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Lake Havasu MPO
METROPOLITAN PLANNING ORGANIZATION

MPO Technical Advisory Committee (TAC) Meeting
Regular Meeting Agenda

Tuesday, August 25, 2020, 1:30 p.m.

In-Person Attendance is Suspended for this Meeting.
This meeting will be held through technological means.

Zoom Meeting ID: 835 9836 2249 Call in Information: 1-669-900-6833

Shaded Items are action items

1. Call To Order

2. Roll Call

3. Title VI – Notice to the Public (Jeanette Buckley)

4. Action Item - Approve the TAC meeting minutes of May 19, 2020

5. LHMPO Director's Report
   Vinny Gallegos, LHMPO Director

6. WACOG Transportation Report
   Justin Hembree, WACOG Transportation Manager

7. RTAC (Rural Transportation Advocacy Council) Report
   Kevin Adam, RTAC Executive Director

8. ADOT District Engineer's Report
   Todd Steinberger, P.E. Northwest Assistant District Engineer

9. ADOT Planner's Report
   Jason James, Transportation Planning Program Manager

10. Lake Havasu City Transit Report
    Patrick Cipres, Transit Manager

11. **HSIP FY19/20 Project Update** - Pedestrian Hybrid Beacon for Acoma Blvd. & Pima Dr. North
    Greg Froslie, LHC Public Works Director

12. **HSIP FY21/22 Project Update** - Swanson Ave. / Acoma Blvd. Revised Scope and Cost
    Vinny Gallegos, LHMPO Director
    Mike Blankenship, Greenlight Traffic Engineering

13. **HSIP FY23/24 Projects Update** – London Bridge Road Safety Improvements / MPO Strategic Transportation Safety Plan
    Vinny Gallegos, LHMPO Director

14. 2045 Regional Transportation Plan (RTP) Workshop
    Vinny Gallegos, LHMPO Director
    Phyllis Davis, Kittelson & Associates Project Manager

15. Future Agenda Items?

16. Upcoming Meeting Schedule

    - LHMPO Executive Board Meeting: **September 8, 2020 2:00 PM**

    - LHMPO Technical Advisory Committee Meeting: **September 22, 2020, 1:30 PM**

17. Adjourn

Agenda Item # 4

LAKE HAVASU MPO - TAC
REQUEST FOR ACTION
August 25, 2020

SUBJECT: **Action to Approve TAC Meeting Minutes for May 19, 2020**

SUBMITTED BY: Vinny Gallegos, LHMPO Director

AGENDA TYPE: **Regular Agenda**

ATTACHMENTS:

May 19, 2020 Meeting Minutes

SUMMARY/BACKGROUND:

The meeting minutes from May 19, 2020, are being submitted for TAC review and approval.

ACTION OPTION:
Motion to approve the Consent Agenda

OR
Motion to approve the Consent Agenda, with the noted changes

RECOMMENDATION:

Motion to approve the Consent Agenda

Lake Havasu MPO
METROPOLITAN PLANNING ORGANIZATION

www.LHMPO.org

MPO Technical Advisory Committee (TAC) Meeting
Minutes

Tuesday, May 19, 2020, 1:30 p.m.

In-Person Attendance is Suspended for this Meeting.
This meeting will be held through technological means.

Call in Information: 1-669-900-6833 Meeting ID: 240 624 4759

1. **CALL TO ORDER/ROLL CALL**
   Greg Froslie called the meeting to order at 1:30 p.m.
   The roll call was performed by Jeanette Buckley
   Present via Zoom Meeting: Greg Froslie, Steven Latoski, Nathan Escoffier, Justin Hembree, Jason Bottjen, Stuart Schmeling, Jess Knudson, and Tim Walsh

2. **TITLE VI – NOTICE TO THE PUBLIC**
   Jeanette Buckley read the Title VI – Notice to the Public

3. **CONSENT AGENDA**
   The following items will be considered as one item by the Technical Advisory Committee(TAC) and will be enacted with one motion with no separate discussion unless a board members requests to so, in that event the item will be removed.

   3.1 Approve the TAC meeting minutes of March 3, 2020
   Motion
   Jess Knudson presented a motion to approve the consent agenda. Motion was seconded by Stuart Schmeling.
   Vote on Motion
   Roll call vote taken. The vote on the motion was unanimous.

4. **DISCUSSION/POSSIBLE ACTION**

   4.1 Discussion and Update: Swanson / Acoma updated scope and cost
   Vinny Gallegos updated the TAC on the Swanson / Acoma intersection scope and updated cost estimate. Greenlight Traffic Engineering is working on this project with evaluating this intersection for the potential HSIP project.

   Mike Blankenship informed the TAC that Greenlight Traffic Engineering has received most of the information that was requested from Lake Havasu City. Mike Blankenship still needs as builts if they are available. Mike Blankenship stated that they have not been able to get the traffic counts scheduled since the traffic patterns have changed in the last couple of months. Mike Blankenship explained that a option for the traffic counts is to use Streetlight Data this uses big data from cell phones, and GPS in cars. This company has traffic data dated back to 2016 available. Mike Blankenship informed the TAC that there was not a big rush from ADOT design is set for 2021. Greenlight Traffic Engineering will need the traffic counts to do the cuing analysis.

Vinny Gallegos advised the TAC that the Streetlight Data program is being looked at as a statewide purchase by Flagstaff MPO and they have reached out to see if Lake Havasu MPO is interested. For Greenlight Traffic Engineering to use this program the MPO is looking at adding additional funds for this project around $1,100. The statewide partnership for annual use of Streetlight Data will be $10,000. Vinny Gallegos is looking at the greater investment of this program for use in upcoming projects.

Stuart Schmeling asked if the program is an annual membership or do we have to purchase and have a certain amount of licenses. Vinny Gallegos asked Justin Hembree if he had more clarification. Justin Hembree advised the TAC that he has not received any more feedback concerning Streetlight Data he is understanding that the $10,000 was on an annual basis not sure how many licenses you get. Justin Hembree noted that this is not just for traffic counts it is also destination information.

Dan Gabiou advised that ADOT is not accepting Streetlight Data for HPMS purposes since it does not meet ADOT and FHWA requirements. Dan Gabiou stated that the data that Streetlight Data provides is cell phone based and could be helpful to the agencies.

Mike Blankenship advised that there will be some processing required to run the Streetlight Data program. Agencies have to set up zones and there is work in setting this program up.

Jess Knudson asked how the technology works with the cell phone data. Mike Blankenship explained that Streetlight Data is tracking the GPS in vehicles and cell phones the data tracks turn movements and ADT's. Steven Latoski asked if there was special software to analysis the data from Streetlight Data. Mike Blankenship explained that there is no special software required to analysis the data.

Greg Froslie asked Vinny Gallegos if he has reached out the Public Works department to see if there is historical data for that location. Vinny Gallegos referred to Mike Blankenship for this answer. Mike Blankenship responded that this was in the original request for information to Jeff Herb and it has not been provided yet but will reach out again.

4.2 Discussion and Update: 2045 Regional Transportation Plan (RTP)
Vinny Gallegos advised the TAC that the Request for Proposals was advertised and the responses were received. There was a five person review committee consisting of TAC Members. Kittleson's & Associates proposal was selected and the draft contract has been sent to Kittleson's & Associates for review.

Phyllis Davis, Kittlesons & Associates responded that she is happy to work with Lake Havasu City and Lake Havasu MPO again.

Vinny Gallegos and Greg Froslie congratulated Phyllis Davis with Kittleson & Associates and the team.

4.3 Discussion and Update: MPO Cooperation with Transit Implementation / CARES Act
Vinny Gallegos advised the TAC that a few months ago that the Transit Implementation Plan was adopted. Vinny Gallegos updated the TAC that the Federal Government has implemented a program called CARES Act. In the CARES Act there is transit money available for transit agencies. Lake Havasu City has been given $2.3 million with this act. This funding is to help with transit in different areas it is 100% funded with no local match requirement.

Vinny Gallegos indicated that the MPO's role is help and assist Lake Havasu City and to offer any assistance that is needed administering these funds.

4.4 Discussion and Update: Rural Transportation Advocacy Council (RTAC)
Vinny Gallegos invited Kevin Adams from RTAC to give an update of what is going on in the State:

Kevin Adam, RTAC updated the TAC with the following:

- Senate made a motion to adjourn for the year
- It is possible the Governor will possibly call a special session of the Senate
- The House of Representatives has gone back to work this week
- There are a couple of COVIG bills that the House of Representatives will be looking at
- There will be no new spending, and no new tax cuts
- There was tremendous revenue growth before COVIG
- This is not good news for the transportation side
- At Arizona State Transportation Board Meeting ADOT advised the board that $711 million will be lost to the State Highway Construction Program
- ADOT staff recommendation is to freeze new construction
- There is less available now for preservation of the roads than was originally programmed across the state
- ADOT is going to have to return grant funding due to not being able to pay match required
- CARES act addresses transit but did not address highway and roads and hopefully this will be addressed with the next bill

Jess Knudson asked Kevin Adam if he has heard anything about the 1.9 billion that the Governor has received for the State in CARES Act funding being distributed to the cities and what the funding can be used for. Kevin Adam responded that he understands that this funding has restrictions and the bulk could only go to COVIG expenses that had not already been incurred. Kevin Adam explained that the push for the next bill is for infrastructure this will include additional funding for state and local relief to help with shortfall for the revenue collection losses.

Vinny Gallegos asked Kevin Adam to give an update on what RTAC is advocating for the MPO's and COG's. Kevin Adam gave the following update on what is going on in the Federal Government:

- FAST Act expires at the end of September
- There is a lot of reforms that were being looked at
- The funding is not addressing the state's growth in population

- The funding that MPO's and COG's receive does not fluctuate with the population of the number of MPO's in the state
- The PL Funding is the primary funding used for operating of the small MPO's
- The last census there were 3 new MPO's added to the State of Arizona with no increase in funding for the state
- There was a meeting with Martha McSally concerns were raised about the lack of funding for transportation
- If there is not funding to relieve the state budget there will potential HURF raids
- Hopefully with the next transportation bill will have more funding President Trump is pushing to increase the amount of funding over what the FAST Act provided for infrastructure

Vinny Gallegos advised the TAC that to stay tuned to how the next census will impacts the MPO's if new MPO's are established. If the funding get cut then there will have to be cuts to the MPO's budget and possibly operation staffing dollars. These will have to be discussions with the TAC and Executive Board.

Steven Latoski wanted the TAC to be made aware that if there is potential cuts like HURF raids that the County and local entities need to be a voice at the state level to express the needs of our areas. This could be a potential $3 million shortfall for Mohave County.

5. AGENCY AND LHMPO UPDATES

Dan Gabiou, ADOT updated the TAC on the following:

- Dan Gabiou will send the MPO the links to the Arizona State Transportation Website for the 5 Year Plan
- Also will send the link to the MS2 website
- There is unofficially a new planner has been hired to replace Jason Bottjen and will attend the LHMPO TAC meetings

6. FUTURE AGENDA ITEMS

Greg Froslie asked for any future agenda items none were given.

7. UPCOMING MEETING SCHEDULE

- LHMPO Executive Board Meeting: **June 9, 2020 2:00 PM**
- State Transportation Board Meeting: **June 19, 2020, 9:00 AM**
- LHMPO Technical Advisory Committee Meeting: **August 11, 2020, 1:30 PM**

8. ADJOURN

Greg Froslie adjourned the meeting at 2:32 p.m.

Agenda Item # 12

LAKE HAVASU MPO
REQUEST FOR ACTION
August 25, 2020

SUBJECT: Discussion and Update on Traffic Signal for Swanson Ave. and Acoma Blvd.

SUBMITTED BY: Vinny Gallegos, LHMPO Director

AGENDA TYPE: Discussion Only

ATTACHMENTS:

No Attachments

SUMMARY/BACKGROUND:

The Lake Havasu MPO on behalf of Lake Havasu City (LHC) made application for Highway Safety Improvement Program (HSIP) funds for FY21 (Design) and FY22 (Construction) to improve safety at the intersection of Swanson Ave. and Acoma Blvd. The application described that a traffic signal would provide the greatest safety benefit for this intersection. ADOT awarded HSIP funds in the amount of $724,750 for the design and construction of this project. LHC in cooperation with ADOT and LHMPO proactively identified a need for a revised project scope and updated cost estimates. LHC and LHMPO met with ADOT to determine availability of additional HSIP federal funds for the project should it be needed. ADOT offered to support the project up to and not exceeding $1,000,000. In an effort to secure an updated project scope and cost estimate, the LHMPO hired Greenlight Traffic Engineering to provide technical assistance.

LHMPO and Greenlight Traffic Engineering now estimate the design and construction of the project to be $999,105. The additional $275,000 will be federal HSIP funds and an addition of $200 local match. Through a creative and innovative approach the project was expanded to include speed feedback signs, pedestrian beacons, in addition to the traffic signal.

ACTION OPTION:

Discussion Only

RECOMMENDATION:

Discussion Only

Agenda Item # 14

LAKE HAVASU MPO - TAC
REQUEST FOR ACTION
August 25, 2020

SUBJECT: 2045 Regional Transportation Plan (RTP) Workshop

SUBMITTED BY: Vinny Gallegos, LHMPO Director

AGENDA TYPE: Regular Agenda

ATTACHMENTS:

2040 Regional Transportation Plan

SUMMARY/BACKGROUND:

This is the first technical workshop for the 2045 RTP. Phyllis Davis, the RTP Project manager will facilitate this workshop with the LHMPO TAC, staff, and invited guests. Your active participation and communication is needed in this workshop, as your input will directly guide the 2045 RTP.

In an effort to prepare for this workshop, the following questions will be asked of you:

- What improvements have been made since the completion of the 2040 RTP (completed in 2014)?
- What changes if any, have you noticed in regional transportation trends?
- What are the key corridors and intersections the study should analyze?
- What areas are experience significant congestion, safety, multimodal, or operational issues?
- What planned development is expected?
- What future trends do you see? (i.e., increased congestion, funding reductions, more emphasis on multimodal, etc.)

ACTION OPTION:

This is not an action item

RECOMMENDATION:

This is not an action item.

Lake Havasu MPO
METROPOLITAN PLANNING ORGANIZATION

2040 Regional Transportation Plan

Final Report

March 8, 2016

Prepared by

JACOBS®

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ACRONYMS

AADT	Average Annual Daily Traffic
ADOA	Arizona Department of Administration
ADOT	Arizona Department of Transportation
ALISS	Accident Location Identification Surveillance System
AZTDM	Arizona Statewide Travel Demand Model
CTL	Center Turn Lane
CMAQ	Congestion Mitigation and Air Quality Improvement Program
FAST Act	Fixing America's Surface Transportation Act
FTA	Federal Transit Administration
FHWA	Federal Highway Administration
GPS	Global Positioning Systems
HCM	Highway Capacity Manual
HSIP	Highway Safety Improvement Program
HURF	Highway User Revenue Fund
ITS	Intelligent Transportation Systems
LHMPO	Lake Havasu Metropolitan Planning Organization
LPA	Local Public Agencies
LOS	Level of Service
NEPA	National Environmental Policy Act
NHFN	National Highway Freight Network
NHFP	National Highway Freight Program
NHPP	National Highway Performance Program
NHS	National Highway System
MPO	Metropolitan Planning Organization
P3	Public Private Partnerships
ROW	Right-of-Way
RSA	Roadway Safety Assessment
RSU	Roadside Unit
RTP	Regional Transportation Plan
SPaT	Signal Phase and Timing
SPR	State Planning and Research
STBG	Surface Transportation Block Grant

ACRONYMS (continued)

STP	Surface Transportation Program
STSP	Strategic Transportation Safety Plan
STIP	State Transportation Improvement Program
TA	Transportation Alternatives
TAC	Technical Advisory Committee
TAP	Transportation Alternatives Program
TAZ	Traffic Analysis Zone
TDM	Travel Demand Model
TIP	Transportation Improvement Program
UPWP	Unified Planning Work Program
WACOG	Western Arizona Council of Governments
V2I	Vehicle-to-Infrastructure
V2V	Vehicle-to-Vehicle
VHT	Vehicle Hours Traveled
VMS	Variable Message Signs
VMT	Vehicle Miles Traveled
VPD	Vehicles per Day

Lake Havasu MPO
METROPOLITAN PLANNING ORGANIZATION

Lake Havasu Metropolitan Planning Organization
900 London Bridge Road, Transit Bldg.
Lake Havasu City, AZ 86404
(928) 453-2823

March 9, 2016

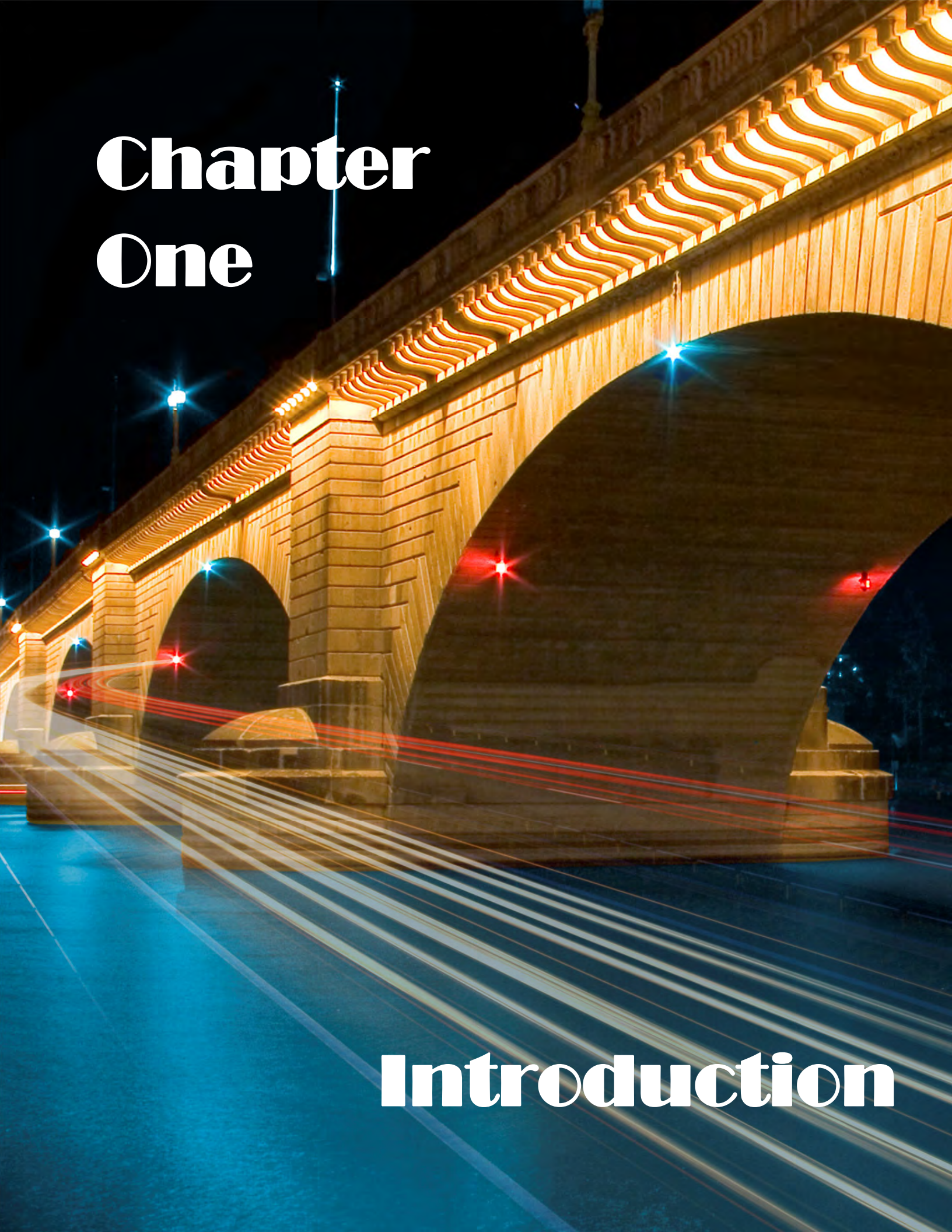
The Lake Havasu Metropolitan Planning Organization (LHMPO) is proud to present its first Regional Transportation Plan. The 2015 – 2040 Transportation Plan was developed in partnership with Lake Havasu City, Mohave County, Arizona Department of Transportation (ADOT), Federal Highways Administration (FHWA), Federal Transit Administration (FTA) and the citizens of the LHMPO area.

The future sustainability and economic vitality of the LHMPO Region is depended on the reliability and safety of its transportation infrastructure. To achieve this goal, it is necessary to proactively plan to enhance mobility, safety and accessibility within the LHMPO Region for all modes of transportation.

The LHMPO Regional Transportation Plan sets forth projects and implementation strategies that will assist us to invest our limited funding wisely to better manage growth. Our goal is to monitor the needs of the traveling public and assess the transportation system performance within the LHMPO Region as well as improve upon as we move forward.

I would like to thank the LHMPO Technical Advisory Committee for their work developing this Plan and the citizens of the Region for your valuable contribution. Additionally I would like to thank the LHMPO Executive Board for their support during the study and for Adopting the Plan on March 8, 2016.

Jean Knight
Manager, LHMPO



Chapter One

Introduction

1. INTRODUCTION

BACKGROUND

A Metropolitan Planning Organization (MPO) is a federally designated agency responsible for coordinating transportation planning and programming in urbanized areas with populations of 50,000 or more. The MPO's mission is to provide planning and programming services for the safe and efficient movement of people and goods consistent with the region's overall land use, economic, social and environmental goals. Special emphasis is placed on providing equal access to a variety of transportation mode choices (transit, bicycling, walking, automobile, carpool, etc.) and ensuring effective public involvement throughout the planning process.

The MPO is involved in transportation planning and related planning issues (e.g., land use) on a regional scale, makes transportation planning decisions and sets transportation planning policies for the metropolitan planning area it covers.

Good planning involves citizens, increases efficiency and effectiveness of the public investments in transportation, and promotes transportation services and infrastructure that are consistent with the community's desires.

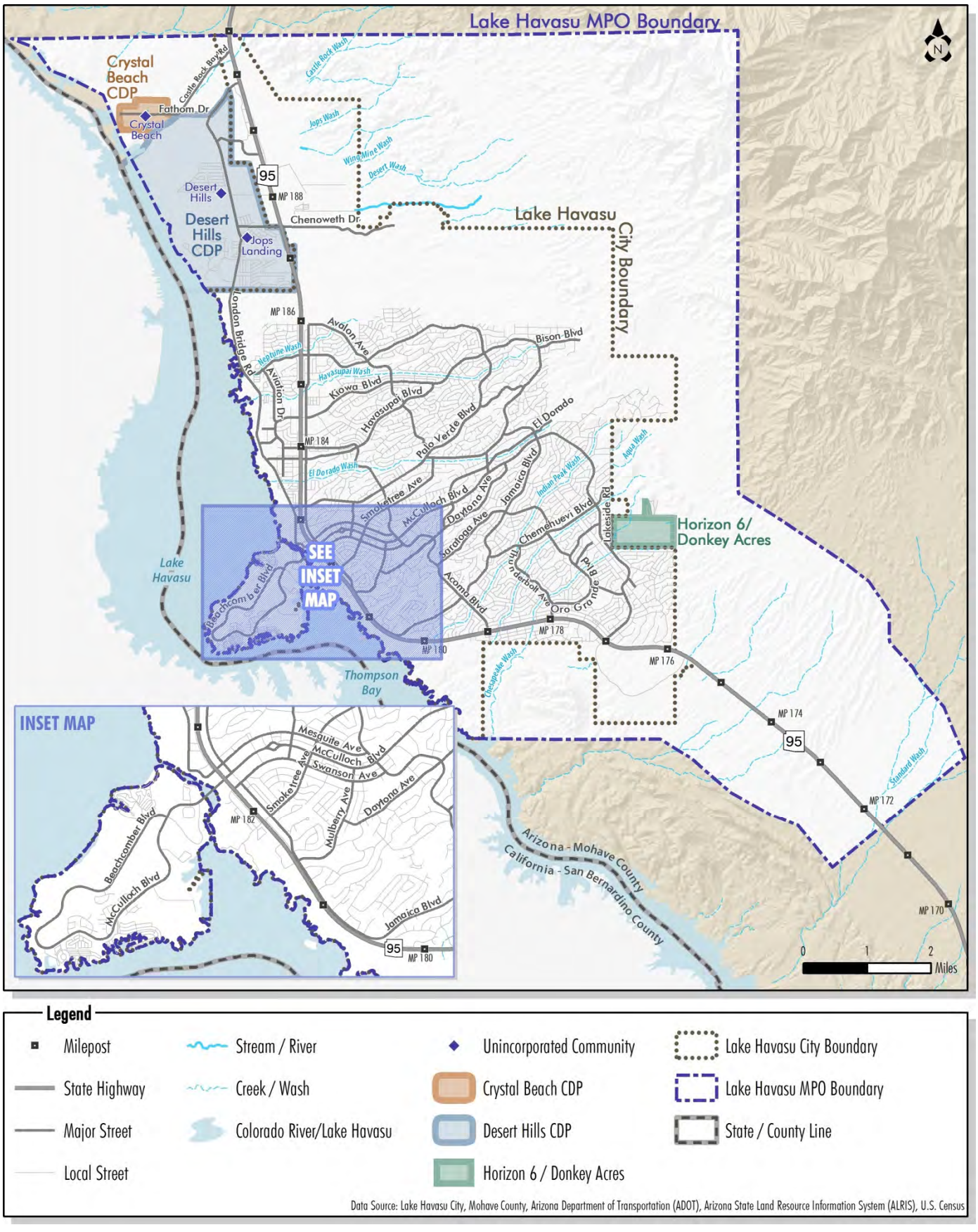
The planning process enhances the community's character and quality of life by considering the interaction between land use and transportation and their cumulative effect on the built and natural environments. The MPO performs its mission through three related activities and documents—the Regional Transportation Plan (RTP), the Transportation Improvement Program (TIP), and the annual Unified Planning Work Program (UPWP).

In 2010 the Lake Havasu City area exceeded the population threshold of 50,000 residents; requiring the creation of the Lake Havasu Metropolitan Planning Organization (LHMPO).

The boundary is delineated in Figure 1.1. The LHMPO is responsible for the continuous, cooperative and comprehensive transportation planning process for Lake Havasu City, the Mohave County area north of the City limits known as Desert Hills, Havasu Gardens, Crystal Beach and the Mohave County area southeast of the City known as Horizon Six.

The LHMPO is mandated to develop an RTP by March 2016 to accommodate future growth, transportation services, policies, programs and infrastructure. The RTP establishes a blueprint for the future multimodal transportation system in the LHMPO region which considers needs-based transportation deficiencies and guides decisions to implement strategic transportation investments.

FIGURE 1.1: LAKE HAVASU MPO PLANNING AREA



PURPOSE OF THE STUDY

The long-range regional transportation planning process stems from the need to plan for and implement transportation solutions that help advance a desired vision of growth and development in an urban area.

The purpose of this study is to develop the first fiscally constrained performance-based RTP for the LHMPO area utilizing the latest General Plans of the MPO member agencies. The RTP identifies future regional transportation system needs and outlines transportation improvements necessary to maintain mobility, increase safe travel within and through the region as well as provide access to land uses within the region to promote economic development.

The RTP is one of the reports needed to fulfill federal requirements to ensure the continued receipt of federal transportation funding to this region. The region has to plan for a future regional transportation system that can adequately support the population and employment growth projected for the LHMPO planning area.

The transportation system is multimodal and includes the region's roadways for the transportation of people and goods, transit, pedestrian and bicycle facilities.

The RTP's goals, objectives and policies help to guide member agencies in planning and programming transportation projects in the LHMPO planning area. The RTP is an essential foundation for building an efficient transportation system capable to meet the region's transportation needs over the next 25 years.

2040 RTP VISION, GOALS AND OBJECTIVES

A vision statement and a set of goals are fundamental parts of strategic planning. They define a direction and guide decision making on allocating resources to pursue a specific strategy. The Vision Statement provides a concise declaration of the important outcomes to be achieved by implementing the RTP.

The RTP Goals then guide the region toward development of the Plan and attainment of the Vision.

The RTP Objectives are specific outcomes to help achieve the intent of the goals. Objectives should be quantifiable in order to determine if the objective has been met and what progress has been made toward achieving the goals.

The goals and objectives were vetted with the public through an extensive outreach program and their input was utilized to develop performance measures to help in the prioritization of identified improvements.

Since this is the first RTP for the LHMPO region, performance measures were mostly qualitative in nature and the improvements performance will be measured by how closely their implementation is achieving the goals and vision of the LHMPO region. For this reason, targets were not established at this time, but information contained in this document can be used as a baseline to develop targets in the next plan update.

VISION STATEMENT

In the year 2040, the Lake Havasu MPO regional transportation system will provide high-quality movement of people and goods in support of a sustainable economy, a preserved and protected environment, and a livable community.

GOALS AND OBJECTIVES

GOAL 1: PRESERVE AND IMPROVE THE FUNCTION OF THE EXISTING TRANSPORTATION SYSTEM.

Objective 1: Maintain the existing network in a state of good repair.

Objective 2: Use cost-efficient transportation system management, travel demand management, intelligent transportation system, and operational improvements and techniques to increase the efficiency and safety of the existing transportation system.

GOAL 2: ENHANCE REGIONAL TRANSPORTATION MOBILITY AND ACCESSIBILITY.

Objective 1: Provide cost effective transportation improvements to address identified mobility problems and reduce the traffic congestion during peak commuter and seasonal/event periods.

Objective 2: Provide appropriate travel options and choices for all users, including auto, transit, paratransit, bicycle, and pedestrian.

Objective 3: Improve accessibility to regional employment and activity centers.

Objective 4: Enhance connections between modes.

Objective 5: Support commercial goods movement within and through the region.

GOAL 3: PLAN, DESIGN, AND IMPLEMENT A COORDINATED TRANSPORTATION SYSTEM SO THAT IMPROVEMENTS ARE CONSISTENT WITH REGIONAL DEVELOPMENT AND INFRASTRUCTURE.

Objective 1: Partner with state and local jurisdictions to ensure transportation and land use are complementary.

Objective 2: Enhance transportation system sustainability and minimize impacts of the transportation system to the built and natural environment.

Objective 3: Support regional economic development.

Objective 4: Support transportation security

Objective 5: Support integration with existing infrastructure and systems.

GOAL 4: PUBLIC INVOLVEMENT

Objective 1: Define for the Public what the MPO role is in the community.

Objective 2: Explain what an RTP is and how they and the community will benefit.

Objective 3: Explain when and why the RTP updates will occur.

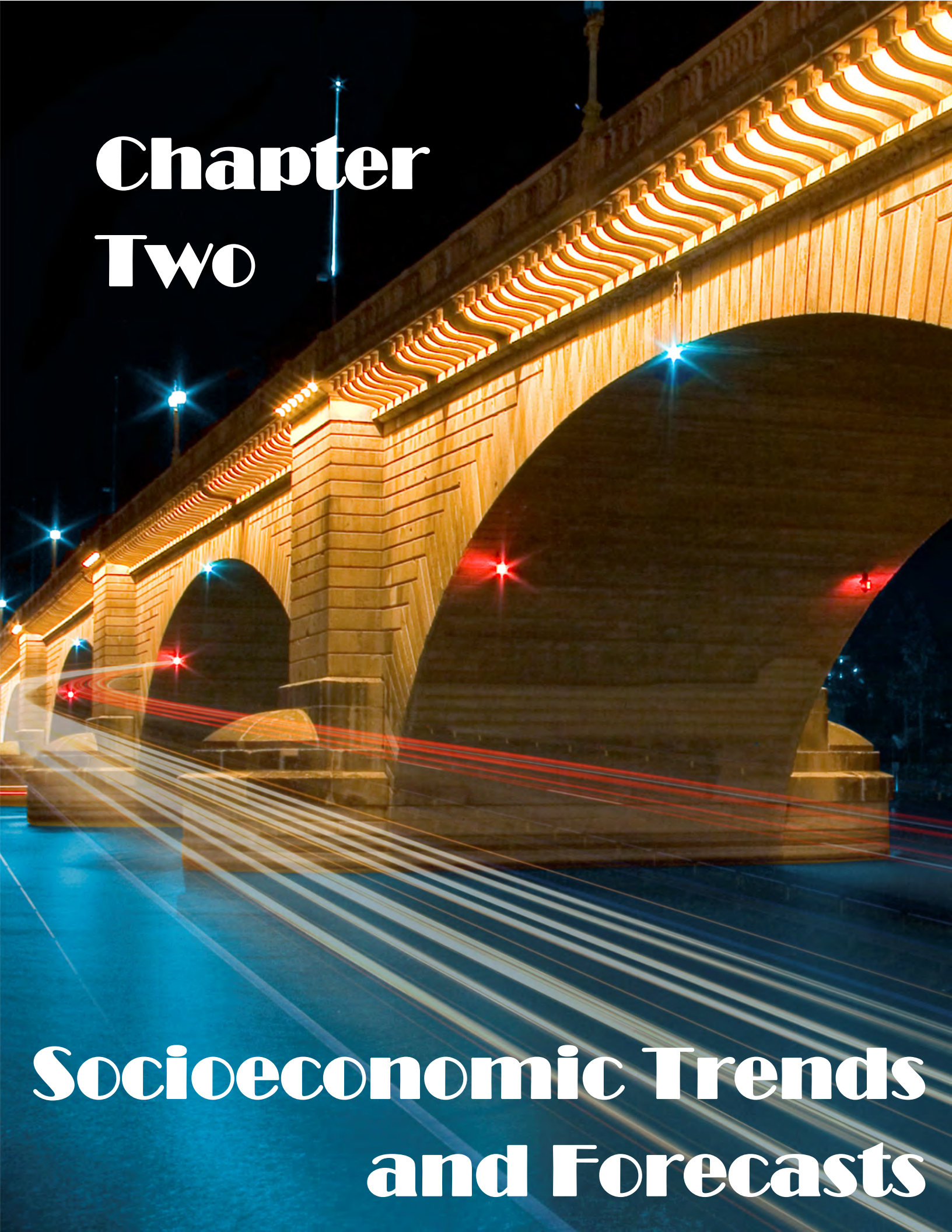
Objective 4: Identify stakeholders and what their role should be. (Business Leaders, Elected Officials, Tribal Leaders)

GOAL 5: REVIEW PAST TRANSPORTATION PLANNING EFFORTS

Objective 1: Obtain listing of planned projects from the past 10-years.

Objective 2: Determine why projects have been planned and not completed or begun.

Objective 3: Prioritization of the past projects for future planning: are they realistic.



Chapter Two

Socioeconomic Trends and Forecasts

2. SOCIOECONOMIC TRENDS AND FORECASTS

Forecasting socioeconomic conditions is an essential and integral part of the planning process as it allows us to anticipate changes in future travel demand and travel patterns. Development of rational projections for population, housing units, and employment is vital to the process of forecasting realistic travel demand needs. This chapter contains a summary of the underlying socioeconomic assumptions used in the study.

POPULATION TRENDS AND PROJECTIONS

According to the 2000 U.S. Census, the total population which consists of all residential and group quarter populations in the LHMPO planning area was 41,938 with majority of the population residing in Lake Havasu City. By the next decennial census count in 2010, the total population in the LHMPO planning area increased to 55,503. During this time period, the average household size for LHMPO planning area decreased from 2.31 to 2.25.

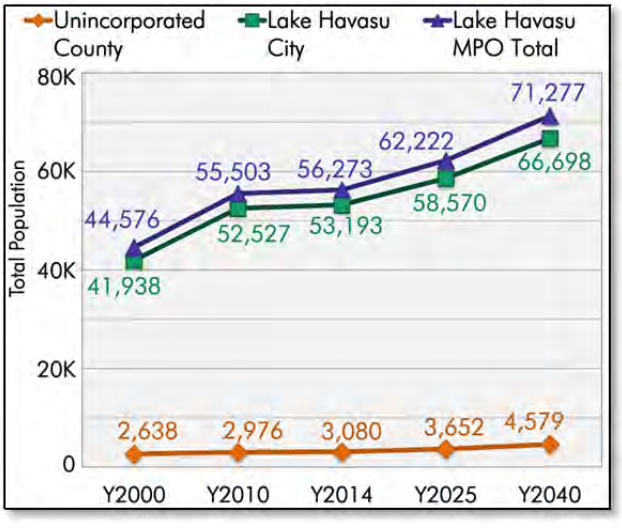
The State Demographer's Office, a branch of the Arizona Department of Administration (ADOA), develops yearly population estimates and 25-year population projections for the State as well as for counties, incorporated areas and some census designated places. In 2014, the Demographer's Office estimated the total population to be 56,279 for the LHMPO planning area and projects that by 2025 the planning area will have a total population of 62,222 and a population of 71,277 by 2040.

Growth is a reflection of the regional and local economy; pre-recession, Arizona had a thriving and robust economy that accelerated population and employment growth throughout the state. While Arizona's economy slowed in 2008, the total population in the LHMPO planning area on averaged increased roughly 1,100 residents per year from 2000 to 2010.

The State's economy is gradually recovering as indicated by the lower growth trends observed throughout the State including in LHMPO area. From 2010 to 2014, the LHMPO planning area increased 192 residents per year which is significantly lower than trends observed from the previous decade.

Future population projections are also reflective of the projected economic recovery. From 2014 to 2025, the population in the LHMPO planning area is anticipated to increase 540 residents per year while from 2025 to 2040 the population is estimated to increase 604 per year. While the LHMPO planning area experienced the largest influx of residents from years 2000 to 2010, the current and future population trends are more conservative. As illustrated in Figure 2.1, total population in the LHMPO planning area gradually increases over the future target years.

FIGURE 2.1: TOTAL POPULATION TRENDS



Figures 2.2 to 2.5 display the residential population per square mile in the LHMPO planning area for years 2014, 2025, and 2040 respectively. Residential population does not include population in group quarters such as correctional facilities, juvenile facilities, nursing homes, college dorms, and/or military quarters.

As depicted in the figures, residential population growth is primarily localized in Lake Havasu City. The residential population growth is primarily based on residential in-fill development which encourages residential construction on vacant lots in established neighborhoods located throughout the City. In the unincorporated county portion of the LHMPO planning area, residential growth is mainly concentrated in the vicinity of Jops Landing just north of the Lake Havasu City limits.

HOUSING UNIT TRENDS AND PROJECTIONS

In 2000, the total number of housing units, which consists of occupied and vacant homes in the planning area, was 24,769. By 2010, housing units in the LHMPO planning area totaled 34,596 and in 2014 totaled 35,092. There is no forecasted data for housing units; it is assumed that the current residential population to occupied housing unit ratio will continue in the future horizon years. It is estimated by 2025, the LHMPO planning area is projected to have 38,787 total housing units and 44,403 by 2040.

The vacancy rate in the planning area since 2000 has increased from 22.2 percent to 28.3 percent in 2010. The majority of the vacant houses in the planning area were utilized as seasonal, recreational, or occasional use homes where the unit is occupied for two months or less.

Table 2.1 shows a tabular summary of the historical and projected population and housing unit data.

