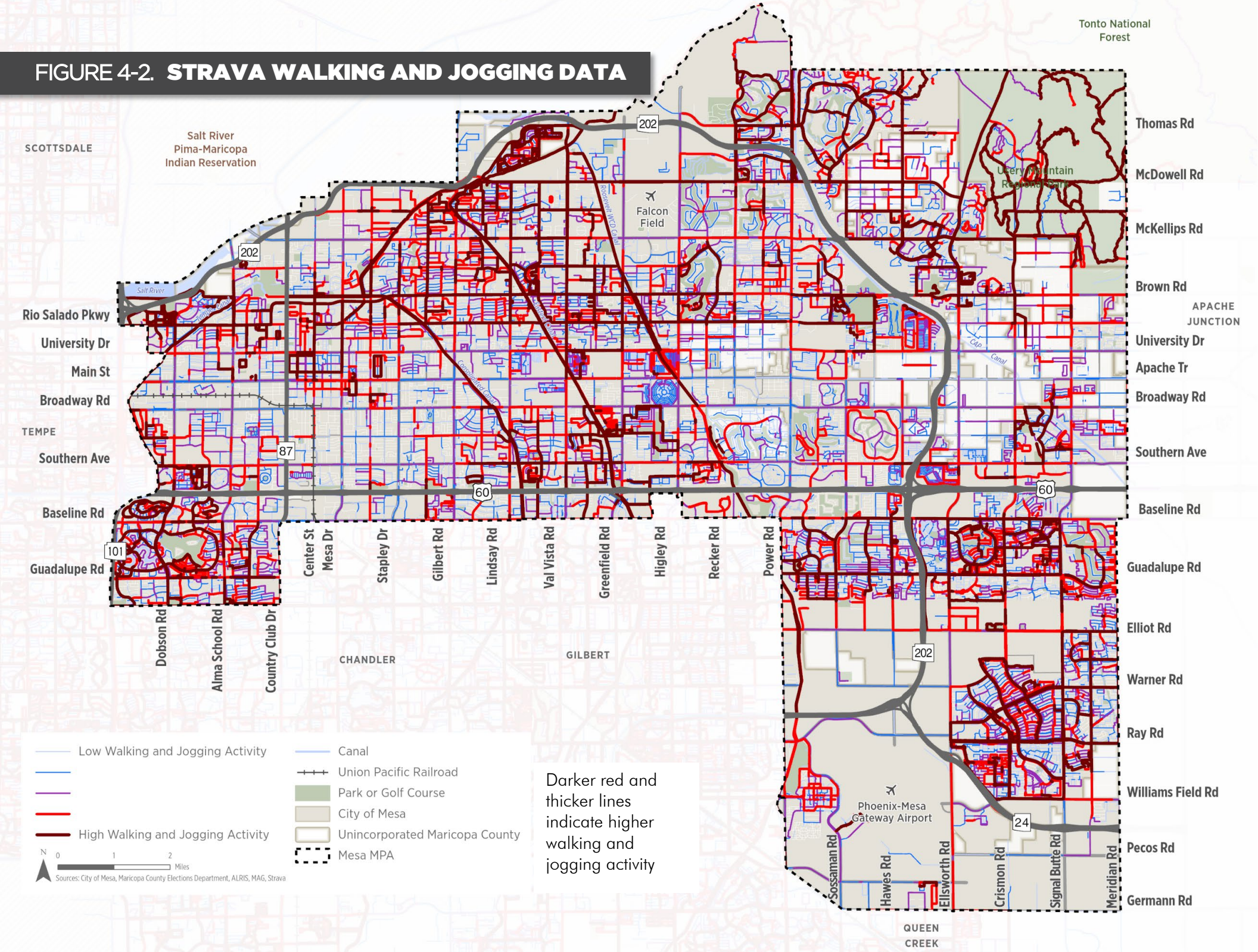
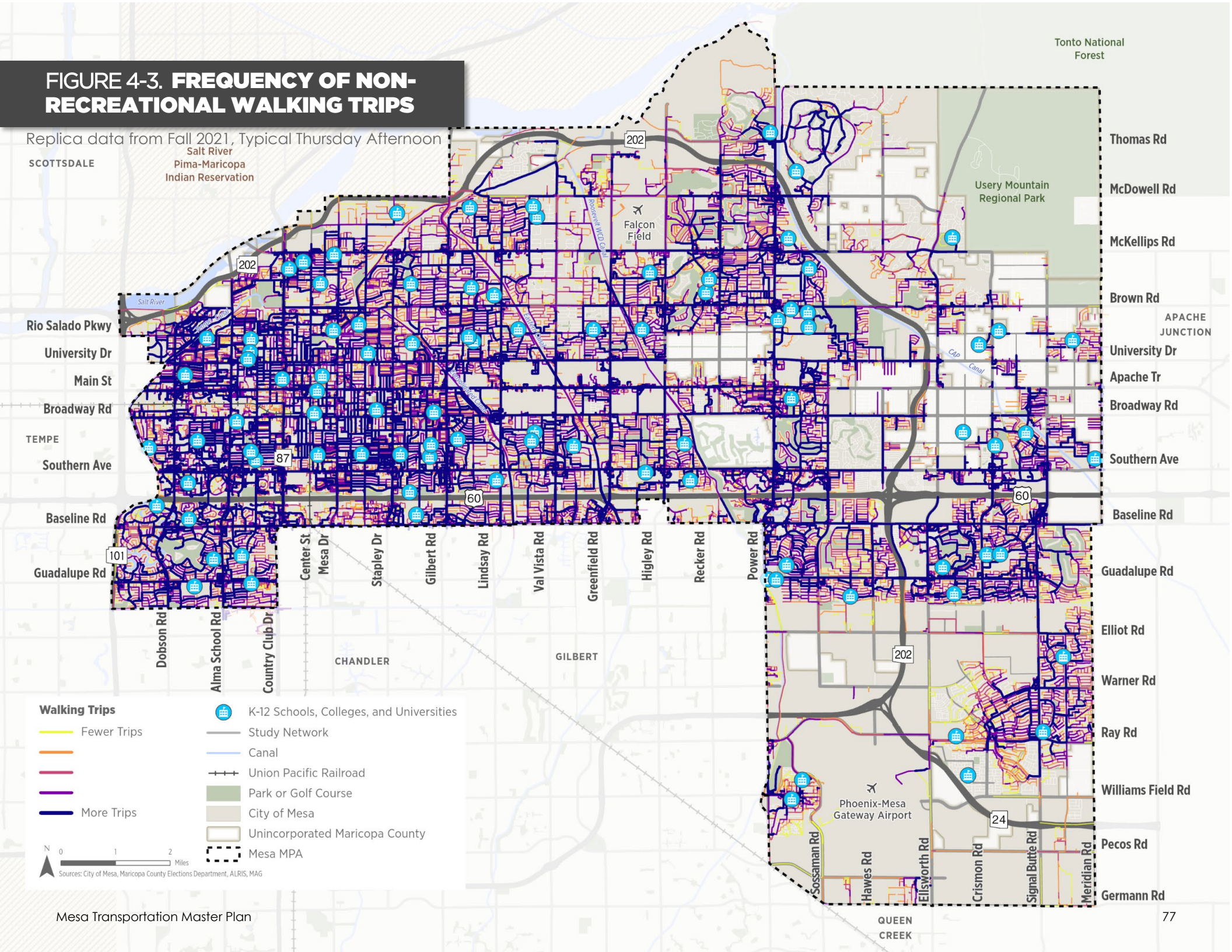


FIGURE 4-3. **FREQUENCY OF NON-RECREATIONAL WALKING TRIPS**

Replica data from Fall 2021, Typical Thursday Afternoon



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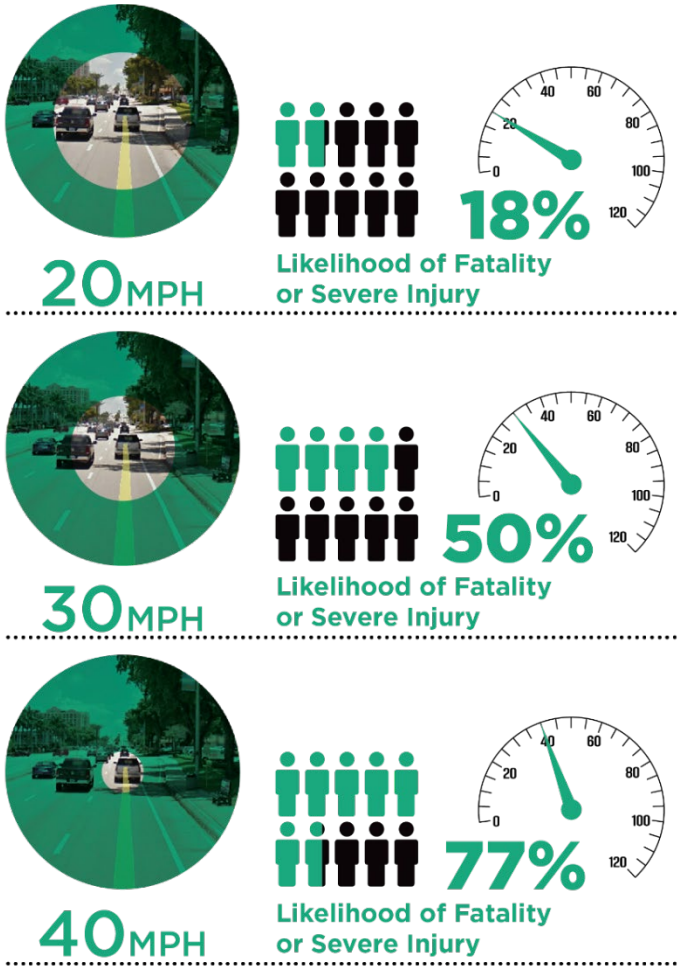
Speeds and Walking

A variety of factors impact safety and comfort for people walking, but interaction with vehicles is one of the most critical to consider. Significant research has been conducted which indicates vehicle speed along a roadway is a major indicator for the potential for death or serious injury in the event of a crash. The change in potential for death or serious injury when a person is hit by a car while walking increases from 18% when a vehicle is moving at 20 MPH to 77% when a vehicle is moving at 40 MPH.

As driving speed increases, a driver's line of sight of the roadway and its surroundings is also impacted. Research shows that when driving at a higher speed, the location on the road one naturally focuses on while driving is further down the road. Because of this, the area a driver can see on the periphery is reduced, and therefore people driving at faster speeds are less likely to notice a person waiting to cross the street. On the other hand, people driving at slower speeds are more likely to have better awareness of people around them.

In Mesa, the speeds on neighborhood streets are often slow (with posted speeds of 25 MPH), creating comfortable walking environments. However, most streets which connect to destinations outside of a neighborhood, like schools, shopping, and employment, tend to be 35 MPH or greater, making it uncomfortable for people to walk to destinations.



Source: Impact Speed and a Pedestrian's Risk of Severe Injury or Death. Brian Tefft, AAA Foundation for Traffic Safety, 2011

BIKING IN MESA

A complete, connected bike network that is comfortable and safe for people of all ages and abilities is critical to make biking a viable transportation option for travel in Mesa. Expanding and enhancing the bicycle network can help reduce congestion and stress on the City's streets, as people can choose to bike rather than drive. **Figure 4-4** illustrates the location of over 496 miles of bicycle facilities throughout Mesa.

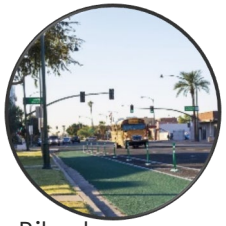
Examples of Bike Facilities

The following are examples of bike facilities currently provided in Mesa MPA today.

Shared Use Paths (21.7 Miles)

Shared use paths (SUPs) are paved trails, physically separated from motorized traffic and designed for use by nonmotorized modes of transportation.

Within the Mesa MPA there is a complex network of private and public SUP that includes SUPs within colleges and universities, parks, and inter-residential connections. To quantify the entirety of the pathways designated as SUPs within Mesa MPA, it would measure 80 Miles; however, many of these SUP segments are extremely short and do not provide connectivity between destinations or between residential neighborhoods. Therefore, the SUPs measured and shown in **Figure 4-4** do provide this type of connectivity and are and amount to 21.7 Miles in total.



Separated Bike Lanes (1.6 Miles)

Separated Bike Lanes are an exclusive lane for bicycle use that is physically separated from motorized traffic using flex posts, curbs, planters, or other forms of separation.

Bike lanes can be separated by many types of vertical separation including curbs, flex posts, planters, as a raised pathway, etc. Bi-directional separated bike lanes are noted as cycle tracks below in **Figure 4-4**.

Images from The City of Mesa Arizona and Google Street View

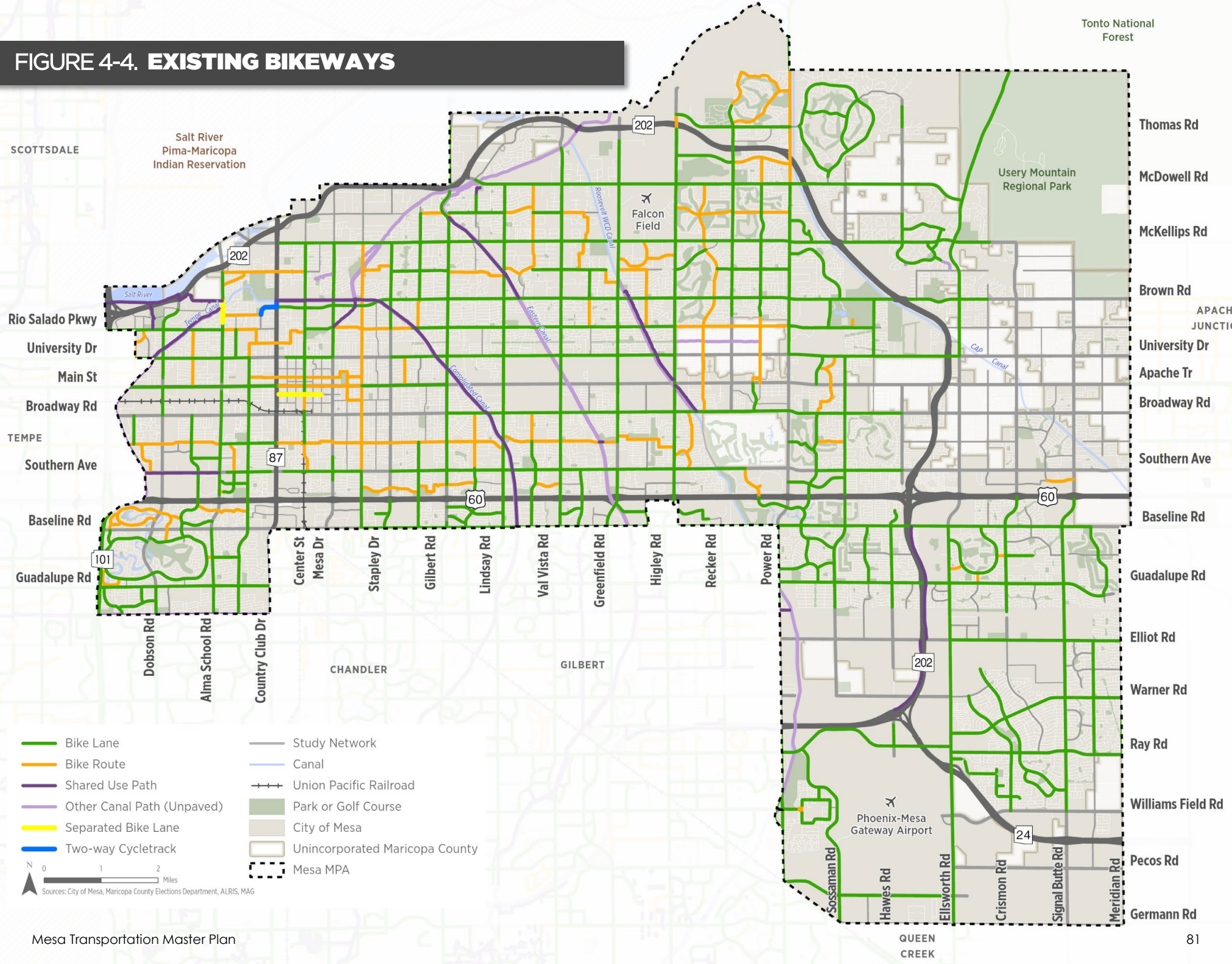
Bike Lanes (~270 Miles)

Bike lanes are striped lanes with pavement markings and signs that designate an exclusive lane for bicycle use only.

Bike Route / Shared Street (~68 Miles)

A street where drivers share the travel lane with cyclists. It may have signage or markings to promote use by bicyclists. Bicycle Boulevards are another form of shared street with additional traffic calming. These can provide a higher level of comfort than a bike route. They are permitted in Mesa although none have been proposed or built yet.