TABLE 2.1: PROJECTED POPULATION AND HOUSING UNITS

		Year 2000	Year 2010	Year 2014	Year 2025	Year 2040
Lake Havasu City	Total Population	41,938	52,527	53,193	58,570	66,698
	Residential Population	41,617	52,326	52,989	58,326	66,364
	Total Housing Units	23,018	32,327	32,737	36,004	40,965
	Occupied Housing Units	17,911	23,168	23,462	25,829	29,380
Unincorporated County	Total Population	2,638	2,976	3,080	3,652	4,579
	Residential Population	2,638	2,958	3,061	3,631	4,552
	Total Housing Units	1,751	2,269	2,355	2,783	3,438
	Occupied Housing Units	1,222	1,414	1,463	1,737	2,178
Lake Havasu MPO Total	Total Population	44,576	55,503	56,273	62,222	71,277
	Residential Population	44,255	55,284	56,050	61,957	70,916
	Total Housing Units	24,769	34,596	35,092	38,787	44,403
	Occupied Housing Units	19,133	24,582	24,925	27,566	31,558

Source: 2010 U.S. Census, Lake Havasu MPO; Lake Havasu City; Arizona Department of Administration, Office of Employment and Population Statistics

FIGURE 2.2: YEAR 2014 POPULATION DENSITY

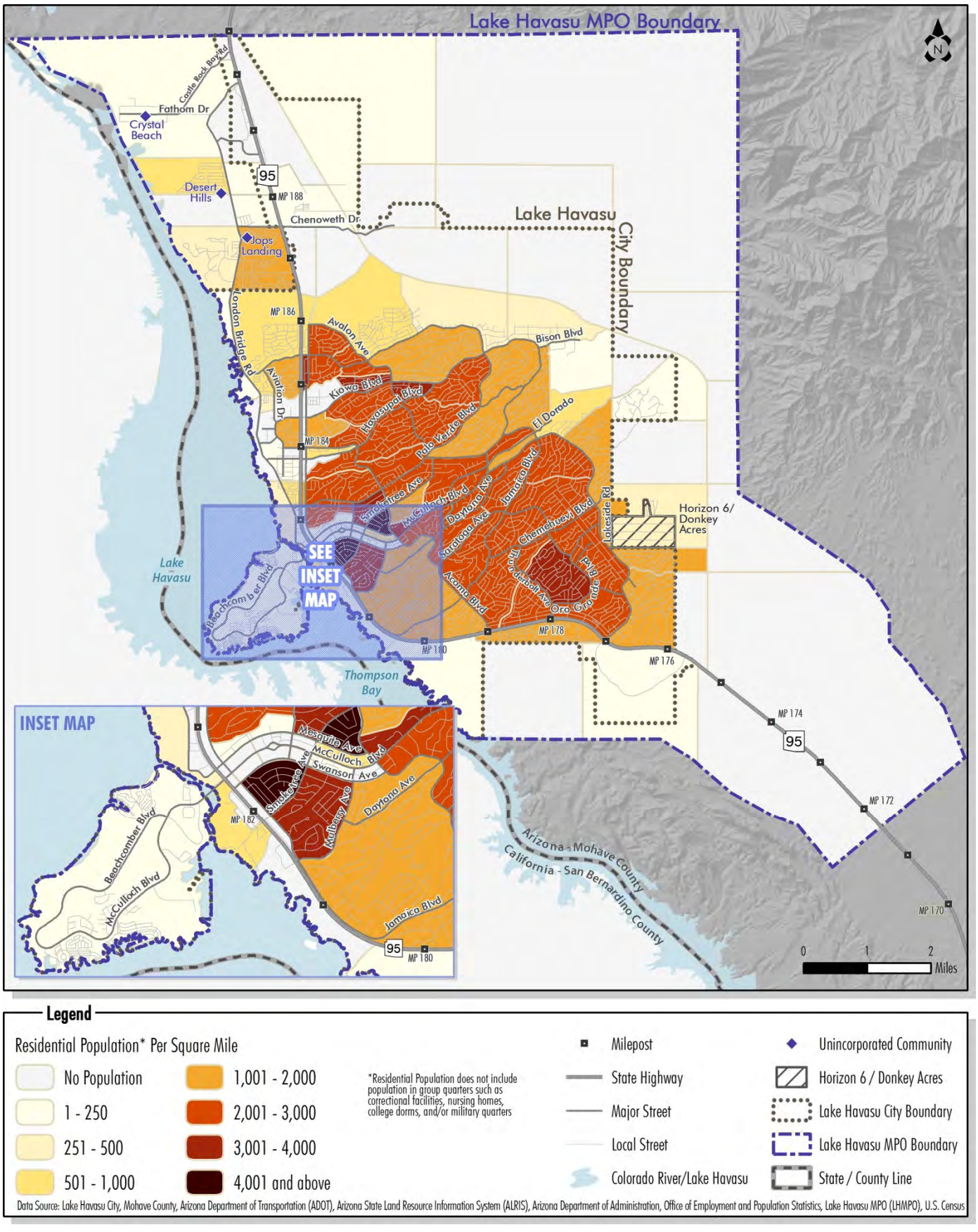


FIGURE 2.3: YEAR 2025 POPULATION DENSITY

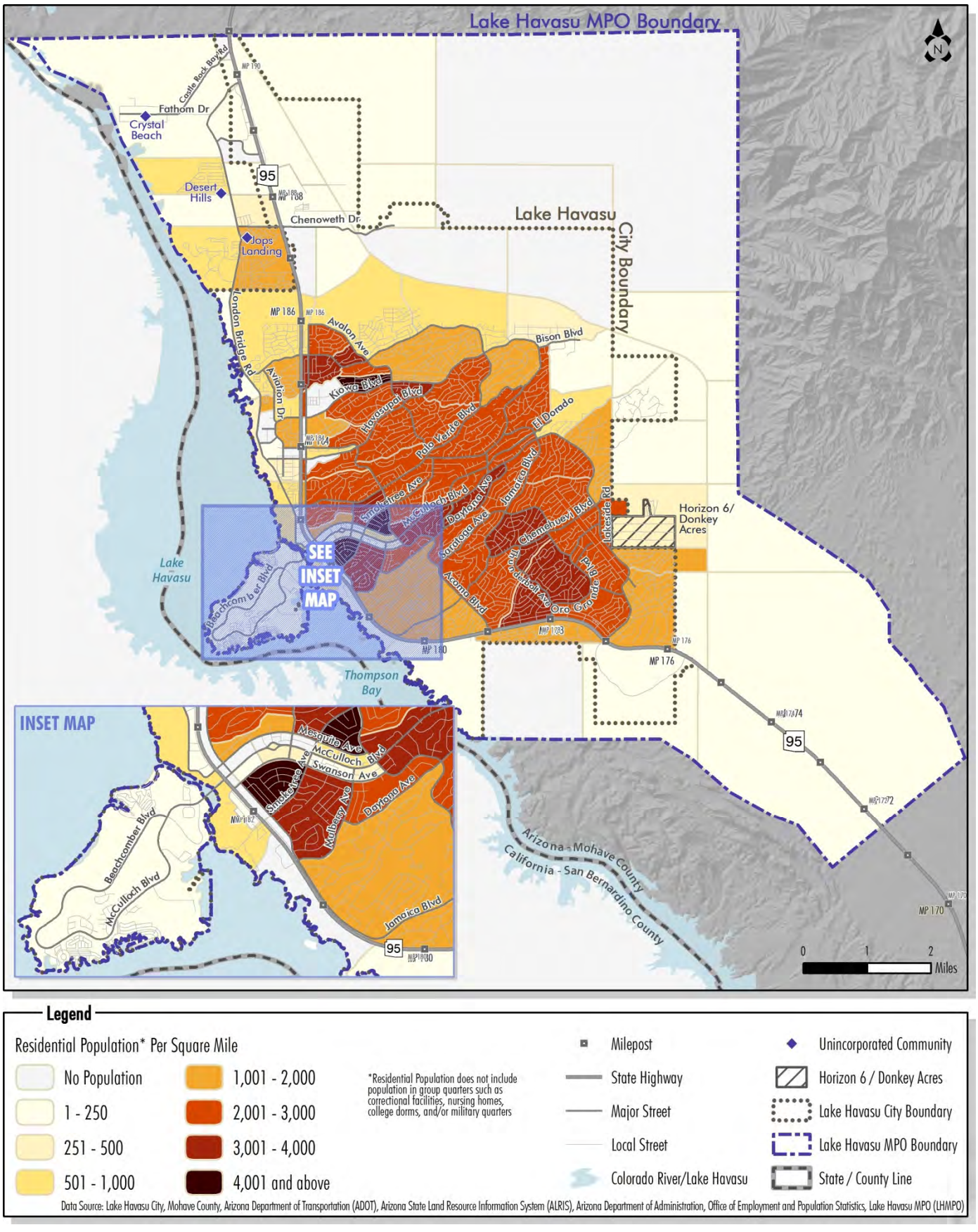
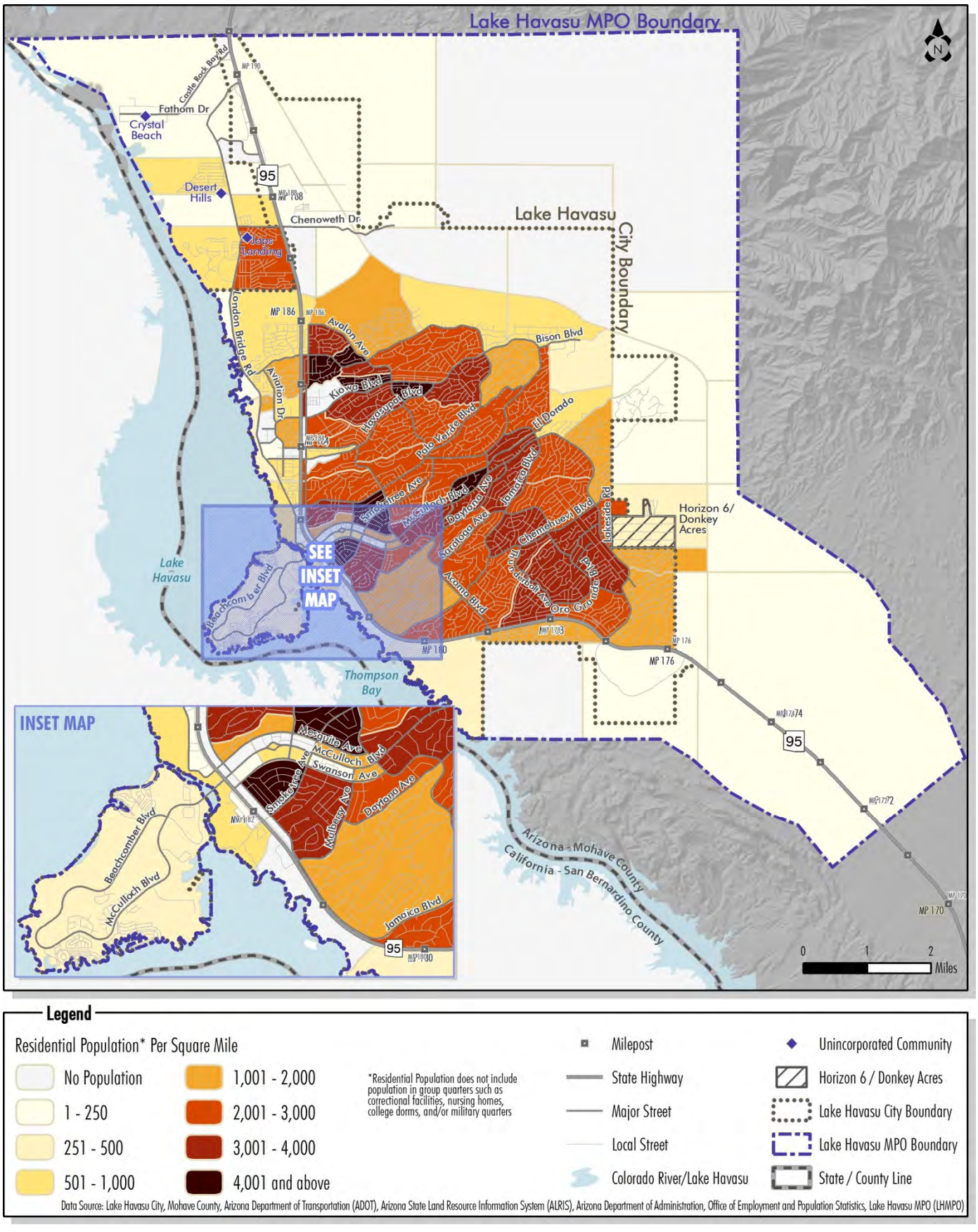


FIGURE 2.4: YEAR 2040 POPULATION DENSITY



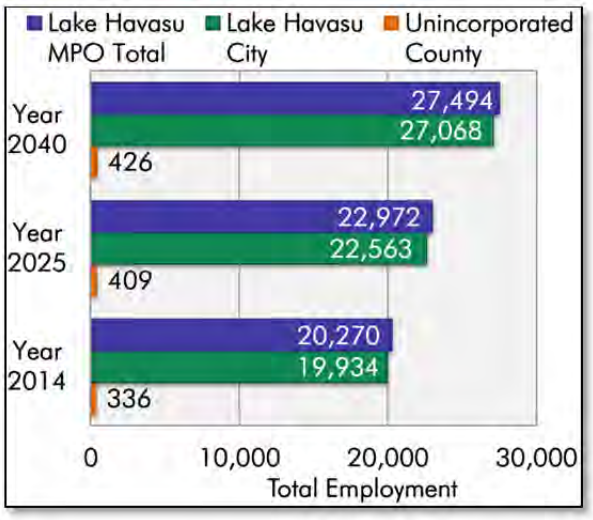
EMPLOYMENT TRENDS AND PROJECTIONS

Retail, accommodation and food service, and health care and social services are the primary drivers of the LHMPO economy. In 2014, employment in the planning area totaled 20,270 with majority of the businesses located in Lake Havasu City. Major employers in the planning area include:

- Lake Havasu School District (598 emp.)
- Lake Havasu City (539 emp.)
- Havasu Regional Medical Center (500 emp.)
- Wal-Mart SuperCenter (350 emp.)
- London Bridge Resort (279 emp.)

There are no known sources for employment projections; however, through coordination with the County and City Staff, and utilizing the *Lake Havasu General Plan*, employment estimates were developed. It was assumed that the current employment to population ratio will remain relatively constant for all horizon years. The LHMPO planning area is projected to have a total employment of 22,972 by 2025 and a total employment of 27,494 by 2040. As depicted in Figure 2.5, total employment in the LHMPO planning area gradually increases over the future target years.

FIGURE 2.5: TOTAL EMPLOYMENT TRENDS



Figures 2.6 to 2.8 display the employees per square mile in the LHMPO planning area for the years 2014, 2025, and 2040. As depicted in the figures, employment growth in Lake Havasu City is primarily adjacent to the existing high-density employment areas along McCulloch Blvd, east and west of SR-95, from McCulloch Blvd to Palo Verde Blvd North, and in the vicinity of the Shops at Lake Havasu. In the unincorporated portion of LHMPO, employment is primarily located in Desert Hills. Table 2.2 shows a tabular summary of the projected total employment.

TABLE 2.2: PROJECTED EMPLOYMENT

		Year 2014	Year 2025	Year 2040
Lake Havasu City	Total Population	53,193	58,570	66,698
	Residential Population	52,989	58,326	66,364
	Total Employment	19,934	22,563	27,068
Unincorporated County	Total Population	3,080	3,652	4,579
	Residential Population	3,061	3,631	4,552
	Total Employment	336	409	426
Lake Havasu MPO Total	Total Population	56,273	62,222	71,277
	Residential Population	56,050	61,957	70,916
	Total Employment	20,270	22,972	27,494

Source: Lake Havasu MPO; Lake Havasu City; Arizona Department of Administration, Office of Employment and Population Statistics

FIGURE 2.6: YEAR 2014 EMPLOYMENT DENSITY

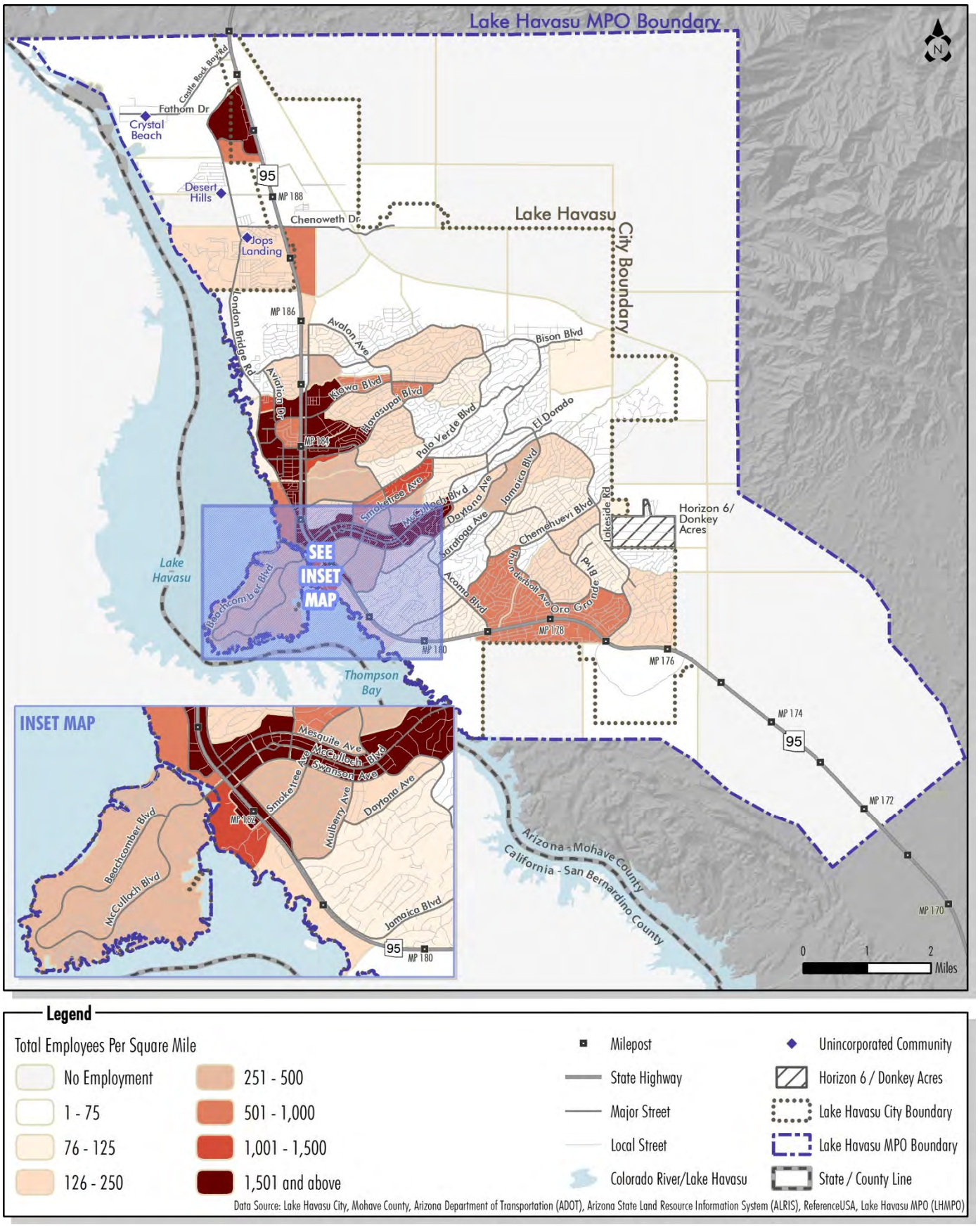


FIGURE 2.7: YEAR 2025 EMPLOYMENT DENSITY

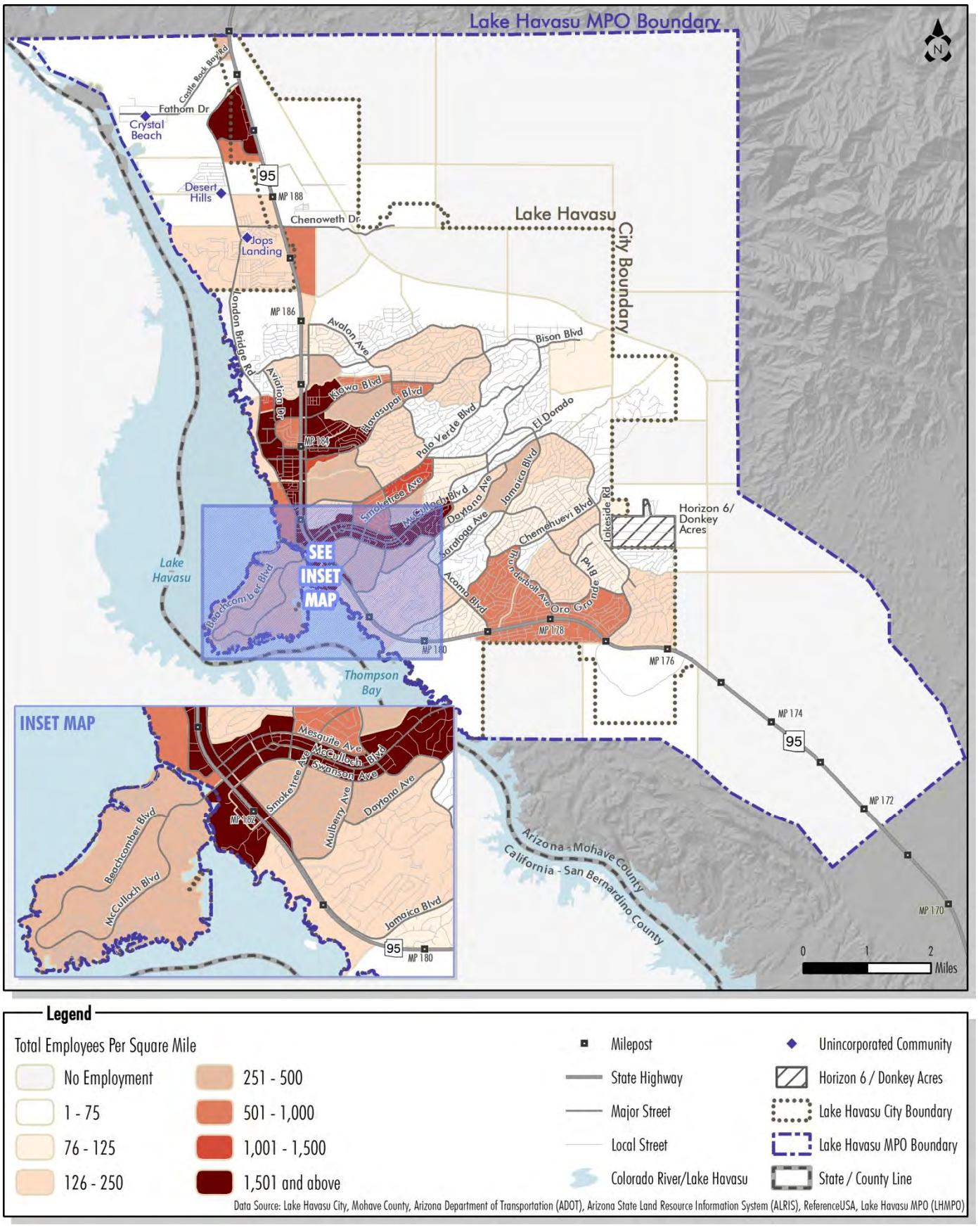
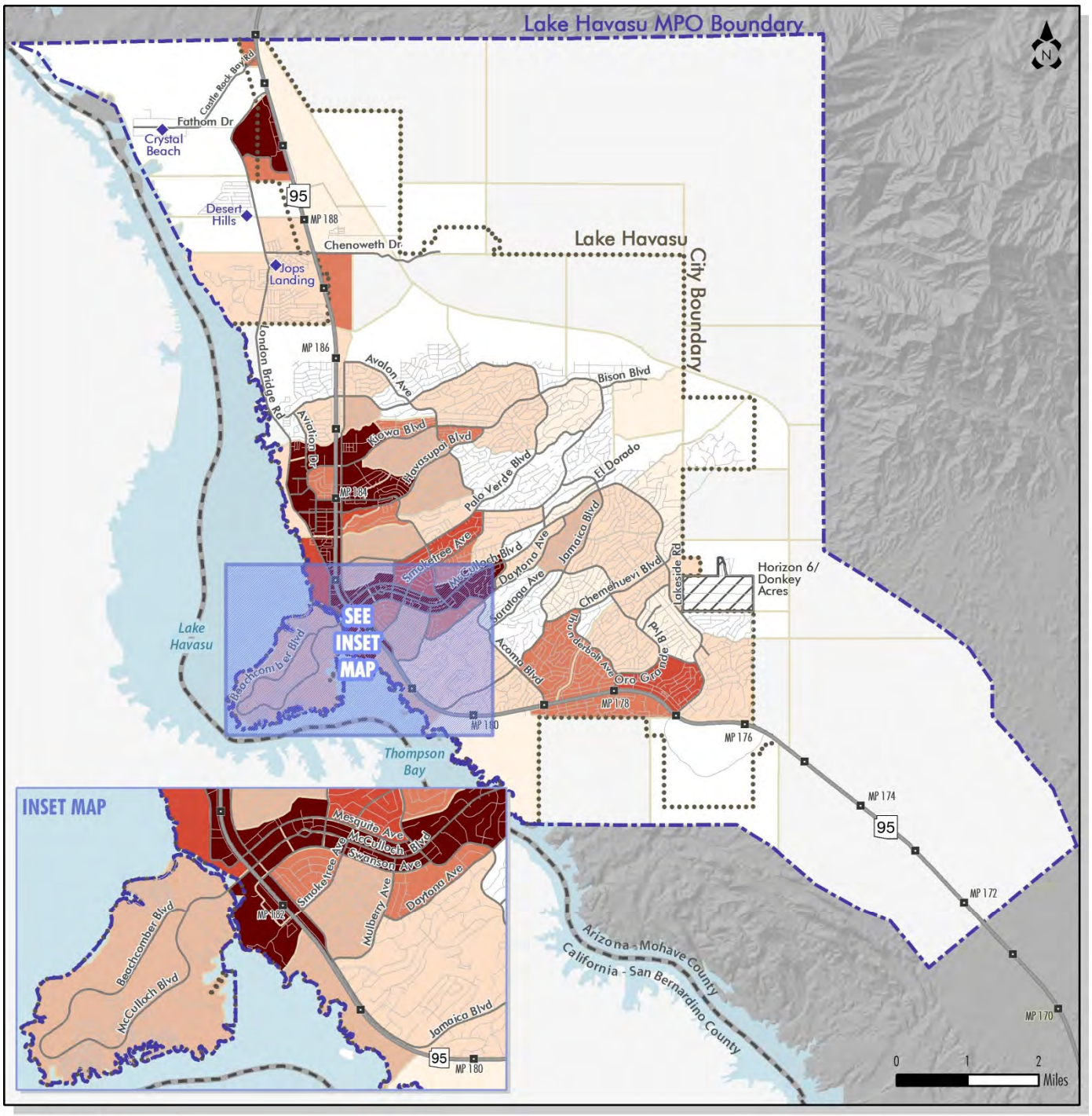


FIGURE 2.8: YEAR 2040 EMPLOYMENT DENSITY



TRAVEL DEMAND MODEL

A transportation planning model is a representation of an MPO's planning area major transportation facilities and of the travel patterns using these facilities. The traffic model contains inventories of existing roadways and of residential and non-residential land uses by traffic analysis zones (TAZs). TAZs are geographical areas, polygons, generally bounded by roadway network, or natural barrier, or geographic features.

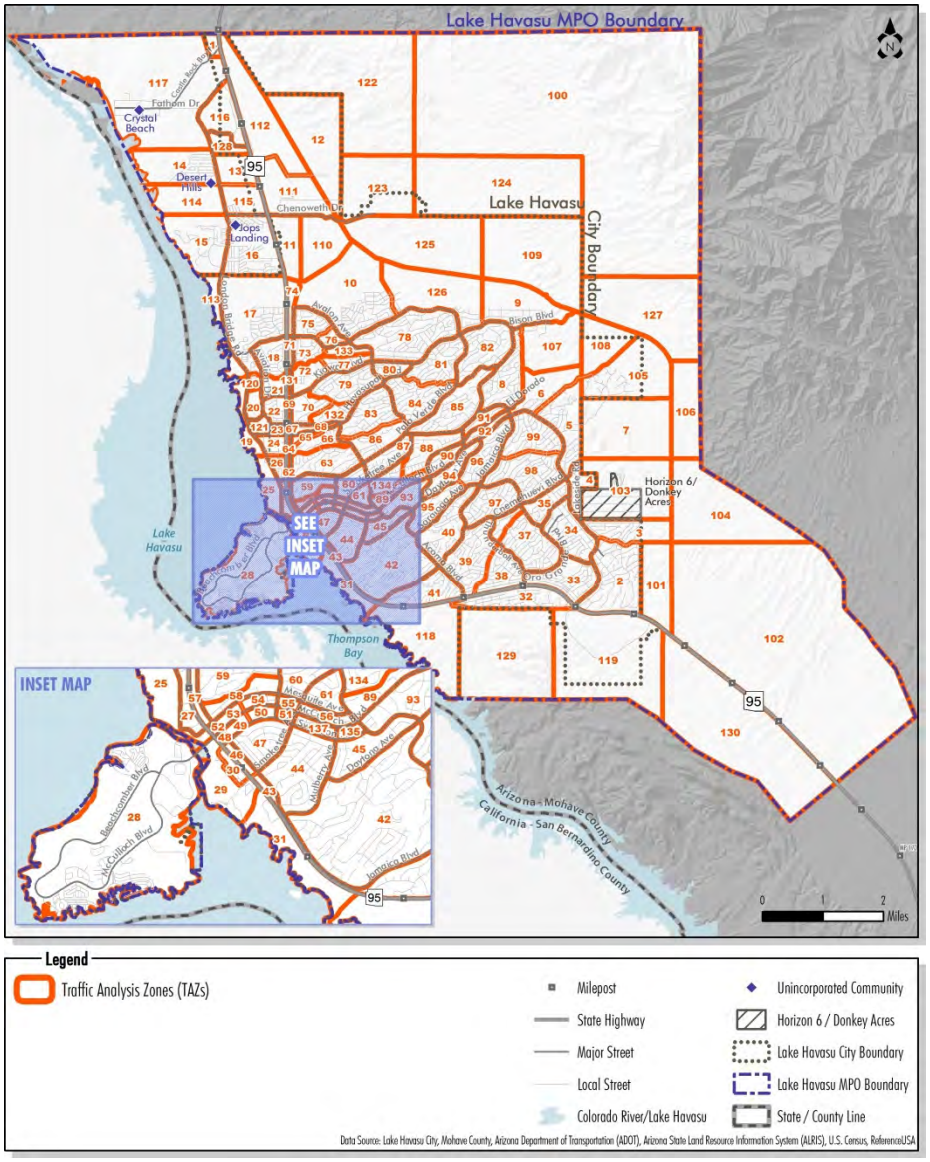
In general, the traffic model process consists of several steps including estimating the number of daily person or vehicle trips by TAZ from the socioeconomic inventory, distributing trips between TAZ, and then assigning vehicles trips to the street to the roadway network. The traffic model assigned trips are then compared to current traffic counts. When the model matches the traffic counts within acceptable ranges of error, the model can then be used to test future year scenarios. The transportation professional uses the traffic forecasting model to project future traffic volumes, which in turn can aid in making planning and project programming decisions.

The ADOT Arizona Statewide Travel Demand Model (AZTDM) was utilized to forecast future travel demand for the LHMPO region. Primary model inputs were: socioeconomic data and roadway network characteristics.

The socioeconomic data is comprised of population, housing unit, and employment estimates; and, is compiled at the TAZ level.

The AZTDM TAZ structure was revised based on current conditions in the area such as new roads, the *2015 Lake Havasu City General Plan* and the *North Havasu Area Transportation Study*. To more accurately depict the travel patterns in the LHMPO planning area, the AZTDM socioeconomic data was updated based on population, housing unit, and employment estimates and projections for base year 2014 and future horizon years 2025 and 2040.

FIGURE 2.9: LHMPO TRAFFIC ANALYSIS ZONES MAP



ENVIRONMENTAL JUSTICE REVIEW (TITLE VI)

Title VI of the Civil Rights Act of 1964 and related statutes require that individuals are not discriminated against based on race, color, national origin, age, sex, or disability. Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, dictates that any programs, policies, or activities to be implemented are not to have disproportionately high adverse human health and environmental effects on protected populations. Environmental justice principles and procedures are followed to assure that transportation improvements do not adversely impact minority and low-income populations. Protected populations considered in this analysis include: minority, elderly, low-income, and disabled populations.

Table 2.3 summarizes the minority, elderly, and female head of household populations for three geographical areas: the Lake Havasu MPO planning area, Mohave County, and Arizona.

Environmental Justice Overview

Percentage of the LHMPO Population:

Minority Population: 16%

Age 65 and Older Population: 27%

Disabled Population (Age 16 to 64): 20.3%

Population Living Below the Poverty Line: 14.3%

Source: 2010 U.S. Census, 2009 to 2013 American Community Survey, 2000 U.S. Census

TABLE 2.3: MINORITY, ELDERLY, AND FEMALE HEAD OF HOUSEHOLD POPULATION PERCENTAGES

	Lake Havasu MPO		Mohave County		State of Arizona	
	Total Population	% of Total Population	Total Population	% of Total Population	Total Population	% of Total Population
Total Population	**55,503**		**200,186**		**6,392,017**	
Male	27,462	49.5%	100,078	50.0%	3,175,823	49.7%
Female	28,041	50.5%	100,108	50.0%	3,216,194	50.3%
Minority Population	**8,859**	**16.0%**	**40,808**	**20.4%**	**2,696,370**	**42.2%**
Hispanic	6,708	12.1%	29,569	14.8%	1,895,149	29.6%
African American	342	0.6%	1,715	0.9%	239101	3.7%
American Indian	442	0.8%	3,793	1.9%	257,426	4.0%
Asian	501	0.9%	2,016	1.0%	170,509	2.7%
Pacific Islander	56	0.1%	316	0.2%	10,959	0.2%
Other Race	29	0.1%	145	0.1%	8,595	0.1%
Two or More Races	781	1.4%	3,254	1.6%	114,631	1.8%
Elderly Population	**15,006**	**27.0%**	**46,658**	**23.3%**	**881,831**	**13.8%**
Male Age 65 and over	7,317	13.2%	23,119	11.5%	401,695	6.3%
Female Age 65 and over	7,689	13.9%	23,539	11.8%	480136	7.5%
Age 15 to 64 Population	**32,579**	**58.7%**	**119,617**	**59.8%**	**4,152,127**	**65.0%**
Male Age 15 to 64	16,133	29.1%	59,819	29.9%	2,081,325	32.6%
Female Age 15 to 65	16,446	29.6%	59,798	29.9%	2,070,802	32.4%
Median Age			47.6		35.9	
Female Head of Household (with children younger than 18 and no husband present)	1,129	4.6%	4,404	5.3%	169,397	7.1%

Source: 2010 U.S. Census

MINORITY POPULATION

Minority population consists of individuals who are members of the following population groups: Hispanic, African American, Native American or Alaskan Native, Asian or Pacific Islander, other race, or two or more races. Minorities accounted for 16 percent of the total population in the LHMPO planning area with Hispanics as the largest minority group. Figure 2.10 displays the concentration of minority population within the LHMPO planning area.

ELDERLY POPULATION

Elderly populations, individuals who are over the age of 65, need to be addressed by Title VI and Executive Order 12898, Environmental Justice. An estimated 27 percent of the total population in the LHMPO planning area is over the age of 65. Figure 2.11 displays the concentration of elderly population in the planning area.

FEMALE HEAD OF HOUSEHOLDS

Female head of household populations consists of households headed by a female with no husband present and with children under the age of 18. These households are more likely to need affordable housing and transit access than households headed by married couples. In the planning area, female head of householders accounted for an approximately 4.6 percent of the total LHMPO population.

DISABLED POPULATION

Disabled populations are civilian, non-institutionalized persons who have disabilities (such as sensory, physical, self-care, unable to go outside the home, and/or employment disabilities). This protected population group often has difficultly operating automobiles and may require access to other forms of transportation such as public transportation, and/or non-profit bus and shuttle systems. Persons between the ages of 16 to 64 who are disabled accounted for 20.3 percent of the total population in the planning area. Also, an estimated 14.6 of the population is both disabled and elderly (age 65 and over). Table 2.4 summarizes the percentage of the disabled and below poverty level populations for the three geographic areas.

BELOW POVERTY POPULATION

Below poverty level populations is comprised of individuals living in households that lie within a set of income thresholds established by the US Census Bureau, which vary by family size and composition. Low income households may rely on public transportation and services more than the general population; therefore, recognition of this group's concentration centers is needed to determine transportation needs. Approximately, 14.3 percent of the LHMPO population is considered to be living below the poverty level.