FIGURE 4-4. **EXISTING BIKEWAYS**



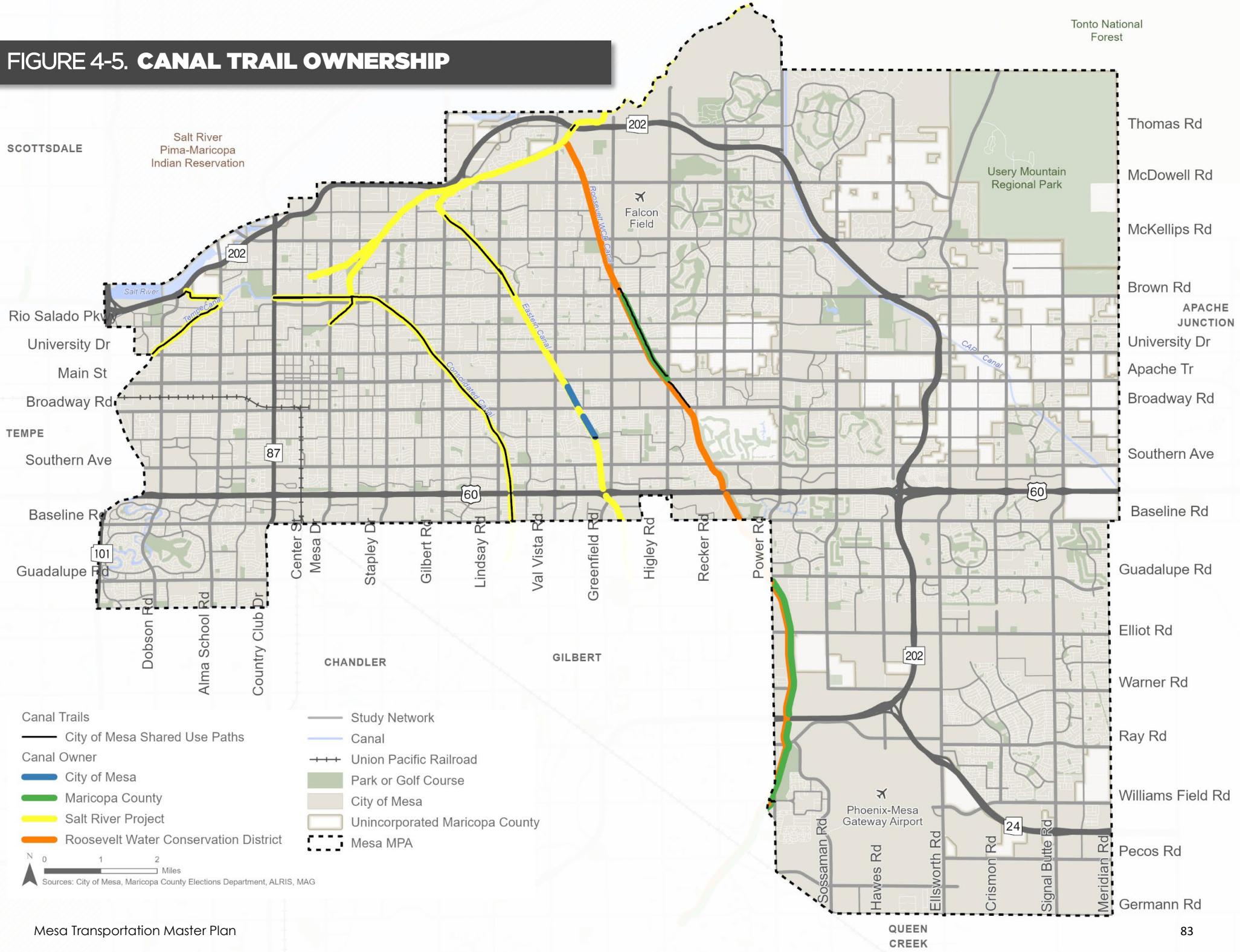
Canal Trails

Canal trails are a network of paths that follow along open water canals that connect Mesa to the greater Phoenix Metropolitan Area. Through easement agreements with canal owners, the City of Mesa has improved many canal banks to provided SUPs. These City of Mesa SUPs provide some of the most comfortable, low-stress facilities for users walking, bicycling, or rolling regardless of their ages and abilities. Other canal paths and trails are managed by the canal owners and are often dirt trails which provide recreational opportunities including easy walking paths and off-road biking within the City but are not accessible to all users. In total, there are 33.9 miles of canal trails with the City of Mesa's SUPs making up 43.4% of them.

Canal banks are owned by a range of government jurisdictions and require the City to coordinate with them in order to make improvements to existing paths or to expand the SUP network. Currently, 68% of all SUPs within the Mesa MPA are run along the canals, 83.4% of which are along canals owned by the Salt River Project (SRP). **FIGURE 4-5** shows where the City of Mesa SUPs run along the canals, Other Canal Paths (unpaved), and each canal owner.

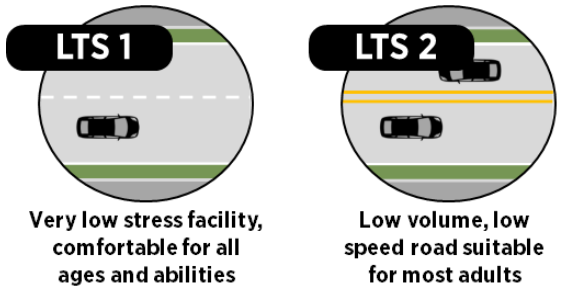
Note: Parts of the Tempe Canal and Western Canal Path run along Mesa MPA's border and are not included in this analysis. These trails are part of the Tempe and Chandler MPAs, respectively.

FIGURE 4-5. **CANAL TRAIL OWNERSHIP**



Bicycle Comfort

The Bicycle Level of Traffic Stress (LTS) is a method of quantifying the perceived sense of comfort for a person biking along a given roadway. As with walking, a variety of factors are known to influence comfort for biking, such as the speed and volume of traffic, presence and type of bicycle facility, and the design of the road. As illustrated below, LTS ranges from low-stress streets suitable for children (LTS 1) to high-stress streets only suitable for experienced riders (LTS 4). Depending on a person's skill level, roads with high LTS scores may deter potential bicyclists from riding, leading them to choose a different mode of transportation or forcing them to make lengthy detours to avoid high-stress streets.



LTS Scoring

The criteria shown in **Table 4-1** were used to determine the LTS score for each street and bike facility in Mesa considering the following:

- Roadways without designated bike infrastructure are analyzed as "Mixed Traffic"
- Dirt pathways, especially unpaved Canal Trails, are used by some people bicycling but are not accessible to all riders as they require different biking equipment or riding skills. These paths are not included as part of this analysis.

The results of these scores are shown in **Figure 4-6**.

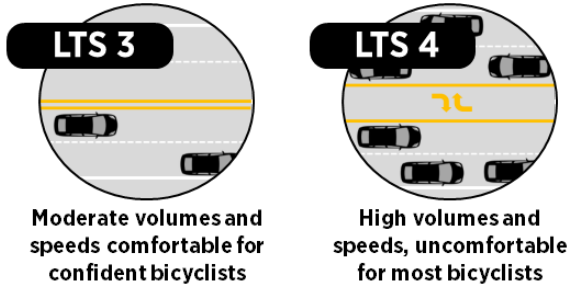
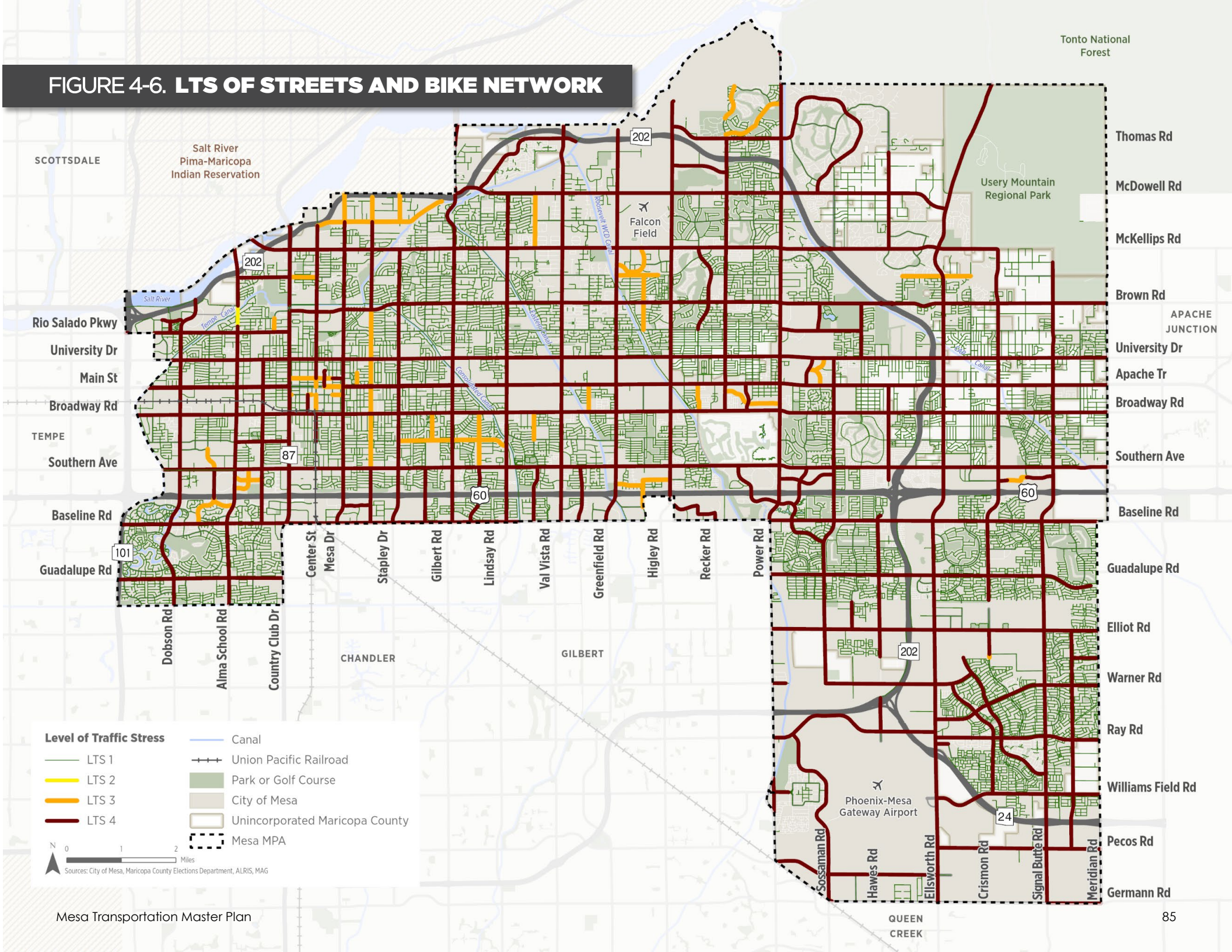


Table 4-1. **Level of Traffic Stress Criteria for Streets in Mesa**

LTS 1 LTS 2 LTS 3 LTS 4

Speed Limit	Number of Lanes	Mixed Traffic / Bike Routes	Bicycle Boulevards	Striped Bike Lane	Buffered Bike Lane	Protected Bikeway	Shared Use Path
25 MPH or Lower	2 Lanes	LTS 1	LTS 1	LTS 1	LTS 1	LTS 1	LTS 1
	3 Lanes	LTS 2	LTS 2	LTS 1	LTS 1	LTS 1	LTS 1
	4+ Lanes	LTS 4	LTS 4	LTS 1	LTS 1	LTS 1	LTS 1
30 MPH	2 - 3 Lanes	LTS 3	LTS 3	LTS 1	LTS 1	LTS 1	LTS 1
	4-5 Lanes	LTS 4	LTS 4	LTS 3	LTS 2	LTS 1	LTS 1
	6+ Lanes	LTS 4	LTS 4	LTS 4	LTS 3	LTS 2	LTS 1
35 MPH	2 - 3 Lanes	LTS 4	LTS 4	LTS 4	LTS 2	LTS 1	LTS 1
	4-5 Lanes	LTS 4	LTS 4	LTS 4	LTS 3	LTS 1	LTS 1
	6+ Lanes	LTS 4	LTS 4	LTS 4	LTS 4	LTS 3	LTS 1
40 MPH or Greater	2 - 3 Lanes	LTS 4	LTS 4	LTS 4	LTS 4	LTS 2	LTS 1
	4-5 Lanes	LTS 4	LTS 4	LTS 4	LTS 4	LTS 2	LTS 1
	6+ Lanes	LTS 4	LTS 4	LTS 4	LTS 4	LTS 3	LTS 1

FIGURE 4-6. **LTS OF STREETS AND BIKE NETWORK**



Biking Conditions

LTS helps measure biking stress, but there are many other conditions which may impact a person's level of comfort when biking. For example, observed speeds of people driving on the roadway, conditions of the infrastructure, the number of driveways that interrupt the bike path, and width or type of separation from vehicles can also impact user comfort. These factors may deter people from bicycling or using existing biking infrastructure when provided.

High Quality Paths

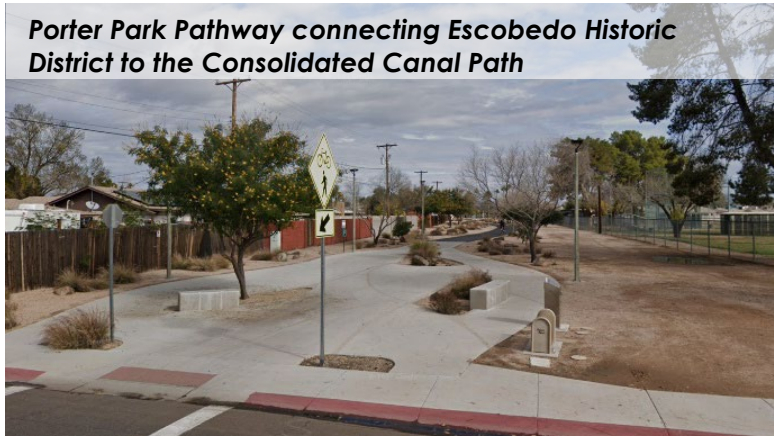
High quality bike paths within Mesa provide the greatest comfort to people bicycling and walking and connect neighborhoods and people to destinations. These paths include paved, off-street shared use paths like the Consolidated Canal and the Rio Salado Pathway and street-adjacent shared-use paths that provide a vegetative buffer like the Southern Avenue shared use path. Although Southern Avenue shared use path is more comfortable than other facilities, frequent driveways may make it stressful for cyclists.

Traffic Calming & Bicycle Boulevards

While they are not a formally designated type of biking infrastructure, low stress local and residential streets make up the largest part of the bike network. This can pose a major challenge, as previously mentioned, as observed speeds--even on residential roads--may be higher than the posted speed limit. Traffic calming elements that can encourage drivers to slow include speed humps, chicanes, road pinch points, lane shifts. When traffic calming elements are applied along bike routes, a Bike Boulevard can be created. The traffic calming elements slow speeds which make it much more comfortable to ride in mixed traffic. While Mesa has plans to expand the use of traffic calming elements across the city, existing speed humps in some residential neighborhoods help slow traffic and increase the comfort of riders. Mesa recognized Bicycle Boulevards as an infrastructure type but has not formally planned to build any yet. 10th Street with low speeds, low traffic volumes, bike signage and bump outs may be a good candidate to consider for such a designation.

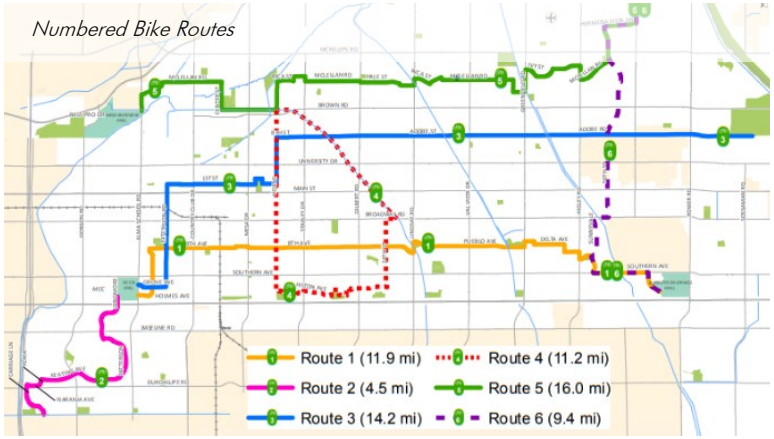
Numbered Bike Routes

Mesa uses wayfinding, marked maps, and numbered signs to encourage cyclists to used "Numbered Bike Routes." Numbered Routes are city-recommended routes that help people bicycling navigate to more comfortable roads and biking infrastructure. While called "Numbered Bike



Porter Park Pathway connecting Escobedo Historic District to the Consolidated Canal Path

Speed humps on Portobello Avenue calming traffic by encouraging slower speeds



Numbered Bike Routes

Routes" these routes include a variety of cycling infrastructure types: bike lanes, bike routes, paved canal paths, and separated bike lanes. "Numbered Bike Routes" play a critical role in how Mesa residents navigate by bike and share directions with others. They also provide visibility and set the expectation to drivers that cyclists are commonly riding along these roadways in particular. However, not all facilities along the Numbered Bike Routes are low-stress. **All six "Numbered Bike Routes" have one or more portions along their routes that are rated as LTS 3 or 4.**

Bike Lanes

Bike lanes make up a large portion of the bike infrastructure in Mesa (**Figure 4-4**) but many of these bike lanes are on multi-lane and fast-speed roadways and are uncomfortable for most people to bike on. Even though bike lanes may be provided, these uncomfortable routes may push people riding to find alternative, circuitous routes or deter people from biking all together. In some cases, high stress bike lanes may result in some people riding on inappropriate infrastructure..

Intersections

Intersections are also uniquely challenging for cyclists. Several bike lanes terminate before reaching the intersection forcing people bicycling to jostle for space with cars potentially traveling high speeds and over multiple lanes. Often where a bike lane is provided through an intersection, right-turn pockets for cars conflict with the bike lane, requiring cyclists to negotiate space with traffic regardless. Finally, there is no dedicated method for people riding to turn left or right through intersections encouraging riders to exit any dedicated biking infrastructure into traffic.

Outdated Infrastructure

Infrastructure that does not meet the latest guidance may also impact visibility and the comfort of cyclists. The following practices have been observed in Mesa:

- Combination bike and parking lanes are common in residential neighborhoods throughout Mesa. In some areas, these lanes are not sufficiently wide enough to provide both parking for cars and space for cycling. MUTCD recommends that bike lanes are fully dedicated with a parking strip painted between the bike lane and parking.
- Bike symbols in bike lanes are smaller than recommended by MUTCD. This may impact their visibility to both cyclists and drivers.

Bike lane is interrupted at intersection with no access available

Bike lane ends on Alma School Road before the intersection with Main Street

Shared bike and parking lane no longer meets the latest MUTCD Guidance

Where are People Cycling?

Strava is a useful tool to understand where people bike. For biking, Strava is advertised to recreational and sports riders and the data collected is from a self-selecting pool of typically whiter, wealthier, and more athletic individuals. Even so, a recent study determined that while Strava data is not representative of the demographics of the population as a whole, it still provides an accurate estimation of where people of all income levels, races, genders, and skill levels are biking.

Strava Data

Figure 4-7 shows where people who use Strava are biking. Some conclusions from this data indicate higher levels of biking occur at:

- Canal trails including the Rio Saldo Pathway, Consolidated Canal, Eastern, Roosevelt Canal, and Western Canal
- Trails within Usery Mountain Regional Park and Tonto National Forrest and on the roadways in neighborhoods surrounding these parks including the Red Mountain Ranch, Thunder Mountain, and Las Sendas communities
- Along east-west connecting roadways like McDowell Road, Brown Road, Adobe Street, and Guadalupe Road
- Along north-south roadways like Signal Butte Road, Crismon Road, Ellsworth Road, Power Road, Higley Road, and Lindsay Road
- County Club Drive / SR 87 north of McKellips Road is a popular route for cyclists from Tempe to Fort McDowell

Replica Data

Like with walking, the most densely populated and developed areas of Mesa see the highest number of biking trips, as reported by Replica and shown in **Figure 4-8**.