TABLE 2.4: DISABLED AND BELOW POVERTY LEVEL POPULATION PERCENTAGES

	Lake Havasu MPO		Mohave County		State of Arizona	
	Total Population	% of Total Population	Total Population	% of Total Population	Total Population	% of Total Population
Percent Disabled[a]						
Age 16 to 64	32,579	20.3%	119,617	27.1%	4,152,127	19.9%
Age 65 and over	15,006	14.6%	46,658	15.0%	881,831	9.7%
Percent Below Poverty[b]		14.3%		19.4%		17.9%

Source: [a]2000 U.S. Census; [b]2009 – 2013 American Community Survey

FIGURE 2.10: MINORITY POPULATION

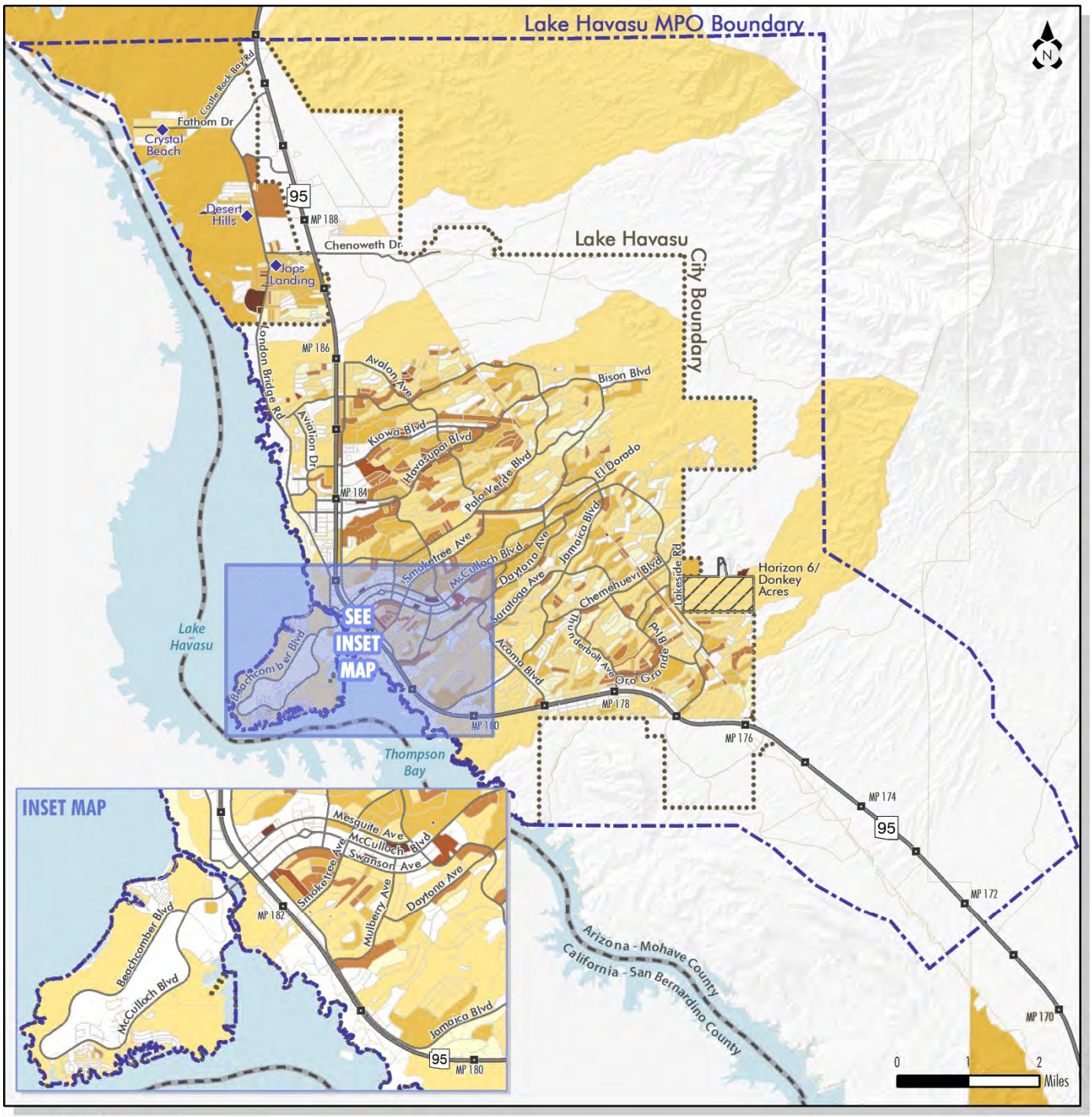
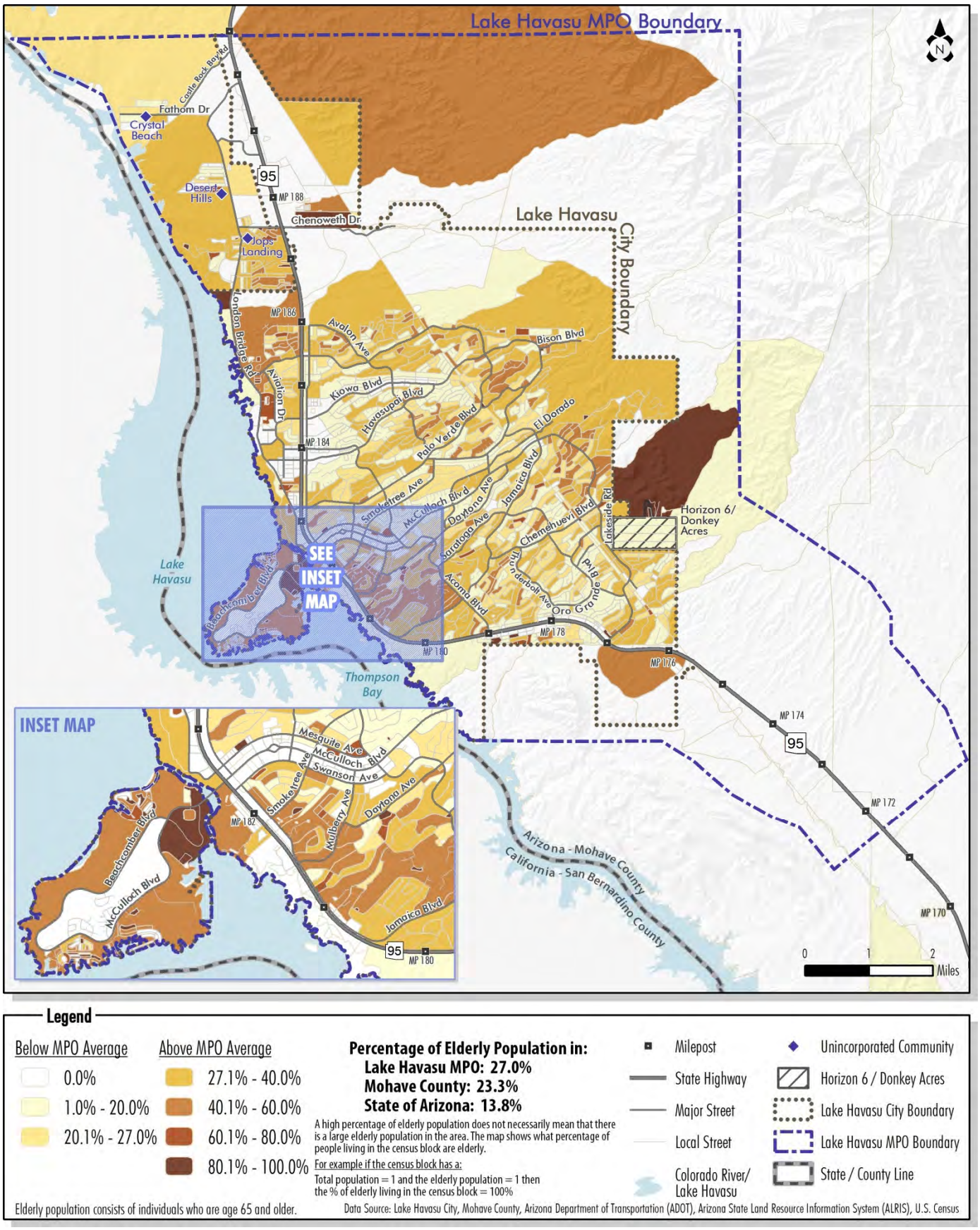


FIGURE 2.11: ELDERLY POPULATION



Legend

Below MPO Average	Above MPO Average
0.0%	27.1% - 40.0%
1.0% - 20.0%	40.1% - 60.0%
20.1% - 27.0%	60.1% - 80.0%
	80.1% - 100.0%

Percentage of Elderly Population in:
Lake Havasu MPO: 27.0%
Mohave County: 23.3%
State of Arizona: 13.8%

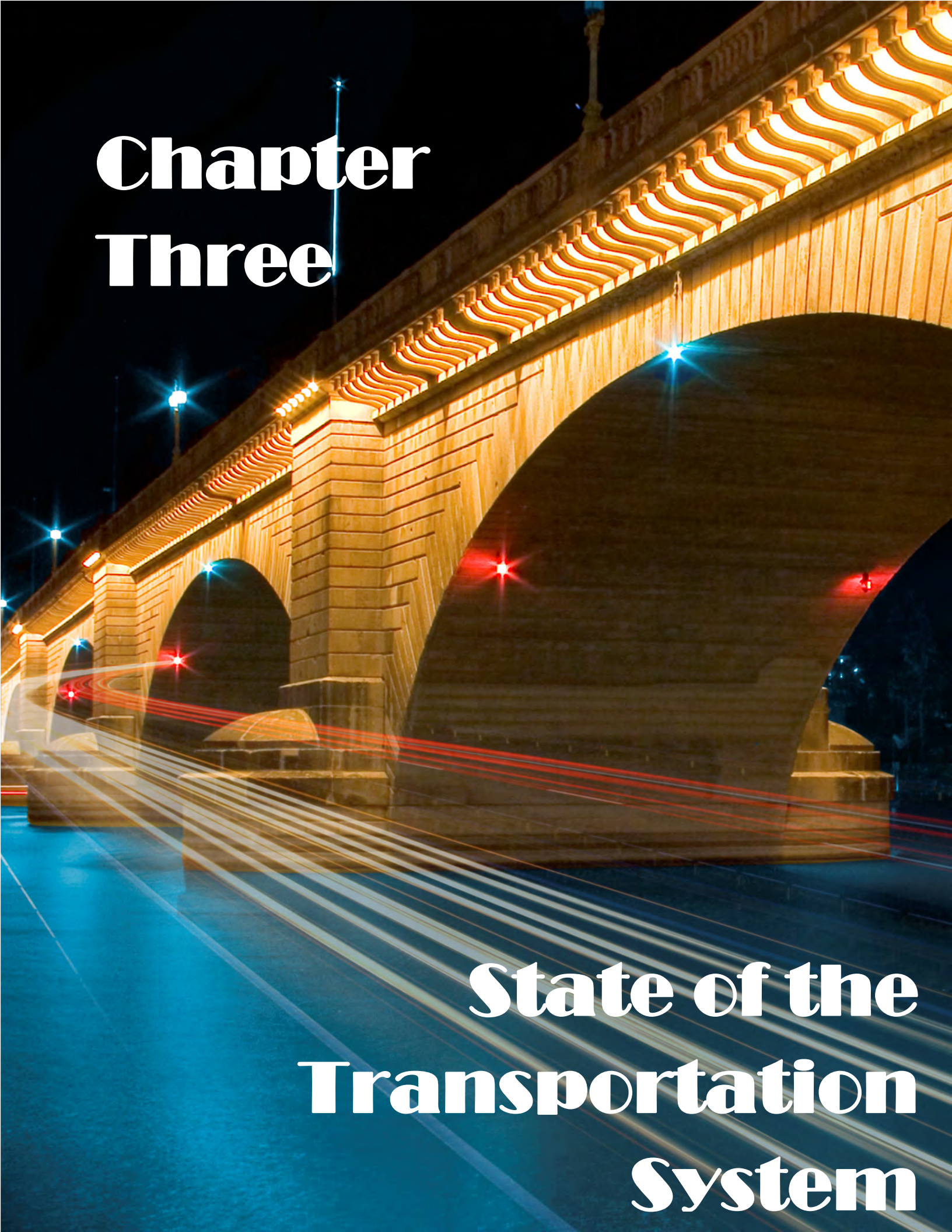
A high percentage of elderly population does not necessarily mean that there is a large elderly population in the area. The map shows what percentage of people living in the census block are elderly.

For example if the census block has a:
Total population = 1 and the elderly population = 1 then the % of elderly living in the census block = 100%

- Milepost
- State Highway
- Major Street
- Local Street
- Colorado River/ Lake Havasu
- Unincorporated Community
- Horizon 6 / Donkey Acres
- Lake Havasu City Boundary
- Lake Havasu MPO Boundary
- State / County Line

Elderly population consists of individuals who are age 65 and older.

Data Source: Lake Havasu City, Mohave County, Arizona Department of Transportation (ADOT), Arizona State Land Resource Information System (ALRIS), U.S. Census



Chapter Three

State of the Transportation System

3. STATE OF THE TRANSPORTATION SYSTEM

This chapter of the report summarizes the major transportation elements comprising the existing transportation system and documents the status/condition of each element for the current as well as the future no-build conditions. Major elements inventoried include roadways, bridges, pavement, crash locations, pedestrian and bicycle facilities and transit services. The data and information obtained for the RTP reflect the conditions at the time the data was received.

YEAR 2014 TRANSPORTATION CONDITIONS

ROADWAY CHARACTERISTICS AND CONDITIONS

Major Roadways

The LHMPO planning area is comprised of a network of minor arterials, collectors, and local roadways that intercross SR-95, the backbone the LHMPO transportation system and local economy carrying people and goods to/from and throughout the planning area. The following is a summary of characteristics of the major roadways in the planning area:

SR-95: a regional north-south ADOT facility that provides connection through the planning area to the interstate corridors, I-40 to the north and I-10 to the south. Federally classified as other principal arterial in the LHMPO planning area, SR-95 transitions from 2/3-lanes in the outer lying portions of the LHMPO planning area to 4-lanes with a center turn lane (CTL) within Lake Havasu City.

McCulloch Blvd: an east-west roadway facility that provides direct access to and from the island and downtown area as well as to the eastern and southern portions of the City. McCulloch Blvd transitions from a collector to a minor arterial west of Isle Circle Dr and varies from 4-lanes with a CTL in the proximity of the island and downtown area to 2-lanes with a CTL in the outer portions of the city limits.

Lake Havasu Ave: a north-south roadway facility that parallels SR-95. It provides additional north-south circulation through the City as well as access to the businesses located east of SR-95. Lake Havasu Ave is a minor arterial that varies from 5-lanes with CTL in the vicinity of the downtown area to 2-lanes north of Kiowa Blvd.

Acoma Blvd: a minor arterial that provides additional north-south circulation within Lake Havasu City. Acoma Blvd varies from 4-lanes with a CTL in the vicinity of the downtown area to 2-lanes north of Havasupai Blvd and south of the Daytona Ave.

London Bridge Rd: a minor arterial that extends along the western border of the LHMPO from SR-95 in the vicinity of the downtown area in Lake Havasu City to SR-95 just south of MP 190 in the northern portion of the LHMPO planning area. London Bridge Rd provides additional north-south circulation and connects Lake Havasu City to the unincorporated communities in the northern portion of the LHMPO planning area. London Bridge Rd varies from the 4-lanes to 2-lanes.

Federal Functional Classification

Functional Classification is the process of identifying and grouping roads into classes based on their particular role in moving traffic through the roadway network.

As depicted in Figure 3.1, traffic is channelized through a hierarchy of inter-connected roads that progresses from the lower classifications where trips are shorter and localized to higher classifications where trips are longer and connect to regional traffic generators. The travel characteristics and the function performed by each road in the network determine its functional classification. Figure 3.2 visually display the current FHWA functional classification for roadways in the LHMPO planning area. Table 3.1 lists the functional classification types, as defined by the FHWA *Highway Functional Classification: Concepts, Criteria and Procedures*, for the major roadways within the LHMPO planning area.

The functional classification includes two area types, Rural and Urban, both of which are located in the LHMPO planning area.

FIGURE 3.1: FUNCTIONAL CLASSIFICATION HIERARCHY

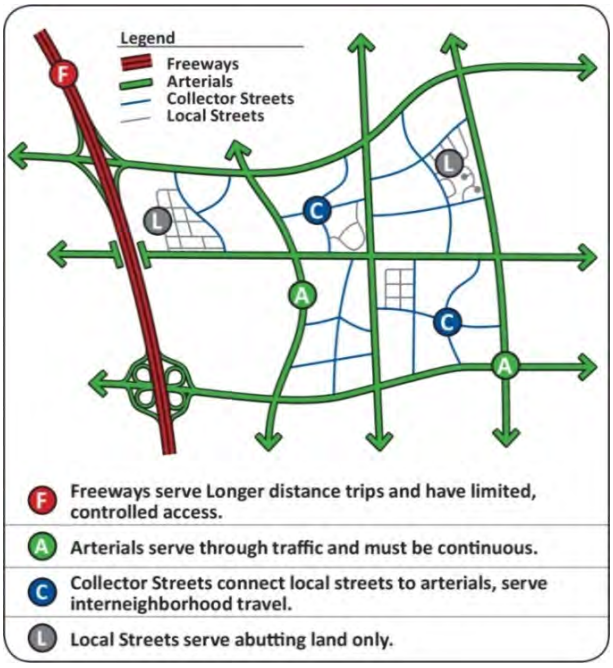


TABLE 3.1: FHWA ROADWAY FUNCTIONAL CLASSIFICATION CHARACTERISTICS

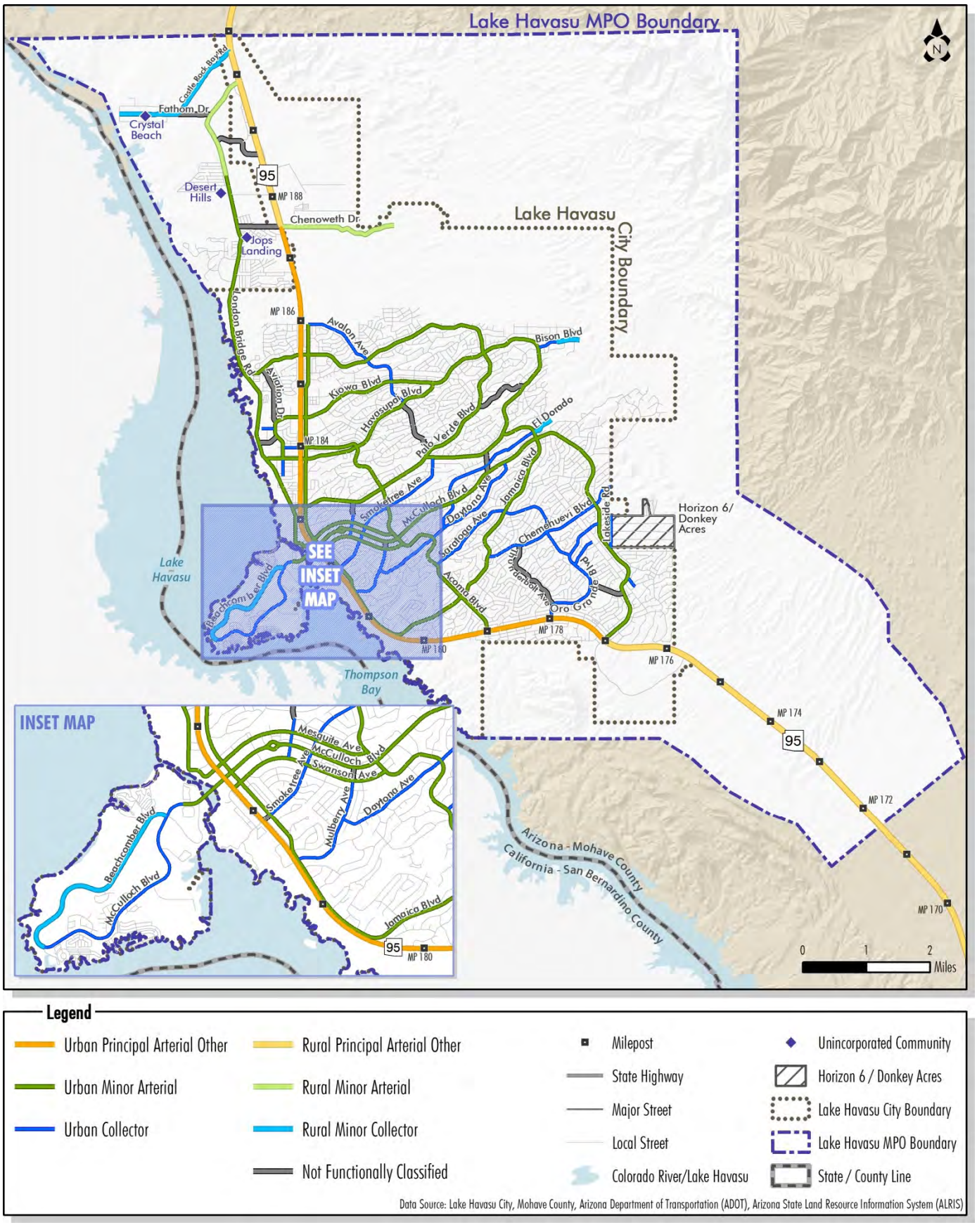
Classification	Urban	Rural
Other Principal Arterial *Example: SR-95*	Serve major activity centers, highest traffic volume corridors and longest trip demands Carry high proportion of total urban travel on minimum of mileage Interconnect and provide continuity for major rural corridors to accommodate trips entering and leaving urban area and movements through the urban area Serve demand for intra-area travel between the central business district and outlying residential areas	Serve corridor movements having trip length and travel density characteristics indicative of substantial statewide or interstate travel Connect all or nearly all Urbanized Areas and a large majority of Urban Clusters with 25,000 and over population Provide an integrated network of continuous routes without stub connections (dead ends)
Minor Arterial *Examples: McCulloch Blvd, Jamaica Blvd, Kiowa Blvd, and London Bridge Rd*	Interconnect and augment the higher-level Arterials Serve trips of moderate length at a somewhat lower level of travel mobility than Principal Arterials	Link cities and larger towns (and other major destinations such as resorts capable of attracting travel over long distances) and form an integrated network providing interstate and inter-county service

TABLE 3.1: FHWA ROADWAY FUNCTIONAL CLASSIFICATION CHARACTERISTICS (continued)

Classification	Urban	Rural
Minor Arterial (Continued)	Distribute traffic to smaller geographic areas than those served by higher-level Arterials Provide more land access than Principal Arterials without penetrating identifiable neighborhoods Provide urban connections for Rural Collector	Be spaced at intervals, consistent with population density, so that all developed areas within the State are within a reasonable distance of an Arterial roadway Provide service to corridors with trip lengths and travel density greater than those served by Rural Collectors and Local Roads and with relatively high travel speeds and minimum interference to through movement
Major Collector *Examples: Smoketree Ave, Saratoga Ave, Lakeside Rd, and Avalon Ave*	Serve both land access and traffic circulation in higher density residential, and commercial/industrial areas Penetrate residential neighborhoods, often for significant distances Distribute and channel trips between Local Roads and Arterials, usually over a distance of greater than three-quarters of a mile Operating characteristics include higher speeds and more signalized intersections	Provide service to any county seat not on an Arterial route, to the larger towns not directly served by the higher systems and to other traffic generators of equivalent intra-county importance such as consolidated schools, shipping points, county parks and important mining and agricultural areas Link these places with nearby larger towns and cities or with Arterial routes Serve the most important intra-county travel corridors
Minor Collector *Examples: Beachcomber Blvd, El Dorado, Bison Blvd, and Fathom Dr*	Serve both land access and traffic circulation in lower density residential and commercial/industrial areas Penetrate residential neighborhoods, often only for a short distance Distribute and channel trips between Local Roads and Arterials, usually over a distance of less than three-quarters of a mile Operating characteristics include lower speeds and fewer signalized intersections	Be spaced at intervals, consistent with population density, to collect traffic from Local Roads and bring all developed areas within reasonable distance of a Collector Provide service to smaller communities not served by a higher class facility Link locally important traffic generators with their rural hinterlands

Source: FHWA Highway Functional Classification: Concepts, Criteria, and Procedures

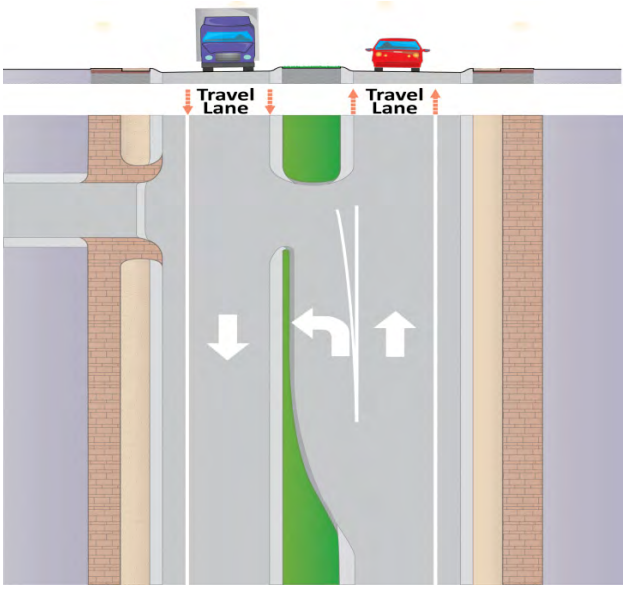
FIGURE 3.2: YEAR 2014 FEDERAL FUNCTIONAL CLASSIFICATION



Number of Lanes

The total number of lanes is the total travel lanes on the road. As an example, the roadway cross section shown in Figure 3.3 has 1-travel lane in each direction for total of 2-lanes.

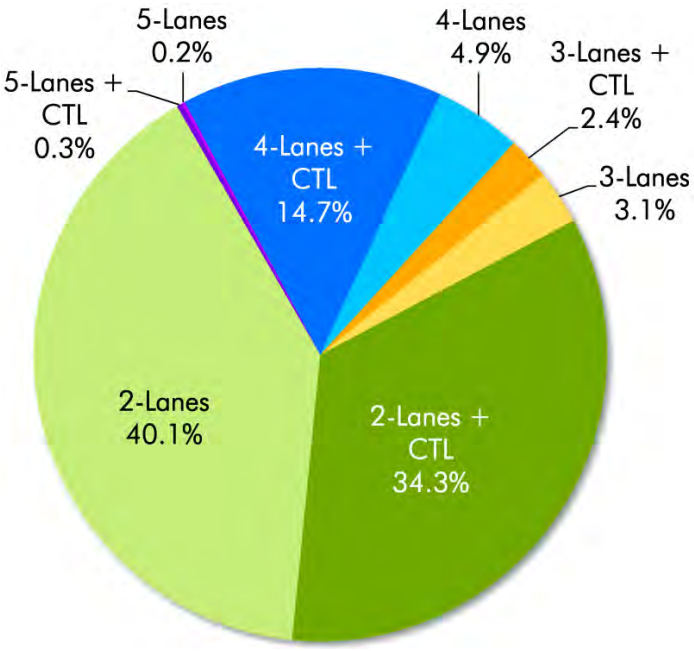
FIGURE 3.3: TRAVEL LANES



Roads that include a center turn lane (CTL) were categorized separately. Roadways in the LHMPO planning area are primarily 2-lanes (1-lane in each direction) and an estimated 34.3 percent of 2-lanes roads include a CTL as depicted in Figure 3.4. Roughly 14.7 percent of the roadways in the planning are 4-lanes (2-lanes in each direction) with a CTL.

Figure 3.5 visually displays the total number of lanes for the LHMPO planning area. Portions of SR-95, McCulloch Blvd, Mesquite Ave, Jamaica Blvd, and London Bridge Rd are 3-lanes with some segments consisting of a CTL. Portions of SR-95, Lake Havasu Ave, Acoma Blvd, McCulloch Blvd, Retail Centre Blvd and Chenoweth Dr are 4-lanes with some segments consisting of a CTL. Lake Havasu Ave in the vicinity of the downtown area transitions to 5-lanes with section from Swanson Ave to Smoketree Ave consisting of a CTL.

FIGURE 3.4: PERCENTAGE OF NUMBER OF LANES FOR THE YEAR 2014



Posted Speed Limits

Posted speed limits can be correlated to the function of the road, mobility, access, modes and vehicle traffic mix. Speeds are generally lower on local roads which mainly provide accessibility such as road in a residential neighborhood while speeds are higher on roads that provide mobility with partial or limited access such SR-95. Figure 3.6 visually displays the posted speeds in the LHMPO planning area. More than half of the roadways have a posted speed of 35 mph or less with the exception of the SR-95 which ranges from 45 mph in the vicinity of the downtown area to 55 and 65 mph in the outer limits of the LHMPO planning area. Also, portions of London Bridge Rd and Fathom Dr have posted speeds of the 45 mph.

FIGURE 3.5: YEAR 2014 NUMBER OF LANES

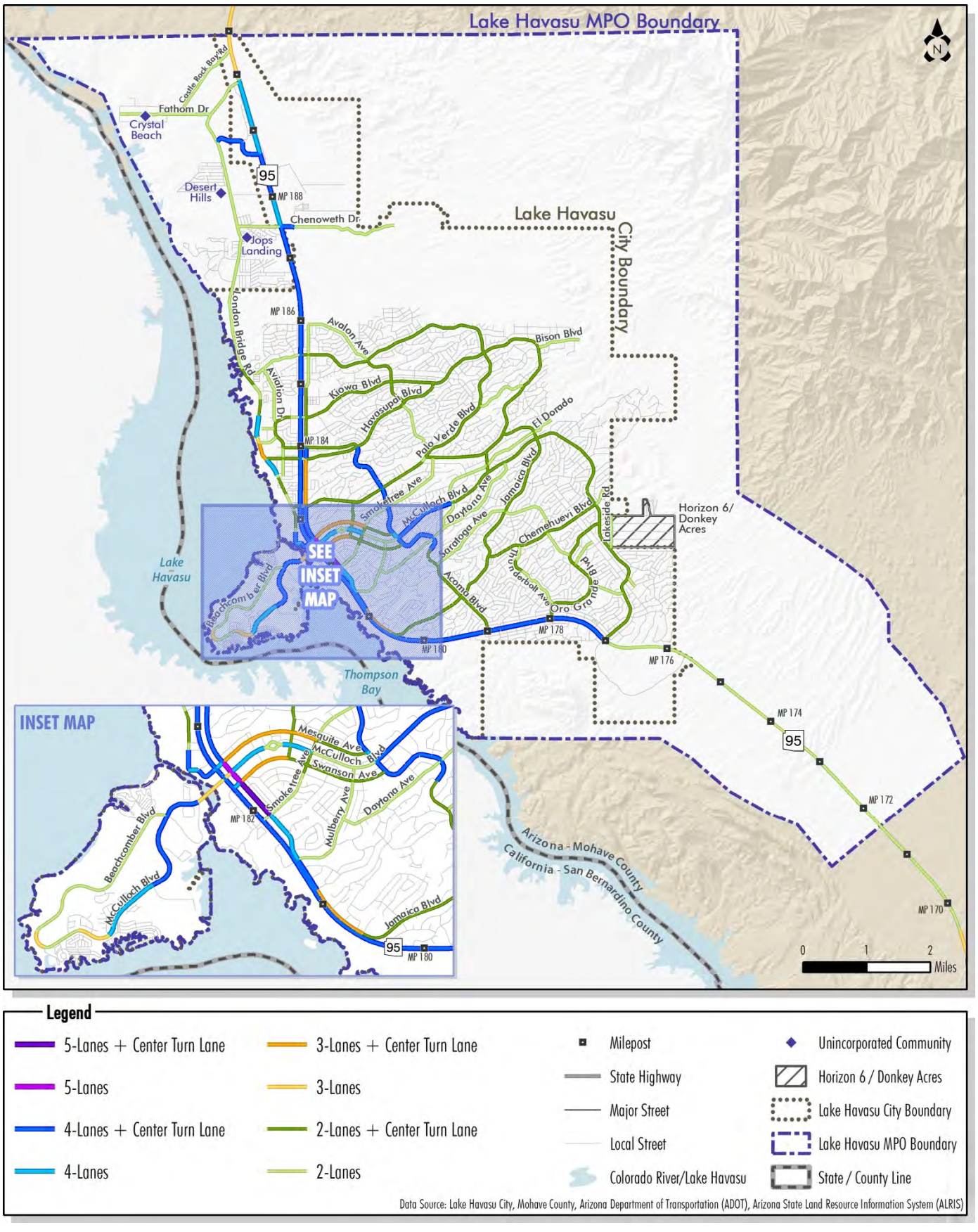
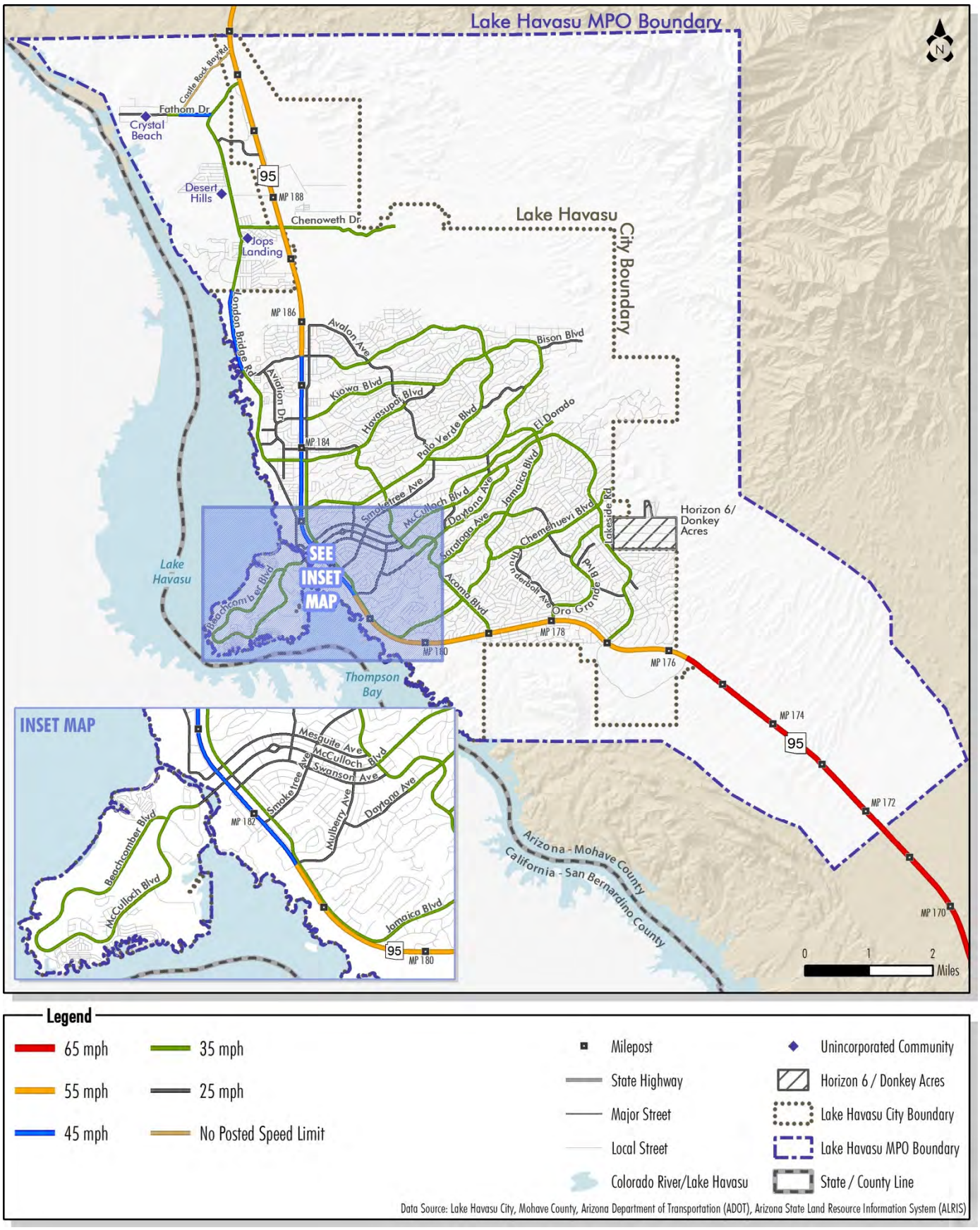


FIGURE 3.6: POSTED SPEEDS



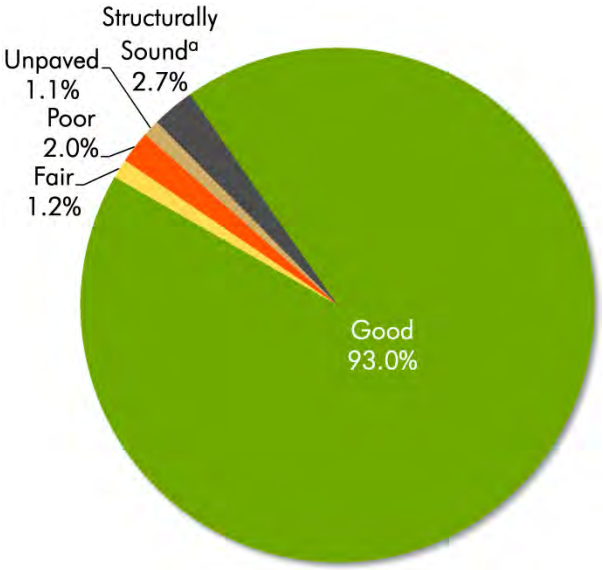
Pavement Conditions

Rehabilitation and repair of deteriorating pavement is necessary to keep the LHMPO roadway network system functioning at an acceptable level that serves the travel needs of the area. Pavement data and information was compiled from various agencies that manage and maintain roadway and pavement conditions were grouped into three categories:

- **Good Condition:** Comparable to new pavement with few defects. No sign of cracking and pavement deterioration, no maintenance is required as cracks are barely visible or well-sealed, liquid asphalt is barely noticeable.
- **Fair Condition:** Slight rutting, and/or cracking, and/or roughness. Roadway may also be bumpy from corrugations but not enough to reduce vehicle speed, and may have some pavement raveling. Some preventative maintenance may be necessary.
- **Poor Condition:** Multiple cracks, potholes, roughness, and/or bleeding are apparent on roadway. Roadway may be uncomfortable to vehicle occupants and drivers may need to reduce vehicle speed and/or correct or avoid road defects. Maintenance includes rehabilitation and/or reconstruction.

The Mohave County utilizes pavement structural stability to provide an indication of the remaining structural life of the pavement; however, this does not necessarily reflect pavement surface conditions. London Bridge Rd is roughly 87 percent to 94 percent of its structural service life hence it is structurally sound and may need pavement structural treatment or rehabilitation. Chenoweth Dr and Fathom Dr were found to be in good condition.

FIGURE 3.7: CENTERLINE MILES PERCENTAGE OF PAVEMENT CONDITIONS



Source: ADOT; Lake Havasu City; and Mohave County.
[a]County Roads with no pavement ratings.

As shown in Figure 3.7, an estimated 93 percent of the centerline mile of roadway is in good condition while 2.8 percent of roadways were determined to be in poor condition. Table 3.2 summarizes the pavement conditions for LHMPO planning area.

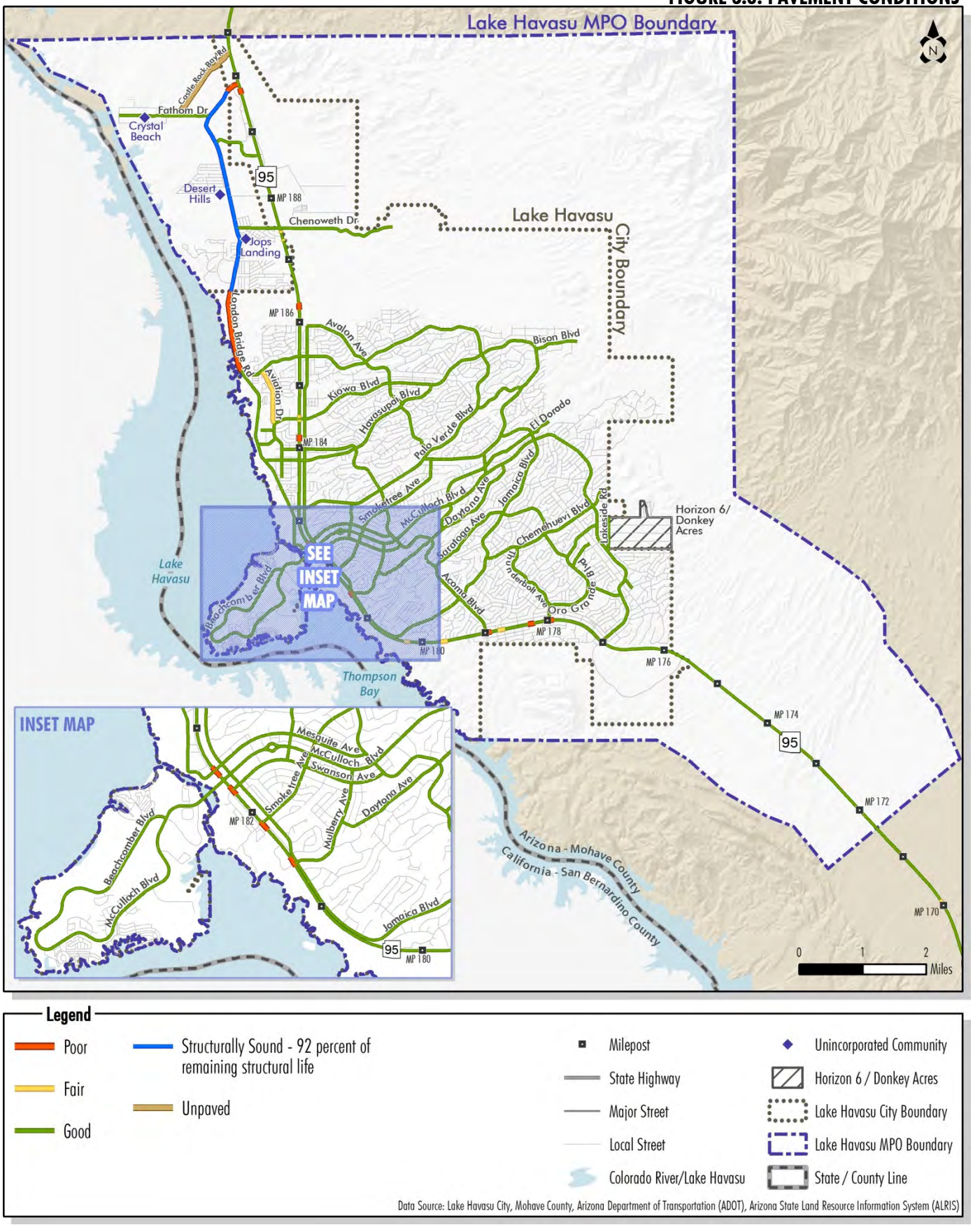
TABLE 3.2: PAVEMENT CONDITIONS

Pavement Condition	ADOT Route	Other Major Roads	Total Centerline Miles
Good	28.8	85.6	114.4
Fair	0.6	0.9	1.5
Poor	1.0	1.5	2.5
Unpaved	0.0	1.3	1.3
Structurally Sound[a]	0.0	3.3	3.3
Total Centerline Miles	30.4	92.6	123.0

Source: ADOT; Lake Havasu City; and Mohave County.
[a]County Roads with no pavement rating.

Figure 3.8 illustrates pavement conditions in the LHMPO planning area. Portions of SR-95 between MP 178 to MP 190 are in poor conditions.

FIGURE 3.8: PAVEMENT CONDITIONS



Bridge Conditions

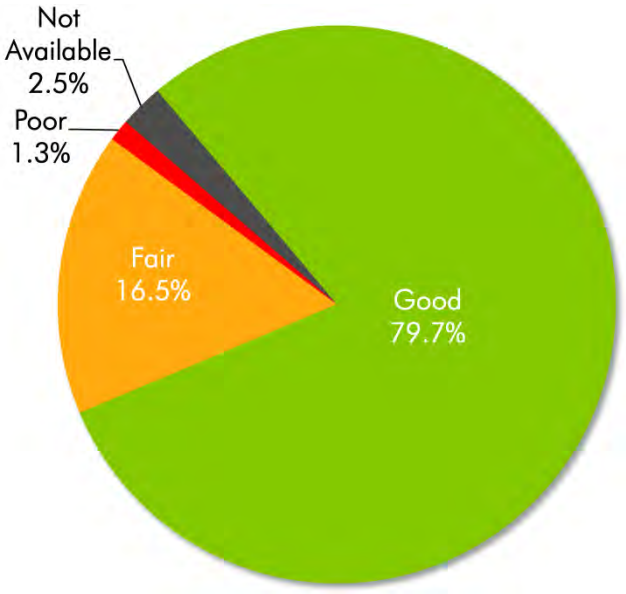
Maintaining is necessary to preserve mobility and connectivity throughout the LHMPO area. The sufficiency rating, which is indicative of bridge sufficiency to remain in service, is expressed as a percentage in which 100% represents an entirely sufficient bridge and zero percent would represent an entirely insufficient bridge. Bridge sufficiency ratings were grouped into three categories:

- **Good Condition (sufficiency rating >80):** No defects to some minor deterioration of structural elements. No structural repairs are needed.
- **Fair Condition (sufficiency rating 50 to 80):** All primary structural elements are sound but may have deficiencies such as minor section loss, deterioration, cracking, spalling, or scour. Some repairs or rehabilitation may be necessary to restore structural integrity.
- **Poor Condition (sufficiency rating <50):** Advanced deficiencies such as section loss, deterioration, cracking, spalling, scour, or seriously affected primary structural components. Major rehabilitation and/or reconstruction are needed.

Structural assessments and ratings of the physical conditions of major bridge components determine if the bridge is deficient.

- **Functionally Obsolete (F):** A bridge is functionally obsolete when the deck geometry, load carrying capacity, clearance, or approach roadway alignment no longer meets bridge design standards.
- **Structurally Deficient (S):** A bridge is considered structurally deficient if significant load carrying elements are found to be in poor condition due to deterioration and/or damage, or the adequacy of the waterway opening provided by the bridge is determined to be extremely insufficient.

FIGURE 3.9: PERCENTAGE OF BRIDGE CONDITIONS



Source: ADOT Bridge Group, Mohave County

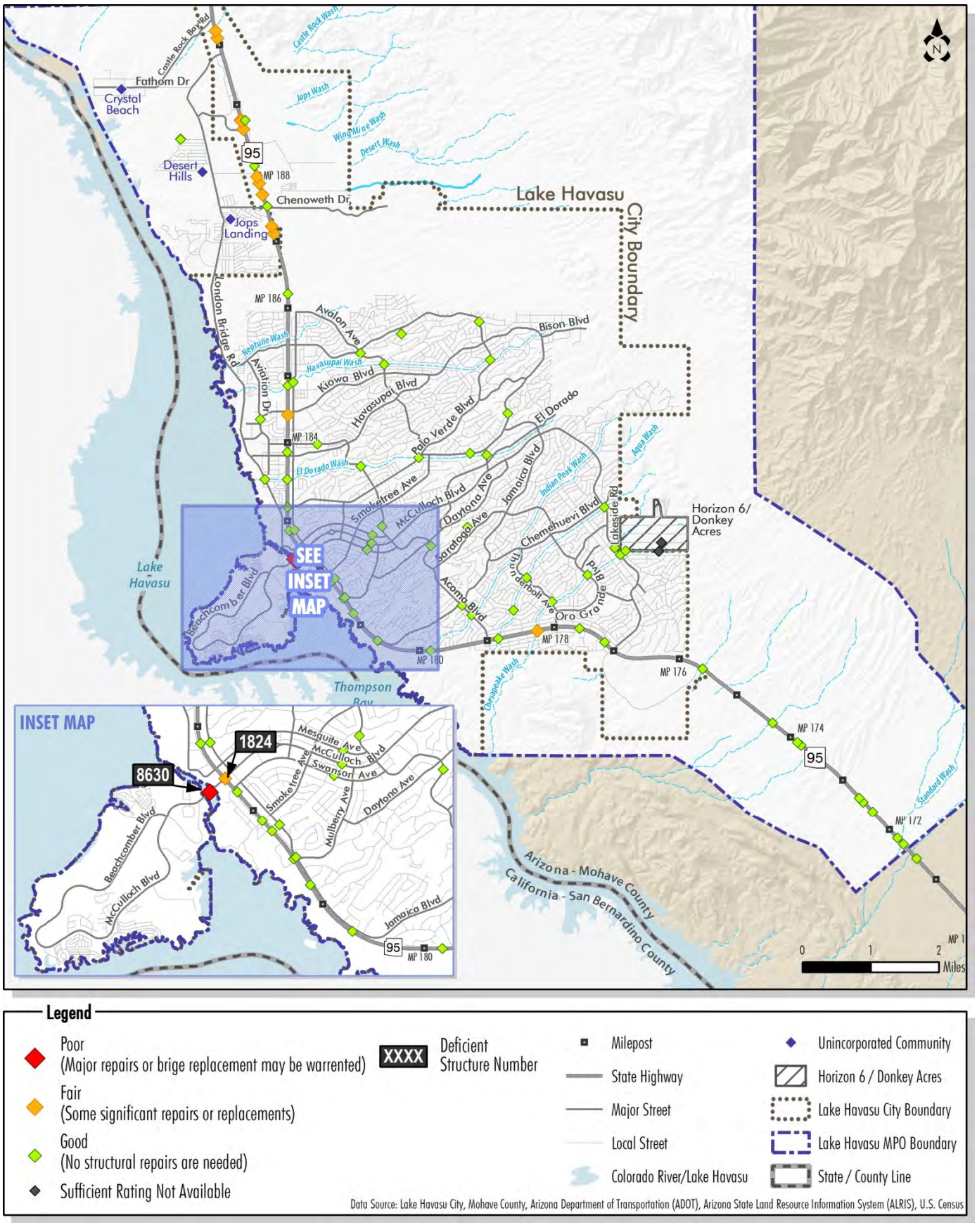
A total of 79 bridges were identified in the LHMPO planning area. As shown in Figure 3.9, most of the bridges are in good condition and 1.3 percent are in poor condition. Two bridges as shown in Table 3.3 have been identified as functionally obsolete and are need of repair or replacement: London Bridge which is a popular tourist attraction and McCulloch Blvd Underpass. Figure 3.10 visually displays the condition of the bridges in the planning area.

TABLE 3.3: BRIDGES IN NEED OF REPAIR OR REPLACEMENT

Structure Number	Structure Name	Road Name	Location	Deficiency Classification	Bridge Sufficiency	
					Rating	Condition
1824	McCulloch Blvd Underpass	SR-95	Milepost 182.3	Functional Obsolete	56.78	Fair
8630	London Bridge	McCulloch Blvd	0.04 mile west of SR-95	Functional Obsolete	45.21	Poor

Source: ADOT Bridge Group

FIGURE 3.10: BRIDGE CONDITIONS



TRAFFIC CONDITIONS

The efficiency and effectiveness of the existing roadway network in LHMPO planning area was evaluated using the inventoried roadway attributes, current traffic patterns and circulation, and levels of congestion.

Traffic Counts

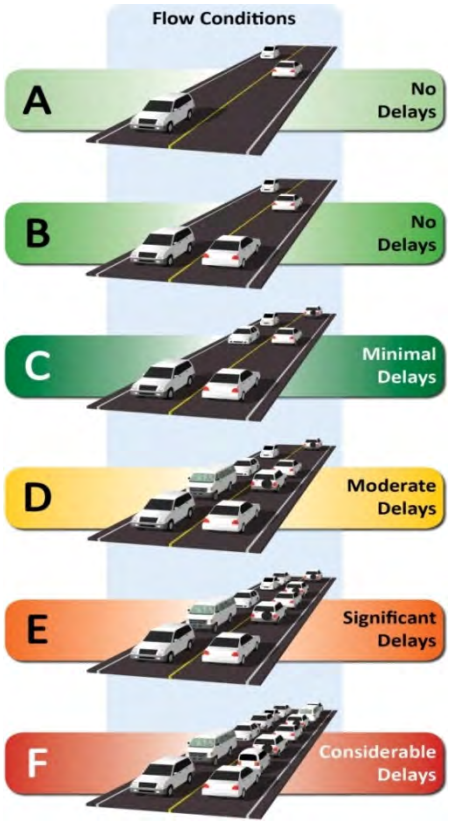
Counts were compiled and reviewed from various agencies; ADOT, Mohave County, and Lake Havasu City. Average Annual Daily Traffic (AADT) is the annualized average 24-hour traffic volume at a specific location or roadway segment. Figure 3.11 visually displays the AADT count locations in the planning area, key observations include:

- As one of the most heavily travelled corridors in the LHMPO, SR-95 averages 5,600 to 23,900 vehicles per day (vpd) with the heaviest demand between Palo Verde Blvd North and Mesquite Ave where traffic ranges from 21,100 to 23,900 vpd.
- Roads providing north-south circulation, Lake Havasu Ave and Acoma Blvd, carry more the 10,000 vpd near the downtown area.
- Roads in the downtown area, Mesquite Ave, McCulloch Blvd, and Swanson Ave, range from 7,300 to 11,800 vpd.
- London Bridge Rd averages 5,000 or less vpd with traffic decreasing steadily as the roadway transverses northward to the unincorporated communities in the LHMPO planning area.

Existing Roadway Level of Service

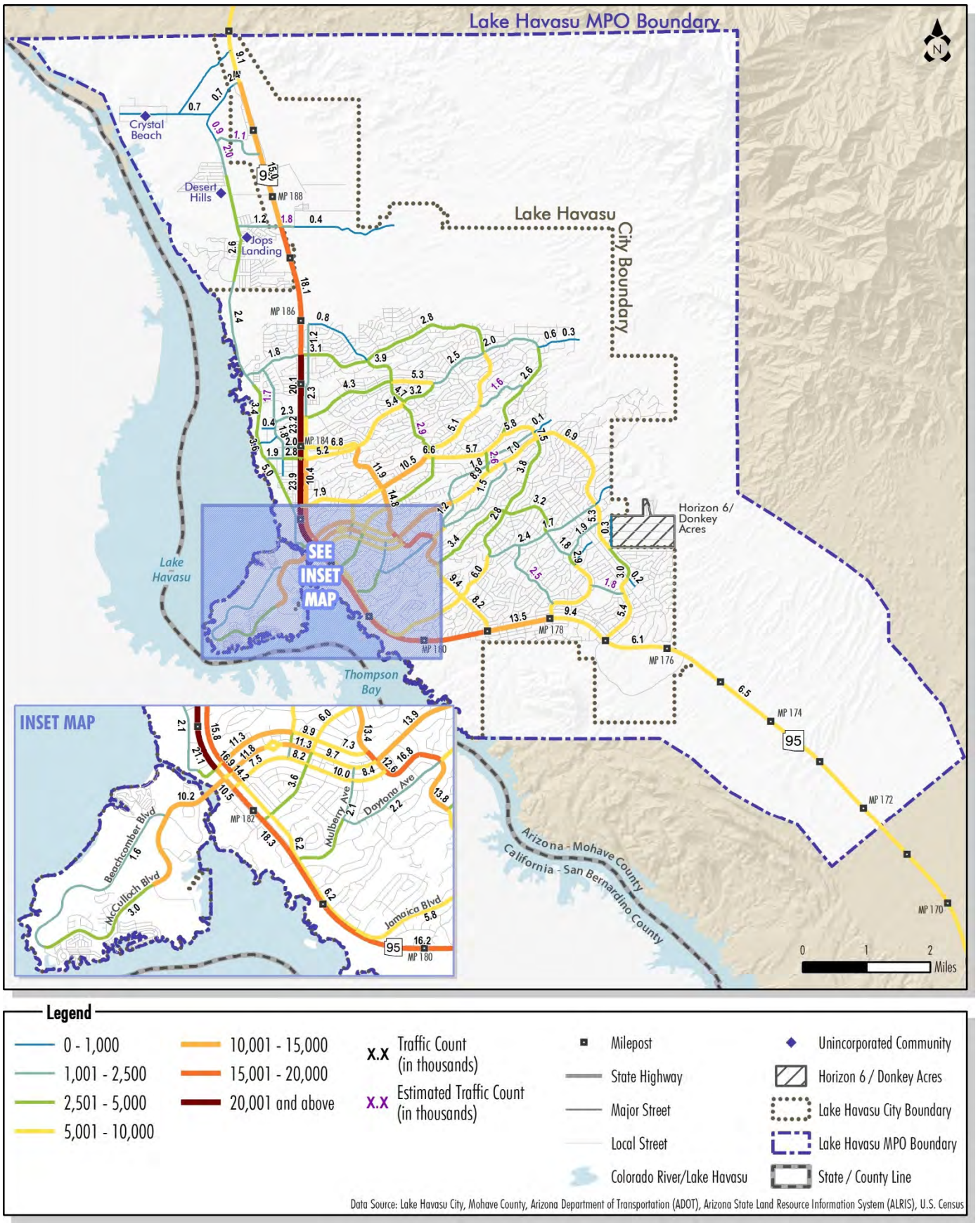
Traffic congestion levels of major roadways were estimated using traffic count data. The degree of traffic congestion is commonly expressed in terms of Level of Service (LOS). For a planning level analysis, the roadway LOS is determined based on the ratio of traffic volume on the road to the capacity of the road. Capacity of the road is a function of the number of lanes, functional classification, speed, and roadway geometrics and provides thresholds for the maximum the peak or daily conditions. Each level of service is given a letter grade based on its level of congestion, ranging from "A" through "F", with LOS A representing free flowing traffic conditions where vehicles experience minimal delays, and LOS F represents failure conditions where vehicles experience long delays. Road segment LOS is characterize by the Highway Capacity Manual (HCM) as follows:

FIGURE 3.12: ROADWAY LEVEL OF SERVICE EXAMPLES



- LOS A: Best, free flow operations (on uninterrupted flow facilities) and very low delay (on interrupted flow facilities). Freedom to select desired speeds and to maneuver within traffic is extremely high.

FIGURE 3.11: TRAFFIC COUNTS



- **LOS B:** Flow is stable, but presence of other users is noticeable. Freedom to select desired speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver within traffic.
- **LOS C:** Flow is stable, but the operation of users is becoming affected by the presence of other users. Maneuvering within traffic requires substantial vigilance on the part of the user.
- **LOS D:** High density but stable flow. Speed and freedom to maneuver are severely restricted. The driver is experiencing a generally poor level of comfort and convenience.
- **LOS E:** Flow is at or near capacity. All speeds are reduced to a low, but relatively uniform value. Freedom to maneuver within traffic is extremely difficult. Comfort and convenience levels are extremely poor.
- **LOS F:** Worse, facility has failed, or a breakdown has occurred.

In 2014, majority of the roadways in the Lake Havasu MPO planning area operated at LOS C or better as shown in Figure 3.13. Roughly 68 percent of the roadways operate at LOS A while less one percent operated at LOS D. There are no roadways at LOS E or F. Figure 3.13 visually displays the existing roadway LOS for the LHMPO planning area. The following roadway segments are moderately congested (LOS C or D):

LOS D:

- Acoma Blvd S: Stroke Dr to Saratoga Ave

LOS C:

- SR-95: Kiowa Blvd N to Palo Verde Blvd S
- Palo Verde Blvd S: Acoma Blvd N to Kiowa Blvd S
- McCulloch Blvd N: El Dorado to Daytona Ave
- Acoma Blvd S: Saratoga Ave to Jamaica Blvd S

FIGURE 3.13: YEAR 2014 CONGESTION

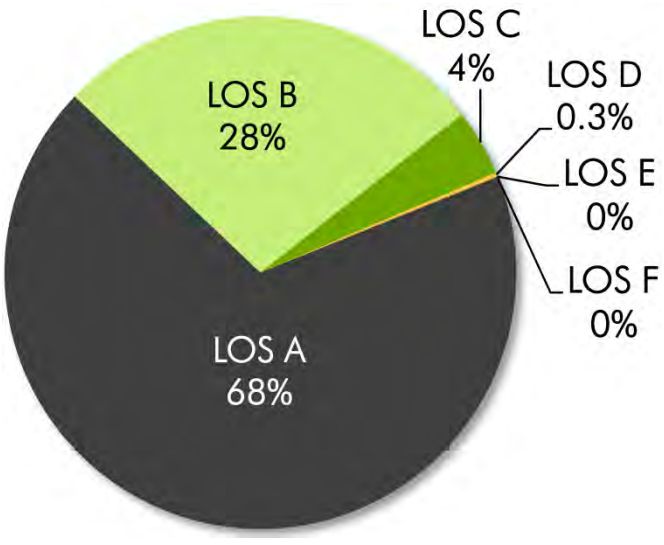
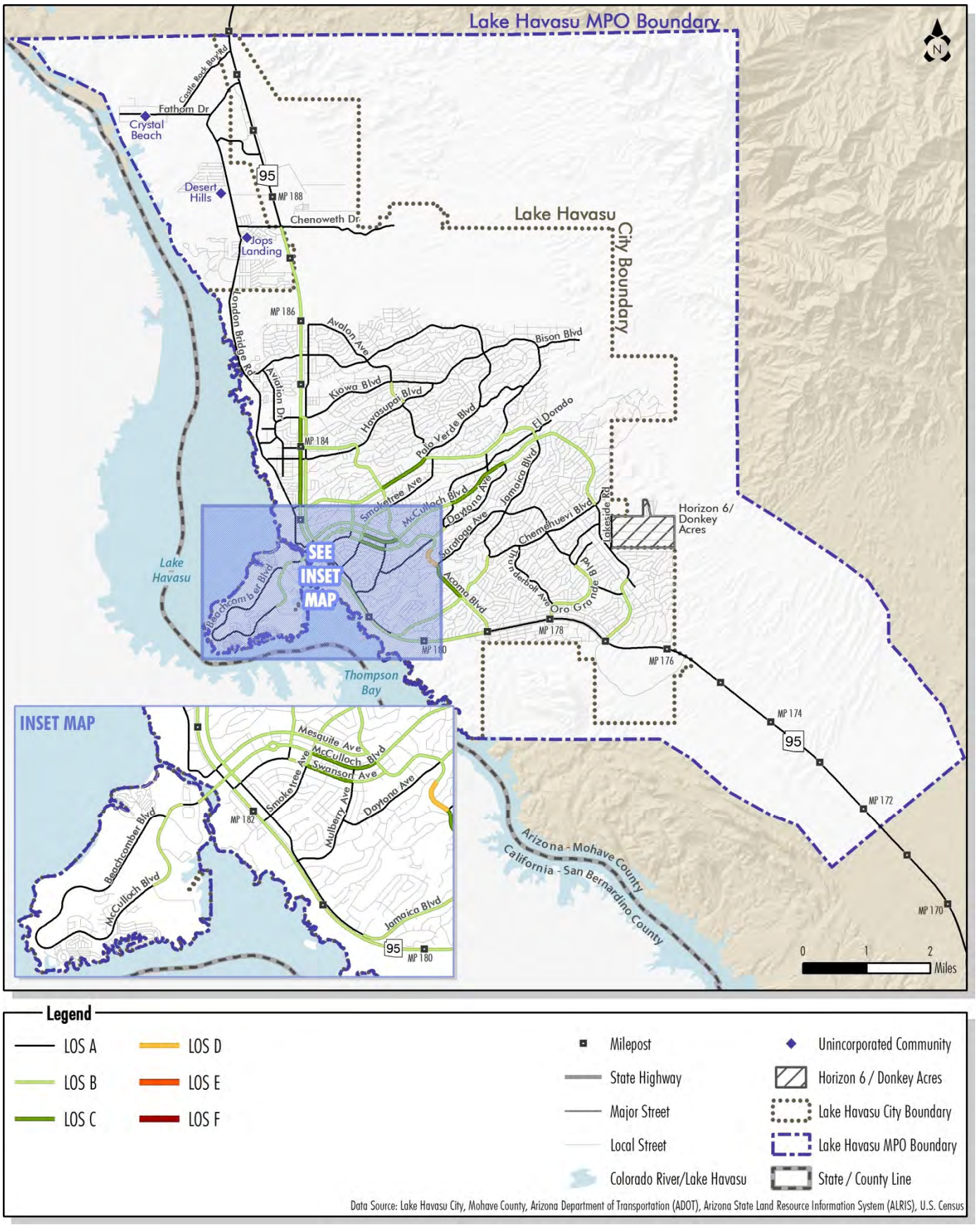


FIGURE 3.14: YEAR 2014 ROADWAY LEVEL OF SERVICE



SAFETY

Traffic crashes result in property damage, traffic delay, and possible injury to driver, passenger, pedestrian, bicyclist, and occasionally, loss of life. A crash analysis was conducted to analyze roadway crash data, identify cause and potential safety improvements in efforts to minimize the frequency and/or severity of roadway crashes due to roadway/traffic operation characteristics. A complete safety analysis which considers driver behavior, weather conditions and other elements influence was not conducted for this effort.

Data for crashes occurring between January 2009 and October 2014 was obtained from ADOT's Accident Location Identification Surveillance System (ALISS) database. Table 3.4 summarizes the number of crashes per year for the LHMPO planning area during the analysis period. A total of 3,377 crashes occurred, of which 15 were fatal and 1,007 resulted in some form of injury. As shown in Figure 3.15, crashes steadily increased from the 2009 to 2011 when crashes in the LHMPO planning area peaked. From 2011 to 2013, the crashes remained fairly steady. Figure 3.16 displays the location and the number of collisions at each site during the analysis period.

Crash Analysis

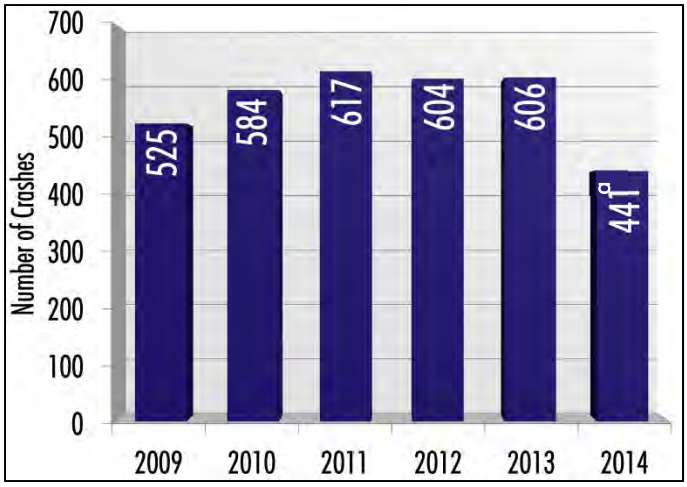
Total Crashes: 3,377

Percentage of Crashes

Intersection Related: 45%
Fatal Crash: 0.44%
Rear End Collisions: 27%
Driver Inattention/Distraction: 32%

Source: ADOT ALISS (Jan. 2009 to Oct. 2014)

FIGURE 3.15: CRASH TRENDS



[a]Crashes from Jan. to Oct. 2014
Source: ADOT ALISS (Jan. 2009 to Oct. 2014)

TABLE 3.4: LHMPO CRASH SUMMARY

Year	Total Crashes	Fatal Crashes	Injury Crashes [b]
2009	525	2	145
2010	584	4	183
2011	617	3	182
2012	604	0	160
2013	606	6	194
2014[a]	441	0	143
Total Crashes	3,377	15	1,007

[a]Crashes from Jan. to Oct. 2014, [b] include incapacitating injury, non-incapacitating injury, and possible injury ; Source: ADOT ALISS (Jan. 2009 to Oct. 2014)

FIGURE 3.16: CRASH LOCATIONS

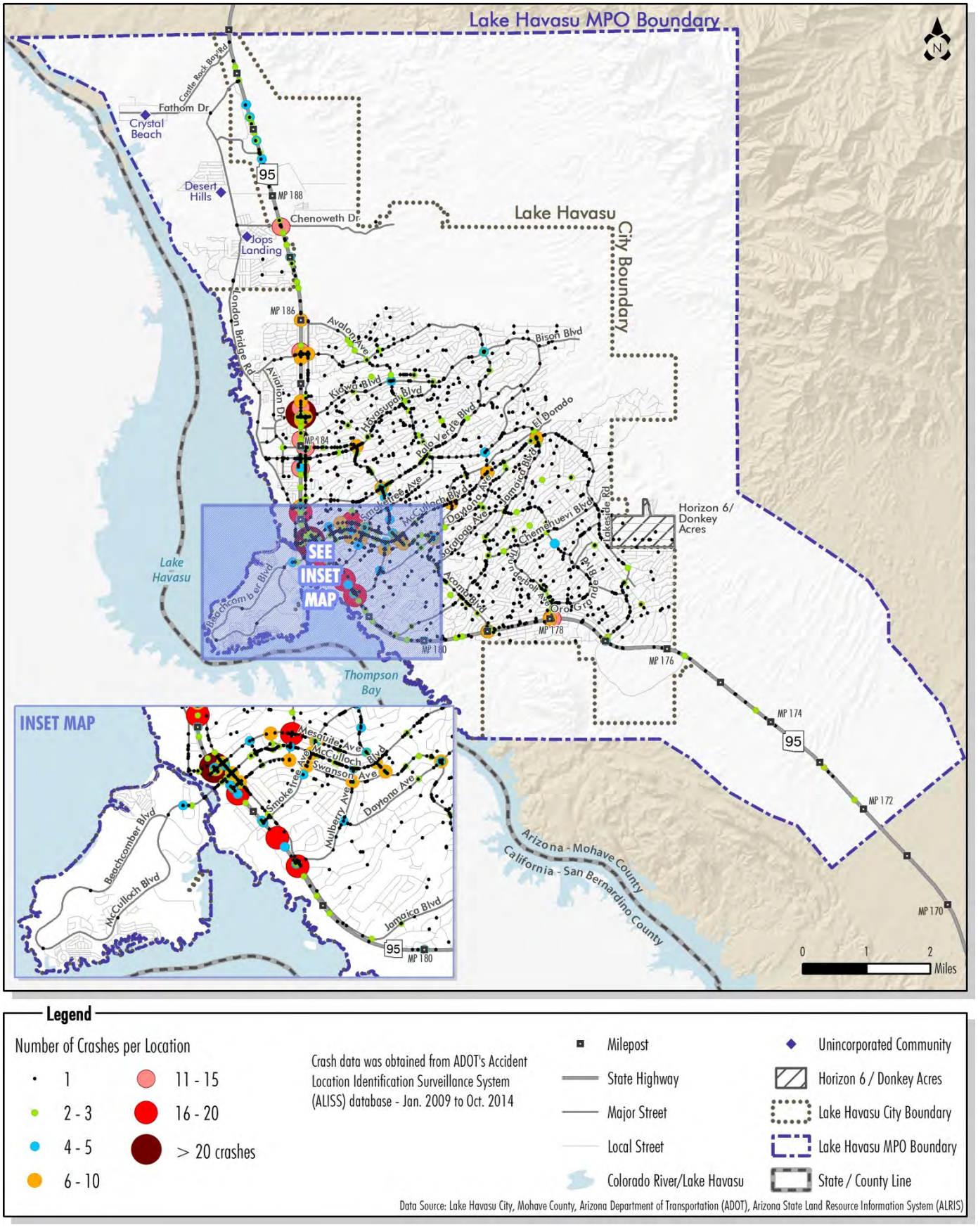
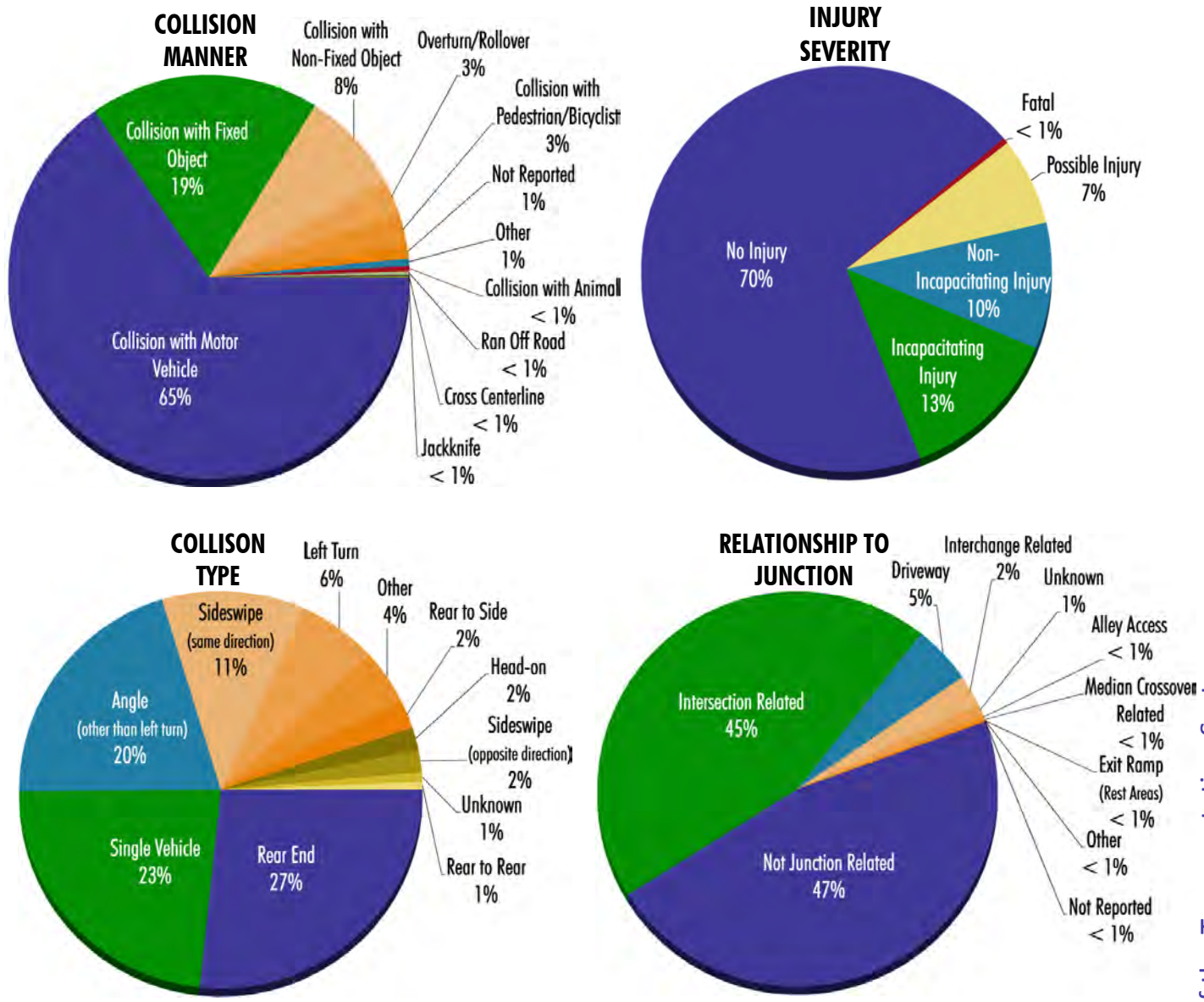


Figure 3.17 summarizes the LHMPO planning area crashes by intersection type, collision type, collision manner, and injury severity.

- An estimated 65 percent were collisions with motor vehicles and another 3 percent were collisions with a pedestrian or bicyclist.
- Roughly 27 percent were rear end collisions while another 23 percent were single vehicles crashes.
- Approximately 47 percent were not junction related while an estimated 45 percent were intersection related.
- Less than 1 percent were fatal while 13 percent resulted in incapacitating injures that prevent the individual from performing their normal activities prior to the crash.

FIGURE 3.17: LHMPO CRASH SUMMARY



Source: ADOT ALISS (Jan. 2009 to Oct. 2014)

Figure 3.18 displays the overall density of crashes as well as the location of collisions with bicyclists/pedestrians and fatal crashes.

- The area in the vicinity of SR-95 and Kiowa Blvd, SR-95 and Mesquite Ave, SR-95 and Swanson Ave, and SR-95 and Mulberry Ave have 16 or more intersection related crashes during the analysis time period.
- The SR-95, McCulloch Blvd, Acoma Blvd, McCulloch Blvd, and Lake Havasu Ave corridors have higher occurrences of the intersection related collisions.
- Higher densities of crashes occur on the roadways in the downtown area as well as on the SR-95 corridor in Lake Havasu City.

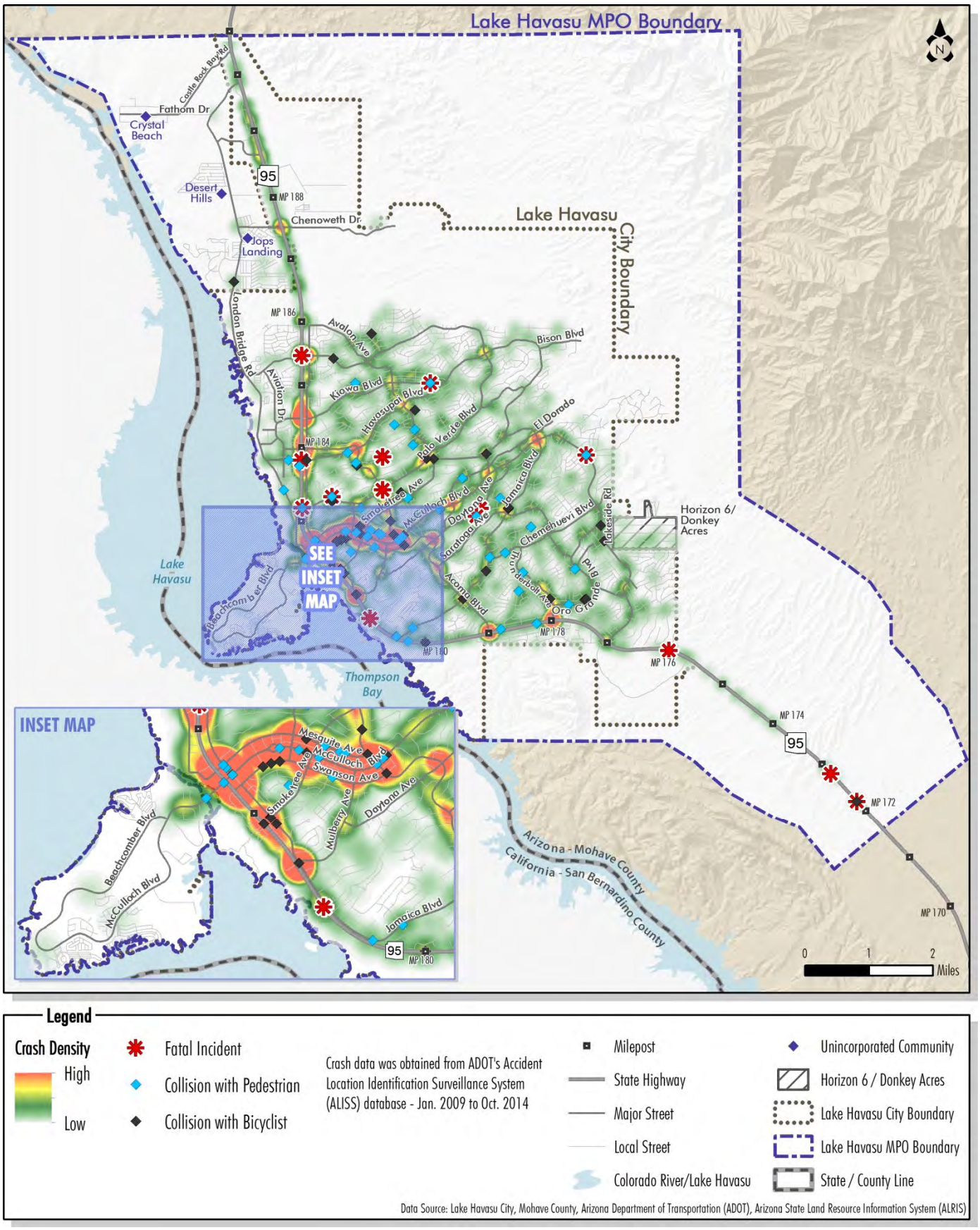
Table 3.5 displays the predominant violations of the crashes in the LHMPO planning area during 5-year analysis period. Primarily violations include driver inattention or distraction, speeds too fast for conditions and failure to yield right-of-way. Fatal crashes were cited as: made improper turn, drove/rode in opposing traffic lane, speeds too fast for conditions, disregarded traffic signal, and failed to keep in proper lane.

TABLE 3.5: PREDOMINANT VIOLATIONS

Violation	Crashes	% of Crashes
Inattention/Distraction	1,070	32%
Speed Too Fast For Conditions	494	15%
Failed To Yield Right-of-Way	480	14%
Failed To Keep in Proper Lane	286	8%
Other	173	5%
No Improper Action	135	4%
Disregarded Traffic Signal	128	4%
Unknown	125	4%
Drove/Rode In Opposing Traffic Lane	94	3%
Unsafe Lane Change	88	3%
Made Improper Turn	84	2%
Followed Too Closely	79	2%
Ran Stop Sign	52	2%
Other Unsafe Passing	28	1%
Knowing Operated With Faulty/Missing Equipment	21	1%
Electronic Communications Device	17	1%
Did Not Use Crosswalk	9	0%
Passed In No Passing Zone	7	0%
Disregarded Pavement Markings	6	0%
Walked On Wrong Side Of Road	1	0%
Total Crashes	3,377	100%

Source: ADOT ALISS (Jan. 2009 to Oct. 2014)

FIGURE 3.18: CRASH DENSITY



PUBLIC TRANSPORTATION

Transit provides mobility to the elderly, low income, and disabled populations. Current providers in the LHMPO planning area include:

Havasu Mobility: provides limited services to individuals who are over age 60, have a disability, are Veterans, or qualify based on income. All riders must fill out an application and be qualified to ride the system.

- Service is available Monday through Friday from 8 AM – 2 PM
- Trips are provided for medical/dental/ therapy appointments, work related trips, trips to the pharmacy, the courthouse and social service agencies, to grocery stores or to the Senior Center for the noon meal.
- Reservations – Should be made at least the day before travel, is needed up to two weeks in advance for curbside service and up to one week in advance for the Senior lunch bus. Same day appointments may be made if there is room in the schedule.
- Fares - Curbside service is $2.00 each way. Income qualified rides are $3.00 each way. Senior lunch bus no fare required.

In addition, human service transportation is provided by those agencies requiring it for their clients. There are many taxis that provide one-way rides for around $5, and there are medical transportation providers for AHCCCS and ALTCS riders. Lake Havasu City also supports Seniors on the Move, a volunteer driver program. The City participates in coordination activities in the region; these have been focused on joint training and customer information.

Transit Challenges

Transit service over the years has declined primarily due to decrease funding, low-ridership, and high operating cost. Challenges to providing effective transit services to the LHMPO planning area include:

- ***Providing viable services.*** The populations are not dense enough or large enough to support a substantial transit network, unless land use patterns are conducive to transit or there is another factor (presence of a university, limited parking, or presence of a resort). While Lake Havasu City does have resort characteristics, most visitors arrive with vehicles as they often haul boats.
- ***Financing.*** Nationally, small urban and rural areas receive about 25% of their funding from State governments, and provide about 25% of funds from local sources. Without a state source of funding, Arizona's small urban and rural areas provide closer to 50% of funding for transit services.
- ***Management Capacity***. Providing effective transit services requires solid management oversight from skilled employees. Transit is a complex service to deliver and requires specialty skills. Small transit services often struggle to provide the necessary level of strong management skill.

TRAILS, SIDEWALK, AND BICYCLE

Trails

Walking is an essential part of everyday activity; traveling to and from work, shopping or recreation. Pedestrians are served by sidewalks or shared use paths that are within or away from the public ROW.

The existing trails system in the LHMPO planning area is comprised of a variety of trails that are designated and managed by a public or private entity and non-designated informal trails that are not owned or maintained. Designated trails in the LHMPO planning area include:

- **SR-95 Multi-use Trail:** a meandering 8.3 mile multi-use path that parallels SR-95 from Palo Verde Blvd North to McCulloch Blvd South.
- **Shoreline Promenade:** a concrete 2 mile path that extends along each side the Bridgewater Channel from Rotary Park to north of the London Bridge.
- **Pima Wash Trail:** a concrete 1.5 mile path that extends along the Pima Wash from the shoreline to Magnolia Dr.
- **Island Trail:** a circular 3.6 mile paved path located in the interior of the island.
- **Mohave Sunset Trail:** a 1.5 mile multi-use path that parallels SR-95 from Palo Verde Blvd North to McCulloch Blvd South. The trail is maintained and managed by Arizona State Parks and is located in the area of Windsor Beach in Lake Havasu State Park.
- **Arroyo-Camino Interpretive Garden Trail:** showcases the diverse desert eco-system in the area of Windsor Beach in the Lake Havasu State Park. The trail is maintained and managed by Arizona State Parks.

In addition, Chemehuevi Wash Trial, which extends 4-miles along the wash from the southern city limits in the area of Sweetwater Ave and Powell Dr to the shoreline of the lake, is within the proximity of two BLM campsites.

Figure 3.19 visually displays the trails maintained by the City.

Sidewalks

Separated by a curb, sidewalks are located along the roadway in the outer sections of the public ROW. More than half of the roadways in the LH MPO planning area include sidewalks, either on both sides of the road or only one side of the road, and provides connectivity to most of the major activity centers as shown in Figure 3.19. Major roadways in the vicinity of the downtown area have sidewalks located on both sides of the road while peripheral roadways have sidewalks located on at least one side of the road. Table 3.6 summarizes the sidewalk inventory in the LHMPO planning area.