Comparing Strava and Replica, it appears recreational trips are concentrated around canal paths, trails within Usery Mountain Regional Park, and roadways in northern and eastern Mesa as potential connectors to these trails, utilitarian trips are concentrated in the western part of Mesa where land use and destinations are most concentrated. **Figure 4-8** reveals that most non-recreational trips are originating from this area as well. Travel patterns for recreational trips show people bicycling along uninterrupted routes over greater distances, while utilitarian trips reveal a denser, gridded pattern within Mesa's core.

FIGURE 4-7. **STRAVA BIKE HEAT MAP**

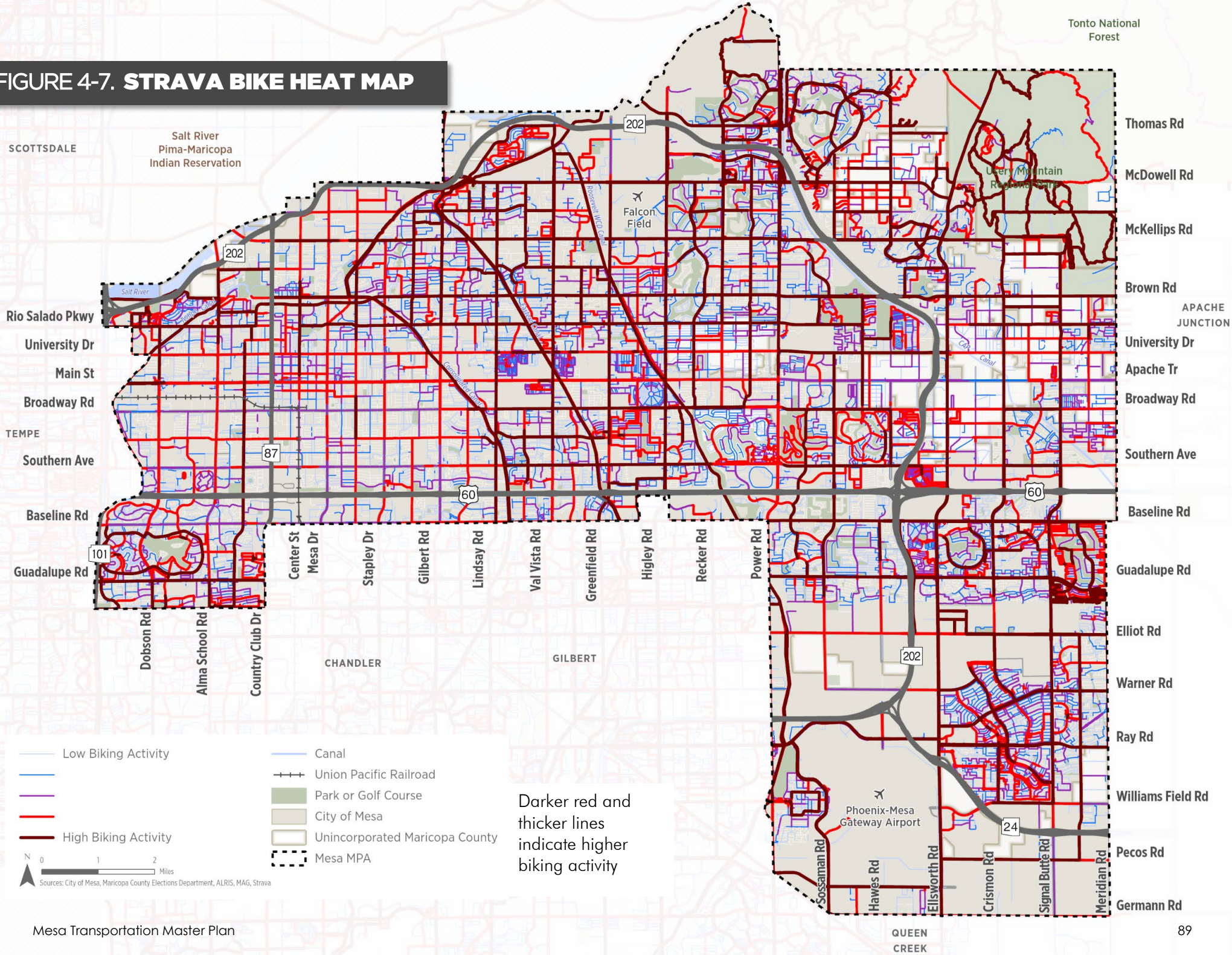
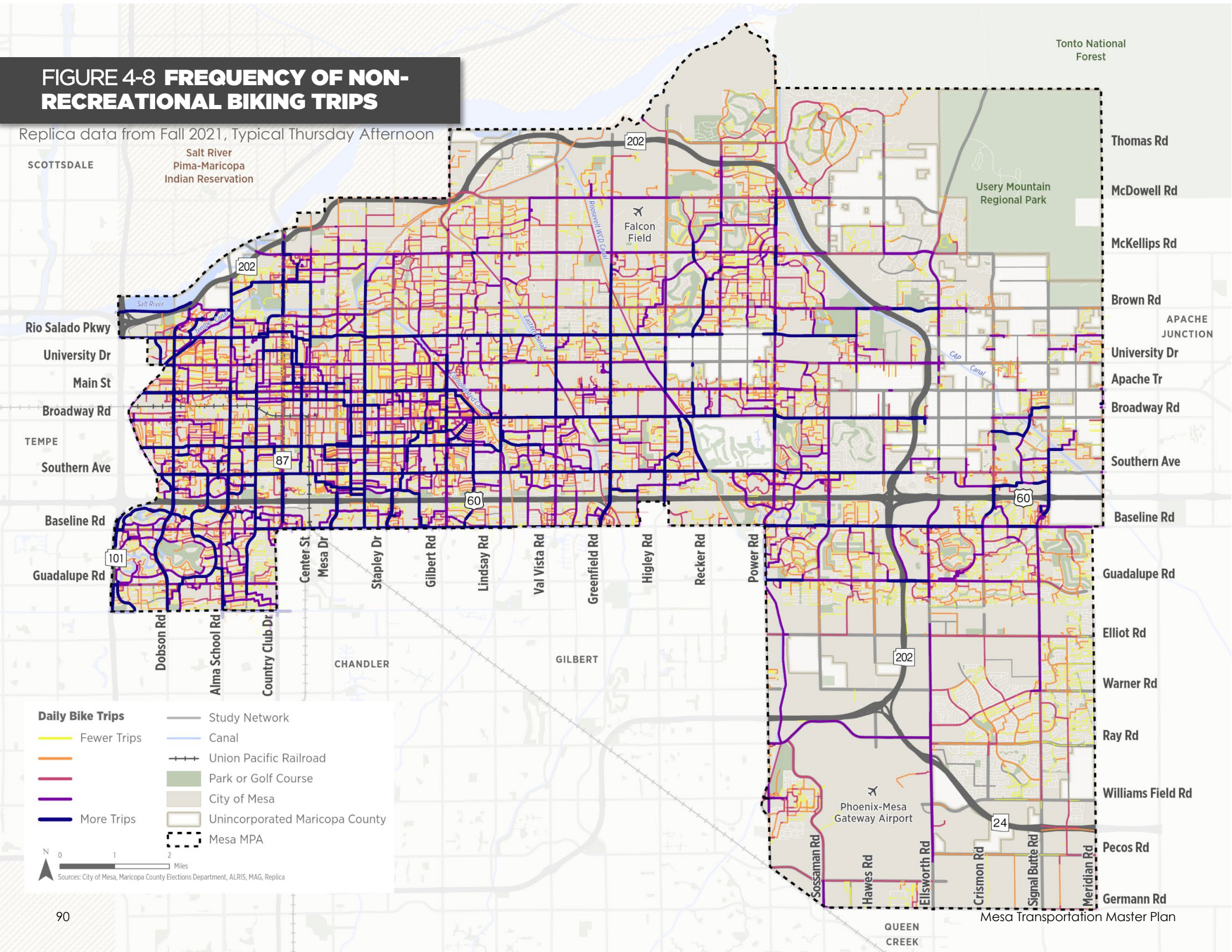


FIGURE 4-8 **FREQUENCY OF NON-RECREATIONAL BIKING TRIPS**

Replica data from Fall 2021, Typical Thursday Afternoon

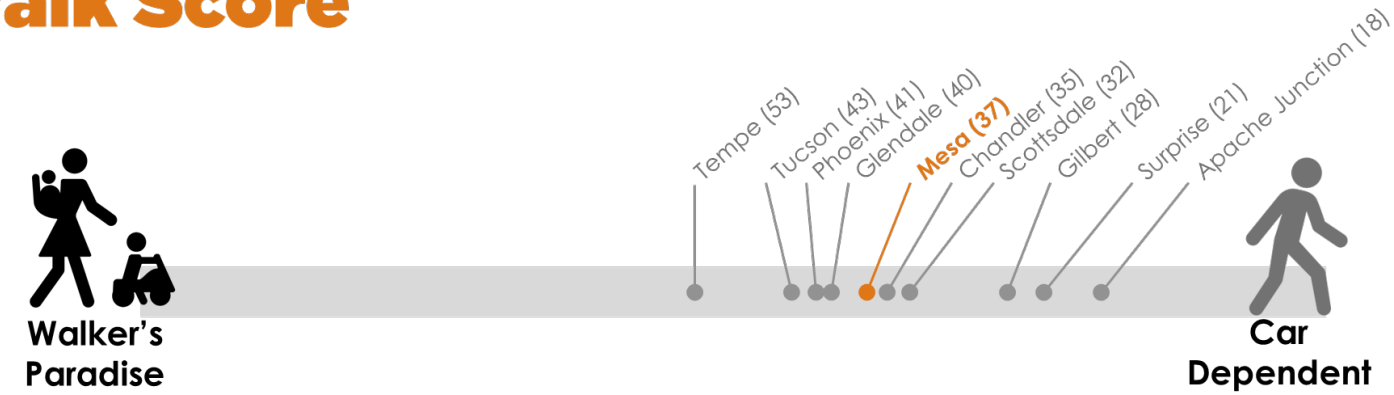


ACCESS TO DESTINATIONS

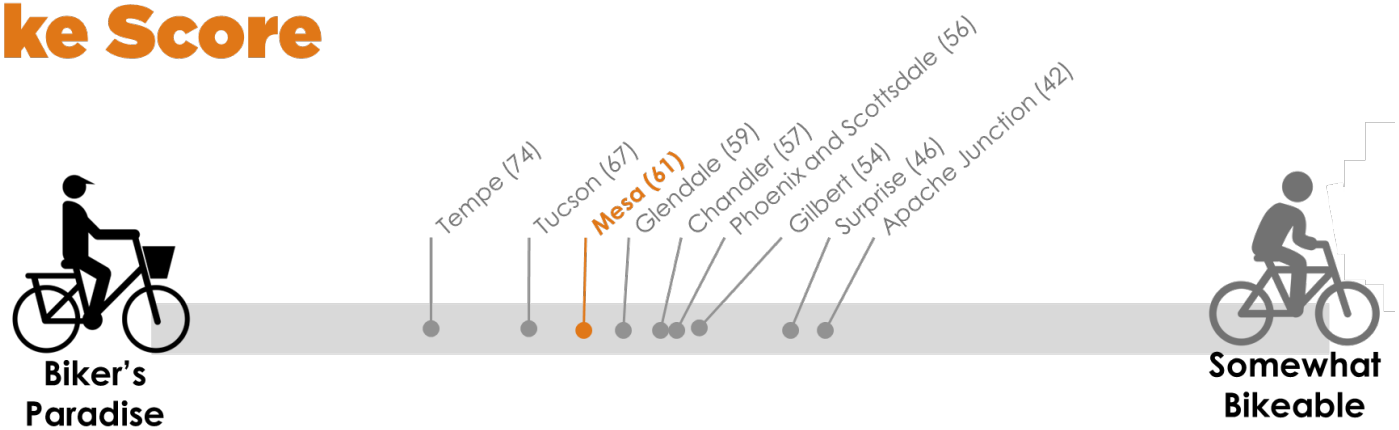
The layout of the street network dictates the directness and convenience of every trip we make, whether driving, walking, or biking. A street grid with shorter block lengths and four-way intersections maximizes access to destinations, minimizes trip distances, and increases the possible number of routes from Point A to Point B. Walkscore.com measures how "walkable" and "bikeable" a community is by measuring walking and biking routes and connectivity to nearby amenities. As shown on the right, Mesa has a higher bike score than its peer cities such as Phoenix, Scottsdale, Gilbert, and Chandler.

How Walkable and Bikeable is Mesa?

Walk Score



Bike Score



Walkability Assessment

Access to destinations is fundamentally different for people walking and biking than those who drive. Drivers can travel much longer distances and access many more destinations than people walking or biking within the same time frame. Mesa has a fairly complete network of sidewalks along its roadways—the ability for people walking to reach their destination is primarily a factor of how long and how far people are willing to walk. In general, most people find it acceptable to walk approximately 10-minutes to their destination. To determine how accessible Mesa is to people walking, an accessibility assessment was conducted to determine how far someone can walk from key destinations in 10-minutes.

Steps in the walkability assessment include:

- Key destinations (as illustrated on the right) were identified.
- Based on available sidewalk facilities, 10-minute travel walksheds were calculated for each key destination.
- Using Census Block Group Data, population estimates were calculated to determine how many residents reside within the 10-minute walkshed.

FIGURE 4-9 shows the 10-minute walkshed for identified destinations and **TABLE 4-2** outlines the estimated residents that live within each 10-minute walk shed. While most destinations evaluated are abutted by a sidewalk, implying that while walking infrastructure may exist, only 65% of residents live within a walkable distance of those destinations. Only 5% of high-quality transit and bus stops and only 6% of care taker trips are accessible by residents. Walk sheds for specific destination categories such as Essential Needs, Transit, Youth Activities, and Shared Use Path and Other Canal Trail Access Points can be found in the **APPENDIX** under "Walking and Biking Access".

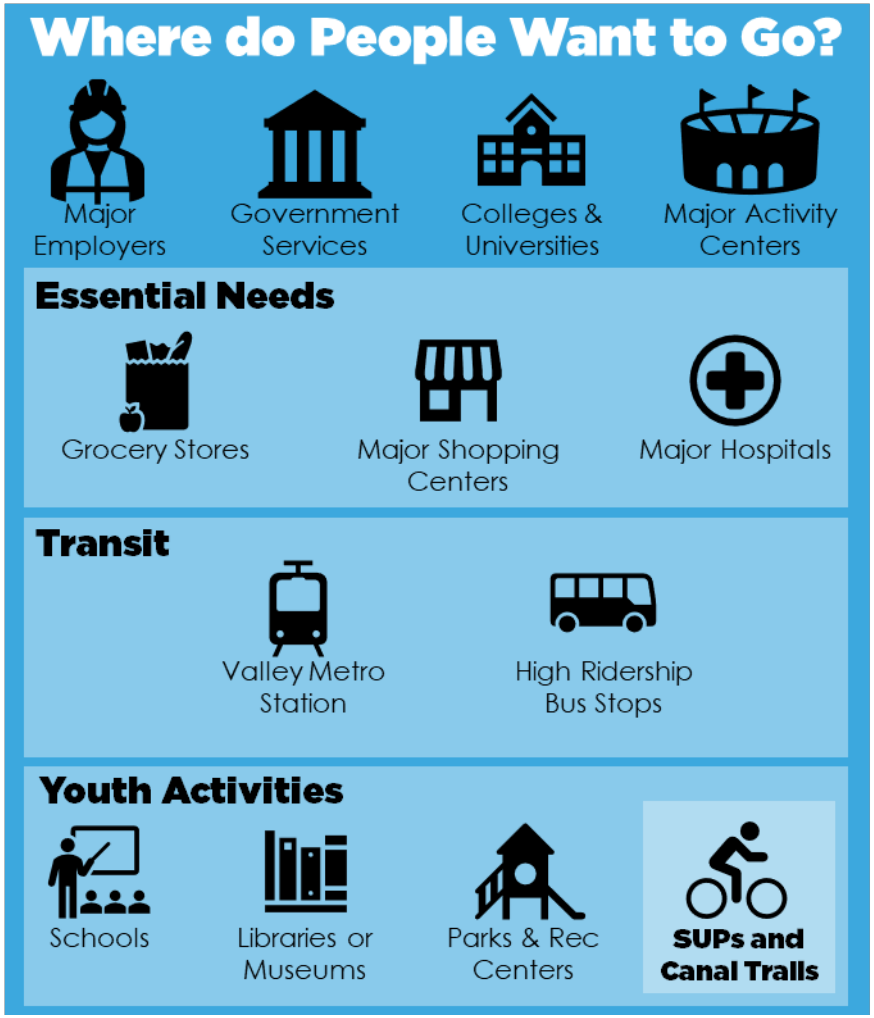
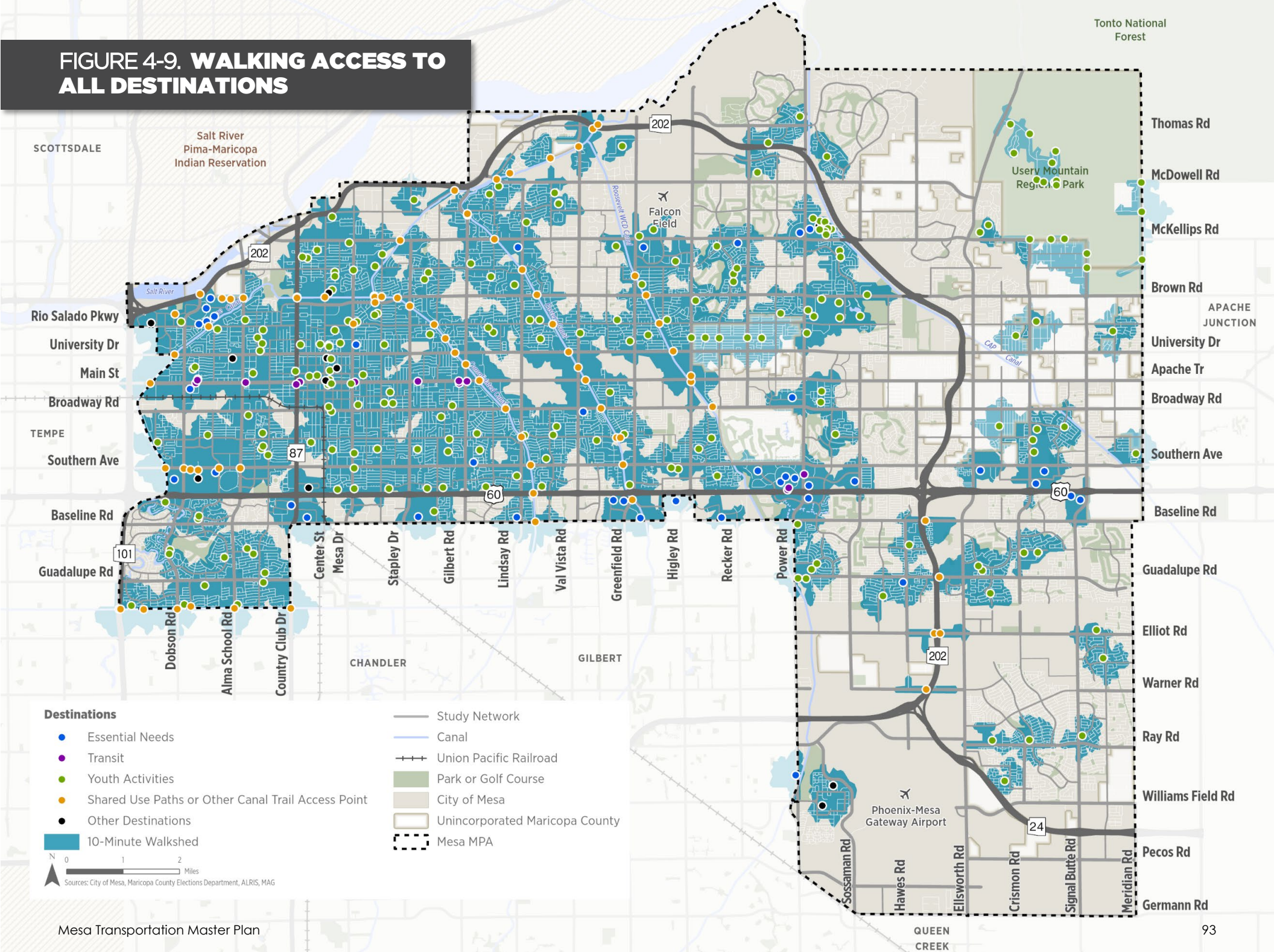