TABLE 3.6: SIDEWALK INVENTORY

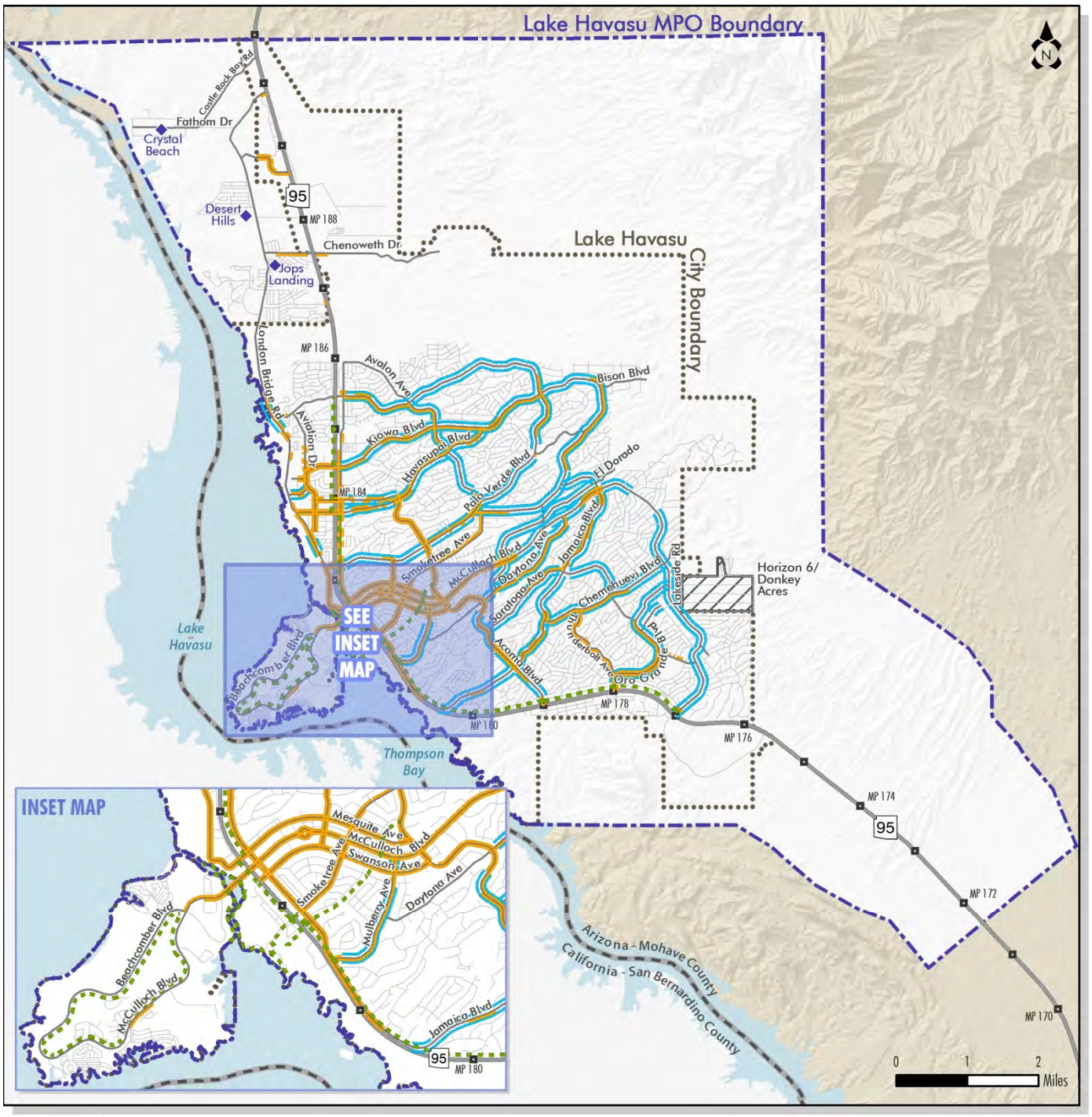
Sidewalk Location	Total Miles
Each side of road	24.6
Left side of road	15.7
Right side of road	20.4
Total Miles	60.7

Bicycle

Bicycles not only provide a healthy alternative to motorized travel but also improve livability by providing access to employment centers and schools. Bicycle facilities include buffered bike lanes, shared use paths, designated bike lanes, and paved shoulders adjacent to vehicle travel lanes in the public ROW.

While there are no designated bicycle lanes or routes in the LHMPO, there are a few multi-use paths that bicyclists can utilize. In addition, on-street parking is permitted on major roadway corridors such Palo Verde Blvd, Havasupai Blvd, Kiowa Blvd, El Dorado, Jamaica Blvd, Saratoga Ave, Chemehuevi Blvd, and Oro Grande Blvd.

FIGURE 3.19: TRAILS AND SIDEWALKS

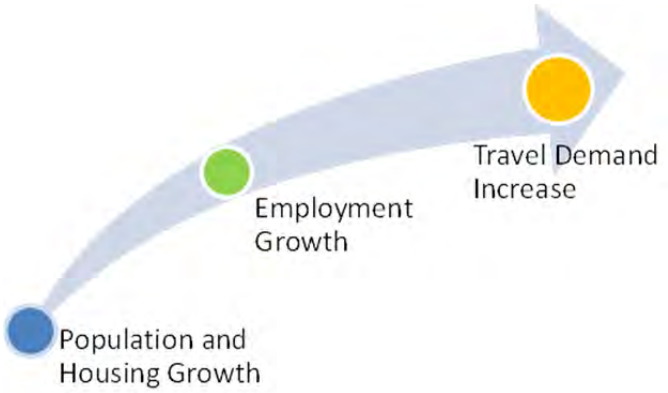


FUTURE NO-BUILD ROADWAY CONDITIONS

The projected socioeconomic data for the future horizon years were utilized to assess the effects of the increase population and employment on the transportation system if only the current roadway system, as is, and committed and funded projects are in place. This is called the "No Build" analysis.

Without additional improvements, since no capacity projects are funded in the next 5 years, and the increase in the number of people utilizing the roadway system as it exists in the base year 2014, congestion on the transportation network is expected to increase as Figure 3.20 shows.

FIGURE 3.20: PROJECTED TRAVEL DEMAND



YEAR 2025 NO-BUILD CONDITIONS

By 2025, the population and employment in the LHMPO planning is projected to reach 62,222 and 22,972 and *if there are no roadway improvements*, the majority of the roadways will have little to moderate congestion (LOS C or better) as shown in Figure 3.21.

Traffic distribution in 2025 is similar to the base year; the heavily travelled corridors include SR-95 and Mesquite Ave, McCulloch Blvd, and Swanson Ave in the downtown area.

FIGURE 3.21: YEAR 2025 NO-BUILD CONGESTION

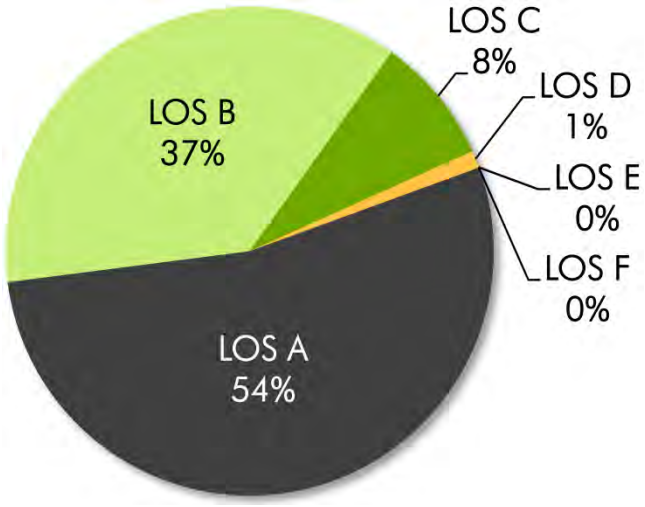


Figure 3.22 displays the projected 2025 AADT volumes for the planning area:

- Increase traffic flow on the roadways such as Kiowa Blvd and Palo Verde Blvd North in the northern portion the City.
- Traffic flow between Lake Havasu City and the unincorporated communities in the northwestern portion of the LHMPO remains relatively the same at 2,500 vpd or less.
- London Bridge Rd averages 5,000 vpd or less in Lake Havasu City with the exception between Sea Lancer Dr and Palo Verde Blvd South.

Figure 3.23 visually displays the LOS for the current roadway network with projected 2025 socioeconomic conditions *if no roadway improvements* are made. The following roadways operated at LOS D or worse:

LOS D

- Acoma Blvd: Daytona Ave to Saratoga Ave
- McCulloch Blvd: Beachcomber Blvd to Lake Havasu Ave
- Palo Verde Blvd South: Acoma Blvd North to Constellation Dr

FIGURE 3.22: YEAR 2025 NO-BUILD DAILY TRAFFIC VOLUMES

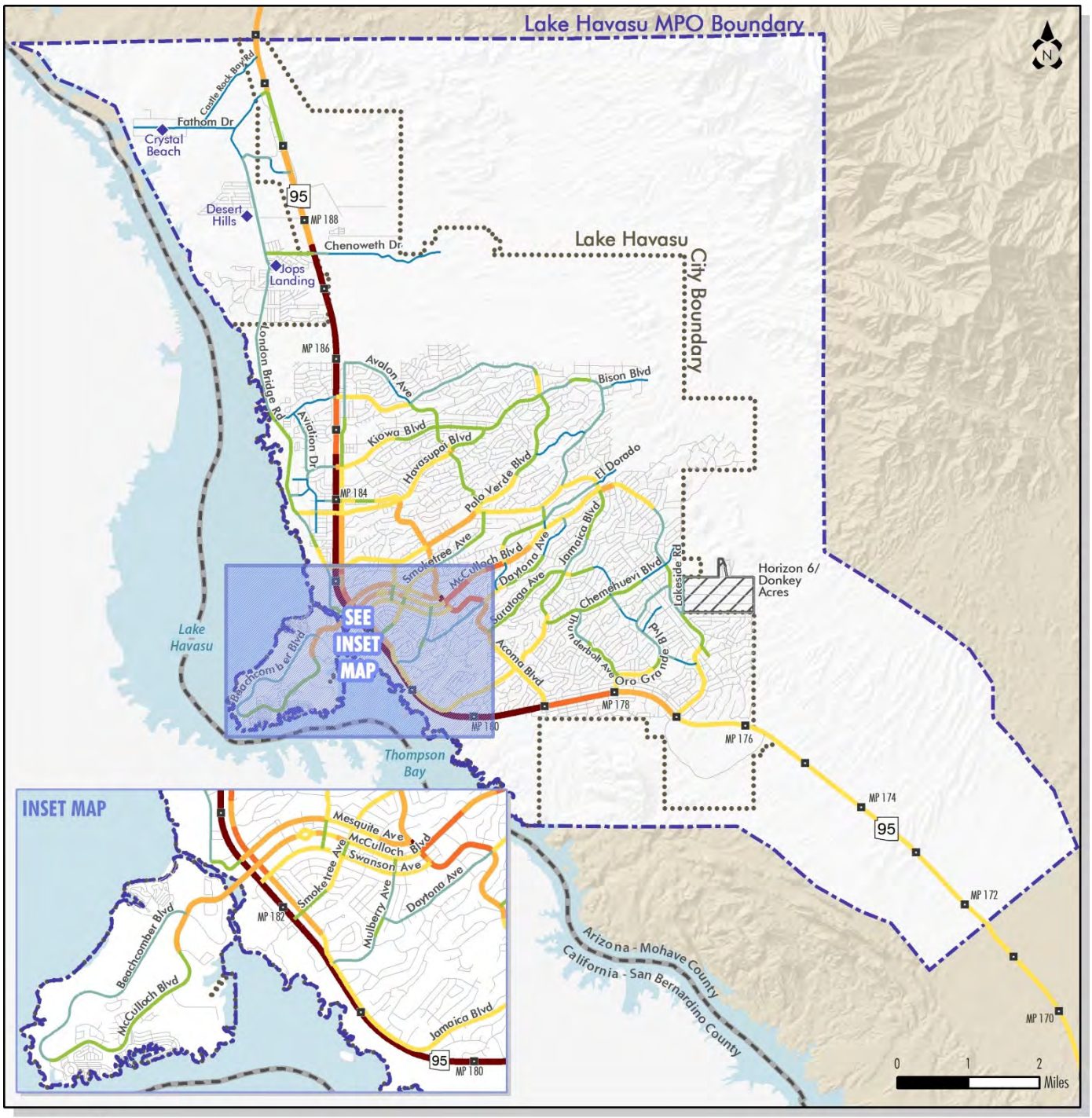
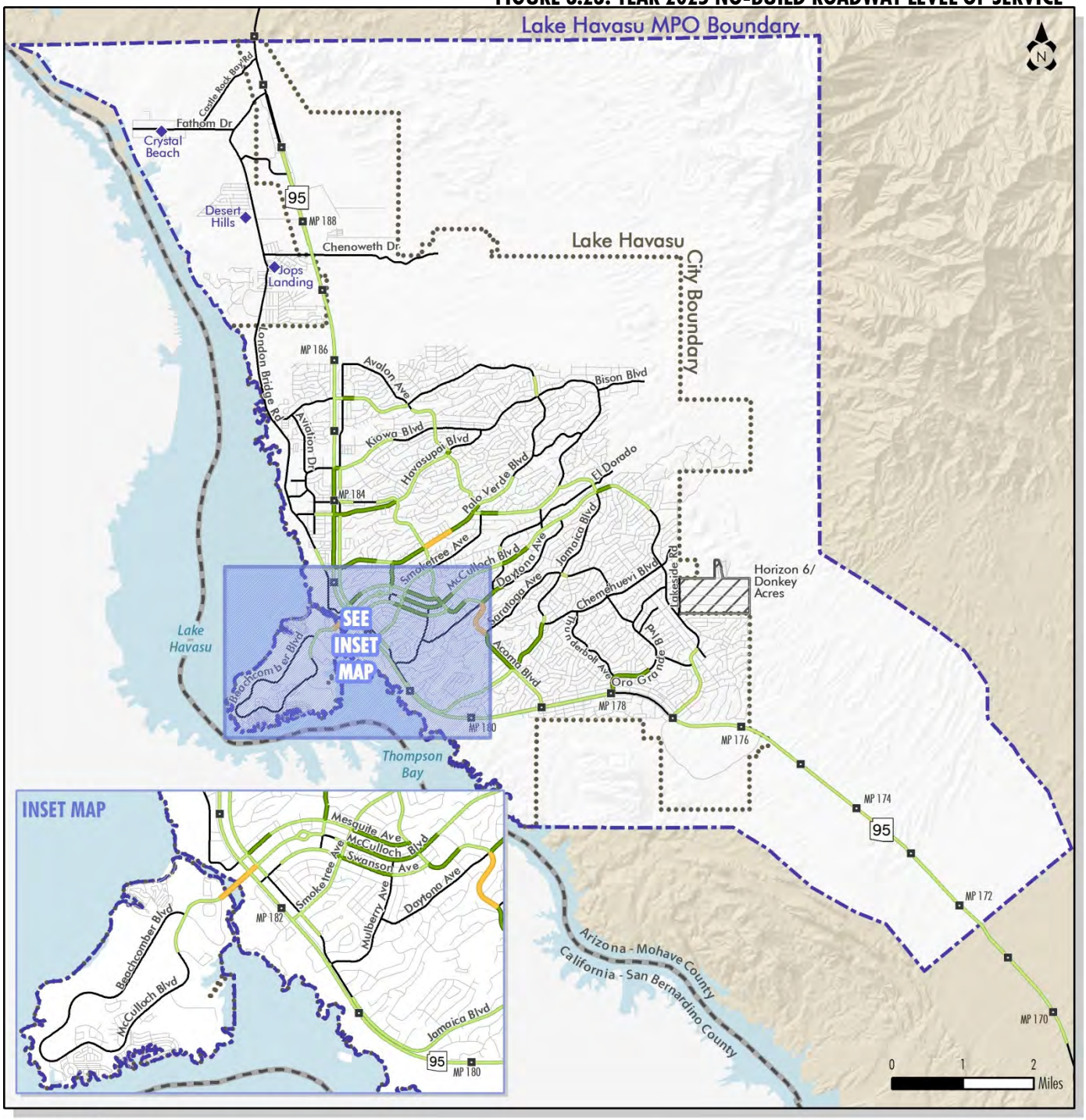


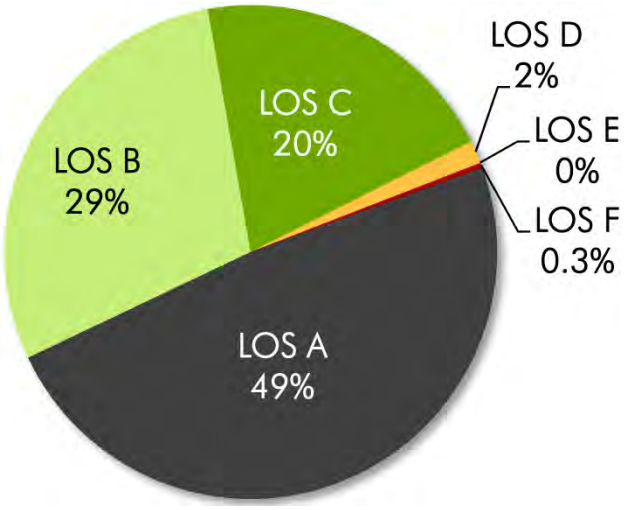
FIGURE 3.23: YEAR 2025 NO-BUILD ROADWAY LEVEL OF SERVICE



YEAR 2040 NO-BUILD CONDITIONS

The population and employment in the LHMPO planning area is projected to reach 71,277 and 27,494 by 2040 and *if there are no roadway improvements*, majority of the roadways will have little to moderate congestion (LOS C or better) while less than 1 percent roadway are highly congested as shown in Figure 3.24.

FIGURE 3.24: YEAR 2040 NO-BUILD CONGESTION



Traffic distribution in 2040 is similar to the traffic patterns observed in 2025 and 2014 where the SR-95 corridor and roadways in the downtown area continue to be heavily travelled. Figure 3.25 displays the projected 2040 AADT volumes for the LHMPO planning area:

- Traffic continues to increase on McCulloch Blvd from Acoma Blvd to El Dorado Ave.
- Increase traffic flow on Jamaica Blvd from Mulberry Ave to Chemehuevi Blvd.
- Traffic between Lake Havasu City and the unincorporated communities in the northwestern portion of the planning area ranges from 2,501 to 5,000 vpd.
- London Bridge Rd in Lake Havasu City continues to average 5,000 vpd or less with the exception of the sections from Dover Ave to Industrial Blvd. From Sea Lancer Dr to Palo Verde Blvd South, traffic averages between 5,001 and 10,000 vpd.

Figure 3.26 visually displays the LOS for the current roadway network with projected 2040 socioeconomic conditions *if no roadway improvements* are made. The following roadways operated at LOS D or worse:

LOS C (Close to D threshold)

- Industrial Blvd: SR-95 to Acoma Blvd N
- Jamaica Blvd S: Lake Havasu Ave to Chemehuevi Blvd
- Lake Havasu Ave N: Palo Verde Blvd S to Havasupai Blvd
- Palo Verde Blvd S: SR-95 to Acoma Blvd N

LOS D

- Acoma Blvd: Daytona Ave to Jamaica Blvd S
- Palo Verde Blvd S: Acoma Blvd to Constellation Dr

LOS F

- McCulloch Blvd: Beachcomber Blvd to Lake Havasu Ave

FIGURE 3.25: YEAR 2040 NO-BUILD DAILY TRAFFIC VOLUMES

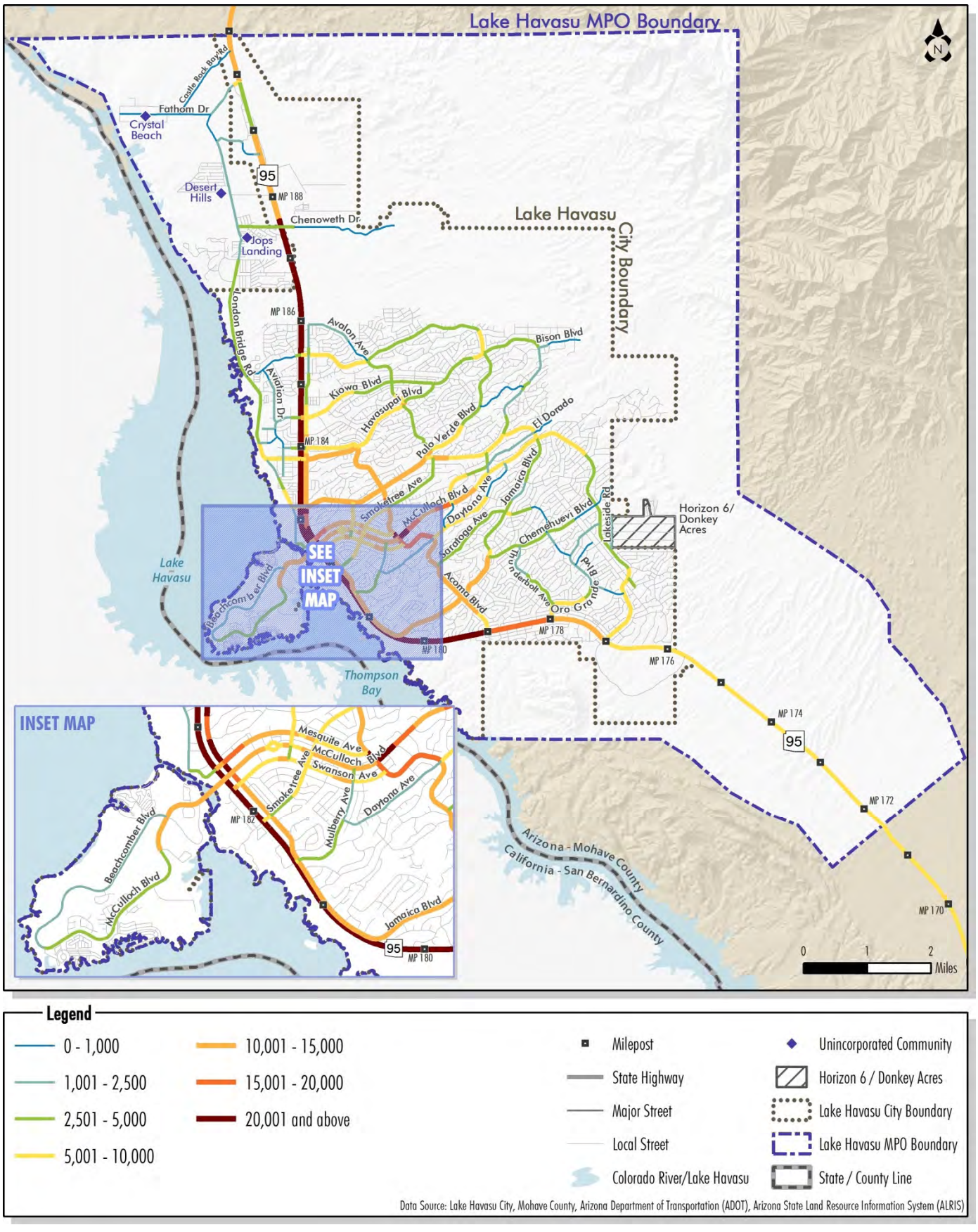
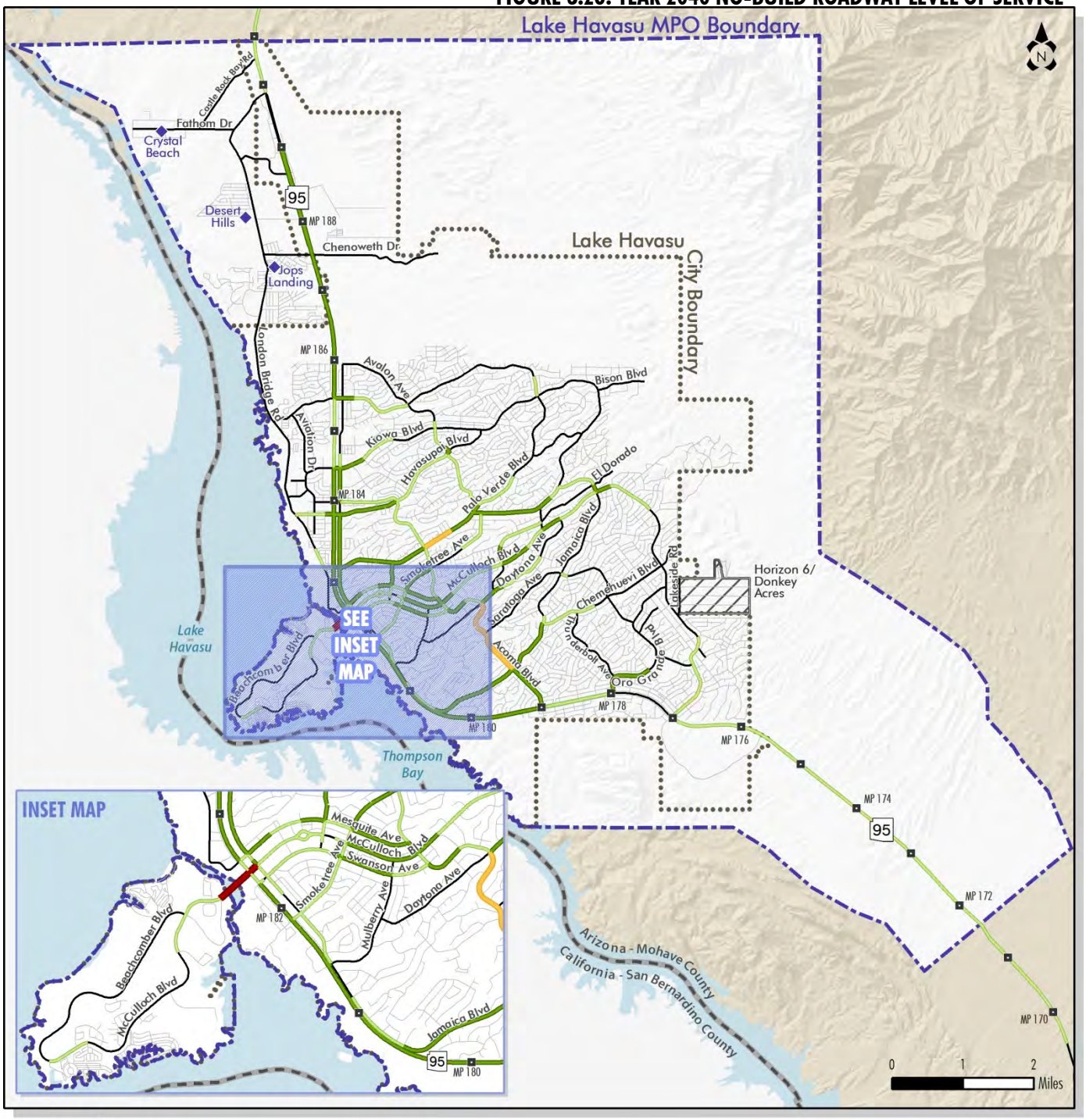


FIGURE 3.26: YEAR 2040 NO-BUILD ROADWAY LEVEL OF SERVICE



ROADWAY SENSITIVITY ANALYSIS

Sensitivity analysis was conducted to evaluate the magnitude of change in roadway performance, traffic circulation and variation, and travel speed on the existing roadway network based on the projected population and employment growth for the LHMPO planning area for the No-Build scenarios.

Screenline Analysis

In addition to reviewing the daily congestion levels and traffic volumes, a screenline analysis provides an indication of how traffic is circulated through the planning area if no roadway capacity improvements are made. Screenlines, as shown in Figure 3.27, are imaginary lines that cross the roadway system at strategic locations to capture the distribution of traffic on the facilities. Table 3.7 displays the aggregated daily traffic volumes for each of the 7 screenlines.

TABLE 3.7: SCREENLINE VOLUMES

Screenlines	Year 2014	Year 2025 NB	Year 2040 NB
1	36,236	40,394	45,676
2	42,095	48,550	56,949
3	49,013	55,833	65,582
4	49,253	56,144	64,541
5	38,854	45,098	51,525
6	20,742	22,798	25,412
7	40,635	43,141	47,051

In 2014, traffic flow is primarily across screenlines 2, 3, 4, and 7. More than 40,000 vpd cross screenline 2 and 7 which are located east of SR-95 in the vicinity of the downtown area while more than 49,000 vpd cross screenlines 3 and 4 in the northern and central portion of Lake Havasu City.

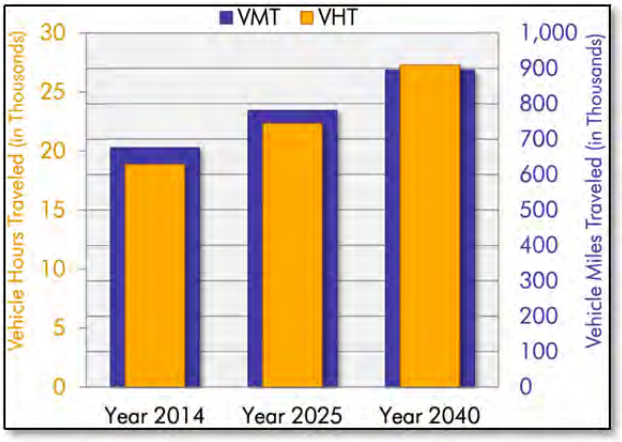
If no improvements are made, traffic patterns in 2025 and 2040 remain relative the same as 2014 where traffic flow is in the easterly and northerly directions.

- The highest influx of traffic is primarily across screenlines 3 and 4 where traffic is expected to exceed 55,000 vpd in 2025 and 64,000 vpd in 2040.
- Traffic across screenline 5 is anticipated to exceed 45,000 vpd by 2025 and 50,000 by 2040.

VMT and VHT

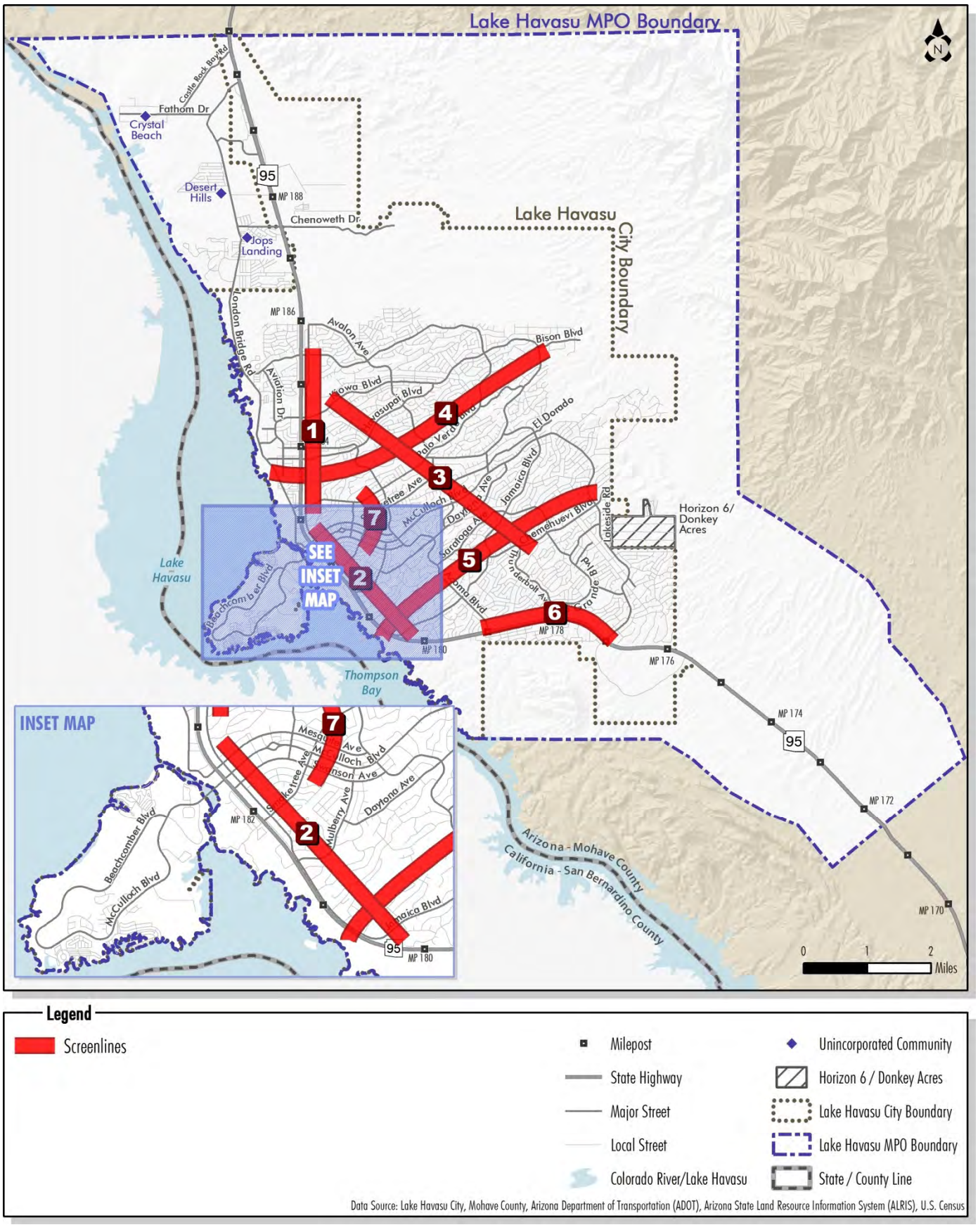
Vehicle miles traveled (VMT) and vehicle hours traveled (VHT) are frequently used to measure congestion. VMT refers to the number of miles that are traveled in a day, while VHT refers to the amount of time spent traveling in a day. Their ratio is "average network speed" for the entire roadway system. As shown in Figure 3.28, the VMT increases in the LHMPO planning as a result of the projected growth, population and employment, for the area.

FIGURE 3.28: VMT AND VHT TRENDS



As more people are utilizing the existing roadway, the VHT or hours travel also increases.

FIGURE 3.27: SCREENLINES



With the projected population and employment growth and with no additional roadway capacity improvements, such as roadway widening or new roads, the average driver in the LHMPO planning area will experience longer travel times resulting in slower travel speeds, as shown in Figure 3.29. The average speed will decrease from 36 mph to approximately 33 mph, as shown in Table 3.8. Since the average speed is system wide a decrease of 3 mph is noticeable. Although SR-95 will carry more than 45 percent of the traffic in the future years, more than half of the travel time will be spent on the minor arterials.

FIGURE 3.29: VHT AND AVERAGE SPEED TRENDS

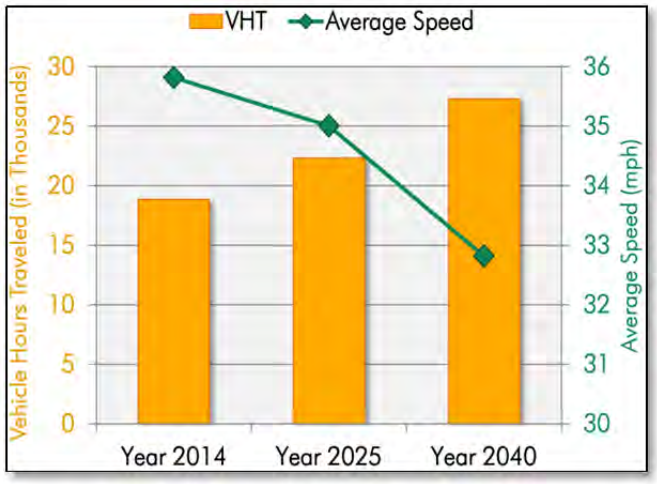


TABLE 3.8: NO-BUILD VMT AND VHT STATISTICS

	Year 2014	Year 2025 NB	Year 2040 NB
Vehicle Miles Traveled (VMT)	675,859	781,443	895,805
Vehicle Hours Traveled (VHT)	18,870	22,324	27,295
Average Speed (mph)	36	35	33

FUTURE DEMAND FOR TRANSIT SERVICES

Based on the peer analysis and historical ridership experience across the nation, a range of 2 to 4 riders per capita is considered appropriate for the LHMPO planning area to serve a wide range of markets: low income workers, seniors or people with disabilities, the youth or others who are unable to drive.

If the area continues serving a more limited market of those individuals who cannot live independently without access to some transportation services, then minimal demand levels can be considered as services carrying from 0.1 to 1.0 trips per capita.

These limited trips may be served by a combination of a demand response system and volunteer drivers. Volunteer drivers may be part of a formal system or they may be families, friends, or church members who chauffeur people to medical appointments.

Demand is closely related to quality and viability of service. Table 3.9 illustrates the range of ridership that would be expected based on various trip rates (annual trips per capita). The challenge is to be able to provide a network of services to provide these trips that is viable from the passenger's standpoint and meets generally accepted standards of cost-effectiveness.

Even at four trips per capita, transit trips would reflect a very small level of the daily person trip demand, – less than one percent of person trips in 2040 (the transit demand of 285,000 annual transit trips equates to 1,100 daily transit trips; 1,100 transit trips =.3% of 368,900 person trips).

TABLE 3.9: POPULATION GROWTH AND DEMAND FOR TRANSIT SERVICES

Community	2014	2025	2040
Lake Havasu City Population	53,193	58,570	66,698
Unincorporated Mohave County Population	3,080	3,652	4,579
LHMPO Total Population	56,273	62,222	71,277

Annual Ridership Based on Trips per Capita			
0.1 Annual Trips per Capita	5,600	6,200	7,100
1 Annual Trips per Capita	56,000	62,000	71,000
2 Annual Trips per Capita	112,000	124,000	142,000
4 Annual Trips per Capita	225,000	249,000	285,000

SUMMARY OF IDENTIFIED NEEDS AND DEFICIENCIES

Based on analysis of existing and future conditions, key findings and observations were compiled into several categories. These will help form the basis for the development of the long-range transportation plan. Key issues in each category are listed below.

MOBILITY

- Based on the projected future socioeconomic data and current roadway network, congestion levels will increase impacting the operation of the roadways if no capacity improvements are made. By 2040, less than half of the roadways in the LHMPO planning area will operate at LOS A.
- Traffic patterns in the future horizon years will remain relatively the same as the base year with higher traffic flow on SR-95 and the downtown area corridors.
- Traffic flow in the LHMPO planning area is primarily in the easterly and northerly directions. Traffic flow is higher across screenlines 2, 3, and 4 in the current base year and future horizon years.
- With the current roadway system, the average driver in the LHMPO planning area will spend more time traveling in future horizon years as a result of more traffic and lower speeds. More than half of the travel time will be spent traveling the minor arterials.
- Limited alternative emergency routes to the Island as well as SR-95 north of MP 186 and south of MP 177.

BRIDGE AND PAVEMENT

- Two bridges are functionally obsolete: McCulloch Blvd underpass and London Bridge.
- Portions of SR-95 from MP 177.90 to MP 189.80 are in poor pavement condition.
- London Bridge Rd from south of Sailing Hawks Dr to SR-95 in the northern portion of the planning area has poor pavement conditions.

SAFETY

- High crash corridors include: SR-95, Palo Verde Blvd (SR-95 to Smoketree Ave), Mesquite Ave, McCulloch Blvd, Smoketree Ave (SR-95 to Mulberry Ave), and Kiowa Blvd (on each side of SR-95).
- Corridors with higher occurrences of fatal crashes include: SR-95 (Palo Verde Blvd North to MP 172), and Palo Verde Blvd South (SR-95 to Acoma Blvd North).
- Corridors with higher occurrence of intersection related crashes include: SR-95, McCulloch Blvd, and Lake Havasu Ave.
- Intersections with 16 or more intersection related crashes include: SR-95 and Kiowa Blvd, SR-95 and Mesquite Ave, SR-95 and Swanson Ave, SR-95 and Mulberry Ave.

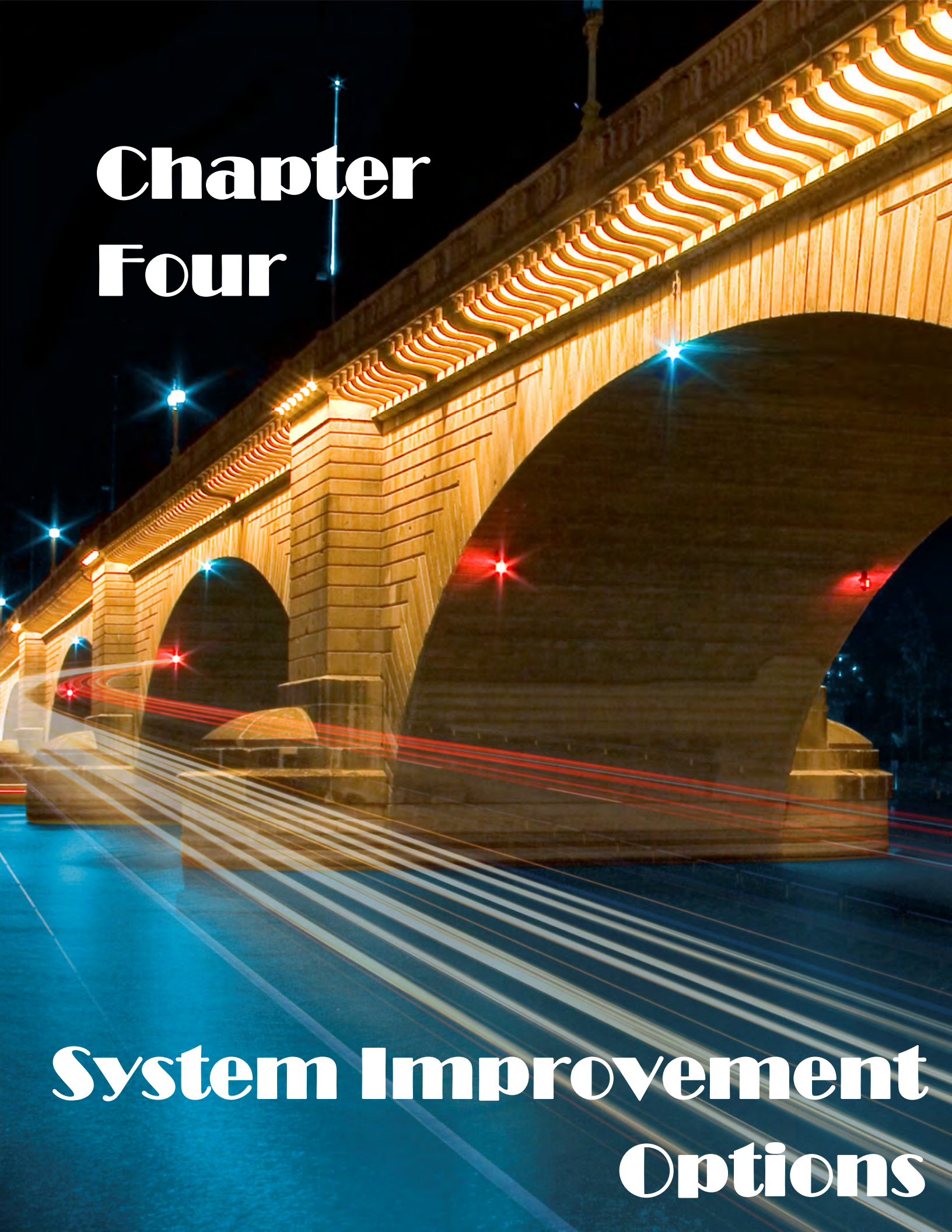
TRANSIT

- The overall challenge is to design a network and level of service that meets residents travel needs while providing a good investment for taxpayers.
- Transit service must be viable for riders to meet a community's needs and to build adequate ridership. It must take riders where they want to go, when they need to travel.

- The resulting network must also be affordable for riders and financially viable for the taxpayers.
- Given how Lake Havasu City's prior service compared to peer cities, it is understandable that Lake Havasu City decided to end general public transit services. The Havasu Mobility can meet the most critical needs for local travel.
- The need for service is on par with similar communities but it will be necessary to find a way to meet these needs in a manner that is both viable for the public and meets general standards of cost effectiveness before consideration is given to additional transit services.

PEDESTRIAN AND BICYCLE

- Gaps in the current sidewalk facilities and limited infrastructures, particularly near schools.
- While on-street parking is signed and permitted on major roadways in Lake Havasu City, there are no designated bike lanes. Local cyclists use the parking lane as an unofficial bike lane.
- Limited to no dedicated bicycle route to the west of SR-95 and to the island where resort related growth such as hotel and motel accommodations, mixed-use and resort residential development, service, retail, and restaurants, is expected to occur.
- Limited to no sidewalks and or trails to the unincorporated area in northwest portion of the LHMPO planning area.
- While only 2.6 percent of the crashes were pedestrian and bicycle related, nearly half occurred at intersections located throughout the LHMPO planning area.
- More than half pedestrian and bicycle related crashes were the result of human behavior such as failure to yield right-of-way, driver inattention/distraction, did not use crosswalk, or disregarded traffic signal, which the LHMPO Strategic Transportation Safety Plan will address and provide recommendations.



Chapter Four

System Improvement Options

4. SYSTEM IMPROVEMENT OPTIONS

A regional transportation network should safely and efficiently accommodate projected travel demands regarding the movement of people and goods and promote multimodal travel. This chapter presents the initial improvement concepts and the criteria used for evaluating recommendations for the study area. Initial concepts were developed based on deficiencies and needs identified in the existing conditions analyses, future land use, socioeconomics, traffic conditions, and the goals and objectives established by the study team and the TAC at the onset of the study.

EVALUATION CRITERIA AND METHODOLOGY

During the study, a preliminary set of goals and objectives where identified and presented to the public for consideration and input during the first two public meetings. Table 4.1 lists the goals and objectives and the corresponding ranking by the region's residents.

TABLE 4.1: STUDY GOALS AND OBJECTIVES USED WITH PUBLIC RANKING

Goals	Objectives
Preserve, make safe, and improve utilization of the existing transportation system. ◆	• Invest in targeted safety improvements at high crash locations, if caused by roadway geometry.② • Repair, maintain, and replace aging bridges and pavement.④ • Reduce highway and street congestion by implementing travel demand management techniques (optimize the existing system).⑥ • Add traffic calming measures (e.g., speed bumps, speed tables, curb extensions, etc.) to address speeding on city roads.⑧
Enhance regional transportation mobility and accessibility.◈	• Reduce highway and street congestion by widening or building new roads.⑤ • Improve multimodal access to major employment and commercial centers.⑦
Plan, design, and implement a coordinated transportation system so that improvements are consistent with regional values. ◆	• Create multimodal connections / facilities (trails, sidewalks and transit services).① • Promote/plan for complete streets to have a livable and sustainable community③.
Involve the Public. ◆	• Provide opportunities to the public to comment during the study and review draft transportation plan.
Review past transportation planning efforts.◇	• Review and use identified improvements if need still exists.

◆ Very Important ◈ Important ◇ Somewhat Important ⓪ Public ranking

The input provided by the public and the stakeholders was used in the development of the evaluation criteria.

Transportation system deficiency analysis and input from the public, various stakeholders, and the Technical Advisory Committee (TAC) resulted in a comprehensive list of potential transportation improvement options. These options were carefully evaluated utilizing a set of evaluation criteria developed during the RTP process. Evaluation criteria are factors utilized to identify the potential benefits, impacts, and constraints of projects for prioritization. Table 4.2 displays the evaluation criteria used in the evaluation and derived from the LHMPO RTP goals and objectives. However, some of the criteria do not lend themselves to numerical or nominal (YES or NO) quantification, which limits the objectivity of the evaluation. Therefore, in order to attain consistency through the evaluation process, a "qualitative" evaluation method was adopted based on the following descriptors:

- • High: Strongly meet the measure - ● (10 pts)
- • Medium: Fairly meet the measure - ◘ (5 pts)
- • Low: Scarcely meet the measure - O (1 pt)

These qualitative descriptors of performance were employed to provide an assessment of the relative value of potential effects – benefits or no-benefits – associated with the package of improvement projects defined for each improvement Alternative.

Potential improvements identified were evaluated and prioritized to determine the projects/improvements that best serve the needs of the local and regional transportation system.

Roadway improvement projects were differentiated by two different categories: capacity related improvement projects and non-capacity roadway improvement projects.

Non-capacity related improvement projects - address safety concerns, pavement preservation, intersection improvements, and the need to conduct additional planning, safety, and traffic studies.

Capacity related improvement projects - include widening existing roadways and constructing new roadways. Capacity-related projects were evaluated using the LHMPO travel demand model developed for this study.

Based on the results of the needs analysis, potential improvement projects were identified, evaluated and prioritized into short-, mid-, and long-term implementation phases:

- Short-term (2015-2020) – short-term projects are typically projects needed to address the most critical needs and deficiencies and have a reasonable potential for obtaining funding. Short-term projects also include projects currently programmed in the State Transportation Improvement Plan (STIP) and will constitute the LHMPO Transportation Improvement Plan (TIP).
- Mid-term (2020-2025) – More complex projects that improve safety, expand mobility and access, or address future development needs.
- Long-term (2025-2040) – High cost projects that require additional time to obtain funding or are not needed until robust growth occurs.

TABLE 4.2: EVALUATION CRITERIA

Evaluation Criteria	Measure	Benefit Scale (High		Low)	
1. Project programmed, designed, or planned	Is the project consistent with planned improvements, comprehensive plans, general plans, and previous transportation plans?	Yes	-	No	N/A
2. Improves traffic operations	Does the project aid in reducing congestion and improving travel times?	High ●	Med ◎	Low ○	N/A
3. Improves safety	Does the project contribute to reducing crashes, crash severity, reducing vehicle speeds, or improve emergency response time?	High ●	Med ◎	Low ○	N/A
4. Improves regional or local connectivity and mobility	Does the project provide additional access or connections between activity centers and improve mobility?	High ●	Med ◎	Low ○	N/A
5. Promotes community health, encourages development, and improves livability	Does the project provide multimodal travel choices? Does it enhance opportunities for development and/or tourism?	High ●	Med ◎	Low ○	N/A
6. Ease of implementation	Does the project have reasonable funding/capital, right-of-way, and on-going maintenance costs?	High ●	Med ◎	Low ○	N/A
7. Local agency and public acceptance	Does the project have documented support from local governing agency or public support?	High ●	Med ◎	Low ○	N/A

The recommended implementation timeframes are based on fiscal years, and actual phasing may need to be adjusted based on funding availability, development activity, traffic patterns, and private participation. Recommended improvement project should be re-evaluated each year as part of the LHMPO planning process or if travel patterns change significantly.

ROADWAY IMPROVEMENT OPTIONS

NON-CAPACITY RELATED IMPROVEMENT OPTIONS

In order to enhance mobility, safety, and access, the following safety and general roadway improvements were evaluated: bridge rehabilitation, roadway pavement treatments, and safety improvements. The following section presents a summary of the different safety and non-capacity enhancements evaluated to identify the most effective improvements for the study area.

PAVEMENT REHABILITATION

On-going, paved road maintenance and pavement reconstruction is critical to the overall safety of the area's transportation network. Maintaining a road's pavement condition can lessen maintenance costs on vehicles, improve overall safety, and provide motorists with a smoother, more comfortable ride.

Pavement rehabilitation is divided into two categories: minor and major. Minor rehabilitation consists of non-structural enhancements to eliminate age-related, top-down surface cracking that develops in flexible pavements due to environmental exposure. Major rehabilitation consists of structural enhancements that both extend the service life of an existing pavement and/or improve its load-carrying capability. Surface treatments methods include chip seal microsurfacing, slurry seal, and crack seal.

SR 95 (approximately from MP 178 to MP 190) and London Bridge Road, primarily in the unincorporated Mohave county portion, maintenance, pavement rehabilitation is recommended. While the poor pavement sections along SR 95 are not contiguous, ADOT usually programs pavement rehabilitation for a continuous stretch of a state route. Table 4.3 displays the projects evaluation and ranking.

TABLE 4.3: PAVEMENT PRESERVATION IMPROVEMENTS AND RANKING

Pavement Preservation		Project Ranking		
Location	Project Description	Term	Total	Rank
Lake Havasu City				
London Bridge Rd: north of Sailing Hawks Dr to south of Arnold Palmer Dr	Pavement rehabilitation	Mid	36	1
London Bridge Rd: west of Showplace Ave to SR-95	Pavement rehabilitation	Mid	36	1
Mohave County				
London Bridge Rd: Unincorporated County (City limits to City limits)	Pavement rehabilitation	Mid	36	1
Arizona Department of Transportation				
SR 95: MP 177.90 to MP 189.90 - Various Sections	Major pavement rehabilitation	Mid	36	1

Bridge Improvements

Proposed bridge improvement projects are usually developed based on input received by stakeholders, review of existing conditions, programmed improvements, and sufficiency ratings obtained from ADOT's bridge inventory. Bridge rehabilitation involves major work required to restore the structural integrity of a bridge and to correct safety defects; to be eligible for rehabilitation, a bridge must have a Sufficiency Rating of 80 or less. To be eligible for replacement a bridge must have a Sufficiency Rating less than 50. No bridges in the LHMPO planning area were found to be structurally obsolete. However, the SR 95/McCulloch Blvd overpass was found to be functionally obsolete. Functionally obsolete bridges are those that do not have adequate lane widths, shoulder widths, or vertical clearances to serve current traffic demand, or those that may be occasionally flooded because built under the standards at the time. The recommendation in this case was that, ADOT must look at ways to bring the structure up to current standards, when it comes time to consider upgrading.

The analysis conducted for the London Bridge resulted in the assessment that the bridge is fast approaching the facility vehicular carrying capacity; however widening is not an option without compromising the structural integrity and historical value of the bridge. **For this reason, a study is recommended to determine the feasibility of an alternate multimodal bridge crossing.**

Safety Improvements

Based on stakeholder and public input, as well as a comprehensive technical analysis, some study area roadway's currently have safety issues that require improvement. Key issues identified include: high vehicle speeds, access management issues, intersection and driveway turning movement conflicts, driving in the wrong lane, disregard of traffic signal, and inattention.

Safety improvement projects evaluated within the planning area and the corresponding improvement recommendations are shown in Table 4.4.

It must be noted that the LHMPO is currently conducting the LHMPO Strategic Transportation Safety Plan (STSP). The final safety recommendations of the LHMPO STSP will supersede the ones contained in this report.

TABLE 4.4: SAFETY IMPROVEMENTS OPTIONS

ACTIONS	LOCATIONS
Conduct a Roadway Safety Assessment (RSA) to determine elements that pose a safety concern on the existing roadway and to identify mitigation measures to improve safety. As the statistics show, accident origins are of behavioral nature, however some targeted roadway improvements could mitigate the root cause.	**SR 95 and N. Palo Verde (20 – 1 fatality 3 incapacitating injuries)** Leading crash cause: Inattention 35%; Fail to yield right-of-way 20%.
	SR 95 and Swanson Ave (36 – 5 Incapacitating injuries) Leading crash cause: Inattention 30%; Disregard traffic signal 22%.
	SR 95 and Smoketree Ave (12 – 2 incapacitating injuries) Leading crash cause: Disregard traffic signal 41%; Fail to yield right-of-way 17%.
	SR 95 and Mulberry Ave (31 – 3 incapacitating injuries) Leading crash cause: Inattention 45%; Disregard traffic signal 23%.
	SR 95 and Oro Grande Blvd (20 – 2 incapacitating injuries) Leading crash cause: Fail to yield right-of-way 45%; Inattention 20%.
	Lake Havasu Ave and Acoma Blvd (16 – 2 incapacitating injuries) Leading crash cause: Fail to yield right-of-way 50%; Ran stop sign 25%.
	Mesquite Ave and Rivera Dr (19 – 2 incapacitating injuries) Leading crash cause: Fail to yield right-of-way 58%; Inattention 26%.
Conduct a traffic study to evaluate the operational performance of the intersections.	Lake Havasu Ave from Mesquite Ave to Smoketree Ave.
Conduct an access management assessment.	Identify strategies and techniques to improve safety and alleviate congestion on **SR 95 and Lake Havasu Ave** from Mesquite Ave to Smoketree Ave and **London Bridge Rd** from Paseo del Sol to SR 95.

CAPACITY RELATED IMPROVEMENT OPTIONS

Capacity related improvement projects, such as widening existing roadways and constructing new roadways, were evaluated to identity potential projects to alleviate existing or projected traffic congestion. Due to the moderate growth in the LHMPO region forecasted for the next 25 years, most of the current roadways will be able to meet future demand with the exception of roadways impacted by residential and/or commercial activity increase. Table 4.5 lists the recommended improvements together with the level-of-service (LOS) before the improvement (No-Build) and after the improvement are in place (Build). The LHMPO travel demand model was used to determine the LOS. As stated previously, the model LOS represents the mid-link LOS which is utilized for this type of planning level analysis and does not represents the intersections LOS.

TABLE 4.5: CAPACITY IMPROVEMENT OPTIONS AND LOS RESULTS

Phase	Improvement: Widen to 4 lanes	No-Build LOS	Build LOS
Mid-term	Palo Verde Blvd S: Acoma Blvd N to Kiowa Blvd S	D/C	B
Mid-term	Acoma Blvd S: Daytona Ave to Saratoga Ave	D	B
Long-Term	Acoma Blvd S: Saratoga Ave to SR-95	D/C	B
Long-Term	Palo Verde Blvd S: SR-95 to Acoma Blvd N	High C	B
Long-Term	Jamaica Blvd S: Lake Havasu Ave to Chemehuevi Blvd	High C	B
Long-Term	Industrial Blvd: SR-95 to Acoma Blvd N	High C	B
Long-Term	Lake Havasu Ave N: Palo Verde Blvd N to Industrial Blvd	High C	B

McCulloch Blvd North from Lake Havasu Ave to Beachcomber Blvd remains at LOS D and LOS F for the mid- and long-term scenarios respectively due to the inability to increase capacity on the London Bridge.

Additionally, an alternate emergency route to SR 95 on the eastern boundary of the LHMPO planning area (connecting SR 95 at MP 176 to SR 95 MP 191) was tested to estimate the potential impact on relieving future congestion on SR 95. Although the reduction of traffic on SR 95 was minor due to the current land uses in the region, this very long-range option provides an opportunity for future economic development as well as an alternate emergency route for the local and regional travelers. A future study is recommended to identify a potential facility alignment. Table 4.6 and 4.7 present the mid- and long-term project evaluation and ranking respectively.

TABLE 4.6: MID-TERM ROADWAY IMPROVEMENT OPTIONS AND RANKING

Roadway Improvements		Project Ranking		
Location	Project Description	Term	Total	Rank
Lake Havasu City				
Palo Verde Blvd S: Acoma Blvd N to Kiowa Blvd S	Widen road to 4-Lanes with a center turn lane	Mid	36	2
Acoma Blvd S: Daytona Ave to Saratoga Ave	Widen road to 4-Lanes with a center turn lane	Mid	37	1

TABLE 4.7: LONG-TERM ROADWAY IMPROVEMENT OPTIONS AND RANKING

Roadway		Project Ranking		
Location	Project Description	Term	Total	Rank
Lake Havasu City				
Acoma Blvd S: Saratoga Ave to SR-95	Widen road to 4-Lanes with a center turn lane	Long	41	1
Palo Verde Blvd S: SR-95 to Acoma Blvd N	Widen road to 4-Lanes with a center turn lane	Long	41	1
Jamaica Blvd S: Lake Havasu Ave to Chemehuevi Blvd	Widen road to 4-Lanes with a center turn lane	Long	36	2
Industrial Blvd: SR-95 to Acoma Blvd N	Widen road to 4-Lanes with a center turn lane	Long	41	1
Lake Havasu Ave N: Palo Verde Blvd S to Industrial Blvd	Widen road to 4-Lanes with a center turn lane	Long	32	3
SR-95 and Lake Havasu Ave from Mesquite Ave to Mulberry Ave	Implement recommendations from traffic study	Long	41	1

TRANSIT IMPROVEMENT OPTIONS

Successful transit systems open economic opportunities for local residents and businesses, enable residents without access to a transportation mode, link neighboring destinations, and generally enhance the quality of life of residents and the economic vitality of the community they serve. However, there are challenges to providing effective transit services that are common to small communities and specifically to those states, such as Arizona, where no State funding is provided to match Federal Transit Administration (FTA) funding. While there are community members who recognize the need for individuals to have access to transit services, especially the elderly and disabled, there is not a prevailing sense that more transit services are needed. Rather, it appears that the combination of private taxis, family and friends, and Havasu Mobility provide the sense that the needs of current residents are generally met. The primary qualitative needs noted through interviews and speaking with individuals at the first public hearing were:

- Longer hours of access to vehicles with wheelchair lifts and more ready access (e.g. calling the night before or day of service need for a reservation).
- Service is needed in Desert Hills and Donkey Acres.
- Regional services are needed, to Kingman and Bullhead City.

LHMPO area is part of a larger region that includes Kingman, Bullhead City, and even Parker to the south and a significant number of workers travel between communities and this is expected to increase over time.

Hence, this study had developed transit improvement options to address the LHMPO area three key challenges: providing viable services, financing and management capacity. The options were developed only for the mid-term due to the uncertainty of funding sources and the ever-changing political arena.

Table 4.8 lists proposed improvement options to be taken to improve and/or expand the current transit service with the resulting evaluation and ranking.

TABLE 4.8: MID-TERM TRANSIT IMPROVEMENT OPTIONS AND RANKING

Transit		Project Ranking		
Location	Project Description	Term	Total	Rank
Lake Havasu City				
Lake Havasu City	Provide current transportation service to the same constituents (demand response service to the elderly, disable and low income population) but with: ◆ longer hours of service (7 am to 7 pm) ◆ ability to reliably reserve rides the day before service is needed	Mid	27	4
Lake Havasu MPO Region	Identify a financially affordable level of general public transit service (fixed route, check-point, or demand response) for the Lake Havasu MPO area	Mid	28	3
Lake Havasu MPO Region	Build partnerships with human service agencies providing specialized transportation services	Mid	22	5
Lake Havasu MPO Region	Ride share services and van pool services for commuters (with park-and-rides)	Mid	37	1
Lake Havasu MPO Region	Identify potential regional routes	Mid	32	2
Lake Havasu MPO Region	Provide comprehensive information to community about transportation service options	Mid	37	1
Lake Havasu MPO Region	Build partnerships with other transportation providers in the region	Mid	27	4
Lake Havasu MPO Region	Investigate options for regional transit management, working with Bullhead City and Kingman, for joint operations	Mid	37	1

PEDESTRIAN, TRAIL, AND BICYCLE IMPROVEMENT OPTIONS

Alternative modes of transportation such as sidewalks, bike paths/routes, and trails (including equestrian) are an important aspect of the multimodal transportation network as they provide mobility for those not able to operate or without access to a vehicle, and also for recreational purpose. At the onset of the study, community members, stakeholders, and the TAC, all expressed interest in enhancing existing pedestrian and bicycle facilities to allow residents and visitors to safely walk or bike between residential areas and activity centers. Developing a community-wide pedestrian and bicycle network can lead to many benefits, including:

- Lowering traffic congestion by reducing dependence on automobiles
- Enhancing residents quality of life through promoting healthier lifestyles
- Providing mobility for those without a vehicle or are unable to drive
- Improving community aesthetics while preserving the natural environment

PEDESTRIAN RELATED IMPROVEMENT OPTIONS

According to the FHWA's Engineering Measures for Improved Pedestrian Safety, "walking along the roadway" crashes are reduced by 88% when sidewalks/walkways are constructed on both sides of a roadway. In LHMPO planning area, existing sidewalk gaps were identified especially near schools and activity centers. For the mid-term, closing these gaps was considered a priority for agencies as well as the public. In the long-term, building a network of sidewalks and multimodal paths will provide the LHMPO area residents with healthy transportation choices. Tables 4.9 and 4.10 present the evaluation results of the proposed improvements for the mid- and long-term horizons.

TABLE 4.9: MID-TERM PEDESTRIAN IMPROVEMENT OPTIONS AND RANKING

Pedestrian Improvements		Project Ranking		
Location	Project Description	Term	Total	Rank
Lake Havasu City				
Acoma Blvd W: Lake Havasu Ave N to Havasupai Blvd	Sidewalk connectivity	Mid	46	1
Acoma Blvd S: Paso Dr to Tonto Dr	Sidewalk connectivity	Mid	46	1
Palo Verde Blvd S: Hummingbird Dr to Starlite Ln	Sidewalk connectivity	Mid	46	1
Jamaica Blvd S: Monte Carlo Ave to Tahiti Ln	Sidewalk connectivity	Mid	46	1
Jamaica Blvd S: Power Dr to Chemehuevi Blvd	Sidewalk connectivity	Mid	46	1
Thunderbolt Ave: Roanoke Dr to Broken Arrow Dr	Sidewalk connectivity	Mid	46	1
London Bridge Rd: Alley 22 to Palo Verde Blvd S	Sidewalk connectivity	Mid	46	1
New Trail on the Island	Construct new trail	Mid	41	2
El Dorado Wash Trail Extension	Construct new trail	Mid	41	2
Mohave County				
Horizon Six Equestrian Trail	Construct new trail	Mid	41	2
Arizona Department of Transportation				
SR-95 and Pima Wash Trail/Aquatic Center	Conduct pedestrian crossing study	Mid	41	2

TABLE 4.10: LONG-TERM PEDESTRIAN IMPROVEMENT OPTIONS AND RANKING

Pedestrian Improvements		Project Ranking		
Location	Project Description	Term	Total	Rank
Lake Havasu City				
Havasupai Wash Trail: Palo Verde Blvd N to Lake Shore Trail (north)	Construct new trail	Long	37	1
El Dorado Wash Trail: Pima Wash Trail to Powerline Trail (align)	Construct new trail	Long	32	2
Chemehuevi Wash Trail: McCulloch Blvd N to SR-95	Construct new trail	Long	28	3
Lake Shore Trail (south): Rotary Park to SR-95	Construct new trail	Long	28	3
Lake Shore Trail (north): City Limits to Shoreline Promenade	Construct new trail	Long	28	3
Arizona Department of Transportation				
SR-95 and Pima Wash Trail/Aquatic Center	Implement study findings	Long	37	1

BICYCLE RELATED IMPROVEMENT OPTION

The LHMPO planning area has hilly terrains, long stretches of open road, clean air, clear skies and lots of open space, all of which is perfect for all types of cycling. Experience bikers can use tougher trails, like the ones in SARA Park which lead to mountaintop views or end in secluded bays on the lake, while well-paved paths or city streets are great for those looking for a relaxing ride. Cycling can be used for different levels of exercise, but it is also an excellent means of travel for the sightseer as well as going to work or school. The LHMPO area has a vocal and active cycling community that would like to improve the safety for all cyclists using city and county roadways. Many roadways in LHMPO area have wide shoulders that could be striped as bike lanes, hence restriping the roadway to include a bike lane could be a cost effective compromise to address the concerns of the local cycling community. Tables 4.11 and 4.12 present the summary of the improvements evaluation and ranking.

TABLE 4.11: MID-TERM BICYCLE IMPROVEMENT OPTIONS AND RANKING

Bicycle Improvements		Project Ranking		
Location	Project Description	Term	Total	Rank
Lake Havasu City				
Kiowa Blvd S: Jamaica Blvd N to Palo Verde Blvd S	Re-stripe road for bicycle lanes	Mid	46	1
Lake Havasu Ave: Palo Verde Blvd S to Jamaica Blvd S	Re-stripe road for bicycle lanes	Mid	41	2
Jamaica Blvd S: Lake Havasu Ave to Kiowa Blvd S	Re-stripe road for bicycle lanes	Mid	41	2
Palo Verde Blvd S: Kiowa Blvd N to Lake Havasu Ave N	Re-stripe road for bicycle lanes	Mid	41	2
McCulloch Blvd N: SR-95 to Jamaica Blvd	Re-stripe road for bicycle lanes	Mid	37	3
Mohave County				
London Bridge Rd: Chenoweth Dr to Fathom Dr	Construct shoulder with bicycle lane	Short	46	1

TABLE 4.12: LONG-TERM BICYCLE IMPROVEMENT OPTIONS AND RANKING

Pedestrian Improvements		Project Ranking		
Location	Project Description	Term	Total	Rank
Lake Havasu City				
McCulloch Blvd S: Jamaica Blvd to SR-95	Re-stripe road for bicycle lanes	Long	37	1
Thunderbolt Ave: Chemehuevi Blvd to Oro Grande Blvd	Re-stripe road for bicycle lanes	Long	28	3
Oro Grande Blvd: SR-95 to McCulloch Blvd S	Re-stripe road for bicycle lanes	Long	28	3
Smoketree Ave N: Pima Dr to Kiowa Blvd S	Re-stripe road for bicycle lanes	Long	32	2
Palo Verde Blvd N: Aviation Dr to Kiowa Blvd N	Re-stripe road for bicycle lanes	Long	32	2
Kiowa Blvd N: Jamaica Blvd to Lake Havasu Ave N	Re-stripe road for bicycle lanes	Long	37	1
Havasupai Blvd: Acoma Blvd N to Kiowa Blvd N	Re-stripe road for bicycle lanes	Long	32	2
Lake Havasu Ave N: Kiowa Blvd N to Palo Verde Blvd S	Re-stripe road for bicycle lanes	Long	32	2
Palo Verde Blvd S: Kiowa Blvd S to Kiowa Blvd N	Re-stripe road for bicycle lanes	Long	32	2

TECHNOLOGY OPPORTUNITIES

INTELLIGENT TRANSPORTATION SYSTEMS (ITS)

The U.S. Department of Transportation defines Intelligent Transportation Systems (ITS) as "the integration of current and emerging technologies in fields such as information processing, communications, and electronics applied to solving surface transportation problems." ITS encompasses a large range of technologies and techniques, among them are: traffic signal control systems, incident management systems, emergency management systems, and regional multimodal traveler information systems.

Coordinated signal timing synchronizes traffic movements and manages the progression speed of specific modes where uninterrupted flow is desired along a corridor. While traditionally applied to increase vehicular traffic flow and reduce peak-hour delay, coordinated signal timing can also be optimized for slower speeds, creating an uninterrupted flow for bicyclists or low vehicle progression speeds. The LHMPO region main thoroughfare is SR 95 and the region would potentially benefit by evaluating the implementation of an advanced traffic signal control systems to improve the efficiency of SR 95 by optimizing traffic signal timings to acceptable operating conditions without making physical changes to the roadway network.

From "A Toolbox for Alleviating Traffic Congestion and Enhancing Mobility", highway information systems consist of changeable message signs, highway advisory radio, and/or in-vehicle navigation and information systems. These systems are provided to convey information to the traveler on the roadway or prior to departure regarding delays from non-recurring congestion, construction delays, speed limits, weather conditions, and other items.

Installing Variable Message Signs (VMS) along SR 95 before entering the LHMPO region could function as a congestion management tool that alert the travelers of potential incidents, adverse weather or roadway closure ahead so they can take an alternative route, if possible, or display an Amber or Silver Alert.

Several motorist information systems projects are in various stages of development at this time. ADOT has implemented a 511 system statewide. With this system, motorists can dial 511 on a cellular phone or landline or go to the website, and receive information about traffic congestion, construction delays, tourism, or other travel related data.

In-vehicle and cell phone global positioning systems (GPS) are now commonplace. These navigation systems, which are normally used to indicate position, can also direct the motorist to nearby facilities, such as gas stations, restaurants, and stores. Applications are available that provide information related to non-recurring congestion, construction delays, and weather alerts. These information systems are generally developed by nongovernmental agencies to provide data available from government agencies to the motorist. More data is expected to become available in the future for these types of systems and it is expected that market demand will result in the implementation of more real time data gathering techniques.

Many of the other strategies provide positive value, but quantitative estimates of the benefits are not yet available since many of these strategies are relatively new.

Emerging Technologies

It would be remiss in today's world not to include a section addressing the potential impacts technology will have on the current transportation system and what proactive planning steps, if any, could be taken. It is projected that by the end of the planning horizon 2040, today's vehicle type will become obsolete. Emerging technologies will include satellite-controlled vehicles, smart roadway surfaces and globally integrated transportation systems. Technological changes are moving at an exponentially fast pace with the new generation of virtually connected young adults seeking to "get their hands off the wheels and onto the keypad -- where they belong." A future challenge will be to integrate new types of vehicles, not only automated vehicles but alternative fuel vehicles requiring different sources of recharging. Adjusting to travelers using virtual space to connect in real-time to rides (such as now occurring with unregulated services like Uber, Lyft) and other elements of a "sharing economy" will likely change patterns and modes of travel. Drone technology already can carry significant weights. How goods are moved is likely to make a huge technological shift from freight haulers to individual point-to-point service. The re-emergence of 21st century, high-speed rail lines as well as high-speed human powered monorail type systems will also challenge the ability of governments to provide a transportation network that effectively addresses half a century of different types of travel modes.

Currently U.S. DOT is working with the automobile industry, state and local transportation

agencies, researchers, private sector stakeholders, and others to lead and fund research on connected vehicle technologies to enable safe wireless communications among vehicles, infrastructure, and travelers' personal communications devices.

Connected vehicle technologies include vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) technologies:

- V2V technologies transmit data between vehicles to enable applications that can warn drivers about potential collisions. Specifically, V2V-equipped cars would emit data on their speed, position, heading, acceleration, size, brake status, and other data (referred to as the "basic safety message") 10 times per second to the on-board equipment of surrounding vehicles, which would interpret the data and provide warnings to the driver as needed. For example, drivers may receive a forward collision warning when their vehicle is close to colliding with the vehicle in front of them. V2V technologies have a greater range of detection than existing sensor-based crash avoidance technologies available in some new vehicles. NHTSA is pursuing actions to require that vehicle manufacturers install the underlying V2V technologies that would enable V2V applications in new passenger cars and light truck vehicles, and requested comment on this issue in an August 2014 Advanced Notice of Proposed Rulemaking.
- Vehicle-to-infrastructure (V2I) technologies transmit data between vehicles and the road infrastructure to enable a variety of safety, mobility, and environmental applications. V2I applications are designed to avoid or mitigate vehicle crashes; particularly those crash scenarios not addressed by V2V alone, as well as provide mobility and environmental benefits. Unlike V2V, U.S. DOT is not considering mandating the deployment of V2I technologies.

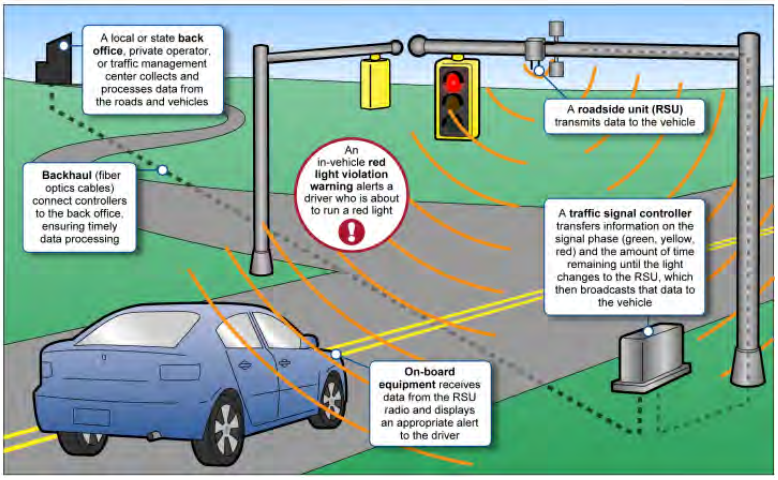
  V2I applications rely on data sent between vehicles and infrastructure to provide alerts and advice to drivers. For example, the Spot Weather Impact Warning application is designed to detect unsafe weather conditions, such as ice or fog, and notify the driver if reduced speed or if an alternative route is recommended. U.S. DOT is also investigating the development of V2I mobility and environmental applications. For example, the Eco-Approach and Departure at Signalized Intersections application alerts drivers of the most eco-friendly speed for approaching and departing signalized intersections to minimize stop-and- eco-speed harmonization, would provide speed limit advice to minimize congestion and maintain consistent speeds among vehicles in dedicated lanes.

V2I equipment may vary depending on the location and the type of application being used, although in general, V2I components in the connected vehicle environment include an array of roadside equipment (RSE) that transmits and receives messages with vehicles for the purpose of supporting V2I applications. For example a V2I equipped intersection, as shown in Figure 4.1, would include:

- Roadside units (RSU)—a device that operates from a fixed position and transmits data to vehicles. This typically refers to a DSRC radio, which is used for safety-critical applications that cannot tolerate interruption, although U.S. DOT has noted that other technologies may be used for non-safety-critical applications.

- A traffic signal controller that generates the Signal Phase and Timing (SPaT) message, which includes the signal phase (green, yellow, and red) and the minimum and maximum allowable time remaining for the phase for each approach lane to an intersection. The controller transfers that information to the RSU, which broadcasts the message to vehicles.
- A local or state back office, private operator, or traffic management center that collects and processes aggregated data from the roads and vehicles. As previously noted, these traffic management centers may use aggregated data that is collected from vehicles (speed, location, and trajectory) and stripped of identifying information to gain insights into congestion and road conditions as well.
- Communications links (such as fiber optic cables or wireless technologies) between roadside equipment and the local or state back office, private operator, or traffic management center. This is typically referred to as the "backhaul network."
- Support functions, such as underlying technologies and processes to ensure that the data being transmitted are secure.

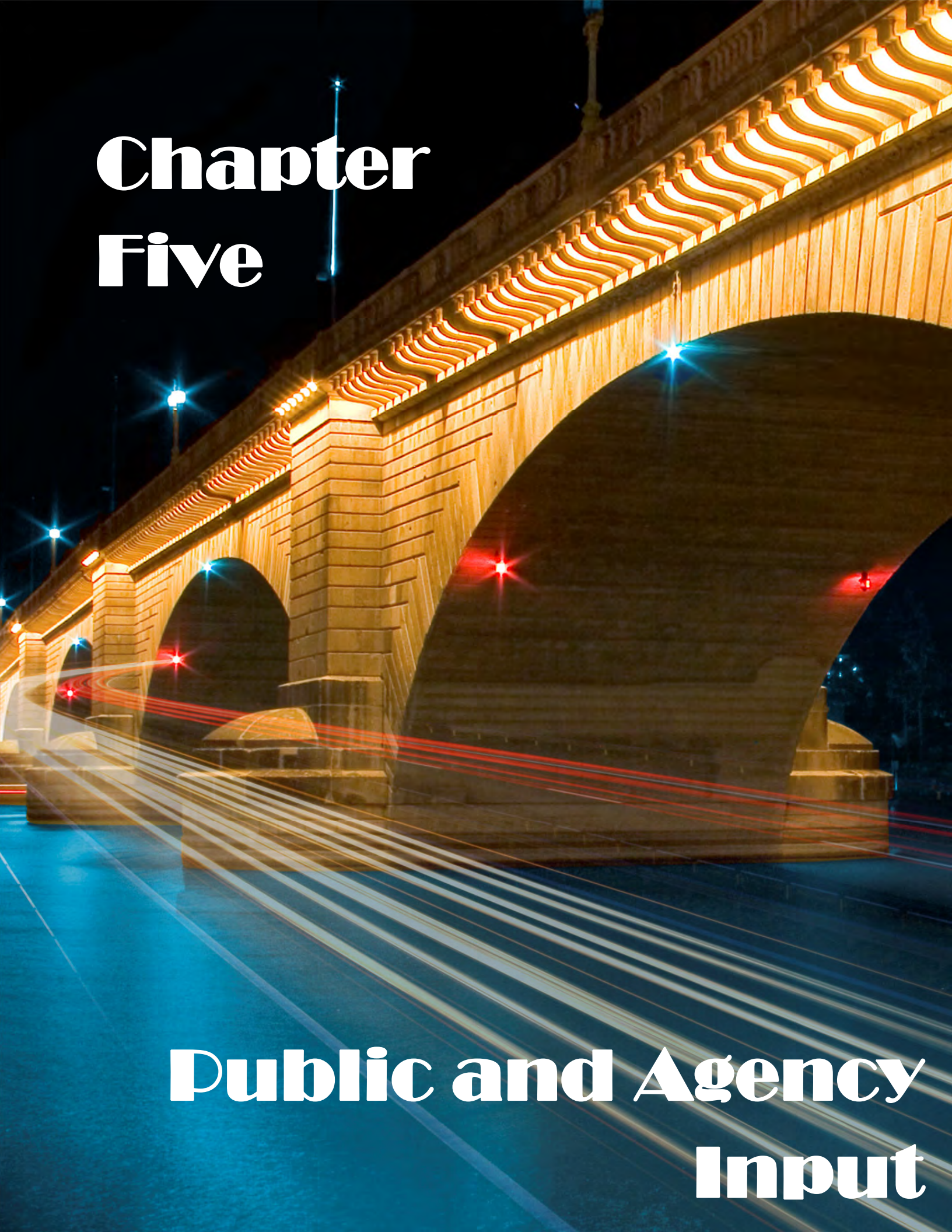
FIGURE 4.1: EXAMPLE OF V2I APPLICATION PROVIDED THROUGH ROADSIDE EQUIPMENT



The *2015 FHWA Vehicle to Infrastructure Deployment Guidance and Products Report* states that "MPO, Local Public Agencies (LPA), transit operators and States should begin considering V2I strategies in their long range planning. Discussion topics could include: a general understanding of the system, which applications options work well under what conditions, pros and cons of each option, capital costs and availability of funding, integration of the existing system including traffic management and communication networks, long term impacts, cooperation and coordination across MPO boundaries and across State boundaries, staff needs, and integration of these options into the existing Statewide or Regional ITS architecture."