Table 4-2 **Residents Living Within Walking Distance of Destinations**

Destinations	% of Residents with Access
Access to All Destinations	65%
Access to Essential Needs	6%
Access to Transit	5%
Access to Shared Use Path and Other Canal Trail Access Points	21%
Access to Youth Activities	63%*

* Taken as a percentage of school aged children (5-19 years of age) with access

FIGURE 4-9. **WALKING ACCESS TO ALL DESTINATIONS**



Biking Assessment

Cyclists experience the roadway differently than drivers and may be dissuaded from riding entirely if the infrastructure does not feel safe. Bike LTS was used to establish a "Low Stress Network" where cyclists would feel comfortable using to access destinations and develop biking sheds. Steps in the biking assessment include:

- Key destinations (as illustrated in the Walking Assessment section) were identified.
- Evaluate roads for Biking LTS and define the Low Stress Network as LTS 1 & 2 roads and paths.
- High-stress roads (LTS 3 & 4) are considered barriers to cyclists and are not displayed or analyzed as part of the network. Only signalized intersections or PHBs that provide a place for people bicycling to cross these roads are included in the Low Stress Network.
- Based on available Low Stress Network, create 15-minute biking sheds for the following types of riders:
    - **Athletic or eBike Rider:** Travels 12 MPH, or up to 3 miles, on a 15-minute trip.
    - **Typical Bike Rider:** Travels 8 MPH, or up to 2 miles, on a 15-minute trip.
- Using Census Block Group Data, population estimates were calculated to determine how many residents reside within the each walkshed.

FIGURE 4-10 shows the 15-minute bike shed for both rider types. Notably, the Low Stress Network is not continuous enough to provide distances of travel that would differentiate bikesheds between Typical Bike Riders from Athletic or eBike Riders for All Destinations. As shown in **TABLE 4-3**, 43% of residents can reach a destination using the Low Stress Network, 17% can access high quality paths, 11% can reach health and services—including shopping destinations, and 5% have access to major transit stops. Bike sheds for specific destination categories such as Essential Needs, Transit, Youth Activities, and Shared Use Path and Other Canal Trail Access Points can be found in the **APPENDIX** under "Walking and Biking Access".

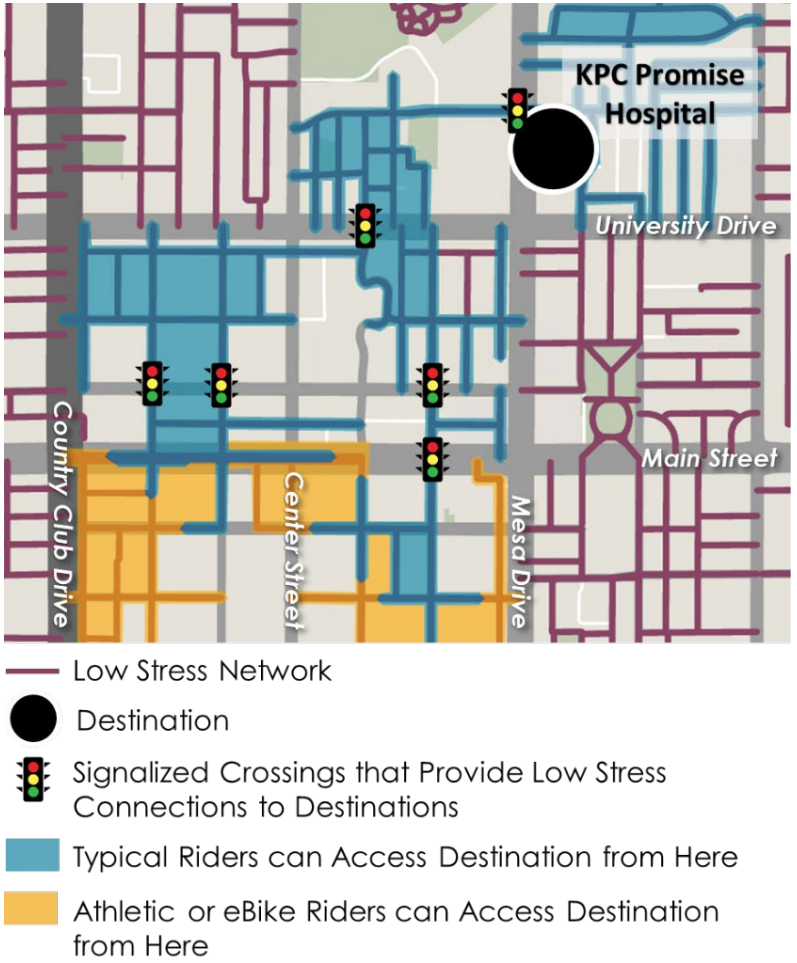
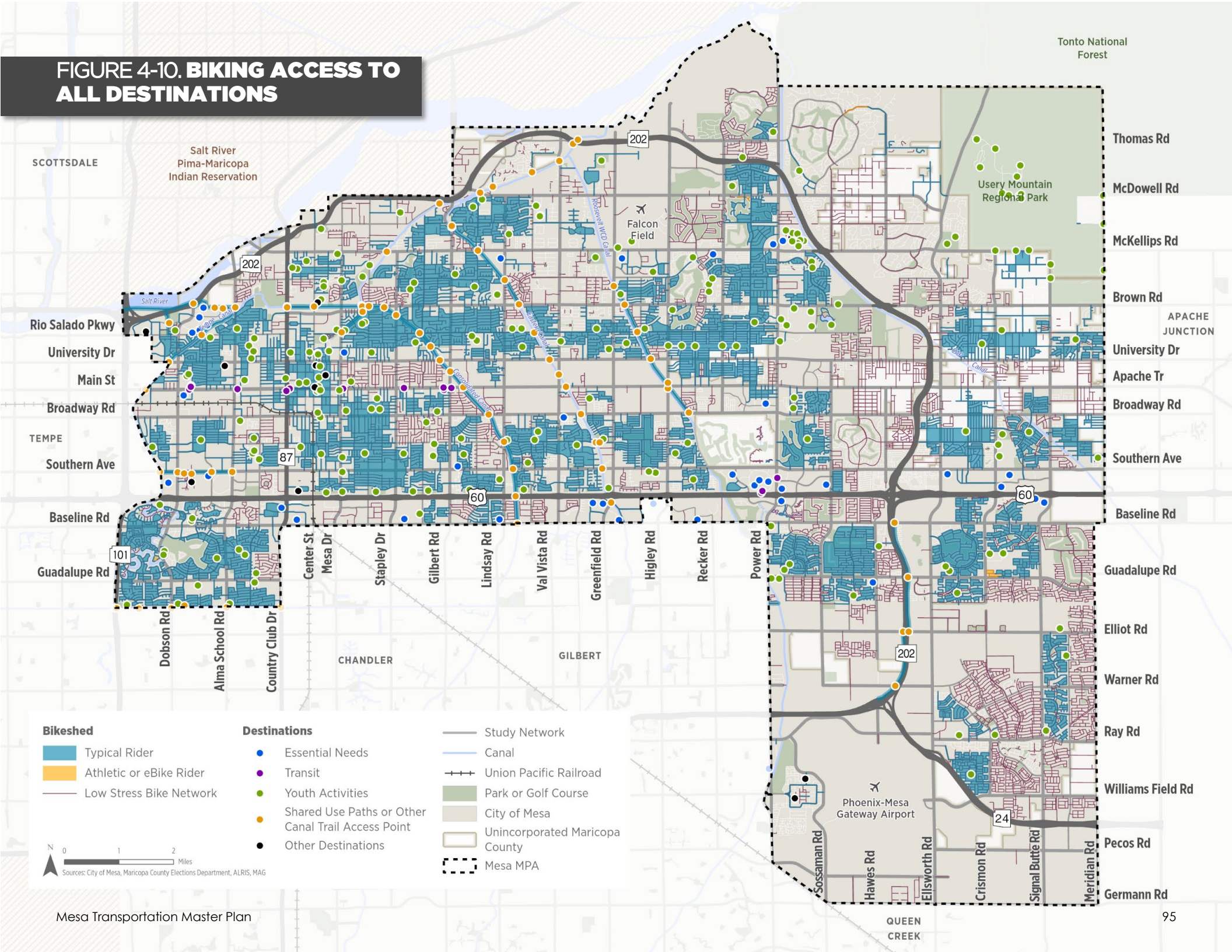


Table 4-3 **Residents Biking Access via the Low Stress Network (by Census Block)**

Low Stress Network Access	% of Residents with Access
Access to All Destinations	43%
Access to Essential Needs	11%
Access to Tranist	5%
Access to SUP and Canal Trails	17%
Access to Youth Activities	47%*

* Taken as a percentage of school aged children (5-19 years of age) with access

FIGURE 4-10. **BIKING ACCESS TO ALL DESTINATIONS**



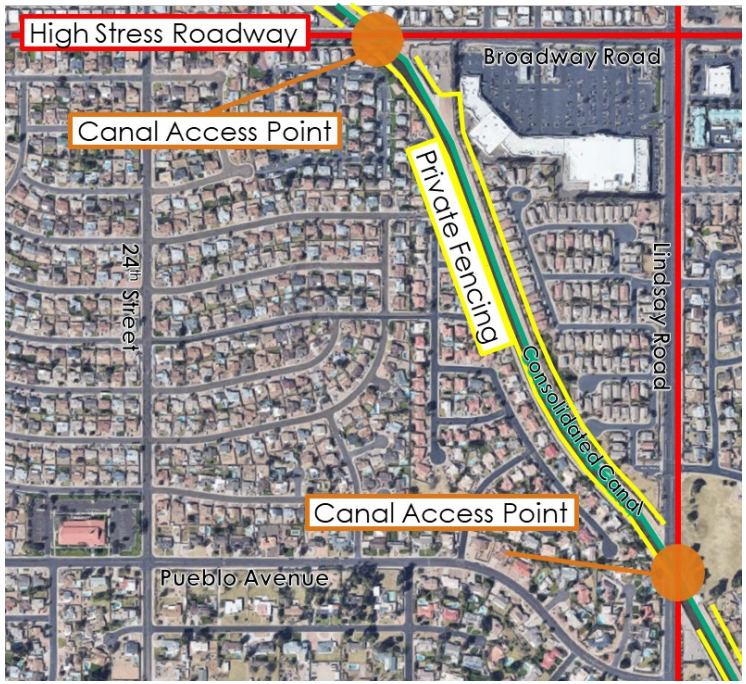
Observed Accessibility Gaps

- Low stress networks are contained within a mostly gridded pattern of high-stress roadways across Mesa. Without high-quality crossings, such as underpasses, overpasses, PHB, or signalized intersections or crossings, these high-stress roadways create significant barriers to walk and bike across the City.
- Although signalized intersections and crossings can increase access across high-stress roadways for people walking there can still be barriers to bicyclists. Many signalized intersections and crossings within Mesa do not provide dedicated infrastructure to cyclists forcing them to either dismount to use the crosswalk or to enter into high-speed and high-volume traffic. Left turn movements at intersections in particular are challenging to those bicycling. There is no way for people riding bikes to take left hand turn without dismounting to use the crosswalk across two-legs or to enter into traffic.
- While the sidewalk network is fairly complete—especially in Western Mesa—the opportunities to cross the street may not be frequent enough to provide a direct-enough path to destinations. There are some segments of roadway—especially in eastern Mesa---where people walking would need to walk over a mile, before being able to cross.
- The sidewalk network in most places in Mesa provides the minimum sidewalk width (4 – 6ft depending on the roadway and when it was built) and, although newer standards require detached sidewalks along arterials, most existing sidewalks provide little or no buffer between people walking and fast moving and loud traffic. These conditions are not comfortable for most people walking along arterials and some collectors.

Lack of Formalized Access to High Quality Paths

Most blocks adjacent to high quality paths have an internal low-stress network but there is no direct low stress connection forcing residents to use an LTS 3 or 4 roadway or the sidewalk. While LTS is a measure of bike stress, these roadways are defined by multi-lane, high speed, and high volume roadways which would be uncomfortable for people to walk near as well. While "cow paths" (worn areas in grass/dirt indicating where people might frequently choose to walk) and other informal connections can provide access to some, they are not ADA accessible. The following are the types of barriers preventing access from low-stress neighborhoods to high quality paths:

- Adjacent parks without ADA accessible paths to canal trails;
- Fencing between public and private parks with no gate to allow access to canal paths;
- Residential development abutting the canal with no gaps between properties to allow access; and
- Parts of the canal paths are only paved on one-side, preventing nearby adjacent neighborhoods from reaching the paved side without a bridge.



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IDENTIFIED GAPS AND OPPORTUNITIES

The following gaps and opportunities were identified within Mesa.

Matching active transportation facilities to land use context.

While there are bike lanes, sidewalks, and other facilities for walking and biking present throughout Mesa, many of them are along roads with high vehicular speeds and volumes do not provide a buffer from vehicular traffic. Therefore, they are not comfortable for most people to walk, bike, or ride micromobility devices along and limit the places people can travel.

There are "islands" of low stress networks.

Many neighborhood streets have low speeds and volumes and are comfortable to walk and bike on. However, high stress streets often bisect neighborhoods, creating "islands" of low stress streets and limiting the area people can access on these networks.

There are limited places to comfortably cross high stress roads, limiting access to destinations.

There are still many car-centric locations in Mesa where there are few places to comfortably cross high stress streets, with long distances between signalized intersections that require people to travel far out of their way to access destinations.

Downtown Mesa is cut off from the surrounding neighborhoods.

While Downtown Mesa has been redeveloped and has made some progress to provide a more comfortable place for people to walk and bike within, it is surrounded by high stress roads. Downtown Mesa remains disconnected from the surrounding neighborhoods due to a lack of low stress connections and comfortable crossings, limiting the number of people who can access it on foot or by bike.

There are high quality paths, but connectivity to them is limited.

There is an existing high quality path system that continues to be expanded and runs adjacent to many destinations. However, the paths often lack direct connections to surrounding neighborhoods and destinations.

US 60, Loop 202 Freeway, and Railroads limit access to nonmotorized travel

While US 60 and Loop 202 freeway provide important regional connections for vehicles, they also act as barriers dividing different areas within Mesa as well as between Mesa and the adjacent municipalities of Tempe and Gilbert. However, shared use paths, such as the Rio Salado Path and the Consolidated Canal provide a dedicated means for people walking and biking to cross these freeways. The UPRR also creates similar barriers, in particular to pedestrian crossings.

SHARED MOBILITY

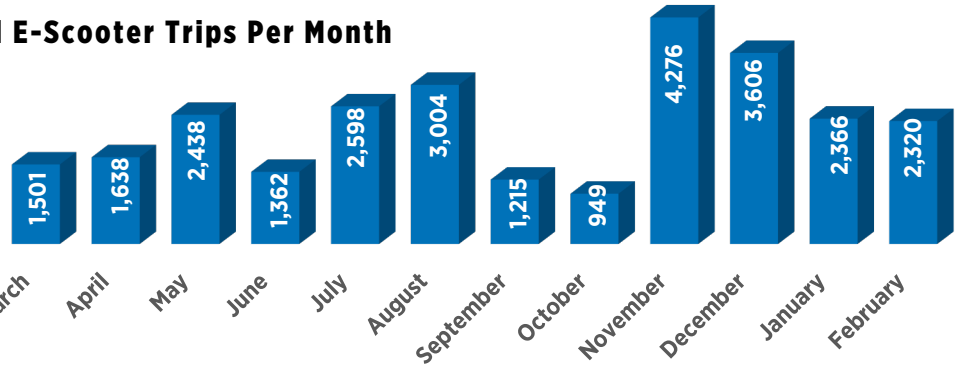
Mesa's active transportation vehicles (SATVs) program has been in effect since February 1, 2020. The program has existed as a pilot program that is reevaluated every year. While Bird, Spin, and Razor all sought permits and operated within Mesa, by 2023 only Bird remained an active provider.

Shared E-Scooter Program Details

Bird is the only SATV operator currently active and offering regular data updates. This analysis focuses on data provided by Bird between March 1, 2022 and February 28, 2023 that can provide insights into e-scooter usage in Mesa.