For the LHMPO region, the opportunity is now to begin discussion about establishing a vision for how the region would like to embrace/integrate the new transportation technologies and take inventory of the available infrastructure.

Although U.S. DOT has explored connected technology that can coordinate travel patterns among cars, roads, and traffic infrastructure, autonomous vehicles can operate without these intelligent networks in place. Arizona HB 2679 contains regulation for operating an autonomous vehicle in the State.



Chapter Five

Public and Agency Input

5. PUBLIC AND AGENCY INPUT

Public outreach is essential to the broad acceptance and successful implementation of any transportation improvement plan from agencies and the public at large. The goal of community outreach is to educate stakeholders and the public about the study, provide opportunities for input, and to create a process to build consensus in support of the study recommendations. For this study three rounds of public meetings were conducted. Round 1 concentrated primarily on introducing and educating the public about the function and responsibilities of an MPO and to garner public sentiment on the goals and objectives guiding the study. Round 2 of the outreach focused on presenting current transportation issues, problem areas, and future needs. Round 3 focused on presenting improvement recommendations for the problem areas identified in the second round. This chapter presents public and stakeholders outreach efforts conducted and results obtained during the three rounds of public meetings.

PUBLIC INVOLVEMENT

Public involvement is the process of involving stakeholders and the public throughout the transportation planning process through meaningful communication with interested citizens. To ensure that transportation decisions reflect the public's best interests, public involvement is a critical component of the transportation planning process. To engage the public, the study work plan includes three public meetings to inform, discuss, and to seek input. Additionally, the LHMPO website was utilized to enable citizens and public agencies to access study documents and to submit comments or questions.

The purpose of the first public meeting was to introduce the public to the LHMPO, its functions and responsibilities, including the development of a regional transportation plan (RTP). It was also the opportunity to gather from the public perspective, transportation issues and concerns. The first meeting was held in Lake Havasu City on January 29, 2015, at two different times: 1:30 to 3:00 PM and 5:00 to 6:30 PM to provide more attendance flexibility to the public. A total of 26 community and agency members attended both meetings.

The meetings began with an overview of the purpose of the meeting, and then continued by explaining the LHMPO organization and responsibilities, the purpose of the RTP, why the study is needed and the study process. During the meeting the public was presented with general goals and priorities to be used in the development of the RTP and was asked to rank them in order of importance. Participants were encouraged to ask questions during the presentation and to discuss issues with study team members during the open discussion after the presentation. Key comments received during the meetings included:

- Need for North-South roadway connections
- Need for additional transit services
- Need for intersection improvements along SR 95 from Mulberry to Kiowa Blvd
- Need for more trails and multiuse paths to connect activity centers

Thirty (30) comment forms were received after the public meeting and Tables 5.1 and 5.2 present a summary of the public feedback regarding the goals and priorities of the study respectively.

TABLE 5.1: PRIMARY GOALS - PUBLIC FEEDBACK

Primary Goals	Rank
Preserve, make safe, and improve utilization of the existing transportation system.	Very Important
Plan, design, and implement a coordinated transportation system so that improvements are consistent with regional values.	Very Important
Involve the public.	Very Important
Enhance regional transportation mobility and accessibility.	Important
Review past transportation planning efforts.	Somewhat Important

TABLE 5.2: PRELIMINARY PRIORITIES - PUBLIC FEEDBACK

Priorities	Rank
Have a Livable and Sustainable Community	1
Increase Safety	2
Reduce Congestion	3
Bike and Pedestrian Facilities	4
Preserve Future Travel Corridors	5
Transit Service	6
Air Quality	7
Preserve the Current Transportation System	8

The purpose of the second round of public outreach was to seek input from the public regarding the existing and future deficiencies and needs of the area. The second public meeting provided interested residents with an overview of the current conditions and future deficiencies of the existing transportation system in the LHMPO area. The second public meeting took place on July 23, 2015 in Lake Havasu City. A total of 80 community and agency members attended the meeting, as shown in Figure 5.1.

The meeting began with a brief overview of the study, including the purpose of the study, why the study is needed, the study process, and the purpose of the meeting. An overview of the current and future socioeconomic conditions and a summary of roadway and multimodal deficiencies and needs, which were identified through technical data analysis and input from stakeholders and TAC members, was presented. During the meeting the public was presented with specific objectives to be used in the improvement development process and was asked to rank them in order of importance. After the presentation, participants were invited to make notes on the boards to identify areas they would like to see improvements. Participants were also encouraged to ask questions during the presentation and to discuss issues with study team members during the open discussion. Key comments received during the meetings included:

- Safety for cyclists. The cycling community was out in force at this meeting due to a fatal accident which occurred on July 1, 2015, along SR 95 just outside of the LHMPO southern boundary. The accident claimed the life of a husband and wife team which helped establish cycling as sport and leisure activity in Lake Havasu City and Mohave County.
- The cycling community provided a map reflecting a bike lanes network using existing roadways. Most improvements were consistent with the 1998 Lake Havasu City Bike Plan.
- Convert roadway shoulders to bicycle lanes.
- Provide motorist education about sharing roadways with bicyclists.
- Need for expanded current transit service hours and locations.
- Need for sidewalks so the public can walk safely.

FIGURE 5.1: PUBLIC MEETING # 2

Twenty-three (23) comment forms were received after the public meeting and Table 5.3 presents a summary of the public feedback regarding potential strategies to be used in the improvement development process.

TABLE 5.3: IMPROVEMENT STRATEGIES - PUBLIC FEEDBACK

Improvement Strategies	Rank
Create multimodal connections /facilities (sidewalks, bike paths/lanes, trails and transit service)	1
Invest in targeted safety improvements at high crash locations	2
Promote/plan for complete streets to have a livable and sustainable community	3
Repair, Maintain, and Replace aging bridges and pavement	4
Reduce congestion by optimizing the performance of the existing system	5
Reduce highway and street congestion by widening or building new roads	6
Improve multimodal access	7
Add traffic calming measures to address speeding on City roads	8

The purpose of the third round of public outreach was to seek input from the public regarding the proposed improvements for the LHMPO region. The third public meeting provided interested residents draft improvements option for roadways, pedestrians, bicycles and transit services. The third public meeting took place on October 22, 2015, in Lake Havasu City. A total of 18 community and agency members attended the meeting, as shown in Figure 5.2. For this meeting, an online interactive form was provided to the public to comment on the draft improvements plan.

The meeting began with a brief overview of the study, including the purpose of the study, the study process, and the purpose of the meeting. A brief overview of the future socioeconomic conditions and a summary of roadway and multimodal deficiencies and needs were given. A highlight of the public input from the previous public meetings was also presented together with the draft recommended improvements by mode for the mid- and long-term time frame. During the meeting the public was asked to participate by ranking the improvements on the provided handout or go to the LHMPO web site and fill out the form online. The public was also asked to encourage friends and colleagues to go online and fill out the form. After the presentation, participants were invited to make notes on the boards to agree or disagree with the identified improvements. Participants were also encouraged to ask questions during the presentation and to discuss issues with study team members during the open discussion. Key comments received during the meetings included:

- New sidewalks, bike lanes and trails are important to improve the safety of our community.

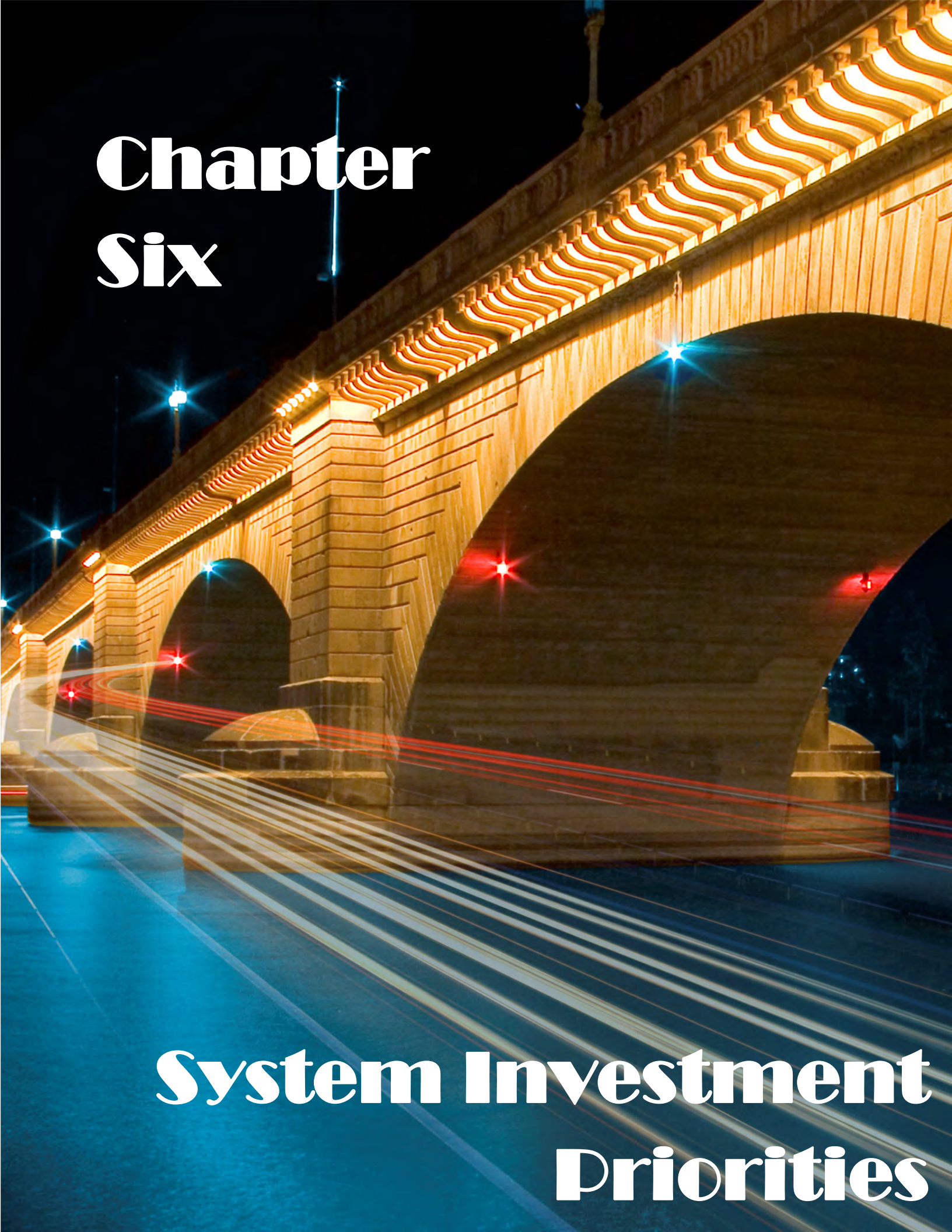
- Extend medical and shopping hours' transit service. Service 2-times a month to Walmart. Service for kids to the high school. Extend curb to curb transit service.
- Provide transit service to Walmart twice a month, movies, bus benches, door to door. Holidays, downtown, events downtown, park and ride to sports events and concerts, Saturday service.
- Time traffic lights between Palo Verde N. and Mulberry for better traffic flow! A main priority would be to do timing of the lights on SR - 95.

FIGURE 5.2: PUBLIC MEETING # 3

A total of eighty-one (81) written and on-line comments were submitted after this meeting. The overwhelming majority of the comments regarded transit services, pedestrian and bicycle facilities. A note on the many transit service comments received: there was an even split between proponents and opposition to additional transit service in the LHMPO region. These contrasting viewpoints make it very difficult to plan for or expand transit services as they are much dependent on local funding.

AGENCY INVOLVEMENT

To facilitate agency communication, the study team conducted meetings with the Technical Advisory Committee (TAC) which is comprised of agency representatives from ADOT MPD, ADOT Northwest District, Mohave County, Western Arizona Council of Governments (WACOG), FHWA, and the Lake Havasu City. TAC meetings were held at key milestones throughout the project and allowed agencies with vested interest in the project an opportunity to provide input and feedback on the study process, technical analysis and information presented to the public.



Chapter Six

System Investment Priorities

6. SYSTEM INVESTMENT PRIORITIES

This chapter presents the Regional Transportation Plan for the LHMPO planning area for the short (2015-2020), mid (2020-2025), and long-term (2025-2040) planning horizons. The improvements identified in this section are subject to further review and comment by agency stakeholders and the general public. It is expected that additional input received on the improvement recommendations may result in further refinement, as needed. Any revisions to the improvements will then be presented in the finalized transportation plan.

ROADWAY IMPROVEMENT PROGRAM

SHORT-TERM (2015-2020) IMPROVEMENTS

Developing the 2040 RTP is only the first step towards achieving the region's transportation vision and goals. However, achieving beneficial results is the true measure of success. The Transportation Improvement Program (TIP) is the LHMPO's primary project implementation tool since it is fully funded. The TIP is a four (4) year program outlining multimodal transportation improvements and services to be implemented within the metropolitan planning area. Projects must be placed in the MPO's TIP to receive federal funding. Table 6.1 presents the list of funded LHMPO TIP projects for this phase.

TABLE 6.1: LHMPO TIP PROJECTS AND FUNDING

Project Sponsor	Project Name	Federal Funds	Federal Source	Review Costs	Local Match	Total Cost
2015						
LHMPO	Safety Plan	$282,594	HSIP	$10,000	$17,686	$310,280
LHMPO/Lake Havasu City	Sign Project Ph. I,II,III,IV	$0		$30,000		$30,000
Total For 2015		$282,594		$40,000	$17,686	$340,280
2016						
LHMPO/ADOT	SR 95/Kiowa	$265,000	HSIP	$0	$0	$265,000
LHMPO/Lake Havasu City	Sign Project Phase II	$170,184	HSIP	$0	$0	$170,184
Friends of Fair/Mohave County	Horizon Six Equestrian Trail	$28,856	Recreational Trails Program	$0	$4,625	$33,480
Total For 2016		$498,040		$0	$4,625	$502,664
2017						
LHMPO/ADOT	SR 95/Kiowa	$376,040	HSIP	$0	$0	$376,040
LHMPO/Lake Havasu City	Sign Project Phase III	$92,616	HSIP	$0	$0	$92,616
LHMPO/ADOT	SR 95/Kiowa	$532,743	HSIP	$0	$0	$532,743
Total For 2017		$1,001,399		$0	$0	$1,001,399
2018						
LHMPO/Lake Havasu City	Sign Project Phase IV	$92,616	HSIP	$0	$0	$92,616
Total For 2018		$92,616		$0	$0	$92,616
TOTAL ALL YEARS		$1,874,648		$40,000	$22,310	$1,936,959

Additionally, Mohave County will construct a shoulder with bicycle lanes on London Bridge Rd from Chenoweth Dr to Fathom Dr. This project is currently in the Western Association Council of Governments (WACOG) TIP program for 2016.

Mid-Term (2020-2025) Improvements

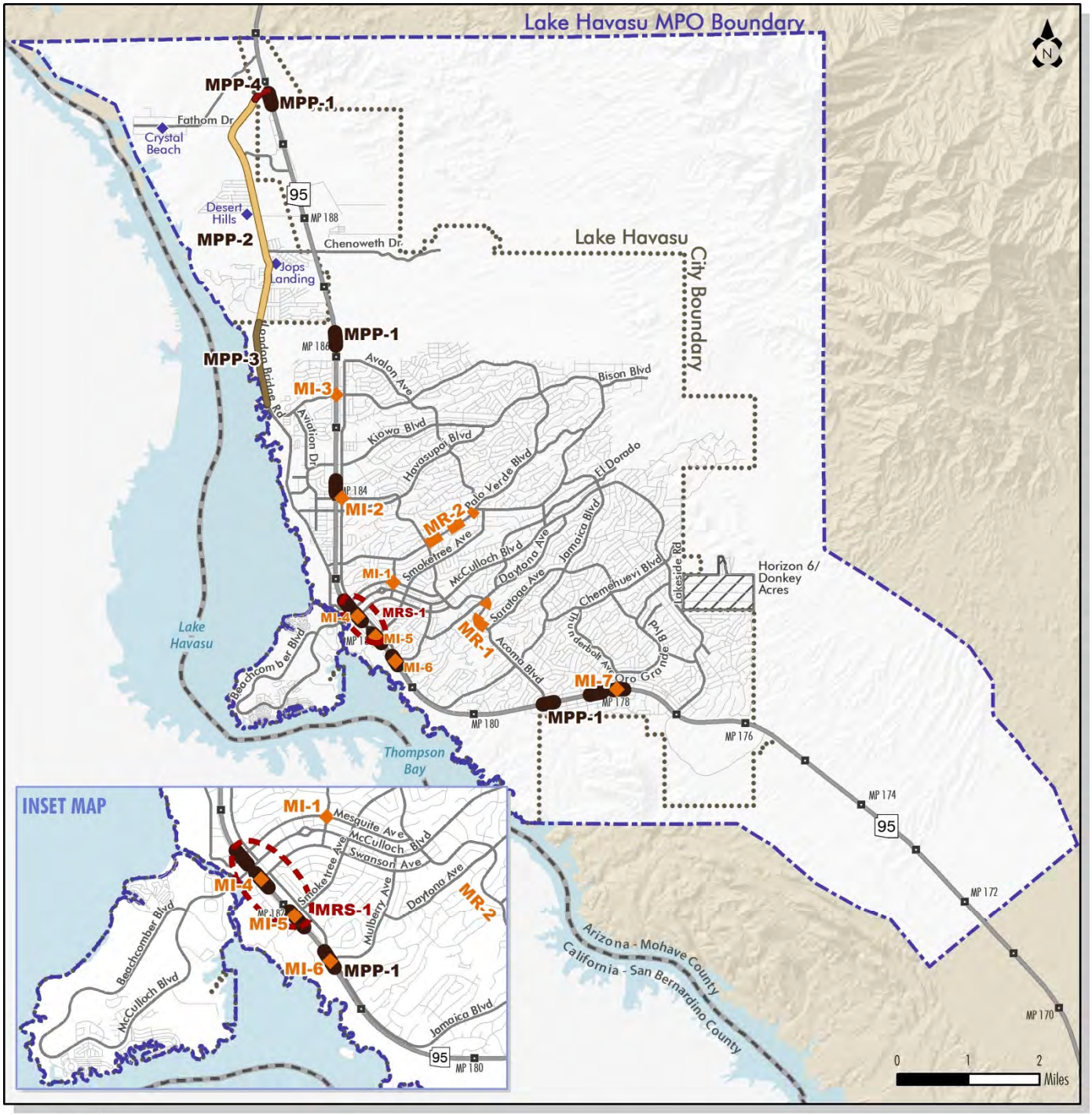
Mid-term phase projects are recommended to be completed as the study area reaches Year 2025. Table 6.2 and Figure 6.1 present a comprehensive list of the transportation recommendations for this phase, as well as the project number, location, and description for each project.

Each project is assigned a unique project number; project numbering does not necessarily represent the priority of the project but rather it is an identification number to track project progress. Unless otherwise noted, funding has not been secured for additional studies, design, purchase of right-of-way, or construction of any recommended project in this phase.

TABLE 6.2: MID-TERM RECOMMENDED ROADWAY PROJECTS

ID	Location	Project Description
	Roadway Widening	
	Lake Havasu City	
MR-1	Acoma Blvd S: Daytona Ave to Saratoga Ave	Widen road to 4-Lanes with a center turn lane
MR-2	Palo Verde Blvd S: Acoma Blvd N to Kiowa Blvd S	Widen road to 4-Lanes with a center turn lane
	Intersection Improvements	
	Lake Havasu City	
MI-1	Mesquite Ave and Riviera Dr	Conduct Roadway Safety Assessment and Implement Recommendations
MI-2	Lake Havasu Ave N and Acoma Blvd W	Conduct Roadway Safety Assessment
	Arizona Department of Transportation	
MI-3	SR-95 and Palo Verde Blvd N	Conduct Roadway Safety Assessment and Implement Recommendations
MI-4	SR-95 and Swanson Ave	Conduct Roadway Safety Assessment and Implement Recommendations
MI-5	SR-95 and Smoketree Ave	Conduct Roadway Safety Assessment and Implement Recommendations
MI-6	SR-95 and Mulberry Ave	Conduct Roadway Safety Assessment
MI-7	SR-95 and Oro Grande Blvd	Conduct Roadway Safety Assessment
	Pavement Preservation	
	Arizona Department of Transportation	
MPP-1	SR 95 MP 178 to MP 190 (Various Sections)	Major Pavement Rehabilitation
	Mohave County	
MPP-2	London Bridge Rd: Unincorporated County (City limits to City limits)	Pavement Rehabilitation
	Lake Havasu City	
MPP-3	London Bridge Rd: north of Sailing Hawks Dr to south of Arnold Palmer Dr	Pavement Rehabilitation
MPP-4	London Bridge Rd: west of Showplace Ave to SR-95	Pavement Rehabilitation
	Studies	
	LHMPO	
MRS-1	Lake Havasu Ave from Mesquite Ave to Mulberry Ave	Conduct traffic study

FIGURE 6.1: MID-TERM RECOMMENDED ROADWAY PROJECTS



Legend

Roadway Widening

- MR-1 Acoma Blvd S: Daytona Ave to Saratoga Ave
- MR-2 Palo Verde Blvd S: Acoma Blvd N to Kiowa Blvd S

Intersection Improvements

- MI-1 Mesquite Ave and Riviera Dr
- MI-2 Lake Havasu Ave N and Acoma Blvd W
- MI-3 SR-95 and Palo Verde Blvd N
- MI-4 SR-95 and Swanson Ave
- MI-5 SR-95 and Smoketree Ave
- MI-6 SR-95 and Mulberry Ave
- MI-7 SR-95 and Oro Grande Blvd

Pavement Preservation

- MPP-1 SR-95: MP 178 to MP 190
- MPP-2 London Bridge Rd: Unincorporated County (City limits to City limits)
- MPP-3 London Bridge Rd: north of Sailing Hawks Dr to south of Arnold Palmer Dr
- MPP-4 London Bridge Rd: west of Showplace Ave to SR-95

Studies

- MRS-1 Traffic Study: Lake Havasu Ave from Mesquite Ave to Smoketree Ave

Data Source: Lake Havasu City, Mohave County, Arizona Department of Transportation (ADOT), Arizona State Land Resource Information System (ALRIS)

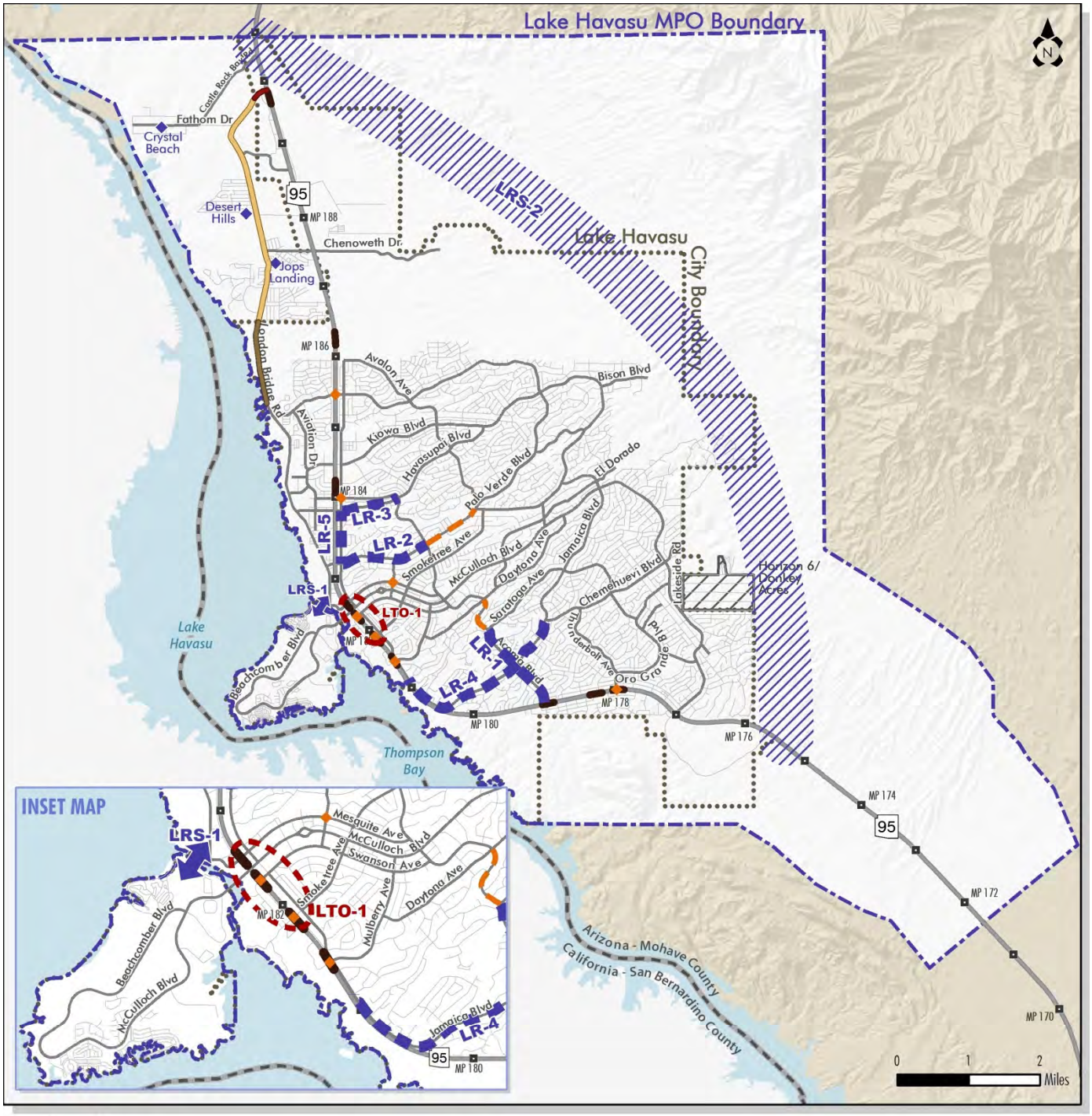
Long-Term (2025-2040) Improvements

Long-term phase projects are recommended to be completed as the study area reaches Year 2040. Table 6.3 and Figure 6.2 present a comprehensive list of the transportation recommendations for this phase, as well as the project number, location, and description for each project. Each project is assigned a unique project number; project numbering does not necessarily represent the priority of the project but rather it is an identification number to track project progress. Unless otherwise noted, funding has not been secured for additional studies, design, purchase of right-of-way, or construction of any recommended projects in this phase. As each project progresses into the concept and design phase, close coordination with the responsible agency should occur to assess if there are available funding. All federally funded projects are also subject to the National Environmental Policy Act (NEPA) process, which identifies projects potential environmental impacts and ensures that subsequent mitigation measures are addressed and implemented appropriately through construction.

TABLE 6.3: LONG-TERM RECOMMENDED ROADWAY PROJECTS

ID	Location	Project Description
	Roadway Widening	
	Lake Havasu City	
LR-1	Acoma Blvd S: Saratoga Ave to SR-95	Widen road to 4-Lanes with a center turn lane
LR-2	Palo Verde Blvd S: SR-95 to Acoma Blvd N	Widen road to 4-Lanes with a center turn lane
LR-3	Industrial Blvd: SR-95 to Acoma Blvd N	Widen road to 4-Lanes with a center turn lane
LR-4	Jamaica Blvd S: Lake Havasu Ave to Chemehuevi Blvd	Widen road to 4-Lanes with a center turn lane
LR-5	Lake Havasu Ave N: Palo Verde Blvd S to Industrial Blvd	Widen road to 4-Lanes with a center turn lane
	Traffic Operations Improvements	
	Lake Havasu City	
LTO-1	Lake Havasu Ave from Mesquite Ave to Mulberry Ave	Implement recommendations from traffic study
	Studies	
	Lake Havasu MPO	
LRS-1	Alternative Bridge Crossing to Island	Conduct feasibility study for 2nd Multimodal Bridge Crossing
	Arizona Department of Transportation	
LRS-2	SR-95 Realignment / Alternative Emergency Route	Conduct feasibility study for SR-95 realignment with potential interchanges at Bentley, Bison, Cherry Tree and Arizona Blvd

FIGURE 6.2: LONG-TERM RECOMMENDED ROADWAY PROJECTS



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Roadway Widening

- **LR-1** Acoma Blvd S: Saratoga Ave to SR-95
- **LR-2** Palo Verde Blvd S: SR-95 to Acoma Blvd N
- **LR-3** Industrial Blvd: SR-95 to Acoma Blvd N
- **LR-4** Lake Havasu Ave S/Jamaica Blvd S: Chip Dr to Chemehuevi Blvd
- **LR-5** Lake Havasu Ave N: Palo Verde Blvd S to Industrial Blvd

Traffic Operations Improvements

- **LTO-1** Lake Havasu Ave from Mesquite Ave to Smoketree Ave

Studies

- **LRS-1** Alternative Bridge Crossing to Island
- **LRS-2** SR-95 Realignment/Alternative Emergency Route

Data Source: Lake Havasu City, Mohave County, Arizona Department of Transportation (ADOT), Arizona State Land Resource Information System (ALRIS)

TRANSIT IMPROVEMENT PROGRAM

Small city transit helps connect people with the places they want to go. It opens up economic opportunities for local residents and businesses, enables students who do not own cars to get to school or college classes, and helps the elderly stay independent. It gives rural populations access to jobs, retail centers, health care and social services and transit enhances the quality of life and economic vitality of small cities and towns. However, the LHMPO region is faced with several challenges:

- LHMPO region has low density, an extensive street network, and activity centers that are spread out.
- There is not a large university or other major activity center to serve as a focal point for a transit network.
- State funding is no longer available for transit.
- The resulting transit network must also be affordable for riders and financially viable for the taxpayers. Transit service must be viable for riders to meet community's needs and to build adequate ridership. It must take riders where they want to go, when they need to travel.

With the community at large divided on transit service and the scarce availability of funds, proactive steps, which are fiscally nominal, can still be taken to enhance this transportation mode. Table 6.4 displays actions that could be taken, when funding becomes available to address the needs of the transit dependent community.

TABLE 6.4: MID-TERM RECOMMENDED TRANSIT ACTIONS

Location	Actions
Lake Havasu City	
Lake Havasu MPO Region	Establish ride share services and van pool services for commuters (with park-and-rides)
Lake Havasu MPO Region	Provide comprehensive information to community about transportation service options
Lake Havasu MPO Region	Identify potential regional routes
Lake Havasu MPO Region	Build partnerships with other transportation providers in the region
Lake Havasu MPO Region	Investigate options for regional transit management, working with Bullhead City and Kingman, for joint operations
Lake Havasu City	Provide current transportation service to the same constituents (demand response service to the elderly, disable and low income population) but with: • longer hours of service (7 am to 7 pm) • ability to reliably reserve rides the day before service is needed

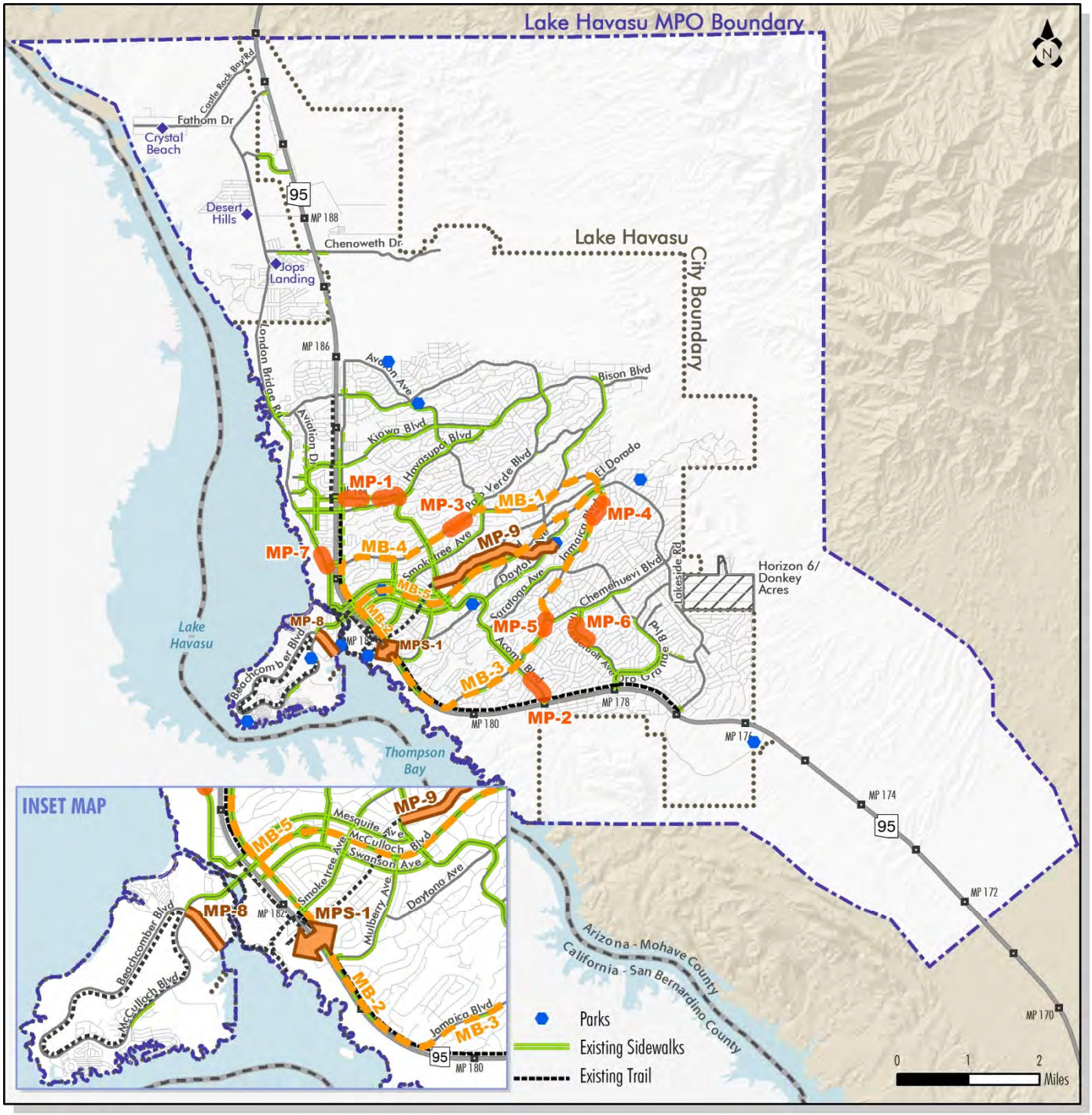
PEDESTRIAN, TRAIL, AND BICYCLE IMPROVEMENT PROGRAM

Existing pedestrian and trail facilities were reviewed in relation to: the location of activity centers such as schools, retail establishments, medical facilities, recreation centers; residential community developments; and existing roadway alignments. Analyzing the study area's existing pedestrian and trail facilities helped to identify locations that would benefit from these amenities and that would be closely integrated with the area's roadway system while maintaining pedestrian safety. The prioritization of the pedestrian, bike, and trail improvement projects is based on the facilities spatial relationship to schools and major activity centers, as well as input from the TAC, stakeholders, and the public. Figure 7.3 and 7.4 provides an illustration of recommended improvements for the mid- and long- terms respectively, while Table 6.5 and Table 6.6 summarize the improvements location and agency responsibility.