- Scooter usage varied throughout the year, with a peak of almost 4,300 trips in November of 2022.
- The average trip distance traveled is approximately 2.2 miles, and the average trip length is around 19 minutes. Therefore, the average trip speed is just over 8 minutes and 30 seconds per mile.
- Bird deployed approximately 160 scooters at a time. While the number of average scooters in the fleet fluctuated from a low of 95 to a high of 230 over the year, increases in fleet size did not necessarily correspond to increases in ridership.
- The most popular days for riding scooters were Friday, Saturday, and Sunday and the least used day was Wednesday. Popular destinations include Downtown Mesa, Mesa Community College, and the Price 101/Apache Boulevard Park & Ride (just west of Mesa in Tempe).

Total E-Scooter Trips Per Month



27,273 Total Trips (March 2022 – February 2023)

40% Of Trips Occurred in 3 Months
1. November
2. December
3. August

Total Miles 57,897

1/2 Of Trips Were on Weekends (Fri, Sat, Sun)

Average Speed 7 MPH

Mesa's Shared Active Transportation Vehicle Operating Environment

Currently Operating

Yes (through Feb 1, 2022)

Geography

The City has not imposed a service area, but coverage may be limited by operator.

RULES AND REGULATIONS

- Cannot ride on sidewalks along Main Street in downtown Mesa.
- Allowed on sidewalks in other parts of the City.
- Users must yield to people walking.
- Users must ride with traffic within the street.

Max Speed

15 mph

Age Restrictions

Not specified

Driver's License Required

Not Required

Helmet Rules

Helmets are encouraged but not required; Vendors must provide 100 helmets that the city distributes

Overnight Collection

None

Locking Device

None

Parking

- Cannot stage on city-owned property, in city parks, under bus shelter canopies
- Cannot stage more than 5 vehicles in a row.
- Groups of 5 must be separated by 20 feet.
- Must stage 20 feet from Grid bike racks and business entrances.
- Must give 8 feet clearance at bus boarding areas. Must leave 4 feet clearance on sidewalks.

Fleet Size

No maximum or minimum devices

Vendors

- Bird
- Spin
- Razor

Hours of Operation

No current restrictions.

If Issues Arise

Vendor has two hours to correct issue after being notified by the city

Enforcement

- City can impound a vehicle immediately if there is an immediate safety hazard.
- Must remove device within 24 hours of notification

Data Reporting

Monthly reports on fleet, trips, crashes, complaints

City Fees

$400 annual fee; No per-vehicle or per-ride fee

DESIGN STANDARDS TODAY

Design standards guide how our streets are built, how space is allocated, and what the walking and biking environment looks like. Understanding these standards helps to identify opportunities and constraints that can be addressed through the planning process. The following documents control where and how facilities for walking and biking are designed and built in Mesa:

- **Engineering & Design Standards (2022):** provides standard details for the design of streets in Mesa for city CIP projects and private developers. These include discussions of traffic studies, traffic calming, pedestrian facilities, and transit facilities.
- **Standard Details (2022):** a companion to the Engineering & Design Standards, the details provide guidance on things like lane width. While typical sections are generally not included, the guidance includes guidance on roadway design at intersections.
- **Traffic Signal Design Manual (2014):** focuses on the design of traffic signals, including pedestrian signals and bicycle detection.
- **Bicycle Master Plan (BMP) (2018):** identifies bike facility types and design standards.
- **Mesa Code of Ordinances** defines requirements for all development in Mesa, including guidance on things like vehicle speeds, parking, facilities for people walking and biking, and roadway design. The City has adopted a Form Based Code in Downtown with unique road design standards.
- **Community Plans:** Mesa allows planned communities to develop their own planning documents and zoning code, including street typologies and standards, via a formally adopted community plan. Such plans exist for Eastmark and Cadence.

Citywide Transportation Related Standards

This section summarizes the relevant elements from the Engineering & Design Standards (2022), Standards Details (2022), Traffic Signal Design Manual (2014) and the Mesa Code of Ordinances as they relate to transportation Citywide.

Vehicle Traffic

Traffic Calming must be approved by the Transportation Department. Speed humps/cushions are not considered traffic calming devices.

Typical Sections are provided for some locations or developments such as Downtown, Eastmark, and Cadence and can provide guidance on how to design roadways given a particular context or roadway type.

Parking requirements are reduced near transit stations and are allowed elsewhere with a study.

Traffic Studies assume all people will drive in new developments unless approved by the City Engineer. However, developers are required to incorporate transit, walking, and biking connections with a focus on safety for non-motorized users.

Other Relevant Standards

Experimental Traffic Control may be authorized by the City Traffic Engineer with the approval of the City Manager. This testing shall consist of conducting research and tests on current devices and traffic control devices not presently included in the Manual on Uniform Traffic Control Devices.

Joint Use of Driveways (with cross-access easements) is encouraged for commercial developments.

Bus Pullouts are required on 4-lane arterials at intersections between arterials and where higher ridership is expected (schools, shopping areas, hospitals, large mutli-family developments, etc). They should also be considered on 6-lane arterials. Farside pullouts are preferred.

Access to Facilities: the City can require developers to designate space for walking and biking with ROW widths or 10-12' for access to schools, playgrounds, shopping centers, and transportation or other community facilities.

Walking

ADA Compliant Sidewalk Ramps required at public intersections:

- Local Streets: single / diagonal ramps
- Collectors / Arterials: dual / directional ramps

Sidewalks are required on all public streets:

- Local Streets: 5' minimum attached to back of curb
- Collectors / Arterials: 6'minimum detached from curb
- Bridges: 8' minimum

Shared Use Paths are permitted:

- One-Way Travel: 6' minimum + 2' shoulder on either side
- Two-Way Travel: 12' minimum + 2' shoulder on either side
- Separation from the Curb: 5' minimum
- Vertical Clearance: 8'; 10' if horses are expected

Countdown Pedestrian Timers are required for all signals.

New Crossings can be designated, designed, and constructed at the discretion of the City Engineer, particularly where safety concerns are identified or at other places where they deem necessary.

BMP Guidance

While the BMP indicates typical guidance for bike facility types, they are not formally incorporated into the City's Engineering & Design Standards Manual or Standard Details, and--in many cases--suggests designs that are different.

Bike Lanes: 4' minimum; 5' minimum if adjacent to gutter

Separated Bike Lanes: separation width of 18", 3' preferred, 6' max. 3' separation required from on street parking. Separation can be painted, stamped concrete, use a curb or bollard, or the entire bike lane can be raised above street level. Minimum bikeway width is not discussed.

- **Shared Use Paths:** 10' minimum width for two-way travel, 12-15' preferred.
- **Bicycle Routes:** Identified using signage only.
- **Bicycle Boulevard:** Shared streets with low vehicle volumes and speeds; can incorporate any or all of signage, markings, and traffic calming devices.
- **Sharrows:** shared lane markings intended to indicate proper positioning of a person biking in the street; not recommended on streets with speed limits greater than 35 mph.
- **If Leading to Intersections**, bike lanes must be provided all the way to the intersection. If there is a right turn lane, the bike lane should be placed between the right turn lane and the through lane.
- **Shared Bike and Parking Lanes** are permitted and should be 13' minimum in width. These are not included in the Bike Master Plan but are included in Mesa's Standard Details.
- **Bike Parking** is required for most development types and is specified based on use. Racks should be easy to lock to and in close proximity to entrances, highly visible, and well lighted without interfering with pedestrian movements.

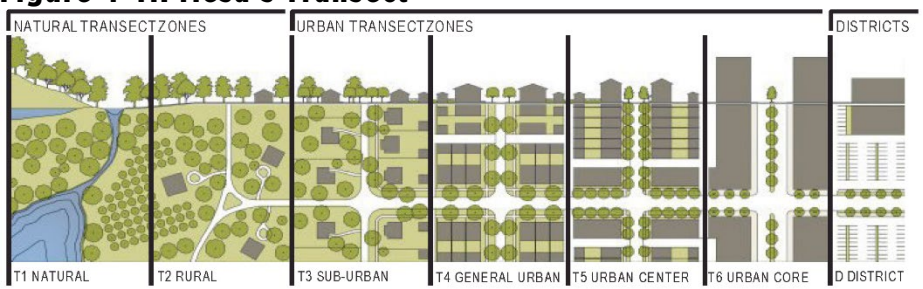
Location Specific Transportation Related Standards

Downtown Mesa Form Based Code

The Mesa Code of Ordinances includes a Form Based Code for Downtown and the Temple/Pioneer Park Neighborhoods aimed at allowing new development while preserving character and fostering a walkable urban environment. The Code defines allowable land uses, urban design, and street sections based on a transect (**Figure 4-11**) which defines a variety of land use contexts. Downtown Mesa includes T3, T4, T5, T6, and D elements of the transect. The code provides the following transportation related guidance:

- **Street Network** design criteria requires an interconnected network and dictates maximum block perimeters to maintain a walkable environment.
- **Thoroughfare Typologies** reflect context classifications and include design standards based on design movement types:
  - Yield – drivers proceed slowly and yield to each other (design speed <20 mph)
  - Slow – drivers move slowly and respect other roadway users (design speed 20-25 mph)
  - Low – drivers travel at design speed; streets intended to connect longer distances (design speed 30-35 mph)
  - Suburban – conventional thoroughfare design with separation of modes (design speed 35+ mph)

Figure 4-11: Mesa's Transect



- **Curb Radius** is dictated by movement type to slow turning speeds.
  - Yield: 5-10' radius
  - Slow: 10-15' radius
  - Low: 15-20' radius
- **Bike Facilities** are allowable as follows:
  - Shared facilities and bike boulevards are allowed on all streets
  - Bike lanes, if provided, must be 5-6' minimum in width and Require review on streets with speed >30 MPH and in T4-6 zones
- **Shared Use Paths** are allowable as follows:
  - Only allowed in T1 through T3 contexts.
  - One-Way Travel: 10' minimum
  - Two-Way Travel: 12' minimum

Cadence (Pacific Proving Grounds North)

Cadence is envisioned as a "New Traditional Community" that is walkable and interconnected. Land uses are intended to be mixed and encourage accessibility by all modes, as opposed to traditional auto-oriented design. The plan provides the following transportation related guidance:

- **Street Network** principles include:
  - A connected network of streets
  - Prioritizing the walking environment
  - Amenities like lighting, shade, and street tree
- **Parking** requirements as follows:
  - Includes both bike and vehicle parking minimums based on square footage.
  - Bike parking requirements match city standards.
- **Street Typologie**s reflect a variety of street types proposed at 3 levels:
  - Arterials: 4-6 lane section with 11' travels lanes, 16' medians, 6' striped bike lane, and 6' sidewalks.
  - Community Collectors: 2-4 lane section with 11-12.5 travel lanes, 9-15' median, 6' striped bike lanes, and 6' sidewalks.
  - Local Streets: 2 lane undivided section with 12 lanes (17' with on street parking) and 4' sidewalks.

Eastmark (Mesa Proving Grounds)

Eastmark uses a transect of land uses along with a transportation plan focused on moving people as opposed to vehicles. The plan provides the following guidance:

- **Street Network** principles include:
  - A connected network of streets
  - Prioritizing the walking environment
  - Amenities like lighting, shade, and street trees
- **Street Typologies**:
  - **District and Arterial Streets**: 2, 4, and 6 lane sections with and without bike lanes and parking. Generally include 10' to 11' wide lanes.
  - **Neighborhood Streets**: One and two-way streets with and without parking. Generally include 10-12' lanes for one-way streets and 12-24' lanes with parking (based on angle of parking).
  - **Service Lanes:** One and two-way streets with and without parking. Include 10-12' lanes for one-way streets and 12-24' lanes with parking (based on angle of parking)
- **Bike Facilities** are required on all streets as follows:
  - Shared streets (bike and neighborhood electric vehicles allowed) for streets with speeds 35 MPH or less.
  - Striped bike lanes along all arterials (6' without parking, 5' with parking).
  - 10-12' wide multi use path through the Great Park as well as along Business Boulevard and Point Twenty-Two Blvd
- **Parking** requirements as follows:
  - Includes both bike and vehicle parking minimums based on square footage or bedrooms; varies by business type.
  - Shared parking is allowed when uses have different travel patterns.

Summary

When reviewing the design standards and codes, several conclusions can be drawn:

- While the form-based codes and design standards in Downtown, Eastmark, and Cadence provide good guidance on how to design streets in those areas, the lack of context based typical sections which can be applied city-wide make it difficult to ensure streets match contexts and include necessary features.
- Providing wider sidewalks, shared use paths, and designated bike facilities may make streets with higher vehicular speeds and volumes more comfortable for people walking and biking.
- The City Traffic Engineer is provided with significant flexibility to improve crossings and the environment for people walking and biking.
- The Engineering and Design Standards and Code of Ordinances provide opportunities for the City to require developers to provide easements for walking and biking improvements to access destinations.
- The BMP provides useful guidance on facility types, but there are several gaps, such as:
    - Formal guidance regarding which facility type should be used based on comfort factors like vehicle speeds, volumes, and number of lanes.
    - Shared street guidance is inconsistent between Bicycle Routes, Shared Routes, and Sharrows. For example, speed guidance is provided for sharrows but not for other shared lane types.
    - Bicycle Boulevards are noted as a separate typology that may include traffic calming, signage, and markings. However, if traffic calming is not included, they do not provide an environment that is significantly different than shared streets.
    - While the BMP notes a maximum speed recommendation of 35 mph for sharrows, FHWA guidance recommends 25 mph if designing for people of all ages and abilities.
    - Shared parking and bike lanes are not included in the BMP but are included elsewhere. These facilities can provide an inconsistent biking experience.
    - There is discussion of intersection treatments, but the BMP does not provide specific guidance to address high stress crossings.

5 PUBLIC TRANSIT

A strong public transit network is a key component to a great transportation system. Public transit provides important access and connectivity to key destinations and regional access to employment, education, shopping, and services. Transit services in Mesa are provided by the City of Mesa and Valley Metro, the regional public transportation authority for the Phoenix metropolitan area, and a variety of social service agencies. This section outlines existing public transit conditions in Mesa today.

OUR SYSTEM TODAY

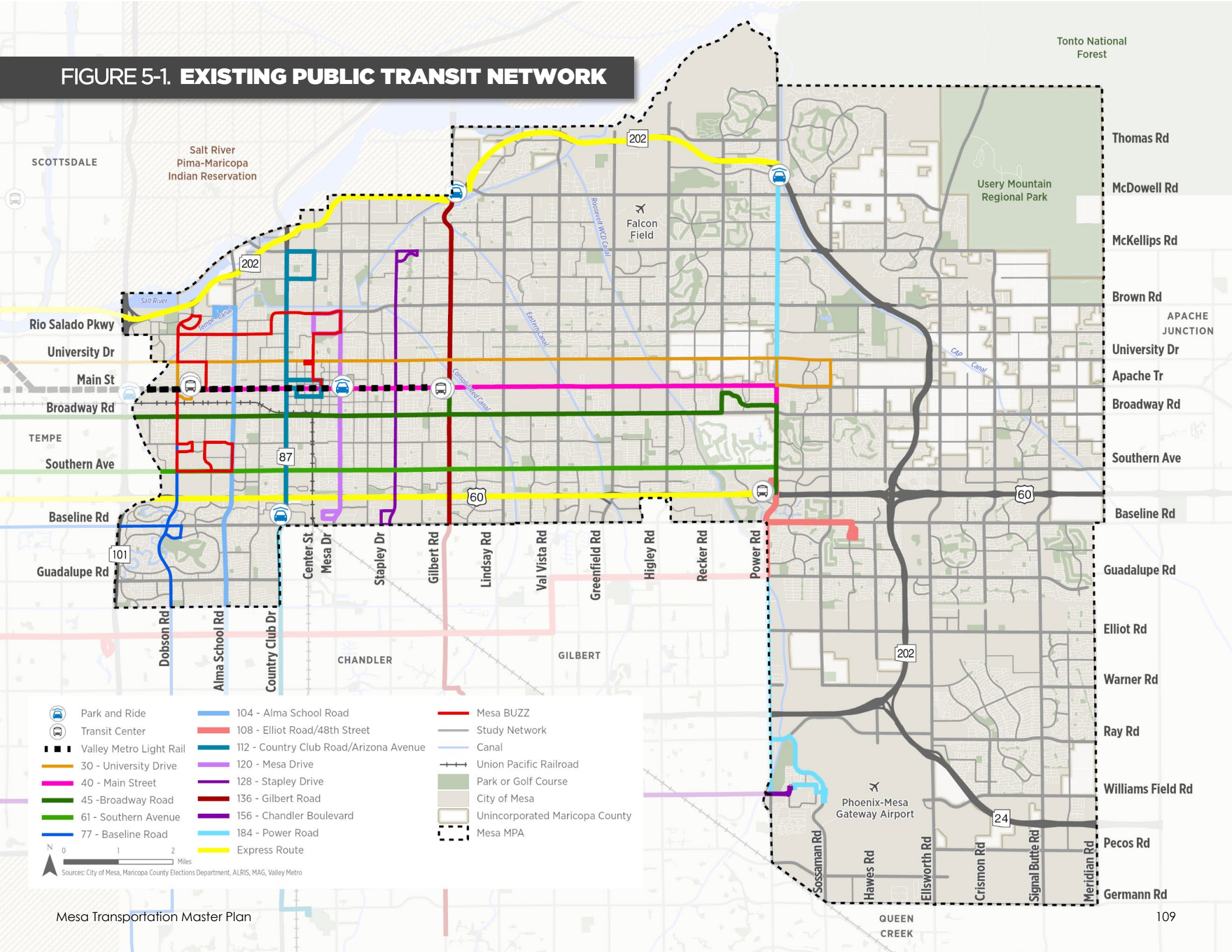
To meet different trip purposes, a variety of transit route types are needed. For example, express bus routes and the light rail excel at taking commuters and residents to major employment and activity centers. Local bus routes, however, provide increased neighborhood connectivity through frequent stops, fixed service, and closer access to destinations/origins. **Figure 5-1** illustrates current transit routes in Mesa. Existing fixed transit services includes:

- **Mesa Downtown Buzz Service:** A free neighborhood 23-passenger bus provided by the City of Mesa that connects visitors to major bus routes and other attractions in Mesa including Mesa Arts Center, library and more. The Downtown Buzz runs every 30 minutes on weekdays and every 60 minutes on Saturday.
- **Mesa Fiesta Buzz Service:** The Fiesta Buzz is a free neighborhood circulator provided by the City of Mesa, connecting the Fiesta District, Asian District, and Mesa Riverview. The circulator travels the route in a northbound/ southbound direction every 30 minutes. Travel time is approximately 25 minutes from end to end.
- **Express Service:** Express buses operate Monday-Friday during morning and evening peak-times to provide commuters with direct, enhanced-speed access to key regional destinations.
- **Local Fixed Route:** operates on a grid system, and provides a straight-forward, convenient way for riders to connect their homes to work, school, and other key destinations.
- **Park-and-Ride:** Park-and-Ride lots provide parking spaces for commuters to board longer-distance express buses or meet their carpool or vanpool. There are currently seven park-and-ride lots in the Mesa MPA.
- **Bus Stops:** Transit routes are supported by a network of passenger facilities. In total, there are 736 bus stops in the Mesa MPA with varying amenities (i.e., shelters, bike racks, etc.).

In addition to the fixed routes, the following public transportation services are also available.

- **Vanpool:** commuter vanpools allow groups of employees to self-organize and lease a vehicle from Valley Metro to use to operate a carpool service, providing a flexible transit solution for those trips not well served by more conventional fixed route service.
- **Paratransit:** Valley Metro operates paratransit service which is a door-to-door, shared-ride public transportation option for persons who are unable to utilize local bus service due to a disability.
- **RideChoice:** Valley Metro RideChoice now has easier access to a larger network of rideshare transportation providers including Uber, taxicabs and other wheelchair-accessible vehicles.

FIGURE 5-1. EXISTING PUBLIC TRANSIT NETWORK



RIDERSHIP

Valley Metro Regional Transportation Planning Agency is one of the largest public transportation agencies in the Nation, with over 31.8 million boardings in 2022. Mesa accounts for approximately 10.8 percent of Valley Metro's total boardings (2022). Since 2021, the total number of boardings in Mesa rose by more than 12.3% from the previous fiscal year; however, bicycle boardings decreased by a staggering 25.9 percent. **Table 5-1** outlines the total number of boardings in Mesa for FY 2022.

Table 5-1. Ridership by Route (FY 2021-2022)

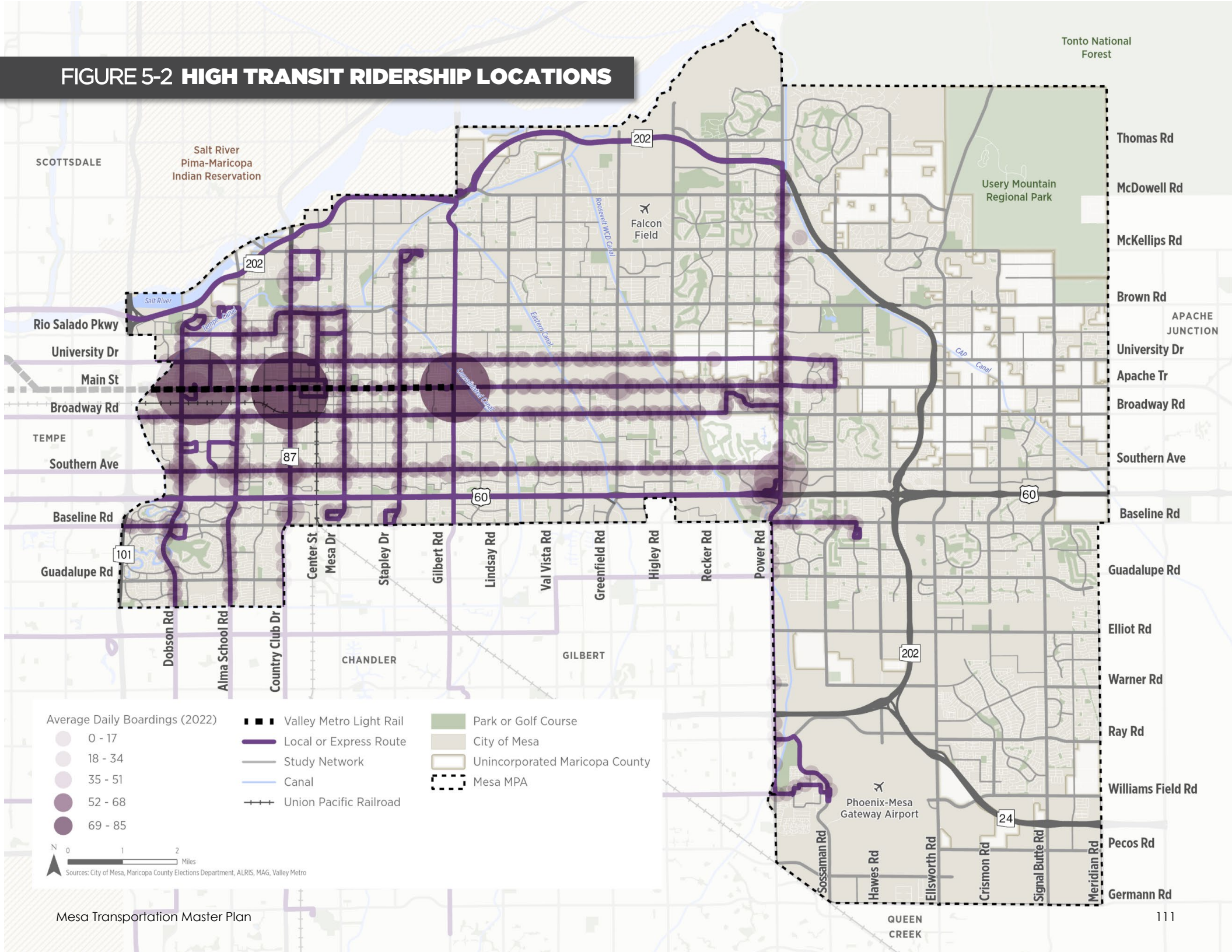
Route	Total Boardings	Bicycle Boardings	Wheelchair Boardings
30 – University Drive	138,843	6,861	1,433
40 – Main Street	313,526	19,847	3,812
45 – Broadway Road	139,518	5,171	1,176
61 – Southern Avenue	249,626	9,732	1,697
77 – Baseline Road	8,804	375	40
96 – Dobson Road	203,609	6,220	1,677
104 – Alma School Road	97,354	2,946	1,023
108 – Elliot Road/48th Street	10,738	554	84
112 – Country Club Road/Arizona Avenue	286,769	9,969	2,258
120 – Mesa Drive	59,736	1,475	1,218
128 – Stapley Drive	48,712	1,898	1,129
136 – Gilbert Road	114,908	4,923	890
156 – Chandler Boulevard	6,939	420	31
184 – Power Road	76,810	5,031	688
515 - Fountain Hills-Mesa Connector	249	2	4
531 - Mesa/Gilbert Express	1,786	10	0
533 – Mesa Express	8,507	135	3
535 – Northeast Mesa Express	8,274	25	0
541 *(no longer in service)*	2,339	0	0
Buzz	69,603	1,380	1,343
Metro Rail	1,590,233	Not Available	Not Available
Total	***3,436,883***	***76,974***	***18,506***

Source: Valley Metro Annual Ridership 2022

High Ridership Stops

Figure 5.2 illustrates bus stops that have the highest average daily boarding within Mesa in 2022. It is important to note that these stops are largely located immediately adjacent to the intersection. High ridership stops occur largely along Main Street through downtown Mesa and at the Superstition Mall Transit center.

FIGURE 5-2 HIGH TRANSIT RIDERSHIP LOCATIONS



MULTIMODAL CONNECTIVITY

Understanding where bicycle and pedestrian facilities exist and where they offer connections to transit stops is critical to creating a sustainable and accessible transit system. Barriers that interfere with first and last mile connections should be addressed and play a role in determining the most advantageous locations for transit stops.

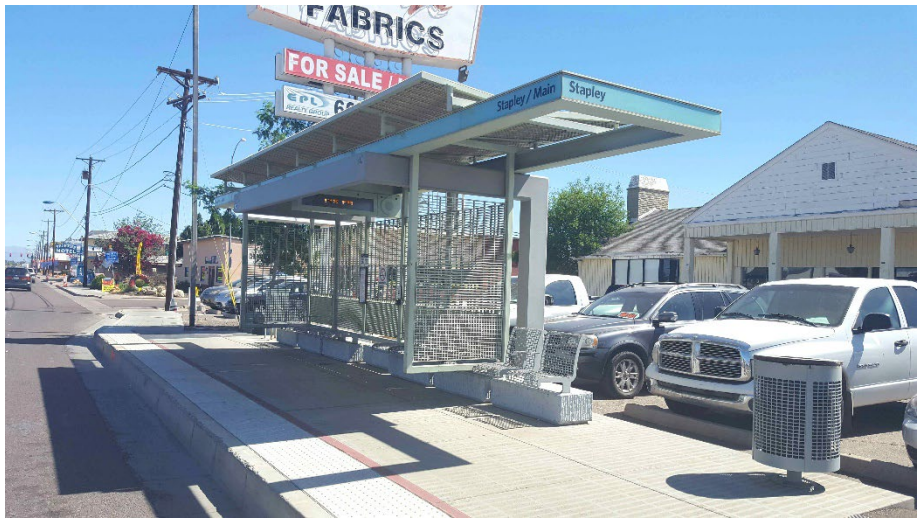
First/Last Mile Connections

Walking and biking are complementary to transit, as every transit rider is either a pedestrian or a bicyclist at some point of their trip. For example, a rider must first walk, bike, drive, or roll themselves to and from the nearest bus stop. This is commonly referred to as "first/last mile". Some riders have a short walk from a parking lot and others have a longer walk or ride from their home, office, or shopping center. The majority of stops in Mesa have sidewalk connections; however, some stops have sidewalks gaps leading to the stop or the sidewalks are in need of repair.

A detailed analysis of pedestrian and bicycle access to high ridership stops is located in the Walking and Biking section of this report.

Transit Stop Amenities

Amenities can include stop signage, bus shelters, benches, timetables, trash cans, bike racks, and more. Currently, a large number of stops in Mesa lack shelter. Transit shelters are important to improving rider satisfaction as they improve a rider's perception of safety, provide an area to wait during hot summer days or during rain, and help rider's recognize bus stop locations.



6 GOODS MOVEMENT

GOODS MOVEMENT TODAY

Another major function of the transportation system is to move goods and services for commercial purposes. The efficient movement of freight, goods, and packages is extremely important to Mesa and the region's economic prosperity. This section outlines existing conditions in relation to the movement of goods in and through the Mesa MPA.

Existing Truck Routes

Currently, the City of Mesa does not have a formally designated truck route designation in place; however, Mesa does have some freight-related regulations. According to Mesa Ordinance 2256: commerical vehicles are restricted on certain streets. When authorized signs are erected, commercial vehicles having a manufacturer's rating of one and one-half (1 1/2) tons or more or any commercial vehicle having a length of twenty-two feet (22') or more, inclusive of front and rear bumpers, or a commercial vehicle coupled to a trailer or semi-trailer having a length of twenty two feet (22') or more, inclusive of the front and rear bumpers, may not operate on those portions of streets so posted except for the delivery and pickup of merchandise, materials, or equipment going to or from a specific location requiring travel on streets so posted. The commercial vehicle must use the shortest and most direct route on such streets.

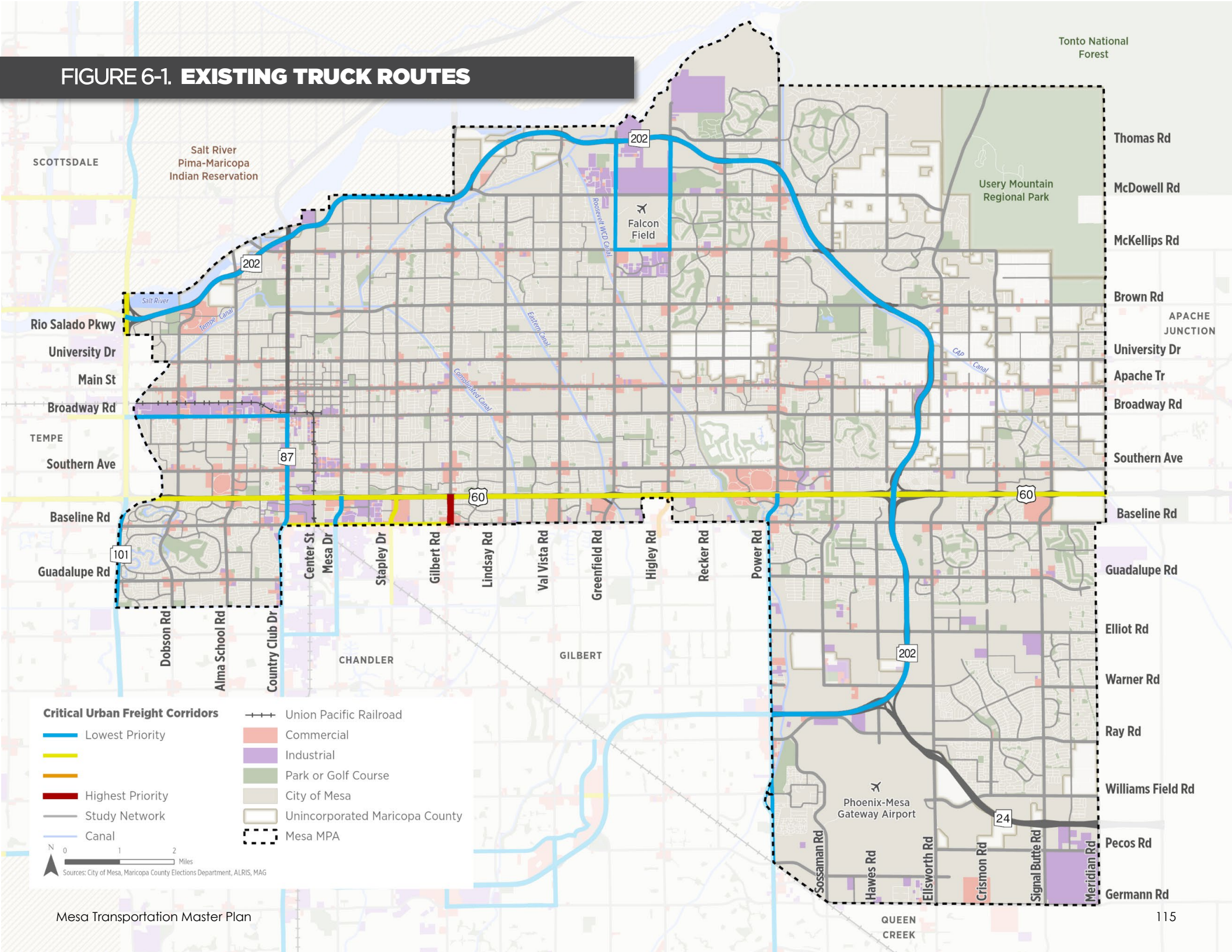
Critical Urban Freight Corridors

In 2017, MAG completed a regional assessment to identify a Freight Transportation Network in the region and prioritize optimal locations for freight-focused investments. Under Fixing America's Surface Transportation (FAST) Act, the designation of Critical Urban Freight Corridors (CUFCs) is an essential component to the establishment of the National Highway Freight Network (NHFN), as project funding eligibility is related to the location of CUFCs. Identification of the network was based on the evaluation of freight infrastructure assets (highways, air, and rail), existing and future forecasted truck traffic, current and forecasted flow of the goods, concentration of industrial and commercial activity, development potential, and network performance.

Based on truck conditions serving industrial areas, candidate routes were identified for inclusion in the Freight Network. Upon refining the candidate Freight Network, corridors were evaluated and prioritized to determine which Network miles should receive CUFC designation and become eligible for federal freight funds. **Figure 6.1** illustrates the CUFCs by their priority score. Within Mesa, the top scoring CUFCs include:

- Gilbert Road (south of US 60)
- US 60 corridor
- Stapley Drive (south of US 60)

FIGURE 6-1. **EXISTING TRUCK ROUTES**



FREIGHT DEMAND

Where Trucks are Traveling

Replica data provides truck usage estimates for vehicles classified by Federal Highway Administration (FHWA) as class 4 or higher, which ranges from medium size city delivery trucks to large freight vehicles. Using Replica data, key routes heavily used by trucks can be identified. As illustrated in **Figure 6-2,** higher truck volumes can be found on freeways and several key arterials. Many of these corridors not only have high truck volumes, but also have high percentages of trucks. As illustrated in the figure, corridors with high truck usage include:

- McKellips Road (west of Val Vista Road)
- University Drive (west of Lindsay Road)
- Broadway Road (west of Country Club Drive)
- Apache Trail (east of SR 202)
- Ellsworth Road (south of SR 24)
- Dobson Road (north of US 60)
- Country Club Drive
- Higley Road (south of University Drive)
- Power Road (south of Broadway Road)
- Ray Road (west of Signal Butte Road)
- Elliot Road (west of Crismon Road)
- Ray Road and Elliot Road in southeast Mesa
- North-South arterials providing access to US 60, including Mesa Drive, Stapley Drive, and Gilbert Road

Heavy Trucks Usage

The American Transportation Research Institute (ATRI) collects and analyzes heavy truck GPS movement data to aid in important freight decision making. **Figures 6-3 and 6-4** illustrate locations with heavy freight trips and stop locations, respectively. Findings show:

- Locations surrounding the Phoenix-Mesa Gateway Airport, along Country Club Drive, through downtown Mesa, and along SR 24 experience the highest heavy truck usage.
- While trucks travel along most arterials in the Mesa MPA, key stop locations include areas surrounding the Phoenix-Mesa Gateway Airport, along SR 24, adjacent to the US 60, industrial sites along Broadway Road, surrounding Falcon Field, and growing industrial areas in southeast Mesa.