TABLE 6.5: MID-TERM RECOMMENDED PEDESTRIAN AND BICYCLE PROJECTS

ID	Location	Project Description
	Pedestrian Improvements	
	Lake Havasu City	
MP-1	Acoma Blvd W: Lake Havasu Ave N to Havasupai Blvd	Build Sidewalk
MP-2	Acoma Blvd S: Paso Dr to Tonto Dr	Build Sidewalk
MP-3	Palo Verde Blvd S: Hummingbird Dr to Starlite Ln	Build Sidewalk
MP-4	Jamaica Blvd S: Monte Carlo Ave to Tahiti Ln	Build Sidewalk
MP-5	Jamaica Blvd S: Power Dr to Chemehuevi Blvd	Build Sidewalk
MP-6	Thunderbolt Ave: Roanoke Dr to Broken Arrow Dr	Build Sidewalk
MP-7	London Bridge Rd: Alley 22 to Palo Verde Blvd S	Build Sidewalk
MP-8	New Trail on the Island	Construct new trail
MP-9	El Dorado Wash Trail Extension	Construct new trail
	Bicycle Improvements	
	Lake Havasu City	
MB-1	Kiowa Blvd S: Jamaica Blvd N to Palo Verde Blvd S	Re-stripe road for bicycle lanes
MB-2	Lake Havasu Ave: Palo Verde Blvd S to Jamaica Blvd S	Re-stripe road for bicycle lanes
MB-3	Jamaica Blvd S: Lake Havasu Ave to Kiowa Blvd S	Re-stripe road for bicycle lanes
MB-4	Palo Verde Blvd S: Kiowa Blvd N to Lake Havasu Ave N	Re-stripe road for bicycle lanes
MB-5	McCulloch Blvd N: SR-95 to Jamaica Blvd	Re-stripe road for bicycle lanes
	Studies	
	Arizona Department of Transportation	
MPS-1	SR-95 and Pima Wash Trail/Aquatic Center	Conduct pedestrian crossing study

FIGURE 6.3: MID-TERM RECOMMENDED PEDESTRIAN AND BICYCLE PROJECTS



Legend

Pedestrian Improvements-Sidewalks

- **MP-1** Acoma Blvd W: Lake Havasu Ave N to Havasupai Blvd
- **MP-2** Acoma Blvd S: Paso Dr to Tonto Dr
- **MP-3** Palo Verde Blvd S: Hummingbird Dr to Starlite Ln
- **MP-4** Jamaica Blvd S: Monte Carlo Ave to Tahiti Ln
- **MP-5** Jamaica Blvd S: Power Dr to Chemehuevi Blvd
- **MP-6** Thunderbolt Ave: Roanoke Dr to Broken Arrown Dr
- **MP-7** London Bridge Rd: Alley 22 to Palo Verde Blvd S

Pedestrian Improvements-Trails

- **MP-8** New Trail on the Island
- **MP-9** El Dorado Wash Trail Extension

Studies

- **MPS-1** SR-95 and Pima Wash Trail/ Aquatic Center

Bicycle Improvements

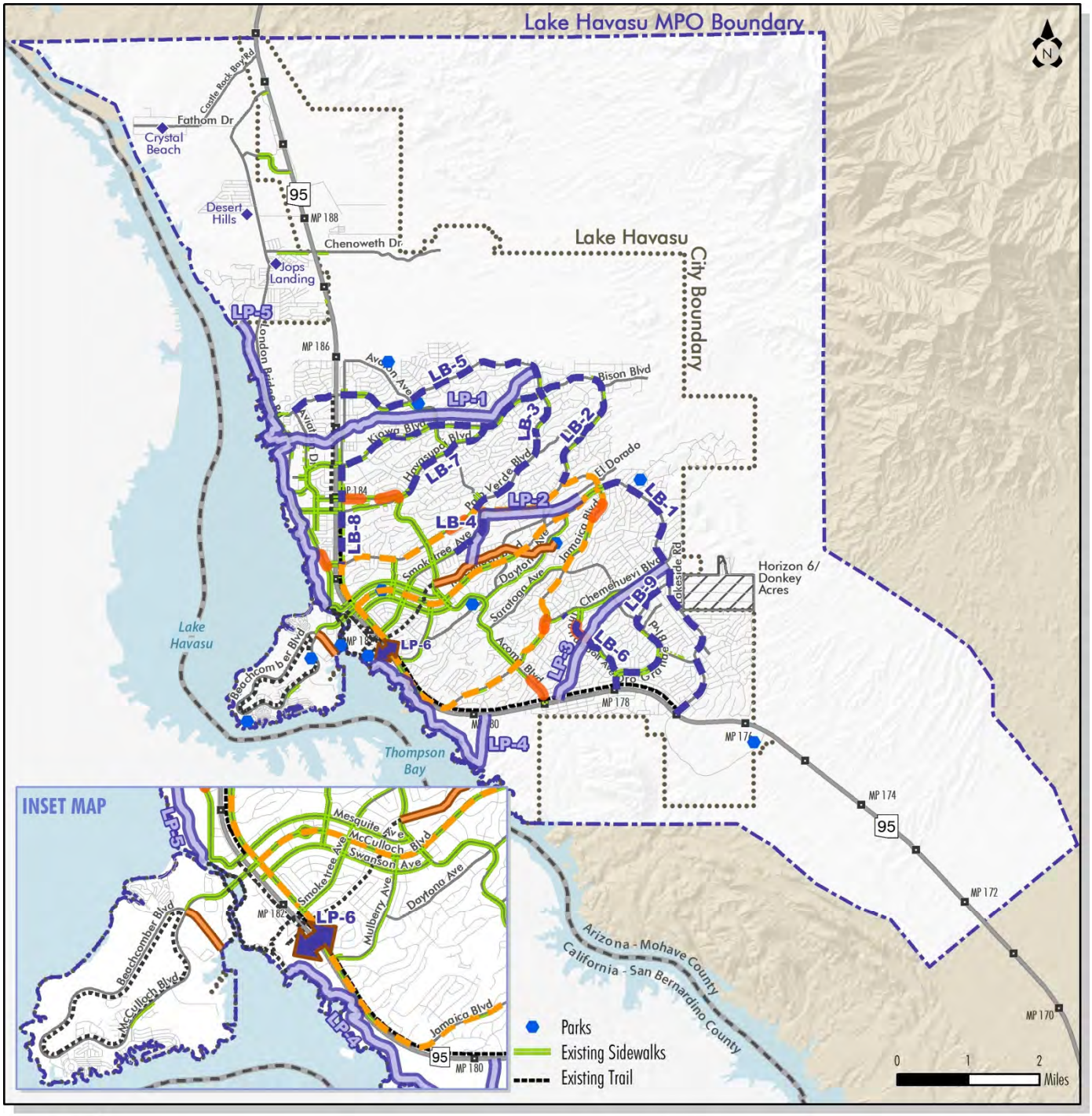
- **MB-1** Kiowa Blvd S: Jamaica Blvd N to Palo Verde Blvd S
- **MB-2** Lake Havasu Ave: Palo Verde Blvd S to Jamaica Blvd S
- **MB-3** Jamaica Blvd S: Lake Havasu Ave to Kiowa Blvd S
- **MB-4** Palo Verde Blvd S: Kiowa Blvd N to Lake Havasu Ave N
- **MB-5** McCulloch Blvd N: SR-95 to Jamaica Blvd

Data Source: Lake Havasu City, Mohave County, Arizona Department of Transportation (ADOT), Arizona State Land Resource Information System (ALRIS)

TABLE 6.6: LONG-TERM RECOMMENDED PEDESTRIAN AND BICYCLE PROJECTS

ID	Location	Project Description
	Pedestrian Improvements	
	Lake Havasu City	
LP-1	Havasupai Wash Trail: Palo Verde Blvd N to Lake Shore Trail (north)	Construct new trail
LP-2	El Dorado Wash Trail: Pima Wash Trail to Powerline Trail (align)	Construct new trail
LP-3	Chemehuevi Wash Trail: McCulloch Blvd N to SR-95	Construct new trail
LP-4	Lake Shore Trail (south): Rotary Park to SR-95	Construct new trail
LP-5	Lake Shore Trail (north): City Limits to Shoreline Promenade	Construct new trail
	Arizona Department of Transportation	
LP-6	SR-95 and Pima Wash Trail/Aquatic Center	Implement study findings
	Bicycle Improvements	
	Lake Havasu City	
LB-1	McCulloch Blvd S: Jamaica Blvd to SR-95	Re-stripe road for bicycle lanes
LB-2	Kiowa Blvd N: Jamaica Blvd to Lake Havasu Ave N	Re-stripe road for bicycle lanes
LB-3	Palo Verde Blvd S: Kiowa Blvd S to Kiowa Blvd N	Re-stripe road for bicycle lanes
LB-4	Smoketree Ave N: Pima Dr to Kiowa Blvd S	Re-stripe road for bicycle lanes
LB-5	Palo Verde Blvd N: Aviation Dr to N. Kiowa Blvd N	Re-stripe road for bicycle lanes
LB-6	Thunderbolt Ave: Chemehuevi Blvd to Oro Grande Blvd	Re-stripe road for bicycle lanes
LB-7	Havasupai Blvd: Acoma Blvd N to Kiowa Blvd N	Re-stripe road for bicycle lanes
LB-8	Lake Havasu Ave N: Kiowa Blvd N to Palo Verde Blvd S	Re-stripe road for bicycle lanes
LB-9	Oro Grande Blvd: SR-95 to McCulloch Blvd S	Re-stripe road for bicycle lanes

FIGURE 6.4: LONG-TERM RECOMMENDED PEDESTRIAN AND BICYCLE PROJECTS



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Pedestrian Improvements-Trails

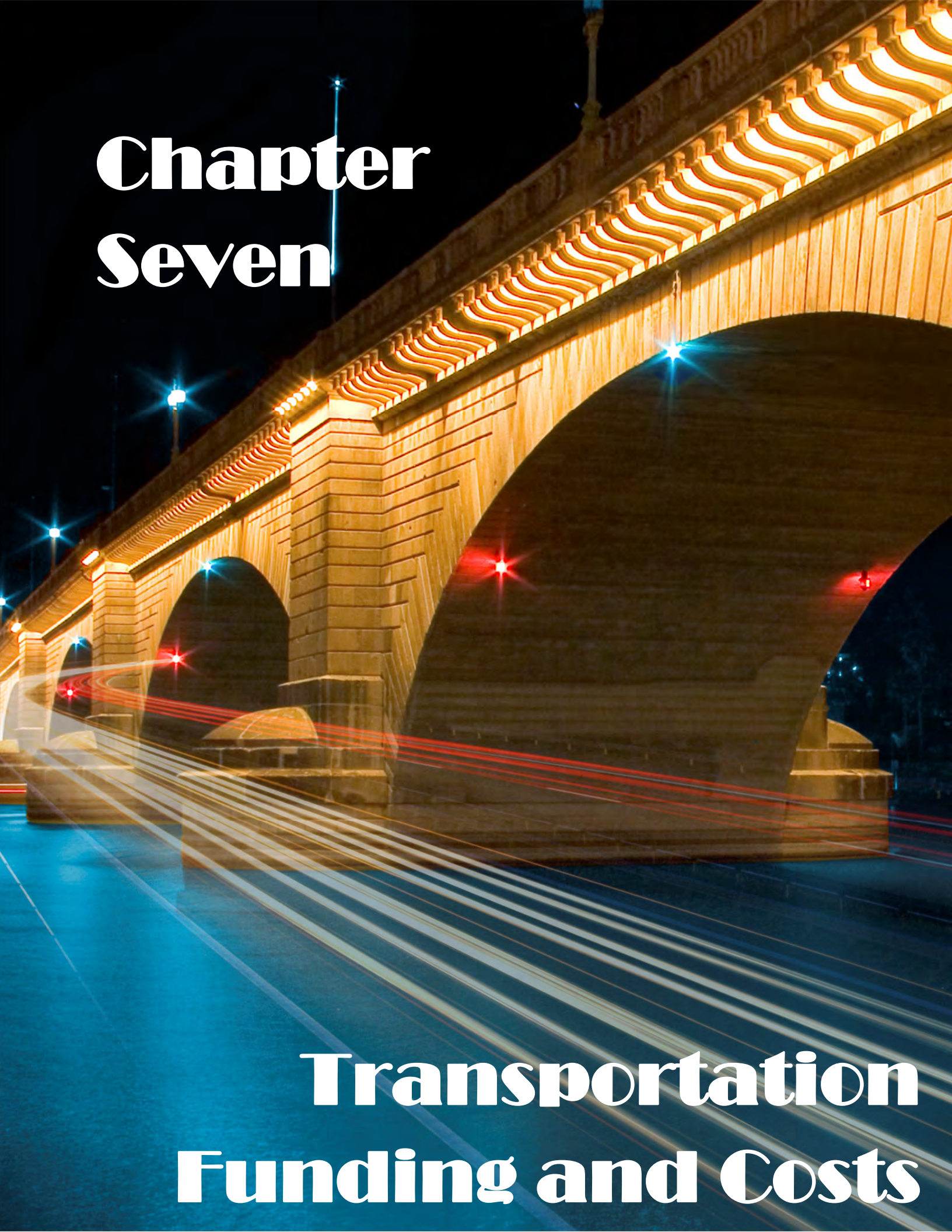
- LP-1 Havasupai Wash Trail: Palo Verde Blvd N to Lake Shore Trail (north)
- LP-2 El Dorado Wash Trail: Pima Wash Trail to Powerline Trail (align)
- LP-3 Chemehuevi Wash Trail: McCulloch Blvd N to SR-95
- LP-4 Lake Shore Trail (south): Rotary Park to SR-95
- LP-5 Lake Shore Trail (north): City Limits to Shoreline Promenade

Pedestrian Improvements-Crossing

- LP-6 SR-95 and Pima Wash Trail/ Aquatic Center

Re-stripe Road for Bicycle Lanes

- LB-1 McCulloch Blvd S: Jamaica Blvd to SR-95
- LB-2 Kiowa Blvd N: Jamaica Blvd to Lake Havasu Ave N
- LB-3 Palo Verde Blvd S: Kiowa Blvd S to Kiowa Blvd N
- LB-4 Smoketree Ave N: Pima Dr to Kiowa Blvd S
- LB-5 Palo Verde Blvd N: Aviation Dr to Kiowa Blvd N
- LB-6 Thunderbolt Ave: Chemehuevi Blvd to Oro Grande Blvd
- LB-7 Havasupai Blvd: Acoma Blvd N to Kiowa Blvd N
- LB-8 Lake Havasu Ave N: Kiowa Blvd N to Palo Verde Blvd S
- LB-9 Oro Grande Blvd: SR-95 to McCulloch Blvd S



Chapter Seven

Transportation Funding and Costs

7. TRANSPORTATION FUNDING AND COSTS

Financial resources are needed to have a safe and efficient transportation system, build new transportation facilities and operate and maintain both the existing and future facilities. There are three major sources of public funding for transportation: federal, state, and local. Federal funds are primarily derived from the gas tax, which is currently unchanged since the early 1990's at 18.4 cents per gallon. Federal formulas distribute these funds to the individual states and to qualified jurisdictions. The State also receives revenues dedicated to transportation uses from fuel taxes, large truck taxes and vehicle licenses. The State gas tax currently is set at 18 cents per gallon (unchanged since 1991). Local sources of funds may include development impact fees, construction sales taxes or a general sales tax. Local jurisdictions also may contribute general funds for transportation, and/or request exactions from developers to offset the cost of transportation improvements that directly serve the proposed residential or commercial land use.

FEDERAL FUNDS

Federal funding for transportation is authorized through a transportation bill which sets upper limits on funding by categories for both highways and transit facilities. Revenues to support Federal spending on transportation stem from the Highway Trust Fund—which is supported by a national fuel tax (18.4 cents per gallon on gasoline and 24.4 cents per gallon on diesel fuel). On December 4, 2015, President Obama signed into law the Fixing America's Surface Transportation Act, or "FAST Act". The FAST Act authorizes $305 billion over fiscal years 2016 through 2020 for highway, transit and railway programs. Of that, $233 billion is for highways, $49 billion is for transit and $10 billion is dedicated to federal passenger rail. The FAST Act is comprised of six formula programs where eligibility must be established before receiving funds. Additionally, states must provide support for transportation planning and research functions by setting aside 2% of their apportioned amount from four of these programs into the State Planning and Research (SPR) Fund. *SRP funds are used primarily for the MPO operational planning activities. Any surplus can be used for planning projects only.*

National Highway Performance Program (NHPP) - provides support for the condition and performance of the National Highway System (NHS), for the construction of new facilities on the NHS, and to ensure that investments of Federal-aid funds in highway construction are directed to support progress toward the achievement of performance targets established in a State's asset management plan for the NHS. (2% set-aside for SPR program)

Surface Transportation Block Grant Program (STBG) – is the new name for the Surface Transportation Program (STP). This program has the most flexible eligibilities among all Federal-aid highway programs and promotes flexibility in State and local transportation decisions by providing flexible funding to best address State and local transportation needs. The STBG program funds a broad range of surface transportation capital needs including roads, transit, airport access, vanpool, and bicycle and pedestrian facilities. Transit related planning, research, and development activities are also eligible uses of STBG funds. The MAP-21 Transportation Alternatives Program (TAP) is now a set-aside of Surface Transportation Block Grant (STBG) program funding for transportation alternatives (TA). These set-aside funds include all projects

and activities that were previously eligible under TAP, encompassing a variety of smaller-scale transportation projects such as pedestrian and bicycle facilities, recreational trails, safe routes to school projects, community improvements such as historic preservation and vegetation management. (2% set-aside for SPR program)

Highway Safety Improvement Program (HSIP) – provides funding to achieve a significant reduction in traffic fatalities and serious injuries on all public roads, including non-State-owned public roads and roads on tribal lands. The HSIP requires a data-driven, strategic approach to improving highway safety on all public roads that focuses on performance. The FAST Act limits HSIP eligibility to infrastructure-safety related improvements only. (2% set-aside for SPR program)

Congestion Mitigation and Air Quality Improvement Program (CMAQ) - provides a flexible funding source to State and local governments for transportation projects and programs to help meet the requirements of the Clean Air Act. Funding is available to reduce congestion and improve air quality for areas that do not meet the National Ambient Air Quality Standards for ozone, carbon monoxide, or particulate matter (nonattainment areas) and for former nonattainment areas that are now in compliance (maintenance areas). (2% set-aside for SPR program)

Metropolitan Planning Program - establishes a cooperative, continuous, and comprehensive framework for making transportation investment decisions in metropolitan areas. Program oversight is a joint Federal Highway Administration/Federal Transit Administration responsibility. The FAST Act continues to require metropolitan transportation plans and transportation improvement programs (TIPs) to provide for facilities that enable an intermodal transportation system, including pedestrian and bicycle facilities. It adds to this list other facilities that support intercity transportation (including intercity buses, intercity bus facilities, and commuter vanpool providers). The FAST Act also requires that the metropolitan long-range plan include identification of public transportation facilities and intercity bus facilities.

National Highway Freight Program (NHFP) – is a newly established program to improve the efficient movement of freight on the National Highway Freight Network (NHFN) by investing in infrastructure and operational improvements that strengthen economic competitiveness, reduce congestion, reduce the cost of freight transportation, improve reliability, and increase productivity.

As the federal designated MPO, LHMPO receives (FHWA) funds that are made available to LHMPO member agencies for transportation projects. In addition to STBG funds, LHMPO can receive HSIP funding for safety projects, SPR funding to conduct planning activities and other FHWA programs, if qualifying. For the most part, federal funds must be used on federally designated roads. (A portion of the STBG may be exchanged for transit funding).

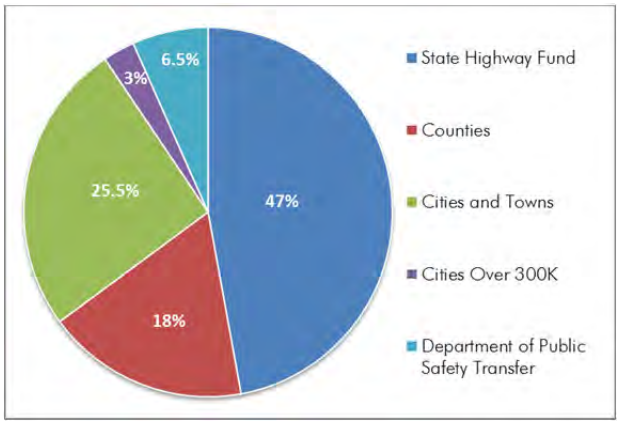
STATE FUNDS

State Highway User Revenue Fund (HURF)

The State of Arizona taxes motor fuels and collects a variety of fees relating to the registration and operation of motor vehicles in the state. These collections include gasoline and use fuel taxes, motor carrier fees, vehicle license taxes, motor vehicle registration fees, and other miscellaneous fees. These revenues are the primary source of funds available to Towns, Cities, Counties and

regional transportation organization such as LHMPO and WACOG throughout the State, to be used for the repair and maintenance of roadways. Figure 7.1 displays the HURF distributions for fiscal year 2015.

FIGURE 7.1: 2015 HURF DISTRIBUTIONS



The entire Mohave County apportionment of the HURF funds in FY 2015 was $11, 543,436.75 with Lake Havasu City receiving $4,531,910.

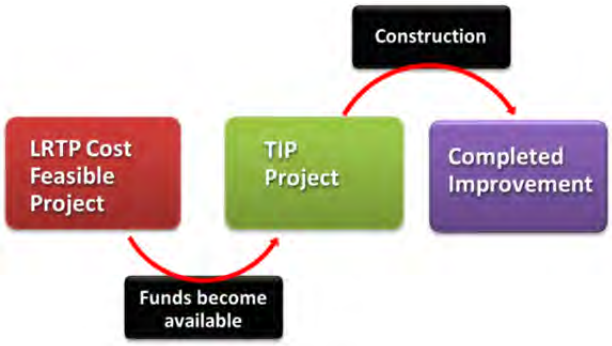
LOCAL FUNDS

Lake Havasu City and Mohave County do not have a dedicated tax for transportation improvements, however they allocate a portion of their budget to the maintenance of transportation infrastructure and transportation projects if needed and fiscally feasible.

FORECASTED REVENUES

Some revenue sources, such as gas tax, are more stable than other sources of revenue, like construction sales tax or lottery revenues. However, even the gas tax has become less reliable as vehicle become more efficient and/or shift to alternative fuels. The variability of some of the revenue sources, along with the unpredictability of long-term economic forecasts and population growth make long-term financial forecasts difficult to prepare. However, these financial forecasts help to match revenues with transportation needs and potential projects in both the short and long term. The revenue forecast provides the total estimated revenue projected to be available to LHMPO for the 21 years beyond the Transportation Improvement Plan (TIP).

The TIP is a 5-year financial program that describes the schedule for obligating federal funds to state and local projects. The TIP contains funding information for all modes of transportation and is consistent with the priority projects identified in the RTP. Major projects that eventually get programmed into the TIP generally begin as ideas many years earlier, sometimes decades earlier and included in the adopted RTP, which covers a 20-25 year time span.



While estimated completion timeframes are given for projects in the plan, it should be noted that the TIP represents an agency's intent to construct or implement a specific project and the anticipated flow of federal funds and matching state or local contributions.

LHMPO receives $302,770 in STBG funds and $125,000 in SPR funds annually. However, due to scarce funding, transportation planning agencies in the state resorts to loaning each other their apportionment of the STBG funds, or a portion of it, to move projects forward. In fiscal years 2016 to 2021 LHMPO has obligated funds to WACOG, therefore no STBG funds for the region are available until fiscal year 2021. Since HSIP funds, administered by ADOT, will be distributed

on a competitive basis beginning FY 2019, it will be impossible to forecast HSIP revenues past the TIP timeframe, which currently is FY 2016-2020. Also, with the passing of the FAST Act, there is a potential for an increase in the funds distribution to states and MPOs, however that information will not be available for some time. For this revenue estimation, no increase of STBG funds and no HSIP funds are included for the 2021-2040 timeframe. The resulting estimated revenue available for the 2015-2040 planning horizon is presented in Table 7.1.

TABLE 7.1: ESTIMATED REVENUES

Years	STBG Funds	HSIP Funds	SPR Funds	HURF
2016-2020	0	$519,767	TBD	TBD
2021-2025	$1,513,850		TBD	TBD
2026-2030	$1,513,850		TBD	TBD
2031-2035	$1,513,850		TBD	TBD
2036-2040	$1,513,850		TBD	TBD
TOTAL	$6,055,400	$519,767	TBD	TBD

COST ESTIMATES

Planning level project costs were determined for all projects identified in the plan to assess their financial feasibility and gather an order of magnitude of the financial investment needed to develop the 2040 RTP. For capital improvements, the planning level costs were determined based on available data provided by the Lake Havasu City and listed in Table 7.2. The planning level cost only includes the cost of constructing upgrading the facility and does not include right-of-way-costs or operation and maintenance costs.

However, it must be noted that the cost to operate and maintain transportation system improvements are often an expensive part of a project and should be estimated for all proposed future facilities. Since the funding level and projects for the LHMPO region for the next five years have already been established, it is suggested that the O&M cost be included in the update of the plan which will be in five years, as mandated by FHWA

TABLE 7.2: PLANNING LEVEL IMPROVEMENT UNIT COSTS IN 2015 DOLLARS

Improvement Type	Unit	Cost
Pavement Rehabilitation		
Chip Seal	One lane-mile	$25,000
Overlay	One lane-mile	$150,000
Roadway Widening	One lane-mile	$1,000,000
Sidewalk	One lane-mile, one side	$150,000
Bike Lane Striping & Signage	One lane-mile, both sides	$25,000
Trail		
Urban Multiuse Path	One lane-mile	$150,000
Nature Trail	Minimum (cost will increase based on drainage and slope)	$20,000
Conduct Roadway Safety Audit (RSA)	One Study	$40,000

A note regarding the unit costs. At times, economy of scale allows for cost saving. For instance if two or three RSAs are conducted concurrently, the price per unit can decrease. The same can be said for roadway paving projects if their phasing is adjusted to bundle various projects together.

The total LHMPO multimodal transportation system planning level cost, based on the 2040 LRTP proposed recommendations, through the year 2040, have been roughly estimated at $24,077,000 dollars, as shown in Table 7.3.

TABLE 7.3: ESTIMATED 2040 RTP PLANNING LEVEL COSTS

Improvement Types	ESTIMATED COSTS Short (Funded) 2016- 2020	Mid 2021-2025	Long 2026-2040
Roadway			
Pavement Preservation		$2,625,000	
Roadway Widening		$2,739,000	$12,740,000
Intersection Improvements (SR 95 and Kiowa)	$1,173,800		
Intersection RSAs		$320,000	
Studies - Roadway			
Lake Havasu Ave – Mesquite Ave to Smoketree Ave Circulation Study		$80,000	
Alternative Bridge Crossing to Island			$80,000
SR-95 Realignment/Alternative Emergency Route Feasibility Study			$400,000
Pedestrian			
Build Sidewalks (filling in gaps)		$420,000	
Construct Multiuse Path (New)		$350,000	$2,059,000
Construct Nature Trails (New)			$77,000
Bicycles			
Re-stripe road for bicycle lanes		$374,000	$589,000
Studies - Multimodal			
SR-95 and Pima Wash Trail/Aquatic Center Pedestrian Crossing Feasibility Study		$50,000	
TOTAL	$1,173,800	$6,958,000	$15,945,000

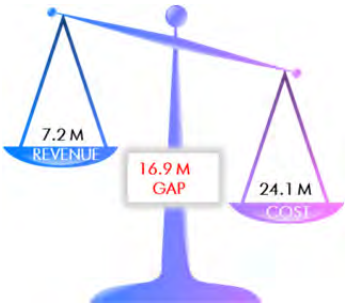
As Figure 7.2 show, the 2040 RTP allocates approximately 80% of the plan needed funds to roadway improvements consisting of pavement preservation and roadway widening; 12% to pedestrian improvements consisting of sidewalks and multiuse paths; 4 % to bicycle improvement consisting of restriping roadway shoulders with bicycle lanes and appropriate signage; and 4% to various studies needed to determine the detailed improvements to enhance safety and mobility in the region.

FIGURE 7.2 COST BY MODE DISTRIBUTION

Since an RTP must be fiscally constrained, most of the projects from 2021 to 2040 are currently unfunded and are usually called "reserve projects". As funding becomes available projects can move into the TIP, using the established evaluation criteria, and be programmed for implementation.

ALTERNATIVE FUNDING STRATEGIES

State and Federal revenues allocated by formula will not be sufficient to fund a systematic program of constructing multimodal transportation projects and providing congestion relief in the LHMPO region. Therefore, the LHMPO and local jurisdictions may need to explore alternative funding measures to supplement existing revenue streams in order to close the funding gap of 16.9 million dollars.



Historically in the LHMPO region support for developer impact fees and higher gas taxes has been negative, even though these are among the most effective strategies to increase transportation funds. Several new funding sources may be considered and are outlined below. However, a mix of funding strategies may be more palatable to the region as it does not focus the burden on one revenue source.

LOCAL OPTION SALES TAX

Local governments may elect to adopt a general-purpose sales tax to fund transportation improvements. This has been a popular option in many other communities in the state and most recently in the Flagstaff MPO region where the City of Flagstaff and Coconino County passed a 1/3 % road maintenance sales tax (33 cents on a $100 purchase) to repair, improve and service county and city maintained roads.

The revenue stream should grow in proportion to population growth, and will keep pace with inflation because the tax is a set percentage of the price of goods sold, except groceries. Sales taxes provide a revenue source that allows visitors and seasonal residents to contribute towards the LHMPO transportation system providing their travel needs to visit recreational sites or other locations.

FEDERAL, STATE, AND REGIONAL GRANTS

Local funds can be leveraged or partnerships formed with federal, state and regional agencies to obtain funding for transportation studies, plans or projects. Often competitive, these grants require the submittal of applications and staff support to implement once received. Although staff typically looks to transportation agencies for these funds there are other sources that allow for transportation improvements to be included in broader grant applications (e.g. CDBG/Housing or CDC/Health or Az. Game & Fish Landowner Relations Program). Tracking opportunities, being able to take advantage quickly of available funding, and having adequate staffing to successfully implement awarded funds are key to supplementing the LHMPO transportation budget for desired projects.

The website WWW.GRANTS.GOV is the first stop when looking for grants opportunities from a variety of federal programs. Although the LHMPO can apply for some funding, many of these opportunities must be initiated by the local jurisdictions, interest groups or other recognized entities eligible to apply for the grants.

SPECIAL DISTRICTS

Arizona Statute authorizes the creation of special taxing districts. Generally, special districts are authorized to levy taxes or assessments on the general public, usually in the form of taxes or assessments on property, and may borrow money to finance their operation, secured by their general taxing power, and are governed by elected boards of directors. Special districts are exempt from the Arizona debt limitations on counties and municipalities. Roadway and Maintenance Districts is one financial tool that the LHMPO residents can use to finance desired improvements or enhanced maintenance activities in their area.

CONSTRUCTION/CONTRACTING SALES TAX

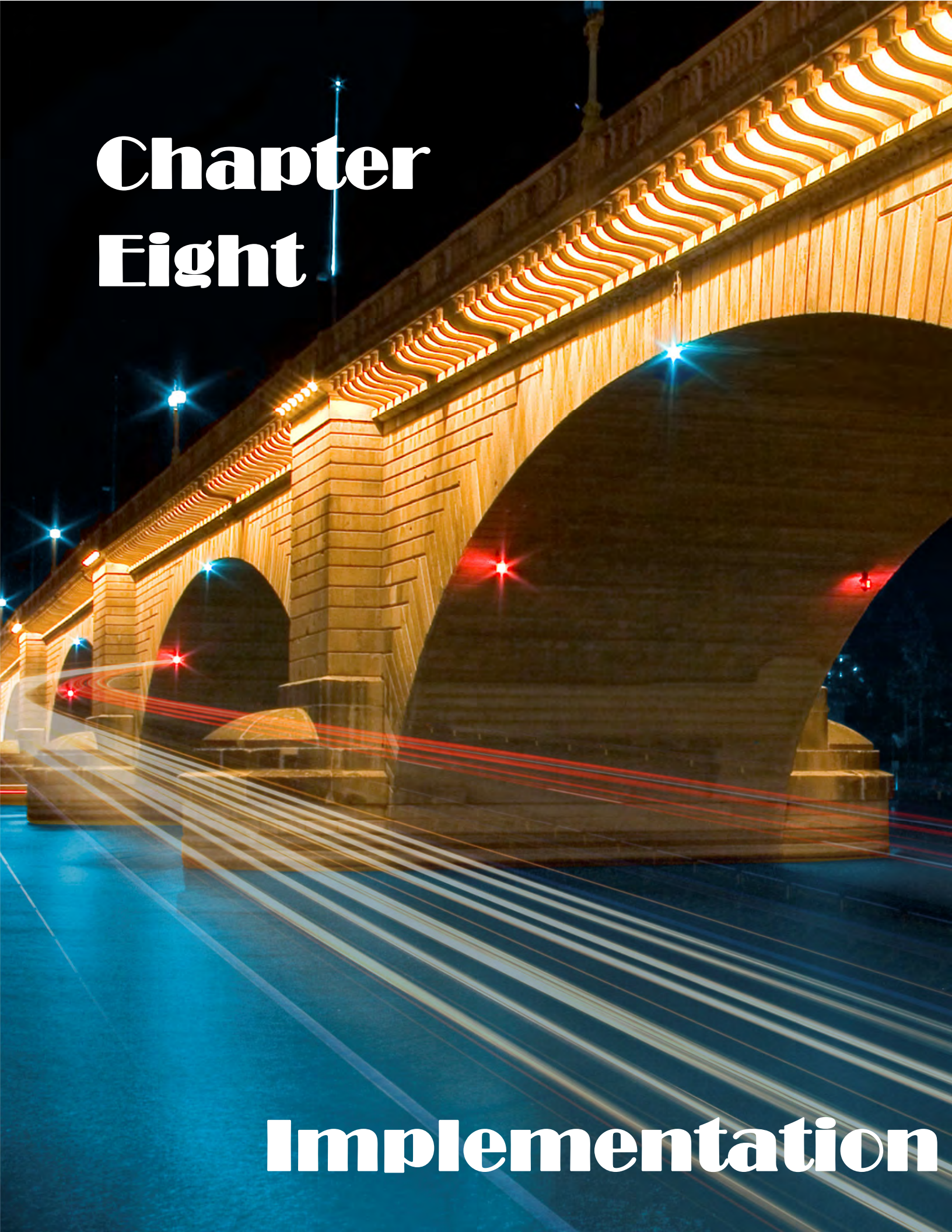
When new housing stagnates there typically is more activity in the remodel and home repairs. The rationale is that there is a direct correlation between housing size/value and vehicle trips generated onto the roadway network. These funds serve as excellent match sources for both roadway and drainage projects.

PRIVATE FUNDING

Some new projects could be identified that will only be implemented if private funds are available. These projects are associated with new developments and are needed should those developments come to fruition within the horizon year of this plan. Historically, off-site improvements have been identified by submitted Traffic Impact Analysis reports and constructed by the applicants. Other sources of private funding include non-profit grants: private organizations that offer innovative ways to provide transportation infrastructure. Some agencies in Arizona have been successful at obtaining such grants from organizations like the Heritage Foundation and the Walton Foundation.

Public Private Partnerships (P3s), agreements between a public agency and a private group, are a growing resource as an innovative way to finance transportation projects. P3s provide greater private-sector involvement to deliver the design, construction, financing, operation and maintenance of transportation improvements as compared to traditional design-bid-build procurements. The transfer of risk including revenue return for which the private sector assumes responsibility differs from project to project.

P3 options can be categorized as: design-build, design-build-finance, design-build-operate-maintain, design-build-finance-operate-maintain, asset monetization concessions, and build-own-operate. Each of these models has somewhat different implications on the interface between the planning and environmental approval processes and the development of P3 procurements.



Chapter Eight

Implementation

8. IMPLEMENTATION

It is recommended that attention be given to identifying alternative funding sources, careful evaluation of the feasibility of projects, garnering public support for critical projects, evaluation of the economic impact of projects, and investigation of phased implementation of improvements in order to implement this plan.

The execution of the implementation steps identified in this chapter may need to be phased and will be subject to a variety of factors that will determine their timing. Some of these factors include:

- The availability of the personnel and financial resources necessary to implement the specific steps necessary to move a project from planning to programming.
- The interdependence of the various implementation items, in particular, the degree to which implementing one item is dependent on the successful completion of another item.
- The relative severity of the problem which a particular implementation item is designed to remedy.

It is vital to the success of this plan that local municipalities continue to work with and educate local citizens and businesses. While public support can encourage implementation, opposition can significantly delay a project.

A PLAN OF ACTION

Upon adoption of the plan, the following action items can be used to implement the recommendations of the *LHMPO 2040 Regional Transportation Plan*. Where possible, early implementation will take advantage of momentum gained during this planning process.

- Use the LHMPO Technical Advisory Committee to prioritize projects and identify projects from this RTP to be included in the next TIP.
- Request inclusion of high-priority projects in the next update of the ADOT State Transportation Improvement Program (STIP).
- Use Citizens Advisory Committees to encourage and educate the public, and aide in the implementation of this plan.
- Coordinate with the development review processes of each MPO jurisdiction to integrate recommended street, bike, and pedestrian networks to create a multimodal interconnected network.

PLANNING ELEMENTS' CONSIDERATIONS

Community's Vision and Plans and Policies - An important relationship exists between the community's vision for the LHMPO region and the plans, policies, and actions that ensure this vision becomes a functional reality. Often, there is an understanding that the desired future is directly related to the types of transportation investments that will be made. Hence public understanding and support of the plan recommendations goes a long way in securing a favorable outcome when new funding sources proposals are discussed to bring this plan to fruition.

Humans and Natural Environments - It is essential that the LHMPO region consider its irreplaceable natural resources when evaluating the impact of changes to its transportation system. It is inevitable that some projects will have an impact on the human and natural environments, but early screening of potential impacts of transportation projects will help to identify how to mitigate or avoid significant impacts that result from

construction, pre-mature implementation, and development activities and reduce unnecessary delays and expenses throughout the implementation of the project.

Land Use and Transportation - The relationship between land use and transportation is also very important. How land use changes directly impacts the demand on the transportation system. Adherence to the long-range land use plans for the member jurisdictions is key to controlling the demands placed on the transportation system.

RECOMMENDATIONS

The following recommendations are presented throughout the RTP and are important to the successful fulfillment of the plan's goals.

LAND USE INTEGRATION RECOMMENDATIONS

- Continue to support local initiatives that result in a more efficient, safe, and livable transportation system (street connectivity, bicycles and pedestrian system enhancements, smart growth, etc.).
- Reinvest in existing infrastructure and promote infill development or redevelopment instead of sprawl out from the core of the community.
- Seek state and federal funding support of activities to improve the quality of development and protect human health and the environment.

ROADWAY RECOMMENDATIONS

Roadway recommendations presented in Chapter 6 – Transportation Strategies of the plan include a variety of strategies aimed at reducing congestion and improving safety. With the number of projects identified and limited funds available for their implementation, project selection is very important. Re-evaluate the roadway improvement ranking based on the latest available data, the criteria developed in Chapter 5 and the available funds.

SAFETY RECOMMENDATIONS

Specific best practices to resolve safety related problems will vary based on the facility type and location. Based on the safety analysis conducted in this study, roadway safety assessment studies are recommended for the intersections identified in the RTP exhibiting fatal crashes and incapacitating injuries crashes. It must be noted that LHMPO is also currently conducting a Regional Strategic Transportation Safety Plan, which could further refine or supersede the recommendations made in this document. Also seek the Federal funds identified within the FAST ACT for addressing safety problems.

The need also exists for better sharing of safety data between the local and state agencies. Liability issues that potentially exist with this information would need to be resolved, but the sharing of this data in a useable format would allow the LHMPO to better identify locations for safety improvements within its boundary.

ACCESS MANAGEMENT RECOMMENDATIONS

The recommendations for access management can be implemented both with new developments and on existing roadways. In both cases, when properly applied access management can improve roadway safety for all modes of transportation and reduce congestion. The following items are a sample of the access management recommendations that can be employed:

- Shared Use Driveways – reduce the number of conflict points, making the roadway safer for all modes of transportation
- Improve On-Site Circulation – prevents internal circulation and congestion problems

from affecting operations on the street. Conduct the circulation study for Lake Havasu Avenue from Mesquite Ave to Smoketree Ave.

- Driveway Spacing – by keeping driveways as far from street intersections as possible and by spreading the access points as far apart as possible, the number of conflict points are reduced and access is allowed to occur in locations of reduced congestion.
- Medians – improve traffic flow and make the roads safer by reducing the number of conflict points and by making the conflicts that occur less severe. Medians also help to reduce delays and provide a place of refuge for pedestrians. Properly landscaped medians will improve corridor aesthetics.
- Intelligent Transportation Systems (ITS) – an approach designed to use technology and the application of traffic management and operations methods to improve the efficiency of a transportation network. The region can proactively address existing congestion by implementing an advanced traffic signal control systems to improve the efficiency of SR 95 by optimizing traffic signal timings to acceptable operating conditions without making physical changes to the roadway network. Begin developing a unified vision for the integration of emerging technologies.

BICYCLE AND PEDESTRIAN RECOMMENDATIONS

A proposed on-street bicycle network should be built based on the recommendations of the LHMPO RTP which is reflective of the Bicycle and Pedestrian Plan for the Lake Havasu City and Mohave County. The routes identified in the bicycle and pedestrian plan should be implemented to provide a bicycle network that makes the best use of available street widths for bicycle commuting routes.

Throughout the region, it is recommended that pedestrian facilities provided along arterial roadways be separated from the roadway with landscape areas, if possible, or other high quality buffers. This separation provides the pedestrian with a buffer that creates a safer walking environment. At a minimum explore potential signage options to heighten the driver's attention to a bicycle lane on the same roadway.

Trails, which include multimodal paths as well as nature trails also has been identified in the LHMPO RTP along washes and other natural features. It is recommended that funding continue to be pursued to allow the development of more trails in the region. These trails not only provide recreational facilities, they also provide a venue for resident to reach a workplace or a school and help to preserve ecologically sensitive areas. Pedestrian and bicycle facilities should be coordinated to provide interconnection of these facilities.

It's an issue of making sure that when someone's only or best option to get to work is a bike, that they have the option to ride it," he said. "When the president talks about ladders of opportunity, that's what he's talking about. Because sometimes that ladder might be a bike path to a new job, or a new school." *Transportation Secretary Anthony Foxx, March 2014*

TRANSIT RECOMMENDATIONS

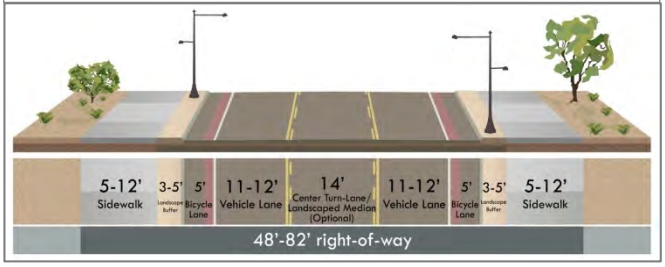
Successful transit systems open economic opportunities for local residents and businesses, enable residents without access to a transportation mode, link neighboring destinations, and generally enhance the quality of life of residents and the economic vitality of the community they serve. While there are community members in the LHMPO region who recognize the need for individuals to have access to transit services, especially the elderly and disabled, there is not a prevailing sense that more transit services are needed at this time. Rather, it appears that the combination of private taxis, family and friends, and Havasu Mobility provide the sense that the needs of current residents are generally met. The region's major challenge has been the unavailability of matching funds needed to utilize the various Federal Transit Administration (FTA) programs.

However, transit services should be monitored and reviewed on a yearly basis to ensure the needs of the transportation dependent population are met; comprehensive information to the community should be provided about transportation service options; and a discussion should begin about options for a regional transit management authority with Bullhead and Kingman to provide transportation options for the commuting public. With the FAST Act, transit funding has received a big boost and the LHMPO member agencies should explore how they can capitalize on this opportunity.

COMPLETE STREETS

The LHMPO member agencies should be proactive and identify policies to implement complete streets. Complete streets is a term used nationally to describe the transformation of vehicle-dominated thoroughfares in urban and suburban areas into community-oriented streets that safely and conveniently accommodate all modes of travel, not just motorists. It is important that the roadway cross-sections reflect the concepts of complete streets in the appropriate context of the area. There is no one size fits all design for complete streets. While the ultimate goal is to design a street that is convenient and safe for all users, every complete street's design evolves from a process of evaluating a number of factors (some possibly competing) that influence the ultimate design of the street. Designing complete streets often requires balancing user needs and prioritizing the design elements and emphasizing the higher-priority elements of the communities' vision.

Sample Complete Street Cross-Section



PERFORMANCE MEASURES

Potential performance measures were identified in Chapter 4. Since documentation of the impacts of implemented projects is becoming more important, a system to identify, collect, record, and analyze the data should be implemented. To initiate this process, the following recommendations should be considered:

- Review the potential performance measures identified in Chapter 4 with the member jurisdictions and agencies.
- Identify the data sources currently available that will help to establish a base line to measure the success of the Plan.

- Determine the performance measures that can be implemented using the existing available data.
- Determine the performance measures that can be implemented by the collection or sharing of data that is readily available.
- Establish a regional protocol for the collection and sharing of the data.

  Refine the establish performance measurement criteria to be used in the project selection processes for future TIP and RTP projects and establish performance targets, when possible. If the data is not available or not sufficient, review the trends generated by the improvements and ascertain if they are reflective of the LHMPO regional goals and objectives.