FIGURE 6-2 CORRIDORS WITH HIGH TRUCK VOLUMES

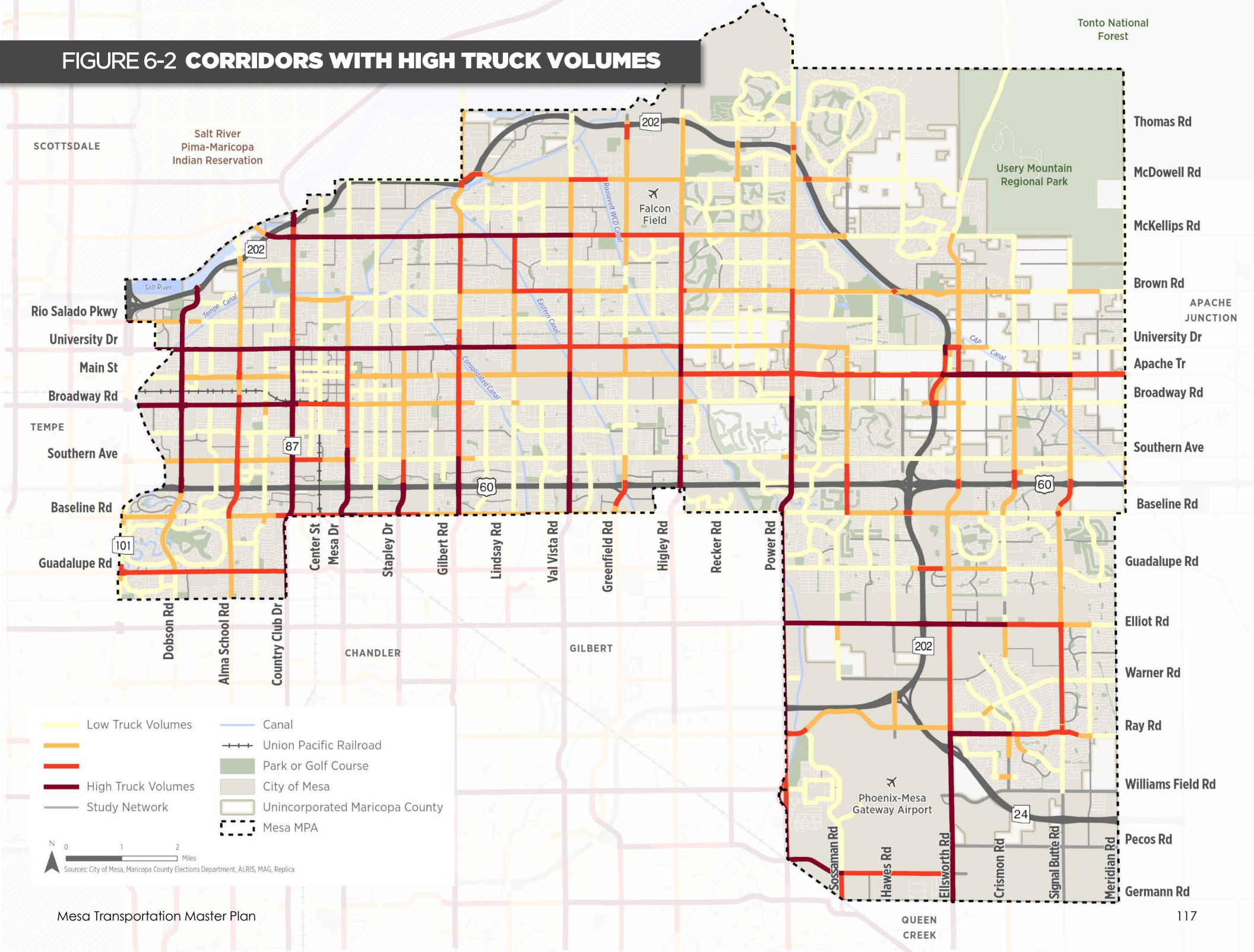


FIGURE 6-3 LOCATIONS WITH HIGH HEAVY TRUCKS VOLUMES

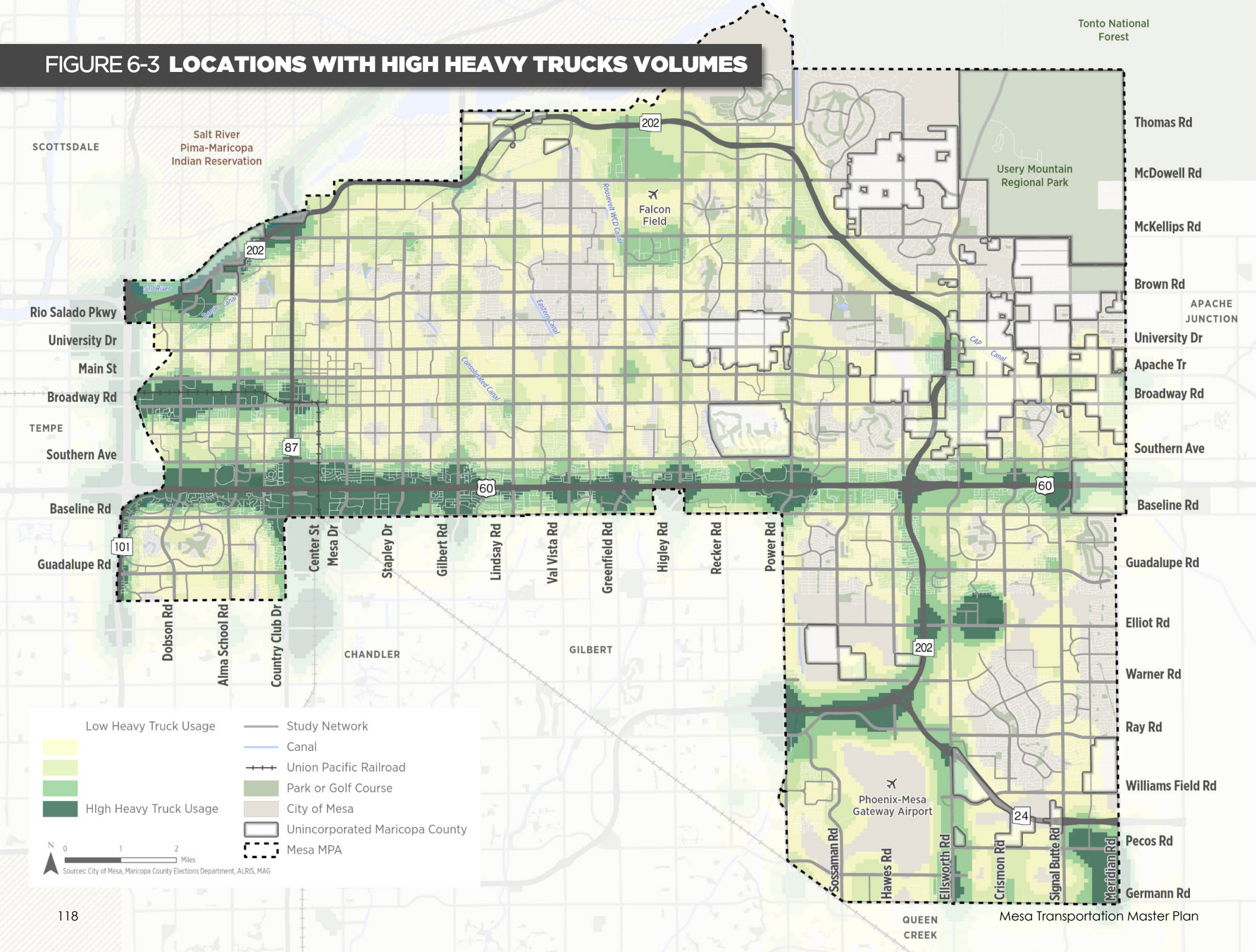
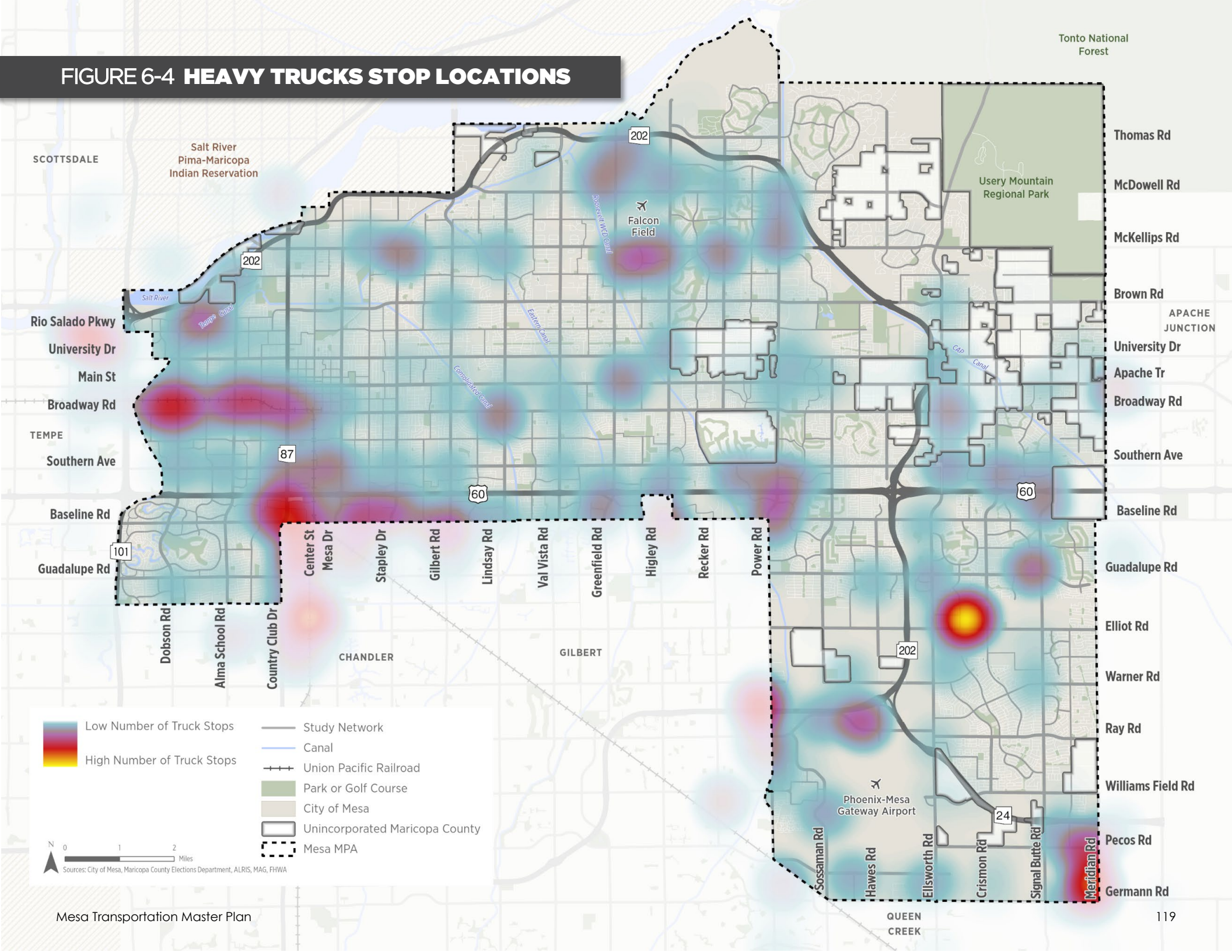


FIGURE 6-4 **HEAVY TRUCKS STOP LOCATIONS**

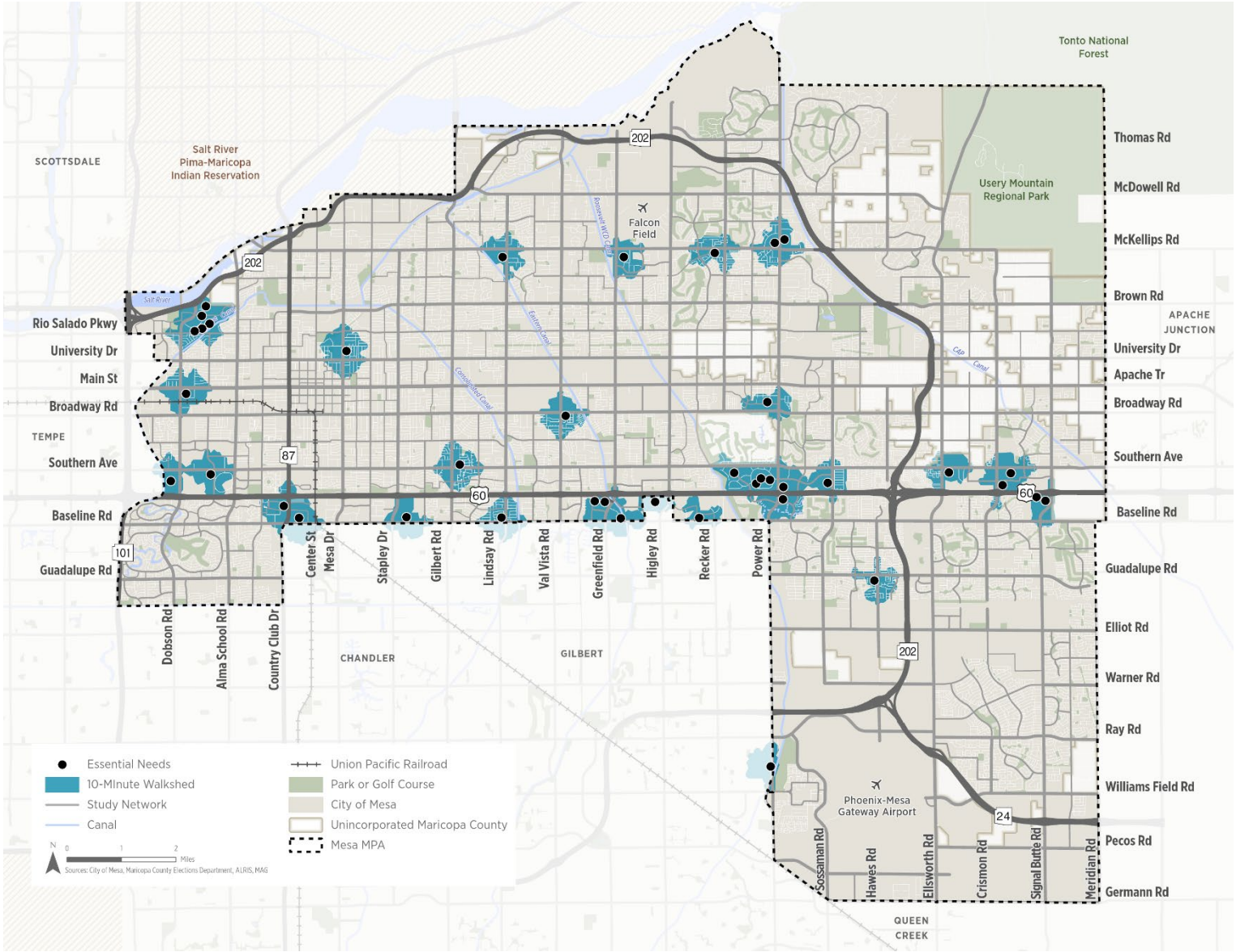


Appendix. Walking and Biking Access

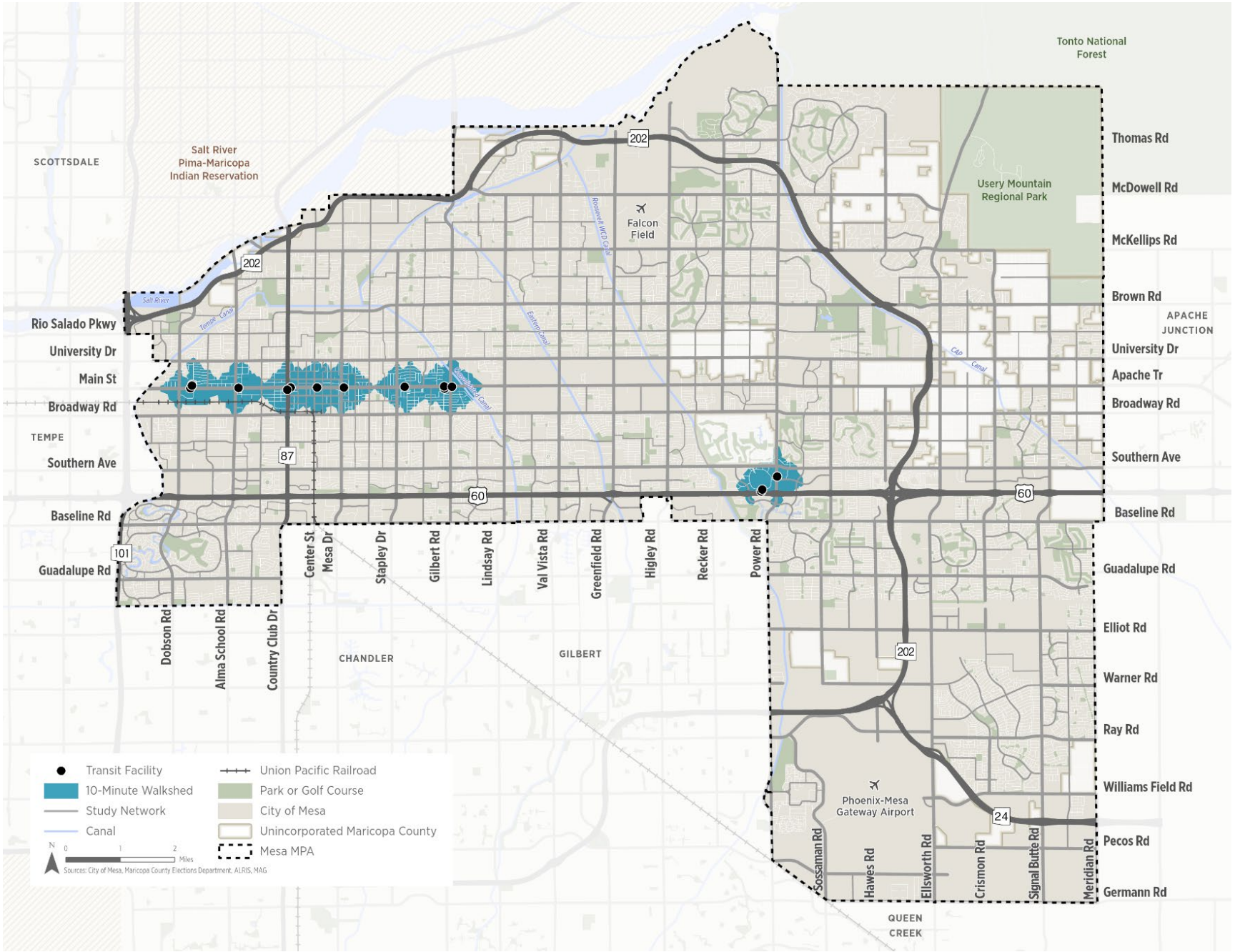
Walking and Biking Access

The following maps are developed from the methodology discussed in "Access to Destinations". These figures provide walking and biking sheds for each destination category (as defined in "Access to Destinations") to provide additional insights. Viewing these maps side by side helps illustrate that not all the needs of Mesa residents are equally accessible by biking or walking.

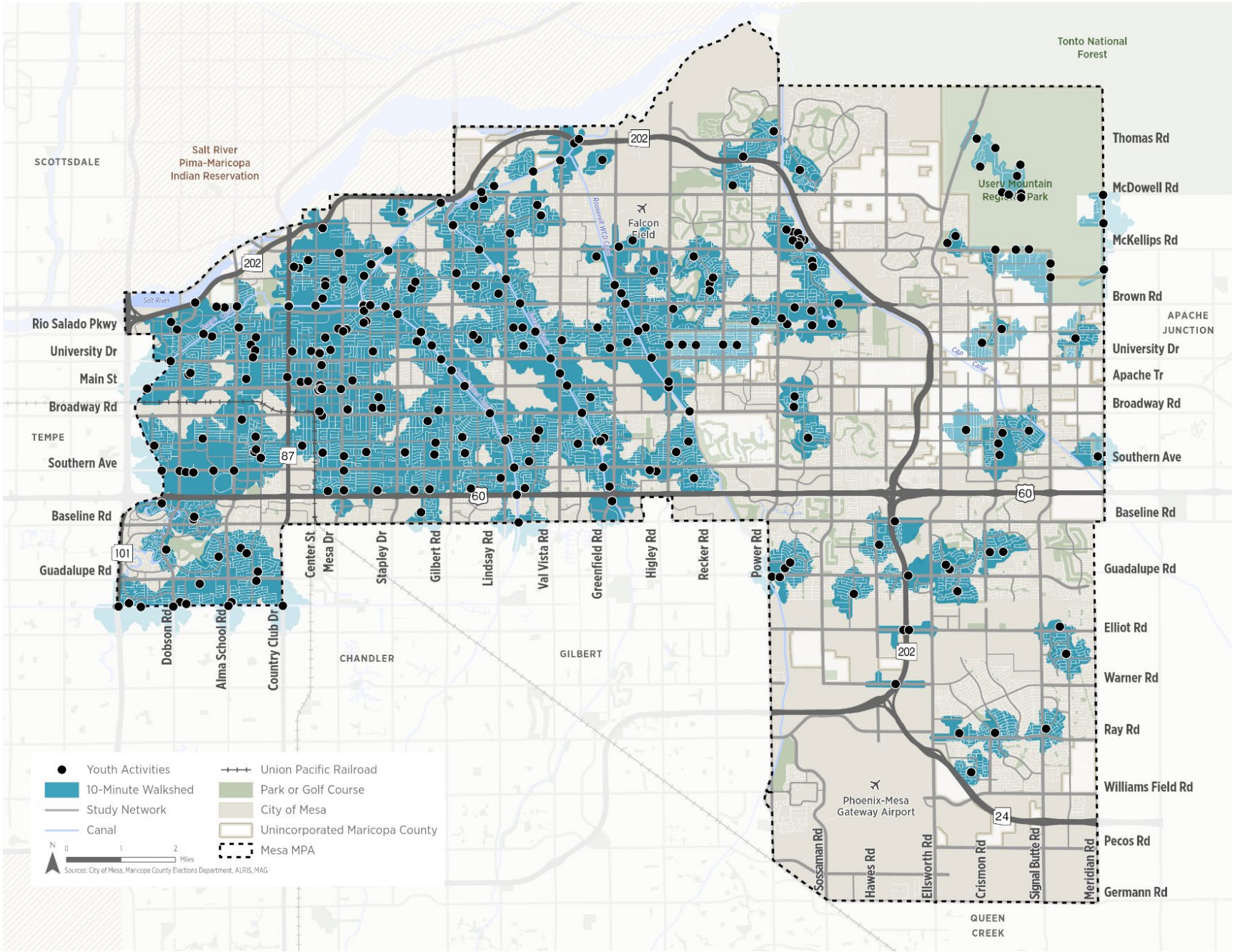
Walking Access to Essential Needs



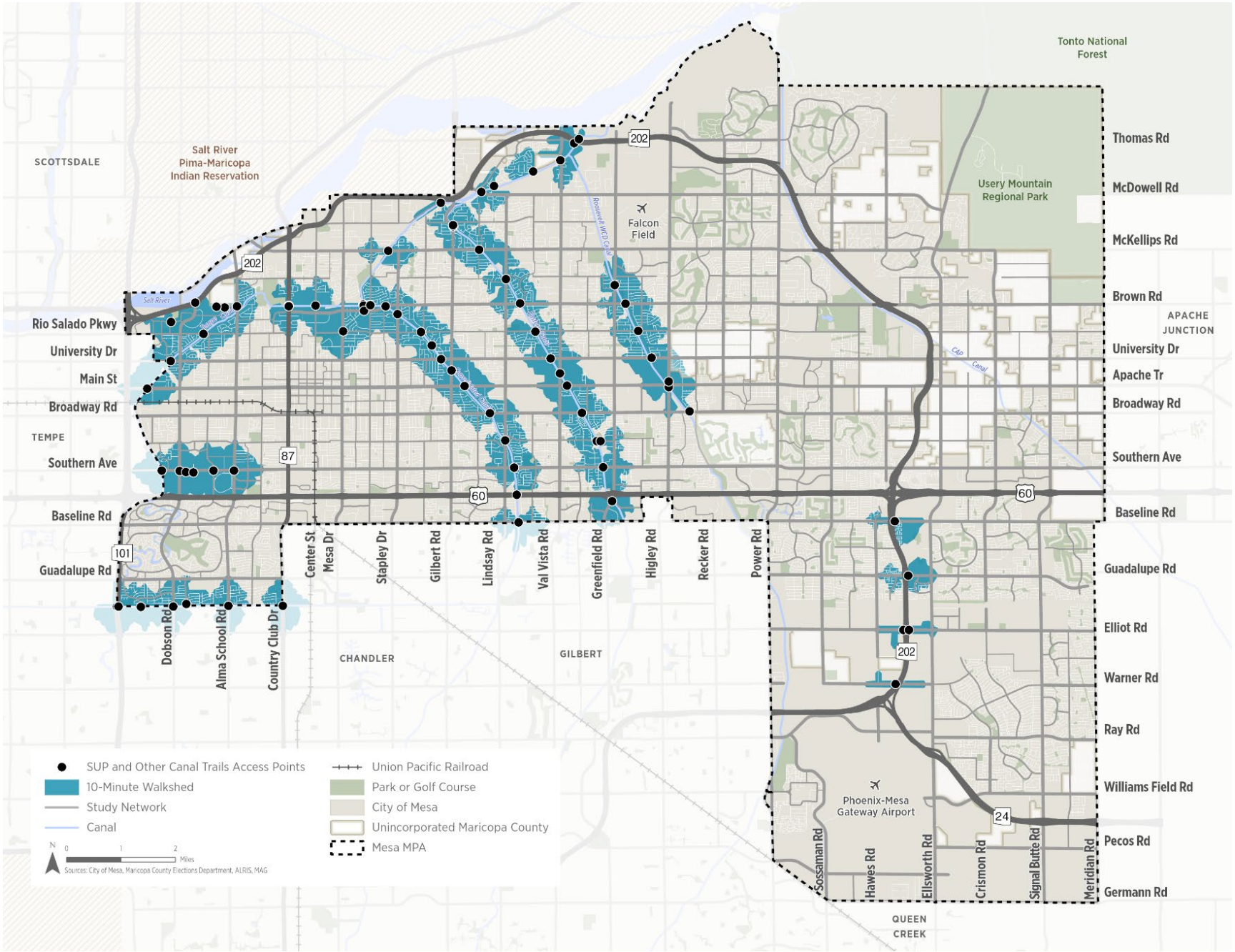
Walking Transit Access



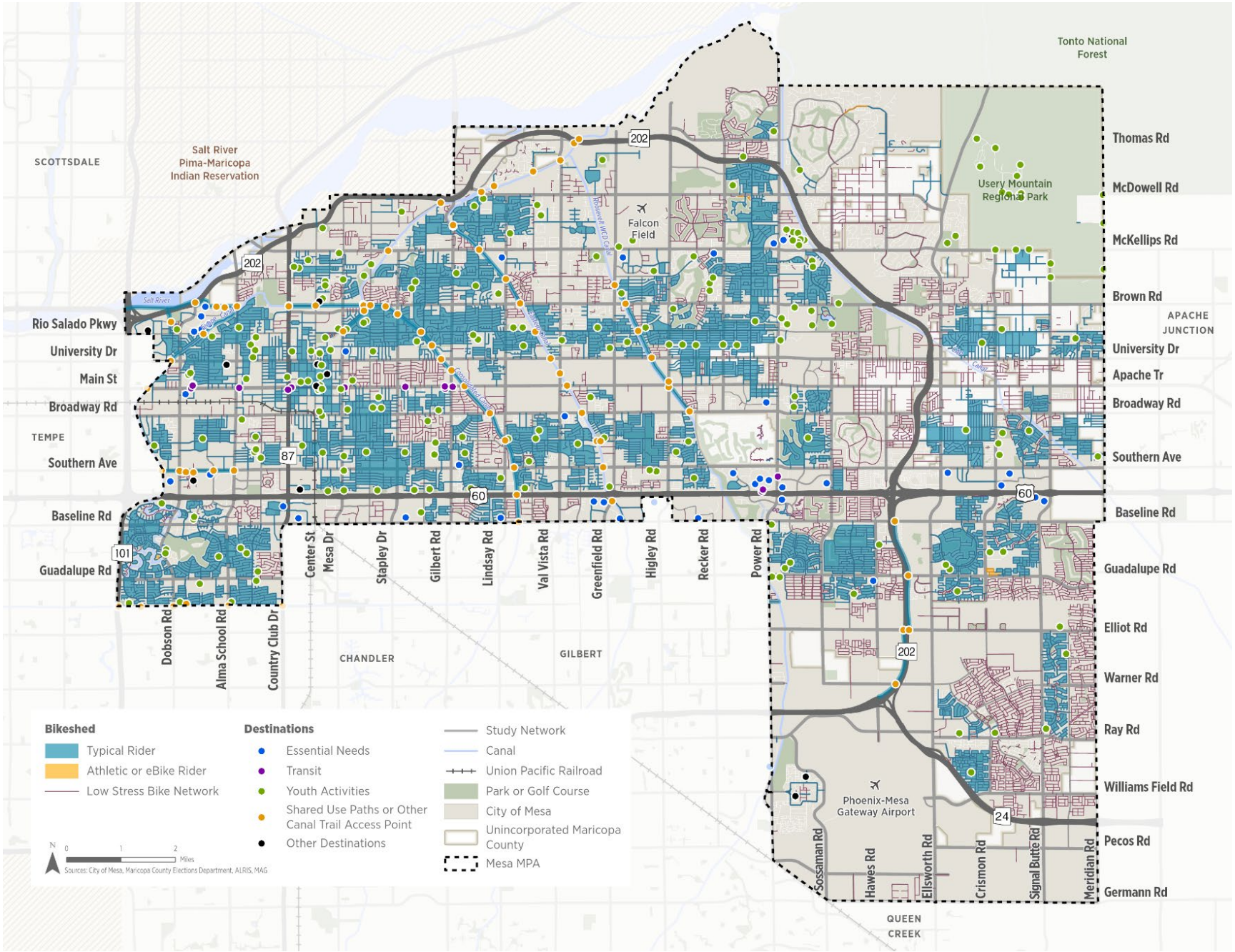
Walking to Youth Activities



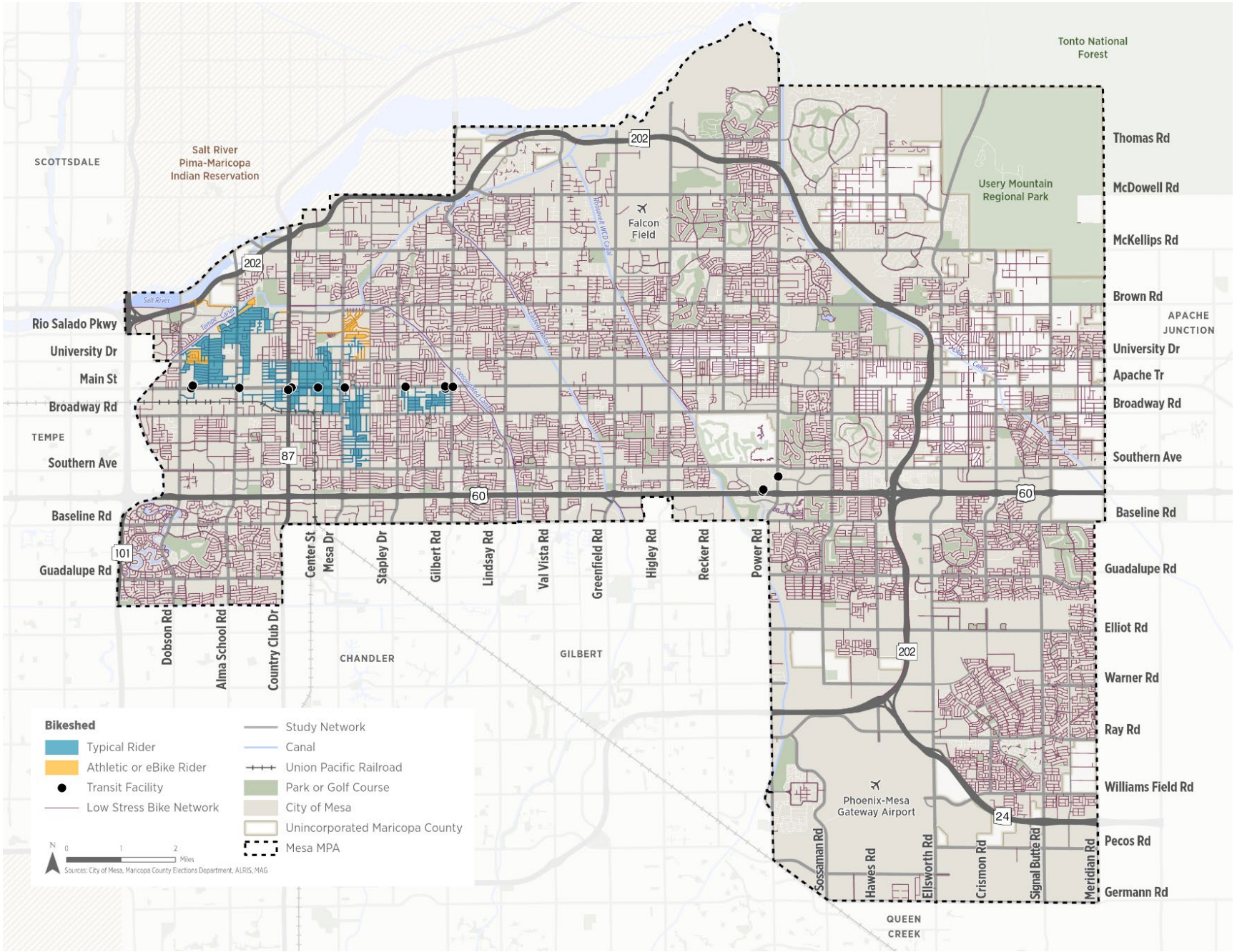
Walking to Shared Use Paths and Other Canal Trail Access Points



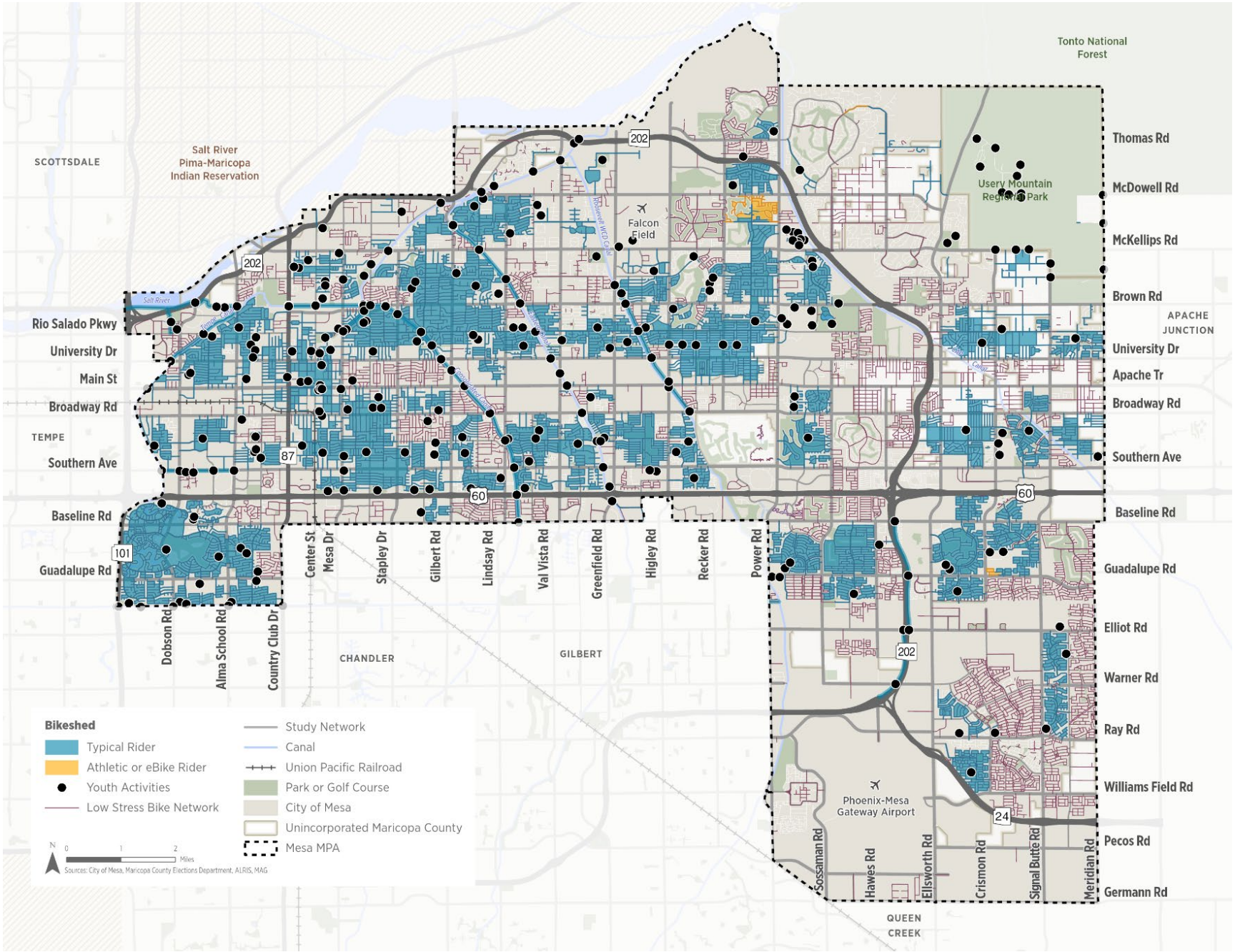
Biking Access to Essential Needs



Biking Transit Access



Biking to Youth Activities



Biking to Shared Use Paths and Other Canal Trail Access Points